

**EPA Superfund  
Record of Decision:**

**CONCORD NAVAL WEAPONS STATION  
EPA ID: CA7170024528  
OU 02  
CONCORD, CA  
04/06/1989**



**DEPARTMENT OF THE NAVY**  
NAVEL WEAPONS STATION  
CONCORD CALIFORNIA 94520-5000

IN REPLY REFER TO:

6 April 1989

Record of Decision of Selection of Final Remedial Action Plan for the Release, and the Threatened Release, of Hazardous Substances on Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, California

The Naval Weapons Station, Concord, California, is the major ammunition transshipment port on the west coast for the Department of the Navy. The station is located in the north-central portion of Contra Costa County in the San Francisco Bay Area of California. The station is approximately thirty (30) miles northeast of the City of San Francisco; it is bounded on the north by Suisun Bay and on the south and west by the City of Concord.

The Naval Weapons Station, Concord, encompasses over 12,900 acres of land which consists of three areas of land: the Tidal Area; the Inland Area, which is linked to the Tidal Area by a narrow Navy-owned rail and road corridor, near the City of Concord; and a radiography facility located in Pittsburg, California.

Pursuant to Sections 104, 120, and 121 of the comprehensive Environmental Response, Compensation, and Liability Act, as amended (CERCLA), and based on the final administrative record of the response to the release, and the threatened release, of hazardous substances on Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, the Department of the Navy is selecting the Remedial Action Alternatives identified as 1-3A, 2-3A, 3-3A, and 4-3A in the Proposed Remedial Action Plan for the Release, and the Threatened Release, of Hazardous Substances on Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, California, as a final remedial action plan for the portions of Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, which are contaminated with hazardous substances, including arsenic, cadmium copper, lead, selenium, and zinc. In addition, the Department of the Navy is determining that, to prevent portions of these parcels on the Naval Weapons Station from being recontaminated after the final remedial action

plan is implemented on these parcels, the remedial action alternatives identified as 1-3A, 2-3A, 3-3A, and 4-3A in the proposed remedial action plan must be undertaken on the portions of the off-site rights of way which transect these parcels, which are contaminated with hazardous substances, including arsenic, cadmium, copper, lead, selenium, and zinc. (Atchison, Topeka, and Santa Fe Railway Company; Southern Pacific Transportation Company; and Sacramento Northern Railroad own and operate the four rights of way which transect such parcels.)

Alternative 1-3A involves the excavation of contaminated soil from the area in RASS 1 designated for active remediation, classification of the contaminated soil, transportation of the contaminated soil to an existing Class I landfill, disposal of contaminated soil in an existing Class I landfill, restoration of the excavated area, and operation and maintenance, including monitoring, of the excavated area. Alternative 1-3A also involves extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded. Alternative 1-3A involves, in addition, monitoring in the areas in RASS 1 not designated for active or passive remediation. The monitoring in the areas designated for active and passive remediation and in the areas not designated for active or passive remediation will include, but not be limited to, the installation of groundwater monitoring wells; sampling of the wells for four quarters; analysis of the groundwater samples; and evaluation of the groundwater analysis.

Alternative 2-3A involves the excavation of contaminated soil from the area in RASS 2 designated for active remediation, classification of the contaminated soil, transportation of the contaminated soil to an existing Class I landfill, disposal of contaminated soil in an existing Class I landfill, restoration of the excavated area, and operation and maintenance, including monitoring, of the excavated area. Alternative 2-3A also involves extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded. Alternative 2-3A involves, in addition, monitoring in the areas in RASS 2 not designated for active or passive remediation. The monitoring in the areas designated for active and passive remediation and in the areas not designated for active or passive remediation will include, but not be limited to, the installation of groundwater monitoring wells; sampling of the wells for four quarters; analysis of the groundwater samples; and evaluation of the groundwater analysis.

Alternative 3-3A involves the excavation of contaminated soil from the area in RASS 3 designated for active remediation, classification of the contaminated soil, transportation of the contaminated soil to an existing Class I landfill, disposal of contaminated soil in an existing Class I

landfill, and operation and maintenance, including monitoring, of the excavated area. Alternative 3-3A also involves extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded. Alternative 3-3A involves, in addition, monitoring in the areas in RASS 3 not designated for active or passive remediation. The monitoring in the areas designated for active and passive remediation and in the areas not designated for active or passive remediation will include, but not be limited to, the installation of groundwater monitoring wells; sampling of the wells for four quarters; analysis of the groundwater samples; and evaluation of the groundwater analysis.

Alternative 4-3A involves the excavation of soil exceeding TTLC/STLC criteria and liming of low pH soil (less than pH of 5.0) on the area in RASS 4 designated for active remediation, classification of the contaminated soil, transportation of the contaminated soil to an existing Class I landfill, disposal of contaminated soil in an existing Class I landfill, and operation and maintenance, including monitoring, of the excavated area. Alternative 4-3A also involves extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded. Alternative 4-3A involves, in addition, monitoring in the areas in RASS 4 not designated for active or passive remediation. The monitoring in the areas designated for active and passive remediation would include, but not be limited to, the installation of groundwater monitoring wells; sampling of the wells for four quarters; analysis of the groundwater samples; and evaluation of the groundwater samples.

The Navy finds and concludes that Alternatives 1-3A, 2-3A, 3-3A, and 4-3A will be protective of human health and the environment; are cost effective; and utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. The Navy also finds and concludes that no alternative remedial actions which would permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances are practicable. The Navy also finds and concludes that no alternative remedial actions which do not use off-site transport and disposal of hazardous substances are practicable.

The Navy also finds and concludes that Alternatives 1-3A, 2-3A, 3-3A, and 4-3A will be in accordance with Section 121 of CERCLA and, to the extent practicable, with the National Contingency Plan. The Navy also finds and concludes that Alternatives 1-3A, 2-3A, 3-3A, and 4-3A will be cost effective.

The Navy also finds and concludes that Alternatives 1-3A, 2-3A, 3-3A, and 4-3A will attain the level or standard of control (with respect to any hazardous substance that will remain

onsite) which at least attains the applicable or relevant and appropriate requirements for RASS 1 which are identified above, except to the extent that compliance with the ARAR's would result in greater risk to the environment than alternative options.

On 14 February 1986, the Western Division, Naval Facilities Engineering Command (WESTDIV), completed the Final Report of Remedial Investigation of Contaminant Mobility at Naval Weapons Station, Concord, California, which concluded that portions of Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, California, and portions of off-site rights of way which transect such parcels are contaminated with hazardous substances, including arsenic, cadmium, copper, lead, selenium, and zinc. Figures 5-1, 5-2, and 5-3 of the Final Remedial Investigation Report depicted the contaminated portions of such parcels on the Naval Weapons Station, Concord, and the off-site rights of way. On 16 September 1988, WESTDIV completed the Final Report of Remedial Investigation of Contaminant Mobility at Naval Weapons Station, Concord, California, Subtitle Appendix 2.5- 1986/87 Data.

WESTDIV completed a (Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, on 7 March 1987, which screened, developed, and analyzed alternative remedial actions for contaminated portions of these parcels. WESTDIV completed a (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, on 16 September 1988, which screened, developed, and analyzed alternative remedial actions for the contaminated portions of these parcels. The (Second Revised) Final Draft Feasibility Study Report divided the contaminated portions of Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, and the rights of way and areas surrounding the contaminated properties into four (4) remedial action subsites (RASS's) to analyze alternative remedial actions. The (Second Revised) Final Draft Feasibility Study Report ranked alternative remedial actions for each RASS. Figure 2 of the (Second Revised) Final Draft Report of the Feasibility Study of Contamination Remediation at the Naval Weapons Station, Concord, California, Volume III: Figures, depicts RASS 1, RASS 2, RASS 3, and RASS 4.

On 16 September 1988, the Naval Weapons Station, Concord, California, completed a proposed remedial action plan for the portions of Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, and portions of off-site rights of way which transect such parcels, which are contaminated with hazardous substances, including arsenic, cadmium, copper, lead, selenium, and zinc. (Atchison, Topeka, and Santa Fe Railway Company; Southern Pacific Transportation Company; and Sacramento Northern Railroad own and operate the

four rights of way which transect such parcels.) The proposed remedial action plan presented the findings and conclusions the Navy proposed to make concerning cleanup standards and decision rules for the release, and the threatened release, of hazardous substances on the contaminated portions of these parcels and the rights of way under Sections 104, 120, and 121 of CERCLA; identified the alternative remedial actions which the Navy analyzed; and described and presented a brief analysis of the preferred alternative remedial actions.

Pursuant to Sections 117 and 113 of CERCLA, on 16 September 1988 the Navy issued a public notice that it had completed the proposed remedial action plan and a draft administrative record of the response to the release, and the threatened release, of hazardous substances on Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord. By the same public notice, the Navy gave public notice that it had completed the following reports in response to the release, and the threatened release, of hazardous substances on Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, California:

- " Final Report of Remedial Investigation of Contaminant Mobility at Naval Weapons Station, Concord, California, Subtitle Appendix 2.5 - 1986/87 Data (June 1988).
- " Final Report of Suitability of Sites for Hazardous Waste Disposal, Concord Naval Weapons Station, Concord, California (September 1987).
- " (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume I: Remedial Action Alternatives (September 1988).
- " Final Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume II: Biological Assessment (July 1988).
- " Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume III: Figures (April 1988).
- " Proposed Remedial Action Plan for the Release, and the Threatened Release, of Hazardous Substances on Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, California (16 September 1988).

By the same public notice, the Navy solicited oral and written comments and information necessary to evaluate the

proposed remedial action plan, and the findings and conclusions which the Navy proposed to make concerning cleanup standards, decision rules, and remedial action alternatives for the release, and the threatened release, of hazardous substances on Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, California. The Navy also solicited any information necessary to complete the administrative record of the response to the release, and the threatened release, of hazardous substances on these parcels.

On 12 October 1988, the Naval Weapons Station, Concord, held a public meeting to solicit oral comments and information. On 19 October 1988, the Naval Weapons Station, Concord, issued a public notice extending the deadline by which written comments and information must be received by the Navy until 18 November 1988.

Interested parties submitted written comments and information in response to the public notice. on 6 April 1989, the Navy completed its Responses to Comments which responded to comments submitted by interested parties in response to the proposed remedial action plan and the draft reports on which the Navy solicited comments and other information. on 6 April 1989, the Navy determined that the (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume I: Remedial Action Alternatives, and the Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume III: Figures, did not require significant revision and, thus, determined that these final draft reports will also serve as final reports. The Navy published errata to the (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume I: Remedial Action Alternatives, and the Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume III: Figures, in the Responses to Comments.

On 6 April 1989, the Naval Weapons Station, Concord, California, completed a final remedial action plan for the portions of Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, and portions of off-site rights of way which transect such parcels, which are contaminated with hazardous substances, including arsenic, cadmium, copper, lead, selenium, and zinc. (Atchison, Topeka, and Santa Fe Railway Company; Southern Pacific Transportation Company; and Sacramento Northern Railroad own and operate the four rights of way which transect such parcels.) The final remedial action plan presented the findings and conclusions the Navy made concerning cleanup standards and decision rules for the release, and the threatened release, of hazardous substances on the contaminated portions of these parcels and the rights of way under Sections 104, 120, and

121 of CERCLA; identified the alternative remedial actions which the Navy analyzed; and described and presented a brief analysis of the alternative remedial actions the Navy selected. The final remedial action plan is attached hereto and incorporated herein by reference as if fully set forth herein.

