



1 Declaration

This Record of Decision (ROD) presents the selected remedies for soil and groundwater at Installation Restoration (IR) Site 2, also known as the West Beach Landfill and Wetlands at the former Naval Air Station (NAS) Alameda in Alameda, California (now referred to as Alameda Point). The remedies were selected based on a thorough and comprehensive Remedial Investigation (RI) and Feasibility Study (FS) analysis conducted in accordance with the Comprehensive, Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, Title 42 United Statutes Code (U.S.C.) Section (§) 9601, et seq., and in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300, et seq.

The United States Environmental Protection Agency (U.S. EPA) CERCLA Information System identification number for Alameda Point is CA2170023236, and Alameda Point was added to the National Priority List (NPL) of Superfund sites on July 22, 1999.

The decisions are based on information contained in the **Administrative Record¹** (AR) for IR Site 2. Information not specifically summarized in this ROD or its references, but contained in the AR, has been considered and is relevant to the selection of the remedies at the site. Thus, the ROD is based upon and relies on the entire AR file in making the decision.

The United States Department of the Navy (Navy) and U.S. EPA jointly selected the remedy for IR Site 2 that will be protective of human health and the environment. The California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC) and the San Francisco Regional Water Quality Control Board (Water Board) concur on the remedy for IR Site 2. The Navy, as the lead federal agency, provides funding for site cleanups at Alameda Point. A Federal Facilities Agreement (FFA) between the Navy and U.S. EPA was signed by the Navy and U.S. EPA on July 5, 2001, and by Cal/EPA DTSC and the Water Board in 2005, and documents how the Navy intends to meet and implement CERCLA in partnership with U.S. EPA, Cal/EPA DTSC, and the Water Board.

Alameda Point is located on the western end of Alameda Island, which lies on the eastern side of San Francisco Bay, adjacent to the City of Oakland. The locations of Alameda Point and IR Site

¹ **Bold blue text** throughout this ROD identifies detailed site information available in the Administrative Record and listed in the References Table in Section 4. This ROD is also available on compact disk (CD) whereby the **bold blue text** serves as a hyperlink to referenced information. To the extent there may be any inconsistencies between the referenced information attached to this ROD via hyperlinks and the information in the basic ROD itself, the language in the basic ROD controls. The hyperlink will open a text box at the top of the screen. A blue box surrounds applicable information in the hyperlink.

2 are depicted on Figure 1-1. Alameda Point served as a base of operations for Naval surface craft prior to World War II until its closure in 1997 by the Defense Base Realignment and Closure (BRAC) Act of 1990. During its long history of operation, Alameda Point was home to several thousand military and civilian personnel, and supported operations of the Navy, Marine Corps, and other military entities.

IR Site 2 is approximately 110 acres in size, made up primarily of the approximately 60-acre former West Beach Landfill (herein referred to as the former landfill) and the West Beach Wetlands (herein referred to as the wetlands), which cover approximately 33 acres immediately south and west of the landfill. The remaining 17 acres within the IR Site 2 boundary are represented by areas known as the interior margin and the coastal margin. The landfill was reportedly used



Figure 1-1. Location of Former NAS Alameda and IR Site 2

for disposal of waste generated by former NAS Alameda activities from 1956 through early 1978. Historical information suggests that up to 1.6 million tons of general waste were disposed during this time. **Potential sources of contamination** in soil and groundwater at IR Site 2 include general household waste and several industrial and process wastes, including, but not limited to, asbestos, pesticides, sandblasting grit, waste oils and solvents, painting and plating wastes, inert ordnance, low-level radiological waste, and medical waste.

Groundwater beneath IR Site 2 is not presently used for drinking water and is **not considered a potential drinking-water source** due to the poor quality of the water. Accordingly, drinking-water standards do not apply to the groundwater at the site. However, groundwater at the site was assessed for potential impacts to surface water in San Francisco Bay.

IR Site 2 is designated for a federal agency to federal agency transfer (i.e., from the Navy to the Office of Veterans Affairs). The proposed future land use at IR Site 2 includes low-impact recreational uses such as wetlands.

This ROD documents the selected remedial actions for soil and groundwater at IR Site 2 that are necessary to protect public health, welfare, and the environment from actual or threatened releases of contaminants at the site.

1.1 Selected Remedy

Remedial alternatives for soil and groundwater at IR Site 2, ranging from "no action" to complete excavation and active groundwater remediation, were evaluated in the FS Report. As described in the Proposed Plan, the preferred remedial actions were identified by comparing the alternatives to the NCP criteria. The Navy, in coordination with the regulatory agencies and the

community, has selected the following remedies for soil and groundwater based upon the evaluation of the nine NCP criteria:

- Soil – install a multilayer soil cover over the former landfill to isolate buried waste and soil contaminants and prevent animal burrowing; implement engineering controls and institutional controls (ICs) to protect human health and the integrity of the multilayer soil cover; provide for any necessary wetland mitigation onsite at Alameda Point if impacts to wetlands occur; monitor the soil cleanup action and wetlands mitigation to ensure their proper construction and long-term effectiveness; and conduct methane gas monitoring as necessary.
- Groundwater – conduct monitored natural attenuation (MNA) for site groundwater by regularly monitoring groundwater quality using shoreline groundwater monitoring wells to ensure that there are continued stable to decreasing trends in contaminant concentrations, and protection of the beneficial uses of surface water in San Francisco Bay; and implement engineering controls and ICs to protect human health and the groundwater remedy.

The Navy has incorporated an additional element into the selected soil remedy (with agreement from the FFA signatories) since issuing the Proposed Plan, which includes scanning the surface and removing surficial radiological hotspot material before placement of the multilayer soil cover. The objective of the radiological scanning and removal process is to prevent the spread of potential contamination during site grading and to ensure worker health and safety. The specific parameters by which the Navy will define and identify radiological hotspots for excavation and disposal are described in more detail in Section 2.9.2.1 of this ROD, and will be further developed during the remedial design phase of the project.

The remedies selected for soil and groundwater at IR Site 2 are protective of human health and the environment, comply with federal and state requirements that are legally applicable or relevant and appropriate requirements (ARARs) to the remedial action, are cost-effective, and utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. The selected remedies will satisfy the corrective action requirements of the Resource Conservation and Recovery Act (RCRA) or otherwise applicable state hazardous waste or water quality protection laws. Although the selected remedies for soil and groundwater do not provide for treatment as a principal element, the multilayer soil cover is expected to result in reductions in the mobility of contamination, and natural attenuation mechanisms will reduce contaminant toxicity, mobility, and volume. The multilayer soil cover remedy was selected based on the results of a detailed analysis of potential alternatives in the FS that determined it would be protective of human health and the environment. Statutory five-year reviews pursuant to CERCLA § 121 and the NCP will be conducted because the remedies for soil and groundwater will leave contamination in place at IR Site 2 above levels which allow for unrestricted use and unlimited exposure.

1.2 Data Certification Checklist

The information included in the Decision Summary (see Section 2.0 of this ROD) for IR Site 2 is contained in the sections or tables as outlined in Table 1-1. Additional information can be found in the AR file for IR Site 2. If contamination posing an unacceptable risk to human health or the

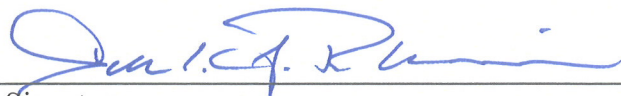
Table 1-1. Data Certification Checklist

Data	Applicable ROD Location
Contaminants of concern (COCs) and their respective concentrations	Sections 2.3 and 2.5
Baseline risk represented by the COCs	Section 2.5
Cleanup levels established for COCs and the basis for these levels	Sections 2.5, 2.6, and 2.7
Source materials constituting principal threats and how they are addressed	Section 2.6
Current and reasonably anticipated future land-use assumptions used in the risk assessment	Section 2.4
Potential land use that will be acceptable at the site as a result of the selected remedy	Section 2.9.3
Estimated net present value (NPV) cost evaluation for soil and groundwater remedies based on NCP criteria and relative performance	Tables 2-7 and 2-8
Key factors that led to selecting the remedies	Section 2.9.1

environment is discovered after execution of this ROD or if chemical concentrations in groundwater at shoreline monitoring wells do not remain stable to decreasing as expected, the Navy will undertake the necessary actions pursuant to CERCLA to ensure continued protection of human health and the environment.

1.3 Authorizing Signatures

This sheet documents the Navy's and the U.S. EPA's co-selection of the remedies in this ROD to address contamination in soil and groundwater at IR Site 2, West Beach Landfill and Wetlands, at Alameda Point, Alameda, California, and the State of California's (Cal/EPA DTSC and Water Board) concurrence with this ROD. The respective parties may sign this sheet in counterparts.

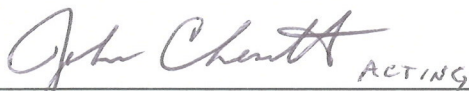


Signature

Aug. 17 2010

Date

Mr. Derek J. Robinson
Base Realignment and Closure Environmental Coordinator
Base Realignment and Closure Program Management Office West
United States Department of Navy

 ACTING

Signature

10-5-10

Date

Mr. Michael M. Montgomery
Assistant Director
Superfund, Federal Facilities and Site Cleanup Branch, Region 9
United States Environmental Protection Agency

The State of California, Department of the Toxic Substances Control had an opportunity to review and comment on the Record of Decision and the Department of Toxic Substances Control comments were addressed.

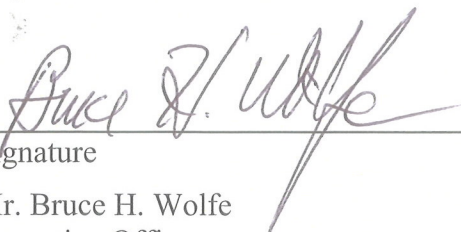


Signature

10-13-10

Date

Ms. Dottie Lofstrom
Team Leader, East Bay Urban Infill Team
Brownfields and Environmental Restoration Program
California Environmental Protection Agency
Department of Toxic Substances Control



Signature

10/19/10

Date

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

(This page intentionally left blank.)

2 Decision Summary

2.1 Site Description and History

2.1.1 Site Description

Overall, Alameda Point encompasses roughly 1,700 acres of land. Development of Alameda Point first began in 1930 under the ownership of the United States Army, and the majority of the former NAS was built on shallow open water through dredging and filling. The average elevation of Alameda Point is 15 feet (ft) above mean sea level.

Alameda Point served as a base of operations for naval surface craft prior to World War II through its closure in 1997. Closure of Alameda Point was mandated by the Defense BRAC Act of 1990. During its long history of operations, Alameda Point was home to several thousand military and civilian personnel, and supported operations of the Navy, Marine Corps, and other military entities. Hundreds of buildings and an extensive network of roadways and utilities were constructed at Alameda Point, and much of this infrastructure still exists. Alameda Point supported aviation activities through extensive runway and tarmac infrastructure and an enclosed lagoon for seaplanes, and also supported Naval surface vessels (including aircraft carriers) through an extensive system of piers, berthing areas, and turning basins. Specific activities conducted historically at Alameda Point include, but are not limited to, aircraft maintenance, ship maintenance, support and training for naval and Marine air units, storage, rework, and distribution of weaponry, fuel storage and refueling, dry goods storage and distribution, pest control, plating, metal working and fabrication, parts washing, cleaning and routine maintenance, blasting and painting, testing of jet engines, heavy equipment maintenance, woodworking, photography, and radiological operations that included the painting of aircraft dials with radioluminescent paints.

IR Site 2 is located on the southwest corner of Alameda Point and is approximately 110 acres in size (see Figure 2-1). The site consists of the former landfill, which occupies approximately 60 acres, and the wetland, which covers approximately 33 acres immediately south and west of the landfill. The remaining 17 acres within the IR Site 2 boundary are represented by areas known as the interior margin and the costal margin, as shown on Figure 2-1. The site is bound to the south and west by San Francisco Bay and to the east and north by runways and tarmacs. The former landfill was reportedly used for disposal of wastes generated by former NAS Alameda activities from 1956 through early 1978.

2.1.2 Site History

The area of present day IR Site 2 was originally shallow open water. In 1956, a sea wall was constructed along the southern and western shorelines of IR Site 2 to confine and protect the area. Dredged fill of varying origins was hydraulically placed inside the sea wall, creating IR Site 2. Observations made during investigation activities indicate that the sea wall surrounding IR Site 2 remains intact, and that its integrity has not been compromised.

Although historical information suggests that limited waste disposal activities may have occurred in the far northeastern portion of the site during the early 1950s, **disposal activities** began in earnest at the former landfill only after completion of the sea wall in 1956. Waste was initially placed starting in the northern portion of the former landfill, eventually extending to most of

the northern and eastern areas of the former landfill and a small portion of the northern wetland pond (see Figure 2-1). Based on historical information, it is estimated that the former landfill received a maximum of 1.6 million tons of general base garbage (e.g., general household waste, food waste, paper products) and was the main disposal location for Alameda Point. In addition, the following specific wastes were reportedly disposed of at the former landfill based on an Initial Assessment Study (IAS) historically commissioned by the Navy: waste chemical drums; solvents; oily wastes and sludge; paint waste; plating wastes; industrial strippers and cleaners; acids; mercury; polychlorinated biphenyl (PCB)-containing liquids; batteries; low-level radiological waste from radium dials and dial paints; scrap metal; inert ordnance; asbestos; several pesticides (solid and liquid); tear gas agent; biological waste (including potentially infectious waste from Oak Noll Naval Hospital and laboratory waste

from the Naval Supply Center at Oakland); creosote; dredge spoils; and waste medicines and reagents. Several types of radiological devices were detected at the site during various environmental investigations, and when they were detected, they were subsequently removed.

Based on available facility documentation, historical disposal methods at the site generally consisted of trench and fill operations. A trench would be excavated to the water table and progressively filled with wastes; then the waste material would be spread and compacted using heavy machinery. The landfill area was covered with soil on an intermittent basis. Reportedly, during the early years of operation, full drums were buried at the site. However, after three separate landfill fires were triggered by damage of full drums of material with heavy machinery, all drums were reportedly punctured and drained before disposal.

In 1978, the Navy developed plans to close the landfill in accordance with requirements of the Water Board's *Minimum Criteria for Proper Closure of Class II Solid Waste Disposal Sites* (Resolution No. 77-7). In 1983, the Water Board issued Order No. 83-35 to implement a final cover, a leachate cutoff barrier, methane gas control, earthquake damage control, drainage control, and erosion control, and to generate compliance reports for the former landfill. The Navy responded between 1983 and 1985 by placing a partial clay-soil cover, installing an 820-ft-long, 2-ft-wide, and 20-ft- to 30-ft-deep slurry wall to restrict potential contaminant migration to San Francisco Bay (see Figure 2-1), installing a gas venting system, and completing repairs to the sea wall. Closure activities were discontinued in 1984 because the Water Board required the Navy to first complete a solid waste assessment test (SWAT). In 1986, the Navy spread 20,000 cubic yards (yd³) of imported soil material on the former landfill. That volume represented a

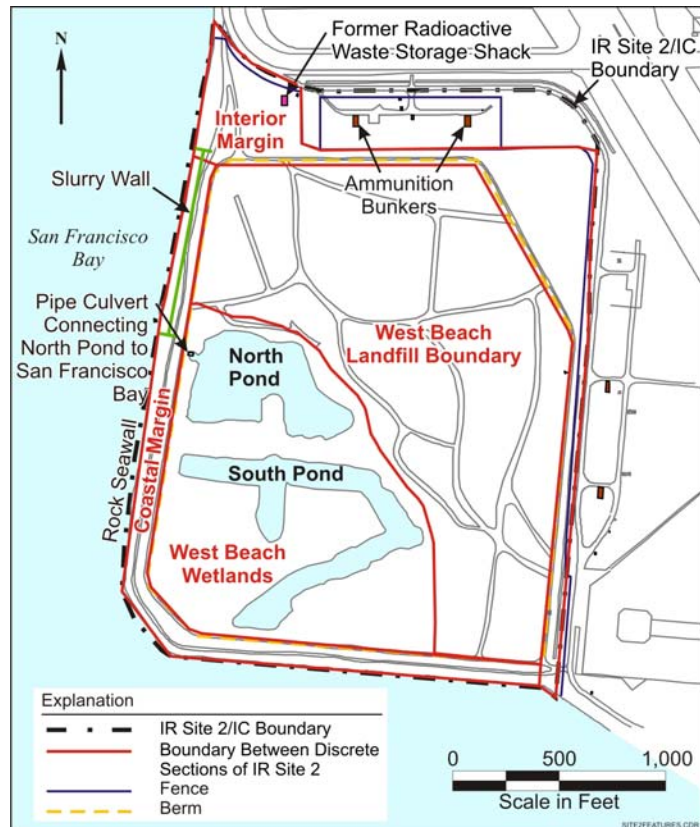


Figure 2-1. IR Site 2 Features

shortfall of 55,000 yd³ to achieve a uniform cover layer of appropriate thickness over the former landfill area. Also in 1986, the former landfill was graded to eliminate depressions that would pond during precipitation events, and an earthen perimeter levee was constructed around the former landfill.

2.2 Site Characteristics

Overall, the site can be divided into the following general areas: the upland area consisting predominantly of the former landfill; the wetland area south and west of the former landfill which contains the wetland ponds (i.e., the North Pond and South Pond); the coastal margin composed of the perimeter rock sea wall and berm along the western and southern boundaries of the site; and the interior margin consisting of the berm north and east of the landfill and all areas north and east of the berm (see Figure 2-1). Elevations across the site range from 5 to 15 ft above mean sea level.

IR Site 2 **topography** gently slopes overall from the north and east toward the south and west in the direction of San Francisco Bay. The former landfill is graded to promote surface drainage and contains upland habitat species, predominantly grasses, shrubs, and trees.

The **hydrogeologic setting** at IR Site 2 consists of two distinct groundwater aquifers. The shallow aquifer occurs above the Yerba Buena Mud aquitard/aquiclude, and is composed of a first and second water-bearing zone. The deep aquifer occurs in the Alameda Formation, below the Yerba Buena Mud aquitard/aquiclude. **Groundwater flow** in the first water-bearing zone (FWBZ) and second water-bearing zone (SWBZ) is predominantly toward the west and southwest, in the direction of San Francisco Bay.

In general, the upland portion of IR Site 2, which exists as a result of historical filling of San Francisco Bay and landfill activities, is considered a disturbed environment. This area of the site does not support a large diversity or density of wildlife species. The wetland areas of IR Site 2, which were also generated as a result of historical filling events, support a variety of wetland **plant species and avian species** that use the site for breeding, foraging, and/or refuge. However, the wetlands themselves do not support a high diversity or density of invertebrates or mammals. Similarly, the wetland ponds may be used by a variety of avian species but do not appear to support aquatic vegetation or significant invertebrate and fish populations. In general, based on observations made during field investigations at the site, the wetlands at IR Site 2 are mature habitat of potentially high ecological value.

Mechanisms of **contaminant fate and transport** that are potentially important at the site include direct movement of soil and/or sediment, dissolution and movement in overland runoff, dissolution and movement in groundwater, volatilization, and movement in the surface water system. These mechanisms represent not only the most likely modes of contaminant transport in the future, but also the most likely explanations for the current occurrence and distribution of contamination in environmental media at the site following cessation of historical site operations.

2.3 Previous Investigations

Numerous historical investigations have been conducted at IR Site 2 to evaluate the types and extent of contamination and to study overall environmental health at the site. These investigations are summarized in Table 2-1 and described in detail in the RI Report.

Table 2-1. Previous Studies and Investigations

Previous Study/ Investigation	Report Date	Investigation Activities
Initial and Supplemental Investigations	1990- 2008	<p>Initial and supplemental investigations conducted at IR Site 2 include Phase I, 2A, 5, and 6 SWAT; ecological assessment including field and supplemental activities; wetland evaluation technique (WET) analysis; radiological surveys and removal actions of miscellaneous buried radioactive devices including radium buttons, Strontium-90 buttons, and various gauges, switches, and knobs; test pitting; periodic groundwater monitoring; biological sampling; an ordnance and explosive waste (OEW) survey and removal action; geotechnical and seismic evaluations; and a Time Critical Removal Action (TCRA) for radiological contamination. Results of these investigations and removal actions indicated that buried waste had impacted environmental media at the site, and that additional characterization was required. The Navy was unable to address all potential radiological contamination at IR Site 2 during the TCRA conducted in 2008, and this ROD selects a remedy for soil to address potential risk as a result of remaining radiological contamination as well as chemical contamination at IR Site 2. The results of the TCRA are described in the Final Post-Construction Report (Tetra Tech EC, Inc., 2009).</p>
RI	2006	<p>A comprehensive RI sampling plan was implemented at the site during two seasonal sampling events in 2004 and 2005 to address data gaps from previous investigations and to generate a robust set of data for all media. Geophysical surveying and exploratory trenching were also performed during the RI sampling. Soil, groundwater, and tissue were sampled in the landfill portion of the site and soil, groundwater, sediment, surface water, and tissue were sampled in the wetland portion of the site. Over the course of the RI, hundreds of individual samples of various environmental media were collected including 203 soil, 13 soil gas, 42 groundwater, 22 surface water, 30 sediment, and 22 biological tissues. The samples were analyzed for one or more of the following contaminant classes: metals; pesticides; PCBs; polycyclic aromatic hydrocarbons (PAHs); semivolatile organic compounds (SVOCs); volatile organic compounds (VOCs); explosives constituents, polychlorinated dibenzodioxins and polychlorinated dibenzofurans (PCDDs/PCDFs); radionuclides; petroleum hydrocarbons; and general chemistry parameters. In addition, an evaluation of ecological health was conducted using toxicity and bioaccumulation tests. Results of the RI indicated that there were large volumes of waste present in the subsurface of the landfill, and many contaminants were detected in soil and groundwater. The nature and extent of contamination is such that numerous chemicals are widespread throughout the site and, with few exceptions, chemicals do not exhibit patterns or trends indicative of contamination hot spots or clear and discrete source areas. A variety of contaminants were observed at relatively low levels in the FWBZ, which extends from the surface to a maximum depth of 30 feet. Virtually no contaminants were observed in the deeper SWBZ. The North and South Ponds were not observed to be significantly impacted by contamination in either sediment or surface water. In summary, there appeared to be a widespread and diffuse occurrence of landfill waste in the subsurface of the landfill, contaminants were present in groundwater and soil, and methane has been detected in soil gas at IR Site 2.</p>

Table 2-1. Previous Studies and Investigations (Continued)

Previous Study/ Investigation	Report Date	Investigation Activities
FS	2008	The FS provided an evaluation of potential remedial alternatives for the site.
Proposed Plan	2009	Preferred remedies for soil and groundwater were proposed. The preferred remedy for soil was a multilayer soil cover, engineering and ICs, and monitoring. The preferred alternative for groundwater was MNA and engineering and ICs. The Navy invited the public to comment on the Proposed Plan for contaminated soil and groundwater at IR Site 2. The Proposed Plan was distributed to more than 700 households; businesses; local, state, and federal agencies; and regulatory agencies in August 2009. A public meeting was held on August 27, 2009, and a public review period was open from August 4 to September 14, 2009.

2.4 Current and Potential Future Site Uses

IR Site 2 was used as a landfill between the mid-1950s and latter 1970s. There was no land use at the site prior to 1956, when the perimeter sea wall was constructed and the site was first formed using dredged fill. Due to its sole historical use as a landfill, no persons have resided or currently reside at the site. Because it has never been used for fulltime residence or occupancy, no above- or belowground utilities (e.g., potable water, electric, or telephone) exist at the site.

In accordance with the City of Alameda, Alameda Point General Plan as amended May 7, 2003, the proposed land use throughout IR Site 2 is recreational. The same land use is shown in the Alameda Point Preliminary Development Concept (PDC) dated February 1, 2006; therefore, the future land use for IR Site 2 addressed in this ROD is recreational.

2.5 Summary of Site Risks

As part of the RI, a **Human Health Risk Assessment (HHRA)** and an **Ecological Risk Assessment (ERA)** were conducted for IR Site 2 using data collected during the RI sampling activities. The objective was to estimate the risk to human and ecological receptors from exposure to chemicals in soil, groundwater, sediment, and surface water at IR Site 2. The risk assessments were implemented according to standard methods, and a list of specific chemicals and exposure pathways was established to measure potentially unacceptable risk at the site. The HHRA and ERA methodologies and results are presented in detail in the RI Report. **Conceptual site models (CSMs)** highlighting potential exposure pathways between contaminants in IR Site 2 media and human or ecological receptors based on the planned future recreational use were developed. Table 2-2 provides a tabular summary of the HHRA and the ERA receptors and exposure pathways that were evaluated for IR Site 2. A **summary of findings for the HHRA and the ERA** in both the landfill and wetland areas is provided below.

2.5.1 Human Health Risk Assessment

In accordance with U.S. EPA guidance, the risk management range for cancer risk is considered to be 10^{-4} to 10^{-6} . U.S. EPA guidance states that “where the cumulative carcinogenic site risk to an individual based on reasonable maximum exposure for both current and future land use is less than 10^{-4} and the non-carcinogenic hazard quotient (HQ) is less than one, action generally is not warranted unless there are adverse environmental impacts.” Site-specific factors are typically

considered at sites where the cancer risks are 10^{-4} to 10^{-6} . Cancer risks below 10^{-6} are generally considered insignificant. For cancer risks above the risk management range of 10^{-4} to 10^{-6} , action is generally required.

In the former landfill portion of the site, cancer risks ranged from 7.1×10^{-6} to 2.8×10^{-5} , and non-carcinogenic hazards ranged from 0.5 to 13.8. For soil in the former landfill portion of IR Site 2, arsenic, lead, benzo(a)pyrene, naphthalene, radium 226, and total PCBs were determined to pose a potentially unacceptable risk to one or more of the human receptors considered. For groundwater in the former landfill area of IR Site 2, the HHRA concluded that total PCBs and PCDDs/PCDFs pose a potentially unacceptable risk to one or more of the human receptors considered through dermal contact.

In the wetland portion of the site, cancer risks ranged from 7.8×10^{-6} to 2.4×10^{-5} , and non-carcinogenic hazards ranged from 0.5 to 26.2. For soil in the wetland portion of IR Site 2, the HHRA concluded that arsenic and radium 226 pose a potentially unacceptable risk to one or more of the human receptors considered. For groundwater in the wetland area of IR Site 2, the HHRA concluded that total PCBs and the pesticide dieldrin pose a potentially unacceptable risk to one or more of the human receptors considered through dermal contact. Benzo(a)pyrene and dibenz(a,h)anthracene were determined to pose potentially unacceptable risk to the restoration supervisor receptor through direct contact with surface water in the wetland ponds.

2.5.2 Ecological Risk Assessment

During the ERA, concentrations of chemicals of potential concern in soil, sediment, groundwater, and surface water were used to evaluate risks to plants and animals by focusing on habitat types found at the site. Potential exposure pathways examined included direct contact, ingestion, and root contact with soil. The ERA developed conclusions separately for the former landfill, wetland, and wetland pond areas.

The ERA concluded that metals (antimony, cadmium, chromium, copper, lead, manganese, mercury, molybdenum, nickel, silver, vanadium, and zinc), a number of SVOCs/PAHs (acenaphthene, chrysene, fluoranthene, fluorene, naphthalene, phenanthrene, pyrene, total light

Table 2-2. Receptors and Pathways at IR Site 2

SOIL	
Human Receptors <ul style="list-style-type: none"> Tour Guide/Park Ranger Restoration Supervisor Visitor (Child/Adult) Construction Worker 	Pathways <ul style="list-style-type: none"> Direct contact with soil Ingestion of soil Inhalation of wind-blown dust or vapors from soil Exposure to ionizing radiation
Ecological Receptors <ul style="list-style-type: none"> Mammal Bird Invertebrate Plant 	Pathways <ul style="list-style-type: none"> Direct contact with soil Ingestion of soil Ingestion of impacted prey Root contact with soil
GROUNDWATER	
Human Receptors <ul style="list-style-type: none"> Restoration Supervisor Construction Worker 	Pathway <ul style="list-style-type: none"> Direct contact with groundwater
SEDIMENT	
Ecological Receptors <ul style="list-style-type: none"> Mammal Bird Invertebrate 	Pathways <ul style="list-style-type: none"> Direct contact with sediment Ingestion of sediment Ingestion of impacted prey
SURFACE WATER	
Human Receptor <ul style="list-style-type: none"> Restoration Supervisor 	Pathway <ul style="list-style-type: none"> Direct contact with surface water
Ecological Receptors <ul style="list-style-type: none"> Fish Invertebrate 	Pathway <ul style="list-style-type: none"> Direct contact with surface water Ingestion of surface water

molecular weight PAHs [LPAHs] total high molecular weight PAHs [HPAHs]), total PCBs, pesticides (dieldrin and sum of total dichlorodiphenyldichloroethane [DDD], dichlorodiphenyldichloroethene [DDE], and dichlorodiphenyltrichloroethane [DDT] [total DDx]), and PCDDs/PCDFs are potential risk drivers for one or more ecological receptors in the former landfill portion of the site. Of these chemicals, chromium, lead, total HPAHs, and total DDx were identified as the most significant risk contributors (i.e., exhibit the highest HQs).

