



# Proposed Plan for IR Site 1 1943-1956 Disposal Area Former NAS Alameda

## BRAC PMO

Alameda, California

September 2006

## U.S. NAVY ANNOUNCES PROPOSED PLAN

The U.S. Navy encourages the public to comment on its Proposed Plan for cleanup of *Installation Restoration (IR)\* Site 1*, in *Operable Unit 3* at Alameda Point, the former *Naval Air Station (NAS) Alameda* in Alameda, California. The U.S. Environmental Protection Agency (EPA), California EPA Department of Toxic Substances Control (DTSC), and San Francisco Bay Regional Water Quality Control Board (Water Board) worked with the Navy in the evaluation of all of the alternatives and in the selection of the *preferred alternatives*.

This Proposed Plan presents the Navy's preferred remedial (cleanup) alternatives for soil and *groundwater* at IR Site 1, also known as the "1943-1956 Disposal Area." The Navy proposes to remediate contaminated soil and *groundwater* at IR Site 1 by:

- **Removing soil** in areas where concentrations of *polynuclear aromatic hydrocarbons (PAH)*, pesticides, *polychlorinated biphenyls (PCB)*, metals, and radiological sources exceed the levels considered safe for recreational and ecological receptors.
- **Screening, segregating, and disposing** of radiological sources from excavated soil.
- **Transporting excavated soil** to an appropriate disposal facility.
- **Installing a soil cover** over former waste disposal areas that are not planned excavation areas to prevent contact with any buried debris or radiological sources.
- **Maintaining existing paved areas** in good condition to prevent human or animal contact with underlying soil.
- **Removing and disposing of radium-impacted soil** in areas where a soil cover will not be installed.
- **Assessing risk** from chemicals in wetlands areas, as well as the extent of wetland degradation, and implementing an appropriate mitigation plan.

- **Treating groundwater** by injecting oxidizing chemicals to break down *volatile organic compounds (VOC)*.
- **Implementing a groundwater monitoring program** to verify remediation has met the objectives proposed in this plan.
- **Restricting** land use to recreational activities.
- **Restricting groundwater** extraction wells.
- **Implementing a wetlands mitigation plan (WMP)** to address impacts to seasonal wetlands during remediation.
- **Removing munitions and explosives** from the firing range berm.

This Proposed Plan summarizes the site history, environmental investigations, risk assessments, and remedial alternatives evaluation conducted at IR Site 1 and describes the basis for choosing the *preferred alternatives*. The Navy will consider the public comments on this Proposed Plan during preparation of the *Record of Decision (ROD)* document for IR Site 1.

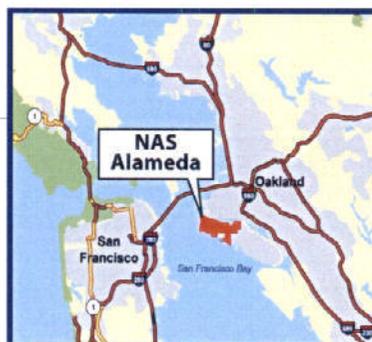


Figure 1. Former NAS Alameda Location

### — NOTICE —

**Public Comment Period**  
September 27 to October 27, 2006

**Public Meeting**  
October 24, 2006

Alameda Point  
Main Office Building  
950 West Mall Square, Room 201  
6:30 to 8:00 p.m.

\* A glossary of terms and definitions is provided on page 18. Words included in the glossary appear as italicized text.

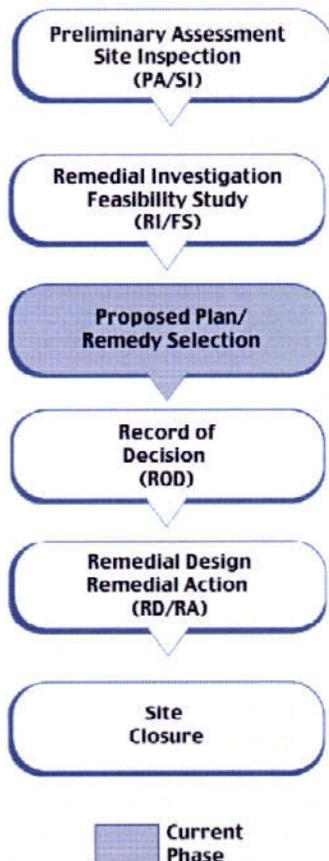
## THE CERCLA PROCESS

The Navy is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the *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)*. The flow chart below illustrates the current status of IR Site 1 in the CERCLA process.

This Proposed Plan summarizes information detailed in the *Remedial Investigation (RI) Report* and the *Feasibility Study (FS) Report* as well as other documents contained in the *Administrative Record (AR)* file for this site. The Navy encourages the public to review these documents to gain an understanding of the environmental assessment and investigation activities that have been conducted. The documents are available for public review at the locations listed on page 17.

A public comment period will be held from September 27 through October 27, 2006, and public comments can be submitted via mail, fax, or e-mail throughout the period. A public meeting will be held on October 24, 2006, at Alameda Point, Main Office Building, 950 West Mall Square, Room 201, from 6:30 to 8:00 p.m.

### COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) PROCESS



Members of the public may submit written and oral comments on this Proposed Plan at the public meeting. Comments must be provided no later than October 27, 2006. In consultation with the regulatory agencies, the Navy may modify the *preferred alternative* or select another cleanup remedy based on feedback from the community or on new information. Therefore, the community is strongly encouraged to review and comment. A final decision will not be made until all comments are considered.

## SITE HISTORY

Alameda Point is located on the western tip of Alameda Island, which is on the eastern side of San Francisco Bay (see Figure 1). This Proposed Plan pertains specifically to IR Site 1, which is located in the northwestern tip of Alameda Point where the Oakland Inner Harbor joins San Francisco Bay (see Figure 2).

IR Site 1 occupies about 78 acres and was historically used for waste disposal. In addition, aircraft engine parts and vehicles were stored in the northern portion of the site. IR Site 1 is partially paved and has generally flat topography, with slight depressions that sometimes flood during the winter rains; three of these areas have been identified as seasonal wetlands. There is approximately 15.5 acres of these seasonal wetlands. IR Site 1 includes four buildings (111, 133, 339, and 576), part of former aircraft runways 7 and 13, a former pistol range, a former skeet and target practice range, a former baseball field, a former aircraft engine and part storage area, and three closed *aboveground storage tanks* (designated as *aboveground storage tanks* 466A, 466B, 467A) that stored diesel and hydraulic fluid.

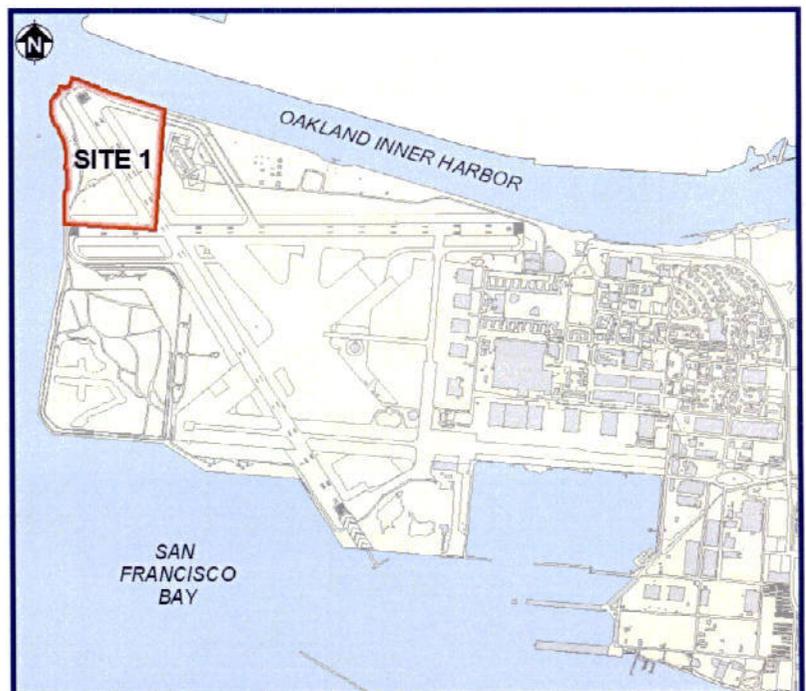


Figure 2. Location of IR Site 1

## REMEDIAL INVESTIGATION AND PRIOR FEASIBILITY STUDIES AND REMOVAL ACTION SUMMARY

From 1991 to 2004, the Navy conducted a series of soil and *groundwater* investigations at IR Site 1. Additionally, from 1996 to 1999, the Navy performed a pilot-scale demonstration of *in situ* (or in ground) treatment for the remediation of chlorinated solvents and petroleum hydrocarbons in *groundwater* at IR Site 1. The demonstration used a funnel-and-gate system to reduce concentrations of VOCs in *groundwater*. In 2003, a geotechnical and seismic study was conducted to examine the ability of the embankment that separated the area of solid waste from the shoreline to prevent releases of solid waste into San Francisco Bay.

Contaminants identified in soil included *total petroleum hydrocarbons (TPH)*, PAHs, pesticides, PCBs, metals, and radium. For management purposes, the site was divided into the following five geographical areas for soil (see Figure 3), and site-wide radium-impacted waste in soil. TPH contamination is being addressed under a separate corrective action program and is not discussed further in this Proposed Plan.

- **Area 1** is the former waste disposal (Area 1a) and burn area (Area 1b), which includes a suspected radium-containing disposal trench (Area 1b). Surface soil in this area is contaminated with PAHs, pesticides, PCBs, and metals. In addition, elevated radium levels were measured in this area.
- **Area 2** consists of the paved areas (such as runways and taxiways) outside of the former disposal area. Radiological surveys were not conducted because paved surfaces shield radium levels from detectors. Area 2 is presumed to have elevated radium levels similar to those in Area 3 (see discussion below).
- **Area 3** consists of the unpaved areas outside of the former disposal area. Surface soil in this area is contaminated with PAHs, PCBs, and metals. In addition, elevated radium levels were measured in Area 3.
- **Area 4** consists of the former pistol range berm, and is located within the boundaries of Area 1. Surface soil in this area is contaminated with PAHs, PCBs, and munitions and explosives of concern (MEC). Radium was not identified on the surface of Area 4; subsurface readings were not taken in this area.

