United States
Environmental Protection
Agency

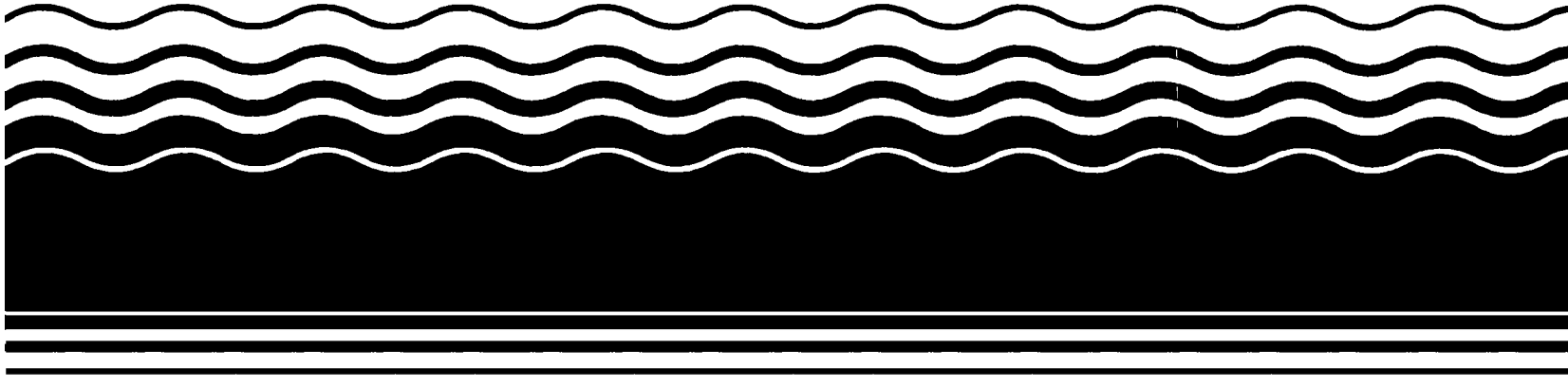
Office of
Emergency and
Remedial Response

EPA/ROD/R09-92/077
December 1991

EPA

Superfund Record of Decision:

Sacramento Army Depot (Operable Unit 3), CA



NOTICE

The appendices listed in the index that are not found in this document have been removed at the request of the issuing agency. They contain material which supplement, but adds no further applicable information to the content of the document. All supplemental material is, however, contained in the administrative record for this site.

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. EPA/ROD/R09-92/077	2.	3. Recipient's Accession No.
4. Title and Subtitle SUPERFUND RECORD OF DECISION Sacramento Army Depot (Operable Unit 3), CA Second Remedial Action - Subsequent to follow			5. Report Date 12/09/91 6.
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15. Supplementary Notes

PB93-964509

16. Abstract (Limit: 200 words)

The 485-acre Sacramento Army Depot (SAAD) is a U.S. Army support, service, and storage facility located approximately 7 miles southeast of the City of Sacramento, California. Land use in the area is predominantly commercial and light industrial, with residential areas located mainly to the west. An estimated 56,000 people obtain water from a deep aquifer that is not considered to be contaminated by the facility. However, some wells in the surrounding area draw water from the upper aquifers. Past and present activities conducted at SAAD include electro-optics equipment repair, the emergency manufacture of parts, shelter repair, and metal treating. The primary waste-generating activities included metal-plating and painting. In conjunction with these activities, SAAD maintains several above- and below-ground storage tanks, some unlined lagoons and burn pits, a battery disposal area, a firefighter training area, and a pesticide mixing area. As a result of a late 1970's U.S. Army initiative, a 1981 onsite investigation of SAAD revealed multiple chemical contamination from numerous sources within the facility. Ground water remediation was addressed in a previous ROD. In the past, Tank 2 was used as a waste solvent underground storage tank. In 1980, the tank was

(See Attached Page)

17. Document Analysis a. Descriptors

Record of Decision - Sacramento Army Depot (Operable Unit 3), CA
Second Remedial Action - Subsequent to follow
Contaminated Medium: soil
Key Contaminants: VOCs (PCE, xylenes), other organics (PAHs, pesticides)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 118
	20. Security Class (This Page) None	22. Price

EPA/ROD/R09-92/077
Sacramento Army Depot (Operable Unit 3), CA
Second Remedial Action - Subsequent to follow

Abstract (Continued)

emptied, and in 1986 the tank was removed. Sampling and analysis of the soil under and around the tank showed that solvent contamination was confined to the soil well above ground water level (aquifer). A 1989 ROD addressed contaminated ground water associated with onsite burn pits. This ROD addresses the final remedial action for approximately 1,000 cubic yards of contaminated soil associated with Tank 2 (OU3). Future RODs will address contamination occurring at the oxidation lagoons, the burn pits, the pesticide mixing area, the battery disposal well, building #320 leach field, and the firefighter training area. The primary contaminants of concern affecting the soil are VOCs, including PCE and xylenes; and other organics including PAHs and pesticides.

The selected remedial action for this site includes constructing and installing an onsite soil vapor extraction system to remove VOCs from contaminated soil; dehumidifying the air stream and treating the collected water vapor using UV/hydrogen peroxide; treating air emissions using granular activated carbon and transporting the residual carbon offsite for recycling and treatment; monitoring air emissions during the treatment process; and sampling media after 6 months to determine compliance with clean-up standards. The estimated present worth cost for this selected remedial action is $614,414. No O&M costs are associated with this selected remedial action.

PERFORMANCE STANDARDS OR GOALS :

Chemical-specific soil clean-up levels are based on health-based criteria of reducing the noncarcinogenic HI to approximately 1 and include 2-butanone (MEK) 1.2 mg/kg; ethylbenzene 6 mg/kg; PCE 0.2 mg/kg; and total xylenes 23 mg/kg.

SUPERFUND
RECORD OF DECISION:

SACRAMENTO ARMY DEPOT
TANK 2
OPERABLE UNIT

SACRAMENTO, CALIFORNIA

September 25, 1991

RECORD OF DECISION
I. DECLARATION

SITE NAME AND LOCATION

Tank 2 Operable Unit
Sacramento Army Depot (SAAD)
8350 Fruitridge Road
Sacramento, California

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Tank 2 Operable Unit at the SAAD facility in Sacramento, California, which was chosen in accordance with The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by The Superfund Amendments and Reauthorization Act of 1986 (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for this site, which contains:

- The Tank 2 Operable Unit Feasibility Study (OUFS) which contains site investigation data, the Public Health Evaluation, and an analysis of remedial alternatives,
- The Proposed Plan (PP), dated August 1991, which summarizes the preferred cleanup alternative, compares the preferred alternative with several other alternatives, and invites public participation,
- The Responsiveness Summary, which summarizes public comments on the OUFS and the PP and includes the Army's response to comments.

The purpose of this Record of Decision (ROD) is to set forth the remedial action to be conducted at SAAD to remedy soil contamination associated with the former Tank 2 waste solvent storage tank. This is the second of several potential remedial actions addressing soil and ground water contamination that may be conducted at SAAD. Subsequent RODs will address other potential threats posed by the site, both on and off site. A final ROD in a few years will comprehensively address the entire SAAD facility.

The U.S. Environmental Protection Agency Region IX (EPA IX) and the State of California [California EPA: Department of Toxic Substances Control (DTSC) and Central Valley Regional Water Quality Control Board (CVRWQCB)] concur with the selected remedy.

ASSESSMENT OF THE SITE

Tank 2 was a 1000-gallon underground storage tank used by SAAD to store waste solvents until approximately 1980. An investigation by the U.S. Army showed that soil around Tank 2 has been contaminated by volatile organic compounds (VOCs). The Tank 2 Operable Unit, which contains the affected soil, is an area approximately 25 feet by 35 feet, and includes the soil down to a depth of approximately 31 feet. The Tank 2 Operable Unit does not include ground water. Analysis of soil samples from the Tank 2 Operable Unit, and comparison of the soil contaminants with the types of contaminants present in ground water, indicates that Tank 2 is currently not a source of ground water contamination found at SAAD. The two VOCs most often detected in soil at the Tank 2 Operable Unit are ethylbenzene and xylene. Other VOCs, including tetrachloroethene and 2-butanone, were detected occasionally.

A baseline health risk assessment was conducted to evaluate the current and future risks posed by the contamination at the Tank 2 area if no cleanup occurs. The health risk assessment found that tetrachloroethene and 2-butanone pose the greatest potential threat to public health, due to their toxicity and relatively high mobility in soil. Cleanup levels based on potential health risks and on protection of ground water were then established for these two VOCs. Cleanup levels were also established for ethylbenzene and xylene since they were found consistently and at relatively high concentrations in samples from the Tank 2 Operable Unit. The cleanup levels were determined based on additive risk and Applicable or Relevant and Appropriate Requirements (ARARs).

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action presented in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The Army intends to clean up the Tank 2 Operable Unit so that the public is not exposed to toxic chemicals from the site. This ROD addresses the principal threat at the Tank 2 site by removing the contamination present in soil. Removal of contaminants in the soil will reduce future migration of contamination from the soil to ground water beneath the site. The primary risk to public health is the potential for future ground water contamination. The public is not currently being exposed to contaminated soil at the Tank 2 Operable Unit since the entire area is covered with asphalt and concrete.