The ERA evaluated the non-inundated portions of the wetland and the wetland ponds separately. The assessment concluded that metals (arsenic, cadmium, chromium, copper, lead, manganese, mercury, molybdenum, nickel, selenium, vanadium, and zinc), total PCBs, and a limited number of pesticides (*alpha*-chlordane, *gamma*-chlordane, dieldrin, and total DDx) are potential risk drivers based on risk findings for one or more ecological receptors in the non-inundated wetland portion of the site. Of these chemicals, chromium and lead were identified as the most significant potential risk drivers (i.e., exhibit the highest HQs).

The ERA also concluded that metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium, and zinc), one SVOC/PAH (acenaphthene), total PCBs, and a limited number of pesticides (*gamma*-chlordane, *trans*-nonachlor, dieldrin, and total DDx) are potential risk drivers based on risk findings for one or more ecological receptors in the wetland ponds. Of these chemicals, mercury and nickel were identified as the most significant potential risk drivers (i.e., exhibit the highest HQs). However, **site-specific toxicity tests** in which test organisms were exposed to wetland pond sediment and surface water from IR Site 2 indicated that there was no observable acute or chronic toxicity. These toxicity tests are a direct measure of risk from IR Site 2 wetland sediment and surface water, and the results indicate that there is actually no unacceptable risk to ecological receptors from the wetland ponds at IR Site 2.

2.5.3 Basis for Response Action

Because potential unacceptable human health and ecological risks were identified, a response action is necessary to protect public health, welfare, and the environment from actual or threatened releases. The presence of contamination at IR Site 2 was thoroughly evaluated through previous investigations and the implementation of the RI. Section 5.0 of the RI Report provides a comprehensive assessment of the nature and extent of contamination at IR Site 2 based on the RI data and available ambient/background data. Based on a **step-wise risk management process**, the list of soil COCs shown in Table 2-3 was identified to reflect the anticipated site receptors. This process, which is described in detail in the FS, considers critical pathways and toxicological characteristics in accordance with general U.S. EPA guidance. As a part of this process, a preliminary remediation footprint was developed for IR Site 2. Remedial action is warranted to protect future receptors from potential risks posed by these COCs in soils.

For shallow (i.e., FWBZ) groundwater at IR Site 2, risk assessments concluded that total PCBs, PCDDs/PCDFs (as toxicity equivalent [TEQ]), and dieldrin represent contributors to potentially unacceptable risk to human receptors through the direct contact pathway. However, as stated in the Declaration (see Section 1.0) of this ROD, groundwater beneath IR Site 2 is not presently used for drinking water and is not considered a potential drinking-water source due to the poor quality of the water. This position has been concurred with by the Water Board and U.S. EPA. Because there is no potential drinking-water use of groundwater, numeric standards associated with such uses (e.g., maximum contaminant levels [MCLs] for drinking water) do not directly apply to groundwater at IR Site 2. The most significant potential risk associated with the

presence of contaminants in IR Site 2 FWBZ groundwater is related to the potential for groundwater contaminants to discharge to and potentially affect surface water quality in San Francisco Bay. To provide the maximum degree of conservativeness to the IR Site 2 groundwater remedy, the FWBZ underlying the entirety of IR Site 2 is considered to be within the groundwater remediation footprint.

Table 2-3. Soil COCs for Remediation Footprint at IR Site 2

Ecological COCs	Human Health COCs	Ecological and Human Health COCs
Landfill		
<ul style="list-style-type: none"> • Cadmium • Chromium • Lead • Molybdenum • Total DDx 	<ul style="list-style-type: none"> • Benzo(a)pyrene • Radium 226 	<ul style="list-style-type: none"> • Total PCBs
Wetland		
<ul style="list-style-type: none"> • Lead • Zinc 	<ul style="list-style-type: none"> • Radium 226 	<ul style="list-style-type: none"> • None

2.6 Principal Threat Waste

Principal threat wastes are defined by the U.S. EPA's **Guide to Principal Threat and Low Level Threat Wastes** as source material considered: (1) to be highly toxic and/or highly mobile; (2) to not be reliably contained; and (3) to present a significant risk to human health or the environment should exposure occur. Potential sources of contamination in soil and groundwater at IR Site 2 include general household waste and several industrial and process wastes, including asbestos, pesticides, sandblasting grit, waste oils and solvents, painting and plating wastes, inert ordnance, radiological wastes, and medical wastes. Overall, with the exception of a limited number of chemicals in the various environmental media assessed at the site, there are no clear source areas or locations with significantly elevated contaminant concentrations, but rather a widespread and diffuse occurrence of contaminants in the various media.

As described in Section 2.1.2 of this ROD, the overall source of contamination at IR Site 2 is from historical landfill activities. Mechanisms of contaminant migration that are potentially important at the site include direct movement of contamination in soil and/or sediment; dissolution and movement in overland runoff; dissolution and movement in groundwater; volatilization; and movement in the surface-water system.

Based on results of the HHRA, the levels of contamination measured at IR Site 2 present risks that are toward the lower end of the CERCLA risk range of 10^{-6} to 10^{-4} , and therefore do not constitute a principal threat waste, which in general is a term used to describe material that poses a risk well above the risk range. Although no threshold level has been established to equate to a "principal threat," treatment alternatives generally should be evaluated when potential risks are 10^{-3} or greater. Therefore, there are no wastes constituting principal threats at IR Site 2.

2.7 Remedial Action Objectives

Remedial action objectives (RAOs) provide the foundation used to develop the remedial alternatives for a site. RAOs are established based on attainment of regulatory requirements,

standards, and guidance (i.e., ARARs), identification of contaminated media and COCs, potential receptors and exposure scenarios, and calculated human health and ecological risks. RAOs establish the basis for identifying areas requiring remedial action (the remediation footprint), screening technologies or processes to accomplish remediation, and assessing a remedial alternative's ability to achieve the required objectives. Based on the data available for the site and the results of the risk assessments conducted during the RI, surface soil and FWBZ groundwater were determined to be the media of interest for developing an appropriate risk management strategy at IR Site 2. RAOs were developed to provide protection against the risks identified in these media. Each RAO specifies a receptor and the relevant exposure route associated with unacceptable risk requiring mitigation. Based on the findings from the RI Report and the summary of human health and ecological risk drivers, the RAOs for IR Site 2 include:

- Protect sensitive human receptors, avian species, and mammal species from exposure to COCs in surface soil in the landfill and wetland portions of the site;
- Protect viable wetland area in the southwest portion of the site from impacts associated with the landfill;
- Protect sensitive human receptors from exposure through external radiation from surface soil in the landfill and wetland portions of the site; and
- Protect beneficial uses of surface water in San Francisco Bay from the potential for discharge of site groundwater containing COCs.

Remediation goals (RGs) for soil in the landfill area were developed to meet applicable RAOs for human health and ecological receptors as presented in Tables 2-4 and 2-5, respectively. Note that no soil RGs for ecological receptors are presented for the wetland area. This is because there was only one soil sampling location identified as presenting potentially unacceptable risk to ecological receptors in the wetland area. The sampling location was in a transition area between the landfill and wetland, and is being addressed through the soil RGs established for ecological receptors in the landfill. Radiological RGs in soil are presented in Table 2-6 for radium 226 in addition to other radionuclides that were identified in the findings of the Final Historical Radiological Assessment (HRA) (Weston Solutions, Inc., 2007).

Table 2-4. Soil Remediation Goals Protective of Human Receptors in Upland/Former Landfill

COC	Units	RG	Source of RG
Benzo(a)pyrene	milligrams per kilogram (mg/kg)	0.24	Risk-based remediation goal calculated in the HHRA for IR Site 2
Total PCBs	mg/kg	0.87	Risk-based remediation goal calculated in the HHRA for IR Site 2

Table 2-7 provides a summary of the chemicals detected during the RI in excess of California Toxics Rule (CTR) surface water quality criteria (40 CFR § 131.38) and Alameda Point background metals levels in monitoring wells screened within the FWBZ and located along the shoreline of San Francisco Bay. The CTR criteria are appropriate to provide a suitable context for evaluating IR Site 2 FWBZ groundwater relative to the identified groundwater RAO and developing a responsible risk management framework for the site. However, the CTR standards are directly applicable only to surface water and are not directly applicable to groundwater. As

such, while these surface water quality standards are important in evaluating the potential effect of groundwater discharges from the shoreline at IR Site 2 into San Francisco Bay, the standards are not directly applicable as RGs or ARARs for groundwater. Periodic groundwater monitoring is ongoing and at the detailed remedial design stage, the methods and criteria that will be used to assess groundwater data trends will be thoroughly evaluated and defined by the Navy with agreement from the FFA signatories (see Section 2.9.2.2).

Table 2-5. Soil Remediation Goals Protective of Ecological Receptors in Upland/Former Landfill

COC	Units	Alameda Point Background	RG
Cadmium	mg/kg	1.6	6.5
Chromium	mg/kg	48.5	48.5
Lead	mg/kg	166	-- ^(a)
Zinc	mg/kg	110	263
Molybdenum	mg/kg	NA	1.9
Total PCBs	mg/kg	NA	1.4
Total DDx	mg/kg	NA	0.027

RG based on the higher of Alameda Point background levels (shown in bold) or the arithmetic mean of risk-based concentrations that are based on the no observed adverse effect level (NOAEL) and low observed adverse effects level (LOAEL) from the ERA. The true threshold effect concentration for a given COC likely lies between the NOAEL and LOAEL so the arithmetic mean between these levels was identified as the RG to provide a reasonable quantitative measure to inform a risk management framework.

- (a) No soil RG for lead has been presented because of uncertainties associated with the bioavailability and toxicity of lead to avian receptors. In addition, the remediation footprint identified to address soil COCs other than lead will address potentially unacceptable risks to ecological receptors associated with lead in surface soil.

Table 2-6. Soil Radiological Remediation Goals for Human Receptors

COC ^(a)	RG ^(b) (pCi/g)
Cesium-137+D	0.113 ^(c)
Cobalt-60	0.0361 ^(c)
Ra-226	1+ ^{(c), (d)}
Strontium-90	0.331 ^(c)
Thorium-232	1.69 ^(c)
Uranium-238+D (used for depleted uranium and uranium oxide)	0.742 ^(e)

+D = Daughter products.

pCi/g = Picocuries per gram.

- (a) Ra-226 was identified as posing a potentially unacceptable risk to one or more of the human receptors considered in the site-specific HHRA conducted at IR Site 2. All radionuclides are identified based on the findings of the Final HRA (Weston Solutions, Inc., 2007).
- (b) The RGs for radionuclides meet or are more protective than the 15 millirem per year residual dose level consistent with the 1997 U.S. EPA Office of Solid Waste and Emergency Response Directive 9200.4-18. The RGs for radionuclides are conservatively based on residential or outdoor construction worker receptors even though institutional controls will be implemented throughout IR Site 2 to effectively mitigate potential risks to these receptors.
- (c) Navy. 2006. "Final Basewide Radiological Removal Action Memorandum, Revision 2006, Hunters Point Shipyard, San Francisco, California." April 21.
- (d) Remediation goal is 1 pCi/g above background per agreement with U.S. EPA.
- (e) U.S. EPA. 2009. "Preliminary Remediation Goals for Radionuclides." <http://epa-prgs.ornl.gov/radionuclides/>.

Table 2-7. Chemicals Detected in Excess of CTR Criteria and Background Metals Concentrations (micrograms per liter [µg/L]) in FWBZ Groundwater at Shoreline Monitoring Wells at IR Site 2

Analyte ^(a)	Receptor	Maximum Concentration in any Shoreline FWBZ Groundwater Monitoring Well ^(b)	Saltwater ^(c)		Human Health (consumption of fish) ^(c)	Alameda Point Background
			Acute	Continuous	Organisms Only	
Metals						
Arsenic	Aquatic Life	122	69	36	NA	20.7
Copper	Aquatic Life	31	4.8	3.1	NA	24.2
Nickel	Aquatic Life	25	74	8.2	4600	21
Pesticides						
Aldrin	Recreational Fisherman	0.01	1.3	NA	0.00014	NA
Alpha Chlordane	Recreational Fisherman	0.02	0.09	0.004	0.0059	NA
a-HCH	Recreational Fisherman	0.02	NA	NA	0.013	NA
b-HCH	Recreational Fisherman	0.16	NA	NA	0.046	NA
4,4'-DDE	Recreational Fisherman	0.05	NA	NA	0.00059	NA
4,4'-DDT	Recreational Fisherman	0.03	0.13	0.001	0.00059	NA
Dieldrin	Recreational Fisherman	8.5	0.71	0.0019	0.00014	NA
Endrin	Aquatic Life	0.06	0.037	0.0023	0.81	NA
Gamma Chlordane	Recreational Fisherman	2.6	0.09	0.004	0.00059	NA
Heptachlor	Recreational Fisherman	0.02	0.053	0.0036	0.00021	NA
Heptachlor Epoxide	Recreational Fisherman	0.02	0.053	0.0036	0.00011	NA
SVOCs/PAHs						
Diethylhexyl Phthalate	Recreational Fisherman	18	NA	NA	5.9	NA

Bolded values represent most stringent CTR criteria.

(a) Note that the list of chemicals detected in excess of CTR criteria and background metals levels was developed based on evaluating a comprehensive analytical dataset utilized in the RI.

(b) Maximum concentrations correspond to the historical maximum measured in the shoreline monitoring wells.

(c) Source of CTR = 40 CFR § 131.38. Also see the following URL:

<http://www.epa.gov/waterscience/criteria/wqctable/>

2.8 Description and Evaluation of Remedial Alternatives

To address surface soil and groundwater contamination at IR Site 2, an **initial screening of remedial alternatives** was completed to refine the remedy selection process. The remedial technologies and process options that were retained from a technology and process option screening process were assembled into remedial alternatives to address the project-specific RAOs and RGs. Six remedial alternatives for soil and three remedial alternatives for

groundwater were developed and evaluated (i.e., with high/moderate/low rankings) with respect to implementability, effectiveness, and relative cost. A **detailed analysis of alternatives** was then completed in accordance with all of the NCP evaluation criteria on four of the six soil alternatives and all three of the groundwater alternatives that were retained for detailed analysis based on the initial screening.

2.8.1 Description of Remedial Alternatives

The four remedial alternatives for soil and three remedial alternatives for groundwater that were evaluated in detail in the FS are presented in Tables 2-8 and 2-9, respectively, along with a general description and estimated cost.

Table 2-8. Remedial Alternatives for IR Site 2 Soil		
Soil Alternative	Description	Total Cost (millions)
1 - No Action	CERCLA requires that the no-action scenario be evaluated as an alternative to establish a baseline on which to compare other alternatives. Under this scenario, no action would be performed to remediate soil at IR Site 2.	\$0
2 - Multilayer Soil Cover, Engineering and Institutional Controls, and Monitoring	This alternative would include the construction of a cover over the entire former landfill, the northeastern portion of the site, and potentially limited portions of the wetlands. The cover would consist of a suitable source of fill material, and an animal intrusion barrier, to contain soil contaminants at IR Site 2 and isolate and prevent direct contact with buried waste. Engineering controls would be implemented to protect the remedy, and ICs and long-term monitoring would be included to ensure long-term protection from contaminants and waste at the site.	\$21
3 - Engineered Cap, Engineering and Institutional Controls, and Monitoring	This alternative would include the construction of an engineered cap over the same area as Soil Alternative 2. The cap would consist of an impervious liner, fill material from a suitable source, and an animal intrusion barrier, to contain soil contaminants at IR Site 2 and isolate and prevent direct contact with buried waste. Engineering controls would be implemented to protect the remedy, and ICs and long-term monitoring would be included to ensure long-term protection from contaminants and waste at the site.	\$47
6 - Near-complete Removal and Backfill, Dewatering, Engineering and Institutional Controls, Disposal, and Monitoring	This alternative would entail removing soil and subsurface waste throughout the former landfill area and the northeastern portion of the site and backfilling the excavation areas. The excavated material would be dewatered and then disposed offsite at landfill facilities. Dewatering effluent would be treated onsite and discharged to San Francisco Bay following treatment. Engineering controls would be implemented to protect the remedy, and ICs and long-term monitoring would be included to ensure long-term protection from residual contaminants and waste at the site.	\$900

Table 2-9. Remedial Alternatives for IR Site 2 Groundwater

Groundwater Alternative	Description	Total Cost (millions)
1 - No Action	No action is required by CERCLA to be evaluated as an alternative to establish a baseline on which to compare other alternatives. Under this scenario, no action would be performed to remediate groundwater at IR Site 2.	\$0
2 - Monitored Natural Attenuation and Engineering and Institutional Controls	MNA relies on naturally-occurring processes to continue reducing contaminant levels in groundwater. This alternative would include a detailed monitoring plan to continue measuring conditions in groundwater over time. Engineering controls would be implemented to protect the remedy, and ICs and long-term monitoring would be included to ensure long-term protection from contaminants in groundwater at the site.	\$6
3 - Hydraulic Barrier, Pump and Treat, Disposal, Monitored Natural Attenuation, and Engineering and Institutional Controls	Under this alternative, an impermeable subsurface barrier would be constructed around the western and southern sides of the former landfill area to prevent the flow of groundwater to San Francisco Bay. The subsurface barrier would extend vertically across the entire FWBZ. To alleviate the buildup of pressure on the barrier, a pump-and-treat system would be operated to extract and treat groundwater. Treated groundwater would be discharged to San Francisco Bay. Other wastes generated would be disposed offsite at landfill facilities. MNA would be relied on to continue reducing contaminant levels in groundwater, and a detailed monitoring plan would be implemented to continue to measure conditions in groundwater over time. Engineering controls would be implemented to protect the remedy, and ICs and long-term monitoring would be included to ensure long-term protection from contaminants in groundwater at the site.	\$23

2.8.2 Comparative Analysis of Alternatives

The results of the comparative analysis of the soil and groundwater remedial alternatives that were evaluated in detail in the FS with respect to the nine NCP evaluation criteria are summarized in Tables 2-10 and 2-11, respectively.

2.8.2.1 Threshold Criteria

Overall Protection of Human Health and the Environment. Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, and/or ICs.

Soil Alternatives 2, 3, and 6 would be protective of human health and the environment, as they would effectively reduce site risks and manage residual risks by either isolating contamination from receptors or removing the contamination altogether. Soil Alternative 1 (No Action) would not be protective of human health and the environment because it would not address contaminated soil in any way. Soil Alternatives 2 (Multilayer Soil Cover) and 3 (Engineered Cap) would be protective of human health and the environment. Soil Alternative 2 would isolate contamination and buried waste from ecological or human receptors under a layer of fill

Table 2-10. Comparative Analysis of Soil Remedial Alternatives for IR Site 2				
NCP Criterion	Soil Alternative			
	1 No Action	2 Multilayer Soil Cover	3 Engineered Cap	6 Near-complete Removal
Protective of Human Health and the Environment	NO	YES	YES	YES
Compliant with ARARs	NE	YES	YES	YES
Long-term Effectiveness and Permanence	NE	●	●	●
Reduction of Toxicity, Mobility, and Volume through Treatment	NE	○	○	○
Short-term Effectiveness	NE	●	●	●
Implementability	NE	●	●	○
Cost (\$M)*	NE	● (\$21)	● (\$47)	○ (\$900)
State Acceptance	The State of California agrees with the selected soil alternative The Proposed Plan was presented for the community and discussed in a public meeting. See responsiveness summary in Section 3 of this ROD.			
Community Acceptance				

Table 2-11. Comparative Analysis of Groundwater Remedial Alternatives for IR Site 2			
NCP Criterion	Groundwater Alternative		
	1 No Action	2 Monitored Natural Attenuation	3 Hydraulic Barrier
Protective of Human Health and the Environment	NO	YES	YES
Compliant with ARARs	NE	YES	YES
Long-term Effectiveness and Permanence	NE	●	●
Reduction of Toxicity, Mobility, and Volume through Treatment	NE	○	●
Short-term Effectiveness	NE	●	●
Implementability	NE	●	●
Cost (\$M)*	NE	● (\$6)	● (\$23)
State Acceptance	The State of California agrees with the selected groundwater alternative The Proposed Plan was presented for the community and discussed in a public meeting. See responsiveness summary in Section 3 of this ROD.		
Community Acceptance			
Notes: * = cost evaluation is based on NPV Selected Alternatives = Soil Alternative 2 and Groundwater Alternative 2	NE = not evaluated because it did not meet threshold criteria M = millions	Relative Performance: ○ Low ● Medium ● High	

material, and would incorporate an animal intrusion barrier, while Soil Alternative 3 would isolate contamination and buried waste using an engineered cap that also would incorporate an animal intrusion barrier. Soil Alternative 6 (Near-complete Removal and Backfill) would also be protective of human health and the environment. Soil Alternative 6 would remove all waste and contaminated soil from the former landfill portion of IR Site 2 and the majority of the northeastern interior margin, leaving little buried waste behind at IR Site 2. Long-term protection of human health and the environment would be achieved by monitoring any remedy for integrity and implementing and enforcing ICs. Because soil containing contaminants (i.e., principal remediation drivers exceeding RGs and other COCs) would not be removed and/or treated, residual risk would remain at IR Site 2 under Soil Alternatives 2, 3 and 6, but these risks would be acceptable on a sitewide basis and would be managed properly using land-use controls and restrictions. Wetland mitigation would be carried out for either alternative through the development of a wetland management plan during the detailed design phase if limited areas of wetlands are affected by construction. A solution to address the potential blockage of the culvert connecting the North Pond and San Francisco Bay may be included as part of the wetland mitigation plan.

Groundwater Alternatives 2 (MNA) and 3 (Hydraulic Barrier) would be protective of human health and the environment, as they would effectively reduce site risks and manage residual risks. Groundwater Alternative 3 would provide the additional benefit of preventing the discharge of groundwater from IR Site 2 to San Francisco Bay. However, a thorough weight of evidence evaluation that was conducted for groundwater at IR Site 2 (details of which are presented in [Appendix G of the FS](#); also see Section 2.9.2.2) indicated that the risk to surface water in San Francisco Bay from the potential discharge of site groundwater is negligible, and therefore Groundwater Alternative 3 would offer no substantial incremental benefit compared to Groundwater Alternative 2. Groundwater Alternative 1 (No Action) would not be protective of human health and the environment, as it would not address groundwater in any way. Long-term protection of human health and the environment would be achieved by Groundwater Alternative 2 by natural attenuation, monitoring the remedy to ensure remedial integrity, and implementing and enforcing ICs. Groundwater Alternative 3 would also be adequately protective of human health and the environment by preventing direct migration of groundwater from the IR Site 2 FWBZ to San Francisco Bay.

Compliance with ARARs. CERCLA §121(d)(1) and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitation which are collectively referred to as ARARs, unless such ARARs are waived under §121(d)(4) of CERCLA.

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental, State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those State standards that are identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental, State environmental or facility siting laws that, while not “applicable” to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently

similar to those encountered at the CERCLA site that their use is well-suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.

Compliance with ARARs addresses whether a remedy will meet all the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides a basis for invoking a waiver.

Chemical-specific ARARs are health- or risk-based numerical values or methods that, when applied to site-specific conditions, establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the environment. Location-specific ARARs are restrictions on the concentrations of hazardous substances or on conducting activities solely because they are in specific locations. Specific locations include floodplains, wetlands, historic places, and sensitive ecosystems or habitats. Action-specific ARARs are technology- or activity-based requirements or limitations for remedial activities. These requirements are triggered by the particular remedial activities conducted at the site.

All of the soil and groundwater alternatives, except the No Action alternative, would meet the chemical-, location-, and action-specific ARARs identified for IR Site 2 (see Appendix A for a complete listing of ARARs for the selected remedies). Note that ARARs do not apply to the No Action alternative.

2.8.2.2 *Balancing Criteria*

Long-Term Effectiveness and Permanence. Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

Soil Alternative 6 likely would provide the greatest long-term effectiveness and permanence by removing soil and waste from the former landfill and northeastern interior margin portions of the site and leaving fewer residual soil risks at the site. However, Soil Alternatives 2 and 3 also would provide long-term effectiveness and permanence by covering the vast majority of buried waste. Risks associated with soil contamination and buried waste left in place would be addressed using a properly designed and maintained multilayer soil cover or engineered cap, which would effectively isolate and prevent direct contact with soil contamination and waste. The soil cover or engineered cap would be designed for optimal thickness and structural stability for the conditions at the site, and a detailed monitoring and maintenance plan would ensure the long-term effectiveness and permanence of these alternatives. The cover and cap would both incorporate an animal intrusion barrier to eliminate risk to burrowing animals and provide for remedy integrity, and would be revegetated at the surface to provide erosion control. ICs implemented in conjunction with Soil Alternatives 2 or 3 would protect against cover/cap disruption and would provide reliable, long-term protection for humans against contaminant exposure.

Groundwater Alternative 3 would provide a high degree of long-term effectiveness and permanence by managing residual site risk and also providing for direct protection of San Francisco Bay. Groundwater Alternative 2 also would provide a high degree of long-term effectiveness and permanence, particularly since risk to surface water in San Francisco Bay is

negligible, even under an MNA scenario, and long-term monitoring would be implemented to verify that this condition continues.

Reviews at least every five years, as required, would be necessary to evaluate the effectiveness of any of the soil and groundwater alternatives because hazardous substances would remain onsite in concentrations above risk-based levels.

Reduction in Toxicity, Mobility, and Volume through Treatment. Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

None of the soil alternatives would accomplish reductions in toxicity or volume of contamination specifically through treatment, but all would be responsible for physically reducing the mobility of contamination at IR Site 2.

Groundwater Alternative 3 would reduce the toxicity, mobility, and volume of contamination through treatment, but the treatment component would only be used in support of hydrologic pressure relief and not specifically for the purpose of addressing groundwater contamination. Groundwater Alternative 2 would not reduce the toxicity, mobility, or volume of contamination directly through treatment, but natural attenuation mechanisms would reduce contaminant toxicity, mobility, and volume.

Short-Term Effectiveness. Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may exist to workers, the community and the environment during construction and operation of the remedy until cleanup goals are achieved.

Short-term environmental impacts would be greater for Soil Alternative 6 than for Soil Alternatives 2 and 3. Control measures for all alternatives would include using careful site work methods to minimize potential impacts within the work areas. The implementation of any alternative would be controlled by a project Health and Safety Plan that would specify potential site hazards, as well as protective equipment and mitigation measures to minimize hazards and risk. Overall, Soil Alternative 6 would have a low level of short-term effectiveness. Soil Alternative 3 would be more effective in the short-term compared to Soil Alternative 6, but less effective in the short-term compared to Soil Alternative 2.

Groundwater Alternative 2 would be as effective in the short-term compared to Groundwater Alternative 3. Groundwater Alternative 2 would essentially require no construction and very little implementation time, and would require measures that would control site risks. Groundwater Alternative 3 likely would require several months to implement and would be characterized by minimal short-term risk. Risks to the community would be limited to potential noise associated with placement of the slurry wall and an increase in vehicle traffic around the site.

Implementability. Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with governmental entities are also considered.

Soil Alternative 2 would be most implementable, followed by Soil Alternative 3, which would be moderately implementable. Soil Alternative 6 would be the least implementable, based on significant uncertainty related to project scale and administrative restrictions.

Soil Alternative 2 would be highly implementable, given the maturity of the soil cover technology and the availability and reliability of the equipment, materials, and contractors needed to implement this remedy. The monitoring program associated with Soil Alternative 2 would be based on proven and reliable equipment and methods and also would be readily implementable. In addition, administrative requirements to complete Soil Alternative 2 would not be overly difficult to resolve, and no significant issues likely would arise with respect to coordinating construction with local or State agencies. Similar issues would challenge Soil Alternative 3, but this alternative would be characterized by requiring some specialized labor and equipment to properly construct the engineered cap. Accordingly, the implementability of Soil Alternative 3 would be lower than Soil Alternative 2.

