SITE 15 TSTA: ACTION MEMORANDUM
NON-TIME CRITICAL REMOVAL ACTION
FINAL

NAVAL AIR STATION, ALAMEDA
ALAMEDA, CALIFORNIA
November 10, 1997

Prepared by:

Moju Environmental Technologies, Inc.
315 Washington Street, Suite 200
Oakland, CA 94607

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I. INTRODUCTION

This action memorandum documents the U.S. Navy decision to complete a non-time-critical removal action at the Temporary Storage Treatment Area (TSTA) for Site 15 soil. The TSTA, and Site 15 from where the soil was originally removed, are at the former Naval Air Station (NAS) Alameda, California. The Navy has decided to dispose of soil containing lead and polychlorinated biphenyl (PCB) compounds, which are stored at the TSTA, at an off-site landfill. This decision has been made after detailed review by the California Environmental Protection Agency (CALEPA), the United States Environmental Protection Agency (USEPA), and the public. The Navy decision has been guided by regulatory requirements, a desire to protect human health and the environment and by concerns for selecting a cleanup option with permanent results.

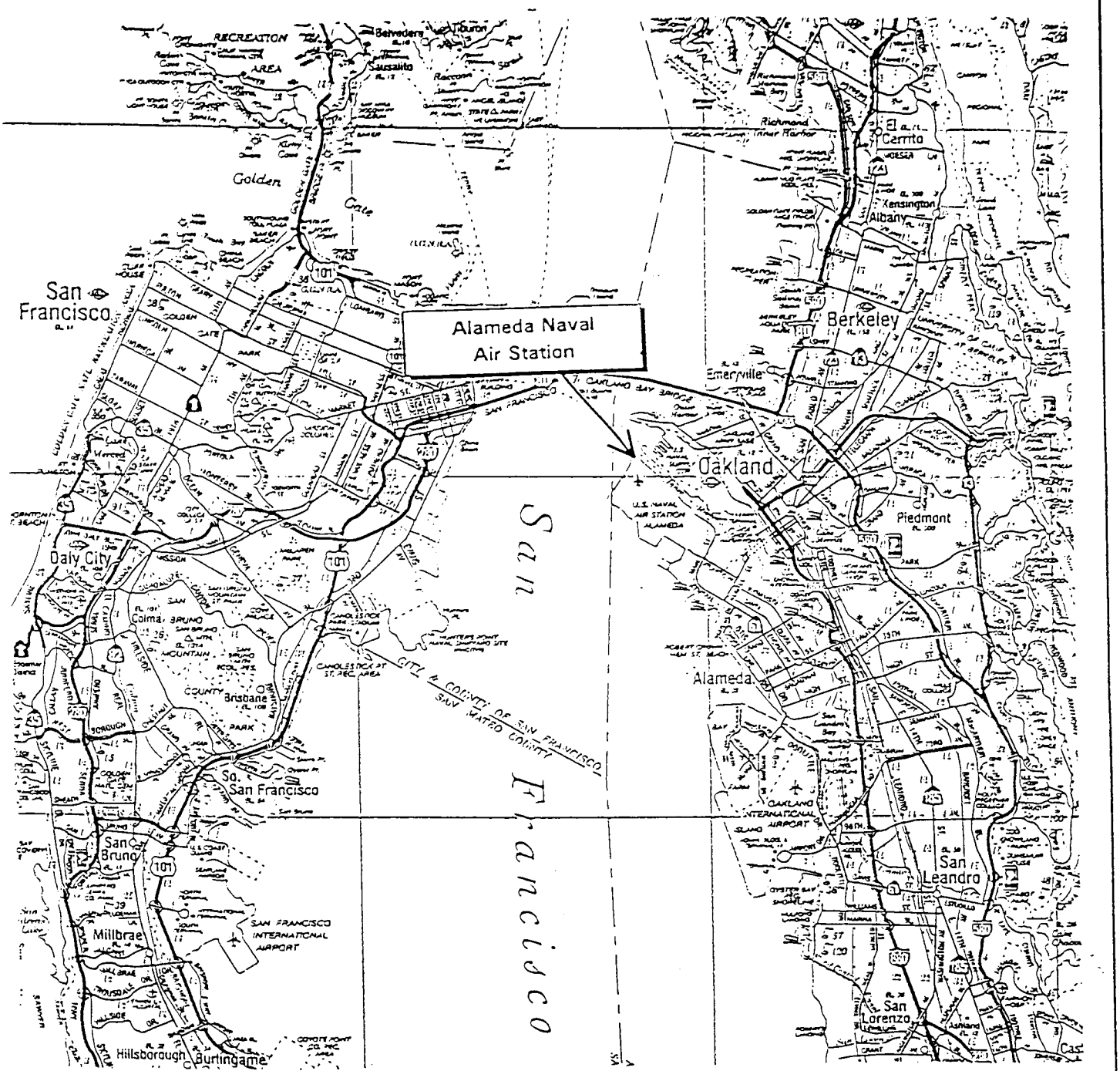
II. SITE CONDITIONS AND BACKGROUND

The following section provides a general description of the TSTA, a description of actions to date, and the role of state and local agencies.

A. SITE DESCRIPTION

1. Site Location

The NAS Alameda complex occupies about 2,635 acres, and is located at the western end of Alameda Island in Alameda County, California. NAS Alameda is bounded to the north by the Oakland Inner Harbor, to the west and south by San Francisco Bay, and to the east by the City of Alameda. Military operations at the facility have ended and the facility is transitioning to civilian reuse. The NAS Alameda Facility is shown in relation to the City of Alameda on the Site Vicinity Map, Figure 1. The TSTA is located at the north-west end of Alameda Island. Relative to the NAS facility, the TSTA is located west of the central area, at the northern edge of the facility, north of Runway 7-25 and the Perimeter Road, approximately 300 feet south of the Oakland Inner Harbor. The TSTA site and Site 15 are shown in relation to the NAS Alameda complex on the NAS Site Plan, Figure 2



N

Not In Scale

Resource: California AAA Maps

Figure 1
SITE VICINITY MAP
ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

Mojas Environmental Technologies

December, 1996

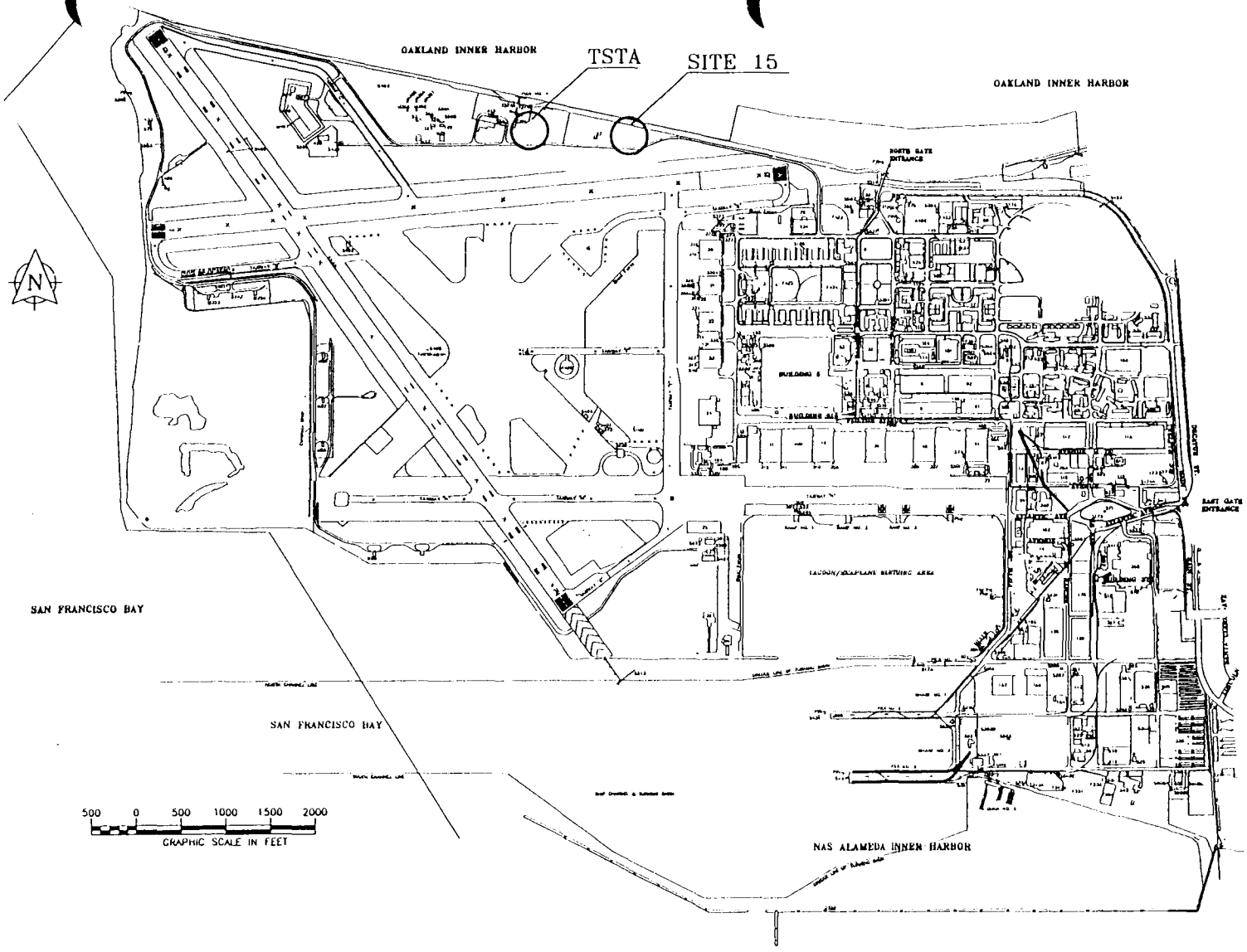


Figure 2.
NAS SITE PLAN

2. Site Description

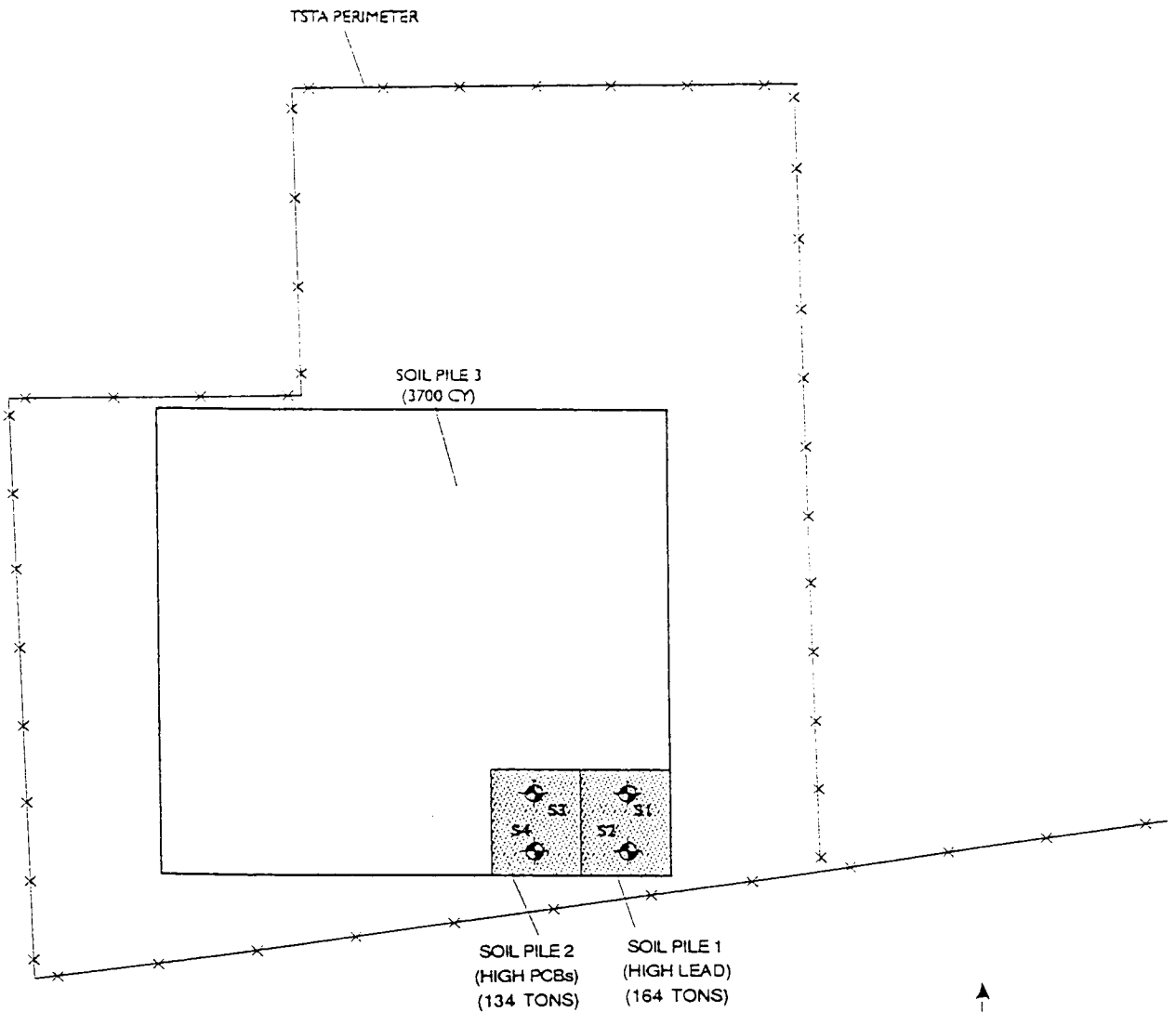
Soil in the TSTA was originally located at Site 15 and was transferred to the TSTA during an earlier removal action. The construction of the TSTA is described in a Construction Work Plan and Workplan Addendum prepared by IT Corporation in the fall of 1995. The TSTA site is largely unpaved and is surrounded by an approximately 8 foot high chain link fence. The TSTA has three stockpiles, which contain a total of about 5400 tons of soil. Key features of the TSTA are shown on the Site Plan, Figure 3. The stockpiles are covered by a plastic membrane. A water collection system surrounds the stockpiles. Water collected from the stockpile area is stored in tanks at the TSTA site, until analytical tests are conducted to determine if the collected water has been polluted or can be discharged.

3. Characterization of Soil Subject to Removal Action

The TSTA has three stockpiles which contain a total of about 5400 tons of affected soil. Stockpile 1 contains 164 tons and was intended to contain soil with the highest lead concentrations. Stockpile 2 contains 134 tons and was intended to contain soil with the highest PCB concentrations. Stockpile 3 contains soil with both lead and PCBs at lower concentrations. Stockpile 3 contains about 5100 tons of soil.

In the area of Site 15,where soil presently in Stockpile 1 was excavated, an evaluation of the pre-removal action investigation data estimated the average concentration of lead in the soil at 242 ppm. However, post excavation sampling of Stockpile 1 found an average lead concentration of only 111 ppm, indicating that some cleaner soil was also excavated during the removal action. Similarly, the average concentrations of PCBs, based on Site 15 sampling, are higher than what was found from Stockpile 2 sampling. Stockpile 3 has not been resampled after excavation from Site 15, but the trend for the concentrations to be lower in the stockpile than was estimated from pre-removal action data probably applies to this stockpile also. Based on the pre-removal action data, the Stockpile 3 average concentration of lead is 92 ppm, and for PCBs is 1.9 ppm.

TSTA Stockpiles 1 and 2 were recently resampled (Spring, 1997), to determine soluble concentrations of PCBs and lead. Four samples were collected, two from Stockpile 1 and two from Stockpile 2. The samples were analysed for total lead



SAMPLING LOCATIONS

SAMPLES ANALYZED FOR TOTAL LEAD, PCBs, CAL-WET TEST, CAL-WET WITH DEIONIZED WATER

Moju ENVIRONMENTAL TECHNOLOGY

PROJECT:

ALAMEDA CALIFORNIA

TSTA SITE
NAVAL AIR STATION, ALAMEDA
ALAMEDA, CALIFORNIA

TSTA Site Plan

MAY 15, 1997

Figure 3

and PCB concentrations, and potential solubility, via CAL-WET extraction with standard citrate buffer and CAL-WET extraction with deionized water. Based on the solubility of lead, soil in Stockpile 1 was found to have an average solubility (6 ppm) slightly above the regulatory threshold concentration (5 ppm) for classification as Hazardous Waste. Based on the information available, soil in Stockpile 1, about 2% of the soil at the TSTA, is likely to be classified as a California Hazardous Waste (but not a RCRA Waste) based on lead solubility. The remainder is a regulated waste subject to disposal requirements promulgated by the State of California for Class 2 and 3 land disposal.

The soil in the stockpiles is not a TSCA regulated waste, as the soil contains less than 50 ppm or more of PCBs (40 CFR Part 761.60 (c) (3) and (d); the maximum concentration of PCBs found in TSTA soil is 5.9 ppm, and the average is much less.

4. Site Characteristics

The TSTA was constructed solely as an interim storage area until a final resolution for the Site 15 removal action could be approved. The site is currently maintained under a RAC contract. Long term usage would require considerable continued maintenance and upgrading to meet requirements, include permits, for hazardous waste storage.

5. Release or Threatened Release

The TSTA was intended for short term storage, and not for permanent disposal. Soil stored at the site contains PCBs and lead. The soil is currently prevented from migrating to the environment by plastic membrane covers and a water collection system. These engineering controls require maintenance. Without such controls and maintenance, the soil is likely to migrate in the future, as dust or water borne sediment.

The proposed removal action is intended to reduce the potential for long term environmental impacts. The potential impacts are directly related to the criteria in the NCP 300.415(b)(2) and are:

- Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, pollutants, or contaminants. PCBs and lead may enter through direct contact and ingestion by burrowing animals or plant uptake and subsequent ingestion by wildlife. PCBs and lead are toxic by

ingestion and accumulate within animal tissue. No sensitive or endangered plant species exist at the TSTA.

- Concentrations of hazardous substances or pollutants or contaminants in soils that may migrate. PCBs and lead could be washed with surface water runoff into the nearby Oakland Inner Harbor during extremely high rainfall events.

- Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released. The Oakland Inner Harbor is about 300 feet from the TSTA. Arid weather conditions and high winds may cause PCBs in soil to become airborne on fugitive dust, thus affecting the Harbor.

6. National Priorities List (NPL) Status

NAS Alameda is not currently and is not proposed to be on the NPL.

B. OTHER ACTIONS TO DATE

1. Previous Investigations and Removal Action

Previous investigations of the soil in the TSTA were conducted primarily when the soil was at Site 15. These investigations are described in the Site 15 EE/CA. Other investigations included stockpile characterization conducted during the Site 15 removal action, and further stockpile characterization conducted to prepare the Site 15 EE/CA Addendum. The results of these investigations are summarized in Section II of this document

The original recommended removal action at Site 15 was off-site disposal. Off-site disposal was not utilized because the Navy attempted to implement the CERCLA preference for on-site treatment. Based on the CERCLA preference, a combined soil-washing/acid washing treatment process was selected as the recommended alternative. This alternative was again amended to allow assessment of an innovative-technology variant soil-washing process to be conducted under a USEPA innovative technology (SITE) assessment program (Site 15 Action Memorandum, Dec. 14, 1994).

After implementing the innovative technology treatment process, the method was found to be ineffective. An Administrative Memorandum (October 25, 1995) revising the 1994 Action Memorandum was prepared, and describes revisions to the Site 15 removal action as follows: "The Navy encountered unanticipated

conditions during soil washing, making it impossible to complete treatment of all soil before an Army Corps of Engineers sewer relocation project needed the site. Therefore the excavated soils must be relocated and stored while a treatment system is implemented near the TSTA. The soil derived from the Site 15 removal action was transported to the TSTA and is contained in three stockpiles there."

2. Current Actions

Further sampling and analytical testing of the TSTA soils is being conducted by the RAC Contractor (I.T. Corporation) to meet waste acceptance protocols for off-site land disposal facilities.

The adequacy of the removal action conducted at Site 15 will be assessed by a base wide Risk Assessment. The TSTA is not subject to this assessment as all the soil derived from Site 15 will be removed from the TSTA and disposed of at an off-site facility.

C. STATE AND LOCAL AUTHORITIES ROLE

Regulatory agencies that will have oversight responsibilities for site activities include:

USEPA- All remedial activities will be subject to USEPA review.

CALEPA DTSC- All remedial activities will be subject to CALEPA review.