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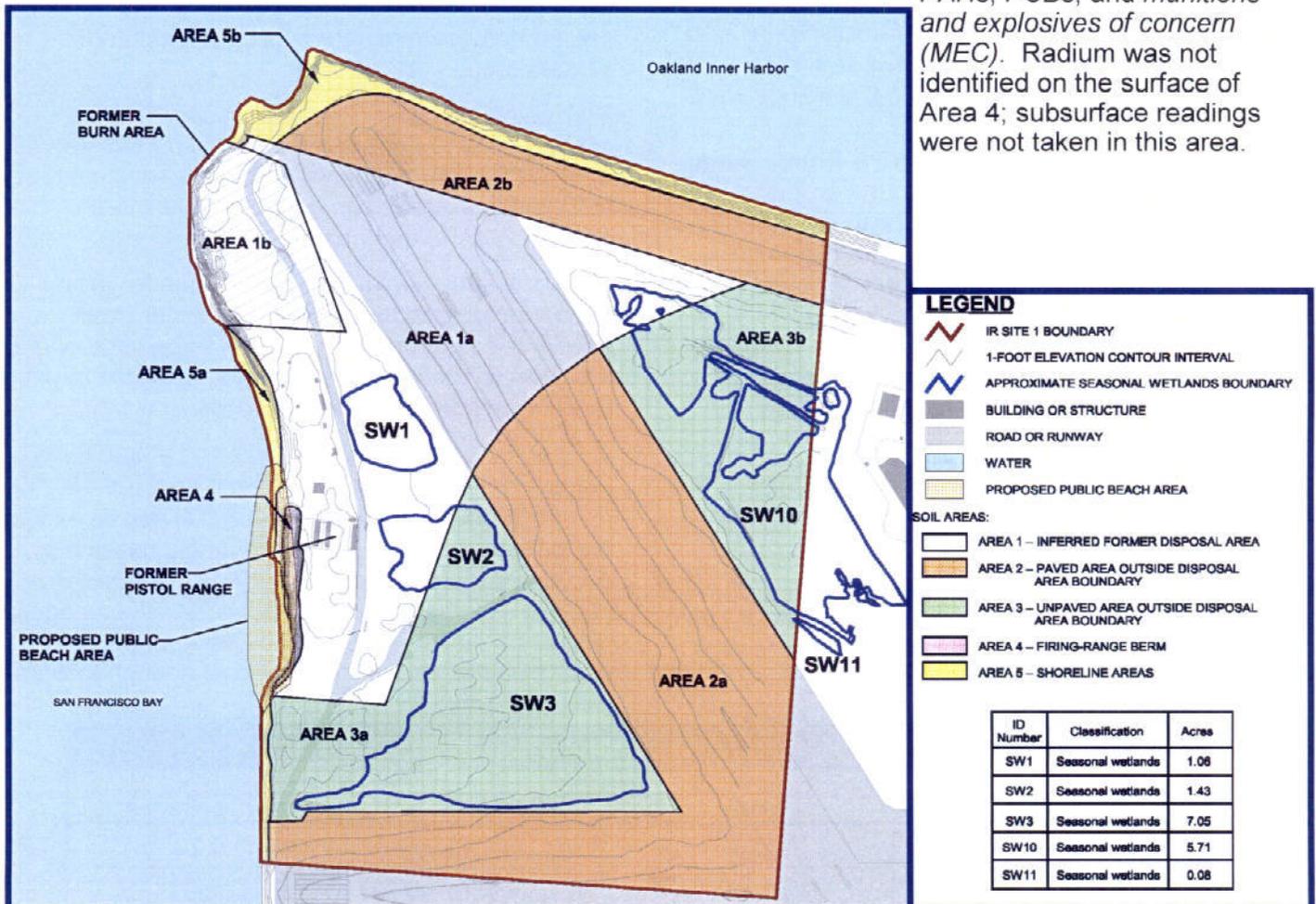


Figure 3. Layout of Soil Areas at Site 1

- **Area 5** consists of the shoreline along the western and northern site boundaries. Surface soil in this area is contaminated with VOCs, semivolatle organic compounds (SVOC), PCBs, metals, and radium. Surface soil readings of radium were localized within three areas each less than 200 square feet; subsurface readings were not taken in this area.
- **Site-wide radium-impacted waste** consists of locations within IR Site 1 (site-wide soil) with elevated radium levels above background in soil.

Contaminants identified in *groundwater* include SVOCs, VOCs, and metals. As a management tool, the site was divided into the following three *groundwater* areas: VOC plume, first water-bearing zone (FWBZ) outside of the VOC plume, and second water-bearing zone (SWBZ). In addition, residual dense nonaqueous-phase liquids (DNAPL) may be present in *groundwater* at IR Site 1, which may potentially affect the ability to remediate *groundwater* at the site.

Each *groundwater* area is briefly summarized below.

- **A VOC Plume** was identified in the FWBZ beneath the western portion of IR Site 1 (see Figure 4 on page 5). VOC concentrations ranged from nondetect to an excess of 200,000 micrograms per liter ( $\mu\text{g/L}$ ). Groundwater also was contaminated with SVOCs and metals. No significant elevated radiological readings were identified in the VOC plume.
- **The FWBZ Outside of the VOC Plume Area** consists of *groundwater* from the ground surface to 8 feet below ground surface to an underlying confining aquitard. Groundwater in this area does not contain any significant concentrations of contaminants.
- **The SWBZ** consists of *groundwater* beneath the aquitard underlying the FWBZ and does not contain any significant concentrations of contaminants.

### SITE-SPECIFIC RISK SUMMARY

“Risk” is the likelihood or probability that a hazardous chemical, when released to the environment, will cause adverse effects on exposed humans or other biological receptors. As part of the RI, a human health risk assessment and an ecological risk assessment were conducted to assess risk.

### SITE-SPECIFIC DOSE SUMMARY (RADIATION EXPOSURE)

Dose (or radiation dose) is a term that means total effective dose equivalent (TEDE). TEDE is the sum of the deep-dose, for external exposures, and the committed effective dose equivalent for internal exposure. A dose assessment was performed to show compliance with a dose-based standard using the RESRAD (pathway modeling software) and MicroShield® (photon/gamma ray shielding and dose assessment software) programs.

### HUMAN HEALTH RISK ASSESSMENT

The Navy considered the different ways that humans might be exposed to chemicals, the possible concentrations of chemicals that could be encountered during exposure, and potential frequency and duration of exposure. The expected long-term use of IR Site 1 is recreational, including a golf course, beach, and recreational fishing. The human health risk assessment includes all data gathered during the expedited field sampling of the beach and burn area (Area 1b) in 2005. This data is summarized in the “Field Summary Report Expedited Field Sampling IR Sites 1 and 15,” dated March 2006.

To support possible future land uses, two exposure scenarios were evaluated: recreational and occupational.

Risk calculations were based on conservative assumptions to protect human health. “Conservative” means the assumption will tend to overestimate risk, resulting in remediation goals that are more protective of human health.

Human health risk is classified as cancer (from exposure to carcinogens) or noncancer (from exposure to noncarcinogens). A hazard index (HI) of 1 or less is considered to be an acceptable exposure level for noncancer health hazards.

Cancer risk is generally expressed as a probability. For example, a cancer risk probability of 5 in 100,000 ( $5 \times 10^{-5}$ ) indicates that out of 100,000 people exposed using these risk assumptions, 5 cancer cases may occur as a result of exposure. To help characterize cancer risks, the federally established risk management range ( $10^{-4}$  to  $10^{-6}$ ) was used by risk managers to determine if site risks are significant enough to warrant further cleanup.

Table 1: Cancer and Noncancer Risks

Use	Media	Cancer Risk	Noncancer HI
Occupational	Soil	$3 \times 10^{-4}$	0.2
	Groundwater	$4 \times 10^{-5}$	0.0001
Recreational	Soil	$5 \times 10^{-4}$	0.4
	Groundwater	$4 \times 10^{-5}$	NA

According to the *EPA*, action is generally warranted for sites where the cumulative site risk for future and current land use is greater than  $10^{-4}$ . When risk is within the risk management range, between  $10^{-4}$  and  $10^{-6}$ , site-specific factors are considered when making decisions about whether action is required. Action may be warranted if a chemical-specific standard that defines acceptable risk is exceeded or if there are noncancer effects or adverse environmental effects that warrant action.

This risk assessment indicated that the noncancer *HIs* are below 1 for both scenarios, and that cancer risk exceeds the risk management range for the recreational and occupational scenarios (see Table 1 on page 4).

Potential cancer risks from surface soil for the recreational and occupational scenarios are attributed to *PAHs*, *PCBs*, and metals.

Potential risk to occupational workers from breathing vapors in indoor air that have migrated from groundwater is attributed to *VOCs* and *SVOCs*.

### HUMAN HEALTH DOSE ASSESSMENT

According to the *U.S. Nuclear Regulatory Commission*, action is warranted for sites where the radiation dose, *TEDE* above background exceeds 15 millirems per year (*mrem/yr*). Based on the remedial action objectives (*RAO*) selected, and the proposed remedy that includes institutional controls (*IC*), the dose to the critical group is expected to be at background levels.

