



JANUARY 1990

FEASIBILITY STUDY PLAN

REMEDIAL INVESTIGATION / FEASIBILITY STUDY
NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

VOLUME 8

DEPARTMENT OF THE NAVY
WESTERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
SAN BRUNO, CALIFORNIA 94066-0727

FEASIBILITY STUDY PLAN
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

Canonie Environmental

Canonie Environmental Services Corp.
1825 South Grant Street
Suite 260
San Mateo, California 94402
Phone: 415-573-8012
FAX: 415-573-5654

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Ms. Bella Dizon (Code 1813BD)
Western Division Naval Facilities
Engineering Command
PO Box 727
San Bruno, CA 94066-0727

Transmittal
Final Feasibility Study Plan, Volume 8
Remedial Investigation/Feasibility Study
Naval Air Station Alameda
Alameda, California

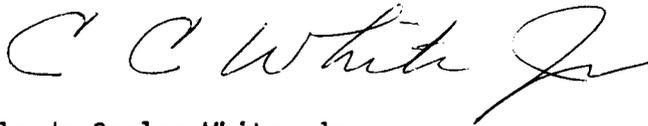
Dear Ms. Dizon:

Enclosed are 20 copies of the final Feasibility Study Plan, Volume 8 of the Remedial Investigation/Feasibility Study Work Plan at the Naval Air Station Alameda.

This report completes a portion of the work authorized under contract No. N62474-85-D-5620 Delivery Order 005.

If you have any questions, please call us.

Respectfully submitted,



Claude Carlos White, Jr.
Project Engineer

CCW/dt

Enclosures

FINAL FEASIBILITY STUDY PLAN
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
(RI/FS)
VOLUME 8 OF 8

DATED 01 JANUARY 1990

THIS RECORD CONTAINS MULTIPLE VOLUMES
WHICH HAVE BEEN ENTERED SEPARATELY

VOLUME 1 OF 8 – FINAL SAMPLING PLAN, RI/FS
DATED 2/1/90 IS ENTERED IN THE DATABASE
AND FILED AT ADMINISTRATIVE RECORD NO.
N00236.000785

VOLUME 1A OF 8 – FINAL SAMPLING PLAN,
SOLID WASTE ASSESSMENT TEST PROPOSAL
ADDENDUM, RI/FS DATED 2/1/89 IS ENTERED IN
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SOLID WASTE ASSESSMENT TEST PROPOSAL
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VOLUME 2 OF 8 – FINAL HEALTH AND SAFETY
PLAN, RI/FS DATED 12/1/88 IS ENTERED IN THE
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RECORD NO. **N00236.000274**

VOLUME 2 OF 8 – REVISED FINAL HEALTH AND
SAFETY PLAN, RI/FS DATED 5/1/89 IS ENTERED
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SAFETY PLAN, RI/FS DATED 11/1/89 IS ENTERED
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VOLUME 3 OF 8 – FINAL QUALITY ASSURANCE
PROJECT PLAN – QUALITY ASSURANCE /
QUALITY CONTROL PLAN, RI/FS DATED 5/1/89 IS
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VOLUME 3 OF 8 – FINAL QUALITY ASSURANCE
PROJECT PLAN – QUALITY ASSURANCE /
QUALITY CONTROL PLAN, RI/FS DATED 1/1/90 IS
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VOLUME 4 OF 8 – COMMUNITY RELATIONS PLAN,
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PLAN/SCHEDULE, RI/FS DATED 2/1/89 IS
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VOLUME 6 OF 8 – DATA MANAGEMENT PLAN,
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ALAMEDA POINT
SSIC NO. 5090.3

VOLUME 7 OF 8 – FINAL PRELIMINARY PUBLIC
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PLAN, RI/FS DATED 6/1/89 IS ENTERED IN THE
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DRAFT FINAL
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
WORK PLAN ADDENDUM

DATED 29 SEPTEMBER 1993

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FEASIBILITY STUDY PLAN
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

1.0 INTRODUCTION

The Work Plan for the Remedial Investigation/Feasibility Study (RI/FS) at Naval Air Station (NAS) Alameda consists of the following planning documents:

- Volume 1 Sampling Plan
- Volume 1A Sampling Plan - Solid Waste Assessment Test (SWAT) Proposal Addendum
- Volume 1B Air Sampling Plan
- Volume 2 Health and Safety Plan
- Volume 3 Quality Assurance Project Plan (QAPP), Quality Assurance/Quality Control Plan (QA/QC)
- Volume 4 Community Relations Plan
- Volume 5 Project Management Plan/Schedule
- Volume 6 Data Management Plan
- Volume 7 Public Health and Environmental Evaluation Plan
- Volume 8 Feasibility Study Plan

The Feasibility Study Plan (FSP) was prepared by Canonie Environmental Services Corp. (Canonie) on behalf of the Department of the Navy, Western Division, Naval Facilities Engineering Command for the United States (U.S.) Naval Air Station in Alameda, California (Figure 1). This document was prepared to conform with the following documents:

1. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), 42 U.S.C. Sections 9601 et seq.

2. U.S. Environmental Protection Agency's (EPA) "Guidance for Conducting Remedial Investigations/Feasibility Studies (RI/FS) under CERCLA" (Draft, March 1988).
3. EPA's Oswer Directive No. 9234.0-05, "Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements," July 9, 1987.

1.1 Site Background Information

NAS Alameda occupies the western tip of Alameda Island located in Alameda and San Francisco Counties, California. Alameda Island is located along the eastern side of San Francisco Bay as shown on Figure 1-1 on the General Location Map. NAS Alameda occupies approximately 2,634 acres, with approximately 2,479 acres of the base owned by the government and the remaining 155 acres leased from others. Approximately 1,526 acres of the air station are above water, and the remaining 1,108 acres are submerged.

The station is rectangular, approximately two miles long and one mile wide. The station is essentially flat, with typical relief ranging from 10 to 15 feet above sea level. Much of the dry land portion of the station, including all of the western portion, is constructed on reclaimed marshes or open water areas which have been filled with dredge spoils. A substantial portion of the fill used in the reclamation of this western area resulted from the dredging of San Francisco Bay and the Oakland Inner Harbor (Estuary), which separates the island from the mainland just to the north (Wahler, 1985).

Various facilities located within the Alameda NAS are currently, or were previously involved in activities requiring the storage, handling, and use of a variety of chemicals. Several investigations have revealed the presence of chemicals in the subsurface soils and ground water. These facilities have been divided into 20 individual sites within the NAS and are here listed:

1. 1943-1956 Disposal Area;
2. West Beach Landfill;
3. Area 97;
4. Building 360 (plating, engine cleaning, paint stripping, and paint shops);
5. Building 5 (plating, paint stripping, cleaning, and paint shops);
6. Building 41 (Aircraft Intermediate Maintenance Department);
7. Buildings 459, 547, and 162 (service stations);
8. Building 114 (pest control area and separator pit);
9. Building 410;
10. Buildings 400 and 530 (missile rework operations);
11. Building 14;
12. Building 10 (power plant);
13. Oil Refinery;
14. Fire Training Area;
15. Buildings 301 and 389 (storage area);
16. Cans C-2 Area;
17. Seaplane Lagoon;

18. Station Sewer System;
19. Yard D-13;
20. Estuary (Oakland Inner Harbor).

A map of the layout of the Naval Air Station showing these specific sites is attached (Figure 1-2).

1.2 Objectives

The major objective of the Feasibility Study (FS) is to define and evaluate alternative courses of remedial action that could be used to mitigate conditions identified in the Remedial Investigation (RI). After addressing public health, consistency with applicable or relevant and appropriate requirements (ARARs), and cost effectiveness; the preferred alternative should be technically sound.

Additional objectives of the FS Plan as part of the NAS Alameda RI/FS are as follows:

1. Review the applicability of various remedial technologies, including innovative technologies, to determine whether the technologies are remedies for the NAS Alameda sites;
2. Determine whether each alternative or combination of alternatives (combining technologies) is effective, by evaluating in the short- and long-terms whether it:
 - o Protects human health and the environment;
 - o Meets and/or exceeds applicable or relevant and appropriate federal and state standards, requirements, criteria, and limitations;

- o Results in permanent and significant reduction of toxicity, mobility, or volume of chemical constituents to the extent required by Section 121 of CERCLA;
 - o Contains the best combination of complimentary technologies to meet the remedial objectives;
3. Assess the implementability of each alternative in terms of:
- o Technical feasibility (short- and long-term);
 - o Administrative and institutional feasibility;
 - o Availability of materials and equipment;
4. Assess costs of each alternative in terms of:
- o Short-term capital costs;
 - o Long-term operations and maintenance costs;
 - o Long-term replacement costs;
 - o Cost effectiveness;
5. Provide direction to the Remedial Investigation (RI) to see that sufficient data of the appropriate type are gathered to select a remedy that adequately addresses the objectives listed above.

Due to the complexity of the site and the different chemicals that might be expected at each of the 20 individual sites, the investigation will proceed on a site-by-site basis. Some of the individual sites may be combined into groups to facilitate reporting requirements. The formation of these groups would be based on potential threats to humans and/or the environment and on ease of investigation and remediation.

1.3 Additional Analysis

The RI and FS are interrelated activities that are performed concurrently. The emphasis of the RI is data collection and site characterization while the FS emphasizes data analysis and remedial alternative evaluations. Additional analysis will be performed to evaluate any previous investigations and to document data deficiencies in the previous or current work.

2.0 POSSIBLE REMEDIAL MEASURES

Preliminary investigations have revealed the presence of various chemicals. Organic solvents, heavy metals, plating solutions, aviation and motor fuel, and other chemicals were identified at some of the sites. The RI will determine the extent of contamination in soils, ground water, and air. The site will be characterized for the horizontal and vertical extent of chemicals, the potential sources, the potential for chemical migration, and the site geology and hydrogeology. The FS will incorporate data from the RI to help determine the need for remedial activities. The collected data will help to design, identify, and select monitoring alternatives for interim and long-term remedial measures.

Interim response measures may be implemented during the combined RI/FS program to help contain and prevent future chemical migration. Interim measures may be part of the long-term remedial measures and may include:

1. Testing and removal of underground storage tanks;
2. Installation of monitoring wells;
3. Air stripping with off-site discharge;
4. Construction of a soil-bentonite slurry cut-off wall;
5. Soil excavation and possible aeration;
6. Impermeable surface caps.

3.0 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

Under Section 121(d) of CERCLA, as amended by SARA, the recommended remedial actions selected at the conclusion of a Remedial Investigation or Feasibility Study must provide for cleanup that assures protection of human health and the environment. In addition, CERCLA requires that remedial actions achieve a level or standard of cleanup that meets "legally applicable or relevant and appropriate requirements" (ARARs).

Three separate categories are identified in the EPA's July 9, 1987 "Interim Guidance on Compliance with ARARs":

1. Ambient or chemical-specific requirements that set health- or risk-based concentration limits or ranges for particular chemicals;
2. Location-specific requirements, such as facility siting restrictions;
3. Performance, design, or other action-specific requirements, such as RCRA incineration standards.

Evaluation of additional data generated during the RI phase of the RI/FS may produce new potential chemical- or location-specific ARARs that may be applicable to possible remedial actions. These ARARs will be further evaluated to identify the final ARARs for the appropriate remedial actions.

3.1 Definition of ARARs

Section 121(d) of CERCLA, as amended by SARA, requires that remedial actions at Superfund sites achieve a level or standard of cleanup that assures protection of human health and the environment. Except as specifically noted below, for any material that remains on-site the standard of cleanup must at least attain "legally applicable or relevant and appropriate" standards, requirements, criteria, or limitations

promulgated under federal or state law. After identifying cleanup standards that adequately protect human health and the environment and that attain ARARs, a cost-efficient means of achieving that goal is selected.

A requirement under federal or state environmental laws may be either "applicable" or "relevant and appropriate." Applicable requirements include all promulgated federal or state standards that "specifically address a hazardous constituent, remedial action, location, or other circumstances under a CERCLA site." For a standard to be "applicable," all of the jurisdictional prerequisites must exist, such that the requirement would apply if the action were not undertaken pursuant to CERCLA.

"Relevant and appropriate" requirements are promulgated federal or state requirements designed to address problems similar to those encountered at a Superfund site, even though such requirements are not legally applicable.

Under CERCLA, only promulgated state standards more stringent than federal requirements can be considered potential ARARs. EPA's, "Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements" defines "promulgated requirements" as "laws imposed by state legislative bodies and regulations developed by state agencies that are of general applicability and are legally enforceable." Nonpromulgated policy or guidance documents issued by federal or state agencies which have not gone through a rule-making process do not rise to the level of ARARs. Non-promulgated standards, such as DHS action levels for the chemicals present at the site, will be considered in determining the extent to which the remedial alternatives discussed in this report are protective of human health and the environment. Examples of possible cleanup standards are shown in Table 3-1. General state policies that are formally promulgated and consistently applied have the same weight as more explicit numerical standards. A list of potential legally applicable or relevant and appropriate Federal standards, requirements, criteria, or limitations for the NAS Alameda site is presented in Table 3-2. A list of other Federal criteria, advisories, and guidance to be considered for the NAS Alameda

site is presented in Table 3-3. A list of potential state of California standards, requirements, criteria, and limitations for hazardous waste cleanup pursuant to Section 121(d) (2) of SARA (September 1987) is presented as Table 3-4. This list was provided to the Navy by the Department of Health Services, North Coast California Section, Toxic Substances Control Division in January 1988.

