Hunters Point Naval Shipyard
Parcels E and UC-3

San Francisco, California ***February 2013***

NAVY ANNOUNCES PROPOSED PLAN

The U.S. Navy encourages the public to comment on its ***Proposed Plan**** for cleanup of Parcels E and UC-3 at Hunters Point Naval Shipyard (HPNS) in San Francisco, California (see Figure 1). Parcel E includes a former industrial support area, consisting of supply and public works facilities for HPNS. Parcel E also includes shoreline areas used to dispose of industrial waste and construction debris. Parcel UC-3 consists of Crisp Road and an adjoining railroad right-of-way. Parcel UC-3 was formerly part of Parcel E; however, this planned utility corridor is now designated as a separate parcel for remedy selection. Two separate ***Records of Decision (RODs)*** will be prepared for Parcel E and Parcel UC-3, although both are discussed in this Proposed Plan. This approach will allow the final cleanup at Parcel UC-3 to be completed sooner than the final cleanup at Parcel E, which is more complicated.

This Proposed Plan presents several remedial alternatives for the final cleanup actions and identifies the Navy's ***Preferred Alternatives***. The Navy and the ***U.S. Environmental Protection Agency (EPA)***, in consultation with the ***California Environmental Protection Agency's Department of Toxic Substances Control (DTSC)*** and ***San Francisco Bay Regional Water Quality Control Board (Water Board)***, will co-select ***remedial actions*** for Parcels E and UC-3 in the RODs after reviewing and considering all information submitted during the public comment period. The Navy may modify the Preferred Alternatives or select other remedial alternatives presented in this Proposed Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives presented in this Proposed Plan. A final decision will not be made until all comments submitted during the review period are considered. See how to comment in the box below.

This Proposed Plan summarizes the remedial (cleanup) alternatives evaluated by the Navy and explains the reasons for identifying the preferred alternative to address contamination at Parcels E and UC-3 . The Navy estimates the cost of the preferred alternatives to be $105.5 million. The Navy proposes the following cleanup actions at Parcel E:

- Remove and dispose of contaminated soil and shoreline sediment in selected areas.
- Separate and dispose of materials and soil with ***residual radiological contamination***.
- Remove or treat contaminated material at the ***Former Oily Waste Ponds***.
- Operate a ***soil vapor extraction (SVE)*** system to remove and treat ***volatile organic compounds (VOCs)*** in soil and ***soil gas*** at Building 406.
- Install durable covers to prevent contact with soil containing ***metals*** (found throughout the fill material quarried from local rock and soil) and chemical or radiological contamination (found at low levels in areas not proposed for excavation).
- Protect the shoreline using natural materials (such as sand) and large rocks.

Figure 1. Location of HPNS.

How to Comment on the Proposed Plan for Parcels E and UC-3

- **Provide written comments no later than March 15, 2013, by one of the following methods:**
  E-mail: keith.s.forman@navy.mil
  Fax: (619) 532-0995
  Mail: See address on page 28
- **Attend the public meeting and provide verbal or written comments:**
  February 28, 2013, from 6:00 p.m. to 8:00 p.m.
  Southeast Community Facility Commission Building, Alex L. Pitcher, Jr. Room
  1800 Oakdale Avenue in San Francisco

*Words in ***bold italic*** type are defined in the glossary on page 31

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Parcel E Cleanup Actions *(continued from previous page)*:

- Treat groundwater by injecting ***biological nutrients*** or ***zero-valent iron*** to break down chemicals at contaminated plumes.
- Install a ***below-ground barriers*** to limit groundwater flow from contaminated plumes near the Parcel E shoreline to San Francisco Bay.
- Inspect and maintain the features of the remedial action (durable covers, etc.) to ensure that they are working properly.
- Monitor groundwater to verify that cleanup efforts meet the ***preliminary remediation goals***, and that chemicals in groundwater do not affect San Francisco Bay.
- Use ***institutional controls (ICs)*** to restrict specific land uses and activities (see Insert 1 on page 29 for more details on ICs).

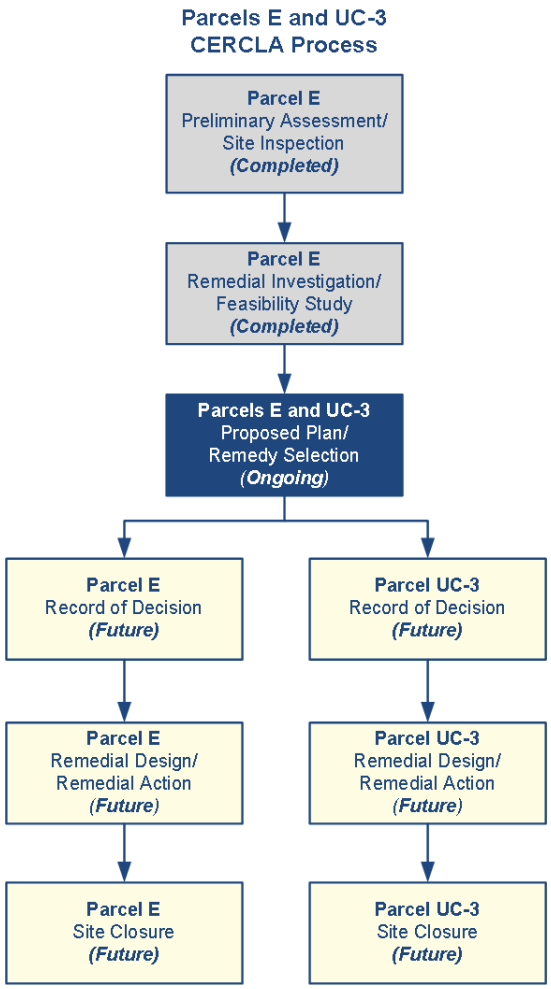
The Navy proposes a subset of the above listed cleanup actions at Parcel UC-3:

- Remove and dispose of contaminated soil in selected areas.
- Install durable covers (in a portion of Crisp Road) to minimize contact with chemicals in soil.
- Treat groundwater by injecting biological nutrients at a contaminated plume (under Crisp Road).
- Inspect and maintain the features of the remedial action .
- Monitor groundwater to verify that cleanup efforts meet the preliminary remediation goals.
- Use ICs to restrict specific land uses and activities (see Insert 1 on page 29).

Public comments will be accepted from February 13 through March 15, 2013, and public comments can be submitted via mail, fax, or e-mail throughout the comment period. A public meeting will be held from 6:00 p.m. to 8:00 p.m. on February 28, 2013, at the Southeast Community Facility Commission Building in the Alex L. Pitcher, Jr. Room, located at 1800 Oakdale Avenue in San Francisco. Members of the public may submit written and oral comments on this Proposed Plan at the public meeting. Written comments can be provided at any time during the comment period but must be received no later than March 15, 2013. Please refer to page 27 for further information on how to provide comments. The Navy developed the proposed cleanup actions for Parcels E and UC-3 based on previous investigations and studies, the results for which are summarized in documents contained in the ***Administrative Record*** file for HPNS (see page 27 for further information).

THE CERCLA PROCESS

The Navy is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of ***Comprehensive Environmental Response Compensation and Liability Act (CERCLA)*** and Section 300.430(f)(2) of the ***National Oil and Hazardous Substances Pollution Contingency Plan (NCP)***. This Proposed Plan has been prepared to highlight key information and conclusions presented in the ***Remedial Investigation (RI)*** Report (May 2, 2008), ***Feasibility Study (FS)*** Report (August 31, 2012) and the ***radiological addendum*** to the FS Report (August 31, 2012). The flowchart below illustrates the status of Parcels E and UC-3 in the CERCLA process.



The Navy received public input during development of the FS Report and radiological addendum, and this input helped identify the remedial alternatives discussed in this Proposed Plan.

The Navy has conducted numerous investigations at HPNS since the mid-1980s. These investigations have identified contamination that poses a potential risk to human health and the environment. The Navy has performed several ***removal actions*** (also referred to as early cleanup actions) from 1991 to 2011 to excavate contaminated soil, remove residual radiological contamination, and to limit the flow of groundwater from the Former Oily Waste Ponds into San Francisco Bay. These early cleanup actions reduced the risk posed by site contaminants, but the Navy must now address the remaining contaminants with final remedial actions for the entirety of each parcel. The Navy's Preferred Alternatives for the final remedial actions are presented in this Proposed Plan.

The ROD will present the selected remedial alternatives, identify the ***remedial action objectives (RAOs)*** and remediation goals, and outline performance standards that must be met when cleanup is complete. After the ROD, the ***remedial design (RD)*** and remedial action are the next steps in the CERCLA process and involve planning and implementation of the selected remedial action. For large sites such as Parcels E and UC-3, the remedial action is often implemented in phases over a period of several years.

The RI and FS Reports, radiological addendum, and other documents that provide information about the conditions and Navy activities at Parcels E and UC-3 are available for public review at the locations listed on page 27.

SITE BACKGROUND

HPNS is located in southeastern San Francisco on a peninsula that extends east into San Francisco Bay (see Figure 1 on page 1). This Proposed Plan applies to Parcels E and UC-3 (see Figure 2 below). Parcel E includes 128 acres in the southwestern portion of HPNS. Parcel E is bounded to the north by Parcel UC-3; to the east by Parcels D-1, G, and UC-1; to the south by intertidal shoreline areas along San Francisco Bay; and to the west by Parcel E-2. Parcel E contains 17 existing buildings, 25 former buildings, and 1 ship berth.

Historically, most of Parcel E was used as an industrial support area, including a warehouse (Building 406) where ***chlorinated solvents*** were spilled and Former Oily Waste Ponds (referred to as Installation Restoration [IR] Site 03 [IR-03]) where contaminated waste oil was stored from 1944 to 1974. Shoreline areas at Parcel E (referred to as IR Site 02 [IR-02]) were used to store construction and industrial materials, as well as to dispose of industrial waste and construction debris. The ***Naval Radiological Defense Laboratory (NRDL)*** used several Parcel E buildings during the 1950s and 1960s. Between 1976 and 1986, the Navy leased most of HPNS to Triple A Machine Shop (Triple A).

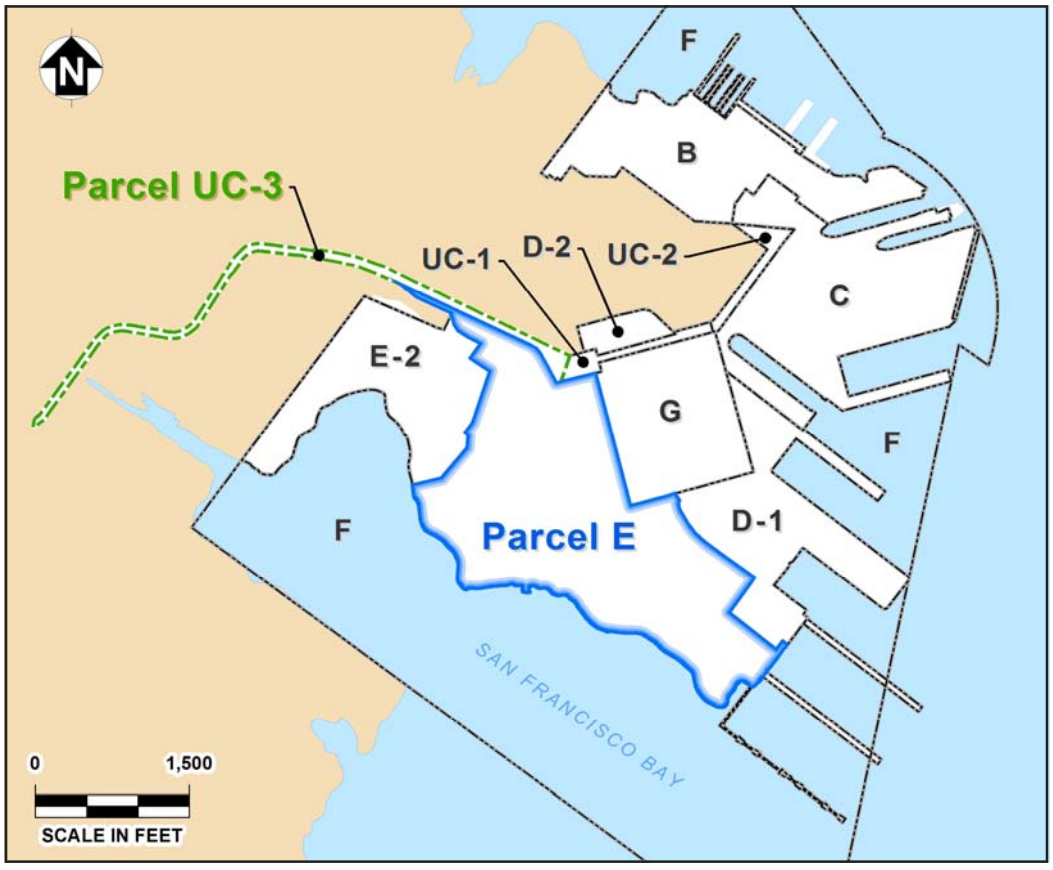


Figure 2. Locations of Parcels E and UC-3.

Triple A allegedly disposed of hazardous wastes at various locations at HPNS, including possibly discharging waste oil within Parcel E using below ground fuel and steam lines. These site features are shown on Figure 3 below.

Parcel UC-3 consists of 11 acres in the western portion of HPNS. Parcel UC-3 is bounded to the north by non-Navy property, to the east by Parcel UC-1, to the south by Parcel E and non-Navy property, and to the west by non-Navy property. Parcel UC-3 consists of Crisp Road and a railroad right-of-way, which were used to transport materials and equipment to and from the shipyard. The chemical contamination at Parcel UC-3 likely resulted from miscellaneous spills while the Navy operated and maintained the railroad. The railroad right-of-way is about 30 feet wide and extends about 3,200 feet west from the end of Crisp Road (near the intersection of Palou Avenue and Griffith Street) to a location near the intersection of Carroll Avenue and Ingalls Street.

Overview of Investigation Activities

Parcel E includes the first ***environmental investigation*** sites identified at HPNS during the Initial Assessment Study (1984). Since 1984, the Navy has performed numerous environmental investigations at Parcel E, including a ***Preliminary Assessment (PA)***, which involved a records search, interviews, and limited field investigations. The PA concluded that contamination was present at multiple sites and that more investigation was needed. The Navy continued to evaluate historical information, perform tests and studies, and collect samples to assess contamination.

After a further ***Site Inspection***, the Navy conducted the RI, which included collection of data to characterize chemicals in soil, shoreline sediment, and groundwater at various locations in Parcel E. The RI also included collection of data to characterize chemicals in soil at the railroad right-of-way in Parcel UC-3. The original RI report was issued in 1997, and was followed by the original FS Report (1998) and a ***Risk Management Review*** (2000). From 2000 to 2002, a data gaps investigation was completed to provide additional soil and groundwater data at multiple sites at Parcel E.

The revised RI Report (2008) and FS Report (2012) considered new information acquired after the original 1997 RI and 1998 FS, including boundary changes, completed cleanup actions, and additional groundwater and soil data. The radiological addendum to the 2012 FS Report evaluated potential radiological contaminants identified by a ***Historical Radiological Assessment (HRA)***. The HRA evaluated all previous uses of radiological materials at HPNS and assessed their potential effects on the site. The revised RI Report (2008), FS Report (2012), and the radiological addendum (2012) document how much is known about contamination at Parcels E and UC-3. These documents identified the types and volumes of soil and groundwater contamination, evaluated site risks, and developed remedial alternatives. The information in these documents supports the Navy's Preferred Alternatives at Parcels E and UC-3.

