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ENGINEERING FIELD ACTIVITY, WEST
NAVAL FACILITIES ENGINEERING COMMAND
2001 JUNIPERO SERRA BOULEVARD, SUITE 600
DALY CITY, CALIFORNIA 94014-1976

IN REPLY REFER TO :

18 August 2004

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To: Distribution

Subj: FINAL RECORD OF DECISION, TIDAL AREA LANDFILL- SITE 1, NAVAL WEAPONS STATION SEAL BEACH, DETACHMENT CONCORD, CONCORD, CALIFORNIA

Encl: (1) Final Record of Decision (ROD) Tidal Area Landfill, Site 1, Naval Weapons Station Seal Beach, Detachment Concord (July 2004)
(2) Letter of Concurrence on the Final Site 1 Landfill ROD from the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) (27 May, 2004)

1. In accordance with Section 10.9 of the Federal Facility Agreement (FFA), enclosures (1) and (2) are provided for your records. Enclosures (1) and (2) will be made available in the public information repository located at the Concord Public Library at 2900 Salvio Street in Concord California. Subsequently, a public notice announcing the availability of the Final Site 1 Landfill ROD in the information repository will appear in the legal section of the *Contra Costa Times*.

2. If there are any questions regarding the enclosed documents, please contact the undersigned at telephone No. 650-746-7451 or by e-mail at stephen.f.tyahla@navy.mil.

Sincerely

STEPHEN F. TYAHLA, P.E., CHMM
By Direction

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Record of Decision
Tidal Area Landfill Site 1

Naval Weapons Station Seal Beach Detachment Concord
Concord, California

FINAL

July 2004

Engineering Field Activity West
Naval Facilities Engineering Command
San Bruno, California

TETRA TECH EM, INC.

Final
Record of Decision
Tidal Area Landfill

Naval Weapons Station Seal Beach Detachment Concord
Concord, California

July 2004

(Pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act)

Department of the Navy
Naval Weapons Station Seal Beach
Seal Beach, California

U.S. Environmental Protection Agency, Region 9
175 Hawthorne Street
San Francisco, California

Department of Toxic Substances Control
8800 Cal Center Drive
Sacramento, California

Prepared by

Department of the Navy
Engineering Field Activity West
Naval Facilities Engineering Command
Daly City, California

Tetra Tech EM Inc.
135 Main Street, Suite 1800
San Francisco, CA 94105
(415) 543-4880

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5 Cost Estimate Summary for Selected Alternatives

ABBREVIATIONS AND ACRONYMS

µg/kg	Micrograms per kilogram
ARAR	Applicable or relevant and appropriate requirement
BAAQMD	Bay Area Air Quality Management District
BCDC	Bay Conservation and Development Commission
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIWMB	California Integrated Waste Management Board
COPC	Chemical of potential concern
CZMA	Coastal Zone Management Act
DTSC	California Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
ERA	Ecological risk assessment
FGC	Fish and Game Codes
FS	Feasibility study
HELP	Hydrologic Evaluation of Landfill Performance
HHRA	Human health risk assessment
HSC	Health and Safety Code
IMP	Installation Master Plan
IRP	Installation Restoration Program
LEL	Lower explosive limit
LUC RD	Land use control remedial design
mg/L	Milligrams per liter
mg/kg	Milligrams per kilogram
msl	Mean sea level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act
NPV	Net present value
O&M	Operation and maintenance

PRC	PRC Environmental Management Inc.
PRG	Preliminary remediation goal
RAB	Restoration Advisory Board
RAO	Remedial action objective
RCRA	Resource Conservation and Recovery Act
RI	Remedial investigation
ROD	Record of decision
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SBD	Seal Beach Detachment
SI	Site inspection
SVOC	Semivolatile organic compound
SWRCB	State Water Resources Control Board
TBC	To-be-considered (regulation)
TDS	Total dissolved solids
TtEMI	Tetra Tech EM Inc.
UCL	Upper confidence limit
USC	United States Code
VOC	Volatile organic compound
WESCO	Western Ecological Services Company, Inc.

1.0 DECLARATION STATEMENT FOR TIDAL AREA LANDFILL

1.1 SITE NAME AND LOCATION

The Tidal Area Landfill at Naval Weapons Station Seal Beach Detachment (NWS SBD) Concord, formerly known as Naval Weapons Station Concord, is located in Concord, California. The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) identification number for the facility is CA7170024528.

On December 16, 1994, NWS SBD Concord was included on the National Priorities List. NWS SBD Concord is an active Naval base. The lead agency is the Department of the Navy. The source of funding for the cleanup is the U.S. Department of Defense, Defense Environmental Restoration Program.

1.2 STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Tidal Area Landfill at NWS SBD in Concord, California. The remedy was selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act. The selection is supported by information in the administrative record for the Tidal Area Landfill, and the remedy is consistent with EPA presumptive remedy guidance for municipal landfill sites (EPA 1993, 1996b). This decision document satisfies requirements for the record of decision (ROD) under CERCLA. The signatures in Section 1.7 indicate approval of this ROD by EPA and the State of California.

1.3 ASSESSMENT OF THE SITE

The selected remedial action described in this final ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances to the environment.

1.4 DESCRIPTION OF THE REMEDY

The selected remedial action described in this ROD addresses potential risks to human health and the environment posed by the Tidal Area Landfill at NWS SBD Concord. The major components of the selected remedy include the following:

- A multilayer municipal solid waste prescriptive soil cap (landfill cap) constructed to isolate and eliminate direct contact with refuse in the landfill and reduce soil erosion, infiltration, and potential contaminant migration. Landfill gas vents will be included in the cap. Surface controls will include ditches (if necessary), grading, and revegetation to reduce soil erosion and infiltration of surface water. The cap will cover an area of 13 acres.
- Land use and access restrictions to protect human health as specified in a future remedial design (RD) will consist of prohibitions on groundwater use and use of the property for any purpose that will disturb the integrity of the cap.
- Monitoring of groundwater, landfill gas, and the integrity of the landfill cap to ensure future effectiveness of the remedy. This ROD is not considered a remedy for groundwater. The Navy will plan and conduct a supplemental groundwater remedial investigation (RI) at and adjacent to the Tidal Area Landfill.

The CERCLA investigation, evaluation, and planning for the Tidal Area Landfill have resulted in the selection of a site-specific remedy with associated land use controls that prevent unacceptable exposure and protect the public welfare and the environment. The Navy will ensure that any future land use for this site will take the selected remedy into account. The land use controls will ensure that land use restrictions remain in place and effective until the concentrations of hazardous substances have been reduced to levels that allow for unlimited exposure and unrestricted use.

This ROD addresses only the landfill cap for the Tidal Area Landfill, Site 1, and does not include the immediately surrounding R Area, Site 2. The immediately surrounding portion of Site 2 is within the potential area of influence of any hazardous material that could have migrated from Site 1. However, Site 2 is the subject of an independent study that will result in a separate ROD to identify remedial actions for the area, if necessary.

This ROD does not address remedial actions that may be necessary to address groundwater contamination emanating from the landfill. The Navy intends to conduct a separate CERCLA supplemental RI of groundwater at and adjacent to the landfill. The supplemental RI will eventually support a separate ROD to address groundwater associated with the Tidal Area Landfill. Consideration and selection of an appropriate remedial action for groundwater, if required, will be addressed in the future Tidal Area Landfill groundwater ROD.

If ongoing studies at Site 2 or landfill monitoring at Site 1 indicate that the Site 1 landfill cap poses significant risk to human health or the environment, the Navy agrees to notify the agencies signing this ROD and agrees to mitigate all risks as required under CERCLA.

1.5 STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action, and is cost effective. The selected remedy uses permanent solutions and satisfies the statutory requirements of CERCLA. In light of the volume of the waste, the heterogeneity of the landfill contents, and the absence of hot spots of contamination, treatment of the disposed waste, the principal source of contamination, was not deemed practical or cost effective. Therefore, this remedy does not satisfy the statutory preference for treatment as a principal element. Remedial options other than the established presumptive remedy approach, including excavation of the landfill with consolidation and off-site disposal, were not formally evaluated in the feasibility study (FS) primarily because of the high cost associated with excavation and off-site disposal, potential uncertainties regarding the landfill contents, the lack of suitable areas for consolidation, and the potential for large-scale excavation and backfilling to damage surrounding sensitive environments. The remedy includes excavation at the perimeter of the landfill to consolidate the waste. Consolidation of only the perimeter wastes will minimize the possibility of any potential disturbance of the area that surrounds the site (Tetra Tech EM Inc. [TtEMI] 1998b). For these reasons, and in accordance with EPA guidance on presumptive remedies, a containment technology was selected as the preferred alternative. Containment technologies, as used by the EPA, refer to remedies that contain or encapsulate waste rather than treat or destroy waste. Therefore, placement of an earthen landfill cap is considered a containment technology.

Because the remedy leaves potentially hazardous substances in the landfill at concentrations above levels that allow for unlimited use and unrestricted exposure, the Navy will conduct five-year reviews in accordance with CERCLA Section 121(c). The reviews will ensure that the remedy continues to provide adequate protection of human health and the environment.

1.6 ROD DATA CERTIFICATION CHECKLIST

The following Data Certification Checklist provides a roadmap to the ROD and identifies the location of key elements or explains why these elements are not addressed in the ROD. Inclusion of the ROD Data Certification Checklist fulfills a commitment by the EPA to the General Accounting Office to ensure that RODs contain certain key information on remedy selection (EPA 1999).

Checklist Item	Description
1. Chemicals of concern and their respective concentrations.	Chemicals of potential concern are characterized only at the landfill perimeter and not throughout the landfill. In accordance with the EPA's presumptive remedy guidance for landfills, chemicals of concern and their concentrations have not been evaluated, and human health and ecological risk assessments have not been completed for the entire landfill because the waste has not been characterized. A description of contamination at the site is presented in Section 2.5.1.
2. Baseline risk represented by the chemicals of concern.	Baseline risk assessment calculations are not required to implement the EPA's presumptive remedy (landfill cap). Although not required, a focused human health risk assessment for the landfill perimeter only is presented in Section 2.7.1 of the ROD. A baseline ecological risk assessment is not a required element of the ROD and is, therefore, not included.
3. Cleanup levels established for chemicals of concern and the basis for these levels.	The EPA's presumptive remedy (landfill cap) is a containment solution and does not include cleanup of the debris within the landfill. Cleanup levels are therefore not included in this ROD.
4. How source materials constituting principal threats are addressed.	Characterization of the landfill contents is not required to select and construct the EPA's presumptive remedy, a landfill cap. However, some sampling has been completed both within the landfill and at its perimeter. Although organic and inorganic contaminants were detected as a result of the sampling effort, these contaminants are typical of landfills of this type; high concentrations of these contaminants were not commonly found and are not uniformly distributed throughout the landfill. The contaminants detected plus any unidentified hazardous materials constitute potential source areas for on-site contact or off-site migration of contaminants. Capping addresses the threats of potential contact with waste and off-site contaminant migration by windborne or surface water erosion of soils and waste. Mitigation of potential threats is discussed in Sections 2.9.1, 2.9.3, 2.9.4, and 2.9.5 of this ROD.
5. Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD.	Current and anticipated future land uses at the landfill are discussed in Section 2.6. Land use assumptions in the focused human health risk assessment are discussed in Section 2.7.1. Because groundwater use is not anticipated in the Tidal Area of Naval Weapons Station Seal Beach Detachment Concord, this exposure pathway is not included in any risk assessment.
6. Potential land and groundwater use that will be available at the site as a result of the selected remedy.	Potential land uses possible at the site as a result of the selected remedy are discussed in Section 2.6.
7. Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected.	The estimated capital, annual O&M, and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected are discussed in Section 2.9.7.
8. Key factors that led to selecting the remedy.	Key factors that led to selecting the remedy are discussed in Sections 2.10 and 2.11.

17 AUTHORIZING SIGNATURES AND ACCEPTANCE OF REMEDY

R.W. Fowler — 4 May 04

Captain R. Fowler
Commanding Officer
Naval Weapons Station Seal Beach

Date

Kathleen H. Johnson — May 17, 2004

Kathleen Johnson
Acting Chief, Federal Facility and Site Cleanup Branch
U.S. Environmental Protection Agency Region 9

Date

Anthony J. Landis — 7-21-04

Anthony J. Landis, P.E.
Chief of Operations, Office of Military Facilities
California Environmental Protection Agency
Department of Toxic Substances Control

Date

In signing this decision document the Department of Toxic Substances Control is confirming that we have reviewed and commented on the Record of Decision for the Landfill known as Site 1, and our concerns were addressed.

2.0 DECISION SUMMARY FOR TIDAL AREA LANDFILL

2.1 SITE NAME, LOCATION, AND DESCRIPTION

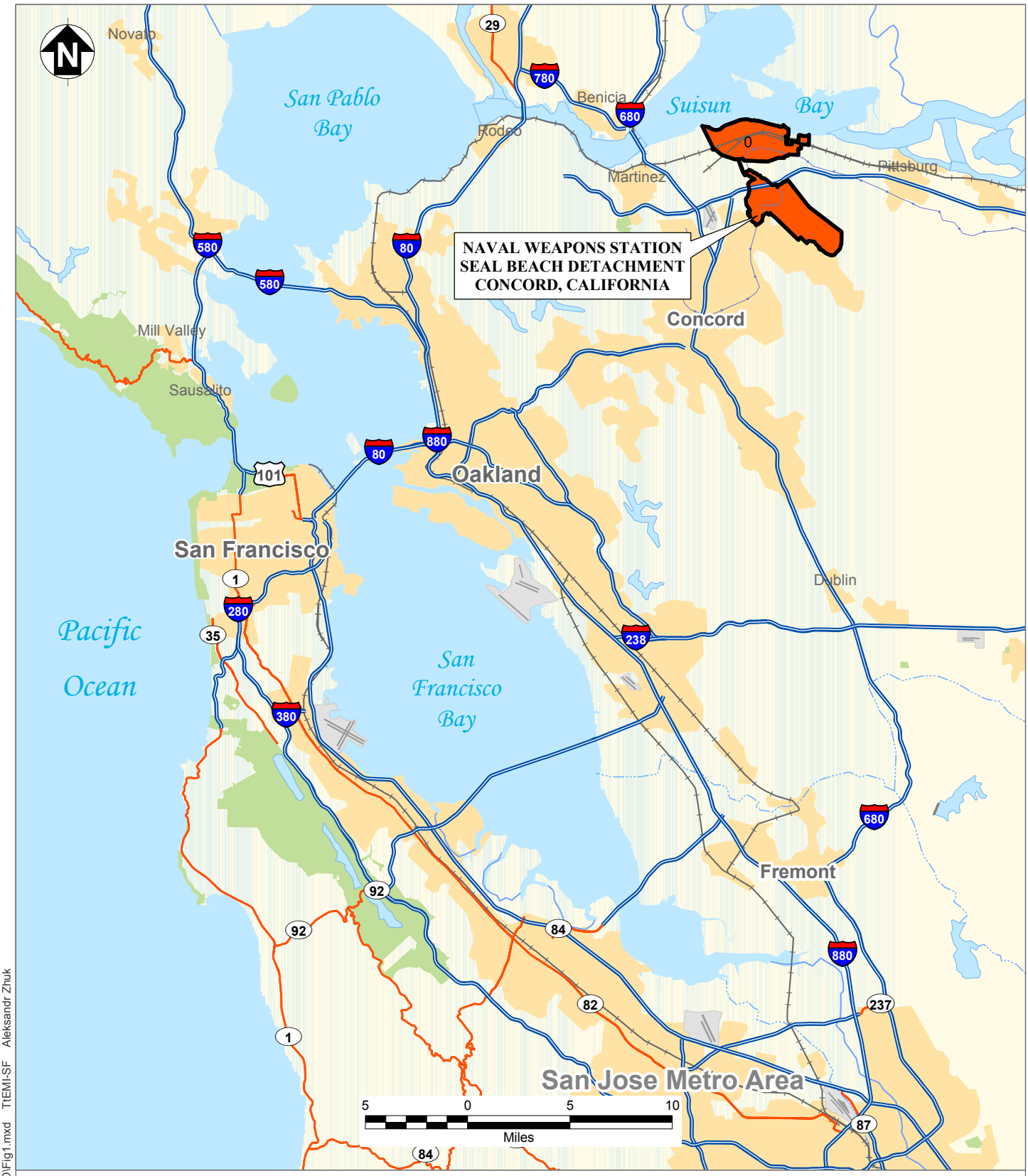
NWS SBD Concord is the major naval munitions transshipment facility on the West Coast and is located in the north-central portion of Contra Costa County, California, 30 miles northeast of San Francisco (Figure 1). The facility, which encompasses 13,000 acres, is bounded by Suisun Bay to the north, by Los Medanos Hills and the City of Pittsburg to the east, and by the City of Concord to the south and west. Currently, the facility contains three main, separate, land holdings: the Tidal Area (which includes islands in Suisun Bay), the Inland Area, and a radiography facility in Pittsburg, California (Figure 2).

The 6,800-acre Tidal Area is located in a low marsh adjacent to Suisun Bay. The Tidal Area Landfill (Site 1) is one of four Tidal Area sites investigated by the Navy under the Installation Restoration Program (IRP). The IRP was established to identify, assess, and remediate uncontrolled hazardous substance, pollutant, and contaminant sites that resulted from military activities (PRC Environmental Management Inc. [PRC] 1995).

Endangered species and other wildlife inhabit portions of the Tidal Area, most of which is a wetland. A large section of the wetland was modified during construction of the original weapons station. Large amounts of fill material were placed in the wetland, and an artificial sluice was constructed to control tidal inflows.

The Tidal Area Landfill covers 13 acres and contains an estimated 125,000 to 135,000 cubic yards of waste and cover soil. The landfill served as the primary disposal area for NWS SBD Concord from 1944 to 1979. During that time, the landfill received household refuse from the base and surrounding communities, as well as facility waste and construction debris. A wetland area designated as a salt marsh is adjacent to the landfill along its western and southern boundaries (Figure 3). The closest civilian population to the landfill is 1.3 miles away.

This ROD addresses only the Tidal Area Landfill (Site 1). The Navy is continuing CERCLA environmental investigations and evaluations at the other three Tidal Area sites: the R Area, Site 2; the Froid and Taylor Roads site, Site 9; and the Wood Hogger site, Site 11. The Navy does not currently use Sites 2 and 9. The Wood Hogger site, Site 11, is mostly vacant and occasionally used for storage of wood. The location of each site is indicated on Figure 3.