3.1.1 Alternatives to ARARs

Section 121(d)(4) of CERCLA, as amended by SARA, provides that a clean-up standard that assures protection of human health and the environment, but does not achieve a level of control equivalent to an ARAR, may be selected if:

1. The remedial action is only part of the total action that will ultimately attain ARARs;
2. Compliance with the ARAR will result in greater risk to human health and the environment than alternative options;
3. Compliance is technically impracticable from an engineering perspective;
4. The remedial action selected will achieve the same level of cleanup through another method or approach;
5. A state has not consistently applied a state ARAR in similar circumstances in connection with other remedial actions within the state;
6. The ARAR would require too great an expenditure from the CERCLA Hazardous Substance Superfund (Fund).

Both the second and third waivers may be relevant to the NAS Alameda site. The first waiver may also be applicable if a remedial action is initiated

as part of the complete site clean-up. The fourth waiver may apply if the selected remedial action is comparable to and will achieve clean-up levels similar to another accepted technology. Waiver five would apply if a state did not consistently apply the same standard in similar situations. All of these waivers will require further technical review once the ARARs have been selected. Waiver six is not relevant because NAS Alameda is a federal facility and as such is not funded by the CERCLA Fund. The final ARARs will be identified based on:

1. Contaminants found in the various site media;
2. Demographic characteristics of the site;
3. Selection of final remedial actions.

The use of the waivers will be evaluated as the RI/FS proceeds and remedial actions are selected. If it is determined that any exception is applicable, ARARs may be waived as long as the remedial actions are protective of human health and environment.

Section 121(e) of CERCLA provides that no federal or state permits are required for removal or remedial activities conducted entirely "on-site" as long as those activities comply with all substantive criteria that would otherwise be imposed through the permitting process.

3.2 Identifying ARARs: Methodology

Identification of ARARs occurs in three steps. First, the chemicals of concern and the media (air, water, or soil) in which they are found are identified. Next, the potential or actual uses of the affected media are determined. Based on these uses, applicable or relevant and appropriate clean-up standards for each chemical in each media are identified. Finally, possible remedial action alternatives which can attain the required degree of cleanup are evaluated and the ARARs associated with each of these actions are identified.

3.2.1 Chemicals of Concern

The remedial investigation portion of the RI/FS and the Public Health and Environmental Evaluation Plan (PHEE), Volume 7 of the Work Plan, will determine the chemical species present, the concentration of chemicals, and the nature and extent of chemical constituent sources and the migration of chemicals from the sources into different environmental media.

3.2.2 Potential or Actual Uses of Affected Media

3.2.2.1 Ground Water

EPA's interim guidance on ARARs employs the EPA ground water classification system to identify potential uses of ground water. The ground water classification system sets guidelines for determining the potential uses of ground water. It is not an ARAR.

The San Francisco Bay Basin Plan, unlike the EPA's ground water classification system, is an ARAR. According to the basin plan, "data collected by the local agencies and/or dischargers regarding the quality and use of waters in their vicinity represent the best information on beneficial uses."

3.2.2.2 Soils

The NAS Alameda occupies an island of approximately 2,634 acres along the eastern side of San Francisco Bay. The dry-land portion of the station, including all of the western portion, is constructed on reclaimed marshes or open water areas which have been filled with dredge spoils. The area is principally devoted to military housing, operations, and landing facilities. The principal use of local soils is for foundation support beneath structures, including buildings, buried utilities, and pavements.

The continued satisfactory use of numerous structures and aircraft support facilities underlain by soils and ground water containing chemicals illustrates that this use is unaffected by the presence of chemicals in soils. Agricultural use of soils is not an issue on this site.

The bottom soils below the water surface close to shore at NAS Alameda must also be considered as affected media. This includes the bay muds of the Estuary and the Seaplane Lagoon and bay muds of the coastline areas on the western and southern shores.

3.2.2.3 Air

The principal use of air in the study area is to support plant, animal, and human respiration. Air quality for this use could be affected by emissions of chemical vapors or dusts containing chemicals from undisturbed areas where chemicals are present, or from areas where chemicals may be treated or stored during remedial actions. The latter case will be addressed during the remedial investigation and the former case will be addressed, as necessary, during the evaluation of specific remedial measures.

3.3 ARARs for the NAS Alameda Site

3.3.1 Remediation Levels of Ground Water

The NAS Alameda is built on an island with some of the area built on fill from dredge spoils. The California Regional Water Quality Control Board for the San Francisco Bay Region has directed that the ground water at the site should be considered potable. The bay waters and associated wildlife at the NAS Alameda site are a potential concern. Presently there are no known wells within the NAS Alameda boundaries used to supply potable water.

The effectiveness of the bay mud underlying the site in preventing the migration of chemicals has not yet been established. However, samples of the bay mud underlying a similar reclaimed area across the Oakland Inner Harbor Estuary have been tested and have shown that the bay mud qualifies

as a substantial aquitard. Hydraulic conductivities from these bay mud samples ranged from 2×10^{-7} centimeters per second (cm/sec) to 6×10^{-8} cm/sec (Canonie, 1989). The bay mud underlying the NAS Alameda site can therefore be expected to act as a significant barrier to the vertical movement of ground water.

CERCLA Section 121(d) authorizes the use of alternative concentration limits (ACLs) for hazardous substances in ground water where human exposure is prevented and the environment is protected. ACLs may be applied if the ground water ultimately discharges to surface water, the discharge will not cause a significant increase in chemical levels in the surface water, and enforceable methods exist to prevent human exposure to the chemical-bearing ground water. If these criteria are met, a clean-up standard that is less stringent than health-based standards may be employed, but state ARARs that are not health-based must still be considered in setting the ACL.

3.3.2 Remediation Levels of Soils

A clean-up level for soils at the NAS Alameda site should reflect the site characteristics and provide for the ultimate cleanup of any affected ground water. The California DHS has determined "recommended soil cleanup levels" (RSCLs) for hazardous waste sites. Although not ARARs, the RSCLs are the only potentially relevant standards that have been established by the government, and will be considered for setting clean-up levels for soils at the various sites.

3.3.3 Action-Specific ARARs

3.3.3.1 Ground Water Extraction and Treatment

Extraction and treatment handles ground water by pumping, treating the extracted ground water, and discharging the treated ground water or reinjecting it into the aquifer. Volatile organic compounds (VOCs) would be removed from the ground water by air stripping or granular activated carbon (GAC) adsorption.

Each of the discharge or reinjection options would have to achieve the clean-up levels identified for the ground water. In addition, air stripping requires consideration of ARARs for VOC emissions, GAC use requires considerations of ARARs associated with carbon regeneration or disposal, and discharge or reinjection must meet specific ARARs.

3.3.3.2 Discharge to Sanitary and Storm Sewers

Discharge of treated ground water to the sanitary sewer system would require compliance with the East Bay Municipal Utility District's Industrial Waste Ordinance, and the Clean Water Act Pretreatment Standards. Additional investigation is necessary to determine the need for discharge as part of a potential remedial measure.

3.3.3.3 Air Stripping: Air Emission Standards

Any new source that emits toxic chemicals to the air at levels determined by the Bay Area Air Quality Management District (BAAQMD) "to be appropriate for review" (Regulation 2, Rule 1, Section 109) must have an authority to construct and a permit to operate. Although on-site treatment facilities are exempt from permit requirements by CERCLA, emission limits or monitoring requirements imposed by the BAAQMD in a permit would have to be met.

Whenever a new source of toxic air emissions is proposed, the BAAQMD requires a risk assessment to determine theoretical cancer risks and non-cancerous adverse health effects. From the risk assessment, the BAAQMD determines the limits of emissions it deems necessary to protect human health. In addition to the general regulations, the BAAQMD has promulgated specific limits for emissions of organic compounds from "Miscellaneous Operations" at 15 pounds per day and 300 parts per million (ppm) total carbon on a dry basis.

3.3.3.4 Carbon Adsorption

Use of vapor phase carbon for removing VOCs triggers requirements associated with disposal or regeneration of the carbon. If the spent carbon meets the criteria for a hazardous waste, or if it was generated from the treatment of a hazardous waste, it would be a hazardous waste under the federal Resource Conservation and Recovery Act (RCRA); and under California law would have to be handled as a hazardous waste.

Regeneration of activated carbon using a high-temperature thermal process would qualify as "recycling" under both federal and California hazardous waste regulations. Transportation, storage, and generation of hazardous waste for recycling must comply with the federal and state hazardous waste regulations.

Storage of spent carbon may trigger substantive requirements under the municipal or county hazardous materials ordinances. If the carbon is determined to be a hazardous waste, construction and monitoring requirements for storage facilities may apply.

Performance standards for hazardous waste incinerators may be relevant and appropriate and should be considered in evaluating on-site carbon reactivation. Removal efficiency of 99.99 percent for each principal organic hazardous constituent (designated by the agency) being incinerated would be required. Stack emissions of hydrochloric acid (HCl) from hazardous waste incinerators must be less than the larger of either 1.8 kilograms of HCl per hour or 1 percent of the HCl in the stack gas prior to entering pollution control equipment. Particulate emissions must be less than 180 milligrams per day per standard cubic meter when corrected for oxygen in the stack gas. The requirements set forth above for hazardous waste incinerators are not "applicable" to recycling activities such as carbon regeneration, but they may be "relevant and appropriate."

3.3.3.5 Containment: Vertical Impermeable Barriers

Containment would entail construction of a slurry wall around all or part of a site to contain the chemicals present beneath the site. The soil excavated during construction of the wall could be reused as backfill on-site, but if soil excavated during construction activities contains levels of VOCs which exceed the soil remediation levels, it may be necessary to aerate the soil to reduce the level of VOCs. Soils excavated as part of source control could also require on-site treatment or off-site disposal.

3.3.3.6 Treatment and Disposal of Soil

Excavation of soil may trigger RCRA, state, or local requirements because the excavated soil would have to be disposed of. The soil could be classified as a hazardous waste because it may contain solvents that are listed as hazardous wastes.

The EPA must determine land disposal restrictions for vinyl chloride, and 1,1-dichloroethene (1,1-DCE) wastes by May 1990. Land disposal restrictions have been promulgated for tetrachloroethene, (PCE) 1,1,1-trichloroethane (TCA), and trichloroethene (TCE). The EPA has also proposed restrictions for cadmium. All of these requirements may be relevant and appropriate to disposal of soils on-site and applicable to disposal off-site. For on-site disposal, RCRA and state and local standards for construction and operation of waste piles may apply.

For the on-site treatment of soils, the BAAQMD regulates aeration of soil containing over 50 ppb of organics. The BAAQMD sets rates at which soil can be aerated depending upon the level of chemicals. Treatment of the soil, assuming it is a hazardous waste, may also trigger RCRA treatment requirements.

3.3.4 Health-Based ARARs

Health- or risk-based standards for a specific chemical in a given media are governed by the current or potential uses of the media and the purposes for which the standards were developed. Health- or risk-based standards consistent with these uses are then applied.

Several health-based standards and potential health-based ARARs are identified in Volume 7 of the Work Plan, Public Health and Environmental Evaluation (PHEE) Plan.

Because ARARs are not available for all of the chemicals in each environmental medium under consideration at NAS Alameda and it was noted in the PHEE that insufficient data exist to adequately characterize site conditions, health-based ARARs have not been identified.

4.0 FEASIBILITY STUDY PROCESS

An FS will be conducted for the NAS Alameda site including each site listed in Section 1.1. Each individual site will be evaluated so that a final FS may be developed involving four primary tasks listed here:

- Task 1 Identify Remedial Objectives, Remedial Technologies, and Develop Remedial Alternatives
- Task 2 Conduct an Initial Screening of Technologies
- Task 3 Prepare a Detailed Analysis of Alternatives that Meet Initial Screening Criteria
- Task 4 Prepare a Feasibility Study that Recommends a Comprehensive Remedial Plan

4.1 Remedial Objectives

Remedial objectives for a site are determined by applying the requirements of SARA and various EPA guidance documents to the extent applicable. The general remediation categories to be considered are listed in the National Contingency Plan [NCP (40 CFR Section 300.68)]. These categories will be evaluated as they apply to site conditions and remediation goals. Two distinct types of remedial response objectives (RROs) identified by the EPA are:

1. Objectives for source control measures that significantly minimize migration of contaminants from a site;
2. Objectives for management of migration measures that eliminate or reduce the impacts resulting from contamination from a site.

Site-specific RROs will be developed as the RI progresses.

4.2 Remedial Technologies

Once remedial objectives are determined, the process of developing remedial alternatives that will achieve those objectives at the various remediation levels begins by identifying a list of potentially applicable technologies for each area. The purpose of identifying potential treatment technologies is to 1) identify general types of response categories that may be necessary to address the site problems as characterized in the RI and 2) to define the specific technologies within each general type of response that may be applicable to the site.

