Public Summary: **Final Record of Decision for Parcel G, Hunters Point Shipyard, San Francisco, California, February 18, 2009**

The Department of Navy (Navy) has prepared this final record of decision (ROD) to address remaining contamination at Parcel G at Hunters Point Shipyard in San Francisco, California. The remedial action selected in this ROD is necessary to protect the public health, welfare, and the environment from actual or potential releases of contaminants from the site. The selected remedial action for Parcel G addresses metals (arsenic, lead, and manganese) and polycyclic aromatic hydrocarbons (PAH) in soil, volatile organic compound (VOC) vapors and several metals (chromium VI and nickel) from groundwater in the A-aquifer, and radionuclides in structures (such as buildings) and in soil.

The Navy considered the following remedial alternatives for contaminants in soil: (1) no action; (2) institutional controls (IC) and maintained landscaping; (3) ICs, limited excavation and off-site disposal; (4) ICs and covers; and (5) a combination of ICs, covers, excavation and disposal. The Navy considered the following remedial alternatives for contaminants in groundwater: (1) no action; (2) long-term monitoring and ICs; (3) *in situ* treatment of VOCs using biological compounds or zero-valent iron, monitoring and ICs; and (4) *in situ* treatment of VOCs and metals using biological compounds or zero-valent iron, monitoring and ICs. The Navy considered the following remedial alternatives for radiologically impacted soil or structures: (1) no action; and (2) surveying radiologically impacted areas that may include structures and former building sites, decontaminating (and demolishing if necessary) buildings, excavating storm drain and sanitary sewer lines and soils in impacted areas, and screening, separating, and disposing of radioactive sources and contaminated excavated soil at an off-site low-level radioactive waste facility. The Selected Remedy for Parcel G is Alternative S-5 (excavation, disposal, covers, and ICs) for soil; Alternative GW-4A&B (treatment, monitoring, and ICs) for groundwater; and Alternative R-2 (survey, decontamination, excavation, disposal, and release) for radiologically impacted structures and soil.

Information Repositories: A complete copy of the "Final Record of Decision for Parcel G" dated February 18, 2009, is available to community members at:

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

Anna E. Waden Bayview Library
5075 Third Street
San Francisco, CA 94124
Phone: (415) 355-5757

The report is also available to community members on request to the Navy. For more information about environmental investigation and cleanup at Hunters Point Shipyard, contact Sarah Koppel, remedial project manager for the Navy, at:

Sarah Koppel
Department of the Navy
Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, CA 92108-4310
Phone: (619) 532-0962
Fax: (619) 532-0995
E-mail: sarah.koppel@navy.mil

Final

Record of Decision for Parcel G

Hunters Point Shipyard
San Francisco, California

February 18, 2009

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

Prepared under:
Naval Facilities Engineering Command
Contract Number N62473-07-D-3213
Contract Task Order 030

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS iii

1. DECLARATION 1
   - 1.1 SELECTED REMEDY 2
   - 1.2 DATA CERTIFICATION CHECKLIST 2
   - 1.3 AUTHORIZING SIGNATURES 4

2. DECISION SUMMARY 5
   - 2.1 SITE DESCRIPTION AND HISTORY 5
   - 2.2 SITE CHARACTERISTICS 10
   - 2.3 PREVIOUS INVESTIGATIONS 10
   - 2.4 CURRENT AND POTENTIAL FUTURE SITE USES 19
   - 2.5 SUMMARY OF SITE RISKS 19
     - 2.5.1 Human Health Risk Assessment 21
     - 2.5.2 Ecological Risk Assessment 23
     - 2.5.3 Basis for Response Action 24
   - 2.6 PRINCIPAL THREAT WASTE 28
   - 2.7 REMEDIAL ACTION OBJECTIVES 28
   - 2.8 DESCRIPTION AND EVALUATION OF REMEDIAL ALTERNATIVES 29
     - 2.8.1 Description of Remedial Alternatives 31
     - 2.8.2 Comparative Analysis of Alternatives 31
   - 2.9 SELECTED REMEDY 41
     - 2.9.1 Rationale for Selected Remedy 41
     - 2.9.2 Description of Selected Remedy 41
     - 2.9.3 Expected Outcomes of the Selected Remedy 46
     - 2.9.4 Statutory Determinations 47
   - 2.10 COMMUNITY PARTICIPATION 48

3. RESPONSIVENESS SUMMARY 49

Attachments

1 Applicable or Relevant and Appropriate Requirements

2 Responsiveness Summary

3 References (Reference documents provided on CD only)

4 Administrative Record (Administrative Record provided on CD only)

LIST OF FIGURES

1 Facility Location Map with the Original Boundary of Parcel D 6

2 Parcel G Location Map 7

3 Reuse Areas and Associated Redevelopment Blocks 8

4 IR Sites 9

5 Parcel G Site Features 11

6 Chemicals in Soil above Remedial Goals 16

7 Chemicals in Groundwater above Remedial Goals 17

8 Radiologically Impacted Areas 18

9 Conceptual Site Model 20

10 Planned Excavation Areas and Stockpiles 26

11 Planned Groundwater Remediation Areas 27

LIST OF TABLES

1 Previous Investigations and Removal Actions 12

2 Cancer Risks and Noncancer Hazards 22

3 Chemicals of Concern in Soil and Groundwater Requiring a Response Action 25

4 Remediation Goals for Soil and Groundwater 30

5 Remediation Goals for Radionuclides 31

6 Remedial Alternatives 32

7 Relative Ranking of Remedial Alternatives 37

ACRONYMS AND ABBREVIATIONS

§	Section
µg/L	Microgram per liter
ARAR	Applicable or relevant and appropriate requirement
ARIC	Area requiring institutional controls
bgs	Below ground surface
CDPH	California Department of Public Health
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm	Centimeter
COC	Chemical of concern
CSM	Conceptual site model
dpm	Dose per minute
DTSC	Department of Toxic Substances Control
ELCR	Excess lifetime cancer risk
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
FS	Feasibility study
GRA	General response action
HHRA	Human health risk assessment
HI	Hazard index
HPS	Hunters Point Shipyard
IC	Institutional control
LUC RD	Land use control remedial design
mg/kg	Milligram per kilogram
NCP	National Contingency Plan
NPL	National Priorities List
NRDL	Naval Radiological Defense Laboratory
O&M	Operation and maintenance

pCi/g	Picocuries per gram
pCi/L	Picocuries per liter
PA	Preliminary assessment
PAH	Polycyclic aromatic hydrocarbon
PCE	Tetrachloroethene
RAB	Restoration Advisory Board
RACR	Removal action completion report
RAO	Remedial action objective
RD	Remedial design
RI	Remedial investigation
RME	Reasonable maximum exposure
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SI	Site inspection
SVE	Soil vapor extraction
TCE	Trichloroethene
TCRA	Time-critical removal action
TRC	Technical review committee
VOC	Volatile organic compound
Water Board	San Francisco Bay Regional Water Quality Control Board
ZVI	Zero-valent iron

1. DECLARATION

This Record of Decision (ROD) presents the Selected Remedy for Parcel G at Hunters Point Shipyard (HPS) in San Francisco, California. HPS was placed on the National Priorities List (NPL) in 1989 (U.S. Environmental Protection Agency [EPA] ID: CA71170090087). The remedy was selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 (Title 42 *United States Code* Section (§) 9601, et seq.), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (Title 40 *Code of Federal Regulations* [CFR] Part 300). This decision is based on information contained in the Administrative Record[1] (Attachment 4) for the site. Information not specifically summarized in this ROD or its references but contained in the Administrative Record has been considered and is relevant to the selection of the remedy at Parcel G. Thus, the ROD is based on and relies on the entire Administrative Record file in making the decision.

The Department of the Navy and EPA jointly selected the remedy for Parcel G and the California EPA's Department of Toxic Substances Control (DTSC) and the San Francisco Bay Regional Water Quality Control Board (Water Board) concur on the remedy for Parcel G. The Navy provides funding for site cleanups at HPS. The Federal Facility Agreement (FFA) for HPS documents how the Navy intends to meet and implement CERCLA in partnership with EPA, DTSC, and the Water Board.

Parcel D is one of six parcels (Parcels A through F) originally designated for environmental restoration. The Navy has divided the former Parcel D into four new parcels: Parcel G, Parcel D-1, Parcel D-2, and Parcel UC-1. Although previous documents focused on the overall Parcel D, referenced information from these documents are also relevant for Parcel G. Long-term uses in specified areas within Parcel G include educational/cultural use, mixed use, open space, and industrial reuse. Environmental investigations began at Parcel D, including Parcel G, in 1988. A Final Remedial Investigation (RI) Report was completed in 1997, and a Revised Final Feasibility Study (FS) Report was completed in 2007. This ROD documents the final remedial action for Parcel G and does not include or affect any other sites at the facility.

[1] **Bold blue text** identifies detailed site information available in the Administrative Record and listed in the References Table (Attachment 3). This ROD is also available on CD whereby **bold blue text** serves as a hyperlink to reference information. The excerpts referenced by the hyperlinks are part of the ROD. The hyperlink will open a text box at the top of the screen. A blue box surrounds applicable information in the hyperlink. To the extent there may be any inconsistencies between the referenced information attached to the ROD via hyperlinks and the information in the basic ROD itself, the language in the basic ROD controls.

1.1 SELECTED REMEDY

The CERCLA remedial action selected in this ROD is necessary to protect the public health, welfare, and the environment from actual or potential releases of contaminants from the site. The selected remedial action for Parcel G addresses metals (arsenic, lead, and manganese) and polycyclic aromatic hydrocarbons (PAH) in soil, volatile organic compound (VOC) vapors and several metals (chromium VI and nickel) from groundwater in the A-aquifer, and radionuclides in structures (such as buildings) and in soil. The remedy consists of excavation and off-site disposal, durable covers, and institutional controls (IC) to address soil contamination; treatment of VOCs with biological substrate or zero-valent iron (ZVI), groundwater monitoring, and ICs to address groundwater contamination; and surveying, decontaminating, and removing radiologically impacted structures and soil.

The selected remedial action is protective of human health and the environment, complies with federal and state statutes and regulations that are applicable or relevant and appropriate to the remedial action, and is cost-effective. The selected remedial action uses permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable and satisfies the statutory preference for remedies employing treatment that reduces the toxicity, mobility, or volume of hazardous substances, pollutants or contaminants as a principal element. A statutory review will be conducted within 5 years after the initiation of remedial action to ensure that the remedy is protective of human health and the environment.

1.2 DATA CERTIFICATION CHECKLIST

The following information is included in Section 2 of this ROD. Additional information can be found in the Administrative Record file for this site:

- Chemicals of concern (COC) and their concentrations (Sections 2.3 and 2.5).
- Baseline risk represented by the COCs (Section 2.5).
- Remediation goals established for COCs and the basis for these goals (Sections 2.5 and 2.7).
- Principal threat wastes (Section 2.6).
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater (Section 2.4).
- Potential land and groundwater use that will be available at the site as a result of the selected remedy (Section 2.9.3).

- Estimated capital costs, annual operation and maintenance (O&M), and total present-worth costs; discount rate; and the number of years over which the remedy cost estimate is projected (Table 6).

- Key factors that led to selecting the remedy (for example, a description of how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) (Section 2.9.1).

If contamination posing an unacceptable risk to human health or the environment is discovered after execution of this ROD, the Navy will undertake all necessary actions to ensure continued protection of human health and the environment.

1.3 AUTHORIZING SIGNATURES

This signature sheet documents the Navy's and EPA's co-selection of the remedy in this ROD. This signature sheet also documents the State of California's (DTSC and Water Board) concurrence with this ROD.

2/05/09

Mr. Keith S. Forman
Base Realignment and Closure Environmental Coordinator
Base Realignment and Closure Program Management
Office West
Department of the Navy

Date

2/18/09

Mr. Michael M. Montgomery
Assistant Director of Federal Facilities
and Site Cleanup Branch, Region 9
U.S. Environmental Protection Agency

Date

2/18/9

Mr. Daniel E. Murphy, P.E.
Supervising Engineer
Brownfields and Environmental Restoration Program
California Environmental Protection Agency
Department of Toxic Substances Control

Date

2/18/09

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

Date

ED_006787_00013380-00010

2. DECISION SUMMARY

2.1 SITE DESCRIPTION AND HISTORY

HPS is located in southeastern San Francisco on a peninsula that extends east into San Francisco Bay (see Figure 1). HPS consists of 866 acres: 420 acres on land and 446 acres under water in the San Francisco Bay. In 1940, the Navy obtained ownership of HPS for shipbuilding, repair, and maintenance activities. After World War II, activities at HPS shifted to submarine maintenance and repair. HPS was also the site of the Naval Radiological Defense Laboratory (NRDL). HPS was deactivated in 1974 and remained relatively unused until 1976. Between 1976 and 1986, the Navy leased most of HPS to Triple A Machine Shop, Inc., a private ship repair company. In 1987, the Navy resumed occupancy of HPS.

Because past shipyard operations left hazardous substances on site, HPS property was placed on the National Priorities List in 1989 pursuant to the CERCLA as amended by the SARA. In 1991, HPS was designated for closure pursuant to the Defense Base Closure and Realignment Act of 1990. Closure activities at HPS involve conducting environmental remediation and making the property available for nondefense use.

Parcel D, which includes about 98 acres in the central portion of the shipyard (see Figure 1), 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. Portions of Parcel D were also used by NRDL.

Parcel G$_{(1)}$ is located within the central portion of the former 98-acre Parcel D; the rest of former Parcel D is divided into Parcel D-2, Parcel UC-1, and Parcel D-1 (the remainder of Parcel D) (see Figure 2). In addition, a small area perpendicular to H Street (see notched area in Figure 1) has been added to Parcel G (see Figure 2) so that the boundary is now straight along H Street. This division supports the potential early transfer of Parcel G to the City and County of San Francisco.

The original redevelopment plan developed by the San Francisco Redevelopment Agency in 1997 divided Parcel G into reuse areas. The reuse areas include educational/cultural, mixed use, open space, and industrial reuse. To facilitate discussion of all areas of the parcel in the context of contamination and cleanup issues - the area was divided into redevelopment blocks. Figures 3 and 4 present the planned reuses and redevelopment blocks and the associated **Installation Restoration (IR) sites**$_{(2)}$ that are within Parcel G. As shown, the redevelopment blocks (and associated reuses) on Parcel G are 29 (educational/cultural), 30A (mixed use), 30B (industrial), 37 (industrial), 38 (industrial), 39 (open space), and DOS-1 (open space).