Naval Weapons Station Boundary

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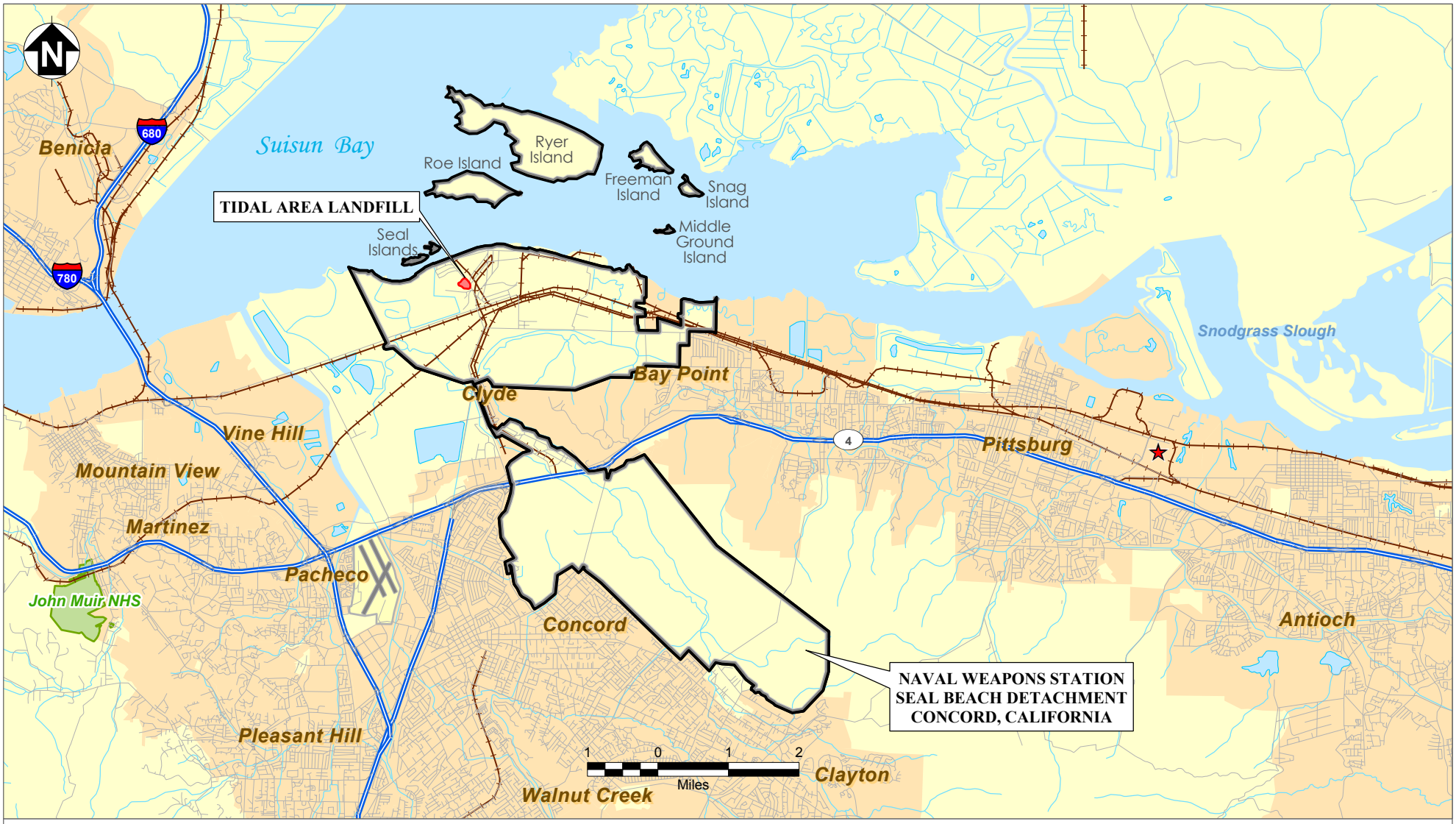
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA
EFA West, Daly City

FIGURE 1
VICINITY MAP

Tidal Area Landfill Record of Decision

2003-10-31 V:\Concord\Projects\Tidal_ROD\Fig1.mxd TtEMI-SF Aleksandr Zhuk



NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD, CALIFORNIA

RADIOGRAPHY FACILITY

Tetra Tech EM Inc.

NAVAL WEAPONS STATION SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA
EFA West, Daly City

FIGURE 2
SITE LOCATION MAP

Tidal Area Landfill Record of Decision

2003-12-12 V:\Concord\Projects\Tidal_ROD\NWS_Pittsburg.mxd TtEMI-SF Aleksandr Zhuk

Figure 3

This detailed station map has been deleted from the Internet-accessible version of this document as per Department of the Navy Internet security regulations.

2.1.1 Geology and Topography

The Tidal Area of NWS SBD Concord, which includes the Tidal Area Landfill, is characterized by artificial fill material that overlies fine-grained Bay Mud sediments. Artificial fill material has been used in the Tidal Area to construct road and railroad beds, channel levees, structural pads, and protective revetments. The fill material was used to elevate portions of the base above the marsh plain, which is generally at or near mean sea level (msl) in the Tidal Area. The artificial fill used outside the area of the landfill is typically a mixed lithology that contains varying proportions of clay, silt, sand, and gravel. The refuse that makes up the landfill is also considered artificial fill. Household refuse, facility waste, construction debris, metal debris, and soil were deposited directly on the surface of the marsh to form the landfill. Aerial photographs show no evidence of excavation at the landfill. Topographic maps indicate that the landfill extends approximately 10 feet above the marsh plain.

Bay Mud underlies the fill material and the landfill and consists chiefly of silty clay with local horizons of peat. Near the Tidal Area Landfill, Bay Mud extends from the ground surface to a total explored depth of 20 feet below msl. Because the Bay Mud is not consolidated, the weight of the refuse in the landfill has likely compressed the underlying Bay Mud to some extent. Silty clay is the predominant lithology of the Bay Mud, although peat lenses are present beneath the landfill and a sand body is present in the area east of the landfill.

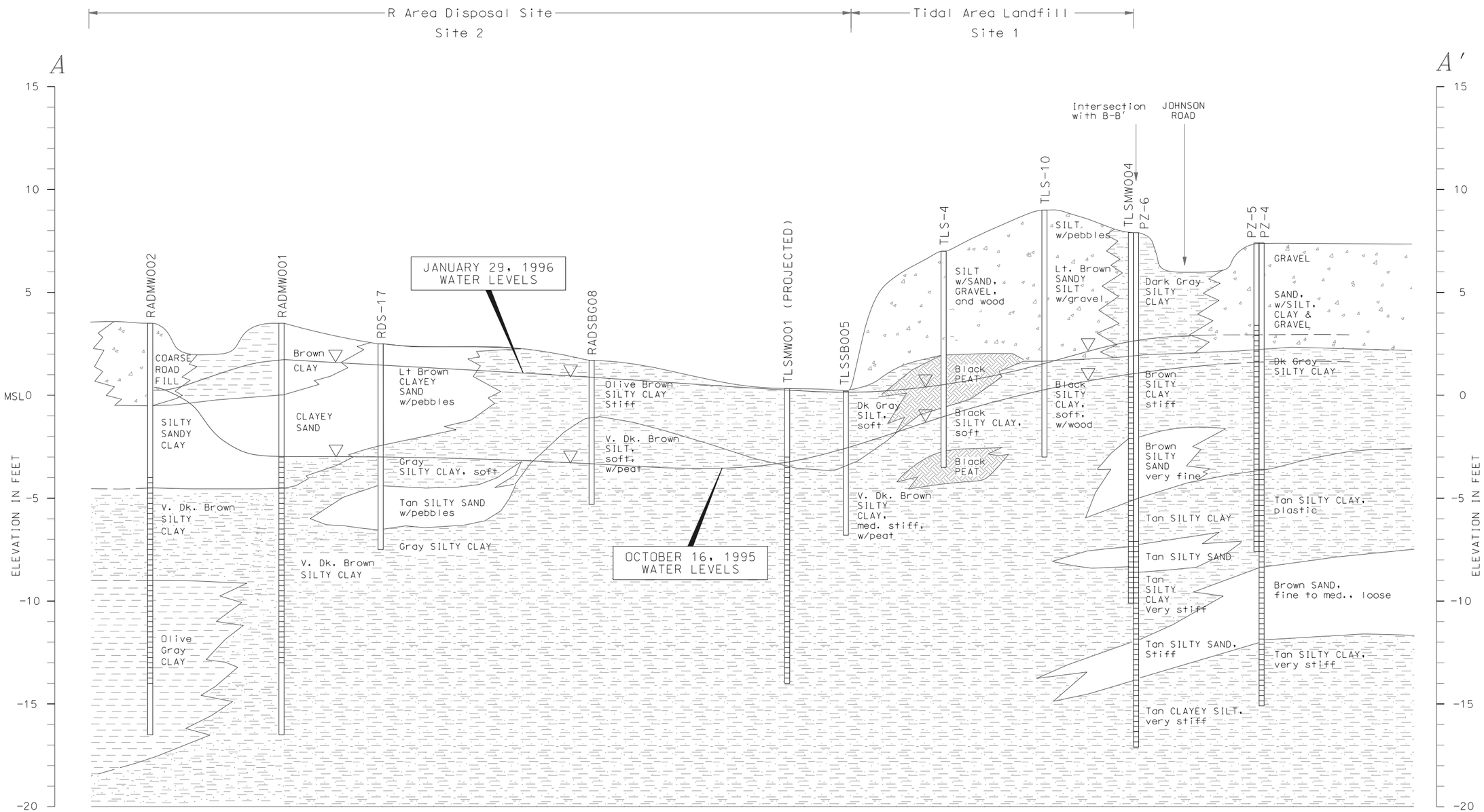
Previous investigations of the site included borings to evaluate the subsurface conditions at the landfill and in the surrounding areas. Figures 4, 5, and 6 illustrate the boring locations and geologic cross sections A-A' and BB' through the area (TtEMI 2003a).

The landfill forms an asymmetric mound that reaches a maximum elevation of more than 10 feet above msl near its eastern edge along Johnson Road. The western half of the landfill is at an elevation of 3 to 5 feet above msl. The area adjacent to the Tidal Area Landfill consists of low-lying wetlands, including the R Area (Site 2), the Froid and Taylor Roads site (Site 9), and the Wood Hogger site (Site 11). The elevation of the wetlands west of the landfill are generally between 2 and 4 feet msl.

The extent of the Tidal Area Landfill depicted in Figure 3 encompasses the entire area where landfill debris and surface cover fill were placed on the former marsh. No horizontal buffer zone separates the landfill from Site 2. Physically, the boundary between the landfill and Site 2 is sharply defined by the toe of a fill slope. In addition, the distinction between the two sites is clear because the plant life changes from a pickleweed marsh on Site 2 to upland grasses and weeds on the landfill.

Figure 4

This detailed station map has been deleted from the Internet-accessible version of this document as per Department of the Navy Internet security regulations.



NOTES:

THIS CROSS SECTION REPRESENTS ONE ITERPRETATION BASED ON AVAILABLE DATA, OTHER INTERPRETATIONS ARE POSSIBLE

WATER LEVELS BETWEEN WELLS ARE INTERPOLATED

PROJECTED WELLS SHOW SCREENED INTERVALS BUT NOT LITHOLOGY

0 150 300
FEET
HORIZONTAL SCALE

VERTICAL SCALE = 20 X HORIZONTAL SCALE

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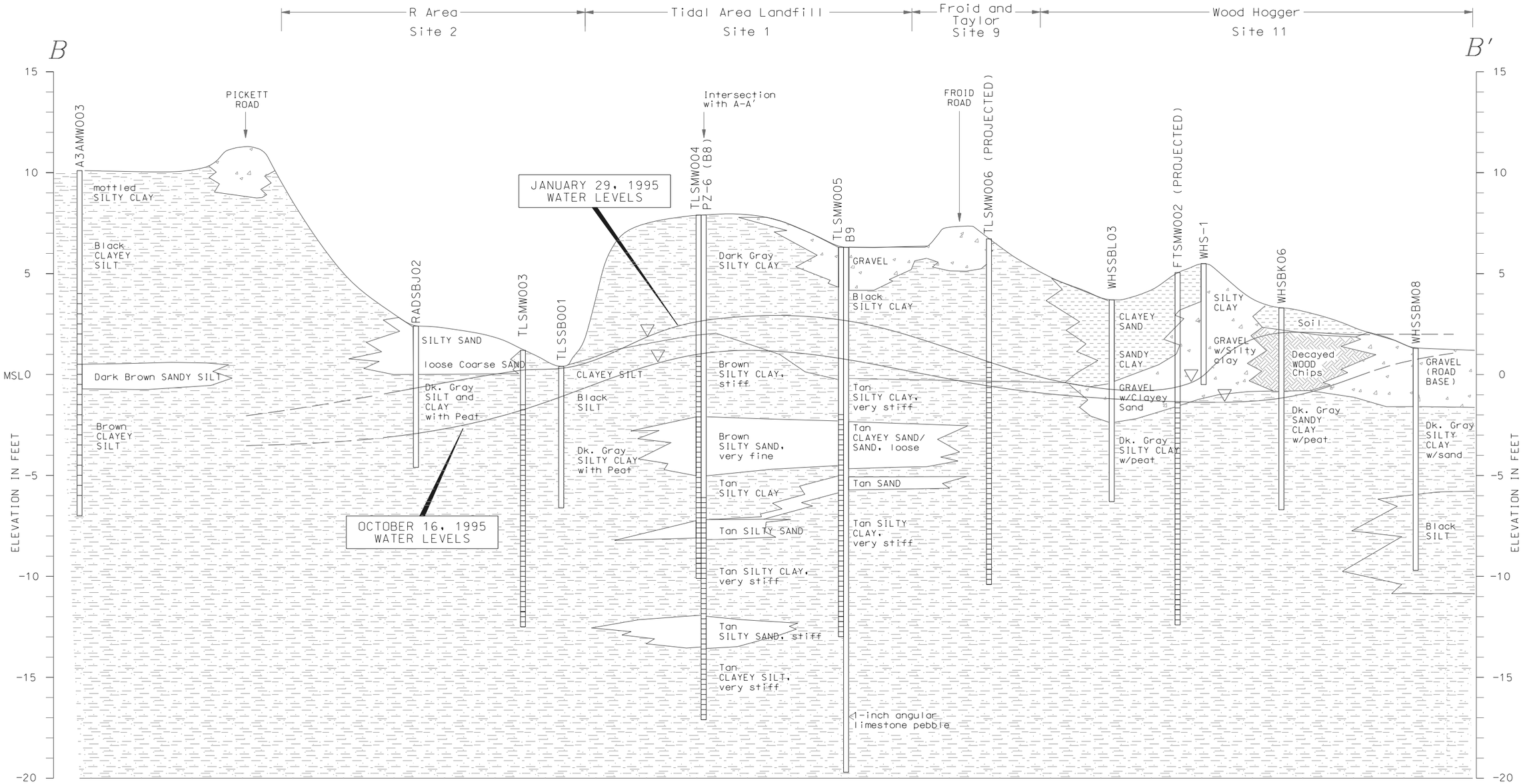
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA
EFA West, Daly City

FIGURE 5
GEOLOGIC CROSS SECTION A-A'

Tidal Area Landfill Record of Decision



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WATER LEVELS BETWEEN WELLS ARE INTERPOLATED

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0 150 300
FEET
HORIZONTAL SCALE

VERTICAL SCALE = 20 X HORIZONTAL SCALE

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NAVAL WEAPONS STATION SEAL BEACH DETACHMENT
CONCORD, CALIFORNIA
EFA West, Daly City

FIGURE 6
GEOLOGIC CROSS SECTION B-B'

Tidal Area Landfill Record of Decision

2.1.2 Hydrology

NWS SBD Concord lies within the boundaries of the Clayton Valley Groundwater Basin, as defined in the San Francisco Bay Water Quality Control Plan (Basin Plan). The existing and potential beneficial uses identified for this groundwater basin, which lies between 50 to 300 feet below ground surface, include the following: municipal and domestic supply, industrial process supply, industrial service supply, and agricultural supply. Groundwater at the Tidal Area Sites occurs in a shallow unconfined water-bearing zone predominantly composed of silty clays.

Shallow groundwater in the Tidal Area contains total dissolved solids (TDS) at levels that are, on average, significantly higher than the 3,000-miligrams per liter (mg/L) level the State Water Resources Control Board Resolution 88-63 sets as a maximum for a municipal or domestic water supply and the 10,000-mg/L level set forth in the EPA's groundwater classification guidelines (EPA 1998). TDS concentrations in the four Tidal Area Sites are generally very high, ranging from 3,930 mg/L to 65,600 mg/L. An average TDS concentration of more than 23,000 mg/L was detected in samples collected from 1990 to 1997 from the 23 wells in the Tidal Area. For comparison, the concentration of TDS in seawater typically is 35,000 mg/L.

Because of high TDS in samples from the monitoring wells, groundwater is not considered potable. There is no historical, existing, or planned use of the shallow groundwater in the Tidal Area as a source of drinking water.

Data obtained from groundwater monitoring wells surrounding the Tidal Area Landfill indicate that groundwater elevations in the eastern, elevated portion of the landfill are consistently higher than in the western edge of the landfill and the adjacent R Area, Site 2. Groundwater consistently flows west or southwest beneath the landfill during both the wet and dry seasons, except in the northern portion of the landfill, where groundwater locally flows northward toward Suisun Bay. The available data do not indicate that groundwater mounds beneath the landfill. However, the refuse in the landfill extends down to and below the groundwater table. Groundwater flow rates in the area are extremely low because the silty clay that makes up the bulk of the Bay Mud does not readily transmit water.

Groundwater flow velocities up to 2.2 feet per year were estimated from hydraulic parameters measured in 1998. Specific yields of the monitoring wells have not been measured, principally because of the difficulty in carrying out pumping tests in wells screened in Bay Mud. Sampling records indicate that wells at the landfill typically experienced significant drawdown at pumping rates of 0.1 liter per minute, suggesting that well yields would be below 200 gallons per day. Groundwater elevations at the Tidal Area Landfill measured from December 1989 to January 1998 ranged from 3.20 feet below msl to 3.54 feet above msl. Except for a few wells or measurement periods, water levels in the wells at the site were highest near the end of the wet season and lowest near the end of the dry season. The response of water levels

in landfill wells to seasonal rainfall indicates that groundwater is recharged by infiltration of precipitation.

A confined sand body is present in the area east of the landfill. The sand body occurs about 16 feet below grade, is approximately 3.5 feet thick, and appears to terminate in the vicinity of the landfill. Groundwater flows to the northwest within the sand body and was not sampled during the confirmation study because the sand body is not downgradient of the landfill (TtEMI 1998a). Surface water is not present at the landfill. The closest permanent surface water body is Otter Sluice, a manmade drainage canal that runs along the southwestern perimeter of the Tidal Area sites; however, some open water typically exists year round at Site 2. At its closest point, Otter Sluice is about 750 feet from the Tidal Area Landfill. Tidal fluctuations in Otter Sluice cause localized reversals in the direction of groundwater flow in the area immediately adjacent to the sluice, but groundwater flow in the vicinity of the landfill is not affected by tidal fluctuations in Otter Sluice.

Figures 7 and 8 depict groundwater elevations at the site at the end of the dry season (October 1995) and during the rainy season (January 1996), respectively. These figures illustrate the general directions of groundwater flow during summer (dry season) and winter (wet season). In general, groundwater at the site flows toward the R Area, Site 2, during both the dry and wet seasons.

2.2 SITE HISTORY

The following sections summarize the history and former environmental investigations of the Tidal Area Landfill, Site 1.

2.2.1 Background

The Tidal Area at NWS SBD Concord is located on a site originally occupied in part by a copper smelting operation from 1901 to 1908 and later by the Pacific Coast Shipbuilding Company. At that time, the area was known as “Bay Point.” The copper smelting and ship building operations occurred in the area north of what is now the Tidal Area Landfill. The distance from the landfill to the former smelting and shipbuilding operations is estimated to be more than 1,000 feet. Otter Sluice was constructed to drain surface water and groundwater from the Tidal Area to Suisun Bay. The sluice is believed to have passed through the current location of the Tidal Area Landfill. During construction of NWS SBD Concord in 1942, the portion of this sluice that passed through the present location of the Tidal Area Landfill was backfilled and the sluice was rerouted around the Tidal Area Landfill.

Figures 7 and 8

These detailed station maps have been deleted from the Internet-accessible version of this document as per Department of the Navy Internet security regulations.

The Tidal Area Landfill is located along the western side of Johnson Road, just north of Froid Road (Figure 3). The landfill covers approximately 13 acres and contains an estimated 125,000 to 135,000 cubic yards of waste and cover soil. The landfill served as the primary disposal area for NWS SBD Concord from 1944 to 1979.

Historical aerial photographs indicate, based on the expansion of the landfill perimeter, that most of the waste was deposited in the landfill between 1959 and 1974. Household garbage from NWS SBD Concord and surrounding civilian communities, as well as shipboard waste, was disposed of at the landfill. The landfill reportedly received solvents, acids, paint cans, creosote-treated timbers, asphalt, concrete, asbestos, and ordnance materials including inert munitions.

According to the initial assessment study, tritonal from a 750-pound, general-purpose bomb was reportedly buried in the landfill. The initial assessment study did not cite the source of information. Subsequent inquiries have not determined the information source. Navy sources consider the tritonal disposal to be a highly unlikely event because the protocol for disposal of explosives does not include landfill disposal. Other safe and appropriate disposal methods for this type of material were in practice at the time. If tritonal was disposed of in violation of Navy rules, it would be subject to degradation with exposure to the elements. Degradation of tritonal by weathering tends to increase the stability of the material (TtEMI 2001, 2003b)

Historical photographs indicate that the Tidal Area Landfill was created by the progressive disposal of debris placed directly on native soil outward from Johnson Road. Apparently the area was not excavated before waste was discarded there. A waste thickness of up to 10 feet was estimated from topographic evaluation; however, the waste may be unevenly distributed, and the ratio of waste to soil cover in the fill may be variable. There is no record of the degree of landfill subsidence that resulted from consolidation of the underlying Bay Mud. The area is currently covered by soil; however, the origin of the soil cover is unknown. Presently, a fence borders the edge of the landfill along Johnson Road but does not surround the landfill.

As indicated in Section 2.1.2, Hydrology, groundwater levels in the vicinity of the Tidal Area Landfill have been measured up to 3.54 feet above msl. Because the waste has been measured at up to 10 feet thick at the landfill, it is clear that at least a portion of the landfill waste is inundated.