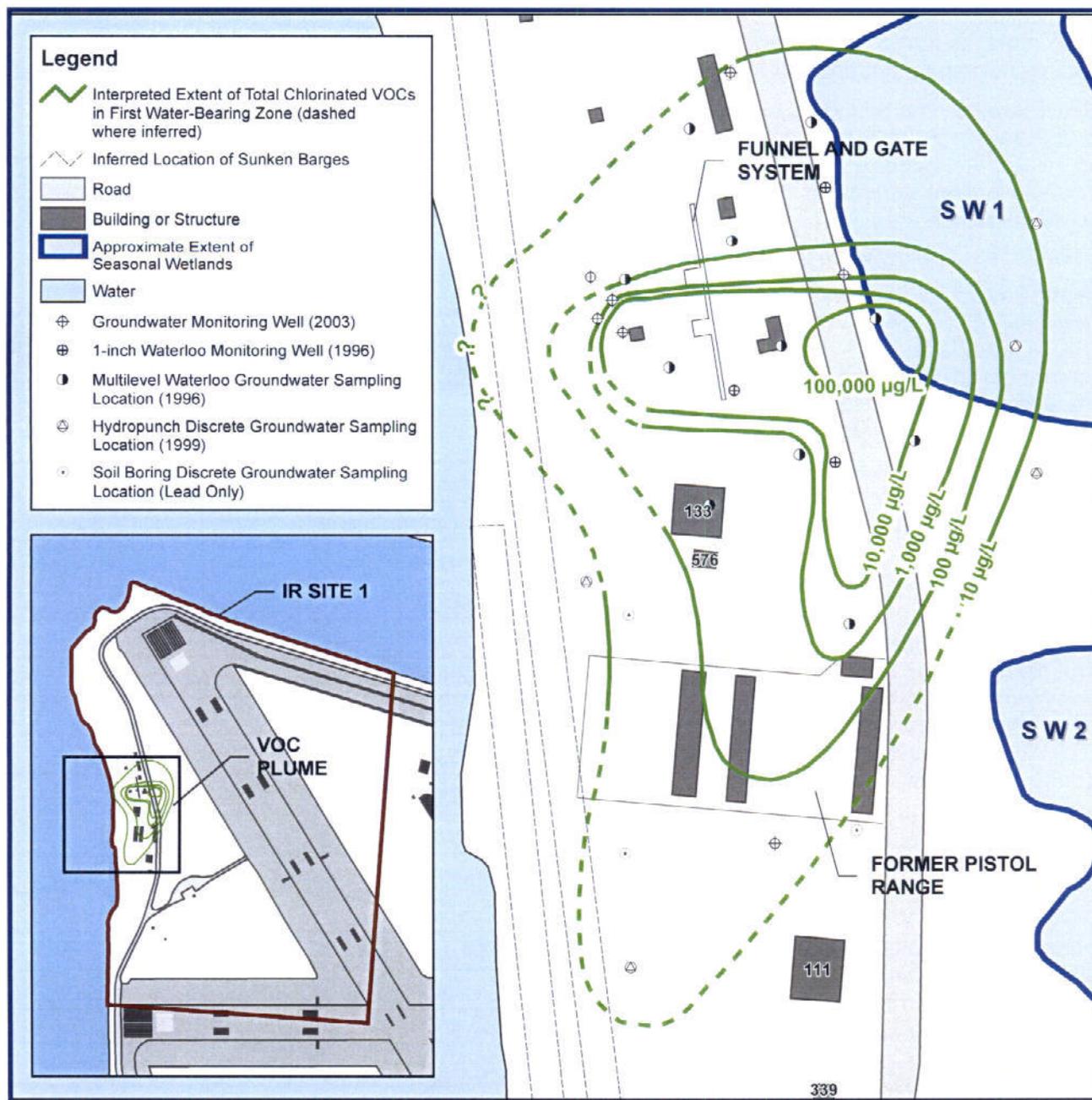


Figure 4. VOC Plume

## ECOLOGICAL RISK ASSESSMENT

An ecological risk assessment considers risks to ecological receptors, such as small mammals, birds, and marine life. The ecological risk assessment at IR Site 1 evaluated risk to terrestrial receptors (small mammals and birds) from exposure to soil and risk to marine life from exposure to *groundwater* discharged to the Oakland Inner Harbor and San Francisco Bay. The ecological risk assessment indicated that potential risk exists to small mammals and birds from pesticides and metals in soil and to aquatic life from metals in *groundwater*.

## REMEDIAL ACTION OBJECTIVES

RAOs provide the foundation upon which remedial alternatives are developed. RAOs are medium-specific (such as soil and *groundwater*) goals for protecting human health and the environment.

IR Site 1 is within the boundary of the public trust land at Alameda Point, which must be used for water-related activities. The proposed future use for this site is a links-style golf course and recreational beach area.

The RAOs listed below were identified for IR Site 1.

- **Soil:** Protect human health for future recreational visitors from exposure to PCBs, PAHs, and hexavalent chromium (also known as chromium VI), and protect terrestrial ecological receptors from pesticides and metals that exceed *remediation goals*.
- **Groundwater:** Prevent ingestion of VOCs and SVOCs by people who fish recreationally, and ingestion of metals by aquatic life above the *remediation goals*.
- **Radium-Impacted Soil:** Prevent exposure to soils with radiation levels that exceed background concentrations, and ensure that the risk and dose received through all pathways to any member of the critical group does not exceed  $10^{-6}$  to  $10^{-4}$  (*risk-based standard*), or TEDE (above background) of 15 *mrem/yr* (*dose-based standard*).

Table 2 lists the proposed *remediation goals* for soil, and Table 3 lists the proposed *remediation goals* for *groundwater*.

The FS Report for IR Site 1 evaluated and proposed remedial alternatives that are anticipated to achieve the *remediation goals* and fulfill the RAOs. *Remediation goals* for soil and *groundwater* at IR Site 1 will be finalized in the ROD.

**Table 2: Soil Remediation Goals**

Chemical of Concern	Remediation Goal (mg/kg)
<b>Polynuclear Aromatic Hydrocarbons</b>	
Benz(a)anthracene	16.4
Benzo(b)fluoranthene	16.4
Benzo(a)pyrene	1.6
Indeno(1,2,3-cd)pyrene	16.4
Dibenz(a,h)anthracene	2.7
<b>Pesticides</b>	
4,4'-DDD	1.2
4,4'-DDT	1.2
<b>Polychlorinated Biphenyls</b>	
Aroclor-1254	0.38
Aroclor-1260	0.38
<b>Metals</b>	
Cadmium	0.76
Chromium (hexavalent)	3.1
Lead	56
Zinc	300

**Table 3: Groundwater Remediation Goals**

Chemical of Concern	Remediation Goal (µg/L)
<b>Volatile Organic Compounds</b>	
1,1-Dichloroethene	3.2
Benzene	71
Trichloroethene	81
Vinyl Chloride	525
<b>Semivolatile Organic Compounds</b>	
Bis(2-chloroethyl)ether	1.4
Bis(2-ethylhexyl)phthalate	5.9
2,4-Dimethylphenol	2,300
<b>Metals</b>	
Arsenic	36
Copper	3.1
Mercury	0.025
Nickel	8.2
Silver	1.9
Zinc	81

## SUMMARY OF REMEDIAL ALTERNATIVES

Remedial alternatives evaluated ranged from "No Action" to extensive remediation, and were screened and evaluated in the *FS*. The results of those evaluations for soil and *groundwater* are briefly summarized below. Table 4 below provides a description of *ICs*, which are included in each remedial alternative. Remedial alternatives may be implemented in conjunction with other remedial alternatives to better achieve *RAOs*. For instance, Alternative S6-5 is inter-related to Alternative S1-4a, and together the two alternatives will achieve *RAOs*.

## REMEDIAL ALTERNATIVES FOR SOIL

As part of the *FS*, remedial technologies were screened for their potential to achieve the *RAOs* for the five soil areas at *IR Site 1*. Technologies were retained and assembled into the remedial alternatives presented in Tables 5A through 5F. Alternatives S2-2, S3-2, S3-3, S5-2, S6-2, and S6-3 were eliminated for the reasons described within the *FS* and are therefore not presented in Tables 5A through 5F.

**TABLE 4. INSTITUTIONAL CONTROLS**

*ICs* described in this Proposed Plan include land use restrictions, which would be established to limit human exposure to contaminated soil and *groundwater* until the risk-based *remediation goals* in the *ROD* and *applicable or relevant and appropriate requirements (ARAR)* have been reached. *ICs* may also include deed restrictions. Specific *ICs* will be established during preparation of the *ROD* and the remedial design.

If the property within *IR Site 1* is transferred to a non-federal entity, the land use restrictions will be incorporated into and implemented through two separate legal instruments, as discussed below.

1. Restrictive covenants included in a "Covenant to Restrict Use of Property" entered into by the Navy and *DTSC*, as provided in the 2000 Memorandum of Agreement between the Navy and *DTSC* and consistent with the substantive provisions of Title 22 of the *California Code of Regulations*, Section 67391.1.
2. One or more Quitclaim Deeds from the Navy to the property recipient.

Proposed Land Use Restrictions for Soil:

- *Prohibit* residential use of *IR Site 1*.
- *Prohibit* actions that might damage or otherwise reduce the effectiveness of (1) any installed soil covers in Area 1 or (2) the paved areas in Area 2.
- *Prohibit* any excavation or disturbance of underlying material below soil cover (Area 1A).
- *Restrict* excavation into soil cover (Area 1A), unless transferees gain regulatory and Navy approval and comply with a risk management plan.
- *Prohibit* demolition activities (including paved surfaces), unless transferees gain regulatory and Navy approval and comply with a risk management plan.
- *Restrict* excavation and/or disturbance of soil in areas within the boundary of *IR Site 1*, but outside the boundary of Area 1A, unless transferees gain regulatory and Navy approval and comply with a risk management plan.

Proposed Land Use Restrictions for Groundwater:

- *Prohibit* the installation of *groundwater* extraction wells in the *FWBZ* or *SWBZ* without approval from the Navy and regulatory agencies.
- *Prohibit* the construction of buildings above the *VOC* plume, or a public beach in the area west of the *VOC* plume until *RAOs* are achieved.
- *Protect groundwater* remediation and/or *groundwater* monitoring equipment.

Any proposed excavation would be managed in accordance with a risk management plan. A vapor barrier/removal system would be required in future buildings at *IR Site 1* to prevent possible accumulation of landfill gas and migration into enclosed buildings.

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

**TABLE 5A: REMEDIAL ALTERNATIVES FOR SOIL IN AREA 1**

Remedial Alternative	Cost (\$M)	Components of Remedial Alternative
S1-1	0	<b>No Action:</b> No actions or costs; this alternative is required by CERCLA as a baseline for comparison with the other alternatives.
S1-2	3.3	<b>Soil Cover:</b> A single 4-foot-thick layer of compacted soil, covering approximately 25.8 acres, which would act as a physical barrier and prevent direct contact with contaminated soil or radium (see Figure 5 on page 10). <b>Wetlands Mitigation Plan (WMP):</b> A compensatory plan for the 2.1 acres of existing seasonal wetlands that will be impacted during installation of the soil cover. <b>ICs:</b> ICs limit the use of land or activities that take place within an area. Table 4 on page 7 lists applicable ICs for soil at IR Site 1.
S1-3	15.1	<b>Engineered Alternative Cap:</b> A synthetic flexible low-permeability membrane overlain with a drain layer and 2 feet of soil cover that provides a physical barrier to prevent direct contact with soil and reduces surface water infiltration into underlying contaminated soil (25.8 acres). <b>WMP and ICs:</b> See description for Alternative S1-2.
S1-4a	18.1	<b>Excavation and Off-Site Disposal:</b> Excavate soil from Area 1b (3.7 acres), and dispose of excavated soil and radium-impacted items at an off-site facility. <b>Soil Cover:</b> Place a 4-foot-thick soil cover over Area 1a (about 22.1 acres). <b>Radiological and MEC Sweep:</b> Radiological screening and a MEC sweep would be conducted in the excavation area prior to excavation. Radiological screening would continue after each 1 foot of excavation depth. Radium-impacted waste in the excavated soil/debris would be segregated and disposed of separately from other soil and debris. <b>WMP and ICs:</b> See description for Alternative S1-2.
S1-4b	24.0	<b>Excavation and Off-Site Disposal:</b> Excavate soil from Area 1b (3.7 acres), and dispose of excavated soil and radium-impacted items at an off-site facility. <b>Engineered Alternative Cap:</b> Place over Area 1a (22.1 acres). <b>Radiological Screening and MEC Sweep:</b> See description for Alternative S1-4A. <b>WMP and ICs:</b> See description for Alternative S1-2.
S1-5	91.9	<b>Complete Removal:</b> Excavation and off-site disposal of all soil and radium-impacted items from Area 1 (25.8 acres). <b>WMP:</b> See description for Alternative S1-2.