BAAQMD - Will enforce requirements restricting discharges of pollutants to the atmosphere during remediation of the site.

City of Alameda: Will have control over traffic routes and noise levels.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT

This section describes the potential threat of contaminants to public health and the environment, if the contaminants were released to the environment.

A. THREATS TO PUBLIC HEALTH OR WELFARE

PCBs are highly persistent and bio-accumulate as pollutants. Chronic toxicity to the liver from long term exposure is reported. At high doses, it causes suppression of the immune

system, reproductive dysfunction, birth defects, and liver tumors. It is a suspected carcinogen.

Toxic effects in humans include chloracne, pigmentation of skin and nails, excessive eye discharge, swelling of eyelids, distinctive hair follicles, and gastrointestinal disturbances. Toxic symptoms in animals include hepatocellular carcinoma, hypertrophy of the liver, adenofibrosis, weight and hair loss, mouth and eyelid edema, acneform lesions, decreased hemoglobin and hematocrit, gastric mucosal ulceration, and reduced ability to reproduce. PCBs may reasonably be anticipated to be carcinogens.

Chronic exposure to lead generally results in 90% accumulation in the bones. Lead impairs the formation of red blood cells largely by inhibiting hemesynthetase and d-ala-dehydratase. Chronic lead poisoning results in anemia and lead encephalopathy. Symptoms include headache, giddiness, insomnia, amblyopia, deafness, depression, stupor, tremor, mania, delirium, convulsions, paralysis, ataxia, and coma. A neuromuscular syndrome called "lead palsy" may be evident. Acute toxicity is most common in young children with history of pica. Anorexia, vomiting, malaise, or convulsions due to increased intracranial pressure may occur. Chronic exposure to lead may leave permanent brain damage if blood lead is increased above 0.05%. Chronic toxicity is shown in children by weight loss, weakness, or anemia. Lead poisoning in adults is usually occupational due mainly to inhalation of lead dust or fumes. Wristdrop and colic rarely occur.

B. THREATS TO THE ENVIRONMENT

There are no sensitive ecosystems at the TSTA itself, which is partially covered by the TSTA stockpiles and stripped of vegetation. However, if the cover deteriorates, dust from the stockpiles or water borne sediment could be carried to nearby receptors and to the San Francisco Bay, where there are potentially sensitive aquatic life forms.

The largest nesting and breeding ground in Northern California for the California least tern is located on NAS Alameda. The least tern colony is 3300 feet away from the TSTA. Another endangered bird species, the California clapper rail, is found close by. NAS Alameda is also near a flatfish nesting area. Commercial fishing for herring and sports fishing for leopard sharks takes place in the Bay southeast of NAS Alameda. None of these environments are likely to be affected by the removal action at the TSTA, as fugitive dust will be very carefully controlled and potential migration through the storm water system will be prevented .

IV. ENDANGERMENT DETERMINATION

If not addressed by implementing the response actions described in this action memorandum, actual or threatened releases of hazardous substances from this site may pose an imminent and substantial endangerment to public health or welfare or the environment.

V. PROPOSED ACTION AND ESTIMATED COSTS

This section describes the details of the proposed removal action at Site 15 and other alternatives, the regulations that apply to the preferred removal action, and its estimated costs.

A. PROPOSED ACTIONS

1. Proposed Action Description

Prior to conducting soil removal, the stockpiles will be sampled and the samples subjected to laboratory analyses, in accordance with the waste acceptance procedures of the receiving land disposal facilities. During the project, the top cover of the stockpile would be removed and water applied to suppress dust. The soil would be excavated and placed directly into trucks for transport to the receiving facility. Soil in the trucks would be covered to prevent the generation of dust. After removal of the soil, the bottom liner and soil pad would be removed. The top cover and bottom liner would be disposed of and the soil pad could be used after conducting verification sampling and analyses. The details of the work to be conducted are in the RAC Contractor Construction Work Plan.

Clean-up levels are not applicable to the TSTA removal action, as it is unlikely that the TSTA area was contaminated by the Site 15 soils, based on the construction technique employed during placement of the soil in the TSTA. Confirmation Sampling will be conducted by the RAC Contractor, the TSTA closure inspection report will be prepared to describe confirmation sampling and analyses to be conducted to confirm that the TSTA barrier layer was effective. Sampling frequency and the types of analyses will be in accordance with USEPA and CALEPA guidance.

2. Contribution of Remedial Performance

Off-site disposal is the selected remedial alternative for completing the removal action started at Site 15. This alternative is readily implementable, meets the NCP

criteria of overall protection and mitigation of the risk to human health and the environment, reduces the potential impacts of soil contaminants on the groundwater, is cost effective, and meets the statutory requirements.

The removal of the soil stockpiles, containing elevated concentrations of PCBs and lead, from the TSTA will ensure overall protection of both human health and the environment. The proposal complies with the listed ARARs. Moving soil with elevated PCB and lead concentrations from the site to a facility that will physically contain it will reduce the mobility of the contaminants at Site 15. In addition, since the receiving facility has been designed to minimize migration of contaminants, and has been approved for receiving the specific compounds of concern present at the TSTA, placement of the soil at the receiving facility will substantially protect the environment.

3. Description of Alternative Technologies

The candidate alternatives considered include:

- Alternative 1 - No Action
- Alternative 2 - On-Site Treatment with Solvent Extraction and Acid Washing
- Alternative 3 - Off-Site Disposal at a Class I and II Landfill
- Alternative 4 - On-Site Disposal At NAS Site 2 (West Beach Landfill)

Alternative 1 is rejected because it provides no long term protection to the environment and has significant regulatory implications, as hazardous waste is currently being stored at the TSTA. Alternative 2 is very costly and the results are not guaranteed. Alternative 3 (Off-site Disposal) is the preferred remedial alternative for completing the removal action at IRP Site 15. This alternative uses demonstrated technologies, is readily implementable, meets the NCP criteria of overall protection and mitigation of the risk to human health and the environment, reduces the potential impacts of soil contaminants on the groundwater, is cost effective, and meets the statutory requirements. Alternative 4 has long term costs associated with inspections and maintenance, and is likely to complicate the closure of the West Beach Landfill

4. Engineering Evaluation/ Cost Estimate (EE/CA)

The identification, detailed evaluation, and selection of the removal action alternative is presented in the Addendum Engineering Evaluation/Cost Analysis Report Site 15 Soil Removal Action, to be completed, 1997, and is provided as Attachment A to this Action Memorandum. The responsiveness Summary (the responses to regulatory agency and public comments on the EE/CA report) is included as Attachment B.

5. Applicable or Relevant and Appropriate Requirements (ARARs)

The following discussion of ARARs is based on the project being a removal action. The removal action is intended to minimize or mitigate potential adverse effects to human health and the environment. However, the decision as to whether this will be a final response will be determined by specific risk assessment.

Federal Applicable Requirements include the substantive requirements of the Clean Air Act . State of California Applicable Requirements include similar health and safety requirements, and substantive requirements, but are generally more stringent than Federal requirements. Additionally, State of California requirements for hazardous waste transport and disposal are applicable to those soils, that are classified as hazardous waste.

No Relevant and Appropriate Requirements for this TSTA removal actions have been identified.

Applicable Requirements

Federal Applicable Requirement that will effect the handling, health and safety, and final disposition of media during the TSTA removal action are the Clean Air Act (40 CFR Part 50) and transportation of hazardous materials (TSTA soil) off-site will be subject to requirements of the DOT (49 CFR Parts 171, and 172). Both ARARs are action specific.

State Applicable Requirements that will affect the handling, treatment, and final disposition of media during the TSTA removal action include requirements of the California Health and Safety Code sections related to removal actions, including health and safety requirements during the removal action These State requirements are action specific. CCR Title 22, Division 4.5- Environmental Health Standards for the Management of Hazardous Waste is a chemical specific

ARAR for the portion of the soil at the TSTA which is considered toxic under California regulations.

The following is a more detailed explanation of the identified ARARs. Compliance with these ARARs is considered practicable at this point. Any ARAR non-compliance will be documented in the site close-out report.

Federal Applicable Requirements

Clean Air Act (CAA), as regulated under 40 CFR Part 50.6 - National Primary and Secondary Ambient Air Quality Standards, lists the ambient air quality standards for particulate matter as 150 micrograms per cubic meter for 24 hours, and 50 micrograms per cubic meter as the annual arithmetic mean average. The standards are measured as PM-10 and are applicable for excavation or other activities that may generate air emissions (e.g., fugitive dust). The generation of dust will be minimized during the removal action by thoroughly saturating the soil with water prior to start of the removal action, during soil removal action, and until verification sampling results are finalized and demonstrate that the cleanup goals have been achieved. Additionally, equipment movement over the affected area will also be conducted in a manner that minimizes traffic in the area subject to the removal action. The Construction Work Plan for the project will require that transit of excavation equipment within the removal action area be minimized and that transit of transport trucks within the TSTA be allowed only in areas not subject to the removal action or where the depth of excavation for the removal action has been achieved. Primary monitoring will be by visual observation. Excavation work will be halted and additional water applied to the excavation area at any time when visible dust is generated. In addition, overall compliance with regulations will be demonstrated by monitoring particulate emissions at the facility fence line and also with personal air monitors for site workers.

State Applicable Requirements

California Health and Safety Code, Section 25323.1 includes substantive State provisions, conditions, and requirements for preparation of remedial action work plan for non-emergency removal actions. Compliance of this document with these provisions is summarized below:

RAW Requirements	Documentation
Description of On-site Contamination	EE/CA - Section 1.0
Removal Action Goals	EE/CA - Section 2.0

Alternatives Considered and Rejected	EE/CA - Sections 3.0 and 4.0
Identification of Removal Action and Detailed Engineering Plan	EE/CA - Section 5.0 and Implementation Work Plan

California Code of Regulations (CCR) Title 22 - Division 45 Environmental Health Standards for the Management of Hazardous Waste will apply to the portion of soil at the TSTA which is classified as a California hazardous waste. The requirements for on-site management of hazardous waste found under 22 CCR 66262.34, which regulates the accumulation of hazardous wastes, will be strictly observed during removal operations. All waste containers shall be labeled in accordance with 2 CCR 66262.34(f). The labeling shall state: the accumulation start date and or the date the 90 day storage limit began; the words A Hazardous Waste; the composition and physical state of the waste; warning words indicating the waste is toxic; the name and address of the generating facility. All wastes stored in a container will be like wastes (i.e., sediments with sediments, PCB materials with PCB materials, etc.). The security requirements 22 CCR 66265.14 will be enacted at the start of waste accumulation by the on-site supervisor. A contingency plan will be maintained on-site during operations involving hazardous waste for the purpose of providing pre-planning for emergencies such as spills or fire, in order to meet the requirements of 22 CCR 66265.50-56.

6. Project Schedule

The project will be conducted during the months of September and November 1997.

B. ESTIMATED COSTS

The cost estimate for Excavation and Class I and Class II Off-Site Disposal is $490,000.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Delayed action at the TSTA results in continued potential for PCBs and lead to be released into the air, and for lead to migrate to nearby surface waters; this increases the probability of human exposure to these chemicals.

VII. RECOMMENDATIONS

Excavation and off-site disposal is the selected removal action alternative. This alternative mitigates the risk to human health and the environment, and reduces the potential impacts of soil contaminants on the environment. None of the other alternatives provides an equivalent long term effectiveness and cost effectiveness.

ATTACHMENT A

SITE 15 TSTA: ADDENDUM EE/CA
ENGINEERING EVALUATION/COST ANALYSIS
NON-TIME CRITICAL REMOVAL ACTION
FINAL

SITE 15 TSTA: ADDENDUM EE/CA
ENGINEERING EVALUATION/COST ANALYSIS
NON-TIME CRITICAL REMOVAL ACTION
FINAL

NAVAL AIR STATION, ALAMEDA
ALAMEDA, CALIFORNIA
October 30, 1997

Prepared by:

Moju Environmental Technologies, Inc.
315 Washington Street, Suite 200
Oakland, CA 94607

ENGINEERING FACILITIES ACTIVITY WEST NAVAL FACILITIES ENGINEERING COMMAND U.S. NAVY
San Bruno, California

Contract No. N62474-94-D-7535

Delivery Order 0009

Navy Remedial Project Manager: George Kikugawa

Moju Project Manager: Akali Igbene

ADDENDUM
SITE 15 TSTA, NON-TIME-CRITICAL REMOVAL ACTION
ACTION MEMORANDUM
FINAL

NAVAL AIR STATION, ALAMEDA
ALAMEDA, CALIFORNIA

Prepared by:

Moju Environmental Technologies, Inc.
315 Washington Street, Suite 200
Oakland, CA 94607

November 10, 1997

ADDENDUM
SITE 15 TSTA, NON-TIME-CRITICAL REMOVAL ACTION
ACTION MEMORANDUM
NAVAL AIR STATION, ALAMEDA

Conditions at Site 15 at the Naval Air Station Alameda meet the National Oil and Hazardous Substance Pollution Contingency criteria for non-time critical removal action. The Navy approves the recommended removal action, off-site disposal, described in this action memorandum. This removal action is approved.

Base Environmental Coordinator _____ Date: 11/12/97
Steve Edde

EXECUTIVE SUMMARY

This report presents an Addendum to the Engineering Evaluation/Cost Analysis (EE/CA) prepared previously for the Installation Restoration Program (IRP) Site 15. IRP Site 15 is located at the former Naval Air Station (NAS) Alameda, California. This addendum addresses treatment and disposal alternatives for soils derived from Site 15 which are currently stored in stockpiles located in a Temporary Storage and Treatment Area (TSTA). The TSTA stockpile is located near Site 15 at the west end of Alameda Island, north of Runway 7-25 and the Perimeter Road, and about 300 feet south of the Oakland Inner Harbor.

This Addendum discusses the background and history of the stockpiles, presents a summary of the stockpile characterization efforts including the nature and extent of the contaminants in the stockpiles, describes possible response actions, and evaluates various treatment and disposal alternatives. The purpose of the EE/CA Addendum is to identify and evaluate candidate response actions and remedial technologies based on site-specific conditions and to select a preferred alternative from the candidate alternatives. The candidate alternatives considered include:

- Alternative 1 - No Action
- Alternative 2 - On-Site Treatment with Solvent Extraction and Acid Washing
- Alternative 3 - Off-Site Disposal at Class I and II Landfills
- Alternative 4 - On-site Disposal At NAS Site 2 (West Beach Landfill)

Alternative 3 (Off-site Disposal) is the preferred remedial alternative for completing the removal action at IRP Site 15. This alternative is readily implementable, meets the NCP criteria of overall protection and mitigation of the risk to human health and the environment, reduces the potential impacts of soil contaminants on the groundwater, is cost effective, and meets the statutory requirements.

This Addendum was prepared and performed in accordance with current U.S. Environmental Protection Agency (USEPA) and U.S. Navy guidance documents for a non-time critical removal action under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and in accordance with State of California requirements for a Removal Action Workplan.

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LIST OF ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirements
BAAQMD	Bay Area Air Quality Management District
bgs	Below Ground Surface
Bis-EHP	Bis-2 (ethylhexyl)phthalate
CAA	Clean Air Act
CAL-EPA	California Environmental Protection Agency
CAMU	Corrective Action Management Units
CANS	Large shipping containers
CCAA	California Clean Air Act
CCR	California Code Regulation
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CL	clays
COC	Compound of Concern
CSM	Conceptual Site Model
CWA	Clean Water Act
CZMA	Coastal Zone Managment Act
dBa	Decibel Attenuated
DHS	Department of Health Services
DoD	Department of Defense
DON	Department of the Navy
DTSC	Department of Toxic Substance Control
EBMUD	East Bay Municipal Utility District
EE/CA	Engineering Evaluation and Cost Analysis
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FFSRA	Federal Facility Site Remediation Agreement
GAC	Granular Activated Carbon
H&SC	Health and Safety Code
IAS	Initial Assessment Study
IRP	Installation Restoration Program
LDR	Land Disposal Requirements

LIST OF ACRONYMS
(continued)

MPRSA	Marine Protection Research and Sanctuaries Act
NACIP	Navy Assessment and Control of Installation Pollutants
NAS	Naval Air Station, Alameda
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NSCO	Naval Supply Center -Oakland
NSCO-AA	Naval Supply Center Oakland-Alameda Annex
NSCO-AF	Naval Supply Center Oakland-Alameda Facility
O&M	Operations and Maintenance
PAH	Poly Aromatic Hydrocarbon
PCB	Polychlorinated Biphenols
PM-10	Particulate Matter- 10 microns
PPA	Pollution Prevention Act
PRG	Preliminary Remediation Goals
RAW	Removal Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/ Field Study
SARA	Superfund Amendments and Reauthorization Act
SC	silty to clayey sands
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SP	fine grained, well-sorted sands
STLC	Soluble Threshold Limit Concentrations
SVOC	Semi-Volatile Organic Chemicals
TKN	Total Kjeldahl Nitrogen
TSCA	Toxic Substances Control Act
TSTA	Temporary Storage and Treatment Area
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Chemicals

1.0 INTRODUCTION

1.1 EE/CA BACKGROUND

This Addendum to the Engineering Evaluation/Cost Analysis (EE/CA) for the Installation Restoration Program (IRP) Site 15 identifies proposed removal action alternatives for the disposition of soils stored in stockpiles located at a Temporary Storage and Treatment Area (TSTA). The TSTA soil stockpiles have detectable concentrations of polychlorinated biphenyls (PCBs) and the metal lead. The soils were originally derived from Site 15 at the Naval Air Station, Alameda, California.

Moju Environmental Technologies (Moju) was selected by the Engineering Field Activity West (EFA West), Naval Facilities Engineering Command, U.S. Navy as the prime contractor for preparing this Addendum to the EE/CA. In preparing this Addendum, Moju reviewed laboratory data prepared by previous Navy contractors and performed technical and cost evaluations for selected remedial alternatives for treatment and/or disposal of the soils currently stored in the TSTA.

1.2 REMOVAL ACTION PROGRAM REQUIREMENTS

The National Oil and Hazardous Substance Pollution Contingency Plan (NCP) defines the program requirements for federally funded removal actions being conducted under CERCLA. The removal action program requirements under the NCP are identified in the Code of Federal Regulations, Title 40, Part 300.415 (40 CFR 300.415). In addition, 40 CFR 300.820 defines the requirements for initiating and maintaining the administrative record file for a removal action performed pursuant to the NCP. The need to perform a removal action at this site and the removal action's definition as a non-time critical removal action were identified in an EE/CA Approval memorandum dated June 15, 1995. (Pursuant to CAL H&SC Section 25356.1, this document will also address the requirements for a Removal Action Workplan).

As indicated under 40 CFR 300.415(b)(4), when the planning period for the removal action is at least 6 months before on-site removal activities are initiated, the removal action is considered non-time critical. The public participation procedures to be followed for a removal action are defined in 40 CFR 300.415(m) and 40 CFR 300.820(a).

This EE/CA Addendum addresses the implementability, effectiveness and cost of a non-time critical removal action to be conducted at the TSTA. The EE/CA Addendum also addresses applicable federal and state requirements and will be used as the basis for a future CERCLA

removal action. The Department of the Navy (DON) is the lead agency for the non-time critical removal action to be conducted at the TSTA. As the lead agency, the DON has final approval authority of the recommended alternative selected and of overall public participation. The DON is working in cooperation with the USEPA and CAL EPA (Department of Toxic Substances Control and the California Regional Water Quality Control Board) in implementing this removal action.

This EE/CA is being issued in accordance with public participation requirements identified in the NCP, Cal H&SC Section 25356.1(e) and the public participation plan prepared by NAS Alameda to facilitate public involvement in the decision making process. The public is encouraged to review and comment on the proposed removal activities described in this EE/CA. Additional information referenced in this document is included in the administrative record for this activity which is available for public review at the following locations:

Alameda Free Library
2264 Santa Clara Ave.
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1.3 PURPOSE AND OBJECTIVES

The purpose of this document is to identify, develop, and evaluate removal action alternatives and to assess potential environmental impacts of the selected alternative. This EE/CA Addendum incorporates a comparative analytical process to evaluate various candidate removal action technologies, and an assessment of potential environmental impacts of the selected alternative will be evaluated.

The overall objectives of this EE/CA Addendum are to:

- Demonstrate that the non-time critical removal action requirements under the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) are met.

- Document the procedure and methods used to evaluate and select removal action technologies.

- Provide detailed information on candidate contaminated soil removal action technologies including effectiveness, implementability, and cost.