The horizontal extent of the landfill has been established with a high degree of certainty based on historical aerial photographs and visual site inspections. The boundary of the landfill on the east side is delineated by a road, and on the south, north, and west sides, the boundary is visually apparent as a sudden change in slope from the flat wetland to the raised mound of the landfill.

The landfill consists predominantly of ruderal non-native grassland habitat. The surface of the landfill is discontinuous soil cover that is mixed with waste throughout the depth of the landfill. Currently, rubble, metal scraps, and wood debris are visible through the soil layer. Animal burrows and differential subsidence have resulted in a highly uneven surface interrupted by deep potholes.

2.2.2 Summary of Environmental Activities

This section briefly describes the investigations of the Tidal Area Landfill and surrounding areas.

2.2.2.1 Historical Environmental Assessments of the Landfill

A summary of environmental investigations conducted at NWS SBD Concord before the RI is provided below. Although the investigations are described with IRP terms used before the Navy adopted EPA's terminology, the investigations are consistent with the CERCLA process. The investigations concerned all four sites within the Tidal Area of NWS SBD Concord. However, the information summarized in the following paragraphs applies only to the Tidal Area Landfill.

The site was first investigated during an initial assessment study in 1983. The initial assessment study consisted of a search of historical records, a visual inspection of the site, and interviews with personnel at NWS SBD Concord. Based on the historical information, the site was recommended for further study. A site inspection (SI) of the Tidal Area Landfill was subsequently conducted from April 1988 to January 1991. Groundwater, surface water, soil, and sediment samples were collected within the Tidal Area Landfill. Results revealed the presence of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons, the pesticide dieldrin, the polychlorinated biphenyl Aroclor-1260, metals, and the nitroaromatic explosive compound nitrobenzene. The Navy documented its intent to use a presumptive remedy approach in December 1994 in the Remedial Investigation/Feasibility Study Tidal Area Sites Draft Final Work Plan. Based on the EPA's Presumptive Remedy for CERCLA Municipal Landfill Sites (1993), a multilayer municipal solid waste prescriptive soil cap was proposed and selected.

The boundary of the Tidal Area Landfill site, as defined in the SI report, was larger than the current boundary shown on Figure 3. During the SI, the landfill area was defined to include the landfill itself and a bordering zone of potential influence. In the RI, the boundary was modified to reduce the size to be equal to the area where the waste was deposited. As a result, many of the SI sampling locations for the Tidal Area Landfill are located outside the landfill boundary as it is currently defined. Samples from these locations were collected within the wetland area now called the R Area, Site 2.

A confirmation sampling study was conducted in 1993 to confirm the results of quarterly sampling during the SI. A limited number of soil, sediment, and groundwater samples were analyzed to verify the extent of organic constituents in groundwater. No organic compounds or pesticides were detected in these samples (PRC and MW 1993).

2.2.2.2 Remedial Investigation and Confirmation Groundwater Sampling Study for the Tidal Area

Data collected during the SI and the 1993 confirmation sampling study were used in planning the RI at the Tidal Area Landfill. A confirmation sampling study for groundwater was later conducted in September and October 1997 to address outstanding questions involving site hydrology and groundwater in the Tidal Area (TtEMI 1998a). Section 2.5 of this ROD describes the nature and extent of contamination at the Tidal Area Landfill and identifies the chemicals of potential concern based on RI screening criteria and the confirmation groundwater sampling study.

2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Navy formed a Restoration Advisory Board (RAB) for cleanup at NWS SBD Concord on July 20, 1995. The RAB serves as a key forum for communications and is made up of members of the community, regulatory agencies, and the Navy. The RAB holds regular public meetings to discuss the progress of environmental cleanup at NWS SBD Concord. In 1999, RAB meetings were cancelled as a result of attrition and lack of attendance. The Navy decided to omit formal RAB meetings in consultation with the community co-chair, who at that time was the only regularly attending member of the RAB. In 2001, local citizens showed a renewed interest in the RAB, and the current 10-member NWS SBD Concord RAB meets monthly. Other community involvement efforts have included publishing notices of intent in local newspapers, distributing fact sheets within the community, and issuing press releases about the IRP. In April 2003, the Navy issued a draft community relations plan for the NWS SBD Concord IRP for public and regulatory agency review. The plan will help guide the Navy's future public participation efforts.

The draft RI report on the Tidal Area Landfill was issued in April 1997 (PRC 1997), and the final FS report was issued in July 1998 (TtEMI 1998b). The RI and FS reports were made available to the public through the administrative record located at Naval Facilities Engineering Command, Engineering Field Activity West offices in Daly City, California, and in the NWS SBD Concord Information Repository at the City of Concord public library. The proposed plan for the Tidal Area Landfill, which identifies the Navy's preferred alternative, was made available to the public on June 8, 1999. A notice of the proposed plan's availability was published in the Contra Costa Times on June 8, 1999. A public comment period on the proposed plan was held from June 8 through July 8, 1999, and a public meeting was held on June 17, 1999. Representatives from the Navy, the EPA, and the State of California answered questions at this meeting about the proposed

alternative for the Tidal Area Landfill at NWS SBD Concord. The Navy has prepared written responses to comments received during the public comment period. These responses are contained in the responsiveness summary, which is Part 2 of this decision document (Appendix A). These community participation activities fulfill the requirements of CERCLA Sections 113(k)(2)(B) (i-v) and 117(a)(2).

2.4 SCOPE AND ROLE OF REMEDIAL ACTION

This section is intended to describe how the remedial activities at Site 1, the Tidal Area Landfill, fit within the overall CERCLA program at NWS SBD Concord, which includes many sites as described below.

To date, 31 sites have been identified under the IRP at NWS SBD Concord. These 31 sites are divided among the following areas: (1) Tidal Area, (2) Litigation Area, and (3) Inland Area. Three sites (2, 9, and 11) in the vicinity of Site 1 have also been identified as potential areas of concern at the Tidal Area of NWS SBD Concord (see Figure 3). These sites are currently being evaluated under the CERCLA environmental restoration process. The overall strategy for the installation is to accelerate remedial and removal actions at each individual site rather than to wait for characterization to be completed at all sites. The next step in the cleanup process for Site 1, the Tidal Area Landfill, is installation of a landfill cap. This ROD addresses only installation of the landfill cap; a separate groundwater ROD will be prepared to address potential groundwater contamination from the Tidal Area Landfill.

The RI/FS for the Litigation Area (Sites 3, 4, 5, 6, 25, 26, and 28) was completed in 1988, the ROD was signed in 1989, and the remedial actions were completed in 1996. Five years of monitoring in the Litigation Area have been completed, and the effectiveness of the remediation is evaluated in the Draft Final Five-Year Periodic Review Assessment report (TtEMI 2002). The RI for the Inland Area Site 17 is complete. A no-action proposed plan and ROD is in progress for Inland Area Site 17. Additional groundwater characterization is planned for Site 13 in 2004. A time-critical removal action was conducted at Site 31 in 2002. Sites 22, 30, and 31 are in the RI phase. Sites 27 and 29 are in the FS phase. The remaining 13 sites at NWS SBD Concord (Sites 7, 8, 10, 12, 14, 15, 16, 18, 19, 20, 21, 23, and 24) are considered no-further-action sites because they do not pose a significant risk to human health or the environment.

2.5 SUMMARY OF SITE CHARACTERISTICS

2.5.1 Nature and Extent of Contamination

The SI completed in 1991 revealed that VOCs, SVOCs, polynuclear aromatic hydrocarbons, polychlorinated biphenyls, and metals are present within the landfill itself. As a result of the SI, an RI was conducted to assess whether contaminants were migrating outward from the landfill.

During the RI, surface and subsurface soil and groundwater samples were collected around the perimeter of the landfill to assess potential migration of chemicals. Surface water samples were not collected at the Tidal Area Landfill during the RI because no surface water exists at the landfill. The RI did not attempt to fully characterize the contents of the landfill because of the heterogeneous nature of the landfill contents and because based on the EPA guidance document Presumptive Remedy for CERCLA Municipal Landfill Sites (EPA 1993), capping was considered the most likely remedy. Instead, samples were collected at eight locations around the perimeter of the landfill, and 24 samples were collected, analyzed, and compared with 1996 EPA Region IX and California-modified residential preliminary remediation goals (PRG) (EPA 1996a) and ambient concentrations for metals. PRGs are calculated from EPA toxicity values with "standard" exposure factors to estimate concentrations in soil and groundwater that are protective of human health over a lifetime. Residential PRG values are lower than industrial PRG values. California-modified PRGs are derived using State of California EPA toxicity values.

Only one organic compound was detected in soil samples at a concentration greater than its residential PRG. The polynuclear aromatic hydrocarbon benzo(a)pyrene was detected in surface soil samples from the western edge of the landfill at a concentration of 68 micrograms per kilogram (µg/kg), and the 1996 PRG was 56 µg/kg (TtEMI 1999). The EPA PRGs have been updated, and the current residential PRG for benzo(a)pyrene has been increased to 62 µg/kg (EPA 2002). Two metals, arsenic and lead, were detected in soil at concentrations greater than the residential PRGs (0.38 milligrams per kilogram [mg/kg] for arsenic and 130 mg/kg for lead) and the estimated ambient concentrations (24 mg/kg arsenic and 61 mg/kg lead). Arsenic was detected in surface and subsurface soil samples at concentrations up to 57.6 mg/kg. Lead was detected in surface soil samples at concentrations ranging from 5.3 to 156 mg/kg. Arsenic was the only compound considered a chemical of concern for the landfill during the human health risk assessment (HHRA).

Results for groundwater samples, including results from the 1998 confirmation groundwater sampling event, indicate that organic compounds are not present in groundwater near the Tidal Area Landfill. Metals (arsenic, chromium, iron, nickel, and zinc) were detected in groundwater, but at concentrations that were comparable to concentrations detected in other wells both upgradient and downgradient of the landfill. Isolated areas of comparatively high concentrations characterize the geographic distribution of metals in groundwater. Most of the higher metals concentrations were detected in samples from Site 2, which is hydraulically downgradient of the landfill, but relatively high concentrations of metals were also detected in samples from upgradient wells at the eastern edge of the landfill. The data for metals do not show evident plumes of groundwater contaminated by metals emanating from the landfill. Instead, the distribution suggests that concentrations of metals at Site 2 are caused by evaporative processes that concentrate metals already present in groundwater throughout the site (TtEMI 1998a). Data collected to date for metals show that concentrations in groundwater are static and exhibit no long-term trend. The results of the 1998 confirmation groundwater sampling event, including

concentrations of inorganic constituents detected in groundwater at the Tidal Area Sites, are presented in "Technical Memorandum: Confirmation Sampling in the Tidal Area Sites" (TtEMI 1998a). The Navy collected additional confirmation groundwater samples from wells located near the landfill in July 2003. In addition, further assessment of groundwater at the site is necessary before a ROD can be prepared to address groundwater conditions in the vicinity of the Tidal Area Landfill.

2.5.2 Conceptual Site Model and Contaminant Fate and Transport

The conceptual site model encompasses the migration pathways for the potential movement of contaminants from the Tidal Area Landfill. These migration pathways are through wind or surface water erosion of surface soil that may contain contaminants or through leachate migration in groundwater to surface water. Wind or surface water erosion occurs when the wind or surface water has sufficient momentum to dislodge and carry soil particles. Installation of a cap over the cover soil at the landfill is expected to effectively eliminate windborne and surface water erosion of contaminants or waste from the landfill surface. The only chemical of concern in surface soil at the Tidal Area Landfill is arsenic. Lead was not identified as a chemical of concern during the HHRA. Concentrations of arsenic in surface soil at the landfill exceeded the 2002 EPA Region IX residential PRG for arsenic. Ambient concentrations of arsenic in soil samples collected throughout the Tidal Area sites and in the upland reference area are generally higher than the arsenic PRG.

Precipitation that infiltrates through the landfill may possibly leach and mobilize contaminants from the landfill via groundwater discharge to surface water. However, repeated groundwater sampling from 1990 to 1998 has shown no evidence that contaminated groundwater is migrating from the landfill. No significant or consistently detected concentrations of organic compounds have been identified in groundwater downgradient of the landfill, and concentrations of metals are comparable upgradient and downgradient of the landfill. The hydrogeologic and lithologic characteristics of the Bay Mud are expected to severely restrict migration of contaminants from the landfill. Lateral groundwater flow velocities on the order of 1 to 2 feet per year have been estimated in the vicinity of the landfill (TtEMI 1998a). Additionally, the Bay Mud in the vicinity of the landfill contains abundant organic material, and it is likely that natural adsorption of contaminants onto the organic matter within the Bay Mud would significantly retard movement of contaminants in any potential leachate that infiltrates into the Bay Mud. Consequently, based on existing data, migration of leachate from the landfill is not expected to transport contaminants to surface water. To ensure that migration of leachate from the landfill is not transporting contaminants, the Navy is planning to conduct an additional CERCLA groundwater investigation. Any remedial decisions related to groundwater will be addressed in a separate groundwater ROD.

2.6 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

At present and for the last 21 years, human contact with the landfill has been extremely limited because the landfill has been inactive for disposal or any other purpose. The greatest amount of human contact with the landfill has been as a result of the CERCLA investigations. The presence of exposed waste, physical depressions, and unsupported voids at the site as a result of waste decay make the landfill potentially dangerous for human contact due to physical hazards.

The landfill does not support good wildlife habitat because the waste is exposed and the landfill surface lacks the necessary plant life to support native animals. The quality of the habitat has not been assessed because assessment is unnecessary and impractical when a landfill cap is to be implemented.

After construction of the cap, there is no proposed change in the future land use because NWS SBD Concord is expected to remain a military facility without significant opportunities for public access.

After the cap is constructed and the surface of the cap is revegetated, the waste will be isolated from contact with animals, and the plant life may provide a source of food for animals. As a result, the landfill is expected to become better habitat for animals than it is now. The landfill will not, however, match the habitat at Site 2 or resemble the ecologically sensitive, high-quality marshland habitat where the landfill was originally constructed.

Other than cap maintenance and inspection activities, no future human land use is expected at the Tidal Area Landfill. This ROD expressly prohibits structural improvements at the site.

The Navy is responsible for ensuring that any change in land use does not diminish the landfill cap's ability to achieve the remedial action objectives (RAOs). If the Navy becomes interested in modifying land use at the site, all proposed changes in physical layout or site use shall be brought to the attention of appropriate state and federal agencies for review and approval, as required under the federal facilities agreement and applicable state and federal regulations.

2.7 SUMMARY OF SITE RISKS

The Navy has not characterized the contents of the landfill, consistent with the EPA's presumptive remedy guidance, because Site 1 is proposed for capping using a presumptive remedy. The landfill cap and associated land use controls preclude use of the landfill area for residential or industrial purposes, and would prevent human contact with materials in the landfill. Therefore, a quantitative human health risk assessment was not completed for refuse in the landfill. For the same reason, an ecological risk assessment (ERA) was not conducted at the Tidal Area Landfill because the required subsequent landfill closure would interrupt the relevant

exposure pathways and eliminate any potential ecological risk. The EPA's presumptive remedy guidance does not recommend evaluation of human health or ecological risk for the contents of a landfill.

Although risks at Site 1 have not been quantified for humans or ecological receptors, the Navy has attempted to characterize site risks posed by Site 1 on the adjoining area of Site 2. This work was submitted for agency review as a draft final RI for Tidal Area Sites 1, 2, 9, and 11 (TtEMI 1999[1]). A new version of the draft final RI was completed in July 2003. The EPA is currently reviewing the document; in a letter dated 2 October 2003 the EPA requested additional review time and that the document be considered "draft" instead of "revised draft final." The ROD for Site 2 and the groundwater ROD for the Tidal Area Landfill will address all site risks and mitigation measures within Site 2 caused by contaminant migration from Site 1, if present.

The Navy previously conducted a focused HHRA for the perimeter area of Site 1 (TtEMI 1999). The HHRA evaluated the potential effects to human health associated with exposure to potential pollutants (chemicals) from soil at the perimeter of the landfill. Because the soils included in the focused HHRA are to be entirely capped by the landfill cover, the findings of the focused HHRA are not applicable to future conditions at the site. The focused HHRA is summarized below because it demonstrates that only slight risk is predicted at the perimeter of the landfill, assuming no capping of the landfill using the conservative residential human exposure scenario. Because future residential exposure is unlikely, the risk calculation should be considered an upper bound estimate of human health risk for the perimeter of the uncapped landfill.

No ecological risk assessment for the landfill perimeter is presented in this ROD because an ecological risk assessment has not been completed for Site 2 and because no quantitative ecological risk assessment is available for soil at the perimeter of the landfill.

2.7.1 Human Health Risk Assessment

The objective of the HHRA for the perimeter of the Tidal Area Landfill was to evaluate the potential carcinogenic risks and noncarcinogenic hazards associated with exposure to chemicals of potential concern (COPC) detected in soil samples collected at the perimeter of the landfill. As noted in Section 2.7 above, the risk assessment was limited to a focused review and is not required under the presumptive remedy guidance. The focused risk assessment was not conducted to evaluate the current level of risk for the uncapped landfill, but to examine the risk to human health associated with soils beyond the limits of the landfill. Soils at the landfill perimeter were suspected of potential contamination originating from the uncapped landfill. Because the proposed landfill cap does not extend beyond the landfill waste area onto these

[1] Although the title of the RI includes Site 1, contaminants at Site 1 have not been characterized. To avoid confusion, the title of the revised version of the Draft Final RI for the Tidal Area sites will not include Site 1.

perimeter soils, the intent of the HHRA was to examine perimeter soils to determine whether these soils pose a potential future risk to human health.

The COPCs for soil evaluated in this focused risk assessment included metals, SVOCs including polynuclear aromatic hydrocarbons, pesticides, and polychlorinated biphenyls. Soil was the only media evaluated at the perimeter of the Tidal Area Landfill.

NWS SBD Concord is within the boundaries of the Clayton Valley Groundwater Basin, as defined in the San Francisco Bay Area Water Quality Control Plan (Basin Plan). The existing and potential beneficial uses identified for this groundwater basin, which lies between 50 to 300 feet below the ground surface, include the following: municipal and domestic water supply, industrial process supply, industrial service supply, and agricultural supply. Groundwater at the Tidal Area Sites occurs in a shallow unconfined water-bearing zone composed predominantly of silty clays. TDS levels in this shallow groundwater are significantly higher than the 3,000-mg/L level, set in California State Water Resources Control Board (SWRCB) Resolution 88-63 as the maximum for a municipal or domestic water supply. TDS levels are also higher than the 10,000-mg/L level set forth in the EPA's groundwater classification guidelines (EPA 1998). TDS in groundwater at the Tidal Area Sites ranges from 3,930 mg/L to 65,600 mg/L. There is no historical, existing, or planned use of the shallow groundwater in the Tidal Area as a source of drinking water. As a result, groundwater was not evaluated as a media of concern at any of the Tidal Area sites at NWS SBD Concord.

Potential carcinogenic risks and noncarcinogenic hazards associated with exposure to COPCs detected in soil at the perimeter of the landfill were calculated using a focused approach consistent with EPA (1996a) and the State of California Department of Toxic Substances Control (DTSC) (1994) guidance on use of EPA Region IX PRGs in screening risk assessments at military facilities. Specifically, carcinogenic risks and noncarcinogenic hazards are derived for residential and industrial land-use scenarios based on the ratio of detected contaminant concentrations to 1996 EPA Region IX PRGs. PRGs for soil are health-based concentrations for individual chemicals that correspond to a risk of 1×10^{-6} or a noncarcinogenic hazard quotient of 1. For the risk evaluation, the contaminant concentration is the average concentration (the upper 95 percent confidence limit on the arithmetic mean [95 UCL]).

Currently, base personnel do not work at the Tidal Area Landfill, and future land use is not likely in light of the purpose of NWS SBD Concord. Although the presence of debris renders the landfill area unsuitable for construction of buildings, the initial screening in the HHRA conservatively assumed that future land use will be unrestricted and that new buildings or residences will be constructed in the area. Consequently, the following receptors were evaluated in the HHRA: industrial worker and resident.

The results of the HHRA for the perimeter of the Tidal Area Landfill are summarized below. To focus the presentation and evaluation of the risk assessment results, the magnitudes of the estimated carcinogenic risks and hazard indices are discussed relative to remedial action goals defined by the EPA. For carcinogens, the goal is an incremental lifetime cancer risk to an individual from exposure to site contamination of between 1×10^{-4} and 1×10^{-6}, which for the following discussion is referred to as the EPA target risk range. For noncarcinogens, the goal is a hazard index that does not exceed 1.