**TABLE 5B: REMEDIAL ALTERNATIVES FOR SOIL IN AREA 2**

Remedial Alternative	Cost (\$M)	Components of Remedial Alternative
S2-1	0	<b>No Action:</b> See description for Alternative S1-1.
S2-3	0.3	<b>Pavement Maintenance:</b> Preserve the condition of existing pavement to prevent contact with underlying soil, unless redevelopment covers the pavement with at least 2 feet of soil, thus the need for maintenance is unnecessary. <b>ICs:</b> See description for Alternative S1-2.
S2-4	4.7	<b>Pavement Demolition:</b> <b>Excavation and Off-Site Disposal, Radiological Screening, and MEC Sweep:</b> See description for Alternative S1-4A. <b>Removal of Soil Hot Spots:</b> Any contaminated soil inside Soil Area 2 with chemical concentrations exceeding <i>remediation goals</i> would be excavated and disposed of either off site or relocated underneath a cover or cap. Radium-impacted soil would be separately disposed of at an off-site facility. Excavations would be backfilled with clean soil. <b>ICs:</b> See description for Alternative S1-2.

**TABLE 5C: REMEDIAL ALTERNATIVES FOR SOIL IN AREA 3**

Remedial Alternative	Cost (\$M)	Components of Remedial Alternative
S3-1	0	<b>No Action:</b> See description for Alternative S1-1.
S3-4	0.5	<p><b>Tier 2 Ecological Risk Assessment:</b> Collect soil samples from the wetlands areas to confirm if chemical concentrations exceed <i>remediation goals</i> for small mammals and birds.</p> <p><b>Hot Spot Relocation:</b> Soil with chemical concentrations exceeding <i>remediation goals</i> would be excavated from Area 3 and relocated to Area 1 and placed under a soil cover or engineered alternative cap (if installed).</p> <p><b>ICs:</b> See description for Alternative S1-2.</p> <p><b>WMP:</b> Little or no impact to the wetlands, but any impacts will be addressed in a wetlands mitigation plan.</p>
S3-5	1.8	<p><b>Tier 2 Ecological Risk Assessment, Hot Spot Removal, and Off-Site Disposal, and ICs:</b> This alternative is identical to Alternative S3-4, except excavated soil would be disposed of at an off-site facility rather than relocated to Area 1.</p> <p><b>WMP:</b> See description for Alternative S3-4.</p>

**TABLE 5D: REMEDIAL ALTERNATIVES FOR SOIL IN AREA 4**

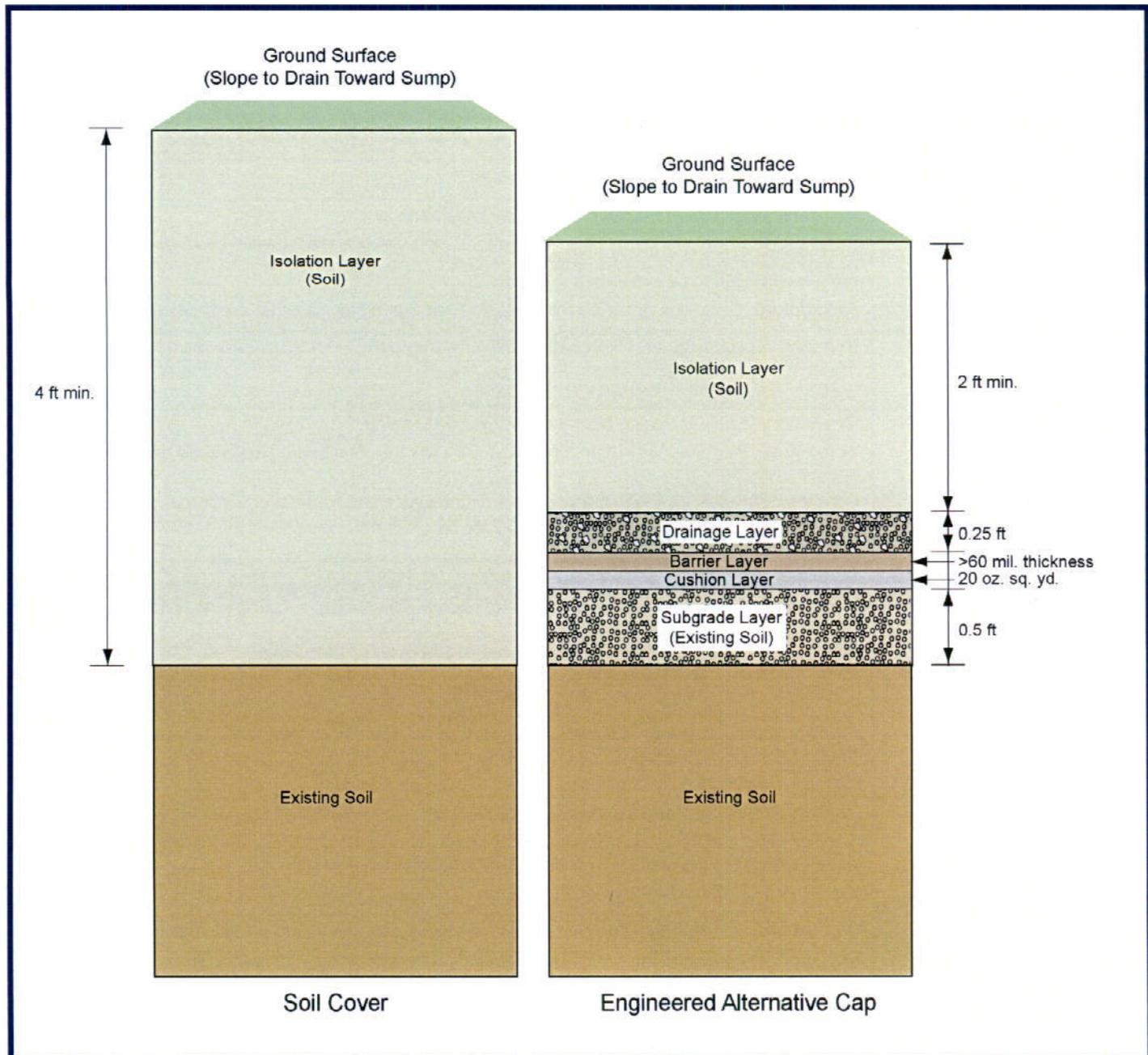
Remedial Alternative	Cost (\$M)	Components of Remedial Alternative
S4-1	0	<b>No Action:</b> See description for Alternative S1-1.
S4-2	0.3	<p><b>Removal:</b> Complete removal of the firing range berm.</p> <p><b>Screening:</b> Berm soil would be screened for bullets or other metal items. All bullets or metal items would be segregated, stored, demilitarized if <i>MEC</i>, and disposed of off site as scrap metal. <i>MEC</i> are not expected to be present at the berm.</p> <p><b>Relocation:</b> Berm soil would be relocated to Area 1 and placed under a cap or cover (if installed).</p>
S4-3	1.4	<b>Removal, Screening, and Relocation/Off-Site Disposal:</b> This alternative is the same as Alternative S4-2, except only nonhazardous soil would be placed under a cover or cap in Area 1 and hazardous soil would be disposed of off site.
S4-4	1.9	<p><b>Removal:</b> All soil, including berm soil, would be removed.</p> <p><b>Screening:</b> Berm soil would be screened for bullets or metal items. Soil would be stockpiled and analyzed for lead.</p> <p><b>Off-Site Disposal:</b> Soil with lead concentrations exceeding Federal or California hazardous waste criteria would be disposed of as hazardous waste. Soil with lead below those concentrations would be disposed of as nonhazardous soil.</p>

**TABLE 5E: REMEDIAL ALTERNATIVES FOR SOIL IN AREA 5**

Remedial Alternative	Cost (\$M)	Components of Remedial Alternative
S5-1	0	<b>No Action:</b> See description for Alternative S1-1.
S5-3	0.4	<p><b>Confirmation Sampling:</b> Soil samples would be collected from the shoreline (approximately 3,000 linear feet).</p> <p><b>ICs:</b> See description for Alternative S1-2.</p>
S5-4	1.4	<p><b>Confirmation Sampling:</b> Samples would be collected as described for Alternative S5-3.</p> <p><b>Hot Spot Relocation:</b> Soil areas with chemical concentrations exceeding <i>remediation goals</i> would be excavated and relocated to Area 1 and placed under a cover or cap.</p> <p><b>ICs:</b> See description for Alternative S1-2.</p>
S5-5	2.2	<p><b>Confirmation Sampling:</b> Samples would be collected as described for Alternative S5-3.</p> <p><b>Hot Spot Relocation:</b> Soil would be relocated as described for Alternative S5-4.</p> <p><b>Shoreline Debris Relocation:</b> Any debris within 25 feet of sea level along the shoreline would be excavated and relocated to Area 1 and placed under a cover or cap.</p> <p><b>ICs:</b> See description for Alternative S1-2.</p>
S5-6	5.9	<b>Confirmation Sampling, Hot Spot Removal, Shoreline Debris Removal, and ICs:</b> This alternative is identical to Alternative S5-5, except soil and debris would be disposed of off site.

**TABLE 5F: REMEDIAL ALTERNATIVES FOR SITE-WIDE RADIUM-IMPACTED WASTE**

Remedial Alternative	Cost (\$M)	Components of Remedial Alternative
S6-1	0	<b>No Action:</b> See description for Alternative S1-1.
S6-4	2.1	<b>Removal of Radium-Impacted Waste in Areas 3 and 5 and One Location in Area 1b:</b> All radium-impacted soil and items would be removed and disposed of off site. <b>Cover/Cap Remaining Radium-Impacted Waste in Area 1:</b> Remaining radium-impacted waste would be covered or capped. <b>WMP:</b> See description for Alternative S3-4.
S6-5	14.7	<b>Removal of All Radium-Impacted Soil and Items:</b> All radium-impacted soil and items would be removed from IR Site 1. <b>WMP:</b> See description for Alternative S3-4.



**Figure 5. Soil Cover and Engineered Alternative Cap**

## REMEDIAL ALTERNATIVES FOR GROUNDWATER

As part of the *FS*, remedial technologies were screened for their potential to achieve the *RAOs* for the three *groundwater* areas at *IR Site 1*. Technologies were retained and assembled into the remedial alternatives presented in Table 6 on page 12.

## COMPARISON OF REMEDIAL ALTERNATIVES

Selection of the *preferred alternatives* is based on the nine *NCP* criteria, as presented on Figure 6 to the right, which is followed by a specific evaluation of the individual soil and *groundwater* alternatives for *IR Site 1*. Figure 6 also includes general descriptions of the nine criteria. All remedial alternatives (except No Action) meet the first two criteria (Overall Protection of Human Health and the Environment and Compliance with *Applicable or Relevant and Appropriate Requirements [ARAR]*). Tables 7A through 7F and Table 8 summarize the comparison of remedial alternatives for soil areas 1 through 5 and site-wide radium-impacted waste and *groundwater*, respectively. Tables 7A through 7F and Table 8 exclude evaluations for state acceptance and community acceptance. The state accepts the preferred soil and *groundwater* alternatives. Community acceptance will be evaluated during the Proposed Plan and public comment period. The symbols in Tables 7 and 8 are used to represent the degree to which the alternative fulfills the criteria compared with the other alternatives. A blank circle (○) is used to represent "low." A half-filled circle (◐) is used to represent "moderate." A full circle (●) is used to represent "high." The *preferred alternative* is highlighted in green for each site.