- Provide documentation to be included in the administrative record of the decision making process (which involves public participation), used to identify, evaluate, and select the removal action to be performed.

- Provide a conceptual design for the selected soil removal technology.

- Provide data that can be used to evaluate potential environmental impacts of the identified contaminated soil removal technology and identify methods to mitigate those impacts.

1.4 REPORT ORGANIZATION

This EE/CA Addendum addresses the implementability, effectiveness, and the cost for disposition of an estimated 5400 tons or about 3300 cubic yards of soil with PCBs and lead. It also addresses applicable regulatory requirements.

This document is organized into seven sections. Section numbers and main headings are:

1.0 Introduction
2.0 Site Characterization
3.0 Identification of Soil Removal Action Objectives
4.0 Identification and Screening of General Removal Actions and Technologies
5.0 Comparative Analysis of Removal Action Alternatives
6.0 Recommended Removal Action Alternative
7.0 References

Section 2.0 presents a description of the TSTA site and the TSTA history. Section 2.0 also gives a brief summary of the volume of soils with PCBs and lead. Section 3.0 summarizes the key objectives of the removal action and Applicable or Relevant and Appropriate Requirements (ARARs). Section 4.0 identifies and screens potential removal action technologies and alternatives. Section 5.0 compares the various removal action alternatives. The preferred

alternative is presented in a conceptual process design in Section 6.0. Section 7.0 lists references cited in preparation of this document.

Additional information can be found in the Site 15 EE/CA and the Temporary Storage and Treatment Area Workplan and Workplan Addendum.

2.0 SITE CHARACTERIZATION

In preparing this addendum, existing site characterization was used. Site characterization data was obtained from the following sources:

- Site characterization by Wahler Associates, 1985
- Additional investigations by PRC and Montgomery Watson, 1992, 1993 and 1994.

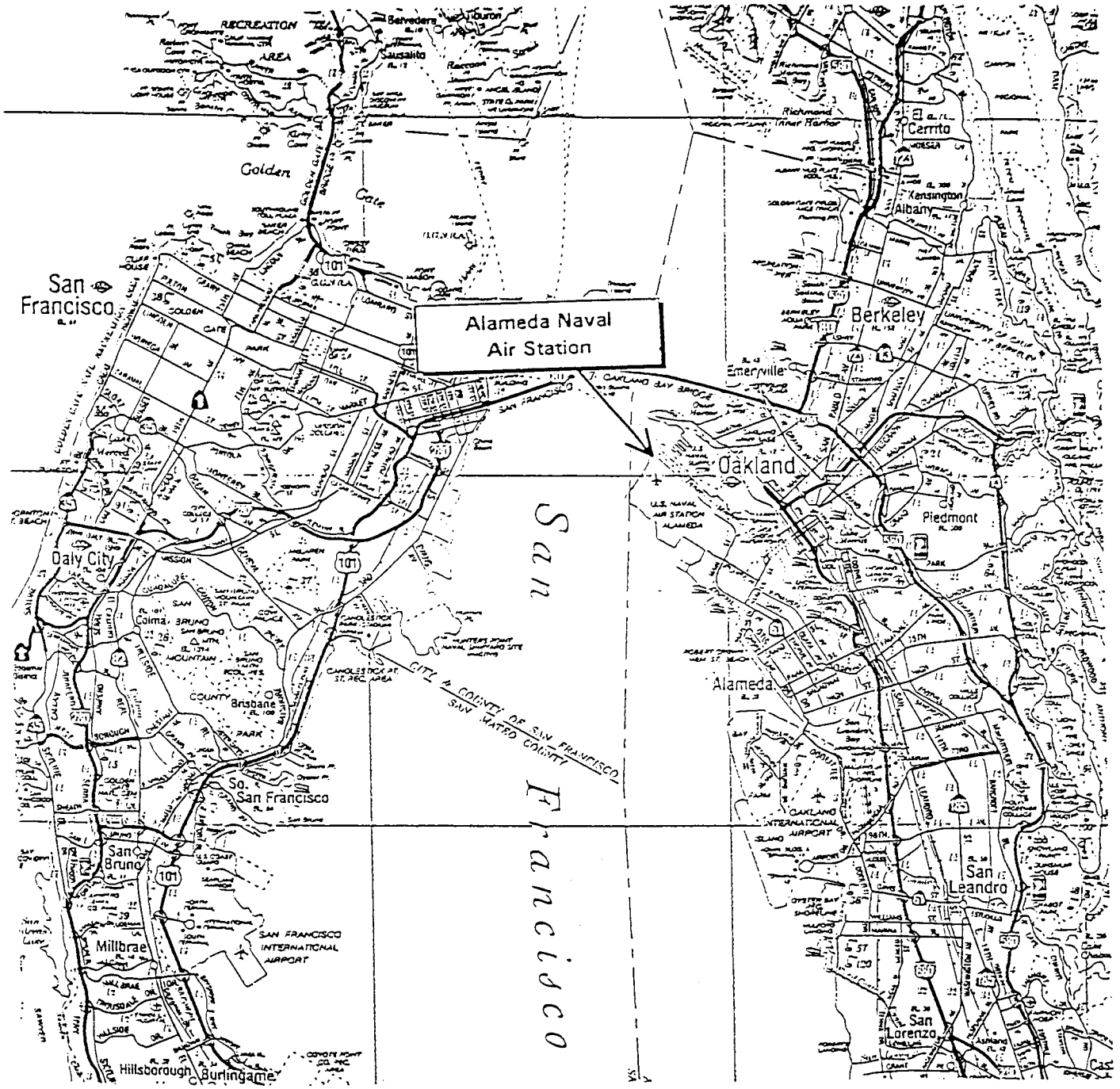
The site characterization data was used as reported.

2.1 SITE DESCRIPTION AND BACKGROUND

2.1.1 Site Location

The NAS Alameda complex occupies about 2,635 acres, and is located at the western end of Alameda Island in Alameda County, California. NAS Alameda is bounded to the north by the Oakland Inner Harbor, to the west and south by San Francisco Bay, and to the east by the City of Alameda. Military operations at the facility have ended and the facility is transitioning to civilian reuse. The NAS Alameda Facility is shown in relation to City of Alameda on the Vicinity Map, Figure 2-1. A layout of the facilities at NAS Alameda is shown on Figure 2-2.

The TSTA is located at the north-west end of Alameda Island. Relative to the NAS facility, the TSTA is located west of the middle of the northern edge of the facility, north of Runway 7-25 and the Perimeter Road, and about 300 feet south of the Oakland Inner Harbor. The TSTA site is shown in relation to the NAS Alameda complex on the TSTA Site Location Map, Figure 2-3.



N

Not In Scale

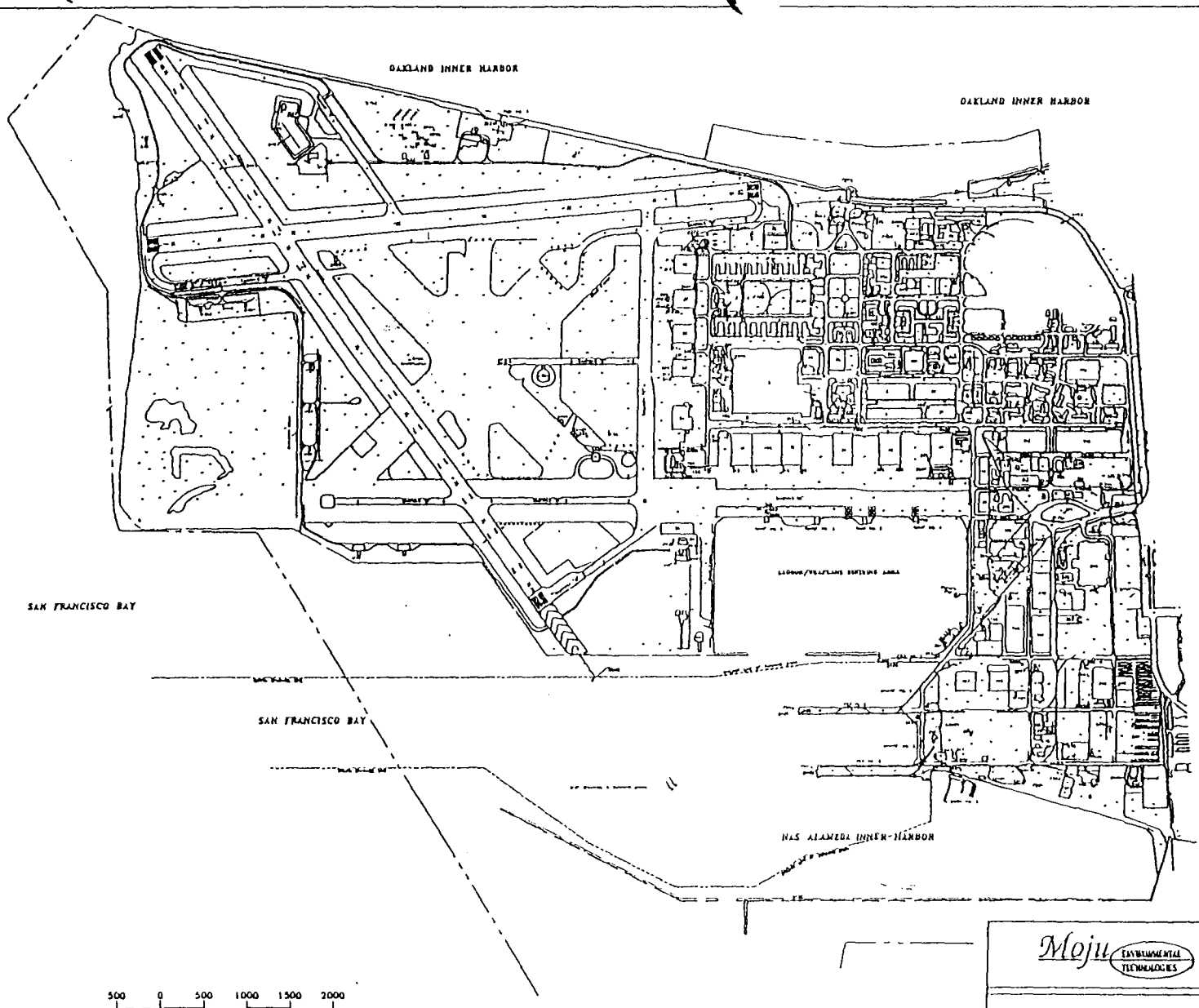
Resource: California AAA Maps

Figure 2-1

SITE VICINITY MAP
ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

Mojave Environmental Technologies

December, 1996



Moju ENVIRONMENTAL TECHNOLOGIES

PROJECT:

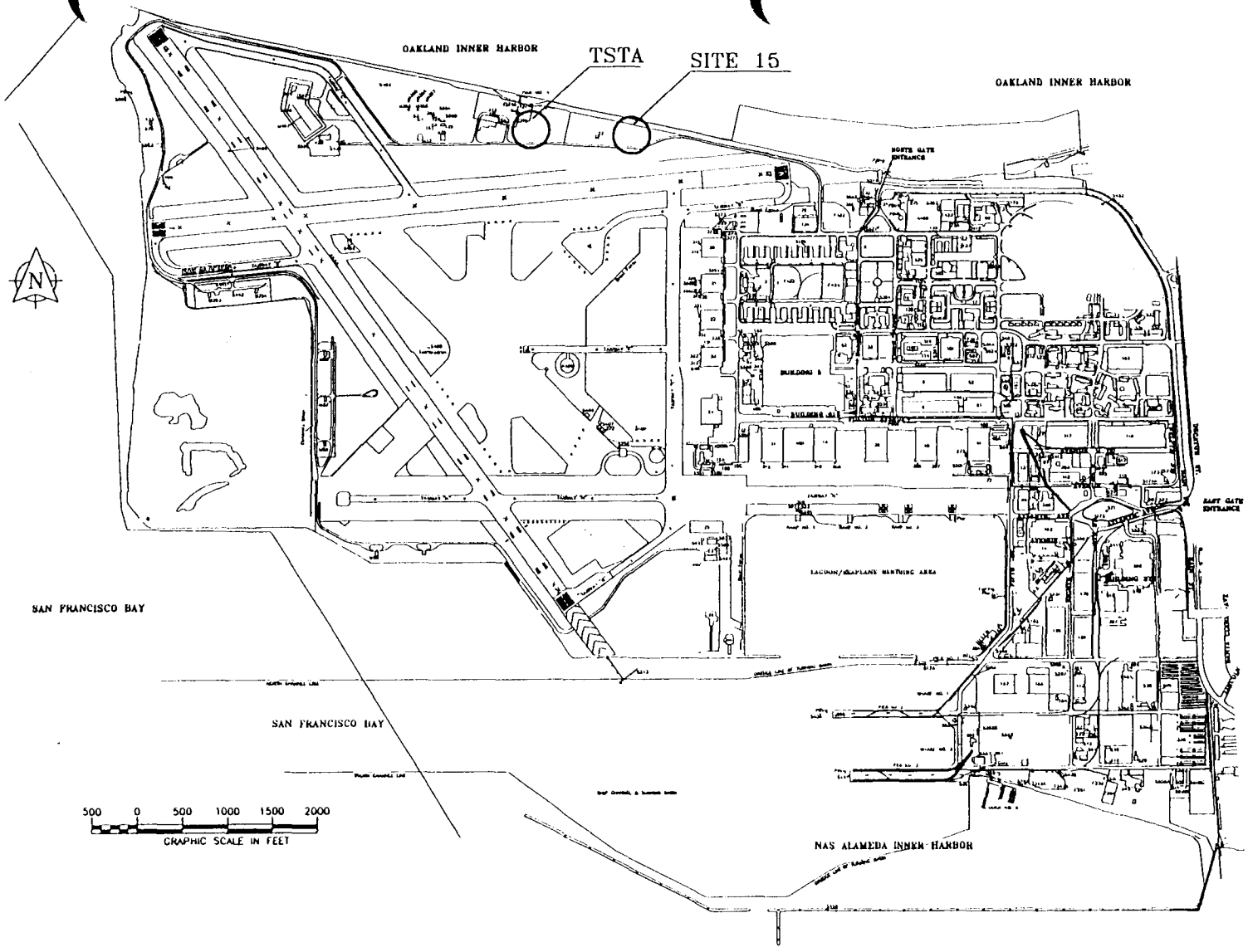
ALAMEDA CALIFORNIA

SITE NO. 15
NAVAL AIR STATION, ALAMEDA
ALAMEDA, CALIFORNIA

NAS SITE PLAN

MAY 14, 1997

Figure 2-2



Moju ENVIRONMENTAL TECHNOLOGIES

PROJECT:

ALAMEDA CALIFORNIA

SITE NO. 15
NAVAL AIR STATION, ALAMEDA
ALAMEDA, CALIFORNIA

TSTA LOCATION PLAN

MAY 14, 1997

Figure 2-3

2.1.2 Type of Facility and Operational Status

The TSTA facility was constructed during the final phase of the previous removal action at Site 15. The Action Memorandum for Site 15 (Site 15 Action Memorandum, Dec. 14, 1994) states the following basis for conducting the original Site 15 removal action: The proposed removal action is intended to reduce the potential for environmental impact identified below due to co-contaminated soil at Site 15. These threats directly relate to the criteria in the NCP 300.415(b)(2).

- Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, pollutants, or contaminants. PCBs and lead may enter through direct contact and ingestion by burrowing animals or plant uptake and subsequent ingestion by wildlife. PCBs and lead are toxic by ingestion and accumulate within animal tissue. No sensitive or endangered plant species exist at Site 15.

- High levels of hazardous substances or pollutants or contaminants in soils that may migrate. Infiltrating rainwater may cause lead in soil to migrate to groundwater, which is 3 to 5 feet below ground surface (groundwater elevations are influenced by tidal and seasonal fluctuations). Although unlikely, PCBs and lead could be washed with surface water runoff into the nearby Oakland Inner Harbor during extremely high rainfall events.

- Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released. The Oakland Inner Harbor is adjacent to Site 15. Arid weather conditions and high winds may cause PCBs in soil to become airborne on fugitive dust, thus affecting the Harbor.

The recommended mechanism for conducting the Site 15 removal action was originally off-site disposal. Off-site disposal was not utilized because the Navy attempted to implement the CERCLA preference for on-site treatment. Based on the CERCLA preference, a combined soil-washing/acid washing treatment process was selected as the recommended alternative. This alternative was again amended to allow assessment of an innovative-technology variant soil-washing process to be conducted under a USEPA innovative technology (SITE) assessment program (Site 15 Action Memorandum, Dec. 14, 1994).

After implementing the innovative technology treatment process the process was found to not be working effectively. An Administrative Memorandum (October 25, 1995) revising

the 1994 Action Memorandum was prepared and describes revisions to the Site 15 removal action as follows: The Navy encountered unanticipated conditions during soil washing, making it impossible to complete treatment of all soil before the Army Corp of Engineers sewer relocation project needed the site. Therefore the excavated soils must be relocated and stored while a treatment system is implemented near the TSTA.

The construction of the TSTA is described in a Workplan and Workplan addendum prepared by IT Corporation in the Fall of 1995. The TSTA site occupies about 1 acre, of which about 3/4 acres is used to stockpile contain soil and the remaining area is for water management. Key features of the TSTA are shown on the Site Plan, Figure 2-4. 5400 tons of affected soil were placed in three stockpiles in the TSTA. Stockpile 1 (164 tons) and Stockpile 2 (134 tons) were intended for soil with higher concentrations of lead or PCBs. Stockpile 3 (about 5100 tons) is much larger, about 3,300 cubic yards, and contains the remaining soil derived from the Site 15 removal action. The stockpiles are covered by a plastic membrane and the stockpile area is surrounded by a water collection system. Water collected from the stockpile area is stored in tanks in the TSTA site, until analytical tests are conducted to determine if the collected water has been polluted or can be discharged. The TSTA site is primarily unpaved.

2.1.3 Site Geology and Hydrogeology

For the most part, NAS Alameda is built on land created by placing fill (mostly dredge fill) over marginal lands at the perimeter of Alameda Island. Alameda Island was formed by a natural process of beach formation and deposits. This type of deposit, identified by geologists as the "Merritt Sand Formation," is classified as a fine-grained, well-sorted sand interspersed with layers of clayey sand and clay. In contrast, the former tidal flats of the estuary and the bay bottom surrounding Alameda are made up of more recent geological deposits of very fine clay and silt particles held in suspension in bay water and gently deposited.

These soils, known as "bay mud," are plastic, highly compressible, and have low strength. Additional land beyond the original Alameda Island was obtained by filling in tidal areas of the bay. The fill came from many places, including material dredged from the estuary during construction of the Posey Tube in the 1920s. Most of the station area is overlaid with silty sand and sand fill 6 to 8 feet thick which ranges from moderately to poorly compacted. Beneath the fill, soft silt clay (bay mud) extends to depths of 25 to 120 feet below the existing ground surface. The soil below the bay mud consists of loose to dense sands, both silty and clean, and stiff to very stiff sandy clays. The fill soils range from

low to moderate in compressibility, while the underlying bay mud is high in compressibility.