Prior to the amendment of CERCLA by the Superfund Amendments and Reauthorization Act on 17 October 1986, the Navy issued a public notice that it had completed a (Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, on 7 March 1986. By the same public notice, the Navy solicited written comments and information necessary to evaluate the seven remedial action alternatives analyzed in the (revised) final draft feasibility study report. Interested parties submitted written comments and information in response to the public notice. On 6 April 1989, the Naval Weapons Station, Concord, completed the Responses to Comments, which responded to comments submitted by interested parties in response to the draft report.

The Navy also issued a public notice that it had completed a Final Draft Report of Remedial Investigation of Contaminant Mobility at Naval Weapons Station, Concord, California, and a Final Draft Report of Feasibility Study of Contamination at Naval Weapons Station, Concord, California, on 8 August 1985. By the same public notice, the Navy solicited comments and information necessary to evaluate the release, and/or the threat of the release, of hazardous substances, and alternative remedial actions for the release, and the threat of release, of hazardous substances. Interested parties submitted written comments and information in response to the public notice. On 6 April 1989, the Navy issued the Responses to Comments, which responded to comments submitted by interested parties in response to the draft reports.

Pursuant to Section 7 of the Endangered Species Act, the Navy engaged in consultation with the U.S. Fish and Wildlife Service concerning the impact to endangered species on Parcel 572 on the Naval Weapons Station, Concord, from the implementation of the proposed remedial action plan. On 23 August 1988, the Fish and Wildlife Service issued a biological opinion which stated that:

[T]he proposed remediation of heavy metals contamination at Concord Naval Weapons Station is not likely to jeopardize the continued existence of the salt marsh harvest mouse or California clapper rail.

The Fish and Wildlife Service also stated in its biological opinion that it would not consider the taking of salt marsh harvest mice which is incidental to and not intended as part of the proposed remedial action as taking in violation of Section 9

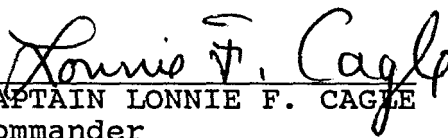


of the Endangered Species Act provided that such taking complies with the conditions set forth in the biological opinion.

Pursuant to Sections 120(f) and 121(f) of CERCLA, the Navy consulted with the State of California concerning the initiation, development, and selection of the final remedial action plan for the portions of Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, which are contaminated. Neither the State of California Regional Water Quality Control Board, nor the State of California Department of Health Services, nor the State of California Department of Fish and Game objected to the proposed remedial action plan which the Navy issued on 16 September 1988.

Pursuant to Section 211 of the Superfund Amendments and Reauthorization Act, the Navy consulted with the Environmental Protection Agency concerning the initiation, development, and selection of the final remedial action plan for the portions of Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, which are contaminated. 10 U.S.C. 2701 and 2705. The Environmental Protection Agency did not object to the proposed remedial action plan which the Navy issued on 16 September 1988.

In addition, the Navy consulted with the defendants and third party defendants in United States v. Allied Chemical Corp., et al., Civil No. C-83-5898 FMS (N.D. Calif.), and United States v. Chemical & Pigment, et al., Civil No. C-83-5896 FMS (N.D. Calif.), concerning the initiation, development, and selection of the final remedial action plan for the portions of Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, which are contaminated.

  
CAPTAIN LONNIE F. CAGLE  
Commander  
Naval Weapons Station  
Concord, California



## DEPARTMENT OF THE NAVY

NAVEL WEAPONS STATION  
CONCORD CALIFORNIA 94520-5000

IN REPLY REFER TO:

6 April 1989

### PUBLIC NOTICE

Naval Weapons Station, Concord, California, hereby gives notice that it is issuing a Record of Decision of Selection of Final Remedial Action Plan for the Release, and the Threatened Release, of Hazardous Substances on Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, California, with this public notice. The Naval Weapons Station, Concord, also gives notice that it is also issuing the Responses to Comments with this public notice.

On 8 August 1985, the Western Division, Naval Facilities Engineering Command, gave public notice that it had completed a Final Draft Report of the Remedial Investigation of Contaminant Mobility at Naval Weapons Station, Concord, California, and a Final Draft Report of the Feasibility Study of Contamination at Naval Weapons Station, Concord, California, and solicited comments and information necessary to evaluate the release, and/or threatened release, of hazardous substances on these parcels of the Naval Weapons Station, Concord. In response, comments and information were submitted by Federal, State, and local agencies, and responsible parties.

On 14 February 1986, the Western Division, Naval Facilities Engineering Command, gave public notice that it had completed a Final Report of the Remedial Investigation of Contaminant Mobility at Naval Weapons Station, Concord, California.

On 7 March 1986, the Western Division, Naval Facilities Engineering Command, gave public notice that it had completed a (Revised) Final Draft Report of the Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, and solicited comments and information necessary to evaluate the release, and/or the threatened release, of hazardous substances on these parcels of the Naval Weapons Station, Concord. In response, comments and information were submitted by Federal, State, and local agencies, and responsible parties.

On 5 July 1988, the Navy submitted a biological assessment of the impact to endangered species on Parcel 572 on the Naval Weapons Station, Concord, from the implementation of its Proposed Remedial Action Plan for the Release, and the Threatened Release, of Hazardous Substances on Parcels 572, 573,

574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, California. The biological assessment was entitled Final Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume II: Biological Assessment.

On 23 August 1988, the U.S. Fish and Wildlife Service, Endangered Species Office, Sacramento, California, completed a biological opinion of the impact to endangered species on Parcels 572 on the Naval Weapons Station, Concord, from the implementation of the proposed remedial action plan.

On 16 September 1988, the Naval Weapons Station, Concord, gave public notice that the Navy had completed the following reports in response to the release, and the threatened release, of hazardous substances on Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, California:

- " Final Report of Remedial Investigation of Contaminant Mobility at Naval Weapons Station, Concord, California, Subtitle Appendix 2.5 - 1986/87 Data.
- " Final Report of Suitability of Sites for Hazardous Waste Disposal, Concord Naval Weapons Station, Concord, California.
- " (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume I: Remedial Action Alternatives.
- " Final Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume II: Biological Assessment.
- " Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume III: Figures.
- " Proposed Remedial Action Plan for the Release, and the Threatened Release, of Hazardous Substances on Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, California.

By the same public notice, the Naval Weapons Station, Concord, gave notice that the Navy had completed a draft administrative record of the response to the release, and the threatened release, of hazardous substances on Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord. The Naval Weapons Station, Concord, solicited oral and written comments and information necessary to evaluate the Proposed

Remedial Action Plan for the Release, and the Threatened Release, of Hazardous Substances, on Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, California, and the findings and conclusions which the Navy proposed to make concerning cleanup standards, decision rules, and remedial action alternatives for the release, and the threatened release, of hazardous substances on Parcel 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord. The Naval Weapons Station, Concord, also solicited any information necessary to complete the administrative record of the response to the release, and the threatened release, of hazardous substances on Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord. In response, comments and information were submitted by Federal, State, and local agencies, and responsible parties.

The Responses to Comments (which the Naval Weapons Station, Concord, is issuing today) contains the Navy's responses to the comments and information which interested parties submitted in response to the public notices which the Navy issued on 8 August 1985, 7 March 1986, and 16 September 1988.

In addition, the Naval Weapons Station, Concord, hereby gives notice that it has completed an administrative record of the response to the release, and the threatened release, of hazardous substances on Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord. The administrative record may be reviewed at the Central Contra Costa County Public Library, 1750 Oak Park Boulevard, Pleasant Hill, California, at 415/646-6434.

Section 4.0 of the Final Report of the Remedial Investigation of Contaminant Mobility at Naval Weapons Station, Concord, California (which the Western Division, Naval Facilities Engineering Command, issued on 14 February 1986), addressed the public health and environmental concerns resulting from the release, and/or the threatened release, of hazardous substances on Parcels 571, 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord. Section 5.0 of the Final Remedial Investigation Report generally defined the areas on Parcels 571, 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, which require remedial action. The (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume I: Remedial Action Alternatives, and Volume III, Figures, more precisely defined the areas on Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, which require remedial action.

Sections 6.0 and 7.0 of the (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume I: Remedial

Action Alternatives, presented a detailed description and a detailed evaluation, respectively, of the remedial action alternatives for the release, and/or the threatened release, of hazardous substances on these parcels on the Naval Weapons Station, Concord. Section 8.0 of the (second revised) final draft feasibility study report ranked the remedial action alternatives described and evaluated in Sections 6.0 and 7.0, respectively. The (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume I: Remedial Action Alternatives, and the Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume III: Figures, did not require significant revision. These reports will serve as final reports. The Navy published errata to the (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume I: Remedial Action Alternatives, and the Final Draft Report of Feasibility Study of Contamination at Naval Weapons Station, Concord, California, Volume III: Figures, in the Responses to Comments.

The Final Remedial Action Plan for the Release, and the Threatened Release, of Hazardous Substances on Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, California, which is attached to the Record of Decision of Selection of Final Remedial Action Plan for the Release, and the Threatened Release, of Hazardous Substances on Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, California, describes and presents a brief analysis of the remedial action alternatives which the Naval Weapons Station, Concord, selected for these parcels. In addition, the final remedial action plan presents the findings and conclusions which the Navy made concerning cleanup standards and decision rules for the release, and the threatened release, of hazardous substances on these parcels under Sections 104, 120, and 121 of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended.

The biological opinion (which the U.S. Fish and Wildlife Service, Endangered Species Office, completed on 23 August 1988) concluded that the implementation of the preferred remedial action alternatives which the Naval Weapons Station, Concord, selected will not jeopardize the continued existence of endangered species on Parcel 572 on the Naval Weapons Station, Concord.

LOCATION OF HAZARDOUS SUBSTANCE CONTAMINATION: The Naval Weapons Station, Concord, California, is the major ammunition transshipment port on the west coast for the Department of the Navy. It is located approximately thirty (30) miles northeast of San Francisco on Suisun Bay. (Exhibit A, which is attached hereto, depicts the location of the Naval Weapons Station,

Concord.) The Naval Weapons Station, Concord, encompasses approximately 12,900 acres, including both inland areas and tidal marsh. Suisun Bay is a transition zone between saltwater and freshwater ecosystems, containing a diverse population of fish, benthic organisms, and zooplankton. The lower wetland portions of the tidal area are characterized by vegetation which tolerates frequent inundation by brackish water. The dryer upland portion of the tidal area and all of the inland area are grasslands. The areas of the Naval Weapons Station, Concord, contaminated with hazardous substances include portions of seven parcels of land: Parcels 572, 573, 574, 575, 576, 579D, and 581. These parcels encompass approximately 200 acres and include both wetland and upland portions of the tidal plain adjacent to Suisun Bay. (Exhibit B, which is attached hereto, depicts the location of Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord.)