**Final Remedy**

Figure 6. Nine Evaluation Criteria

**TABLE 6: REMEDIAL ALTERNATIVES FOR GROUNDWATER**

Remedial Alternative	Cost (\$M)	Components of Remedial Alternative
GW1	0	<b>No Action:</b> No actions or costs; this alternative is required by CERCLA as a baseline for comparison with the other alternatives.
GW2	7.2	<b>Source Removal:</b> Removal and off-site disposal of soil contaminated by DNAPL and VOCs within the VOC plume area that may be acting as a source of VOCs in <i>groundwater</i> . <b>WMP:</b> See description for Alternative S3-4. <b>Monitored Natural Attenuation (MNA):</b> Residual VOCs still present in the VOC plume area would be monitored for approximately 30 years until they decrease to concentrations below <i>remediation goals</i> . <b>Monitoring:</b> Long-term monitoring (for about 30 years) of <i>groundwater</i> in the FWBZ (outside the plume area) and SWBZ to assess if contaminants are migrating and to monitor changes in ambient conditions. <b>ICs:</b> ICs would prohibit or restrict activities site-wide. ICs would last for about 30 years until RAOs have been achieved. Table 4 on page 7 provides further detail of site-wide ICs.
GW3	6.0	<b>In Situ Chemical Oxidation (ISCO):</b> Treatment of <i>groundwater</i> in the VOC plume area using ISCO (injection of a reagent). <b>MNA:</b> <i>Groundwater</i> in the VOC plume area would be monitored (for about 30 years) to confirm if chemical concentrations have been reduced below <i>remediation goals</i> . <b>Monitoring:</b> Monitoring of <i>groundwater</i> within the FWBZ outside the VOC plume would be conducted as described for Alternative GW2. <b>ICs:</b> ICs, as described in Alternative GW2, would be implemented site-wide.
GW4	6.1	<b>In Situ Bioremediation (ISB) and MNA:</b> Treatment of <i>groundwater</i> using bioremediation and using MNA to reduce VOC concentrations in the plume area to below <i>remediation goals</i> . <b>Monitoring:</b> Monitoring of <i>groundwater</i> within the FWBZ outside the VOC plume. <b>ICs:</b> ICs, as described in Alternative GW2, would be implemented site-wide.
GW5a	8.8	<b>Zero-Valent Iron (ZVI) Powder Injection and MNA:</b> Treatment of <i>groundwater</i> by injecting ZVI powder into the subsurface and by using MNA in the VOC plume area to reduce VOC concentrations below <i>remediation goals</i> . <b>Monitoring and ICs:</b> See description for Alternative GW3.
GW5b	8.7	<b>Source Removal:</b> See description for Alternative GW2. <b>ZVI Powder Injection and MNA, Monitoring, and ICs:</b> See description for Alternative GW3.

**TABLE 7A: COMPARATIVE ANALYSIS OF SOIL ALTERNATIVES IN AREA 1**

Remedial Alternative	Overall Protection of Human Health and Environment	Compliance with ARARs	Long-Term Effectiveness/ Permanence	Reduction of Toxicity, Mobility, or Volume via Treatment	Short-Term Effectiveness	Implementability	Cost (\$M)
S1-1: No Action	No	NA	○	○	○	●	0
S1-2: Soil Cover, WMP, and ICs	Yes	Yes	◐	○	●	●	3.3
S1-3: Engineered Alternative Cap, WMP, and ICs	Yes	Yes	◐	○	◐	◐	15.1
S1-4a: Removal of Waste from Area 1b, Soil Cover for Area 1a, and ICs	Yes	Yes	◑	○	●	◑	18.1
S1-4b: Removal of Waste from Area 1b, Engineered Alternative Cap for Area 1a, and ICs	Yes	Yes	◐	○	◐	○	24.0
S1-5. Complete Removal	Yes	Yes	●	◐	○	○	91.9

Notes: ○ = Low; ◐ = Moderate; ● = High. Text in green indicates preferred alternative.

**TABLE 7B: COMPARATIVE ANALYSIS OF SOIL ALTERNATIVES IN AREA 2**

Remedial Alternative	Overall Protection of Human Health and Environment	Compliance with ARARs	Long-Term Effectiveness/ Permanence	Reduction of Toxicity, Mobility, or Volume via Treatment	Short-Term Effectiveness	Implementability	Cost (\$M)
S2-1: No Action	No	Not Applicable	○	○	○	●	0
S2-3: Pavement Maintenance and ICs	Yes	Yes	●	○	●	●	0.3
S2-4: Demolition, Sampling, Hot Spot Removal, and ICs	Yes	Yes	●	●	●	○	4.7

**TABLE 7C: COMPARATIVE ANALYSIS OF SOIL ALTERNATIVES IN AREA 3**

Remedial Alternative	Overall Protection of Human Health and Environment	Compliance with ARARs	Long-Term Effectiveness/ Permanence	Reduction of Toxicity, Mobility, or Volume via Treatment	Short-Term Effectiveness	Implementability	Cost (\$M)
S3-1: No Action	No	Not Applicable	○	○	○	●	0
S3-4: Tier 2 Ecological Risk Assessment, Hot Spot Relocation, and ICs	Yes	Yes	●	○	●	●	0.5
S3-5: Tier 2 Ecological Risk Assessment, Hot Spot Removal, and ICs	Yes	Yes	●	●	○	●	1.8

**TABLE 7D: COMPARATIVE ANALYSIS OF SOIL ALTERNATIVES IN AREA 4**

Remedial Alternative	Overall Protection of Human Health and Environment	Compliance with ARARs	Long-Term Effectiveness/ Permanence	Reduction of Toxicity, Mobility, or Volume via Treatment	Short-Term Effectiveness	Implementability	Cost (\$M)
S4-1: No Action	No	Not Applicable	○	○	○	●	0
S4-2: Removal, Screening, and Relocation	Yes	Yes	○	○	●	●	0.3
S4-3: Removal, Screening, and Relocation/Off-Site Disposal	Yes	Yes	●	●	●	●	1.4
S4-4: Removal, Screening, and Off-Site Disposal	Yes	Yes	●	●	○	○	1.9

Notes: ○ = Low; ● = Moderate; ● = High. Text in green indicates preferred alternative.

**TABLE 7E: COMPARATIVE ANALYSIS OF SOIL ALTERNATIVES IN AREA 5**

Remedial Alternative	Overall Protection of Human Health and Environment	Compliance with ARARs	Long-Term Effectiveness/ Permanence	Reduction of Toxicity, Mobility, or Volume via Treatment	Short-Term Effectiveness	Implementability	Cost (\$M)
S5-1: No Action	No	Not Applicable	○	○	○	●	0
S5-3: Confirmation Sampling and ICs	Yes	Yes	○	○	●	●	0.4
S5-4: Confirmation Sampling, Hot Spot Relocation, and ICs	Yes	Yes	○	○	●	●	1.4
S5-5: Confirmation Sampling, Hot Spot Relocation, Shoreline Debris Relocation, and ICs	Yes	Yes	◐	○	◐	○	2.2
S5-6: Confirmation Sampling, Hot Spot Removal, Shoreline Debris Removal, and ICs	Yes	Yes	●	◐	○	○	5.9

**TABLE 7F: COMPARATIVE ANALYSIS OF SOIL ALTERNATIVES FOR SITE-WIDE RADIUM-IMPACTED WASTE**

Remedial Alternative	Overall Protection of Human Health and Environment	Compliance with ARARs	Long-Term Effectiveness/ Permanence	Reduction of Toxicity, Mobility, or Volume via Treatment	Short-Term Effectiveness	Implementability	Cost (\$M)
S6-1: No Action	No	Not Applicable	○	○	○	●	0
S6-4: Removal of Radium-Impacted Waste in Areas 3 and 5 and in One Location of Area 1b, and Cover/Cap Remaining Radium-Impacted Waste in Area 1	Yes	Yes	●	●	●	●	2.1
S6-5: Removal of all Radium-Impacted Waste	Yes	Yes	●	●	○	○	14.7

Notes: ○ = Low; ◐ = Moderate; ● = High. Text in green indicates preferred alternative.

TABLE 8: COMPARATIVE ANALYSIS OF GROUNDWATER ALTERNATIVES

Remedial Alternative	Overall Protection of Human Health and Environment	Compliance with ARARs	Long-Term Effectiveness/ Permanence	Reduction of Toxicity, Mobility, or Volume via Treatment	Short-Term Effectiveness	Implementability	Cost (\$M)
GW1: No Action	No	Not Applicable	○	○	○	●	0
GW2: Source Removal, MNA, Monitoring, and ICs	Yes	Yes	◐	◐	○	◐	7.2
GW3: ISCO, MNA, Monitoring, and ICs	Yes	Yes	●	●	◐	○	6.0
GW4: ISB, MNA, Monitoring, and ICs	Yes	Yes	●	◐	◐	◐	6.1
GW5A: ZVI Powder Injection, MNA, Monitoring, and ICs	Yes	Yes	●	◐	◐	○	8.8
GW5B: Source Removal, ZVI Powder Injection, MNA, Monitoring, and ICs	Yes	Yes	●	●	◐	●	8.7

Notes: ○ = Low; ◐ = Moderate; ● = High. Text in green indicates preferred alternative.

**APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS**

CERCLA requires that remedial actions meet federal or state (if more stringent) environmental standards, requirements, criteria, or limitations that are determined to be ARARs. Attachment 1 (on pages 20 and 21) summarizes the significant potential ARARs that will be met by the preferred alternative for cleanup of soil and groundwater at IR Site 1.

**PREFERRED ALTERNATIVES**

Based on the comparison of remedial alternatives, the Navy identified preferred remedial alternatives for soil and groundwater at IR Site 1. Each preferred alternative is briefly summarized below.

**Alternative S1-4a for Soil Area 1.** This alternative would achieve the RAOs by removing soil from Area 1b. Excavated soil would be screened for radiological contamination and contaminated soil would be disposed of off site. A 4-foot soil cover would be installed over the remainder of Area 1, and a WMP would be developed for the seasonal wetlands impacted during excavation of soil. Only 2.1 acres of seasonal wetlands will be impacted in this alternative. The soil cover will be designed to follow all seismic and geotechnical requirements. Although landfill gases are unlikely to be an issue, the Navy will conduct monitoring events to confirm landfill gases are not a problem. The seismic and geotechnical requirements and monitoring events will be detailed during the remedial design phase of the CERCLA process. ICs would be implemented following these activities. This alternative is preferred based on the following key points.

- Permanently removes some contamination and helps prevent further migration of remaining contamination.
- Provides excellent immediate (short-term) protection of human and ecological receptors.