The EPA has identified the list of broad categories of remedial responses that follows:

1. No Action;
2. Containment;
3. Storage;
4. Collection;
5. On-Site Treatment;
6. In-Situ Treatment;
7. On-Site Disposal;
8. Off-Site Disposal;
9. Complete Removal;
10. Partial Removal;
11. Diversion;

12. Alternative Water Supplies;
13. Relocation of Receptors;
14. Land Use Controls;
15. Innovative Technologies.

A comprehensive list of waste removal, treatment, disposal, and containment technologies applicable to RCRA and CERCLA wastes is presented in Tables 3-5a and 3-5b. This list of technologies will be screened as part of the final FS plan. The preliminary selection will be based upon existing literature, on-site data, previous investigations, and the RI. The preliminary list will be refined as additional data becomes available from the RI.

4.3 Remedial Alternatives

The list of remedial technologies will be screened with respect to their ability to achieve the RROs and then assembled in combinations to form remedial alternatives which will result in potential remedial alternatives that are capable of mitigating site conditions identified in the RI.

The initial step for developing remedial alternatives is to qualitatively evaluate the ability of each technology, in whole or in part, to achieve the RROs. The screening process will consider the technical suitability based upon site conditions, waste characteristics, nature and extent of contamination, and acceptable engineering practices. Similar alternatives may be combined.

Specifications in the NCP list general categories of remedial alternatives to be developed and evaluated in an FS report. These categories have a degree of flexibility incorporated in them due to the variety of sites that need to be evaluated. The remedial alternatives will be examined to see that at least one alternative has been defined for each of the five

categories mandated by the NCP. The general categories to be evaluated as specified in 40 CFR Section 300.68 are:

1. Alternatives for treatment or disposal at an off-site facility, as appropriate;
2. Alternatives that attain applicable or relevant and appropriate federal public health and environmental requirements;
3. As appropriate, alternatives that exceed applicable or relevant and appropriate federal public health and environmental requirements;
4. As appropriate, alternatives that do not attain applicable or relevant and appropriate federal public health and environmental requirements, but will reduce the likelihood of present or future threat from the hazardous substances and that provide significant protection to public health and welfare and the environment. This must include an alternative that closely approaches the level of protection provided by the ARARs;
5. No-Further-Action (monitoring only) alternative.

These categories are to be evaluated, and to the extent that it is both possible and appropriate, at least one remedial alternative from each category should be developed in the FS Report. As appropriate, the alternatives developed should also consider and integrate waste minimization, destruction, and recycling. Title 40 CFR was modified by SARA, as follows:

1. SARA mandates a preference for permanent solutions;
2. SARA mandates a preference for solutions that reduce volume, toxicity, or mobility;
3. SARA discourages off-site treatment or disposal of waste materials;

4. SARA requires attainment of substantive state public health and environmental requirements in addition to federal requirements.

4.4 Screening of Technologies

Remedial technologies that remain after the technology screening will be assembled into logical remedial alternatives by applying engineering judgment based on effectiveness, implementability, and estimated cost. The remaining alternatives are then screened based upon public health, environmental impacts, and order-of-magnitude costs. It is necessary to develop a list of remedial alternatives that are complete, feasible, logical, and capable of effectively remediating the NAS Alameda site.

Consistent with the requirements of 40 CFR Section 300.68 (f), a No-Further-Action (monitoring only) alternative should be considered for each remedial objective to provide a base line against which the performance of other alternatives can be compared.

4.4.1 Screening Methodology for Remedial Alternatives

In accord with EPA's "Guidance on Feasibility Studies under CERCLA" (June 1985), the remedial alternatives should be evaluated based upon public health and environmental impacts, and order-of-magnitude costs. The alternatives should first be evaluated based on public health and environmental impact criteria. The alternatives that are determined to produce a net benefit relative to these criteria are then evaluated relative to cost criteria. An alternative that offers a greater net health and environmental benefit should not be eliminated solely on cost.

4.4.2 Cost Analysis

Preliminary cost estimates for implementing a remedial alternative and estimates of capital costs and operations and maintenance (O&M) costs will be developed for each alternative that passes the technical, public health, and environmental screening. The cost estimates should be based upon

similar ongoing or completed projects. Additional factors such as costs estimated by the EPA, its contractors, and subcontractors and standard construction industry costs should be applied.

A present worth analysis should be prepared to allow alternatives with different capital costs, O&M costs, and lifetimes to be compared on an equal basis. Alternatives will be grouped according to similar technologies and the most cost effective alternative, with the highest benefit and lowest cost, in each group will be identified. The major cost components along with any assumptions that may affect the accuracy of the estimate will be noted.

4.5 Detailed Analysis of Alternatives

The detailed analysis of alternatives represents the final step in the evaluation of remedial alternatives. The detailed analysis presents an end result which provides a detailed characterization of the relative merits and costs associated with each alternative. A limited number of alternatives will be subjected to a detailed evaluation using the criteria here listed:

1. Technical Evaluation;
2. Environmental Assessment;
3. Public Health Analysis;
4. Institutional Issues;
5. Cost Analysis;
6. Cost Summary.

The detailed analysis of alternatives should incorporate the requirements of SARA and, to the extent applicable, other guidance materials referenced in Section 1.0.

4.5.1 Technical Evaluation

The technical evaluation will consider performance and effectiveness, reliability, implementability, and safety.

Anticipated performance and effectiveness of each alternative will evaluate the ability to effectively minimize any threat to public health, welfare, or the environment and the length of time the alternative will provide that protection. The alternative should meet or exceed the ARARs and be evaluated for its ability to permanently reduce toxicity, mobility, and volume of chemical constituents.

Reliability of each alternative should be assessed by evaluating costs of labor and materials associated with start-up costs and O&M activities. Any activity associated with O&M should be evaluated for frequency and complexity. Each alternative should be capable of maintaining a level of effectiveness that will see that remediation levels are met. If the alternative will not be sufficiently effective over the projected life of the remediation, a more reliable alternative should be selected.

Implementability evaluations should be determined site by site. Time and ease of installation is often controlled by site conditions such as buildings, aboveground and belowground utilities, and general site access. Time of installation and anticipated benefits must be evaluated as well as the operability of technologies and compatibility with other remedial measures. The technology should be evaluated based on current utilization of that technology for similar remediation projects and the availability of sufficient treatment capacity. Implementability should also include an evaluation of the acceptability of the alternative to the local community and all agencies involved.

The potential safety issues during installation and operation need to be addressed. Safety issues relevant to workers involved in remedial activities and the safety of nearby residents, workers, and businesses should be evaluated.

4.5.2 Environmental Evaluation

The environmental evaluation will focus on three main factors:

1. The beneficial effects of each alternative in terms of its ability to eliminate or reduce actual or potential damage to the environment;
2. The potential adverse effects of each alternative along with methods and costs of mitigation of these effects;
3. Any potential adverse impacts to the endangered species (California Least Tern, Brown Pelican) or state species of special concern (Double-Crested Cormorants, Northern Harrier, Elegant Tern) which nest at or around NAS Alameda (PHEE).

The environmental evaluation will focus on long- and short-term effects when assessing the beneficial effects of each alternative. The assessment should address:

1. Anticipated final site conditions;
2. Changes in the release of contaminants;
3. Improvements in the biological environment;
4. Improvements in resources used by the public.

Adverse affects of each alternative may be evaluated by assessing the potential for:

1. Increased airborne emissions;
2. New contaminant discharges to surface, air, or subsurface media;
3. An increase in the volume of contaminants from existing sources to other locations;
4. Significant adverse effects on the environment or uses of environmental resources;
5. Adverse effects associated with operation, construction, or O&M procedures associated with each alternative.

The postremediation conditions should be compared to the baseline conditions consistent with the No-Further-Action (monitoring only) alternative which provides a base line against which the performance of other alternatives can be compared.

Potential adverse effects may be classified as inevitable, probable, possible, and remote and may be subclassified as reversible or irreversible. Some of the classifications may require evaluation of potential mitigation measures. The alternatives with these classifications may require additional considerations associated with their anticipated effectiveness or performance, reliability, implementability, and safety. Integrating additional measures with the primary function of the alternative may affect the overall success of the alternative and may increase the cost of the mitigation measures.

4.5.3 Public Health Analysis

The public health analysis will be conducted in conjunction with the Public Health Environmental Evaluations (PHEEs) which are in Volume 7 of the Work

Plan. The public health analysis in the FS will provide a summary of environmental concerns associated with each of the remedial alternatives considered. The analysis should consider the following:

1. Base line evaluation;
2. Exposure assessment;
3. Chemical concentration comparison;
4. Evaluation of alternatives.

The base line evaluation is based upon a No-Further-Action alternative which would require only monitoring. This base line provides a base by which all alternatives can be equally compared, therefore the base line evaluation should include the types and quantities of chemicals, their toxic effects and proximity to potential populations, the probability of chemical release and migration from the site, and the potential for exposure.

The exposure assessment should estimate the magnitude, duration, and frequency of human exposure to the chemical contaminants during and after remedial activities. Using the chemicals identified in the PHEE and base line evaluation, the following items should be included as part of the exposure assessment:

1. Select indicator chemicals.
2. Identify potential human exposure and exposure pathways for each remedial alternative.
3. Identify all exposure points and concentrations of each indicator chemical for the remedial alternatives.

The chemical concentration comparison should compare the estimated chemical indicator concentrations with the state and federal ARARs identified in Chapter 3 of this document. Potential ARARs may include:

1. Acceptable Cancer Risk Levels (ACRLs);
2. Recommended Maximum Contaminant Levels;
3. Ambient Air Quality Standards;
4. State and Federal Water Quality Criteria;
5. EPA Health Advisories, Suggested No Adverse Response Levels (SNARLS).

A more comprehensive list of potential ARARs is found in Chapter 3.

The final step of the public health analysis will be to evaluate the effects of each of the remedial alternatives. Specific design goals may be necessary based upon the exposure assessment or the ARARs.

4.5.4 Institutional Issues

The institutional evaluation will be based upon:

1. Regulatory requirements;
2. Permitting requirements;
3. Community relations.

Each alternative will be evaluated in terms of the CERCLA requirements relative to attaining or exceeding ARARs or reducing impacts and the promotion of permanent solutions resulting from reductions in the volume, toxicity, or mobility of hazardous substances at the site. Potential regulatory requirements include the federal RCRA, CERCLA, Toxic Substances Control Act (TSCA), Safe Drinking Water Act (SDWA), Clean Water Act (CWA), Occupational Safety and Health Act (OSHA), and applicable state regulations, along with other environmental standards, and other criteria identified during the ARARs evaluation.

CERCLA does not require environmental permits for on-site remedial actions taken pursuant to Sections 104 or 106. However, permits may be required for off-site removal, storage, disposal, or treatment.

Each alternative will be assessed in terms of the permitting and regulatory requirements that may be required during each phase (design, construction, start-up, operation, shutdown, and completion) of implementation of the preferred remedial alternative.

Community relations are a primary concern that should be addressed in the early stages of the program. The community should be informed about the cleanup and understand the inconveniences associated with the process and remedial activities.

4.5.5 Cost Analysis

To complete the detailed analysis of remedial alternatives, each alternative will be evaluated in terms of the combined capital and operating costs for the life of each alternative. Present worth analysis is used to compare the life cycle costs of various alternatives with widely varying capital and operating costs with different periods of anticipated operation. Standard parameters for present worth analysis would initially use a 10-percent discount rate and a 30-year design life.

The capital cost of each alternative should include all initial costs, both direct such as physical equipment and indirect such as wells. The operating cost of each alternative will include maintenance, utility expenses, operating labor and supervision, monitoring, chemical analyses, supervisory costs, and local taxes.

The cost analysis shall provide a -50 to +100 percent cost estimate wherever possible for comparative purposes only. The costs will include current prices for the preferred technologies, required equipment, and any subcontractors. These estimates will be further adjusted to reflect actual instead of potential costs as the RI/FS progresses.

4.5.6 Cost Summary

A tabular summary will be prepared to reflect differences between the alternatives. The comparisons will include total capital cost, present worth, O&M costs, and cash flow for the duration of the alternative. Any major assumption, unknowns, or secondary costs that affect the accuracy or reliability of the estimates will be noted.

The purpose of the FS is to analyze the data gathered from the RI and evaluate the applicability of existing or new technologies for the remediation of a particular site. Cost estimates that have a level of accuracy between -50 to +100 percent will be developed for comparative purposes only. Detailed cost estimates may be prepared during remedial design efforts which can be used for budgetary planning or financial tracking.

4.6 Summary of Alternatives

At the completion of the detailed analysis of each alternative, a summary will be developed that discusses the relevant ranking of each alternative in terms of the various subtasks discussed above. As a minimum, the factors will include the following:

1. Health considerations;
2. Environmental effects;
3. Technical aspects;
4. Achievement of objectives;
5. Community effects;
6. Present worth;
7. Other considerations.