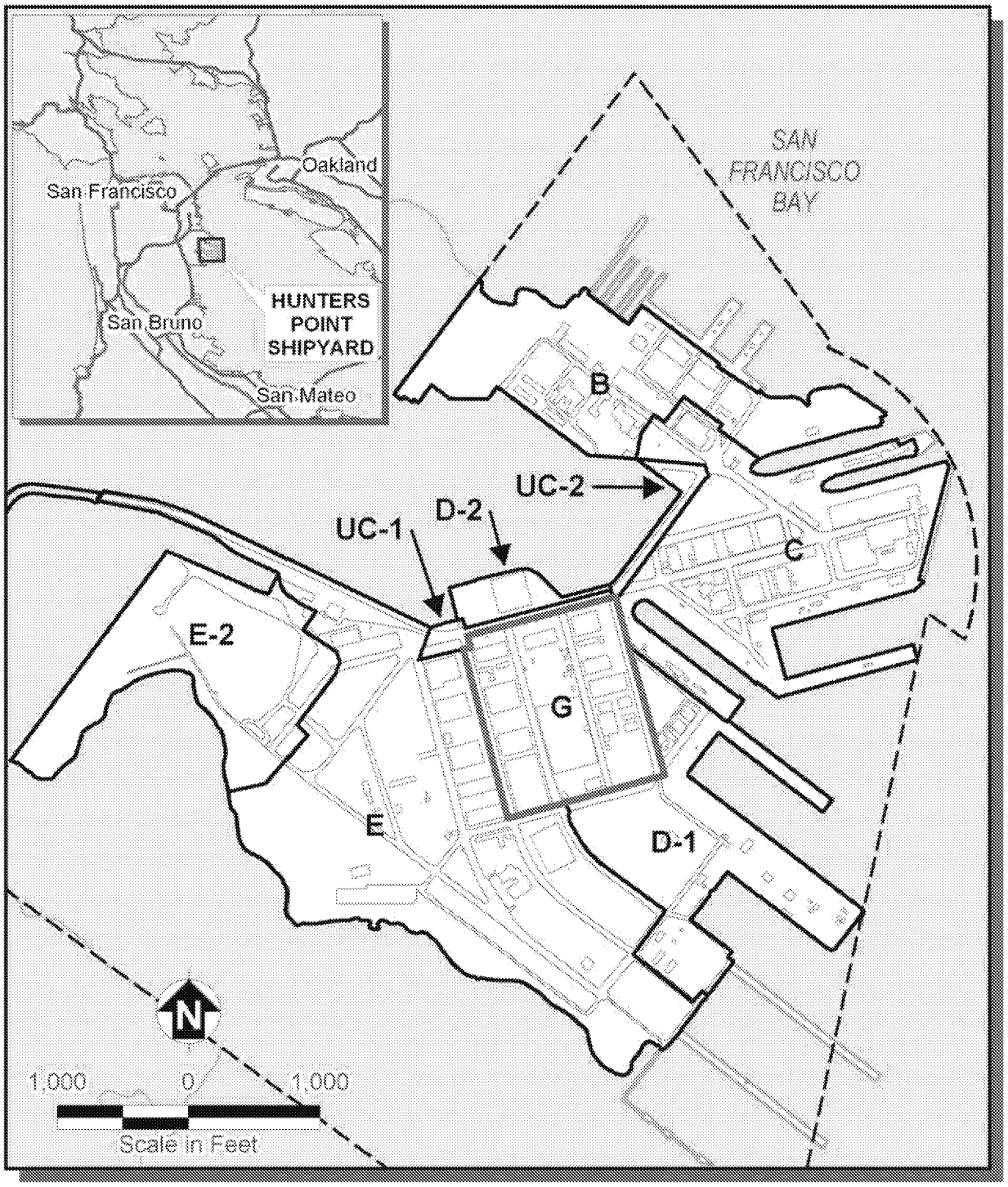

Figure 1. Facility Location Map with the Original Boundary of Parcel D

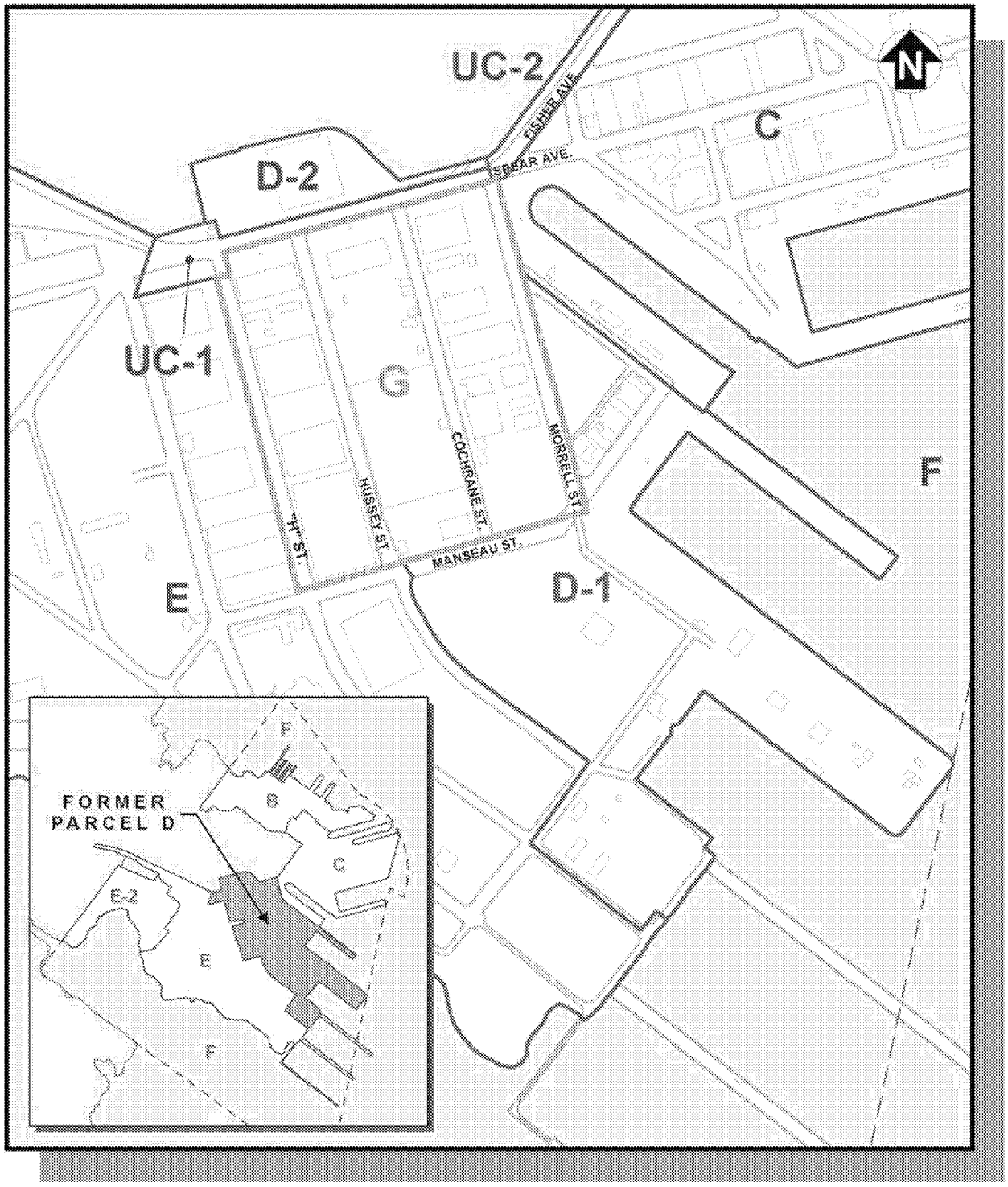

Figure 2. Parcel G Location Map

ED_006787_00013380-00013

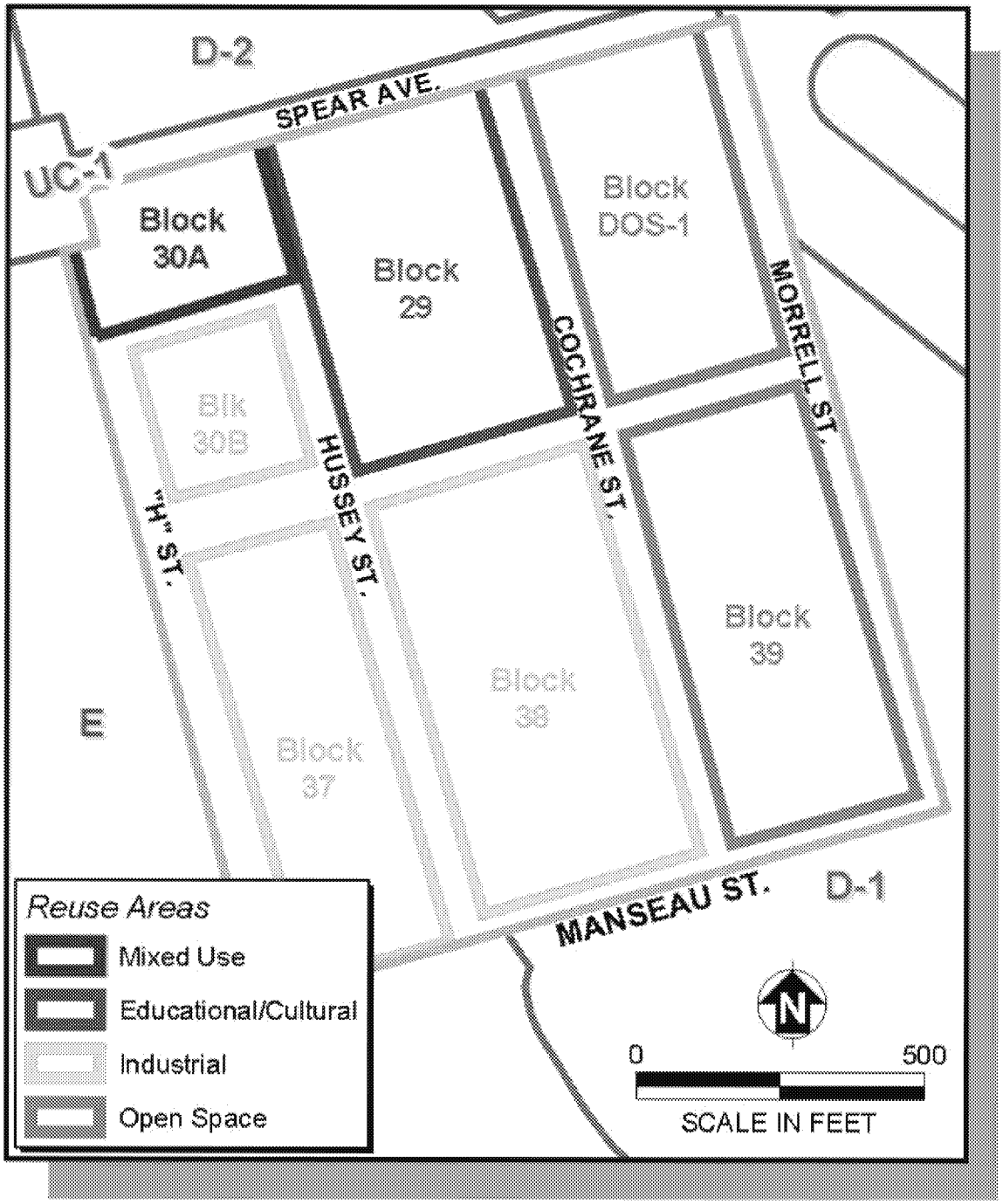

Figure 3. Reuse Areas and Associated Redevelopment Blocks

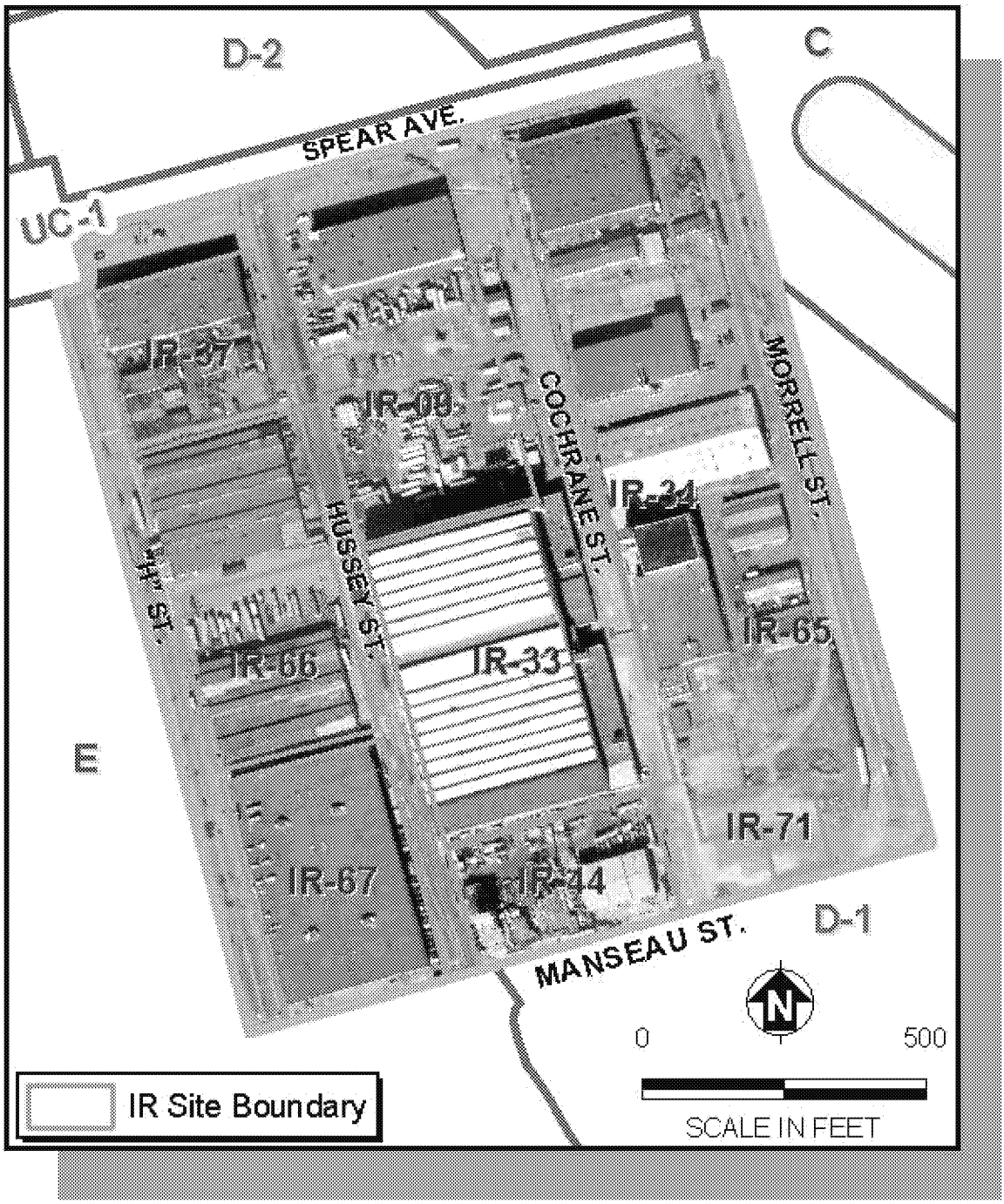

Figure 4. IR Sites

ED_006787_00013380-00015

2.2 SITE CHARACTERISTICS

Parcel G consists of flat lowlands that were constructed by placing borrowed fill material from various sources, including crushed serpentinite bedrock from the adjacent highland and dredged sediments with surface elevations between 0 to 10 feet above mean sea level. The serpentinite bedrock and serpentine bedrock-derived fill material consist of minerals that naturally contain asbestos and relatively high concentrations of arsenic, manganese, nickel, and other metals.

The **hydrostratigraphic units**(3) present at Parcel G are the same as at Parcel D: the A-aquifer, the aquitard zone, the B-aquifer, and a bedrock water-bearing zone. Groundwater beneath Parcel G includes the shallow A-aquifer and the deeper B-aquifer; groundwater is not currently used for any purpose at Parcel G. Groundwater in the A-aquifer is not suitable as a potential source of drinking water. Groundwater in the B-aquifer has a low potential as a future source of drinking water.

Groundwater flow patterns at Parcel G are complex because they are potentially affected by (1) a groundwater sink located in adjacent Parcel E; (2) a groundwater mound located near the western boundary of Parcel G (beneath IR-33, IR-44, IR-66, and IR-67); (3) leaks of groundwater into former sanitary sewers or storm drains; (4) recharge from water supply lines; and (5) tides in the Bay. Most groundwater at Parcel G flows toward the Bay, except in the western portion of Parcel G, which historically has flowed away from the mound and toward the groundwater sink in Parcel E, where groundwater elevations are below mean sea level. The sink is believed to have been caused by leaks of groundwater into sanitary sewer lines, which were then pumped off site to the local publicly owned treatment works, thereby lowering groundwater levels in the area. Flow patterns continue to change now that the pumping has been discontinued and as sewer and storm drain lines are removed throughout HPS.

Parcel G ecology(4) is limited to those plant and animal species adapted to the industrial environment. Viable terrestrial habitat is inhibited at Parcel G because nearly all of the ground surface is paved or covered by structures. No threatened or endangered species are known to inhabit Parcel G or its immediate vicinity.

Nearly all of Parcel G is covered with buildings or pavement. A series of storm drains and sanitary sewer lines beneath the parcel have been recently removed. Figure 5 shows these site characteristics for Parcel G.

2.3 PREVIOUS INVESTIGATIONS

Potential contamination at Parcel G is associated with metals and PAHs in soil, metals and VOCs in groundwater, and radiologically impacted structures and soil. Assessment of contamination and risk for Parcel G is based on the Final Revised FS Report for Parcel D, (November 30, 2007) including the revised human health risk assessment (HHRA), and the radiological addendum to the FS Report. The Revised FS Report for Parcel D considered new information associated with several cleanup actions completed within Parcel G and at other adjacent parcels at HPS. Both the FS and HHRA activities are detailed in the Final Revised FS Report for Parcel D. The FS Report and radiological addendum (April 11, 2008) summarize the most recent information available on former Parcel D and provide the basis for the RODs for Parcel G and the other three parcels. Table 1 summarizes the previous studies, investigations, and removal actions conducted at Parcel D, including the area identified as Parcel G.

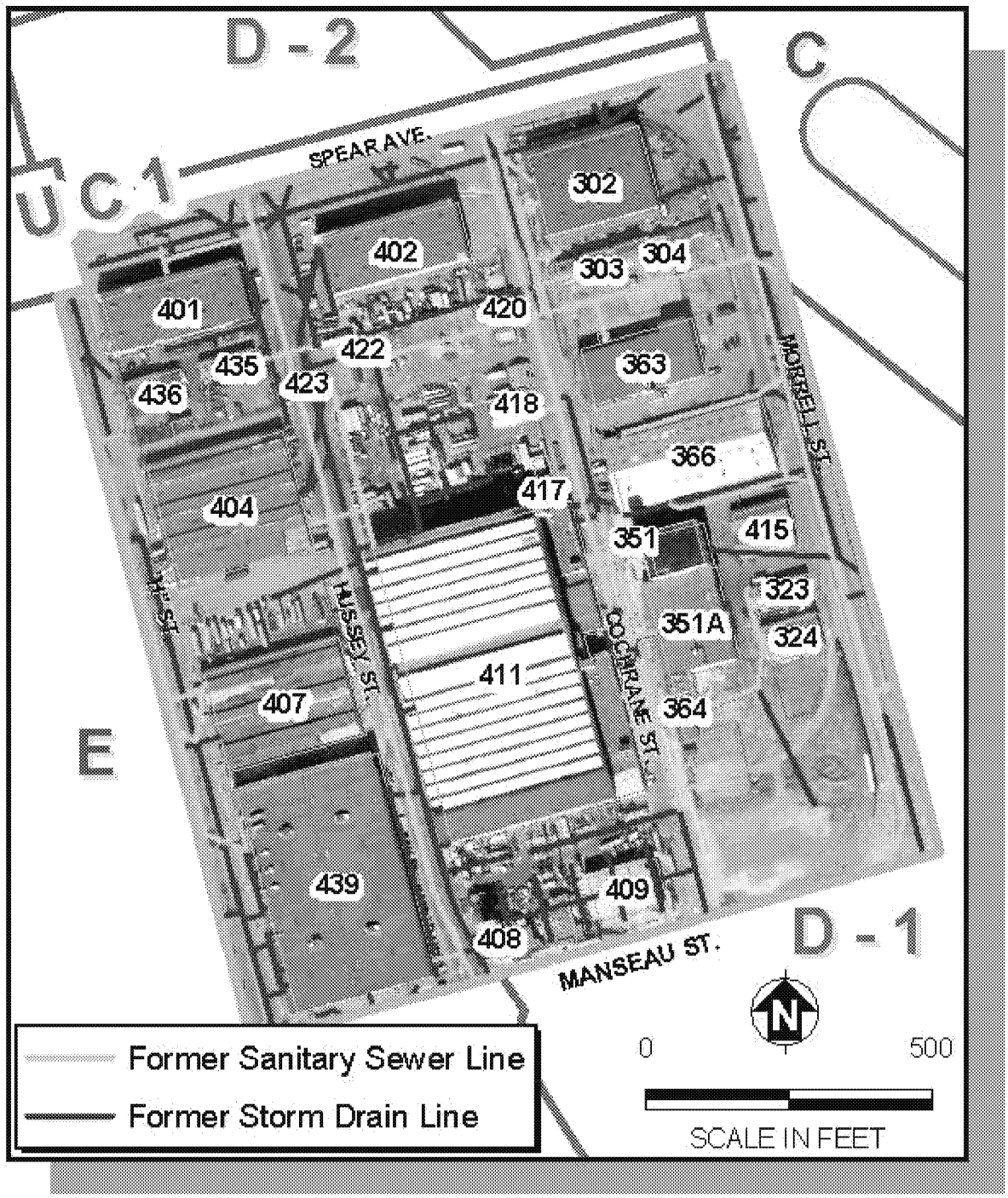

Figure 5. Parcel G Site Features

Table 1. Previous Investigations and Removal Actions

Previous Investigation/ Removal Action*	Date	Investigation/Removal Action Activities
Investigations and Studies		
Preliminary Assessment (PA)	1990	The PA for Parcel D involved record searches, interviews, and limited field investigations. The PA report concluded that portions of Parcel D, including areas within the new Parcel G, warranted further investigation because of the potential for contamination of soil and groundwater from past site activities.
Site Inspection (SI)	1994	Evaluated whether contamination was present and whether a release to the environment had occurred, evaluated each site for inclusion in the Navy's IR program, and eliminated sites that posed no significant threats to public health or the environment. Based on the results of the SI, all 12 sites within Parcel D, including utilities, were recommended for inclusion in RI activities.
Remedial Investigation	1988-1997	Site conditions were assessed through literature searches; interviews with former on-site employees; geophysical, radiological, and aerial map surveys; installation of soil borings and monitoring wells; and aquifer testing. The following **samples**(5) were collected: 418 surface soil, 1,938 subsurface soil, 429 A-aquifer groundwater samples, 9 B-aquifer groundwater samples, 7 bedrock water-bearing zone groundwater samples, 185 HydroPunch groundwater samples, 77 water and sediment samples (from utility lines, sumps, and floor drains), 8 sandblast samples, 1 asbestos sample, 29 test pit samples, 2 floor scrape samples, and 2 underground storage tank samples. Samples were analyzed for one or a combination of the following chemicals: metals, VOCs, semivolatile organic compounds, pesticides and polychlorinated biphenyls, and petroleum-related products. Based on the RI results, all of Parcel D (except for IR-48 and IR-66) was recommended for further evaluation in an FS.
Feasibility Study	1996-1997	Results and analyses in the RI Report were used to identify, screen, and evaluate remedial alternatives and to define areas for proposed remedial action. Three different cleanup scenarios and associated cleanup goals were considered: cleanup to the industrial land use scenario (10^{-5} excess lifetime cancer risk [ELCR]); cleanup to the industrial land use scenario (10^{-6} ELCR); and cleanup to the residential land use scenario (10^{-6} ELCR). Each scenario also considered cleanup of soils representing a hazard index (HI) greater than 1 and lead concentrations greater than 1,000 milligrams per kilogram (mg/kg). Areas exceeding different cleanup goals for each reuse scenario and cleanup level were delineated, risk drivers were identified, and the extent of the cleanup areas were defined. Twenty IR sites had soil cleanup areas for industrial use (9 IR sites in Parcel G), and 23 IR sites had soil cleanup areas for residential use (9 sites in Parcel G). All soil cleanup areas exceeding at least one of the various cleanup criteria under each reuse scenario were identified.
Proposed Plan/Record of Decision	1997	The Proposed Plan invited the public to review and comment on the Preferred Alternative for addressing environmental contamination at Parcel D prior to the final remedy selection. The Draft ROD presented the following Selected Remedy: excavation and off-site disposal of soils based on the cleanup goals described in the proposed plan. Subsequent to the submittal of the draft ROD, the costs and environmental improvements associated with the selected soil remedy for Parcel D were reviewed by the Navy. Navy concerns about the level of risk reduction, cost effectiveness of the cleanup approach, and discussions with other members of the Base Realignment and Closure Cleanup Team resulted in further review of risk.
Risk Management Review (RMR) Process	1999	The RMR process was developed and conducted during a series of meetings held by the Navy and the regulatory agencies from January through April 1999. The process used various criteria and decision rules to reevaluate whether remedial actions were required at 19 of the 27 IR sites in Parcel D that were originally identified as requiring remedial actions for soil. After completion of the review, all sites fell into one of the following three categories: (1) sites that the team agreed no response action was required, (2) sites that the team agreed response action was required, and (3) sites that the team did not yet agree on the course of action. Based on the **RMR results**(6), the sites and chemicals requiring further evaluation and remedial action were revised.

Table 1. Previous Investigations and Removal Actions (Continued)

Previous Investigation/ Removal Action*	Date	Investigation/Removal Action Activities
Investigations and Studies (Continued)		
Groundwater Data Gaps Investigation	2002	A data gaps investigation was completed to provide additional understanding of the groundwater conditions underlying the parcel. Groundwater samples were collected and analyzed for various chemicals (including metals and VOCs), and results were used to further define the nature and extent of contamination in groundwater.
Historical Radiological Assessment (HRA)	2004	The HRA evaluated and designated sites as radiologically **impacted or non-impacted**(7). A radiologically impacted site is one that has the potential for radioactive contamination based on historical information, or is known to contain or have contained radioactive contamination. A non-impacted site is one, based on historical documentation or results of previous radiological survey information, where there is no reasonable possibility for residual radioactive contamination. Based on the results of the assessment, six buildings, one building site and the sewer and storm drains were identified as radiologically impacted at Parcel G.
Revised Feasibility Study	2007	Existing RI data were combined with new data collected after completion of the 1996 RI Report. The revised FS considered new information associated with several cleanup actions completed within Parcel D and at other adjacent parcels at HPS. New information considered and incorporated into the revised FS included (1) the widespread presence of metals in soil across Parcel D, (2) quarterly monitoring of groundwater since 2004, (3) updates to toxicity criteria used in the 1997 HHRA, and (4) the findings from removal actions conducted to address chemicals identified by a RMR process and radiological contaminants that were identified by the HRA. Data were summarized and evaluated to refine the site conceptual model, further define the nature and extent of contamination, assess potential risks based on existing site conditions, and develop and evaluate revised alternatives. Data evaluation included (1) a comparison of new and existing data with updated screening criteria, (2) a revised evaluation of groundwater beneficial uses and exposure pathways, and (3) a revised assessment of potential risk posed by exposure to soil and groundwater at Parcel D. Revised remedial action objectives (RAO) were developed, which included a risk range rather than specific concentrations for contaminants. Remedial alternatives were developed and a detailed and comparative analysis of alternatives was performed.
Radiological Addendum[2]	2008	The primary purpose of this addendum was to provide decision makers with the information necessary to select a final remedy for radiologically impacted buildings, former building sites, outdoor areas, and soils and piping associated with remediated storm drains and sanitary sewers. This was accomplished through the development and evaluation of appropriate remedial alternatives. After the screening of general response actions and process options, two remedial alternatives were identified: no action, and a combination of surveys, decontamination, excavation, disposal, and release. The two alternatives were analyzed against the nine criteria and against each other.
Proposed Plan	2008	The Proposed Plan invited the public to review and comment on the Preferred Alternatives for addressing environmental contamination at Parcel D prior to the final remedy selection.
Removal Actions		
Phase I and II Underground Storage Tank Removal Action	1991-1993	Nine underground storage tanks were removed and one closed in place.
Sandblast Grit Removal Action	1991-1995	A total of 4,665 tons of discarded sandblast grit was removed throughout HPS.
Pickling and Plate Yard Removal Action	1994-1996	Contaminated equipment and residue were removed at IR-09.
Exploratory Excavation Removal Action	1996-1997	Stained soil, asphalt, and concrete were removed from three IR sites (IR-33, IR-37, and IR-70) within Parcel G.

Table 1. Previous Investigations and Removal Actions (Continued)

Previous Investigation/ Removal Action*	Date	Investigation/Removal Action Activities
Removal Actions (Continued)		
Storm Drain Sediment Removal Action	1996-1997	A total of 1,200 tons of contaminated sediment was removed from storm drain lines and appurtenances.
Time-Critical Removal Action (TCRA)	2000-2001	A total of 81 cubic yards of soil was removed from several IR sites (IR-09, IR-37, and IR-65) within Parcel G.
Industrial Process Equipment Survey, Sampling, Decontamination and Waste Consolidation Action	2002	This action resulted in the removal of equipment and cleanup of buildings, steam lines, fuel pipelines, and impacted soil in areas within Parcel G.
Radiological Time-Critical Removal Action	2001-ongoing	In 2001, soil impacted by a cesium-137 spill was removed from Building 364 and the surrounding area. Radiologically impacted buildings, former building sites, outdoor areas, and soils and piping associated with remediated storm drains and sanitary sewers have been surveyed and in some cases removed. Additional radiological investigation and remediation are ongoing at radiologically impacted sites throughout Parcel G. Each of the radiologically impacted sites will be investigated through the CERCLA process. If the final report of the site investigation is approved by the stakeholders and the site is determined to require no further action, the classification of "radiologically impacted" may be removed. The radiologically impacted classification will not be removed from sites that are addressed in an approved CERCLA containment remedy.
Storm Drain and Sanitary Sewer Removal Action	2007-ongoing	This removal action included radiological investigation and removal of storm drains and sanitary sewers, and is anticipated to be completed in 2008.
Groundwater Treatability Study	2008-ongoing	A groundwater treatability study using zero-valent iron (ZVI) injection points is currently being conducted in several locations within Parcels G and D-1. This study is expected to be completed in spring 2009.

Notes:

1 The documents listed are available in the Administrative Record and provide detailed information used to support remedy selection at Parcel G.

2 After the Radiological Addendum became final, Building 401 and an additional site within Building 439 were found to require radiological remediation and were added to the areas to be remediated.

Although a number of removal actions have been completed within Parcel G, chemical contamination remains. Based on recent studies and investigations, the sources and extent of the remaining contamination in soil and groundwater have been well characterized. Industrial activities have resulted in elevated concentrations of **PAHs**(8) and **lead**(9) in soil (Figure 6). Elevated concentrations of metals other than lead, such as arsenic and manganese, may be related to the bedrock fill quarried to build the shipyard in the 1940s. The fill may have contained elevated concentrations of select metals from the bedrock. Therefore, the Navy has worked with the regulatory agencies to identify remedial alternatives that address metals in soil, regardless of their source.

The Navy also identified the former Pickling and Plate Yard (IR-09) within Parcel G as the source of the elevated concentrations of **chromium VI and possibly nickel**(10) in groundwater (Figure 7). Cultural resource issues have delayed the removal of the pickling and plating sump. Use of solvents during industrial operations also released **VOCs**(11) into groundwater (IR-71). The plume configuration presented in Figure 7 is based on groundwater monitoring information collected before 2004. Recent findings from a treatability study and ongoing groundwater monitoring suggest that there has been a reduction in the contaminant and plume extent since 2004. This reduction will result in a reconfiguration of the plumes presented on Figure 7. The current groundwater sample data will be reviewed during the remedial design (RD) to focus the groundwater remediation activities.

The Navy identified **radiologically impacted sites**(12), including buildings, equipment, and infrastructure at Parcel D (including areas within Parcel G) associated with the former use of general radioactive materials and decontamination of ships used during atomic weapons testing in the South Pacific. Radiologically impacted buildings (351, 351A, 364, 365, 366/351B, 401, 408, and 411); former building sites (317); and storm drains and sanitary sewers are all of concern in Parcel G (Figure 8). In addition, a focused area in Building 439 was found to require remediation during the radiological investigation. The Navy decided to conduct a time-critical removal action (TCRA) to address potential radioactive contamination in buildings, former building sites, storm drains, and sanitary sewers at Parcel G. The TCRA involves (1) surveying radiologically impacted structures and former building sites; (2) decontaminating (and demolishing if necessary) buildings and former building sites; (3) excavating radiologically impacted storm drain and sanitary sewer lines; and (4) screening, separating, and disposing of radioactively contaminated excavated materials at an off-site, low-level radioactive waste facility.

Activities for the TCRA at Parcel G began in 2006. The Navy excavated more than 47,000 cubic yards of material and disposed of about 5,600 cubic yards off site as low-level radioactive waste. As part of the TCRA, the Navy removed more than 21,800 linear feet of storm drain and sanitary sewer lines for radiological contamination in Parcel G. Removal actions and backfill has been completed for approximately 80% of the storm drain and sanitary sewer trench units. Ongoing TCRA activities will continue post ROD until release criteria have been met. Upon completion of the storm drain and sanitary sewer trench TCRA, Survey Unit Package Reports will be completed and distributed to the BCT and CDPH for all trench units.