**Alternative S2-3 for Soil Area 2.** This alternative would achieve the RAOs through pavement maintenance and ICs. Pavement maintenance would indefinitely prevent human or ecological contact with underlying soil and potentially elevated radiological readings. ICs would be implemented to prevent damage to the existing paved areas and to prohibit demolition or excavation activities without Navy approval. This alternative is preferred based on the following key points.

- Readily implementable.
- Provides excellent immediate (short-term) protection of human and ecological receptors.
- Provides greater cost efficiency than excavation of soil (Alternative S2-4).

**Alternative S3-4 for Soil Area 3.** This alternative would achieve the RAOs by conducting a Tier 2 ecological risk assessment, removing and relocating soil with concentrations exceeding remediation goals to Area 1 to be placed beneath the soil cover. Excavations would be backfilled with clean soil, and ICs would be implemented for management of excavated soil and future soil excavations within Area 3. This alternative would be protective of human and ecological receptors and comply with environmental regulations and laws. This alternative is preferred based on the key points listed on the following page.

- Permanently removes some contamination, while minimizing disturbance of the wetland areas.
- Provides effective short- and long-term protection of human and ecological receptors.
- Provides greater cost efficiency than disposal of soil off site (Alternative S3-5).

**Alternative S4-4 for Soil Area 4.** This alternative would achieve the *RAOs* by completely removing and disposing of soil from the firing range berm. Soil would be screened for bullets and metals and they both would be segregated and recycled off site as inert scrap metal. This alternative is preferred based on the key points listed below.

- Permanently removes contaminated soil, which is the most effective and permanent solution.
- No *ICs* would be required to maintain the effectiveness of this alternative.

The Navy has decided to expedite this alternative, and it will be implemented under a *time-critical removal action (TCRA)*. (See call-out box to the right.)

**Alternative S5-4 for Soil Area 5.** This alternative would achieve the *RAOs* by identifying and removing any chemicals that are present in soil at concentrations above *remediation goals*. If chemicals are present, the top 2 feet of accessible shoreline soil would be excavated and placed under a soil cover in Area 1a. This alternative would be performed in conjunction with Alternative S1-4a. *ICs* would be implemented to prohibit disturbance of areas that may contain buried items, and to require a management plan for excavated soil. This alternative is preferred based on the key points listed below.

- Provides protection of human and ecological receptors.
- Provides greater cost efficiency than Alternative S5-5.

**Alternative S6-4 for Site-Wide Radium-Impacted Soil.** This alternative would achieve the *RAOs* by removing all soil that has been impacted by radium from all soil areas, except Area 1a (see Figure 3). (Area 1a would be addressed by Alternative S1-4a.) Soil would be excavated and disposed of off site. A radium survey would be performed following the removal action. This alternative would be implemented along with all other *preferred alternatives*, and would specifically address radium-impacted soil at all sites. The Navy has decided to expedite this alternative and it will be implemented under a *TCRA*. See call-out box above right.

**Alternative GW3 for Groundwater.** This alternative will achieve the *RAOs* by actively treating the *VOC groundwater* plume using *ISCO* and *MNA* until the *remediation goals* are achieved. There were slight exceedances for metals and *VOCs* in other areas within the site; these areas and the plume area

will have long-term monitoring to ensure permanent reduction of *VOCs* and associated risks. *ICs* would be established to restrict installing wells and constructing public facilities around areas of contaminated *groundwater* without agency consent.

This alternative would be protective of human health and the environment, and complies with environmental regulations and laws. This alternative is preferred based on the key points listed below.

- Provides long-term protection by significantly reducing concentrations of *VOCs* and their associated risk.
- Reduces the mobility, toxicity, and volume of *VOCs* by implementing an expedient and aggressive treatment strategy.
- Provides equivalent or better cost effectiveness when compared with other alternatives.

### Time-Critical Removal Action (TCRA)

The *BRAC Cleanup Team (BCT)* has decided to conduct a *TCRA* at *IR Site 1* based on input from the Restoration Advisory Board (RAB). Under the *TCRA*, the former firing range berm and all radium-impacted soil (except soil in proposed covered area, Area 1a) will be removed and properly disposed of off site. The *TCRA* field work is expected to begin in fall 2006.

### SUMMARY STATEMENT

Based on information currently available, the *preferred alternatives* for soil and *groundwater* meet the *NCP* threshold criteria and satisfy the following statutory requirements of *CERCLA* 121(b):

1. Protective of human health and the environment
2. Compliant with *ARARs*
3. Cost-effective
4. Uses permanent solutions and alternative treatment technologies to the maximum extent practicable

### Multi-Agency Environmental Team Concurs with Preferred Remedy

The *BRAC Cleanup Team (BCT)*, which has been working cooperatively to address remedial decisions for Alameda Point *IR Site 1 groundwater* and will sign the *ROD*, consists of:

- ◆ The Navy
- ◆ EPA Region 9
- ◆ DTSC
- ◆ Water Board

## OPPORTUNITIES FOR PUBLIC INVOLVEMENT

### Information Repositories

Individuals interested in the full technical details beyond the scope of this Proposed Plan should visit either of the two local Information Repositories in Alameda:

- Alameda Point - 950 West Mall Square, Bldg 1, Rooms 240 and 241
- Alameda Public Library - 2200A Central Avenue

Supporting documents describing the field investigation, laboratory analysis, and risk assessment are part of the Alameda Point *Administrative Record (AR)* and are available for your review at the Information Repositories in Alameda. These reports include:

- 1999 - Final OU-3 Remedial Investigation Report
- 2006 - Final Feasibility Study Report, IR Site 1, 1943-1956 Disposal Area, Alameda Point

### INTERNET CONNECTION

For more information on the closure of Alameda Point, the IR Program, and Site 1, checkout the website at: <http://www.bracpmo.navy.mil>

### Site Contacts

Community involvement in the decision-making process is encouraged. If you have any questions or concerns about environmental activities at Alameda Point, please feel free to contact any of the following project representatives:

#### Mr. Thomas Macchiarella

BRAC Environmental Coordinator  
Department of the Navy  
BRAC Program Management Office West  
1455 Frazee Road, Suite 900  
San Diego, CA 92108-4310  
(619) 532-0907

#### Mr. Mark Ripperda

U.S. EPA, Region 9  
75 Hawthorne Street  
San Francisco, CA 94105  
(415) 972-3028

#### Ms. Dot Lofstrom

Project Manager  
Department of Toxic Substances Control  
8800 California Center Drive  
Sacramento, CA 95826  
(916) 255-6449

#### Ms. Judy Huang

Project Manager  
San Francisco Bay RWQCB  
1515 Clay Street, Suite 1400  
Oakland, CA 94612  
(510) 622-2363

### Administrative Record

The AR is the collection of reports and historical documents used by the decision-making team in the selection of cleanup or environmental management alternatives. The AR file is located at:

#### Naval Facilities Engineering Command, Southwest

1220 Pacific Highway  
San Diego, CA 92132-5190  
ATTN: Diane Silva FISC Building 1, 3rd Floor  
Phone: (619) 532-3676

### PUBLIC COMMENT PERIOD

The 30-day public comment period for the Proposed Plan is September 27 through October 27, 2006.

#### Submit Comments

There are two ways to provide comments during this period:

- Offer oral comments during the public meeting
- Provide written comments by mail, email or fax (no later than October 27, 2006)



#### Public Meeting

The public meeting will be held on Tuesday, October 24, 2006 at Alameda Point, 950 West Mall Square, Room 201 from 6:30 pm to 8:00 pm. It will be an opportunity to discuss the information presented in this Proposed Plan. Navy representatives will provide visual displays and information on the environmental



investigations and the cleanup alternatives evaluated. You will have an opportunity to ask questions and formally comment on this Proposed Plan.

#### Send Comments to:

Mr. Thomas Macchiarella  
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BRAC Program Management Office West  
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## GLOSSARY OF TECHNICAL TERMS

**Administrative Record (AR):** The reports and historical documents used in selection of cleanup or environmental management alternatives.

**Applicable or Relevant and Appropriate Requirements (ARAR):** Federal, state, and local regulations and standards determined to be legally applicable or relevant and appropriate to remedial actions at a CERCLA site.

**Aboveground storage tank:** A single tank or combination of tanks (including underground pipes connected thereto) that is less than 10 percent beneath the surface of the ground.

**Aquitard:** A layer of soil that slows groundwater movement between water-bearing zones.

**BRAC Cleanup Team (BCT):** Base Realignment and Closure Cleanup Team consisting of representatives from the Navy, EPA, DTSC, and the Water Board.

**Base Realignment and Closure (BRAC) Program:** Program established by Congress under which Department of Defense installations undergo closure, environmental cleanup, and property transfer to other federal agencies or communities for reuse.

**Below ground surface:** Collection depth of a sample or depth of an excavation.

**Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA):** A law establishing a program to identify hazardous waste sites and procedures for cleaning up sites to be protective of human health and the environment, and to evaluate damages to natural resources.

**Department of Toxic Substances Control (DTSC):** One of California's environmental protection agencies, which is part of Cal/EPA, herein referred to as DTSC.

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

**First Water-Bearing Zone (FWBZ):** The artificial fill layer of soil at Alameda Point bearing groundwater that is underlain by an aquitard.

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

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

**Institutional Controls (IC):** Non-engineered mechanisms established to limit human exposure to contaminated waste, soil, or groundwater. These mechanisms may include deed restrictions, covenants, easements, laws, and regulations.

**Installation Restoration (IR):** Department of Defense's comprehensive program to investigate and clean up environmental contamination at military facilities in full compliance with CERCLA.

**In situ:** Identifies an action or process as occurring within a given media, such as groundwater or soil.

**In Situ Bioremediation (ISB):** Treatment involving injection of chemicals into contaminated groundwater to accelerate the natural degradation of contaminants into nonharmful byproducts.

**In Situ Chemical Oxidation (ISCO):** Treatment that accelerates the breakdown of contaminants by injecting oxidizing chemicals into groundwater.

**Microgram per liter ( $\mu\text{g/L}$ )**

**Milligram per kilogram (mg/kg)**

**Millirem per year (mrem/yr):** Unit used to describe dosages of radiological compounds.

**Monitored Natural Attenuation (MNA):** A form of treatment that analyzes the natural process of contaminant degradation.

**Maximum Contaminant Level (MCL):** MCL is an EPA or State standard that protects public health by limiting the levels of contaminants in drinking water.

**Munitions and Explosives of Concern (MEC):** MEC is a term used to identify three specific categories of military munitions that may pose unique explosives safety risks. These three specific categories include: unexploded ordnances, discarded military munitions, and munitions that pose an explosive hazard such as TNT.

**Naval Air Station (NAS):** Former Naval Air Station in Alameda, California.

**National Oil and Hazardous Substances 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.

## GLOSSARY OF TECHNICAL TERMS (CONTINUED)

**U.S. Nuclear Regulatory Commission (NRC):** NRC is an independent agency established by the Energy Reorganization Act of 1974 to regulate civilian use of nuclear materials. NRC's primary mission is to protect the public health and safety, and the environment from the effects of radiation from nuclear reactors, materials, and waste facilities

**Operable Unit (OU):** A grouping of similar sites or areas that are addressed together during cleanups of large facilities or complex sites under Superfund.