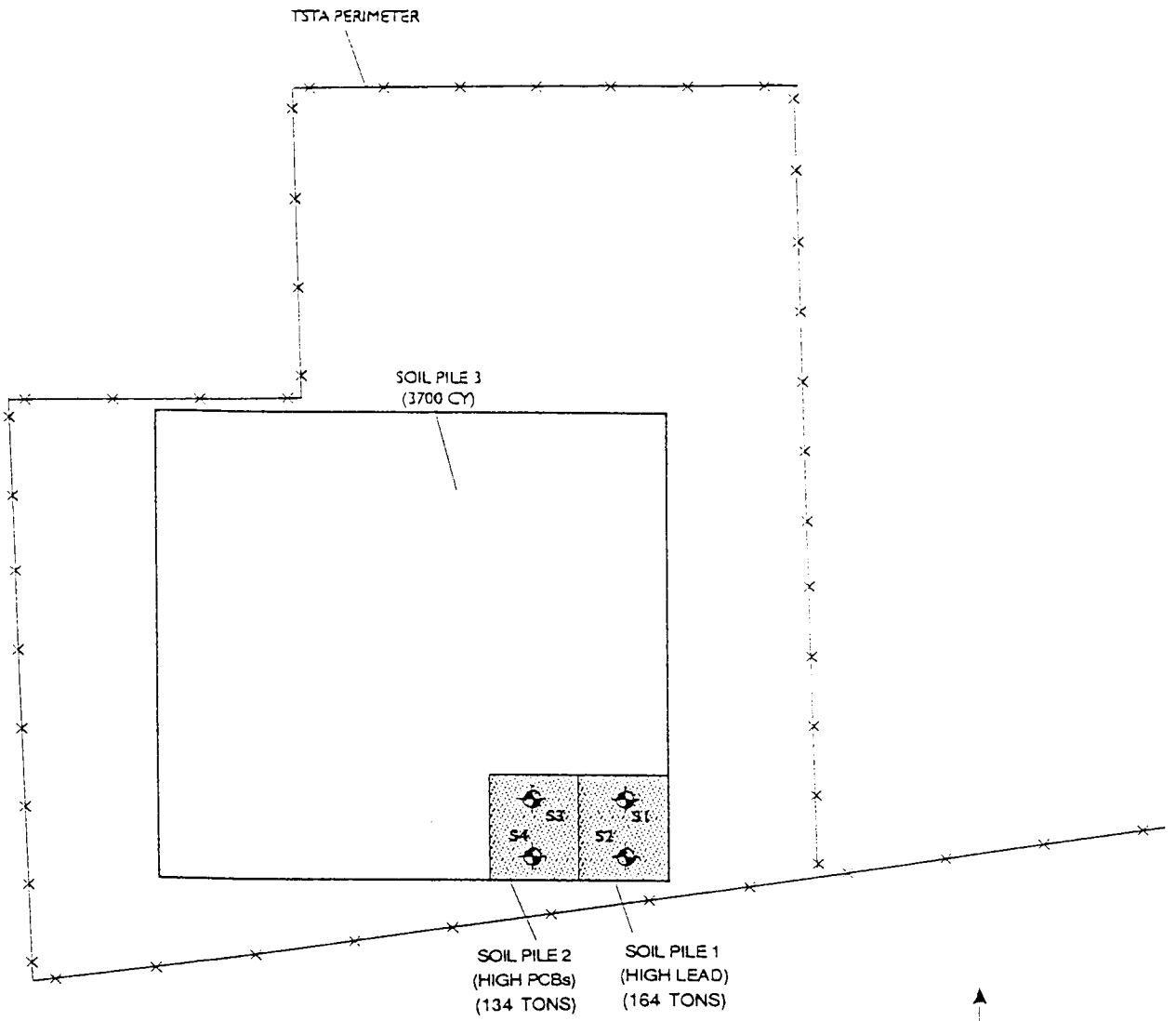
Reportedly, in the vicinity of the TSTA Area, soil material underlying the site can be divided into two groups: fill material and native sediments. Fill material underlies the site from ground surface to approximately 12 to 13 feet below ground surface (bgs). The fill material consists of interbedded fine-grained, well-sorted sands (SP), moderately well-sorted silty to clayey sands (SC), and clays (CL). The native sediments consist of sandy-silty clay (SC) and clayey sand to clay (CL). The native sediments, below the fill, are believed to be Holocene Bay Mud. The average depth to groundwater was 3.7 feet bgs, and ranged from 2.5 to 5.2 feet bgs.

2.1.4 Surrounding Land Use and Populations

Land use in the vicinity of NAS Alameda is primarily residential and military. The base is bordered on the north by Oakland Inner Harbor (Figure 2-5). To the west and south of the station is the San Francisco Bay. To the east is a mixture of industrial, residential, and public land uses. The remaining land use to the east of NAS Alameda is residential, with scattered commercial establishments such as restaurants and retail stores. Schools located in this residential area include Encinal High School (which abuts the southeastern edge of NAS Alameda).

Land in the vicinity of the TSTA site is currently mostly open space, with the NAS runways to the south and the Oakland Inner Harbor to the north. NAS Alameda is closed as an active military base and the facility is transitioning to civilian reuse. The final reuse in the vicinity of the site has not been determined, but possible re-use is for recreational activities and for an International Trade Zone.

No considerations related to the National Historic Preservation Act have been identified in the vicinity of the TSTA Site.



SAMPLING LOCATIONS

SAMPLES ANALYZED FOR TOTAL LEAD, PCBs, CAL-WET TEST, CAL-WET WITH DEIONIZED WATER

Moju ENVIRONMENTAL SOLUTIONS

PROJECT:

ALAMEDA CALIFORNIA

TSTA SITE
NAVAL AIR STATION, ALAMEDA
ALAMEDA, CALIFORNIA

TSTA SOIL PILES

MAY 15, 1997

Figure 2-4

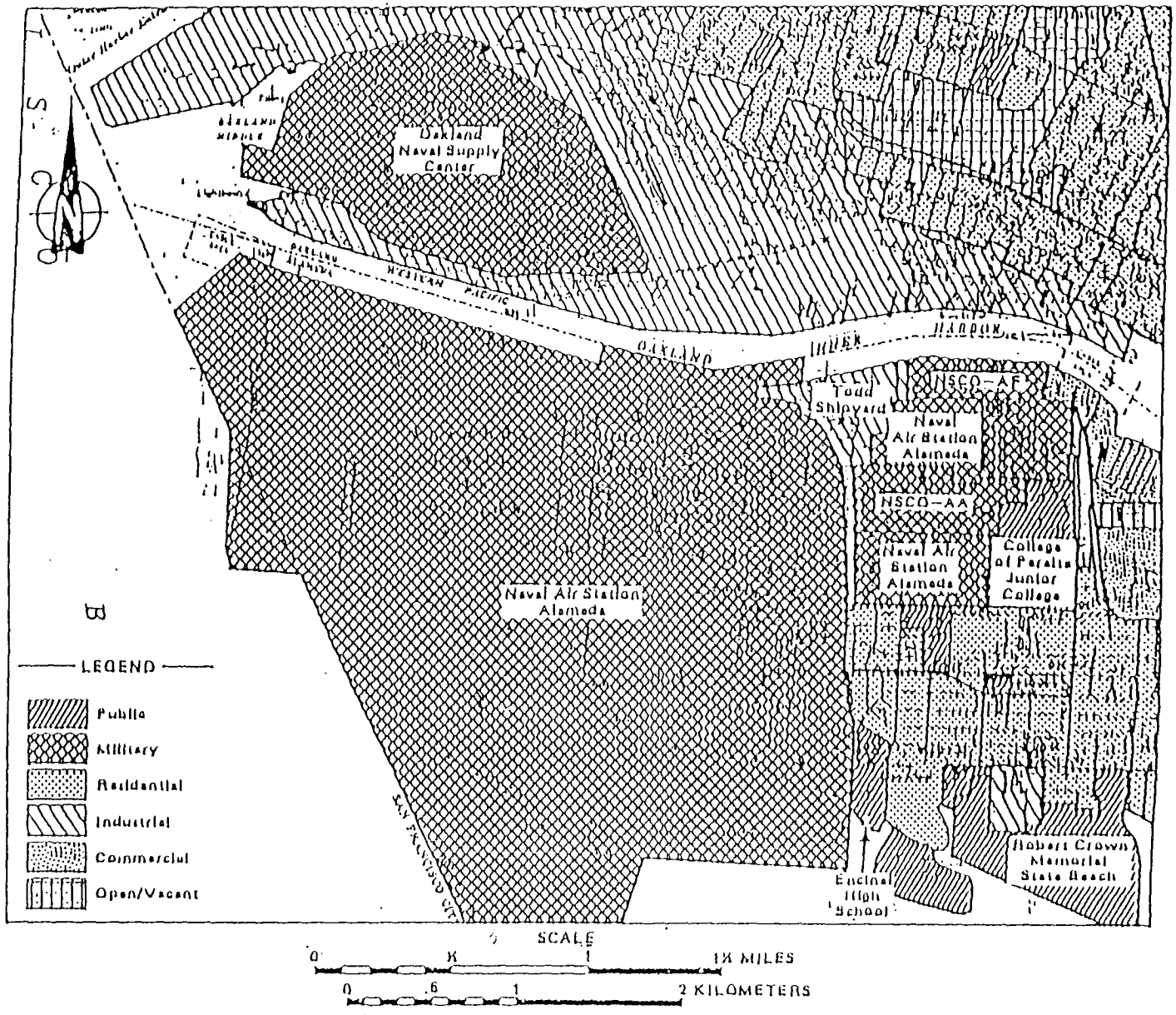


Figure 2-5 ADJACENT LAND USE, NAS ALAMEDA

2.1.5 Sensitive Ecosystems

There are no sensitive ecosystems at the TSTA itself, which is partially covered by the TSTA stockpiles and stripped of vegetation. However, if the cover deteriorates, dust from the stockpiles or water borne sediment could be carried to nearby receptors and to the nearby San Francisco Bay where there are potential sensitive Bay aquatic life forms. Dust suppression water, applied during the removal action, will be prevented from entering the storm drain system either by controlled application and/or berming of storm drain inlets.

The largest nesting and breeding ground in Northern California for the California least tern is located on NAS Alameda. The least tern colony is 3300 feet away from the TSTA. Several other sensitive environments are located nearby in the San Francisco Bay Area. Southeast of NAS Alameda in the bay is commercial fishing for herring and sports fishing for leopard sharks. There is also a public beach located southeast of NAS Alameda. Nearby, another endangered bird species, the California clapper rail, is found. NAS Alameda is also near a flatfish nesting area. Crab Cove, located at the west end of the Robert Crown Memorial State Beach, is a unique marine reserve protected by California law and administer by the East Bay Regional Park District. None of these environments are likely to be affected by the removal action at the TSTA as fugitive dust will be very carefully controlled and potential migration through the storm water system will be prevented .

2.1.6 Meteorology

The prevailing winds of the San Francisco Bay area are from a westerly direction. Based on available information from the U.S. Western Regional Climate Center in Nevada and the U.S. Geological Survey, the average wind speed for the months of August and September are 10 knots and 9 knots, respectively. The maximum wind speed occurs in the mid-afternoon (3 to 5 P.M.). The historic record for a day in August 1996 recorded maximum wind speeds ranging from 10 to 14.9 knots in the mid-afternoon.

Heavy fogs occur on the average of 21 days per year. These fogs impair visibility for navigation at Oakland an average of fewer than 100 hours per year. Freezing temperatures rarely occur, and no snow or icy conditions are encountered. Rainfall averages approximately 20 inches annually, generally from October to May.

2.2 PREVIOUS REMEDIAL ACTION, INVESTIGATION AND ACTIVITIES SUMMARY

2.2.1 Previous Removal Actions

The soil in the TSTA is derived from the Site 15 removal action. Sampling and analytical testing of the soil in the TSTA was primarily conducted prior to removal of the soil from Site 15. Additional testing for two small stockpiles in the TSTA was conducted during the removal action. Due to the need to construct a major sewer system through Site 15, the removal action at Site 15 was stopped and the soil was moved from Site 15 to the TSTA. The concentrations of PCBs and lead in TSTA stockpile soils are discussed in Sections 2.3 and in Appendix 1. Residual concentrations of the compounds of concern remaining at Site 15 will be addressed in the Site 15 Closure Report.

2.2.2 Previous Site Investigations

Previous investigations, of the soil in the TSTA, were conducted primarily when the soil was at Site 15. These investigations are described in the Site 15 EE/CA. Additionally, during the removal action at Site 15, the two small soil piles, Stockpile 1 and 2 currently in the TSTA, were subject to further sampling and analytical testing, as discussed in the following sections.

2.3 CHARACTERIZATION OF TSTA STOCKPILES FOR WASTE CLASSIFICATION

A preliminary assessment was conducted to determine if the soil, subject to the removal action, is likely to be classified as TSCA waste, as Hazardous Waste (requiring Class 1 land disposal and possibly treatment) or is likely to be a designated waste (requiring Class II land disposal, without treatment).

In order to assess the appropriate waste classification, soil samples were collected from Stockpiles 1 and 2, the stockpiles with the highest concentrations of PCBs and lead, and subject to laboratory analyses for total and soluble PCB and lead concentrations in accordance with CCR Title 22 requirements (which also include RCRA requirements). The results of these analyses were compared with results of earlier investigations.

Based on the information available, as described in the following sections, about 2% of the soil is likely to be Hazardous Waste and the remainder is likely to be designated waste; none of the soil should be classified as a TSCA regulated waste.

2.3.1 Basis for Characterization

Information available to derive the concentrations of PCBs and lead in soil, in the three stockpiles, comes from three sources which include: (1) Site 15 investigations conducted prior to the Site 15 removal action; (2) sampling and analyses conducted during the Site 15 removal action; and (3) sampling conducted from soil stockpiles in the TSTA. Based on the EE/CA for Site 15 the primary chemicals of concern identified at Site 15 are PCBs and the metal lead. The soil stockpiles at the TSTA are shown on the Site Plan, Figure 2-4. There are three stockpiles which contain a total of 5400 tons (as reported by IT Corporation) of affected soil. Stockpile 1 is 164 tons (intended to contain soil with high lead concentrations) and Stockpile 2 is 134 tons (intended to contain soil with high PCB concentrations). These two soil piles were intended for soil with higher concentrations of lead or PCBs. Stockpile 3 is 5100 tons and contains the remaining soil derived from the Site 15 removal action. Table 2-1 shows the weight of each stockpile.

2.3.2 TSTA Stockpile Characterization

Stockpiles 1 and 2 were subject to sampling and analytical testing prior to and during the Site 15 removal action (data shown in Table 2-2). Based on these pre- removal action data, the average concentration of lead in the soil is 242 ppm, for Site 15 soil prior to the removal action, in the area excavated and designated for Stockpile 1. However, the sampling conducted for the soil in Stockpile 1 was found to have an average concentration of lead of only 111 ppm, indicating that some cleaner soil was also excavated during the removal action. Similarly the average concentrations of PCBs, based on Site 15 sampling for the soil in Stockpile 2, is higher than what was found in Stockpile 2. It is expected that this trend is also applicable to the large stockpile, Stockpile 3.

TSTA Stockpiles 1 and 2 were recently re-sampled (Spring 1997) to determine soluble concentrations of PCBs and lead. Four samples, two from each of the small stockpiles (Stockpiles 1 and 2), were collected. The samples were subject to analyses for total lead and PCB concentrations and potential solubility via CAL-WET extraction with standard citrate buffer and also CAL-WET extraction with deionized water. The results of these analyses are summarized in Table 2-4. Based on the solubility of lead, soil in Stockpile 1

was found to have an average solubility (6 ppm) slightly above the regulatory threshold concentration (5 ppm) for classification as Hazardous Waste. Soil in Stockpile 1, for the purpose of this EE/CA is therefore assumed to be Hazardous Waste. Soil in Stockpile 2 was found to have an average solubility for lead of 2.85 ppm, about 1/2 the threshold concentration for classification as Hazardous Waste, and is therefore likely to be designated waste.

Data available for Stockpile 3 characterization is limited to data from sampling and analyses conducted prior to the Site 15 removal action. Data shown in Table 2-3 for Stockpile 3, is derived from the pre-removal action sampling for the total removal action excavated area but not including the areas excavated for Stockpiles 1 and 2. The average concentration of lead, based on the Site 15 data is 92 ppm and for PCBs is 1.9 ppm. Based on this data, soil in Stockpile 3 has a lower total lead concentrations, and is assumed to have lower soluble concentrations and therefore the soil in Stockpile 3 is likely to be Designated Waste.

The soil in the stockpiles is not a TSCA regulated waste as the soil contains less than 50 ppm or more of PCBs (40 CFR Part 761.60 (c) (3) and (d); the maximum concentration of PCBs found in TSTA soil is 5.9 ppm, and the average is much less.

2.4 STREAMLINED RISK EVALUATION

2.4.1 Previous Risk Assessments and Evaluations

No previous risk assessments have been conducted for the TSTA area. Conditions at the site meet the following NCP requirements for a removal action (40 CFR 300.415(b)(2)). The criteria that are applicable include:

- Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants.
- Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.

2.4.2 Health Effects of Lead and PCBs on the Human Population and Environment

PCBs are highly persistent and bio-accumulate as pollutants. Chronic toxicity to the liver from long-term exposure is reported. At high doses, it causes suppression of the immune

Table 2-1

TSTA Stockpiles, Soil Tonnage Estimates

TSTA Location	Estimated Soil (Tons)
Stockpile 1	164
Stockpile 2	134
Stockpile 3	5100

* Based on information provided by IT Corporation.

Table 2-2
Lead and PCBs Concentrations in Soil Pile 1&2 at TSTA
(mg/kg)

Sample Number	Soil Pile 1		Soil Pile 2	
	Lead	PCBs	Lead	PCBs
1	91	4.5	45	5.9
2	240	4.3	42	2.6
3	136	4.2	69	1.5
4	71	NA	NA	3.1
5	86	NA	NA	3.4
6	78	NA	NA	2.8
7	101	NA	NA	3.2
8	98	NA	NA	3.2
9	97	NA	NA	3.5
10	107	NA	NA	2.2
Ave. Conc. =	111	4.3	52	3.1

Lead Concentrations from On-Site Sampling of Area
Where Excavation of Soil for Soil Pile 1 was Conducted

Sample #	Lead (ppm)
S15-06	160
S15-07	210
S15-09	1050
S15-10	216
S15-11	201
S15-12	257
S15-13	222
S15-14	134
S15-15	186
S15-16	117
S15-17	136
S15-28	218
S15-37	108
S15-46	219
S15-55	199
AVE. CONC. =	242 (Total of 15 samples)

Table 2-3
Site 15 - PCBs Concentrations in Soil Pile 3 at TSTA

Sample #	Sample Depth (ft)	PCB Aroclor-1260 (ppm)
S19	0.5	<1.000*
S21	0.5	0.240
S22	0.5	<0.035
S24	0.5	0.220
S25	0.5	<1.000
S27	0.5	<0.034
S29	0.5	<0.037
S30	0.5	<1.0
S31	0.5	0.014
S32	0.5	<1.0
S33	0.5	<1.0
S34	0.5	<0.035
S35	0.5	0.010
S15-01	0.5	5.300
S15-01DUP	0.5	5.100
S15-02	0.5	2.200
S15-3	0.5	0.770
S15-4	0.5	7.500
S15-5	0.5	2.500
S15-6	0.5	0.960
S15-7	0.5	3.000
S15-8	0.5	0.870
S15-9	0.5	16.000
S15-10	0.5	1.400
S15-14	0.5	1.800
S15-15	0.5	2.400
S15-16	0.5	0.530
S15-17	0.5	0.710
S15-17DUP	0.5	1.200
S15-18	0.5	2.700
S15-19	0.5	2.600
S15-20	0.5	4.100
S15-21	0.5	1.500
S15-25	0.5	1.400
S15-26	0.5	3.100
S15-27	0.5	<0.035
S15-28	0.5	2.000
S15-29	0.5	5.000
S15-30	0.5	4.300
S15-34	0.5	<0.034
S15-35	0.5	0.140
S15-36	0.5	<0.035

*: "<1.000" indicates PCB was not detected above the laboratory reporting limit, 1.000 ppm.

Table 2-3 (con't)
Site 15 - PCBs Concentrations in Soil Pile 3 at TSTA

Sample #	Sample Depth (ft)	PCB Aroclor-1260 (ppm)
S15-37	0.5	0.250
S15-38	0.5	1.200
S15-39	0.5	0.690
S15-43	0.5	0.180
S15-44	0.5	0.170
S15-45	0.5	0.220
S15-46	0.5	1.800
S15-47	0.5	1.700
S15-48	0.5	0.320
S15-49	0.5	2.900
S15-49DUP	0.5	5.200
S15-50	0.5	3.100
S15-51	0.5	1.700
S15-51DUP	0.5	4.800
S15-52	0.5	4.100
S15-53	0.5	0.740
S15-54	0.5	0.270
S15-55	0.5	0.260
M-15-01	0.5	2.700
M-15-02	0.5	6.400
M-15-02DUP	0.5	8.600
M15-03	0.5	<0.350

Average Conc. = 2.070
(Total of 64 Samples)

*: "<1.000" indicates PCB was not detected above the laboratory reporting limit, 1.000 ppm.