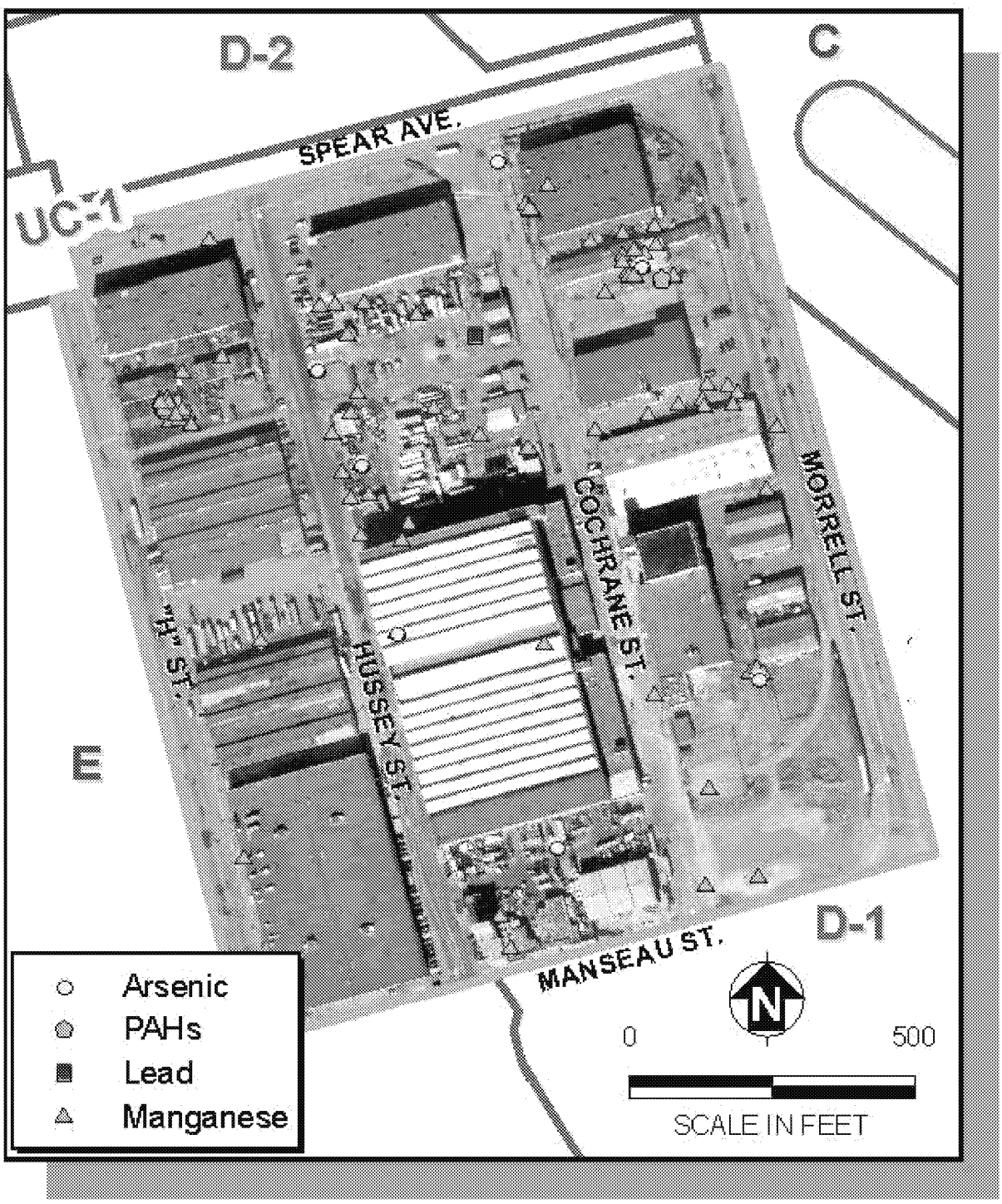

Figure 6. Chemicals in Soil above Remedial Goals

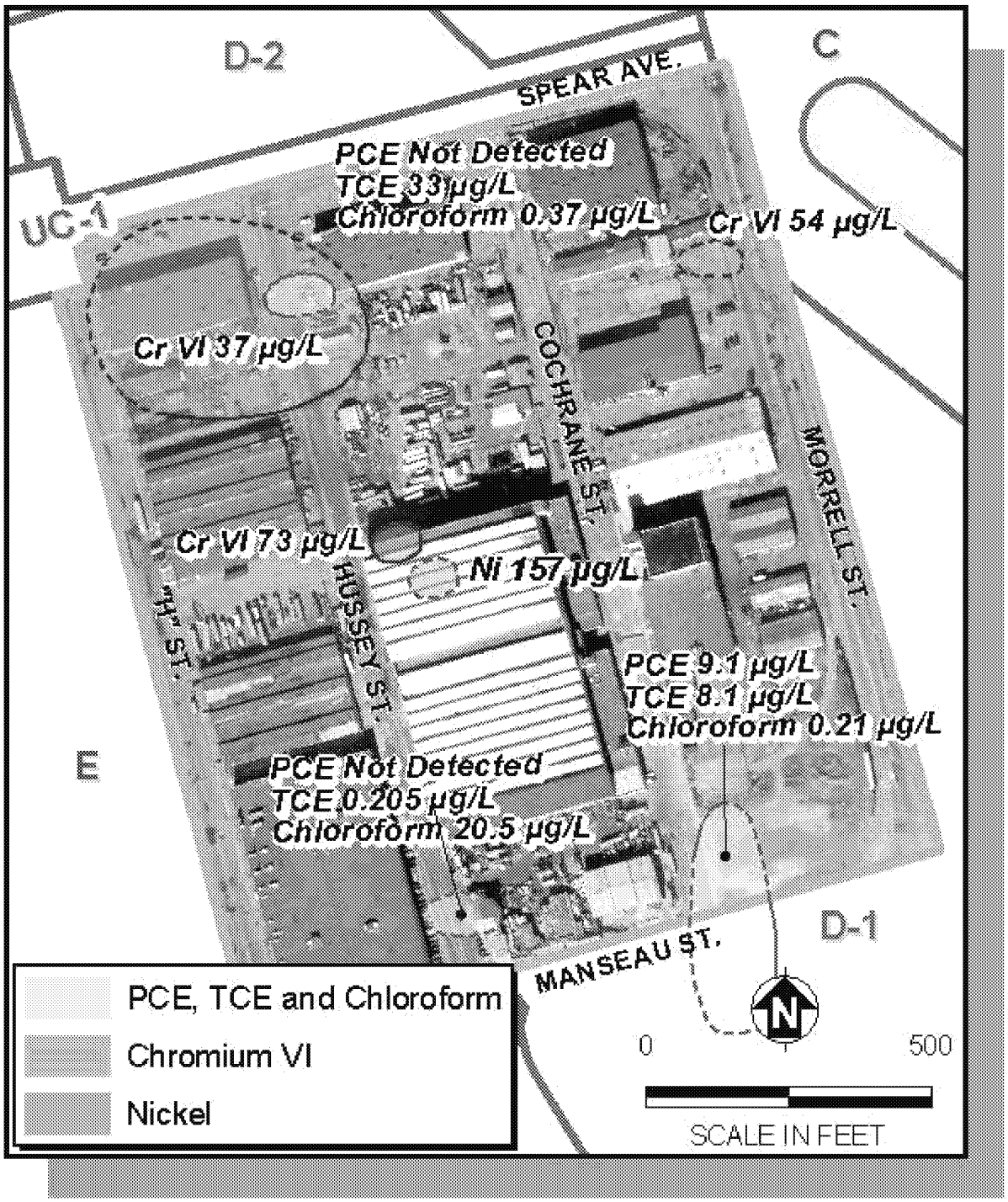

Figure 7. Chemicals in Groundwater above Remedial Goals

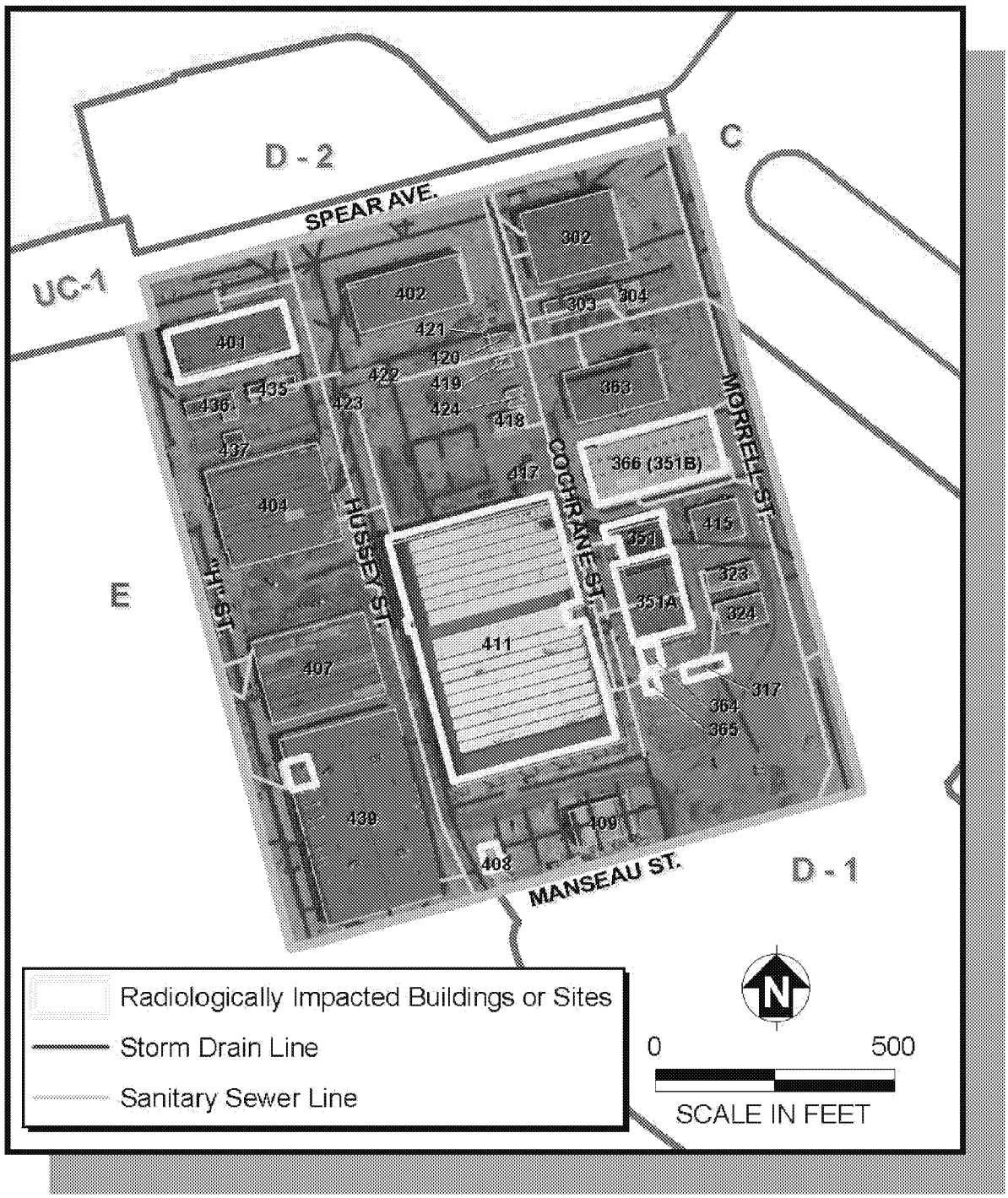

Figure 8. Radiologically Impacted Areas

ED_006787_00013380-00024

As of January 2009, 90% of the radiological surveys, remediation, and draft preparation of the final status surveys are complete in all Parcel G Buildings, to include Buildings 351, 351A, 366, 401, 408, 411, and 439. Following building surveys, Buildings 364, 365, and 408 were demolished, and have had their building footprints surveyed and remediated. Materials from Buildings 364, 365, and 408 have had their construction debris appropriately radiologically and chemically screened, and transported to the appropriate disposal facility. TCRA activities continue in the localized area surrounding former Building Sites 364, 365, and 317. Final Status Survey Reports are currently being produced for all radiologically impacted buildings and sites in Parcel G for upcoming distribution.

All Final Status Survey Reports and Survey Unit Package Reports for Parcel G will be summarized in the Parcel G removal action completion report (RACR), which will be reviewed and approved by the BRAC Cleanup Team (BCT) and the California Department of Public Health (CDPH). Although the TCRA may not be completed by the time the ROD is signed, the TCRA is intended to achieve cleanup goals that are identical to the RAOs identified in this ROD. In the event that the TCRA does not achieve its cleanup goals, cleanup will continue in accordance with the remedial action selected in this ROD until the RAOs are achieved.

2.4 CURRENT AND POTENTIAL FUTURE SITE USES

The reuses defined in the San Francisco Redevelopment Agency's 1997 Reuse Plan were evaluated by the following exposure scenarios: residential (mixed-use and research and development blocks), industrial (industrial and educational/cultural blocks), and recreational (open space block). The groundwater in the A aquifer, as discussed in the Feasibility Study, is not suitable for use as (**drinking water**$_{(13)}$). Exposures to the A aquifer were evaluated based on indoor air inhalation and transport to the Bay. The groundwater in the B-aquifer was evaluated as a drinking water source, though it has low potential for use as drinking water.

2.5 SUMMARY OF SITE RISKS

The source of potential contamination at Parcel G is mostly attributed to industrial activities by the Navy or other tenants, except for several metals such as arsenic, manganese, and nickel found at levels consistent with ambient concentrations in the local serpentine bedrock. Most of the contamination is from identified IR sites with associated spills and leaks. The primary fate and transport mechanisms include root uptake, wind suspension, volatilization, and the migration of contaminants via infiltration and percolation into subsurface soil and groundwater. A general conceptual site model (CSM) for Parcel G is provided on Figure 9. Based on the CSM, Parcel G was evaluated for potential risks to human health and the environment in the Revised FS Report and its radiological addendum. The risk assessment results can be applied by focusing on the redevelopment blocks within the parcel. Results of the HHRA are presented in Section 2.5.1.

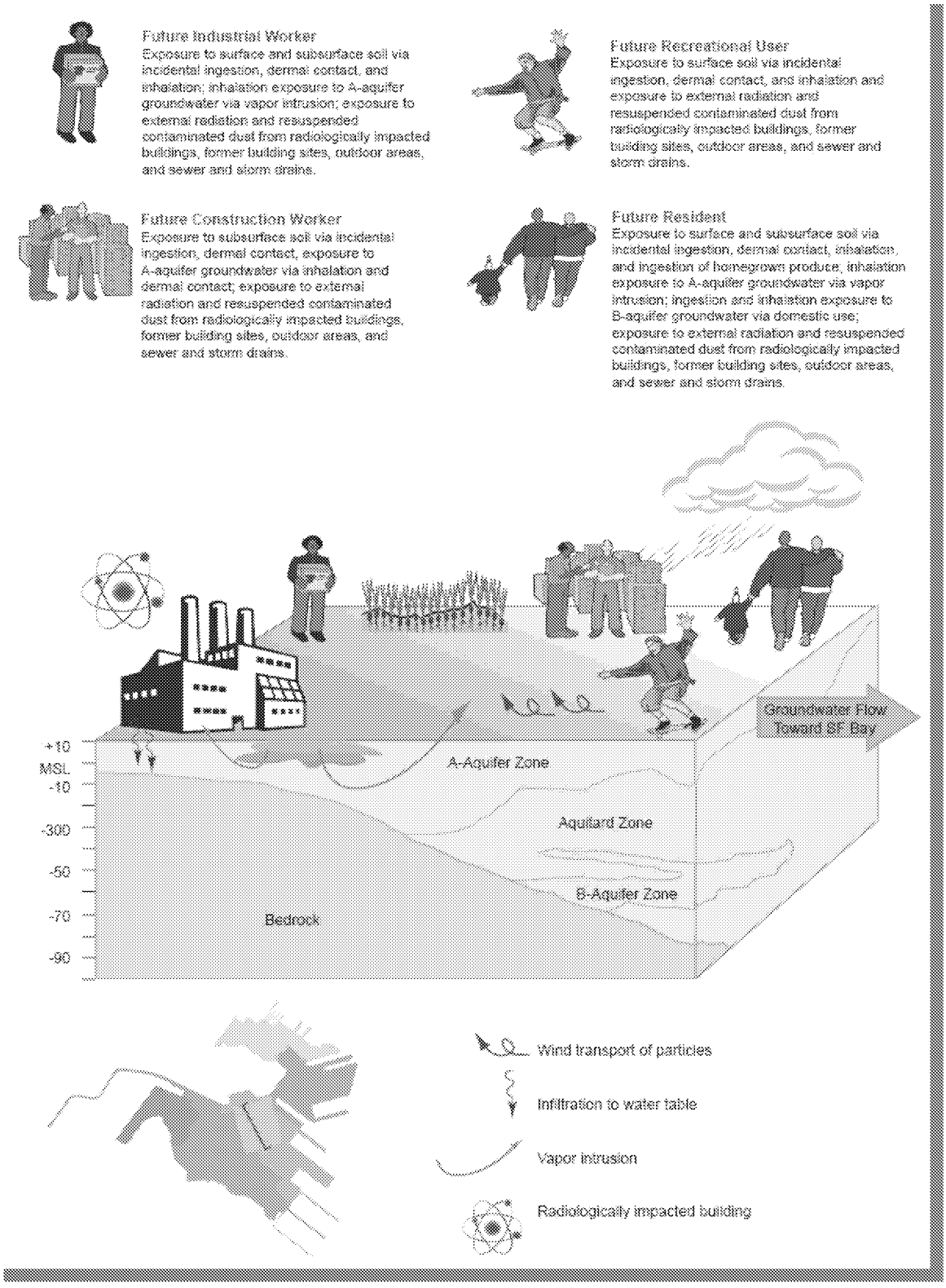

Figure 9. Conceptual Site Model

During the RI, the Navy concluded that limited viable habitat is available for terrestrial wildlife at Parcel D (and thus also Parcel G) because most of the site is covered with pavement. Therefore, ecological risk associated with exposure to soil was not evaluated further. Furthermore, even if the future reuse of Parcel G was to change to open space/recreational, soil covers would protect terrestrial wildlife from risks due to exposure to contaminants left below the cover. A screening evaluation of groundwater was conducted in the Revised FS Report to evaluate potential risks to aquatic wildlife in San Francisco Bay. Results of that evaluation are summarized in Section 2.5.2.

2.5.1 Human Health Risk Assessment

Based on a **human health CSM**(14), a quantitative **HHRA**(15) was completed for Parcel D (including Parcel G) for exposure to surface soil, subsurface soil, groundwater, and vapor intrusion via groundwater. Potential **cancer risks and noncancer hazards**(16) were calculated based on reasonable maximum exposure (RME) assumptions recommended by EPA and DTSC. These assumptions are based on a reasonable maximum exposure rather than an average or medium-range exposure assumption, and provide a conservative and protective approach that estimates the highest health risks that are reasonably expected to occur at a site. Actual risks from exposures to chemicals in soil and groundwater at Parcel G are likely to be lower.

To help characterize cancer risk, the Navy adopted a conservative approach at Parcel G and evaluated action for risks greater than 10^{-6}. For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual between 10^{-4} (a 1 in 10,000 chance of developing cancer) and 10^{-6} (a 1 in 1,000,000 chance of developing cancer) using information on the relationship between dose and response. The 10^{-6} risk level is used as the point of departure for determining cleanup goals for alternatives when Applicable or Relevant and Appropriate Requirements (ARARs) are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure.

Both **total and incremental risks**(17) were evaluated for exposure to soil. For the total risk evaluation, all detected chemicals, including naturally occurring metals from the serpentine bedrock-derived fill material, were included as chemicals of potential concern regardless of their concentration. Only the essential nutrients calcium, magnesium, potassium, and sodium were not included as chemicals of potential concern. The total risk evaluation provides an estimate of the risks posed by chemicals at the site, including those present at concentrations at or below ambient levels. For the incremental risk evaluation, the above essential nutrients were excluded as soil chemicals of potential concern, as well as the detected metals with maximum measured concentrations below the Hunters Point ambient levels. The incremental risk evaluation provides an estimate of risks posed by metals present at the site that are above the estimated ambient levels.

Potential unacceptable risks include cancer risks and noncancer hazards for future receptors from exposure to soil or groundwater as discussed below. Potential unacceptable risk is defined as an excess lifetime cancer risk of greater than 10^{-6} or a segregated hazard index greater than 1 as calculated by the incremental risk evaluation.

Based on the **revised HHRA results**(18) for soil, chemical cancer risks are greater than 10^{-6} at Redevelopment Blocks 29, 30A, 38, and 39 within Parcel G (see Table 2). Noncancer hazards were less than 1 for all redevelopment blocks evaluated for industrial risk. Redevelopment Block 30A, evaluated against the more stringent residential exposure scenario, had a noncancer hazard above 1 (see Table 2).

The risk assessment for groundwater estimated cancer risks greater than 10^{-6} or noncancer hazards greater than 1 in distinct areas within all seven redevelopment blocks within Parcel G where data are available (see Table 2). Potential risks from groundwater are based on breathing VOC vapors in indoor air that may have migrated through the subsurface from groundwater in the A-aquifer. The COCs in groundwater from the vapor intrusion pathway are benzene, carbon tetrachloride, chloroform, methylene chloride, naphthalene, tetrachloroethene, trichloroethene, and xylenes. In addition, the HHRA results for groundwater show that the risk from exposure to the A-aquifer groundwater via dermal exposure and inhalation to the construction workers exceeds the cancer risk threshold of 10^{-6} in areas with elevated concentrations of the COCs. These COCs from this exposure pathway are arsenic, benzene, naphthalene, tetrachloroethene, and xylenes. The B-aquifer was evaluated for all chemicals of potential concern through the domestic use of groundwater pathway. No unacceptable risk was found from this exposure scenario; therefore, no COCs are associated with the B-aquifer.

Table 2. Cancer Risks and Noncancer Hazards

Parcel	Redevelopment Block	Exposure Scenario	Cancer Risk[a]		Noncancer HI
			Chemical	Radiological[b]	
Soil					
G	30B	Industrial	2×10^{-7}	NA	< 1
	37	Industrial	4×10^{-8}	Not Estimated[c]	< 1
	38	Industrial	4×10^{-5}	2×10^{-4}	< 1
	29	Industrial	3×10^{-5}	NA	< 1
	DOS-1	Recreational	4×10^{-6}	NA	< 1
	39	Recreational	1×10^{-4}	4×10^{-5}	< 1
	30A	Residential	2×10^{-7}	1×10^{-6}	6
Groundwater			**Exposure Area[d]**	**Maximum Cancer Risk**	**Noncancer Risk (Total RME HI)**
G	29, 30A, 30B, 37, 38, 39, and DOS-1	Industrial	IR-33 Plume, IR-09, and IR-71 Plumes	1×10^{-4}	9

Notes:

a Listed risk value is maximum in each redevelopment block. These blocks and their associated reuses are based on the "Hunters Point Shipyard Redevelopment Plan." Reuse areas and development blocks may change in the future.

b Radiological risk from ongoing sewer and storm drain removal across Parcels G, D-2, UC-1, and D-1 was assessed at 5 x E-6.

c Risk was not estimated in the radiological addendum for the Building 439 site at the time of the radiological addendum.

d Maximum of the identified risk from all plumes.

NA Not applicable; no radiologically impacted areas or buildings were located in this block.

Additionally, radiological risk was calculated based on estimated concentrations of radiological contamination at radiologically impacted sites, using remediation goals for each radionuclide of concern. Actual calculated risk will be based on field measurements following receipt of final status survey results for each impacted site. **Radiological risks**(19) for soil and building structures are greater than 10^{-6} at Redevelopment Blocks 30A, 38, and 39 (see Table 2). Total and incremental risks were also calculated for radionuclides with Radium-226, the only naturally occurring radionuclide that affected the incremental risk calculation. However, the background concentration of Radium-226 in building materials was assumed to be zero.

Potential risks were primarily based on exposure to metals (arsenic, lead, and manganese) and PAHs in soil, VOC vapors and several metals (chromium VI and nickel) from groundwater in the A-aquifer, and radionuclides in structures (such as buildings) and soil. **Combined chemical and radiological risk**(20) was also summed to determine the overall potential risk to human health associated with a site.

The HHRA specifies the **assumptions and uncertainties**(21) inherent in the risk assessment process due to the number of samples collected or their location, the literature-based exposure and toxicity values used to calculate risk, and risk characterization across multiple media and exposure pathways. The effects of uncertainties are overestimation or underestimation of the actual cancer risk or HI. In general, the risk assessment process is based on the use of conservative (health-protective) assumptions that when combined, are intended to overestimate the actual risk.

2.5.2 Ecological Risk Assessment

As previously stated, the Navy concluded during the RI that limited viable habitat is available for terrestrial wildlife at Parcel D because most of the site is covered with pavement. Specifically, the RI concludes that "Parcels C and D are almost entirely paved except for small pockets of vegetation which are not considered suitable habitat for animal life." In addition, the shoreline habitat is not a concern for Parcel G because of its inland location. Therefore, ecological risk associated with exposure to soil was not evaluated further in the Revised FS Report.

The Navy completed a screening evaluation of **surface water quality**(22) to assess potential exposure by aquatic wildlife to groundwater as it interacts with the surface water of San Francisco Bay. Results of the screening evaluation indicated two metals (**chromium VI and nickel**(23)) in groundwater may pose a potential risk to aquatic wildlife. However, the current areas within Parcel G where chromium VI and nickel are present are not in close proximity to the nearest discharge point on the Bay. Groundwater monitoring data indicated metals migrate at a much slower rate than groundwater flows; thus, discharge of metals to the Bay is not imminent.

Chemicals present in both the A-aquifer and the B-aquifer groundwater at Parcel G were evaluated to assess potential **environmental impacts to the Bay**(24). This evaluation was completed as part of the derivation of **trigger levels**(25) for chemicals that present a potential impact to the Bay. Based on the evaluation results, chromium VI and nickel in the A-aquifer were identified as COCs that originated in Parcel G.

Chromium VI(26) was identified as a COC because it was detected at concentrations consistently exceeding surface water criteria in both plumes and in individual wells in the A-aquifer. The locations of the elevated chromium VI concentrations are mostly near IR-09 where there was a known source of chromium from pickling and plating operations.

Nickel was identified as a COC because it was detected in a single well at concentrations consistently exceeding surface water criteria, and historical detections of nickel in an adjacent well also exceeded surface water criteria. These nickel concentrations indicate a localized area near IR-09 of nickel-impacted groundwater. The source of the nickel is not known.

2.5.3 Basis for Response Action

The response action selected in this ROD is necessary to protect the public health, welfare, or the environment from actual or potential releases of hazardous substances into the environment. The Navy, in partnership with EPA, DTSC, and the Water Board, considered all pertinent factors in accordance with CERCLA and NCP remedy selection criteria and determined remedial action is necessary to clean up **soil**(27), **groundwater**(28), and **radiologically impacted structures and soil**(29) at Parcel G. This determination was made because:

- Based on the HHRA results for soil, chemical cancer risks are greater than 10^{-6} at Redevelopment Blocks 29, 30A, 38, and 39 within Parcel G (see Table 2).
- Radiological risks for soil, building structures and sanitary/storm sewers are greater than 10^{-6} across Parcel G.
- Redevelopment Block 30A, evaluated against the more stringent residential exposure scenario, had a noncancer hazard above 1.
- The risk assessment for groundwater estimated cancer risks greater than 10^{-6} or noncancer hazards greater than 1 in distinct areas within all seven redevelopment blocks within Parcel G.
- Potential risks from groundwater are based on breathing VOC vapors in indoor air that may have migrated through the subsurface from groundwater in the A-aquifer.
- HHRA results for groundwater show that the risk from exposure to the A-aquifer groundwater via dermal exposure and inhalation to the construction workers exceeds the cancer risk threshold of 10^{-6} in areas with elevated concentrations of the COCs.

The concentrations of COCs for soil and groundwater requiring a response action are summarized in Table 3.

Radionuclides of concern(30) were identified by redevelopment block and by specific buildings within each block. There were a number of radiologically impacted buildings within Block 30A, Block 38, and particularly Block 39. Radionuclides of concern included cesium-137, cobalt-60, plutonium-239, radium-226, strontium-90, thorium-232, hydrogen-3, and uranium-235.