4.7 Final Feasibility Study Report

A final FS report will be prepared following the receipt of comments from the regulatory agencies. A draft Remedial Action Plan (RAP) will be prepared which summarizes the chosen remedial action alternative and the basis for that decision. The RAP will be made available for at least a 30-day public comment period, including a public meeting on the RAP.

REFERENCES

Canonie Environmental Services Corp., 1989, "Revised Hydrogeologic Assessment Report, West Oakland Yard, Oakland, California," report prepared for Southern Pacific Transportation Company, San Francisco, California and submitted to the California Regional Water Quality Control Board for the San Francisco Bay Region, June 1989.

U.S. Environmental Protection Agency, 1985, "Guidance on Remedial Investigations under CERCLA," June.

_____, 1987, "Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements," OSWER-9234.0-05, July.

_____, 1988, "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA," draft, OSWER-9355.3-01.

Wahler Associates, 1985, "Verification Step Confirmation Study, Naval Air Station, Alameda," draft report for Western Div., Naval Facilities Engineering Command, Contract N62474-83-C-3075, May.

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TABLES

FINAL FEASIBILITY STUDY PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY

DATED 01 JANUARY 1990

TABLE 3-1
 POSSIBLE CLEAN-UP STANDARDS
 FOR THE NAVAL AIR STATION ALAMEDA
 (ppb)

| <u>Chemical</u> | <u>MCL</u> | <u>AWQC Fresh Water (acute/chronic)</u> | <u>AWQC Marine (acute/chronic)</u> | <u>RCRA MCL</u> | <u>Applied Action Levels (water/air)</u> | <u>Drinking Water Action Levels</u> | <u>RfD^a</u> |
|----------------------------|------------|---|--|---------------------|--|---|------------------------|
| <u>Inorganics</u> | | | | | | | |
| Antimony | - | 9,000/1,600 | - | - | - | - | 1.4 |
| Cadmium | 10 | 3.9/1.1 | 43/9.3 | 10 | 0.17 | - | - |
| Silver | 50 | 4.1/0.12 | 2.3/- | 50 | - | - | 10.5 |
| <u>Organics</u> | | | | | | | |
| Chloroform | 100* | 280/1200 | - | - | 4.3/0.43 | 20 | 70 |
| 1,2-Dichlorobenzene | 620 | - | 1100/760 | 1900 | - | 130 | - |
| 1,1-Dichloroethane | - | - | - | - | - | 20 | - |
| 1,1-Dichloroethylene | 6.0 | 11,000 | 220,000 | - | - | 6.0 | 0.06 |
| Trans-1,2-Dichloroethylene | 70 | - | - | - | - | 16 | - |
| Phenol | - | 10,000/2,500 | 5,800/ | - | - | - | 280 |
| Tetrachloroethylene | 5.0 | 5,200/840 | 10,000/450 | - | - | 4.0 | 140 |
| 1,1,1-Trichloroethane | 200 | - | 31,000/ | - | 200/310 | 200 | 630 |
| Trichloroethylene | 5.0 | 45,000/21,000 | 2,000/ | - | - | 5.0 | 3.0 |
| Vinyl Chloride | 0.5 | - | - | - | - | 2.0 | - |

Notes:

* denotes Proposed Standard.

^aThe RfD is the reference dose published by EPA. For carcinogens, the RfD in this table represents the dose associated with a 10^{-6} cancer rate. Values were taken from the Region 9 Environmental Protection Agency Drinking Water Standards and Health Advisory Table (September 21, 1987).

TABLE 3-2

POTENTIAL LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE
FEDERAL STANDARDS, REQUIREMENTS, CRITERIA, OR LIMITATIONS
FOR THE NAVAL AIR STATION ALAMEDA

| <u>Standard Requirement, Criteria, Limitation</u> | <u>Citation</u> | <u>Description</u> | <u>Legally Applicable/ Relevant & Appropriate</u> | <u>Comments</u> |
|--|--|--|---|---|
| Comprehensive Environmental Response, Compensation, and Liability Act | 42 USC 9601 et seq. 40 CFR Part 300 | Establishes funding and enforcement authority for a comprehensive response program for past hazardous waste activities which caused or may cause significant negative impact on human health and/or the environment. | | Section 121, of the amended CERCLA, is entitled "Cleanup Standards" and is applicable for identifying and evaluating ARARs; minimum remedial requirements; and the selection of remedial actions. |
| National Oil and Hazardous Substances Pollution Contingency Plan; Final Rule | 40 CFR Part 300 | Codifies the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. | | Even though this NCP is still in affect, it does not cover many elements contained in the Superfund Amendments of 1986. |
| Superfund Amendments and Reauthorization Act of 1986 | Pub. L. 99-499 100 Stat. 1613 (1986) | 1986 Amendments for the Comprehensive Response, Compensation, and Liability Act. | | These amendments significantly changed the identification and evaluation of legally applicable or relevant and appropriate requirements (ARARs), along with the selection of remedial actions. |
| Safe Drinking Water Act | 42 USC Section 300 f,g,h,j Pub. L. 99-399 (1986) | Regulations and standards for public water systems; valuable aquifers; and the underground injection of contaminants. | | |

TABLE 3-2

POTENTIAL LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE
FEDERAL STANDARDS, REQUIREMENTS, CRITERIA, OR LIMITATIONS
FOR THE NAVAL AIR STATION ALAMEDA
(Continued)

| Standard Requirement, Criteria, Limitation | Citation | Description | Legally Applicable/ Relevant & Appropriate | Comments |
|--|--------------------------------|---|--|--|
| National Primary Drinking Water Standards | 40 CFR Part 141 | Maximum Contaminant Levels (MCLs). Enforceable standard establishing maximum permissible levels of contaminants in drinking water from a public water system. MCLs are based on health considerations, technological feasibility, economic considerations, and the inclusion of a safety factor to protect sensitive populations. | | For current or potential drinking water supplies, use of MCLs as a remedial standard would clean-up ground water to its highest beneficial use (eg, drinking water). |
| Underground Injection Standards | 40 CFR Parts 144, 145, 146 147 | Regulates underground injection of wastes to protect aquifers that are or may reasonably be expected to be a source of drinking water. Prohibits injection of contaminants into a drinking water source if the contaminant(s) may cause a violation of any primary drinking water regulation or may adversely affect public health. | | Wells used to inject contaminated ground water that has been treated and is being reinjected into the same formation from which it is drawn cannot be prohibited by this law if such injection is approved by the EPA pursuant to provisions for cleanup under CERCLA. For remedial actions involving reinjection, the law may be relevant and appropriate to establish criteria and standards for the injection well. |
| Wellhead Protection Areas | 42 USC 300h-7 | Requires the state to adopt and submit to the EPA by June 1989 a program to protect "wellhead" area within the state from contaminants which may have any adverse effects on public health. | | The appropriate regulatory agency will need to determine if and how this law would apply. |

TABLE 3-2

POTENTIAL LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE
FEDERAL STANDARDS, REQUIREMENTS, CRITERIA, OR LIMITATIONS
FOR THE NAVAL AIR STATION ALAMEDA
(Continued)

| Standard Requirement, Criteria, Limitation | Citation | Description | Legally Applicable/ Relevant & Appropriate | Comments |
|---|---------------------------|--|--|---|
| Clean Water Act | 33 USC Section 1251-1376. | Established a system of minimum national effluent discharge standards; a construction grant program for POTWs; ocean discharge requirements; and water quality criteria. | | |
| National Pollutant Discharge Elimination System | 40 CFR Parts 122, 125 | Regulates point source pollutant discharges into waters of the United States. The Act defines a point source as "any discernible, confined or discrete conveyance...from which pollutants are or may be discharged". Under the NPDES regulatory framework the effluent limitations must "assure the protection of public water supplies and protection and propagation of a balanced, indigenous population of shellfish, fish, fauna, wildlife, and other aquatic organisms, and to allow recreational activities in and on the water." | | Remedial actions which would discharge a pollutant from a point source into any marine or surface waters would enter into the NPDES regulatory framework. EPA will need to determine if an NPDES discharge is considered as being "conducted entirely on-site." If so, a permit is not required and just the substantive requirements would apply. In addition, CWA states that "any discharge in compliance with the instruction of an On-Scene Coordinator pursuant to 40 CFR Part 1510 (300-NCP)...do not require an NPDES permit." In California the RWQCB administers the NPDES program. |

TABLE 3-2

POTENTIAL LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE
FEDERAL STANDARDS, REQUIREMENTS, CRITERIA, OR LIMITATIONS
FOR THE NAVAL AIR STATION ALAMEDA
(Continued)

| <u>Standard Requirement, Criteria, Limitation</u> | <u>Citation</u> | <u>Description</u> | <u>Legally Applicable/ Relevant & Appropriate</u> | <u>Comments</u> |
|---|-----------------|---|---|--|
| Toxic Pollutant Effluent Standards | 40 CFR Part 129 | Establishes effluent limitations, standards and prohibitions for certain toxic pollutants: aldrin/dieldrin, endrin, toxaphene, benzidine, PCBs, and DDT. | | If any of the chemicals listed under this regulation would be discharged from a point source during a remedial action, then this law would apply. |
| Oil Discharge Requirements | Section 311 | Prohibits discharge of harmful quantities of oil into navigable waters. | | EPA defines the term "harmful quantities" to cover all discharges which "violate applicable water quality standards or cause a film or sheen upon the surface of the water." |
| National Pretreatment | 40 CFR Part 403 | Establish pretreatment standards for introduction of pollutants into treatment works which are publicly owned (POTWs) for those pollutants which are determined not to be susceptible to treatment by such treatment works, or which would interfere with the operation of such treatment works, or which would result in contamination of sewage sludge. | | If a remedial action includes discharge to a publicly owned treatment works (POTWs) the law would be legally applicable. Where specific prohibitions or limits on pollutants or pollutant parameters are developed by a POTW, such limits will set the pretreatment standards. |

TABLE 3-2

POTENTIAL LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE
FEDERAL STANDARDS, REQUIREMENTS, CRITERIA, OR LIMITATIONS
FOR THE NAVAL AIR STATION ALAMEDA
(Continued)

| <u>Standard Requirement, Criteria, Limitation</u> | <u>Citation</u> | <u>Description</u> | <u>Legally Applicable/ Relevant & Appropriate</u> | <u>Comments</u> |
|---|-------------------------------------|---|---|--|
| Ocean Discharge Requirements | 40 CFR Part 125 | Establishes guidelines for issuance of NPDES permits for the discharge of pollutants from a point source into the territorial seas, contiguous zone, and the oceans. Requires that a discharge must not cause unreasonable degradation of the marine environment. | | EPA will need to make a determination whether (1) a discharge into a stream flowing into the San Francisco Bay is enforceable under this regulation, and (2) the discharge would need a permit. This would determine whether or not the requirements are legally applicable or relevant and appropriate. |
| Dredge or Fill Requirements | 40 CFR Parts 230 and 231 | Regulates dredging activity and the disposal of dredged or fill material into navigable waters. | | |
| Solid Waste Disposal Act (SWDA) | 42 USC Section 3251-3259, 6901-6991 | Regulatory statutes designed to provide cradle to grave management of hazardous waste by imposing management requirements on generators and transporters. | | This law has been amended by the Resource Conservation and Recovery Act (RCRA) and the Hazardous and Solid Waste Amendments (HSWA). |
| Guidelines for the Thermal Processing of Solid Wastes | 40 CFR Part 240 | Prescribes guidelines for thermal processing of municipal-type solid waste. | | |

TABLE 3-2

POTENTIAL LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE
 FEDERAL STANDARDS, REQUIREMENTS, CRITERIA, OR LIMITATIONS
 FOR THE NAVAL AIR STATION ALAMEDA
 (Continued)

| <u>Standard Requirement, Criteria, Limitation</u> | <u>Citation</u> | <u>Description</u> | <u>Legally Applicable/ Relevant & Appropriate</u> | <u>Comments</u> |
|---|-----------------|---|---|-----------------|
| Guidelines for the Land Disposal of Solid Wastes | 40 CFR Part 241 | Establishes requirements and procedures for land disposal of solid wastes. | | |
| Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste | 40 CFR Part 246 | Establishes guidelines for collection of residential, commercial, and institutional solid wastes. | | |
| Source Separation for Materials Recovery Guidelines | 40 CFR Part 246 | Establishes requirements and recommended procedures for source separation by Federal agencies of residential, commercial, and institutional solid wastes. | | |
| Guidelines for Development and Implementation of State Solid Waste Management Plans | 40 CFR Part 256 | Establishes requirements for federal approval of state programs to regulate open dumps. | | |