The technical implementability of Soil Alternative 6 would be high. This alternative would be implemented using conventional mechanical methods, dewatering techniques, and disposal in properly designed, permitted, and monitored disposal facilities (i.e., landfills). Given the sheer magnitude of the excavation, waste characterization, backfill, and disposal required under Soil Alternative 6, there would be scale-related implementability challenges, and this approach would also be characterized by administrative uncertainties related to dewatering and effluent disposal.

Groundwater Alternative 2 would be highly implementable, given the maturity of the MNA approach and the availability and reliability of the equipment, materials, and contractors needed to implement this remedy. Groundwater Alternative 3 would be characterized by moderate technical implementability, but with uncertainty related to administrative restrictions. The technical implementability of Groundwater Alternative 3 would be moderate to high. This alternative would be implemented using conventional mechanical methods and treatment processes. Construction equipment and personnel would be available from several local commercial companies in the region. However, this approach would also be characterized by administrative uncertainties related to water treatment and effluent disposal and the availability or approval of permit equivalencies for these actions.

Costs. Soil Alternative 2 would be least costly, with a present worth cost of \$21,020,000; Soil Alternative 3 would be approximately twice as costly as Soil Alternative 2, with a present worth cost of \$46,547,000. The total present worth costs for Soil Alternative 6 would be prohibitively high at \$903,001,000.

Groundwater Alternative 2 would be relatively inexpensive with a present worth cost of \$6,452,000, which is approximately four times less expensive than Groundwater Alternative 3, with a total present worth cost of \$23,122,000.

2.8.2.3 *Modifying Criteria*

State Acceptance. Regulatory involvement has been solicited throughout the CERCLA process. The U.S. EPA, Cal/EPA DTSC, and Water Board concur with the remedies selected in this ROD to address contamination in soil and groundwater at IR Site 2.

Community Acceptance. The Proposed Plan was issued for public review between August 4 and September 14, 2009, and was discussed at a public meeting on August 27, 2009. The

responsiveness summary portion of this ROD (see Section 3.0) addresses the public's comments and concerns related to the preferred remedies identified in the Proposed Plan and selected in this ROD to address contamination in soil and groundwater at IR Site 2.

2.9 Selected Remedy

2.9.1 Rationale for Selected Remedy

The selected soil remedy for IR Site 2 is Soil Alternative 2 — a multilayer soil cover, engineering and ICs, and monitoring. The selected remedy for groundwater is Groundwater Alternative 2 — MNA and engineering and ICs. These soil and groundwater remedies were chosen because they provide the best balance of tradeoffs with respect to the nine NCP threshold, balancing, and modifying criteria, and they will protect human health and the environment. Soil Alternative 2 will provide excellent immediate (short-term) protection of human health and the environment by eliminating the potential exposure pathway between human and ecological receptors and contaminants in surface soil and buried waste, and by implementing ICs. Screening and removal of surficial radiological contamination will be performed prior to installing the multilayer soil cover to prevent the spread of potential contamination which will ensure worker health and safety. Groundwater Alternative 2 (MNA) will ensure that there are continued stable to decreasing trends in contaminant concentrations, and that there are no adverse impacts to surface water in the San Francisco Bay.

2.9.2 Description of Selected Remedy

2.9.2.1 Soil Remedy

The selected remedy for soil will include the installation of a multilayer soil cover to isolate buried waste and soil contaminants and to prevent animal burrowing. Prior to placing the multilayer soil cover, the surface will undergo scanning and removal of radiological hotspot material to prevent the spread of potential contamination during site grading which will ensure worker health and safety. The surface scan will be conducted using field screening instruments, which provide measurements in counts per minute (cpm). For the purpose of this remedial action, the Navy will identify hot spots as material exhibiting gamma radiation readings approximately two times background, while recognizing that background radiation readings typically vary depending on whether the source material is soil, gravel, or concrete (all of which are present at IR Site 2), and that different field instruments will also influence that selected screening value. The final numerical screening values (in cpm) will be determined in the remedial design after field instrumentation has been selected. The remedial design will also describe the screening and removal procedures.

Landfill waste and contaminated soil will remain in place at IR Site 2, but will be covered by a multilayer soil cover to prevent exposure to waste material and COCs. Conceptually, the multilayer soil cover will consist of suitable sources of fill material (including non-hazardous materials originating from other areas of Alameda Point) of a minimum depth of two feet and a barrier to prevent animal intrusion. The engineering and geotechnical aspects of the soil will be a primary selection criteria for the multilayer soil cover such that it will be able to withstand a maximum credible earthquake (MCE). The multilayer soil cover will be placed over the entire former landfill area within the former landfill perimeter berm and a significant amount of the northeastern portion of the site referred to as the interior margin. The multilayer soil cover will also be placed over limited portions of the far northern edge of the wetlands. If impacts to

wetlands occur, an equivalent acreage of similar wetland habitat will be constructed onsite at Alameda Point, the details of which will be presented in a Wetlands Mitigation Plan to be developed during the remedial design phase. The substantive provisions of the Bay Plan will be addressed in the remedial design process. Overall, the conceptual multilayer soil cover will extend over roughly 60 acres (see Figure 2-2). However, the specific boundaries for the multilayer soil cover will be developed during the remedial design phase after the Navy conducts some additional exploratory trenching in the northeastern and northwestern corners of the site to determine whether the multilayer soil cover should extend into those areas.

Engineering controls will be implemented during remedy construction to avoid injury to humans or damage to ecological resources, and to improve short-term effectiveness. Appropriate access controls will be in place to prohibit anyone other than essential workers from entering the work zone. Necessary engineering controls will be used to ensure the stability of the former landfill berms, as well as the remedy, both during and after remedy construction. All appropriate health and safety precautions will be taken to protect site workers against potential exposure to contamination, buried waste, and/or materials potentially presenting an explosive hazard (MPPEH).

ICs will be implemented across the entire site, including the wetlands, to limit human exposure to contaminants in soil and to protect the integrity of the multilayer soil cover. The conceptual IC boundary is shown in Figure 2-2. Monitoring will be conducted in the form of both construction monitoring and long-term monitoring. Construction monitoring will include periodic assessment of imported fill materials to ensure their characteristics and suitability, as well as routine quality assurance (QA) monitoring to ensure the proper working condition of all equipment and facilities. Construction monitoring will also include appropriate health and safety monitoring to ensure that site workers and off-site receptors in the community will not be exposed to fugitive dust or other potential sources of contamination. Long-term monitoring will consist of annual inspections of the remedy and the IC mechanisms to ensure their continued integrity and effectiveness.

2.9.2.2 Groundwater Remedy

The selected remedy for groundwater is MNA, which combines natural attenuation of groundwater contaminants with monitoring to verify the occurrence of natural attenuation processes and the long-term effectiveness of the strategy. The contaminants present in FWBZ

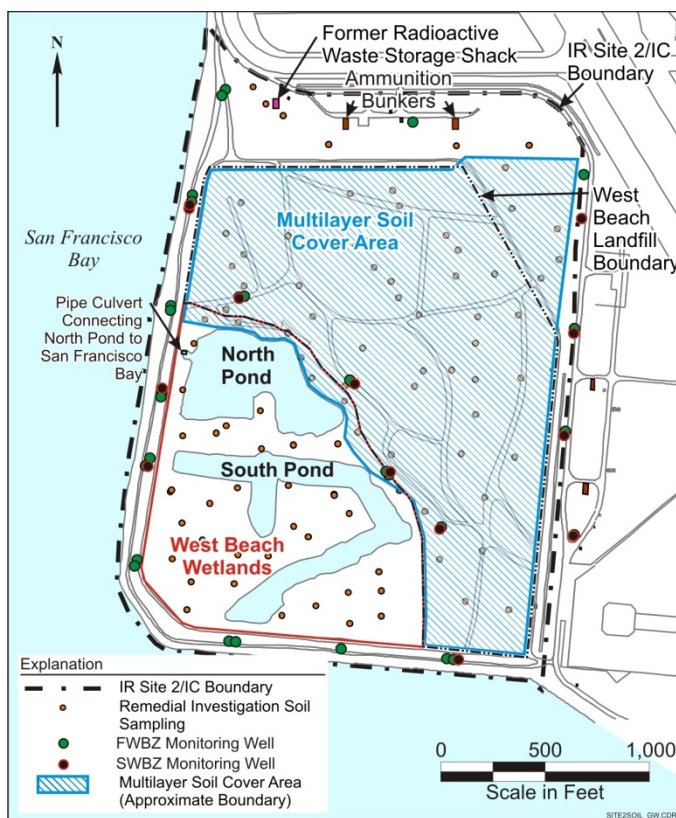


Figure 2-2. Selected Soil and Groundwater Remedy for IR Site 2 – Multilayer Soil Cover and MNA of Groundwater

groundwater at IR Site 2 will not be actively remediated, but will be allowed to degrade, adsorb, dilute, and/or transform according to natural, unaided environmental processes. MNA was identified as the preferred alternative based on the evaluation of the nine NCP criteria and the weight of evidence summarized in Table 2-12.

Engineering controls during the implementation of the groundwater remedy are not an issue because active remediation of the groundwater will not be conducted. However, a groundwater-monitoring network and monitoring program will be used along the shoreline to support this remedy. Engineering controls will be in place to protect monitoring wells from damage and/or to protect site users from harm. ICs consistent with those described in detail in Table 2-13 will be used to ensure that potential exposures to contamination are minimized during and after implementation of the groundwater remedy.

Long-term monitoring will consist of regular groundwater monitoring to document stable or declining trends in contaminant levels and support the expectation that natural attenuation is occurring, and that there are no adverse impacts to surface water in San Francisco Bay. If, however, monitoring indicates that contaminant levels are not stable or declining over time, the remedy will be reevaluated according to decision-making procedures that will be developed during the remedial design phase. The existing monitoring well network at the site is shown on Figure 2-2. At the detailed remedial design stage, the monitoring well network, monitoring schedule, analytes, and the methods to be used to assess groundwater data trends, along with the goals and endpoint of MNA, will be thoroughly evaluated and defined by the Navy with agreement from the FFA signatories. Long-term monitoring will be conducted throughout the FWBZ and in the SWBZ along the coastal margin (shoreline) of the site to confirm that contaminant levels remain within an acceptable range. Groundwater samples will be collected and analyzed to evaluate the principal contaminant classes observed in FWBZ groundwater above relevant criteria, and their associated trends.

Table 2-12. MNA for Groundwater at IR Site 2 Is a Viable Option Based on the Following Weight of Evidence

Applicability of CTR Criteria: CTR criteria apply to surface water and not to groundwater.

Long-term Contaminant Trends: The observed contaminant levels in shoreline monitoring wells, and long-term stable to declining trends in these contaminant levels, suggest that MNA is occurring.

Waste Saturation: Site conditions and historical waste disposal practices suggest that the buried waste mass is in constant or nearly constant contact with groundwater and/or infiltrating precipitation. This suggests the likelihood that the buried waste mass is (at a minimum) at steady state with the local groundwater system in terms of contaminant dissolution.

Contaminant Fate and Transport: The CSM indicates that the general fate and transport of the contaminants identified in IR Site 2 groundwater, and the large-scale mixing expected upon discharge of IR Site 2 groundwater to San Francisco Bay, would result in a lack of risk to the Bay.

IR Site 2 Pond and Western Bayside Characterization: There is a lack of observed environmental impairment and risk in the IR Site 2 wetland ponds and Western Bayside, which includes the open water environment immediately offshore of IR Site 2. The characterization work done at Western Bayside has resulted in regulatory approval of "No Further Action."

Beneficial Use of IR Site 2 Groundwater and Regulatory Guidance on MNA: IR Site 2 groundwater is not currently nor will it be used in the future for drinking-water purposes; available regulatory guidance on the proper consideration and application of MNA as a groundwater remedy supports its use at IR Site 2.

Table 2-13. Institutional Controls for IR Site 2

ICs are a component of the selected remedies for soil and groundwater at IR Site 2. ICs are legal and administrative mechanisms used to implement land use restrictions that are used to limit the exposure to hazardous substances of future landowner(s) and user(s) of the property and to maintain the integrity of the remedial action. ICs are required on a property where the selected remedial clean-up levels result in contamination remaining at the property above levels that allow for unlimited use and unrestricted exposure. ICs will be maintained until the concentrations of hazardous substances in soil and groundwater are at such levels to allow for unrestricted use and exposure. Implementation of ICs includes requirements for monitoring and inspections, and reporting to ensure compliance with land use or activity restrictions.

If the property containing IR Site 2 is transferred to another federal entity or department, the Land Use Restrictions and Activity Restrictions set forth below will be incorporated into a Memorandum of Understanding (MOU) between the Navy and the federal transferee. The MOU will also require that: (1) the transferee comply with all applicable federal and state environmental, public health, and cultural and natural resource protection laws following transfer; (2) any subsequent future transfer by the federal transferee to a federal entity shall incorporate the land use and activity restrictions set forth below; and (3) if the federal transferee in turn transfers the property to a non-federal entity, it shall comply with the requirements set forth in the following paragraph.

If IR Site 2 is transferred from the Navy or another federal transferee to a non-federal entity, the Land Use Restrictions and Activity Restrictions set forth below will be incorporated into a quitclaim deed and environmental restrictive covenants as provided in the "Memorandum of Agreement Between the United States Department of the Navy and the California Department of Toxic Substances Control" and attached covenant models (Navy and DTSC, 2000) (hereinafter referred to as the "Navy/DTSC memorandum of agreement [MOA]"). If the property within IR Site 2 is transferred to a non-federal entity, the following two legal instruments, as provided in the Navy/DTSC MOA, will be recorded:

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

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

ICs will be applied to the property in the area requiring institutional controls (ARIC) (see Figure 2-1) and included in findings of suitability to transfer, findings of suitability for early transfer, "Covenant to Restrict Use of Property" ("the Covenant(s)") between the Navy and DTSC, and any Quitclaim Deeds ("the Deed(s)") conveying real property containing Site 2.

The following sections describe the IC objectives to be achieved through land use and activity restrictions within the ARIC at IR Site 2:

Land Use Restrictions

IR Site 2 shall be restricted to open space and recreational uses. In addition, the following land uses are specifically prohibited within the boundaries of the IR Site 2 ARIC:

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

Table 2-13. Institutional Controls for IR Site 2 (Continued)

- b. A hospital for humans;
- c. A school for persons under 21 years of age;
- d. A daycare facility for children; or
- e. Any permanently occupied human habitation including those used for commercial or industrial purposes.

Activity Restrictions

The following activities are restricted within the boundaries of the IR Site 2 ARIC and must be approved by the Navy, FFA signatories, and the California Department of Public Health (CDPH) prior to conducting them:

- a. Land disturbing activity is prohibited unless conducted pursuant to an approved soil management plan. "Land disturbing activity" includes but is not limited to (1) excavation of soil and disturbance of the multilayer soil cover; (2) construction of roads, utilities, permanently occupied buildings, facilities, structures, and appurtenances of any kind; (3) demolition or removal of paved areas; (4) actions that may impair the multilayer soil cover or other exposure prevention barriers; (5) excavation and/or disturbance of soil or riprap areas; and (6) any other activity that involves movement of soil to the surface from below the surface of the land.
- b. Alteration, disturbance, or removal of any component of a response or cleanup action (including, but not limited to, soil cover/containment systems); groundwater extraction, injection, and monitoring wells and associated piping and equipment; or associated utilities.
- c. Extraction of groundwater and installation of new groundwater wells.
- d. Removal of or damage to security features (for example, locks on monitoring wells, survey monuments, fencing, signs, or monitoring equipment and associated pipelines and appurtenances).

ICs will be maintained until the concentrations of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and exposure.

Additional Land Use Restrictions Specifically Related to Radionuclides at IR Site 2

Excavation within the Site 2 ARIC is strictly prohibited unless approved in writing by the FFA signatories and CDPH. Any proposed excavation below a depth greater than the thickness of the soil cover shall be described in a soil management plan that will include but not be limited to a radiological work plan, the identification of a radiological safety specialist, soil sampling and analysis requirements, and a plan for off-site disposal of any excavated radionuclides by the transferee in accordance with federal and state law. This work plan must be submitted to and approved in writing by the FFA signatories and CDPH in accordance with procedures that will be set forth in the IR Site 2 Operation and Maintenance Plan and/or Land Use Control (LUC) Remedial Design (RD) report.

The integrity of the multilayer soil cover/cap must be restored upon completion of any excavation as provided in the IR Site 2 Operation and Maintenance Plan, LUC RD report, or similar document. A completion report describing the details of the implementation of the soil management plan, the sampling and analysis, the off-site disposal, and the restoration of the integrity of the multilayer soil cover/cap must be submitted to and approved in writing by the FFA signatories and CDPH in accordance with procedures and timeframes that will be set forth in the Covenant(s), the Deed(s), the IR Site 2 Operation and Maintenance Plan, and/or LUC RD report.

Table 2-13. Institutional Controls for IR Site 2 (Continued)

Access

The MOU if the property is transferred to another federal entity, or the Deed(s) and Covenant(s) if the property is transferred to a non-federal entity, shall provide that the Navy and FFA signatories and their authorized agents, employees, contractors, and subcontractors shall have the right to enter IR Site 2 at Alameda Point to conduct investigations, tests, or surveys; inspect field activities; or construct, operate, and maintain any response or remedial action as required or necessary under the cleanup program, including but not limited to monitoring wells, pumping wells, treatment facilities, and landfill cap/containment systems.

Implementation

The Navy shall address IC implementation and maintenance actions including, but not limited to, frequency and requirements for periodic inspections during development and post development, monitoring, and reporting in the preliminary and final LUC RD reports to be developed and submitted to the FFA signatories for review pursuant to the FFA (see "Navy Principles and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions" attached to the Department of Defense [2004], memorandum titled "Comprehensive Environmental Response, Compensation and Liability Act [CERCLA] ROD and Post-ROD Policy", dated January 16, 2004). The preliminary and final LUC RD reports are primary documents as provided in Section 10.3 of the FFA.

The preliminary and final RD reports will include a "Land Use Control Remedial Design" section to describe IC implementation actions, including the following:

- Requirements for CERCLA five-year remedy review;
- Frequency and requirements for periodic monitoring and/or visual inspections;
- Reporting for monitoring and inspections;
- Notification procedures to the regulators for planned property conveyance, changes, and/or corrective action required for the remedy;
- Development of wording for land use restrictions and parties to be provided copies of the deed language once executed;
- Identification of responsibilities for the FFA signatories, other government agencies, and the new property owner for implementation, monitoring, reporting, and enforcement of ICs;
- Provision of a list of ICs with the expected duration; and
- Maps identifying where ICs are to be implemented.

The Navy will be responsible for implementing, inspecting, reporting, maintaining, and enforcing the ICs described in this ROD in accordance with the approved LUC RD reports. Although the Navy may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or other means, the Navy shall retain ultimate responsibility for remedy integrity. Should any of the ICs fail, the Navy shall ensure that appropriate actions are taken to reestablish protectiveness of the remedy and may initiate legal action to either compel action by a third party(ies) and/or recover the Navy's costs for mitigating any discovered IC violation(s).

2.9.3 Expected Outcomes of the Selected Remedies

Once the selected remedies have been implemented, risks to human health or the environment under the planned future recreational use will be acceptable, and the RAOs will be achieved. The soil cover will isolate site soil exhibiting the greatest magnitude of potentially unacceptable risk, achieve RGs in soil, be effective at mitigating against the unlikely presence of high-risk items such as OEW, take a relatively short period of time to implement, and be implemented using readily available technologies and labor. In addition, worker health and safety will be protected from potential radiological contamination through scanning and removal of such waste prior to placing the multilayer soil cover. For site groundwater, MNA will manage the risks associated with COCs in site groundwater through engineering and ICs and monitoring to confirm that the long-term contaminant trends in groundwater along the shoreline of the site continue to be stable to decreasing over time. MNA is an implementable and effective strategy, particularly at a site with largely immobile contaminants and no likelihood of residential use or other groundwater consumption. This alternative will take little time to implement, will pose very few operational challenges, and will not be characterized by any real short- or long-term risk associated with the remedy itself. In addition, there is negligible risk of impact to San Francisco Bay surface water from the discharge of IR Site 2 groundwater (see Table 2-12), so that passive groundwater remediation is a suitable strategy.

2.9.4 Statutory Determinations

In accordance with the NCP, the selected remedies meet the following statutory determinations.

- **Protection of Human Health and the Environment** – The selected remedies are needed to protect human health and ecological receptors by preventing exposure to waste material and COCs through the installation and monitoring of a multilayer soil cover and by implementing engineering controls and ICs. Protection of potential receptors in surface water in the San Francisco Bay will be achieved by monitoring groundwater conditions along the shoreline of IR Site 2 and confirming that concentrations of COCs continue to be stable to decreasing over time, and thus pose no risk to the environment.
- **Compliance with ARARs** – CERCLA §121(d)(1) states that remedial actions at CERCLA sites must attain (or the decision document must justify the waiver of) any Federal or more stringent State environmental requirements, standards, criteria, or limitations that are determined to be legally applicable or relevant and appropriate. The selected remedies for IR Site 2 will comply with the substantive provisions of the Federal and State requirements identified as ARARs. The chemical-, location-, and action-specific ARARs for the selected remedies for soil and groundwater at IR Site 2 are listed in Appendix A.
- **Cost-Effectiveness** – The selected remedies for soil and groundwater are the most cost-effective remedies and will provide overall effectiveness proportional to their costs. All technologies included in the selected remedies are readily implementable and have been widely used, thus demonstrating their effectiveness.
- **Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable** – The selected remedies represent the maximum extent practicable to which permanent solutions and alternative treatment technologies can be used in a cost-effective manner at IR Site 2.

For soil, a multilayer soil cover provides the best balance of tradeoffs, given the high level of short-term effectiveness, long-term effectiveness and permanence, and implementability and cost. For groundwater, MNA will effectively achieve RAOs because there is negligible risk of impact to San Francisco Bay surface water from the discharge of IR Site 2 groundwater (see Table 2-12).

- **Preference for Treatment as a Principal Element** – The selected remedy for soil is protective of human health and the environment, complies with all ARARs, is cost-effective, and uses permanent solutions to the maximum extent practicable for IR Site 2; however, it does not satisfy the statutory preference for treatment. The multilayer soil cover is anticipated to result in some reductions in the mobility of contamination. MNA of groundwater will not reduce toxicity, mobility, or volume of contamination directly through treatment, but natural attenuation mechanisms will reduce contaminant toxicity, mobility, and volume over time. As previously discussed, there is negligible impact to the San Francisco Bay surface water from discharge of IR Site 2 groundwater so active treatment of groundwater is not warranted to achieve the RAOs.
- **Five-Year Review Requirements** – A five-year review will be conducted at IR Site 2 pursuant to CERCLA § 121 and the NCP because the selected remedies will result in contaminants being left onsite above levels allowing for unlimited use and unrestricted exposures. A statutory review will be conducted no less often than once every five years after implementation of the selected remedies to ensure that the remedy remains protective of human health and the environment.

2.10 Community Participation

A community relations plan was developed for Alameda Point in February 1989 to document interests, issues, and concerns raised by the community in regard to ongoing investigations and cleanup activities, and to describe a specific community relations program designed to address community issues and concerns. The plan was updated in 1996, 1998, 2002, and 2009 to incorporate the most recent assessment of community issues, concerns, and informational needs related to the ongoing environmental investigation and remediation program at Alameda Point.

The ongoing community relations program that is being implemented at Alameda Point includes monthly open meetings by the Restoration Advisory Board (RAB), which consists of members of the Navy, the regulatory agencies, and the community. Meetings are held in the evenings after normal working hours at Building 1, Room 140, at 950 West Mall Square at Alameda Point. Members of the community that sit on the RAB review and comment on technical documents, including those that have been developed as part of the CERCLA process at IR Site 2. At monthly RAB meetings, the Navy and regulatory agencies provided regular updates on the status of investigative activities and documentation activities for IR Site 2.

Another form of community relations that has been applied at Alameda Point are public mailings, including information updates, Fact Sheets, and Proposed Plans, which are designed to broadly disseminate information throughout the local community. Information updates announcing the investigation and remediation process at Alameda Point are mailed to residents in the vicinity of Alameda Point; city, state, and federal officials; regulatory agencies; and local groups and individuals that have added their names to the community relations plan mailing list since 1990. Previous updates and Fact Sheets have included general program information such as the status of environmental investigations, the remedy selection process, opportunities the

public has to participate in the investigation and remediation process, and the availability of the AR for Alameda Point. Proposed Plans provide an overview of environmental investigation results, including HHRA and ERA results, summarize the remedial alternatives for a site or group of sites, and present the Navy's preferred alternative(s). The updates, Fact Sheets, and Proposed Plans are mailed to more than 700 households, businesses, public officials, and regulatory agencies in an effort to reach as many community members as possible.

At IR Site 2, a significant effort was made to inform the public of the Proposed Plan outlined in this ROD. Prior to making the Proposed Plan available for public review from August 4 to September 14, 2009, the Navy published a notice of the public comment period and a public meeting in two local newspapers. The Proposed Plan was presented to the RAB on August 6, 2009, prior to being presented again during a public meeting on August 27, 2009. At the public meeting, the Navy gave presentations on the conditions at IR Site 2, and representatives from the Navy and the regulatory agencies were available to answer questions. A [transcript of the public meeting](#) prepared by a court reporter is part of the AR for this ROD and is available on the CD for this ROD. Responses to written comments received during the public comment period are included in the Responsiveness Summary in Section 3.0 of this ROD.

The Proposed Plan, as well as other relevant project documents that were relied upon during the remedy selection process, is available for public review in the local Information Repository in Alameda (Alameda Point – 950 West Mall Square, Building 1 Room 240). In addition, the Alameda Public Library also maintains new Navy environmental documents during review periods. The Alameda Public Library is located at 1550 Oak Street, Alameda, CA 97501. Supporting documents describing field investigations, laboratory analyses, and risk assessments are archived at the Information Repository in Alameda. These reports include:

- Final FS Report for IR Site 2 (2008), AR#N00236/002504
- Final RI Report for IR Site 2 (2006), AR#N00236002317
- Final RI Sampling Work Plan for IR Site 2 (2005), AR#N00236/001976
- Final Time-critical Removal Action Closeout Report for IR Site 2 [OEI] (2002), AR#N00236/000434.

The AR is the comprehensive collection of reports, key correspondence, regulatory review comments and responses, and historical documents used by the decision-making team in selecting the soil and groundwater remedies at IR Site 2. The AR file provides a record of actions by the Navy for IR Site 2 and is located at:

Naval Facilities Engineering Command, Southwest
1220 Pacific Highway
San Diego, CA 92132-5190
ATTN: Ms. Diane Silva
Phone: (619) 532-3676

Members of the public may view documents by appointment during working hours (Monday through Friday, 8 a.m. to 5 p.m.) by contacting Ms. Silva at the number listed above.

(This page intentionally left blank.)

3 Responsiveness Summary

The public review period for the IR Site 2 Proposed Plan was August 4 to September 14, 2009. A public meeting was held on August 27, 2009, at Alameda Point, Room 201, Building 1 – 950 West Mall Square, and included representatives from the Navy, U.S. EPA, Cal/EPA DTSC, and the Water Board. Questions and concerns received during the meeting were addressed at the meeting and are documented in the meeting transcript provided in the AR. Written comments on the Proposed Plan were received from Mr. Patrick G. Lynch, Ms. Joan Konrad (Alameda Point RAB Member), the Alameda Point RAB with support from the Sierra Club and Audubon Society, and Ms. Leslie Little (Alameda Reuse and Redevelopment Authority [ARRA]). Responses to these comments are presented in this Responsiveness Summary.

Comments by Mr. Patrick G. Lynch:

Comment No. 1: The Proposed Plan is bereft of details. Despite over 25 years of soil and groundwater investigations, details of the composition and thickness of the cover were not included in the Proposed Plan for public comment. Similarly no details on the proposed groundwater monitoring are provided for public comment. As the cover composition and scope of groundwater monitoring will not be modified by public comment, I express a complete lack of confidence that the proposed remedy will be protective of human health and the environment.