For an industrial worker, the carcinogenic risks associated with reasonable maximum exposure to COPCs in surface soil (2×10^{-5}) and subsurface soil (9×10^{-6}) are within EPA's target risk range. The risks for a worker are attributable to arsenic, which is the only chemical of concern (that is, a chemical for which the chemical-specific risk exceeds 1×10^{-6}). The hazard indices for surface soil (0.1) and subsurface soil (0.06) are less than the threshold value of 1.

For a resident, the carcinogenic risks associated with reasonable maximum exposure to COPCs in surface soil (9×10^{-5}) and subsurface soil (5×10^{-5}) are within EPA's target risk range. The risks for a resident are attributable to the sole chemical of concern, arsenic. The hazard indices for surface soil (2.3) and subsurface soil (1.5) exceed the threshold value of 1.

The above risk assessment is limited to the evaluation of soil at the landfill perimeter and does not assess risk posed by the landfill contents that are currently exposed at the site. Additional risk assessment of the site is not required under CERCLA presumptive remedy guidance.

The Navy will address site groundwater in a separate ROD. The selected remedy of landfill cap containment is unlikely to change unless the cap itself is not protective of human health and the environment. In the event of this finding, any changes to the ROD will be made in accordance with the EPA's Comprehensive Five-Year Review Guidance, OSWER directive 9355.7-03B-P, (June 2001) and the EPA's Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Documents (July 1999).

2.7.2 Ecological Risk Assessment

In accordance with EPA guidance (1993), the Navy followed the presumptive remedy approach for the Site 1 landfill. The use of a presumptive remedy (containment) permits elimination of an ERA for the landfill because the presumptive remedy involves construction of a landfill cap. This cap would interrupt the relevant exposure pathways, thus eliminating potential ecological risk. In addition, the landfill cap will radically alter the ruderal habitat on the surface of the landfill, rendering an ecological risk assessment of the area in its current state moot.

Surface water runoff and migration of contaminants in soil are the sole potential exposure pathways that would transport pollutants (hazardous substances) from Site 1 to Site 2 before the containment remedy is implemented. As a result, the adjacent Site 2 is the only viable wildlife habitat potentially affected by the landfill (TtEMI 1999). The Navy is conducting an RI, including an ERA, for the habitat at Site 2. The Site 2 risk assessment includes data for samples collected in an area of Site 2 where potential impacts from the Site 1 landfill would be identified. The ERA includes chemical analysis of samples of sediment, surface water, and plant and animal tissues, as well as endangered species surveys in Site 2.

In the event that the RI for Site 2 finds that pollutants pose an unacceptable risk to human health or ecological receptors, the Navy will notify the appropriate regulatory agencies. After the agencies have been notified, the Navy will conduct a FS of potential remedial alternatives for Site 2 in accordance with CERCLA.

2.8 DESCRIPTION OF ALTERNATIVES

In June 1999, the Navy presented to the public the "Tidal Area Landfill Proposed Plan" for NWS SBD Concord. The proposed plan described the Navy's proposed approach to addressing contamination at the Tidal Area Landfill and summarized the proposed remedial alternatives under consideration in the FS report. Descriptions of how the alternatives presented in this ROD differ from those summarized in the proposed plan are included in Section 2.12.

The FS report and the subsequent proposed plan drew on the EPA presumptive remedy approach in identifying and evaluating remedial alternatives. The EPA has developed presumptive remedies to accelerate cleanup for certain types of sites. Presumptive remedies are preferred technologies based on an evaluation of performance data from previous technology implementation. Title 40 of the *Code of Federal Regulations* (CFR) 300.430 (a)(1)(iii)B (the NCP) sets forth the expectation that engineering controls such as containment will be used for sites with relatively low-level threats or where treatment is impracticable. Therefore, the EPA has established source containment as the presumptive remedy for CERCLA municipal (and appropriate military) landfills (EPA 1996b). The presumptive remedy is appropriate for the Tidal Area Landfill because it describes a practical and economic means to reduce risk to human health and the environment.

The RAOs for Site 1 were developed using the following EPA guidance documents: "Conducting RI/FS Studies for CERCLA Municipal Landfill Sites" (EPA 1991) and "Presumptive Remedy for CERCLA Municipal Landfill Sites" (EPA 1993). Alternatives were developed with the goal of attaining these RAOs:

- Protect human health and environmental receptors from contact with landfill contents.
- Protect human health and the environment from exposure to leachate.
- Protect human health and the environment from subsurface landfill gas migration.

Three remedial alternatives were developed and address the RAOs to varying degrees. The alternatives assembled for the landfill are as follows:

- Alternative 1: No Action, Landfill Gas Monitoring
- Alternative 2: Containment (Soil Cap), Institutional Controls, and Landfill Gas Monitoring
- Alternative 3: Containment (Multilayer Cap), Institutional Controls, and Landfill Gas Monitoring

The remedial alternatives involve combinations of process options, including landfill gas monitoring, grading, revegetation, and maintenance of the cap. Each alternative was analyzed in detail during the FS.

The selected Alternative 2 soil cap described in this ROD differs from the native soil cap originally proposed in the FS. Since the FS was completed, the Navy has received agency comments on the draft final ROD and has held extensive discussions with the EPA, DTSC, SFBRWQCB, and Integrated Waste Management Board regarding the proposed Alternative 2 remedy. Based on the agencies' comments and meetings, the Navy has determined that the soil cap should consist of a prescriptive standard cap described in Title 27 *California Code of Regulations* (CCR), Division 2, 21090.

Alternative 1, the no-action alternative, and Alternatives 2 and 3 described in this ROD were evaluated against the criteria established under the NCP. The criteria include overall protection of human health and the environment; compliance with applicable or relevant and appropriate requirements (ARARs); long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; short-term effectiveness; implementability; cost; state acceptance; and community acceptance. The ARARs pertinent to the alternatives are summarized in Section 2.8.1 below. The alternatives are described in Sections 2.8.2, 2.8.3, and 2.8.4 of this ROD.

2.8.1 Applicable or Relevant and Appropriate Requirements

This section identifies federal and state of California ARARs from the universe of statutes, regulations, requirements, and guidance and sets forth the Navy's determinations of ARARs for the selected remedy for Site 1, the Tidal Area Landfill at NWS SBD Concord.

2.8.1.1 Summary of CERCLA and NCP Requirements

Section 121(d) CERCLA (Title 42 United States Code [USC] 9621[d]), as amended, states that remedial actions on CERCLA sites must attain (or the decision document must justify the waiver of) any federal or more stringent state environmental standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate.

Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address the situation at a CERCLA site. The requirement is applicable if the jurisdictional prerequisites of the standard show a direct correspondence when objectively compared to the conditions at the site. An applicable federal requirement is an ARAR. An applicable state requirement is an ARAR only if it is more stringent than federal ARARs.

If the requirement is not legally applicable, then the requirement is evaluated to determine whether it is relevant and appropriate. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not applicable, address problems or situations similar to the circumstances of the proposed remedial action and are well suited to the conditions of the site. A requirement must be determined to be both relevant and appropriate in order to be considered an ARAR.

The criteria for determining relevance and appropriateness are listed in Title 40 CFR 300.400(g)(2) and include the following:

- The purpose of the requirement and the purpose of the CERCLA action
- The medium regulated or affected by the requirement and the medium contaminated or affected at the CERCLA site
- The substances regulated by the requirement and the substances found at the CERCLA site
- Any variances, waivers, or exemptions of the requirement and their availability for the circumstances at the CERCLA site
- The type of place regulated and the type of place affected by the release or CERCLA action
- The type and size of structure or facility regulated and the type and size of structure or facility affected by the release or contemplated by the CERCLA action
- Any consideration of use or potential use of affected resources in the requirement and the use or potential use of the affected resources at the CERCLA site

According to CERCLA ARARs guidance, a requirement may be "applicable" or "relevant and appropriate," but not both. Identification of ARARs must be done on a site-specific basis and involves a two-part analysis: first, a determination of whether a given requirement is applicable; then, if it is not applicable, a determination of whether it is nevertheless both relevant and appropriate. Some requirements may be applicable or, if not applicable, may still be relevant and appropriate. When the analysis determines that a requirement is both relevant and appropriate, such a requirement must be complied with to the same degree as if it were applicable.

Tables 1, 2, 3, and 4 included in this ROD present each ARAR for the selected remedy with a determination of ARAR status (i.e., applicable, or relevant and appropriate). For the determination of relevance and appropriateness, the pertinent criteria were examined to determine whether the requirements addressed problems or situations sufficiently similar to the circumstances of the release or remedial action contemplated, and whether the requirement was well suited to the site.

The FS for the Tidal Area Landfill includes a more detailed ARARs analysis.

To qualify as a state ARAR under CERCLA and the NCP, a state requirement must be:

- A state law
- An environmental or facility siting law
- Promulgated (of general applicability and legally enforceable)
- Substantive (not procedural or administrative)
- More stringent than the federal requirement
- Identified in a timely manner
- Consistently applied

To constitute an ARAR, a requirement must be substantive. Therefore, only the substantive provisions of requirements identified as ARARs in this ROD are considered to be ARARs. Permits are considered to be procedural or administrative requirements. Provisions of generally relevant federal and state statutes and regulations that were determined to be procedural or non-environmental, including permit requirements, are not considered to be ARARs. CERCLA 121(e)(1), Title 42 USC 9621(e)(1), states that "No Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely on-site, where such remedial action is selected and carried out in compliance with this section." The term on-site is defined for purposes of this ARARs discussion as "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action" (Title 40 CFR 300.5).

Nonpromulgated advisories or guidance issued by federal or state governments are not legally binding and do not have the status of ARARs. Such requirements may, however, be useful, and are "to be considered" (TBC) requirements (Title 40 CFR 300.400[g][3]). These requirements complement ARARs but do not override them. They are useful for guiding decisions regarding cleanup levels or methodologies when regulatory standards are not available.

As the lead federal agency, the Navy has primary responsibility for identifying federal ARARs at NWS SBD Concord. The DTSC is responsible for identifying and advising the Navy of state ARARs relating to the site. In 1993, the Navy formally requested ARARs from the state for all Tidal Area sites, and responses were received from the following agencies:

- SFBRWQCB
- DTSC
- California Department of Fish and Game
- San Francisco Bay Conservation and Development Commission (BCDC)

The information received from the state agencies was not specific to the site. The Navy has since informally met with state regulatory agency representatives to discuss ARARs specific to Site 1. Based on these meetings and on comments received from state agencies on previous draft versions of the ROD, this ROD contains the final determination of state requirements that apply to the Tidal Area Landfill site.

ARARs common to the alternatives are discussed below. A more detailed discussion of the ARARs that apply to the selected alternative is contained in Section 2.11.2 of this ROD.

2.8.1.2 Chemical-Specific ARARs

Chemical-specific ARARs are generally health- or risk-based numerical values or methodologies applied to site-specific conditions that result in the establishment of a cleanup level. Air and soil are the environmental media potentially affected by the Site 1 response actions. The conclusions for ARARs pertaining to these media are presented below.

Chemical-specific ARARs do not exist for soil or landfill refuse.

Requirements for control of landfill gas at solid waste landfills under either Subtitle D of the Resource Conservation and Recovery Act (RCRA, 42 U.S.C. 6941 - 6949a) and the associated municipal solid waste landfill regulations (Title 40 CFR 258) or Title 27 CCR 20921 et seq. were considered potential ARARs. Because the landfill stopped receiving waste prior to the effective date of Subtitle D of RCRA (October 9, 1991), RCRA standards are not applicable. However,

RCRA landfill gas control requirements of Subtitle D (Title 40 CFR 258.23) are relevant and appropriate because methane gas is a common hazard created by landfill decomposition. Additionally, the Navy has identified the methane gas control requirements of Title 27 (CCR 20921) as applicable because the landfill did not complete closure pursuant to regulations in effect at the time waste was last received. The Navy has reviewed and compared both sets of requirements and determined that the standards of Title 27 are more stringent than the RCRA Subtitle D standards.

Therefore, the following standards of Title 27 are ARARs:

- Section 20921(a)(2), which requires that landfill gas be monitored to ensure that methane gas concentrations at site boundaries do not exceed the lower explosive limit (LEL) for methane (5 percent methane by volume)
- Section 20921(a)(3), which requires that trace gases shall be controlled to prevent adverse acute and chronic exposure to toxic or carcinogenic compounds

Chemical-specific ARARS are summarized in Table 1.

2.8.1.3 Location-Specific ARARs

Location-specific ARARs are restrictions on the concentrations of hazardous substances or the conduct of activities as a result of the characteristics of the site or its immediate environment. Location-specific ARARs for the Tidal Area Landfill are summarized in this section. Federal location-specific ARARS are summarized in Table 2, and State of California location-specific ARARS are summarized in Table 3. Biological resources, wetlands protection, floodplain management, and coastal resources are the resource categories relating to location-specific requirements potentially affected by the Site 1 response actions.

The ARARs conclusions pertaining to these resources are summarized below.

Biological Resource ARARs

Biological resource ARARs may be either federal or state requirements, as described below.

Federal

Endangered Species Act: The Endangered Species Act (ESA) of 1973 (Title 16 USC 1531-1543) provides a means for conserving various species of fish, wildlife, and plants threatened with extinction. The ESA defines an endangered species and provides for the designation of critical habitats. Federal agencies may not jeopardize the continued existence of any listed species or cause the destruction or adverse modification of critical habitat. Under

Section 7(a) of the ESA, federal agencies must carry out conservation programs for listed species. 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. Consultation regulations at Title 50 CFR 402 are administrative in nature and therefore are not ARARs. However, they may be TBCs to comply with the substantive provisions of the ESA. The requirement of Section 7(a) for federal agencies to assure that the actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of endangered or threatened species or to adversely modify or destroy their critical habitat is a substantive requirement.

No endangered, threatened, or otherwise protected species are known to inhabit the surface of the landfill. However, threatened and endangered species, including the salt marsh harvest mouse, may inhabit areas near the landfill, so precautions will be taken to ensure that the remedial action does not adversely affect any threatened or endangered species. Section 7(a) is thus included as an ARAR for the Tidal Area Landfill.

State

California Endangered Species Act: The California Endangered Species Act is set forth in California Fish and Game Code Sections 2050 through 2068, 2070, 2080, and 2090 through 2096. Sections 2050-2068 and 2070 are procedural and nonsubstantive, and Sections 2090 through 2096 are not effective after January 1, 1994. Section 2080 prohibits the take of endangered species. As explained above, no threatened or endangered species are known to inhabit the landfill; however, because threatened and endangered species, including the salt marsh harvest mouse, may inhabit areas near the landfill, precautions will be taken to ensure that the remedial action does not adversely affect any threatened or endangered species. For this reason, Section 2080 is considered relevant and appropriate.

Other Wildlife Protection Statutes: In addition to the California Endangered Species Act, the following Fish and Game Code provisions were identified by the state as potential ARARs: Sections 3005, 3511, 3513, and 5650. Sections 3005(a) and 3511 prohibit the taking or possession of birds and mammals by trapping or netting, or with poisonous substances. Section 3513 prohibits the taking of migratory birds such as the California Clapper Rail. Section 5650 prohibits the deposition of toxic materials into waters of the state that would have a deleterious effect on a species or habitat. Based on its review of these provisions, the Navy has listed Sections 3005(a), 3511, and 5650(a), (b) and (f) as relevant and appropriate requirements for actions at the Site 1 landfill. Other sections of these provisions are administrative or procedural and therefore are not considered ARARs. There are no migratory birds at the landfill site, so Sections 3513 is not an ARAR.

The following federal requirements were considered as potential ARARs in the FS for Site 1:

- Executive Order No. 11988, Floodplain Management
- Executive Order No. 11990, Protection of Wetlands
- Clean Water Act Section 404, Title 33 USC 1344.
- 40 CFR Part 258, Subpart B (Location Restrictions)

Each of these requirements is discussed below. No state location-specific ARARs for wetlands and floodplain management were identified.

Floodplain Management, Executive Order 11988: Under Title 40 CFR 6.302(b), federal agencies are required to evaluate the potential effects of actions they may take in a floodplain to avoid, to the extent possible, adverse effects associated with direct and indirect development of a floodplain. Executive orders are not ARARs because they are not promulgated; as a result, Executive Order 11988 is not an ARAR. However, Executive Order 11988 is a TBC. There are regulations codifying Executive Order 11988 which are ARARs for this action. Executive Order 11988 was codified at 40 CFR § 6.302(b). The substantive provisions of 40 CFR § 6.302(b) and 40 CFR Part 6 Appendix A, excluding § 6(a)(2), 6(a)(4) and 6(a)(6) of Appendix A, are ARARs for response actions within a floodplain.

Protection of Wetlands, Executive Order 11990: Executive Order 11990 requires that federal agencies minimize the destruction, loss, or degradation of wetlands; preserve and enhance the natural and beneficial value of wetlands; and avoid support of new construction in wetlands if a practicable alternative exists. Wetlands are defined in Executive Order 11990 as areas inundated by surface or groundwater with a frequency sufficient to support, under normal circumstances, a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated conditions for growth or reproduction. Jurisdictional wetlands, including “salt marsh” and “seasonal brackish/salt marsh mosaic” habitats, exist immediately adjacent to the boundaries of the Tidal Area Landfill, so Executive Order 11990 is a TBC to the extent the selected remedy could impact these wetlands, and appropriate precautions will be taken to ensure these wetlands are not impacted (WESCO 1995). Since executive orders are not promulgated, they are not ARARs. Executive Order 11990 is, however, codified at 40 CFR § 6.302(a). The substantive provisions of 40 CFR § 6.302(a) are ARARs if the response action impacts areas within a wetland.

Clean Water Act, (Title 33 USC 1344): Section 404 of the Clean Water Act of 1977 governs discharge of dredged and fill material into waters of the United States, including adjacent wetlands. Wetlands are areas that are inundated by water frequently enough to support vegetation typically adapted for life in saturated soil conditions. Wetlands include swamps, marshes, bogs, sloughs, potholes, wet meadows, river overflows, mudflats, natural ponds, and similar areas. Both the EPA and the U.S. Army Corps of Engineers have jurisdiction over

wetlands. EPA's Section 404 regulations are promulgated in Title 40 CFR 230, and the U.S. Army Corps of Engineer's guidelines are promulgated in Title 33 CFR 320.

Discharge of dredge or fill material to a wetland is not planned as part of the response action. Therefore, Section 404 is not an ARAR or a TBC. However, because the landfill is located adjacent to wetlands, precautions will be taken to ensure that the wetlands are not impacted, and the Navy will comply with Section 404 if any response action at the site triggers the requirements of that section.

Coastal Resources ARARs

Federal

Coastal Zone Management Act: The Coastal Zone Management Act (CZMA) (Title 16 USC 1451-1464) and the accompanying implementing regulations in Title 15 CFR 930 require that federal agencies conducting or supporting activities directly affecting the coastal zone conduct or support those activities in a manner that is consistent with the approved state coastal zone management programs. A state coastal zone management program (developed under state law and guided by the CZMA) sets forth objectives, policies, and standards to guide public and private use of lands and water in the coastal zone. California's approved coastal management program includes the San Francisco Bay Plan (Bay Plan) developed by the BCDC. The BCDC was formed under the authority of the McAteer-Petris Act, California Government Code 66600 et seq., which authorizes the BCDC to regulate activities within San Francisco Bay and the shoreline (100 feet landward from the shoreline) in conformity with the policies of the Bay Plan. The McAteer-Petris Act and the Bay Plan were developed primarily to halt uncontrolled development and filling of the Bay. Their broad goals include reducing Bay fill and disposal of dredged material in the Bay, maintaining marshes and mudflats to the fullest extent possible to conserve wildlife and abate pollution, and protecting the beneficial uses of the Bay. The Navy intends to comply with the substantive provisions of the Bay Plan. The CZMA is relevant and appropriate and is therefore an ARAR.

State

McAteer-Petris Act of 1965: California's approved coastal management program also includes the Bay Plan developed by the BCDC. Its broad goals are discussed above. The Navy intends to comply with the substantive provisions of the Bay Plan.

Cultural Resources and Other ARARs

The landfill does not encompass any historic properties included or eligible for inclusion on the National Register of Historic Places. No scientific, prehistoric, or archeological artifacts have been identified at Site 1. Therefore, no cultural resource ARARs have been identified as pertinent to Site 1.

The EPA and the Navy have determined that the requirements of National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) are no more stringent than the requirements for environmental review under CERCLA and the NCP. Hence, NEPA and CEQA are not considered ARARs for CERCLA actions.