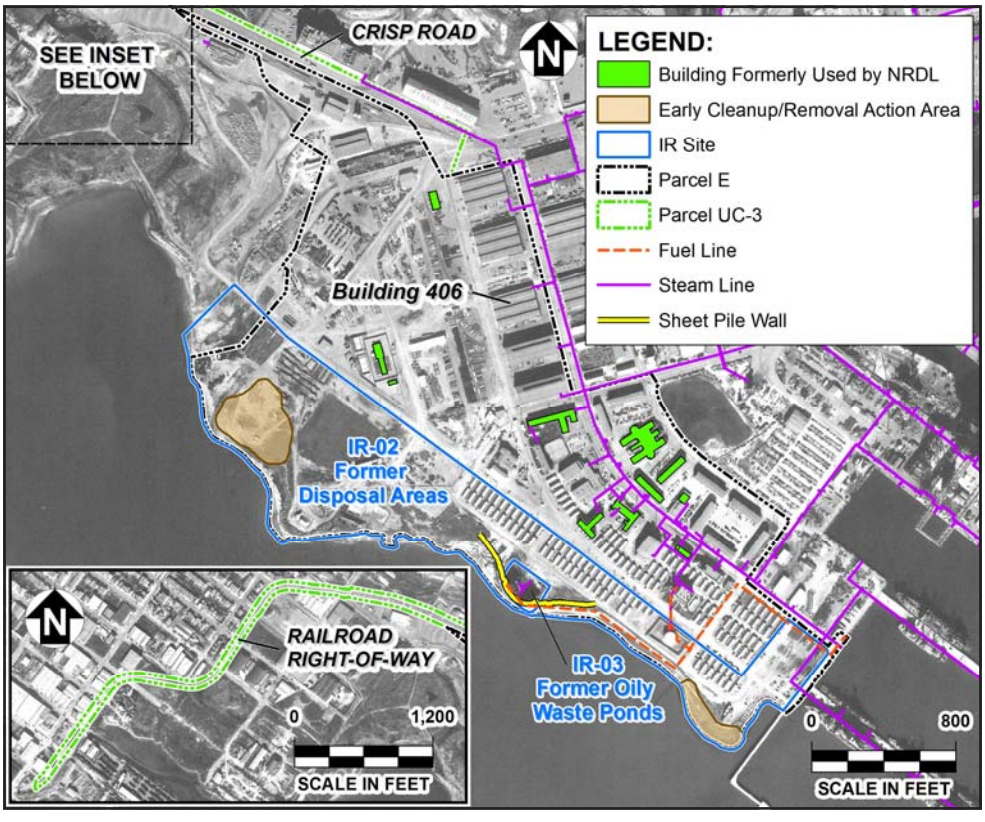


Figure 3. 1969 Aerial Photograph with Key Site Features

Past Removal Actions and Current Conditions

The Navy has also performed several early cleanup actions (referred to as removal actions) at Parcel E to minimize potential exposure to hazardous chemicals. Although these potential exposures did not pose an immediate risk to the public, the Navy decided to take early action because these areas contained the most significant contamination at Parcel E. Completed actions include:

- Removal and screening of over 60,000 cubic yards (about 4,600 truckloads) of soil and debris with potential radiological contamination from two former disposal areas in IR-02 (2005 through 2007) (Figure 3 on page 4).
- Installation of a ***protective liner*** and a 900-foot-long below-ground barrier at the Former Oily Waste Ponds in IR-03 (1996 to 1998) (Figure 3 on page 4).
- Removal and disposal of over 10,000 cubic yards (about 750 truckloads) of soil (with non-radioactive chemical contamination) from various sites (multiple actions performed from 1988 through 2004).
- Removal and cleanup of 8 underground storage tanks and 12 aboveground storage tanks (1991 to 1994).
- Removal and cleanup of radiological contamination at various sites and buildings in Parcel E (2010 to 2012). During this early action, storm drain and sewer lines throughout Parcel UC-3 and in most of Parcel E were also removed because of potential radiological contamination.

The early removal actions described above successfully removed significant amounts of contamination from certain areas of Parcel E. For example, the recent cleanup of radiological contamination at various sites and buildings in Parcel E has addressed most areas identified in the HRA, including buildings formerly used by NRDL (see Figure 4 below). Despite the early removal actions, contamination remains elsewhere at Parcels E and UC-3, which the Navy intends to address with the Preferred Alternatives described in this Proposed Plan.

The Navy has also performed the following additional studies to help guide the future cleanup at Parcels E and UC-3:

- A ***treatability study*** (from 2009 to 2010) to collect additional data at groundwater plumes with chlorinated solvents and evaluate zero-valent iron injection as a potential method to clean up the larger plumes (most notably the trichloroethene [TCE] plume under Building 406).
- A treatability study (from 2011 to 2012) to collect additional data at the Former Oily Waste Ponds in IR-03 and perform laboratory testing to evaluate one type of cleanup technology. The remaining oil is relatively deep (10 to 20 feet below the ground surface), is contaminated with non-petroleum chemicals (such as metals and PCBs), and has a consistency similar to molasses (which makes it difficult to remove by pumping). A second treatability study (planned for 2013), involving field testing of two cleanup technologies, will be performed to identify the best ways to remove or treat the remaining oil.

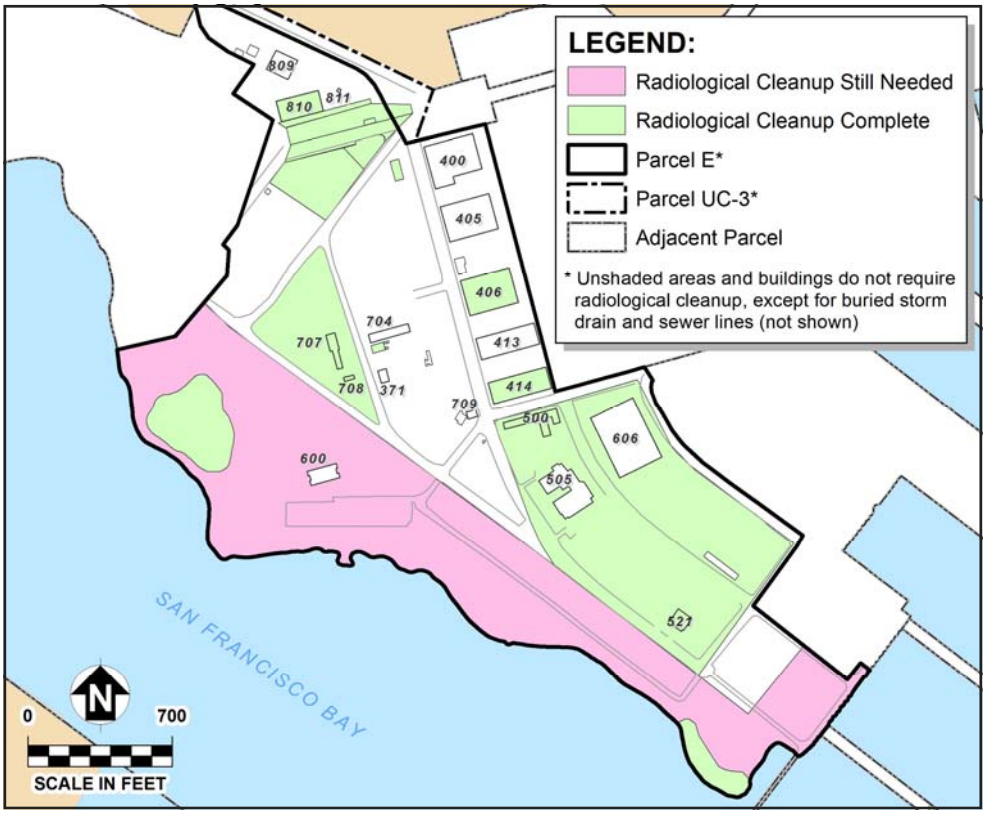


Figure 4. Radiological Cleanup Areas

The Navy has collected thousands of soil and groundwater samples to identify where cleanup needs to occur. The Navy identified several likely sources of contamination at Parcel E during these investigations, including former disposal areas in IR-02, the Former Oily Waste Ponds in IR-03, and a TCE spill at Building 406 (Figure 3 on page 4).

The chemicals found in soil and groundwater at Parcel E include metals (such as lead and zinc), VOCs (such as TCE), ***semivolatile organic compounds (SVOCs)***, pesticides, ***polychlorinated biphenyls (PCBs)***, and petroleum-related compounds (also referred to as total petroleum hydrocarbons [TPH]). In addition, ***radioactive chemicals*** were found in soil at several locations in Parcel E, but radioactive chemicals were not found in groundwater at levels that could impact people or wildlife in the Bay.

Most of the chemical contamination in soil at Parcel E is present at relatively shallow depths (less than 10 feet below the ground surface). However, deeper soil and groundwater contamination (10 to 20 feet below the ground surface) is found in isolated areas, most notably at the Former Oily Waste Ponds and the TCE plume at Building 406. In addition, the contaminated oil at the Former Oily Waste Ponds and the TCE source at Building 406 may be considered ***principal threat wastes*** that could require removal or treatment.

The chemicals found in soil and groundwater at Parcel UC-3 include metals (such as copper and lead), VOCs, SVOCs, and TPH. The chemical contamination in soil at Parcel UC-3 is present at relatively shallow depths (less than 10 feet below the ground surface). The chemical contamination in groundwater at Parcel UC-3 is limited to a relatively small area in the eastern portion of Crisp Road.

The Navy identified soil ***hot spots*** at multiple locations in Parcels E and UC-3, but these contaminant sources are not considered principal threat wastes because the chemicals (primarily metals, SVOCs, and PCBs) do not migrate readily in the environment. The Navy is currently collecting additional data at soil hot spots throughout Parcels E and UC-3 in order to better understand the extent of contamination at these areas. In addition, the Navy is monitoring groundwater plumes at Parcels E and UC-3 to help plan the future cleanup.

SUMMARY OF SITE RISKS

"Risk" is the likelihood or probability that a hazardous chemical, when released to the environment, will cause effects (such as cancer or other illnesses) on exposed humans or wildlife. Chemicals that are spilled onto the ground or released through underground pipes can contaminate soil, air, and groundwater. Figure 5 below shows the most common ways, such as breathing of contaminants from soil, that people may be exposed to contamination (referred to as the ***exposure pathway***).

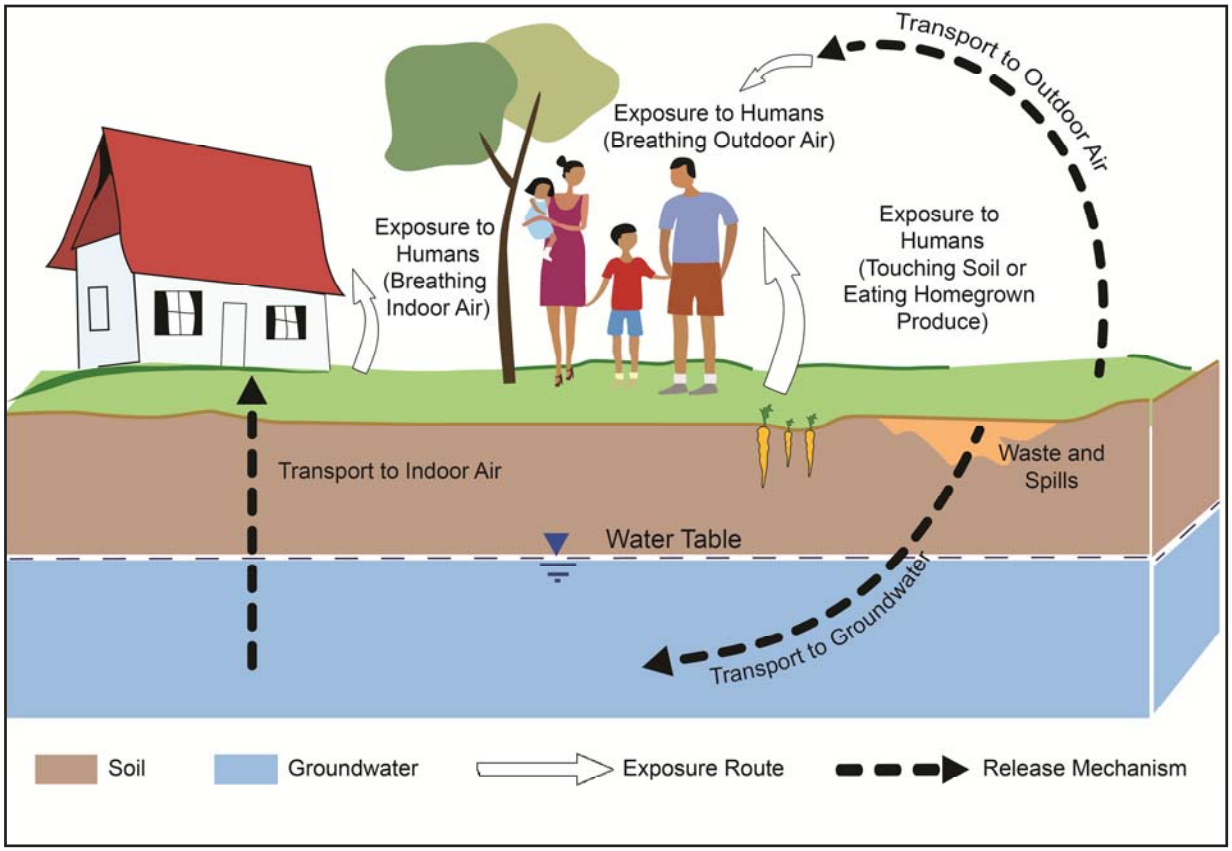


Figure 5. Conceptual Site Model.

The Navy evaluated the risk to humans and wildlife from exposure to contaminated soil, shoreline sediment, and groundwater. Table 1 on page 8 shows the list of exposure pathways and human and ecological ***receptors*** considered in the risk assessments. The risk calculations were based on site conditions prior to the cleanup, and all of the risks at the site will be minimized by the cleanup. The risk assessment results are summarized below.

Human Health Risk Assessment (HHRA). The Navy evaluated risk to human health at Parcels E and UC-3 in the HHRA that was presented in the Revised RI Report and the radiological addendum to the FS Report. The Navy considered the various ways that humans might be exposed to chemicals (see Table 1 on page 8), the possible concentrations of chemicals that could be encountered during exposure, and the potential frequency and duration of exposure (referred to as "***exposure scenarios***"). These exposure scenarios depend on the future use of the land. The Navy calculated the possible risk to humans for many different scenarios to make sure that the risk is understood, whatever the future use.

The 2010 redevelopment plan from the City and County of San Francisco outlines the proposed reuses for Parcels E and UC-3. In preparing the HHRA, the Navy divided Parcels E and UC-3 into reuse areas based on the redevelopment plan and, in the case of the railroad right-of-way (which does not have designated use in the redevelopment plan), to reflect the surrounding neighborhood uses (see Figure 6 on page 8). The expected long-term uses for Parcel E include mixed use (including residences) and open space (including recreation areas). The expected long-term uses for Parcel UC-3 include mixed use and, in the railroad right-of-way, commercial and light industrial use. The Navy evaluated these reuses using residential (mixed use), industrial, and recreational (open space) exposure scenarios.

Risk calculations were based on conservative assumptions to protect human health. "Conservative" means the assumption will tend to overestimate risk, resulting in preliminary remediation goals that are more protective of human health. Human health risk is classified as cancer risk (from exposure to carcinogens) or noncancer hazard (from exposure to noncarcinogens).

Cancer risk is the estimated probability that a person will develop cancer from exposure to site contaminants, and is generally expressed as an upper-bound probability. For example, a 1 in 10,000 chance is a risk that for every 10,000 people, one additional cancer case may occur as a result of exposure to site contaminants. A 1 in 1,000,000 chance is a risk that for every 1,000,000 people, one additional cancer case may occur as a result of exposure to site contaminants. The Navy adopted a conservative approach at Parcels E and UC-3 and evaluated action where potential risk exceeded 1 in 1,000,000, which meets the most conservative end of the risk management range established by EPA.

Noncancer hazard is the risk of health effects other than cancer, and is expressed as a number called the ***hazard index (HI)***. An HI of 1 or less is considered an acceptable exposure level for noncancer health hazards. The Navy evaluated action at areas of Parcels E and UC-3 with an HI greater than 1.

Based on the risk assessment results for soil and shoreline sediment, chemical and radiological cancer risks greater than 1 in 1,000,000 were identified at many specific locations across Parcels E and UC-3 (see Table 2 on page 9). Noncancer risks were also identified at many locations, typically as a result of metals in the soil. Potential risks from soil and shoreline sediment are based on exposure to several types of chemicals, including metals, VOCs, SVOCs, pesticides, PCBs, and radioactive chemicals. The risk assessment for groundwater estimated cancer risks greater than 1 in 1,000,000 or noncancer hazards greater than 1 for contaminant plumes located in Parcels E and UC-3 (see Table 3 on page 9). Potential risks from groundwater are based on breathing VOC vapors in indoor air that may have migrated from shallow groundwater through the shallow soil (see Figure 5 on page 6) and from drinking deep groundwater.