The selected remedy for cleaning up the soil at the Tank 2 Operable Unit is composed of: in-situ soil ventilation; air emissions control; and entrained (suspended) water treatment by the existing on-site ultraviolet-hydrogen peroxide treatment plant. The selected remedy includes:

- Completing construction and installation of the soil ventilation system within the next six months,
- Removing VOCs from the soil with a soil ventilation system that pulls air through the contaminated soil, volatilizing contaminants and removing them with the air-stream.
- De-humidifying the contaminated air-stream, which contains air, contaminants, and vapor from the soil, by passing it through a moisture separator.
- Treating contaminated water from the moisture separator in the on-site treatment plant that is part of the ongoing ground water remediation.
- Treating the contaminated air-stream, now containing significantly less water but still carrying the contaminants, by passing it through a bed of granular activated carbon. The contaminants in the air stream will be removed by adsorbing onto the carbon bed. The treated air will be released to the atmosphere and the carbon will be transported to a facility where the contaminants are removed and treated,
- Meeting cleanup levels within approximately six months of system operation. The soil will be sampled following remediation to verify that cleanup levels have been met.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies, to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element. Because the remedial action will not leave hazardous residuals on-site above health-based levels and will be completed after approximately six months of the operation, the five-year review will not apply to this action.

IT IS SO AGREED:

FOR THE U.S. DEPARTMENT OF THE ARMY:

Date

Lewis D. Walker
Deputy for Environmental, Safety, and Occupational Health
Office of the Assistant Secretary of the Army (I&L)

Date

William Grundy
Colonel, SC
Commander, Sacramento Army Depot

FOR THE STATE OF CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY:

9-30-91
Date

Val R. Siebal
Regional Administrator
Region 1
Department of Toxic Substances Control

Date

William H. Crooks
Executive Officer
Central Valley Regional Water Quality Control Board

FOR THE U.S. ENVIRONMENTAL PROTECTION AGENCY:

Date

Daniel W. McGovern
Regional Administrator
United States Environmental Protection Agency, Region IX

IT IS SO AGREED:

FOR THE U.S. DEPARTMENT OF THE ARMY:

Date

Lewis D. Walker
Deputy for Environmental, Safety, and Occupational Health
Office of the Assistant Secretary of the Army (I&L)

Date

William Grundy
Colonel, SC
Commander, Sacramento Army Depot

FOR THE STATE OF CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY:

Date

Val F. Siebal
Regional Administrator
Region 1
Department of Toxic Substances Control

10-11-91

Date

William H. Crooks
Executive Officer
Central Valley Regional Water Quality Control Board

FOR THE U.S. ENVIRONMENTAL PROTECTION AGENCY:

Date

Daniel W. McGovern
Regional Administrator
United States Environmental Protection Agency, Region IX

IT IS SO AGREED:

FOR THE U.S. DEPARTMENT OF THE ARMY:

10/21/91 — Lewis D. Walker
Date

Lewis D. Walker
Deputy for Environmental, Safety, and Occupational Health
Office of the Assistant Secretary of the Army (I&L)

4 Dec 91 — William Grundy
Date

William Grundy
Colonel, [illegible]
Commander, Sacramento Army Depot

FOR THE STATE OF CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY:

Date

Val F. Siebal
Regional [illegible]

ances Control

Date

Vater Quality Control

FOR THE U.S. ENVIRONMENTAL

Date

[illegible] Administrator
United States Environmental Protection Agency, Region IX

IT IS SO AGREED:

FOR THE U.S. DEPARTMENT OF THE ARMY:

Date	Lewis D. Walker Deputy for Environmental, Safety, and Occupational Health Office of the Assistant Secretary of the Army (I&L)
Date	William Grundy Colonel, SC Commander, Sacramento Army Depot

FOR THE STATE OF CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY:

Date	Val F. Siebal Regional Administrator Region 1 Department of Toxic Substances Control
Date	William H. Crooks Executive Officer Central Valley Regional Water Quality Control Board

FOR THE U.S. ENVIRONMENTAL PROTECTION AGENCY:

12.9.91 Date	Daniel W. McGovern Regional Administrator United States Environmental Protection Agency, Region IX

RECORD OF DECISION
II. DECISION SUMMARY
SAAD -- TANK 2 OPERABLE UNIT

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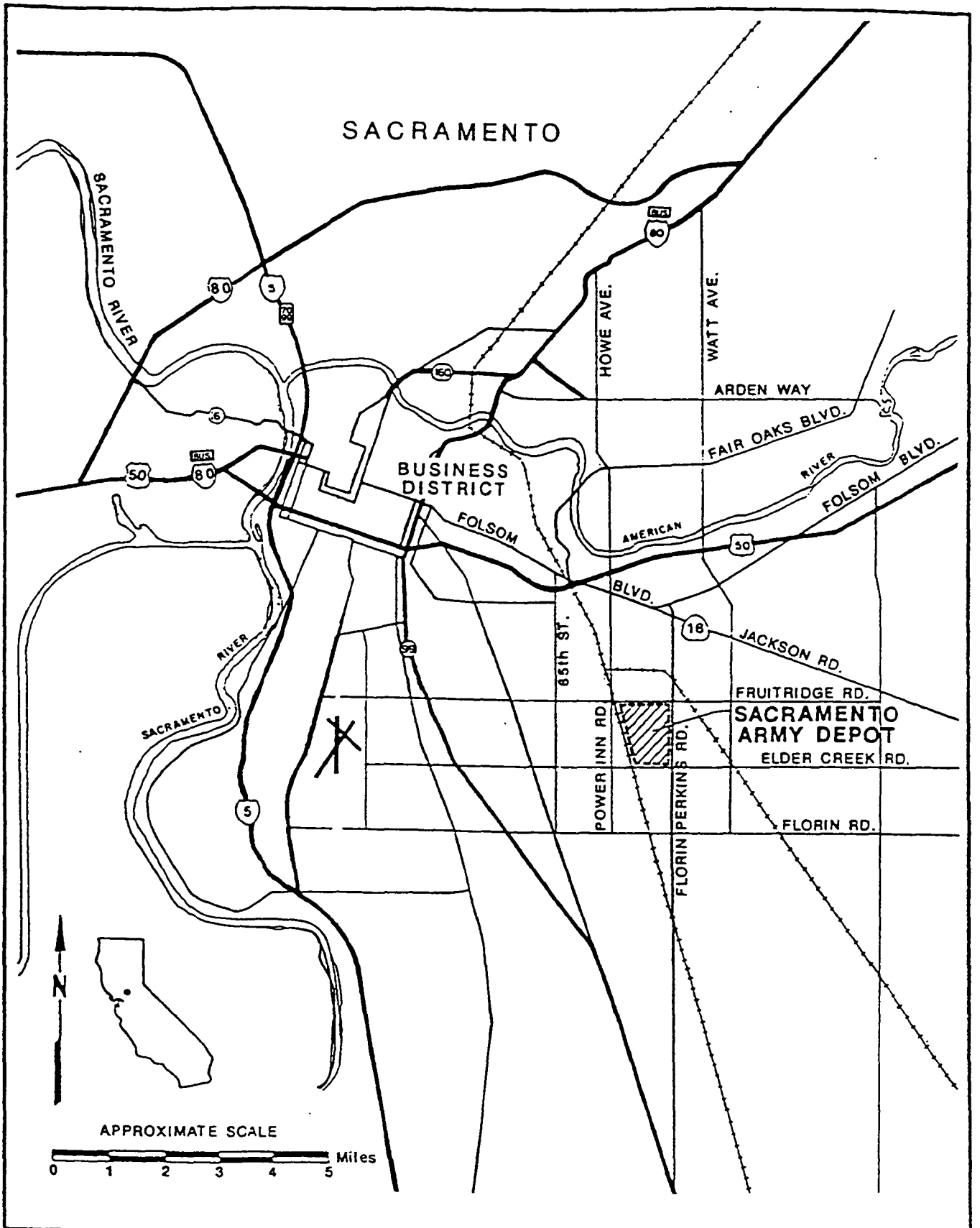
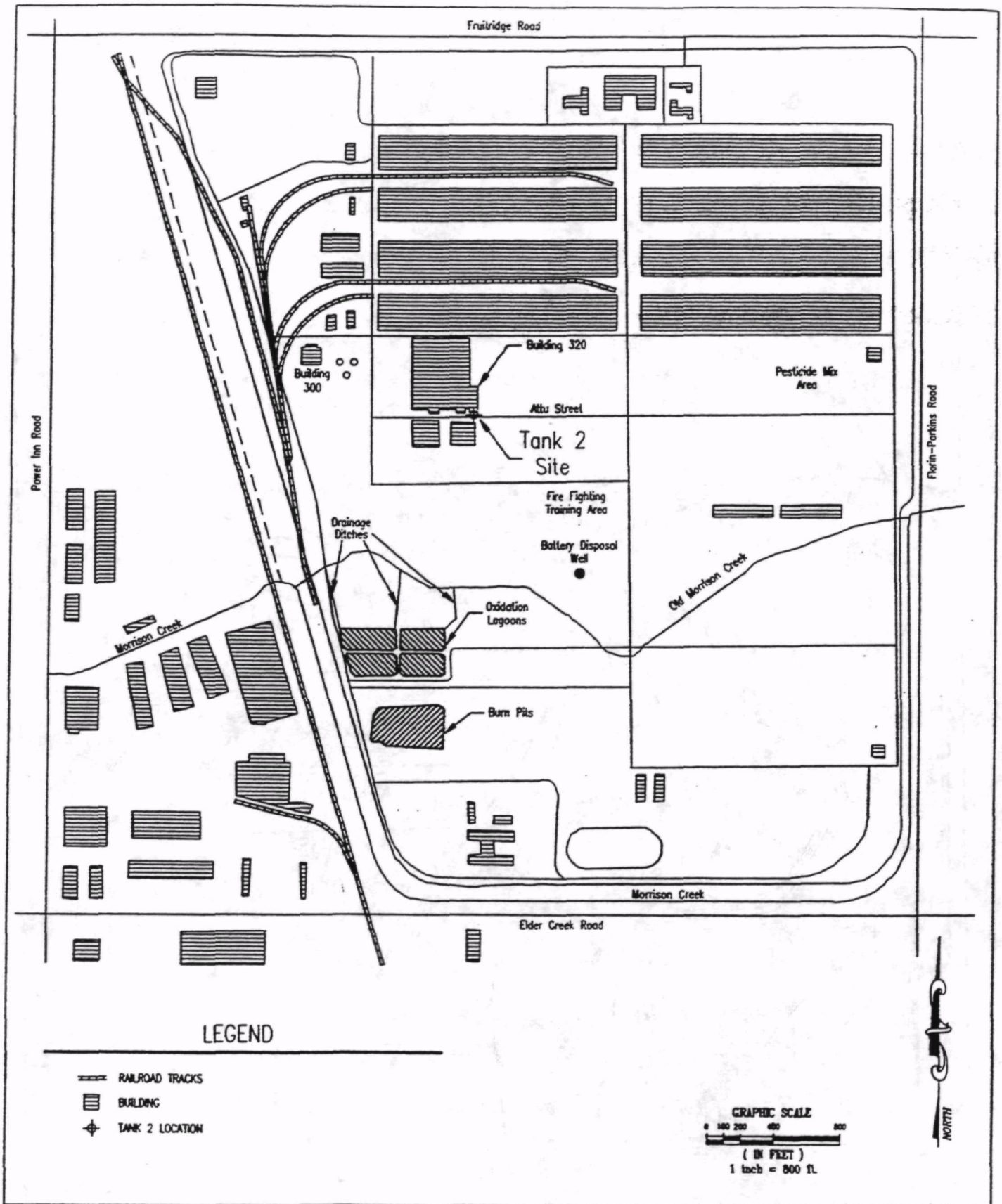