**Polynuclear Aromatic Hydrocarbons (PAH):** A group of over 100 different chemicals comprising one or more fused carbon rings. PAHs are present in coal and petroleum products, and are formed during burning of organic substances.

**Polychlorinated Biphenyls (PCBs):** A mixture of up to 209 individual chlorinated compounds. PCBs have been used as coolants and lubricants in electrical equipment.

**Preferred Alternative:** The remedial alternative selected by the Navy, in conjunction with the agencies, that best satisfies the RAO and remediation goal, based on the evaluation of alternatives presented in the FS report.

**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.

**Resource Conservation and Recovery Act (RCRA):** RCRA establishes the framework for treatment, storage, transportation, and disposal of hazardous substances.

**Receptors:** A living organism (human, animal, or plant) that may be exposed to chemicals at a site.

**Remediation Goal:** Chemical concentration limits that provide a quantitative means of identifying areas for potential remedial action, screening the types of appropriate technologies, and assessing a remedial action's potential to achieve the RAO.

**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 determine the nature and extent of contamination and to estimate the risks presented by the contamination at a site.

**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 and FS reports, and on public comments and community concerns.

**San Francisco Bay Regional Water Quality Control Board (Water Board):** The California water quality authority.

**Semivolatile organic compound (SVOC):** SVOC is an organic compound that has a boiling point higher than water and can vaporize when exposed to a temperature above room temperature. SVOCs include phenols and PAHs.

**Second Water-Bearing Zone (SWBZ):** Native layers of soil-bearing groundwater confined by aquitards.

**Tier 2 Ecological Risk Assessment:** A baseline ERA that is more rigorous than a Tier 1 (screening) ERA. Additional documentation and data are used to refine exposure assumptions, and recalculate risk estimates.

**Time-critical removal action (TCRA):** A TCRA is a removal action that requires a maximum 6-month planning phase. The removal action may contribute to the implementation phase of a Superfund site cleanup.

**Total Effective Dose Equivalent (TEDE):** Measure of the amount of radiation exposure.

**Total Petroleum Hydrocarbons (TPH):** Measure of the total concentration of petroleum hydrocarbon constituents present in a given amount of soil or water.

**U.S. Environmental Protection Agency (EPA):** 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 industrial solvents that are commonly used in dry cleaning, metal plating, and machinery degreasing operations.

**Wetlands Mitigation Plan (WMP):** This plan identifies the loss of seasonal wetlands during remediation and the plan to restore lost wetlands.

**Zero-valent iron (ZVI):** A type of treatment involving injection of iron pellets into contaminated groundwater to promote chemical degradation of contaminants to nonharmful byproducts.

## ATTACHMENT 1

### APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

CERCLA requires that remedial actions meet federal or state (if more stringent) environmental standards, requirements, criteria, or limitations that are determined to be ARARs. Significant potential ARARs that will be met by the preferred alternative for groundwater are listed below. See the RI and FS reports for more specific information on potential ARARs.

#### POTENTIAL FEDERAL ARARs

The Navy has determined that substantive requirements of Section 141.61(a) of 40 CFR pertaining to *maximum contaminant levels (MCL)* are not federal chemical-specific ARARs for groundwater. The Navy does not consider the *MCLs* to be relevant and appropriate because groundwater is unlikely to be used as a drinking water supply.

The groundwater beneficial use report states that in consideration of these factors and property reuse, the Alameda Point BRAC Cleanup Team (BCT) has concluded that groundwater beneath IR Site 1 is unlikely to be used as a potential drinking water source because (1) the IR Site 1 landfill is located over the aquifer and (2) dermal exposure to groundwater would be limited by restrictions on excavation at IR Site 1 where the golf course is planned.

The determination of beneficial uses of groundwater at Alameda Point was also documented in a January 2000 letter from Anna-Marie Cook, EPA. In this letter, EPA stated that groundwater underlying the western region of Alameda Point is unlikely to be considered a drinking water source. EPA stated: "The NAS Alameda BCT have concluded that the groundwater beneath Sites 1 [and 14] is unlikely to be used as a potential drinking water source due to the location of the landfill over the aquifer and the reuse restrictions that will be inherent with turning Site 1 [and 14] into a golf course. Groundwater beneath Alameda Point is currently classified by the California State Water Resources Control Board (SWRCB) as potentially suitable for municipal or domestic supply, industrial process water, industrial service water, and agricultural water supply."

In consideration of these criteria, in 2000, the Water Board proposed that the municipal and domestic supply (MUN) designation for shallow bay-front groundwater in the artificial fill layer, Young Bay Mud, and the San Antonio/Merritt Sand Formations in the Oakland shoreline/ Alameda Point area be de-designated. IR Site 1 is within the specific area delineated by the Water Board as appropriate for de-designation. Water Board adopted the groundwater amendments of the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) during a board meeting on April 19, 2000. In a letter dated July 21, 2003, the Navy received concurrence from the Water Board that groundwater meets the exemption criteria in the SWRCB source of drinking water policy Resolution (Res.) 88-63 (SWRCB 1988), and RWQCB Res. 89-39 for groundwater west of Saratoga Street at Alameda Point. This includes groundwater beneath IR Site 1.

The substantive provisions of the following requirements were identified as federal chemical-specific ARARs:

- Determination of RCRA characteristic hazardous waste [California Code of Regulations (Cal. Code Regs.) tit. 22, §§ 66261.21, 66261.22(a)(1); 66261.23, 66261.24(a)(1) and 66261.100]
- RCRA groundwater protection standards [Cal. Code Regs. tit. 22, §§ 66264.94, except 66264.94(a)(2) and (b)]
- RCRA hazardous waste treatment standards [Cal. Code Regs. tit. 22, §§ 66268.40, 66268.48]
- Clean Water Act Water Quality Standards (40 CFR § 131.36(b) and 131.38) and effluent limitations [33 United States Code [U.S.C.] § 1311(b)(2)]
- Toxic Substances Control Act regulations governing disposal of PCB remediation waste [40 CFR § 761.61(a)(4), (b) and (c)]
- Nuclear Regulatory Commission Standards for Protection of Radiation [10 CFR § 20.1402, 20.1403(a),(b)]
- Uranium Mill Tailings Radiation Control Act [40 CFR § 192.12(a)(1), (b)(1) and (b)(2); 192.32(b)(2) and 192.41(a) and (b)]

The substantive provisions of the following requirements were identified as federal location-specific ARARs:

- National Historic Preservation Act of 1966 [16 U.S.C. §§ 470f and 470h-2(a) as amended]
- Executive Order 11990 [40 CFR § 6.302(a)] (protection of wetlands)
- Clean Water Act Section 404 [33 U.S.C. § 1344]
- Endangered Species Act [16 U.S.C. § 1536(a), and (h)(1)(B)]
- Migratory Bird Treaty Act [16 U.S.C. § 703]
- Coastal Zone Management Act [16 U.S.C. §§1456c, 15 CFR § 930]

The substantive provisions of the following requirements were identified as federal action-specific ARARs:

- RCRA on-site waste generation Cal. Code Regs. tit. 22, §§ 66262.10(a), 66262.11, and 66264.13(a) and (b)]
- RCRA hazardous waste accumulation [Cal. Code Regs. tit. 22, § 66262.34]
- RCRA site closure [Cal. Code Regs. tit. 22, §§66264.111(a) and (b), 66264.114]
- RCRA hazardous waste container storage regulations [Cal. Code Regs. tit. 22, §§ 66264.171, 66264.172, 66264.173, 66264.174, 66264.175(a) and (b), 66264.177 and 66264.178]
- RCRA waste pile requirements [Cal. Code Regs. tit. 22, § 66264.553(b), (d), (e) and (f); 66264.258(a) and (b) and 40 CFR § 264.554(d)(1)(i-ii) and (d)(2), (e), (f), (h), (i), (j), and (k)]

- RCRA corrective action monitoring [Cal. Code Regs. tit. 22, §§ 66264.100(d) and ((g)(1); 66264.117(b)(1)(A) and (b)(2)(A); 66264.310 (a)(1)-(6), (b)(1)(3)]
- RCRA site security [Cal. Code Regs. tit. 22, § 66264.14(a)]
- Standards applicable to the transportation, storage, and treatment and disposal of solid waste military munitions (40 CFR § 266.203, 266.205, and 266.206)
- Clean Water Act Storm water discharge requirements [40 CFR § 122.44(k)(2) and (4)]; discharge of dredged material and filling of wetlands (33 CFR § 320.4; 40 CFR §§ 230.10, 230.11, 230.20-230.25, 230.31, 230.32, 230.41, 230.42 and 230.53)
- Clean air provisions of state implementation plan (40 U.S.C. § 7410; and NAAQS Bay Area Air Quality Management District Regulation 6, Rules 6-301, 6-302 and 6-305)
- Nuclear Regulatory Commission requirements [10 CFR § 20.1402, .1403(a), (b)]

**Potential State of California ARARS**

The substantive provisions of the following requirements have been determined to be applicable state chemical-ARARs:

- Non-RCRA hazardous waste determinations [Cal. Code Regs. tit. 22 §§ 66261.22(a)(3) and (4), 66261.24(a)(2) to (a)(8), 66261.101(a)(1) and (a)(2) and 66261.3(a)(2)(C) or 66261.3(a)(2)(F)]
- San Francisco Bay Basin Water Quality Control Plan, for groundwater beneficial use, promulgated pursuant to the Porter-Cologne Water Quality Control Act [*California Water Code* §§ 13240, 13241, 13242, 13243, 13360, and 13263(a)], selected substantive provisions of Chapter 2 and 3.
- SWRCB Resolution No. 88-63, established criteria to identify potential drinking water sources
- SWRCB Policy for Implementation of Toxic Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California § 1.3 and 1.4.
- Definitions of designated, nonhazardous, and inert waste [Cal. Code Regs. tit. 27, §§ 20210, 20220 and 20230]

In July 2003, the RWQCB issued a letter stating groundwater in the first and second water-bearing zones west of Saratoga Street at Alameda Point meet the exemption criteria in SWRCB Resolution No. 88-63 and RWQCB Resolution No. 89-39 and are not potential sources of drinking water.