The Navy plans to perform remedial actions at areas with cancer risks greater than 1 in 1,000,000 and noncancer hazards greater than 1. The Navy and environmental regulators developed preliminary remediation goals (PRGs) for chemicals that pose a potential risk. These PRGs were based on preventing people from contacting soil, shoreline sediment, or groundwater that contains chemicals at concentrations above these risk levels (Table 4 on page 10, Tables 5 and 6 on page 11, and Table 7 on page 12 identify PRGs for the most significant chemicals). The ROD will contain the final remediation goals.

Ecological Risk Assessment (ERA). The Navy performed two separate ERAs to evaluate risks to wildlife; one for exposure to shoreline sediment and another for exposure to soil. A screening-level ERA was performed for shoreline sediment and concluded that contaminated shoreline sediment in Parcel E poses a potential threat to wildlife. A more detailed ERA was performed for soil in Parcel E, and concluded that chemicals in soil did not pose a potential threat to wildlife. The Navy developed PRGs for chemicals in shoreline sediment that pose a potential risk (Table 5 on page 11 identifies PRGs for the most significant chemicals). Ecological exposure to chemical concentrations that pose an ***unacceptable risk*** would be addressed by the remedial actions.

(text continued on page 12)

Table 1: Exposure Pathways and Potential Receptors at Parcels E and UC-3		
Soil or Shoreline Sediment	**Groundwater**	**Radioactive Chemicals**
▪ Touching or eating contaminated soil or sediment: residents, industrial (soil only) and construction workers, and recreational users, and wildlife (shoreline sediment only) on the land. ▪ Ingesting contaminants in soil from eating homegrown produce: residents ▪ Breathing of contaminants from soil or soil gas: residents, industrial and construction workers, and recreational users (soil only)	▪ Breathing vapors from contaminated shallow groundwater in indoor air: residents ▪ Breathing vapors from contaminated shallow groundwater in construction trenches (outdoor air): construction workers ▪ Touching shallow contaminated groundwater: construction workers ▪ Drinking or showering (for example, breathing vapors) with contaminated deep groundwater: residents (but only if groundwater is used for domestic purposes, which is unlikely because of high natural salt levels) ▪ Touching or drinking contaminated groundwater that could migrate to San Francisco Bay: wildlife in the bay (but only if groundwater is released to the bay carrying chemicals at concentrations greater than regulatory limits)	▪ Touching or eating contaminated soil, sediment, or other material: residents, construction workers, and recreational users ▪ Breathing of contaminants from soil, sediment, or buildings: residents, construction workers, and recreational users ▪ Exposure to radioactivity coming from soil, sediment, or buildings: residents, construction workers, and recreational users

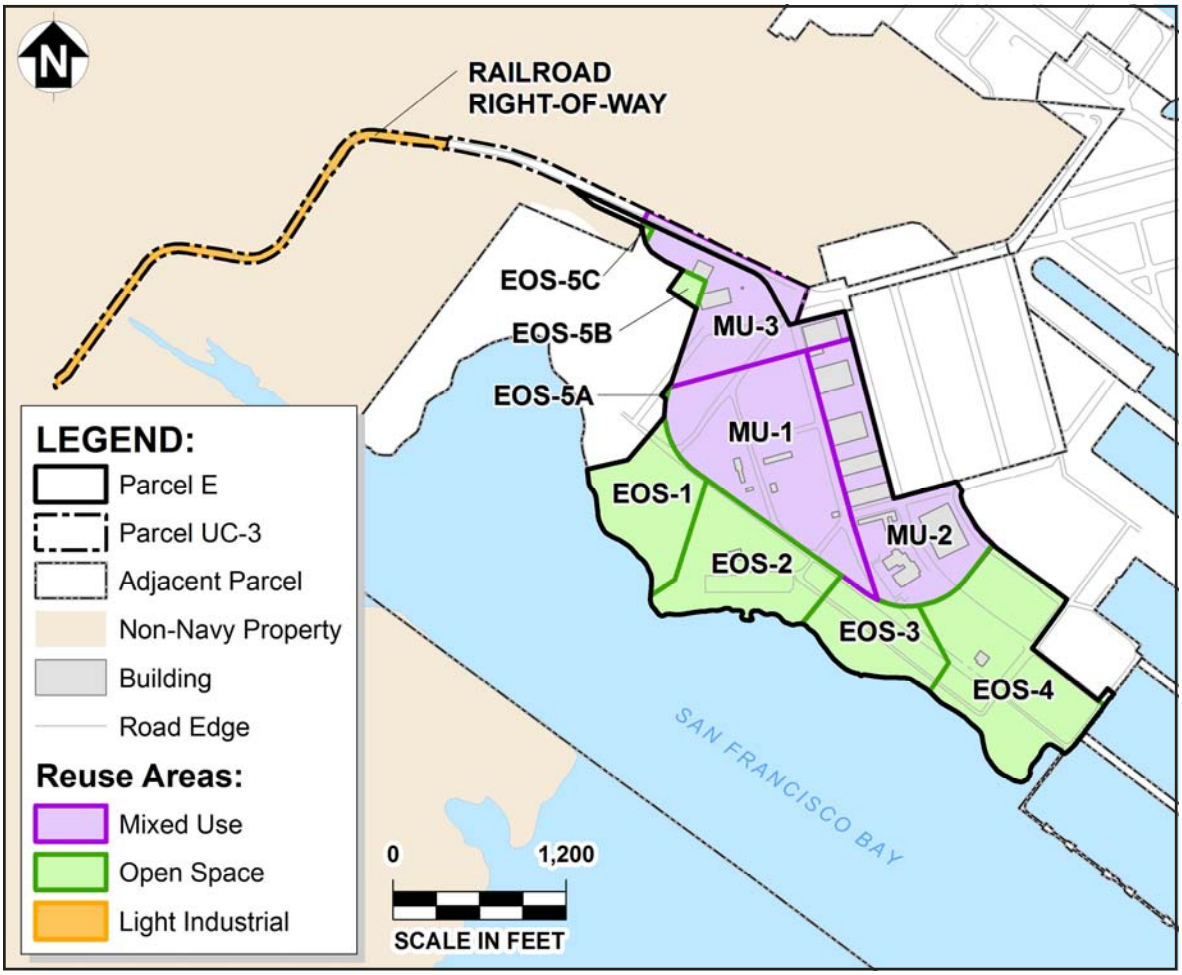


Figure 6. Reuse Areas.

Table 2. Maximum Cancer Risks and Noncancer Hazards from Soil and Shoreline Sediment Before Cleanup[a]					
Reuse Area	Parcel	Exposure Scenario	Chemical Cancer Risk	Hazard Index	Radiological Cancer Risk
EOS-1	E	Recreational	1 in 10,000	10	7 in 1,000,000
EOS-2	E	Recreational	9 in 1,000	1,700	3 in 10,000
EOS-3	E	Recreational	1 in 1,000	3.2	2 in 100,000
EOS-4	E	Recreational	3 in 10,000	9.6	7 in 1,000
EOS-5A	E	Recreational	1 in 100,000	<1	--
EOS-5B	E	Recreational	7 in 100,000	<1	--
EOS-5C	E	Recreational	--	<1	--
MU-1	E	Residential	6 in 1,000	130	7 in 1,000
MU-2	E	Residential	3 in 1,000	54	9 in 10,000
MU-3	E / UC-3	Residential	1 in 1,000	65	8 in 10,000
Railroad Right-of-Way	UC-3	Industrial	5 in 100,000	<1	--

Notes:

Reuse areas are shown in Figure 6 on page 8, and align with anticipated future use.

a = Listed risk value is maximum in each area; risk is based on conditions before cleanup (including prior to interim removal actions, such as those related to radioactive chemicals).

HI = hazard index

-- = not applicable (i.e., no chemicals of concern in the reuse area)

Table 3: Maximum Cancer Risks and Noncancer Hazards from Groundwater Before Cleanup[a]			
Reuse Area	Exposure Scenario	Cancer Risk	Hazard Index
Breathing Indoor Air from Shallow Groundwater			
MU-1	Residential	2 in 1,000	11
MU-2	Residential	1 in 1,000	4.6
MU-3	Residential	8 in 100,0000	2.9
Drinking of or Showering with Deep Groundwater[b]			
MU-1	Residential	--	--
MU-2	Residential	4 in 10,000	2.5
MU-3	Residential	--	--

Notes:

a = Listed risk value is maximum in Parcel E; risk is based on conditions before cleanup.

b = Evaluation used shallow and deep groundwater data; groundwater is an unlikely source of drinking water because of high natural salt levels.

HI = hazard index

-- = not applicable (i.e., no chemicals of concern in the reuse area)

Table 4. Preliminary Remediation Goals for Humans Exposed to Select Chemicals in Soil and Shoreline Sediment[a,b]				
Chemical of Concern	PRG for Residential Exposure Scenario (mg/kg)	PRG for Industrial Worker Exposure Scenario (mg/kg)	PRG for Construction Worker Exposure Scenario (mg/kg)	PRG for Recreational Exposure Scenario (mg/kg)
3,3'-Dichlorobenzidine	0.008	--	--	--
alpha-BHC	0.0019	--	--	--
Antimony	10	--	120	--
Aroclor-1254	0.093	--	2.1	0.74
Aroclor-1260	0.21	--	2.1	0.74
Arsenic	11.1	--	11.1	11.1
Benzo(a)anthracene	0.37	1.8	6.4	1.3
Benzo(a)pyrene	0.33	0.33	0.65	0.33
Benzo(b)fluoranthene	0.34	1.8	6.5	1.3
Benzo(k)fluoranthene	--	1.8	6.5	1.3
Bis(2-ethylhexyl)phthalate	1.1	--	--	--
Copper	160	76,000	11,000	470
Dibenz(a,h)anthracene	--	0.33	1.1	0.33
Dieldrin	--	--	--	0.12
Heptachlor epoxide	--	--	--	0.21
Indeno(1,2,3-cd)pyrene	--	1.8	6.5	1.3
Lead	155	800	800	155
Manganese	--	--	6,900	2,430
Mercury	2.28	--	93	--
Naphthalene	1.7	--	75	--
Total TPH	3,500	3,500	3,500	3,500
Vanadium	117	--	310	--
Zinc	370	--	--	719

Notes:

a = The source of the PRGs is presented in Table 3-1 of the FS Report.

b = The listed chemicals are those found in soil and sediment at concentrations at least 5 times higher than the levels considered safe for future human receptors.

BHC = benzene hexachloride

mg/kg = milligrams per kilogram

PRGs = preliminary remediation goals

TPH = total petroleum hydrocarbons

-- = not applicable (i.e., not a chemical of concern under the exposure scenario)

Table 5. Preliminary Remediation Goals for Wildlife Exposed to Chemicals in Shoreline Sediment[a,b]	
Chemical of Concern	**PRG for Wildlife Exposure Scenario (mg/kg)**
Cadmium	3.14
Copper	124
Lead	218
Mercury	2.28
Molybdenum	2.68
Zinc	158
Total Aroclors	0.2
Total DDT	0.0461

Notes:

a = The source of the PRGs is presented in Table 3-2 of the FS Report. PRGs for sediment are also protective of humans using and working along the shoreline.

b = The ecological risk assessment concluded that risk to wildlife from chemicals in soil does not warrant cleanup actions; however, ecological benchmarks (presented in Table 3-1 of the FS Report) were considered in developing cleanup actions to address risk identified in the human health risk assessment.

DDT = dichlorodiphenyltrichloroethane

mg/kg = milligrams per kilogram

Table 6. Preliminary Remediation Goals for Select Chemicals in Groundwater[a,b]		
Exposure Scenario	**Chemical of Concern**	**PRG (µg/L)**
Construction Worker Exposure to Shallow Groundwater (A-aquifer)	1,2-Dichloroethene (total)	305
	Arsenic	39
	Benzo(a)anthracene	0.65
	Benzo(a)pyrene	0.05
	Chrysene	6.7
	Naphthalene	22
	Trichloroethene[c]	370
	Vinyl chloride	6.3
Domestic Use of Deep Groundwater by Residents (B-aquifer)	Arsenic	27.3
	Manganese	8,140
	Tetrachloroethene	5
Wildlife in the Bay	Total TPH (goals vary based on distance from the bay)	1,400 to 20,000

Notes:

a = The listed chemicals are those found in shallow and deep groundwater at concentrations that contribute most (greater than 80 percent) of the estimated risk for the individual exposure scenarios.

b = The source of the PRGs is presented in Tables 3-3, 3-4, and 3-5 of the FS Report.

c = Trichloroethene is the only chemical of concern for groundwater in Parcel UC-3.

DDE = dichlorodiphenyldichloroethene

PRG = preliminary remediation goals

TPH = total petroleum hydrocarbons

µg/L = micrograms per liter

Table 7. Preliminary Remediation Goals for Radioactive Chemicals[a]			
	Soil and Sediment (pCi/g)	Surfaces (dpm/100 cm^2)	
Radioactive Chemical of Concern	Resident[b]	Equipment, Waste (dpm/100 cm^2)	Structures (dpm/100 cm^2)
Americium-241	1.36	100	100
Cesium-137	0.113	5,000	5,000
Cobalt-60	0.252	5,000	5,000
Plutonium-239	2.59	100	100
Radium-226	1.0[c]	100	100
Strontium-90	0.331	1,000	1,000
Uranium-235	0.195	5,000	488

Notes:

a = The source of the PRGs is presented in Table 7 of the radiological addendum.

b = Residential use is not planned throughout Parcel E, but residential goals are proposed for all exposure scenarios as an additional level of protection.

c = PRG for Radium-226 is 1.0 pCi/g above the background level for Parcel E.

dpm/100 cm^2 = disintegration per minute per 100 square centimeters

pCi/g = picocuries per gram

PRGs =preliminary remediation goals

(text continued from page 7)

The Navy also compared data for chemicals detected in groundwater with values the Water Board uses to protect aquatic wildlife in San Francisco Bay. The screening evaluation found that metals, PCBs, pesticides, and TPH in groundwater may pose a potential risk to aquatic wildlife if groundwater with these chemicals reaches the Bay. The remedial action would control (through either containment or removal of the contaminant source) these chemical concentrations in groundwater and protect aquatic wildlife in the Bay.

REMEDIAL ACTION OBJECTIVES

After the risk assessments were completed, the Navy developed RAOs to assist in identifying and assessing remedial alternatives that would address risks at Parcels E and UC-3. RAOs are established for soil, shoreline sediment, and groundwater at Parcel E. Additional RAOs were established for contaminated oil at the Former Oily Waste Ponds and areas with residual contamination. Each RAO takes into account (1) the ***chemicals of concern (COCs)***, (2) the ways people or wildlife could be affected, and (3) an associated acceptable chemical concentration or range of concentrations (known as PRGs). The RAOs were developed in conjunction with the regulatory agencies and are consistent with the expected future uses of Parcels E and UC-3.

The RAOs include protecting people and wildlife from exposure to unacceptable levels of contamination (for example, chemical concentrations that exceed PRGs). Exposure to chemical concentrations exceeding the PRGs poses an unacceptable risk that would be addressed by the remedial actions. PRGs for the most significant COCs are presented in Table 4 on page 10, Tables 5 and 6 on page 11, and Table 7 above and will be finalized in the ROD. The RAOs are listed below.

RAOs for Soil and Shoreline Sediment

- Protect people from eating, breathing, or touching soil and shoreline sediment with chemical concentrations greater than the PRGs.
- Protect people from exposures to vapors in soil gas at concentrations greater than those considered safe for humans.
- Protect wildlife in the shoreline from exposures from eating and touching shoreline sediment with chemical concentrations greater than the PRGs.

RAOs for Groundwater

- Protect people from drinking or showering in groundwater that may contain chemical concentrations greater than the PRGs.
- Protect construction workers from touching or breathing chemicals that may be in groundwater at concentrations greater than the PRGs.
- Prevent or minimize migration of chemicals identified in the groundwater screening-level ERA from migrating to the Bay.

RAOs for Contaminated Oil at Former Oily Waste Ponds

- Prevent or minimize migration of contaminated oil from Former Oily Waste Ponds to the Bay, where it could result in the discharge of contaminants at concentrations greater than the PRGs or other water quality criteria.

RAOs for Residual Radiological Contamination (in soil, shoreline sediment, or structures)

- Protect people from exposures to radiological chemicals at levels greater than the PRGs.