AUTHORITY TO RESPOND TO THE RELEASE, OR THE THREATENED RELEASE, OF HAZARDOUS SUBSTANCES: On non-Federal facilities, the U.S. Environmental Protection Agency has the responsibility to respond to the release, or the threatened release, of hazardous substances. 42 U.S.C. 9604 and 9606; Executive Order 12,580, 52 Fed. Reg. 2923. However, the Department of Defense has the responsibility to respond to the release, or the threatened release, of hazardous substances on Department of Defense facilities. 42 U.S.C. 9604, 9620, and 9621; Executive Order 12,580. The Department of Defense has delegated the responsibility to respond to the release, or the threatened release, of hazardous substances on Navy facilities to the Navy.

The Navy responds to the release, or threatened release, of hazardous substances on its facilities through its Installation Restoration Program.

HAZARDOUS SUBSTANCES RELEASED, OR THREATENED TO BE RELEASED: Arsenic, Cadmium, Copper, Lead, Selenium, and Zinc have been released, and threaten to be released, on portions of Parcels 572, 573, 574, 575, 576, 579D, and 581 of the Naval Weapons Station Concord.

PARTIES NOTIFIED:

Federal agencies:

- " U.S. Environmental Protection Agency, Headquarters,  
Washington, D.C.
- " U.S. Environmental Protection Agency, Region IX, San  
Francisco, CA
- " U.S. Department of the Interior, Washington, D.C.
- " U.S. Department of the Interior, Pacific Southwest  
Region, San Francisco, CA

- " U.S. Fish and Wildlife Service, Endangered Species office,  
Sacramento, CA
- " U.S. Fish and Wildlife Service, Ecological Services  
Office, Sacramento, CA
- " U.S. Fish and Wildlife Service, San Francisco Bay National  
Wildlife Refuge, Newark, CA
- " U.S. National oceanic and Atmospheric Administration,  
Terminal Island, CA
- " U.S. National Oceanic and Atmospheric Administration,  
Superfund Program Coordinator, Rockville, MD
- " U.S. Army Corps of Engineers, Office of the Chief of  
Engineers, Washington, D.C.
- " U.S. Army Corps of Engineers, San Francisco District, San  
Francisco, CA
- " U.S. Coast Guard, 12th District, Alameda, CA

State agencies:

- " California Health and Welfare Agency, Sacramento, CA
- " California Department of Health Services, Toxic  
Substances Control Division, Sacramento, CA
- " California Department of Health Services, Toxic Substances  
Control Division (North Coast), Berkeley, CA
- " California Water Resources Control Board, Sacramento, CA
- " California Regional Water Quality Control Board, San  
Francisco Bay Region, Oakland, CA
- " California Waste Management Board, Sacramento, CA
- " California Department of Fish and Game, Sacramento, CA
- " California Department of Fish and Game, Region 3,  
Yountville, CA
- " California Coastal Commission, San Francisco, CA
- " California Land Commission, Sacramento, CA
- " California Air Resources Board, Sacramento, CA
- " San Francisco Bay Conservation and Development Commission,  
San Francisco, CA


Local agencies:

- " Contra Costa County Community Development Department
- " Contra Costa County Mosquito Abatement District
- " Contra Costa County Health Services Department
- " Central Contra Costa County Sanitary District
- " Bay Area Air Quality Management District

Potentially responsible parties:

- " Allied Corporation
- " Allied-Signal Corporation
- " Chemical & Pigment Company
- " ESI Chemicals, Inc.

" Getty Oil Company  
" Texaco, Inc.  
" Atchison, Topeka, and Santa Fe Railway Company  
" Santa Fe Industries, Inc.  
" Santa Fe Land Improvement Company  
" Santa Fe Southern Pacific Foundation  
" Southern Pacific Transportation Company  
" Joe Sobotka and Wilda Sobotka  
" O.E. Cooper, James Cooper, and Elizabeth Cooper  
" Everett Harris  
" Earth Sciences, Inc.  
" Sacramento Northern Railroad

  
CAPTAIN LONNIE F. CAGLE  
Commander  
Naval Weapons Station  
Concord, California



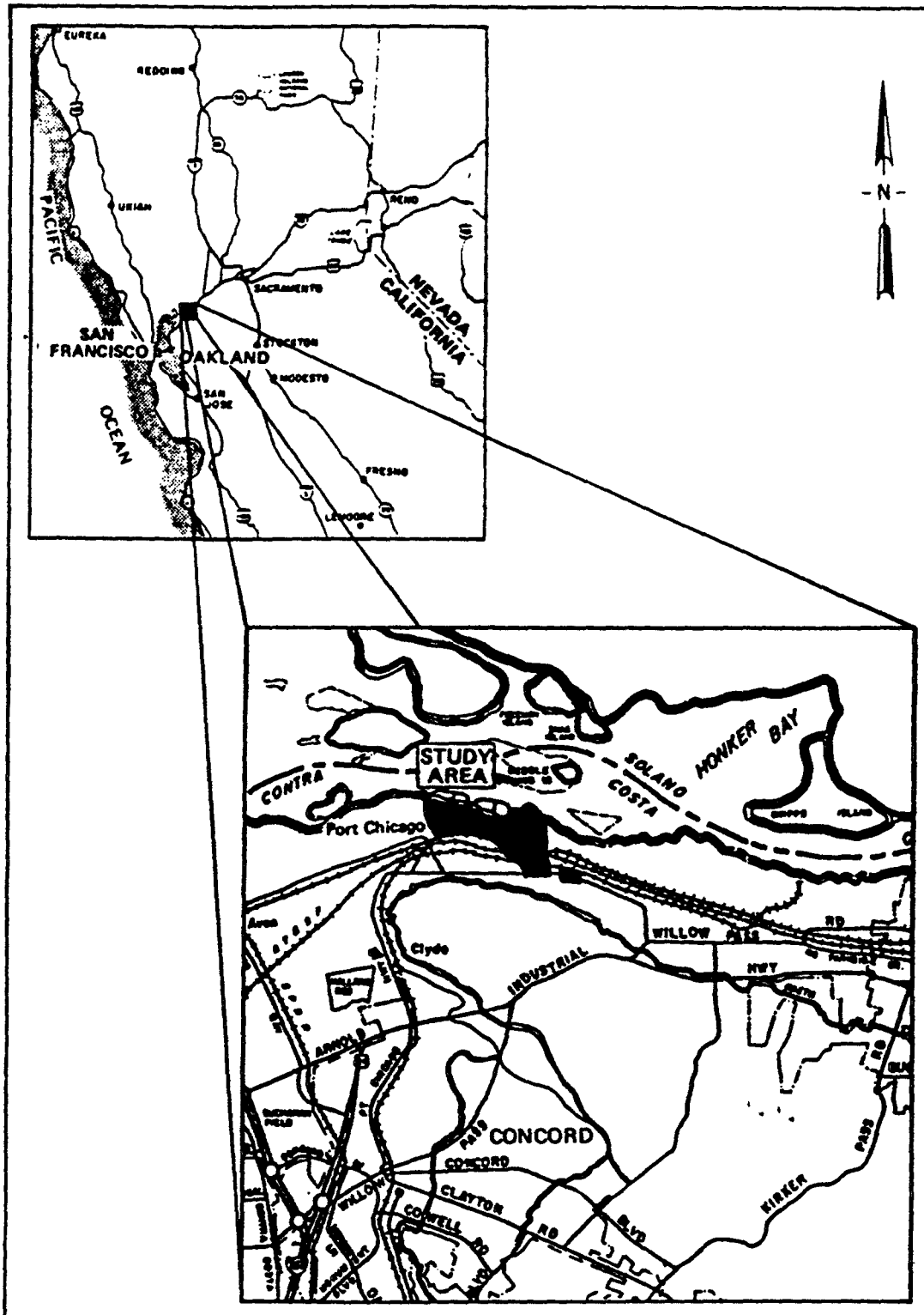


EXHIBIT A

3 SACAVENTO NORTHERN RAILROAD WAS FORMERLY  
OAKLAND, ANTICUM & EASTERN RAILWAY  
CUMECUI TOMERA & SANTA FE RAILROAD WAS FORMERLY  
SAN FRANCISCO & SAN JOAQUIN VALLEY RAILWAY COMPANY  
3 SOUTHERN PISCAC RAILROAD WAS FORMERLY  
SAN PABLO TULANE RAILWAY

NOT UNDER ANY JURISDICTION  
U.S.A. OR OVERSEAS

NOTE THE RECORDING DATA LISTED ABOVE REFERS TO THE OFFICIAL RECORDS OF THE RECORDS OFFICE OF THE COUNTY OF CONTRA COSTA. THE BOOK MAY BE THE BOOK OF DEEDS OR THE OFFICIAL RECORDS DEPENDENT ON THE DATE OF RECORDING.

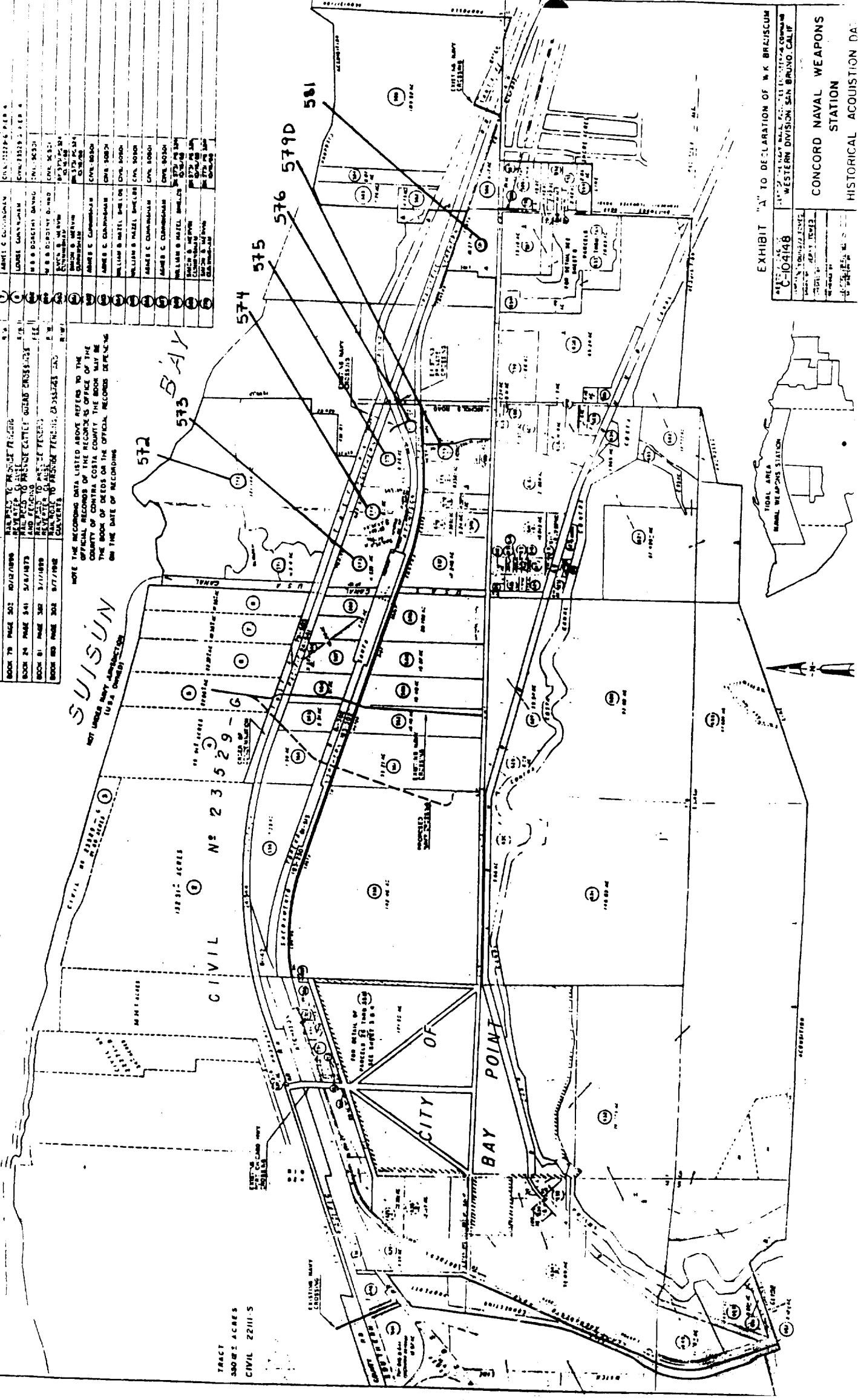
[illegible]