Response No. 1: Detailed information of the type referenced in this comment is provided in other CERCLA documents prepared for IR Site 2 and submitted to the U.S. EPA, Cal/EPA DTSC, Water Board, and RAB, among others, for review and comment. This information is provided, in conceptual but appropriate detail, in the IR Site 2 FS Report. The FS stage of a CERCLA program identifies a range of technically and administratively appropriate remedial alternatives to address potentially unacceptable human health or environmental risks at a site, while the Proposed Plan provides a general summary of the preferred remedial alternative identified. While certain detail was incorporated into the Proposed Plan for IR Site 2 to convey an understanding of site conditions, calculated site risks, and conceptual details of the various remedies considered and the preferred remedial alternative, the purpose of the Proposed Plan was not to provide all specific details. Ultimately, the ROD identifies the selected remedy for a site, and the remedial design/remedial action work plan defines the specific design details (including cover composition and groundwater monitoring program) and implementation requirements for the remedial action. The U.S. EPA, Cal/EPA DTSC, and Water Board have concurred that the preferred soil (i.e., multilayer soil cover with ICs) and groundwater (i.e., MNA with ICs) remedy for IR Site 2 as conveyed in the Proposed Plan is appropriate and acceptable to protect human health and the environment.

A remedial design/remedial action work plan will be prepared for IR Site 2, and will include all required detail pertaining to the precise design of the cover system and the scope of groundwater monitoring to support the MNA groundwater remedy. As indicated in the IR Site 2 FS Report and the Proposed Plan, the cover system for the soil remedy will be a multilayer soil cover, consisting at its base of an animal intrusion barrier, a fill soil layer overlying the animal intrusion barrier, and a topsoil layer at the surface. The surface of the cover system will be seeded with a mixture of native grasses to promote ecological stability and minimize erosion potential. Also as indicated in the IR Site 2 FS Report and the Proposed Plan, the groundwater monitoring

approach is assumed to be to sample the significant number of existing site monitoring wells along the shoreline of IR Site 2 on a regular basis for an extensive list of target analytes. Ultimately, the precise scope of the groundwater monitoring (i.e., monitoring locations, frequency, and appropriate methods to evaluate resulting data) will be determined at the remedial design/remedial action work plan stage at which time the Navy will conduct a comprehensive evaluation of specific monitoring network details to ensure the suitability of the wells, both in terms of their layout and specific construction details. Details incorporated into the remedial design/remedial action work plan will be developed in consultation with the U.S. EPA, Cal/EPA DTSC, Water Board, and RAB to ensure their appropriateness with respect to ensuring the long-term effectiveness of the remedy. Please also see the response to Comment No. 1 from Ms. Joan Konrad below.

Comment No. 2: The Navy has failed to complete a competent remedial investigation of the landfill prior to proposing a remedy. After 25 years of investigations the Navy failed to determine the lateral extent of landfilled wastes. The Proposed Plan should be represented for public comment after the boundaries of the Site 2 landfill have been determined.

Response No. 2: Samples have been collected spatially throughout IR Site 2 and from all environmental media, including soil, soil gas, groundwater, sediment, surface water, and biota, to assess potential sources and identify site contamination. Specifically, the RI dataset includes extensive soil, groundwater, surface water, sediment, and tissue chemistry data and observations from borings and test pits, including areas within the interior of the former landfill and the interior margin representative of worst-case site conditions. In addition, site-specific toxicity and bioaccumulation testing has been conducted, non-invasive assessment tools have been deployed, including geophysical surveying, and historically available data, including landfill gas sampling data, have been assimilated into the site dataset. All of this information has been used to generate a detailed CSM for the site. The scope of work for the collection of RI data was fully vetted with the U.S. EPA, Cal/EPA DTSC, and Water Board through a detailed RI sampling work plan. The characterization dataset developed for IR Site 2 is spatially and analytically extensive. The data generated at IR Site 2 are of sufficient quantity and quality to have developed an understanding of the nature and extent of contamination, performed rigorous risk assessments, and contemplated appropriate risk management scenarios and remedial strategies.

As the Navy has previously indicated in responding to comments on the CERCLA program for IR Site 2, given the documented site history, both in terms of site construction/development and disposal, it is highly unlikely that waste extends to the full site perimeter. However, as described in the IR Site 2 FS Report and the Proposed Plan, conceptually the cover system will extend over nearly 60 acres, encompassing all of the former landfill proper, the northern portion of the wetlands, and a significant portion of the northeastern interior margin, where geophysical surveying and other sampling data demonstrate the vast majority of historically landfilled waste is present. Furthermore, exploratory trenches will be used during the remedial design phase to further investigate the potential presence of buried waste in the northern portion of the site. If any information becomes available that suggests the extensive presence of buried waste in these areas that could materially affect remedial effectiveness, it will be addressed in the remedial design. Overall, the available site dataset, the site CSM, and the remedial planning and remedial action are not appreciably impacted by the potential need for the minor expansion of the

remediation footprint to cover some additional waste identified along the periphery of the site. In addition, ICs will be implemented and enforced throughout the entire site to provide residual risk mitigation in and beyond the covered area.

Comment No. 3: The Proposed Plan does not address the landfill's continued degradation of water quality in San Francisco Bay in violation of California's Non-degradation Policy. The Proposed Plan's claim that dilution is provided by "large-scale mixing" ignores that the landfill leachate is being diluted by previously discharged landfill leachate.

Response No. 3: The available data from IR Site 2 and the area offshore of IR Site 2 do not suggest that environmental quality in San Francisco Bay has been degraded as a result of the site.

Extensive sediment and surface water sampling and toxicity and bioaccumulation testing were conducted in the IR Site 2 wetland ponds during the RI. Given the acknowledged communication between IR Site 2 groundwater and the surface water in the wetland ponds, toxicity and bioaccumulation potential in the wetland ponds can be considered a conservative surrogate for chemical impacts, and toxicity and bioaccumulation potential in San Francisco Bay given the direct discharge of site groundwater to the ponds, the much more limited area of the ponds, and the significantly lower amount of dilution and mixing in the ponds relative to San Francisco Bay.

Based on the RI data, there were very few contaminants observed in IR Site 2 wetland pond surface water at detectable concentrations, and those concentrations detected were generally very low. During the RI, potential IR Site 2 pond media toxicity was assessed using three discrete toxicity tests, including a 10-day solid phase test using *E. estuarius* (amphipod) and pond sediment, a 7-day aqueous phase test using *A. bahia* (shrimp) and pond surface water, and a 7-day aqueous phase test using *A. affinis* (fish) and pond surface water. The results of these tests did not suggest the pond media were responsible for acute or chronic toxicity. Bioaccumulation testing was also conducted at IR Site 2 using 28-day sediment exposure tests of *M. nasuta* (clam) and *N. caecoides* (worm). In the bioaccumulation testing, test organism survival was acceptable and no unacceptable risk was identified for the IR Site 2 wetland ponds.

Surface and subsurface sediment sampling and toxicity and bioaccumulation testing have also been conducted for Western Bayside (i.e., the San Francisco Bay area immediately offshore of IR Sites 1 and 2 and Breakwater Beach at Alameda Point). In virtually all cases, contaminant concentrations detected in surface and subsurface sediment immediately offshore of IR Site 2 were not above ambient environmental ranges and/or ecological benchmark values, and sampling stations that were deliberately located adjacent to onshore groundwater monitoring wells did not exhibit locally elevated or unacceptable concentrations of chemicals. Surface water sampling conducted for Western Bayside indicated no detectable concentrations of dissolved metals and several other chemical classes (i.e., pesticides, PCBs, and PAHs). Overall, surface water was determined to be a medium of no concern for Western Bayside.

Potential toxicity in the Western Bayside environment has also been previously evaluated in a manner similar to the IR Site 2 wetland ponds, namely using a 10-day *E. estuarius* sediment toxicity test, a 20-day *N. arenaceodentata* (polychaete) sediment toxicity test, and a 48-hour *M.*

edulis (mussel) embryo sediment elutriate toxicity test. The results of the toxicity testing demonstrated that the offshore media in Western Bayside are not responsible for acute or chronic toxicity. Bioaccumulation testing has also been previously conducted for Western Bayside in a manner similar to IR Site 2, with the results indicating no unacceptable risk associated with the offshore environment.

Overall, the documented conclusions for Western Bayside are that no unacceptable risks have been identified for any ecological receptors and human health risks have all been determined to be consistent with ambient environmental conditions. Multiple lines of evidence have supported these conclusions, including comparison to screening benchmarks, toxicity bioassays, dose modeling, sediment concentrations, and a conservative comparison to background values. Based on this information, no further action was recommended in the Final Site Inspection Report for Western Bayside, and this recommendation was concurred with by the regulatory agencies.

If contaminant discharge from IR Site 2 was responsible for a significant threat to San Francisco Bay, this threat would be manifested as a finding of elevated contaminant concentrations and environmental risk in offshore media. This is not the case on the basis of direct measurements and studies conducted for the San Francisco Bay environment immediately offshore of IR Site 2.

Comment No. 4: Alameda NAS was placed on the NPL List based on the discharge of PCBs from the Site 2 landfill into San Francisco Bay. The Proposed Plan does not propose a remedy for the PCB contamination that is located offshore of Site 2 and continues to impact food fish in San Francisco Bay.

Response No. 4: The NPL Site Narrative for Alameda Point posted at <http://www.epa.gov/superfund/sites/npl/nar1560.htm> indicates that PCBs were reportedly disposed of at IR Site 2, but there is no mention of PCBs being discharged to San Francisco Bay. PCBs were thoroughly evaluated during the extensive sampling that was performed as part of the RI. Environmental samples were intentionally collected from areas within the interior of the former landfill that reportedly received PCB waste (e.g., the alleged PCB-containing oil disposal area located in the northeastern portion of the landfill and specifically referenced in the NPL Site Narrative) to determine worst-case site conditions. The results of the RI and associated human health and ecological risk assessments indicate that the preferred soil remedy (i.e., multilayer soil cover with ICs) will provide adequate protection of future receptors by eliminating potential exposure pathways while meeting the remedial goals for the site for PCBs as well as other COCs.

Please see the response to Comment No. 3 from Mr. Patrick G. Lynch above. If contaminant (PCB) discharge from IR Site 2 was responsible for a significant threat to San Francisco Bay, this threat would be manifested as a finding of elevated contaminant concentrations and environmental risk in offshore media. This is not the case on the basis of direct measurements and studies conducted for the San Francisco Bay environment immediately offshore of IR Site 2.

Comment No. 5: The Proposed Plan misrepresents the long-term effectiveness and permanence of the proposed remedy by ignoring the uncertainties associated with land disposal.

Response No. 5: The preferred remedy for soil as presented in the Proposed Plan for IR Site 2 is based on a multilayer soil cover system to provide protection through isolation against identified site risks, as well as ICs to ensure residual risk mitigation throughout the site. The multilayer soil cover system and the ICs will be monitored and maintained to ensure their long-term effectiveness. Contaminated soil or buried waste will remain at IR Site 2 based on this soil remedy. The only land disposal of material from IR Site 2 will be associated with scanning for and removing radiological contamination prior to placing the multilayer soil cover to prevent the spread of potential contamination, which will ensure worker health and safety. ARARs associated with the scanning and removal of potential radiological contamination have been added to Appendix A of the ROD for IR Site 2.

Comment No. 6: The Proposed Plan continues to ignore the human health and environmental hazards from asbestos containing wastes in Navy landfills.

Response No. 6: The Proposed Plan for IR Site 2 presented the preferred soil and groundwater remedial alternatives to address human health and environmental hazards based on the significant amount of environmental data collected, and the rigorous risk assessments completed.

As documented in the RI and the FS for IR Site 2, historical disposal information suggests that some amount of asbestos-containing material was landfilled at the site. The multilayer soil cover system would address the potential environmental concerns associated specifically with asbestos-containing material, as it is to address all potential human health and environmental risks identified at the site. The multilayer soil cover will be adequately thick to provide a barrier between human or ecological receptors and contaminated soil and buried waste, and will contain an animal intrusion barrier to prevent burrowing animals from penetrating the cover system and either being exposed to contaminated soil and/or buried waste or from bringing contamination and/or buried waste to the surface. The cover system will be monitored to ensure its integrity, and will be maintained as necessary to ensure its continued effectiveness.

Comments by Ms. Joan Konrad (Alameda Point RAB Member):

Comment No. 1: I am concerned about the way the IR Site 2 will appear if the site is mitigated as proposed. Providing four feet of soil cover will not disguise the ugly contours of that partially filled dump. That method of cleanup severely restricts the ability to contour the site to meet the needs of any possible future use. Even though the site is proposed to be transferred to another Federal agency, it is still on the island of Alameda and part of it is proposed as a segment of the perimeter trail around the island.

Response No. 1: The specific design of the cover system, including total thickness and the thicknesses of various layers, and the methods for constructing the remedy will be documented in the remedial design/remedial action work plan.

The Navy does not believe there is a concern over the aesthetics or function of the site following remediation. In particular, the site will be graded and seeded with grassy vegetation, whereas the site is currently sparsely vegetated. The Navy will consider and seek to minimize impacts on wetlands during the remedial design process. However, if it is determined during the remedial design process that some impacts to wetlands will be necessary, wetland losses will be mitigated. Overall, the Navy believes that the soil cover remedy for IR Site 2 is directly compatible with the anticipated future reuse of the site. The Navy will continue to participate in regular RAB meetings to present information related to the CERCLA program at IR Site 2 and to discuss the program with the community.

Comment No. 2: The Navy not only created a Super Fund dump site, but in doing so filled in the San Francisco Bay with no regard for aesthetics. It is understandable that no thought was given to such matters at the time, but now, leaving the island with such an ugly scar should be unconscionable to the Navy.

Response No. 2: Please see the response to Comment No. 1 from Ms. Joan Konrad above.

Comment No. 3: I hope a method of cleanup will be implemented to permit flexibility and configuration of the contours of the site so that future development will not be a liability to the community. I further hope the method of cleanup will be discussed at Alameda Point Restoration Advisory Committee meetings so that we can inform the community of results that are beneficial to the community.

Response No. 3: Please see the response to Comment No. 1 from Ms. Joan Konrad above. The Navy will continue to participate in regular RAB meetings to present information related to the CERCLA program at IR Site 2 and to discuss the program with the community.

Comments by Restoration Advisory Board with Support from Sierra Club and Audubon Society:

Comment No. 1: We have commented in the past that the characterization of the site is not complete enough to make an informed decision as to remediation. After commenting on the Remedial Investigation and the Feasibility Study, no further investigations were performed to establish a sound basis for action. Sampling was sparse and monitoring wells are widely spaced.

Response No. 1: Please see the response to Comment No. 2 from Mr. Patrick G. Lynch above. The RI dataset includes extensive soil, groundwater, surface water, sediment, soil-gas, and tissue chemistry data and observations from borings and test pits, including in areas within the interior of the former landfill and the interior margin representative of worst-case site conditions. In addition, site-specific toxicity and bioaccumulation testing has been conducted, non-invasive assessment tools have been deployed, including geophysical surveying, and historically available data, including landfill gas sampling data, have been assimilated into the site dataset. All of this information has been used to generate a detailed CSM for the site. The scope of work for the collection of RI data was fully vetted with the U.S. EPA, Cal/EPA DTSC, and Water Board through a detailed RI sampling work plan. The characterization dataset developed for IR Site 2

is spatially and analytically extensive. The data generated at IR Site 2 are of sufficient quantity and quality to have developed appropriate remedial strategies.

The precise scope of the groundwater monitoring (i.e., monitoring locations, frequency, and appropriate methods to evaluate resulting data) will be determined at the remedial design/remedial action work plan stage. Details incorporated into the remedial design/remedial action work plan for IR Site 2 will be developed in consultation with the U.S. EPA, Cal/EPA DTSC, Water Board, and RAB to ensure their appropriateness with respect to ensuring the long-term effectiveness of the remedy.

Comment No. 2: The costs of the Navy's preferred alternative (soil capping and institutional controls) do not include the future costs of repairs and environmental damages due to seismic failures of the landfill berm. The costs of near-complete removal and disposal have been inflated (\$73 MM was included for remedial design). The focused removal alternatives 4 and 5 should have been given more serious consideration. Therefore, these alterations cannot be evaluated accurately as to preference.

Response No. 2: The costs associated with the multilayer soil cover remedy do include routine operations and maintenance costs in the form of annual mowing of the grassy cover at the site and a contingency cost for the potential need to repair some portion of the cover system based on observations of erosion or attempts at burrowing by animals (note that the animal intrusion barrier component of the soil cover will be designed to prevent animals from breaching the entire cover and either being exposed to contaminated soil and/or buried waste or bringing contamination and/or waste to the surface, but it is possible that animals would burrow into the surface layers of the cover without fully breaching the system).

The Navy has previously indicated that it will evaluate seismic mitigation measures for the site that will be intended to mitigate against the risk of seismic failure. Specifically, the analysis of ARARs for the site indicates that the Navy will comply with the intent of California Code of Regulations (Cal. Code Regs.) Title (tit.) 22, Section (§) 66264.310(a)(5), which requires that a landfill cover be designed to withstand a MCE. While the multilayer soil cover will be designed to withstand a MCE, until the detailed design phase, a comprehensive analysis of the need for seismic mitigation measures cannot be fully completed, nor can the Navy determine whether earthquake drains, stone columns, or some other seismic mitigation technique is more appropriate than another. At a minimum, the seismic requirements for landfill covers will be met by monitoring the cover and by providing for any necessary repairs following significant damage by a potential future earthquake. This repair program will be documented in an operations and maintenance plan prepared during the remedial design/remedial action work plan phase. If, during the detailed design phase, it is determined that more significant seismic measures are required for the cover system to withstand an MCE, the design process will address this situation accordingly.

The costs for the near-complete removal scenario (i.e., approximately \$900 million) are dominated by the costs of excavation, soil screening and characterization, and backfill (i.e., combined approximately \$446 million), waste disposal (i.e., approximately \$191 million), and CERCLA-recommended contingencies for construction (i.e., 20% of total capital costs, or

approximately \$127 million). In turn, the costs for soil screening and characterization include cost for radiological screening and the costs for soil disposal include cost for radiological waste disposal, both of which were recommended by the regulatory agencies and other reviewers of previous CERCLA documents for inclusion in the remedial alternative cost estimates for IR Site 2. Ultimately, all component costs were vetted through the agencies and other important groups, including the Navy's Radiological Affairs Support Office (RASO). The cost for the development of a remedial design for the near-complete removal scenario (i.e., approximately \$61 million rather than the \$73 million cited in this comment) is based on a specific recommendation under CERCLA that remedial design costs be assumed as a percentage of total capital costs. In this instance, the assumed percentage of total capital costs is at the extreme low end of the CERCLA-recommended range. Regardless, even if the cost of the remedial design was reduced, the total cost of the near-complete disposal alternative would still be prohibitively high relative to other suitable alternatives.

Notably, the specific costs of a geotechnical remedy for the site were not included in the remedial alternative cost estimates provided in the Proposed Plan. However, if the costs of a geotechnical remedy were included for all soil alternatives in which waste stayed in place, the total costs of each of these alternatives would rise generally by an identical magnitude, and the near-complete removal scenario would still be disproportionately and prohibitively more costly.

With specific respect to the soil remedial alternatives that considered focused soil removal, these alternatives would provide no material increase in effectiveness relative to RAOs when compared to the multilayer soil cover, and in fact would be characterized by greater short-term risks, greater implementability challenges, and increased costs.

Comment No. 3: The evaluation of the Ecological Risk Assessment by Michael Johnson stated that high body weights for each receptor were used, ingestion rates were not calculated for each receptor, home range assumptions for species were incorrect, tissue concentrations in various taxa were improperly used to determine the exposure point concentrations and all bioaccumulation factors were defined as being equal to one. This resulted in the lowest probability of exposure and thus the lowest risk and resulted in the elimination of antimony, beryllium, cobalt, manganese, mercury, selenium and thallium as chemicals of concern. Selenium is a chemical of great impact to avian species, especially during migration. Because the Navy manipulated data current conclusions are not reliable.

Response No. 3: The Navy is not familiar with any comments on the IR Site 2 ecological risk assessments by Michael Johnson. All risk assessments conducted for IR Site 2 were conducted in accordance with U.S. EPA and Navy guidance and accepted industry practices, and were reviewed and accepted by U.S. EPA, Cal/EPA DTSC, and the Water Board. The Navy did not manipulate any site data during the risk assessments in any manner other than as required to properly complete the risk assessments and as directly consistent with standard and approved risk assessment practice.

Comment No. 4: Sampling overall was so minimal that contaminants, such as molybdenum, uranium, titanium and thallium, were eliminated because there were inadequate data to

determine toxicity and groundwater sampling was collected only twice a year and intermittently over time resulting in a lack of reliable data.

Response No. 4: Contrary to this comment, and as indicated in the response to Peter G. Lynch's comment No. 2 above, the characterization dataset developed for IR Site 2 is spatially and analytically extensive, and the data generated at IR Site 2 are of sufficient quantity and quality to have developed an understanding of the nature and extent of contamination, performed rigorous risk assessments, and contemplated appropriate risk management scenarios and remedial strategies. The groundwater dataset for IR Site 2 covers the entire site, including interior portions of the former landfill, was temporally, and analytically extensive, and the available groundwater data as well as the comprehensive assessment of the groundwater data do not suggest either an issue of data reliability or a specific concern associated with molybdenum, uranium, titanium, or thallium. Toxicity associated with site groundwater was specifically evaluated by assessing surface water and sediment in the wetland ponds and the potential impacts to San Francisco Bay offshore of the site (see the response to Comment No. 3 from Peter G. Lynch above), and no chronic or acute toxicity effects were observed for either.

Comment No. 5: The wetlands areas were not evaluated because of impacts to resident species, yet the Navy states that there are no taxa present in the wetlands and no species of concern. The only evaluation of flora was of non-native invasives. It is stated that tissue samples could not be taken as no animals were found in the ponds. However, it is also reported that stickleback fish were observed. It is also stated that benthic species are not present in the South Pond because the pond is not permanent year round and highly saline. However, vernal pools are also not year round and are known to contain organisms during the time when there is water in them and saline ponds contain organisms.

Response No. 5: The wetland portion of IR Site 2 was evaluated extensively through geophysical surveying, soil, groundwater, surface water, sediment, and tissue sampling, and toxicity and bioaccumulation testing. The Navy has described the habitat and potential receptors in the wetlands, documented observations of ecological species in the wetlands during specific ecological investigations, and conducted thorough ecological risk assessments based on reasonable and appropriate receptor and pathway combinations focusing on relevant species of concern. With specific respect to fish and benthic organisms in the wetland ponds, three individual threespine stickleback fish were harvested historically from the South Pond during a historical sampling event and benthic organisms were identified historically during a benthic study, albeit at low diversity and density, but no fish or benthic organisms could be collected during the RI despite reasonable and appropriate efforts to obtain these tissue types. Overall, the RI was conducted in accordance with a regulatory agency-approved sampling work plan, thorough risk assessments were conducted, including an assessment of potential risk to several receptor categories, and the risk assessment results have been reviewed and approved by the U.S. EPA, Cal/EPA DTSC, and Water Board.

Comment No. 6: The Navy has stated that water and soil tests performed on samples from the South Pond showed no negative impact on sea urchins. It is very unusual to have a body of water such as this not contain living organisms. The first tests conducted on benthic species of soil and water resulted in extensive life failures. The second series of tests used organisms not found in the

Bay waters, but appear to be chosen because they resist contamination. The choice of organism for testing water quality could result in no adverse effect because it is not affected by exposure to tributyl tin; however, worms and crustaceans are and that would explain the lack of arthropods in the ponds. Given the degree of manipulation to which the Navy resorted to reduce the chemicals of concern in the landfill proper, it is not unreasonable to expect that similar efforts were made to reduce contaminant loads in the pond samples.

Response No. 6: Living organisms have been harvested from the IR Site 2 wetland ponds during previous sampling events. However, during the RI, despite reasonable and appropriate and regulatory agency-approved sample collection methods, no fish or benthic invertebrates could be collected because they were not present. Nevertheless, risk assessments were completed for the wetland ponds to identify any potentially unacceptable risk based on reasonable receptor and pathway combinations and focusing on relevant species of concern. Toxicity testing conducted during the RI for the wetland ponds at IR Site 2 was implemented in accordance with accepted industry protocol, in conformance with regulatory and Navy guidance, and using appropriate and standard test organisms that are specifically suited to the assessments performed. No organisms were selected because they resist contamination; to the contrary, test organisms were selected to provide an accurate and conservative assessment of potential toxic effects from pond surface water and/or sediment. The toxicity testing performed during the RI did not reveal acute or chronic toxicity effects from exposure of test organisms to wetland pond surface water or sediment. The Navy did not manipulate any site data during the toxicity testing, and the toxicity testing protocols and results were reviewed and accepted by U.S. EPA, Cal/EPA DTSC, and the Water Board.

Comment No. 7: There is a significant benzene plume under both ponds (ITSI, September 2006). It is very likely that this plume is degrading the pond. The benzene plume has been shown to extend to the bay and that there is a source area to the northeast of the North Pond. Bioremediation would remove the hot spot and reduce the impact to the water quality of the ponds but this is not considered. Additionally, the Remedial Investigation found trichloroethylene and 1,4-dioxin in water samples.

Response No. 7: In evaluating the data generated at IR Site 2, the Navy has documented the presence of benzene in groundwater, as it has documented the presence of all identified contaminants in environmental media throughout the site. However, there is no evidence to support the suggestion that benzene is likely degrading the wetland ponds, and, to the contrary, there is significant evidence in the form of surface water and sediment sampling and toxicity and bioaccumulation testing to indicate that the wetland ponds have not been adversely impacted.

Comment No. 8: Sandblasting grit, tributyl tin, was spread through the area and is an inhibitor of invertebrate growth. This could clearly lead to the lack of organisms in the ponds. Also dredge spoils from Seaplane lagoon were deposited in the wetland area. Building 5 discharged heavy metals and radioactive materials to Seaplane Lagoon through the stormdrain system. The lack of investigation of either of these constituents means that the wetlands may be left contaminated and of inferior quality to wildlife.

Response No. 8: Based on historical facility documentation, and as documented in the RI and FS reports, there was a reported one-time disposal of dredge material from Seaplane Lagoon in the

wetland portion of IR Site 2 in 1981. The sediment from Seaplane Lagoon that was reportedly deposited at IR Site 2 was spread in the area of the central portion of the South Pond. However, the sediment that was dredged from Seaplane Lagoon that would have been placed at IR Site 2 originated from a portion of the lagoon not known to be impacted by contamination and that is outside the remediation footprint for Seaplane Lagoon based on that site's approved ROD. Nevertheless, tributyl tin, heavy metals, and radionuclides have been investigated throughout IR Site 2, including in soil, groundwater, surface water, and sediment in the wetland portion of the site, and all of the data generated for the site were used to evaluate the nature and extent of contamination, complete the risk assessments, and develop an appropriate risk management strategy and remedial approach for IR Site 2.

Comment No. 9: The landfill is identified as a municipal landfill by the State of California Department of Toxic Substances Control. However, the number and concentration of heavy metals, radiological nuclides, airplane engine parts, PCB containing oil, OEW and chemical drums belies this. This is clearly an industrial dump and requires more thorough evaluation and clean up than a municipal dump. Mount Trashmore, a municipal (residential and commercial wastes) landfill at the east end of Alameda, operated from 1953 to the 1970s. Its closure measures include a low-permeability clay cap, a gas collection system and a slurry cut-off wall along the side abutting San Leandro Bay. It seems incongruous that Site 2 which received toxic industrial wastes should have less vigorous closure requirements.

Response No. 9: The remedy for IR Site 2 is based on the extensive investigation and thorough risk assessments performed specifically for the site. The site has been sampled extensively, and evaluated with numerous other assessment tools, including toxicity and bioaccumulation testing, non-invasive geophysical surveying, and invasive test pitting. The geophysical surveying and test pitting results do not suggest the widespread presence of chemical drums, and there is no information to suggest a high concentration of airplane engine parts or radionuclides. The general distribution of contaminants in site media is low concentrations occurring over relatively widespread areas, which is not indicative of significant contaminant hotspots. A lack of contaminant impact and risk in the surrounding San Francisco Bay has been documented (see the response to Comment No. 3 from Mr. Patrick G. Lynch above). Overall, the U.S. EPA, Cal/EPA DTSC, and Water Board concur that the multilayer cover soil remedy and MNA groundwater remedy are appropriate for IR Site 2, and this overall remedial approach will achieve the RAOs. Please also see the response to Comment No. 1 from Ms. Leslie Little below.

Comment No. 10: Even if it could be called a municipal landfill, Federal regulations require groundwater released from a municipal landfill to meet MCLs. Additionally, State Water Resource Control Board resolutions 68-16 and 92-49 apply to the site and should be adhered to. Therefore, off-shore impacts need to be monitored. There are no off-shore monitoring locations to ensure protection of the Bay shown in the Proposed Plan.