Table 2-3 (con't)
Site 15 - Lead Concentrations in Soil Pile 3 at TSTA

Sample #	Sample Depth (ft)	Lead (ppm)
S19	0.5	4.9
S21	0.5	4.7
S22	0.5	7.0
S24	0.5	15.0
S25	0.5	56.8
S27	0.5	9.8
S29	0.5	32.9
S31	0.5	5.8
S34	0.5	44.7
S35	0.5	3.1
S37	0.5	3.7
S39	0.5	39.7
S15-01	0.5	175.0
S15-02	0.5	726.0
S15-03	0.5	188.0
S15-04	0.5	309.0
S15-05	0.5	130.0
S15-08	0.5	206.0
S15-18	0.5	150.0
S15-19	0.5	1350.0
S15-20	0.5	282.0
S15-21	0.5	133.0
S15-22	0.5	36.0
S15-23	0.5	27.0
S15-24	0.5	53.0
S15-25	0.5	36.0
S15-26	0.5	35.0
S15-27	0.5	19.0
S15-29	0.5	65.0
S15-30	0.5	35.0
S15-31	0.5	38.0
S15-32	0.5	28.0
S15-33	0.5	33.0
S15-34	0.5	15.0
S15-35	0.5	48.0
S15-36	0.5	48.0
S15-38	0.5	11.0
S15-39	0.5	5.0
S15-40	0.5	29.0
S15-41	0.5	42.0
S15-42	0.5	22.0

Table 2-3 (con't)
Site 15 - Lead Concentrations in Soil Pile 3 at TSTA

Sample #	Sample Depth (ft)	Lead (ppm)
S15-43	0.5	12.0
S15-44	0.5	17.0
S15-45	0.5	35.0
S15-47	0.5	62.0
S15-48	0.5	77.0
S15-49	0.5	53.0
S15-50	0.5	17.0
S15-51	0.5	40.0
S15-52	0.5	57.0
S15-53	0.5	81.0
S15-54	0.5	79.0
M-15-01	0.5	0.0
M-15-02	0.5	0.0
M-15-03	0.5	0.0

Average Conc. = 91.5
(Total of 55 Samples)

Note:

S1-S42: Follow-on site characterization surface soil sample location
S15-01-S15-55: IR program RI surface soil sample location
M-15-01 - M-15-03: Monitoring well location

Table 2-4
Site 15 - Solubility Test Results

(PCBs)

Sample ID	Date Sampled	Matrix	Sample Depth (ft)	Pesticide Organics Analysis by EPA 8080		
				PCBs* (mg/kg)	CWET PCBs** (mg/L)	CWET DI*** PCBs (mg/L)
121-S15-001	4/14/97	Soil	0.5	3.0	0.0037	0.005
121-S15-002	4/14/97	Soil	0.5	1.9	<0.002	<0.002
Stockpile 1 - Average Solubility:					0.0029	
121-S15-003	4/14/97	Soil	0.5	6.9	0.0021	0.0032
121-S15-004	4/14/97	Soil	0.5	1.5	<0.002	<0.002
Stockpile 2 - Average Solubility:					0.0021	

Note:

*: Aroclor-1260 is the only group of PCBs detected from the pesticides analysis.

**: CWET - California Waste Extraction Test using Citrate buffer as extraction solvent, and the extract was analyzed for PCBs.

***: CWET DI - California Waste Extraction Test using Deionized Water to replace Citrate buffer as extraction solvent, and the extract was analyzed for PCBs.

Total Threshold Limit Concentration (TTLC): PCBs = 50 mg/kg, Lead = 1000 mg/kg
Soluble Threshold Limit Concentration (STLC): PCBs = 5 mg/L, Lead = 5 mg/L

(Lead)

Lab ID	Date Sampled	Matrix	Sample Depth (ft)	Lead Analysis by EPA 6010			
				Total Lead (mg/kg)	CWET Lead (mg/L)	CWET DI Lead (mg/L)	TCLP Lead (mg/L)
121-S15-001	4/14/97	Soil	0.5	56.0	3.4	0.62	0.058
121-S15-002	4/14/97	Soil	0.5	91.1	8.6	1.9	0.033
Stockpile 1 - Average Solubility:					**6.0**		
121-S15-003	4/14/97	Soil	0.5	50.8	2.4	0.63	0.031
121-S15-004	4/14/97	Soil	0.5	68.4	3.3	0.93	0.55
Stockpile 2 - Average Solubility:					**2.9**		

Note: Sample 121-S15-001 and 002 were collected from Stockpile 1 at the TSTA.
Sample 121-S15-003 and 004 were collected from Stockpile 2 at the TSTA.

system, reproductive dysfunction, birth defects, and liver tumors. It is a suspected carcinogen.

Toxic effects in humans include chloracne, pigmentation of skin and nails, excessive eye discharge, swelling of eyelids, distinctive hair follicles, gastrointestinal disturbances. Toxic symptoms in animals include hepatocellular carcinoma, hypertrophy of the liver, adenofibrosis, weight and hair loss, mouth and eyelid edema, acneform lesions, decreased hemoglobin and hematocrit, gastric mucosal ulceration, and reduced ability to reproduce. PCBs may reasonably be anticipated to be carcinogens.

Chronic exposure to lead generally results in 90% accumulation in the bones. Lead impairs the formation of red blood cells largely by inhibiting hemsynthetase and d-ala-dehydratase. Chronic lead poisoning results in anemia and lead encephalopathy. Symptoms include headache, giddiness, insomnia, amblyopia, deafness, depression, stupor, tremor, mania, delirium, convulsions, paralysis, ataxia, and coma. A neuromuscular syndrome called "lead palsy" may be evident. Acute toxicity is most common in young children with history of pica. Anorexia, vomiting, malaise, or convulsions due to increased intracranial pressure may occur. Chronic exposure to lead may leave permanent brain damage if blood lead is increased above 0.05%. Chronic toxicity is shown in children by weight loss, weakness, or anemia. Lead poisoning in adults is usually occupational due mainly to inhalation of lead dust or fumes. Wristdrop and colic rarely occur.

2.4.3 Exposure Pathways Analysis

No exposure pathway has been documented for the TSTA Area.

2.4.4 Sensitive Population

Potential sensitive populations at NAS Alameda include the endangered bird specie the California least tern (*Sterna albifrons browni*). Other sensitive species lists compiled for the San Francisco Bay must be considered because of rainwater impacts on the Bay, if the removal action at the TSTA is not completed.

3.0 IDENTIFICATION OF SOIL REMOVAL ACTION OBJECTIVES

3.1 STATUTORY FRAMEWORK

This removal action is taken pursuant to CERCLA and the NCP under the delegated authority of the Office of the President of the United States by Executive Orders 12080 and 12580. These orders to provide the U.S. Department of the Navy with authorization are non-time-critical because a six-month planning period was available from the time the removal action was determined to be necessary before the initiation of removal actions.

This EE/CA Addendum complies with the requirements of CERCLA, SARA, NCP at 40 CFR Part 300, USC Sec. 2701, et seq., and EO 12580. This EE/CA Addendum is being pursued under 40 CFR Part 300.415(b)(2):

- Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants

- Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released

The requirements for this EE/CA Addendum and its mandated public comment period provide opportunity for public input to the cleanup process. The entire process is also described by the NAS Alameda Draft Federal Facility Site Remediation Agreement (FFSRA), 1993, which has not yet been completed. Parties to the FFSRA include the DON, USEPA, and CALEPA (DTSC and SFBRWQCB).

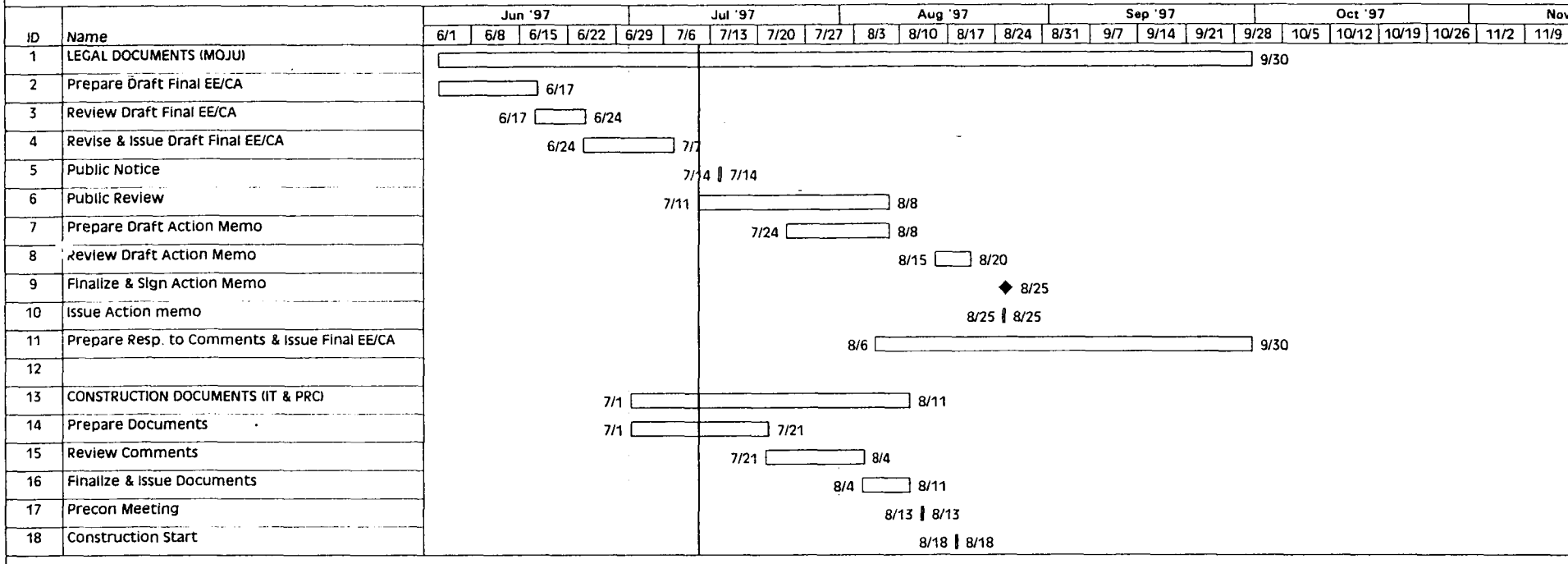
3.2 DETERMINATION OF REMOVAL SCOPE

The medium that will be subject to the removal action consists of soil stockpiles in the TSTA containing PCBs and lead, existing covers and bottom liners, and water collection tanks and appurtenances. The removal action for the TSTA stockpiles is not anticipated to exceed 2 months in duration or to cost in excess of $500,000.

3.3 DETERMINATION OF REMOVAL SCHEDULE

The schedule for the contaminated soil removal action to be conducted at the TSTA has been developed as part of an EE/CA Addendum. The schedule for the above referenced removal actions is presented in Figure 3-1. Details of schedule, health, safety, and engineering controls for the selected removal action alternative will be presented in an Implementation Work Plan.

re 3-1
Si[illegible]CA Schedule
NAS Alameda



Project:
Date: 7/11/97

Critical
Noncritical
Progress
Milestone
Summary
Rolled Up

3.4 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The following discussion of Applicable or Relevant and Appropriate Requirements (ARARs) is based on the project being a removal action. The removal action is intended to minimize or mitigate potential adverse effects to human health and the environment. However, the decision as to whether this will be a final response will be determined by specific risk assessment.

Federal Applicable Requirements include the substantive requirements of the Clean Air Act . State of California Applicable Requirements include similar health and safety requirements, and substantive requirements, but are generally more stringent than Federal requirements. Additionally, State of California requirements for hazardous waste transport and disposal are applicable to those soils, that are classified as hazardous waste.

No Relevant and Appropriate Requirements for this Site 15 removal actions have been identified.

3.4.1 Applicable Requirements

Federal Applicable Requirement that will effect the handling, health and safety, and final disposition of media during the TSTA removal action are the Clean Air Act (40 CFR Part 50) and transportation of hazardous materials (TSTA soil) off-site will be subject to requirements of the DOT (49 CFR Parts 171, and 172). Both ARARs are action specific.

State Applicable Requirements that will affect the handling, treatment, and final disposition of media during the TSTA removal action include requirements of the California Health and Safety Code sections related to removal actions, including health and safety requirements during the removal action These State requirements are action specific. CCR Title 22, Division 4.5- Environmental Health Standards for the Management of Hazardous Waste is a chemical specific ARAR for the portion of the soil at the TSTA which is considered toxic under California regulations.

The following is a more detailed explanation of the identified ARARs. Compliance with these ARARs is considered practicable at this point. Any ARAR non-compliance will be documented in the site close-out report.

3.4.2 Federal Applicable Requirements

Clean Air Act (CAA), as regulated under 40 CFR Part 50.6 - National Primary and Secondary Ambient Air Quality Standards, lists the ambient air quality standards for particulate matter as 150 micrograms per cubic meter for 24 hours, and 50 micrograms per cubic meter as the annual arithmetic mean average. The standards are measured as PM-10 and are applicable for excavation or other activities that may generate air emissions (e.g., fugitive dust). The generation of dust will be minimized during the removal action by thoroughly saturating the soil with water prior to start of the removal action, during soil removal action, and until verification sampling results are finalized and demonstrate that the cleanup goals have been achieved. Additionally, equipment movement over the affected area will also be conducted in a manner that minimizes traffic in the area subject to the removal action. The Construction Work Plan for the project will require that transit of excavation equipment within the removal action area be minimized and that transit of transport trucks within the TSTA be allowed only in areas not subject to the removal action or where the depth of excavation for the removal action has been achieved. Primary monitoring will be by visual observation. Excavation work will be halted and additional water applied to the excavation area at any time when visible dust is generated. In addition, overall compliance with regulations will be demonstrated by monitoring particulate emissions at the facility fence line and also with personal air monitors for site workers.

3.4.3 State Applicable Requirements

California Health and Safety Code, Section 25323.1 includes substantive State provisions, conditions, and requirements for preparation of remedial action work plan for non-emergency removal actions. Compliance of this document with these provisions is summarized below:

RAW Requirements	Documentation
Description of On-site Contamination	EE/CA - Section 1.0
Removal Action Goals	EE/CA - Section 2.0
Alternatives Considered and Rejected	EE/CA - Sections 3.0 and 4.0
Identification of Removal Action and Detailed Engineering Plan	EE/CA - Section 5.0 and Implementation Work Plan

California Code of Regulations (CCR) Title 22 - Division 45 Environmental Health Standards for the Management of Hazardous Waste will apply to the portion of soil at the TSTA which is classified as a California hazardous waste. The requirements for on-site management of hazardous waste found under 22 CCR 66262.34, which regulates the accumulation of hazardous wastes, will be strictly observed during removal operations. All waste containers shall be labeled in accordance with 2 CCR 66262.34(f). The labeling shall state: the accumulation start date and or the date the 90 day storage limit began; the words Hazardous Waste; the composition and physical state of the waste; warning words indicating the waste is toxic; the name and address of the generating facility. All wastes stored in a container will be like wastes (i.e., sediments with sediments, PCB materials with PCB materials, etc.). The security requirements 22 CCR 66265.14 will be enacted at the start of waste accumulation by the on-site supervisor. A contingency plan will be maintained on-site during operations involving hazardous waste for the purpose of providing pre-planning for emergencies such as spills or fire, in order to meet the requirements of 22 CCR 66265.50-56.

3.5 AGENCIES WITH REVIEW AND OVERSIGHT RESPONSIBILITIES

Regulatory agencies that will have oversight responsibilities for site activities and remedial action alternatives analyses include:

USEPA - All remedial activities will be subject to USEPA's oversight.

CALEPA DTSC- All remedial activities will be subject to CALEPA oversight.

BAAQMD - Will enforce requirements restricting discharges of pollutants to the atmosphere during remediation of the site.

City of Alameda- Will enforce traffic control for transport of trucks through the City and may restrict working hours and noise levels during the removal action.

4.0 IDENTIFICATION AND SCREENING OF GENERAL REMOVAL ACTIONS AND TECHNOLOGIES

4.1 SCREENING METHODOLOGY

To achieve the removal action objectives described in Section 3.5, site-specific data from the site characterization were reviewed so that potential alternatives could be identified, developed, and evaluated. The removal action alternative development and evaluation process proceeded as follows: First, applicable general removal actions and technologies were identified and screened with respect to site-specific data. Second, candidate removal actions were developed from the initial screening. Third, the alternatives were evaluated based on effectiveness, implementability, and cost and compared with one another to identify a preferred alternative. Section 4.1 summarizes the general removal actions and treatment technologies that were identified and screened for this removal action. The removal action alternatives are developed in Section 4.2 and evaluated in Section 4.3.

Alternatives are evaluated assuming PCB and lead contamination only. Other organic compounds and inorganic products were not identified as primary contaminants in previous investigations and are not considered within the scope of this removal action. An initial discussion of potential alternatives and applicable technologies in this section will be followed by a more detailed analysis of the four selected options including their effectiveness, implementability, and cost.

The effectiveness criteria used were the following: (a) protection of human health and the environment; (b) ability to achieve the target cleanup levels; in other words reduction of toxicity, mobility, or volume through the removal action; (c) compliance with ARARs and other guidance; and (d) long and short-term effectiveness of the alternative.

The implementability criteria were the following: (a) technical feasibility, including commercial availability; (b) administrative feasibility; (c) availability of services and materials; and (d) regulatory agency and public acceptance.

The cost evaluation of each alternative is based upon estimates of capital costs and operation and maintenance costs.

4.2 IDENTIFICATION OF POTENTIAL TECHNOLOGIES

Potential alternatives and technologies are those which are appropriate for the site contaminants and may achieve the specific objectives, but may not necessarily be technically effective, successfully implementable, or cost-effective. A wide range of potential alternatives and technologies were initially considered to ensure that no reasonable alternative was overlooked. Four general removal actions which may be applicable to TSTA were considered based on the screening criteria defined above. The waste treatment processes associated with each removal action were also evaluated based on their technical feasibility and effectiveness. The general removal action and technologies/ treatment processes that were screened are shown in Tables 4-1 and 4-2. If any of the potential technologies options failed the technical feasibility, effectiveness, or implementability criteria, it was dropped from further consideration. The last two columns of Table 4-1 show the initial screening decision and the basis for each remedial technology considered.