EXHIBIT "A" TO DECLARATION OF W.K. BRZJESKUM	C-0948	DECLASSIFIED BY 60370 DATE 11-17-2011	CLASSIFIED BY 60370 DATE 11-17-2011
WESTERN DIVISION SAN BRUNO, CALIF.		CONCORD NAVAL WEAPONS STATION	
HISTORICAL ACQUISITION DATA			

**EXHIBIT B**



## DEPARTMENT OF THE NAVY

NAVAL WEAPONS STATION  
CONCORD, CALIFORNIA 94520-5000

IN REPLY REFER TO:

6 April 1989

Final Remedial Action Plan for the Release, and the  
Threatened Release, of Hazardous Substances on Parcels  
572, 573, 574, 575, 576, 579D, and 581 on the Naval  
Weapons Station, Concord, California

### 1. General.

The Naval Weapons Station, Concord, California, is the major ammunition transshipment port on the west coast for the Department of the Navy. The station is located in the north-central portion of Contra Costa County in the San Francisco Bay Area of California. The station is approximately thirty (30) miles northeast of the City of San Francisco; it is bounded on the north by Suisun Bay and on the south and west by the City of Concord.

The Naval Weapons Station, Concord, encompasses approximately 12,900 acres of land which consists of three areas of land: the Tidal Area; the Inland Area, which is linked to the Tidal Area by a narrow Navy-owned rail and road corridor, near the city of Concord; and a radiography facility located in Pittsburg, California.

On 14 February 1986, the Western Division, Naval Facilities Engineering Command (WESTDIV), completed the Final Report of Remedial Investigation of Contaminant Mobility at the Naval Weapons Station, Concord, California, which concluded that portions of Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, California, and portions of off-site rights of way which transect such parcels are contaminated with hazardous substances, including arsenic, cadmium, copper, lead, selenium, and zinc. Figures 5-1, 5-2, and 5-3 of the Final Remedial Investigation Report depicted the contaminated portions of such parcels on the Naval Weapons Station, Concord, and the off-site rights of way. On 16 September 1988, WESTDIV completed the Final Report of Remedial Investigation of Contaminant Mobility at Naval Weapons Station, Concord, California, Subtitle Appendix 2.5- 1986/87 Data.

WESTDIV completed a (Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, on 7 March 1986, which screened, developed, and analyzed alternative remedial actions for contaminated portions of these parcels. WESTDIV completed a (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, on 16 September 1988, which screened, developed, and analyzed alternative remedial actions for the contaminated portions of these parcels. The (Second Revised) Final Draft Feasibility Study Report divided the contaminated portions of Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, and the rights of way and areas surrounding the contaminated properties into four (4) remedial action subsites (RASS's) to analyze alternative remedial actions. The (Second Revised) Final Draft Feasibility Study Report ranked alternative remedial actions for each RASS. Figure 2 of the Final Draft Report of Feasibility Study of Contamination Remediation at the Naval Weapons Station, Concord, California, Volume III: Figures, depicts RASS 1, RASS 2, RASS 3, and RASS 4.

On 16 September 1988, WESTDIV completed a Final Report of Suitability of Sites for Hazardous Waste Disposal, Concord Naval Weapons Station, Concord, California; a (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume I: Remedial Action Alternatives; a Final Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume II: Biological Assessment; and a Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume III: Figures.

In addition, on 16 September 1988, the Naval Weapons Station, Concord, California, completed a Proposed Remedial Action Plan for the Release, and the Threatened Release, of Hazardous Substances on Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord, California.

On 6 April 1989, the Navy completed the Responses to Comments submitted by interested parties in response to the proposed remedial action plan and the draft reports on which the Navy solicited comments and other information.

On 6 April 1989, the Navy determined that the (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume I: Remedial Action Alternatives, and the Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume III: Figures, did not require revision and, thus, determined that these final draft reports will also serve as final reports. The Navy

published errata to the (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume I: Remedial Action Alternatives, and the Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, Volume III: Figures, in the Responses to Comments.

This final remedial action plan presents the findings and conclusions the Navy is making concerning cleanup standards and decision rules for the release, and the threatened release, of hazardous substances on the contaminated portions of these parcels and the rights of way under Sections 104, 120, and 121 of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended (CERCLA); identifies the alternative remedial actions which the Navy analyzed; and describes and presents a brief analysis of the remedial action the Navy is selecting.

2. Conclusions Concerning Cleanup Standards for the Release, and the Threatened Release, of Hazardous Substances.

The Navy concludes that Section 121(b) of CERCLA requires that the Navy select a remedial action that is protective of human health and the environment; that is cost effective; and that utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. Section 121(b) of CERCLA also provides that remedial actions in which treatment which permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances is a principal element, are preferred over remedial actions which do not involve such treatment. Section 121(b) of CERCLA also provides that the off-site transport and disposal of hazardous substances without such treatment should be the least favored alternative remedial action where practicable treatment technologies are available. Section 121(a) of CERCLA requires that the Navy select a remedial action that is in accordance with Section 121 of CERCLA; that is, to the extent practicable, in accordance with the National Contingency Plan; and that provides for cost effective response. Section 121(d)(2) of CERCLA requires that the Navy select a remedial action which, at the completion of the remedial action, attains a level or standard of control (with respect to any hazardous substance that will remain onsite) which at least attains:

- " Any legally applicable, or relevant and appropriate standards, requirements, criteria, or limitations (under the circumstances of the release, or threatened release, of hazardous substances) under any Federal environmental law;
- " Any legally applicable or relevant and appropriate promulgated standards, requirements, criteria, or

limitations (under the circumstances of the release, or threatened release, of hazardous substances) under any State environmental or facility siting law, which is more stringent than any Federal standards, requirements, criteria, or limitations and which have been identified to the Navy by the State in a timely manner.

Section 121 (d) (4) of CERCLA, however, provides that the Navy may select a remedial action which does not attain a level or standard of control at least equivalent to any legally applicable or relevant and appropriate standards, requirements, criteria, or limitations as required by Section 121(d)(2) of CERCLA, if the Navy finds that one or more of the following conditions exists:

- " Remedial action selected is only part of a total remedial action that will attain such level or standard of control when completed;
- " Compliance with such standards, requirements, criteria, or limitations will result in greater risk to human health and the environment than alternative options;
- " Compliance with such standards, requirements, criteria, or limitations is technically impracticable from an engineering perspective;
- " The remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standards, requirements, criteria, or limitations in similar circumstances at other remedial actions within the State.
- " With respect to a state standard, requirement, criteria, or limitation, the state has not consistently applied (or demonstrated the intention to consistently apply) the standard, requirement, criteria, or limitation in similar circumstances at other remedial actions within the state.

In its Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements, the Environmental Protection Agency identified three (3) types of applicable or relevant and appropriate standards, requirements, criteria, or limitations:

- " Locational requirements, which set restrictions on activities or limits on contaminant levels depending on the characteristics of a site or its immediate environs.

- " Ambient or chemical-specific requirements, which set health or risk based concentration limits in various environmental media for specific hazardous substances, pollutants, or contaminants.
- " Performance, design, or other action-specific requirements, which set controls or restrictions on particular kinds of activities related to management of hazardous substances, pollutants, or contaminants.

The Navy concludes that the applicable or relevant and appropriate requirements for RASS 1, 2, 3, and 4 are:

a. Applicable or Relevant and Appropriate Requirements for RASS 1.

The Federal ARAR'S for RASS 1 include locational requirements; ambient or chemical-specific requirements; and performance, design, or other action-specific requirements. The Federal locational requirements include:

- " Section 7 of the Endangered Species Act.
- " Section 9 of the Endangered Species Act.
- " Section 404 of the Clean Water Act.
- " Executive order 11,990.
- " Executive order 11,998.

The Federal ambient or chemical-specific requirements include:

- " Section 402 of the Clean Water Act.
- " Resource Conservation and Recovery Act.
- " Safe Drinking Water Act.

The Federal performance, design, or other action-specific requirements include:

- " Section 7 of the Endangered Species Act.
- " Section 9 of the Endangered Species Act.
- " Section 404 of the Clean Water Act.
- " Resource Conservation and Recovery Act.
- " Executive Order 11,990.
- " Executive Order 11,998.

The State ARAR'S for RASS 1 include locational requirements; ambient or chemical-specific requirements; and performance, design, or other action-specific requirements. The state locational requirements include:

- " Sections 13261(b) and 13376 of the California Water Code.
- " Sections 5650(f) and 2080 of the California Fish and Game Code.

The state ambient or chemical-specific requirements include:

- " Section 13376 of the California Water Code.
- " Section 5650(f) of the California Fish and Game Code.
- " Section 25154 of the California Health and Safety Code.

The state performance, design, or other action-specific requirements include:

- " Section 13376 of the California Water Code.
- " Section 2080 of the California Fish and Game Code.
- " Section 66632 of the California Public Resources Code.

Section 7.3.1 of the (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, analyzes the ARAR's for RASS 1. Table 7.14 of the same report summarizes the analysis of ARAR'S for RASS 1.

b. Applicable or Relevant and Appropriate Requirements for RASS 2.

The Federal ARAR's for RASS 2 include locational requirements; ambient or chemical-specific requirements; and performance, design, or other action-specific requirements. The Federal vocational requirements include:

- " Section 7 of the Endangered Species Act.
- " Section 9 of the Endangered Species Act.
- " Section 404 of the Clean Water Act.
- " Executive Order 11,990.
- " Executive Order 11,998.

The Federal ambient or chemical-specific requirements include:

- " Section 402 of the Clean Water Act.
- " Resource Conservation and Recovery Act.
- " Safe Drinking Water Act.

The Federal performance, design, or other action-specific requirements include:

- " Section 7 of the Endangered Species Act.
- " Section 9 of the Endangered Species Act.
- " Section 404 of the Clean Water Act.
- " Resource Conservation and Recovery Act.
- " Executive Order 11,990.
- " Executive Order 11,998.



The State ARAR's for RASS 2 include locational requirements; ambient or chemical-specific requirements; and performance, design, or other action-specific requirements. The state locational requirements include:

- " Sections 13261(b) and 13376 of the California Water Code.
- " Sections 5650(f) and 2080 of the California Fish and Game Code.

The state ambient or chemical-specific requirements include:

- " Section 13376 of the California Water Code.
- " Section 5650(f) of the California Fish and Game Code.
- " Section 25154 of the California Health and Safety Code.