TABLE 3-2

POTENTIAL LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE
FEDERAL STANDARDS, REQUIREMENTS, CRITERIA, OR LIMITATIONS
FOR THE NAVAL AIR STATION ALAMEDA
(Continued)

| <u>Standard Requirement, Criteria, Limitation</u> | <u>Citation</u> | <u>Description</u> | <u>Legally Applicable/ Relevant & Appropriate</u> | <u>Comments</u> |
|--|-----------------|--|---|---|
| Criteria for Classification of Solid Waste Disposal Facilities and Practices | 40 CFR Part 257 | Establishes criteria for use in determining which solid waste disposal facilities and practices pose a reasonable probability of adverse effects on health or the environment, and thereby constitute prohibited open dumps. | | |
| Hazardous Waste Management System: General | 40 CFR Part 260 | Establishes procedures and criteria for modification or revocation of any provision in 40 C.F.R. Parts 260 through 265. | | Would only apply for modification or revocation of guidelines and standards for generators, transporters and identification of hazardous wastes and owners and operators of hazardous waste treatment, storage, and disposal facilities |
| Identification and Listing of Hazardous Wastes | 40 CFR Part 261 | Defines solid wastes which are subject to regulation as hazardous wastes under 40 CFR Parts 262-265 and Parts 124, 270 and 271. | | This part is applicable with respect to determining whether the hazardous waste sections of SWDA applies to the site. |
| Standards Applicable to Generators of Hazardous Waste | 40 CFR Part 262 | Establishes standards for generators of hazardous waste. | | |

TABLE 3-2

POTENTIAL LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE
 FEDERAL STANDARDS, REQUIREMENTS, CRITERIA, OR LIMITATIONS
 FOR THE NAVAL AIR STATION ALAMEDA
 (Continued)

| Standard Requirement, Criteria, Limitation | Citation | Description | Legally Applicable/ Relevant & Appropriate | Comments |
|---|---------------------------|--|--|--------------------------------------|
| Standards Applicable to Transporters of Hazardous Waste | 40 CFR Part 263 | Establishes standards which apply to persons transporting hazardous waste within the U.S., if the transportation requires a manifest under 40 CFR 262. | | |
| Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities | 40 CFR Part 264 | Establishes minimum national standards which define the acceptable management of hazardous waste for owners and operators of facilities which treat, store, or dispose of hazardous waste. | | See discussion of specific subparts. |
| General Facility Standards | 40 CFR Part 264 Subpart B | | | |
| Preparedness and Prevention | 40 CFR Part 264 Subpart C | | | |
| Contingency Plan and Emergency Procedures | 40 CFR Part 264 Subpart D | | | |

TABLE 3-2
 POTENTIAL LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE
 FEDERAL STANDARDS, REQUIREMENTS, CRITERIA, OR LIMITATIONS
 FOR THE NAVAL AIR STATION ALAMEDA
 (Continued)

| <u>Standard Requirement, Criteria, Limitation</u> | <u>Citation</u> | <u>Description</u> | <u>Legally Applicable/ Relevant & Appropriate</u> | <u>Comments</u> |
|---|---------------------------|--------------------|---|---|
| Manifest System, Recordkeeping, and Reporting | 40 CFR Part 264 Subpart E | | | |
| Release from Solid Waste Management Units | 40 CFR Part 264 Subpart F | | | |
| Closure and Post-Closure | 40 CFR Part 264 Subpart G | | | |
| Financial Requirements | 40 CFR Part 264 Subpart H | | | |
| Use and Management of Containers | 40 CFR Part 264 Subpart I | | | Would apply if alternative developed involves storage of hazardous materials in containers. |
| Tanks | 40 CFR Part 264 Subpart J | | | Would apply if alternative developed involves use of tanks to treat or store hazardous materials. |
| Surface Impoundments | 40 CFR Part 264 Subpart K | | | Would apply if alternative involves the use of surface impoundments to treat, store, or dispose of hazardous materials. |

TABLE 3-2

POTENTIAL LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE
 FEDERAL STANDARDS, REQUIREMENTS, CRITERIA, OR LIMITATIONS
 FOR THE NAVAL AIR STATION ALAMEDA
 (Continued)

| <u>Standard Requirement, Criteria, Limitation</u> | <u>Citation</u> | <u>Description</u> | <u>Legally Applicable/ Relevant & Appropriate</u> | <u>Comments</u> |
|---|------------------------------|--|---|---|
| Waste Piles | 40 CFR Part 264 Subpart L | Would apply if alternative developed involves | | treatment or storage of hazardous materials in waste piles. |
| Land Treatment | 40 CFR Part 264 Subpart M | | | Would apply if alternative developed involves land treatment. |
| Landfills | 40 CFR Part 264 Subpart N | | | Would apply if alternative developed involves disposal of hazardous materials in a landfill. |
| Incinerators | 40 CFR Part 264 Subpart O | | | Would apply if alternative developed involves incineration. |
| Interim Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities | 40 CFR Part 265 | Establishes minimum national standards that define the acceptable management of hazardous waste during the period of interim status and until certification of final closure, or if the facility is subject to post-closure requirements, until post-closure responsibilities are fulfilled. | | Remedies should be consistent with the more stringent Part 264 standards as these represent the ultimate RCRA compliance standards and are consistent with CERCLA's goal of long-term protection of public health, welfare and the environment. |

TABLE 3-2

POTENTIAL LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE
FEDERAL STANDARDS, REQUIREMENTS, CRITERIA, OR LIMITATIONS
FOR THE NAVAL AIR STATION ALAMEDA
(Continued)

| <u>Standard Requirement, Criteria, Limitation</u> | <u>Citation</u> | <u>Description</u> | <u>Legally Applicable/ Relevant & Appropriate</u> | <u>Comments</u> |
|---|-----------------|---|---|---|
| Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Management Facilities | 40 CFR Part 266 | Establishes requirements for recyclable materials. | | |
| Interim Standards for Owners and Operators of New Hazardous Waste Land Disposal Facilities | 40 CFR Part 267 | Establishes interim minimum national standards that define acceptable management of hazardous waste for new land disposal facilities. | | Remedies should be consistent with more stringent Part 264 standards as these represent the ultimate RCRA compliance standards and are consist with CERCLA's goal of long-term protection of public health, welfare, and the environment. |
| Land Disposal | 40 CFR Part 268 | Established a timetable and criteria for the restriction of land disposal of specified hazardous wastes. | | May apply if land disposal is a remedial alternative. |
| Hazardous Waste Permit Program | 40 CFR Part 270 | Establishes provisions covering basic permitting requirements. | | Permits are not required for on-site CERCLA response actions. Substantive requirements are addressed in 40 CFR Part 264. |

TABLE 3-2

POTENTIAL LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE
FEDERAL STANDARDS, REQUIREMENTS, CRITERIA, OR LIMITATIONS
FOR THE NAVAL AIR STATION ALAMEDA
(Continued)

| <u>Standard Requirement, Criteria, Limitation</u> | <u>Citation</u> | <u>Description</u> | <u>Legally Applicable/ Relevant & Appropriate</u> | <u>Comments</u> |
|--|---|---|---|---|
| Underground Storage Tanks | 40 CFR Part 280 | Establishes regulations of underground storage tanks. | | Would apply if the alternative developed would involve the use of underground storage tanks. May apply to corrective actions associated with leaking tanks. |
| BDAT Standards | RCRA Sections 3004(d)(3), (e)(3) 42 USC 6924(d)(3), (e)(3) | Effective 11/8/1988 disposal of contaminated soil or debris resulting for CERCLA response action or RCRA corrective actions is subject to land disposal prohibitions and/or treatment standards established for spent solvent wastes, dioxin-containing wastes, and "California List" wastes. | | |
| Clean Air Act | 42 USC Sections 7401-7642 | | | |
| National Primary and Secondary Ambient Air Quality Standards | 40 CFR Part 50 | Establishes standards for ambient air quality to protect public health and welfare. | | |

TABLE 3-2

POTENTIAL LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE
FEDERAL STANDARDS, REQUIREMENTS, CRITERIA, OR LIMITATIONS
FOR THE NAVAL AIR STATION ALAMEDA
(Continued)

| <u>Standard Requirement, Criteria, Limitation</u> | <u>Citation</u> | <u>Description</u> | <u>Legally Applicable/ Relevant & Appropriate</u> | <u>Comments</u> |
|--|---------------------------|--|---|---|
| National Emission Standards for Hazardous Air Pollutants | 40 CFR Part 61 | Sets emission standards for designated hazardous pollutants, including mercury, beryllium, asbestos, and inorganic arsenic. | | |
| Hazardous Materials Transportation Act | 49 USC Section 1801-1813 | | | |
| Hazardous Materials Transportation Regulations | 49 CFR Parts 107, 171-177 | Regulates transportation of hazardous materials. | | These regulations would apply if remedial alternative involves the transportation of hazardous materials. |
| Marine Protection, Research, and Sanctuaries Act | 13 USC Sections 1401-1445 | Regulates ocean dumping. | | |
| Fish and Wildlife Coordination Act | 16 USC Sections 661-666 | Requires consultation when a Federal department or agency proposes or authorizes any modification of any stream or other water body which may affect the fish or wildlife. Requires protection of fish and wildlife resources. | | |

TABLE 3-2

POTENTIAL LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE
 FEDERAL STANDARDS, REQUIREMENTS, CRITERIA, OR LIMITATIONS
 FOR THE NAVAL AIR STATION ALAMEDA
 (Continued)

| <u>Standard Requirement, Criteria, Limitation</u> | <u>Citation</u> | <u>Description</u> | <u>Legally Applicable/ Relevant & Appropriate</u> | <u>Comments</u> |
|---|---------------------------|---|---|---|
| Coastal Zone Management Act | 16 USC Sections 1451-1464 | Prohibits Federal agencies from undertaking any activity in or affecting a State's coastal zone that is not consistent to the maximum extent practicable with a State's approved coastal zone management program. | | |
| Rivers and Harbor Act of 1899 | 33 USC Section 403 | | | |
| Section 10 Permit | 33 CFR Parts 320-330 | Requires a permit for structures or work in or affecting navigable waters. | | A permit is not required for on-site CERCLA response actions. |
| Historic Sites, Building and Antiquities Act | 16 USC Sections 461-467 | Requires Federal agencies to consider the existence and location of landmarks on the National Registry of Natural Landmarks to avoid undesirable impacts on such landmarks. | | |

TABLE 3-2
 POTENTIAL LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE
 FEDERAL STANDARDS, REQUIREMENTS, CRITERIA, OR LIMITATIONS
 FOR THE NAVAL AIR STATION ALAMEDA
 (Continued)

| Standard Requirement, Criteria, Limitation | Citation | Description | Legally Applicable/ Relevant & Appropriate | Comments |
|---|---|---|--|----------|
| Archeological and Historic Preservation Act | 16 USC Section 469 36 CFR Part 65 40 CFR Section 6.301(c) | Establishes procedures to provide for preservation of historic and archeological data which might be destroyed through alteration of terrain as a result of a Federal construction project or a Federally licensed activity. | | |
| National Historic Preservation Act | 16 USC Section 470 36 CFR Part 800 40 CFR Section 6301(b) | Requires Federal agencies to take into account the effect of any Federally assisted undertaking or licensing on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places. | | |
| Endangered Species Act | 16 USC Sections 1531-1543 40 CFR Section 6.302(h) 50 CFR Parts 17, 200, 402 | Requires Federal agencies to insure that any action authorized, funded, or carried by an agency is not likely to jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify critical habitat. | | |

TABLE 3-2

POTENTIAL LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE
FEDERAL STANDARDS, REQUIREMENTS, CRITERIA, OR LIMITATIONS
FOR THE NAVAL AIR STATION ALAMEDA
(Continued)

| <u>Standard Requirement, Criteria, Limitation</u> | <u>Citation</u> | <u>Description</u> | <u>Legally Applicable/ Relevant & Appropriate</u> | <u>Comments</u> |
|---|--|---|---|---|
| Occupational Safety and Health Act | 29 USC Sections 651- | Regulates worker health and safety. | | Under 40 CFR Section 300.38, OSHA applies to all response activities under the NCP. |
| Executive Order on Floodplain Management | Exec. Order No. 11,988 40 CFR Section 6.302 & Appendix A | Requires Federal agencies to evaluate the potential effects of actions they may take in a floodplain to avoid, to the maximum extent possible, the adverse impacts associated with direct and indirect development of a floodplain. | | This order would apply if the remedial alternative developed affects a floodplain. |
| Executive Order on Protection of Wetlands | Exec. Order No. 11,990 40 CFR Section 6.302(a) & Appendix A | Requires Federal Agencies to avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practicable alternative exists. | | This order would apply if the remedial alternative developed affects a wetland. |