SUMMARY OF REMEDIAL ALTERNATIVES

The Navy, in consultation with EPA, DTSC, and the Water Board, developed a range of alternatives in the FS Report to address contamination at Parcels E and UC-3. The alternatives evaluated in the FS range from not taking any cleanup action to extensive remediation. All of the alternatives, except for the no action alternative, address the RAOs. The remedial alternatives, which are presented in Tables 8 and 9 on page 14 and Tables 10 and 11 on page 15 and summarized below, present a variety of methods with different costs and approaches to meet the RAOs.

Remedial Alternatives for Soil and Shoreline Sediment. Alternatives for soil and shoreline sediment are listed in Table 8 on page 14, and are briefly described below.

- Alternative S-1 is no action; no further cleanup would be performed. EPA requires that no action be included among the alternatives to help understand and compare the relative advantages of other alternatives.
- Alternative S-2 relies on durable covers, shoreline protection features (to be installed after the excavation and offsite disposal of shoreline sediment), institutional controls (ICs), and long-term monitoring and maintenance to prevent exposure and involves little active remediation.
- Alternative S-3 also uses the same components as Alternative S-2, but adds excavation and offsite disposal of soil from ***Tier 1*** locations (see Figure 7 on page 16). Tier 1 locations contain chemicals at concentrations greater than 10 times the PRGs.
- Alternative S-4 uses all of the same elements as Alternatives S-2 and S-3, but also includes excavation and offsite disposal of soil from ***Tier 2*** and TPH locations (see Figure 7 on page 16). Tier 2 locations contain chemicals at concentrations greater than five times the PRGs, and TPH locations contain TPH at concentrations greater than the PRG. Alternative S-4 also includes operation of an SVE system to address VOC contamination associated with the Building 406 TCE plume.

ICs are an integral component of every remedial alternative except Alternative S-1, and Insert 1 on page 29 provides an overview of ICs common to all the remedial alternatives (except Alternative S-1).

Remedial Alternatives for Groundwater. Alternatives for groundwater are listed in Table 9 on page 14, and are briefly described below.

- Alternative GW-1 is no action; no further cleanup would be performed.
- Alternative GW-2 relies on long-term groundwater monitoring to assess whether contaminants migrate over time.
- Alternative GW-3 includes groundwater containment with a below-ground barrier (for plumes containing metals and PCBs near the Parcel E shoreline) and active groundwater treatment (for VOC plumes under Parcels E and UC-3) using either biological nutrients or zero-valent iron, followed by monitored natural attenuation (MNA). Groundwater would be monitored during the active treatment and natural attenuation phases.
- Alternative GW-4 includes the same components as Alternative GW-3, but includes a different treatment technology (using air sparging) for the Building 406 TCE plume.

All alternatives except Alternative GW-1 include ICs to prevent people from installing wells for drinking water or other uses. Insert 1 on page 29 provides an overview of ICs common to all the remedial alternatives (except Alternative GW-1).

Remedial Alternatives for Contamination at Former Oily Waste Ponds. Alternatives for the Former Oily Waste Ponds, listed in Table 10 on page 15, were developed to address the potential for residual oil to migrate to the Bay. The remedial alternatives for the Former Oily Waste Ponds are briefly described below.

- Alternative O-1 is no action; no further cleanup would be performed.
- Alternative O-2 includes construction of a soil cover, protective liner, and below-ground barrier, followed by long-term groundwater monitoring and ICs.
- Alternative O-3 includes the same components as Alternative O-2, but includes removal or treatment of the contaminated oil using a combination of several technologies and groundwater monitoring/MNA.

(text continued on page 16)

Table 8. Remedial Alternatives for Soil and Shoreline Sediment

Remedial Alternative	Approximate Cost ($M)	Components of Remedial Alternative
S-1	0	**No Action:** No actions or costs; this alternative is required by CERCLA as a baseline for comparison with the other alternatives.
S-2	35.2	**Covers:** construct physical barriers to eliminate the exposure pathways to soil and shoreline sediment at Parcel E. **Shoreline Protection:** construct shoreline protection features to prevent contaminated shoreline sediment and onshore soil from entering San Francisco Bay and to integrate with the proposed surface covers; shoreline sediment (to a depth of about 2.5 feet) would be excavated and disposed of at an approved offsite landfill prior to installing the shoreline protection features. **Long-Term Monitoring and Maintenance:** regularly inspect, maintain, and repair the existing covers and shoreline protection. **ICs:** Impose ICs to limit the use of land or restrict activities that take place within an area. The insert on page 29 lists the ICs for Parcel E.
S-3	48.7	*All of the same elements as Alternative S-2, but would also include:* **Excavation and Offsite Disposal of Tier 1 Locations:** remove Tier 1 locations that contain chemicals in soil at concentrations greater than 10 times the PRGs and TPH locations that contain TPH at concentrations greater than the PRG; covers and ICs to address remaining low-risk contaminated soil.
S-4	50.2	*All of the same elements as Alternative S-3, but would also include:* **Excavation and Offsite Disposal of Tier 2 Locations:** remove Tier 2 locations that contain chemicals in soil at concentrations greater than 5 times the PRGs; covers and ICs to address remaining low-risk contaminated soil. **Soil vapor extraction (SVE):** perform SVE to address VOC soil contamination associated with Building 406 TCE plume.

Table 9. Remedial Alternatives for Groundwater

Remedial Alternative	Approximate Cost ($M)	Components of Remedial Alternative
GW-1	0	**No Action:** No actions or costs; this alternative is required by CERCLA as a baseline for comparison with the other alternatives.
GW-2	2.6	**Groundwater Monitoring:** implement long-term monitoring of groundwater to assess whether chemicals are migrating and to monitor changes in ambient conditions. **ICs:** Impose ICs to limit the use of land or restrict activities that take place within an area. The insert on page 29 lists the ICs for Parcel E.
GW-3	4.5	*All of the same elements as Alternative GW-2, but would also include:* **Groundwater Containment:** build below-ground barrier in nearshore areas to better control discharge of contaminated groundwater (with PCBs and metals) into San Francisco Bay. **In-Situ Groundwater Treatment:** Inject an organic compound at the source of groundwater contamination to stimulate biological activity to create conditions where VOCs are destroyed in groundwater. If determined necessary in the RD, a more aggressive form of in-situ treatment may be performed at the Building 406 TCE plume. This option would consist of injecting zero-valent iron at the source of groundwater contamination to create conditions where VOCs are destroyed in groundwater. **Monitored Natural Attenuation:** implement long-term monitoring and studies of groundwater to assess whether chemicals are migrating and to evaluate the effects of treatment.
GW-4	5.9	*All of the same elements as Alternative GW-3, but would include a different treatment technology for the Building 406 TCE plume:* **Air Sparging:** perform a more aggressive form of in-situ treatment at the Building 406 TCE plume, consisting of injecting air under high pressure at the source of groundwater contamination to create conditions where VOCs are stripped from groundwater, captured by SVE wells, and treated above the ground prior to discharge to the atmosphere. **Soil vapor extraction (SVE):** perform SVE to address VOC soil contamination associated with Building 406 TCE plume.

Table 10. Remedial Alternatives for Contamination at Former Oily Waste Ponds		
Remedial Alternative	**Approximate Cost ($M)**	**Components of Remedial Alternative**
O-1	0	**No Action:** No actions or costs; this alternative is required by CERCLA as a baseline for comparison with the other alternatives.
O-2	1.7	**Source Containment:** construct surface cover to eliminate the exposure pathways and limit groundwater infiltration, and build below-ground barrier to better control discharge of oil contamination into the Bay. **Groundwater Monitoring:** implement long-term monitoring of groundwater to assess whether chemicals are migrating and to monitor changes in ambient conditions. **ICs:** Impose ICs to limit the use of land or restrict activities that take place within an area. The insert on page 29 lists the ICs for Parcel E.
O-3	13.1	*All of the same elements as Alternative O-2, but would also include:* **Source Removal or Treatment:** perform a combination of several technologies to remove or treat the contaminated oil to the extent practical (future studies would help identify the specific combination of technologies, which may include excavation and offsite disposal, in-situ mixing of a stabilizing compound, and thermally-enhanced extraction). **Monitored Natural Attenuation:** implement long-term monitoring and studies of groundwater to assess whether chemicals are migrating and to evaluate the effects of treatment.
O-4	14.7	*All of the same elements as Alternative O-3, but would also include:* **In-Situ Groundwater Treatment:** Inject an organic compound at the source of groundwater contamination to stimulate biological activity to create conditions where contaminants are destroyed in groundwater. If thermally-enhanced extraction is used over a large area (to be determined in the RD), then a more aggressive form of in-situ treatment involving heating the groundwater might be implemented. This option would involve heating the groundwater to boiling temperature to create conditions where contaminants are stripped from groundwater, captured by SVE wells, and treated above the ground prior to discharge to the atmosphere.
O-5	22.0	*All of the same elements as Alternative O-4, but would also include:* **Excavation and Offsite Disposal of Shallow Contamination:** excavate the contaminated oil above the groundwater table and dispose of the material at an offsite landfill; the contaminated oil below the groundwater table would be addressed with a combination of several technologies (as identified for Alternative O-3).
O-6	21.8	**Excavation and Offsite Disposal of Shallow and Deep Contamination:** excavate the contaminated oil above and below the groundwater table and dispose of the material at an offsite landfill; monitored natural attenuation would be performed and ICs would be imposed (as identified for Alternative O-3) until groundwater concentrations reach the PRGs.

Table 11. Remedial Alternatives for Residual Radiological Contamination		
Remedial Alternative	**Approximate Cost ($M)**	**Components of Remedial Alternative**
R-1	0	**No Action:** No actions or costs; this alternative is required by CERCLA as a baseline for comparison with the other alternatives.
R-2	34.9	**Scoping or Characterization Surveys:** perform scoping or characterization surveys to identify potential radioactive contamination requiring remediation. **Soil, Sediment, or Debris Removal:** remove soil, sediment, or debris with radioactive contamination exceeding the PRGs and dispose of the waste at an offsite landfill, with soil excavation depth at IR-02 and IR-03 (where covers and ICs are proposed to address radioactive contamination) generally limited to the upper 1 foot. **Structure Decontamination and Demolition:** remove building materials with radioactive contamination exceeding the PRGs and dispose of the debris at an offsite landfill, with specific decontamination or demolition approach varying depending on the extent of contamination and building type and size. **Final Status Surveys:** perform final surveys to demonstrate that PRGs have been met. **Soil Cover, Shoreline Protection, and ICs (at IR-02 and IR-03):** following removal of radioactive contamination near the existing surface, construct a 2-foot-thick soil cover (with underlying demarcation layer) to eliminate the exposure pathways and impose ICs to limit the use of land or restrict activities that take place within an area. The insert on page 29 lists the ICs for Parcel E.
R-3	36.1	All of the same elements as Alternative R-2, with the addition of a thicker (3-foot) soil cover at IR-02 and IR-03 to provide additional shielding from residual radioactivity.

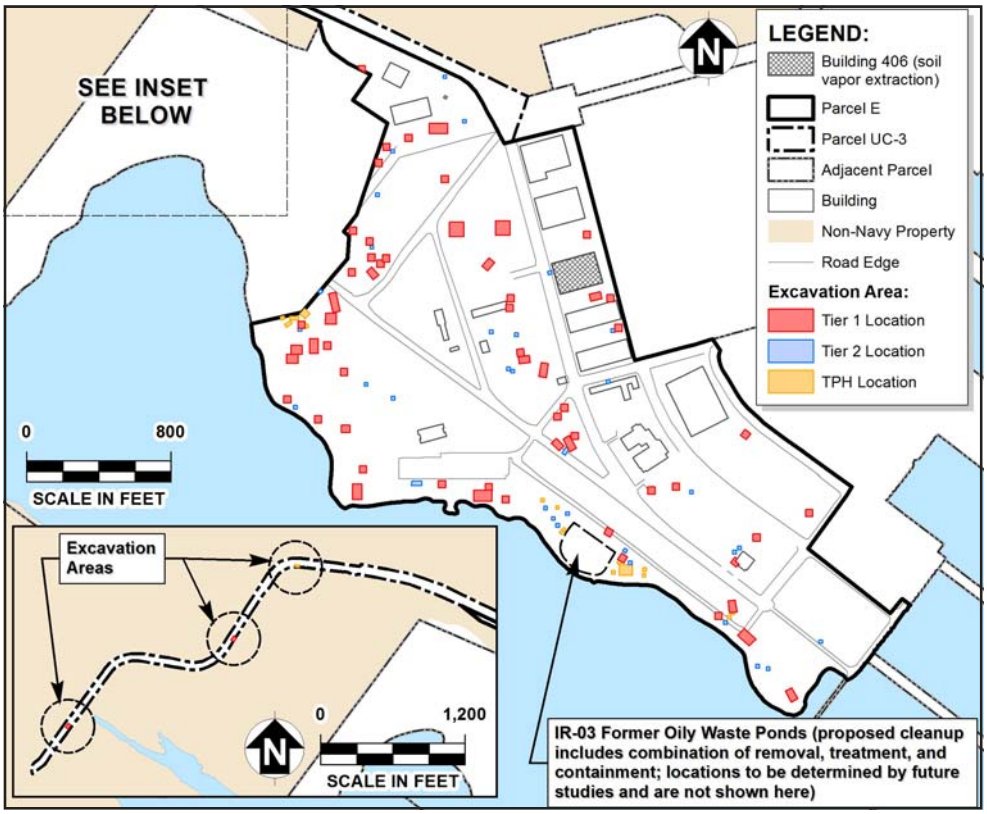


Figure 7. Proposed Soil Excavations.

(text continued from page 13)

The contaminated oil would be removed or treated using multiple technologies, including excavation and offsite disposal, ***in-situ mixing*** of a stabilizing compound, and ***thermally-enhanced extraction*** with offsite disposal.

- Alternative O-4 has the same components as Alternative O-3, but also includes active groundwater treatment after the contaminated oil is removed or treated.
- Alternative O-5 includes the same components as Alternative O-4, but also includes excavation of all contaminated oil above the groundwater.
- Alternative O-6 includes excavation of all contaminated oil both above and below the groundwater, followed by groundwater monitoring/ MNA, and ICs.

ICs are an integral component of every remedial alternative except Alternative O-1 (see Insert 1 on page 29).

Remedial Alternatives for Residual Radiological Contamination. Alternatives for residual radiological contamination are listed in Table 11 on page 15, and are briefly described below.

- Alternative R-1 is no action; again, no further cleanup would occur.
- Alternative R-2 includes the following components that are consistent with the Navy's recently completed early removal actions:

1. Scanning radiologically impacted areas at Parcel E that may include structures and former building sites
2. Decontaminating (and demolishing if necessary) buildings at Parcel E
3. Screening, separating, and disposing of radiologically contaminated debris and soil at an approved landfill
4. Performing final surveys to demonstrate PRGs have been met

As shown on Figure 4 on page 5, the radiological cleanup has been completed in all Parcel E areas except IR-02 and IR-03. Although not shown on Figure 4, the Navy has also removed storm drain and sewer lines throughout Parcel UC-3 and in most of Parcel E as part of the Navy's investigation for residual radiological contamination in these areas. Alternative R-2 would address the residual radiological contamination at IR-02 and IR-03 by performing the following actions:

1. Scanning the entire area within IR-02 and IR-03 for radioactivity to a depth of at least 1 foot
2. Removing residual radiological contamination near the ground surface at IR-02 and IR-03 and disposing of it at an approved landfill
3. Constructing a 2-foot thick soil cover throughout IR-02 and IR-03 to eliminate exposure pathways and installing a demarcation layer to mark the boundary between the existing surface and the soil cover
4. Implementing ICs at IR-02 and IR-03 to limit the use of land or restrict activities that take place within the area
5. Removing remaining storm drain and sewer lines in areas outside of IR-02 and IR-03 (where the buried lines will remain in place because the soil cover and ICs will prevent exposure to residual radiological contamination in these lines)

- Alternative R-3 has the same components as Alternative R-2, with the addition of a thicker (3 foot) soil cover at IR-02 and IR-03 to provide additional shielding from residual radiological contamination.