The state performance, design, or other action-specific requirements include:

- " Section 13376 of the California Water Code.
- " Section 2080 of the California Fish and Game Code.
- " Section 66632 of the California Public Resources Code.

Section 7.3.2 of the (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, analyzes the ARAR's for RASS 2. Table 7.16 of the same report summarizes the analysis of ARAR's for RASS 2.

c. Applicable or Relevant and Appropriate Requirements for RASS 3.

The Federal ARAR's for RASS 3 include locational requirements; ambient or chemical-specific requirements; and performance, design, or other action specific requirements. The Federal locational requirements include:

- " Section 404 of the Clean Water Act.
- " Executive Order 11,990.
- " Executive Order 11,998.

The Federal ambient or chemical-specific requirements include:

- " Section 402 of the Clean Water Act.
- " Resource Conservation and Recovery Act.
- " Safe Drinking Water Act.

The Federal performance, design, or other action-specific requirements include:

- " Section 404 of the Clean Water Act.
- " Resource Conservation and Recovery Act.
- " Executive Order 11,990.
- " Executive Order 11,998.

The state ARAR's for RASS 3 include locational requirements; ambient or chemical-specific requirements; and performance, design, or other action-specific requirements. The state locational requirements include:

- " Sections 13261(b) and 13376 of the California Water Code.
- " Sections 5650(f) and 2080 of the California Fish and Game Code.

The state ambient or chemical-specific requirements include:

- " Section 13376 of the California Water Code.
- " Section 5650(f) of the California Fish and Game Code.
- " Section 25154 of the California Health and Safety Code.

The state performance, design, or other action-specific requirements include:

- " Section 13376 of the California Water Code.
- " Section 2080 of the California Fish and Game Code.
- " Section 66632 of the California Public Resources Code.

Section 7.3.3 of the (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, analyzes the ARAR's for RASS 3. Table 7.18 of the same report summarizes the analysis of ARAR's for RASS 3.

d. Applicable or Relevant and Appropriate Requirements for RASS 4.

The Federal ARAR's for RASS 4 include locational requirements; ambient or chemical-specific requirements; and performance, design, or other action-specific requirements. The Federal locational requirements include:

- " Section 404 of the Clean Water Act.
- " Executive Order 11,990.
- " Executive Order 11,998.

The Federal ambient or chemical-specific requirements include:

- " Section 402 of the Clean Water Act.
- " Resource Conservation and Recovery Act.
- " Safe Drinking Water Act.

The Federal performance, design, or other action-specific requirements include:

- " Section 404 of the Clean Water Act.
- " Resource conservation and Recovery Act.
- " Executive Order 11,990.
- " Executive Order 11,998.

The state ARAR's for RASS 4 include locational requirements; ambient or chemical-specific requirements; and performance, design, or other action specific requirements. The state locational requirements include:

- " Sections 13261(b) and 13376 of the California Water Code.
- " Sections 5650(f) and 2080 of the California Fish and Game Code.

The state ambient or chemical-specific requirements include:

- " Section 13376 of the California Water Code.
- " Section 5650(f) of the California Fish and Game Code.
- " Section 25154 of the California Health and Safety Code.

The state performance, design, or other action-specific requirements include:

- " Section 13376 of the California Water Code.
- " Section 2080 of the California Fish and Game Code.
- " Section 66632 of the California Public Resources Code.

Section 7.3.4 of the (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at Naval Weapons Station, Concord, California, analyzes the ARAR's for RASS 4. Table 7.20 of the same report summarizes the analysis of ARAR's for RASS 4.

3. Conclusions concerning Decision Rules for Cleanup of the Release, and the Threatened Release, of Hazardous Substances.

To attain the level or standard of control appropriate, for the conditions on RASS 1, 2, 3, and 4, decision rules, which

specify the criteria for the cleanup required, were developed for RASS 1, 2, 3, and 4. The Navy concludes that the decision rules for RASS 1, 2, 3, and 4 are<sup>1</sup>:

a. Decision Rules for RASS 1.

Full compliance with the ARAR's for RASS 1 will result in greater risk to the environment than alternative options. Because of that environmental risk, the remedial action need not attain a level or standard of control at least equivalent to the ARAR's for RASS 1 (to the extent that compliance with the ARAR's for RASS 1 will result in greater risk to the environment than alternative options).

The decision rules, which specify the criteria for cleanup required, for RASS 1<sup>2</sup> are:

- " Active remediation of those areas in which the soil metal content exceeds the TTLC/STLC criterion, modified as follows:
- " Reduce the area of active remediation, accounting for topography and the presence of wetlands and

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<sup>1</sup>As stated in Item 1 above, the Final Report of the Remedial Investigation of Contaminant Mobility at the Naval Weapons Station, Concord, California, concluded that portions of Parcels 572, 573, 574, 575, 576, 579D, and 581 on the station depicted in Figures 5-1, 5-2, and 5-3 of the report are contaminated. As a result of its analysis of the applicable or relevant and appropriate requirements for RASS 1, 2, 3, and 4, the Navy determined that Section 25154 of the California Health and Safety Code and the regulations promulgated under it, Section 66699 of the California Administrative Code, are ARAR's. Section 66699 of the California Administrative Code provides that soils which contain total threshold limit concentrations (SLTC) of arsenic, cadmium, copper, lead, selenium, or zinc which exceed the values stated therein are hazardous wastes.

The Navy developed decision rules based on these ARAR's, as well as other ARAR's. Application of the decision rules required remediation in some areas which the Final Remedial Investigation Report had not concluded were contaminated. These were areas where the TTLC/STLC criterion was exceeded or barren areas existed.

<sup>2</sup> The decision rules for RASS 1 do not attain a level or standard of control at least equivalent to the ARAR's for RASS 1 to the extent that compliance with the ARAR's would result in greater risk to the environment than alternative options.

endangered species, to the area in the easterly most portion of the RASS.

- " Increase the area of active remediation to include those barren areas not contained within the boundaries of the TTLC/STLC criterion. Limited monitoring in areas actively remediated.
- " Passive remediation, extensive monitoring, with the potential for future active remediation, in areas of contamination not actively remediated.
- " Monitoring, less intensively than in the passive remediation zone, in the remainder of the RASS.

Implementation of these criteria for cleanup in RASS 1 will result in actively remediating approximately 9.03 acres, passively remediating approximately 23.01 acres, and monitoring approximately 177.74 acres.

b. Decision Rules for RASS 2.

Full compliance with the ARAR's for RASS 2 will result in greater risk to the environment than alternative options. Because of that environmental risk, the remedial action need not attain a level or standard of control at least equivalent to the ARAR's for RASS 2 (to the extent that compliance with the ARAR's for RASS 2 will result in greater risk to the environment than alternative options).

The decision rules, which specify the criteria for the cleanup required, for RASS 2<sup>3</sup> are:

- " Active remediation of those areas in which the soil metal content exceeds the TTLC/STLC criterion. Increase the area of active remediation to include those barren areas not contained within the boundaries of the TTLC/STLC criterion. Limited monitoring in areas actively remediated.
- " Passive remediation, extensive monitoring with the potential for future active remediation, in areas of contamination not actively remediated.
- " Monitoring, less-intensively than in the passive remediation zone, in the remainder of the RASS.

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<sup>3</sup> The decision rules for RASS 2 do not attain a level or standard of control at least equivalent to the ARAR's for RASS 2 to the extent that compliance with the ARAR's would result in greater risk to the environment than alternative options.

Implementation of these criteria for cleanup in RASS 2 will result in actively remediating approximately 4.17 acres, passively remediating approximately 0.94 acres, and monitoring approximately 8.21 acres.

c. Decision Rules for RASS 3.

The decision rules, which specify the criteria for the cleanup required, for RASS 3 are:

- " Active remediation of those areas in which the soil metal content exceeds either the TTLC/STLC criterion or the statistically above reference area criterion. Limited monitoring in areas actively remediated.
- " Passive remediation, extensive monitoring with the potential for future active remediation, in areas of contamination not actively remediated.
- " Monitoring, less intensively than in the passive remediation zone, in the remainder of the RASS.

Implementation of these criteria for cleanup in RASS 3 will result in actively remediating approximately 4.68 acres, passively remediating approximately 1.05 acres, and monitoring approximately 65.48 acres.

d. Decision Rules for RASS 4.

The decision rules, which specify the criteria for cleanup required, for RASS 4 are:

- " Active remediation of those areas in which the soil metal content exceeds either the TTLC/STLC criterion or the low pH criterion. Limited monitoring in areas actively remediated.
- " Passive remediation, extensive monitoring with the potential for future active remediation, in areas of contamination not actively remediated.
- " Monitoring, less intensively than in the passive remediation zone, in the remainder of the RASS.

Implementation of these criteria for RASS 4 will result in actively remediating approximately 0.87 acres, passively remediating approximately 0.11 acres, and monitoring approximately 12.31 acres.

4. Findings and Conclusions Concerning Alternative Remedial Actions Subjected to Detailed Evaluation.

The Navy finds and concludes that the alternative remedial actions which were subjected to detailed evaluation are:

a. Alternative Remedial Actions for RASS 1.

The alternative remedial actions for RASS 1 which were subjected to a detailed evaluation included:

" Alternative 1-3A:

Excavation of contaminated soil from areas designated for active remediation, disposal of contaminated soil in an existing Class I landfill, and restoration of the excavated area; limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded; and monitoring in the areas not designated for active or passive remediation.

" Alternative 1-3C:

Excavation of contaminated soil from areas designated for active remediation, immobilization of contaminants in soil by addition of chemical reagents, disposal of immobilized contaminated soil in an existing Class III landfill, and restoration of the excavated area; limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded; and monitoring in the areas not designated for active or passive remediation.

" Alternative 1-3D:

Excavation of contaminated soil from areas designated for active remediation, immobilization of contaminants

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4, 5, 6, 7, 8 The monitoring included in Alternatives 1-3A, 1-3C, 1-3D, 1-3E, and 1-3F (in the areas designated for active and passive remediation and in the areas not designated for active or passive remediation) will include, but not be limited to, the installation of groundwater monitoring wells; sampling of the wells for four quarters; analysis of the groundwater samples; and evaluation of the groundwater analysis. Enclosure 1 sets forth the full monitoring plan for RASS 1, 2, 3, AND 4.

in soil by addition of chemical reagents, disposal of immobilized contaminated soil in a monofill constructed on the Naval Weapons Station, Concord, and restoration of the excavated area; limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded; and monitoring in the areas not designated for active or passive remediation.<sup>6</sup>

" Alternative 1-3E:

Excavation of contaminated soil from areas designated for active remediation, decontamination of contaminated soil by soil washing, disposal of decontaminated soil in an existing Class III landfill, disposal of residual sludges in an existing Class I landfill, and restoration of the excavated area; limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded; and monitoring in the areas not designated for active or passive remediation.<sup>7</sup>

" Alternative 1-3F:

Excavation of contaminated soil from areas designated for active remediation, decontamination of contaminated soil by soil washing, disposal of decontaminated soil in a Class III monofill constructed on the Naval Weapons Station, Concord, disposal of residual sludges in an existing Class I landfill, and restoration of the excavated area; limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded; and monitoring in the areas not designated for active or passive remediation.<sup>8</sup>

" Alternative 1-2: Environmental monitoring.