TABLE 3-3

OTHER FEDERAL CRITERIA, ADVISORIES, AND GUIDANCE TO BE
CONSIDERED FOR THE NAVAL AIR STATION ALAMEDA

| <u>Standard Requirement, Criteria, Limitation</u> | <u>Citation</u> | <u>Description</u> | <u>Comments</u> |
|---|--|---|--|
| Safe Drinking Water Act | 42 USC Section 300 f, g,h,j Pub. L. 99-339 (1986) | Regulations and standards for public water systems; valuable aquifers; and the underground injection of contaminants. | |
| National Secondary Drinking Water Standards | 40 CFR Part 143 | Secondary Maximum Contaminant Levels (SMCLs). Standard to control chemicals in drinking water that primarily affect the aesthetic qualities relating to public acceptance of drinking water from a public water system. Secondary standards are not federally enforceable. | For drinking water supplies, use of SMCLs as a cleanup standard would ensure that the beneficial use of the water for drinking would not be negatively impacted by the listed SMCL chemicals. |
| Maximum Contaminant Level Goals | Pub. L. 99-339, 100 Stat. 642 (1986) | Establishes drinking water quality goals (MCLGs), set at levels of no known or anticipated adverse health effect, with an adequate margin of safety. MCLGs do not take cost or feasibility into account. Under SDWA, MCLGs are goals, not enforceable standards. Recommended Maximum Contaminant Levels (RMCLs) are identical to and are converted to MCLGs in the 1986 amendments to the SDWA. | Section 121 (d)(2)(A) of CERCLA, as amended by SARA, states that "...remedial action shall require a level or standard of control which at least attains Maximum Contaminant Level Goals established under the Safe Drinking Water Act...where such goals or criteria are relevant and appropriate under the circumstances of the release or threatened release". The EPA considers that the use of MCLGs will be determined on a case-by-case basis, but that there is no difference in the protectiveness of the MCLGs and MCLs for most contaminants and that MCLs provide a sufficient level of protectiveness even for carcinogens. |

TABLE 3-3

OTHER FEDERAL CRITERIA, ADVISORIES, AND GUIDANCE TO BE
 CONSIDERED FOR THE NAVAL AIR STATION ALAMEDA
 (Continued)

| <u>Standard Requirement, Criteria, Limitation</u> | <u>Citation</u> | <u>Description</u> | <u>Comments</u> |
|---|---|---|---|
| Clean Water Act | 33 USC Section 1251 - 1376 | Established a system of minimum national effluent discharge standards; a construction grant program for POTWs; ocean discharge requirements; and water quality criteria. | |
| Water Quality Criteria | 40 CFR Part 131 Quality Criteria for Water (1976, 1980, 1986) | Nonenforceable criteria for water quality to protect human health and aquatic life. From the water quality criteria, states adopt water quality standards that protect a designated use. A water quality standard defines the water quality goals of a body of water by designating the use or uses of the water and by setting criteria necessary to protect the uses. The law allows that states may develop water quality standards more stringent than required by the regulation. In addition the law requires states to develop and adopt a statewide antidegradation policy. | CERCLA requires that the remedy selected must "require a level or standard of control which at least attains...water quality criteria established under Section 304 or 303 of the Clean Water Act, where such...criteria are relevant and appropriate with the circumstances of the release or threatened release." CERCLA also requires that "In determining whether any water quality criteria...is relevant and appropriate...the President shall consider the designated or potential use of the surface or ground water, the environmental media affected, the purpose for which the criteria were developed, and the latest information available." |

TABLE 3-4

POTENTIAL STATE OF CALIFORNIA STANDARDS, REQUIREMENTS, CRITERIA, AND LIMITATIONS FOR HAZARDOUS WASTE CLEANUPS PURSUANT TO SECTION 121 (D) (2) OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT, SEPTEMBER 1987

I. Statutes and Regulations

| <u>Statutes</u> | <u>Regulations</u> | <u>Applicability</u> ² | <u>Regulatory Agency</u> |
|--|---|--|---|
| Air Resources Act Health and Safety Code, Division 26, Section 39000 et seq. | 17 CAC, Part III, Chapter 1 Section 60,000 et seq, | Air Quality (Refer also to air district requirements, in Section II) | Air Resources Board |
| California Coastal Act of 1976 Public Resources Code, Division 20 Section 30,000 et seq. | | Activities in Coastal Zone Coastal Management Program | California Coastal Commission |
| California Environmental Quality Act, Public Resources Code Division 13, Section 21000 et seq. | 14 CAC, Division 6, Chapter 3 Section 15000 et seq. | CEQA Law and Guidelines. EIR process and alternatives. | Resources Agency Office of Planning and Research |
| California Health and Safety Code Div. 20 | California Administrative Code, Title 22, Division 4 Chapter 30, Minimum Standards for Management of Hazardous and Extremely Hazardous Wastes. | | Department of Health Services |
| Chapter 6.5 Hazardous Waste Wastes. | | Management and Control of TSD facilities, Transportation, Hauling, Laboratories, Fees, Waste Classification. | Department of Health Services |

TABLE 3-4

POTENTIAL STATE OF CALIFORNIA STANDARDS, REQUIREMENTS, CRITERIA, AND LIMITATIONS
 FOR HAZARDOUS WASTE CLEANUPS PURSUANT TO SECTION 121 (D) (2)
 OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT, SEPTEMBER 1987
 (Continued)

I. Statutes and Regulations

| <u>Statutes</u> | <u>Regulations</u> | <u>Applicability</u> ² | <u>Regulatory Agency</u> |
|---|--------------------|--|--|
| Chapter 6.6 Safe Drinking Water and Toxics Enforcement Act (Proposition 65) | | Reproductive Toxin Levels Reporting of hazardous materials releases to local government | Department of Health Services |
| Chapter 6.7 Underground Storage of Hazardous Substances | | Underground tank construction and containment | Department of Health Services State Water Resources Control Board Regional Water Quality Control Board |
| Chapter 6.8 Hazardous Substance Account | | Principle requirement governing State Superfund and Board program abandoned sites, emergency response, victim's compensation | Department of Health Services |
| Chapter 6.91 Hazardous Materials Duty | | Notification to local government officials of the use of and dangers imposed by hazardous materials. Community information program. | Office of Emergency Services |

TABLE 3-4

POTENTIAL STATE OF CALIFORNIA STANDARDS, REQUIREMENTS, CRITERIA, AND LIMITATIONS
FOR HAZARDOUS WASTE CLEANUPS PURSUANT TO SECTION 121 (D) (2)
OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT, SEPTEMBER 1987
(Continued)

I. Statutes and Regulations

| <u>Statutes</u> | <u>Regulations</u> | <u>Applicability</u> ² | <u>Regulatory Agency</u> |
|--|---|--|---|
| | | Community information program | |
| Chapter 6.95 Hazardous Materials Release Response Plans and Inventory | 19 CAC, Chapter 3, Subchapter 3 | Emergency plans in the event of hazardous materials release or threatened release | Office of Emergency Services |
| Chapter 6.98 Environmental Quality Assessment | | Registration of Environmental Assessors | Department of Health Services State Water Resources Control Board Air Resources Board |
| California Safe Drinking Water Act. Health and Safety Code, Division 7, Part 1, Chapter 7 Section 4010 et seq. | California Administrative Code, Title 22, Division 4, Chapter 15, Domestic Water Quality and Monitoring | Public Water Systems Drinking Water Standards Maximum Contaminant Levels (MCLs), Lab Certification | Department of Health Services, Sanitary Engineering |
| Hazardous Substances Act, Health and Safety Code Division 22, Chapter 13, Section 28740 et seq. | | "Hazardous Substance" and "Toxic" broadly defined | Department of Health Services |
| Occupational Health and Safety Act, Labor Code Section 6300 et seq. | | Worker safety, responsibilities and duties of employer | Department of Industrial Relations, Division of Industrial Safety |

TABLE 3-4

POTENTIAL STATE OF CALIFORNIA STANDARDS, REQUIREMENTS, CRITERIA, AND LIMITATIONS
 FOR HAZARDOUS WASTE CLEANUPS PURSUANT TO SECTION 121 (D) (2)
 OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT, SEPTEMBER 1987
 (Continued)

I. Statutes and Regulations

| <u>Statutes</u> | <u>Regulations</u> | <u>Applicability</u> ² | <u>Regulatory Agency</u> |
|--|--|---|--|
| Porter Cologne Water Quality Control Act, Water Code, Division 7 Section 13000 et seq. | California Administrative Code, Title 23, Chapter 3 Subchapter 9, Waste Discharge Reports and Requirements Subchapter 9.1, Enforcement Procedures and Septic Tank Prohibition Review by the (Water) Board. Subchapter 10, Licensing and Regulation of Use of Oil Spill Cleanup Agents. Subchapter 13, Registration and Regulation of Liquid Waste Haulers Subchapter 15, Discharges of Waste to Land. | Identification of general duties and authorities of State and Regional Water Boards | State Water Resources Control Board Regional Water Quality Control Board Department of Health Services |

TABLE 3-4

POTENTIAL STATE OF CALIFORNIA STANDARDS, REQUIREMENTS, CRITERIA, AND LIMITATIONS
 FOR HAZARDOUS WASTE CLEANUPS PURSUANT TO SECTION 121 (D) (2)
 OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT, SEPTEMBER 1987
 (Continued)

I. Statutes and Regulations

| <u>Statutes</u> | <u>Regulations</u> | <u>Applicability</u> ² | <u>Regulatory Agency</u> |
|--|--|--|--------------------------------|
| | (23 CAC, Chapter 3 Cont.) Subchapter 16, Underground Tank Regulation | Underground Tanks | |
| | Subchapter 20, Standards for Removal of Sewage from Vessels | | |
| Fish and Game Code, Division 6 Part 1, Chapter 2, Sections 5650 and 5651 | | Fish and Wildlife, Water Pollution Prohibition, Correction of Chronic Water Pollution | Department of Fish and Game |
| | California Administrative Code, Title 8, Chapter 4 | Health and Safety Re- quirements | |
| | Subchapter 4, Construction Safety Orders | | |
| | Subchapter 5, Electrical Safety Orders | | |
| | Subchapter 7, General Industry Safety Orders | | |

TABLE 3-4

POTENTIAL STATE OF CALIFORNIA STANDARDS, REQUIREMENTS, CRITERIA, AND LIMITATIONS
FOR HAZARDOUS WASTE CLEANUPS PURSUANT TO SECTION 121 (D) (2)
OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT, SEPTEMBER 1987
(Continued)

I. Statutes and Regulations

| <u>Statutes</u> | <u>Regulations</u> | <u>Applicability</u> ² | <u>Regulatory Agency</u> |
|-----------------|---|--|---|
| | California Administrative Code, Title 14, Division 7, Chapter 3. Standards for Solid Waste Handling and Disposal. | | Solid Waste Management Board |
| | California Administrative Code, Title 17, Chapter 5, Subchapter 4, Group 3 Article 6, Section 30298. | Cleanup of radioactive bearing hazardous waste in buildings. | Department of Health Services |
| | California Administrative Code, Title 19, Chapter 2, Subchapter 3, Hazardous Materials Release Response | Emergency Response (Office of Emergency Services) | Office of Emergency Services (OES) |
| | California Administrative Code, Title 23, Chapter 4, Subchapter 15. Regulations for Implementation of the California Environmental Quality Act of 1970 (Water Board Requirements) | Water Board CEQA Regulations | State Water Resources Control Board, Regional Water Quality Control Board |
| | California Administrative Code, Title 26, Toxics | Directory of Toxic Related Regulations. | Office of Administrative Law |

TABLE 3-4

POTENTIAL STATE OF CALIFORNIA STANDARDS, REQUIREMENTS, CRITERIA, AND LIMITATIONS
FOR HAZARDOUS WASTE CLEANUPS PURSUANT TO SECTION 121 (D) (2)
OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT, SEPTEMBER 1987
(Continued)

| <u>II. Other Standards, Requirements, Criteria, and Limitations</u> | <u>Applicability²</u> | <u>Regulatory Agency</u> |
|---|--|--|
| All policies and procedures for hazardous waste and hazardous materials management and cleanup adopted by the Toxic Substances Control Division. Control Division. | | Department of Health Services |
| Department of Health Services Decision Tree. | Development of site-specific Cleanup levels evaluation of remedial action alternatives | Department of Health Services |
| Department of Health Services Exposure Criteria | | Department of Health Services |
| <ul style="list-style-type: none"> o RMCLs, MCLs, and action levels for unregulated chemicals in drinking water. o Applied action levels developed by the Toxic Substances Control Division. o Other cleanup levels developed by the Toxic Substances Control Division on a site specific basis. | | |
| Toxic air quality criteria policies or standards generated by the Department of Health Services or the Air Resources Board. | | Department of Health Services, Air Resources Boards |

TABLE 3-4

POTENTIAL STATE OF CALIFORNIA STANDARDS, REQUIREMENTS, CRITERIA, AND LIMITATIONS
FOR HAZARDOUS WASTE CLEANUPS PURSUANT TO SECTION 121 (D) (2)
OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT, SEPTEMBER 1987
(Continued)

| <u>II. Other Standards, Requirements, Criteria, and Limitations (Con't)</u> | <u>Applicability²</u> | <u>Regulatory Agency</u> |
|--|--|---|
| Air Pollution Control District regulations. | | Local Air Pollution Control District |
| South Coast Air Quality Management District Rule 1150, Excavation of Landfill Sites | Permit requirements for excavation at landfill sites. | South Coast Air Quality Management District |
| South Coast Air Quality Management District Rule 1150.1, Control of Gaseous Emissions from Active Landfills. Storage Tanks | Gas collection at active landfills. | South Coast Air Quality Management District Underground |
| Bay Area Air Quality Management District Regulation B Rule 40, Aeration of Contaminated Soil and Removal of Underground Storage Tanks. | Control of organic compounds during removal of underground tanks | Bay Area Air Quality Management District |
| Water Quality Control plans of the State Water Resources Control Board and the Regional Water Quality Control Board | Water Quality and Basin Plans | State Water Resources Control Board Regional Water Quality Control Board |
| Other requirements of the State Water Resources Control Board and Regional Water Quality Control Boards. | | State Water Resources Control Board Regional Water Quality Control Board |