EVALUATION OF REMEDIAL ALTERNATIVES

The Navy, in consultation with EPA, DTSC, and the Water Board, evaluated the remedial alternatives using the criteria specified by federal regulations in the NCP. General descriptions of the nine criteria are presented in the illustration to the right. Protection of human health and the environment and compliance with state and federal laws and regulations, called ***applicable or relevant and appropriate requirements (ARARs)***, are threshold criteria that each alternative must meet to be eligible for selection. Key ARARs are summarized in Attachment 1 at the end of this Proposed Plan and a complete discussion of ARARs for all of the alternatives is presented in Appendix B of the FS Report and Appendix C of the radiological addendum.

The following five balancing criteria are used to weigh major tradeoffs in the benefits and limitations among alternatives: (1) long-term effectiveness and permanence; (2) reduction of toxicity, mobility, or volume through treatment; (3) short-term effectiveness; (4) implementability; and (5) cost. Modifying criteria include state acceptance and community acceptance. State acceptance is evaluated based on comments on the FS Report and Proposed Plan. Community acceptance is evaluated based on comments received from the public during the comment period for the Proposed Plan.

Tables 12 and 13 on page 19 summarize the comparison of the remedial alternatives for soil (including shoreline sediment) and groundwater at Parcels E and UC-3. Table 14 on page 20 and Table 15 on page 21 summarize the comparison of the remedial alternatives for contamination at the Former Oily Waste Ponds and residual radiological contamination at Parcel E. The Navy's preferred alternatives are described in the next section. The Navy's evaluation relative to the threshold and balancing criteria is summarized below.

Criteria 1 and 2: Overall Protection of Human Health and the Environment and Compliance with ARARs. All alternatives, with the exception of the "no action" alternatives (S-1, GW-1, O-1, and R-1) and Alternative GW-2, provide adequate protection of human health and the environment and comply with state and federal ARARs. Therefore, Alternatives S-2 through S-4, GW-3 and GW-4, O-2 through O-6, and R-2 and R-3

satisfy the two threshold criteria specified in the NCP and are eligible for selection as the final remedial action. The "no action" alternatives (S-1, GW-1, O-1, and R-1) and Alternative GW-2 would not provide adequate protection of human health and the environment and are not eligible for selection as the final remedial action.

Criterion 3: Long-Term Effectiveness and Permanence. All alternatives, with the exception of the "no action" alternatives (S-1, GW-1, O-1, and R-1) and Alternative GW-2, would be effective in the long term. Of the soil alternatives, Alternatives S-4 would be most effective in the long term because the largest volume of soil contamination would be removed. Of the groundwater alternatives, Alternative GW-3 would be most effective in the long term because it would use reliable and effective treatment technologies, as demonstrated by the groundwater cleanup at other HPNS parcels. For the contamination at the Former Oily Waste Ponds, Alternative O-6 would be most effective in the long term because the largest volume of contaminated oil would be removed. For residual radiological contamination at Parcel E, Alternatives R-2 and R-3 would be equally effective in the long term because the residual radiological contamination would be removed and, for IR-02 and IR-03, the final soil cover would protect people and wildlife from being exposed to remaining contamination. The permanent features of each alternative (such as covers) would be maintained as long as contamination that could pose an unacceptable risk remains at the site.

Criterion 4: Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment. The alternatives include varying levels of treatment to address contamination in soil and groundwater, as well as contamination at the Former Oily Waste Ponds. Alternatives S-4, GW-3, O-4, and O-5 provide the highest performance in the way they reduce the toxicity, mobility, and volume of contaminants through treatment. The alternatives for residual radiological contamination focus on removing and/or containing contaminants at Parcel E, and do not involve a significant amount of treatment. Therefore, Alternatives R-2 and R-3 would perform equally in the minimal way they reduce the toxicity, mobility, and volume of radiological contaminants through treatment.

Criteria 5, 6, and 7: Short-Term Effectiveness, Implementability, and Cost. Alternatives involving more active cleanup (such as excavation) generally pose more short-term risks (to humans and the environment), are more difficult to carry out, and are more expensive. This finding is illustrated by the different ratings for Alternatives S-2 and S-4 (see Table 12 on page 19). In addition, the Navy's evaluation identified major differences between Alternative O-6 and Alternatives O-2, O-3, and O-4 relative to short-term effectiveness, implementability, and cost. Alternative O-6 presents many short-term risks (for example, increased risk of accidents for site workers), would be difficult to carry out, and would be very expensive. The ratings for Alternative O-6 were based on several factors, the most significant being the extremely deep excavation (potentially up to 35 feet) required to completely remove the contaminated oil. Alternatives O-2, O-3, and O-4 present fewer short-term risks, would be easier to carry out, and would be significantly more cost-effective when compared with Alternative O-6. Alternative O-2 would be the easiest and least expensive because it involves only containment, while Alternatives O-3 and O-4 balance ease of implementation and cost because they would involve removing or treating the contaminated oil without major excavations. For the alternatives addressing residual radiological contamination, Alternative R-2 would be easier to carry out when compared to Alternative R-3 because the soil cover (over about 45 acres comprising IR-02 and IR-03) would be 2 feet thick instead of 3 feet thick.

Criteria 8 and 9: State Acceptance and Community Acceptance. The State of California (as represented by DTSC and Water Board) approved the FS Report (and its radiological addendum) and agreed in principle with the Navy's Preferred Alternatives in order to proceed with this Proposed Plan. These two modifying criteria will be further evaluated based on comments received on the Proposed Plan.

Conclusion

Alternatives S-4, GW-3, O-4, and R-2 are each rated very good overall based on the Navy's evaluation of the five balancing criteria: (1) long-term effectiveness and permanence; (2) reduction of toxicity, mobility, or volume through treatment; (3) short-term effectiveness; (4) implementability; and (5) cost. These alternatives are more cost-effective and implementable when compared with the other remedial alternatives.

Table 12. Comparative Analysis of Alternatives for Soil and Shoreline Sediment

Remedial Alternative	Overall Protection of Human Health and Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume via Treatment	Short-Term Effectiveness	Implement-ability	Cost ($M)	Overall
S-1: No Action	No	NA					0	
S-2: Covers, ICs, and Shoreline Protection	Yes	Yes					35.2	
S-3: Excavation and Offsite Disposal of Tier 1 Locations, followed by Covers, ICs, and Shoreline Protection	Yes	Yes					48.7	
S-4: Excavation and Offsite Disposal of Tier 1 and Tier 2 Locations, followed by Covers, SVE, ICs, and Shoreline Protection	**Yes**	**Yes**					50.2	

Table 13. Comparative Analysis of Alternatives for Groundwater

Remedial Alternative	Overall Protection of Human Health and Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume via Treatment	Short-Term Effectiveness	Implement-ability	Cost ($M)	Overall
GW-1: No Action	No	NA					0	
GW-2: ICs and Long-Term Groundwater Monitoring	No	No					2.6	
GW-3: Groundwater Containment, In-Situ Treatment, MNA, and ICs	**Yes**	**Yes**					5.7	
GW-4: Groundwater Containment, In-Situ Treatment, Air Sparging, MNA, and ICs	Yes	Yes					5.9	

Notes:

Text in **blue** indicates preferred alternative.

Symbol:

Fill symbol by quarters from open (not acceptable) to full (excellent).

Table 14. Comparative Analysis of Alternatives for Contamination at Former Oily Waste Ponds

Remedial Alternative	Overall Protection of Human Health and Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume via Treatment	Short-Term Effectiveness	Implement-ability	Cost ($M)	Overall
O-1: No Action	No	NA					0	
O-2: Source Containment, Long-Term Monitoring, and ICs	Yes	Yes					1.7	
O-3: Source Removal or Treatment, Containment, MNA, and ICs	Yes	Yes					13.1	
O-4: Source Removal or Treatment, In-Situ Groundwater Treatment, Containment, MNA, and ICs	**Yes**	**Yes**					14.7	
O-5: Source Removal by Excavation and Extraction/ Treatment, In-Situ Groundwater Treatment, MNA, and ICs	Yes	Yes					22.0	
O-6: Source Removal by Excavation, MNA, and ICs	Yes	Yes					21.8	

Notes:

Text in **blue** indicates preferred alternative.

Symbol:

Fill symbol by quarters from open (not acceptable) to full (excellent).

Table 15. Comparative Analysis of Alternatives for Residual Radiological Contamination

Remedial Alternative	Overall Protection of Human Health and Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume via Treatment	Short-Term Effectiveness	Implement-ability	Cost ($M)	Overall
R-1: No Action	No	NA					0	
R-2: Survey, Removal, and Disposal (with 2-foot-thick soil cover and ICs at IR-02 and IR-03)	**Yes**	**Yes**					34.9	
R-3: Survey, Removal, and Disposal (with 3-foot-thick soil cover and ICs at IR-02 and IR-03)	Yes	Yes					36.1	

Notes:

Text in **blue** indicates preferred alternative.

Symbol:

Fill symbol by quarters from open (not acceptable) to full (excellent).

SUMMARY OF THE PREFERRED ALTERNATIVES

Preferred Alternatives for Parcels E and UC-3

- Alternative S-4, Excavation and Offsite Disposal of Tier 1 and Tier 2 Locations, followed by Covers, Soil Vapor Extraction, Institutional Controls (ICs), and Shoreline Protection
- Alternative GW-3, Groundwater Containment, In-Situ Treatment, Monitored Natural Attenuation (MNA), and ICs
- Alternative O-4, Source Removal or Treatment, In-Situ Groundwater Treatment, Containment, MNA, and ICs
- Alternative R-2, Survey, Removal, and Disposal (with 2-foot-thick soil cover and ICs at IR-02 and IR-03)

Based on information currently available for each of the parcels, the Navy believes that the preferred alternatives provide the best balance among the alternatives with respect to long-term and short-term effectiveness, implementability, and cost. The Navy expects the preferred alternatives to satisfy the following statutory requirements of CERCLA Section 121(b):

1. Protect human health and the environment
2. Comply with ARARs
3. Be cost effective
4. Use permanent solutions and alternative treatment technologies to the maximum extent practicable

The Navy, in consultation with EPA, DTSC, and the Water Board, identified preferred alternatives for soil (including shoreline sediment) and groundwater at Parcels E and UC-3 based on the comparison of remedial alternatives. Similarly, the Navy also identified preferred alternatives for contamination at the Former Oily Waste Ponds and residual radiological contamination at Parcel E. Table 16 on page 22 identifies the cleanup actions that make up the preferred alternatives, and shows how certain cleanup actions (such as excavation) would be used in multiple alternatives. Table 16 also identifies which cleanup actions will be performed in Parcels E and UC-3, and indicates that Alternatives O-4 and R-2 apply only to Parcel E. Figures 8 and 9 on page 23 and Figure 10 on page 24 identify the locations where each cleanup action will be performed. Each preferred alternative is described below. The approximate cost of Alternatives S-4, GW-3, O-4, and R-2 is $105.5 million.

Soil and Shoreline Sediment (Alternative S-4). This alternative would achieve RAOs by removing soil in selected areas where chemicals exceed PRGs (Tier 1, Tier 2, and TPH locations, as described on page 13). In total, 112 areas in Parcels E and UC-3 are planned for excavation (see Figure 7 on page 16), with a total of approximately 42,600 cubic yards (about 3,300 truckloads) of soil estimated to be removed and disposed of at an approved offsite landfill. The planned excavation areas generally range from

(text continued on page 24)

Table 16. Components of Preferred Alternatives for Parcels E and UC-3				
	Preferred Alternatives			
Cleanup Action	Alternative S-4 Soil and Shoreline Sediment	Alternative GW-3 Groundwater	Alternative O-4 Former Oily Waste Ponds	Alternative R-2 Radiological Contamination
Parcel E				
Excavation and Off-Site Disposal	✓	--	✓[a]	✓
Covers	✓	--	✓	✓[b]
Shoreline Protection	✓	--	✓	✓[b]
Soil Vapor Extraction	✓	--	--	--
Fuel/Steam Line Closure	✓	--	✓	--
Soil Gas Monitoring	✓	--	--	--
Institutional Controls	✓	✓	✓	✓[b]
Groundwater Monitoring	--	✓	✓	✓[d]
Groundwater Treatment	--	✓	✓	--
Below-Ground Barrier	--	✓	✓	--
Oil Contaminant Removal (with Heating Technology)	--	--	✓[a]	--
Oil Contaminant Treatment (with Mixing Technology)	--	--	✓[a]	--
Final Radiological Surveys	--	--	--	✓
Parcel UC-3				
Excavation and Off-Site Disposal	✓	--	--	--
Covers	✓	--	--	--
Steam Line Closure (no fuel lines in Parcel UC-3)	✓	--	--	--
Soil Gas Monitoring	✓[c]	--	--	--
Institutional Controls	✓	✓	--	--
Groundwater Monitoring	--	✓[c]	--	--
Groundwater Treatment	--	✓	--	--

Notes: See Figures 8 and 9 on page 23 and Figure 10 on page 24 for specific locations where each component would be performed.

a = The oil contaminant source at IR-03 would be addressed through a combination of excavation/off-site disposal, removal by heating, and treatment by mixing.

b = The radiological cleanup at IR-02 and IR-03 would involve excavation and off-site disposal, followed by covers, shoreline protection, and institutional controls.

c = Soil gas and groundwater monitoring for Parcel UC-3 would be performed at the IR-56 Plume (see Figure 9 on page 23).

d = Groundwater monitoring for radionuclides would be performed at Parcel E, IR-02 and IR-03 to verify the Navy's previous conclusion that groundwater is not radiologically contaminated.

-- = not applicable

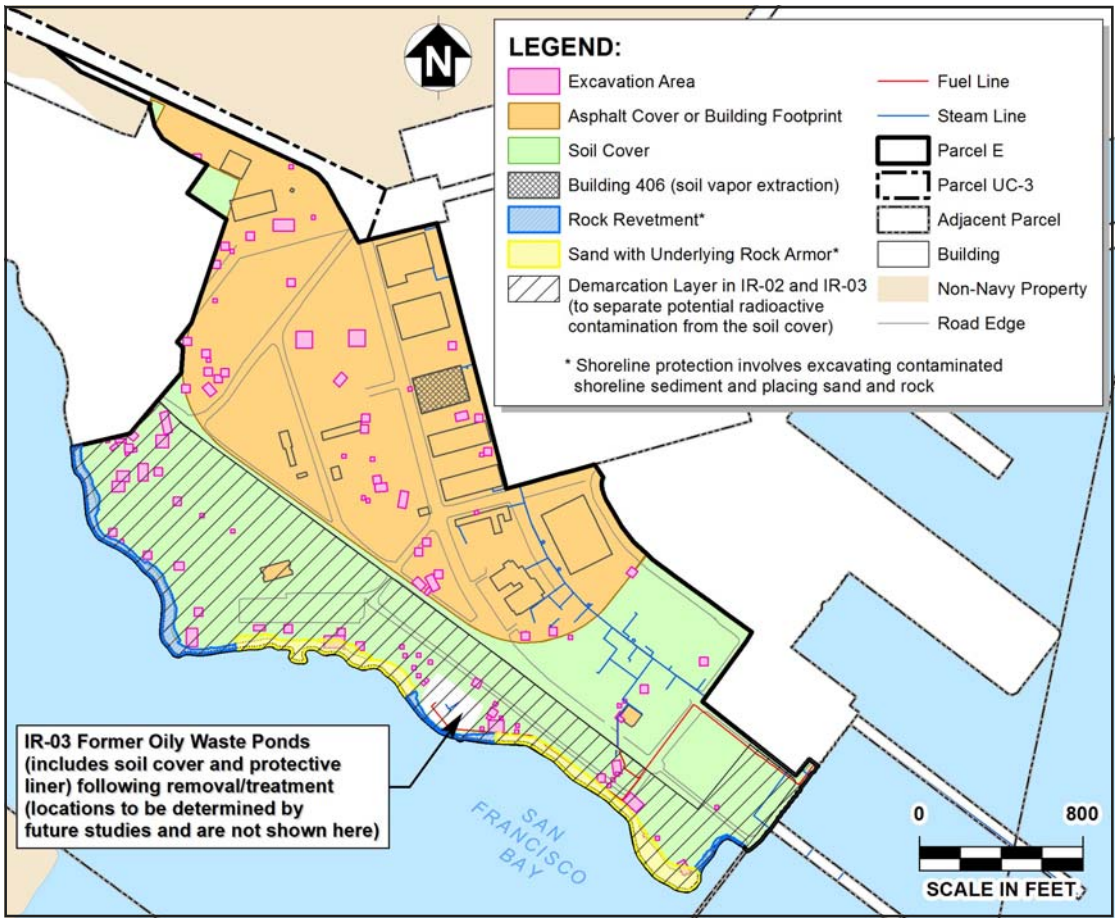


Figure 8. Soil Remediation Areas for Parcel E.