KLEINFELDER

PROJECT NO. 24-150028-A05

SITE LOCATION MAP
SACRAMENTO ARMY DEPOT
SACRAMENTO, CALIFORNIA

FIGURE
1



KLEINFELDER

PROJECT NO. 24-150028-A05

SITE LOCATION MAP
TANK 2 OPERABLE UNIT
SACRAMENTO ARMY DEPOT
SACRAMENTO, CALIFORNIA

FIGURE
2

1 SITE NAME, LOCATION, AND DESCRIPTION

1.1 Location

The Tank 2 Operable Unit is part of the Sacramento Army Depot (SAAD) military facility owned by the U.S. Army. The SAAD facility is located at 8350 Fruitridge Road in the City and County of Sacramento, California. SAAD lies approximately seven miles southeast of downtown Sacramento (Figure 1) and is bound by Fruitridge Road on the north, Florin-Perkins Road on the east, Elder Creek Road on the south, and the Southern Pacific Railroad tracks on the west. The SAAD facility encompasses an area of 485 acres.

The Tank 2 Operable Unit is located slightly northwest of the center of the SAAD facility, approximately 10 feet south of Building 320 and 15 to 20 feet north of Attu Street. The Operable Unit includes the area where Tank 2 was located prior to its removal and the soil that appears to have been affected by leakage from Tank 2. The Tank 2 Operable Unit encompasses approximately 875 square feet. A site map of the SAAD facility, showing the location of Tank 2 with respect to other Operable Units and site features, is shown on Figure 2.

1.2 Site Description

Past and present activities conducted at SAAD include electro-optics equipment repair, the emergency manufacture of parts, shelter repair, metal plating and treatment, and painting. The metal-plating and painting operations were the primary on-site waste generating activities. Tank 2 was a 1000-gallon underground storage tank used to store waste solvents produced at SAAD until 1980. Past and present surface and subsurface storage units and other structures at the site include several underground and above ground storage tanks, unlined oxidation lagoons and burn pits, a battery disposal area, areas where pesticides were mixed or pesticide rinse water may have been discharged to the ground surface, and an area used for firefighter training where flammable hydrocarbons were burned on the ground surface. Several of these areas have released contaminants into the soil and/or ground water at SAAD and are being investigated and cleaned up as separate Operable Units. The various areas where contaminants have been found at SAAD are discussed in more detail in Section 2.

1.3 Demography

In 1987, there were 76 people living on the SAAD facility and 56,398 people living off-site within two to three miles of SAAD. Data for the working populations on and around SAAD

in 1987 are not available. In 1984, 3,430 people worked on the SAAD facility and 20,710 people worked off-site within two to three miles of SAAD.

1.4 Land Use

SAAD is immediately surrounded on all sides by land currently zoned as commercial/light industrial property. Within two to three miles of SAAD, the areas that are primarily low to medium density residential are northwest, west and southwest of SAAD, while the areas south, east, and north of SAAD are largely industrial.

1.5 Climatology

Climate at SAAD is classified as Mediterranean, hot summer (Köppen System), with mean temperatures of 30 to 40 degrees Fahrenheit in January and 90 to 100 degrees Fahrenheit in July. Average relative humidity in January ranges from 80 to 90 percent, while in July it ranges from 50 to 60 percent. Generally, 85 to 95 percent of the annual precipitation occurs in winter. The mean annual precipitation at the site is estimated to be 17 inches, while the estimated mean annual evaporation is estimated to be approximately 73 inches.

1.6 Regional Topography

SAAD is located in the Central Valley of California, a broad flat valley that lies between the Sierra Nevada Mountains to the east and the Coast Ranges to the west. The youngest sediments (up to 5 million years old) underlying SAAD were deposited by the American River as its course meandered across the valley floor and, to a lesser extent, by Morrison Creek. Consequently, the topography at the SAAD is relatively flat. The slope of the land surface is approximately 0.13 percent to the west, with ground surface elevations ranging from 36 to 42 feet above mean sea level.

1.7 Surface Water Hydrology

SAAD is situated within the Morrison Creek drainage basin. Morrison Creek originally flowed from east to west through the land now occupied by the SAAD facility. When SAAD was constructed at its current location, the Army re-routed Morrison Creek so that it flowed around the south side of the facility rather than through it. The floodplain for the re-routed Morrison Creek extended approximately $^1/_2$ mile north of the creek, onto the SAAD facility.

In 1958, 7,900 linear feet of flood-control dike was constructed along the re-routed portion of Morrison Creek, and in 1986 the new channel was widened and deepened. The re-routed portion of Morrison Creek is currently able to handle 100-year flood events, so SAAD is not considered to be on the floodplain at this time. The old channel of Morrison Creek is currently dry during most of the year. This channel bisects the facility from east to west and is referred to as Old Morrison Creek.

Drainage of the SAAD facility is mainly overland flow to Morrison Creek and man-made diversion structures. Morrison Creek also receives surface runoff from other industrial and agricultural sites along the creek and permitted discharges from industries.

A study of the SAAD facility indicates that the only potential wetlands currently in existence on the facility appear to be located approximately 1,000 feet southwest of Tank 2, along Old Morrison Creek. No wetlands exist within the Tank 2 Operable Unit.

1.8 Geology

SAAD is located in the Great Valley of California, a broad asymmetric trough filled with a thick assemblage of flat-lying marine and non-marine sediments. The most recent formations deposited in the Great Valley are non-marine sediments derived from the Sierra Nevada foothills and mountains on the west side of the valley and from the Coast Ranges on the east side of the valley. The sediments are carried out of the mountains and deposited by a series of large and small rivers. Sediments under SAAD have been largely derived from the Sierra Nevada's, and have been deposited by the American River as it has meandered back and forth across the valley floor.

The upper 250 feet of sediments under SAAD is comprised of interbedded sands, silts and clays, with some coarse gravels underlying the north side of the facility at an approximate depth of 40 feet. The identification of horizontal and vertical boundaries of formations is extremely difficult in alluvial environments such as that encountered at SAAD. Older buried stream channels exist at various locations and depths in the area. These streams have deposited materials ranging in size from gravel down to clay as they meandered back and forth. Multiple discontinuous hardpans (cemented clays), representing buried ancient soil horizons, exist throughout the site.

1.9 Hydrogeology

SAAD is underlain by a series of alluvial aquifers which provide water to residences, industries, and agricultural properties in Sacramento County. The California Department of Water Resources has divided the ground water in the area into two hydraulically isolated sections, the superjacent (upper) series located from approximately 80 to 250 feet in depth under the site and the subjacent (lower) series located deeper than approximately 250 feet under the site. The primary water-producing aquifers are in the subjacent series, although many wells in the surrounding area draw water from the superjacent series. Ground water contamination under the SAAD facility has been found in three discrete, relatively thin, strata located within the upper portion of the superjacent series, approximately 80 to 200 feet below ground surface. Ground water contamination extends off site to the southwest of the SAAD facility. The lateral extent of ground water contamination is currently being investigated, but appears to extend approximately 1,000 feet southwest of SAAD. Industries and residences in this area use City water from municipal wells located at least $^3/_4$ mile from SAAD.