Table 3. Chemicals of Concern in Soil and Groundwater Requiring a Response Action

Exposure Scenario	Chemical of Concern	Soil		
		Maximum Detected Concentration	Remediation Goal	Frequency of Exceedance
Soil (mg/kg)				
Residential	Manganese	11,900	1,431	97/474
Recreational	Arsenic	47.2	11.1	8/299
	Benzo(a)pyrene	0.49	0.33	1/16
Industrial	Arsenic	47.2	11.1	8/299
	Benzo(a)pyrene	0.49	0.33	1/16
	Benzo(b)fluoranthene	1	1.76	0/26
	Lead	920	800	1/373
Construction Worker	Arsenic	47.2	11.1	8/299
	Benzo(a)pyrene	0.49	0.65	0/16
	Lead	920	800	1/373
	Manganese	11,900	6,889	6/474
Groundwater (µg/L)				
Residential – Vapor Intrusion	Chloroform	21	1.0	17/39
	Methylene Chloride	45	27	2/2
	Trichloroethene	72	2.9	19/30
Industrial – Vapor Intrusion	Benzene	650	0.63	10/13
	Carbon Tetrachloride	0.9	0.50	1/4
	Chloroform	21	1.2	17/39
	Naphthalene	ND	17	ND
	Tetrachloroethene	25	1.0	8/11
	Trichloroethene	72	4.8	17/30
	Xylene (total)	1,200	337	2/15
Construction Worker – Trench Exposure	Arsenic	76.3	40	2/64
	Benzene	650	17	5/13
	Naphthalene	ND	17	ND
	Tetrachloroethene	25	18	1/11
	Xylene (total)	1,200	861	2/15

Notes: Exposures in the residential, industrial, and construction worker scenarios consider exposure to soil from 0 to 10 feet below ground surface. The recreational exposure scenario considers exposure to soil from 0 to 2 feet below ground surface.

µg/L Micrograms per liter
mg/kg Milligram per kilogram
ND Naphthalene was not detected in Parcel G.

Figures 10 and 11 show the areas where remedial actions for soil and groundwater, respectively, would occur.

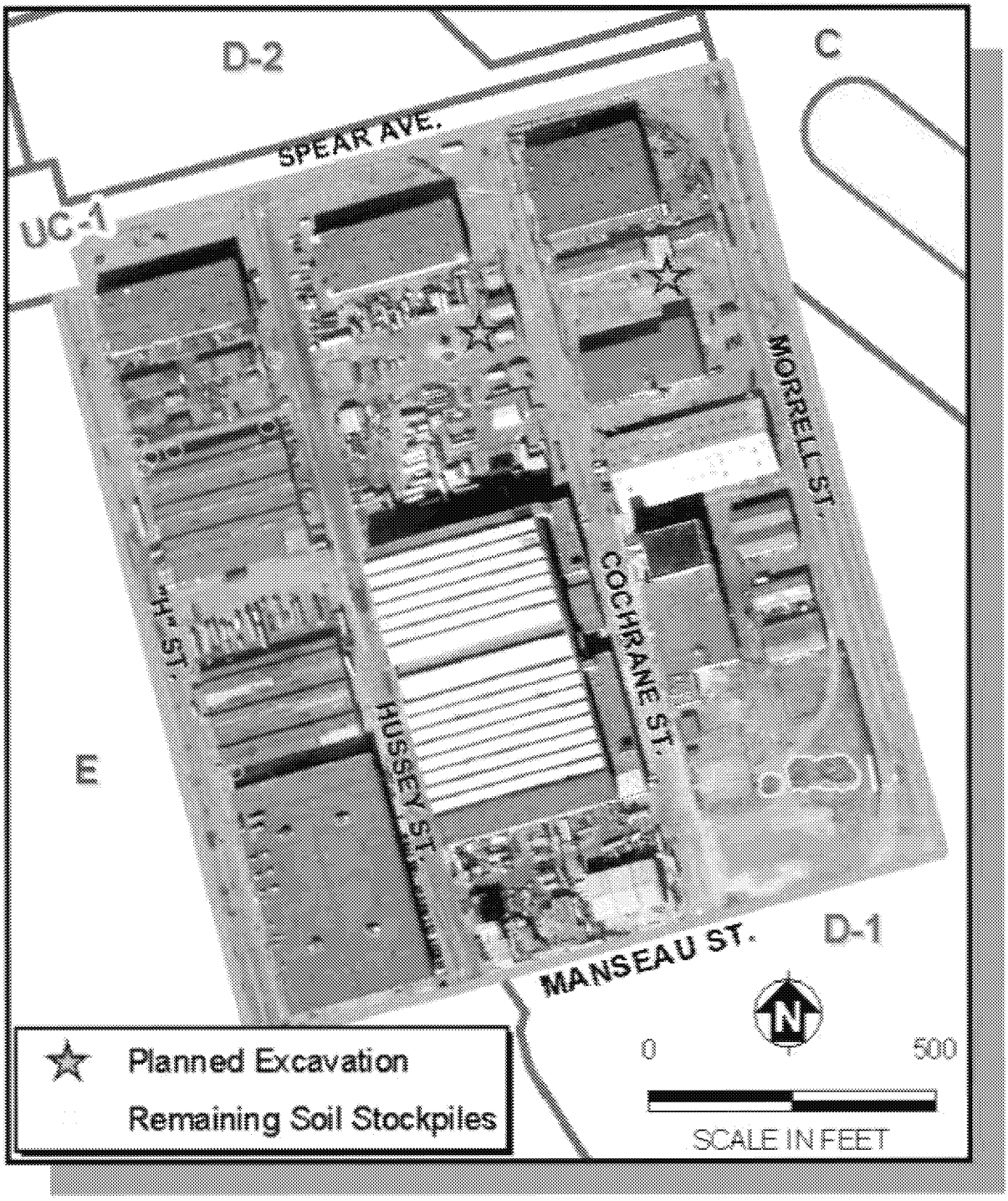

Figure 10. Planned Excavation Areas and Stockpiles

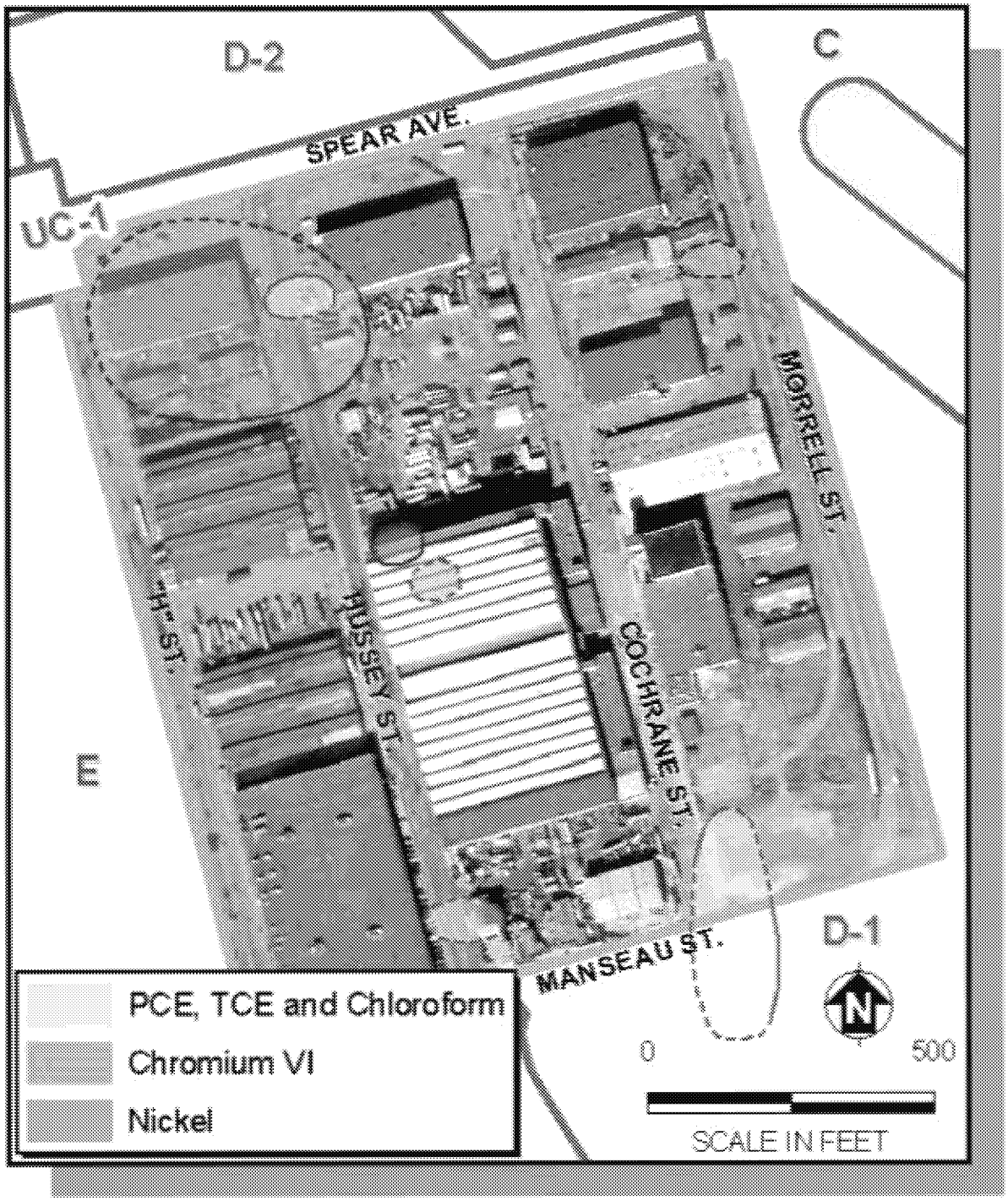

Figure 11. Planned Groundwater Remediation Areas

2.6 PRINCIPAL THREAT WASTE

Although a remedial response action is necessary (Section 2.5.3), there are no wastes in Parcel G that constitute a "principal threat." Principal threat wastes are hazardous or highly toxic source materials that result in ongoing contamination to surrounding media, generally cannot be reliably contained, or present a significant risk to human health or the environment should exposure occur. Although elevated concentrations of metals, PAHs, and radionuclides are present in soil and structures, the potential risks do not suggest there is a principal threat waste in soil at Parcel G. Contaminated groundwater is not generally considered to be source material unless it has the potential to be extremely mobile. Based on a review of the data, VOCs and metals in groundwater at Parcel G appear to be somewhat stable showing a minimal expansion of the associated plumes over time. In addition, a variety of processes occur in the subsurface that serve to reduce chemical concentrations in groundwater as groundwater migrates toward a discharge point such as the Bay. These processes include hydrodynamic dispersion, sorption, chemical and biological transformation, dilution in the tidal mixing zone, and dilution upon discharge to a surface water body. Therefore, VOCs (most significantly, tetrachloroethene [PCE], trichloroethene [TCE] and chloroform) and metals (chromium VI and nickel) in groundwater at Parcel G are not considered a principal threat waste.

2.7 REMEDIAL ACTION OBJECTIVES

RAOs are established based on attainment of regulatory requirements, standards, and guidance; contaminated media; COCs; potential receptors and exposure scenarios; and human health and ecological risks. Ultimately, the success of a remedial action is measured by its ability to meet the RAOs. Planned future land use is an important component in developing RAOs, and the RAOs for Parcel G are based on the San Francisco Redevelopment Agency's 1997 reuse plan. However, the application of the RAOs may need to be revisited if there are significant changes in the planned reuse (for example, a recreational use area becomes a residential use area). The RAOs for Parcel G were developed in conjunction with the regulatory agencies and are listed below by medium.

- **Soil RAOs:**
  1. Prevent exposure to organic and inorganic chemicals in soil at concentrations above remediation goals developed in the HHRA for the following exposure pathways:
     (a) Ingestion of, outdoor inhalation of, and dermal exposure to surface and subsurface soil
     (b) Ingestion of homegrown produce by residents in mixed-use blocks
  2. Prevent exposure to VOCs in soil gas at concentrations that would pose unacceptable risk via indoor inhalation of vapors. Remediation goals for VOCs to address exposure via indoor inhalation of vapors may be superseded based on COC identification information from soil gas surveys that may be conducted in the future. Future action levels would be established for soil gas, would account for vapors from both soil and groundwater, and would be calculated based on a cumulative risk level of 10^{-6} using the accepted methodology for risk assessments at HPS.

- **Groundwater RAOs:**
  1. Prevent exposure to VOCs in the A-aquifer groundwater at concentrations above remediation goals via indoor inhalation of vapors from groundwater.
  2. Prevent direct exposure to the groundwater that may contain COCs through the domestic use pathway (for example, drinking water or showering).
  3. Prevent or minimize exposure of construction workers to metals and VOCs in the A-aquifer groundwater at concentrations above remediation goals from dermal exposure and inhalation of vapors from groundwater.
  4. Prevent or minimize migration to the surface water of San Francisco Bay of chromium VI and nickel in A-aquifer groundwater that would result in concentrations of chromium VI above 50 micrograms per liter (µg/L), and nickel above 96.5 µg/L at the point of discharge to the Bay.

- **Radiologically Impacted Soil and Structures RAOs:**
  1. Prevent exposure to radionuclides of concern in concentrations that exceed remediation goals for all potentially complete exposure pathways.

Remediation goals for soil and groundwater and radiologically impacted sites are listed in Tables 4 and 5, respectively.

2.8 DESCRIPTION AND EVALUATION OF REMEDIAL ALTERNATIVES

To address contamination in soil and groundwater and radiologically impacted structures and soil, preliminary screening of **General Response Actions (GRAs)**(31) and process options was completed to refine the remedy selection process, as detailed in the Revised FS Report. Because the RAOs were developed based on the planned future land use, the GRAs were also developed considering the planned future land use of each redevelopment block. Five soil, four groundwater, and two radiological remedial approaches were retained as combinations of **preliminary remedial alternatives**(32) and were evaluated with respect to implementability, effectiveness, and relative cost (high/moderate/low). Detailed cost analysis was not performed as part of this preliminary screening.

Five remedial alternatives for soil (no action; ICs and maintained landscaping; excavation, disposal, maintained landscaping, and ICs; covers and ICs; and excavation, disposal, covers, and ICs), four remedial alternatives for groundwater (no action; long-term monitoring and ICs; in-situ treatment for VOCs, groundwater monitoring for metals and VOCs, and ICs; and in-situ treatment for VOCs and metals, groundwater monitoring, and ICs), and two remedial alternatives for radiologically impacted structures and soil (no action and survey, decontamination, excavation, disposal, and release) were retained for a detailed comparative analysis in accordance with the NCP.

Table 4. Remediation Goals for Soil and Groundwater

Exposure Scenario	Chemical of Concern	Remediation Goal / Basis
Soil		
Residential	Manganese	1,431 / HPAL
Recreational	Arsenic	11.1 / HPAL
	Benzo(a)pyrene	0.33 / RBC
Industrial	Arsenic	11.1 / HPAL
	Benzo(a)pyrene	0.33 / PQL
	Benzo(b)fluoranthene	1.76 / RBC
	Lead	800 / RBC
Construction Worker	Arsenic	11.1 / HPAL
	Benzo(a)pyrene	0.65 / RBC
	Lead	800 / RBC
	Manganese	6,889 / RBC
Groundwater		
Residential – Vapor Intrusion	Chloroform	1.0 / PQL
	Methylene Chloride	27 / RBC
	Trichloroethene	2.9 / RBC
Industrial – Vapor Intrusion	Benzene	0.63 / RBC
	Carbon Tetrachloride	0.50 / PQL
	Chloroform	1.2 / RBC
	Naphthalene	6.0 / RBC
	Tetrachloroethene	1.0 / PQL
	Trichloroethene	4.8 / RBC
	Xylene (total)	337 / RBC
Construction Worker – Trench Exposure	Arsenic	40 / RBC
	Benzene	17 / RBC
	Naphthalene	17 / RBC
	Tetrachloroethene	18 / RBC
	Xylene (total)	861 / RBC
Migration to Surface Water of Bay	Chromium VI	50 / SWC
	Nickel	96.5 / HGAL

Notes:

Soil remediation goals are in milligrams per kilogram (mg/kg).

Groundwater remediation goals are in micrograms per liter (µg/L).

Groundwater remediation goals for chromium VI and nickel are at the point of discharge to the Bay.

Exposures in the residential, industrial, and construction worker scenarios consider exposure to soil from 0 to 10 feet below ground surface. The recreational exposure scenario considers exposure to soil from 0 to 2 feet below ground surface.

Remediation goals for volatile organic compounds to address exposure via indoor inhalation of vapors may be superseded based on chemicals of concern identification information from soil gas surveys that may be conducted in the future. These future action levels would be established for soil gas, would account for vapors from both soil and groundwater, and would be calculated based on a cumulative risk level of 10^{-6} using the accepted methodology for risk assessments at the Hunters Point Shipyard.

HGAL Hunters Point groundwater ambient level
HPAL Hunters Point ambient level
PQL Practical quantitation limit
RBC Risk-based concentration
SWC Surface water criteria

Table 5. Remediation Goals for Radionuclides

Radionuclide	Surfaces (dpm/100 cm^2)		Soil (pCi/g)		Water (pCi/L)
	Equipment Waste [a]	Structures[b]	Construction Worker	Resident[d]	
Cesium-137	5,000	5,000	0.113	0.113	119
Cobalt-60	5,000	5,000	0.0602	0.0361	100
Plutonium-239	100	100	14	2.59	15
Radium-226	100	100	1[c]	1[c]	5
Strontium-90	1,000	1,000	10.8	0.331	8
Thorium-232	1,000	36.5	19	1.69	15
Hydrogen-3	5,000	5,000	4.23	2.28	20,000
Uranium-235 + daughters	5,000	488	0.398	0.195	30

Notes:

a Limits for removable surface activity are 20 percent of these values.

b Remediation goals are consistent with those issued in the Radiological TCRA Action Memo. Remediation goals meet the 25 millirem per year residual dose level consistent with 10 CFR Section 20.1402. Furthermore, for most radionuclides of concern, goals meet the 15 millirem per year residual dose level consistent with the 1997 EPA OSWER Directive (OSWER No. 9200.4-18). Of exception is the goal for Thorium-232 goal which due to detection limit technical limitations, corresponds to a dose of 25 mrem/yr.

c Goal is 1 pCi/g above background per agreement with EPA.

d All radiologically impacted soils in this parcel will be remediated according to Residential Remediation Goals.

ARAR Applicable or relevant and appropriate requirements
CFR Code of Federal Regulations
dpm/100cm^2 Disintegration per minute per one hundred square centimeters
EPA U.S. Environmental Protection Agency
millirem One thousandth of a rem (10^{-3})
mrem/yr Millirem per year
NRC Nuclear Regulatory Commission
OSWER Office of Solid Waste and Emergency Response
pCi/g Picocurie per gram
pCi/L Picocurie per liter
TCRA Time-Critical Removal Action

2.8.1 Description of Remedial Alternatives

Table 6 provides the major components, details, and cost of each remedial alternative identified for soil, groundwater, and radiologically impacted sites.

2.8.2 Comparative Analysis of Alternatives

A comparative analysis of alternatives with respect to the **nine evaluation criteria**(33) was completed and is provided below. Table 7 depicts a relative ranking of the alternatives.

Table 6. Remedial Alternatives

Remedial Alternative	Components	Details	Cost
Soil Remedial Alternatives			
S-1: No Action *No action for contaminated soil with no restriction on activities.*	▪ Existing soil	▪ No action	No cost
S-2: ICs and Maintained Landscaping *Impose ICs to limit land use and maintain landscaping of bare or disturbed areas with no cover.*	▪ ICs ▪ Maintained landscaping	▪ ICs, including proprietary controls, restrictive covenants, restricted land use, restricted activities, and prohibited activities, will be implemented to prevent exposure to areas where there is potential unacceptable risk posed by COCs in soil. Entire blocks would not be fenced, and areas within a block that are covered with a building footprint or existing cover (such as a parking lot) would not be fenced. ▪ Maintain landscaping for bare or minimally vegetated areas that have been disturbed by excavation or construction activities and not restored with a cover. ▪ Maintained landscaping would prevent exposure to asbestos that may be present in surface soil and transported by wind erosion.	Capital Cost: $155,000 Annual O&M Cost: $132,000 **Present-Worth Cost: $344,000**(34) Discount Rate: 3.1% Timeframe: 30 years Note: The costs presented are the proportion of the Parcel D FS costs allocated to Parcel G, based on land area (42%). The costs associated with this remedial alternative are within the -30/+50 range assumed for the original Parcel D in the FS.
S-3: Excavation, Disposal, Maintained Landscaping, and ICs *Excavation of contaminated soil followed by off-site disposal, maintained landscaping, and ICs.*	▪ Excavation of soils ▪ Off-site disposal ▪ Maintain landscaping ▪ ICs	▪ Excavate two areas within Parcel G where lead or PAHs exceed remediation goals. The two areas to be excavated are a total of approximately 168 cubic yards of soil. Assuming a 20-percent bulking during this removal, approximately 202 cubic yards of soil will be hauled off site for disposal. In addition, 325 cubic yards of existing soil stockpiles within Parcel G. ▪ Depth of excavations is the maximum depth for human health exposure scenarios based on the proposed planned reuse (2 feet for recreational areas; 10 feet for industrial and residential areas).	Capital Cost: $476,000 Annual O&M Cost: $122,000 **Present-Worth Cost: $706,000**(35) Discount Rate: 3.1% Timeframe: 30 years Note: The costs presented are the proportion of the overall Parcel D FS costs allocated to Parcel G. The general costs for Parcel G are based on land area (42% of D) whereas for the excavation, 21% of the areas requiring remediation and 58% of the stockpiles requiring removal were within the boundary of Parcel G. The costs associated with this remedial alternative are within the -30/+50 range assumed for the original Parcel D in the FS.

Table 6. Remedial Alternatives (Continued)

Remedial Alternative	Components	Details	Cost
Soil Remedial Alternatives (Continued)			
S-4: Covers and ICs *Install physical barriers, such as covers, to block exposure pathways to contaminated soil, followed by ICs.*	▪ Install covers ▪ ICs	▪ Install durable covers that will not break, erode, or deteriorate such that the underlying soil becomes exposed. Existing asphalt and concrete surfaces and buildings may be used as covers as long as they meet the durability requirement. ▪ All asphalt covers will be sealed at the start of construction and maintained by resealing once every 10 years or as needed to prevent opening an exposure pathway. ▪ Only ground outside of existing building footprints would be considered for covers. Such ground would be covered with a minimum of 4 inches of asphalt paving (industrial areas) or 2 feet of new soil (residential areas). ▪ Existing soil stockpiles would be hauled off site for disposal. ▪ Impose same ICs as those for Alternative S-2.	Capital Cost: $1,032,000 Annual O&M Cost: $588,000 **Present-Worth Cost: $1,952,000**(36) Discount Rate: 3.1% Timeframe: 30 years Note: The costs presented are the proportion of the Parcel D FS costs allocated to Parcel G, based on land area (42%) and volume of stockpiles (58%) at Parcel G. The costs associated with this remedial alternative are within the -30/+50 range assumed for the original Parcel D in the FS.
S-5: Excavation, Disposal, Covers, and ICs *Excavation of contaminated soil followed by off-site disposal, covers, and ICs.*	▪ Excavation of soil ▪ Off-site disposal ▪ Install covers ▪ ICs	▪ Excavate two areas within Parcel G where lead or PAHs exceed remediation goals. The two areas to be excavated are a total of approximately 168 cubic yards of soil. Assuming a 20-percent bulking during this removal, approximately 202 cubic yards of soil will be hauled off site for disposal. In addition, 325 cubic yards of existing soil stockpiles within Parcel G would also be hauled off site. These stockpiles pre-date the ongoing radiological TCRA. ▪ Depth of excavations is the maximum depth for human health exposure scenarios based on the proposed planned reuse (2 feet for recreational areas; 10 feet for industrial and residential areas). ▪ Install durable covers that would be maintained to minimize breakage, erosion, or deterioration such that the underlying soil becomes exposed. Standard construction practices for roads, sidewalks, and buildings would likely be adequate to meet this performance standard. Other examples of covers could include a minimum 4 inches of asphalt (or 2 inches of asphalt over a 4- to 6-inch base) or a minimum 2 feet of clean imported soil. The covers must achieve a full cover over the entire parcel. The cover design will be provided in the RD.	Capital Cost: $1,290,000 Annual O&M Cost: $599,000 **Present-Worth Cost: $2,555,000**(37) Discount Rate: 3.1% Timeframe: 30 years Note: The costs presented are the proportion of the overall Parcel D FS costs allocated to Parcel G. The general costs for Parcel G are based on land area (42% of D) whereas for the excavation, 21% of the areas requiring remediation and 58% of the stockpiles requiring removal were within the boundary of Parcel G. The costs associated with this remedial alternative are within the -30/+50 range assumed for the original Parcel D in the FS.

Table 6. Remedial Alternatives (Continued)

Remedial Alternative	Components	Details	Cost
Soil Remedial Alternatives (Continued)			
S-5: Excavation, Disposal, Covers, and ICs *Excavation of contaminated soil followed by off-site disposal, covers, and ICs (Continued)*		▪ Existing asphalt and concrete surfaces and buildings may be used as covers as long as they meet the durability requirement ▪ All asphalt covers will be sealed at the start of construction and maintained to meet the performance standard of preventing exposure to soil and being durable. ▪ Only ground outside of existing building footprints would be considered for covers.	
Groundwater Remedial Alternatives			
GW-1: No Action *No action for contaminated groundwater with no restriction on activities.*	▪ Existing groundwater	▪ No action	No cost
GW-2: Long-Term Monitoring and ICs *Implement monitoring to assess migration of chemicals and ambient conditions, followed by ICs.*	▪ Groundwater monitoring ▪ ICs	▪ Monitor VOCs and metals at strategically located monitoring wells to see if plumes are stable or mobile. Frequency and duration will be determined at a later date. ▪ ICs, including proprietary controls, restrictive covenants, restricted land use, restricted activities, and prohibited activities, will be implemented to prevent exposure to groundwater where there is potential unacceptable risk posed by COCs in groundwater.	Capital Cost: $280,000 Annual O&M Cost: $2,655,000 **Present-Worth Cost: $3,520,000**(38) Discount Rate: 3.1% Timeframe: 30 years Note: The costs are primarily associated with the plumes that originate in Parcel G; therefore, it is assumed that the costs associated with this remedial alternative are within the -30/+50 range assumed for the original Parcel D in the FS.