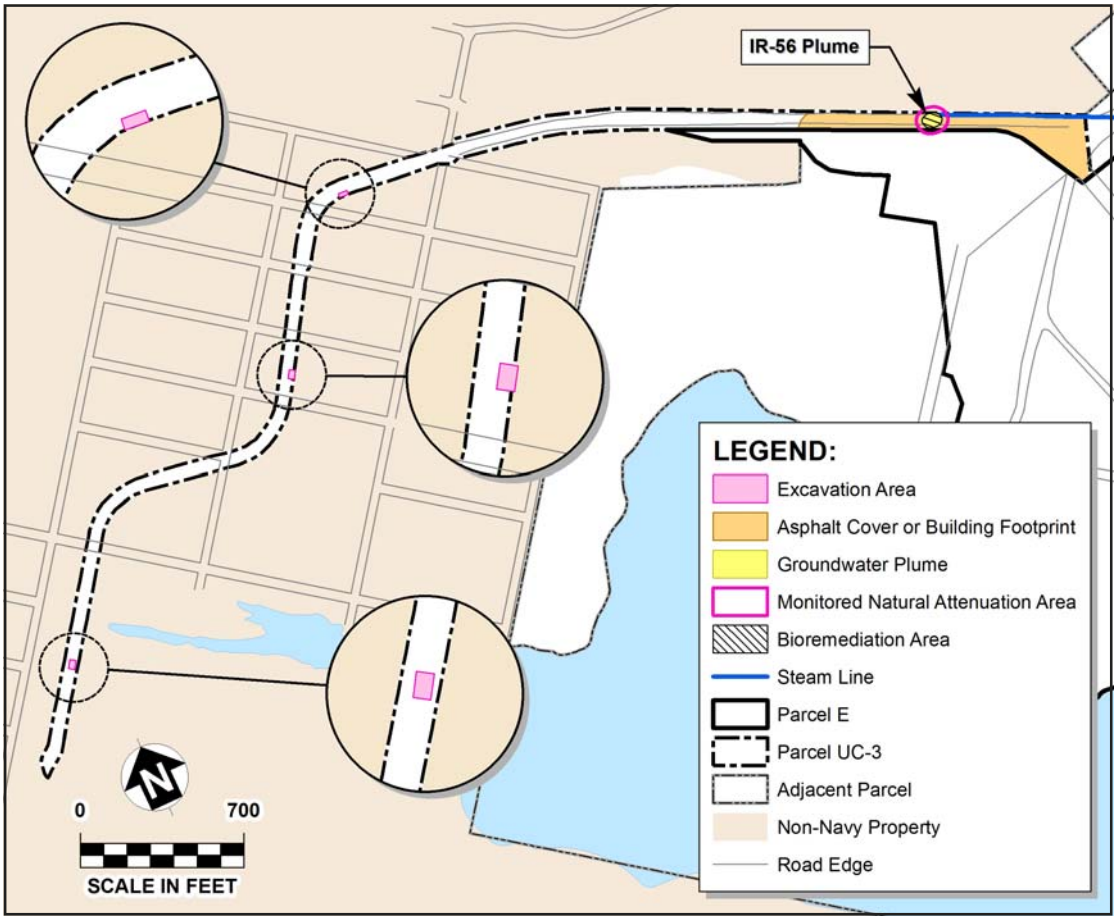


Figure 9. Soil and Groundwater Remediation Areas at Parcel UC-3.

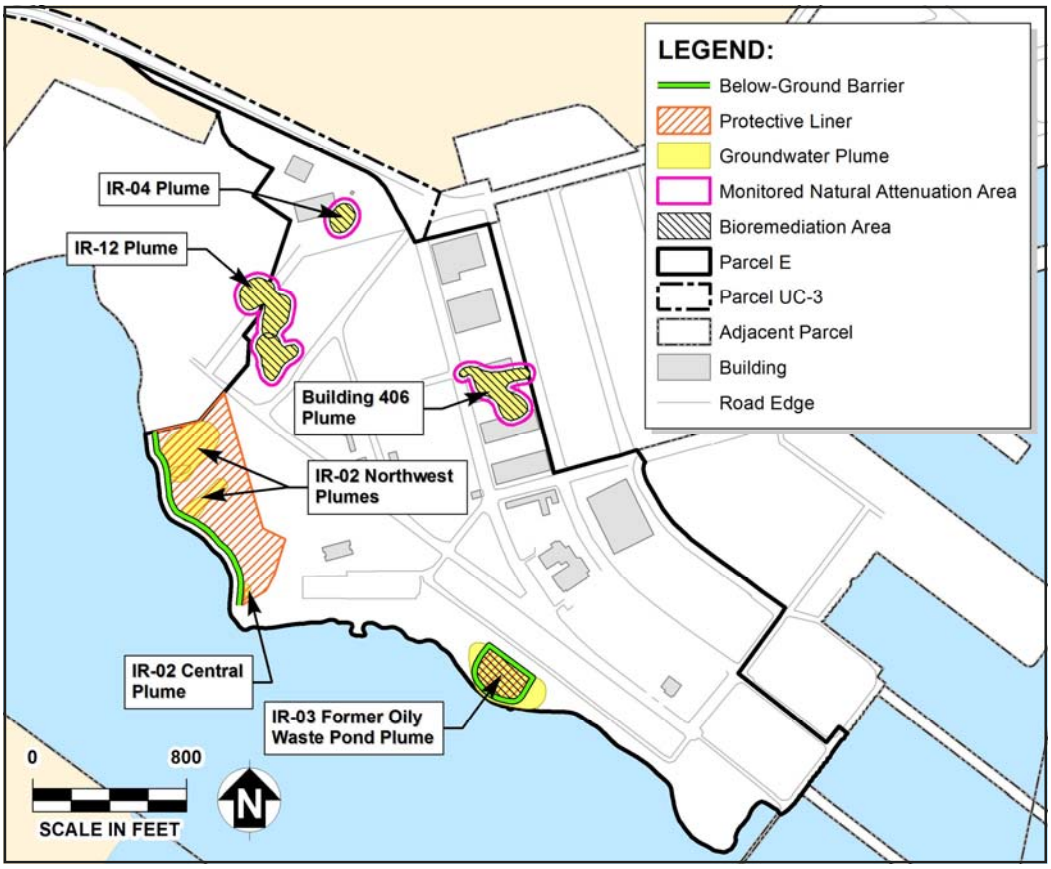


Figure 10. Groundwater Remediation Areas at Parcel E.

(text continued from page 21)

2 to 10 feet deep, but include isolated TPH locations adjacent to the Former Oily Waste Ponds that are up to 16 feet deep. Soil confirmation samples would be collected to ensure that the Tier 1, Tier 2, and TPH locations are adequately removed. The areas of Parcels E and UC-3 with buried steam and fuel lines will be cleaned and closed (Figures 8 and 9 on page 23). At Building 406 in Parcel E, where volatile chemicals are present in soil and soil gas, an SVE system will be installed and operated to extract contaminated soil gas (using a vacuum technology) and to treat the removed vapors (using adsorbent material like a charcoal filter). Figure 11 on page 25 presents a conceptual view of an SVE system. Following active treatment, soil gas monitoring will be performed at Building 406, and other treatment areas with VOC contamination in groundwater (see Figure 9 on page 23 and Figure 10 above), to ensure that chemicals in soil gas are not present at concentrations greater than those considered safe for humans.

Durable covers would be applied across all of Parcel E and parts of Parcel UC-3 as physical barriers to cut off potential exposure to residual contamination that remains in soil after excavation. As shown on Figure 8 on page 23, durable covers at Parcel E would consist of asphalt and concrete surfaces (in the northern half of Parcel E), and a 2-foot thick soil cover (in the southern half, and small areas on the western edge of Parcel E). As shown on Figure 9 on page 23, durable covers at Parcel UC-3 would consist of asphalt and concrete surfaces in the eastern portion of Crisp Road. Covers are not required in the western portion of Crisp Road because soil and groundwater in this area are not contaminated. Existing asphalt and concrete surfaces would be repaired as necessary to be durable. New asphalt or soil covers would be installed elsewhere in the parcels.

Two areas in Parcel E, the Former Oily Waste Ponds (IR-03) and the northwest portion of IR-02, require additional elements to properly contain contaminants that remain in soil after excavation. A protective liner (consisting of high-density plastic) would be installed under the soil cover in these two areas (see Figure 10 above) to minimize water seeping into the contaminated soil. The protective liners would work with the below-ground barriers (proposed under Alternative GW-3) to minimize migration of contaminants to the Bay. In addition, the shoreline adjacent to IR-03 and the northwest portion of IR-02 is steep and requires stronger protection. A rock ***revetment*** structure (about 2,400 feet long), consisting of large rocks placed on the shoreline slope, is proposed to prevent exposure to contaminated soil and shoreline sediment by controlling erosion and protecting the edge of the covered upland area. The remaining shoreline in Parcel E (about 2,400 feet long) has more gradual slopes, and would be protected with natural materials (such as sand) over a protective rock layer

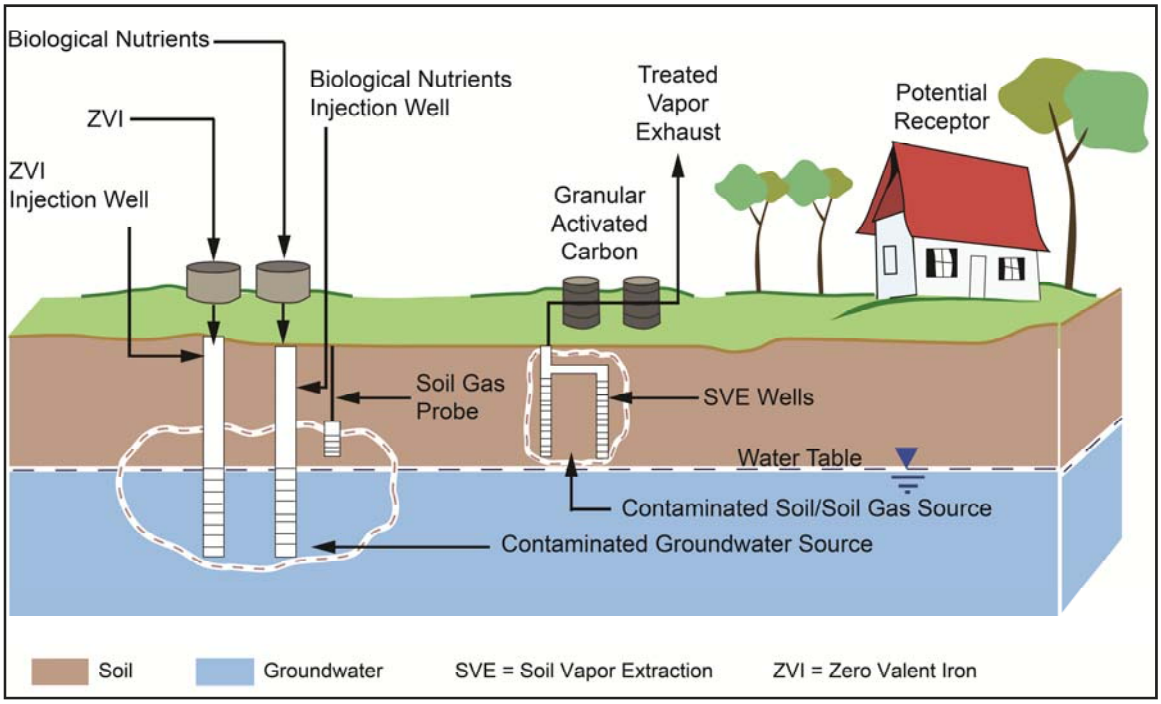


Figure 11. Conceptual View of Active Treatment of Soil Gas and Groundwater.

to prevent exposure to contaminated soil and shoreline sediment. Shoreline sediment (to a depth of about 2.5 feet) would be excavated and disposed of at an approved offsite landfill prior to installing the shoreline protection features (such as sand and rock). The covers and the shoreline protection features will be inspected and maintained regularly to ensure they remain intact. The Navy will also implement ICs after these activities for continued protection of public health and the environment and to ensure the integrity of the containment remedies (for example, soil covers). Insert 1 on page 29 provides an overview of ICs.

Why is Alternative S-4 the preferred alternative for soil and shoreline sediment contamination?

- Provides the best long-term protection by permanently removing the highest concentrations and largest volume of contamination (by excavation of Tier 1, Tier 2, and TPH locations), thus providing the greatest reduction in onsite risk.
- Reduces the toxicity, mobility, and volume of VOCs by active treatment (SVE).
- Prevents exposure to contaminants remaining in soil (by durable covers) and shoreline sediment (by excavating surface sediments and installing shoreline protection features). Durable covers and shoreline protection features provide the best option to make sure people are not exposed to contaminants remaining in soil and shoreline sediment.
- Includes long-term inspections and maintenance, as well as ICs to ensure the integrity of the covers and shoreline protection features.

Groundwater (Alternative GW-3). This alternative would achieve RAOs by actively treating VOC groundwater plumes at Parcels E and UC-3 using injected biological nutrients to break down the VOCs to nontoxic compounds. Figure 9 on page 23 identifies the Parcel UC-3 plume to be treated, and Figure 10 on page 24 identifies the Parcel E plumes to be treated. As described in Table 9 on page 14, the Building 406 plume (in Parcel E) may require more aggressive treatment using injected zero-valent iron, if determined necessary in the RD. Figure 11 above presents a conceptual view of an active groundwater treatment system using either injected biological nutrients or zero-valent iron. The Navy expects it will take several years to complete the active treatment, which will be followed by MNA to ensure that natural processes are degrading the remaining VOCs.

For groundwater plumes near San Francisco Bay containing metals and PCBs (at IR-02, see Figure 10 page 24), below-ground barriers would be constructed to control discharge of contaminated groundwater into the Bay. The below-ground barriers would work with the protective liners (proposed under Alternative S-4) to minimize migration of contaminants to the Bay. Groundwater quality would be monitored at all plumes, including those plumes behind the below-ground barriers. Monitoring will continue until chemical concentrations reach PRGs. ICs will be implemented to restrict access to and use of contaminated groundwater.

Why is Alternative GW-3 the preferred alternative for groundwater contamination?

- Provides long-term protection by reducing concentrations of groundwater contaminants and minimizing contaminant migration to the Bay.
- Reduces the toxicity, mobility, and volume of VOCs by active treatment and MNA.
- Includes long-term monitoring to track the cleanup progress, and ICs to prevent access to and use of contaminated groundwater.

Contamination at Former Oily Waste Ponds (Alternative O-4). This alternative would achieve RAOs by using a combination of technologies (such as excavation and offsite disposal, in-situ mixing of a stabilizing compound, and thermally-enhanced extraction) to remove or treat the contaminated oil. If Alternative O-4 is selected in the ROD, the Navy will perform additional studies to select the best combination of technologies to remove or treat the contaminated oil remaining at the Former Oily Waste Ponds. As described for Alternative S-4, a 2-foot-thick soil cover with protective liner would be constructed to eliminate the exposure pathways and limit groundwater infiltration (Figure 8 on page 23). Also, as described for Alternative GW-3, a below-ground barrier would be constructed to control discharge of oil and contaminated groundwater into San Francisco Bay (Figure 10 on page 24). Following removal or treatment of the contaminated oil, biological nutrients would be injected to create conditions where remaining contaminants in groundwater are destroyed. The Navy expects it will take several years to complete the active treatment, which will be followed by MNA to ensure that natural processes are degrading the remaining contaminants. Similar to Alternative GW-3, monitoring would continue until chemical concentrations reach PRGs, and ICs would be implemented to restrict access to and use of contaminated groundwater.

Why is Alternative O-4 the preferred alternative for contamination at the Former Oily Waste Ponds?