Response No. 10: All project ARARs have been identified and were documented in the Proposed Plan for IR Site 2. The Navy's position is that SWRCB Res. 68-16 and Res. 92-49 do not constitute chemical-specific ARARs (i.e., 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 Regs. tit. 22 § 66424.94, which have been

determined to be ARARs for the IR Site 2 groundwater remedial action. The Water Board and Cal/EPA DTSC do not agree with the Navy's determination that SWRCB Res. 92-49 and Res. 68-16 are not ARARs for the IR Site 2 remedial action; however, the Water Board and Cal/EPA DTSC agree that the MNA groundwater remedy would comply with SWRCB Res. 92-49 and Res. 68-16. MCLs are specifically not ARARs for the groundwater remedial action for IR Site 2, as documented in the FS and as concurred with by U.S. EPA, Cal/EPA DTSC, and the Water Board.

Comment No. 11: The landfill cap proposed is not suitable for burrowing animals. Because the RAB has been continuously told no animals live on the site and all documents state the site is uninhabited, the RAB requested four feet of cover and a rodent barrier. However, now that it is known that there are ground squirrels on site, even four feet of cover is not adequate. Ground squirrels in order to thrive need six feet of soil in which to burrow. The presence of ground squirrels provides a suitable diet for red tailed hawks and other raptors, keeping them from preying on the least Tern chicks. If the ground squirrel colony does not thrive, this may lead to significant negative impacts to the California least tern colony. This was not considered in developing the proposed plan. This least tern colony has consistently provided a significant percentage of annual fledglings for the entire species listed as endangered by the U.S. Fish and Wildlife Service. Due to these potential impacts the Navy should enter into a consultation with the Service concerning the Proposed Plan and the potential impacts to the least tern colony of the preferred alternative and its proposed institutional controls.

Response No. 11: Ecological management is currently employed for the protection of the Caspian and least tern colonies residing at Alameda Point. Potential predators of terns and tern eggs that are managed through this program include red fox, coyote, and carnivorous birds. Specifically, these potential predators are harassed, temporarily relocated, or in extreme circumstances culled periodically by field staff from the United States Fish and Wildlife Service (USFWS) to protect the terns. The Navy anticipates that the USFWS will continue to conduct ecological management in the future, after the IR Site 2 remedy is constructed. However, the Navy also anticipates interacting with the USFWS and other natural resource trustees throughout the CERCLA remedial design/remedial action process for IR Site 2. Please also see the response to Comment No. 1 from Ms. Joan Konrad above.

Comment No. 12: Soil samples were taken primarily at or near the surface, or outside the areas where wastes were deposited in the landfill and dredge spoils area. Groundwater sampling was widely spaced and intermittent.

Response No. 12: Please see the response to Comment No. 2 from Mr. Patrick G. Lynch above. Soil data are available from throughout IR Site 2, including in areas within the interior of the former landfill and the interior margin representative of worst-case site conditions, and from multiple depths, including the surface and subsurface. Groundwater data are similarly widespread throughout the site, including interior portions of the former landfill, and the permanent monitoring well network is suitable to characterize groundwater conditions throughout the site, including along the shoreline of the site.

Comment No. 13: The exploratory trenches, or “pits,” were relatively shallow (a maximum of four feet deep) compared to the depth of the wastes. The proposed plan states that no drums were found. This is not significant because the trenches were so shallow, because the trenches were dug outside the designated drum disposal areas and because the trenching areas were prescreened for metal, using a Schonstedt magnetometer to avoid areas where there was buried metal.

Response No. 13: During historical test pit activities conducted in 2002 as part of a geophysical investigation of IR Site 2, 12 trenches were dug in areas cleared of metal debris for the explicit purpose of evaluating the thickness of existing cover soils above buried waste material. Alternatively, during the RI, five test pits were completed within the former landfill specifically addressing areas with the greatest likelihood of having buried waste based on geophysical surveying and sampling data. One such RI test pit was installed specifically within an area historically identified as a drum disposal area and another was positioned immediately adjacent to an area historically identified as a drum disposal area based on higher geophysical readings at the test pit location. None of the RI test pits revealed the presence of buried drums. For practical reasons, the test pits were only completed to and slightly below the water table. However, based on known disposal history at IR Site 2 (i.e., trench and fill methods), it is unlikely that waste was ever emplaced to significant depths below the water table (see the response to Comment No. 14 from the Alameda Point RAB with support from Sierra Club and Audubon Society below). Note that one of the five RI test pits extended to 8.5 feet below ground surface, which is deeper than the “maximum four feet depth” referenced in the comment. Regardless, the site has been investigated thoroughly and the remedy, which consists primarily of a multilayer soil cover system and groundwater MNA and has been concurred with by U.S. EPA, Cal/EPA DSTC, and the Water Board, is suitable to accomplish the RAOs.

Comment No. 14: From the RAB’s 2008 site tour, it appears that the surface elevation of the landfill is 15 to 20 feet above the water level in North Pond. The Proposed Plan describes the construction of Site 2 as starting with the construction of the seawall, followed by filling in the enclosed shallow bay waters with wastes. The wastes probably extend to a depth considerably below sea level, as has been shown in cross-sections cited by Dr. Oberdorfer in her comments. This implies that there is a considerable depth of waste material that has never been sampled. Using the estimated waste tonnage of 1.6 MM tons, the site area of 77 acres and typical in-place densities for wastes, it is estimated that the average waste depth is between 13 and 22 feet. As the fill probably is not homogenous, the maximum depth could be considerably greater.

Response No. 14: The Navy is not familiar with any comments on IR Site 2 documentation from Dr. Oberdorfer, and any specific reference to cross-sections showing the depth of waste at IR Site 2. There is some uncertainty in the precise depth of waste placement at IR Site 2. Specifically, as indicated in the response to Comment No. 13 from Alameda Point RAB with support from Sierra Club and Audubon Society above, waste was placed at IR Site 2 using trench and fill methods based on known disposal history at the site. Disposal trenches were likely to have been excavated to the groundwater surface but potentially some additional depth beyond this surface. Given the volume of waste material that was reportedly disposed at IR Site 2, the area over which waste was reported or suspected to have been disposed, the variable depth of the water table, and available general site information, including documentation of historical

interviews with Alameda Point personnel, it is presumed that waste was deposited to a depth on the order of 8 to 12 feet below ground surface. Geophysical surveying conducted in conjunction with the RI confirmed the widespread occurrence of buried landfill waste at the site. In addition, invasive sampling and observations conducted during the RI, including soil borings, exploratory trenching, and groundwater sampling, generally support these presumptions regarding waste placement.

The general condition across IR Site 2 is a shallow groundwater surface, and there is also measured fluctuation, both positive and negative, in the depth of groundwater. Direct observations made at IR Site 2 during invasive RI sampling indicate the depth to groundwater across the portion of the site where the majority of waste is buried (i.e., the former landfill) is on the order of 2 to 6 feet, and even more shallow during the wet season (i.e., very near the ground surface). These direct measurements specifically indicate that a great deal of the waste material buried at IR Site 2 is likely to be permanently or regularly saturated and exposed continuously or at least nearly continuously to leaching. This also suggests that only a fraction of the buried waste at IR Site 2 exists above the water table in an unsaturated condition.

Throughout its history, IR Site 2 has not been protected by any form of impermeable surface covering. Rather, the native soil material at the site, and the material that has been used historically as cover soil, is predominantly sandy and permeable. This would indicate that even the waste material that is above the average groundwater surface, whatever its relative abundance in comparison to the permanently saturated waste below the average groundwater surface, would be exposed to the wetting effects of contact with infiltrating precipitation and leaching associated with this infiltrating water.

Persistent episodes of higher groundwater elevations have been observed in the San Francisco Bay region. Specifically, El Nino weather events that led to prolonged periods of increased precipitation and increases in regional surface water levels were observed in 1957-58, 1982-83, and 1997-98. Of related importance, the increased levels of precipitation during the El Nino episodes and other observed periods that gave rise to the increased surface water and groundwater elevations would have led to increased rates of infiltration through the permeable IR Site 2 soils and increased subsurface waste wetting and saturation.

All of these physical conditions (i.e., waste placement methods, general groundwater elevations relative to waste depth, the permeability of site soils, and fluctuations in groundwater levels relative to prolonged climatic forces) are interrelated, and taken together suggest that much of the buried waste at IR Site 2 is continuously or nearly continuously saturated and that subsurface waste is directly exposed to the effects of infiltrating precipitation and fluctuating groundwater elevations. The impact of this waste saturation, wetting, and leaching has been ongoing for over 30 to over 50 years (i.e., over 30 years for waste placed at the end of the active landfill period in 1978, and over 50 years for waste placed at the beginning of the active landfill period in 1956). Overall, it is a reasonable position that IR Site 2 groundwater is at least at steady state relative to the dissolution of contamination from the buried waste mass. As such, the temporally, laterally, and analytically extensive groundwater dataset for IR Site 2 that was used to characterize contaminant occurrence, distribution, and mobility in site groundwater also defines the contaminant impacts associated with the buried waste at the site.

Comment No. 15: The Navy's preferred soil alternative (Alternative 2) of a soil cover and rodent barrier does not appear adequate to prevent the release of contamination into the ponds and Bay following a design basis earthquake. Foster Wheeler's 2003 Geotechnical Feasibility Study for Site 2 showed lateral displacements of 20 feet due to slope instability and/or liquefaction during a strong earthquake. The Foster Wheeler analysis only looked at the seismic stability of the seawall. It is likely that the berm next to the landfill also would be subject to slope failures of about 20 feet due to a strong event. Large earthquakes on the Hayward Fault are known to occur at about 140 year intervals. As it has been almost 140 years since the last large earthquake on that fault, it is certain that the landfill will experience a strong earthquake in the not too distant future. The Navy will continue to be responsible for the resulting damages due to the release of contaminants, for repairs to the seawall, berm and land fill cover and for litigation costs associated with lawsuits brought by public entities and environmental groups.

Response No. 15: Please see the response to Comment No. 2 from the RAB with support from the Sierra Club and Audubon Society.

Comment No. 16: The point of release to the waters of the Bay is the culvert in the landfill berm abutting North Pond. Except for the landfill portion in the northwest corner of the site, the seawall does not adjoin the landfill. The monitoring wells along the western and southern sides of the wetlands are unlikely to detect any contaminants because of the diluting effect of the Bay waters flushing contaminants out through the culvert.

Response No. 16: The Navy agrees that a point of discharge from the site is through the North Pond culvert, as has been acknowledged in the CERCLA documentation for IR Site 2. Direct surface water and sediment sampling and toxicity and bioaccumulation testing in the wetland ponds do not support the position that the ponds have been significantly impacted or that flushing through the North Pond culvert is responsible for contamination moving to San Francisco Bay. Moreover, direct investigation of Western Bayside has revealed that the offshore environment around IR Site 2 is also not impacted (see the response to Comment No. 3 from Mr. Patrick G. Lynch above). The monitoring wells along the perimeter of IR Site 2, some of which are directly adjacent to the former landfill portion of the site and others of which are adjacent to the wetlands, directly monitor conditions in groundwater that is potentially discharged to San Francisco Bay.

Comment No. 17: Although the Feasibility Study mentions radium and radioactivity as being present within the body of the landfill (as opposed to the near surface), the Proposed Plan implies that radiological wastes are not present below the surface. This appears to be misleading. The first full paragraph on the right side of page 2 lists potential sources of contamination as "...general household waste and several industrial and process wastes, including asbestos, pesticides, sandblasting grit, waste oils and solvents, painting and plating wastes, inert ordnance and medical wastes," but does not mention radiological wastes. On page 3 the first paragraph under Remedial Investigation Summary states that no radiological wastes were found during test pit activities. The cost estimate for Alternative 6 (near complete removal) includes costs of \$552 MM, out of a total of \$903 MM, for radiological screening and disposal. The Navy must consider sub-grade (below two feet) radiological contamination to be a major potential cost.

Response No. 17: As indicated in the response to Comment No. 1 from Patrick G. Lynch above, certain detail was incorporated into the Proposed Plan for IR Site 2 to convey an understanding of site conditions, calculated site risks, and conceptual details of the various remedies considered and the preferred remedial alternative, but the purpose of the Proposed Plan was not to provide all specific details of the site or the site remedy. The radiological waste streams reportedly disposed at IR Site 2, as documented in other CERCLA documents for the site, are in fact a potential contaminant source even though not specifically cited in the Proposed Plan. Some radiological contamination was detected and removed during a TCRA conducted in 2008, after the RI, and based on the conclusions of the TCRA the Navy will be scanning the surface and removing radiological hotspots prior to placing the multilayer soil cover at IR Site 2.

The costs for the near-complete removal scenario (i.e., Soil Alternative 6), at approximately \$900 million, are dominated by the costs of excavation, soil screening and characterization, and backfill (i.e., combined approximately \$446 million), waste disposal (i.e., approximately \$191 million), and CERCLA-recommended contingencies for construction (i.e., 20% of total capital costs, or approximately \$127 million). In turn, the costs for soil screening and characterization include cost for radiological screening and the costs for soil disposal include cost for radiological waste disposal, both of which were recommended by the regulatory agencies and other reviewers of CERCLA documents for inclusion in the remedial alternative cost estimates. Ultimately, all component costs were vetted through the agencies and other important groups, including the Navy's RASO. It should be noted that the radiological screening of soil and disposal of radiologically impacted waste is significantly more costly on a unit base when compared even to hazardous waste.

Comment No. 18: The selected remedies should take into account global climate change and rising sea levels. It is irrelevant that other low-lying areas of Alameda may be subject to future inundation that will be addressed separately. This long-term view is especially important because of toxic chemicals resistant to natural degradation and the 1,600-year half-life of radium 226.

Response No. 18: The Navy has previously acknowledged this comment and does not wish to diminish this very serious global phenomenon. The CERCLA remedial process includes five-year reviews for the duration that ICs are in place at a site. According to U.S. EPA guidance, the five-year review process determines if any other information has come to light that could call into question the protectiveness of a remedy. Such reviews are incorporated into the remedy for IR Site 2, and if climate change becomes a relevant factor in assessing the protectiveness of the remedy, it will be addressed accordingly in compliance with CERCLA. Furthermore, annual inspections of the multilayer soil cover will be conducted to ensure its integrity and effectiveness. These annual inspections will provide another opportunity to identify whether climate change becomes a factor in assessing the protectiveness of the remedy.

Comment No. 19: There should be more monitoring wells along the west side of the landfill berm, as that is the most likely location for releases to the waters of the ponds and the Bay.

Response No. 19: As indicated in the IR Site 2 FS Report and the Proposed Plan, the groundwater monitoring approach for the site remedy is assumed to be to sample the significant

number of existing site monitoring wells along the shoreline of IR Site 2 on a regular basis for an extensive list of target analytes. Ultimately, the precise scope of the groundwater monitoring (i.e., monitoring locations, frequency, and appropriate methods to evaluate resulting data) will be determined at the remedial design/remedial action work plan stage. Details incorporated into the remedial design/remedial action work plan for IR Site 2 will be developed in consultation with the U.S. EPA, Cal/EPA DTSC, and Water Board to ensure their appropriateness with respect to ensuring the long-term effectiveness of the remedy.

Comment No. 20: Tributyl tin should have been carried forward as a contaminant of concern. It is present in the sandblasting grit used as road base to construct the roads and berm in the landfill. It also should be present in the dredge spoil disposal area in the wetlands as those dredging wastes came from Seaplane Lagoon. Tributyl tin toxicity values are listed and were considered in the RI for Seaplane Lagoon.

Response No. 20: Tributyl tin was investigated throughout IR Site 2, including in soil, groundwater, surface water, and sediment in the wetland portion of the site, and all of the data generated for the site were used to evaluate the nature and extent of contamination, complete the risk assessments, and develop an appropriate risk management strategy and remedial approach for IR Site 2. Tributyl tin was not observed to be widespread and was not determined to be a driver of site remediation based on the rigorous risk assessments conducted for the site.

Comment No. 21: Under the Navy's preferred soil remedy, additional exploratory trenching is planned in the northeast and northwest corners of the site. These trenches should be deep enough to characterize the wastes, not just materials on or near the surface. Characterization should not be solely visual; samples should be taken and analyzed for chemicals of concern, including radioactivity.

Response No. 21: The purpose of the test pits that will be completed during the remedial design stage will be to further investigate the potential presence of buried waste in the northern portion of the site. The specific details including the total number, location, and depth of future test pits will be defined during the remedial design/remedial action work plan development process. If any information becomes available that suggests the extensive presence of buried waste in these areas that could materially affect remedial effectiveness, it will be addressed in the remedial design.

Response No. 22: The proposed plan does not include adequate monitoring wells to guarantee the safety of the ponds and bay.

Response No. 22: Please see the responses to Comment No. 1 from Patrick G. Lynch and Comment No. 19 from the RAB with support from the Sierra Club and Audubon Society above.

Comment No. 23: Regardless of the final remediation path chosen by the Navy and approved in the ROD, the Navy should retain responsibility for the remediation of all residual contaminants not identified or treated as a result of the final remediation actions that are revealed in the future (regardless of new owners of the property) and for all berm maintenance into the future to

ensure that any contaminants remaining in the landfill are not released into the Bay due to berm failure.

Response No. 23: The CERCLA remedial process includes five-year reviews for the duration that ICs are in place at a site. According to U.S. EPA guidance, the five-year review process determines if any other information has come to light that could call into question the protectiveness of a remedy. Such reviews are incorporated into the remedy for IR Site 2, and if a relevant factor is identified in assessing the protectiveness of the remedy, it will be addressed accordingly in compliance with CERCLA. In addition, as described in the response to Comment No. 18 above from the RAB with support from the Sierra Club and Audubon Society, annual inspections of the multilayer soil cover will be conducted to ensure its integrity and effectiveness. The Navy's legal obligations with respect to residual contamination and remedy maintenance at IR Site 2 will be governed by institutional controls that the Navy will be responsible for implementing, inspecting, reporting, maintaining, and enforcing.

Comment No. 24: The proposed plan does not include two for one mitigations for impacts to the ponds from the construction of the landfill cover.

Response No. 24: The Navy will address potential impacts on wetlands during the remedial design process for the landfill cover as described in Section 2.9.2.1 of the ROD. See also response to Comment No. 1 in responses to comments by Ms. Joan Konrad (Alameda Point RAB Member) in this Responsiveness Summary.

Comments by Ms. Leslie Little:

Comment No. 1: The Alameda Reuse and Redevelopment Authority (ARRA) has reviewed the Navy's August 2009 Final Proposal Plan (PP) for IR Site 2, Former NAS Alameda. In keeping with the comments the ARRA has submitted on numerous occasions during the remedy selection process for Installation Restoration (IR) Site 1, the 1943-1956 Disposal Area, the ARRA reiterates its long-standing position concerning cleanup of landfilled wastes at Alameda Point. Excavation and removal of the waste is the only satisfactory remediation for the IR Site 2 landfill. Merely covering the buried wastes is unacceptable. The landfill is not compatible with this urban setting on the shores of San Francisco Bay.

Response No. 1: The amount of characterization completed at IR Site 2 is extensive and appropriate, and was used to guide the development of the risk management framework and the FS for the site. At IR Site 2, a significant amount of data were collected from the interior of the landfill to determine whether possible sources of contamination were present, thorough human health and ecological risk assessments were completed to evaluate potential risks presented by the contaminants identified using appropriate receptors and multiple exposure pathways, and a conventional FS that evaluated the full spectrum of possible remedial technologies was prepared. IR Site 2 has been properly characterized, and the evaluation of risks and risk mitigation strategies clearly demonstrates that complete or near-complete removal of landfill waste is not required to reduce site risks sufficiently and to meet RAOs.

Comment No. 2: The Navy should remove all wastes from the IR Site 2 landfill, with off-site disposal. At its November 1, 2006, meeting, the ARRA Board adopted the positions that

complete removal, not isolation beneath a soil cover, is the only appropriate remedy for landfilled wastes at IR Site 1, which is adjacent to IR Site 2. The ARRA Board unanimously reaffirmed this position at its October 3, 2007, and September 15, 2009, meetings.

Similarly, the ARRA believes complete removal, not isolation beneath a soil cover, is the only appropriate remedy for the wastes buried at IR Site 2. That is, the Record of Decision should select Soil Alternative 6 (near-complete removal), not Soil Alternative 2 (multilayer soil cover), the PP's preferred remedial alternative for IR Site 2 soil.

Among the considerations favoring Soil Alternative 6 are:

- This landfill was the primary waste disposal location for the Naval Air Station Alameda from 1956 until 1978. The base generated large amounts of hazardous wastes during this time, many of which have caused extensive soil and groundwater contamination elsewhere on Alameda Point. It is reasonable to assume similar wastes are buried in IR Site 2. If the buried radioactivity and other contaminants migrate from the landfill, they likely will constitute unacceptable risks to human health and the environment. The landfill should be excavated and disposed of offsite before this occurs.*
- The landfill is very close to San Francisco Bay. Earthquakes, tsunamis, storm surges, and long-term shoreline erosion could lead to hazardous wastes reaching the Bay. If the wastes were disposed offsite, aquatic habitats in the area would be protected from these hazards.*

The ARRA believes a soil cover over the landfill (Soil Alternative 2, the Navy's preferred alternative) is unacceptable. It is highly uncertain that a soil cover will be effective into the future. If groundwater migration from the landfill worsens, the environmental regulatory agencies likely would require the Navy to upgrade the soil cover to an engineered cap and install a perimeter, and impermeable barrier.

Merely covering the landfill with four feet of soil is unacceptable. The buried low-level radiological waste and other wastes should be excavated and removed from Alameda Point. Only landfill removal will restore the area to the environmental quality it had when the Navy acquired it.

Response No. 2: Samples have been collected throughout IR Site 2 and from all environmental media, including soil, soil gas, groundwater, sediment, surface water, and biota, to assess potential sources and identify site contamination. Specifically, the RI dataset includes extensive soil and groundwater chemistry data and observations from borings and test pits, including in areas within the interior of the former landfill and the interior margin representative of worst-case site conditions, site-specific toxicity and bioaccumulation testing, non-invasive assessment tools including geophysical surveying, and historically available data, including landfill gas sampling data, all of which have provided information that has been used to generate a detailed CSM for the site. The scope of work for the collection of RI data was fully vetted with the U.S. EPA, Cal/EPA DTSC, and Water Board through a detailed RI sampling work plan. The characterization dataset developed for IR Site 2 is spatially and analytically extensive. The data generated at IR Site 2 are of sufficient quantity and quality to have developed an understanding

of the nature and extent of contamination, performed rigorous risk assessments, and contemplated appropriate risk management scenarios and remedial strategies. The Proposed Plan for IR Site 2 presented the preferred remedial alternative for IR Site 2 based on the significant amount of environmental data collected, the rigorous risk assessments completed, and the risk management scenarios and remedial strategies evaluated.

The risk of shoreline erosion at IR Site 2 is considered negligible, given the existence of massive stone riprap that forms the site perimeter seawall. The Navy has previously indicated that it will evaluate seismic mitigation measures for the site that will mitigate against the risk of seismic failure. Specifically, the analysis of ARARs for the site indicates that the Navy will comply with the intent of Cal. Code Regs. tit. 22, § 66264.310(a)(5), which requires that a landfill cover be designed to withstand an MCE. While the multilayer soil cover will be designed to withstand an MCE, a comprehensive analysis of the need for seismic mitigation measures cannot be completed until the detailed design phase is underway, nor can the Navy determine whether earthquake drains, stone columns, or some other seismic mitigation technique is more appropriate than another. At a minimum, the seismic requirements for landfill covers will be met by monitoring the cover and by providing for any necessary repairs following significant damage by a potential future earthquake. This repair program will be documented in an operations and maintenance plan prepared during the remedial design/remedial action work plan phase. If, during the detailed design phase, it is determined that more significant seismic measures are required for the cover system to withstand an MCE, the design process will address this situation accordingly.

Overall, it is a reasonable position that IR Site 2 groundwater is at least at steady state relative to the dissolution of contamination from the buried waste mass (see the response to Comment No. 14 from the RAB with support from the Sierra Club and Audubon Society above). As such, the extensive groundwater dataset for IR Site 2 provides an accurate measure of contaminants in site groundwater that in turn characterizes the buried waste mass. Direct surface water and sediment sampling and toxicity and bioaccumulation testing in the wetland ponds do not support the position that the ponds have been significantly impacted or that flushing through the North Pond culvert is responsible for contamination moving to San Francisco Bay. Moreover, direct investigation of Western Bayside has revealed that the offshore environment around IR Site 2 is also not impacted (see the response to Comment No. 3 from Mr. Patrick G. Lynch above).

The preferred remedy for soil as presented in the Proposed Plan for IR Site 2 is based on a multilayer soil cover system to provide protection against identified site risks, as well as ICs to ensure residual risk mitigation throughout the site. The multilayer soil cover system and the ICs will be monitored and maintained to ensure their long-term effectiveness. The CERCLA remedial process generally includes five-year reviews for the duration that ICs are in place at a site. According to U.S. EPA guidance, the five-year review process determines if any other information has come to light that could call into question the protectiveness of a remedy. Such reviews in addition to annual inspections are incorporated into the soil cover remedy for IR Site 2, and if a relevant factor is identified in assessing the protectiveness of the remedy, it will be addressed accordingly in compliance with CERCLA.



Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administrative Record
1	Administrative Record	Section 1.0	Administrative Record Index for IR Site 2.
2	Potential sources of contamination	Section 1.0	Final Remedial Investigation Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and Blasland, Bouck, and Lee, Inc. (BBL). June 23, 2006. Section 2.11, pages 2-14 through 2-16; Figure 2-11.
3	not considered a potential drinking-water source	Section 1.0	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 2.3.6.2, pages 2-8 through 2-10; Section 3.3.2, pages 3-19 and 3-20; Appendix C, Section C2.2.1.1, pages C2-3 through C2-5; Appendix C, Attachments C3 through C5.
4	disposal activities	Section 2.1.2	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 2.2, pages 2-1 and 2-2.
5	topography	Section 2.2	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 2.3.2, pages 2-4 and 2-5; Figure 2-3.
6	hydrogeologic setting	Section 2.2	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 2.3.6.2, pages 2-8 through 2-10; Figures 2-4 through 2-10.
7	Groundwater flow	Section 2.2	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 2.3.6.2, pages 2-8 through 2-10; Figure 2-11.
8	plant species and animal species	Section 2.2	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 2.3.7, pages 2-10 through 2-13; Tables 2-1 through 2-3, and Table 2-14.
9	contaminant fate and transport	Section 2.2	Final Remedial Investigation Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. June 23, 2006. Section 8.2, pages 8-5 through 8-11.
10	Numerous historical investigations	Section 2.3	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 2.4, pages 2-16 through 2-30; Figures 2-13 through 2-19; Tables 2-4 through 2-17.

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administrative Record
11	Initial and supplemental investigations	Table 2-1	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 2.4, pages 2-16 through 2-30; Figures 2-13 through 2-19; Tables 2-4 through 2-17.
12	nature and extent of contamination	Section 2.3	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 2.6.2, pages 2-41 and 2-42.
13	Human Health Risk Assessment (HHRA)	Section 2.5	Final Remedial Investigation Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. June 23, 2006. Section 6.0, pages 6-1 through 6-43; Figures 6-1 through 6-8; Tables 6-1 through 6-46; Appendix J.
14	Ecological Risk Assessment (ERA)	Section 2.5	Final Remedial Investigation Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. June 23, 2006. Section 7.0, pages 7-1 through 7-66; Figures 7-1 through 7-4; Tables 7-1 through 7-56. Appendix K.
15	Conceptual site models (CSMs)	Section 2.5	Final Remedial Investigation Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. June 23, 2006. Figures 6-7 and 7-2 through 7-4.
16	summary of findings for the HHRA and the ERA	Section 2.5	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 2.7, pages 2-45 through 2-49; Tables 2-18 and 2-19.
17	site-specific toxicity tests	Section 2.5.2	Final Remedial Investigation Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. June 23, 2006. Section 7.4.4.3, pages 7-49 through 7-53; Appendix C.
18	step-wise risk management process	Section 2.5.3	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 3.2, pages 3-8 through 3-17; Figure 3-1; Tables 3-1 through 3-11.
19	Guide to Principal Threat and Low-Level Threat Wastes	Section 2.6	Guide to Principal Threat and Low Level Threat Wastes. U.S. EPA Office of Solid Waste and Emergency Response. OSWER Directive 9380.3-06FS. November 1991.
20	initial screening of remedial alternatives	Section 2.8	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Tables 4-1 and 4-2.
21	detailed analysis of alternatives	Section 2.8	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 5.3, pages 5-33 through 5-67; Figures 5-1 through 5-13; Tables 5-1 through 5-4.
22	1 - No Action	Table 2-8	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 5.3.1.1.1, page 5-34.