ED_006787_00013380-00040

Table 6. Remedial Alternatives (Continued)

Remedial Alternative	Components	Details	Cost
Groundwater Remedial Alternatives (Continued)			
GW-3 (A&B): In-Situ Treatment for VOCs, Groundwater Monitoring for Metals and VOCs, and ICs *Treat groundwater with VOCs with organic compound or ZVI, followed by monitoring and ICs.*	▪ Treatment ▪ Monitoring ▪ ICs	▪ Perform in-situ pilot tests to confirm performance and support design and layout of the groundwater treatment system for VOCs. ▪ Treat groundwater with an in-situ injection of an organic compound (GW-3A) or ZVI (GW-3B) to create conditions where VOCs are reduced in groundwater. ▪ Monitor VOCs and metals at strategically located monitoring wells to see if plumes are stable or mobile. Frequency and duration will be determined at a later date. ▪ Impose same ICs as those for Alternative GW-2. ICs will remain in place until remedial goals are achieved.	Capital Cost: $690,000 (A&B)/$3,110,000 (A&B) Annual O&M Cost: $1,350,000 (both A&B) **Present-Worth Cost: $2,450,000/$5,350,000**(39) Discount Rate: 3.1% Timeframe: 30 years Note: The costs are primarily associated with the plumes that originate in Parcel G; therefore, it is assumed that the costs associated with this remedial alternative are within the -30/+50 range assumed for the original Parcel D in the FS.
GW-4 (A&B): In-Situ Treatment for VOCs and Metals, Groundwater Monitoring, and ICs *Treat groundwater with VOCs and metals with organic compound or ZVI, following by monitoring and ICs.*	▪ Treatment ▪ Monitoring ▪ ICs	▪ Perform in-situ pilot tests to confirm performance and support design and layout of the groundwater treatment system for VOCs and metals. ▪ Treat groundwater with an in-situ injection of an organic compound (GW-4A) or ZVI (GW-4B) to create conditions where both VOCs and metals concentrations are reduced in groundwater to remedial goals. ▪ Monitor VOCs and metals at strategically located monitoring wells to see if plumes are stable or mobile. Frequency and duration will be determined at a later date. ▪ Impose same ICs as those for Alternative GW-2. ICs will remain in place until remedial goals are achieved.	Capital Cost: $1,040,000 (GW-4A)/$6,320,000 (GW-4B) Annual O&M Cost: $1,350,000 (for both A&B) **Present-Worth Cost: $2,870,000/$9,200,000**(40) Discount Rate: 3.1% Timeframe: 30 years Note: The costs are primarily associated with the plumes that originate in Parcel G; therefore, it is assumed that the costs associated with this remedial alternative are within the -30/+50 range assumed for the original Parcel D in the FS. Monitoring frequencies were assumed to estimate costs; the actual monitoring plan for groundwater will be presented in the remedial design.

Table 6. Remedial Alternatives (Continued)

Remedial Alternative	Components	Details	Cost
Radiologically Impacted Structures and Soil Remedial Alternatives			
R-1: No Action *No action for radiologically impacted structures and soil with no restriction on activities.*	▪ Existing structures ▪ Existing soil	▪ No action	No cost
R-2: Survey, Decontamination, Excavation, Disposal, and Release *Survey existing structures, followed by excavation and off-site disposal of contaminated materials and soil.*	▪ Survey ▪ Decontamination ▪ Excavation ▪ Disposal ▪ Release	▪ Survey structures, former building sites, and radiologically impacted areas. ▪ Decontaminate buildings. ▪ Excavate storm drain and sanitary sewer lines, and excavate at outdoor and radiologically impacted areas. ▪ Dispose of excavated materials and soils at off-site facilities. ▪ Conduct surveys to ensure that remediation goals are met for radiologically impacted sites scheduled for unrestricted release.	Capital Cost:: $15,200,000 Annual O&M Cost: None **Present-Worth Cost: $15,200,000**[41] Discount Rate: Not applicable Timeframe: Approximately 1 year Note: The costs presented are the proportion of the Parcel D FS costs that were allocated to Parcel G based on the number of radiological sites identified in Parcel G (50%). The costs associated with this remedial alternative are within the -30/+50 range assumed for the original Parcel D in the radiological addendum to the FS. Additionally, much of the estimated $15 million have already been expended under the Radiological TCRA for Parcel G. Actual post ROD implementation costs are expected to be significantly less assuming the successful attainment of the TCRA's action limits and unrestricted free release designation following the completion of the TCRA.

ED_006787_00013380-00042

Table 7. Relative Ranking of Remedial Alternatives

CERCLA Criteria	Soil					Groundwater				Radiologically Impacted Structures and Soil	
	S-1 No Action	S-2 Institutional Controls and Maintained Landscaping	S-3 Excavation, Disposal, Maintained Landscaping, and ICs	S-4 Covers and ICs	S-5*** Excavation, Disposal, Covers, and ICs	GW-1 No Action	GW-2 Long-Term Monitoring and Institutional Controls	GW-3 (A&B) In-Situ Treatment for VOCs, Groundwater Monitoring for Metals and VOCs, and ICs	GW-4 (A&B)*** In-Situ Treatment for VOCs and Metals, Groundwater Monitoring, and ICs	R-1 No Action	R-2*** Survey, Decontamination, Excavation, Disposal, and Release
Threshold Criteria											
Overall Protection of Human Health and the Environment	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Compliance with ARARs	N/A	Yes	Yes	Yes	Yes	N/A	Yes	Yes	Yes	N/A	Yes
Balancing Criteria											
Long-Term Effectiveness and Permanence	○	◔	◑	◕	●	○	◑	◕	●	○	●
Reduction in Toxicity, Mobility, or Volume through Treatment	○	○	○	○	○	○	○	◑	●	○	○
Short-Term Effectiveness	◕	◕	◕	◕	●	◑	◕	◕	◕	◕	◕
Implementability	●	◑	◕	◕	◕	●	◕	◕	◕	◕	◕
Present-Worth Cost ($M)	0	0.35	0.7	2	2.3	0	3.5	2.5 (GW-3A) 5.4 (GW-3B)	2.9 (GW-4A) 9.2 (GW-4B)	0	15
Modifying Criteria											
State Acceptance	○	○	○	◑	◕	○	◔	◕	●	○	●
Community Acceptance	○	◔	◔	◔	◕	○	◔	◑	◕	○	●

Notes: Fill symbol by quarters from open (poor) to full (excellent). *** Indicates preferred alternative

ED_006787_00013380-00043

Threshold Criteria

Overall Protection of Human Health and the Environment. The no-action alternatives for soil, groundwater, and radiologically impacted structures and soil do not achieve RAOs; therefore, they do not protect human health and the environment and are not considered further in this ROD. For soil, Alternatives S-2 through S-5 are protective of human health and the environment under the anticipated future land use of the site. For groundwater, Alternatives GW-2, GW-3A, GW-3B, GW-4A, and GW-4B are also protective of human health and the environment, although the degree of protection varies between the different alternatives. For radiologically impacted structures and soil, Alternative R-2 is protective of human health and the environment because it includes remediation that reduces exposure to radionuclides of concern.

Compliance with ARARs. ARARs do not apply to the no-action alternatives for soil, groundwater, and radiologically impacted structures and soil. For the remaining soil, groundwater, and radiological alternatives, a given alternative must either comply with ARARs or provide grounds for a waiver. Alternatives S-2 through S-5 complies with all pertinent ARARs. Alternatives GW-4A and GW-4B meet all of the pertinent ARARs. Alternatives GW-2, GW-3A, and GW-3B also meet all the pertinent ARARs, but with potentially less certainty. Alternative R-2 fulfills all ARARs related to radiologically impacted structures or soil.

Primary Balancing Criteria

Criteria Long-Term Effectiveness and Permanence. Alternative S-5 is rated the highest with respect to long-term effectiveness and permanence because it includes the effective and permanent remedies of removal and disposal off site from Alternatives S-3, and the parcel-wide covers and ICs from Alternative S-4. The long-term permanence is lower for Alternatives S-2 and S-4, which rely more heavily on ICs to meet the RAOs for the chemicals that are left in place, and higher for Alternatives S-3 and S-5, which include excavations that reduce the volume of on-site contaminants. Alternatives S-2 through S-5 would also provide long-term effectiveness in meeting the RAOs through reliance on continual enforcement of covenants to restrict use of property to maintain covers and access restrictions. Alternative S-3 provides long-term effectiveness and permanence for lead- and PAH-contaminated soil that is excavated, but relies on access restrictions for other COCs until ICs are implemented. Alternative S-4 provides a permanent cover prior to development, but does not permanently remove any contamination. Since no action will be taken under Alternative S-1, it does not provide a long-term effective or permanent solution to the soil risks present at the site.

Alternatives GW-4A and GW-4B would provide the highest level of long-term effectiveness and permanence, because COCs would be degraded or immobilized. Alternative GW-2 would provide a moderate level of effectiveness and permanence because groundwater plumes would be addressed only through ICs and monitoring to assess the potential migration of contaminants. Alternatives GW-3A and GW-3B would provide a higher level of long-term effectiveness and permanence than Alternative GW-2, because VOCs would be degraded or immobilized but metals would be addressed through ICs and monitoring, using the plume-specific attenuation factors and the chemical-specific trigger levels for metals. All alternatives, except for Alternative GW-1 provide an adequate and reliable level of controls.

Alternative R-2 would provide excellent long-term effectiveness and performance for radiologically impacted sites. Alternative R-1 provides very little long-term effectiveness and performance because it includes no action.

Reduction in Toxicity, Mobility, or Volume through Treatment. None of the alternatives proposed for remediating soils at Parcel D include treatment as a GRA; therefore, all of the alternatives (S-1 through S-5) are rated poor with respect to reducing the mobility, toxicity, or volume through treatment.

Alternatives GW-4A and GW-4B are rated the highest because they both reduce the toxicity and volume of contaminants by active treatment of VOCs, and the chromium VI and nickel plumes. The treatment would also reduce the mobility of the chromium VI and nickel plumes by in-situ precipitation of metals from their dissolved phase. Mobility of these contaminants would be monitored and human health exposure would be eliminated through ICs. Alternatives GW-3A and GW-3B would reduce the toxicity or volume of VOC contaminants through treatment, but would monitor the mobility of metals contamination through the groundwater monitoring program and eliminate exposure through the use of ICs. Alternative GW-2 would not reduce the toxicity or volume of contaminants, and would also monitor the mobility of the contamination through the groundwater monitoring program and eliminate exposure through the use of ICs. Alternative GW-1 does not reduce the mobility, toxicity, or volume of contaminants in groundwater.

Alternatives R-1 and R-2 are both rated poor because they do not include treatment that would result in the destruction, transformation, or irreversible reduction in radionuclides of concern mobility.

Short-Term Effectiveness. Alternative S-1 has the least effect on the community, remedial workers, or the environment by the implementation because it includes no actions. Alternatives S-2 and S-4 introduce less risk to these receptors because they do not include excavation, hauling, and disposal of soil that contains contamination. Alternatives S-3 and S-5 include removing and hauling soils with contamination that would pose potential risk to these receptors, although this risk is considered low and mitigation measures would be implemented.

All of the alternatives scored well in terms of short-term effectiveness according to the criteria. Alternatives GW-3A, GW-3B, GW-4A, and GW-4B pose a slightly greater risk through use of active in-situ treatment compared with Alternative GW-2. Alternatives GW-2, GW-3A, GW-3B, GW-4A, and GW-4B all pose a very low risk to workers during implementation of the groundwater monitoring program. Alternative GW-2 may pose a slightly greater risk than Alternatives GW-3A, GW-3B, GW-4A, and GW-4B because they require active on-site remediation. Alternative GW-1 has an excellent short-term effectiveness rating as no remedial actions are conducted under this alternative.

Alternative R-1 has the least effect on the community, remedial workers, or the environment because it includes no actions; therefore, it would not disturb the radionuclides of concern. Alternative R-2 includes removing and hauling contaminated soil and building materials

from the site. This alternative would pose a potential risk to the community, remedial workers, or the environment, although this risk is considered low and mitigation measures would be implemented.

Implementability. Distinction between the alternatives for implementability is minimal. Alternatives S-2 through S-4 requires implementation of ICs. Installing covers (Alternative S-4) and excavating soil (Alternatives S-3 and S-5) are standard technologies that are easy to implement. Alternative S-1 does not involve remedial technologies or ICs and requires no implementation.

Alternatives GW-1 and GW-2 have the highest rating and are technically the easiest to implement. Alternative GW-2 would require the greater resources to conduct the long-term groundwater monitoring program; however, these resources are readily available. Alternatives GW-3A, GW-3B, GW-4A, and GW-4B are more complex to implement because of the injection treatment; however, this treatment is expected to be a one-time injection that would reduce the resources required for groundwater monitoring as compared to Alternative GW-2. Alternatives GW-3A and GW-4A may be easier to implement because the injected substrates are slow-release compounds that continue to degrade or precipitate COCs over time, which increases the potential to react with contaminants as they disperse in the aquifer.

Alternative R-2 requires the use of standard technologies that are easy to implement. Alternative R-1 does not involve remedial technologies and requires no implementation. Therefore, the distinction between these two alternatives regarding implementability is minimal.

Cost. Alternatives S-1 requires no action; therefore, no costs are associated with this alternative. Alternative S-2 is the least costly ($344,000) because it includes no active remediation prior to property transfer. Alternative S-3 has moderate cost (approximately $706,000), and Alternatives S-4 and S-5 that include the covers as a process option have the greatest cost (approximately $1.95 million and $2.26 million).

Alternative GW-1 is rated the highest because it has no associated cost because no actions would be taken. Alternative GW-3A has a moderate cost (approximately $2.45 million) because of in-situ treatment of VOCs and long-term monitoring of metals. Alternative GW-2 has slightly higher costs (approximately $3.52 million), most of which is for the 30 years of long-term monitoring. Alternatives GW-4A has a similar cost (approximately $2.87 million). Alternative GW-3B has the second highest capital cost because of the cost of the ZVI additive treatment for VOC plumes ($5.35 million). Alternative GW-4B has the highest capital cost because of the cost of the ZVI additive treatment for both VOC and metal plumes ($9.2 million).

Alternative R-1 requires no action; therefore, no costs are associated with this alternative. Alternative R-2 is costly ($15 million) but effectively addresses all radiologically impacted sites. For Alternative R-2, much of the estimated $15 million costs have already been expended under the Radiological TCRA for Parcel G. Actual post ROD implementation costs are expected to be significantly less assuming the successful attainment of the TCRA's action limits and unrestricted free release designation following completion of the TCRA.

Modifying Criteria

State Acceptance. State involvement has been solicited throughout the CERCLA process. The State of California concurs with the Navy's selected remedial alternatives.

Community Acceptance. Community acceptance is evaluated based on comments received from the public during the public comment period for the proposed plan. The proposed plan was presented to the community and discussed during a public meeting on July 30, 2008. Comments were also gathered during the public comment period from July 23 through August 22, 2008. Attachment 2, the responsiveness summary, of this ROD addresses the public's comments and concerns about the selected remedial alternatives at Parcel G.

2.9 SELECTED REMEDY

2.9.1 Rationale for Selected Remedy

The Selected Remedy for Parcel G is Alternative S-5 (excavation, disposal, covers, and ICs) for soil; Alternative GW-4A&B (treatment, monitoring, and ICs) for groundwater; and Alternative R-2 (survey, decontamination, excavation, disposal, and release) for radiologically impacted structures and soil. The Selected Remedy provides the best balance of tradeoffs with respect to the nine criteria. The remedy for soil meets the RAOs by excavating and disposing of contaminated soils with lead and PAHs at concentrations exceeding remediation goals, thus removing the source of contamination. Additionally, the entire parcel will be covered to cut off potential exposure pathways to arsenic, manganese, and any remaining COCs in soils. The remedy for groundwater meets the RAOs by treating groundwater to reduce concentrations of VOCs and metals to below remediation goals, thus removing the source of contamination. Monitoring will be implemented as needed to confirm the treatment was successful for up to 30 years. The remedy for radiologically impacted sites meets the RAOs by identifying and decontaminating any impacted structures. Additionally, remaining contaminated materials, storm drains and sewers, and soils would be excavated and disposed of off site, thereby removing the source of contamination.

ICs, including restrictive covenants regulating restricted land use, restricted activities, and prohibited activities, will be implemented to prevent exposure to areas where there is potential unacceptable risk posed by COCs in soil and groundwater. ICs will remain in place as long as contamination remains at the site above levels that allow for unlimited use and unrestricted exposure.

2.9.2 Description of Selected Remedy

The Selected Remedy for soil consists of removing soil in selected areas where COCs exceed remediation goals and disposing of excavated soil at an off-site facility. Two areas are planned for excavation within Parcel G with a total of approximately 168 cubic yards of soil to be removed. Assuming a 20-percent bulking during this removal, approximately 202 cubic yards of soil will be hauled off site for disposal. In addition, 325 cubic yards of existing soil stockpiles

that may contain hazardous levels of contamination but pre-date the radiological TCRA will be hauled off site for disposal as part of this alternative.

Across all of Parcel G, durable covers will be applied as physical barriers to cut off potential exposure to metals in soil. Existing asphalt and concrete surfaces (repaired as necessary to be durable) and buildings will act as covers. The type of new covers installed will be consistent with the redevelopment plan (for example, soil covers may be used for open space areas or asphalt for industrial areas). The cover design will be provided in the RD and will include plans for inspection and maintenance. Future landowners will need approval from the regulatory agencies to modify the soil covers.

The Selected Remedy for groundwater consists of actively treating VOCs in groundwater using an injected biological substrate or ZVI to destroy the VOCs in the groundwater plumes at IR-09, IR-33, and IR-71. The treatment will also minimize migration of metals in the groundwater plumes at IR-09 and IR-33, within Parcel G (see Figure 7) and discharge of these metals into the bay at levels exceeding remediation goals. A treatability study is currently being conducted in Parcel G using ZVI injection points in the plumes associated with IR-09, IR-33 and IR-71. Groundwater monitoring will occur in and around the remediation areas and also in downgradient locations, as necessary. The locations of monitoring points and the monitoring frequency will be determined in the RD. The RD will use current information on the plume extent and concentration to select the actual injection parameters. The monitoring plan will be flexible to allow modifications as data are collected.

Soil vapor surveys will be conducted after the groundwater cleanup actions for the following purposes:

- to evaluate potential vapor intrusion risks,
- to identify COCs for which risk-based numeric action levels for VOCs in soil gas would be established (based on a cumulative risk of 10^{-6}),
- to identify where the initial areas requiring institutional controls (ARIC) for VOCs would be retained and where they would be released, and
- to evaluate the need for additional remedial action in order to remove ARICs.

The Selected Remedy for radiologically impacted soil and structures consists of surveying radiologically impacted buildings and former building sites with documented radiological impacts for unrestricted release. Unrestricted release means that a property can be used for any residential or commercial purpose once regulatory requirements have been met. Decontamination will be performed and buildings will be dismantled if necessary. Remaining radiologically impacted storm drains and sanitary sewer lines throughout Parcel G will be removed and disposed of off site.

The Navy has continued to conduct its ongoing Hunters Point Shipyard Radiological Removal Action. As of the date of this Record of Decision the Navy has completed the removal of radiologically impacted storm and sanitary sewer piping within Parcel G. Active remediation efforts continue in less than 30% of the trench segments in Parcel G. Draft survey unit project reports are currently being prepared for distribution.

Radiological surveys, remediation, and final status surveys have been completed in all Parcel G buildings. Furthermore, Buildings 364, 365, and 408 were demolished, have had Final Status Surveys completed on their building foundations and are now having appropriate closeout reports written. Remediation efforts continue for soil areas outside the former Building Sites of 364, 365, and 317.

A Removal Action Completion Report will summarize all Building, Storm and Sewer Drain Final Status Survey Reports and Survey Unit Package Reports. Following concurrence on the Radiological Removal Action Completion Report for Parcel G, unrestricted release is to be granted. Should unrestricted release not be achieved, further remedial actions will occur to meet remedial goals established in the ROD.

Each radiologically impacted site will be investigated through the CERCLA process. If the final report of the site investigation is approved by the stakeholders and the site is determined to require no further action, the classification of "radiologically impacted" may be removed.

The survey and removals will occur before any covers are installed as part of Alternative S-5. Buildings, former building sites, and excavated areas will be surveyed after cleanup is completed to ensure that no residual radioactivity is present at levels above the remediation goals. Excavated soil, building materials, and drain material from radiologically impacted sites will be screened and radioactive sources and contaminated soil will be removed and disposed of at an off-site low-level radioactive waste facility.

Institutional Controls$_{(42)}$ (ICs) will be implemented to prevent exposure to areas where potential unacceptable risk is posed by COCs in soil and groundwater. ICs are legal and administrative mechanisms used to implement land use restrictions that are used to limit the exposure of future landowner(s) or user(s) of the property to hazardous substances present on the property, and to ensure the integrity of the remedial action. ICs are required on a property where the selected remedial cleanup levels result in contamination remaining at the property above levels that allow for unlimited use and unrestricted exposure. ICs will be maintained until the concentrations of hazardous substances in soil and groundwater are at such levels to allow for unrestricted use and exposure. Implementation of ICs includes requirements for monitoring and inspections, and reporting to ensure compliance with land use or activity restrictions.

The Navy has determined that it will rely on proprietary controls in the form of environmental restrictive covenants as provided in the "Memorandum of Agreement Between the United States Department of the Navy and the California Department of Toxic Substances Control" and attached covenant models (Navy and DTSC 2000) (hereinafter referred to as the "Navy/DTSC MOA").

More specifically, land use and activity restrictions will be incorporated into two separate legal instruments as provided in the Navy/DTSC MOA:

1. Restrictive covenants included in one or more Quitclaim Deeds from the Navy to the property recipient.
2. Restrictive covenants included in one or more "Covenant to Restrict Use of Property" entered into by the Navy and DTSC as provided in the Navy/DTSC MOA and consistent with the substantive provisions of California Code of Regulations (Cal. Code Regs.) tit. 22 § 67391.1.

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

The activity restrictions in the "Covenant(s) to Restrict Use of Property" and Deed(s) shall be addressed in the Parcel G Risk Management Plan ("Parcel G RMP") that may be prepared by the City and County of San Francisco and approved by the Navy and FFA signatories and/or the Land Use Control Remedial Design (LUC RD) report that would be reviewed and approved by the FFA signatories. The Parcel G RMP and/or LUC RD shall be referenced in the applicable Covenant to Restrict Use of Property and Deed. The RMP and/or LUC RD shall specify soil and groundwater management procedures for compliance with the remedy selected in the Parcel G ROD. The Parcel G RMP and/or LUC RD shall identify the roles of local, state, and federal government in administering the Parcel G RMP and/or LUC RD and shall include, but not be limited to, procedures for any necessary sampling and analysis requirements, worker health and safety requirements, and any necessary site-specific construction and/or use approvals that may be required.

Land use restrictions will be applied to specified portions of the property and described in findings of suitability to transfer, findings of suitability for early transfer, "Covenant(s) to Restrict Use of Property" between the Navy and DTSC, and any Quitclaim Deed(s) conveying real property containing Parcel G at HPS.

Access

The Deed and Covenant shall provide that the Navy and FFA signatories and their authorized agents, employees, contractors and subcontractors shall have the right to enter upon HPS Parcel G to conduct investigations, tests, or surveys; inspect field activities; or construct, operate, and maintain any response or remedial action as required or necessary under the cleanup program, including but not limited to monitoring wells, pumping wells, treatment facilities, and cap/containment systems.

Implementation

The Navy shall address and describe institutional control implementation and maintenance actions including periodic inspections and reporting requirements in the preliminary and final RD reports to be developed and submitted to the FFA signatories for review pursuant to the FFA (see "Navy Principles and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions" attached to January 16, 2004 Department of Defense memorandum titled "Comprehensive Environmental Response, Compensation and Liability Act [CERCLA] Record of Decision [ROD] and Post-ROD Policy"). The preliminary and final RD reports are primary documents as provided in Section 7.3 of the FFA.

The Navy is responsible for implementing, maintaining, reporting on, and enforcing land use controls. Although the Navy may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Navy shall retain ultimate responsibility for remedy integrity.

Activity Restrictions that Apply throughout Parcel G

The following sections describe the institutional control objectives to be achieved through activity restrictions throughout Parcel G in order to ensure that any necessary measures to protect human health and the environment and the integrity of the remedy have been undertaken.

Restricted Activities

The following restricted activities throughout HPS Parcel G must be conducted in accordance with the "Covenant(s) to Restrict Use of Property", Quitclaim Deed(s), the Parcel G RMP, the LUC RD report, and if required, any other workplan or document approved in accordance with these referenced documents and must be further reviewed and approved by the FFA signatories:

a. "Land disturbing activity" which includes but is not limited to: (1) excavation of soil, (2) construction of roads, utilities, facilities, structures, and appurtenances of any kind, (3) demolition or removal of "hardscape" (for example, concrete roadways, parking lots, foundations, and sidewalks), (4) any activity that involves movement of soil to the surface from below the surface of the land, and (5) any other activity that causes or facilitates the movement of known contaminated groundwater.

b. Alteration, disturbance, or removal of any component of a response or cleanup action (including but not limited to pump-and-treat facilities, shoreline protection, and soil cap/containment systems); groundwater extraction, injection, and monitoring wells and associated piping and equipment; or associated utilities.

c. Extraction of groundwater and installation of new groundwater wells.

d. Removal of or damage to security features (for example, locks on monitoring wells, survey monuments, fencing, signs, or monitoring equipment and associated pipelines and appurtenances).

Prohibited Activities

The following activities are prohibited throughout HPS Parcel G:

a. Growing vegetables or fruits in native soil for human consumption.

b. Use of groundwater.