" Alternative 1-1: No action.

b. Alternative Remedial Actions for RASS 2.

The alternative remedial actions for RASS 2 which were subjected to a detailed evaluation included:



" Alternative 2-3A:

Excavation of contaminated soil from areas designated for active remediation, disposal of contaminated soil in an existing Class I landfill, and restoration of the excavated area; limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded; and monitoring in the areas not designated for active or passive remediation.<sup>9</sup>

" Alternative 2-3C:

Excavation of contaminated soil from areas designated for active remediation, immobilization of contaminants in soil by addition of chemical reagents, disposal of immobilized contaminated soil in an existing Class III landfill, and restoration of the excavated area; limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded; and monitoring in the areas not designated for active or passive remediation.<sup>10</sup>

" Alternative 2-3D:

Excavation of contaminated soil from areas designated for active remediation, immobilization of contaminants in soil by addition of chemical reagents, disposal of immobilized contaminated soil in a monofill constructed on the Naval Weapons Station, Concord, and restoration of the excavated area; limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are

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<sup>9, 10, 11, 12, 13</sup> The monitoring included in Alternatives 2-3A, 2-3C, 2-3D, 2-3E, and 2-3F (in the areas designated for active and passive remediation and in the areas not designated for active or passive remediation) will include, but not be limited to, the installation of groundwater monitoring wells; sampling of the wells for four quarters; analysis of the groundwater samples; and evaluation of the groundwater analysis. Enclosure 1 sets forth the monitoring plan for RASS 1, 2, 3, and 4.

exceeded; and monitoring in the areas not designated for active or passive remediation.<sup>11</sup>

" Alternative 2-3E:

Excavation of contaminated soil from areas designated for active remediation, decontamination of contaminated soil by soil washing, disposal of decontaminated soil in an existing Class III landfill, disposal of residual sludges in an existing Class I landfill, and restoration of the excavated area; limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded; and monitoring in the areas not designated for active or passive remediation.<sup>12</sup>

" Alternative 2-3F:

Excavation of contaminated soil from areas designated for active remediation, decontamination of contaminated soil by soil washing, disposal of decontaminated soil in a Class III monofill constructed on the Naval Weapons Station, Concord, disposal of residual sludges in an existing Class I landfill, and restoration of the excavated area; limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded; and monitoring in the areas not designated for active or passive remediation.<sup>13</sup>

" Alternative 2-2: Environmental monitoring.

" Alternative 2-1: No action.

c. Alternative Remedial Actions for RASS 3.

The alternative remedial actions for RASS 3 which were subjected to a detailed evaluation included:

" Alternative 3-3A:

Excavation of contaminated soil from areas designated for active remediation and disposal of contaminated soil in an existing Class I landfill; limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action

levels are exceeded; and monitoring in the areas not designated for active or passive remediation.<sup>14</sup>

" Alternative 3-3C:

Excavation of contaminated soil from areas designated for active remediation, immobilization of contaminants in soil by addition of chemical reagents, and disposal of immobilized contaminated soil in an existing Class III landfill; limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded; and monitoring in the areas not designated for active or passive remediation.<sup>15</sup>

" Alternative 3-3D:

Excavation of contaminated soil from areas designated for active remediation, immobilization of contaminants in soil by addition of chemical reagents, and disposal of immobilized contaminated soil in a monofill constructed on the Naval Weapons Station, Concord; limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded; and monitoring in the areas not designated for active or passive remediation.<sup>16</sup>

" Alternative 3-3E:

Excavation of contaminated soil from areas designated for active remediation, decontamination of contaminated soil by soil washing, disposal of decontaminated soil in an existing Class III landfill, and disposal of residual sludges in an existing Class I landfill; limited monitoring in areas designated for active remediation after remediation is conducted; extensive

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<sup>14, 15, 16, 17, 18</sup> The monitoring included in Alternatives 3-3A, 3-3C, 3-3D, 3-3E, and 3-3F (in the areas designated for active and passive remediation and in the areas not designated for active or passive remediation) will include, but not be limited to, the installation of groundwater monitoring wells; sampling of the wells for four quarters; analysis of the groundwater samples; and evaluation of the groundwater analysis. Enclosure 1 sets forth the monitoring plan for RASS 1, 2, 3, and 4.

monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded; and monitoring in the areas not designated for active or passive remediation.<sup>17</sup>

" Alternative 3-3F:

Excavation of contaminated soil from areas designated for active remediation, decontamination of contaminated soil by soil washing, disposal of decontaminated soil in a Class III monofill constructed on the Naval Weapons Station, Concord, and disposal of residual sludges in an existing Class I landfill; limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded; and monitoring in the areas not designated for active, or passive remediation.<sup>18</sup>

" Alternative 3-2: Environmental monitoring.

" Alternative 3-1: No action.

d. Alternative Remedial Actions for RASS 4.

The alternative remedial actions for RASS 4 which were subjected to a detailed evaluation included:

" Alternative 4-3A:

Excavation of soil (exceeding TTLC/STLC criterion) and liming of low pH soil (less than pH of 5.0) on areas designated for active remediation and disposal of excavated soil in an existing class I landfill; limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded; and monitoring in the areas not designated for active or passive remediation.<sup>19</sup>

" Alternative 4-3C:

Excavation of soil (exceeding TTLC/STLC criterion) and liming of low pH soil (less than pH of 5.0) on areas designated for active remediation, immobilization of contaminants in excavated soil by addition of chemical reagents, and disposal of immobilized contaminated soil in an existing class III landfill; limited monitoring

in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded; and monitoring in the areas not designated for active or passive remediation.<sup>20</sup>

" Alternative 4-4A:

Placement of soil cover over soil (exceeding TTLC/STLC criterion) and liming of low pH soil (less than pH 5.0); limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded; and monitoring in the areas not designated for active or passive remediation.<sup>21</sup>

" Alternative 4-3D:

Excavation of soil (exceeding TTLC/STLC criterion) and liming of low pH soil (less than pH of 5.0) on areas designated for active remediation, immobilization of contaminants in excavated soil by addition of chemical reagents, and disposal of immobilized contaminated soil in a monofill constructed on the Naval Weapons Station, Concord; limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded; and monitoring in the areas not designated for active or passive remediation.<sup>22</sup>

" Alternative 4-3E:

Excavation of soil (exceeding TTLC/STLC criterion) and liming of low pH soil (less than pH of 5.0) on areas designated for active remediation, decontamination of

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<sup>19, 20, 21, 22, 23, 24</sup> The monitoring included in Alternatives 4-3A, 4-3C, 4-4A, 4-3D, 4-3E, and 4-3F (in the areas designated for active and passive remediation and in the areas not designated for active or passive remediation) will include, but not be limited to, the installation of groundwater monitoring wells; sampling of the wells for four quarters; analysis of the groundwater samples; and evaluation of the groundwater analysis. Enclosure 1 sets forth the monitoring plan for RASS 1, 2, 3, and 4.

excavated soil by soil washing, disposal of decontaminated soil in an existing Class III landfill, and disposal of residual sludges in an existing Class I landfill; limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation if action levels are exceeded; and monitoring in the areas not designated for active or passive remediation .<sup>23</sup>

" Alternative 4-3F:

Excavation of soil (exceeding TTLC/STLC criterion) and liming of low pH soil (less than pH of 5.0) on areas designated for active remediation, decontamination of excavated soil by soil washing, disposal of decontaminated soil in a Class III monofill constructed on the Naval Weapons Station, Concord, and disposal of residual sludges in an existing Class I landfill; limited monitoring in areas designated for active remediation after remediation is conducted; extensive monitoring with the potential for future active remediation in areas designated for passive remediation action levels are exceeded; and monitoring in the areas not designated for active or passive remediation.<sup>24</sup>

" Alternative 4-2: Environmental monitoring.

" Alternative 4-1: No action.

5. Findings and Conclusions Concerning Preferred Alternatives.

a. Preferred Alternatives for RASS 1.

In its proposed remedial action plan, the Navy stated that the preferred alternative remedial action for RASS 1 was Alternative 1-3C. Alternative 1-3C involves the excavation of contaminated soil from the area in RASS 1 designated for active remediation, classification of the contaminated soil, immobilization of contaminants in the excavated soil by addition of chemical reagents, transportation of treated soil to an existing Class III landfill, disposal of contaminated soil in an existing Class III landfill, restoration of the excavated area, and operation and maintenance, including monitoring, of the excavated area. The area designated for active remediation in RASS 1 is depicted in the (Second Revised) Final Draft Report of the Feasibility Study of Contamination Remediation, Volume III: Figures, at Figures 23 and 24. Alternative 1-3C also involves extensive monitoring with the potential for future, active remediation in areas designated for passive remediation if action levels are exceeded. The area designated for passive remediation

in RASS 1 is depicted in the (Second Revised) Final Draft Report of Contamination Remediation, Volume III: Figures, at Figures 23, 24, and 25. Alternative 1-3C involves, in addition, monitoring in the areas in RASS 1 not, designated for active or passive remediation. The monitoring in the areas designated for active and passive remediation and in the areas not designated for active or passive remediation would include, but not be limited to, the installation of groundwater monitoring wells; sampling of the wells for four quarters; analysis of the groundwater samples; and evaluation of the groundwater analysis.

In its proposed remedial action plan, the Navy also stated that the second preferred alternative remedial action for RASS 1 was Alternative 1-3A. Alternative 1-3A involves the excavation of contaminated soil from the area in RASS 1 designated for active remediation,<sup>25</sup> classification of the contaminated soil, transportation of the contaminated soil to an existing Class I landfill, disposal of contaminated soil in an existing Class I landfill, restoration of the excavated area, and operation and maintenance, including monitoring,<sup>26</sup> of the excavated area. Alternative 1-3A also involves extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded. Alternative 1-3A involves, in addition, monitoring in the areas in RASS 1 not designated for active or passive remediation. The monitoring in the areas designated for active and passive remediation and in the areas not designated for active or passive remediation will include, but not be limited to, the installation of groundwater monitoring wells; sampling of the wells for four quarters; analysis of the groundwater samples; and evaluation of the groundwater analysis.

Although the first preferred alternative remedial action for RASS 1, Alternative 1-3C, would satisfy the general rule that remedial actions, in which treatment which permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances is a principal element, are preferred over remedial actions which do not involve such treatment, the Navy finds that Alternative 1-3C cannot be implemented because the contaminated soil from the area in RASS 1 designated for active remediation is not suitable for immobilization.

The implementation of Alternative 1-3C would require that contaminants in the excavated soil be immobilized by chemical stabilization/solidification before disposal of the soil

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<sup>25</sup>Enclosure 2 sets forth the criteria for excavating and removing soil from RASS 1,2,3, and 4.

<sup>26</sup>Enclosure 1 sets forth the monitoring plan for RASS 1,2,3, and 4.

in a class III landfill. Generally, the technology would include the addition, singly or in some combination, of Portland cement, lime and fly ash, and cement or lime kiln dust.