1.10 Natural Resources

Except for ground water, which is an extremely important resource throughout the Central Valley, no other natural resources on the site are used.

2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Remedial Investigations conducted at SAAD are a part of the U.S. Army Installation Restoration Program (IRP). The Army is the owner of the site and the lead agency for implementing the environmental response actions.

In the late 1970's, the U.S. Army Depot Systems Command recommended that SAAD be included in the Installation Restoration Program (IRP). Consequently, in 1978 and 1979, the U.S. Army Toxic and Hazardous Materials Agency (USATHMA) conducted a review of historical data to assess SAAD with regard to the use, storage, treatment, and disposal of toxic and hazardous materials. USATHMA identified several areas of concern where further investigation was warranted. In early 1981, the Army initiated an on-site investigation of soil and ground water in the areas of concern identified by USATHMA, including the Oxidation Lagoons, Burn Pits, Pesticide Mix Area, Morrison Creek and Old Morrison Creek. Tank 2 was not an identified area of concern at that time. Ground water samples collected during this

investigation indicated that VOCs were present in ground water under the southwest corner of SAAD. Based on the location of the VOCs in ground water, the Burn Pits appeared to be one of the main sources of ground water contamination in this area.

In late 1981, the CVRWQCB sampled off-site wells near the southwest corner of SAAD. VOCs were reported in some of the wells closest to SAAD and the Army began working with the CVRWQCB to assess the source and extent of ground water contamination. The U.S. EPA and California Department of Health Services (DHS) subsequently became involved in the investigation of contamination at SAAD and SAAD was placed on the National Priorities List (NPL) effective August 21, 1987 (52 Fed. Reg. 27620; July 22, 1987). In December 1988, the U.S. Army, the U.S. EPA, and the State of California signed a Federal Facility Agreement under CERCLA Section 120 agreeing to address the entire facility, including the contaminated ground water and seven other areas of suspected contamination on the SAAD facility:

- Tank 2
- Oxidation Lagoons
- Burn Pits
- Building 320 Leach Field
- Pesticide Mix Area
- Firefighter Training Area
- Battery Disposal Well

The FFA also calls for a rigorous RCRA Facility Assessment to identify specific Solid Waste Management Units that need further characterization and cleanup. To expedite the investigation and cleanup of the individual sites, the seven areas listed above and the on-site ground water are each being treated as individual Operable Units. These seven Operable Units are shown on Figure 2. Ground water was the first Operable Unit investigated, and is currently being cleaned up under a ROD signed in 1989. Contaminated soil at the Tank 2 Operable Unit is scheduled to be cleaned up next, under the provisions of this ROD.

Tank 2 was a 1000-gallon underground storage tank used to store waste solvents produced at SAAD. In 1980, Tank 2 was emptied, and in August 1986 it was removed. Upon removal, Tank 2 showed signs of deterioration. The Army subsequently performed a Remedial Investigation (RI) and Operable Unit Feasibility Study (OUFS) in accordance with the requirements of the Federal Facility Agreement. The RI was performed to characterize the extent of contamination at the Tank 2 Operable Unit. The field and laboratory work for the RI was conducted in accordance with the Quality Assurance Project Plan (QAPP) and Field

Sampling Plan (FSP) reviewed and approved by the regulatory agencies. The RI Report concluded that VOCs were present in the soil around Tank 2, but that VOCs did not appear to have migrated to ground water from this site. Therefore, the contaminants in the soil under Tank 2 have not yet impacted ground water.

The OUFS identified alternatives for cleaning up the site. As part of the OUFS, the Army prepared a baseline Public Health Evaluation (PHE) to estimate potential health and environmental risks that could result if no action were taken at the site. The PHE indicated that two of the VOCs present in the soil, tetrachloroethene and 2-butanone, could migrate to ground water in the future and subsequently pose a significant risk to future on-site residents if they were exposed to the ground water. Details of the PHE are summarized in Section 6.

3 HIGHLIGHTS OF COMMUNITY INVOLVEMENT

In June 1988, the Army prepared a Community Relations Plan. In August, 1991, the U.S. Army issued a Proposed Plan for the Tank 2 Operable Unit. The plan consists of an 11-page fact sheet that was mailed to residents in the surrounding community. The plan describes the site background, presents a summary of site contamination, discusses health risks, and discusses cleanup levels and remedial alternatives. The plan also includes a list of individuals who may be contacted for additional information, lists the addresses of the information repositories, and announces the public comment period. The Army also placed an advertisement in two local daily newspapers, The Sacramento Bee and the Sacramento Union, for five days prior to the public comment to outline the preferred remedial alternative and to announce the availability of the OUFS and PP, as part of the Administrative Record, for review and comment. The SAAD Administrative Record was located at the following local repositories: SAAD Visitor Control Center and the California State University, Sacramento, Library. The OUFS and PP were also available for public review at the Sacramento office of DTSC and at EPA headquarters in San Francisco.

The public comment period was held from August 19 through September 18, 1991. A public meeting to discuss the PP was held on August 20, 1991. Approximately 39 people, including community members and representatives from the Army, USEPA, DTSC, and CVRWQCB attended the public meeting. Six oral questions were received at the public meeting. No sets of written comments were received during the public comment period.

Details of community involvement activities and responses to official public comments on the PP are presented in the Responsiveness Summary, which is in Part III of this ROD.

4 SCOPE AND ROLE OF OPERABLE UNIT WITHIN SITE STRATEGY

Since the Army began investigating possible contamination at SAAD, eight Operable Units have been identified that may require response (see Section 2, above). Four of the units, the Oxidation Lagoons, Tank 2, the Burn Pits, and On-Site Ground Water, were recommended for OUFS. The other four units will be addressed in the overall site Feasibility Study as the important site characterization information becomes available.

The Ground Water OUFS was completed on May 19, 1989 and on-site ground water is currently being remediated under a ROD signed September 29, 1989. The OUFS for Tank 2 was finished on August 2, 1991 and the OUFS for the Oxidation Lagoons was finished on August 16, 1991. A ROD is expected to be completed for Oxidation Lagoons late in 1991. The OUFS for Burn Pits is currently being conducted, and the ROD for the Burn Pits is scheduled to be signed in 1992. Subsequent RODs will address other potential threats posed by the site. Also, there will be a final ROD that will comprehensively address all of the contaminated areas at SAAD.

The remedy selected in this ROD will address VOC contamination in soils at the Tank 2 Operable Unit. The principal threat at the Tank 2 Operable Unit is posed by several VOCs present in the soil, including tetrachloroethene and 2-butanone. The primary risk posed by VOCs in soil at Tank 2 is through ingestion of, or direct contact with, contaminated ground water if the tetrachloroethene and 2-butanone currently present in soil are allowed to remain in place where they could eventually migrate to ground water.

5 SUMMARY OF SITE CHARACTERISTICS

5.1 Contamination Sources

Within the Tank 2 Operable Unit, the 1000-gallon storage tank known as Tank 2 is the only known source of contaminants. This underground tank reportedly stored waste solvents until 1980. Based on the condition of the tank when it was excavated in 1986, Tank 2 appears to have deteriorated with age and began leaking waste solvents into the soil surrounding the tank at some time before it was emptied in 1980.

5.2 Evaluation of Primary Contaminants

Sampling and analysis of soils at the Tank 2 Operable Unit indicate that VOCs, polycyclic aromatic hydrocarbons (PAHs) and pesticides exist around the area where Tank 2 was located. The volume of affected soil (soil with contaminants at concentrations above laboratory detection limits) is approximately 1,000 cubic yards. Twenty-three chemicals were detected in soil samples from the Tank 2 area. The two chemicals detected most frequently and at highest concentrations around Tank 2 were ethylbenzene and xylene. Two other chemicals, tetrachloroethene and 2-butanone, were detected in a smaller percentage of the samples analyzed and at relatively low concentrations, but are of concern because they pose the greatest risk to the public. The remaining 19 chemicals, with the exception of naphthalene, were detected in less than four percent of the samples analyzed. The 19 chemicals detected are:

Chemical	Percent of Times Detected +
Anthracene	0.9
Benzoic Acid	0.9
Benzo(a)anthracene	0.9
Benzo(g,h,i)perylene	1.9
Chrysene	1.9
4,4'-DDE	1.4(x)
4,4-DDT	1.4(x)
Dibenzo(a,h)anthracene	0.9
Dieldrin	2.7(x)
2,4-Dimethylphenol	1.9
Fluoranthene	3.7
Heptachlor epoxide	1.4(x)
Ideno(1,2,3-cd)pyrene	0.9
2-Methylnaphthalene	0.9
4-Methyphenol	0.9
Naphthalene	0.9
Phenanthrene	3.7
Phenol	1.9
Pyrene	3.7

+ = Percent is calculated by dividing the number of times detected by the total number of samples. The total number of samples is 105 to 108, unless percentage is marked with an (x). Chemicals whose "percent detected" result is marked by an (x) were only analyzed for in 74 samples.

x = See Footnote (+) above.