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administrative Record
23	2 - Multilayer Soil Cover, Engineering and Institutional Controls, and Monitoring	Table 2-8	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 5.3.1.2.1, pages 5-35 through 5-40; Figures 5-1 and 5-8.
24	3 - Engineered Cap, Engineering and Institutional Controls, and Monitoring	Table 2-8	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 5.3.1.3.1, pages 5-44 through 5-46; Figures 5-2 and 5-10.
25	6 - Near-complete Removal and Backfill, Dewatering, Engineering and Institutional Controls, Disposal, and Monitoring	Table 2-8	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 5.3.1.4.1, pages 5-49 through 5-52; Figures 5-5 and 5-11.
26	1 - No Action	Table 2-9	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 5.3.2.1.1, page 5-56.
27	2 - Monitored Natural Attenuation and Engineering and Institutional Controls	Table 2-9	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 5.3.2.2.1, pages 5-57 through 5-61; Figure 5-6.
28	3 - Hydraulic Barrier, Pump and Treat, Disposal, Monitored Natural Attenuation, and Engineering and Institutional Controls	Table 2-9	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Section 5.3.2.3.1, pages 5-63 through 5-65; Figure 5-7.
29	Appendix G of the FS	Section 2.8.2.1	Final Feasibility Study Report IR Site 2, West Beach Landfill and Wetlands Alameda Point, California. Battelle and BBL. October 22, 2008. Appendix G.
30	transcript of the public meeting	Section 2.10	Proposed Plan for Installation Restoration Site 2 at Alameda Point, Alameda Point, California, Public Meeting. Jan Brown & Associates. August 27, 2009.

Acronyms and Abbreviations

AR	Administrative Record
ARIC	area requiring institutional controls
ARAR	applicable or relevant and appropriate requirement
ARRA	Alameda Reuse and Redevelopment Authority
BRAC	Base Realignment and Closure
Cal/EPA	California Environmental Protection Agency
CDPH	California Department of Public Health
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COC	contaminant of concern

cpm	counts per minute
CSM	conceptual site model
CTR	California Toxics Rule
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DTSC	Department of Toxic Substances Control
ERA	ecological risk assessment
FFA	Federal Facilities Agreement
FS	Feasibility Study
FWBZ	first water-bearing zone
HHRA	human health risk assessment
HPAH	high molecular weight PAH
HQ	hazard quotient
HRA	historical radiological assessment
IAS	initial assessment study
IC	institutional control
IR	Installation Restoration
LPAH	light molecular weight PAH
LUC	land use control
MCE	maximum credible earthquake
MCL	maximum contaminant level
MNA	monitored natural attenuation
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPPEH	materials potentially presenting an explosive hazard
NAS	Naval Air Station
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priority List
NPV	net present value
OEW	ordnance and explosive waste
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCDD	polychlorinated dibenzodioxin
PCDF	polychlorinated dibenzofuran
PDC	preliminary development concept

QA	quality assurance
RAB	Restoration Advisory Board
RAO	remedial action objective
RASO	Radiological Affairs Support Office
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RG	remediation goal
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SVOC	semivolatile organic compound
SWAT	solid waste assessment test
SWBZ	second water-bearing zone
TCRA	Time Critical Removal Action
TEQ	toxicity equivalent
U.S.C.	United Statutes Code
U.S. EPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
Water Board	San Francisco Regional Water Quality Control Board
WET	wetland evaluation technique

(This page intentionally left blank.)

Appendix A

ARAR Analysis

(This page intentionally left blank.)

CHEMICAL-SPECIFIC^a APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Requirement	Prerequisite	Citation ^b	ARAR Determination	Comments
SOIL				
FEDERAL ARARs FOR CHEMICAL CONTAMINATION				
Resource Conservation and Recovery Act (Title 42 USC, ch. 82, §§ 6901 through 6991[i])^c				
Defines RCRA hazardous waste. A solid waste is characterized as toxic, based on the TCLP, if the waste exceeds the TCLP maximum concentrations.	Waste	Cal. Code Regs. tit. 22, § 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100	Applicable	Applicable for determining whether waste is hazardous.
Groundwater protection standards: requirements to ensure that hazardous constituents entering the groundwater from a regulated unit do not exceed the concentration limits for contaminants of concern in the uppermost aquifer underlying the waste management area of concern at the POC.	A regulated unit that receives or has received hazardous waste before July 26, 1982, or regulated units that ceased receiving hazardous waste prior to July 26, 1982, where constituents in or derived from the waste may pose a threat to human health or the environment	Cal. Code Regs. tit. 22, § 66264.94(a)(1) and (3), (c), (d), and (e)	Relevant and appropriate	While these standards are not applicable because IR Site 2 does not contain an RCRA waste management unit, the Navy has determined that the substantive provisions are potentially relevant and appropriate ARARs for this response action because the wastes at the site are similar to RCRA hazardous waste constituents.

CHEMICAL-SPECIFIC^a APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Requirement	Prerequisite	Citation ^b	ARAR Determination	Comments
SOIL (Continued)				
FEDERAL ARARs FOR CHEMICAL CONTAMINATION				
Uranium Mill Tailings Radiation Control Act ^c				
In any occupied or habitable building the objective of remedial action shall be, and reasonable effort shall be made to achieve, an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 working level. In any case, the radon decay product concentration (including background) shall not exceed 0.03 working level. Provisions applicable to radon-222 shall also apply to radon-220.	UMTRCA Sites	40 CFR § 192.12(b)(1) and 192.41(b)	Relevant and appropriate	These requirements are not applicable because IR Site 2 is not an UMTRCA site. The Navy has determined that these requirements are relevant and appropriate because radiological contamination may remain on IR Site 2. Currently there are no buildings on IR Site 2 property and no buildings are planned in the future. However, because the ICs do not prohibit the construction of all new buildings (ICs prohibit construction of the buildings associated with the prohibited land uses listed in Table 2-12 of the ROD), these requirements are necessary. If buildings are constructed on IR Site 2 in the future, the transferee will address these requirements in documents provided to the FFA signatories and CDPH for approval of land disturbing activities.

CHEMICAL-SPECIFIC^a APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Requirement	Prerequisite	Citation ^b	ARAR Determination	Comments
SOIL (Continued)				
FEDERAL ARARs FOR CHEMICAL CONTAMINATION (Continued)				
Uranium Mill Tailings Radiation Control Act ^c				
Concentration limits for cleanup of gamma radiation in buildings at inactive uranium processing sites designated for remedial action. In any occupied or habitable building, the level of gamma radiation shall not exceed the background level by more than 20 microroentgens per hour.	UMTRCA sites	40 CFR § 192.12(b)(2)	Relevant and appropriate	These requirements are not applicable because IR Site 2 is not an UMTRCA site. The Navy has determined that these requirements are relevant and appropriate because radiological contamination may remain on IR Site 2. Currently there are no buildings on IR Site 2 property and no buildings are planned in the future. However, because the ICs do not prohibit the construction of all new buildings (ICs prohibit construction of the buildings associated with the prohibited land uses listed in Table 2-12 of the ROD), these requirements are necessary. If buildings are constructed on IR Site 2 in the future, the transferee will address these requirements in documents provided to the FFA signatories and CDPH for approval of land disturbing activities.
Standards for cleanup of land and buildings contaminated with radium-226, radium-228, and thorium from inactive uranium processing sites. As a result of residual radiological materials from any designated processing site: (a) The concentration of radium-226 in land averaged over any area of 100 square meters shall not exceed the background level by more than: (1) 5 pCi/g, averaged over the first 15 cm of soil below the surface, and (2) 15 pCi/g, averaged over 15 cm thick layers of soil more than 15 cm below the surface.	UMTRCA Title 1 Sites	40 CFR § 192.12(a), 192.32(b)(2), and 192.41(a)	Not ARARs	These requirements are not ARARs for IR Site 2. They are not applicable because IR Site 2 is not an UMTRCA Title 1 site. They are not relevant and appropriate for sites like IR Site 2 that are remediated based upon restricted reuse. The Navy will place ICs to prohibit residential use of IR Site 2 because the level of contamination that will remain at IR Site 2 will be above unrestricted use levels.

CHEMICAL-SPECIFIC^a APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Requirement	Prerequisite	Citation ^b	ARAR Determination	Comments
SOIL (Continued)				
FEDERAL ARARs FOR RADIOLOGICAL CONTAMINATION (Continued)				
Uranium Mill Tailings Radiation Control Act (Continued)^c				
NRC Radiological Criteria				
Performance objectives for the land disposal of low level radioactive waste. Concentrations of radioactive material that may be released to the general environment must not result in an annual dose exceeding 25 millirems to the body or any organ of a member of the general public.	Existing NRC-licensed low level radioactive waste disposal site	10 CFR § 61.41	Relevant and appropriate	These requirements are not applicable because IR Site 2 is not an NRC-regulated site. The Navy has determined that these requirements are relevant and appropriate because radiological contamination may remain on IR Site 2. Implementation of the remedy selected in this ROD will result in concentrations of released radiological material less than an annual dose of 25 millirems to the body or any organ of a member of the general public. See Table 2-4 of the IR Site 2 ROD for remediation goals for Ra-226.
Requires that the total effective dose equivalent to individual members of the public not exceed 0.1 rem from licensed operation: construction, operation, and decommissioning of commercial reactors and fuel cycle facilities; possession, use, processing, exporting, and certain aspects of transporting nuclear materials and waste; and siting, design, construction, operations, and closure of waste disposal sites.	Existing NRC-licensed site	10 CFR § 20.1301	Relevant and appropriate	These requirements are not applicable because IR Site 2 is not an NRC-regulated site. The Navy has determined that these requirements are relevant and appropriate because radiological contamination may remain on IR Site 2.
A site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in total effective dose equivalent to an average member of the critical group that does not exceed 25 mrem/yr, including that from groundwater sources of drinking water, and that the residual radioactivity has been reduced to as low as reasonably achievable.	Existing NRC-licensed radiologically-contaminated site.	10 CFR § 20.1402	Not an ARAR	These requirements are not applicable because IR Site 2 is not an NRC-regulated site. The Navy and U.S. EPA have determined that this requirement is not relevant and appropriate because: 1) the regulation addresses circumstances that are not sufficiently similar to the remedial action selected which includes a multilayer soil cover and ICs and 2) the Alameda IR Site 2 remediation goals are more protective.

CHEMICAL-SPECIFIC^a APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Requirement	Prerequisite	Citation ^b	ARAR Determination	Comments
SOIL (Continued)				
FEDERAL ARARs FOR RADIOLOGICAL CONTAMINATION (Continued)				
NRC Radiological Criteria (Continued)				
As a condition for license termination with restricted site use, the licensee must demonstrate that further reductions in residual radioactivity necessary to comply with the provisions of 10 C.F.R. § 20.1402 would result in net public or environmental harm or were not being made because the residual levels associated with restricted conditions are as low as reasonably achievable.	Existing NRC-licensed radiologically-contaminated site	10 CFR § 20.1403(a)	Not an ARAR	These requirements are not applicable because IR Site 2 is not an NRC-regulated site. These requirements are not relevant and appropriate because the remediation goals for IR Site 2 are protective of human health and the environment and are more stringent and protective than the criteria in 10 CFR § 20.1403.
As a condition for license termination with restricted site use, the licensee must make provisions for legally enforceable institutional controls that provide reasonable assurance that the total effective dose equivalent from residual radioactivity distinguishable from background to the average member of the critical group will not exceed 25 mrem/yr.	Existing NRC-licensed radiologically contaminated site	10 CFR § 20.1403(b)	Not an ARAR	These requirements are not applicable because IR Site 2 is not an NRC-regulated site. These requirements are not relevant and appropriate because the remediation goals for IR Site 2 are protective of human health and the environment and are more stringent and protective than the criteria in 10 CFR § 20.1403.

CHEMICAL-SPECIFIC^a APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Requirement	Prerequisite	Citation ^b	ARAR Determination	Comments
SOIL (Continued)				
STATE ARARs FOR CHEMICAL CONTAMINATION				
California Environmental Protection Agency Department of Toxic Substances Control				
Definitions of designated waste, nonhazardous waste, and inert waste.	Waste	Cal. Code Regs. tit. 27, §§ 20210, 20220, and 20230	Applicable	Applicable for classifying waste and determining ARAR status of other requirements.
Definition of non-RCRA hazardous waste.	Waste	Cal. Code Regs. tit. 22, § 66261.3(a)(2) (C) or 66261.3(a)(2)(F), 66261.22(a)(3) and (4), 66261.24(a)(2)–(a)(8), 66261.101(a)(1) and (a)(2)	Applicable	Applicable for determining whether a waste is a non-RCRA hazardous waste.
STATE ARARs FOR RADIOLOGICAL CONTAMINATION				
California Department of Public Health				
<p>This regulation requires each person granted a specific license to do the following:</p> <ul style="list-style-type: none"> keep records of information important to the decommissioning of a facility notify CDPH prior to vacating an installation that may have been contaminated with radioactive material complete certain activities if the person does not submit a specific license renewal application 	A person with a specific license granted pursuant to Group 2 of Title 17, Division 1, Chapter 5, Subchapter 4.	Cal. Code Regs. tit. 17, § 30256	Not an ARAR	<p><u><i>The State Regulation is not Applicable.</i></u></p> <p>A CERCLA action must comply with promulgated State requirements, which are either “applicable” or “relevant and appropriate.” The Navy and U.S. EPA assert that the provisions of Cal. Code Regs. tit. 17 § 30256 are not “applicable” requirements because these regulations by their express terms apply to facilities licensed by the State of California that are undergoing a license termination process. The remediation of IR Site 2 under CERCLA is not part of a decommissioning or license termination procedure nor has any state license ever been issued for IR Site 2 because California laws and regulations</p>

CHEMICAL-SPECIFIC^a APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Requirement	Prerequisite	Citation ^b	ARAR Determination	Comments
SOIL (Continued)				
STATE ARARs FOR RADIOLOGICAL CONTAMINATION (Continued)				
California Department of Public Health (Continued)				
<ul style="list-style-type: none"> submit a decommissioning plan for approval by CDPH, and if approved, complete decommissioning <p>The regulation also provides that if the information submitted does not adequately demonstrate that the premises are suitable for release for unrestricted use, CDPH shall inform the licensee of appropriate further actions and that specific licenses shall be terminated by written notice to the licensee when CDPH determines that: (1) radioactive material has been properly disposed; (2) reasonable effort has been made to eliminate residual radioactive contamination, if present; and (3) a radiation survey has been performed which demonstrates that the premises are suitable for release for unrestricted use; or other information submitted by the licensee is sufficient to demonstrate that the premises are suitable for release for unrestricted use.</p>				<p>regarding possession of radioactive materials do not apply to land possessed by the federal government.</p> <p><u><i>The State Regulation is not Relevant and Appropriate.</i></u></p> <p>The Navy and U.S. EPA also assert that the provisions of this regulation are not “relevant and appropriate” because standards for de-commissioning a licensed facility are not “appropriate” for this Site because they do not address a set of circumstances similar to the remediation of IR Site 2. The NCP specifies a series of factors to be used to compare the proposed CERCLA action with potential ARARs to determine if a requirement is both relevant and appropriate (40 CFR § 300.400[g][2]). The CDPH regulation can be distinguished from the selected remedial action for IR Site 2 on a number of bases, including the medium addressed, type of action/activity regulated, and type of place regulated.</p> <p>More specifically, the license termination process described in the regulation appears to be intended to reach the conclusion that the facility is suitable for release for unrestricted use. This requirement is one among a detailed set of requirements for the “cradle to grave” management of licensed radiological material that were never applied to Alameda Point. The radionuclides addressed in IR Site 2 were not subject to such regulatory controls when they were utilized by the Navy or when they were released into the environment, and, hence, present very different issues, for example, very high volume of potentially impacted soil, low concentrations of radionuclides in soil, high cost of removal, etc.</p>

CHEMICAL-SPECIFIC^a APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Requirement	Prerequisite	Citation ^b	ARAR Determination	Comments
SOIL (Continued)				
STATE ARARs FOR RADIOLOGICAL CONTAMINATION (Continued)				
California Department of Public Health (Continued)				
				<p>The remedial action selected in this ROD provides for a surface scan of the landfill to identify and address radiological contamination which is accessible and a containment remedy for residual radionuclides consisting of a multilayer soil cover and enforceable ICs that will ensure adequate protection of human health and the environment by preventing unauthorized disturbance of the cover and limiting use of the property. Containment remedies for sites potentially containing radionuclides consisting of remedial caps or covers supported by enforceable ICs have been accepted by U.S. EPA and Cal/EPA DTSC as compliant with CERCLA and the NCP (for example, Marine Corps Air Station El Toro operable unit 2C [Site 3 and 5] ROD and Hunters Point Shipyard Amended Parcel B ROD).</p> <p><u><i>The State Regulation is not More Stringent than Federal ARARs or Risk-based Cleanup Levels.</i></u></p> <p>To qualify as a State ARAR under CERCLA and the NCP, a State regulation must be more stringent than Federal laws and regulations. See 40 CFR §§ 300.400(g)(4) and 300.515(h)(2). The State is responsible for identifying potential State ARARs that it believes are more stringent than Federal ARARs or risk-based cleanup levels and for demonstrating why they are more stringent. The remedy for IR Site 2 is based on a risk-based approach and the State has not demonstrated that the standards under § 30256(k) would be more stringent.</p>

CHEMICAL-SPECIFIC^a APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Requirement	Prerequisite	Citation ^b	ARAR Determination	Comments
SOIL (Continued)				
STATE ARARs FOR RADIOLOGICAL CONTAMINATION (Continued)				
California Department of Public Health (Continued)				
				<p>The State has asserted that the phrase “eliminate residual radioactive contamination” in subsection 30256(k)(2) established a more stringent standard because CERCLA does not require the elimination of residual radioactive contamination. The suggestion ignores the actual language of the regulation which requires only “reasonable effort to eliminate residual radioactive contamination.” This standard is by its terms flexible and cannot be assumed to require a more stringent cleanup than the selected CERCLA remedial action.</p> <p>Subsection (k) neither contains a numerical standard nor describes a narrative standard which would inform the question of whether (or what quantity of) radiological material can remain in the landfill. If there were a means to derive an objective standard from (k), that standard has not been identified by the State. Without an identified objective standard, there can be no basis for asserting that the requirement is more stringent than the CERCLA risk-based standards for the landfill. Although general goals can be considered state ARARs if they are directive in intent and enforceable (see NCP preamble at 55 Fed. Reg. 8746, March 8, 1990), CDPH has stated that California laws concerning possession of radioactive materials do not apply to property that remains in the possession of the federal government. Therefore, these laws are not enforceable as required by CERCLA and the NCP.</p>

CHEMICAL-SPECIFIC^a APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Requirement	Prerequisite	Citation ^b	ARAR Determination	Comments
SOIL (Continued)				
STATE ARARs FOR RADIOLOGICAL CONTAMINATION (Continued)				
California Department of Public Health (Continued)				
				<p><u><i>The State Regulation is not Substantive.</i></u></p> <p>A State regulation must be substantive rather than procedural to qualify as a State ARAR (See definitions of "applicable" and "relevant and appropriate" in the NCP at 40 CFR § 300.5). CDPH asserts that, in particular, subdivision (k) is a potential ARAR because it contains substantive requirements. Since these three criteria apply to decisions to terminate a specific license, the Navy and U.S. EPA interpret them to be procedural and not substantive requirements.</p> <p>In summary, the Navy and U.S. EPA have determined that the provisions of Cal. Code Regs. tit. 17 § 30256 do not constitute an ARAR because: (1) they are neither "applicable" nor "relevant and appropriate", (2) they have not been demonstrated by the State to be more stringent than federal ARARs or risk-based cleanup levels, and (3) they are not substantive requirements.</p>

CHEMICAL-SPECIFIC^a APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Requirement	Prerequisite	Citation ^b	ARAR Determination	Comments
GROUNDWATER				
FEDERAL ARARs				
Resource Conservation and Recovery Act (Title 42 USC, ch. 82, §§ 6901 through 6991[i])^c				
Defines RCRA hazardous waste. A solid waste is characterized as toxic, based on the TCLP, if the waste exceeds the TCLP maximum concentrations.	Waste	Cal. Code Regs. tit. 22, § 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100	Applicable	Substantive provisions are applicable for determining whether waste is hazardous.
Owners/operators of RCRA TSD facilities must comply with conditions designated to assure that hazardous constituents entering groundwater from a regulated unit do not exceed concentration limits for chemicals of concern set forth under Cal. Code Regs. tit. 22, § 66264.94 in the uppermost aquifer underlying the waste management area beyond the point of compliance.	Waste	Cal. Code Regs., tit. 22, § 66264.94(a)(1), (a)(3), (b), (c), and (e)	Relevant and Appropriate	These requirements are not applicable because IR Site 2 was used for waste disposal before the RCRA waste management unit regulations were in place. However, substantive provisions of these requirements are relevant and appropriate for groundwater at IR Site 2 because the wastes at the site are similar to RCRA wastes, making this a chemical-specific ARAR for development of site remediation goals.
STATE ARARs				
California Environmental Protection Agency Department of Toxic Substances Control				
Definition of non-RCRA hazardous waste.	Waste	Cal. Code Regs. tit. 22, § 66261.3(a)(2) (C) or 66261.3(a)(2)(F), 66261.22(a)(3) and (4), 66261.24(a)(2)–(a)(8), 66261.101(a)(1) and (a)(2)	Applicable	Applicable for determining whether a waste is a non-RCRA hazardous waste.

CHEMICAL-SPECIFIC^a APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Requirement	Prerequisite	Citation ^b	ARAR Determination	Comments
GROUNDWATER (Continued)				
STATE ARARs (Continued)				
State and Regional Water Quality Control Boards^c				
Authorizes the SWRCB and RWQCB to establish in water quality control plans beneficial uses and numerical and narrative standards to protect both surface water and groundwater quality. Authorizes regional water boards to issue permits for discharges to land or surface or groundwater that could affect water quality, including NPDES permits, and to take enforcement action to protect water quality.	Waters of the State	Cal. Water Code, div. 7, §§ 13241, 13243, 13263(a), 13269, and 13360 (Porter-Cologne Act)	Applicable	The Navy accepts the substantive provisions of §§ 13241, 13243, 13263(a), 13269, and 13360 of the Porter-Cologne Act enabling legislation, as implemented through the beneficial uses, WQOs, waste discharge requirements, promulgated policies of the Basin Plan for the San Francisco Bay Region.
Describes the water basins in the San Francisco Bay Region, establishes beneficial uses of groundwater and surface water, establishes water quality objectives, including narrative and numerical standards, and incorporates statewide water quality control plans and policies.	Waters of the State	Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) Chapter 2 and Chapter 3 (Cal. Water Code § 13240)	Applicable	Substantive provisions in Chapters 2 and 3 of the Water Quality Control Plan for the San Francisco Bay are ARARs, except for the municipal beneficial use designation of the Basin Plan (see Section B2.2.1.2). The beneficial uses for the East Bay subbasin are agricultural supply, industrial service supply, and industrial process supply. These uses also apply to the shallow groundwater system at Alameda Point. The narrative standard requiring that all waters be maintained free of toxic substances in concentrations that are lethal to or that produce other harmful responses in aquatic organisms, and that there shall be no acute toxicity or chronic toxicity in ambient waters is an ARAR for groundwater.

CHEMICAL-SPECIFIC^a APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Requirement	Prerequisite	Citation ^b	ARAR Determination	Comments
GROUNDWATER (Continued)				
STATE ARARs (Continued)				
State and Regional Water Quality Control Boards (Continued)^c				
Incorporated into all regional board basin plans. Designates all groundwater and surface waters of the state as drinking water except where the total dissolved solids exceed 3,000 milligrams per liter, and it is not reasonably expected by the Water Board to supply a public water system.	Waters of the State	SWRCB Resolution 88-63 (Sources of Drinking Water Policy)	Applicable	This resolution is an ARAR for the selected remedial alternative for groundwater.
Establishes the policy that high-quality waters of the state "shall be maintained to the maximum extent possible" consistent with the "maximum benefit to the people of the State." It provides that whenever the existing quality of water is better than that required by applicable water quality policies, such existing high-quality water will be maintained until it has been demonstrated to the state that any change will be consistent with maximum benefit to the people of the state, will not unreasonably affect present and anticipated beneficial use of such water, and will not result in water quality less than that prescribed in the policies. It also states that any activity that produces or may produce a waste or increased volume or concentration of waste and that discharges or proposes to discharge to existing high-quality waters will be required to meet waste-discharge requirements that will result in the best practicable treatment or control of the discharge.	Waters of the State	Statement of Policy With Respect to Maintaining High Quality of Waters in California, SWRCB Resolution 68-16	Not an ARAR	This policy is not a chemical-specific ARAR for determining remediation goals or for addressing any further migration of existing contamination at IR Site 2. The State does not agree. Whereas the Navy and State of California have not agreed on whether this resolution is an ARAR for this response action, this ROD documents each of the parties' positions on the resolution but does not attempt to resolve the issue. See further discussion on the positions of the Navy and the State of California's on SWRCB Resolutions 92-49 and 68-16 at the end of this Appendix.

CHEMICAL-SPECIFIC^a APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Requirement	Prerequisite	Citation ^b	ARAR Determination	Comments
GROUNDWATER (Continued)				
STATE ARARs (Continued)				
State and Regional Water Quality Control Boards (Continued)^c				
Describes requirements for RWQCB oversight of investigation and cleanup and abatement activities resulting from discharges of hazardous substances. RWQCB may decide on cleanup and abatement goals and objectives for the protection of water quality and beneficial uses of water within each region. Establishes criteria for "containment zones" where cleanup to established water-quality goals is not economically or technically practicable.	Discharge of hazardous substances to waters of the State	Policies and procedures for investigation and cleanup and abatement of discharges under Cal. Water Code § 13304, SWRCB Resolution 92-49	Not an ARAR	This policy is not applicable because it is not more stringent than the federal ARAR at Cal. Code Regs. tit. 22, § 66264.94(a)(1), (a)(3), (b), (c), and (e). The State does not agree. Whereas the Navy and State of California have not agreed on whether this resolution is an ARAR for this response action, this ROD documents each of the parties' positions on the resolution but does not attempt to resolve the issue. See further discussion on the positions of the Navy and the State of California's on SWRCB Resolutions 92-49 and 68-16 at the end of this Appendix.
SURFACE WATER				
FEDERAL ARARs				
Clean Water Act of 1977, as Amended (33 USC, ch. 26, §§ 1251–1387)^c				
Water quality standards in the California Toxics Rule	Discharge to waters of the United States	40 CFR § 131.38	Applicable	The substantive numeric standards in the CTR are ARARs for surface water and will be met in the surface water offshore of IR Site 2, at the interface of the groundwater and the Bay.
Water quality standards in the National Toxics Rule	Discharge to waters of the United States	40 CFR § 131.36(b)	Applicable	The substantive numeric standards in the NTR are ARARs for surface water and will be met in the surface water offshore of IR Site 2, at the interface of the groundwater and the Bay.
Effluent limitations that meet technology-based requirements, including BCPCT and BAT to the extent economically achievable.	Point source discharges to waters of the United States	33 USC, ch. 26, § 1311(b)(2) (CWA § 301[b])	Applicable	Substantive provisions are applicable for point source discharges of groundwater to surface water in San Francisco Bay associated with any dewatering activities associated with the implementation of the selected remedial alternative for soil.