Recognizing uncertainties associated with the stabilization/solidification technology, the Navy conducted laboratory scale studies to determine the ability of various stabilization/solidification techniques to immobilize the contaminants. Samples of the contaminated soils were collected from RASS 1 and treated with various ratios of Portland cement, lime and fly ash, and cement kiln dust. The resulting specimens were tested using the State of California procedure known as the Waste Extraction Test (WET test). Values for both the Total Threshold Limit Concentration (TTLIC) and the Soluble Threshold Limit Concentration (STLC) were determined. Although the results of the tests showed that the contaminants were partially immobilized, concentrations of arsenic exceeded the STLC criterion. The results were attributed to the following factors: first, the initial concentrations of arsenic were extremely high; second, the State of California WET test, which uses a citric acid leachant, is much more aggressive than the standard Extraction Procedure Toxicity Test (EP) or the Toxicity Characteristic Leaching Procedure (TCLP) which are typically used by the Environmental Protection Agency to evaluate the toxicity of hazardous wastes.

Based on the laboratory tests, the Navy found and concluded that:

(1) Although stabilization/solidification with cement and pozzolanic materials significantly reduced contaminant mobility, stabilization/solidification failed to produce a product which would pass the WET test.

(2) The stabilized/solidified contaminated soils were Class I wastes.

(3) As Class I wastes, the treated contaminated soils would require disposal in a Class I landfill.

(4) Because the treated contaminated soils require disposal in a Class I landfill, the added cost of stabilization/solidification was not justified.

(5) Alternative 1-3C (and other alternatives, i.e., 1-3D involving stabilization/solidification) should be eliminated from further consideration based on technical considerations.

The Navy finds and concludes that Alternative 1-3A will be protective of human health and the environment; is cost effective; and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. The



Navy also finds and concludes that no alternative remedial actions which would permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances are practicable. The Navy also finds and concludes that no alternative remedial actions which do not use off-site transport and disposal of hazardous substances are practicable.

The Navy also finds and concludes that Alternative 1-3A will be in accordance with Section 121 of CERCLA and, to the extent practicable, with the National Contingency Plan. The Navy also finds and concludes that Alternative 1-3A will be cost effective.

The Navy also finds and concludes that Alternative 1-3A will attain the level or standard of control (with respect to any hazardous substance that will remain onsite) which at least attains the applicable or relevant and appropriate requirements for RASS 1 which are identified above, except to the extent that compliance with the ARAR's would result in greater risk to the environment than alternative options.

Thus, the Navy selects Alternative 1-3A as the final remedial action for RASS 1.

b. Preferred Alternatives for RASS 2.

In its proposed remedial action plan, the Navy stated that the preferred alternative remedial action for RASS 2 was Alternative 2-3C. Alternative 2-3C involves the excavation of contaminated soil from the area in RASS 2 designated for active remediation, classification of the contaminated soil, immobilization of contaminants in the excavated soil by addition of chemical reagents, transportation of treated soil to an existing Class III landfill, disposal of contaminated soil in an existing Class III landfill, restoration of the excavated area, and operation and maintenance, including monitoring, of the excavated area. The area designated for active remediation in RASS 2 is depicted in the (Second Revised) Final Draft Report of the Feasibility Study of Contamination Remediation, Volume III: Figures, at Figure 23. Alternative 2-3C also involves extensive monitoring, with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded. The area designated for passive remediation in RASS 2 is depicted in the (Second Revised) Final Draft Report of Contamination Remediation, Volume III: Figures at Figure 23. Alternative 2-3C involves, in addition, monitoring in the areas in RASS 2 not designated for active or passive remediation. The monitoring in areas designated for active and passive remediation and in the areas not designated for active or passive remediation would include, but not be limited to, the installation of groundwater monitoring wells; sampling of the wells for four

quarters; analysis of the groundwater samples; and evaluation of the groundwater analysis.

The second preferred alternative remedial action for RASS 2 was alternative 2-3A. Alternative 2-3A involves the excavation of contaminated soil from the area in RASS 2 designated for active remediation,<sup>27</sup> classification of the contaminated soil, transportation of the contaminated soil to an existing Class I landfill, disposal of contaminated soil in an existing Class I landfill, restoration of the excavated area, and operation and maintenance, including monitoring,<sup>28</sup> of the excavated area. Alternative 2-3A also involves extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded. Alternative 2-3A involves, in addition, monitoring in the areas in RASS 2 not designated for active or passive remediation. The monitoring in the areas designated for active and passive remediation and in the areas not designated for active or passive remediation will include, but not be limited to, the installation of groundwater monitoring wells; sampling of the wells for four quarters; analysis of the groundwater samples; and evaluation of the groundwater analysis.

Although the first preferred alternative remedial action for RASS 2, Alternative 2-3C, would satisfy the general rule that remedial actions, in which treatment which permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances is a principal element, are preferred over remedial actions which do not involve such treatment, the Navy finds that Alternative 2-3C cannot be implemented because the contaminated soil from the area in RASS 2 designated for active remediation is not suitable for immobilization.

The implementation of Alternative 2-3C would require that contaminants in the excavated soil be immobilized by chemical stabilization/solidification before disposal of the soil in a Class III landfill. Generally, the technology would include the addition, singly or in some combination, of Portland cement, lime and fly ash, and cement or lime kiln dust.

Recognizing uncertainties associated with the stabilization/solidification technology, the Navy conducted laboratory scale studies to determine the ability of various stabilization/solidification techniques to immobilize the contaminants. Samples of the contaminated soils were collected

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<sup>27</sup> Enclosure 2 sets forth the criteria for excavating and removing soil from RASS 1,2,3, and 4.

<sup>28</sup> Enclosure 1 sets forth the monitoring plan for RASS 1,2, 3, and 4.

from RASS 2 and treated with various ratios of Portland cement, lime and fly ash, and cement kiln dust. The resulting specimens were tested using the State of California procedure known as the Waste Extraction Test (WET test). Values for both the Total Threshold Limit Concentration (TTLC) and the Soluble Threshold Limit Concentration (STLC) were determined. Although the results of the tests showed that the contaminants were partially immobilized, concentrations of lead and zinc exceeded the TTLC/STLC criterion and cadmium and zinc exceeded the TTLC criterion. In some cases, the values exceeded the criterion by an order of magnitude. The results were attributed to the following factors: first, the initial concentrations of contaminants were extremely high; this was particularly true for lead and zinc; second, the State of California WET test, which uses a citric acid leachant, is much more aggressive than the standard Extraction Procedure Toxicity Test (EP) or the Toxicity Characteristic Leaching Procedure (TCLP) which are typically used by the Environmental Protection Agency to evaluate the toxicity of hazardous wastes.

Based on the laboratory tests, the Navy found and concluded that:

(1) Although stabilization/solidification with cement and pozzolanic materials significantly reduced contaminant mobility, stabilization/solidification failed to produce a product which would pass the WET test.

(2) The stabilized/solidified contaminated soils were Class I wastes.

(3) As Class I wastes, the treated contaminated soils would require disposal in a Class I landfill.

(4) Because the treated contaminated soils require disposal in a Class I landfill, the added cost of stabilization/solidification was not justified.

(5) Alternative 2-3C (and other alternatives, i.e., 2-3D involving stabilization/solidification) should be eliminated from further consideration based on technical considerations.

The Navy finds and concludes that Alternative 2-3A will be protective of human health and the environment; is cost effective; and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. The Navy also finds and concludes that no alternative remedial actions which would permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances are practicable. The Navy also finds and concludes that no

alternative remedial actions which do not use off-site transport and disposal of hazardous substances are practicable.

The Navy also finds and concludes that Alternative 2-3A will be in accordance with Section 121 of CERCLA and, to the extent practicable, with the National Contingency Plan. The Navy also finds and concludes that Alternative 2-3A will be cost effective.

The Navy also finds and concludes that Alternative 2-3A will attain the level or standard of control (with respect to any hazardous substance that will remain onsite) which at least attains the applicable or relevant and appropriate requirements for RASS 2 which are identified above, except to the extent that compliance with the ARAR's would result in greater risk to the environment than alternative options.

Thus, the Navy selects Alternative 2-3A as the final remedial action for the portion of RASS 2 which is on Parcel 572 on the Naval Weapons Station, Concord. The Navy determines that Alternative 2-3A must be undertaken as final remedial action on the portions of RASS 2 which are on the off-site right of way adjacent to Parcel 572 on the Naval Weapon Station, Concord. Atchison, Topeka, and Santa Fe Railway Company owns and operates this right of way.

#### C. Preferred Alternatives for RASS 3.

In its proposed remedial action plan, the Navy stated that the preferred alternative remedial action for RASS 3 was Alternative 3-3C. Alternative 3-3C involves the excavation of contaminated soil from the area in RASS 3 designated for active remediation, classification of the contaminated soil, immobilization of contaminants in the excavated soil by addition of chemical reagents, transportation of treated soil to an existing Class III landfill, disposal of contaminated soil in an existing Class III landfill, and operation and maintenance, including monitoring, of the excavated area. The area designated for active remediation in RASS 3 is depicted in the (Second Revised) Final Draft Report of the Feasibility Study of Contamination Remediation, Volume III: Figures, at Figure 41. Alternative 3-3C also involves extensive monitoring, with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded. The area designated for passive remediation in RASS 3 is depicted in the (Second Revised) Final Draft Report of Contamination Remediation, Volume III: Figures, at Figure 41. Alternative 3-3C involves, in addition, monitoring in the areas in RASS 3 not designated for active or passive remediation. The monitoring in the areas designated for active and passive remediation and in the areas not designated for active or passive remediation would include, but not be limited to, the installation of groundwater monitoring

wells; sampling of the wells for four quarters; analysis of the groundwater samples; and evaluation of the groundwater analysis.

The second preferred alternative remedial action for RASS 3 was Alternative 3-3A. Alternative 3-3A involves the excavation of contaminated soil from the area in RASS 3 designated for active remediation,<sup>29</sup> classification of the contaminated soil, transportation of the contaminated soil to an existing Class I landfill, disposal of contaminated soil in an existing Class I landfill, and operation and maintenance, including monitoring,<sup>30</sup> of the excavated area. Alternative 3-3A also involves extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded. Alternative 3-3A involves, in addition, monitoring in the areas in RASS 3 not designated for active or passive remediation. The monitoring in the areas designated for active and passive remediation and in the areas not designated for active or passive remediation will include, but not be limited to, the installation of groundwater monitoring wells; sampling of the wells for four quarters; analysis of the groundwater samples; and evaluation of the groundwater analysis.

Although the first preferred alternative remedial action for RASS 3, Alternative 3-3C, would satisfy the general rule that remedial actions, in which treatment which permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances is a principle element, are preferred over the remedial actions which do not involve such treatment, the Navy finds that Alternative 3-3C cannot be implemented because the contaminated soil from the area in RASS 3 designated for active remediation is not suitable for immobilization.

The implementation of Alternative 3-3C would require that contaminants in the excavated soil be immobilized by chemical stabilization/solidification before disposal of the soil in a Class III landfill. Generally, the technology would include the addition, singly or in some combination, of Portland cement, lime and fly ash, and cement or lime kiln dust.

Recognizing uncertainties associated with the stabilization/solidification technology, the Navy conducted laboratory scale studies to determine the ability of various stabilization/solidification techniques to immobilize the contaminants. Samples of the contaminated soils were collected

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<sup>29</sup> Enclosure 2 sets forth the criteria for excavating and removing soil from Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord.