A summary of the four primary organic chemicals described above, the percentage of times each chemical was detected, the range of concentrations reported by the analytical laboratory, the relative mobility of each chemical, and its classification as a carcinogen or non-carcinogen, is presented in Table 1.

5.3 Location of Contaminants and Potential Routes of Migration

Most of the contaminants found at the Tank 2 Operable Unit are present in approximately 150 cubic yards of soil located in a circle that is 10 to 15 feet wide around the excavated tank and extends from 9 to 15 feet below the ground surface. Figures 3 and 4 show the mapped configuration of the contaminated soil in plan view and cross section, respectively. Although soil samples were analyzed at depths up to 48 feet below ground surface, contaminants were not found in soil more than 31 feet below ground surface. Therefore, it does not appear that chemicals from the Tank 2 Operable Unit have migrated to ground water, which is approximately 80 feet below ground water. Ground water downgradient of Tank 2 is contaminated with several compounds not found in Tank 2 soils (trichloroethene, freon 113, 1,1,1-trichloroethane and chloroform), but the source of these compounds is currently unknown. As noted in Section 2, contaminated ground water is being investigated and cleaned up as a separate Operable Unit.

The entire ground surface above and around the Tank 2 area is currently covered with either asphalt or concrete. The asphalt and concrete prevent on-site personnel or wildlife from coming in direct contact with contaminated soil; therefore, there are currently no exposures to the contaminated soil and there is no surface contaminant migration. The asphalt/concrete surface also inhibits the infiltration of rainwater through the contaminated soil, thereby reducing the potential for contaminants to be carried or pushed vertically downward through the unsaturated soil (vadose zone) to ground water. Contaminants can migrate downward through the vadose zone under the influence of gravity, spread laterally due to capillary forces, or may move both vertically and laterally in the vapor phase, but other factors (such as adsorption of the contaminants to soil or biodegradation of contaminants) may reduce the movement of individual contaminants through the soil.

6 SUMMARY OF SITE RISKS

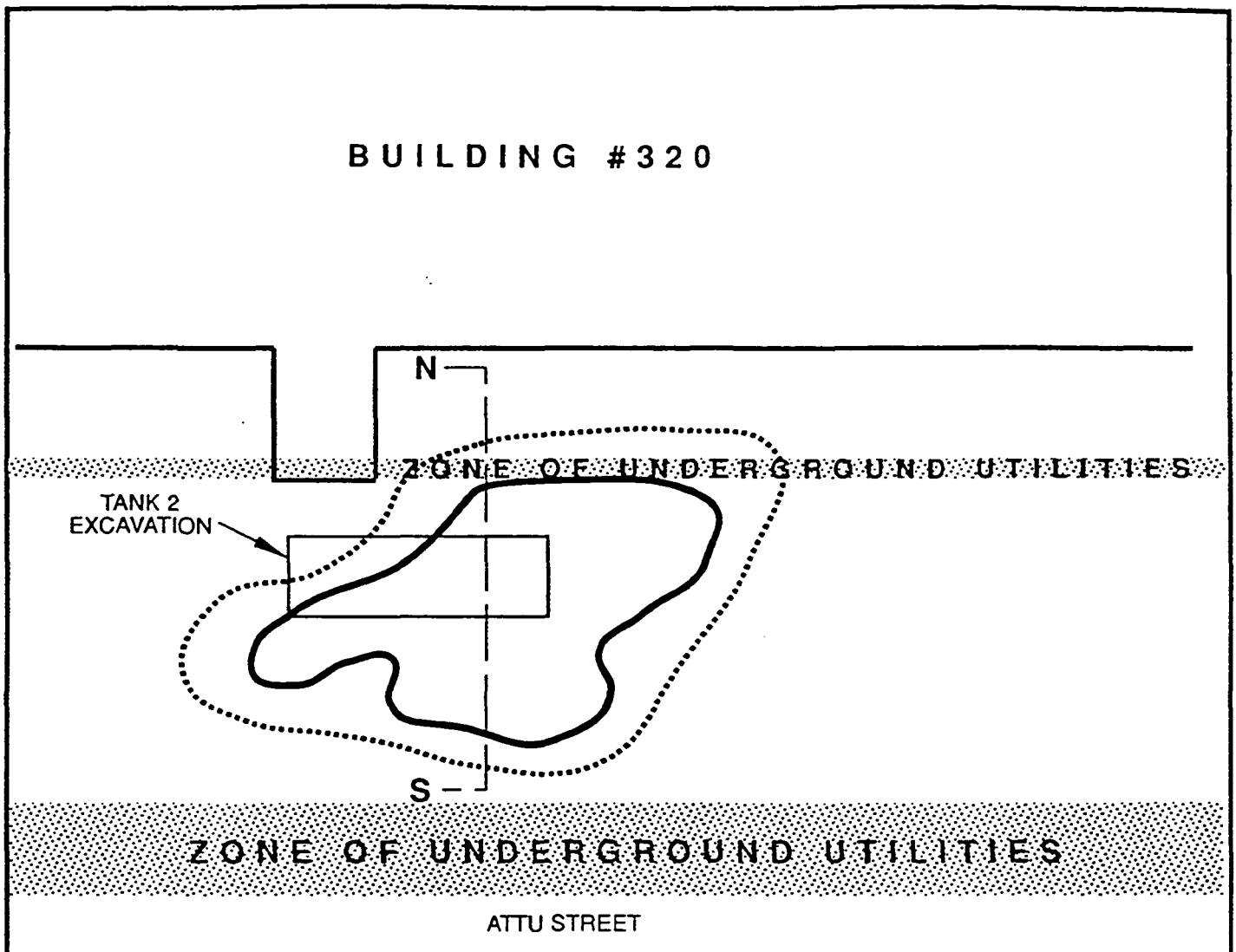
6.1 Human Health Risks

As part of the OUFS, the Army prepared a Baseline PHE. This PHE was carried out to estimate, in the absence of remedial action (i.e., the No Action Alternative), the potential

TABLE 1
SUMMARY OF PRIMARY CONTAMINANTS
TANK 2 OPERABLE UNIT

Chemical	Total Number of Samples Analyzed	Percent of Times Detected	Range of Detected Concentrations (ug/kg)	Relative Mobility In Soil	Toxicity Characteristic
2-Butanone	105	4.8	<11 - 15,000	high	NC
Ethylbenzene	105	13.3	<6 - 2,100,000	moderate	NC
Tetrachloroethene	105	5.7	<6 - 39,000	high	C, NC
Xylenes	105	21.0	<5 - 11,000,000	moderate	NC

C - Carcinogen
NC - Non-carcinogen
ug/kg - micrograms per kilogram, which is equivalent to "parts per billion"



LEGEND

APPROXIMATE EXTENT OF DETECTABLE CONTAMINATION IN SOIL

APPROXIMATE EXTENT OF CONTAMINANTS AT CONCENTRATIONS ABOVE CLEANUP GOALS

N S

CROSS SECTION LOCATION

N

APPROXIMATE SCALE 1"= 10'

0 10 20

5 Scale in Feet

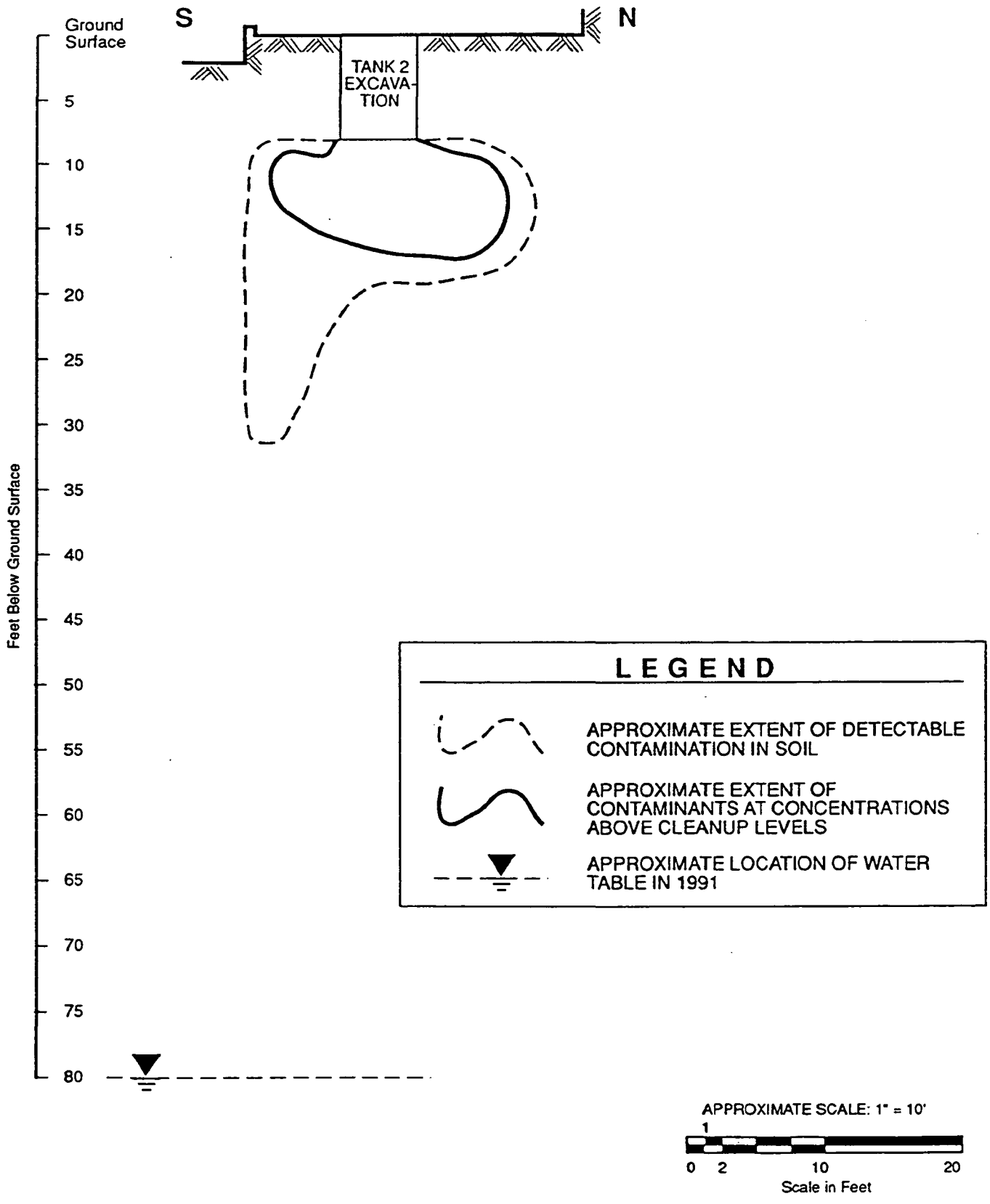
Note: The extent of contamination is an estimate based on interpolating between discrete sample locations.