CHEMICAL-SPECIFIC^a APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Requirement	Prerequisite	Citation ^b	ARAR Determination	Comments
SURFACE WATER (Continued)				
STATE ARARs				
State and Regional Water Quality Control Boards^c				
Authorizes the SWRCB and RWQCB to establish in water quality control plans beneficial uses and numerical and narrative standards to protect both surface water and groundwater quality. Authorizes regional water boards to issue permits for discharges to land or surface or groundwater that could affect water quality, including NPDES permits, and to take enforcement action to protect water quality.	Waters of the State	Cal. Water Code, div. 7, §§ 13241, 13243, 13263(a), 13269, and 13360 (Porter-Cologne Act)	Applicable	The Navy accepts the substantive provisions of §§ 13241, 13243, 13263(a), 13269, and 13360 of the Porter-Cologne Act enabling legislation, as implemented through the beneficial uses, WQOs, waste discharge requirements, promulgated policies of the Basin Plan for the San Francisco Bay Region.
Describes the water basins in the San Francisco Bay Region, establishes beneficial uses of groundwater and surface water, establishes water quality objectives, including narrative and numerical standards, and incorporates statewide water quality control plans and policies.	Waters of the State	Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) Chapter 2 and Chapter 3 (Cal. Water Code §13240)	Applicable	Substantive provisions in Chapters 2 and 3 of the Water Quality Control Plan for the San Francisco Bay are ARARs, except for the municipal beneficial use designation of the Basin Plan (see Section B2.2.1.2). The beneficial uses for the East Bay subbasin are agricultural supply, industrial service supply, and industrial process supply. These uses also apply to the shallow groundwater system at Alameda Point. The narrative standard requiring that all waters be maintained free of toxic substances in concentrations that are lethal to or that produce other harmful responses in aquatic organisms, and that there shall be no acute toxicity or chronic toxicity in ambient waters is an ARAR for surface water.

CHEMICAL-SPECIFIC^a APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Requirement	Prerequisite	Citation ^b	ARAR Determination	Comments
SURFACE WATER (Continued)				
STATE ARARs (Continued)				
State and Regional Water Quality Control Boards^c (Continued)				
Requires analysis for each priority pollutant to determine if water-quality-based effluent limitation is required. Provides effluent limitation development methodology.	Discharges of toxic priority pollutants into in land surface waters, bays, or estuaries	Policy for Implementation of Toxic Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (Inland Surface Waters Plan) (SWRCB 2000a), § 1.3 and 1.4	Applicable	The substantive provisions of this Plan are accepted as ARARs for implementing the CTR and the NTR, identified as federal ARARs above, and for the point source discharge of groundwater to surface water that may be necessary in the implementation of the selected remedial alternative for soil.

Notes:

- a Chemical-specific concentrations used for feasibility study evaluation may not be ARARs indicated in this table but may be based on other factors, including: human health risk-based concentrations (40 CFR § 300.430[e][2][i][A][1] and [2]), ecological risk-based concentrations (40 CFR § 300.430 [e][2][i][G]), or practical quantification limits of contaminants (40 CFR § 300.430[e][2][i][A][3]). Many action-specific ARARs contain chemical-specific limitations and are addressed in the action-specific ARAR tables.
- b Only the substantive provisions of the requirement(s) cited in this table are ARARs.
- c Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as ARARs; specific ARARs are addressed in the table below each general heading; only pertinent substantive requirements of specific citations are considered ARARs.

§	Section	RCRA	Resource Conservation and Recovery Act
§§	Sections	ROC	Radionuclide of concern
ARAR	Applicable or relevant and appropriate requirement	RWQCB	Regional Water Quality Control Board
Cal. Code Regs	<i>California Code of Regulations</i>	SWRCB	State Water Resources Control Board
CFR	Code of Federal Regulations	TCLP	Toxic characteristic leaching procedure
CDPH	California Department of Public Health	tit.	Title
Fed. Reg.	Federal Register	TSD	Treatment, storage, and disposal
NPDES	National Pollution Discharge Elimination System	UMTRCA	Uranium Mill Tailings Radiation Control Act
NRC	Nuclear Regulatory Commission	USC	<i>United States Code</i>
PCB	Polychlorinated biphenyl	Water Board	San Francisco Bay Regional Water Quality Control Board
pCi/g	Picocuries per gram		
ppm	Parts per million		

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Location	Requirement	Prerequisite	Citation ^a	ARAR Determination	Comments
FEDERAL ARARs					
Executive Order No. 11990, Protection of Wetlands^b					
Wetland	Action to minimize the destruction, loss, or degradation of wetlands.	Wetland meeting definition of Section 7	40 CFR § 6.302(a)	Applicable	Substantive provisions are ARARs because wetlands are located within IR Site 2.
Clean Water Act of 1977, as Amended, Section 404 (33 USC § 1344)^b					
Wetland	Action to prohibit discharge of dredged or fill material into wetland without permit.	Wetland as defined by Exec. Order No. 11990 Section 7	33 U.S.C § 1344	Applicable	Substantive provisions are ARARs because filling of some portions of the wetlands at IR Site 2 may be required to effectively implement the remedial alternative selected for soil.
Migratory Bird Treaty Act of 1918 (16 USC § 703-712)^b					
Migratory bird area	Protects almost all species of native birds in the U.S. from unregulated "take," which can include poisoning at hazardous waste sites.	Presence of migratory birds	16 U.S.C. § 703	Relevant and appropriate	Substantive provisions are ARARs because the wetlands at IR Site 2 could be used for nesting and foraging by many migratory bird species.
Habitat upon which endangered species or threatened species depend	Federal agencies may not jeopardize the continued existence of any listed species or cause the destruction or adverse modification of critical habitat. The Endangered Species Committee may grant an exemption for agency action if reasonable mitigation and enhancement measures such as propagation, transplantation, and habitat acquisition and improvement are implemented.	Determination of effect upon endangered or threatened species or its habitat. Critical habitat upon which endangered species or threatened species depend	16 U.S.C. § 1536(a) and (h)(1)(B); 16 U.S.C. § 1538(a)(1)(B) and (G);	Applicable	The substantive provisions of these requirements are ARARs for IR Site 2 because the wetlands at IR Site 2 could be used by bird species that are listed as endangered or threatened. The selected remedy will prevent exposure of ecological receptors to contamination at IR Site 2 and will be implemented in a manner by which taking or adverse effects to threatened or endangered species does not occur.

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Location	Requirement	Prerequisite	Citation ^a	ARAR Determination	Comments
Coastal Zone Management Act (16 USC §§ 1451 – 1464)^b					
Within coastal zone	Conduct activities in a manner consistent with approved state management programs.	Activities affecting the coastal zone, including land under and adjacent to shore land	16 USC § 1456(c) 15 CFR § 930	Relevant and Appropriate	The CZMA specifically excludes federal lands from its jurisdiction; however, because IR Site 2 is adjacent to San Francisco Bay, the Navy has identified the CZMA as relevant and appropriate. The selected remedial alternatives for soil and groundwater at IR Site 2 will not result in filling in San Francisco Bay proper, but may entail some minor filling of the North Pond that is present in the wetlands portion of the site. To the extent that during the remedial design phase it is determined that some minor filling of the North Pond is required to place the multilayer soil cover, the Navy will ensure applicable substantive requirements are followed to protect the beneficial uses of San Francisco Bay in compliance with the CZMA by and the San Francisco Bay Plan (an approved state management program).
STATE ARARs					
California Endangered Species Act, California Fish & Game Code^b					
State threatened or endangered species	No person shall import, export, take, possess, or sell any endangered or threatened species or part or product thereof.	Threatened or endangered species determination on or before January 1, 1985	Cal. Fish and Game Code § 2080	Relevant and Appropriate	Cal. Fish & Game Code § 2080 is not applicable because the United States of America has not waived sovereign immunity for this State of California requirement. The Savannah Sparrow is protected under Cal. Fish & Game Code § 2080. The substantive provisions of Cal. Fish & Game Code § 2080 appear to meet the criteria under 40 C.F.R. § 300.400(g)(2)(viii) and are potentially relevant and appropriate for this species. The DON is subject to

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Location	Requirement	Prerequisite	Citation ^a	ARAR Determination	Comments
STATE ARARs (Continued)					
California Endangered Species Act, California Fish & Game Code^b (Continued)					
State threatened or endangered species (continued)					the jurisdiction of the FESA. The substantive requirements of Cal. Fish & Game Code § 2080 that are more stringent than FESA are accepted by the DON as being relevant and appropriate. Thus, species that are listed under CESA, but not protected under FESA, will be addressed by the application of the substantive provisions of Cal. Fish & Game Code § 2080.
	A take under Cal. Fish & Game Code § 2080 may be allowed if it is incidental to a response action and is fully mitigated.	Threatened or endangered species determination	Cal. Fish & Game Code § 2081(b)	Relevant and appropriate	The selected remedial alternatives do not include the intentional taking of species listed under the CESA. Cal. Fish & Game Code § 2081(b) allows for take incidental to otherwise lawful activities. The substantive provisions of Cal. Fish & Game Code § 2081(b) are integrally related to § 2080 and are also accepted as “relevant and appropriate” requirements consistent with 40 C.F.R. § 300.400(g)(2)(v). DON environmental restoration projects are exempt from procedural permitting processes under CERCLA Section 121(d)(2)(B)(i) (42 U.S.C. § 9621[d][2][B][i]).

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Location	Requirement	Prerequisite	Citation ^a	ARAR Determination	Comments
STATE ARARs (Continued)					
California Endangered Species Act, California Fish & Game Code^b (Continued)					
Birds or mammals	It is unlawful to take birds or mammals with any net, pound, cage, trap, set line or wire, or poisonous substance, or to possess birds or mammals so taken, whether taken within or without this state.		Cal. Fish & Game Code § 3005(a) (Statute 1957, c. 456, p. 1353, Section 3005)	Not an ARAR	<p>See June 16, 2009 letter from Department of Navy counsels Rex Callaway and Michael Waters to California Department of Fish and Game counsel Wendy Johnson for a more detailed explanation of the position set forth below.</p> <p>This section is not an environmental or facility siting law and is, therefore, not an ARAR (see CERCLA § 121(d) and 40 CFR § 300.5 of the NCP). The Navy further reviews below whether this requirement would otherwise qualify as a State ARAR if it were deemed to be an environmental requirement.</p> <p>Cal. Fish and Game Code § 3005(a) is not applicable because the United States of America has not waived sovereign immunity in the FESA for this State of California requirement.</p>

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Location	Requirement	Prerequisite	Citation ^a	ARAR Determination	Comments
STATE ARARs (Continued)					
California Endangered Species Act, California Fish & Game Code^b (Continued)					
Birds or mammals (continued)					<p>Pursuant to 40 CFR § 300.400(g)(2) of the NCP, the Navy has determined that this requirement is not "relevant and appropriate", because it does not address problems or situations sufficiently similar to the circumstances of the release or CERCLA response action and is not well-suited to the site based upon the pertinent provisions of Subsections 300.400(g)(2)(i) and (iv) of the NCP.²</p> <p>CERCLA response actions are intended to respond to releases of hazardous substances in order to protect human health and the environment including environmental receptors such as the species addressed in the statutory provisions and regulations cited by CDFG. In contrast, the purpose of this State requirement is to regulate and set forth conditions for the "taking" of the species addressed by those</p>

² Note that there is no requirement in Subsection 300.400(g)(2) of the NCP that the Navy make specific findings for each of the eight factors listed in Subsection 300.400(g)(2)(i) through (viii) for each potential State ARAR. The factors are to be examined "where pertinent," with pertinence "depending, in part, on whether a requirement addresses a chemical, location, or action."

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Location	Requirement	Prerequisite	Citation ^a	ARAR Determination	Comments
STATE ARARs (Continued)					
California Endangered Species Act, California Fish & Game Code^b (Continued)					
Birds or mammals (continued)					<p>requirements. Moreover, that purpose is achieved through the regulation of intentional conduct directed at the species as opposed to incidental “take” (or possession, etc.) of species in the course of lawful activity such as CERCLA remedial action. The focus on intentional conduct is not well-suited to the circumstances at CERCLA sites.</p> <p>In summary, the <u>purposes</u> of this State requirement and <u>the actions that it regulates</u> do not include responding to releases of hazardous substances. Therefore, it is not “relevant and appropriate” based upon the pertinent provisions of Subsections 300.400(g)(2)(i) and (iv) of the NCP. The Navy’s ecological risk assessment process takes into account representative environmental receptors for the site and final remediation/cleanup goals will ensure that they are adequately protected from exposure to CERCLA hazardous substances that present unacceptable risk.</p>

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Location	Requirement	Prerequisite	Citation ^a	ARAR Determination	Comments
STATE ARARs (Continued)					
California Endangered Species Act, California Fish & Game Code^b (Continued)					
Birds or mammals (continued)					In addition, any species that are present and are federal and/or state endangered, threatened, or fully protected species will be addressed by ARARs related to those designations. Although this requirement is not an ARAR, the Navy will coordinate with other natural resource trustees throughout the CERCLA remedial action process.
Bird nest or eggs	It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.	Bird nests or eggs on-site	Cal. Fish & Game Code § 3503 (Added by Statutes 1985, c. 1334, Section 6)	Not an ARAR	See June 16, 2009 letter from Department of Navy counsels Rex Callaway and Michael Waters to California Department of Fish and Game counsel Wendy Johnson for a more detailed explanation of the position set forth below. This section is not an environmental or facility siting law and is, therefore, not an ARAR (see Section 121(d) of CERCLA and 40 CFR Section 300.5 of the NCP). The Navy further reviews below whether this requirement would otherwise qualify as a State ARAR if it were deemed to be an environmental requirement.

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Location	Requirement	Prerequisite	Citation ^a	ARAR Determination	Comments
STATE ARARs (Continued)					
California Endangered Species Act, California Fish & Game Code^b (Continued)					
Bird nest or eggs (continued)					<p>Cal. Fish and Game Code § 3503 is not applicable because the United States of America has not waived sovereign immunity in the FESA for this State of California requirement.</p> <p>Pursuant to 40 CFR § 300.400(g)(2) of the NCP, the Navy has determined that this requirement is not "relevant and appropriate", because it does not address problems or situations sufficiently similar to the circumstances of the release or CERCLA response action and is not well-suited to the site based upon the pertinent provisions of Subsections 300.400(g)(2)(i) and (iv) of the NCP.³</p>

³ Note that there is no requirement in Subsection 300.400(g)(2) of the NCP that the Navy make specific findings for each of the eight factors listed in Subsection 300.400(g)(2)(i) through (viii) for each potential State ARAR. The factors are to be examined "where pertinent," with pertinence "depending, in part, on whether a requirement addresses a chemical, location, or action."

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Location	Requirement	Prerequisite	Citation ^a	ARAR Determination	Comments
STATE ARARs (Continued)					
California Endangered Species Act, California Fish & Game Code^b (Continued)					
Bird nest or eggs (continued)					CERCLA response actions are intended to respond to releases of hazardous substances in order to protect human health and the environment including environmental receptors such as the species addressed in the statutory provisions and regulations cited by CDFG. In contrast, the purpose of this State requirement is to regulate and set forth conditions for the "taking" of the species addressed by those requirements. Moreover, that purpose is achieved through the regulation of intentional conduct directed at the species as opposed to incidental "take" (or possession, etc.) of species in the course of lawful activity such as CERCLA remedial action. The focus on intentional conduct is not well-suited to the circumstances at CERCLA sites.

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Location	Requirement	Prerequisite	Citation ^a	ARAR Determination	Comments
STATE ARARs (Continued)					
California Endangered Species Act, California Fish & Game Code^b (Continued)					
Bird nest or eggs (continued)					<p>In summary, the <u>purposes</u> of this State requirement and <u>the actions that it regulates</u> do not include responding to releases of hazardous substances. Therefore, it is not “relevant and appropriate” based upon the pertinent provisions of Subsections 300.400(g)(2)(i) and (iv) of the NCP. The Navy’s ecological risk assessment process takes into account representative environmental receptors for the site and final remediation/cleanup goals will ensure that they are adequately protected from exposure to CERCLA hazardous substances that present unacceptable risk.</p> <p>Although this requirement is not an ARAR, the Navy will coordinate with other natural resource trustees throughout the CERCLA remedial action process.</p>

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Location	Requirement	Prerequisite	Citation ^a	ARAR Determination	Comments
STATE ARARs (Continued)					
California Endangered Species Act, California Fish & Game Code^b (Continued)					
<i>Falconiformes</i> or <i>Strigiformes</i>	It is unlawful to take, possess, or destroy any birds in the orders <i>Falconiformes</i> or <i>Strigiformes</i> (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird.	<i>Falconiformes</i> or <i>Strigiformes</i> birds on-site	Cal. Fish & Game Code § 3503.5 (Added by Statutes 1985, c. 1334, Section 6)	Not an ARAR	The California Department of Fish and Game has withdrawn its identification of this requirement as a potential State ARAR (see December 3, 2009, letter from Department counsel Wendy Johnson to Navy counsels Rex Callaway and Mike Waters).

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Location	Requirement	Prerequisite	Citation ^a	ARAR Determination	Comments
STATE ARARs (Continued)					
California Endangered Species Act, California Fish & Game Code^b (Continued)					
Fully protected bird species/habitat	Provides that it is unlawful to take or possess listed fully protected birds.	Taking of protected birds	Cal. Fish and Game Code § 3511	Relevant and Appropriate	Cal. Fish & Game Code § 3511 is not applicable because the United States of America has not waived sovereign immunity for this State of California requirement. The Savannah Sparrow is protected under Cal. Fish & Game Code § 3511. The substantive provisions of Cal. Fish & Game Code § 3511 appear to meet the criteria under 40 C.F.R. § 300.400(g)(2)(viii) and are potentially relevant and appropriate for these species. The DON is subject to the jurisdiction of the FESA. The substantive requirements of Cal. Fish & Game Code § 3511 that are more stringent than FESA are accepted by the DON as being relevant and appropriate.
Nongame birds	It is unlawful to take any nongame bird.	All birds occurring naturally in California that are not resident game birds, migratory game birds, or fully protected birds are nongame birds	Cal. Fish & Game Code § 3800(a) (Added by Statutes 1971, c. 1470, p. 2906, Section 13)	Not an ARAR	The California Department of Fish and Game has withdrawn its identification of this requirement as a potential State ARAR (see December 3, 2009, letter from Department counsel Wendy Johnson to Navy counsels Rex Callaway and Mike Waters).

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Location	Requirement	Prerequisite	Citation ^a	ARAR Determination	Comments
STATE ARARs (Continued)					
California Endangered Species Act, California Fish & Game Code^b (Continued)					
Nongame mammals	All mammals occurring naturally in California that are not game mammals, fully protected mammals, or fur-bearing mammals, are nongame mammals. Nongame mammals or parts thereof may not be taken or possessed.	Response action may potentially take a nongame mammal	Cal. Fish & Game Code § 4150	Not an ARAR	The California Department of Fish and Game has withdrawn its identification of this requirement as a potential State ARAR (see December 3, 2009, letter from Department counsel Wendy Johnson to Navy counsels Rex Callaway and Mike Waters).

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Location	Requirement	Prerequisite	Citation ^a	ARAR Determination	Comments
STATE ARARs (Continued)					
California Endangered Species Act, California Fish & Game Code^b (Continued)					
Aquatic habitat	Action must be taken if toxic materials are placed where they can enter the waters of the state	Materials entering the waters of the state	Cal. Fish and Game Code § 5650(a), (b) and (f)	Relevant and Appropriate	California Fish and Game Code § 5650 is not applicable because the United States of America has not waived sovereign immunity in the FESA for this State of California requirement. While no direct deposition of material is expected to enter into or impact waters of the state, the substantive provisions of this standard will be complied with as an ARAR. Any removal action taking place in an area that may impact waters of the state will be conducted in such a way as to ensure that materials dug up will not be released into the water column.
Mollusks, crustaceans, or invertebrates	No mollusks, crustaceans, or other invertebrates may be taken, possessed aboard a boat, or landed for commercial purposes by any person in any tide pool or tidal area, including tide flats or other areas between the high tidemark and 1,000 feet beyond the low tidemark.	The taking and possession of fish for any commercial purpose	Cal. Fish & Game Code § 8500	Not an ARAR	The California Department of Fish and Game has withdrawn its identification of this requirement as a potential State ARAR (see December 3, 2009, letter from Department counsel Wendy Johnson to Navy counsels Rex Callaway and Mike Waters).

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Location	Requirement	Prerequisite	Citation ^a	ARAR Determination	Comments
STATE ARARs (Continued)					
California Endangered Species Act, California Fish & Game Code^b (Continued)					
Reptiles and amphibians	It is unlawful to capture, collect, intentionally kill or injure, possess, purchase, propagate, sell, transport, import, or export any native reptile or amphibian, or part thereof.	Potentially affect native reptiles or amphibians	Cal. Code Regs. tit. 14 § 40	Not an ARAR	The California Department of Fish and Game has withdrawn its identification of this requirement as a potential State ARAR (see December 3, 2009, letter from Department counsel Wendy Johnson to Navy counsels Rex Callaway and Mike Waters).
Nongame birds and mammals	Nongame birds and mammals may not be taken except as provided. (a) The following nongame birds and mammals may be taken at any time of the year and in any number except as prohibited: English sparrow, starling, coyote, weasels, skunks, opossum, moles, and rodents (excluding tree and flying squirrels, and those listed as furbearers, endangered, or threatened species). (b) Fallow, sambar, sika, and axis deer may be taken only concurrently with the general deer season. (c) Aoudad, mouflon, tahr, and feral goats may be taken all year. (d) American crows (<i>Corvus brachyrhynchos</i>) may be taken only under the provisions of Section 485 and by landowners or tenants, or by persons authorized in writing by such landowners or tenants, when American crows are committing or about to commit depredations upon ornamental or shade trees, agricultural crops, livestock, or wildlife, or when concentrated in such numbers and manner as to constitute a health hazard or other nuisance.	Taking of nongame birds and mammals	Cal. Code Regs. tit. 14, § 472	Not an ARAR	The California Department of Fish and Game has withdrawn its identification of this requirement as a potential State ARAR (see December 3, 2009, letter from Department counsel Wendy Johnson to Navy counsels Rex Callaway and Mike Waters).

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Location	Requirement	Prerequisite	Citation ^a	ARAR Determination	Comments
STATE ARARs (Continued)					
California Endangered Species Act, California Fish & Game Code^b (Continued)					
McAteer-Petris Act (California Government Code §§ 66600 through 66661)^b					
Within the San Francisco Bay coastal zone	Reduce fill and disposal of dredged material in San Francisco Bay, maintain marshes and mudflats to the fullest extent possible to conserve wildlife, abate pollution, and protect the beneficial uses of the bay.	Activities affecting the San Francisco Bay and 100 feet landward of the shoreline	San Francisco Bay Plan at Cal. Code Regs. tit. 14, §§ 10110 through 11990	Relevant and appropriate	The Navy has determined that the substantive provisions of the CZMA are relevant and appropriate federal location-specific requirements of IR Site 2. The CZMA requires federal agency activity be conducted in a manner consistent with approved state management programs to the maximum extent practicable. The McAteer-Petris Act is enabling legislation for the San Francisco Bay Plan, an approved state management program for the San Francisco Bay. Substantive provisions of the McAteer-Petris Act and the San Francisco Bay Plan are relevant and appropriate because their authority is derived from the CZMA, a relevant and appropriate federal requirement. The Navy will conduct the selected remedial alternatives for soil and groundwater at IR Site 2 in accordance with the substantive provisions of the San Francisco Bay Plan.

Notes:

- a Only the substantive provisions of the requirements cited in this table are ARARs.
- b Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as ARARs; specific ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered ARARs.
- § Section
- §§ Sections
- ARAR Applicable or relevant and appropriate requirement
- Cal. California
- Cal. Code Reg. California Code of Regulations

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

CFR	Code of Federal Regulations
CESA	California Endangered Species Act
CZMA	Coastal Zone Management Act
FESA	Federal Endangered Species Act
tit.	Title
USC	United States Code

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
EXCAVATION AND DISPOSAL OF WASTE					
FEDERAL ARARs					
Resource Conservation and Recovery Act (42 USC, Chapter 82, §§ 6901-6991[ij])^a					
On-site waste generation	Person who generates waste shall determine if that waste is a hazardous waste	Generator of waste	Cal. Code Regs., tit. 22, §§ 66262.10(a), 66262.11	Applicable	Applicable for characterization of waste generated during monitoring and construction of monitoring wells.
	Requirement for analyzing waste to determine whether waste is hazardous.	Generator of waste	Cal. Code Regs., tit. 22, § 66264.13(a) and (b)	Applicable	Applicable for characterization of waste generated during monitoring and construction of monitoring wells.
Hazardous waste accumulation	On-site hazardous waste accumulation is allowed for up to 90 days as long as the waste is stored in containers in accordance with § 66262.171–178 or in tanks, on drip pads, inside buildings, and is labeled and dated.	Accumulate hazardous waste	Cal. Code Regs. tit. 22, § 66262.34	Applicable	Applicable for characterization of waste generated during monitoring and construction of monitoring wells.
Container storage	Containers of RCRA hazardous waste must be: <ul style="list-style-type: none"> maintained in good condition, compatible with hazardous waste to be stored, and closed during storage, except to add or remove waste. 	Storage in a container of RCRA hazardous waste not meeting small quantity generator criteria before treatment, disposal, or storage elsewhere	Cal. Code Regs. tit. 22, § 66264.171, 66264.172, and 66264.173	Applicable and relevant and appropriate	The substantive provisions are ARARs for handling small amounts of waste generated in the implementation of the remedies (for example, the construction of new groundwater monitoring wells or other investigation derived waste). The requirements are applicable if waste is determined to be RCRA hazardous or non-RCRA, state-regulated hazardous waste. These requirements are relevant and appropriate for solid waste that is designated or nonhazardous solid waste.

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
EXCAVATION AND DISPOSAL OF WASTE (Continued)					
FEDERAL ARARs (Continued)					
Resource Conservation and Recovery Act (42 USC, Chapter 82, §§ 6901-6991[i])^a (Continued)					
Container Storage (Continued)	Inspect container storage areas weekly for deterioration.	Storage in a container of RCRA hazardous waste not meeting small-quantity generator criteria before treatment, disposal, or storage elsewhere	Cal. Code Regs. tit. 22, § 66264.174	Applicable and relevant and appropriate	The substantive provisions are ARARs for handling small amounts of waste generated in the implementation of the remedies (for example, the construction of new groundwater monitoring wells or other investigation derived waste). The requirements are applicable if waste is determined to be RCRA hazardous or non-RCRA, state-regulated hazardous waste. These requirements are relevant and appropriate for solid waste that is designated or nonhazardous solid waste.
	Place containers on a sloped, crack-free base, and protect from contact with accumulated liquid. Provide containment system with a capacity of 10 percent of the volume of containers of free liquids. Remove spilled or leaked waste in a timely manner to prevent overflow of the containment system.	Storage in a container of RCRA hazardous waste not meeting small-quantity generator criteria before treatment, disposal, or storage elsewhere	Cal. Code Regs. tit. 22, § 66264.175(a), (b)	Applicable and relevant and appropriate	The substantive provisions are ARARs for handling small amounts of waste generated in the implementation of the remedies (for example, the construction of new groundwater monitoring wells or other investigation derived waste). The requirements are applicable if waste is determined to be RCRA hazardous or non-RCRA, state-regulated hazardous waste. These requirements are relevant and appropriate for solid waste that is designated or nonhazardous solid waste.

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
EXCAVATION AND DISPOSAL OF WASTE (Continued)					
FEDERAL ARARs (Continued)					
Resource Conservation and Recovery Act (42 USC, Chapter 82, §§ 6901-6991[i])^a (Continued)					
Container Storage (Continued)	Keep incompatible materials separate. Separate incompatible materials stored near each other by a dike or other barrier.	Storage in a container of RCRA hazardous waste not meeting small-quantity generator criteria before treatment, disposal, or storage elsewhere	Cal. Code Regs. titl 22, § 66264.177	Applicable and relevant and appropriate	The substantive provisions are ARARs for handling small amounts of waste generated in the implementation of the remedies (for example, the construction of new groundwater monitoring wells or other investigation derived waste). The requirements are applicable if waste is determined to be RCRA hazardous or non-RCRA, state-regulated hazardous waste. These requirements are relevant and appropriate for solid waste that is designated or nonhazardous solid waste.
	At closure, remove all hazardous waste and residues from the containment system, and decontaminate or remove all containers and liners.	Hazardous waste	Cal. Code Regs. tit. 22, § 66264.178	Applicable and relevant and appropriate	The substantive provisions are ARARs for handling small amounts of waste generated in the implementation of the remedies (for example, the construction of new groundwater monitoring wells or other investigation derived waste). The requirements are applicable if waste is determined to be RCRA hazardous or non-RCRA, state-regulated hazardous waste. These requirements are relevant and appropriate for solid waste that is designated or nonhazardous solid waste.