Proposed Activity Restrictions Relating to VOC Vapors at Specific Locations within Parcel G

Any proposed construction of enclosed structures must be approved in accordance with the "Covenant(s) to Restrict Use of the Property," Quitclaim Deed(s), LUC RD, and the RMP with approval of the FFA signatories prior to the conduct of such activity within the ARIC for VOC vapors to ensure that the risks of potential exposures to VOC vapors are reduced to acceptable levels that are adequately protective of human health. Initially, the ARIC will include all of Parcel G. This can be achieved through engineering controls or other design alternatives that meet the specifications set forth in the ROD, remedial design reports, LUC RD report, and the RMP. The ARIC for VOC vapors may be modified by the FFA signatories as the soil contamination areas and groundwater contaminant plumes that are producing unacceptable vapor inhalation risks are reduced over time to less than 10^{-6}.

Additional Land Use Restrictions for Areas Designated for Open Space, Educational/Cultural, and Industrial Reuse

The following restricted land uses for property areas designated for open space, educational/cultural, and industrial land uses in the San Francisco Redevelopment Agency's reuse plan must be reviewed and approved by the FFA Signatories in accordance with the "Covenants to Restrict Use of the Property," Quitclaim Deed(s), LUC RD, and the RMP for each parcel prior to use of the property for any of the following restricted uses:

a. A residence, including any mobile home or factory built housing, constructed or installed for use as residential human habitation,

b. A hospital for humans,

c. A school for persons under 21 years of age, or

d. A daycare facility for children.

2.9.3 Expected Outcomes of the Selected Remedy

For soil, the expected outcome is that excavation will remove contaminated soil that exceeds remediation goals for lead and PAHs. Residual risks from these and other COCs would be mitigated through the use of durable covers and access restrictions to restrict exposure. Following implementation of the remedy, the property will be suitable for the uses specified in the redevelopment plan.

The groundwater remedy is expected to achieve remediation goals by actively treating VOCs and metals in groundwater to restore the aquifer quality by reducing or immobilizing the mass of contaminants of concern in groundwater to levels that do not pose a threat to human health through the inhalation exposure pathway. A treatability study using ZVI injections is currently underway in Parcel G. Although treatment of groundwater is expected to reduce VOC vapors released from groundwater, ARICs for vapor intrusion may be needed at some locations at Parcel G. Furthermore, the Navy intends to permanently prohibit the use of groundwater at Parcel G through the use of ICs.

For radiological contamination, the remedy includes surveys, decontamination, excavation, and off-site disposal. The removal of contaminants from radiologically impacted buildings and former building sites with documented radiological impacts, and removal of potential radiologically impacted sanitary and storm sewers and soils, are expected to result in a reduction of the potential risks to levels below remediation goals associated with exposure to radionuclides of concern. The HRA classified several buildings, former building sites, and land areas in Parcel G as "radiologically impacted." Each of the radiologically impacted sites were investigated through the CERCLA process. If the final report of the site investigation is approved by the stakeholders and the site is determined to require no further action, the classification of "radiologically impacted" may be removed.

2.9.4 Statutory Determinations

In accordance with the NCP, the Selected Remedy meets the following statutory determinations.

- **Protection of Human Health and the Environment** – The Selected Remedy for soil will protect human health and the environment through excavation of contaminated soil, preventing exposure to remaining metals by installing durable covers, and the implementation of ICs. The Selected Remedy for groundwater will provide long-term protection by reducing concentrations of VOCs and metals through treatment.

- **Compliance with ARARs** – CERCLA § 121(d)(1) states that remedial actions on CERCLA sites must attain (or the decision document must justify the waiver of) any federal or more stringent state environmental standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate. Chemical-specific ARARs are health- or risk-based numerical values or methods that, when applied to site-specific conditions, establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the environment. Location-specific ARARs are restrictions on the concentrations of hazardous substances or on conducting activities solely because they are in specific locations. Specific locations include floodplains, wetlands, historic places, and sensitive ecosystems or habitats. Action-specific ARARs are technology- or activity-based requirements or limitations for remedial activities. These requirements are triggered by the particular remedial activities conducted at the site. The remedial alternatives selected by the Navy will meet all chemical-, location-, and action-specific ARARs. The ARARs that will be met by the preferred alternatives are summarized in Attachment 1.

- **Cost-Effectiveness** – The Selected Remedy would provide overall protectiveness proportional to their costs and are therefore considered cost-effective.

- **Utilization of Permanent Solution and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable** – The Navy has determined that because soil contamination is widely dispersed across the installation a containment remedy, combined with excavation of small quantities of more highly contaminated soil, represents the maximum extent to which permanent solutions can be used in a cost effective manner. The in situ treatment of contaminated groundwater meets the preference for alternative treatment technologies. The Selected Remedy is expected to be permanent and effective in light of the anticipated land use.

- **Preference for Treatment as a Principal Element** – The Selected Remedy for soil does not satisfy the statutory preference for treatment as a principal element of the remedy because there is no cost-effective means of treating the large quantity of low-level soil contamination and the small quantities of soil to be excavated cannot be treated in a cost-effective manner. The soil remedy will not reduce the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants through treatment for the contaminated soil remaining on site but will provide for the off-site disposal of more highly contaminated soil at a facility which will minimize the potential for those hazardous substances to migrate or otherwise pose a threat. The Selected Remedy for groundwater satisfies the statutory preference for treatment as a principal element of the remedy; that is, it reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment. The Selected Remedy for radiologically impacted soil and remediation of radiologically impacted building materials does not include treatment as a principal element of the remedy because there is no available technology for the reduction in the toxicity or volume of radionuclides in contaminated soil or building materials.

- **Five-Year Review Requirements** – Because the Selected Remedy will result in hazardous substances, pollutants, or contaminants remaining on site above levels that allow for unrestricted use, a statutory review will follow the schedule of the on-going site-wide five year review after the remedial action is initiated to ensure the remedy is protective of human health and the environment.

2.10 COMMUNITY PARTICIPATION

Community participation at HPS includes a Restoration Advisory Board (RAB), public meetings, public information repositories, newsletters and fact sheets, public notices, and an IR Program website. The Community Involvement Plan for HPS provides detailed information on community participation for the IR Program and documents interests, issues, and concerns raised by the community regarding ongoing investigation and cleanup activities at HPS.

In the late 1980s, the Navy formed a technical review committee (TRC) consisting of the Navy, community members, and regulatory agency representatives. The TRC met to discuss environmental issues pertaining to HPS. In 1993, pursuant to the Defense Environmental Restoration Program, Title 10 United States Code § 2705(d), the Navy formed the RAB, which replaced the TRC. The RAB consists of members of the Navy, the community, and the regulatory agencies. RAB meetings are held on the fourth Thursday of every month and are open to the public to provide opportunity for public comment and input. Documents and relevant information relied upon in the remedy selection process will be made available for public review in the public information repositories listed below or on the **IR Program website**(43).

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

Anna E. Waden Bayview Library
5075 Third Street
San Francisco, California 94124
Phone: (415) 355-5757

For access to the Administrative Record or additional information on the IR Program contact:

Mr. Keith Forman
Hunters Point Shipyard BRAC Environmental Coordinator
Base Realignment and Closure Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310
Phone: (619) 532-0913
e-mail: keith.s.forman@navy.mil

In accordance with CERCLA §§ 113 and 117, the Navy provided a public comment period from July 23, 2008, to August 22, 2008, for the proposed remedial action described in the Proposed Plan for Parcels G, D, D-2, and UC-1. A public meeting to present the Proposed Plan was held at 6:30 to 8:00 p.m. on July 30, 2008. Public notice of the meeting and availability of documents was placed in the *San Francisco Examiner* on July 27, 2008.

3. RESPONSIVENESS SUMMARY

The responsiveness summary is the third component of a ROD; its purpose is to summarize information about the views of the public and support agency on both the remedial alternatives and general concerns about the site submitted during the public comment period. It documents in the record how public comments were integrated into the decision-making process. The participants in the public meeting, held on July 30, 2008, included community members, RAB members, and representatives of the Navy, EPA, DTSC, and the Water Board. Questions and concerns received during the meeting were addressed at the meeting and are documented in the meeting transcript. Responses to comments provided at the meeting and received during the public comment period by the Navy, EPA, DTSC, or the Water Board are included in the responsiveness summary (Attachment 2).

ATTACHMENT 1
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Federal Chemical-Specific[a] Applicable or Relevant and Appropriate Requirements
Record of Decision for Parcel G, Hunters Point Shipyard, San Francisco, California

Requirement	Prerequisite	Citation[b]	ARAR Determination	Comments
Soil				
Resource Conservation and Recovery Act (Title 42 U.S.C. Chapter 82, §§ 6901-6991[i])[c]				
Defines RCRA hazardous waste. A solid waste is characterized as toxic, based on TCLP, if the waste exceeds the TCLP maximum concentrations.	Waste	Cal. Code Regs. tit. 22, §§ 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100	Applicable	These regulations are applicable to activities that generate waste in order to determine if the waste is hazardous. The Navy will determine if the excavated soil meets the definition of non-RCRA hazardous waste when it is generated.
Uranium Mill Tailings Radiation Control Act (42 U.S.C., ch. 88, § 192.02, 192.129[a] and [b], 192.42)[c]				
Standards for Cleanup of Land and Buildings Contaminated with Radium-226, Radium-228, and Thorium from Inactive Uranium Processing Sites. As a result of residual radioactive materials from any designated processing site: (a) The concentration of radium-226 in land averaged over any area of 100 square meters shall not exceed the background level by more than: (1) 5 pCi/g, averaged over the first 15 cm of soil below the surface, and (2) 15 pCi/g, averaged over 15 cm-thick layers of soil more than 15 cm below the surface.	UMTRCA sites (radioactivity above 5 pCi/g).	40 CFR § 192.12(a)	Relevant and Appropriate	This requirement is relevant and appropriate.

ED_006787_00013380-00057

Requirement	Prerequisite	Citation[b]	ARAR Determination	Comments
Soil (Continued)				
Radiological Criteria for License Termination				
A site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in TEDE to an average member of the critical group that does not exceed 25 mrem/y, including that from groundwater sources of drinking water, and that the residual radioactivity has been reduced to ALARA.	Existing NRC-licensed radiologically contaminated site.	10 CFR § 20.1402	Relevant and Appropriate	This ARAR is relevant and appropriate for an unrestricted land use scenario. U.S. EPA does not believe this NRC regulation is protective of human health and the environment, and the HPS cleanup goals are more protective. This regulation is an ARAR only for radiologically impacted sites that are undergoing TCRAs and any additional remedial action required for those sites.
Groundwater				
Resource Conservation and Recovery Act (Title 42 United States Code Chapter 82, §§ 6901-6991[i])[c]				
Groundwater protection standards: Owners/operators of RCRA treatment, storage, or disposal facilities must comply with conditions in this section that are designed to ensure that hazardous constituents entering the groundwater from a regulated unit do not exceed the concentration limits for contaminants of concern set forth under Cal. Code Regs. tit. 22, § 66264.94 in the uppermost aquifer underlying the waste management area of concern at the POC.	A regulated unit that receives or has received hazardous waste before July 26, 1982, or regulated units that ceased receiving hazardous waste prior to July 26, 1982 where constituents in or derived from the waste may pose a threat to human health or the environment.	Cal. Code Regs. tit. 22, § 66264.94(a)(1), (a)(3), (c), (d), and (e)	Relevant and appropriate	The lowest concentration determined to be technologically and economically achievable is an ARAR for the A-aquifer. The lowest concentration limit greater than background that is technologically and economically achievable for the A-aquifer is based on unacceptable risk from the vapor intrusion pathway.

ED_006787_00013380-00058

Federal Chemical-Specific Applicable or Relevant and Appropriate Requirements
Record of Decision for Parcel G, Hunters Point Shipyard, San Francisco, California (Continued)

Requirement	Prerequisite	Citation[b]	ARAR Determination	Comments
Surface Water				
Clean Water Act of 1977, as Amended (33 U.S.C., ch. 26, §§ 1251–1387)[c]				
Surface water quality standards.	Discharges to waters of the United States.	40 CFR § 131.38	Applicable	These standards, known as the CTR, are applicable surface water ARARs. The Navy has identified the CTR as ARARs for HPS Parcel G because groundwater discharges to the Bay. The Navy will meet these ARARs for contaminants that do not have a promulgated standard in Table 3-3 of the Basin Plan at the interface of the A-aquifer and the Bay. No groundwater response action is necessary for the B-aquifer; therefore, these standards are not ARARs for the B-aquifer.
Air				
Clean Air Act (42 U.S.C., ch. 85, §§ 7401–7671)[c]				
Emissions of radionuclides into the ambient air from Department of Energy facilities shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/y.	Facility owned or operated by the Department of Energy that emits any radionuclide other than radon-222 and radon-220 into the air.	40 CFR § 61.92	Relevant and Appropriate	Not applicable because Parcel G is not a Department of Energy site but may be relevant and appropriate if there is the potential for airborne emissions of radionuclides other than radon. Only an ARAR until cleanup action is completed. Not an ARAR for residual contamination after cleanup.

ED_006787_00013380-00059

Requirement	Prerequisite	Citation[b]	ARAR Determination	Comments
		Air (Continued)		
Clean Air Act (42 U.S.C., ch. 85, §§ 7401–7671)[c]				
Emissions of radionuclides, including iodine, into the ambient air from a facility regulated under this subpart shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/y. Emissions of iodine into the ambient air from a facility regulated under this subpart shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 3 mrem/y.	Facilities owned or operated by any federal agency other than the Department of Energy and not licensed by the NRC.	40 CFR § 61.102	Applicable	The requirements are applicable since fugitive dust may be generated during implementation of remedial action at Parcel G. The exposure to the public due to remedial action operations at Parcel G is not likely to exceed 10 mrem/y because of the following reasons: (1) The concentrations of any radionuclide in dust are relatively low as previously measured in air samples, and (2) the concentration of any radionuclide in dust will be reduced by use of engineering controls such as wetting of soils.

Notes:

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

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

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

§ Section
§§ Sections
ALARA As low as reasonably achievable
ARAR Applicable or relevant and appropriate requirement
Cal. Code Regs. California Code of Regulations
CFR Code of Federal Regulations
cm Centimeter
CTR California Toxics Rule
HPS Hunters Point Shipyard
mrem/y Millirem per year
NRC Nuclear Regulatory Commission
pCi/g PicoCurie per gram
POC Point of compliance
RCRA Resource Conservation and Recovery Act
TBC To be considered
TCLP Toxicity characteristic leaching procedure
TEDE Total effective dose equivalent
tit Title
UMTRCA Uranium Mill Tailings Radiation Control Act
U.S.C. United States Code

ED_006787_00013380-00060

State Chemical-Specific[a] Applicable or Relevant and Appropriate Requirements
Record of Decision for Parcel G, Hunters Point Shipyard, San Francisco, California

Requirement	Prerequisite	Citation[b]	Preliminary ARAR Determination	Comments
Groundwater				
State and Regional Water Quality Control Boards[c]				
Incorporated into all regional board basin plans. Designates all groundwater and surface waters of the state as drinking water except where the total dissolved solids are greater than 3,000 parts per million, the well yield is less than 200 gallons per day from a single well, the water is a geothermal resource or in a water conveyance facility, or the water cannot reasonable be treated for domestic use using either best management practices or best economically achievable treatment practices.	Waters of the state	SWRCB Res. 88-63 (Sources of Drinking Water Policy)	Applicable	The Navy has evaluated the groundwater characteristics in the A-aquifer and B-aquifer at HPS Parcel G against the criteria listed in SWRCB Res. 88-63. The Navy has determined that groundwater in the A-aquifer is not a potential source of drinking water and groundwater in the B-aquifer has a low potential for use as a drinking water source. The Water Board has concurred in the Navy's determination that groundwater in the A-aquifer is not a potential drinking water source.
Describes the water basins in the San Francisco Bay Region beneficial uses of groundwater and surface water, establishes water quality objectives, including narrative and numerical standards and establishes implementation plans to meet the water quality objectives and protect beneficial uses, and incorporates statewide water quality control plans and policies.	Waters of the state	Comprehensive Water Quality Control Plan for the San Francisco Region (Basin Plan) Chapters 2 and 3 (California Water Code § 13240), except the MUN designation for the A-aquifer	Applicable	The substantive groundwater provisions of Chapters 2 and 3 of the basin plan, except the MUN designation, are ARARs. According to the basin plan, which incorporates SWRCB Res. 88-63, A-aquifer groundwater at HPS Parcel G is not a potential drinking water source. The only beneficial use of the A-aquifer groundwater is freshwater replenishment of San Francisco Bay. The B-aquifer groundwater has a low potential for use as a drinking water source.
Authorizes SWRCB and the Water Board to establish in water quality control plans, beneficial uses and numerical and narrative standards to protect both surface water and groundwater quality.	Waters of the state	California Water Code, div. 7, §§ 13241, 13243, 13263(a), 13269, and 13360 (Porter-Cologne Act)	Applicable	The Navy accepts the substantive provisions of §§ 13241, 13243, 13263(a), 13269, and 13360 of the Porter-Cologne Act enabling legislation, as implemented through the beneficial uses, water quality objectives, waste discharge requirements, and promulgated policies of the San Francisco Basin Plan as ARARs.

ED_006787_00013380-00061

Requirement	Prerequisite	Citation[b]	Preliminary ARAR Determination	Comments
Establishes the policy that high-quality waters of the state "shall be maintained to the maximum extent possible" consistent with the "maximum benefit to the people of the State." It provides that whenever the existing quality of water is better than that required by applicable water quality policies, such existing high-quality water will be maintained until it has been demonstrated to the state that any change will be consistent with maximum benefit to the people of the state, will not unreasonably affect present and anticipated beneficial use of such water, and will not result in water quality less than that prescribed in the policies. It also states that any activity that produces or may produce a waste or increased volume or concentration of waste and that discharges or proposes to discharge to existing high-quality waters will be required to meet waste-discharge requirements that will result in the best practicable treatment or control of the discharge.		Statement of Policy With Respect to Maintaining High Quality of Waters in California, SWRCB Res. 68-16	Not an ARAR	The DON has determined that SWRCB Res. 68-16 is not a chemical-specific ARAR for determining remedial action goals, but it is an action-specific ARAR for regulating discharged treated groundwater to surface water. This remedial action does not include discharge of treated groundwater to surface water. The DON has determined that further migration of VOCs through groundwater is not a discharge governed by the language in Res. 68-16. More specifically, the language of SWRCB Res. 68-16 indicates that it is prospective in intent, applying to new discharges in order to maintain existing high-quality waters. It is not intended to apply to restoration of waters that are already degraded. The state does not agree with the Navy's determination that SWRCB Res. 92-49 and 68-16 are not ARARs for this response action. SWRCB has interpreted the term "discharges" in the *California Water Code* to include the movement of waste from soils to groundwater and from contaminated to uncontaminated water (SWRCB 1994). However, the state agrees that the proposed action would comply with SWRCB Res. 92-49 and 68-16. The state does not intend to dispute the ROD, but reserves its rights if implementation of the provisions at Cal. Code Regs. tit. 22 is not as stringent as state implementation of the provisions at Cal. Code Regs. tit. 23. Because Cal. Code Regs. tit. 22 regulation is part of the state's authorized hazardous waste control program, it is also the state's position that Cal. Code Regs. tit. 22, § 66264.94 is a state ARAR and not a federal ARAR (*United States v. State of Colorado*, 990 F.2d 1565 [1993]).

ED_006787_00013380-00062

Requirement	Prerequisite	Citation[b]	Preliminary ARAR Determination	Comments
Describes requirements for Water Board oversight of investigation and cleanup and abatement activities resulting from discharges of hazardous substances. The Water Board may decide on cleanup and abatement goals and objectives for the protection of water quality and beneficial uses of water within each region. Establishes criteria for "containment zones" where cleanup to established water-quality goals is not economically or technically practicable.		Policies and procedures for investigation and cleanup and abatement of discharges under Cal.Water Code § 13304, SWRCB Res. 92-49	Not an ARAR	SWRCB Res. 92-49 is not an ARAR for groundwater cleanup because the provisions of Cal. Code Regs. tit. 22, § 66264.94 (a)(1), (a)(3), (c), (d), and (e) have been determined to be a federal ARAR and SWRCB Res. 92-49 is not more stringent. The state does not agree with the Navy's determination that SWRCB Res. 92-49 and 68-16 are not ARARs for this response action. SWRCB has interpreted the term "discharges" in the *California Water Code* to include the movement of waste from soils to groundwater and from contaminated to uncontaminated water (SWRCB 1994). However, the state agrees that the proposed action would comply with SWRCB Res. 92-49 and 68-16. The state does not intend to dispute the ROD, but reserves its rights if implementation of the provisions at Cal. Code Regs. tit. 22 is not as stringent as state implementation of the provisions at Cal. Code Regs. tit. 23. Because Cal. Code Regs. tit. 22 regulation is part of the state's authorized hazardous waste control program, it is also the state's position that Cal. Code Regs. tit. 22, § 66264.94 is a state ARAR and not a federal ARAR (*United States v. State of Colorado*, 990 F.2d 1565 [1993]).

ED_006787_00013380-00063

Requirement	Prerequisite	Citation[b]	Preliminary ARAR Determination	Comments
Surface Water				
Surface water quality standards.	Marine water with salinities equal to or greater than 10 ppt 95 percent of the time	Basin Plan Table 3-3	Applicable	These standards are applicable to the Bay. The Navy has identified Table 3-3 an ARAR for HPS Parcel G because groundwater discharges to the Bay. The Navy will meet these ARARs in the Bay at the interface of the A-aquifer and the Bay. No groundwater response action is necessary for the B-aquifer; therefore, these standards are not ARARs for the B-aquifer.
Soil				
Department of Toxic Substances Control[b]				
Definition of non-RCRA hazardous waste.	Waste	Cal. Code Regs. tit. 22, §§ 66261.3(a)(2)(C) or (a)(2)(F), 66261.22(a)(3) and (a)(4), 66261.24(a)(2) – (a)(8), and 66261.101	Applicable	These regulations are applicable to activities that generate waste in order to determine if the waste is non-RCRA hazardous waste. Some of the alternatives evaluated in this revised feasibility study report include excavation and off-site disposal of soil. The Navy will determine if the excavated soil meets the definition of non-RCRA hazardous waste when it is generated.
State Water Resources Control Board[b]				
Definition of designated waste, nonhazardous waste, and inert waste.	Waste	Cal. Code Regs. tit. 27, §§ 20210, 20220, and 20230	Applicable	These regulations are applicable to activities that generate waste for classifying waste and determining the status of other ARARs. One of the alternatives evaluated in this revised feasibility study report includes excavation and off-site disposal of soil. The Navy will determine if the excavated soil meets these definitions when it is generated.

ED_006787_00013380-00064

Notes:

a	Many action-specific ARARs contain chemical-specific limitations are addressed in the action-specific ARAR tables.
b	Only the substantive provisions of the requirements cited in this table are ARARs.
c	Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as ARARs. Specific ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered ARARs.
§	Section
§§	Sections
ARAR	Applicable or relevant and appropriate requirement
div.	Division
Cal. Code Regs.	Code of California Regulations
HPS	Hunters Point Shipyard
MUN	Municipal and domestic supply
ppt	Part per thousand
RCRA	Resource Conservation and Recovery Act
Res.	Resolution
SWRCB	State Water Resources Control Board
tit.	Title
Water Board	San Francisco Bay Regional Water Quality Control Board

ED_006787_00013380-00065

Federal Location-Specific Applicable or Relevant and Appropriate Requirements
Record of Decision for Parcel G, Hunters Point Shipyard, San Francisco, California

Location	Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
National Historic Preservation Act of 1966, as Amended (Title 16 U.S.C. §§ 470-470x-6)[b]					
Historic project owned or controlled by federal agency	Action to preserve historic properties; planning of action to minimize harm to properties listed on or eligible for listing on the National Register of Historic Places.	Property included in or eligible for the National Register of Historic Places.	16 U.S.C. §§ 470-470x-6 36, CFR Part 800 40, and CFR § 6.301(b)	Applicable	The Navy has determined that the 450-ton bridge crane is eligible for inclusion on the National Register of Historic Places. None of the remedial alternatives evaluated in this feasibility study report include activities that will have an impact on the crane.
Coastal Zone Management Act (Title 16 USC §§ 1451–1464)[b]					
Within coastal zone	Conduct activities in a manner consistent with approved state management programs.	Activities affecting the coastal zone, including lands thereunder and adjacent shore land.	16 U.S.C. § 1456(c) and 15 CFR § 930	Relevant and appropriate	Federal lands are specifically excluded from the coastal zone; however, the Navy has determined that the Coastal Zone Management Act is relevant and appropriate for activities that will occur within 100 feet of the San Francisco Bay. Any remedial actions taken by the Navy will be consistent with the San Francisco Bay Plan, an approved state management program.

Notes:

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

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

§ Section
§§ Sections
ARAR Applicable or relevant and appropriate requirement
CFR Code of Federal Regulations
U.S.C. United States Code

ED_006787_00013380-00066

State Location-Specific Applicable or Relevant and Appropriate Requirements
Record of Decision for Parcel G, Hunters Point Shipyard, San Francisco, California

Location	Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
McAteer-Petris Act (California Government Code §§ 66600 through 66661)[b]					
Within the San Francisco Bay coastal zone	Reduce fill and disposal of dredged material in San Francisco Bay, maintain marshes and mudflats to the fullest extent possible to conserve wildlife, abate pollution, and protect the beneficial uses of the San Francisco Bay.	Activities affecting the San Francisco Bay and 100 feet landward of the shoreline.	San Francisco Bay Plan (Bay Plan) at Cal. Code Regs. tit. 14 §§ 10110 through 11990	Relevant and appropriate	The Bay Plan, developed under the authority of the McAteer-Petris Act, is an approved state coastal zone management program. Any remedial actions take by the Navy that will affect San Francisco Bay or that will occur within 100 feet landward of the shoreline will be consistent with the goals of the Bay Plan.