4.3 DEVELOPMENT OF REMOVAL ACTION ALTERNATIVES

Following the screening of general removal actions and technologies, demonstrated and potentially applicable technologies were considered from the screened generalized classes of removal action alternatives for the soils at the TSTA. These classes include:

No Action

Removal and Disposal Actions

- On-Site Disposal
- Class I and II Landfill Facility Disposal

Ex-Situ Treatment Actions

- Soil Washing
- Acid Washing
- Solvent Extraction
- Slurry-phase Bioremediation
- Photolytic dehalogenation
- GAC Adsorption
- Clarification/Filtration

Table 4-1

GENERAL REMOVAL ACTION AND TECHNOLOGY SCREENING SUMMARY
TSTA (Soil From Site 15)

General Response Action/Process	Remedial Technology /Process	Effectiveness	Implementability	Estimate Cost	Initial Screening Decision	Comments
No Action	No Action	Low	Good	Low	Consider	Serves as baseline, contaminants remain indefinitely
Institutional Controls	Deed Restrictions	Low	Good	Low	Eliminate	Minimal protection to human health and the
	Fencing	Low	Good	Low	Eliminate	environment, not permanent soil remediation solution
Containment Actions	Capping	Low	Good	Low	Consider	These actions prevent exposure and further migration
	Vertical Barriers	Low	Moderate	Moderate	Eliminate	however, they provide only limited protection to
	Horizontal Barriers	Low	Moderate	Moderate	Eliminate	human health and the environment and limit future
	Surface Controls	Low	Good	Low	Eliminate	land use
Removal/Disposal Actions	Excavation	High	Good	Moderate	Consider	Effective, easy to implement
	On-Site Backfill	Moderate	Moderate	Low	Consider	Lack of certainty about long-term monitoring and closure requirements
	Class I Disposal	High	Good	High	Consider	Can pretreat for lead and PCBs prior to disposal
	Class II Disposal	Moderate	Good	Moderate	Consider	Case by case acceptance of waste
	Class III Disposal	Low	Difficult	Low	Eliminate	Soils do not meet stringent facility acceptance criteria
	Recycler	Low	Difficult	Low	Eliminate	Lead and PCB concentrations too high for acceptance
In Situ Action	Solidification/Stabilization	Moderate	Moderate	Low	Consider	Immobilizes lead may immobilize PCBs
	Aeroble Bioremediation	Low	Moderate	Moderate	Eliminate	Not proven effective for all PCBs, not effective for lead
	Anaerobic Bioremediation	Low	Difficult	Moderate	Eliminate	Not feasible in shallow soil (<2 ft bgs) nor for lead
	Vitrification	High	Difficult	Very High	Eliminate	Complex technology, very high costs
Ex Situ Actions	Soil Washing	Moderate	Moderate	Moderate	Consider	Effective for removing lead and potential PCBs
	Acid Washing	Moderate	Moderate	Moderate	Consider	Effective for removing lead, not effective for PCBs
	Solvent Extraction	Moderate	Moderate	Moderate	Consider	Effective for removing PCBs and potentially lead
	Slurry-phase Bioremediation	Moderate	Moderate	Moderate	Consider	Effective for removing PCBs, not effective for lead
	Controlled Solid-phase Biotreatment	Low	Difficult	Low	Eliminate	Not effective for lead, lead toxic to microbes
	White-rot Fungus	Low	Difficult	Moderate	Eliminate	Not proven technology, not effective for lead
	Solidification/Stabilization	Moderate	Moderate	Moderate	Eliminate	In-Situ more cost effective
	Chemical Dechlorination	Low	Difficult	High	Eliminate	Effective for PCBs, not effective for lead
	Ultrasonic Detoxification	Low	Difficult	High	Eliminate	Not proven technology, not effective for lead
	Incineration	Moderate	Good	High	Eliminate	Proven for PCBs, but not lead, very high costs
	Thermal Desorption	Moderate	Difficult	Moderate	Eliminate	Proven for PCBs not lead, difficult for site-specific soil
	Pyroplasmic	Low	Difficult	High	Eliminate	Not effective for solid wastes or lead
	Photo Dehalogenation	High	Good	Moderate	Consider	Effective for PCBs, not effective for lead

NAVAL AIR STATION, ALAMEDA
TSTA (Site 15 Soil)
WASTE TREATMENT PROCESS SCREENING

TABLE 4-2

Proj. #: 95A1601

General Response Action	Treatment Process	Contaminant Treated		General Response Action	Treatment Process	Contaminant Treated	
		PCB	Metal			PCB	Metal
No Action	Do Nothing			Institutional Control Actions	Natural Attenuation	●	
Containment Actions	Capping	●	●	Removal & Disposal Actions	Excavation & Land Disposal	●	●
	Encapsulation	●	●				
In-Situ Treatment Actions	Electrolytic Recovery Techniques		●	Ex-Situ Treatment Actions	Dehalogenation	●	
	Air Stripping & Steam Stripping	●			Ozonation		
	Evaporation				Evaporation		
	Physical and Chemical Fixation	●	●		Physical & Chemical Fixation	●	●
	Aerobic Process	●			Liquid-injection Incineration		
	Anaerobic digestion				Rotary Kilns Incineration	●	
	Enzymatic Treatment				Fluidzed Bed Thermal Oxidation		
	Thermal Desorption	●			Wet Oxidation		
	Detoxification	●			Pyrolysis	●	
Ex-Situ Treatment Actions	Activated Carbon Adsorption	●			Supercritical Fluid Extraction		
	Distillation				Plasma System		
	Electrolytica Recovery Techniques		●		Incineration	●	
	Hydrolysis				Catalytic Incineration		
	Ion Exchange		●		Aerobic Process	●	
	Solvent Extraction	●			Surfactant Washing	●	
	Membrane Separation Technolgy				Abaerobic Digestion		
	Air Stripping & Steam Stripping	●			Enzymatic Treatment		
	Freeze Crystallization				Photolysis	●	
	Filtration and Separation'	●	●		Chemical Oxidation & Reduction		
	Chemical Precipitatoin		●		Termal Desorpation	●	
	Thin-film Evaporation				Detoxification	●	

References:

1. EPA Document, 1993; Remediation Technologies Screening Matrix and Reference Guide, Version I.

2. DHS/TSCD Third Biennial Report, 1986; Alternative Technologies for Recycling and Treatment of Hazardous Wastes

3. Freeman, Harry M.; Standard Handbook of Hazardous Waste Treatment and Disposal

The technologies within the classes may not individually satisfy the site-specific removal action objectives. It was thus necessary to assemble and group them to form site-specific removal action alternatives. Certain technologies are necessarily associated with other technologies. For example, depending on the concentration of constituents in the excavated soils and the applicability of Land Disposal Requirements (LDRs), excavated soils may require treatment before disposal. The following specific removal action alternatives were assembled for the removal action at the TSTA based on the results of the screening:

Alternative 1 - No Action

Alternative 2 - On-Site Treatment with Solvent Extraction and Acid Washing

Alternative 3 - Off-Site Disposal at Class I and Class II Landfill

Alternative 4 - Disposal at NAS Site 2 (West Beach Landfill)

4.3.1 Description of Removal Alternatives

Alternative 1: No Action

Alternative 1 is to leave the site as is, to take no action affecting the contaminants, and not to conduct periodic inspection or monitoring of ambient air and groundwater.

Alternative 2 On-Site Treatment with Solvent Extraction and Acid Washing

Alternative 2 is to separate PCBs from soil through surfactant washing or solvent extraction; and remove soluble lead through on-site soil washing or if necessary acid washing. PCBs in wash water or solvent would be destroyed by UV oxidation or removed in beds of granular activated carbon (GAC) adsorbers. Lead removed from the metal solubilization process is disposed of off-site. Treated soil is disposed of at NAS Alameda perhaps as backfill for underground storage tank removals.

Alternative 3: Off-Site Disposal at a Class I and II Land Disposal Facilities

Alternative 3 is to remove the TSTA soil and transport the soil to off-site Class I and Class II Landfill facilities for disposal.

Alternative 4 : Excavation and Disposal at NAS Site 2 (West Beach Landfill)

Alternative 4 is to move the soil from the TSTA to an new engineered fill to be constructed at the West Beach Landfill, Site 2. This may be the permanent location of the new fill or the location may have to be moved to incorporate the fill into the final closure of the West Beach Landfill; if required by the Site 2 Closure Plan (as yet to be prepared).

4.4 EVALUATION OF REMOVAL ACTION ALTERNATIVES

Evaluation Criteria

The identified removal action alternatives are evaluated based on three criteria: (1) effectiveness; (2) implementability; and (3) estimated costs.

Effectiveness

The effectiveness of an alternative refers to its ability to meet the cleanup objectives within the scope of the removal action. These objectives include: (1) overall protection of public health, community, and the environment; (2) ability to achieve the target cleanup levels; (3) reduction of toxicity, mobility, or volume through treatment; (4) long-term effectiveness and permanence; and (5) system reliability/maintainability. The preference of each treatment option over land disposal alternatives, where practicable treatment technologies are available is also considered.

Implementability

The implementability criteria encompass: (1) technical feasibility; (2) administrative feasibility of implementing a particular alternative; (3) availability of various services and materials required; and (4) regulatory agency and community acceptance. Technical feasibility was used to eliminate those alternatives that are clearly impractical at the TSTA. Administrative feasibility evaluates those activities needed to coordinate with other offices and agencies such as permits and waivers.

Cost

Each removal action alternative is evaluated to determine its projected costs. The evaluation compares each alternative's capital, operations and maintenance (O&M) costs. For Alternatives 2 and 3 the removal action alternative can be implemented in a relatively short period of time and associated O&M are negligible. These costs are prepared using many sources and include vendor estimates, disposal facility fees, and estimates for similar projects.

4.5 REMOVAL ACTION ALTERNATIVES

The preliminary screening resulted in four alternatives, including the no-action alternative. The analysis of each removal action alternative consists of a description of the alternative, followed by an evaluation based on its relative effectiveness, implementability, and estimated cost.

4.5.1 Alternative 1: No Action

Description

This removal action alternative is retained for analysis to provide a basis for comparison with other alternatives. For this alternative, no remedial activities would be implemented at the TSTA Area at NAS Alameda. Table 4-3 provides a detailed evaluation of this alternative.

4.5.2 Alternative 2: Excavation, Soil Washing and/or Solvent Extraction

Prior to conducting the removal action, treatability studies would have to be conducted to determine that the required clean-up levels can be obtained. After selecting the appropriate treatment technology(ies), soils would be removed using conventional earthwork equipment such as a loader or backhoe-excavator from the TSTA stockpiles, and placed into the treatment system. Obstructions to handling of the TSTA soil piles are the plastic membranes covering the stockpiles, and the water collection system. These obstructions will be removed prior to removing soils from the stockpile.

Soil washing is accomplished by washing the soil, in tanks, with a surfactant or solvent to extract the PCBs and lead. Evaluations of the technical feasibility and implementability of this alternative are summarized in Table 4-4. Contaminants sorbed onto soil particles are separated from soil in an aqueous-based system. The liquid-PCB containing phase is

Table 4-3
Alternative 1: No Action
Detailed Evaluation

EVALUATION CRITERIA		EVALUATION
EFFECTIVENESS	Overall Protection	No action involves no excavation or handling materials. Therefore, site workers require no protective equipment and there is no risk to the community from excavation and transportation of contaminated materials. There are potential potential long term risks for migration of contaminants with deterioration of the cover and rain water collection system
	Compliance with ARARs	Potential ARARs are not met
	Long-term Effectiveness and Permanence	Does not comply with ARARs. Since contaminants are not removed from the soil, future migration of contaminants is likely.
	Reduction in Toxicity, Mobility, or Volume through Treatment	No treatment is involved. Thus, there is no reduction in toxicity, mobility or volume of contaminants at the site.
	System Reliability/Maintainability	No treatment system is required.
IMPLEMENTABILITY	Technical Feasibility	Technically feasible.
	Administrative Feasibility	Not administratively feasible since the alternative is not acceptable to regulatory agencies and is only used for comparative purpose.
	Availability of Services and Materials	No services and materials are required to implement this alternative.
	Regulatory Agency/ Community Acceptance	Acceptance to regulatory agencies is doubtful.
COST	- Engineering - Capital - Operation & Maintenance (O&M)	No Cost has been associated with this alternative.

passed through either a GAC or a UV oxidizer to remove or breakdown the PCB. The liquid surfactant or solvent can be recycled through reflux. The slurry soil phase is either re-suspended or treated with acid solution to solubilize the lead. Soluble lead is precipitated chemically and precipitated lead is recycled or disposed of at a Class I landfill. Figure 4-1 shows the general process for this alternative. The remaining slurry suspension is dewatered by centrifugation or filter press. The dewatered soil will be tested for PCBs and lead and confirmed to meet treatment action levels and soluble lead level. Soil containing lead at 130 ppm or less, or PCB at 0.34 ppm, will be stockpiled for reuse at NAS Alameda. Sludge containing PCBs and lead will be disposed of off-site in a Class I landfill.

Verification sampling includes sampling of the treated soil and the TSTA area for PCBs and lead. Sampling of every 150 tons of treated soil would be conducted. Verification sampling of the TSTA area would include collecting and analyzing one sample for every 2500 square feet of the TSTA area.

4.5.3 Alternative 3: Class I and II Off-Site Landfill Disposal

Conventional earthwork equipment such as a loader or backhoe-excavator would be used to remove soils from the TSTA stockpiles and load them onto trucks. The soil would then be hauled by trucks to an appropriately licensed, off-site, disposal facility. Obstructions to handling of the TSTA soil piles are the plastic membranes covering the stockpiles, and the water collection system. These obstructions will be removed prior to mobilizing equipment. The process for this alternative is as shown in Figure 4-2. Evaluation of the technical feasibility and implementability of this alternative is summarized in Table 4-5.

Prior to conducting soil removal, the stockpiles would have to be sampled and the samples subject to laboratory analysis in accordance with the waste acceptance procedures of the accepting facility. Typically this would include collecting one sample for every 50 cubic yards of soil and determining the total concentrations of PCBs and lead, and also the soluble concentrations of these compounds. After completion of the project, verification sampling of the TSTA area would include collecting and analyzing one sample for every 2500 square feet of the TSTA area.

4.5.4 Alternative 4: Disposal at West Beach Landfill

Non-hazardous waste soils would be removed, using conventional earthwork equipment such as a loader or backhoe-excavator from the TSTA stockpiles, placed on trucks, and then hauled by trucks to the West Beach Landfill (Figure 4-3). The plastic membranes covering the stockpiles, and the water collection system would be removed prior to mobilizing equipment. Soil which is classified as Hazardous Waste (estimated to be about 2% of the total TSTA soil) would be sent to a Class 1 land disposal facility. Figure 4-4 shows the general process for this alternative. Evaluations of the technical feasibility and implementability of this alternative are summarized in Table 4-6.

Prior to conducting soil removal, the stockpiles would have to be sampled and samples subject to laboratory analysis to confirm the non-hazardous classification. Soil already identified as hazardous waste will have to be sampled in accordance with the waste acceptance procedures of the accepting facility. Typically this would include collecting one sample for every 50 cubic yards of soil and determining the total concentrations of PCBs and lead, and also the soluble concentrations of these compounds. Verification sampling of the TSTA would include collecting and analyzing one sample for every 2500 square feet of the TSTA.

The West Beach Landfill encompasses an area of about 200 acres. The fill would be placed in an area of about 1 acre, at the northeast corner of the landfill, the corner furthest from the San Francisco Bay and the designated wetland area within the West Beach Landfill, as shown in Figure 4-3. The northeast corner is physically isolated from the rest of the landfill by a 10 foot high, 30 foot wide, berm. The fill would reach a height about 2/3's the height of the existing berm, at the berm, and would slope gently away from the berm to the facility boundaries at the north-west corner of Site 2. At about a distance of 30 to 40 feet from the facility boundary the fill would end at a height of about 7 feet and the slope down to meet the existing grade.

In order to construct the fill, geotechnical investigation would have to be conducted to determine if adverse geotechnical conditions are present at the site. The engineered fill will have to be designed to minimize contaminant migration by physical forces such as wind or erosion or by biological activity such as burrowing animals, insects or worms. Additionally, the design will have to provide surety that the integrity of the fill will maintain, to the extent feasible, during catastrophic events such as earthquakes.

Table 4-4
Alternative 2: Excavation, Soil Washing And/or Solvent Extraction
Detailed Evaluation

	EVALUATION CRITERIA	EVALUATION
EFFECTIVENESS	Overall Protection	Soil washing with surfactants or solvent has been proven to reduce PCB levels in soils to 1.0 mg/kg Metal solubilization of lead and subsequent removal by precipitation have also been shown to remove lead. If an appropriate technology for PCB is demonstrated by treatability studies, treating soil will reduce potential adverse impacts to site workers and the public Potential environmental impacts during implementation can be minimized by engineered controls. Excavation poses a potential health and safety risk to site workers through skin contact and air emissions. Personal protective equipment, at a level commensurate with the contaminants involved, is normally required during excavation operations.
	Compliance with ARARs	Potential ARARs are met to the extent practicable if contaminants are reduced to clean-up levels
	Long-term Effectiveness and Permanence	Successful implementation of this alternative provides an adequate degree of protection to both human health and the environment on a long-term basis.
	Reduction in Toxicity, Mobility, or Volume through Treatment	This alternative reduces significantly the total amount of contaminants, the amount of contaminants available to migrate, and the volume of contaminated soil. However, the remaining lead in treated soil may be more soluble, but with less impact due to reduced quantities.
	System Reliability/Maintainability	Prior to implementing this alternative demonstration via treatability studies must be conducted to demonstrate probability of achievement of PCB clean-up levels
IMPLEMENTABILITY	Technical Feasibility	The excavation aspect of this alternative is implementable and site conditions are generally favorable. Soil washing and acid washing are commonly applied technologies that can implemented on-site.
	Administrative Feasibility	Site mobilization and setting up of this alternative may require more space for operation. Permits would be required for discharge and treatment.
	Availability of Services and Materials	Equipment and skilled or knowledgeable personnel required for implementation are available. Personnel specifically trained in soil washing or solvent extraction operations would be required on-site. Water would be required on-site for contamination control (e.g., dust suppression) and treatment activities. Should water not be readily available (e.g., nearby hydrant), water would have to be brought in by truck. Other resources, such as electricity are available on-site, whereas, telephone, and fuel would be provided by mobile sources. Off-site disposal capacity and analytical capabilities are readily available.
	Regulatory Agency/ Community Acceptance	On-site disposal of treated soil is anticipated to be acceptable to the regulatory agencies and the community because this alternative reduces contaminant toxicity, volume, and mobility. In addition, no air emissions are produced using this treatment process.
COST	- Engineering - Capital - Operation & Maintenance (O&M)	$250,000 $1,950,000 $0