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
EXCAVATION AND DISPOSAL OF WASTE (Continued)					
FEDERAL ARARs (Continued)					
Resource Conservation and Recovery Act (42 USC, Chapter 82, §§ 6901-6991[i])^a (Continued)					
Waste pile	Alternative requirements that are protective of human health or the environment may replace design, operating, or closure standards for temporary tanks and container storage areas.	Hazardous remediation waste temporarily stored in piles	Cal. Code Regs. tit. 22, § 66264.553(b),(d), (e), and (f)	Applicable and relevant and appropriate	The substantive provisions are applicable for temporarily storing excavated soil that is RCRA hazardous or non-RCRA, state-regulated hazardous waste prior to on-site relocation or off-site disposal. The substantive provisions are relevant and appropriate for temporarily storing excavated soil that is designated or nonhazardous waste.
	Allows generators to accumulate solid remediation wastes during remedial operations in a U.S. EPA-designated pile for storage only, up to 2 years, without triggering LDRs.	Hazardous remediation waste temporarily stored in piles	40 CFR§ 264.554(d)(1)(i-ii) and (d)(2),(e), (f), (h), (i),(j), and (k)	Applicable and relevant and appropriate	The substantive provisions are applicable for temporarily storing excavated soil that is RCRA hazardous or non-RCRA, state-regulated hazardous waste prior to on-site relocation or off-site disposal. The substantive provisions are relevant and appropriate for temporarily storing excavated soil that is designated or nonhazardous waste.
	At closure, owner shall remove or decontaminate all waste residues, contaminated containment system components, contaminated subsoils, and structures and equipment contaminated with waste and leachate, and manage them as hazardous waste. If waste is left onsite, perform postclosure care in accordance with the closure and postclosure care requirements that apply to landfills.	Waste pile used to store hazardous waste	Cal. Code Regs. tit. 22, § 66264.258(a) and (b) except references to procedural requirements	Applicable and relevant and appropriate	The substantive provisions are applicable for temporarily storing excavated soil that is RCRA hazardous or non-RCRA, state-regulated hazardous waste prior to on-site relocation or off-site disposal. The substantive provisions are relevant and appropriate for temporarily storing excavated soil that is designated or nonhazardous waste.

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
FEDERAL ARARs (Continued)					
Resource Conservation and Recovery Act (42 USC, Chapter 82, §§ 6901-6991[i])a (Continued)					
Military Munitions Rule (40 CFR part 266 subpart M)^a					
Management of military munitions	Identification of hazardous waste munitions and treatment and storage requirements for hazardous waste munitions.	Presence of military munitions	40 CFR §§ 266.203, 266.205, and 266.206	Applicable	The substantive provisions of these requirements are applicable to any MPPEH found while implementing the remedy.
Clean Water Act of 1977 (33 USC § 1344)^a					
Storm Water Discharge	General requirements for a storm water management plan and implementation of best management practices.	Construction involving one acre or more of soil disturbance	40 CFR § 122.44(k)(2) and (4)	Applicable	Substantive provisions are applicable for the selected remedial alternative for soil wherein an acre or more of soil disturbance is expected.
Clean Air Act (42 USC §§ 7401–7671)^a					
Discharge to air	A person shall not emit from any source for a period or periods aggregating more than 3 minutes in any hour a visible emission which is as dark as or darker than No. 1 on the Ringelmann chart or of such opacity as to obscure an observer's view to an equivalent or greater degree. A person shall not emit for a period or periods aggregating more than 3 minutes in any hour, an emission equal to or greater than 20 percent opacity.	Emissions	BAAQMD Regulation 6, § 6-301 and 302	Applicable	Substantive provisions are applicable for the earthwork and soil excavation activities.

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
MULTILAYER SOIL COVER					
FEDERAL ARARs					
Resource Conservation and Recovery Act (42 USC, Chapter 82, §§ 6901-6991[i])^a					
Site closure	Minimize the need for further maintenance controls and minimize or eliminate, to the extent necessary to protect human health and the environment, postclosure escape of hazardous waste, hazardous constituents, leachate, contaminated rainfall or runoff, or waste decomposition products to groundwater or surface water or to the atmosphere.	Hazardous waste management facility	Cal. Code Regs. tit. 22, § 66264.111(a) and (b)	Relevant and Appropriate	Substantive provisions are relevant and appropriate for the multilayer soil cover.
Clean closure	During the partial and final closure periods, all contaminated equipment, structures, and soils shall be properly disposed or decontaminated by removing all hazardous waste and residues.	Hazardous waste management facility	Cal. Code Regs. tit. 22, § 66264.114	Relevant and appropriate	Substantive provisions are relevant and appropriate for the multilayer soil cover.
Final cover	The final cover shall be designed and constructed to function with minimum maintenance.	Hazardous waste treatment, storage, or disposal facility	Cal. Code Regs. tit. 22 § 66264.310(a)(2)	Relevant and appropriate	Substantive provisions are relevant and appropriate for the multilayer soil cover.
	The final cover shall be designed and constructed to promote drainage and minimize erosion or abrasion of the cover.	Hazardous waste treatment, storage, or disposal facility	Cal. Code Regs. tit. 22 § 66264.310(a)(3)	Relevant and appropriate	Substantive provisions are relevant and appropriate for the multilayer soil cover.
	The final cover shall be designed and constructed to accommodate settling and subsidence so that the cover's integrity is maintained.	Hazardous waste treatment, storage, or disposal facility	Cal. Code Regs. tit. 22 § 66264.310(a)(4)	Relevant and appropriate	Substantive provisions are relevant and appropriate for the multilayer soil cover.

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
MULTILAYER SOIL COVER (Continued)					
FEDERAL ARARs (Continued)					
Resource Conservation and Recovery Act (42 USC, Chapter 82, §§ 6901-6991[i])^a (Continued)					
Final cover (continued)	Landfill cover design requirements.	Hazardous waste treatment, storage, or disposal facility	Cal. Code Regs. tit. 22, § 66264.228(e) through (r)	Relevant and appropriate	Substantive provisions are relevant and appropriate for the multilayer soil cover.
	The final cover shall be designed and constructed to accommodate lateral and vertical shear forces generated by the maximum credible earthquake so that the integrity of the cover is maintained.	Hazardous waste treatment, storage, or disposal facility	Cal. Code Regs. tit. 22, § 66264.310(a)(5)	Relevant and appropriate	Substantive provisions are relevant and appropriate for the multilayer soil cover.
Postclosure care	After closure, maintaining the integrity and effectiveness of the final cover, which includes making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion, or other events throughout the postclosure period.	Hazardous waste treatment, storage, or disposal facility	Cal. Code Regs. tit. 22, § 66264.310(b)(1)	Relevant and appropriate	Substantive provisions are relevant and appropriate for the multilayer soil cover.
Site security	Prevent the unknowing entry, and minimize the possibility for the unauthorized entry of persons or livestock onto the active portion of the facility.	Hazardous waste treatment, storage, or disposal facility	Cal. Code Regs. tit. 22, § 66264.14(a)	Relevant and appropriate	Substantive provisions are relevant and appropriate for the multilayer soil cover.
Clean Water Act of 1977 (33 USC § 1344)^a					
Storm Water Discharge	General requirements for a storm water management plan and implementation of best management practices.	Construction involving one acre or more of soil disturbance	40 CFR § 122.44(k)(2) and (4)	Applicable	Substantive provisions are applicable for constructing the multilayer soil cover.

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
MULTILAYER SOIL COVER (Continued)					
STATE ARARs					
Clean Air Act (42 USC § 7401-7671)^a					
Discharge to air	Provisions of SIP approved by the U.S. EPA under Section 110 of the Clean Air Act.	Major sources of air pollutants	40 USC § 7410; portions of 40 CFR § 52.220	Applicable	Substantive provisions are applicable for constructing the multilayer soil cover but implemented through the SIP.
Landfill gas control	The operator shall ensure that landfill gases generated at a disposal site are controlled. Methane must not exceed 1.25 percent by volume in air within on-site structures, concentrations of methane gas migrating from the landfill must not exceed 5 percent by volume in air at the property boundary, and trace gases shall be controlled to prevent adverse acute and chronic exposure to toxic and/or carcinogenic compounds.	Cal. Code Regs. tit. 27 requirements are applicable only for waste discharged after July 18, 1997, unless otherwise noted	Cal. Code Regs. tit. 27, § 20921(a)(1),(2), and (3)	Relevant and appropriate	Substantive provisions are relevant and appropriate for the multilayer soil cover.
Erosion control	Diversion and drainage facilities shall be designed, constructed, and maintained to accommodate the anticipated volume of precipitation and peak flows. Collection and holding facilities associated with precipitation and drainage control systems shall be emptied immediately or otherwise managed to maintain system design capacity.	Cal. Code Regs. tit. 27 requirements are applicable only for waste discharged after July 18, 1997, unless otherwise noted	Cal. Code Regs. tit. 27, §§ 20365(c) and(d), 21090(c)(4),and 21150	Relevant and appropriate	Substantive provisions are relevant and appropriate for the multilayer soil cover.

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
MULTILAYER SOIL COVER (Continued)					
STATE ARARs (Continued)					
Engineered alternatives to final cover standard	Alternatives to prescriptive standards may be considered provided the prescriptive standard is not feasible and there is a specific engineered alternative that is consistent with the performance goal and affords equivalent protection against water quality impairment. The Water Board can allow any alternative final cover that it finds will continue to isolate the waste and irrigation waters at least as well as a final cover built in accordance with applicable prescriptive standards.	Cal. Code Regs. tit. 27 requirements are applicable only for waste discharged after July 18, 1997, unless otherwise noted	Cal. Code Regs. tit. 27, §§ 20080(b) and(c) and 21090(a)	Relevant and appropriate	Substantive provisions are relevant and appropriate for the multilayer soil cover.
Vegetative layer	Closed landfills shall be provided with an uppermost cover layer consisting of either a vegetative layer consisting of not less than 1 foot of soil capable of sustaining native or other suitable plant growth or a mechanically erosion-resistant layer.	Cal. Code Regs. tit. 27 requirements are applicable only for waste discharged after July 18, 1997, unless otherwise noted	Cal. Code Regs. tit. 27, § 21090(a)(3)	Relevant and appropriate	Substantive provisions are relevant and appropriate for the multilayer soil cover.
Final grading	The final cover of closed landfills shall be designed, graded, and maintained to prevent ponding and to prevent site erosion due to high runoff velocities. Slopes should be at least 3 percent.	Cal. Code Regs. tit. 27 requirements are applicable only for waste discharged after July 18, 1997, unless otherwise noted	Cal. Code Regs. tit. 27, § 21090(b)(1)	Relevant and appropriate	Substantive provisions are relevant and appropriate for the multilayer soil cover.

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
RADIOLOGICAL SCREENING AND MPPEH SWEEP					
FEDERAL ARARs					
Atomic Energy Act of 1954 (42 U.S.C. ch. 23, § 2011 et seq.)^a					
Temporary storage of radiologically contaminated soil	The licensee shall secure from unauthorized removal or access licensed materials that are stored in controlled or unrestricted areas.	Existing NRC-licensed site	10 CFR § 20.1801	Relevant and appropriate	This requirement is not applicable because IR Site 2 is not an NRC-licensed facility. The substantive provisions of this requirement are relevant and appropriate for staging excavated soil contaminated with ROCs at levels at or above remediation goals prior to off-site disposal.
	The licensee shall control and maintain constant surveillance of licensed material that is in a controlled or unrestricted area and that is not in storage.	Existing NRC-licensed site	10 CFR § 20.1802	Relevant and appropriate	This requirement is not applicable because IR Site 2 is not an NRC-licensed facility. The substantive provisions of this requirement are relevant and appropriate for staging excavated soil contaminated with ROCs at levels at or above remediation goals prior to off-site disposal.

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
WETLAND MITIGATION PLAN					
FEDERAL ARARs					
Clean Water Act of 1977 (33 USC § 1344)^a					
Discharge of dredged material	U.S. Army Corps of Engineers requirements for permitting discharges of dredged material to waters of the United States.	Discharge of dredged material to waters of the United States, including adjacent 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	Applicable	Substantive provisions are applicable for the multilayer soil cover in the event that during the remedial design phase it is determined that dredged material needs to be discharged to waters of the United States to effectively implement the soil remedy.
REMOVAL OF RADIOLOGICALLY-IMPACTED WASTE					
FEDERAL ARARs					
Resource Conservation and Recovery Act (42 USC, Chapter 82, §§ 6901-6991[i])^a					
On-site generation of waste	Person who generates waste shall determine if that waste is a hazardous waste.	Generator of waste	Cal. Code Regs., tit. 22, §§ 66262.10(a), 66262.11	Applicable	Applicable for characterization of waste generated during removal of radiological hot spots prior to placing the multilayer soil cover.
	Requirement for analyzing waste to determine whether waste is hazardous.	Generator of waste	Cal. Code Regs., tit. 22, § 66264.13(a) and (b)	Applicable	Applicable for characterization of waste generated during removal of radiological hot spots prior to placing the multilayer soil cover.
Resource Conservation and Recovery Act (42 USC, Chapter 82, §§ 6901-6991[i])^a (Continued)					
Temporary waste pile	Alternative requirements that are protective of human health or the environment may replace design, operating, or closure standards for temporary tanks and container storage areas.	Hazardous remediation waste temporarily stored in piles.	40 CFR§ 264.554(d)(1)(i-ii) and (d)(2),(e), (f), (h), (i),(j), and (k)	Applicable and relevant and appropriate	The substantive provisions are applicable for temporarily storing excavated soil that is RCRA hazardous or non-RCRA, state-regulated hazardous waste prior to on-site relocation or off-site disposal. The substantive provisions are relevant and appropriate for temporarily storing excavated soil that is designated or

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
					nonhazardous waste.
REMOVAL OF RADIOLOGICALLY-IMPACTED WASTE (Continued)					
FEDERAL ARARs (Continued)					
Clean Water Act of 1977 (33 USC § 1344)^a					
Storm Water Discharge	General requirements for a storm water management plan and implementation of best management practices.	Construction involving one acre or more of soil disturbance	40 CFR § 122.44(k)(2) and (4)	Applicable	Substantive provisions are applicable for the excavation of waste during removal of radiological hot spots prior to placing the multilayer soil cover.
Atomic Energy Act of 1954 (42 U.S.C. ch. 23, § 2011 et seq.)^a					
Temporary storage of radiologically contaminated soil	The licensee shall secure from unauthorized removal or access licensed materials that are stored in controlled or unrestricted areas.	Existing NRC-licensed site	10 CFR § 20.1801	Relevant and appropriate	This requirement is not applicable because IR Site 2 is not an NRC-licensed facility. The substantive provisions of this requirement are relevant and appropriate for staging excavated soil contaminated with ROCs at levels at or above remediation goals prior to off-site disposal.
	The licensee shall control and maintain constant surveillance of licensed material that is in a controlled or unrestricted area and that is not in storage.	Existing NRC-licensed site	10 CFR § 20.1802	Relevant and appropriate	This requirement is not applicable because IR Site 2 is not an NRC-licensed facility. The substantive provisions of this requirement are relevant and appropriate for staging excavated soil contaminated with ROCs at levels at or above remediation goals prior to off-site disposal.

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
GROUNDWATER MONITORING					
FEDERAL ARARs					
Resource Conservation and Recovery Act (42 USC, Chapter 82, §§ 6901-6991[i])^a					
Groundwater monitoring	After final closure, maintain and monitor the groundwater monitoring system and comply with all other applicable requirements of article 6 of chapter 14.	Hazardous waste treatment, storage, or disposal facility	Cal. Code Regs. tit. 22, § 66264.310(b)(3)	Relevant and appropriate	The substantive provisions are relevant and appropriate for the groundwater monitoring associated with constructing the multilayer soil cover over the waste at IR Site 2. The specific provisions of chapter 14, article 6 that the Navy has identified as ARARs are discussed below.
Resource Conservation and Recovery Act (42 USC, Chapter 82, §§ 6901-6991[i])^a (Continued)					
Monitoring	The owner or operator shall establish and implement, in conjunction with the corrective action measures, a water quality monitoring program that will demonstrate the effectiveness of the corrective action program and be effective in determining compliance with the water quality protection standard and in determining the success of the corrective action measures under subsection (c) of this section.	Hazardous waste treatment, storage, or disposal facility	Cal. Code Regs. tit. 22, § 66264.100(d)	Relevant and Appropriate	The substantive provisions are relevant and appropriate for the selected remedial alternative for groundwater.
Completion of response action	The corrective action program is complete when compliance with the water quality standard is demonstrated based on the results of sampling and analysis for all constituents of concern for a period of 1 year.	Hazardous waste treatment, storage, or disposal facility	Cal. Code Regs. tit. 22, § 66264.100(g)(1)	Relevant and Appropriate	The substantive provisions are relevant and appropriate for the selected remedial alternative for groundwater.

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
GROUNDWATER MONITORING (Continued)					
FEDERAL ARARs (Continued)					
Resource Conservation and Recovery Act (42 USC, Chapter 82, §§ 6901-6991[i])^a (Continued)					
Chemicals of concern	Identify constituents of concern including the waste constituents, reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the regulated unit.	Hazardous waste treatment, storage, or disposal facility	Cal. Code Regs. tit. 22, § 66264.93	Relevant and Appropriate	The substantive provisions are relevant and appropriate for the selected remedial alternative for groundwater.
Monitoring	Requirements for monitoring groundwater, surface water, and the vadose zone.	Hazardous waste treatment, storage, or disposal facility	Cal. Code Regs. tit. 22, § 66264.97(b)(1)(A), (B) and (C), 66264.97(b)(1)(D)(1) and (2), 66264.97(b)(2), 66264.97(b)(4)-(7), 66264.97(e)(6), 66264.97(e)(12)(A) and (B), 66264.97(e)(13), and 66264.97(e)(15)	Relevant and Appropriate	The substantive provisions are relevant and appropriate for the selected remedial alternative for groundwater.
	Requirements for a detection monitoring program.	Hazardous waste treatment, storage, or disposal facility	Cal. Code Regs. tit. 22, § 66264.98(e)(1-5), (i), (j), (k)(1-3), (4)(A) and (D),(5), (7)(C) and (D),(n)(1),(2)(B), and (C)	Relevant and Appropriate	The substantive provisions are relevant and appropriate for the selected remedial alternative for groundwater.

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
GROUNDWATER MONITORING (Continued)					
FEDERAL (Continued)					
Resource Conservation and Recovery Act (42 USC, Chapter 82, §§ 6901-6991[i])^a (Continued)					
Monitoring (Continued)	Requirements for an evaluation monitoring program.	Hazardous waste treatment, storage, or disposal facility	Cal. Code Regs. tit. 22, § 66264.99(b), (e)(1)–(6), (f)(3), and (g)	Relevant and Appropriate	The substantive provisions are relevant and appropriate for the selected remedial alternative for groundwater.
	Requires continued monitoring until the regulated unit has been in compliance with the water quality protection standard for a period of three consecutive years and all waste, waste residues, contaminated subsoils and all other contaminated geologic materials are removed or decontaminated at closure.	Hazardous waste treatment, storage, or disposal facility	Cal. Code Regs. tit. 22, § 66264.90(c)(1) and (c)(2)	Relevant and Appropriate	The substantive provisions are relevant and appropriate for the selected remedial alternative for groundwater.
	For compliance demonstration each “must have remained at or below its respective concentration limit during a proof period of at least one year . . . and . . . (2) each Monitoring Point must have been evenly distributed throughout the proof period and have consisted of no less than eight sampling events per year per Monitoring Point.”	Waste discharged after July 18, 1997	Cal. Code Regs. tit. 27, § 20430(g)(1)	Relevant and Appropriate	The substantive provisions are relevant and appropriate for the selected remedial alternative for groundwater.

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
INSTITUTIONAL CONTROLS					
State ARARs					
California Civil Code (Cal. Civil Code § 1471)^a					
Land use controls	Provides conditions under which land use restrictions will apply to successive owners of land	Transfer property from the Navy to a nonfederal agency	Cal. Civil Code § 1471	Relevant and appropriate	Substantive provisions are the following general narrative standard: "to do or refrain from doing some act on his or her own land ... where (c) Each such act relates to the use of land and each such act is reasonably necessary to protect present or future human health or safety of the environment as a result of the presence of hazardous materials, as defined in § 25260 of the Cal. Health & Safety Code." This narrative standard would be implemented through incorporation of restrictive covenants in the deed at the time of transfer.

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
INSTITUTIONAL CONTROLS (Continued)					
State ARARs (Continued)					
California Health and Safety Code Land Use Controls (Cal. Health & Safety Code §§ 25202.5, 25222.1, 25232(b)(1)(A)-(E), 25233(c), § 25234, § 25355.5)					
Land use controls	Allows DTSC to enter into an agreement with the owner of a hazardous waste facility to restrict present and future land uses.	Transfer property from the Navy to a nonfederal agency	Cal. Health & Safety Code § 25202.5	Relevant and appropriate	The substantive provisions of this section are the general narrative standards to restrict "present and future uses of all or part of the land on which the facility ...is located."
	Provides a streamlined process to be used to enter into an agreement to restrict specific use of property in order to implement the substantive use restrictions.	Transfer property from the Navy to a nonfederal agency.	Cal. Health & Safety Code § 25222.1	Relevant and appropriate	Cal. Health & Safety Code § 25222.1 provides the authority for the state to enter into voluntary agreements to establish land use covenants with the owner of the property. The substantive provision of Cal. Health & Safety Code § 25222.1 is the general narrative standard: "restricting specified uses of the property."

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
INSTITUTIONAL CONTROLS (Continued)					
State ARARs (Continued)					
California Health and Safety Code Land Use Controls (Cal. Health & Safety Code §§ 25202.5, 25222.1, 25233(c), § 25234, § 25355.5)					
Land use controls (Continued)	Provides a process for obtaining a written variance from a land use restriction.	Transfer property from the Navy to a nonfederal entity.	Cal. Health & Safety Code § 25233(c)	Relevant and appropriate	Cal. Health & Safety Code § 25233(c) sets forth substantive criteria for granting variances from the uses prohibited in § 25232(b)(1)(A)-(E) based on specific environmental and health criteria.
	Provides a process by which DTSC can remove land use restrictions	Transfer property from the Navy to a nonfederal entity	Cal. Health & Safety Code § 25234	Relevant and appropriate	Cal. Health & Safety Code § 25234 sets forth the following "relevant and appropriate" substantive criteria for the removal of a land-use restriction on the grounds that "...the waste no longer creates a significant existing or potential hazard to present or future public health or safety."
	Authorizes DTSC to enter into an enforceable agreement that imposes restrictions on present and future uses of the property	Transfer property from the Navy to a nonfederal entity	Cal. Health & Safety Code § 25355.5(a)(1)(C)	Relevant and appropriate	The substantive requirements of the following Cal. Health & Safety Code § 25355.5(a)(1)(C) provisions are "relevant and appropriate": "...execution and recording of a written instrument that imposes an easement, covenant, restriction, or servitude, or combination thereof, as appropriate, upon the present and future uses of the site."

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)
Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
INSTITUTIONAL CONTROLS (Continued)					
State ARARs (Continued)					
Cal/EPA Department of Toxic Substances Control (Cal. Code Regs., tit. 22, § 67391.1)^a					
Land use covenants	A land use covenant imposing appropriate limitations on land use shall be executed and recorded when facility closure, corrective action, remedial or removal action, or other response actions are undertaken and hazardous materials, hazardous wastes or constituents, or hazardous substances will remain at the property at levels which are not suitable for unrestricted use of the land.	Property transfer by federal government to nonfederal entity.	Cal. Code Regs., tit. 22, § 67391.1	Relevant and appropriate	Relevant and appropriate when the Navy is transferring property to a nonfederal agency. EPA considers the following portions of 22 CCR 67391.1 to be relevant and appropriate for this ROD: (a)(1), (a)(2), (d), (e)(1) and (e)(2). The Navy has selected ICs as part of the remedies for soil and groundwater. These requirements are ARARs for those ICs. EPA agrees that the substantive portions of the regulations referenced are ARARs. EPA specifically considers sections (a), (b), (d), and (e) of Cal. Code Regs. tit. 22 § 67391.1, to be ARARs for this ROD. DTSC's position is that all of the state regulation is an ARAR.

Notes:

- a Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the Navy accepts the entire statutes or policies as ARARs; specific ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered ARARs.
- § Section
- §§ Sections
- ARAR Applicable or relevant and appropriate requirement
- BAAQMD Bay Area Air Quality Management District
- Cal. Code. Regs. *California Code of Regulations*
- Cal. Civil Code *California Civil Code*
- Cal/EPA California Environmental Protection Agency

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (CONTINUED)

Record of Decision for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California

CFR	<i>Code of Federal Regulations</i>
DTSC	California Environmental Protection Agency Department of Toxic Substances Control
POC	Point of compliance
SIP	State Implementation Plan
RCRA	Resource Conservation and Recovery Act
ROC	Radionuclides of concern
ROD	Record of Decision
tit.	Title
USC	<i>United States Code</i>
U.S. EPA	United States Environmental Protection Agency
Water Board	San Francisco Bay Regional Water Quality Control Board

The Navy's Position Regarding SWRCB Resolutions 92-49 and 68-16

The Navy and the state of California have not agreed whether SWRCB Res. 92-49 and Res. 68-16 are ARARs for the remedial action at IR Site 2. Therefore, this ROD documents each party's position but does not attempt to resolve the issue.

The Navy recognizes that the key substantive requirements of Cal. Code Regs. tit. 22, § 66264.94 (and the identical requirements of Cal. Code Regs. tit. 23, § 2550.4 and Section III.G of SWRCB Res. 92-49) require cleanup of constituents to background levels unless that is technologically or economically infeasible and an alternative cleanup level will not pose a substantial present or potential hazard to human health or the environment. In addition, the Navy recognizes that these provisions are more stringent than the corresponding provisions of 40 CFR § 264.94 and, although they are federally enforceable under RCRA, they are also independently based on state law to the extent that they are more stringent than the federal regulations.

The Navy has also determined that SWRCB Res. 68-16 is not a chemical-specific ARAR for determining remediation goals, but it is an action-specific ARAR for regulating discharged treated groundwater to surface water. The Navy has determined that further migration of COCs through groundwater is not a discharge governed by the language in Res. 68-16. More specifically, the language of SWRCB Res. 68-16 indicates that it is prospective in intent, applying to new discharges in order to maintain existing high-quality waters. It is not intended to apply to restoration of waters that are already degraded.

The Navy's position is that SWRCB Res. 68-16 and Res. 92-49 and Cal. Code Regs. tit. 23, § 2550.4 do not constitute chemical-specific ARARs for this remedial action because they are state requirements and are not more stringent than the federal ARAR provisions of Cal. Code Regs. tit. 22, § 66264.94. The NCP set forth in 40 CFR § 300.400(g) provides that only state standards more stringent than federal standards may be ARARs (see also CERCLA § 121[d][2][A][iii]).

The substantive technical standard in the equivalent state requirements (that is, Cal. Code Regs. tit. 23, Division (div.) 3, Chapter (ch.) 15 and SWRCB Res. 92-49 and Res. 68-16) is identical to the substantive technical standard in Cal. Code Regs. tit. 22, § 66264.94. This section of Cal. Code Regs. tit. 22 will likely be applied in a manner consistent with equivalent provisions of other regulations, including SWRCB Res. 92-49 and Res. 68-16.

State of California's Position Regarding SWRCB Resolutions 92-49 and 68-16

The state does not agree with the Navy determination that SWRCB Res. 92-49 and Res. 68-16 and certain provisions Cal. Code Regs. tit. 23, div. 3, ch. 15 are not ARARs for this response action. SWRCB has interpreted the term "discharges" in the California Water Code to include the movement of waste from soils to groundwater and from contaminated to uncontaminated water (SWRCB, 1994). However, the state agrees that the proposed action would comply with SWRCB Res. 92-49 and Res. 68-16, and compliance with Cal. Code Regs. tit. 22 provisions should result in compliance with Cal. Code Regs. tit. 23 provisions. The state does not intend to dispute the ROD, but reserves its rights if implementation of the Cal. Code Regs. tit. 22 provisions is not as stringent as state implementation of Cal. Code Regs. tit. 23 provisions. Because the Cal. Code Regs. tit. 22

regulation is part of the state's authorized hazardous waste control program, it is also the state's position that Cal. Code Regs. tit. 22, § 66264.94 is a state ARAR and not a federal ARAR (*United States v. State of Colorado*, 990 F.2d 1565 [1993]).

Whereas the Navy and the state of California have not agreed on whether SWRCB Res. 92-49 and Res. 68-16 and Cal. Code Regs. tit. 23, § 2550.4 are ARARs for this response action, this ROD documents each of the parties' positions on the resolutions but does not attempt to resolve the issue.