2.8.1.4 Action-Specific ARARs

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 and suggest how a selected remedial alternative should be achieved. These action-specific requirements do not in themselves determine the remedial alternative; rather, they indicate how a selected alternative must be conducted.

Summarized below are the Navy's conclusions as to the controlling ARARs for landfill closure. State action-specific ARARS are summarized in Table 4.

Based on available historical information, the Tidal Area Landfill received household garbage and municipal waste from the Naval Weapons Station, ships, and surrounding civilian communities. The results for groundwater samples collected over a period of 9 years indicate that no hazardous substances or hazardous wastes are migrating from the landfill. This information supports the Navy's finding that wastes disposed of at the Tidal Area Landfill are consistent with landfills that fall under the EPA presumptive remedy guidance for municipal landfills. Neither the federal nor California hazardous waste regulations for landfills (Title 40 CFR 264, Title 22 CCR and Title 23 CCR Chapter 15) are applicable to the Tidal Area because Site 1 is considered a solid waste landfill (and not a hazardous waste landfill).

Federal requirements for municipal solid waste landfills generally are not applicable to the Tidal Area Landfill because Site 1 was not active after the effective date of federal regulations codified in Title 40 CFR 258. Similarly, the solid waste disposal requirements of Title 27 CCR, Division 2, are not applicable because the Tidal Area Landfill became inactive prior to the effective date of the regulations and did not receive waste after November 27, 1984. However, because the Tidal Area Landfill was not completely closed at the time it became inactive, many of the closure and post-closure maintenance standards of Title 27, Division 2, Subdivision 1, Chapter 3, Subchapter 5, are applicable to this remedial action, as discussed below.

Pursuant to the state's efforts to consolidate and simplify its environmental programs, SWRCB and the California Integrated Waste Management Board (CIWMB) have consolidated the solid waste regulations into Title 27 CCR, Division 2. These regulations became effective in July 1997. Until that date, two different sets of solid waste regulations existed in the State of California: SWRCB's regulations in Title 23, and CIWMB's regulations in Title 14. Title 27, Division 2 regulations continue to distinguish between regulations adopted by CIWMB and SWRCB. Therefore, the ARAR analysis considered both SWRCB and CIWMB regulations.

Title 27 CCR, Division 2, 20950 sets forth general standards for closure of all solid waste management units, including performance goals for closing such units. Section 21090 establishes final cover requirements of SWRCB, including a prescriptive, multilayer cap design. Sections 20310 and 20320 set forth general construction and containment criteria. The Navy has determined that the substantive standards of these requirements are relevant and appropriate to closure of the Tidal Area Landfill. Title 27 CCR 20080 and 21090 are also applicable for the capping alternatives because these sections govern closed, inactive, or abandoned units.

In addition, CIWMB regulations in Title 27, Division 2 are applicable for closure of landfills that did not complete closure pursuant to regulations in effect at the time waste was last received (Title 27 CCR 21099 and 21100(b)). CIWMB requirements for closed sites appear at Title 27 CCR 21100 et seq. In particular, CIWMB closure and post-closure maintenance requirements are specified at Title 27 CCR 21140(a)(b), 21142(a), 21145(a), and 21150(a) and (b). These four sections provide narrative standards that duplicate many of the requirements discussed above from Title 27 CCR 21090. These narrative standards are as follows:

- Function with minimum maintenance
- Provide waste containment to protect public health and safety
- Achieve compatibility with post-closure land use
- Provide equivalent protection from wind and surface water soil erosion as an erosion layer that contains a minimum of 6 inches of earthen material capable of sustaining native plant growth

Title 27 CCR 21130 requires that the operator maintain a written post-closure emergency response plan that identifies occurrences that may exceed the site design and endanger public health or the environment. The plan must describe specific procedures that minimize these hazards to protect public health and safety and address vandalism, fires, explosions, earthquakes, floods, the collapse or failure of artificial or natural dikes, levees, or dams, surface drainage problems, and other waste releases. This section is applicable.

Qualitative CIWMB requirements for final grading, slope stability, and drainage and erosion control are discussed in Title 27 CCR 21142, 21145, and 21150. Substantive portions of these requirements are applicable to the cap construction and are listed in Table 4.

The Navy has determined that the Title 27, Division 2 requirements for a landfill gas monitoring program, as described in Section 2.8.1.2, are applicable to capping alternatives. Title 27 CCR 20921, 20923, 20925, 20932, 20933, 20937, and 21160 require construction and operation of a perimeter landfill gas monitoring network. However, Title 27 CCR 20918 allows for exemptions from the landfill gas monitoring requirement based on a showing that there are no potential or adverse impacts on public health and safety and the environment. These sections are listed as ARARs in Table 4.

Title 27 CCR 21180(a) requires post-closure monitoring for no less than 30 years and has been included as an ARAR. The Navy will monitor the landfill in accordance with this section to the extent that monitoring is determined to be required. Monitoring may be for less than 30 years if there is no potential for adverse impacts on public health and safety and the environment as stated in Title 27 CCR Section 20918. Subsection (b) states that if nonliquid waste is exposed during post-closure maintenance activities, the waste may be returned to that landfill provided that the integrity of the final cover is maintained. This section is an ARAR.

Title 27 CCR 21190 requires that proposed post-closure land uses be designed and maintained to protect health and safety and prevent damage to structures, road, utilities and gas monitoring and control systems; to prevent public contact with waste, landfill gas and leachate; and prevent landfill gas explosions. Subsections (a), (d), (e), (f) and (g) are ARARs.

The Navy will comply with the substantive requirements of Title 27 CCR 21769 and 21830 relating to post-closure. Section 21769 requires that classified waste management units be closed in accordance with an approved closure and post-closure maintenance plan, which provides for continued compliance with the applicable standards for waste containment and precipitation and drainage controls and monitoring requirements. Section 21830 sets forth requirements for a final post-closure maintenance plan.

Title 27 CCR 21800(c) states the final closure plan must include a detailed description of each item contained in Section 21790(b) and a detailed description of the sequence of closure stages. The substantive provisions of this section are ARARs.

2.8.2 Alternative 1: No Action

Under the no-action alternative, no remedial actions will be implemented other than conducting groundwater and landfill gas monitoring. Groundwater and landfill gas monitoring are discussed below.

2.8.2.1 Groundwater Monitoring

Under this no-action alternative, a groundwater detection monitoring program is required for the site and will be developed in accordance with the monitoring regulations of Title 27 CCR, Division 2, Subdivision 1, Chapter 3, Subchapter 3, which is applicable to final closure of the landfill. The groundwater monitoring program will be developed after the groundwater ROD is signed. The Navy intends to plan and conduct a separate groundwater study in consultation with the regulatory agencies to further assess groundwater conditions around the perimeter of the landfill and determine future actions, if necessary.

2.8.2.2 Landfill Gas Monitoring

Under this alternative, landfill gas monitoring wells would be completed around the perimeter of the Tidal Area Landfill in accordance with the applicable requirements in Title 27 CCR, Division 2, Chapter 3, Subchapter 4, Article 6. The required spacing of up to 1,000 feet apart would be satisfied with the installation of four new wells. The exact placement of these wells would be decided during the remedial design. The landfill gas monitoring wells would be screened at various depths throughout the vadose zone to a maximum depth set by the bottom of refuse, with probes installed above the permanent low seasonal water table. Concentrations of methane around the landfill perimeter would be monitored quarterly for 3 years and evaluated against the lower explosive limit (concentration of 5 percent by volume in air). The need for continued monitoring would be re-evaluated based on the results of the first 3 years of landfill gas monitoring.

2.8.3 Alternative 2: Containment, Soil Cap, Institutional Controls, and Groundwater and Landfill Gas Monitoring

Alternative 2, containment, involves the following actions:

- Landfill gas monitoring
- Implementation of institutional controls
- Installation of a soil cap
- Site grading and revegetation
- Operation and maintenance

Section 2.8.2 addressed landfill gas monitoring. Therefore, institutional controls and the soil cap (including site grading and revegetation) are the only components of Alternative 2 described below.

2.8.3.1 Institutional Controls

Institutional controls would be implemented as part of Alternative 2 to safeguard the integrity of the soil cap and associated monitoring systems. Institutional controls are mechanisms for restricting access or exposure to contaminants. The NCP recognizes that institutional controls may be necessary to supplement and protect engineering controls in preventing exposure of humans and the environment when waste is left in place. In addition, the EPA has identified institutional controls as part of the containment presumptive remedy. Institutional controls are included as a component of this remedial action to maintain effectiveness of the selected containment alternative in preventing exposure to debris and contaminated soil and groundwater within the landfill. In particular, these controls are intended to protect the integrity of the soil cover and prevent use of groundwater at Site 1 (see Figure 3). Institutional controls are required to protect the landfill remedy by achieving these land use control performance objectives: (1) preventing excavation or physical alteration of the landfill cap, (2) preventing unacceptable risk to human health caused by excavation of contaminated materials from the landfill, (3) preventing use of water that presents an unacceptable risk to human health, (4) protecting monitoring equipment, (5) preventing unauthorized access to the site, and (6) preserving access to the site and associated monitoring equipment. Institutional controls would prohibit the following activities at the Site 1 landfill (see Figure 3):

- Construction of facilities, structures, appurtenances, or any other land-disturbing activity into or onto the surface of the landfill that may affect the drainage or increase erosion, including any activity that will damage the cover or affect the drainage and erosion controls developed to protect the cover. Excavations into the landfill would generally be prohibited except as necessary to maintain or repair the landfill cover.
- Planting of plants that could threaten the integrity of the landfill cap.
- Land-disturbing activity on lands adjacent to the landfill that may cause adverse effects on the landfill through erosion of the surface or diversion of off-site surface water onto the landfill.
- Removal of, tampering with, or damage to security features (for example, locks on monitoring wells).
- Irrigation of the landfill surface unless for the purpose of establishing and maintaining the vegetative layer.
- Construction of any buildings.
- Withdrawal of groundwater for potable, irrigation, industrial, or agricultural use.

In addition, the Navy will develop a land use control remedial design (LUC RD) for the institutional controls. The LUC RD will describe the boundaries of the site, the objectives of the institutional controls, the restrictions, the specific mechanisms to be implemented or already implemented, the required frequency for inspections, the entities responsible for carrying out the monitoring and inspection, the methods for certifying compliance with institutional controls after inspections have been completed, and procedures for notifying the SFBRWQCB and the EPA in the event of a failure to comply with the restrictions. The LUC RD will be developed as part of the final remedial design and will be provided to the regulatory agencies for review and comment pursuant to the schedule for remedial design in the NWS SBD Concord Site Management Plan, and will be provided in accordance with the NWS SBD Concord Federal Facilities Agreement.

The Navy will be responsible for implementing, monitoring, reporting, and enforcing these institutional controls for the duration of the controls. The institutional controls shall be maintained until the concentration of hazardous substances in the soil and groundwater beneath have been reduced to levels that allow for unlimited exposure and unrestricted use.

2.8.3.2 Soil Cap

A soil cap would be implemented under Alternative 2 to isolate refuse, eliminate direct contact with surface soil, and reduce erosion, infiltration, and surface contaminant migration at the landfill. This cap would use low-permeability soil and evapotranspiration to reduce infiltration. The soil cap meets the applicable or relevant and appropriate performance standards and minimum design requirements for a final landfill cover system of SWRCB, Title 27 CCR, Division 2, 20950(a)(2) and 21090 and of CIWMB at Title 27 CCR, Division 2, 21140.

The Alternative 2 soil cap would rest on a foundation layer that would consist of the compacted and regraded surface of the existing landfill. The proposed cap would cover the entire extent of the existing landfill. In order to do so, existing refuse and fill material at the perimeter of the landfill would be stripped from the area and replaced as compacted foundation materials for cap support in the interior portions of the landfill.

Excavation of the landfill perimeter is expected to provide the following advantages over alternative treatments:

1. The existing landfill perimeter soil will be consolidated to a smaller area.
2. The proposed cap can be sealed to the underlying, relatively impermeable, Bay Mud soil.

3. The relocated fill soil and waste will be placed as a compacted fill to provide foundation for the soil cap.

4. No additional marsh area in Site 2 will be disturbed as a result of the proposed work.

The soil cap would consist of a minimum 1-foot-thick low hydraulic conductivity layer of compacted clay or sandy clay soil. The soil layer would be designed and constructed for an in-place permeability of 1×10^{-6} centimeters per second or less. The hydraulic conductivity of the underlying Bay Mud would be assessed during the remedial design. A minimum 1-foot-thick layer of clay or sandy clay topsoil would overlie the low hydraulic conductivity layer. The top soil depth, to be specified in the remedial design, would be adequate to allow full root zone development of local vegetation such that the root depth does not exceed the depth of the top of the low hydraulic conductivity layer as required by Title 27 Section 21090(a)(3)(A) 1.d. The selected vegetation would be low-maintenance and drought tolerant.

The cap would be sloped so rainwater would drain off to the west side of the landfill and to a perimeter ditch on the east side of the site. Because the landfill is expected to settle under its own weight and under the weight of the new cap, the final surface of the cap would be designed to accommodate the anticipated settlement. The final capped surface of the landfill would be designed to slope to promote drainage of surface water from the cap and prevent surface water ponding. The cap would be designed to minimize erosion, thereby reducing the potential for surface migration of contaminants. The soil cap would also limit infiltration into the landfill and reduce formation of leachate by promoting growth of vegetation and surface water runoff. The cap would be tied into the existing Bay Mud along the perimeter of the landfill. This construction would serve as an additional landfill gas control mechanism by limiting lateral and vertical migration of gas through the cap and low-permeability Bay Mud.

As part of the cap design process, the Navy would conduct a landfill gas survey in accordance with the regulatory requirements of California's Health and Safety Section (HSC) Section 41805.5 to evaluate whether any landfill gas control (active or passive venting or oxidation) system is necessary to protect human health and the environment and to assist with gas collection design. If concentrations of gas detected during the survey exceed the requirements in Title 27 20921(a)(2), then the Navy would design and construct a landfill gas control system in consultation with county, state and federal regulators. Regardless of the results of the landfill gas survey, some amount of landfill gas venting would be included in the design of the cap.

Surface controls would be implemented in conjunction with the soil cap to minimize erosion. Surface drainage and erosion control technologies channel and direct site runoff. Surface drainage and erosion controls that would be used at the Tidal Area Landfill include surface grading and revegetation. Details of the cap design would be determined during the remedial design phase.

If groundwater remediation is required in the future, the groundwater remediation system will be designed in a manner that would provide for integrity of the containment cap.

O&M is a necessary part of Alternative 2. A post-closure maintenance plan would be developed during the detailed remedial design phase and would include the following inspection schedules:

- A schedule for periodically inspecting the integrity of the soil cap. Inspections would be directed toward identifying potential erosion areas or breaches in the layer and areas of non-uniform settlement that result or would result in ponding of surface water or direct infiltration of precipitation or surface water.
- A schedule for periodically inspecting the vegetative cover to identify stressed or failed areas.

In addition to the above schedules, a schedule for fertilization and replanting would be included in the maintenance plan if these elements are necessary for the early success of the vegetative cover. Criteria to measure the success of the vegetative cover would be included in the remedial design.

2.8.4 Alternative 3: Containment (Multilayer Cap), Institutional Controls, and Groundwater and Landfill Gas Monitoring

Alternative 3 involves the following actions:

- Landfill gas monitoring
- Implementation of institutional controls
- Installation of a multilayer cap
- Surface controls (site grading and revegetation)
- O&M

Sections 2.8.2 and 2.8.3 previously addressed landfill gas monitoring, institutional controls, and surface controls. Therefore, the multilayer cap is the only component of Alternative 3 described below.

Alternative 3 Multilayer Cap

The Alternative 3 multilayer cap would be implemented under this alternative to isolate refuse, eliminate direct contact with surface soil, reduce erosion, reduce surface migration of contaminants, and limit infiltration. The main action-specific ARARs associated with design and construction of the multilayer cap are in Title 27 CCR Division 2, Chapter 3, Subchapter 5. The principal difference between the Alternative 3 multilayer cap and the Alternative 2 soil cap

is the significantly higher cost resulting from the additional layers in the Alternative 3 design. The multilayer cap exceeds the performance standards and minimum design requirements for a final landfill cover system of SWRCB at Title 27 CCR, Division 2, 20950(a)(2) and 21090, and of CIWMB at Title 27 CCR, Division 2, 21140. The multilayer cap includes a low-permeability layer (or barrier layer) of material in the cap, typically consisting of compacted clay or a geosynthetic clay liner. The other layers mainly serve to protect this low-permeability layer and maintain its function.

The sequence of layers in a typical multilayer cap consists of, from bottom to top, the foundation layer, low-permeability barrier layer, and drainage layer, and vegetative (surface soil) layer. A 2-foot-thick foundation layer of soil (Title 27 CCR 21090[a][1]) would be placed over the refuse, typically consisting of soil and recycled or reused waste materials, to support the barrier layer and provide a foundation for its construction.

The low-permeability barrier layer would be placed above the 2-foot-thick foundation layer constructed in accordance with Title 27 CCR 21090(a)(2). The barrier layer would be designed during the remedial design phase and would comply with the minimum permeability requirement of 1×10^{-6} centimeters per second (1 foot per year). Unless the low-permeability barrier layer is designed using geosynthetic materials, it will be designed to be at least 1 foot thick.

Lastly, the surface soil layer, typically consisting of soil, supports vegetation and is typically at least 12 inches thick (Title 27 CCR 21090[a][3]). The thickness of the vegetative layer in Alternative 3 would be specified during the remedial design phase to allow for the full development of plant root systems. This surface layer would be constructed to encourage drainage of rainwater, consistent with the minimum post-settlement 3 percent slope specified in Title 27 CCR 21090(b). Post-closure requirements would be followed as specified in Title 27 CCR 21090(c). This layer mainly functions to protect the barrier layer by reducing erosion and desiccation.

Similar to Alternative 2, the location of the landfill warrants consideration of several location-specific ARARs when designing the multilayer cap. Specifically, requirements pertaining to floodplains, wetlands, threatened and endangered species, and coastal zone would be addressed in designing the cap. Section 2.11.2.2 discusses these location-specific ARARs.

Similarly, landfill gas closure and post-closure monitoring and control requirements of Title 27 CCR, Division 2, 20921, 20923, 20925, 20932, 20933, and 21160 are applicable and would be complied with under the proposed landfill gas monitoring program for Alternative 3. And as for Alternative 2, regardless of the results of the landfill gas survey conducted during design, some amount of landfill gas venting would be included in the design of the cap.

Section 2.11.2.3 discusses these action-specific ARARs in detail.

2.9 SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

This section analyzes the advantages and disadvantages of each of the three alternatives described in Section 2.8. The alternatives were evaluated based on the following nine criteria, as required by Section 300.430(e) of the NCP:

- Overall protection of human health and the environment
- Compliance with ARARs and TBC regulations
- Long-term effectiveness and permanence
- Reduction in toxicity, mobility, or volume through treatment
- Short-term effectiveness
- Implementability
- Cost
- State acceptance
- Community acceptance

The comparative analysis of the three alternatives with respect to these nine criteria is summarized below.

2.9.1 Overall Protection of Human Health and the Environment

This criterion assesses whether each alternative adequately protects human health and the environment. The overall assessment of protection is based on an evaluation of long-term effectiveness and permanence, short-term effectiveness, and compliance with ARARs. The evaluation of protectiveness focuses on how site risks are reduced or eliminated by each alternative. Risk reductions are associated with how effectively an alternative meets the RAOs. This criterion is considered a threshold criterion that must be met by the selected alternative.

Alternative 1 does not meet the threshold criteria of overall protection of human health and the environment because refuse would not be contained and isolated. If no action is taken, conditions at the site will be unpredictable and uncontrolled, leaving open the possibility for future erosion and exposure to human and ecological receptors. Leaving the site uncontrolled would not likely provide continual overall protectiveness from hazards.

Alternatives 2 and 3 are protective of human health and the environment. Both alternatives provide protection of human health and the environment by isolating the contaminants with a cap

and protecting its integrity with supporting technologies and institutional controls. Both alternatives monitor groundwater and landfill gas migration. The comparative analysis of alternatives in the FS found that both would be similar in effectiveness at reducing leachate formation, but Alternative 2 is slightly more effective in the long term based on concerns regarding settlement as discussed in Section 2.9.3.

Modification of Alternative 2 by reducing the permeability of the hydraulic barrier layer from 1×10^{-5} centimeters per second to 1×10^{-6} centimeters per second has improved hydrologic performance of the Alternative 2 cap.