- Provides long-term protection by removing or treating contaminated oil and minimizing contaminant migration to the Bay.
- Reduces the toxicity, mobility, and volume of contaminated oil through treatment (including treatment following extraction of the contaminated oil, in-situ mixing to stabilize the contaminated oil that cannot be extracted, and groundwater treatment by injecting biological nutrients).
- Soil cover, protective liner, and below-ground barrier would eliminate exposure pathways and limit groundwater infiltration and migration of contaminants to San Francisco Bay.
- Includes long-term monitoring to track the cleanup progress, and ICs to prevent access to and use of contaminated groundwater.

Residual Radiological Contamination (Alternative R-2). This alternative would achieve RAOs by performing the following actions: (1) scanning radiologically impacted areas at Parcel E that may include structures and former building sites; (2) decontaminating (and demolishing if necessary) buildings at Parcel E; (3) screening, separating, and disposing of radiologically contaminated debris and soil at an approved landfill; and (4) performing final surveys to demonstrate PRGs have been met. As shown on Figure 4 on page 5, the radiological cleanup has been completed in all of Parcel E areas except IR-02 and IR-03. Although not shown on Figure 4, the Navy has also removed storm drain and sewer lines throughout Parcel UC-3 and in most of Parcel E as part of the Navy's investigation for residual radiological contamination in these areas. Alternative R-2 would achieve RAOs and address the residual radiological contamination by performing the following actions: (1) scanning the entire area within IR-02 and IR-03 for radioactivity to a depth of at least 1 foot; (2) removing residual radiological contamination near the ground surface at IR-02 and IR-03 and disposing at an approved landfill; (3) constructing a 2-foot-thick soil cover at IR-02 and IR-03 to eliminate exposure pathways and installing a demarcation layer to mark the boundary between the existing surface and the soil cover; (4) implementing ICs at IR-02 and IR-03 to limit the use of land or restrict activities that take place within the area; and (5) removing remaining storm drain and sewer lines in areas outside of IR-02 and IR-03 (where the buried lines will remain in place because the soil cover and ICs will prevent exposure to residual radiological contamination in these lines).

Why is Alternative R-2 the preferred alternative for residual radiological contamination?

- Provides the best long-term protection by permanently removing the residual radiological contamination (by excavation) to the maximum extent practical, and by minimizing the areas (IR-02 and IR-03 only) where covers and ICs are needed to prevent exposure to remaining radiological contaminants.
- Prevents exposure to remaining contaminants at IR-02 and IR-03 by durable covers and shoreline protection features. The 2-foot-thick soil cover (proposed for Alternative R-2) would be equally effective but easier to carry out when compared to the 3-foot-thick soil cover (proposed for Alternative R-3).
- Includes long-term inspections and maintenance, as well as ICs to ensure the integrity of the covers and shoreline protection features.

HOW TO FIND ADDITIONAL INFORMATION

The Navy provides information on the cleanup of Parcels E and UC-3 to the public through public meetings, the Administrative Record file for HPNS, and notices published in the local newspapers. Parcel UC-3, which consists of Crisp Road and an adjoining railroad right-of-way, was formerly part of Parcel E; however, this planned utility corridor is now designated as a separate parcel for remedy selection.

The collection of reports and historical documents used by the Navy, in conjunction with the regulatory agencies, in selecting remedial alternatives is the Administrative Record. The Administrative Record includes documents such as the Final FS Report for Parcel E and its radiological addendum. These two reports provide the most comprehensive, current understanding of Parcels E and UC-3. The Administrative Record also contains other supporting documents and data for Parcels E and UC-3. Administrative Record files are located at the following address:

Naval Facilities Engineering Command, Southwest
Attention: Diane Silva, Commands Records Manager
2965 Mole Road, Building 3519
San Diego, CA 92136
Phone: (619) 556-1280

Community members interested in the full technical details beyond the scope of this Proposed Plan can also find key supporting documents that pertain to Parcels E and UC-3 and a complete index of all Navy HPNS documents at the following information repositories:

Information Repositories

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

HPNS Office Trailer
690 Hudson Avenue
San Francisco, CA 94124

The Navy, EPA, DTSC, and the Water Board encourage the public to gain a more thorough understanding of Parcels E and UC-3 and CERCLA work conducted at HPNS by visiting one of the information repositories, reviewing the relevant records contained in the Administrative Record file, and attending public meetings. The Navy schedules regular public meetings to discuss the cleanup program at HPNS. Please visit the Navy's http://www.bracpmo.navy.mil for more information on the cleanup of Parcels E and UC-3 (Click "Prior BRAC" at the bottom of page, click on "Prior BRAC Installations" drop-down menu and select "Former NSY Hunters Point," and then click on "View/Hide All Documents" and select "Parcels E and UC-3") .

PROVIDING COMMENTS ON THIS PROPOSED PLAN

There are two ways to provide comments during the public comment period (February 13 through March 15, 2013):

- Tell us your comments in person at the public meeting
- Provide written comments by mail, fax, or e-mail to the Navy no later than March 15, 2013 (see contact information below)

The public meeting will be held from 6:00 p.m. to 8:00 p.m. on February 28, 2013, at the Southeast Community Facility Commission Building in the Alex L. Pitcher, Jr. Room located at 1800 Oakdale Avenue in San Francisco.

Navy representatives will provide visual displays and information on the environmental investigations at and the remedial alternatives for Parcels E and UC-3. The Navy will also give a presentation on the Proposed Plan. The public will have an opportunity to ask questions and formally comment on the remedial alternatives summarized in this Proposed Plan.

Please send all written comments to:

Mr. Keith Forman
BRAC Environmental Coordinator
BRAC Program Management Office West
1455 Frazee Road, Suite 900
San Diego, CA 92108-4310
Telephone: (619) 532-0913
Cell Phone: (415) 308-1458
Fax: (619) 532-0995
E-mail: keith.s.forman@navy.mil

For More Information

If you have any questions or concerns about environmental activities at HPNS, feel free to contact any of the following project representatives:

Navy

Mr. Keith Forman
BRAC Environmental Coordinator
BRAC Program Management Office West
1455 Frazee Road, Suite 900
San Diego, CA 92108-4310
Telephone: (619) 532-0913
Cell Phone: (415) 308-1458
E-mail: keith.s.forman@navy.mil

U.S. EPA

Mr. Craig Cooper
Project Manager
U.S. EPA, Region 9
75 Hawthorne Street
San Francisco, CA 94105
Telephone: (415) 972-4148
E-mail: cooper.craig@epa.gov

DTSC

Mr. Ryan Miya
Project Manager
Department of Toxic Substances Control
700 Heinz Avenue
Berkeley, CA 94710
Telephone: (510) 540-3775
E-mail: Ryan.Miya@dtsc.ca.gov

Water Board

Ms. Tina Low
Project Manager
San Francisco Bay
Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612
Telephone: (510) 622-5682

INFORMATION AVAILABLE ON THE INTERNET

For more information on the closure of HPNS Parcels E and UC-3 and future public meetings, go to the website at:
http://www.bracpmo.navy.mil

Click "Prior BRAC" at the bottom of page, click on "Prior BRAC Installations" drop-down menu and select "Former NSY Hunters Point," and then click on "View/Hide All Documents" and select "Parcels E and UC-3."

Overview of Proposed Institutional Controls

ICs described in this Proposed Plan include land use and activity restrictions, which would be established to limit human exposure to contaminants in soil, shoreline sediment, and groundwater, as well as contamination at the Former Oily Waste Ponds. ICs are a component of all remedial alternatives that are considered in the FS Report (except the "no action" alternatives). ICs apply at the areas identified in Figure 12 on page 30; these areas are referred to collectively as the Area Requiring Institutional Controls (ARIC). ICs would remain in place unless the remedial action taken would allow for unrestricted use of the property and unrestricted exposure. Land use and activity restrictions would be incorporated into and implemented through two separate legal instruments:

1. Restrictive covenants included in one or more "Covenant(s) to Restrict Use of Property" provided in the Navy and DTSC 2000 Memorandum of Agreement and consistent with the substantive provisions of California Code of Regulations Title 22, Section 67391.1.
2. Restrictive covenants included in one or more Quitclaim Deed(s) from the Navy to the property recipient.

Proposed Activity Restrictions:

- Prohibit growing vegetables or fruits in native soil for human consumption;
- Prohibit use of and restrict access to groundwater[1];
- Restrict any "land disturbing activity" including but not limited to those listed below that may impact the effectiveness of the remedial alternative [1]:
  - Excavation of soil;
  - Construction of roads, utilities, facilities, structures, and appurtenances of any kind;
  - Demolition or removal of "hardscape" (for example, concrete roadways, parking lots, foundations, and sidewalks);
  - Any activity that involves movement of soil to the surface from below the surface of the land; and
  - Any other activity that causes or facilitates the movement of known contaminated groundwater.
- Further restrict any "land disturbing activity" in areas restricted for radioactive chemicals by requiring that:
  - Any proposed land-disturbing activity must be described in a work plan approved by the Federal Facility Agreement (FFA) signatories and California Department of Public Health (CDPH);
  - Following implementation of an approved land-disturbing activity, the integrity of the cover/liner must be restored and documented in a completion report approved by the FFA signatories and CDPH; and
  - The Land Use Control Remedial Design (LUC RD) report, the Operation and Maintenance Plan (OMP), or a project-specific work plan, if applicable, list the procedures for ensuring that the cover is not disturbed or breeched.
- Restrict[1] alteration, disturbance, or removal of any component of a response or cleanup action (including but not limited to shoreline protection and soil cover/containment systems); soil vapor or groundwater extraction, injection, and monitoring wells and associated piping and equipment; or associated utilities;
- Restrict[1] extraction of groundwater and installation of new groundwater wells;
- Restrict[1] 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); and
- Restrict[1] construction of enclosed structures to ensure that the risks of potential exposure to VOC vapors are reduced to acceptable levels that are adequately protective of human health. Proposed construction and occupancy of enclosed structures within areas subject to VOC vapor restrictions must be approved by the FFA signatories.

Proposed Land Use Restrictions for areas designated for open space or industrial reuse only):

- Prohibit a residence, including any mobile home or factory built housing, constructed or installed for use as residential human habitation;
- Prohibit a hospital for humans;
- Prohibit a school for persons under 21 years of age;
- Prohibit a day care facility for children; and
- Restrict Parcel E property areas in the Shipyard Shoreline Open Space District (as identified in the 2010 amended redevelopment plan for HPNS) to open space and recreational uses, unless approval is received from the FFA signatories (and the CDPH for areas restricted for radioactive chemicals).

The LUC RD report will identify specific requirements for obtaining written approval to deviate from these land use restrictions.

Access Provisions:

Access provisions would be required to ensure the Navy and the regulatory agencies have access to remedial equipment and other remedy components for the purpose of implementing the remedial action, performing maintenance activities, and conducting monitoring.

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[1] *Performing any of these restricted activities requires approval from FFA Signatories (and CDPH for areas restricted for radioactive chemicals) prior to conducting the activity.*

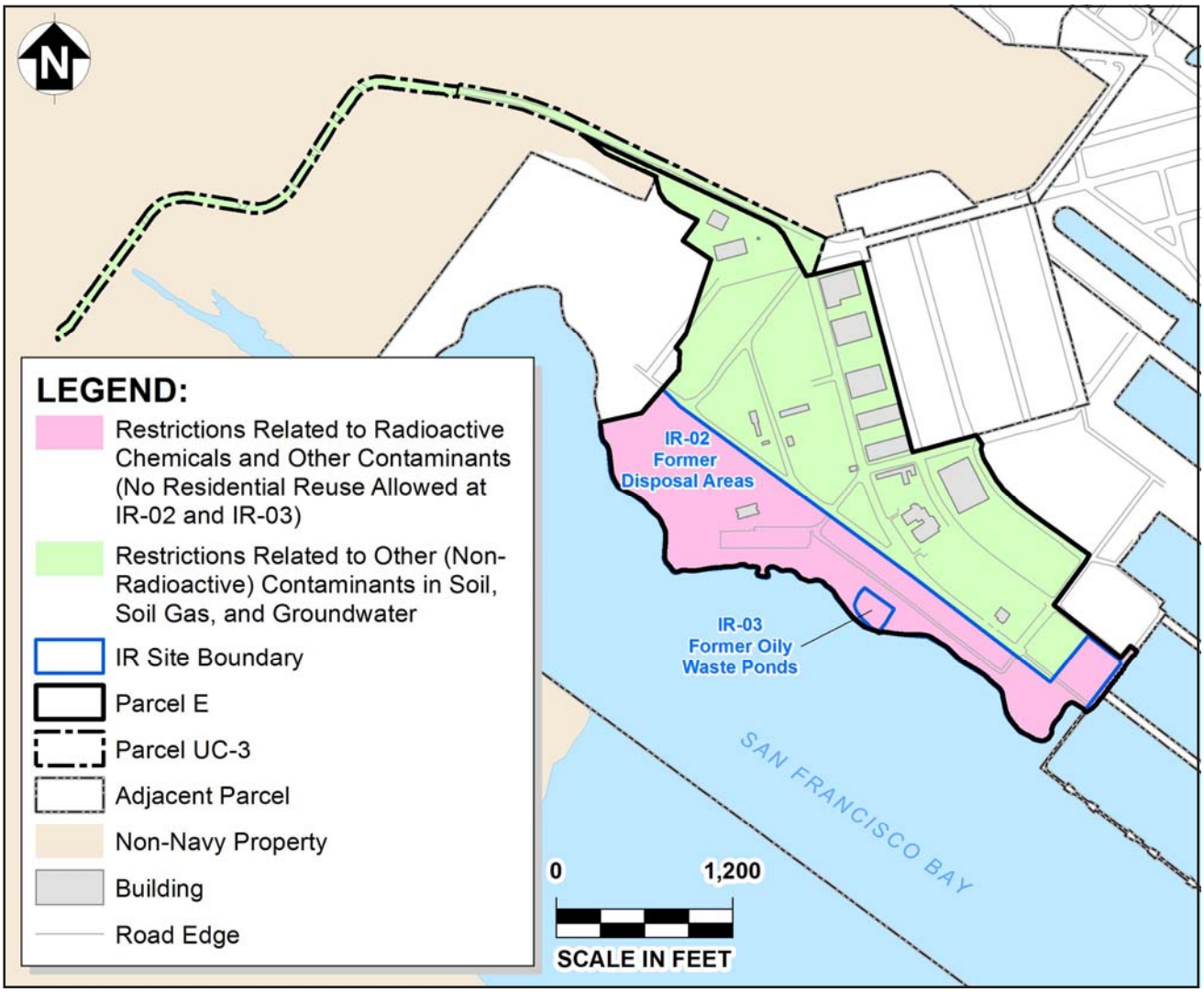

Figure 12. Areas Requiring Institutional Controls (ARIC).

Glossary of Technical Terms

Administrative Record: The reports and historical documents used in selection of cleanup or environmental management actions.

Air Sparging: A cleanup technology involving the injection of air into groundwater contaminated with VOCs. The injected air strips out the VOCs, and the contaminated vapor can be captured by SVE wells and treated aboveground prior to discharge to the atmosphere.

Applicable or relevant and appropriate requirements (ARARs): Federal and state regulations and standards determined to be legally applicable or relevant and appropriate to removal or remedial actions at a CERCLA site. The NCP requires compliance with all state or federal ARARs at a Superfund site unless they are waived.

Aquifer: A zone of rock or soil below the earth's surface through which groundwater moves in sufficient quantity to serve as a source of water.

Below-ground barrier: A vertical structure built below the ground surface with material that does not allow groundwater to easily pass through it. These barriers include slurry walls, which are trenches excavated and filled with a clay mixture that limits the speed with which groundwater passes through the barrier.

Biological nutrients: A compound that acts as a source of food for microorganisms that break down hazardous chemicals to nontoxic chemicals. For groundwater remediation, food for microorganisms is injected into the groundwater to help them grow (see Figure 11 on page 25). Once the population has increased, the microorganisms begin to use the hazardous chemicals as food; this process breaks down the hazardous chemicals.

California Department of Public Health: State agency established to protect human health, and which oversees the Navy's cleanup of residual radiological contamination at HPNS.

California Environmental Protection Agency (Cal/EPA): State agency established to protect human health and the environment.

Chemical of concern (COC): A metal, organic chemical, or radioactive chemical that is present in soil, shoreline sediment, soil gas, or groundwater at concentrations greater than those considered safe for humans or wildlife.