KLEINFELDER

PROJECT NO. 24-150028-A05

LOCATION OF SOIL CONTAMINATION
PLAN VIEW
TANK 2
SACRAMENTO ARMY DEPOT
SACRAMENTO, CALIFORNIA

FIGURE 3



NOTE: The extent of contamination is an estimate based on interpolating between discrete sample locations.

KLEINFELDER	LOCATION OF CONTAMINATION CROSS SECTION SACRAMENTO ARMY DEPOT SACRAMENTO, CALIFORNIA	FIGURE 4
PROJECT NO. 24-150028-A05		

future risks to human health by contaminants remaining in soil or leaching through soil, migrating in ground water, or released to the air. Table 2 provides definitions of key risk terms from the PHE that are used in this section of the ROD.

6.1.1 Contaminants of Concern

The risk assessment provides a list of contaminants based on the results of the RI that were found above detection limits or above natural background levels. Twenty-three chemicals of potential concern were identified in soil that appeared to originate at Tank 2. Of the 23 chemicals, four (ethylbenzene, xylene, tetrachloroethene, and 2-butanone) were detected at concentrations higher than laboratory reporting limits. The remaining 19 compounds were detected at concentrations below reporting limits but above instrument detection limits, and all of the 19 chemicals, except naphthalene, were detected in less than four percent of the samples collected and analyzed. To be conservative, the PHE estimated the risk posed by all 23 chemicals. However, the four chemicals listed above are the primary chemicals of concern based on the estimated health risks and on the frequency of detection.

The toxicity characteristics of the four primary chemicals of concern are discussed below:

2-Butanone: 2-Butanone (methyl ethyl ketone) is classified as a non-carcinogen. It has potential effects on the peripheral nervous system.

Ethylbenzene: a non-carcinogen that is toxic to the lung and central nervous system. Subchronic and chronic exposures of laboratory animals to this compound cause liver and kidney damage, as well as testicular toxicity. Teratogenicity of ethylbenzene has also been indicated in rats.

Tetrachloroethene: classified as a group B2 carcinogen (a probable human carcinogen) based on evidence that the chemical causes hepatocellular carcinoma (liver tumors) in mice. Experiments with mice and rats indicate that tetrachloroethene is a teratogen and a reproductive toxin. Tetrachloroethene may also cause non-carcinogenic health effects, including liver, kidney and spleen toxicity.

Xylene: classified as a non-carcinogen. Xylene has been observed to cause hyperactivity and decreased body weight in a chronic ingestion rat study.

6.1.2 Exposure Assessment

Since no exposure pathways to the contaminants present in the soil exist at this time, current health risks were not evaluated.

TABLE 2

DEFINITIONS OF RISK TERMS

Carcinogen: A substance that, with long term exposure, may increase the incidence of cancer.

Chronic Daily Intake (CDI): The average amount of chemical in contact with an individual on a daily basis over a substantial portion of a lifetime.

Chronic Exposure: A persistent, recurring, or long-term exposure. Chronic exposure may result in health effects (such as cancer) that are delayed in onset, occurring long after exposure ceased.

Exposure: The opportunity to receive a dose through direct contact with a chemical or medium containing a chemical.

Exposure Assessment: The process of describing, for a population at risk, the amounts of chemicals to which individuals are exposed, or the distribution of exposures within a population, or the average exposure of an entire population.

Health Hazard Index (HHI): An EPA method used to assess the potential noncarcinogenic risk. The ratio of the CDI to the chronic RfD (or other suitable toxicity value for noncarcinogens) is calculated. If it is less than one, then the exposure represented by the CDI is judged unlikely to produce an adverse noncarcinogenic effect. A cumulative, endpoint-specific HHI can also be calculated to evaluate the risks posed by exposure to more than one chemical by summing the CDI/RfD ratios for all the chemicals of interest that exert a similar effect on a particular organ. This approach assumes that multiple subthreshold exposures could result in an adverse effect on a particular organ and that the magnitude of the adverse effect will be proportional to the sum of the ratios of the subthreshold exposures. If the cumulative HHI is greater than one, then there my be concern for public health risk.

Reference Dose (RfD): An estimate, with uncertainty spanning an order of magnitude, of a daily exposure level for human population that is likely to be without an appreciable risk of deleterious effects.

Risk: The nature and probability of occurrence of an unwanted, adverse effect on human life, health, or on the environment.

Risk Assessment or Health Evaluation: The characterization of the potential adverse effect on human life, health, or on the environment. According to the National Research Council's Committee on the Institutional Means for Assessment of Health Risk, human health risk assessment includes: (1) description on the potential adverse health effects based on an evaluation of results of epidemiologic, clinical, toxicologic, and environmental research; (2) extrapolation from those results to predict the types and estimate the extent of health effect in humans under given conditions of exposure; (3) judgements as to the number and characteristics of persons exposed at various intensities and durations; (4) summary judgements on the existence and overall magnitude of the public-health program; and (5) characterization of the uncertainties inherent in the process of inferring risk.

Slope Factor: A plausible upper-bound estimate (set at 95%) of the probability of a response per unit intake of a chemical over a lifetime.

The SAAD facility is in an area zoned industrial and the Tank 2 area is occupied by industrial operations at SAAD. Future residential use of the Tank 2 area is not expected. Most of the area around SAAD is zoned industrial, although scattered residences exist around the perimeter of the SAAD facility. To be conservative, the PHE assumed that the Tank 2 Operable Unit could be re-zoned and developed as residential at some time in the future, and that the asphalt/concrete covering the area would be removed. Based on these assumptions, two important exposure scenarios, the Future On-Site Residents and the Future Off-Site Residents, were developed to assess potential future risks posed by soil and ground water at the site. The Future On-Site Residents represent the maximum exposed individual (MEI) under the scenario that the SAAD facility is re-zoned and developed residential in the future. The Future Off-Site Residents are also called the Average Exposed Individual (AEI), and represent potential risks to off-site residents if the asphalt/concrete is removed, whether or not the SAAD facility becomes residential in the future. For the Future On-Site Residents, four potential exposure pathways were evaluated:

- Direct Dermal Contact with Soil
- Ingestion of Soil
- Drinking Shallow Ground Water
- Breathing Vapors From Shallow Ground Water

For the Future Off-Site Residents, only two potential exposure pathways were evaluated:

- Drinking Shallow Ground Water
- Breathing Vapors From Shallow Ground Water

Estimates of chemical concentrations at the point of exposure were made as follows. For exposures that involve direct contact with the soil, only chemicals found in the upper three feet of soil were addressed. The exposure-point concentration for these chemicals was calculated by taking the lesser of the following two numbers: the 95% upper confidence limit (UCL) of the arithmetic mean for samples collected in the upper three feet; or the maximum concentration reported in a sample collected from the upper three feet. The exposure-point soil concentrations for the four primary chemicals of concern are shown in Table 3.

For exposures that involve contact with ground water, the exposure-point concentrations for the 23 chemicals detected at the site were calculated by 1) finding the 95% UCL of the arithmetic mean concentration for each chemical based on soil samples collected down to a depth of 47.5 feet and assuming that the chemical exists uniformly throughout the Tank 2 site

TABLE 3
ESTIMATED EXPOSURE-POINT CONCENTRATIONS@
TANK 2 OPERABLE UNIT

	Exposure-Point Concentration (ppm)*		
Chemical	On-site Soil	On-site Ground Water	Off-site Ground Water
2-Butanone	NA+	16.0	0.02
Ethylbenzene	NA	0.99	0.0015
Tetrachloroethene	0.003	0.29	0.0018
Xylene	0.004	28.0	0.15

*ppm: parts per million (equivalent to milligrams per kilogram soil or milligrams per liter of water.