TABLE 3-4
(Continued)

POTENTIAL STATE OF CALIFORNIA STANDARDS, REQUIREMENTS, CRITERIA, AND LIMITATIONS
FOR HAZARDOUS WASTE CLEANUPS PURSUANT TO SECTION 121 (D) (2)
OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT, SEPTEMBER 1987

| <u>II. Other Standards, Requirements, Criteria, and Limitations (Con't)</u> | <u>Applicability²</u> | <u>Regulatory Agency</u> |
|--|---|---|
| All policies and procedures for water quality control adopted by the State Water Resources Control Board and the nine Regional Water Quality Control Boards. | Includes "Non Degradation" Policy | State Water Resources Control Board Regional Water Quality Control Board |
| Regional Water Quality Control Board cleanup levels. | | Regional Water Quality Control Board |
| Regional Water Quality Control Board site remediation guidance and criteria. | | Regional Water Quality Control Board |
| All county hazardous waste management plans. | | Department of Health Services |
| Hazardous Waste Move Committee Memorandum of Understanding | Transportation of Hazardous waste during cleanup. | Department of Health Services, Department of Transportation, Highway Patrol |
| General Orders of the Public Utilities Commission | | Public Utilities Commission |

TABLE 3-4

POTENTIAL STATE OF CALIFORNIA STANDARDS, REQUIREMENTS, CRITERIA, AND LIMITATIONS
FOR HAZARDOUS WASTE CLEANUPS PURSUANT TO SECTION 121 (D) (2)
OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT, SEPTEMBER 1987
(Continued)

Notes:

1. Pursuant to the Superfund Amendments and Reauthorization Act, Section 121 (e), and associated state policies and requirements, permits may not be mandatory at Superfund sites.
2. The "Applicability" column is intended only to highlight some major elements of the statute or regulation. It is not designed to denote which sections of the code or statute apply.
3. The Department of Health Services has reserved the right to amend this list pursuant to the intent of the Superfund Amendments and Reauthorization Act.

Source: California Department of Health Services, 1988, Attachment to January 5, 1988 letter to Captain P. W. Drennon from Dwight R. Hoenig, Toxic Substances Control Division.

^aThe text of the body of this table has not been altered; thus the California Code of Regulations still appears as California Administrative Code or CAC

TABLE 3-5a

POTENTIAL REMEDIAL TECHNOLOGIES
FOR THE NAVAL AIR STATION ALAMEDA

| Technology | Applicable to Site Chemicals ⁽¹⁾ | Applicable to Site Conditions ⁽²⁾ |
|--|--|---|
| <u>Containment</u> | | |
| I. Vertical Impermeable Barriers A. Slurry Wall B. Grout Curtain | | |
| II. Horizontal Impermeable Barriers: Grout Injection | | |
| III. Ground Water Pumping Wells | | |
| IV. Surface Capping | | |
| V. Natural Phreatophytes | | |
| <u>Removal</u> | | |
| I. Excavation of Soil A. Full B. Partial 1. Open-Pit 2. Sheet-Piled 3. Caisson | | |
| II. Ground Water Extraction | | |
| <u>Treatment</u> | | |
| I. Organics A. Incineration 1. Rotary Kiln 2. High-pressure Boilers 3. Electric Infrared Furnace 4. Fluidized Bed 5. Circulating Bed Combuster 6. Electric Pyrolyzer 7. Plasma Arc (Pyroplasma System) B. Chemical Treatment 1. Chemical oxidation a. Ozone b. UV/Ozone c. Peroxide d. UV/Peroxide e. Wet Air 2. Dechlorination | | |

TABLE 3-5a

POTENTIAL REMEDIAL TECHNOLOGIES:
FOR THE NAVAL AIR STATION ALAMEDA
(Continued)

| <u>Technology</u> | <u>Applicable to Site Chemicals</u> (1) | <u>Applicable to Site Conditions</u> (2) |
|---|---|--|
| <u>Treatment (Continued)</u> | | |
| I. Organics (Continued) | | |
| C. Physical Treatment | | |
| 1. Air Stripping | | |
| a. Elevated Temperature | | |
| b. Ambient Temperature | | |
| 2. Activated Carbon Adsorption | | |
| a. Liquid-Phase | | |
| b. Vapor-Phase | | |
| 3. Aeration | | |
| a. Ambient Temperature | | |
| b. Low Temperature Thermal | | |
| D. Biological Treatment: Sequencing Batch Reactors | | |
| II. Metals | | |
| A. Precipitation | | |
| 1. Hydroxide | | |
| 2. Carbonate | | |
| 3. Sulfide | | |
| 4. Combined | | |
| B. Coagulated/Flocculation | | |
| C. Flotation | | |
| D. Ion Exchange | | |
| E. Liquid Ion Exchange/ Liquid-Liquid Extraction | | |
| F. Cementation | | |
| G. Electrochemical Operations | | |
| H. Biological Operations | | |
| I. Adsorption: Carbon Activated | | |
| J. Membrane Operation Reverse Osmosis | | |
| K. Alkaline Chlorination | | |
| M. Incineration | | |
| N. Alga/Sorb | | |
| III. Corrosives | | |
| A. Neutralization | | |
| B. Sedimentation | | |
| C. Filtration | | |

TABLE 3-5a

POTENTIAL REMEDIAL TECHNOLOGIES:
FOR THE NAVAL AIR STATION ALAMEDA
(Continued)

| <u>Technology</u> | <u>Applicable to Site Chemicals</u> (1) | <u>Applicable to Site Conditions</u> (2) |
|--|---|--|
| <u>Disposal</u> | | |
| I. Off-Site Disposal | | |
| A. Excavated Soil Containing Chemicals | | |
| B. Treated Ground Water | | |
| II. ReInjection of Extracted and Treated Ground Water | | |
| <u>In-Situ Treatment</u> | | |
| I. Ground Water Flushing: Surfactants | | |
| II. Solvent Extraction | | |
| III. Vacuum Extraction/Aeration | | |
| IV. Steam Flushing | | |
| V. Thermal Stripping | | |
| VI. Enhanced Biodegradation | | |
| VII. Stabilization | | |
| VIII. Vitrification | | |

(1) Applicable to treatment of the chemicals at the site.

(2) Suitable for implementation at the site. Compatible with physical site characteristics.

REMEDIAL TECHNOLOGIES

A. Surface Water Controls

Capping (See B.)

Grading

Scarification

Tracking

Contour furrowing

Revegetation

Grasses

Legumes

Shrubs

Trees, conifers

Trees, hardwoods

Diversion and Collection Systems

Dikes and berms

Ditches and trenches

Terraces and benches

Chutes and downpipes

Seepage basins

Sedimentation basins and ponds

Levees

Addition of freeboard

Floodwalls

B. Air Pollution Controls

Capping

Synthetic membrane

Clay

Asphalt

Multimedia cap

Concrete

Chemical sealants/stabilizers

Dust Control Measures

Polymers

Water

REMEDIAL TECHNOLOGIES
(Continued)C. Leachate and Ground Water Controls

Capping (See B.)

Containment barriers

Function options

Downgradient placement

Upgradient placement

Circumferential placement

Material and construction options (vertical barriers)

Soil-bentonite slurry wall

Cement-bentonite slurry wall

Vibrating beam slurry wall

Grout curtains

Steel sheet piling

Horizontal barriers (bottom sealing)

Block displacement

Grout injection

Ground water pumping (generally used with capping and treatment)

Functional options

Extraction and injection

Extraction alone

Injection alone

Equipment and material options

Well points

Deep wells

Suction wells

Injection wells

Subsurface Collection Drains

French drains

Tile drains

Pipe drains (dual media drains)

TABLE 3-5b

REMEDIAL TECHNOLOGIES
(Continued)D. Gas Migration Controls (generally used with treatment)

Capping [gas barriers (See B.)]

Gas collection and/or recovery

Passive pipe vents

Passive trench vents

Active gas collection system

E. Excavation and Removal of Waste and Soil

Excavation and removal

Backhoe

Cranes and attachments

Front-end loaders

Scrapers

Pumps

Industrial vacuums

Drum grapplers

Forklifts and attachments

Grading (See A.)

Capping (See B.)

Revegetation (See A.)

F. Removal and Containment of Contaminated Sediments

Sediment removal

Mechanical Dredging

Clamshell

Dragline

Backhoe

Hydraulic dredging

Plain suction

Cutterhead

Dustpan

Pneumatic dredging

Airlift

Pneuma

Oozer

REMEDIAL TECHNOLOGIES
(Continued)F. Removal and Containment of Contaminated Sediments (Continued)

Sediment turbidity controls and containment

- Curtain barriers
- Coffer dams
- Pneumatic barriers
- Capping

G. In-Situ Treatment

- Hydrolysis
- Oxidation
- Reduction
- Soil aeration
- Solvent flushing
- Neutralization
- Polymerization
- Sulfide precipitation
- Bioreclamation
- Permeable treatment beds
- Chemical dechlorination

H. Direct Waste Treatment

Incineration

- Rotary Kiln
- Fluidized bed
- Multiple hearth
- Liquid injection
- Molten salt
- High-temperature fluid wall
- Plasma arc pyrolysis
- Cement kiln
- Pyrolysis/starved combustion
- Wet air oxidation
- Industrial boiler or furnace

REMEDIAL TECHNOLOGIES
(Continued)H. Direct Waste Treatment (Continued)

Gaseous waste treatment

- Activated carbon
- Flares
- Afterburners

Treatment of aqueous and liquid waste streams

- Activated sludge
- Trickling filters
- Aerated lagoons
- Waste stabilization ponds
- Rotating biological disks
- Fluidized-bed bioreactors

Chemical treatment

- Neutralization
- Precipitation
- Oxidation
- Hydrolysis
- Reduction
- Chemical dechlorination
- Ultraviolet/ozonation

Physical treatment

- Floor equalization
- Flocculation
- Sedimentation
- Activated carbon
- Kleensorb
- Ion exchange
- Reverse osmosis
- Liquid-liquid extraction
- Oil-water separator
- Steam distillation
- Air stripping
- Filtration
- Dissolved air flotation

TABLE 3-5b

REMEDIAL TECHNOLOGIES
(Continued)

H. Direct Waste Treatment (Continued)

Discharge to a publicly owned treatment works

Solids handling and treatment

Screens, hydraulic classifiers, scalpers
Centrifuges
Gravity thickening
Flocculation, sedimentation
Belt filter presses
Filter presses
Drying or dewatering beds
Vacuum-assisted drying beds

Treatment

Neutralization
Solvent
Oxidation
Reduction
Composting

Solidification, stabilization, or fixation

Cement-based
Lime-based
Thermoplastic
Organic polymer
Self-cementing techniques
Surface encapsulation
Gasification
Solidification (ie, to fly ash, polymers, sawdust)

I. Contaminated Water Supplies and Sewer Lines

In-situ cleaning

Removal and replacement

Alternative drinking water supplies

Cisterns or tanks
Deeper or upgradient wells
Municipal water systems
Relocation of intake

Individual treatment wells

TABLE 3-5b

REMEDIAL TECHNOLOGIES
(Continued)