2.9.2 Compliance with ARARs

This evaluation criterion is used to evaluate whether each alternative will meet all of its identified federal and state ARARs. This criterion is also a threshold that must be met by the selected alternative.

ARARs are not applied to the no-action alternative (Alternative 1) because no action would take place.

Alternatives 2 and 3 comply with all chemical-, location-, and action-specific ARARs. Compliance with specific requirements is evaluated for the selected remedy in Section 2.11.2.

2.9.3 Long-Term Effectiveness and Permanence

This criterion evaluates the long-term effectiveness of the alternatives in protecting human health and the environment. The primary focus of this evaluation is the extent and effectiveness of controls used to manage the risk posed by untreated wastes.

Alternatives 2 and 3 both provide long-term effectiveness and permanence for the landfill, but will require occasional O&M. The function of both capping alternatives is to physically isolate refuse from contact with potential receptors, eliminate the exposure of waste to surface soil, reduce erosion, and limit infiltration of rainfall into the landfill waste. The caps are highly effective in the long term because with proper O&M, they both will succeed in each of these functions. The primary differences between Alternatives 2 and 3 lie in their long-term hydrologic performance (infiltration reduction).

Alternatives 2 and 3 both provide long-term effectiveness and permanence, whereas Alternative 1 does not. Over the long term, site conditions under Alternative 1 will be unpredictable. Alternative 1 could result in future erosion and exposure to human and ecological receptors.

Alternative 2 is equivalent to Alternative 3 for long-term effectiveness and permanence.

2.9.4 Reduction in Toxicity, Mobility, or Volume Through Treatment

This criterion addresses the statutory preference for selecting remedial actions that use treatment technologies to permanently reduce toxicity, mobility, or volume of hazardous substances.

None of the alternatives involve treatment to reduce the toxicity, mobility, or volume of contaminants. Treatment options for refuse in a landfill are not considered because hot spots do not pose immediate and elevated threats to human health and the environment. Treatment of hot spots is impractical for landfills that present a low-level threat (EPA 1991). However, isolating refuse with a cap, and thereby reducing infiltration through the refuse, will help to reduce the likelihood that leachate will form and reduce the mobility of contamination at the Tidal Area Landfill. Alternatives 2 and 3 are comparable in controlling the mobility and off-site migration of leachate. Through isolation of landfill refuse, Alternatives 2 and 3 are more effective in reducing the mobility of contamination than Alternative 1. Alternative 1 does not reduce the mobility of contaminants.

2.9.5 Short-Term Effectiveness

Short-term effectiveness addresses the effects of each alternative during the construction and implementation phases until RAOs are met. The alternatives are evaluated with respect to effects on human health and the environment during implementation of the alternative. Factors considered include the time to achieve RAOs and exposure to the community and the environment during construction.

Alternative 1 will have no effect on risks posed by the site in the short term because no remedial action will be implemented. There would be no impact to the surrounding community. Alternative 1 also provides short-term effectiveness because it minimizes impacts to existing ecological receptors at the Tidal Area Landfill.

Alternatives 2 and 3 both provide short-term effectiveness in reducing potential risk to the community during the construction and implementation phase through access restrictions. Potential exposure of workers to contaminants will be minimized by the use of personal protective equipment and ambient air monitoring.

As indicated in the RI report (PRC 1997), the Tidal Area supports some threatened and endangered plant and animal species. In the absence of an ecological survey of the landfill itself, the potential exists for some of these species to inhabit the Tidal Area Landfill. The Navy will consult with the U.S. Fish and Wildlife Service before the remedial action is undertaken to review the possibility of impacts to protected species during construction. Under Alternatives 2

and 3, heavy machinery and materials will be used to construct the proposed cap. However, impacts on the adjacent wetland, if any, will be minimized through standard engineering controls and through consolidation along the perimeter of the landfill to allow for construction of the cap within the current boundaries of the landfill. Detrimental impacts to existing habitats are expected to be short term, and no critical habitat is expected to be destroyed. It is reasonable to assume that the affected areas will recover in less than 5 years after the landfill has been capped based on recovery rates at sites with similar conditions (PRC 1997). In addition, revegetation efforts by the Navy will assist in accelerating the rate of recovery.

Under the short-term effectiveness criterion, alternatives were evaluated considering factors that included time to reach RAOs. Although both alternatives are expected to achieve RAOs relatively quickly (4 to 6 months), Alternative 3 will require slightly more time to implement because a larger volume of material is required. Therefore, any exposure to the community under Alternative 3 is somewhat lengthier. Alternative 3 results in greater truck traffic, and associated disturbances to the community are expected to be somewhat greater.

2.9.6 Implementability

This criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of services and materials required during implementation.

Alternative 1 is easier to implement than Alternatives 2 and 3. Except for the monitoring wells, no construction is required. Monitoring is readily implementable.

Greater technical and administrative effort will be required to implement Alternatives 2 and 3 than to implement Alternative 1 because Alternatives 2 and 3 include construction of the caps and surface controls. Alternatives 2 and 3 also include the establishment of land use controls by means of institutional controls within the IMP or its equivalent planning document. Alternative 3 requires more material to construct the cap than for the Alternative 2 cap. Implementability of institutional controls is the same for Alternatives 2 and 3. O&M will consist of groundwater monitoring, landfill gas monitoring, monitoring cap integrity, and cap maintenance.

2.9.7 Cost

The cost analysis for each alternative is calculated from estimates of capital and O&M costs. Capital costs consist of direct and indirect costs. Direct costs include the purchase of equipment, labor, and materials necessary to install the alternative. Indirect costs include engineering, financial, and other services such as testing and monitoring. Annual O&M costs for each alternative include operating labor, maintenance materials and labor, auxiliary materials, and energy.

Table 5 summarizes the costs for each alternative. The total net present value costs (including both capital and O&M costs) for Alternatives 2 and 3 are $2,007,000 and $2,993,000, respectively. Most of these estimated costs are associated with cap material and construction. For Alternative 3, capital costs associated with quality assurance and quality control testing required for placement of the barrier layer have been included. Annual O&M costs for the first 5 years, including groundwater monitoring, landfill gas monitoring, and cap maintenance, are estimated at $75,000 for both alternatives. Estimated costs for construction of the monitoring systems, the land use and access restrictions, and the surface controls are identical for Alternatives 2 and 3. Total net present value costs (including capital costs and O&M costs) are higher for Alternative 3 than for Alternative 2.

The cost for Alternative 1 is lower than for Alternatives 2 and 3 because no remedial action would be implemented under Alternative 1.

2.9.8 State Acceptance

Early in the RI/FS process, state and federal agencies supported the presumptive remedy process as evidenced by their approval of the RI work plans that included only limited sampling at Site 1, in accordance with the EPA's presumptive remedy guidance. The state does not accept Alternative 1 because Alternative 1 is not protective of human health or the environment.

Based on comments submitted to the Navy, DTSC recently favored Alternative 3 over Alternative 2. Since that time, Alternative 2 has been modified in response to agency comments, and DTSC supports the selection of Alternative 2. SFBRWQCB supports the construction of Alternative 2. SFBRWQCB also requested additional changes to the text and assurances from the Navy concerning the long-term protectiveness of the remedy. This version of the ROD has been updated with the changes requested by SFBRWQCB.

State and federal agencies, including Cal-EPA, DTSC, the SFBRWQCB, CIWMB, and the EPA have been involved in a long period of review, comment, and approval for investigation and remedy selection for the Tidal Area Landfill, Site 1. The process has spanned a period of more than 10 years and has included preparation all of CERCLA documents associated with Site 1 and the surrounding IR sites.

The process has led to the preparation of this ROD, which state and federal agencies have also reviewed in detail. This document has been revised based on agency comment and requested modifications. As a result of the long-term involvement and guidance by the state and federal agencies, the state accepts and supports this ROD. Signatures of state officials on this document evidence the state's acceptance of the ROD.

2.9.9 Community Acceptance

The community does not accept Alternative 1 because Alternative 1 is not protective of human health or the environment.

Several members of the RAB have issued public comments at the monthly public RAB meetings. In general, these RAB members do not support any landfill cap alternative (including Alternatives 2 and 3) for the landfill and would prefer that all landfill waste be excavated and removed from the site. Excavation and removal of waste from the site was not evaluated in the FS because the Navy decided the site was addressed most appropriately by pursuing the EPA presumptive remedy closure of the landfill.

During the 30-day public comment period in June 1999, the community did not favor one alternative over another.

2.9.10 Results of the Comparative Analysis

Results of the comparative analysis indicate that Alternative 2 ranks the highest among the three alternatives. Alternative 2 is easier to implement, has comparable to slightly greater short-term effectiveness, and costs less than Alternative 3. Alternative 3 incorporates additional cap layers; however, the increased thickness yields no practical increase in effectiveness, while reducing implementability, and increasing costs.

Alternative 2 is preferred over Alternative 1. Even though Alternative 1 is the easiest to implement, has the lowest cost, and does not threaten current habitat, Alternative 1 does not comply with ARARs and therefore cannot be selected. Alternative 2 eliminates exposures to human and ecological receptors by minimizing direct contact with refuse, diminishing infiltration, preventing inhalation of contaminated dust, and minimizing erosion and runoff through revegetation and grading. In addition, in-place containment of the contents of the landfill reduces the potential spread of contaminants off-site into the nearby wetlands. Alternative 1 achieves none of these results. The no-action alternative will leave these potential pathways intact and will provide little assurance against off-site contaminant migration. Erosion and runoff would continue to occur under Alternative 1, potentially spreading contaminants off site. In summary, Alternative 2 is recommended over Alternative 1 because it has superior long-term protectiveness, permanence, and reduction in mobility of contaminants.

2.10 THE SELECTED REMEDY

The Navy has selected Alternative 2 (soil cap, surface controls, institutional controls, landfill gas monitoring, and maintenance) as the preferred alternative based on the analysis presented in the RI/FS reports.

The Tidal Area Landfill will require separate consideration of the potential contamination of groundwater from the landfill. A separate groundwater ROD is required to select the appropriate remedy for groundwater at the site, as deemed necessary based on the planned further assessment of groundwater.

The remedial action selected in this ROD for the Tidal Area Landfill consists of Alternative 2, which includes the following:

- A soil cap constructed to isolate landfill refuse from contact with potential receptors, eliminate direct contact with surface soil, and reduce erosion, infiltration, and potential surface contaminant migration.
- Institutional controls to safeguard the integrity of the soil cap and associated monitoring systems. Institutional controls would prohibit construction of any habitable structures, or other land-disturbing activity into or onto the surface of the landfill or adjacent to the landfill, planting of vegetation that could threaten the integrity of the landfill cap, removal of or tampering with posted signs, irrigation of the surface of the landfill, and extraction of groundwater from beneath the landfill. The Navy will develop a LUC RD as part of the post-closure maintenance and monitoring plan to ensure that institutional controls are maintained in the long term.
- Surface controls including ditches, if necessary, grading, and revegetation to eliminate direct contact with surface soil, and reduce erosion, infiltration, and surface contaminant migration.

This selected remedy fulfills the landfill refuse, groundwater, and landfill gas RAOs developed using EPA guidance documents (EPA 1991, 1993). The soil cap meets the RAO for landfill refuse of protecting human and ecological receptors from exposure to landfill contamination by minimizing exposure pathways and contaminant migration. The cap will isolate the wastes to eliminate direct contact of receptors with wastes and minimize leachate and landfill gas migration. The cap and groundwater monitoring program act together to meet the groundwater RAO of protecting human and ecological receptors in the area from potentially harmful exposure resulting from leachate migration into groundwater and subsequently into surface water. The cap minimizes formation of leachate. The groundwater monitoring program ensures that no contaminants are migrating off site. The soil cap combined with the landfill gas monitoring and control program fulfills the RAO for landfill gas of protecting human health and the environment from off-site subsurface methane gas migration. The soil cap will be constructed to tie into the existing Bay Mud along the perimeter of the landfill, thereby limiting lateral and vertical landfill gas migration through the cap and low-permeability Bay Mud. The connection of the cap to the Bay Mud, along with the landfill gas monitoring program, will ensure that methane gas is not migrating off site. And regardless of the results of the landfill gas survey to be conducted during the design, some amount of landfill gas venting will be included in the design of the cap.

The soil cap will greatly reduce risks to human health and the environment, will eliminate the possibility of direct contact of humans and animals with landfill waste, and will minimize the potential for erosion, formation of leachate, and migration of surface contaminants. Exposure limits will be reduced to levels well below the EPA risk range for carcinogens, and hazard indices for noncarcinogens will be less than 1. In addition, implementation of Alternative 2, a soil cap, will not pose unacceptable short-term risks or cross-media impacts.

However, as stated in Section 2.7.2, the Navy will notify the agencies in the event that the RI for Site 2 finds that pollutants, which may have migrated or are migrating from the landfill, pose an unacceptable risk to human health or ecological receptors. After the agencies have been notified, the Navy will evaluate the risk posed by releases of contaminants to Site 2. If appropriate, the Navy will conduct a FS of potential remedial alternatives for Site 2 in accordance with the requirements of CERCLA.

The net present value (NPV) of the total estimated cost associated with Alternative 2 is $2,007,000. The total capital cost for Alternative 2 is $1,575,000. The annual O&M cost during the first 5 years is estimated to be $75,000. The annual O&M cost assumes quarterly groundwater and landfill gas monitoring for 5 years and annual monitoring for 25 years. Although quarterly monitoring is required for the entire period of post-closure maintenance, it is likely that the Navy will seek a waiver, if appropriate, depending on the results of quarterly monitoring and other factors. The above estimated cost assumes that a waiver for quarterly monitoring will be sought after 5 years of monitoring and will be granted by the CIWMB.

The remedial design and construction phases may result in variations of the design parameters for the selected remedy. These alterations to the design parameters, in general, will reflect modifications resulting from the engineering design process.

2.11 STATUTORY DETERMINATIONS

Remedy selection is based on CERCLA, as amended by Superfund Amendments and Reauthorization Act, and the regulations contained in the NCP. All remedies must meet the threshold criteria established in the NCP. The selected remedy must also be cost effective and use permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes. The following sections discuss how the selected remedy meets these statutory requirements.

2.11.1 Overall Protection of Human Health and the Environment

The selected remedy, Alternative 2, is protective of human health and the environment. The combination of capping, institutional controls, and monitoring will meet all RAOs. Alternative 2 provides protection of human health and the environment by isolating the contaminants with a cap and protecting the integrity of the cap by monitoring, maintenance, and institutional controls. Alternative 2 includes groundwater monitoring. Alternative 2 is not intended to address potential groundwater contamination that may be emanating from the site. However, if groundwater remediation is required in the future, the groundwater remediation system will be designed in a manner that would provide for integrity of the containment cap. This potential and any consequent remedial actions that may be required will be more thoroughly evaluated during the CERCLA investigation of groundwater in the area. Remedial measures for groundwater, if required, will be selected in the groundwater ROD. Alternative 2 also includes landfill gas monitoring and control requirements, if necessary. Alternative 2 also includes institutional controls to further limit exposure and protect human health.

The soil cap will greatly reduce risks to human health and the environment, will eliminate direct contact of humans and animals with the contents of the landfill, and will minimize erosion, leachate formation, and surface contaminant migration. In addition, implementation of Alternative 2, the soil cap, will not pose unacceptable short-term risks or cross-media impacts.

The proposed cap will fully contain all of the debris in the landfill, so human and animal exposure to the waste materials in the landfill is not anticipated. In addition, exposure to contaminated leachate is not anticipated. The intent of the cap is to provide physical isolation of the waste to fully prevent contact exposure to potentially toxic material. As long as the soil cap is in place, is maintained, and is not otherwise disturbed, it is expected to fully prevent direct receptor contact with the waste. Without contact, the direct exposure pathway is considered broken, and no risk can be posed. As a result, the proposed cap remedy is expected to be fully protective of human health and the environment. As previously mentioned, the indirect groundwater exposure pathway will be addressed during the CERCLA groundwater investigation of the site and in the groundwater ROD.

2.11.2 Compliance with ARARs

The selected remedy complies with ARARs. Each category of ARARs is discussed below.

2.11.2.1 Chemical-Specific ARARs

Chemical-specific ARARs do not exist for landfill refuse or soil. Chemical-specific ARARS for landfill gas are described below.

Requirements for control of landfill gas at solid waste landfills under either Subtitle D of RCRA (Title 40 CFR 258), or Title 27 CCR 20921 et seq.) were considered ARARs. The Navy reviewed and compared both sets of requirements and determined that the standards of Title 27 are more stringent than the Subtitle D standards. Therefore, the Navy is identifying the following standards of Title 27 as ARARs.

Regulations adopted by CIWMB in CCR 20921(a)(2) require that landfill gas be monitored to ensure that methane gas concentrations at site boundaries do not exceed the lower explosive limit (LEL) for methane (5 percent methane by volume).

Section 20921(a)(3) requires that trace gases shall be controlled to prevent adverse acute and chronic exposure to toxic or carcinogenic compounds.

The landfill gas will be monitored quarterly for 3 years to determine whether these standards are achieved. After 3 years, the Navy, in consultation with the regulatory agencies, will evaluate whether continued monitoring is necessary based on analytical results.

In addition, the San Francisco Bay Area Air Quality Management District (BAAQMD) regulates air emissions from landfills in Regulation 8, Rule 34. The rule limits emissions of organic compounds and methane from solid waste disposal sites. The Navy, however, has determined that Site 1 is exempt from this regulation because it does not meet the minimum volume requirement of 1 million tons of waste.

Table 1 summarizes chemical-specific ARARs for Alternative 2.

2.11.2.2 Location-Specific ARARs

Location-specific ARARs for the selected remedy are summarized in this section and in Table 2 (federal location-specific ARARs) and Table 3 (state location-specific ARARs). Biological resources, floodplain management, and coastal resources are the resource categories related to location-specific requirements potentially affected by the Site 1 response actions.

Biological Resources ARARs

Substantive requirements of the federal Endangered Species Act of 1973 (Title 16 USC 1531, et seq.) and the California Fish and Game Code (FGC) (FGC 2080, 3005, 3511, and 5650(a) and (b)) were included as ARARs because threatened and endangered species, migratory nongame birds, and mammals occur in the Tidal Area. No endangered, threatened, or otherwise protected species are known to inhabit the surface of the landfill. However, threatened and endangered species, including the salt marsh harvest mouse, may inhabit areas near the landfill, so precautions will be taken to ensure that the remedial action does not adversely affect any threatened or

endangered species. Because Site 1 is not critical habitat and threatened or endangered species are not known to depend on it, actions taken under Alternative 2 are not likely to appreciably reduce the likelihood of the survival and recovery of any endangered species.

Nevertheless, the landfill cap will protect these habitats by controlling erosion and washout that could otherwise accelerate migration of contaminants from the Tidal Area Landfill. The landfill cap will eliminate exposure pathways that result from erosion of the landfill surface and will reduce generation of leachate by reducing infiltration. In constructing the landfill cap and associated monitoring systems, the Navy will exercise precautions to avoid taking endangered species, mammals, migratory nongame birds, and other birds protected under State of California and federal laws.

Wetlands Protection and Floodplains Management ARARs

The regulations codifying Executive Order No. 11990, Wetlands Protection (40 CFR § 6.302(a)), and Clean Water Act Section 404 were identified as potential ARARs, because jurisdictional wetlands, including "salt marsh" and "seasonal brackish/salt marsh mosaic" habitats, exist immediately adjacent to the boundaries of the Tidal Area Landfill (WESCO 1995). The Navy does not anticipate that proposed actions under Alternative 2 would affect wetlands. However, the cap construction will be near wetlands, so engineering practices commonly used to reduce potential impacts to wetlands, including those listed below, will be in place:

- Sensitivity training for subcontractors working on the site
- Construction of temporary silt collection fences around the landfill perimeter to control sediment and surface water migration into the wetland during cap construction
- Stockpiling of soil away from the wetland boundaries
- Construction during the dry season to minimize runoff

In addition, should any impact to wetlands be anticipated or occur during the remedial design or remedial action phases, the Navy will comply with the substantive requirements of 40 CFR § 6.302(a) and Section 404 of the Clean Water Act. Executive Order 11990 is a TBC.