Notes:

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

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

§§ Sections
ARAR Applicable or relevant and appropriate requirement
Cal. Code Regs. California Code of Regulations
tit. Title

ED_006787_00013380-00067

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Excavation and Off-Site Disposal of Soil					
Resource Conservation and Recovery Act (Title 42 U.S.C., Chapter 82, §§ 6901-6991[i])[a]					
On-site generation of waste	Person who generates waste shall determine if the waste is a hazardous waste.	Generator of waste	Cal. Code Regs. tit. 22, §§ 66262.10(a), and 66262.11	Applicable	These regulations are applicable to any operation that generates waste. The excavation and off-site disposal alternative contemplates the generation of waste to be disposed of off site. The Navy will decide whether the waste in RCRA hazardous waste when it is generated.
On-site generation of waste	Requirements for analyzing waste for determining whether waste is hazardous.	Generator of waste	Cal. Code Regs. tit. 22, § 66264.13(a) and (b)	Applicable	These regulations are applicable to any operation that generates waste. The excavation and off-site disposal alternative includes activities that generate waste to be disposed of off site. The Navy will decide whether the waste is RCRA hazardous waste when it is generated.
Stockpiling soil for off-site disposal	Allows generators to accumulate solid remediation waste in an EPA-designated pile for storage only up to 2 years during remedial operations without triggering land disposal restrictions.	Hazardous remediation waste temporarily stored in piles	40 CFR § 264.554 (d)(1)(i) through (ii), (d)(2), (e), (f), (h), (i), (j), and (k)	Relevant and appropriate	The Navy will temporarily stockpile soil in staging piles for off-site disposal. The Navy does not anticipate that all soil will be RCRA hazardous waste; however, the Navy has determined that these requirements are relevant and appropriate for all stockpiled soil.
Clean Air Act (Title 42 U.S.C. §§ 7401-7671)[a]					
Excavate soil	Prohibits emission equal or greater to 20 percent opacity.	Emission from a source	Bay Area Air Quality Management District Rule 6-302	Applicable	This requirement is applicable to the construction required for installation of the soil cover.

ED_006787_00013380-00068

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Covering Portions of Soil					
Resource Conservation and Recovery Act (Title 42 U.S.C., Chapter 82, §§ 6901-6991[i])[a]					
Construct a cover	The final cover must accommodate lateral and vertical shear forces generated by the maximum credible earthquake so that the integrity of the final cover is maintained.	RCRA hazardous waste management unit	Cal. Code Regs. tit. 22, § 66264.310(a)(5)	Relevant and appropriate	The Navy has determined that this regulation is an ARAR for covering portions of the soil. This regulation is relevant and appropriate because the soil cover will not be constructed as a landfill waste management unit. Instead, the cover will be constructed solely to prevent human exposure to contaminants in the soil.
Construct a cover	The integrity and effectiveness of the final cover, including making repairs to the cover as necessary to correct the effects of settling, subsidence, erosion, or other events throughout the post-closure period.	RCRA hazardous waste management unit	Cal. Code Regs. tit. 22, § 66264.310(b)(1)	Relevant and appropriate	The Navy has determined that this regulation is an ARAR for covering portions of the soil. This regulation is relevant and appropriate because the soil cover will not be constructed as a landfill waste management unit. Instead, the cover will be constructed solely to prevent human exposure to contaminants in the soil.
Construct a cover	Run-on and run-off must not erode or otherwise damage the final cover.	RCRA hazardous waste management unit	Cal. Code Regs. tit. 22, § 66264.310(b)(4)	Relevant and appropriate	The Navy has determined that this regulation is an ARAR for covering portions of the soil. This regulation is relevant and appropriate because the soil cover will not be constructed as a landfill waste management unit. Instead, the cover will be constructed solely to prevent human exposure to contaminants in the soil.

ED_006787_00013380-00069

Federal Action-Specific Applicable or Relevant and Appropriate Requirements
Record of Decision for Parcel G, Hunters Point Shipyard, San Francisco, California (Continued)

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Covering Portions of Soil					
Resource Conservation and Recovery Act (Title 42 U.S.C., Chapter 82, §§ 6901-6991[i])[a]					
Construct a cover	Protect and maintain surveyed benchmarks throughout the postclosure period.	RCRA hazardous waste management unit	Cal. Code Regs. tit. 22, § 66264.310(b)(5)	Relevant and appropriate	The Navy has determined that this regulation is an ARAR for covering portions of the soil. This regulation is relevant and appropriate because the soil cover will not be constructed as a landfill waste management unit. Instead, the cover will be constructed solely to prevent human exposure to contaminants in the soil
Clean Water Act (Title 33 U.S.C., Chapter 26, §§ 1251-1387)[a]					
Construct a cover	Owners and operators of construction activities must be in compliance with discharge standards.	Construction activities at least 1 acre in size	Clean Water Act § 402 (33 U.S.C. Chapter 26, §1342) and 40 CFR § 122.44(k)(2) and (4)	Applicable	The Navy anticipates disturbing more than one acre when constructing the soil covers. The Navy will use the provisions in the state general storm water discharge permit, Order 99-08-DWQ, as TBCs for complying with these storm water discharge requirements under the Clean Water Act.
Clean Air Act (Title 42 U.S.C. §§ 7401-7671)[a]					
Construct a cover	Prohibits emission equal or greater to 20 percent opacity.	Emission from a source	Bay Area Air Quality Management District Rule 6-302	Applicable	This requirement is applicable to construction required for the cover.

ED_006787_00013380-00070

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Groundwater Monitoring					
Resource Conservation and Recovery Act (Title 42 U.S.C., Chapter 82, §§ 6901-6991[i])[a]					
Monitor groundwater	After closure of a regulated unit, water quality monitoring regulations apply during the post-closure care period under Cal. Code Regs. tit. 22, § 66264.117 unless the regulated unit has been in compliance with the water quality protection standard for three consecutive years.	RCRA hazardous waste management unit	Cal. Code Regs. tit. 22, § 66264.90(c)	Relevant and appropriate	These requirements are applicable to RCRA hazardous waste facilities; however, the Navy has determined that they are relevant and appropriate to the monitoring component of the groundwater response action.
Monitor groundwater	Requirement to establish a detection monitoring program.	RCRA hazardous waste management unit	Cal. Code Regs. tit. 22, § 66264.91(a)(1)	Relevant and appropriate	The requirement to establish a detection monitoring program is applicable to RCRA hazardous waste facilities; however, the Navy has determined that it is relevant and appropriate to establishing its detection monitoring program.
Monitor groundwater	Contaminants of concern are the waste constituents, reaction products, and hazardous constituents that are reasonably expected to be in or derived from the waste contained in the regulated unit.	RCRA hazardous waste management unit	Cal. Code Regs. tit. 22, § 66264.93	Relevant and appropriate	These requirements are applicable to RCRA hazardous waste facilities; however, the Navy has determined that they are relevant and appropriate to the monitoring component of the groundwater response action.

ED_006787_00013380-00071

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Groundwater Monitoring (Continued)					
Resource Conservation and Recovery Act (Title 42 U.S.C., Chapter 82, §§ 6901-6991[i])[a] (Continued)					
Monitor groundwater	The owner or operator shall establish a groundwater monitoring system for each regulated unit and include a sufficient number of monitoring points installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer that represent the quality of groundwater passing the point of compliance.	RCRA hazardous waste management unit	Cal. Code Regs. tit. 22, § 66264.97(b)(1)(A), (b)(1)(B), (b)(1)(C), (b)(1)(D)(1), and (b)(1)(D)(2)	Relevant and appropriate	These requirements are applicable to RCRA hazardous waste facilities; however, the Navy has determined that they are relevant and appropriate to the monitoring component of the groundwater response action.
Monitor groundwater	Requirements for monitoring well construction and sampling intervals.	RCRA hazardous waste management unit	Cal. Code Regs. tit. 22, § 66264.97(b)(4), (5), (6), and (7)	Relevant and appropriate	These requirements are applicable to RCRA hazardous waste facilities; however, the Navy has determined that they are relevant and appropriate to the monitoring component of the groundwater response action.
Monitor groundwater	Requirements for groundwater sample collection.	RCRA hazardous waste management unit	Cal. Code Regs. tit. 22, § 66264.97(e)(6), (e)(12)(A), (e)(12)(B), (e)(13), and (e)(15)	Relevant and appropriate	These requirements are applicable to RCRA hazardous waste facilities; however, the Navy has determined that they are relevant and appropriate to the monitoring component of the groundwater response action.

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Groundwater Monitoring (Continued)					
Resource Conservation and Recovery Act (Title 42 U.S.C., Chapter 82, §§ 6901-6991[i])[a] (Continued)					
Monitor groundwater	Requirements for a detection monitoring program.	RCRA hazardous waste management unit	Cal. Code Regs. tit. 22, § 66264.98(e)(1) through (5), (i), (j), (k)(1) through (3), (k)(4)(A), (k)(4)(D), (k)(5), (k)(7)(C), (k)(7)(D), (n)(1), (n)(2)(B), and (n)(2)(C)	Relevant and appropriate	These requirements are applicable to RCRA hazardous waste facilities; however, the Navy has determined that they are relevant and appropriate to the monitoring component of the groundwater response action.
Monitor groundwater	Requirements for an evaluation monitoring program.	RCRA hazardous waste management unit	Cal. Code Regs. tit. 22, § 66264.99(b), (e)(1) through (6), (f)(3), and (g)	Relevant and appropriate	These requirements are applicable to RCRA hazardous waste facilities; however, the Navy has determined that they are relevant and appropriate to the monitoring component of the groundwater response action.
Monitor groundwater	In conjunction with corrective action measures, the owner or operator shall establish and implement a water quality monitoring program to demonstrate the effectiveness of the corrective action program. The program shall be effective in determining compliance and in determining the success of the corrective action measures.	Corrective action for groundwater at RCRA hazardous waste management unit	Cal. Code Regs. tit. 22, § 66264.100(d)	Relevant and appropriate	These requirements are applicable to RCRA hazardous waste facilities; however, the Navy has determined that they are relevant and appropriate to the monitoring component of the groundwater response action.

ED_006787_00013380-00073

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Groundwater Monitoring (Continued)					
Resource Conservation and Recovery Act (Title 42 U.S.C., Chapter 82, §§ 6901-6991[i])[a] (Continued)					
Monitor groundwater	After terminating corrective action measures, the owner or operator must continue corrective action monitoring until compliance with remediation goals for a period of 1 year is demonstrated.	Corrective action for groundwater at a RCRA hazardous waste management unit	Cal. Code Regs. tit. 22, § 66264.100(g)(1)	Relevant and appropriate	These requirements are applicable to RCRA hazardous waste facilities; however, the Navy has determined that they are relevant and appropriate to the monitoring component of the groundwater response action.
Monitor groundwater	DTSC may shorten the post-closure care period if the owner or operator demonstrates that the reduced period is sufficient to protect human health and the environment.	RCRA hazardous waste facility where wastes, waste residues, contaminated materials, and contaminated soils will not be removed during closure	Cal. Code Regs. tit. 22, § 66264.117(b)(2)(A)	Relevant and appropriate	These requirements are applicable to RCRA hazardous waste facilities; however, the Navy has determined that they are relevant and appropriate to the monitoring component of the groundwater response action.

ED_006787_00013380-00074

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Groundwater Monitoring (Continued)					
Bioremediation					
Safe Drinking Water Act (Title 42 U.S.C., § 300[f]-300[j]-26)[a]					
Inject metals treatment compound and/or hydrogen treatment compound into groundwater	The underground injection control program prohibits injection activities that allow movement of contaminants into underground sources of drinking water that may result in violations of maximum contaminant levels or adversely affect health.	An approved underground injection control program is required in states listed under SDWA 40 CFR § 144.12. Class I wells and Class IV wells are the relevant classifications for CERCLA sites. Class I wells are used to inject hazardous waste beneath the lowermost formation that contains a USDW within 0.25 mile of the well.	40 CFR § 144.12, excluding the reporting requirements in § 144.12(b), and 144.12(c)(1)	Applicable	This requirement is applicable to the Navy's injection of metals treatment compound and/or hydrogen treatment compound into the groundwater. The Navy will use the basic information requirements contained in 40 CFR §144.83 as TBCs for complying with the requirement in 40 CFR §144.12(a).

ED_006787_00013380-00075

Federal Action-Specific Applicable or Relevant and Appropriate Requirements
Record of Decision for Parcel G, Hunters Point Shipyard, San Francisco, California (Continued)

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Disposal of Investigation-Derived Waste Generated in Implementing Groundwater Alternatives					
Resource Conservation and Recovery Act (Title 42 U.S.C., Chapter 82, §§ 6901-6991[i])[a]					
On-site generation of waste	Person who generates waste shall determine if the waste is hazardous waste.	Generator of waste	Cal. Code Regs. tit. 22, §§ 66262.10(a), and 66262.11	Applicable	These regulations are applicable to any operation that generates waste. The Navy will decide whether the waste is RCRA hazardous waste when it is generated.
Disposal of Investigation-Derived Waste Generated in Implementing Groundwater Alternatives					
Resource Conservation and Recovery Act (Title 42 USC, Chapter 82, §§ 6901-6991[i])[a]					
On-site generation of waste	Requirements for analyzing waste for determining whether waste is hazardous.	Generator of waste	Cal. Code Regs. tit. 22, § 66264.13(a) and (b)	Applicable	These regulations are applicable to any operation that generates waste. The Navy will determine whether the waste is RCRA hazardous waste when it is generated.

Notes:

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

§ Section
§§ Sections
ARAR Applicable or relevant and appropriate requirement
Cal. Code Regs. California Code of Regulations
CERCLA Comprehensive Environmental Response, Compensation, and Liability Act
CFR Code of Federal Regulations
DTSC Department of Toxic Substances Control
DWQ Department of Water Quality
EPA U.S. Environmental Protection Agency
RCRA Resource Conservation and Recovery Act
SDWA Safe Drinking Water Act
TBC To be considered
tit. Title
U.S.C. United States Code
USDW Underground sources of drinking water

ED_006787_00013380-00076

State Action-Specific Applicable or Relevant and Appropriate Requirements
Record of Decision for Parcel G, Hunters Point Shipyard, San Francisco, California (Continued)

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
		Institutional Controls			
California Civil Code[a]					
Placing a institutional controls on soil and groundwater	Provides conditions under which land-use restrictions will apply to successive owners of land.	Transfer of property from the Navy to a nonfederal agency	California Civil Code §1471	Relevant and appropriate	The Navy is evaluating ICs for soil and groundwater. These requirements are ARARs for those ICs.
California Health and Safety Code[a]					
Placing institutional controls on soil and groundwater	Allows DTSC to enter into an agreement with the owner of a hazardous waste facility to restrict present and future land uses.	Transfer of property from the Navy to a nonfederal agency	California Health and Safety Code § 25202.5	Relevant and appropriate	The Navy is evaluating ICs for soil and groundwater. These requirements are ARARs for those ICs.
Placing institutional controls on soil and groundwater	Provides processes and criteria for obtaining written variances from a land use restriction and for the removal of a land use restriction.	Transfer of property from the Navy to a nonfederal agency	California Health and Safety Code §§ 25233(c) and 25234	Relevant and appropriate	The Navy is evaluating ICs for soil and groundwater. These requirements are ARARs for those ICs.
Placing institutional controls on soil and groundwater	Provides a streamlined process to be used to enter into an agreement to restrict specific use of property in order to implement the substantive use restrictions of California Health & Safety Code § 25232(b)(1)(A)–(E).	Transfer of property from the Navy to a nonfederal agency	California Health and Safety Code §§ 25222.1 and 25355.5(a)(1)(C)	Relevant and appropriate	The Navy is evaluating ICs for soil and groundwater. These requirements are ARARs for those ICs.
Placing institutional controls on soil and groundwater.	Prohibits certain uses of land containing hazardous waste without a specific variance.	Transfer of property from the Navy to a nonfederal agency	California Health and Safety Code § 25232(b)(1)(A) through (E)	Relevant and appropriate	The Navy is evaluating ICs for soil and groundwater. These requirements are ARARs for those ICs.

ED_006787_00013380-00077

State Action-Specific Applicable or Relevant and Appropriate Requirements
Record of Decision for Parcel G, Hunters Point Shipyard, San Francisco, California (Continued)

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Institutional Controls (Continued)					
Department of Toxic Substances Control[a]					
Placing institutional controls on soil and groundwater	A land use covenant imposing appropriate limitations on land use shall be executed and recorded when facility closure, corrective action, remedial or removal action, or other response actions are undertaken and hazardous materials, hazardous wastes or constituents, or hazardous substances will remain at the property at levels which are not suitable for unrestricted use of the land.	Property transfer by federal government to a non-federal entity	Cal. Code Regs. tit. 22, § 67391.1	Relevant and appropriate	The Navy is evaluating ICs for soil and groundwater. These requirements are ARARs for those ICs. EPA agrees that the substantive portions of the regulations referenced are ARARs. EPA specifically considers sections (a), (b), (d), and (e) of Cal. Code Regs. tit. 22 § 67391.1, to be ARARs for this ROD. DTSC's position is that all of the state regulation is an ARAR.
Excavation and Off-Site Disposal					
State Water Resources Control Board[a]					
Excavating soil and generating investigation-derived waste	Sampling and analysis of discharges shall be used for accurate characterization of wastes.	Waste	Cal. Code Regs. tit. 27, §20200(c)	Applicable	This requirement is applicable to operations that generate waste. The Navy will accurately characterize waste for off-site disposal.

ED_006787_00013380-00078

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Excavation and Off-Site Disposal (Continued)					
State Water Resources Control Board[a] (Continued)					
Off-site disposal of soil and investigation derived waste	Requires that designated waste as defined at California Water Code §13173 be discharged to Class I or Class II waste management units.	Discharge of designated waste after July 18, 1997 (nonhazardous waste that could cause degradation of surface or ground waters) to land for treatment, storage, or disposal	Cal. Code Regs. tit. 27, §20210	Applicable	This requirement is applicable to operations that generate waste. The Navy will determine if the waste meets the definition of designated waste for off-site disposal.
Off-site disposal of soil and investigation derived waste	Requires that nonhazardous solid waste as defined at Cal. Code Regs. tit. 27 §20220(a) be discharged to a classified waste management unit.	Discharge of nonhazardous solid waste after July 18, 1997, to land for treatment, storage, or disposal	Cal. Code Regs. tit. 27, §20220(b), (c), and (d)	Applicable	This requirement is applicable to operations that generate waste. The Navy will determine if the waste meets the definition of nonhazardous solid waste for off-site disposal.
Off-site disposal of soil and investigation derived waste	Inert waste as defined at Cal. Code Regs. tit. 27 §20230(a) need not be discharged at a classified unit.	Applies to discharges of inert waste to land after July 18, 1997, for treatment, storage, or disposal	Cal. Code Regs. tit. 27 §20230(b)	Applicable	This requirement is applicable to operations that generate waste. The Navy will determine if the waste meets the definition of inert waste for off-site disposal.

ED_006787_00013380-00079

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Covering Portions of the Soil					
State Water Resources Control Board[a]					
Covering portions of the soil	Alternatives to construction or prescriptive standards.	Cal. Code Regs. tit. 27 requirements are only applicable for waste discharged after July 18, 1997 unless otherwise noted	Cal. Code Regs. tit. 27, § 20080(b)	Relevant and appropriate	The Navy has determined that this regulation is an ARAR for covering portions of the soil. This regulation is relevant and appropriate because the soil cover will not be constructed as a landfill waste management unit. Instead, the cover will be constructed solely to prevent human exposure to contaminants in the soil.
Remediation activities	Actions taken by or at the direction of public agencies to clean up or abate conditions of pollution or nuisance resulting from unintentional or unauthorized releases of waste or pollutants to the environment; provided that wastes, pollutants, or contaminated materials removed from the immediate place of release shall be discharged according to the SWRCB-promulgated sections of Article 2, Subchapter 2, Chapter 3, Subdivision 1 of this division (§20200 et seq.); and further provided that remedial actions intended to contain the wastes at the place of release shall implement applicable SWRCB-promulgated provisions of this division to the extent feasible.	Action taken by or at the direction of a public agency to cleanup release of pollutant	Cal. Code Regs. tit. 27 §20090(d)	Relevant and appropriate	This regulation is relevant and appropriate because “public agency” is not defined in the regulations; therefore, it does not specifically apply to the federal government.

ED_006787_00013380-00080

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Covering Portions of the Soil (Continued)					
State Water Resources Control Board[a] (Continued)					
Covering portions of the soil	Closed units shall be provided with at least two permanent monuments installed by a licensed land surveyor or a registered civil engineer, from which the location and elevation of containment structures can be determined throughout the post-closure maintenance period.	Waste discharged after July 18, 1997	Cal. Code Regs. tit. 27 §20950(d)	Relevant and appropriate	The Navy has determined that this regulation is an ARAR for covering portions of the soil. This regulation is relevant and appropriate because the soil cover will not be constructed as a landfill waste management unit. Instead, the cover will be constructed solely to prevent human exposure to contaminants in the soil.

ED_006787_00013380-00081

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

ED_006787_00013380-00082

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Covering Portions of the Soil (Continued)					
State Water Resources Control Board[a] (Continued)					
Covering portions of the soil	Throughout the post-closure maintenance period, the discharger shall prevent erosion and related damage of the final cover caused by drainage.	Waste management unit	Cal. Code Regs. tit. 27 §21090(c)(4)	Relevant and appropriate	The Navy has determined that this regulation is an ARAR for covering portions of the soil. This regulation is relevant and appropriate because the soil cover will not be constructed as a landfill waste management unit. Instead, the cover will be constructed solely to prevent human exposure to contaminants in the soil.

ED_006787_00013380-00083

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

ED_006787_00013380-00084

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Covering Portions of the Soil (Continued)					
State Water Resources Control Board[a] (Continued)					
Excavating soil	Construction that disturbs at least 1 acre must use best management practices to control storm water discharges.	Construction activities at least 1 acre in size	SWRCB General Permit for Storm Water Discharges 99-08-DWQ	TBC	The excavation and off-site disposal alternative and the cover alternative will disturb at least 1 acre. Therefore, the Navy has determined that Clean Water Act §402 (33 U.S.C. §1342) and 40 CFR. §122.44(k)(2) and (4) requirements for storm water discharge are federal ARARs. In order to comply with these federal ARARs, the Navy will use the substantive requirements of the state permit as TBCs.
Covering portions of the soil	The final cover shall function with minimum maintenance and shall be compatible with post-closure land use. Alternative final cover designs shall meet the performance requirements of Cal. Code Regs. tit. 27 §21140(a). The Enforcement Authority may require additional thickness, quality, and type of final cover depending on, but not limited to the future reuse of the site.	Waste management unit	Cal. Code Regs. tit. 27 §21140	Relevant and appropriate	The Navy has determined that this regulation is an ARAR for covering portions of the soil. This regulation is relevant and appropriate because the soil cover will not be constructed as a landfill waste management unit. Instead, the cover will be constructed solely to prevent human exposure to contaminants in the soil.

ED_006787_00013380-00085

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Covering Portions of the Soil (Continued)					
California Integrated Waste Management Board[a]					
Covering portions of the soil	The operator shall ensure the integrity of final slopes under both static and dynamic conditions to protect public health and safety and prevent damage to post-closure land uses, roads, structures, utilities, and to prevent exposure of waste.	Waste management unit	Cal. Code Regs. tit. 27 §21145(a)	Relevant and appropriate	The Navy has determined that this regulation is an ARAR for covering portions of the soil. This regulation is relevant and appropriate because the soil cover will not be constructed as a landfill waste management unit. Instead, the cover will be constructed solely to prevent human exposure to contaminants in the soil.
Covering portions of the soil	The drainage and erosion control system shall be designed and maintained to ensure integrity of post-closure land uses, roads, and structures; to prevent public contact with waste; to prevent safety hazards; and to prevent exposure of waste. Slopes that are not underlain by waste shall be stabilized to prevent soil erosion. Methods used to protect slopes and control erosion shall include, but are not limited to, terracing, contour furrows, and trenches.	Waste management unit	Cal. Code Regs. tit. 27 §21150	Relevant and appropriate	The Navy has determined that this regulation is an ARAR for covering portions of the soil. This regulation is relevant and appropriate because the soil cover will not be constructed as a landfill waste management unit. Instead, the cover will be constructed solely to prevent human exposure to contaminants in the soil.

ED_006787_00013380-00086

State Action-Specific Applicable or Relevant and Appropriate Requirements
Record of Decision for Parcel G, Hunters Point Shipyard, San Francisco, California (Continued)

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Groundwater Monitoring					
State Water Resources Control Board[a]					
Remediation activities	Actions taken by or at the direction of public agencies to clean up or abate conditions of pollution or nuisance resulting from unintentional or unauthorized releases of waste or pollutants to the environment; provided that wastes, pollutants, or contaminated materials removed from the immediate place of release shall be discharged according to the SWRCB-promulgated sections of Article 2, Subchapter 2, Chapter 3, Subdivision 1 of this division (§20200 et seq.); and further provided that remedial actions intended to contain the wastes at the place of release shall implement applicable SWRCB-promulgated provisions of this division to the extent feasible.	Action taken by or at the direction of a public agency to cleanup release of pollutant	Cal. Code Regs. tit. 27 §20090(d)	Relevant and appropriate	This regulation is relevant and appropriate to the Navy's groundwater remedial action because "public agency" is not defined in the regulations; therefore, it does not specifically apply to the federal government.