J. Land Disposal Storage

Landfills

Surface impoundments

Land application

Waste piles

Deep well injection

Temporary storage

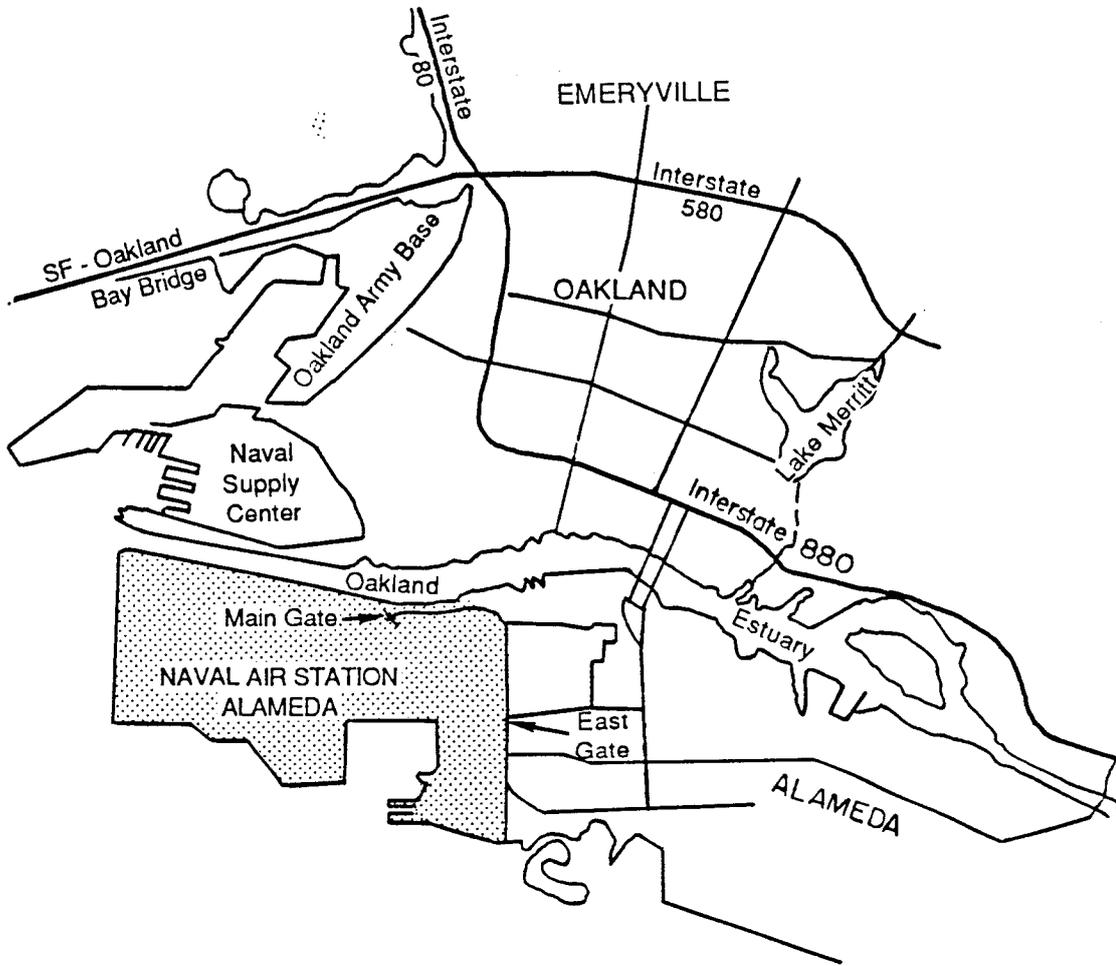
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ALAMEDA POINT
SSIC NO. 5090.3

FIGURES

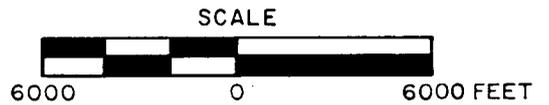
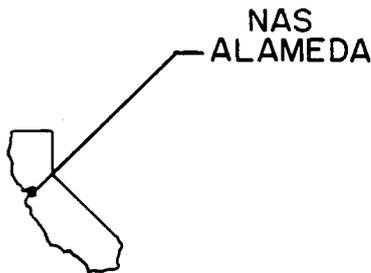
FINAL FEASIBILITY STUDY PLAN REMEDIAL INVESTIGATION/FEASIBILITY STUDY

DATED 01 JANUARY 1990

| | | | | | |
|----------|-----|------|------------|-------------|----------------|
| REVISION | NO. | DATE | CHECKED BY | APPROVED BY | DRAWING NUMBER |
| | | | CC | | 86-018-A1 |
| | | | LEH | | |
| | | | 5-4-88 | | |



SITE LOCATION



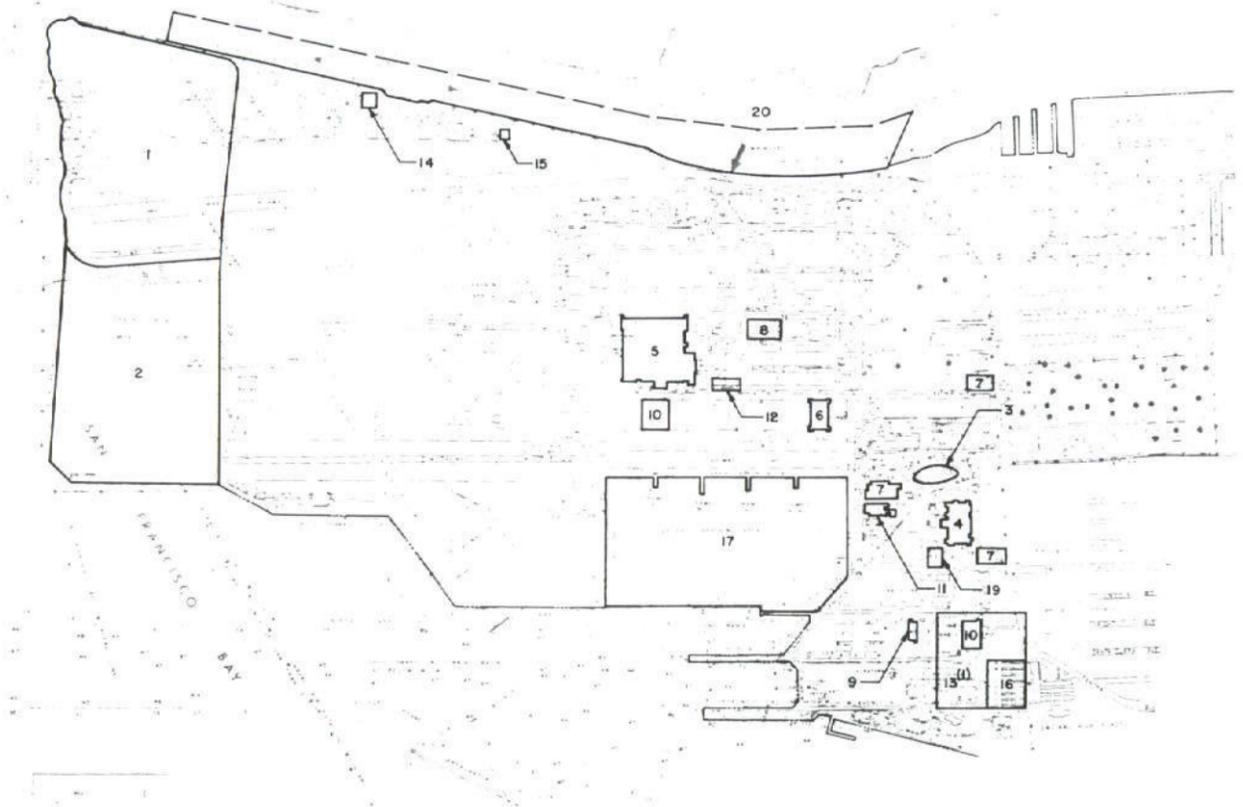
SITE LOCATION PLAN
 NAVAL AIR STATION
 ALAMEDA, CALIFORNIA

PREPARED FOR
 WESTERN DIVISION
 NAVAL FACILITIES ENGINEERING
 COMMAND

Canonie Environmental

| | | |
|-----------------|------------|----------------|
| DATE: 5-4-88 | FIGURE 1-1 | DRAWING NUMBER |
| SCALE: AS SHOWN | | 86-018-A1 |

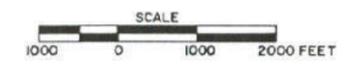
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 NO. DATE
 REVISIONS



NOTES:
 1. THE AREA OF SITE 13 INCLUDES THE AREAS OF SITES 10 AND 16.

LEGEND:

| Site No. | Site Description |
|----------|---|
| 1 | 1943-1956 Disposal Site |
| 2 | West Beach Landfill |
| 3 | Area 97 (Aviation Gasoline Tanks) |
| 4 | Building 360 (Plating Shop, Engine Cleaning Shop, Paint Shop, and Paint Stripping Shop) |
| 5 | Building 5 (Plating Shop, Paint Stripping Shop, Cleaning Shop, and Paint Shop) |
| 6 | Building 41 (Aircraft Intermediate Maintenance Dept.) |
| 7 | Buildings 162, 459, and 547 (Service Stations) |
| 8 | Building 114 (Pest Control Area and Separator Pit) |
| 9 | Building 410 (Paint Stripping) |
| 10 | Buildings 400 and 530 (Missile Rework Operations) |
| 11 | Building 14 (Engine Test Cell) |
| 12 | Building 10 (Power Plant) |
| 13 | Oil Refinery |
| 14 | Fire Training Area |
| 15 | Buildings 301 and 389 (Storage Area) |
| 16 | Cans C-2 Area |
| 17 | Seaplane Lagoon |
| 18 | Station Sewer System (Not on Site) |
| 19 | Yard D-13 (Hazardous Waste Solvents) |
| 20 | Estuary (Oakland Inner Harbor) |



REMEDIAL INVESTIGATION/FEASIBILITY
 STUDY SITES
 NAVAL AIR STATION
 ALAMEDA, CALIFORNIA

PREPARED FOR
 WESTERN DIVISION
 NAVAL FACILITIES ENGINEERING COMMAND
 SAN BRUNO, CALIFORNIA



DATE: 7-27-88
 SCALE: [Blank]
 FIGURE 1-2
 DRAWING NUMBER 86-018-E3

APPENDIX A
NAVY RESPONSES TO COMMENTS
FROM THE DEPARTMENT OF HEALTH SERVICES

APPENDIX A
NAVY RESPONSES TO COMMENTS
FROM THE DEPARTMENT OF HEALTH SERVICES

This appendix provides the Navy's responses to the comments made by the California Department of Health Services (DHS) concerning the Feasibility Study Plan, Volume 8 of the Remedial Investigation/Feasibility Study (RI/FS) Work Plan for the Naval Air Station Alameda (NAS Alameda) in Alameda, California.

Comment 1 (Page 9, Section 3.1)

The list of "Potential ARARs" in tables 3-2 and 3-3 are only the Federal ARARs. A table should be made which would include State standards, requirements and criteria for hazardous waste cleanups pursuant to Section 121 (d) of SARA. Examples include, California Coastal Act, California Environmental Quality Act, California Health and Safety Code Div. 20, California Code of Regulation Title 22, California Safe Drinking Water Act and the Porter Cologne Water Quality Control Act.

Response 1

The text of Section 3.1 has been revised to clarify that Table 3-2 presents a list of potential legally applicable or relevant and appropriate Federal standards, requirements, criteria, or limitations for the NAS Alameda site and that Table 3-3 presents a list of other Federal criteria, advisories, and guidance to be considered for the NAS Alameda site. An additional table to present potential State of California standards, requirements, criteria, and limitations for hazardous waste cleanups has been added as Table 3-4. The full consideration of legally applicable or relevant and appropriate requirements (ARARs) and development of ARARs for the NAS Alameda site will be performed during the feasibility study described in

the Feasibility Study Plan after evaluation of the additional data generated during the RI phase of the RI/FS. Please note that Tables 3-4a and 3-4b have been renumbered as Tables 3-5a and 3-5b to allow the addition of the table of state standards as Table 3-4.

Comment 2 (Page 12, Section 3.2.2.2)

The soils section does not address the Estuary, Seaplane Lagoon and coastline bay muds as "affected media." The Department expects the Navy to address the bay muds during the Remedial Investigation and therefore these bay muds should also be included in the Feasibility Study Plan.

Response 2

The text of Section 3.2.2.2 has been amended to state that the bay muds of the Estuary, Seaplane Lagoon and along the western and southern coastline of NAS Alameda must also be considered as affected media at the site.

Comment 3 (Page 13, Section 3.3.1)

The Regional Water Quality Control Board sent a letter (27 June 1989) to the Navy which identified that the ground water should be considered potable.

The bay muds which are below the site are geologically immature, have not been compacted or dewatered and cannot be expected to act as an impermeable bed to "prevent the migration of many chemicals."

Response 3

The text of Section 3.3.1 has been revised to indicate that the California Regional Water Quality Control Board for the San Francisco Bay Region (RWQCB) has directed that the ground water at the site be considered potable.

The statement that "the bay mud below the site should prevent the migration of many chemicals" has been deleted from the text of Section 3.3.1. However, the bay mud underlying the NAS Alameda site can be expected to serve as a substantial barrier to vertical movement of ground water. Hydraulic conductivity tests were performed on samples of bay mud underlying a similar site directly across the Oakland Inner Harbor Estuary from NAS Alameda. This site was reclaimed by filling over a bay mud marsh area between approximately 1900 and 1920. Laboratory tests indicated that the hydraulic conductivity of samples of the bay mud underlying this site ranged between 2×10^{-7} cm/sec and 6×10^{-8} cm/sec (Canonie, 1989). These values certainly qualify the bay mud under these conditions as a substantial aquitard. Statements regarding this have been included in Section 3.3.1, while noting that the effectiveness of the bay muds in preventing the migration of chemicals has not yet been established.

Comment 4 (Table 3-1)

Update Table 3-1 to reflect the new Maximum Contaminant Levels. The table should include chemicals listed in Title 22, Article 5.5, Section 64444.5.

Response 4

Table 3-1 has been updated to reflect the new Maximum Contaminant Levels for the chemicals already listed in that table. However, additional chemicals from Title 22, Article 5.5, Section 64444.5 have not been added to the table. Table 3-1 is not intended to present a complete list of cleanup standards at this time. It provides examples of possible cleanup standards to support the discussions regarding procedures for selecting ARARs. The cleanup standards for NAS Alameda will be established during the performance of the feasibility study described in the Feasibility Study Plan, and many of the MCLs are likely to change before the feasibility study begins. The text of Section 3.1 has been revised to clarify that Table 3-1 presents examples of possible cleanup standards.