ALTERNATIVE 2
EXCAVATION, SOIL WASHING, PHOTOLYSIS OR GAC ADSORPTION AND
METAL SOLUBILIZATION AND ON SITE DISPOSAL

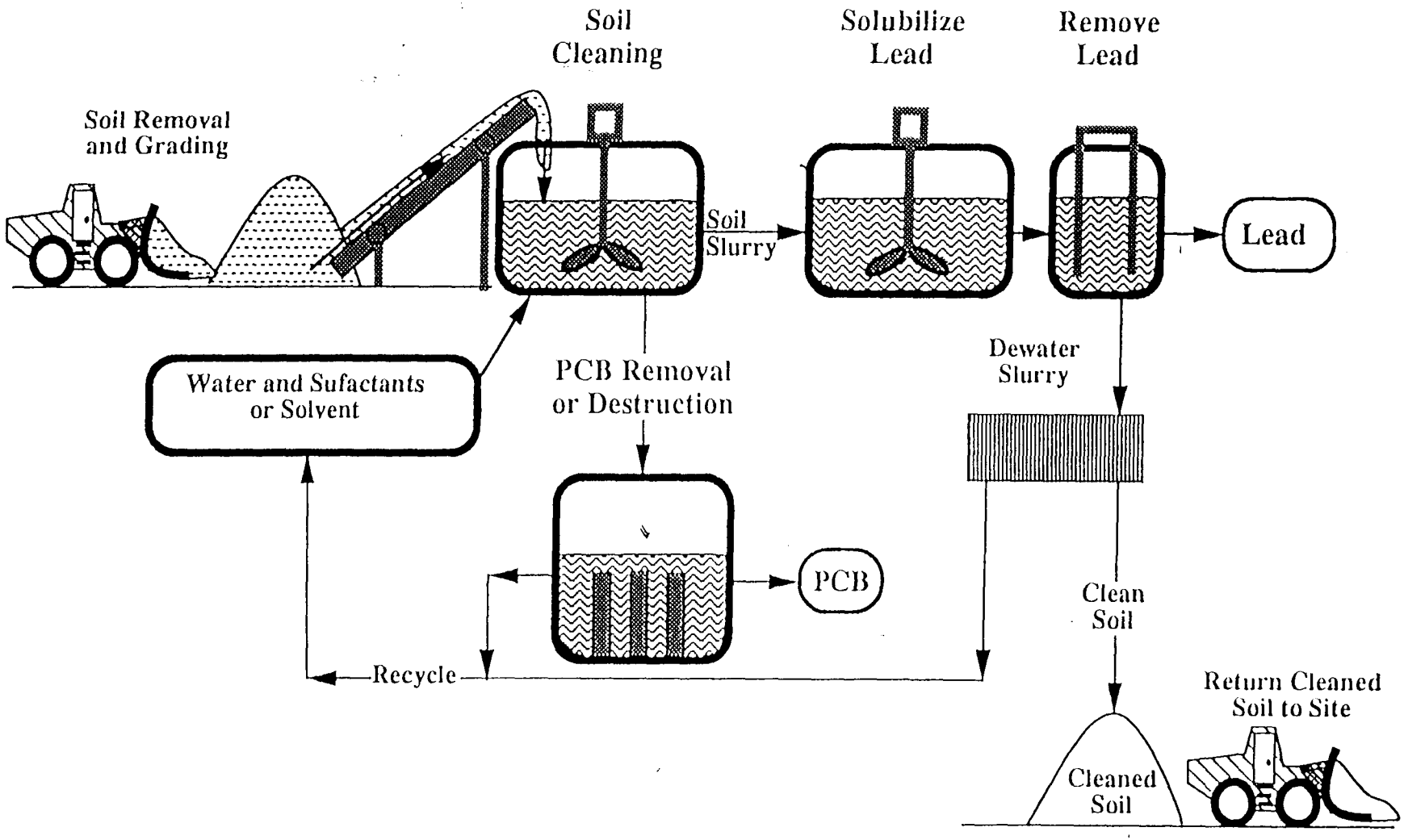


Figure 4-1

ALTERNATIVE 3
EXCAVATION AND CLASS I AND II
OFF-SITE DISPOSAL

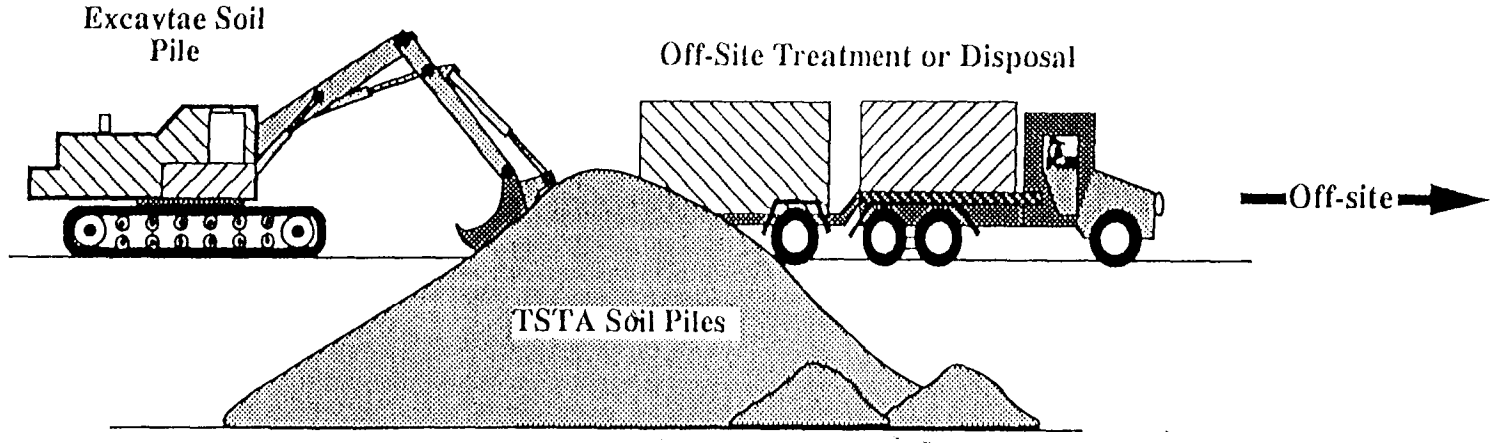
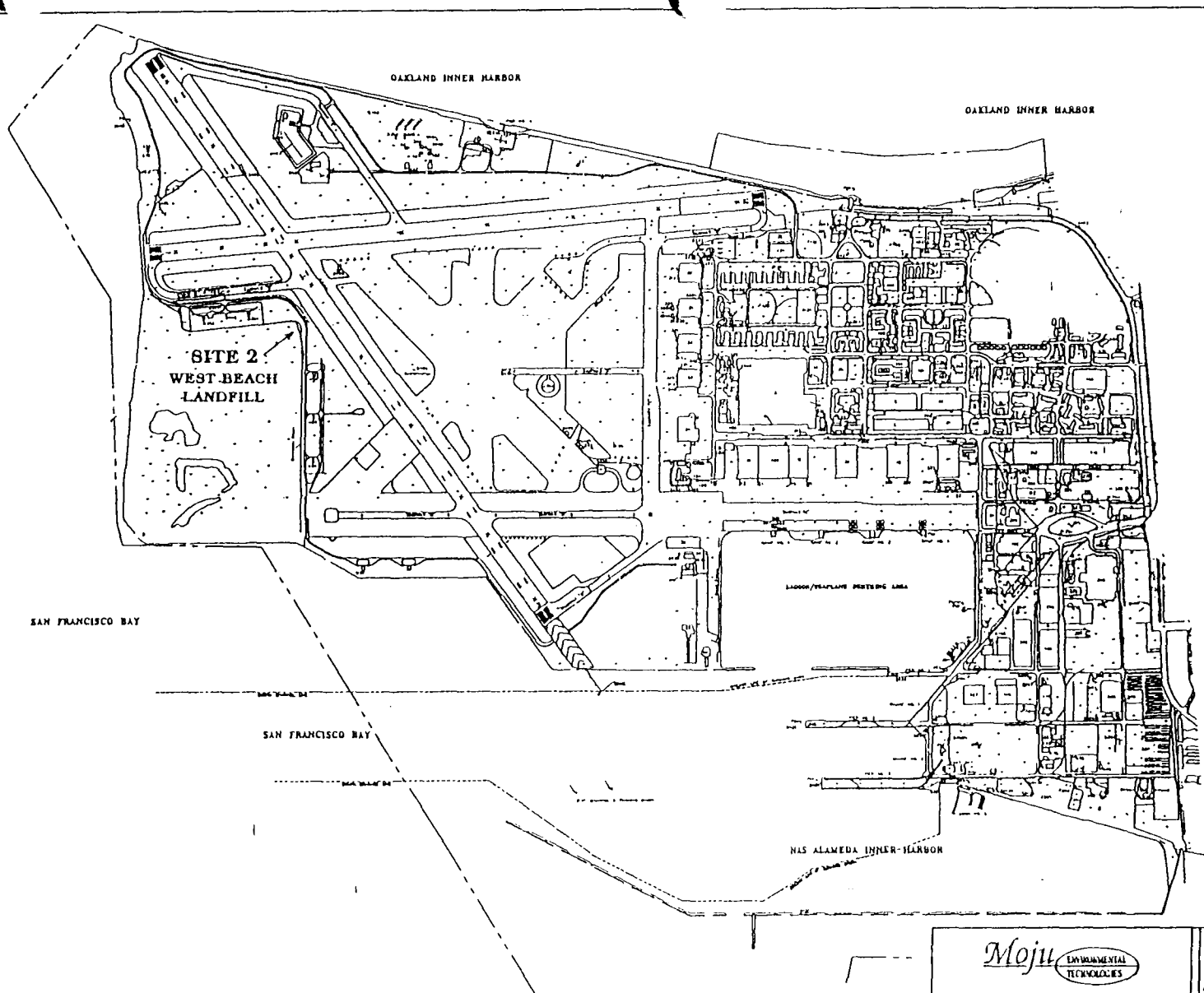


Figure 4-2

Table 4-5
Alternative 3: Excavation and Class I and II Off-Site Disposal
Detailed Evaluation

	EVALUATION CRITERIA	EVALUATION
EFFECTIVENESS	Overall Protection	Removal of contaminants from the site ensures overall protection of both human health and the environment. The contaminated soils are transferred to a managed disposal facility. This alternative meets the basic objectives of overall protection. For workers at the site, personal protective equipment, at a level appropraite for the site conditions will be required.
	Compliance with ARARs	Potential ARARs are met to the extent practicable by removing all contaminated soils which exceed action levels, except for CERCLA preferences against off-site disposal.
	Long-term Effectiveness and Permanence	By moving soil with elevated PCB and lead concentrations from the site to a facility that will physically contain it, the mobility of the contaminants at the site itself is reduced. The Class I treatment and disposal facility and Class II disposal facility would ensure that stringent LDRs are met with or without waste pretreatment, thus attaining long-term effectiveness and permanence.
	Reduction in Toxicity, Mobility, or Volume through Treatment	The excavation and disposal of subsurface soils does not provide any reduction in the volume of excavated material requiring disposal. Disposal of surface soils in a engineered disposal cell provides reduction in contaminant mobility and eliminates exposure pathways which in turn reduces the potential release of contaminants to the environment.
	System Reliability/Maintainability	System is well established and reliable.
IMPLEMENTABILITY	Technical Feasibility	Excavation and disposal is a well demonstrated removal action which uses standard construction practices. The action is reliable and readily implementable.
	Administrative Feasibility	Permits would not be necessary to implement the action. A traffic management plan for transportation of the soil off-site should be prepared.
	Availability of Services and Materials	Equipment and knowledgeable personnel required for implementation are readily available. Water would be required on-site for contamination control (e.g., dust suppression) and treatment activities. Should water not be readily available (e.g., nearby hydrant), water would have to be brought in by truck. Other resources, such as electricity, telephone, and fuel for equipment would be provided by temporary/mobile sources. Off-site disposal capacity and analytical capabilities are readily available.
	Regulatory Agency/ Community Acceptance	This alternative does not meet the statutory preference for treatment; however, it offers timely mitigation of threats posed by contaminants at the TSTA. This alternative can be accomplished in a short period of time, about 1 month.
COST	- Engineering - Capital - Operation & Maintenance (O&M)	$50,000 $450,000 $0



Moju ENVIRONMENTAL TECHNOLOGIES

PROJECT:

ALAMEDA CALIFORNIA

SITE NO. 15
NAVAL AIR STATION, ALAMEDA
ALAMEDA, CALIFORNIA

WEST BEACH LANDFILL
LOCATION MAP

MAY 14, 1997

Figure 4-3

ALTERNATE 4
DISPOSAL AT WEST BEACH LANDFILL

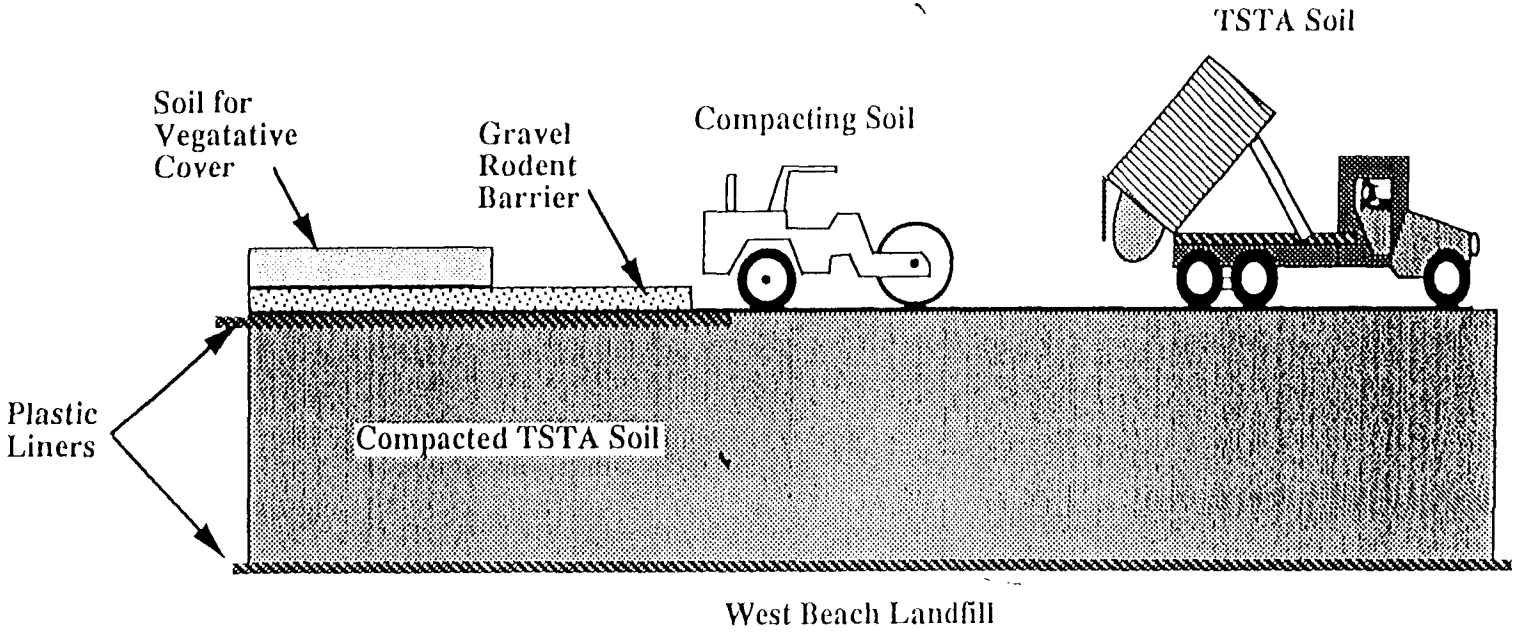


Figure 4-4

Table 4-6
Alternative 4: Excavation and On-Site Disposal
Detailed Evaluation

	EVALUATION CRITERIA	EVALUATION
EFFECTIVENESS	Overall Protection	Removal of contaminants from the site provides overall protection of both human health and the environment. The contaminated soils are transferred to a engineered disposal fill. This alternative meets the basic objectives of overall protection. Maintenance of the disposal fill would have to be conducted to assure long term protection of health and the environment. For workers at the site, personal protective equipment, at a level appropriate for the site conditions will be required.
	Compliance with ARARs	Potential ARARs are met to the extent practicable by removing all contaminated soils which exceed action levels. Landfill ARARs, for the disposal fill, will have to be complied with.
	Long-term Effectiveness and Permanence	By moving soil with elevated PCB and lead concentrations from the site to a facility that will physically contain it, the mobility of the contaminants is reduced. Catastrophic events, such as an earthquake, could increase the possibility of mobility.
	Reduction in Toxicity, Mobility, or Volume through Treatment	The excavation and disposal of subsurface soils does not provide any reduction in the volume of excavated material requiring disposal. Disposal of surface soils in a engineered disposal cell provides reduction in contaminant mobility and eliminates exposure pathways which in turn reduces the potential release of contaminants to the environment.
	System Reliability/Maintainability	System is well established and reliable.
IMPLEMENTABILITY	Technical Feasibility	Excavation and disposal is a well demonstrated removal action which uses standard construction practices. The action is reliable and readily implementable.
	Administrative Feasibility	Permits would not be necessary to implement the action. Preparation and implementation of Closure, Post Closure, and Closure Certifiction workplans and work would be required.
	Availability of Services and Materials	Equipment and knowledgeable personnel required for implementation are readily available. Water would be required on-site for contamination control (e.g., dust suppression) and treatment activities. Should water not be readily available (e.g., nearby hydrant), water would have to be brought in by truck. Other resources, such as electricity, telephone, and fuel for equipment would be provided by temporary/mobile sources. Off-site disposal capacity for the small amount of soil classified as hazardous waste is available.
	Regulatory Agency/ Community Acceptance	This alternative does not meet the statutory preference for treatment; however, it offers timely mitigation of threats posed by contaminants at the TSTA. This alternative can be accomplished in a short period of time; 2 months with 10 years of maintanence.
COST	- Engineering - Capital - Operation & Maintenance (O&M)	$140,000 $290,000 $250,000 - $400,000 (10 years)

Initially, the site will be graded for placement of an impermeable liner at the base of the fill. Soil, from the TSTA, will be placed on the liner and compacted to produce a dense engineered fill. After placing all the TSTA soil, a rodent/insect/worm barrier will be placed on top of TSTA soil, and will surround the entire TSTA fill. Soil capable of supporting a vegetative cover will be placed on top of, and around the perimeter of the barrier layer and TSTA fill.

The TSTA fill will be considered an interim landfill cell until the final closure plan for the West Beach Landfill is determined. Closure, Post Closure and Certification plans would have to be prepared for the new landfill cell in accordance with requirements of the Integrated Waste Management Board. Maintenance and monitoring would have to be conducted as required by the Closure, Post Closure and Certification plans.

Groundwater monitoring presently being conducted for the West Beach Landfill is considered adequate to meet the groundwater monitoring requirements of the new TSTA soil-fill as long as there is no indication of leakage from the new fill. Maintenance will be required if damage to the cap occurs. Annual inspections are likely to be required to assess the integrity of the fill. It is possible that a major catastrophic event such as an earthquake might cause damage to the fill and require additional inspections and repairs.

5.0 COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES

This section presents a comparative analysis of the four alternatives using the criteria employed in Section 4. Based on this analysis, the four alternatives are ranked in order of preference. Table 5-1 summarizes the comparative analysis of the four removal action alternatives. Details of the comparative analysis are discussed below.

Effectiveness, Implementability, and Cost

The four alternatives were compared and the primary reasons for rejecting a removal action are described below and shown in Table 5-1.

Alternative 1 (No Action) does not provide adequate short-term or long-term effectiveness or permanence for TSTA soil because contaminants are not removed and the cover and water collection system are not maintained. The cost of maintaining the existing TSTA facility as a long-term storage solution is high. The likelihood of community and regulatory acceptance of this alternative is low. Therefore, the No Action alternative, even with maintenance, is eliminated.

The effectiveness of Alternative 2 (On-site Treatment), especially for PCBs is difficult to ascertain. Treatability studies would have to be conducted initially with no assurance that an acceptable technology for the site soils could be found. Thus, on-site treatment may not provide sufficient assurance of adequate long-term environmental and public health protection. Additionally, the cost of treatment technologies (including treatability studies) is very expensive as it is a two step process; one step for removal of PCBs and a second step for removal of lead. For these two reasons Alternative 2 is eliminated.

Implementation of Alternative 3 (Off-site Landfill Disposal) would remove the affected soil from the site and from the facility and therefore is permanently effective for the NAS Alameda Facility. The initial cost of this alterative is similar to Alterative 4, but upon completion of the project there are no foreseeable additional costs. This alternative is the preferred alternative. It should be noted that in CERCLA, transportation and disposal of hazardous substances or contaminated materials off-site without treatment is the least favored remedial action.

Alternative 4 (On-site Disposal) has a similar initial cost to off-site disposal, and is probably as effective as off-site disposal. However, in the event of a major earthquake the level protection provided by on-site disposal may be substantially reduced. Alternative 4 requires preparation of a Closure, Post Closure and Certification of Closure Workplans and completing work tasks as

specified in those workplans. The work includes long term monitoring and maintenance. Also, Alternative 4 is likely to have long-term implications to the closure of the West Beach Landfill. Alternative 4 is likely to take longer to implement due to the need for engineering studies and for regulatory approval and has a higher overall cost with operations and maintenance included.

Table 5-1

REMEDIAL ALTERNATIVES COMPARISON SUMMARY
SITE 16 - CANS - 2 AREA

Remedial Alternative	Effectiveness	Implementability	Estimated Total Capital Cost
Alternative 1 No Action	Inadequate protection to human health and the environment. Removal action objectives are not attained with this alternative. Contaminants will remain on site. Natural bioremediation process results in little or no remediation over a long period of time.	Technically but not administratively implementable (that is, public and regulatory agency acceptance may be difficult). Does not remove liability associated with land reuse.	not estimated
Alternative 2 Excavation, Soil Washing, and/or Solvent Extraction	Provides adequate protection to human health and the environment. Removal action objectives are likely to be achieved with this alternative. PCBs and lead are removed from soil. Therefore, treated soil disposal on site should not affect the groundwater over the long term.	Technically and administratively implementable. On-site soil washing, photolysis and acid washing would require permitting. A treatability study would assess effectiveness. Treatment work requires secondary treatment or disposal. Regulatory and community acceptance of on-site disposal will be required. Backfill of acid-washed soil would be treated.	$2,200,000
Alternative 3 Excavation and Class I and II Off-Site Disposal	Provides adequate protection to human health and the environment. Removal action objectives are achieved with this alternative. Because soils would be permanently removed from the site, this alternative is highly effective in eliminating impacts to groundwater. Off-site disposal is, however, a least preferred remedial alternative.	Implementable. Waste acceptance criteria of recieving facility must be met. Small percentage of soil goes to Class 1 Facility. Class II disposal facility will be adequate for most of the soil. Long term CERCLA liability at landfill.	$500,000
Alternative 4 Excavation and Placement in Engineered Fill at West Beach Landfill	Provides adequate protection to human health and the environment. Removal action objectives are achieved with this alternative. Because soils would be permanently removed from the site. However, engineered fill will have to be incorporated into West Beach Landfill closure	Technically and administratively implementable. Hazardous waste soils would still have to be transported to Class 1 land disposal facility. Remaining soil (98%) would be placed in engineered fill. Requires geotechnical and fill engineering studies. Also, requires preparation of Closure, Post Closure and Closure Certifications and related implementation of workplans. Potential long term cost of including fill into West Beach Closure activities.	$680,000 to $830,000

6.0 RECOMMENDED REMOVAL ACTION ALTERNATIVE

The recommended removal action is determined by the analysis of the alternatives using the evaluation criteria indicated in Section 5. The alternative that most satisfies the effectiveness, implementability, and cost criteria is identified as the preferred alternative.

Alternative 3 (Excavation, and Off-site Disposal) is the preferred alternative. This alternative mitigates the risk to human health and the environment and reduces the potential impacts of soil contaminants on the environment. None of the other alternatives provide the surety of long term effectiveness that Alternative 3 provides. The overall costs of the other alternatives are also greater.

7.0 REFERENCES

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N00236.001471
ALAMEDA POINT
SSIC NO. 5090.3

ATTACHMENT A – FINAL SITE 15 TSTA: ADDENDUM EE/CA ENGINEERING EVALUATION/COST ANALYSIS NON-TIME CRITICAL REMOVAL ACTION

APPENDICES

FINAL SITE 15 TSTA: ACTION MEMORANDUM NON-TIME CRITICAL REMOVAL ACTION

THE ABOVE IDENTIFIED APPENDICES ARE NOT AVAILABLE.