+NA: Not applicable because the chemical was not detected in the upper three feet of soil. Therefore, no exposure to the chemical via direct contact with soil is expected.

@: Assuming no site cleanup.

at that concentration, and then 2) estimating the amount of each chemical that could leach to ground water from the area assuming no attenuation or degradation of the chemical. The resulting estimated future ground water concentrations that could exist immediately under the site were then used as the exposure-point ground water concentrations for the on-site resident. The movement of chemicals in ground water to potential future off-site residents was then modeled using a computer program to estimate the exposure-point ground water concentrations for the off-site residents. On-site and off-site ground water exposure-point concentrations for the four primary chemicals of concern are shown in Table 3.

The contaminant intake equations and values chosen for various intake parameters were derived from the standard intake equations and data presented in EPA guidance documents. Chronic daily intakes (CDIs), the amount of each chemical that could be inhaled, ingested, or adsorbed, were estimated in the PHE. The estimated CDIs are shown on Tables 4 and 5. The CDIs were then multiplied by chemical specific slope factors to calculate carcinogenic risk. The slope factor represents the 95% UCL value of the probability of a carcinogenic response per unit intake of a contaminant over a lifetime (70 years for the analysis in the PHE). Slope factors used in the PHE are presented in Table 4. To calculate the Health Hazard Index (HHI) for non-carcinogenic risks, the CDIs were multiplied by chemical-specific Reference Dose values. The Reference Dose values (RfD) for a substance represents a level of intake which is unlikely to result in adverse non-carcinogenic health effects in individuals exposed for an extended period of time (70 years for the analysis in the PHE). RfDs for the four primary chemicals of concern are shown on Table 5.

6.1.3 Summary of PHE Results

The PHE estimated the potential carcinogenic and non-carcinogenic risks posed by each of the 23 chemicals of concern at the Tank 2 Operable Unit to both the Future On-Site and Future Off-Site Residents. Carcinogenic risks were estimated by multiplying the CDI of each contaminant by its slope factor. The carcinogenic risks for the four primary chemicals of concern, expressed as the Potential Excess Cancer Risk, for each exposure pathway and each chemical, are shown in Table 4. As a national goal, the EPA's target risk range is 10^{-4} to 10^{-6}, or one additional incidence of cancer per 10,000 people to one additional incidence of cancer per 1,000,000 people. The aggregate (total) estimated carcinogenic risk from these four chemicals due to the combined effects of all pathways is 4.5 excess cancers per 10,000 people for Future On-Site Residents and 2.9 excess cancers per 1,000,000 people for Future

TABLE 4
CARCINOGENIC RISKS
TANK 2 OPERABLE UNIT

Exposure Pathway	Chemical	CDI (mg/kg-day)	CDI adj. for absorption	Slope Factor $(mg/kg\text{-}day)^{-1}$	Weight of Evidence	Slope Factor Source/Basis	Chemical Specific Risk*	Total Pathway Risk*	Total Exposure Risk*
FUTURE ON-SITE RESIDENT									
Soil Ingestion	Tetrachloro-ethane	4.5E-9	No	5.1E-2	B2	IRIS+	2.3E-10	2.3E-10	4.5E-4
Dermal Contact With Soil	Tetrachloro-ethane	2.1E-8	Yes	5.1E-2	B2	IRIS+	1.1E-9	1.1E-9	
Ground Water Ingestion	Tetrachloro-ethane	8.3E-3	No	5.1E-2	B2	IRIS+	4.2E-4	4.2E-4	
Inhalation of Waterborne Chemicals	Tetrachloro-ethane	8.3E-3	Yes	3.3E-3	B2	IRIS+	2.7E-5	2.7E-5	
FUTURE OFF-SITE RESIDENT									
Ground Water Ingestion	Tetrachloro-ethane	5.3E-5	No	5.1E-2	B2	IRIS+	2.7E-6	2.7E-6	2.9E-6
Inhalation of Waterborne Chemicals	Tetrachloro-ethane	5.3E-5	Yes	3.3E-3	B2	IRIS+	1.7E-7	1.7E-7	

+These are proposed toxicity values, but have not been adopted yet.
*These risks represent potential excess cancer cases. A risk of 1.0E-6 means that one person out of one million people exposed for a lifetime (70 years) could potentially develop cancer as a result of the exposure.

TABLE 5
NON-CARCINOGENIC RISKS
TANK 2 OPERABLE UNIT

Exposure Pathway	Chemical	CDI (mg/kg-day)	CDI adj. for absorption	RfD (mg/kg-day)	RfD Source/Basis	Chemical Specific HHI	Total Pathway HHI	Total Exposure HHI
FUTURE ON-SITE RESIDENT								
Soil Ingestion	2-Butanone	NA	NA	NA	NA	NA		
	Ethylbenzene	NA	NA	NA	NA	NA	4.5E-7	
	Tetrachloroethene	4.5E-9	No	1.0E-2	1	4.5E-7		
	Xylene	6.1E-9	No	2.0E+0	1	3.1E-9		
Dermal Contact with Soil	2-Butanone	NA	NA	NA	1	NA		
	Ethylbenzene	NA	NA	NA	1	NA		
	Tetrachlorothene	2.1E-8	Yes	1.0E-2	1	2.1E-6	2.1E-6	
	Xylene	3.5E-10	Yes	2.0E+0	1	1.8E-10		15.9E+0
Ground Water Ingestion	2-Butanone	4.6E-1	No	5.0E-2	1	9.1E+0		
	Ethylbenzene	2.8E-2	No	1.0E-1	1	2.8E-1		
	Tetrachloroethene	8.3E-3	No	1.0E-2	1	8.3E-1	10.6E+0	
	Xylene	8.0E-1	No	2.0E+0	1	4.0E-1		
Inhalation of Waterborne Chemicals	2-Butanone	4.6E-1	No	9.0E-2	2	5.1E+0		
	Ethylbenzene	NI	NI	NI	NI	NI		
	Tetrachloroethene	8.3E-3	Yes	4.0E-2	3	2.1E-1	5.3E+0	
	Xylene	NI	NI	NI	NI	NI		
FUTURE OFF-SITE RESIDENT								
Ground Water Ingestion	2-Butanone	5.8E-4	No	5.0E-2	1	1.1E-2		
	Ethylbenzene	4.4E-5	No	1.0E-1	1	4.4E-4		
	Tetrachloroethene	5.3E-5	No	1.0E-2	1	5.3E-3	1.9E-2	
	Xylene	4.1E-3	No	2.0E+0	1	2.1E-3		2.7E-2
Inhalation of Waterborne Chemicals	2-Butanone	5.8E-4	No	9.0E-2	2	6.3E-3		
	Ethylbenzene	NI	NI	NI	NI	NI		
	Tetrachloroethene	5.3E-5	Yes	4.0E-2	3	1.3E-3	7.6E-3	
	Xylene	NI	NI	NI	NI	NI		

NA - Not appropriate because chemical does not exist in upper 3 feet of soil
NI - Not included because chemical is not an aliphatic. Therefore, by convention, it is not included in this exposure path.
1 - Supplied by EPA, Dr. Gerald Hiatt, personal communication.
2 - IRIS (Integrated Risk Information System)
3 - Derived in PHE

Off-Site Residents. Thus, the baseline risk estimated for the Future On-Site Resident is slightly higher than the target risk range. The baseline risk estimate for Future Off-Site Residents is within the target risk range.

The non-carcinogenic risk posed by contaminants was estimated by computing the HHI for each chemical in accordance with procedures established by EPA. An HHI of greater than 1.0 indicates a potential health threat. The non-carcinogenic risk posed by the four primary chemicals of concern is shown on Table 5. The aggregate estimated HHI from these four chemicals due to the combined effects of all pathways is 16.1 for the Future On-Site Resident and is almost six orders of magnitude less than 1.0 for the Future Off-Site Resident. Therefore, the baseline risk assessment indicates a potential non-carcinogenic health threat to the Future On-Site Residents due to chemicals at the site, but no non-carcinogenic health threat to the Future Off-Site Residents.

Health risk assessment provides a means of quantifying potential risks posed by chemicals present in the environment. However, a great deal of uncertainty exists in the estimation process. In addition to uncertainties common to the risk assessment process, sources of uncertainty in the PHE conducted for the Tank 2 Operable Unit include:

Site Characterization -- Chemicals may exist in localized "hotspots" where samples were not collected or chemicals may exist at the site but may not have been detected by the selected analytical methods. This could result in **underestimations** of risk.

Estimation of Exposure Point Concentrations -- These may be **overestimated** since (1) chemicals reported as "non-detects" are assigned a value of half the detection limit for the purpose of calculating site concentrations, and (2) the PHE assumes that chemical concentrations in soil and ground water remain constant over the 70 year exposure period, rather than decreasing as expected due to volatilization, degradation, and leaching. This could result in overestimating the risk.

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

6.2 Environmental Evaluation

Ecological assessments, aquatic toxicity tests, stream evaluations, and terrestrial surveys were not performed for the Tank 2 Operable Unit because the site is relatively small (875 square feet), covered with asphalt/concrete, and located adjacent to industrial buildings and roadways. Therefore, wildlife and surface water bodies are not expected to come in contact with contaminated soil at the Tank 2 Operable Unit. There is no evidence of critical habitat, endangered species, or wetlands within the Tank 2 Operable Unit.