Chlorinated solvents: Large family of chemical compounds that contain chlorine (e.g., carbon tetrachloride, TCE, or methylene chloride). They are used for a wide variety of commercial and industrial purposes, including degreasers, cleaning solutions, paint thinners, pesticides, resins, glues, and other mixing and thinning solutions. Their chlorine-containing chemical structure helps them to efficiently dissolve organic materials like fats and greases and to serve as raw materials or intermediates in the production of other chemicals.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): The federal law (also referred to as the "Superfund" law) establishing a program to identify hazardous waste sites and procedures for cleaning up sites to protect human health and the environment, and to evaluate damages to natural resources.

Contaminated plume: An area of contaminated groundwater.

Department of Toxic Substances Control (DTSC): Part of the Cal/EPA, whose mission is to protect California's people and environment from harmful effects of toxic substances through the restoration of contaminated resources, enforcement, regulation and pollution prevention.

Ecological Risk Assessment: An analysis of the potential ecological effects caused by exposure to hazardous substances at a site.

Environmental investigation: Activities that involve reviewing historical information, performing site inspections, and collecting and analyzing samples of soil, shoreline sediment, soil gas, or groundwater for chemicals. Investigations are designed to identify potential chemical contamination that may pose a risk to humans or wildlife. Often referred to as the "Remedial Investigation" during the CERCLA cleanup process.

Exposure pathway: The route a chemical takes from its source (where it began) to its end point (where it ends), and how people or wildlife can come into contact with (or be exposed to) it. An exposure pathway has five parts: (1) a source of contamination; (2) an environmental medium (such as soil or groundwater) and transport mechanism (such as movement through groundwater); (3) a point of exposure (such as a well); (4) a route of exposure (such as eating, drinking, breathing, or touching), and (5) a receptor population (such as people or wildlife potentially or actually exposed). When all five parts are present, the exposure pathway is considered a complete exposure pathway.

Glossary of Technical Terms

Exposure scenario: A set of facts, assumptions, and inferences about how exposure takes place that aids the risk assessor in evaluating, estimating, or quantifying exposures.

Feasibility Study (FS): A study to identify, screen, and compare cleanup (remedial) alternatives for a site.

Federal Facility Agreement (FFA): A written agreement among the Navy, U.S. EPA, and Cal/EPA (including DTSC and the Water Board) for environmental remediation. The FFA outlines the roles and responsibilities of each party, and sets timetables for cleanup actions.

Former Oily Waste Ponds: An area along the Parcel E shoreline with two ponds formerly used to store waste oil from shipyard operations. Waste oil typically consists of a mixture of petroleum compounds, some of which are relatively light (like diesel fuel) and others that are relatively heavy (like motor oil). During shipyard operations, the waste oil was heated to separate the light and heavy portions of the oil, allowing the light oil portions to be pumped off of the pond surface and reused elsewhere. The heavy oil portions were left in place, and were eventually covered with soil. The remaining oil at the Former Oily Waste Ponds is contaminated with non-petroleum chemicals (such as metals and PCBs).

Groundwater: Water in the subsurface that fills pores in soil or openings in rocks.

Groundwater Monitoring: Actions to routinely collect and analyze samples of groundwater to better understand the status of chemicals in groundwater, including whether the contamination is moving or changing in quantity.

Hazard Index (HI): A calculated value used to represent a potential noncancer health risk. An HI value of 1 or less is considered an acceptable exposure level.

Historical Radiological Assessment (HRA): A document that summarizes the review completed by the Navy to evaluate potential residual radiological contamination from the use of general radioactive materials at HPNS and the identification of radiologically impacted areas at HPNS.

Hot spots: Area with contaminated soil where concentrations of certain chemicals are much higher (such as 10 times) than the levels considered generally acceptable for humans and wildlife in the long-term. Hot spots at Parcel E were categorized as Tier 1 and Tier 2 locations (see definitions on page 34).

Human Health Risk Assessment (HHRA): An analysis of the potential human health effects caused by exposure to hazardous substances at a site.

In-situ mixing: An action involving the physical mixing of a stabilizing compound (including clay, cement, or a chemical mixture) into contaminated material to form a more solid material and limit contaminant migration.

Institutional controls (ICs): Legal and administrative documents and processes to limit human exposure to contaminated waste, soil, or groundwater. These documents and processes may include deed restrictions, covenants, easements, laws, and regulations.

Metals: Inorganic chemicals (such as lead) that are present in the natural environment (such as rock formations), but can be extracted and used for various products (such as paint). Soil and groundwater can be contaminated if such products are spilled on the ground or buried for disposal.

Microgram per liter (μg/L): Unit used to describe concentrations of chemicals in groundwater that is nearly equal to one part per billion, which is equivalent to about 50 drops in an Olympic-size swimming pool.

Milligram per kilogram (mg/kg): Unit used to describe concentrations of chemicals in soil or sediment that is nearly equal to one part per million. A part per million is equivalent to about 4 drops in 55 gallons or 15 grains of sand in a 90-pound bag.

Monitored Natural Attenuation: Natural attenuation relies on natural processes to clean up or attenuate pollution in groundwater. Scientists monitor or test the groundwater to make sure natural attenuation is working.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): The NCP is the basis for government responses to oil and hazardous substance spills, releases, and sites where these materials have been released.

Naval Radiological Defense Laboratory (NRDL): A Navy command based at HPNS from 1948 until 1969. The mission of NRDL was to study the effects of nuclear weapons and the different ways to clean ships used during weapons testing in the South Pacific.

Polychlorinated biphenyls (PCBs): A mixture of up to 209 individual chlorinated organic compounds. PCBs have been used as coolants and lubricants in electrical equipment. Their use is now banned.

Glossary of Technical Terms

Picocurie per gram (pCi/g): Unit used to describe concentrations (or activity levels) of radioactive chemicals in soil or sediment.

Preferred Alternative: The remedial alternative recommended by the Navy, in conjunction with the regulatory agencies, that best satisfies the remedial action objectives and remediation goals, based on the evaluation of alternatives presented in the FS Report.

Preliminary Assessment (PA): The initial site evaluation, including record searches, interviews, and limited field investigations.

Preliminary remedial goal (PRG): Concentration limit for each chemical of concern to identify areas for potential cleanup, screen the types of appropriate technologies, and evaluate a remedial action's potential to achieve the remedial action objective. PRGs are identified in the FS and Proposed Plan, and later finalized in the ROD.

Principal threat wastes: Contaminant sources that are either highly toxic or highly mobile that cannot be reliably contained or would present a significant risk to humans or wildlife should exposure occur.

Proposed Plan: A document that summarizes remedial alternatives, presents the recommended cleanup action, explains the recommendation, and solicits comments from the community.

Protective liner: A durable material (such as natural clay or thick plastic) that is placed under a soil cover to limit rain water from coming into contact with remaining contamination.

Radioactive chemicals: Chemicals containing elements that emit energy as radiation that are present in the natural environment but are usually changed for various purposes (such as being used to create paint that glows in the dark). Soil and groundwater can be contaminated if such chemicals are spilled on the ground or buried for disposal.

Radiological addendum: A document that presents additional information on the investigation results and remedial alternatives for radiologically impacted areas.

Residual Radiological contamination: A radioactive substance on an area, building, or piece of equipment that, based on test results, contains radioactivity higher than the levels considered safe for humans.

Radiologically impacted: An area, building, or piece of equipment that, under professional interpretation, has the distinct possibility of having residual radioactive material associated with it.

Receptors: People or wildlife that may be exposed to contaminated soil, shoreline sediment, groundwater, or soil gas.

Record of Decision (ROD): A decision document that identifies the remedial alternative chosen for implementation at a CERCLA site. The ROD is based on information from the RI, FS, and other reports, and on public comments and community concerns.

Remedial action: An environmental cleanup that is conducted based on a ROD and involves actions to contain, collect, or treat hazardous wastes to protect human health and the environment. Also referred to as a cleanup action or final remedy.

Remedial Action Objective (RAO): A set of statements that each contains a remediation goal for the protection of one or more receptors from one or more chemicals in a specific medium (such as soil, groundwater, or air) at a site.

Remedial design (RD): The phase in the CERCLA cleanup process where the technical specifications for remedial action are identified. The RD contains the detailed information describing how the selected remedial action will be implemented, including enforcement of institutional controls (referred to as the Land Use Controls RD).

Remedial Investigation (RI): The first of two major studies that must be completed before a decision can be made about how to clean up a site. (The FS is the second study.) The RI is designed to delineate the nature and extent of contamination at a site and to estimate the risks presented by the contamination.

Removal action: An early cleanup action that is implemented before a ROD and involves actions to contain, collect, or treat hazardous wastes to protect human health and the environment.

Revetment: A structure, usually consisting of large rocks, placed on a sloped shoreline in such a way as to absorb the energy of incoming waves and tidal currents.

Risk assessment: An assessment of the likelihood or probability that a hazardous chemical, when released to the environment, will have negative effects on exposed humans or wildlife. the environment, will have negative effects on exposed humans or wildlife.

Risk Management Review: A process where the Navy, EPA, DTSC, the Water Board, and the City and County of San Francisco reviewed the available soil and groundwater data at a site to identify locations where action should be taken. Action could be additional investigation or cleanup.

San Francisco Bay Regional Water Quality Control Board (Water Board): Part of Cal/EPA and local division of the state agency established to protect water resources.

Semivolatile Organic Compound (SVOC): An organic (carbon containing) compound that evaporates slowly at room temperature. The most common SVOCs are called polycyclic aromatic hydrocarbons (PAHs), which are a group of more than 100 different chemicals commonly present in coal and petroleum products. PAHs are formed when organic substances burn.

Site Inspection: An investigation involving the collection of environmental data to evaluate the extent to which hazardous substances may present a threat to humans or the surrounding environment and whether further action is required.

Soil Gas: Air that is present below the ground surface and above the groundwater level. VOCs in soil and groundwater can migrate to soil gas, which can then migrate into indoor air (where it could be harmful to humans).

Soil Vapor Extraction (SVE): Soil vapor extraction removes harmful chemicals, in the form of vapors (or gases), from the soil above the water table. Soil vapor (also referred to as soil gas) forms when chemicals in soil evaporate. The vapors are extracted (removed) from the ground by applying a vacuum to pull the vapors out.

Thermally-enhanced extraction: An action involving the use of heat to extract contaminated oil by pumping. Heating the soil and groundwater allows the trapped oil to be pumped to extraction wells, where it can be transferred to above-ground holding tanks and then shipped to an approved treatment and disposal facility.

Tier 1: Locations containing COCs at concentrations greater than 10 times the PRGs.

Tier 2: Locations containing COCs at concentrations greater than or equal to 5 times the PRGs (but less than 10 times the PRGs).

Treatability study: A field or laboratory study that tests a cleanup technology on a portion of the contamination. Information from the study indicates how well the technology might work at the contaminated site.

Unacceptable risk: The risk level at which cleanup is necessary to avoid potential negative effects to humans or the environment. Risk levels are evaluated as both cancer and noncancer risk. For Parcels E and UC-3, the Navy considers a cancer risk greater than 1 in 1,000,000 to be unacceptable. For noncancer risk, an HI greater than 1 is considered unacceptable.

U.S. Environmental Protection Agency (EPA): A federal agency established to protect human health and the environment.

Volatile Organic Compound (VOC): An organic (carbon containing) compound that evaporates readily at room temperature. VOCs are found in chlorinated solvents commonly used in dry cleaning, metal plating, and machinery degreasing operations.

Zero-Valent Iron: Fine iron particles that can be injected into groundwater. VOCs in the groundwater react with the iron particles and break down into nontoxic compounds.

ATTACHMENT 1

KEY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

CERCLA requires that remedial actions meet substantive provisions of federal or state (if more stringent) environmental standards, requirements, criteria, or limitations that are determined to be ARARs unless they are waived. The following list identifies some key ARARs for the Preferred Alternatives described in this Proposed Plan. A complete list of potential chemical-, location-, and action-specific ARARs identified for the Preferred Alternatives is provided in the FS Report (Appendix B) and its radiological addendum (Appendix C).

Key Potential Chemical-Specific ARARs:

- Provisions of California Code of Regulations (CCR) Titles 22, 23, and 27, as specified in Appendix B of the FS Report, which define RCRA and non-RCRA hazardous and solid waste and designated waste.
- Uranium Mill Tailings Radiation Control Act requirements found at Code of Federal Regulations (CFR) Title 40 Section (§) 192, as specified in Appendix C of the radiological addendum.
- Nuclear Regulatory Commission Standards for Protection of Radiation found at Title 10 CFR (10 CFR) §§ 20 and 61, as specified in Appendix C of the radiological addendum.
- Federal and State of California maximum contaminant limits (MCLs) and the RCRA groundwater protection standard in Title 22 CCR § 66264.94 are potential ARARs for groundwater, as specified in Appendix B of the FS Report.
- Provisions of the California Water Code and water quality objectives (WQOs), waste discharge requirements, and promulgated policies of the Comprehensive Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan), as specified in Appendix B of the FS Report.
- SWRCB, Resolution 88-63 (SWRCB, 1988), identifies exceptions to potential sources of drinking water. Evaluation by the Navy indicates that shallow (A-aquifer) groundwater at HPNS is not a potential source of drinking water, and that deeper (B-aquifer) groundwater has a moderate potential for use as a drinking water source.
- California Toxics Rule (CTR) requirements found at 40 CFR § 131.38 for groundwater discharges from Parcel E to San Francisco Bay, as specified in Appendix B of the FS Report.
- Clean Air Act requirements for radioactive chemicals found at 40 CFR § 61, as specified in Appendix C of the radiological addendum.

Key Potential Location-Specific ARARs:

- San Francisco Bay Plan requirements found at Title 14 CCR, as specified in Appendix B of the FS Report.
- Clean Water Act of 1977 requirements found at Title 33 United States Code § 1344, as specified in Appendix B of the FS Report.

Key Potential Action-Specific ARARs:

- Containment, closure and post-closure requirements for the proposed soil cover and protective liner found at Title 22 CCR § 66264 and Title 27 CCR, as specified in Appendix B of the FS Report.
- Shoreline construction requirements for the proposed shoreline protection features found at Title 40 CFR § 230, as specified in Appendix B of the FS Report.
- Requirements for operating a SVE system at Bay Area Air Quality Management District Regulations 2-2-301 and 8-47, as specified in Appendix B of the FS Report.
- Groundwater monitoring requirements found at Title 22 CCR §§ 66262 and 66264, as specified in Appendix B of the FS Report.
- Requirements for institutional controls found at California Civil Code § 1471, California Health and Safety Code, and Title 22 CCR § 67391.1, as specified in Appendix B of the FS Report. The U.S. Environmental Protection Agency considers subsections (a), (b), (d), and (e) of 22 CCR § 67391.1 to be ARARs. DTSC's position is that all of the state statutes and regulations referenced in this section are ARARs. The Navy recognizes that the substantive provisions of 22 CCR § 67391.1 are state ARARs as stated in Section N4.2.6 of Appendix B to the FS Report.

Proposed Plan for Parcels E and UC-3

Hunters Point Naval Shipyard
San Francisco, California

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Request Public Comment on Parcels E and UC-3
Comment Period from February 13, 2013, to March 15, 2013
See Inside How to Comment

Proposed Plan Comment Form

Parcels E and UC-3, Hunters Point Naval Shipyard

The public comment period for the Proposed Plan for Parcels E and UC-3 at Hunters Point Naval Shipyard, San Francisco, California, is from February 13, 2013, to March 15, 2013. A public meeting to present the Proposed Plan will be held at the Southeast Community Facility Commission Building in the Alex L. Pitcher, Jr. Room, located at 1800 Oakdale Avenue in San Francisco, California, on February 28, 2013, from 6:00 pm to 8:00 pm. You may provide comments verbally at the public meeting, where all comments will be recorded by a stenographer. Alternatively, you may provide written comments in the space provided below or on your own stationery. After completing your comments and your contact information, please mail this form to the address provided on the reverse side. All written comments must be received no later than March 15, 2013. You may also submit this form to a Navy representative at the public meeting. Comments are being accepted by e-mail; please address e-mail messages to keith.s.forman@navy.mil. Comments are also being accepted by fax: (619) 532-0995.

Name: _____

Representing: (if applicable) _____

Phone Number: (optional) _____

Address: (optional) _____

☐ Please check the box if you would like to be added to the Navy's Environmental Mailing List for Hunters Point Naval Shipyard.

Comments:

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