The following state location-specific ARARs were identified for IR Site 1:

- California Endangered Species Act (*California Fish and Game Code* § 2080)
- *California Fish and Game Code* §§ 5650(a) and (f); 3005(a), 3503, 3503.5, 3511, 3800(a), 4150 and 8500
- Cal. Code Regs. tit. 14, § 40 and 472 (prohibition on taking birds and mammals and reptile and amphibians)

The following state action-specific ARARs were identified for IR Site 1:

- California landfill requirement [Cal. Code Regs. tit. 27 20921(a)(1)-(3) (landfill gas control); Cal. Code Regs. tit. 27 § 20365(c) and (d) and 21090(c)(4) and 21150 (erosion control); Cal. Code Regs. tit. 27 § 20080(b) and 21090(a) (engineered alternatives to final cover); 21090(a)(3) (vegetative layer); 21090(b)(1) (final grading)]

Substantive provisions of the following requirements of the *California Civil Code* (CCC) and the *Health and Safety Code* (HSC) have been determined to be state action-specific ARARs for implementation of institutional controls for property that will be transferred to a nonfederal entity:

- CCC § 1471, Transfer of Obligations
- Cal. Code Regs. tit. 22, § 67391.1, Land Use Covenants
- HSC §§ 25202.5, 25222.1, 25355.5(a)(1)(C), 25232(b)(1)(A)-(E), 25233(c), and 25234

The Water Board identified the substantive provisions of the "Statement of Policy with Respect to Maintaining High Quality of Waters in California" (SWRCB Res. 68-16) and "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under California Water Code Section 13304" (SWRCB Res. 92-49) as State ARARs for the Site 1 groundwater remedial action. The SWRCB interprets Res. 68-16 as prohibiting further migration of the VOC contaminant plume at Site 1; however, the EPA and the Navy do not agree that SWRCB Res. 68-16 applies to further migration. Further, the Navy's position is that the SWRCB Res. 68-16 and 92-49 do not constitute chemical-specific ARARs (numerical values or methodologies that result in the establishment of a cleanup level at the site) since they are state requirements and are not more stringent than federal provisions of Cal. Code Reg. tit. 22 § 66424.94, determined to be ARARs for Site 1 groundwater remedial action. The Water Board and DTSC do not agree with the Navy's determination that SWRCB Res. 92-49 and 68-16 are not ARARs for Site 1 remedial action; however, the Water Board and DTSC agree that the proposed remedial action would comply with SWRCB Res. 92-49 and 68-16.





Attn: Ms. Tommie Jean Damrel  
Community Involvement Coordinator, SulTech  
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San Francisco, CA 94105



**BRAC  
PMO**

**Proposed Plan for  
IR Site 1 – 1943-1956 Disposal Area  
Alameda Point, California**

# Proposed Plan Comment Form

## Site 1, 1943-1958 Disposal Area, Former NAS Alameda

The public comment period for the Proposed Plan for Installation Restoration Site 1 at Alameda Point, Alameda, California, is from September 27 to October 27, 2006. A public meeting to present the Proposed Plan will be held at the Alameda Point, Main Office Building, 950 West Mall Square, Building 1, Room 201, in Alameda, California, on October 24, 2006, from 6:30 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 postmarked no later than October 27, 2006. You may also submit this form to a Navy representative at the public meeting. Comments are also being accepted by e-mail; please address e-mail messages to [thomas.macchiarella@navy.mil](mailto:thomas.macchiarella@navy.mil). Comments are also being accepted by fax: (619) 532-0940.

Name: \_\_\_\_\_

Representing: \_\_\_\_\_  
(if applicable)

Phone Number: \_\_\_\_\_  
(optional)

Address: \_\_\_\_\_  
(optional)

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

Comments:

Thomas Macchiarella, BRAC Environmental Coordinator  
Program Management Office  
1455 Frazee Road, Suite 900  
San Diego, CA 92108

**RESPONSES TO REGULATORY AGENCY COMMENTS ON THE  
DRAFT FINAL PROPOSED PLAN FOR IR SITE 1, 1943-1956 DISPOSAL AREA,  
FORMER NAS ALAMEDA, ALAMEDA, CALIFORNIA**

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This document presents the U.S. Department of the Navy (Navy) responses to comments from the regulatory agencies on the "Draft Final Proposed Plan for IR [Installation Restoration] Site 1, 1943-1956 Disposal Area, Former NAS [Naval Air Station] Alameda, Alameda, California," submitted on August 14, 2006. The Navy received the comments addressed below from the U.S. Environmental Protection Agency (EPA) and Department of Toxic Substances Control (DTSC) on August 31, 2006.

**RESPONSES TO COMMENTS FROM EPA**

- 1. Comment:** Page 5, Human Health Dose Assessment. The last sentence is a little confusing, as it seems to be saying that ICs are part of the remedial objective. Perhaps it should instead say: "Based on the remedial action objectives selected, and the proposed remedy that includes ICs, the dose to the critical group is expected to be at background levels."

**Response:** Text was revised as requested.
- 2. Comment:** Page 6. The Remedial Action Objective for Radium-Impacted Soil should state that the dose based standard is 15 mrem/year (as stated in the Final FS), not 25 mrem/year. Same comment for page 5, Human Health Dose Assessment.

**Response:** Text was revised to reflect the dose-based standard of 15 millirems per year.
- 3. Comment:** Pages 8-10. It would be helpful to designate the preferred alternatives in the tables, perhaps putting them in color, or labeling them as such.

**Response:** Table 5 (A through F) and 6 introduce and describe all the remedial alternatives, while Tables 7 (A through F) and 8 include colors (green) highlighting the preferred alternatives.
- 4. Comment:** Page 7. Why should the ICs include a prohibition on actions affecting the paved portions of Area 2? As this area is outside of the fill area, it could possibly have no ICs (as the city has requested for areas outside of the cover), or at least have the same restrictions, not prohibitions, as the rest of Area 2.

**Response:** Institutional controls (IC) would be put in place to prevent damage to existing paved surfaces (or the soil cover, if applicable), and would prohibit demolition or removal of hardscapes unless transferees gain

approval from the regulatory agencies and the Navy and comply with a risk management plan in Area 2.

5. **Comment:** Page 15. This calls for pavement maintenance and ICs. We see no reason for pavement maintenance, and the IC issue is similar to the previous comment.

**Response:** Please see the response to EPA Comment No. 4.

6. **Comment:** Page 15, Alternative S3-4 for Soil Area 3. Please remove the sentence: "ICs are expected to be in place for 30 years".

**Response:** The sentence was removed as requested.

7. **Comment:** Page 16, Second Arrow. There should be an 's' on receptor.

**Response:** The text was revised as requested.

8. **Comment:** Page 20, Sixth Bullet. The '20' is green. Also, '14.03' should have the period removed.

**Response:** The text was revised as requested.

9. **Comment:** Page 20, Seventh Bullet. We did not understand the response to our comments on why 40 CFR 192.12(a)(2) is not an ARAR. Is the Navy applying 5 pico-curries/gram at all depths?

**Response:** The Navy determined that the criteria in Title 40 *Code of Federal Regulations* Section 192.12(a)(2) for the cleanup of radioactive contamination in soil are not ARARs for IR Site 1. Therefore, the concentration of 5 picoCuries per gram is not applicable.

## RESPONSES TO COMMENTS FROM DTSC

### General Comments

1. **Comment:** The paragraph entitled "Site-Specific Dose Summary" needs to be revised so that it is evident that the paragraph refers to radiation exposure. This may be accomplished by rewriting the first sentence in the paragraph or perhaps incorporating some of the information from Human Health Dose Assessment paragraph. For example, the first sentences could be rewritten as follows:

**"According to the Nuclear Regulatory Commission (NRC), action is warranted for sites where the radiation dose exceeds 25 millirems per year (mrem/yr). Radiation dose (or dose) is a term that means total effective dose equivalent (TEDE). ...."**

**Response:** The title of the paragraph was revised for clarification to: "Site-Specific Dose Summary (Radiation Exposure)." The text should remain the same. The suggested sentence, "According to the Nuclear Regulatory Commission (NRC), action is warranted..." appears on page 5 under "Human Health Dose Assessment."

2. **Comment:** U.S. EPA comments 1, 3, 4, and 5 have not been incorporated into the Proposed Plan. DTSC supports and agrees with these comments submitted by U.S. EPA and would like to see the Proposed Plan modified, accordingly.

**Response:** EPA comments 1, 3, 4, and 5 were addressed in the Draft Final Proposed Plan. Please refer to the previous Responses to Regulatory Agency Comments, which were included with the Draft Final Proposed Plan, dated August 14, 2006.

3. **Comment:** In our memorandum dated August 9, 2006, DTSC recommended that the Navy should design a third alternative, which would be a non-prescriptive cap that would retard but not necessarily prevent the downward movement of surface water. The purpose of this comment is to reiterate our recommendation; the Proposed Plan does not need to include this statement.

**Response:** This issue is addressed in the letter sent by Mr. Macchiarella of the Navy to Ms. Lofstrom of DTSC, dated September 5, 2006, in response to the August 9, 2006, memorandum.

## Minor Editorial Comments

1. **Comment:** Public comment period page 2 is listed as August 14 through September 13, 2006.

**Response:** The text was revised to reflect the updated dates of the public comment period (September 27 to October 27, 2006).

2. **Comment:** Remove unnecessary “s” in dose assessments (page 4).

**Response:** The text was revised as requested.

3. **Comment:** Capitalize “f” in Fall 2006 in TCRA box on page 16.

**Response:** The Proposed Plan was prepared in accordance with the *Chicago Manual of Style, The Essential Guide for Writers, Editors, and Publishers, 15th Edition*. According to the *Chicago Manual of Style*, Section 7.74, the “f” in “fall 2006” should not be capitalized:

*"Names of days of the week and months of the year are capitalized. The four seasons are lowercased (unless personified; see 7.32)."*

Section 7.32 indicates the following:

*"The personification of abstractions—giving them the attributes of persons—is not a common device in today's prose writing. When it is used, the personified noun is usually capitalized." For example, "Then Spring—with her warm showers—arrived."*

Because the season is not “personified” in the Proposed Plan, the “f” has been kept as a lowercase letter based on Section 7.74 of the *Chicago Manual of Style*.

4. **Comment:** Under the third bullet titled radium-impacted soil (under Remedial Action Objectives) all the acronyms are spelled out, even though they have been defined earlier in the document. This may be deliberate, however, and I certainly don't object if it was intended. In fact, TEDE is defined every time it is used in a new paragraph throughout the Plan (page 4, page 5, and page 6) but that may be because it's assumed this will be an acronym that is unfamiliar to most readers of the Proposed Plan.

**Response:** The Proposed Plan was revised to define the acronym the first time it is used. After that, it is referred to as the acronym. The acronym also has been defined in the Glossary of Terms.

# SulTech

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## TRANSMITTAL/DELIVERABLE RECEIPT

Contract No. **N68711-03-D-5104**

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 Naval Facilities Engineering Command  
 Southwest Division  
 1220 Pacific Highway, Bldg 127  
 San Diego, CA 92132-5190

DATE: 09/26/06  
 CTO: 119  
 LOCATION:  
Alameda Point, Alameda, California

FROM:



**Steve Bradley, Contract Manager**

DOCUMENT TITLE AND DATE:

**Proposed Plan (with RTC's) for IR Site 1, 1943 – 1956 Disposal Area, Former NAS Alameda**

TYPE:  Contractual Deliverable  Technical Deliverable (DS)  Other (TC)

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NUMBER OF COPIES SUBMITTED TO NAVY:

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