EXTENSIVE RESEARCH WAS PERFORMED BY NAVFAC SOUTHWEST TO LOCATE THESE APPENDICES. THIS PAGE HAS BEEN INSERTED AS A PLACEHOLDER AND WILL BE REPLACED SHOULD THE MISSING ITEMS BE LOCATED.

QUESTIONS MAY BE DIRECTED TO:

DIANE C. SILVA
RECORDS MANAGEMENT SPECIALIST
NAVAL FACILITIES ENGINEERING COMMAND SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 532-3676

ATTACHMENT B

RESPONSE TO COMMENTS ON THE DRAFT ACTION MEMORANDUM ADDENDUM & EE/CA FOR THE SITE 15 REMOVAL ACTION AT NAS ALAMEDA, CA

RESPONSE TO COMMENTS ON THE DRAFT ACTION MEMORANDUM ADDENDUM & EE/CA FOR THE SITE 15 REMOVAL ACTION AT NAS ALAMEDA, ALAMEDA, CA

November 10, 1997

RESPONSE TO COMMENTS ON THE

DRAFT FINAL ENGINEERING EVALUATION/COST ANALYSIS (EE/CA) ADDENDUM FOR SITE 15 AND DRAFT FINAL EE/CA FOR SITE 16 REMOVAL ACTIONS AT NAS ALAMEDA, ALAMEDA, CA

This document presents the Navy's responses to comments from Robert Membrez, dated 28 July, 1997 and the Clearwater Revival Company dated August 22, 1997, on the draft final Engineering Evaluation / Cost Analysis, July 14, 1997 for Installation Restoration (IR) Sites 15 and 16, NAS Alameda.

Comments from Mr. Robert Membrez

COMMENT NO. 1. Where shall the contaminated soil be removed to?

RESPONSE: The Navy contractor, IT Corporation conducted soil sampling at Site 16 on July 29, 1997. Soil samples were collected to allow the soil from Site 16 to be profiled for disposal at either a Class I or Class II facility. Site 15 has current analytical data which can be used to profile the soil for disposal. It is expected that soils will be disposed of at either Vasco Road in Livermore or Altamont Hills in Tracy.

COMMENT NO. 2. What kind of material shall replace the removed soil?

RESPONSE: The soil from Site 16 will be replaced with clean fill material, to be obtained when the project is underway.

COMMENT NO. 3. When is this operation expected to be completed?

RESPONSE: Based on a projected start date of 18 September 1997, it is anticipated that the work will be completed by October 31, 1997.

RESPONSE TO COMMENTS ON THE

DRAFT FINAL ENGINEERING EVALUATION/COST ANALYSIS (EE/CA)
ADDENDUM
FOR THE SITE 15 REMOVAL ACTION
AT NAS ALAMEDA, ALAMEDA, CA

FROM THE CLEARWATER REVIVAL COMPANY

SPECIFIC COMMENTS

COMMENT NO. 1 -The Removal Action does not comply with Executive Order No. 128987 on Environmental Justice.

Federal agencies are required to develop environmental strategies that identify and address disproportionate exposure and adverse health effects of their activities. The proposed removal action and other environmental cleanup activities at NAS have not complied with state environmental standards nor have they complied with the generally accepted standard of professional care. The Navy's activities have therefore created, and continue to perpetuate a disproportionate exposure to toxic chemicals and a disproportionate health burden in the West End of Alameda. The West End is a low-income ethnically-diverse community. Until the Navy commits to a acceptable standard of cleanup at Site 15 and other toxic waste sites at NAS a great injustice continues to be done to residents of the West End.

RESPONSE: The executive order referenced pertains to the NEPA (National Environmental Policy Act) process, but this action is being conducted under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act). In particular, Executive Order No. 12898 applies to the analysis of environmental effects of federal actions when **"such analysis is required by NEPA"**. CERCLA actions are not within the scope of the executive order, because they are inherently considered to benefit the community through the mitigation of environmental hazards. In addition, CERCLA actions are considered to be equivalent to the NEPA process, due to the ability of the states, local governments, and the public to comment on the proposed process.

The proposed removal action is very unlikely to affect the community, because engineering controls will be implemented during the removal action to prevent contaminants from migrating outside the removal action area. The proposed removal action will also mitigate existing potential environmental and health impacts, and will allow beneficial community reuse of the area.

The actual risk to the environment is being assessed by conducting both base-wide and site-specific risk assessments. Depending on the findings of the risk assessments, further action may or may not be necessary. The finding of adequacy or inadequacy of clean-up has not yet been made, and comments related to the overall adequacy of the clean-up at Site 15 should be deferred

until the risk assessment is completed, at which time the final recommendation will be made available to the public for comment.

COMMENT NO. 2 - Failure to Identify State Applicable or Relevant and Appropriate Requirements (ARARs)

The minimum standards for constructing and operating a solid waste facility which are contained in State Water Resource Control Board regulations Chapter 15. *Discharge of Waste to Land (23 CCR 2510 et al)* continue to be ignored. The Corrective Action Management Unit (CAMU) was not originally designed to the requirements of Chapter 15 as required, and the CAMU was operated without mandated environmental controls and monitoring. The closure of the CAMU proposed in the Removal Action Workplan will not comply with Chapter 15 requirements. In order to ensure that all hazardous waste is removed, and that all equipment and debris is decontaminated and disposed of in accordance with Chapter 15 requirements, a written closure plan must be prepared for this removal action. This closure plan should address the groundwater monitoring requirements that were ignored during operation of the CAMU.

RESPONSE: The construction and management of the Temporary Storage and Treatment Area (TSTA) has been conducted in accordance with workplans reviewed and approved by the Cal-EPA. The TSTA qualifies for an exemption under (23 CCR 2510.(b)(2)). The Temporary Storage and Treatment Area (TSTA) is not a CAMU, although it was constructed to the same standards as a CAMU. The TSTA was constructed and has been monitored in accordance with workplans reviewed and approved by the Cal-EPA.
The closure of the TSTA does not have to meet the administrative requirements of Chapter 15, such as the preparation of a written Closure Plan. The closure of the TSTA will be in accordance with the Administrative Memorandum for changes to the Removal Action at Site 15 dated 25 October 1995, reviewed and per Title 40, CFR Sect. 264.552 and Title 22 of CCR Sect 66264.552. Written documentation of the work required for closure will be described in the site specific Construction Workplan, which will be incorporated into the Administrative Record.
All contaminated media will be removed from the TSTA and post removal verification sampling will be conducted to ensure that all contaminated media has been removed. Written documentation of the work required for closure will be described in the site specific Construction Workplan, which will be incorporated into the Administrative Record.

COMMENT NO. 3 -Failure to meet Removal Action Workplan content requirements (22 CCR 25356.1 (h)(2)(b))

The requirements of a removal action workplan included a description of techniques and methods for excavating, storing, handling, transporting, treating, and disposing of material from the site. A description of the methods that will be employed during the removal action to ensure the health and safety of the workers and the public during the removal action are also required. These specific details are not provided in the Removal Action Workplan.

The Removal Action Workplan states that air quality standards may be exceeded during the work. Details of the proposed air monitoring to ensure that ambient air quality standards for particulates, lead and PCBs are not exceed should therefore be provided in the Removal Action Workplan. Best management practices for dust control should be discussed in detail. Monitoring of wind speed and establishment of a "stop work" condition should be made to ensure air quality standards are not exceeded.

Navy environmental work has not used best management practices to prevent storm water pollution. This was particularly evident when contaminated soil was excavated near an old industrial waste pond along the shoreline of IR Site 1. Details of storm water pollution controls including requirements for covering of inactive waste piles, and limits on storage duration, need to be established in the Removal Action Workplan.

Work hours, truck traffic routes, and requirements for truck covering should be established in the Removal Action Workplan.

NOTE:
The referenced citation 22 CCR 25356.1 (h) (2) (b) probably refers to Health and Safety Code 25356.1 (h) (2) (b), as there is no Section 25356 in 22 CCR; sections begin with numbering 66001 and end with 67785. Assuming that the correct reference is to the Health and Safety Code, the cited section does not apply to this removal action, because the intent of the section is to provide an exemption from the permitting process for sites on the National Priority List. The former Alameda Naval Air Station is not a National Priority List site.

The following is the referenced section of the Health and Safety Code, 25356.1(h)(2):

> "A remedial action plan is not required pursuant to subdivision (b) if the site is listed on the National Priority List by the Environmental Protection Agency pursuant to the federal act, if the department or the regional board concurs with the remedy selected by the Environmental Protection Agency's record of decision. The department or the regional board may sign the record of decision issued by the Environmental Protection Agency if the department or the regional board concurs with the remedy selected."

RESPONSE: It is assumed that the reference to a Removal Action Workplan (RAW) is to State of California requirements for the RAW described in the Health and Safety Code. As required by CERCLA, substantive requirements of the Health and Safety Code must be included in the Administrative Record. The Construction Workplan, which is part of the Administrative Record, includes descriptions of the activities needed to complete the removal action, including addressing concerns by the commentator related to air monitoring, best management practices for storm water pollution control, work hours, traffic routes, truck covering etc... .

COMMENT NO. 4 - Previous Comments on Site 15 Removal Action

The Removal Action at Site 15, on-going since 1994, has set a bad precedent for public participation. Following the previous Public Comment period, the Navy twice amended the Removal Action without additional public participation in these decisions. If the public is to play a meaningful role in the cleanup process, public review documents must contain the alternatives that will ultimately be implemented.

During the past three year period comments about the Site 15 cleanup have been continuously received by the Navy from members of the public. Previously the Navy was willing to accommodate community concerns about off-site disposal and transportation of hazardous wastes through Alameda neighborhoods. In fact, this community concerns prompted the Navy to spend over $500,000 to construct and operate a CAMU rather that ship toxic soils off-site in November of 1995. Accommodating this "community concern" is no longer a priority of the Navy.

Not all of these interested community members have been able to sustain the pace of the Site 15 cleanup planning and progress. It is appropriate that their previously submitted comments on the Site 15 cleanup plan be reevaluated by the Navy to ensure that these community concerns that were raised during early planning, continue to be addressed.

RESPONSE: The substantive intent of the removal action, as described in the document reviewed during public comment, was not changed. Comments made after the public notice period for the original removal action have been considered in preparing the current Site 15 EE/CA Addendum. These comments, and the experience gained from removing the soil at Site 15, have provided part of the basis for preparing the Site 15 EE/CA Addendum and for reaching the conclusions and recommendations presented in that document.
Previous comments made during the public notice period for the Site 15 removal action were responded to.

NOTE: The recommended alternative in the Site 15 EE/CA for on-site treatment was implemented. The change in treatment technology was done to test innovative technologies, as recommended by CERCLA, and under the USEPA SITE program; the test system was similar to the treatment system that was originally proposed. Movement of the soil to the TSTA storage area was done to avoid the risk of contaminant migration and has always been described as an interim action by the Navy.

COMMENT NO. 5 - Justification for Non-time Critical Removal Action

The Navy has made several; inconsistent representations about the reasons a Removal Action was justified at Site 15 and continues to be justified for the CAMU. Based on the April 25, 1995 letter from the Navy to Cal-EPA *Winter Rain Effect at Installation Restoration (IR) Site 15 NAS Alameda*, "..contaminants of concern are generally not water soluble, therefore, it is expected that very minimal or no transport of contaminated material.." from the site occurred. This comment addresses an uncovered, thirty-foot high pile of excavated soil that was left in a flooded area for a period of over twelve months during which over 20 inches of rain fell. The Navy now states that weather conditions that

may cause contaminants to migrate is one of reasons the removal of the CAMU is appropriate. The CAMU has been maintained as a covered soil pile. How can the Navy state that migration is not a problem in an uncontrolled environment, but is a problem under a controlled one?" The Navy has made several subjective and contradictory evaluations of the risks posed by Site 15 conditions. The existing risk posed by the site should be quantitatively evaluated to justify the need for a removal action.

RESPONSE: This excerpt from the April 25, 1995 letter is taken out of context. The intent and primary subject matter of the letter was to describe engineering measures taken by the Navy to prevent contaminant migration due to storm water run-off during Site 15 excavation activities, and to provide a status report for the action conducted and the site conditions that occurred during the previous rain season. The primary actions described in the letter are engineering controls, which included berming Site 15 excavation areas, inspections of the site during the rain season, and preparations in place for emergency measures, which were not needed. The TSTA Construction was started at the end of 1995 and should not be confused with issues stated in the April 25 letter.

As described in the previous response concerning the excerpt from the April 25, 1995 letter, the conditions described as uncontrolled at Site 15 were actually subject to substantial engineering controls. The primary reasons for conducting the TSTA removal are, however, not short term but, rather, long term concerns. Possible scenarios that have motivated the planning of the removal action include damage to the soil pile covers during a major weather event, or deterioration of the cover in the future due to degradation under ambient atmospheric conditions and lack of maintenance.

Reasons for the Site 15 Removal Action are delineated in the original Site 15 EE/CA and Action Memorandum. The TSTA soil disposal is a continuation of the Site 15 Removal Action as described in the Administrative Memorandum dated 25 October 1995.

The recommended alternative of off-site disposal at appropriately permitted disposal facility(ies) was, therefore, selected for implementation rather than continuing to store soil at the TSTA.

COMMENT NO. 6 - Inadequate Cost Estimates

The selection of the preferred alternative was made largely based on cost. The basis for the total cost has not been provided in the Removal Action Workplan. Due to the wide differences between the current and previous cost estimates for this removal action, cost estimate details should be provided.

RESPONSE: The preferred alternative was the best choice that satisfies the criteria for protection of human health and the environment, effectiveness, implementability and cost.

The difference between the earlier EE/CA cost estimates and the current EE/CA Addendum cost estimates primarily relate to the cost of on-site treatment and reflect experience gained attempting on-site treatment of the Site 15 soil. This alternative was, therefore, estimated to cost substantially more than previously thought. Other differences in cost relate to the fact that the soil has already been excavated from Site 15 and removal from the soil piles at the TSTA will be much easier, and less costly, than was found during the original in-situ removal at Site 15.

COMMENT NO. 7 - Failure to communicate sampling results from Site 15

Verification samples were apparently taken at Site 15 in 1994 but the results have not been made public. Though no determination has been formally made about residual risk at Site 15, fences and warning signs have been removed. Six months ago I watched a gentlemen drive his pick-up truck across the site. The "quicksand condition" quickly buried a back wheel to the trucks axle. Over the course of several hours, the driver of the truck dug the tire out by hand, as his wife and infant daughter stood nearby. What was the risk to this man? Because sampling results are being withheld from the public there is no way to determine what potential risk this man and his family may have been exposed to.

RESPONSE: The results of the sampling can be found in the Preliminary Removal Action Implementation Report, December 1995. This report is part of the Administrative Record for the project.
The entire area along the length of the perimeter road, including Site 15, is fenced and access to the fenced area is currently restricted.

COMMENT NO. 8 - Waste Characterization

Under state law, the waste from Site 15 was required to be classified before it was placed in the CAMU. The waste from Site 15 was previously characterized as a RCRA hazardous waste (Engineering Evaluation/Cost Analysis, October, 1994). It is appropriate that the waste now be delisted as a RCRA waste before it is disposed of in a non-RCRA landfill.

The waste characterization presented in the Removal Action Workplan is not based on the requirements contained in RCRA and California's Hazardous Waste Control Law. Both state and federal requirements call for the use of *US EPA, SW-846 Test Methods for Evaluating Solid Waste*, to determine waste characteristics. SW-846 does not base waste determination on the average concentration of a toxic chemical in a group of samples. SW-846 uses the value corresponding to the upper-bound of the 95-percent confidence interval. The waste classification contained in the Removal Action Workplan does not appear to comply with hazardous waste ARARs.

RESPONSE: The TSTA is not a CAMU. The soil had to be placed in a protective engineered cell based on the characterization done of the soil at that time. The TSTA location was selected based on a number of criterion as the best candidate site for the facility and the TSTA was constructed to be very protective of the environment for the media being stored at the site.
Site 15 soil was not characterized as a RCRA hazardous waste in the EE/CA. Rather, it is stated that the soil may be found to be a RCRA hazardous waste after leachability tests are conducted (EE/CA, October 1994, page 2-6). Further, it is stated in the EE/CA document that, for the purpose of this removal action, the soil is assumed to be RCRA hazardous waste. The statement about the assumption of the classification is misleading and should have been corrected. The apparent intent of this statement, however, within the context of the document, was to explain the

basis (which was to assume worst case conditions) for preparation of the EE/CA document so that the costs and difficulties in conducting the project would not be underestimated.
As stated in the EE/CA addendum, "A preliminary assessment was conducted to determine if the soil, subject to the removal action, is likely to be classified as TSCA waste, as Hazardous Waste (requiring Class 1 land disposal and possibly treatment) or is likely to be a regulated waste (requiring Class II land disposal, without treatment). As such, the assessment was preliminary and not intended to be the final characterization. The final characterization is being conducted presently and will meet waste acceptance protocols for receiving land disposal facilities.

COMMENT NO. 9 - Overall Health and Safety Concern

Health and safety should be the primary concern inn the completion of the Site 15 Removal Action Workplan. Previously in June 1995, work on the Removal Action was halted after a sewer line was broken during soil excavation activities. Later, work was halted because of concerns with the safety of treatment equipment. Hazardous waste workers are expected to have a high level of sophistication with respect to Health and Safety practices. Unsafe equipment and failure to identify and protect subsurface utilities seem to suggests workers with a very low-level of sophistication were used previously on this project. The resources necessary to hire a qualified and trained work force should be dedicated to this removal action to ensure that it completion is performed safely.

RESPONSE: The Contractor selected for the project has been pre-qualified in accordance with Federal procurement procedures and is required to conduct work in accordance with CERCLA health and safety requirements.

RESPONSE TO COMMENTS ON THE DRAFT ACTION MEMORANDUM ADDENDUM FOR THE SITE 15 REMOVAL ACTION AT NAS ALAMEDA, ALAMEDA CA

FROM USEPA

SPECIFIC COMMENTS

COMMENT- Comments regarding Site 16 generally apply. The Site 15 Draft Action Memorandum does give some sampling data for lead at the site. As with the Site 16 Draft Action Memorandum, there is no discussion of action levels or cleanup levels.

RESPONSE TO GENERAL COMMENT: Revisions to ARARs have been made in the Site 15 Addendum documents, similar to those made for the SITE 16 ARARs.

RESPONSE: Clean-up levels are not applicable to the TSTA removal as described in the 2nd. paragraph of Section V. A. 1.Proposed Action Description, paragraph 2, page 11):

"Clean-up levels are not applicable to the TSTA removal action, as it is unlikely that the TSTA area was contaminated by the Site 15 soils, based on the construction technique employed during placement of the soil in the TSTA. A Sampling & Analysis Plan will be prepared by the RAC Contractor and will describe confirmation sampling and analyses to be conducted to confirm that the TSTA barrier layer was effective. Sampling frequency and the types of analyses will be in accordance with USEPA and CALEPA guidance."

COMMENT- Comments on Draft Work Plan - On page 1-8 we finally find the action levels! This should be incorporated in the Action Memorandum.

RESPONSE: Clean-up levels are not applicable to the TSTA removal as described in the 2nd. paragraph of Section V. A. 1.Proposed Action Description, paragraph 2, page 11):

"Clean-up levels are not applicable to the TSTA removal action, as it is unlikely that the TSTA area was contaminated by the Site 15 soils, based on the construction technique employed during placement of the soil in the TSTA. A Sampling & Analysis Plan will be prepared by the RAC Contractor and will describe confirmation sampling and analyses to be conducted to confirm that the TSTA barrier layer was effective. Sampling frequency and the types of analyses will be in accordance with USEPA and CALEPA guidance."

COMMENT- What are the cleanup levels? p.12 and p.16 refer to clean-up levels or clean-up goals, but they aren't specified.

RESPONSE: The second paragraph of Section II. B.2. (Current Actions) has been revised as follows: Verification of the attainment of clean-up goals of 1 ppm or less for PCBs and 300 ppm for lead, in excavated areas, will be conducted by the CLEAN Contractor (PRC Environmental Management) in accordance with USEPA protocols for verification sampling. The CLEAN Contractor will prepare a work plan for the sampling.

Additionally, the same sentence has been added to 4th paragraph of Section V. A.1. (Proposed Action Description).