<sup>30</sup> Enclosure 1 sets forth the monitoring plan for RASS 1, 2, 3, and 4.

from RASS 3 and treated with various ratios of Portland cement, lime and fly ash, and cement kiln dust. The resulting specimens were tested using the State of California procedure known as the Waste Extraction Test (WET test). Values for both the Total Threshold Limit Concentration (TTLC) and the Soluble Threshold Limit Concentration (STLC) were determined. Although the results of the tests showed that the contaminants were partially immobilized, concentrations of copper, lead, and zinc exceeded the STLC criterion and lead and zinc exceeded the TTLC criterion. In some cases, the values exceeded the criterion by an order of magnitude. The results were attributed to the following factors: first, the initial, concentrations of contaminants were extremely high; this was particularly true for lead and zinc; second, the State of California WET test, which uses a citric acid leachant, is much more aggressive than the standard Extraction Procedure Toxicity Test (EP) or the Toxicity Characteristic Leaching Procedure (TCLP) which are typically used by the Environmental Protection Agency to evaluate the toxicity of hazardous wastes.

Based on the laboratory tests, the Navy found and concluded that:

(1) Although stabilization/solidification with cement and pozzolanic materials significantly reduced contaminant mobility, stabilization/solidification failed to produce a product which would pass the WET test.

(2) The stabilized/solidified contaminated soils were Class I wastes.

(3) As Class I wastes, the treated contaminated soils would require disposal in a Class I landfill.

(4) Because the treated contaminated soils require disposal in a Class I landfill, the added cost of stabilization/solidification was not justified.

(5) Alternative 3-3C (and other alternatives, i.e., 3-3D involving stabilization/solidification) should be eliminated from further consideration based on technical considerations.

The Navy finds and concludes that Alternative 3-3A will be protective of human health and the environment; is cost effective; and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. The Navy also finds and concludes that no alternative remedial actions which would permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances are practicable. The Navy also finds and concludes that no alternative remedial actions which do not use off-site transport and disposal of hazardous substances are practicable.

The Navy also finds and concludes that Alternative 3-3A will be in accordance with Section 121 of CERCLA and, to the extent practicable, with the National Contingency Plan. The Navy also finds and concludes that Alternative 3-3A will be cost effective.

The Navy also finds and concludes that Alternative 3-3A will attain the level or standard of control (with respect to any hazardous substance that will remain onsite) which at least attains the applicable or relevant and appropriate requirements for RASS 3 which are identified above.

Thus, the Navy selects Alternative 3-3A as the final remedial action for the portion of RASS 3 which is on Parcels 579D, 576, 575, 574, and 573 on the Naval Weapons Station, Concord. The Navy determines that Alternative 3-3A must be undertaken as final remedial action on the portions of RASS 3 which are on off-site rights of way adjacent to Parcels 579D, 576, 575, 574, and 573 on the Naval Weapon Station, Concord. Atchison, Topeka, and Santa Fe Railway Company; Southern Pacific Transportation Company; and Sacramento Northern Railroad Company own and operate these rights of way.

d. Preferred Alternatives for RASS 4.

In its proposed action plan, the Navy stated that the preferred alternative remedial action for RASS 4 was Alternative 4-3C. Alternative 4-3C involves the excavation of soil exceeding the TTLC/STLC criterion and liming of low pH soil (less than pH of 5.0) which is not excavated on the area in RASS 4 designated for active remediation, classification of the excavated soil, immobilization of contaminants in the excavated soil by addition of chemical reagents, transportation of treated soil to an existing Class III landfill, disposal of contaminated soil in an existing Class III landfill, and operation and maintenance, including monitoring, of the excavated area. The area designated for active remediation in RASS 4 is depicted in the (Second Revised) Final Draft Report of the Feasibility Study of Contamination Remediation, Volume III: Figures, at Figure 51. Alternative 4-3C also involves extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded. The area designated for passive remediation in RASS 4 is depicted in the (Second Revised) Final Draft Report of Contamination Remediation, Volume III: Figures, at Figure 51. Alternative 4-3C involves, in addition, monitoring in the areas in RASS 4 not designated for active or passive remediation. The monitoring in the areas designated for active and passive remediation and in the areas not designated for active or passive remediation would include, but not be limited to, the installation of groundwater monitoring wells; sampling of the wells for four quarters; analysis of the groundwater samples; and evaluation of the groundwater analysis.

The second preferred alternative remedial action for RASS 4 was Alternative 4-3A. Alternative 4-3A involves the excavation of soil exceeding the TTLC/STLC criterion and liming of low pH soil (less than pH of 5.0) on the area in RASS 4 designated for active remediation,<sup>31</sup> classification of the contaminated soil, transportation of the contaminated soil to an existing Class I landfill, disposal of contaminated soil in an existing Class I landfill, and operation and maintenance, including monitoring,<sup>32</sup> of the excavated area. Alternative 4-3A also involves extensive monitoring with the potential for future active remediation in areas designated for passive remediation if action levels are exceeded. Alternative 4-3A involves, in addition, monitoring in the areas in RASS 4 not designated for active or passive remediation. The monitoring in the areas designated for active and passive remediation would include, but not be limited to, the installation of groundwater monitoring wells; sampling of the wells for four quarters; analysis of the groundwater samples; and evaluation of the groundwater samples.

Although the first preferred alternative remedial action for RASS 4, Alternative 4-3C, would satisfy the general rule that remedial actions, in which treatment which permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances is a principal element, are preferred over remedial actions which do not involve such treatment, the Navy finds that Alternative 4-3C cannot be implemented because the contaminated soil from the area in RASS 4 designated for active remediation is not suitable for immobilization.

The implementation of Alternative 4-3C would require that contaminants in the excavated soil be immobilized by chemical stabilization/solidification before disposal of the soil in a Class III landfill. Generally, the technology would include the addition, singly or in some combination, of Portland cement, lime and fly ash, and cement or lime kiln dust.

Recognizing uncertainties associated with the stabilization/solidification technology, the Navy conducted laboratory scale studies to determine the ability of various stabilization/solidification techniques to immobilize the contaminants. Samples of the contaminated soils were collected from RASS 1, 2, and 3 and treated with various ratios of Portland cement, lime and fly ash, and cement kiln dust. Contaminated

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<sup>31</sup> Enclosure 2 sets forth the criteria for excavating and removing soil from Parcels 572, 573, 574, 575, 576, 579D, and 581 on the Naval Weapons Station, Concord.

<sup>32</sup> Enclosure 1 sets forth the monitoring for RASS 1, 2, 3, and 4.



soils collected from RASS 4 were sufficiently similar to contaminated soils from RASS 1, 2, and 3 that the soils from RASS 4 were not tested separately. The resulting specimens were tested using the State of California procedure known as the Waste Extraction Test (WET test). Values for both the Total Threshold Limit Concentration (TTLC) and the Soluble Threshold Limit Concentration (STLC) were determined. Although the results of the tests showed that the contaminants were partially immobilized, concentrations of arsenic and lead exceeded the STLC criterion. In some cases, the values exceeded the criterion by an order of magnitude. The results were attributed to the following factors: first, the initial concentrations of contaminants were extremely high; this was particularly true for arsenic, lead, and zinc; second, the State of California WET test, which uses a citric acid leachant, is much more aggressive than the standard Extraction Procedure Toxicity Test (EP) or the Toxicity Characteristic Leaching Procedure (TCLP) which are typically used by the Environmental Protection Agency to evaluate the toxicity of hazardous wastes.

Based on the laboratory tests, the Navy found and concluded that:

(1) Although stabilization/solidification with cement and pozzolanic materials significantly reduced contaminant mobility, stabilization/solidification failed to produce a product which would pass the WET test.

(2) The stabilized/solidified contaminated soils were Class I wastes.

(3) As class I wastes, the treated contaminated soils would require disposal in a Class I landfill.

(4) Because the treated contaminated soils require disposal in a Class I landfill the added cost of stabilization/solidification was not justified.

(5) Alternative 4-3C (and other alternatives, i.e., 4-3D involving stabilization/solidification) should be eliminated from further consideration based on technical considerations.

The Navy finds and concludes that Alternative 4-3A will be protective of human health and the environment; is cost effective; and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. The Navy also finds and concludes that no alternative remedial actions which would permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances are practicable. The Navy also finds and concludes that no alternative remedial actions which do not use off-site transport and disposal of hazardous substances are practicable.

The Navy also finds and concludes that Alternative 4-3A will be protective of human health and the environment; is cost effective; and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. The Navy also finds and concludes that no alternative remedial actions which would permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances are practicable. The Navy also finds and concludes that no alternative remedial actions which do not use off-site transport and disposal of hazardous substances are practicable.

The Navy also finds and concludes that Alternative 4-3A will be in accordance with Section 121 of CERCLA and, to the extent practicable, with the National Contingency Plan. The Navy also finds and concludes that Alternative 4-3A will be cost effective.

The Navy also finds and concludes that Alternative 4-3A will attain the level or standard of control (with respect to any hazardous substance that will remain onsite) which at least attains the applicable or relevant and appropriate requirements for RASS 4 which are identified above.

Thus, the Navy selects Alternative 4-3A as the final remedial action for RASS 4.

6. Analysis of Alternative Remedial Actions Subjected to Detailed Evaluation.

Each of the alternative remedial actions subjected to detailed evaluation was evaluated for technical feasibility, environmental considerations, institutional considerations, public health considerations, and cost. Section 7.0 of the (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at the Naval Weapons Station, Concord, California, evaluated these five criteria. Each of the alternative remedial actions subjected to detailed evaluation was also evaluated for compliance with ARAR's. Section 7.0 of the (Second Revised) Final Draft Report of Feasibility Study of Contamination Remediation at the Naval Weapons Station, Concord, California, evaluated this criterion. Neither the State of California Regional Water Quality Control Board, nor the State of California Department of Health Services, nor the State of California Department of Fish and Game objected to the proposed remedial action plan which the Navy issued on 16 September 1988. The Environmental Protection Agency did not object to the proposed remedial action plan which the Navy issued on 16 September 1988. The Fish and Wildlife Service concluded that the implementation of the proposed remedial action plan which the Navy issued on 16 September 1988 is not likely to jeopardize the

continued existence of the salt marsh harvest mouse or the California clapper rail.

## ENCLOSURE 2

### Conceptual Plan for Determining the Soil Which Must Be Excavated

1. Beginning at points of known contamination, i.e., locations where contaminant concentrations are equal to or greater than the criterion for excavating and removing soil, a grid of sampling locations will be established. A grid composed of sampling points twenty (20) feet on centers and radiating from the points of known high contaminant concentrations will be developed.
2. Sampling points in each grid will be established. Each sampling point will be sampled to a depth of three (3) feet. Distinct subsamples will be collected for each six (6) inch horizon. Based on a twenty (20) foot grid, each sampling point/sampling horizon would represent approximately ten (10) cubic yards of soil.
3. The 0-6-inch horizon will be analyzed for the contaminants of concern.
4. Grid squares in which contaminant concentrations are equal to or greater than the criterion will be excavated to a depth of six (6) inches.
5. The next six (6) inch horizon will be analyzed in excavated squares. If the results exceed the criterion, the next six (6) inches will be excavated.
6. Steps 4 and 5 will be repeated until the analyses indicate that the soil in each grid meets the criterion.