Notes:

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

§ Section
§§ Sections
ARAR Applicable or relevant and appropriate requirement
Cal. Code Regs. California Code of Regulations
CFR Code of Federal Regulations
DTSC Department of Toxic Substances Control
DWQ Department of Water Quality
EPA U.S. Environmental Protection Agency
HPS Hunters Point Shipyard
IC Institutional control
ROD Record of Decision
SWRCB State Water Resources Control Board
TBC To be considered
tit. Title
U.S.C. United States Code
Water Board San Francisco Bay Regional Water Quality Control Board

ED_006787_00013380-00087

ATTACHMENT 2
RESPONSIVENESS SUMMARY

Proposed Plan for Parcel D, Hunters Point Shipyard		
Spoken Comment by Kristine Enea received at the public meeting held July 30, 2008		
Comment Number	**Comment**	**Response**
1	I feel comfortable that the RAD material will not escape the trucks. However, trucks themselves sometimes take dirt out with them. I've seen trucks come out with dirt on the fender. So my request would just be to make sure that the trucks themselves are clean of dirt, not because I'm afraid of radiological contamination, but because I live on Innes Avenue. All the trucks go by my house, and our houses are kind of dirty. [Refer to the transcript of the public meeting beginning on page 38 for the complete comment.]	Appropriate engineering measures (for example, inspecting and cleaning trucks before they leave the site) will be used during remediation to minimize any impact from site soil on the surrounding Bayview Hunters Point community. Furthermore, radiologically impacted material is transported off site in sealed containers to prevent any releases.

ED_006787_00013380-00089

Proposed Plan for Parcel D, Hunters Point Shipyard		
Spoken Comments by Ahimsa Sumchai received at the public meeting held July 30, 2008		
Comment Number	**Comment**	**Response**
1	I wanted to go on record as being very, very strongly opposed to a proposal to early transfer. Parcel UC-1, I am strongly opposed to any plan to dirty-transfer a parcel that in its reuse is expected to be a site for residential development. And Parcel UC-1 is slated for mixed-use development under the current redevelopment plan. [Refer to the transcript of the public meeting beginning on page 39 for the complete comment.]	Parcel UC-1 consists mostly of a portion of Spear Avenue. Figure 4 in the Proposed Plan shows a portion of Parcel UC-1 is planned for mixed use. However, residential reuse of this street area is unlikely. Furthermore, no data were collected within Parcel UC-1 because no historical activities with risk concerns took place in this area. Nevertheless, all of Parcel UC-1 will be covered to protect all users from exposure to the surface soil.
2	Additionally, Parcel UC-1 is adjacent to Redevelopment Block 30A, which you have identified as being a region in which the soil concentrations approached 10^{-6}, and that concerns me. The risk, of course, is 10^{-5}. So I really do think that we are identifying a region of Parcel D that is at significant risk for human exposure and that – you've documented that, and I just think it doesn't make common sense to not do a full cleanup of a parcel that is potentially slated for residential development. [Refer to the transcript of the public meeting beginning on page 39 for the complete comment.]	Table 1 in the Proposed Plan shows that the cancer risk at Redevelopment Block 30A based on residential exposure to chemicals is 2×10^{-7} and for exposure to radionuclides is 1×10^{-6}. Both these risk values are less than the range that the Navy and the regulatory agencies consider as acceptable. The goal of the remedial action at Parcel D-1, D-2, G, and UC-1 is to protect human health and the environment to the standards set by the federal and state regulatory agencies. The remedies proposed in the proposed plan, and detailed in this Record of Decision (ROD), address all contamination that resulted from past Navy activities. After all the proposed actions are conducted and operation and maintenance and institutional controls (IC) are implemented, the actions proposed will be protective of human health.
3	Additionally, it violates community acceptance, as documented in Proposition P, which was passed by the overwhelming majority of San Francisco voters in the year 2000 and that called for cleanup of the Shipyard to residential standards. [Refer to the transcript of the public meeting beginning on page 39 for the complete comment.]	The goal of the remedial action at Parcels D-1, D-2, G, and UC-1 is to protect human health and the environment to the standards set by the regulatory agencies. Cleanup goals consider the expected future land use so not all areas will be remediated to residential levels. For example, areas that will become open space will be remediated to standards that consider recreational use. Nevertheless, all of Parcels D-1, D-2, G, and UC-1 will be covered to protect all users from exposure to the surface soil. Community acceptance is considered in the ROD as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

ED_006787_00013380-00090

Proposed Plan for Parcel D, Hunters Point Shipyard		
Written Comments by City and County of San Francisco received August 15, 2008 by email		
Comment Number	**Comment**	**Response**
1	In the Overview of Proposed Institutional Controls, Proposed Activity Restrictions Relating to VOC vapors at Specific Locations within Parcel D-1 and G, it states that "Initially, the ARIC includes all of Parcel D-1 and G". We think this is a misrepresentation of the current state of knowledge about the ARIC for VOC vapors and unnecessarily restricts Parcel D-1 and G. Our request is to phrase the restriction as "Initially, the ARIC will include all areas of the Parcels D-1 and G with soil gas levels above the remediation goals." This sentence more accurately reflects the current state of knowledge about the ARIC for VOC vapors and describes where the ARIC will be required. The soil gas surveys will be performed in areas where past uses and data suggest possible concerns regarding soil gas. However, based on the current knowledge of the site we are certain that there are many areas where: (a) no soil gas sampling will be required and (b) there will be no requirement for an ARIC for VOC vapors.	The area requiring institutional controls (ARIC) for vapor intrusion may be modified as remediation is completed or in response to further sampling and analysis that establishes that areas now in the ARIC do not pose unacceptable potential exposure risk to volatile organic compound (VOC) vapors. The initial ARIC is proposed to include the entire area of Parcels D-1 and G because existing data for soil gas are insufficient to further reduce the size of the ARIC.
2	Soil gas remediation goals need to be established in the Parcel D-1 and G RODs. The language relating to soil gas remediation goals on page 8 of the Proposed Plan, which states that a numerical goal for each VOC will be established *in the remedial design (RD)* and on page 14, that survey results *following remedial actions* will be used to establish risk-based remediation goals for soil gas should be changed to reflect that soil gas remediation goals will be established in the ROD. If the current schedule for the ROD would be impacted by the establishment of these soil gas goals, a mechanism for adding these goals to the ROD should be discussed.	The text on page 8 of the Proposed Plan was incorrect. Remediation goals for soil gas will not be established until after the soil gas survey that will be conducted following soil and groundwater remedial actions, as soil gas concentrations will very likely change as a result of the remedial actions. Further, as potential risks from soil gas are partially dependent on the structures and other modifications that will be constructed for future use of the property, the soil gas risk calculations must wait until decisions are made on the proposed use designs (i.e., structures and ground cover layouts). Results from the soil gas survey will be used to provide data to establish risk-based numeric goals for VOCs in soil gas based on cumulative risk at a 10^{-6} risk level and to evaluate potential vapor intrusion risk. The results of the survey will be used to evaluate the need for additional remedial action and to identify where the initial ARICs for VOCs shall be retained and areas where they shall be released.

ED_006787_00013380-00091

Proposed Plan for Parcel D, Hunters Point Shipyard		
Written Comments by City and County of San Francisco received August 15, 2008 by email		
Comment Number	**Comment**	**Response**
3	We appreciate that the Navy has revised the text of the proposed plan to discuss some of the remedy implementation plans in relation to reuse areas instead of redevelopment blocks. In future documents please continue to work towards the goal of dropping the use of the redevelopment blocks to describe areas of the parcel because land planning efforts are anticipating a change to the configuration of the blocks.	The proposed plan was revised to reduce the use of and emphasis on redevelopment blocks to the extent possible. However, a means to clearly and unambiguously identify areas within Parcel D is still needed to explain the proposed remedial actions, and redevelopment blocks still serve that purpose. The Navy would appreciate communication from the city when changes to redevelopment blocks, and especially those changes that affect the reuse exposure, are identified. The Navy will work closely with the city to use the most current plans for land reuses at Parcel D. The Navy will continue to use redevelopment blocks, only when necessary, in the three RODs.
4	We would like to point out for the record, that once the engineering controls and institutional controls are properly installed and maintained the current design of the proposed remedies will cut off pathways for: (a) contact with soil contaminants and (b) inhalation of indoor VOC vapors and this means that the entire property will be health protective for all types of uses.	The proposed remedial alternatives are specific to the reuse identified for each area. Future residents would be protected in areas currently identified for industrial or recreational reuse only by the consistent enforcement of the activity restrictions described by the proposed ICs. For example, the ARIC for vapor intrusion would need to be maintained in areas currently identified as open space (unless the ARIC could be modified by new data for soil gas, as discussed above in the response to comment 1). The Navy believes that the proposed remedy would result in an environment that would not pose health risks for future residents. However, this does not mean that future reuse would be unrestricted. The following text was included on the first page of the proposed plan to note the general protectiveness of the planned revised remedy: "*After all the proposed actions are conducted and operation and maintenance and ICs are implemented, the actions proposed will be protective of human health and the environment and will meet all cleanup objectives*."

ED_006787_00013380-00092

Proposed Plan for Parcel D, Hunters Point Shipyard		
Written Comments by J.V. McCarthy received by email on July 31, 2008. **Only comments that specifically reference Parcel D (or the new Parcels G, D-1, D-2, or UC-1) are included in this Responsiveness Summary. All other comments were addressed in the Responsiveness Summary for Parcel B. Comment numbers reflect those used in the Responsiveness Summary for Parcel B.**		
Comment Number	**Comment**	**Response**
6	The basic issues cited for "Parcel G", per notice to Congresswoman N. Pelosi and Supervisor A. Peskin also apply to Covenant Restriction for "Parcel B" (refer to the following page with items # 1.-10.)	The Navy does not have a copy of this notice and cannot respond. However, the Navy team is aware of and is ensuring that there is consistency between land use restrictions being considered and developed for the different parcels.
Introduction to items 1-10	How inappropriate is a linking of "Candlestick Park" development with Hunter's Point Shipyard reuse? If "Parcel 49" of the former Hunter's Point Shipyard is to be considered fit for new stadium construction, the potential liability is worth more than a passing glance. A deferral or covenant agreement required as the waiver to federal conditions of the city's exclusive discretion, to federal conditions in transfer, is specified from CERCLA 120 h(3)(C). This is because the environmental remediation is not without conditions. No matter what the political priorities, the land speculation, or the wishful thinking, parcel areas requiring this kind of covenant agreement will remain so for good reasons (refer to CLEAN II, Department of the Navy, 09/04/98, HPS). "Parcel 49" is not exempt. The local SF CUPA or HAZMAT agency, the involved state agencies, and the title insurance people will all have serious obligations and concerns to be maintained.	Access restrictions on future activities will be contained in "Covenant(s) to Restrict Use of Property", Quitclaim Deed(s), the Risk Management Plan, and if required, any other workplan or document approved in accordance with these referenced documents. The protectiveness of the remedy will be evaluated at least every 5 years to ensure it remains protective. These 5-year reviews are required by law and will include any new information that may become available in the future.
Item 1	Subparcels S-28, S-29, S-38, and S-39 are co-located where "Parcel 49", formerly in Parcel D, has been proposed. All are cited for sandblast waste and radioactive materials, at least some of which are likely to have been left from "Operation Crossroads" (1946-1947, see "Historical Radiological Assessment", 2004).	Parcel D was constructed prior to "Operation Crossroads" and is not expected to have radioactive waste materials from that operation. Radiological surveys have been conducted in all areas and buildings at Parcel G (formerly Parcel 49) that have been identified, based on shipyard activities and work practices, to potentially be radiologically impacted. The areas identified as having radiological risks in the surveys are being addressed and radiologically remediated by the proposed remedy and released for unrestricted future use.

ED_006787_00013380-00093

Proposed Plan for Parcel D, Hunters Point Shipyard		
Written Comments by J.V. McCarthy received by email on July 31, 2008. **Only comments that specifically reference Parcel D (or the new Parcels G, D-1, D-2, or UC-1) are included in this Responsiveness Summary. All other comments were addressed in the Responsiveness Summary for Parcel B. Comment numbers reflect those used in the Responsiveness Summary for Parcel B.**		
Comment Number	**Comment**	**Response**
Item 2	It is unlikely that the maximum extent of excavation in the foreseeable future, as sponsored by the Navy, will go any farther than the inconclusive excavation, to be capped, for IR-07 and IR-18 of Parcel B where the radiation at depth will go unresolved. Consider the implications in D for S-28, S-29, S-38, and S-39.	Please see the Responsiveness Summary in the Parcel B amended ROD for discussion of the IR Sites 7 and 18. All of Parcel G will be covered to protect all users from exposure to the soil regardless of the future use. Covers are an effective way to eliminate exposure and protect human health.
Item 3	The materials applied for support piers to penetrate landfill are likely to be what is planned for building foundation support, as under the cap required for “Parcel 49” remediation.	Any construction-related foundation support piers constructed after transfer will be protective of human health and the environment, and will meet the requirements of the remedial design. Any breaching or alteration of the cover post-transfer will be conducted in compliance with the Covenant(s) to Restrict Use of the Property, Quitclaim Deed(s), and the Risk Management Plan, all of which will be reviewed and approved by the regulatory agencies. Materials used during remediation, including the cover material, will be selected during the remedial design phase of the project and will be constructed to be robust and persistent over time.

ED_006787_00013380-00094

Proposed Plan for Parcel D, Hunters Point Shipyard		
Written Comments by J.V. McCarthy received by email on August 20, 2008.		
Comment Number	**Comment**	**Response**
1	As an hasty and inadequately addressed parcel transfer proposal, "Parcel G" is a good example of how the City of San Francisco, and some public officials, could bring great harm upon themselves. Who would bear ultimate "responsibility" with consequences (?) once an incomplete and inadequate investigation has been signed off, even with CERCLA 120 (h)(3)(C)? If "Blocks" # 28, 29, 38, and 39 are any example, perhaps it would be where existing documentation would suggest considerable more caution.	If the property in Parcel G is conveyed as an "early transfer" subject to the requirements of Section 120(h)(3)(C) of CERCLA, the Navy must provide assurances approved by EPA and the State of California that there will be interim land use restrictions to ensure the protection of human health and the environment. Access restrictions on future activities will be contained in "Covenant(s) to Restrict Use of Property", Quitclaim Deed(s), the Risk Management Plan, and if required, any other workplan or document approved in accordance with these referenced documents. The protectiveness of the remedy will be evaluated at least every 5 years to ensure it remains protective. These 5-year reviews are required by law and will include any new information that may become available in the future.
2	Of "Block" 28, it appears to be unknown or unclear whether contaminants from IR-34 could include plume discovery, as from, storage tank contents unspecified at the Building 363 site.	There is no Redevelopment Block 28 within Parcel D or the new Parcel G. However, potential contaminants associated with IR-34 were evaluated for Parcel D and are summarized in the Final Revised Feasibility Study for Parcel D (SulTech 2007).
3	Of "Block" 29, it appears to be unknown or unclear whether multiple fluid contaminants or plume discovery, from IR-09 could have come into contact with or mixed with contaminants from IR-33.	Within Redevelopment Block 29, the potential mixing of contaminants between the IR-09 plumes and the IR-33 plumes was considered and is summarized in the Final Revised Feasibility Study for Parcel D (SulTech 2007).
4	Of "Block" 38, it appears to be unknown or unclear whether contaminants from IR-33, by the specified plumes at the Building 411 site, could have been complicated by radiological impact at the Building 364 site.	The contamination associated with Buildings 411 and 364 (they are both within IR-33) were evaluated in conjunction with Block 38. The chemical risks are presented in the Final Revised Feasibility Study for Parcel D (SulTech 2007) and the radiological risks and combined risks are presented in the Final Radiological Addendum to the Revised Feasibility Study for Parcel D (SulTech 2008).
5	Of "Block" 39, it appears to be unknown or unclear whether contaminants from IR-65 or IR-34, could include a plume discovery, as from the Building 324 site, or a radiological impact from the Building 364 site.	The contamination associated with IR-65, IR-34 and specifically the Building 324 site were evaluated as part of Redevelopment Block 39 in the Final Revised Feasibility Study for Parcel D (SulTech 2007). Radiological impacts associated with the Building 364 site are considered in the Final Radiological Addendum to the Revised Feasibility Study for Parcel D (SulTech 2008).

ED_006787_00013380-00095

Proposed Plan for Parcel D, Hunters Point Shipyard		
Written Comments by J.V. McCarthy received by email on August 20, 2008.		
Comment Number	**Comment**	**Response**
6	The potential of radiological impact, as in residual unspecified radioactive contamination, is serious in "Parcel G". Is it preferred that waiting for consequences of breaching CERCLA 120 (h)(3)(C), beneath the required "covers" with foundation support piers, will be the expedient "Record of Decision" (?).	If the property in Parcel G is conveyed as an "early transfer" subject to the requirements of Section 120(h)(3)(C) of CERCLA, it is anticipated that the transferee will be responsible for constructing covers after transfer. The covers will be constructed to meet all the requirements of the remedial design, and will be conducted under the oversight of the regulatory agencies. The deed of transfer will contain any necessary interim land use restrictions required to protect covers following construction and comply with Section 120(h)(3)(C) of CERCLA. Please see the response to Comment Number 7 below for a discussion of foundation support piers.
7 (item 1)	Construction related "covers", as well as foundation support piers where required through bay mud and fill, are out of compliance with "… land disturbing activity…" restriction ("Restricted Activities", a.) where this occurs following transfer.	Any construction-related covers or foundation support piers constructed after transfer will be constructed to be protective of human health and the environment, and will meet the requirements of the remedial design.
8 (item 2)	Construction related "alteration, disturbance, or removal…" is likely to be out of compliance where this may involve installation of public utilities for permanent structures, as required by construction activities which follow property transfer.	Any breaching or alteration of the cover post-transfer will be conducted in compliance with the Covenant(s) to Restrict Use of the Property, Quitclaim Deed(s), and the Parcel G risk management plan, all of which will be reviewed and approved by the regulatory agencies.

ED_006787_00013380-00096

Proposed Plan for Parcel D, Hunters Point Shipyard		
Written Comments by Michael F. McGowan, Arc Ecology, received by email on August 25, 2008		
Comment Number	**Comment**	**Response**
1	On page 1 the proposed remedy for treating groundwater at Installation Sites IR-09, IR-33, and IR-71 is to use chemicals or biological nutrients to break down contaminants. These methods, zero valent iron (ZVI) treatment and bacterial enhancement, are effective under certain circumstances but are still considered experimental at Hunters Point Shipyard. Please document with a reference to a report or an explanation of the logic that supports the effectiveness of these treatments at the shipyard. If they are not as effective as hoped for, what does the Navy propose to do to remediate the groundwater, or will this problem be passed along to the new owners of the property?	Treatability studies using the proposed in situ biological and chemical treatment technologies have been conducted at other parcels with similar conditions and shown to be effective. Injection of ZVI was studied at Parcel B (Engineering/Remediation Resources Group, Inc. and URS Corporation "Final Cost and Performance Report, Zero-Valent Iron Injection Treatability Study, Building 123, Parcel B, Hunters Point Shipyard" June 2004). Injection of a biological growth medium was studied at Parcel C (Shaw Environmental "Final In Situ Sequential Anaerobic-Aerobic Bioremediation Treatability Study, Remedial Unit C5, Building 134, Installation Restoration Site 25, Hunters Point Shipyard" November 2005).
2	Page 1 last paragraph states that the Navy will consider comments on the Proposed Plan when three Records of Decision (ROD) are prepared for the new sub-parcels within Parcel D. Please explain what opportunity will be provided for public input to the cleanup plans if members of the public are not satisfied with the responses to comments as presented in the RODs.	Members of the public may contact Mr. Keith Forman, the Navy Base Realignment and Closure Environmental Coordinator, directly (see page 16 of the Proposed Plan for contact information). Members of the public may also coordinate with community members of the Restoration Advisory Board (RAB) or attend the RAB meetings which are held on the fourth Thursday of every month (except November and December) and are open to the public (see page 15 of the Proposed Plan for more information about the RAB).
3	Page 6 last paragraph states that action is warranted for cumulative risk of cancer that exceeds a certain probability. Shouldn't that be incremental risk above a background? Please clarify.	Remedial action is proposed for areas where health risks exceed 1×10^{-06} (one in a million). For the evaluation of health risks from exposure to chemicals in soil, metals with measured concentrations that are less than Hunters Point ambient levels (HPAL) were not included in the calculation of health risks and identification of areas that require remedial action. The approach used in the human health risk assessment (HHRA) to address ambient levels of metals is described in Section 2.5.1 of the ROD for Parcel G.

ED_006787_00013380-00097

Proposed Plan for Parcel D, Hunters Point Shipyard		
Written Comments by Michael F. McGowan, Arc Ecology, received by email on August 25, 2008		
Comment Number	**Comment**	**Response**
4	The explanation of risk assessment and cleanup goals with respect to proposed reuse areas is confusing. For example, different exposure scenarios (concentration x time) were used for industrial than for residential. Was it assumed that industrial workers would be exposed fewer hours of the day than residents? What if an industrial worker was employed on Parcel D for 50 years while residents moved away every 5 years? What were the assumptions underlying these scenarios?	Tables B-4 through B-9 of the Final Revised Feasibility Study for Parcel D (SulTech 2007) summarize the exposure assumptions used in the HHRA to calculate health risks for residential, industrial, recreational, and construction worker exposure to chemicals in soil and groundwater at Parcel D. The exposure assumptions used in the HHRA are based on U.S. Environmental Protection Agency (EPA) and California Environmental Protection Agency (Cal/EPA) recommendations for evaluating reasonable maximum exposure, and were also based on agreement with the Base Realignment and Closure Cleanup Team (BCT). Multiple conservative exposure assumptions were combined in the HHRA so that the calculated health risks over-predict actual risks. The HHRA calculated health risks using assumptions for potential exposure that are specific to the planned reuse for each redevelopment block at Parcel D. For example, the planned reuse is industrial for redevelopment blocks 30B, 37, 28, and 29. Therefore, the health risks for each of the exposure areas within these redevelopment blocks were calculated using assumptions for industrial exposure. Likewise, the preliminary remediation goals for each of these redevelopment blocks are protective for exposure during industrial use. As a conservative measure, the HHRA additionally evaluated residential, industrial, recreational, and construction worker risks for each exposure area throughout Parcel D, regardless of the planned reuse. This approach was included to provide information on potential risks for all potential reuses, in the event that revisions are made to the Redevelopment Plan for HPS. The preferred alternative for soil at Parcel G involves removal of soil in selected areas where chemicals exceed reuse-specific remediation goals and application of parcel-wide covers. The use of parcel-wide covers will eliminate the potential for contact with and health risks from exposure to chemicals in soil across all of Parcel D.

ED_006787_00013380-00098

Proposed Plan for Parcel D, Hunters Point Shipyard		
Written Comments by Michael F. McGowan, Arc Ecology, received by email on August 25, 2008		
Comment Number	**Comment**	**Response**
5	Do the results of the different risk scenarios mean that the areas designated for industrial can be left more contaminated than those designated for residential?	Use of reuse-specific exposure scenarios for the HHRA (for example, industrial exposure for redevelopment block 30B at Parcel G) and for preliminary remediation goals results in different preliminary remediation goals for residential and industrial reuse areas. As noted in the response to comment 4, the use of parcel-wide covers will eliminate the potential for contact with and health risks from exposure to chemicals in soil across all of Parcel D, regardless of the remediation goals.
6	Will additional cleanup be required and who will be responsible if the future use of an area changes from industrial to residential?	Additional cleanup is not anticipated if future use changes. Covers will block exposure to soil, regardless of whether the exposure scenario is residential or industrial. However, the transferee would be responsible if changes in land reuse required changes in the remedy.
7	Page 7 second full paragraph states that the health risk assessments were based on reasonable exposure assumptions recommended by EPA and DTSC. What were these assumptions?	As stated in the response to comment 4, Tables B-4 through B-9 of the Final Revised Feasibility Study for Parcel D (SulTech 2007) summarize the exposure assumptions used in the HHRA to calculate health risks for residential, industrial, recreational, and construction worker exposure to chemicals in soil and groundwater at Parcel D. The exposure assumptions used in the HHRA are based on EPA and Cal/EPA recommendations for evaluating reasonable maximum exposure, and were also based on agreement with the BCT.
8	Page 7 next to last sentence says that the Remedial Action Objectives will be appropriate if the reuse plan is changed. However, the previous sentence says that the planned future land use was an important component in developing the RAOs. These two statements seem to conflict. Please explain.	The planned future land use was used to help develop the RAOs; however, the RAOs are carefully worded so that there is flexibility in whatever reuse is selected. Therefore, the RAOs presented in the proposed plan and associated RODs can be used for any reuse plan that the San Francisco Redevelopment Agency decides to implement prior to the ROD.

ED_006787_00013380-00099

Proposed Plan for Parcel D, Hunters Point Shipyard		
Written Comments by Michael F. McGowan, Arc Ecology, received by email on August 25, 2008		
Comment Number	**Comment**	**Response**
9	Page 14 Radiological Alternative R-2 next to last paragraph states that the Time Critical Removal Action is anticipated to achieve Remedial Action Objectives in the proposed plan. What if there is still residual radiation above the remediation goals? Will the radiation goals for industrial use areas present a problem if the use changes to residential?	Remediation will continue until the remediation goals for radionuclides are achieved. Remediation goals are not set separately for industrial areas. All areas will be cleaned to residential standards for radionuclides.
10	If radiological decontamination of all areas will result in free release, then the future reuse designations should not matter. If this is so, please state that all areas will be cleaned to “residential standards” with regard to radiological materials. The desire for residential standard cleanup is very strong in the local community.	The risk assessment for radionuclides used the residential exposure scenario to bound the risks to industrial workers or recreational users. All areas will be cleaned to residential standards for radionuclides.

ED_006787_00013380-00100

REFERENCES

SulTech. 2007. "Final Revised Feasibility Study for Parcel D, Hunters Point Shipyard, San Francisco, California." November 30.

SulTech. 2008. "Final Radiological Addendum to the Revised Feasibility Study for Parcel D, Hunters Point Shipyard, San Francisco, California." April 11.

ED_006787_00013380-00101