Executive Order 11988, Floodplain Management

Under Title 40 CFR 6.302(b), federal agencies are required to evaluate the potential effects of action they may take in a floodplain to avoid, to the extent possible, adverse effects associated with direct and indirect development of a floodplain. The cap will be installed to allow surface flow across the landfill toward the wetland in an evenly distributed pattern. Erosion will be minimized. With these actions, the selected remedy will not adversely affect the floodplain or be

incompatible with floodplain development. Therefore, the remedy complies with this TBC provision. This requirement is a TBC because executive orders are not promulgated and thus are not ARARs. However, regulations codifying Executive Order 11988 are ARARs for this action. Executive Order 11988 was codified at 40 CFR § 6.302(b). The substantive provisions of 40 CFR § 6.302(b) and 40 CFR part 6 Appendix A, excluding § 6(a)(2), 6(a)(4) and 6(a)(6) of Appendix A, are ARARs for response actions within a floodplain.

Coastal Area ARARs

Section 307(c)(1) of the CZMA (Title 16 USC 1456(c)1), and the implementing regulations in 15 CFR 930 and 923.45, require that all federal activities affecting land or water uses of the coastal zone be conducted in a manner consistent, to the maximum extent practicable, with approved state management programs. A state coastal zone management program (developed under state law and guided by the CZMA) sets forth objectives, policies, and standards to guide public and private uses of lands and water in the coastal zone. California's approved coastal management program includes the BCDC Bay Plan; its broad goals include reducing Bay fill and disposal of dredged material in the Bay, maintaining marshes and mudflats to the fullest extent possible to conserve wildlife and abate pollution, and protecting the beneficial uses of the Bay. Alternative 2 will be implemented consistent with this goal and will conform to the substantive requirements of the state management program. The landfill cap will protect the adjacent coastal zone by reducing erosion and washout from the Tidal Area Landfill. The monitoring programs for groundwater and landfill gas proposed under Alternative 2 will assist in maintaining the existing overall quality of the coastal zone.

2.11.2.3 Action-Specific ARARs

As described in Section 2.8.1.3, federal or California hazardous waste regulations for landfills (Title 40 CFR 264 and Title 22 CCR and Title 23 CCR Chapter 15) are not applicable to Site 1. Further, the federal and state requirements for municipal solid waste landfills codified at Title 40 CFR 258 and Title 27 CCR, respectively, are not applicable because the landfill was not active at the time these regulations became effective. However, because the Tidal Area Landfill was not completely closed at the time it became inactive, many of the closure and post-closure maintenance standards of Title 27, Division 2, Subdivision 1, Chapter 3, Subchapter 5 are applicable, and the federal and state requirements for municipal solid waste landfills are relevant and appropriate to this remedial action.

Title 27 CCR, Division 2, 20950 sets forth general standards for closure of all solid waste management units, including performance goals for closing such units. Section 21090 establishes final cover requirements of SWRCB, including a prescriptive cap design. The Navy has determined that the substantive standards of these requirements are relevant and appropriate to closure of the Tidal Area Landfill.

The Alternative 2 soil cap achieves the requirements of Title 27 CCR 20950(a)(2)(A) that set forth the State Water Resources Control Board's final cover performance standard, which states, "the goal of closure, including but not limited to the installation of a final cover, is to minimize the infiltration of water into the waste, thereby minimizing the production of leachate and gas." The Alternative 2 soil cap will substantially reduce the infiltration of water into the waste by providing a sloped grade to promote surface drainage.

In addition, CIWMB regulations in Title 27, Division 2 are relevant and appropriate for closure of landfills that did not complete closure pursuant to regulations in effect at the time waste was last received (Title 27 CCR 21099 and 21100(b)). Specifically, CIWMB closure and post-closure maintenance requirements specified in Title 27 CCR 21140(a)(b), 21142(a), 21145(a), and 21150(a) and (b) are ARARs. These four sections contain requirements for final cover, grading, slope stability, and drainage and erosion control. Substantive portions of these requirements are relevant and appropriate to the Alternative 2 soil cap construction and are listed in Table 4.

The Navy has determined that the Title 27, Division 2 requirements for a landfill gas monitoring program, as described in Section 2.8.1.2, are applicable for Alternative 2. A perimeter landfill gas monitoring network will be constructed and operated in accordance with the substantive requirements of Title 27 CCR 20921, 20923, 20925, 20932, 20933, and 21160. Should the results of landfill gas monitoring indicate concentrations of methane in excess of the standards of 20921, control measures will be implemented pursuant to 20937. Landfill gas monitoring has not been conducted to date, and the presence of methane in excess of the standards of 20921 has not been established. The requirements of these CIWMB regulations are summarized in Table 4.

2.11.3 Cost Effectiveness

Alternative 2 is considered cost effective because its costs are proportional to its overall effectiveness. Overall effectiveness is measured by evaluating the following three of the five primary balancing criteria for remedy selection, as provided by Title 40 CFR 300.430(f)(1)(ii)(D) of the NCP: (1) long-term effectiveness and permanence; (2) reduction in toxicity, mobility, and volume through treatment; and (3) short-term effectiveness. Once this is determined for each alternative, then overall effectiveness for each alternative is compared with cost individually, and the cost and effectiveness of alternatives are compared with one another.

Although Alternatives 2 and 3 will not reduce toxicity, mobility, and volume through treatment, the EPA presumptive remedy for landfills does not require this reduction because treatment of contamination sources within landfills is typically not practical.

By evaluation of the remaining two balancing criteria, Alternative 2 is considered effective. It is effective in the long term because with proper implementation the soil cap will permanently provide physical isolation of landfill waste and any associated contaminants from humans and the environment. No current evidence suggests that groundwater contamination is emanating from the landfill; however, this issue will be more thoroughly evaluated during the CERCLA groundwater investigation of the area surrounding the landfill. Institutional controls can be easily enforced to prevent disturbance of the landfill cover because Site 1 is on Navy property with restricted public access. Alternative 2 is effective in the short term because it can be implemented in a matter of months and includes measures to protect the environment, workers, and the public during construction of the cap.

The overall effectiveness is related to the cost of implementing this alternative. An NPV of $2.0 million is reasonable for capping a landfill the size of the Tidal Area Landfill. Thus, Alternative 2 is cost effective.

Similarly, Alternative 3 is also considered effective overall. It is judged effective in the long term at isolating landfill waste and associated contaminants from human and animal exposure. It is highly effective because it sheds rainfall from the landfill. It is also effective in the short term because access to the public will be restricted while the remedy is being implemented and it can be implemented in a relatively short time. Furthermore, this overall effectiveness bears a reasonable relationship to the cost for implementing the alternative. In summary, Alternative 3 is cost effective.

When compared to one another, Alternative 2 is considered more cost effective than Alternative 3. Alternative 2 is slightly more effective overall because it satisfies the RAOs in the long term (isolating the wastes from exposure to humans and ecological receptors) and increased short term effectiveness because it can be implemented more quickly than Alternative 3. Moreover, Alternative 2 achieves this at a significantly reduced cost over Alternative 3. The cost for Alternative 3 is approximately 50 percent greater than the cost for Alternative 2, and Alternative 3 does not offer improved performance. As a result, Alternative 2 is judged significantly more cost effective than Alternative 3.

2.11.4 Utilize Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be applied in a cost-effective manner. In accordance with the EPA's presumptive remedy for CERCLA landfill sites, the selected remedy is effective for long-term protection of human health and the environment. Refuse and leachate at the Tidal Area Landfill will be isolated from human and environmental receptors through capping and through implementation of institutional controls including access and land use restriction notations within

the IMP or its equivalent planning document. Changes in groundwater quality will be tracked through the groundwater monitoring program. Decisions relating to groundwater will be addressed in the separate groundwater ROD.

Implementation of the selected remedy will eliminate future physical exposures of landfill waste to humans and ecological receptors by (1) minimizing direct contact with landfill contents, (2) preventing inhalation of contaminated dust, and (3) minimizing erosion and runoff through revegetation and grading. In addition, containment of the landfill contents with a low-permeability cap will minimize rainfall infiltration and the consequent generation of leachate.

2.11.5 Preference for Treatment as a Principal Element

Alternative 2 does not involve treatment to reduce toxicity, mobility, or volume. Treatment options for refuse in the landfill were not considered because hot spots do not pose immediate and elevated threats to human health and the environment. Treatment of hot spots is impractical for landfills that present a low-level threat (EPA 1991). However, isolating and thereby reducing infiltration through refuse with a cap will help to reduce the likelihood that leachate will form and reduce the mobility of contamination at the Tidal Area Landfill.

2.12 DOCUMENTATION OF SIGNIFICANT CHANGES

As a result of agency review and the Navy's reevaluation of the Alternative 2 landfill cap, the composition of the cap has been revised since publication of the feasibility study and proposed plan. The Alternative 2 cap has been modified so that it now meets the Title 27 CCR prescriptive cap requirements.

Modifications to the Alternative 2 cap include revised material properties of the low-permeability barrier layer and deletion of the specification of a biotic barrier layer to meet the requirement for a protective layer. The revised low-permeability layer now consists of a minimum of 12 inches of soil with a permeability of 1×10^{-6} centimeters per second or less, rather than the previous native soil design with a permeability of 1×10^{-5} centimeters per second. This change increases the protection of water quality by limiting precipitation infiltration into the waste material, and it makes the cap design consistent with the prescriptive standards of Title 27 CCR. In addition, the Alternative 2 cap has been revised to delete the specification of a gravel biotic barrier layer, as described in Section 2.8.3.2. The biotic barrier was removed from the description of Alternative 2 in order to allow for greater flexibility during the design phase in meeting the requirements of Title 27 Section 21090(a)(2) for protecting the low hydraulic conductivity layer. The Alternative 2 Title 27 CCR prescriptive standard cap is more effective in protecting the environment than the Alternative 2 cap proposed in the FS, and meets the ARARs for a landfill closure.

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TABLES

TABLE 1

CHEMICAL-SPECIFIC ARARs
RECORD OF DECISION FOR THE TIDAL AREA LANDFILL
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD, CONCORD, CALIFORNIA

Requirement	Prerequisite	Citation	ARAR Determination	Comments
The concentration of methane at the landfill boundary shall not exceed the LEL (5 percent methane in air)	Landfill closure	CCR 27 Sec. 20921(a)(1), (2) and (a)(3)	Applicable	These regulations are applicable to the landfill because landfill gas containing methane may be present at the landfill.

Notes:

CCR California Code of Regulations
LEL Lower explosive limit

TABLE 2

FEDERAL LOCATION-SPECIFIC ARARs
RECORD OF DECISION FOR THE TIDAL AREA LANDFILL
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD, CONCORD, CALIFORNIA

Location	Requirement	Prerequisite	Citation	ARAR Determination	Comments
Executive Order 11988, Protection of Floodplains*					
Within floodplain	Actions taken should avoid adverse effects, minimize potential harm, and restore and preserve natural and beneficial values.	Action that will occur in a floodplain (that is, lowlands) and relatively flat areas adjoining inland and coastal waters and other flood-prone areas.	Title 40 CFR 6.302(b)	To Be Considered	Installation of a soil cap will not adversely affect the floodplain.
Executive Order 11990, Protection of Wetlands					
Wetland	Action to minimize the destruction, loss or degradation of wetlands.	Wetland meeting definition of Section 7 of Exec. Order 11990.	40 CFR § 6.302(a)	To Be Considered	Exec. Order 11990 is a TBC to the extent the remedy could impact wetlands. The substantive provisions of 40 CFR § 6.302(a) are ARARs if the remedy impacts areas within a wetland.
Endangered Species Act of 1973* (16 USC §§1531–1543)					
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 on endangered or threatened species or its habitat. Critical habitat upon which endangered species or threatened species depend.	16 USC §1536(a), (h)(1)(B)	Relevant and Appropriate	Both endangered and threatened species are known to reside within or near the Tidal Area, so the remedial action must be conducted so as to conserve endangered species including the salt marsh harvest mouse.

TABLE 2 (Continued)

FEDERAL LOCATION-SPECIFIC ARARs
RECORD OF DECISION FOR THE TIDAL AREA LANDFILL
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD, CONCORD, CALIFORNIA

Location	Requirement	Prerequisite	Citation	ARAR Determination	Comments
Coastal Zone Management Act* (16 USC §§1451–1464)					
Within coastal zone	Conduct activities in a manner consistent with approved state management programs.	Activities affecting the coastal zone including lands thereunder and adjacent shore land.	16 USC § 1456(c) 15 CFR § 930	Relevant and appropriate	Remedial action at the Tidal Area Landfill could affect the coastal zone.

Notes:

* Statutes and policies, and their citations, are provided as headings to identify general categories of potential 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 potential ARARs; specific potential ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered potential ARARs.

ARAR Applicable or relevant and appropriate requirement
CCR *California Code of Regulations*
CFR *Code of Federal Regulations*
§ Section
U.S. United States
USC *United States Code*

TABLE 3

STATE LOCATION-SPECIFIC ARARs
RECORD OF DECISION FOR THE TIDAL AREA LANDFILL
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD, CONCORD, CALIFORNIA

Location	Requirement	Prerequisite	Citation	ARAR Determination	Comments
California Endangered Species Act (California Fish and Game Code §§ 2050–2116)					
Endangered species habitat	Provides that 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 01 January 1985 or a candidate species with proper notification.	Cal. Fish and Game Code § 2080	Relevant and appropriate	California threatened and endangered species are known to occur within or near the Tidal Area and will be protected in conducting the remedial actions.
Wildlife area	Prohibits taking birds or mammals with a net, pound, cage, trap, setline, wire, or poisonous substance or possessing birds or mammals except as provided in the California Fish & Game Code.	Presence of birds and mammals	Cal. Fish and Game Code § 3005(a) and § 3511	Relevant and appropriate	Although the taking of such species is not anticipated during the landfill capping remedy, this ARAR has been included to protect wildlife species in the vicinity of the landfill.
Areas with protected birds	Provides that fully protected birds, including the California Clapper Rail or parts thereof, many not be taken or possessed at any time except under special circumstances.	Presence of protected birds	Cal. Fish and Game Code § 2080	Relevant and appropriate	Although the taking of such species is not anticipated during the landfill capping remedy, this ARAR has been included to guard against the taking of protected birds, which may live in the vicinity of the landfill.
Waters of the State	Prohibits the deposition of toxic materials into waters of the state that would have a deleterious effect on species or habitat.		Cal. Fish and Game Code § 5060(a), (b), and (f)	Relevant and appropriate	Although landfill leachate formation has not been detected and proposed capping remedies would further limit leachate formation, this ARAR is included to protect aquatic habitat and species. The landfill is located within a low-elevation marsh, and groundwater elevations are typically at or below sea level.

TABLE 3 (Continued)

STATE LOCATION-SPECIFIC ARARs
RECORD OF DECISION FOR THE TIDAL AREA LANDFILL
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD, CONCORD, CALIFORNIA

Location	Requirement	Prerequisite	Citation	ARAR Determination	Comments
McAteer-Petris Act of 1965*					
San Francisco Bay	Specifies permit requirements for placing fill, dredging or extracting materials from the Bay bottom, subdividing property, or grading and/or changing the use of any land, water, or structure within the Bay.	Listed activities in San Francisco Bay.	Cal. Government Code §§ 66600–66687	Relevant and appropriate	Remedial action at the Tidal Area Landfill could affect the coastal zone

Notes:

* Statutes and policies, and their citations, are provided as headings to identify general categories of potential 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 potential ARARs; specific potential ARARs follow each general heading; only substantive requirements of the specific citations are considered potential ARARs

ARAR	Applicable or relevant and appropriate requirement
CCR	*California Code of Regulations*
Cal.	California
Cal. Pub. Res. Code	California Public Resources Code
§	Section

TABLE 4

STATE ACTION-SPECIFIC ARARs
RECORD OF DECISION FOR THE TIDAL AREA LANDFILL
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD, CONCORD, CALIFORNIA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
State Water Resources Control Board*					
Landfill capping	General construction criteria and general criteria for containment structures.	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, §§ 20310 and 20320 (SWRCB)	Relevant and appropriate	Standards for construction and containment may be relevant and appropriate to closure of the Tidal Area Landfill.
Landfill closure	Provides specific standards for closure and post-closure of landfills.	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, § 21090 (SWRCB)	Applicable	Specific standards for closure and post-closure of landfills are applicable to closure of the Tidal Area Landfill.
Emergency response	Potential emergency conditions that may exceed the design of the site and could endanger the public health or the environment must be anticipated.	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, 21130 (CIWMB)	Applicable	The Navy will comply with the substantive portions of this requirement. Even though no waste was discharged after 18 July 1997, this section is applicable because it is a closure/post-closure requirement in CCR Title 27, Division 2, Subchapter 5, Article 2, which applies to "disposal sites that did not complete closure prior to November 18, 1990, in accordance with all applicable requirements." CCR Title 27, § 21100.

TABLE 4 (Continued)

STATE ACTION-SPECIFIC ARARs
RECORD OF DECISION FOR THE TIDAL AREA LANDFILL
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD, CONCORD, CALIFORNIA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
Final cover	Contains general standards for the design of the final cover.	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, §21140(a) and (b) (CIWMB)	Applicable	The Cap will be designed to function with minimal maintenance and to control vectors, prevent exposure to landfill contents, ensure stability and integrity of the cover. Even though no waste was discharged after 18 July 1997, this section is applicable because it is a closure/post-closure requirement in CCR Title 27, Division 2, Subchapter 5, Article 2, which applies to "disposal sites that did not complete closure prior to November 18, 1990, in accordance with all applicable requirements." CCR Title 27, § 21100.
Final grading	Contains general standards for landfill grading.	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, § 21142(a) (CIWMB)	Applicable	The cap will be designed to function with minimal maintenance and to control vectors, prevent exposure to landfill contents, and ensure stability and integrity of the cover. Even though no waste was discharged after 18 July 1997, this section is applicable because it is a closure/post-closure requirement in CCR Title 27, Division 2, Subchapter 5, Article 2, which applies to "disposal sites that did not complete closure prior to November 18, 1990, in accordance with all applicable requirements." CCR Title 27, § 21100.

TABLE 4 (Continued)

STATE ACTION-SPECIFIC ARARs
RECORD OF DECISION FOR THE TIDAL AREA LANDFILL
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD, CONCORD, CALIFORNIA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
Slope stability	Contains general standards for slope stability.	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, § 21145(a) (CIWMB)	Applicable	The cap will be designed to function with minimal maintenance and to control vectors, prevent exposure to landfill contents, and ensure stability and integrity of the cover. Even though no waste was discharged after 18 July 1997, this section is applicable because it is a closure/post-closure requirement in CCR Title 27, Division 2, Subchapter 5, Article 2, which applies to "disposal sites that did not complete closure prior to November 18, 1990, in accordance with all applicable requirements." CCR Title 27, § 21100.
Drainage and erosion control	Contains general standards for drainage and erosion control.	CCR 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, § 21150(a,b) § 21150(c) (CIWMB)	Applicable	The cap will be designed to function with minimal maintenance and to control vectors, prevent exposure to landfill contents, and ensure stability and integrity of the cover. Even though no waste was discharged after 18 July 1997, this section is applicable because it is a closure/post-closure requirement in CCR Title 27, Division 2, Subchapter 5, Article 2, which applies to "disposal sites that did not complete closure prior to November 18, 1990, in accordance with all applicable requirements." CCR Title 27, § 21100.

TABLE 4 (Continued)

STATE ACTION-SPECIFIC ARARs
RECORD OF DECISION FOR THE TIDAL AREA LANDFILL
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD, CONCORD, CALIFORNIA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
Landfill gas control and leachate contact	Landfill gas control shall be implemented and maintained. Leachate must be collected and controlled in a manner which prevents public contact and controls vectors, nuisance and odor.	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, § 21160(a) and (b) (CIWMB)	Applicable	The Navy will comply with the substantive portions of this requirement. The Navy does not expect that any leachate control or leachate collection and removal system will be required. If leachate control or a leachate collection and removal system is required in the future as part of the groundwater ROD, the Navy will comply with subsections (c) and (d). Even though no waste was discharged after 18 July 1997, this section is applicable because it is a closure/post-closure requirement in CCR Title 27, Division 2, Subchapter 5, Article 2, which applies to "disposal sites that did not complete closure prior to November 18, 1990, in accordance with all applicable requirements." CCR Title 27, § 21100.
Closure of a waste management unit	General closure and post-closure maintenance standards	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, § 20950(a) (b), (d), and (e) (SWRCB)	Relevant and appropriate	General performance standards for closure and post-closure of solid waste landfills including surveying monuments and revegetation, are relevant and appropriate because the landfill received municipal solid waste.

TABLE 4 (Continued)

STATE ACTION-SPECIFIC ARARs
RECORD OF DECISION FOR THE TIDAL AREA LANDFILL
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD, CONCORD, CALIFORNIA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
Post-closure maintenance	Landfill must be maintained and monitored for no less than 30 years following closure.	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, § 21180(a) and (b) (CIWMB)	Applicable	The Navy will monitor the landfill in accordance with this section to the extent that monitoring is determined to be required. Monitoring may be for less than 30 years if there is no potential for adverse impacts on public health and safety and the environment as stated in CCR Title 27, § 20918. Even though no waste was discharged after 18 July 1997, this section is applicable because it is a closure/post-closure requirement in CCR Title 27, Division 2, Subchapter 5, Article 2, which applies to "disposal sites that did not complete closure prior to November 18, 1990, in accordance with all applicable requirements." CCR Title 27, § 21100.
Exemption from landfill gas monitoring	A disposal site may be granted an exemption to the requirements of Article 6 (Gas Monitoring and Control at Active and Closed Disposal Sites) if the operator can demonstrate that there is no potential for adverse impacts on public health and safety and the environment.	27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, §20918 (CIWMB)	Applicable	The Navy will comply with the substantive portions of this requirement. Even though no waste was discharged after 18 July 1997, this section is applicable because it is a closure/post-closure requirement in CCR Title 27, Division 2, Subchapter 5, Article 2, which applies to "disposal sites that did not complete closure prior to November 18, 1990, in accordance with all applicable requirements." CCR Title 27, § 21100.

TABLE 4 (Continued)

STATE ACTION-SPECIFIC ARARs
RECORD OF DECISION FOR THE TIDAL AREA LANDFILL
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD, CONCORD, CALIFORNIA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
Post-closure land use	Subsection (a) requires proposed post-closure land uses be designed and maintained to protect public health and safety and prevent damage to structures. Subsection (d) requires that construction maintain the integrity of the final cover and that proposed modification of the low-permeability layer be approved. Subsection (e) sets forth conditions for construction of structures on top of the landfill. Subsection (f) states that the enforcement agency may require an additional soil layer or building pad be placed on the final cover before construction. Subsection (g) contains requirements for construction within 1,000 feet of the boundary of the disposal area.	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, § 21190(a), (d), (e), (f) and (g) (CIWMB)	Applicable	The Navy will comply with the substantive portions of subsections (a), (d), (e), (f), and (g). Even though no waste was discharged after 18 July 1997, this section is applicable because it is a closure/post-closure requirement in CCR Title 27, Division 2, Subchapter 5, Article 2, which applies to "disposal sites that did not complete closure prior to November 18, 1990, in accordance with all applicable requirements." CCR Title 27, § 21100.
Landfill closure	Classified waste management units shall be closed in accordance with an approved closure and post-closure maintenance plan, which provides for continued compliance with the applicable standards for waste containment and precipitation and drainage controls and monitoring requirements.	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, § 21769 (SWRCB)	Relevant and appropriate	Preparation of closure and post-closure maintenance plans are procedural requirements. However the design documents for the remedial response will document how the substantive requirements will be met.

TABLE 4 (Continued)

STATE ACTION-SPECIFIC ARARs
RECORD OF DECISION FOR THE TIDAL AREA LANDFILL
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD, CONCORD, CALIFORNIA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
Final closure plan	Sets forth requirements for final closure plan contents.	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, § 21800(c) (CIWMB)	Relevant and appropriate	Preparation of closure and post-closure maintenance plans are procedural requirements; however, the design documents for the remedial response will explain how the substantive requirements will be met.
Final closure plan	Sets forth requirements for final post-closure maintenance plan.	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, § 21830 (CIWMB)	Relevant and appropriate	Preparation of closure and post-closure maintenance plans are procedural requirements; however, the design documents for the remedial response will explain how the substantive requirements will be met.
Monitoring	Persons responsible for discharges at units that were closed, abandoned, or inactive on or before 27 November 1984 may be required to develop and implement a monitoring program in accordance with Subdivision. 1, Subchapter 3, Article 1, (CCR Title 27, §§ 20380–20435).	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, § 20080(g) (SWRCB)	Applicable	SFBRWQCB's request that the Navy implement a detection monitoring program under CCR Title 27 makes these requirements applicable to closure of the landfill. Even though no waste was discharged after 18 July 1997, this section is applicable because it specifically applies to discharges at units that were closed, abandoned, or inactive on or before 27 November 1984.

TABLE 4 (Continued)

STATE ACTION-SPECIFIC ARARs
RECORD OF DECISION FOR THE TIDAL AREA LANDFILL
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD, CONCORD, CALIFORNIA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
Landfill gas monitoring	Contains general standards for a landfill gas monitoring network	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, § 20923 (CIWMB)	Applicable	This requirement is applicable to the landfill because it was not completely closed in accordance with all applicable requirements Even though no waste was discharged after 18 July 1997, this section is applicable because it is a gas monitoring and control requirement that applies to closed disposal sites. This section applies to solid waste disposal sites that did not commence complete closure prior to August 18, 1989 and to any new postclosure activities that may jeopardize the integrity of previously closed sites or pose a threat to public health and safety or the environment. CCR Title 27, § 20920.
Landfill gas monitoring	Describes the location, spacing, depth, and construction requirements for a perimeter monitoring system.	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, § 20925 (CIWMB)	Applicable	This requirement is applicable to the landfill because it was not completely closed in accordance with all applicable requirements. Even though no waste was discharged after 18 July 1997, this section is applicable because it is a gas monitoring and control requirement that applies to closed disposal sites. This section applies to solid waste disposal sites that did not commence complete closure prior to August 18, 1989 and to any new postclosure activities that may jeopardize the integrity of previously closed sites or pose a threat to public health and safety or the environment. CCR Title 27, § 20920.

TABLE 4 (Continued)

STATE ACTION-SPECIFIC ARARs
RECORD OF DECISION FOR THE TIDAL AREA LANDFILL
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD, CONCORD, CALIFORNIA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
Landfill gas monitoring	Provides that monitoring probes be sampled for methane.	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, § 20932 (CIWMB)	Applicable	This requirement is applicable to the landfill because it was not completely closed in accordance with all applicable requirements. Even though no waste was discharged after 18 July 1997, this section is applicable because it is a gas monitoring and control requirement that applies to closed disposal sites. This section applies to solid waste disposal sites that did not commence complete closure prior to August 18, 1989 and to any new postclosure activities that may jeopardize the integrity of previously closed sites or pose a threat to public health and safety or the environment. CCR Title 27, § 20920.
Landfill gas monitoring	Establishes the monitoring frequency for landfill gas monitoring.	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, § 20933 (CIWMB)	Applicable	This requirement is applicable to the landfill because it was not completely closed in accordance with all applicable requirements. Even though no waste was discharged after 18 July 1997, this section is applicable because it is a gas monitoring and control requirement that applies to closed disposal sites. This section applies to solid waste disposal sites that did not commence complete closure prior to August 18, 1989 and to any new postclosure activities that may jeopardize the integrity of previously closed sites or pose a threat to public health and safety or the environment. CCR Title 27, § 20920.

TABLE 4 (Continued)

STATE ACTION-SPECIFIC ARARs
RECORD OF DECISION FOR THE TIDAL AREA LANDFILL
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD, CONCORD, CALIFORNIA

Action	Requirement	Prerequisite	Citation	ARAR Determination	Comments
Landfill gas monitoring	Describes actions to be taken if the results of landfill gas monitoring indicate concentrations of methane in excess of levels set forth in Section 20921(a).	CCR Title 27 requirements are only applicable for waste discharged after 18 July 1997 (the effective date of the consolidated regulations) unless otherwise noted.	CCR Title 27, § 20937 (CIWMB)	Applicable	This requirement is applicable to the landfill because it was not completely closed in accordance with all applicable requirements. Even though no waste was discharged after 18 July 1997, this section is applicable because it is a gas monitoring and control requirement that applies to closed disposal sites. This section applies to solid waste disposal sites that did not commence complete closure prior to August 18, 1989 and to any new postclosure activities that may jeopardize the integrity of previously closed sites or pose a threat to public health and safety or the environment. CCR Title 27, § 20920.
Department Toxics Substances Control					
Land use controls	When it is not feasible to record a land use covenant for property owned by the federal government, other mechanisms may be used to ensure that future land use will be compatible with the levels of hazardous materials, hazardous wastes or constituents, or hazardous substances that remain on the property.	Land use control on property owned by federal government.	CCR Title 22, § 67391.1(e)(2)	Relevant and appropriate	The substantive provisions of subsection(e)(2)of this regulation have been determined to be relevant and appropriate state ARARs.

TABLE 4 (Continued)

STATE ACTION-SPECIFIC ARARs
RECORD OF DECISION FOR THE TIDAL AREA LANDFILL
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD, CONCORD, CALIFORNIA

Notes:

* Statutes and policies, and their citations, are provided as headings to identify general categories of potential 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 potential ARARs; specific potential ARARs are addressed in the table below each general heading; only substantive requirements of the specific actions are considered potential ARARs. The federal regulations at 40 CFR Part 258 are not applicable because the landfill did not accept waste after October 1, 1991.

ARAR	Applicable or relevant and appropriate requirement
CAI	Closed, abandoned, or inactive
CCR	*California Code of Regulations*
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CIWMB	California Integrated Waste Management Board
CLGB	concentration limit greater than background
SWRCB	State Water Resources Control Board
USC	*United States Code*

TABLE 5

**COST ESTIMATE SUMMARY FOR SELECTED ALTERNATIVES
RECORD OF DECISION FOR THE TIDAL AREA LANDFILL
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD,
CONCORD, CALIFORNIA**

Alternative	Capital Cost	Annual O&M Cost [a]	Total NPV Cost [b]
1 – No Action[c]	$34,000	$66,700	$453,000
2 – Native Soil Cap	$1,575,000	$75,000	$2,007,000
3 – Multilayer Soil Cap	$2,561,000	$75,000	$2,993,000

Notes:

a Annual O&M cost during the first 5 years. Annual O&M cost assumes quarterly groundwater and landfill gas monitoring for the first 5 years and annual monitoring for the next 25 years.

b Total NPV cost includes capital costs and NPV of annual O&M cost.

c The no-action alternative includes costs for groundwater and landfill gas monitoring.

NPV Net present value

O&M Operation and maintenance

APPENDIX A

RESPONSIVENESS SUMMARY

FOR THE TIDAL AREA LANDFILL PROPOSED PLAN
NAVAL WEAPONS STATION SEAL BEACH DETACHMENT CONCORD

(5 Pages)

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1.0 OVERVIEW

In June 1999, the Navy presented the "Tidal Area Landfill Proposed Plan" for Naval Weapons Station Seal Beach, Detachment Concord (NWS SBD), to the public. The proposed plan described the Navy's proposed approach to addressing contamination at the Tidal Area Landfill. Environmental conditions at the Tidal Area Landfill had been investigated as part of the Navy's Installation Restoration Program, a comprehensive environmental investigation and cleanup program that mirrors the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

A 30-day public comment period on the proposed plan was held from June 8, 1999, to July 8, 1999. A public meeting was held to present the proposed plan and receive public comment on June 17, 1999. Notice of the public comment period and public meeting was provided to those listed on the community mailing list and publicized in the Contra Costa Times. No written comments were received on the proposed plan; however, oral comments were received from two community members and one regulatory agency representative at the June 17 public meeting.

CERCLA requires that a responsiveness summary be prepared following the public comment period. The responsiveness summary must present significant community comments on the Navy's proposed cleanup alternative presented in the proposed plan, and the Navy's responses to those comments. This responsiveness summary has been prepared to fulfill the requirements of CERCLA.

The selected approach to addressing the Tidal Area Landfill is described in the record of decision; it is the same as the preferred approach described in the proposed plan.

Section 2.0 of this document presents background information on the community involvement programs at NWS SBD Concord. Section 3.0 presents significant public comments received at the June 17, 1999, meeting on the proposed plan and the Navy's responses.

2.0 BACKGROUND ON COMMUNITY INVOLVEMENT

The Navy has conducted an active community involvement program at NWS SBD Concord since 1989 and has initiated a wide range of activities. Numerous open houses, site tours, and community meetings have been held to explain the environmental investigation and cleanup process and to solicit community input on the Navy's approach. Fact sheets have been sent to those on the community mailing list, which includes elected officials, community organizations and interest groups, residents, and local businesses.

A community relations plan (CRP) for NWS SBD Concord was prepared in February 1996 and was recently updated in April 2003. The CRP presents an outreach program to inform and involve the community in the cleanup decision-making process. An information repository has been established to provide public access to detailed information regarding environmental cleanup activities at NWS SBD Concord. The repository is located at the Concord Library, 2900 Salvio Street, Concord, California. Additionally, an administrative record has been established that includes documentation to support final decisions on how to address sites undergoing environmental investigations and cleanup at NWS SBD Concord. Both the information repository and administrative record are available for public review.

The Navy has also established a Restoration Advisory Board (RAB) composed of community members to provide a forum for ongoing dialogue among the Navy, regulatory agencies, and the community on environmental cleanup issues at NWS SBD Concord. The RAB includes a wide range of community members. The goal of the RAB is to advise the Navy on its cleanup approach and to review and comment on environmental cleanup documents. RAB meetings are currently held on the first Monday of every month and are open to the public.

Community outreach activities conducted for the Tidal Area Landfill Site are summarized in Table A-1.

3.0 PUBLIC COMMENTS AND THE NAVY'S RESPONSES

Following is a summary of significant comments and questions raised during the public meeting conducted by the Navy on June 17, 1999. The purpose of the public meeting was to (1) present the proposed plan for the Tidal Area Landfill to the community, (2) receive community comments on the proposed plan, and (3) respond to questions. Two community members and one regulatory agency representative raised questions during the public meeting; their questions and the Navy's response are summarized below. All questions focused on the technical aspects of the proposed remedy for the landfill.

No written comments were received during the 30-day public comment period.

3.1 COMMENTS FROM STEVE GALLO, FORMER RAB COMMUNITY CO-CHAIR

1. Question: Will the Navy develop a maintenance plan to monitor the integrity of the proposed remedy?

Response: Yes, the Navy will develop a long-term operation and maintenance plan to inspect the landfill cap and monitor adjacent groundwater for contamination, as well as to monitor for the unlikely possibility of landfill gas seepage from the landfill.

2. Question: Is the cap so impermeable that gas may seep out? Are there any potential difficulties in capturing the gas?

Response: The landfill is not expected to generate much landfill gas because it is so old; most of the organic contents have already decomposed to such an extent that little landfill gas is expected to be generated. A landfill gas assessment is required to assess the anticipated quantity of landfill gas currently being generated by the landfill. Landfill gas generation is a design consideration and the results of the landfill gas assessment will be incorporated in the design of the landfill cap.

3. Question: Because there are voids and uneven surfaces at the landfill (due to decomposed organic materials), how is the Navy planning to protect the landfill from sink holes that may develop in the future?

Response: The landfill surface will be leveled and compacted to remove void areas. Most of the wastes likely to decompose and create void space have already done so. Ongoing or future degradation will be considered in the final engineering design for the landfill cap. The design will also address the potential for settlement or compression of materials. Unanticipated sinkholes would be identified during the required 30-year maintenance period as a result of routine inspections. If sinkholes develop and are judged to require repair, the landfill surface can be locally repaired and regraded as necessary.

3.2 COMMENTS FROM KARL YOCUM, COMMUNITY MEMBER

1. Question: What is the thickness of the proposed landfill cap?

Response: The preferred Alternative 2 cap will be a minimum of 2 feet thick at all locations where it is placed to cover landfill waste. At the perimeter of the landfill, the cap will taper. The design has not been completed, so the precise cap thickness at the landfill perimeter has not been determined.

2. Question: How will the landfill cap be sealed with the bay mud?

Response: The details of the construction to seal the cap at the landfill boundary with the underlying Bay Mud have not been established, but are an important consideration for the detailed engineering design. The design is expected to extend the relatively impermeable landfill cap down to the relatively impermeable Bay Mud. The purpose is to restrict the flow of landfill leachate so it will not pass freely to and from the landfill regardless of the elevation of surface water outside the landfill.

3.3 COMMENT FROM DAVID COOPER, EPA REGION IX COMMUNITY RELATIONS SPECIALIST

1. Question: What is the difference in weight and height between the Navy's preferred native soil cap option (Option 2) and an alternative multilayer cap option (Option 3) in the proposed plan?

Response: The Alternative 2 and Alternative 3 caps have been revised since preparation of the FS, and these two caps are now similar in overall thickness. Where the landfill caps cover waste materials, the minimum thickness of the Alternative 2 cap is 24 inches (not counting the recompacted foundation layer), and the minimum thickness of the Alternative 3 cap is 30 inches (also excluding the recompaced foundation layer). The Alternative 3 cap is slightly heavier than the Alternative 2 cap.

TABLE A-1

SUMMARY OF COMMUNITY OUTREACH ACTIVITIES
SITE 1, TIDAL AREA LANDFILL

< **1989:** The Community Relations Plan for the Tidal Area (including Site 1) was drafted but never finalized.

< **August 1995:** The Navy presented a summary of the Tidal Area investigations to the RAB. Previous investigations of Site 1 and potential remedial alternatives were discussed.

< **April 1995:** NWS Concord Flagship Newspaper announced establishment of the RAB. The article includes all the IR Program Sites and their history.

< **April 16, 1995:** Public Notice, invitation on the formation of the NWS Concord RAB and Site Tour for the IR Program Sites.

< **April 29, 1995:** Tour of the IR Program Sites. Tidal Area Landfill (TAL) (Site 1) was Stop No. 3 for the brief and site walk.

< **May 1995:** RAB Fact Sheet, invitation to the community to attend the first NWS Concord RAB meeting.

< **May 1995:** NWS Concord Environmental Fact Sheet – First series.

< **May 1995:** Contra Costa Newspaper article about NWS Concord Site Tour.

< **July 20, 1995:** Overview of the IR Program Sites (History and Investigation) presented to the RAB.

< **August 3, 1995:** Public Notice for the RAB's second meeting scheduled for August 17, 1995.

< **August 17, 1995:** RAB Meeting presentation to the RAB on the Tidal Area Landfill (TAL) Site and Tidal Area Sites by Dr. Barbara Smith, EPA.

< **September 21, 1995:** Dr. Barbara Smith, EPA, provided the RAB responses to their comments for the proposed remedial investigation of the Tidal Area Sites, including Site 1.

< **February 15, 1996:** Tidal Area Landfill Presentation to the RAB by Dr. Barbara Smith of EPA.

< **June 20, 1996:** The Navy released the Draft RI report for the TAL and Tidal Area Sites.

< **July 18, 1996:** Dr. Dan Stralka, EPA, presented the results of the Remedial Investigation of the Tidal Area Sites to the RAB.

TABLE A-1 (Continued)

SITE 1, TIDAL AREA LANDFILL
SUMMARY OF COMMUNITY OUTREACH ACTIVITIES

< **January 16, 1997:** Presentation by Dr. Dan Stralka, EPA to the RAB regarding Risk Assessment and discussion about the landfill capping.

< **April 12, 1997:** Navy provided NWS Concord Site Tour (79 participated). RAB members placed newspaper ads and distributed 9,000 flyers.

< **May 15, 1997:** RAB Meeting – TtEMI Overview of the Tidal Area Sites and Tidal Area Landfill.

< **June 19, 1997:** TtEMI Presentation on the Tidal Area Landfill.

< **September 18, 1997:** RAB Meeting – Presentation on the Tidal Area Landfill Feasibility Study by TtEMI.

< **November 20, 1997:** RAB Meeting – Discussion of the RAB comments on the TAL Feasibility Study; Navy announced extension of comment period to December 15, 1997 to accommodate RAB members.

< **September 25, 1998:** Released the Draft Proposed Plan and the ROD to regulatory Agencies and RAB for review with comments due back on Oct 26, 1998.

< **June 1999:** The Proposed Plan for the Site 1 was made available to the community.

< **June 8, 1999:** A public notice was published in the Central and East County *Contra Costa Times* to announce the public comment period for the Site 1 Proposed Plan.

< **June 17, 1999:** A public meeting was held to present the TAL Proposed Plan and to accept public comments on Proposed Plan. (The public comment period ran from June 8 through July 8, 1999.)

< **February 2002:** Tidal Area Landfill site tour for the RAB.

< **February 4, 2002:** The Navy gave a presentation to the RAB summarizing the Site 1 TAL ROD.

< **February 10, 2002:** Gay Tanasescu (RAB member) submits comments to the Navy on the Site 1 ROD.

< **Summer 2002:** The Navy submits responses to Gay Tanasescu's comments.

< **December 2002:** The Navy conducted a site tour of the Inland Area and Tidal Area IR Program Sites, including Site 1.