The treatment of soil at Tank 2 is not expected to affect wildlife or wildlife habitat, since the system installed will be located entirely in the industrial area next to Building 320 and no air emissions of organic chemicals are expected during cleanup.

6.3 Cleanup Levels

Based on the results of the PHE, cleanup levels were established for each of the four primary chemicals of concern. Since the PHE showed that health risks were highest for the Future On-Site Residents, the cleanup levels were developed based on that scenario. Potential ground water exposures represented the greatest risk to human health; therefore, cleanup levels were developed by estimating the effects that contaminants left in the soil at concentrations below cleanup levels would have on the ground water. The selected cleanup levels will reduce contaminant levels in soil such that future ground water impacts will not affect human health and will comply with Applicable or Relevant and Appropriate Requirements (ARARs). A conservative computer model was used to estimate contaminant concentrations in leachate for chemicals that could potentially migrate to ground water. Leachate concentrations of 2-butanone and heptachlor epoxide could exceed state MCLs assuming that these contaminants exist throughout the entire Tank 2 area. However, since 2-butanone was detected in only five of 105 samples and heptachlor epoxide was detected in only one of 74 samples, actual leachate concentrations are expected to meet ARARs. A list of ARARs is provided on Table A-1, Appendix A. The cleanup levels are shown in Table 6, and are discussed below.

6.3.1 Non-Carcinogens

Of the four primary chemicals of concern, only 2-butanone and tetrachloroethene exceed the acceptable HHI of 1.0. Cleanup levels were developed for both of these compounds. The cleanup levels for 2-butanone and tetrachloroethene will result in a reduction in risk of 92%

TABLE 6
CONTAMINANT CONCENTRATIONS & CLEANUP LEVELS IN SOIL

Contaminants+	Average Area Levels (ppm*)	Maximum Area Levels (ppm*)	Cleanup Levels (ppm*)	Percent Reduction In Health Risks
2-butanone	**	15	1.2	92
ethylbenzene	107	2,300	6	97
Total xylenes	645	11,000	23	98
tetrachloroethene	9	39	0.2	99

*ppm = Parts per million

** = This compound was not found frequently enough to calculate an area average. To be conservative, the risk assessment assumed that the average level of this compound is 18 ppm, which is higher than the maximum level that was detected.

\+ = Only contaminants with cleanup levels are included in this table.

and 99%, respectively. Ethylbenzene and xylenes, although individually below the HHI level of concern, when considered together may contribute to the total risk at the site. These compounds were the most frequently detected chemicals, and were present at relatively high concentrations. Therefore, cleanup levels were developed for these compounds that represent risk reductions of 97% for ethylbenzene and 98% for xylene.

6.3.2 Carcinogens

Of the four primary chemicals of concern, only tetrachloroethene is a carcinogen. The proposed soil clean-up level, 0.2 mg/kg, would result in an estimated risk of approximately 4E-6 (four additional cases of cancer per one million people exposed). This represents a 99% reduction in the level of risk estimated for the site.

7 DESCRIPTION OF ALTERNATIVES

An OUFS was conducted to develop and evaluate remedial alternatives for the Tank 2 Operable Unit. Seventy-five remedial alternatives were assembled from applicable remedial technology process options and were initially evaluated for effectiveness, implementability, and cost. Thirteen alternatives for cleaning up soil at Tank 2 passed this initial screening and were then considered in detail by comparing them to the nine criteria required by the NCP. In addition to the remedial alternatives, the NCP and CERCLA require that a no-action alternative be considered at every site. The no-action alternative serves primarily as a point-of-comparison for other alternatives. The fourteen alternatives evaluated were:

1) Alternative 1:	No Action
2) Alternative 2a:	Soil Ventilation, Air Emission Control by Thermal Vapor Treatment, On-Site Entrained Water Treatment
3) Alternative 2b:	Soil Ventilation, Air Emission Control by Gas Phase Carbon Adsorption, On-Site Entrained Water Treatment
4) Alternative 2c:	Soil Ventilation, Air Emission Control by Vapor Recovery, On-Site Entrained Water Treatment
5) Alternative 3a:	Soil Ventilation, Air Emission Control by Thermal Vapor Treatment, Off-Site Entrained Water Treatment/Disposal
6) Alternative 3b:	Soil Ventilation, Air Emission Control by Gas Phase Carbon Adsorption, Off-Site Entrained Water Treatment/Disposal

7) Alternative 3c:	Soil Ventilation, Air Emission Control by Vapor Recovery, Off-Site Entrained Water Treatment/Disposal
8) Alternative 4:	Excavation, Soil Washing, Activated Carbon Vapor Treatment, Off-Site Liquid Treatment, Backfill
9) Alternative 5:	Excavation, Incineration, Backfill
10) Alternative 6a:	Excavation, Low Temperature Desorption, Air Emission Control by Gas Phase Carbon Adsorption, On-Site Water Treatment, Backfill
11) Alternative 6b:	Excavation, Low Temperature Desorption, Air Emissions Control by Incineration, On-Site Water Treatment, Backfill
12) Alternative 7a:	Excavation, Low Temperature Desorption, Air Emission Control by Gas Phase Carbon Adsorption, Off-Site Water Treatment, Backfill
13) Alternative 7b:	Excavation, Low Temperature Desorption, Air Emissions Control by Incineration, Off-Site Water Treatment, Backfill
14) Alternative 8:	Excavation, Surface Aerobic Biodegradation, Backfill

Each alternative would be applied to remediate approximately 150 cubic yards (yd^3) of soil that contain the bulk of the contaminants detected at the site. The remaining 850 yd^3 of affected soil contains contaminants at concentration that are already below cleanup levels. The location and configuration of the 150 yd^3 are described in Section 5.3. Each alternative is expected to attain the treatment levels (cleanup levels) described in Section 6.3. Each alternative can be implemented, subject to the difficulties and considerations described in Section 8.6. The 14 alternatives are described in more detail in the following sections.

7.1 Alternative 1: No Action

Under this alternative, the Army would take no further action to control the source of contamination. However, long-term monitoring of the site would be necessary to monitor contaminant migration. Since periodic ground water monitoring is presently being conducted, it is assumed that the current monitoring program would be continued under this alternative.

Because this alternative would result in contaminants remaining on site, CERCLA requires that the site be reviewed every five years. If indicated by the review, remedial actions would be implemented at that time to remove or treat the wastes. Estimated future upper-bound

contaminant concentrations in ground water exceed State MCLs, which are ARARs for this site (see Table A-1 in Appendix A). Therefore, this alternative does not meet ARARs.

7.2 Alternatives 2a, 2b, & 2c

These three alternatives involve the use of a soil ventilation system (SVS), composed of extraction wells and a vacuum pump/rotary blower, to extract hydrocarbon vapor from the subsurface soil. The extracted vapor is then treated either by Thermal Vapor Treatment (Alternative 2a), Gas Phase Adsorption (Alternative 2b), or Vapor Recovery/Condensation (Alternative 2c). Entrained water, if any, will be treated in the existing on-site UV/H_2O_2 water treatment unit. Air sampling will be performed to evaluate the effectiveness of the operation and compliance with the emissions requirements (a permit is not required for Alternative 2b).

Extraction well sizing and the selection of a vacuum pump/blower will depend on the desired soil ventilation rate. The results of treatability testing using a computer modeling approach suggest that a soil ventilation rate of 200 cfm can accomplish site remediation over a period of six months. For a 200 cubic feet per minute (cfm) SVS, the extraction system will be comprised of two-inch wells screened from nine to 18 feet below grade.

The extracted vapor will be treated prior to discharge to the atmosphere. Treatment can be accomplished in one of three ways:

Alternative 2a: Thermal Vapor Treatment - treatment will be accomplished by thermal treatment such as catalytic oxidation, a catalyst-aided, low-temperature burning of organic vapors. Typical destruction efficiencies are 90 to 99 percent.

Alternative 2b: Gas Phase Carbon Adsorption - treatment will be accomplished in an activated carbon unit consisting of series of approximately 2000-pound carbon canisters connected in parallel. The carbon will be changed out as necessary depending on contaminant loading, and the loaded activated carbon will be shipped off site to a carbon regeneration facility where the contaminants will be stripped. Typical organic destruction efficiencies are 90 percent.

Alternative 2c: Vapor Recovery - treatment will be accomplished in a refrigeration cycle which turns the contaminants and the moisture in the vapors into a liquid. The condensed

liquid consists of a mixture of organics and water that will be treated in the on-site UV/H_2O_2 treatment plant.

Subsequent to treatment, the estimated upper-bound concentration of contaminants in ground water are expected to be below State MCLs, which are ARARs for this site. (See Table A-1 in Appendix A. Other ARARs that will be met by Alternatives 2a, 2b, and 2c are presented on Table A-2 in Appendix A.

7.3 Alternatives 3a, 3b and 3c

These three alternatives are the same as Alternatives 2a, 2b and 2c except that entrained water, if any, will be collected in 55-gallon drums and transported off site for treatment at a facility permitted to treat hazardous waste. ARARs that will be met by Alternatives 3a, 3b, and 3c are shown on Table A-2 in Appendix A.

7.4 Alternative 4

Under this alternative, the contaminated soil would be excavated and washed on site. Treatability testing conducted on soil from the site suggests the use of anionic surfactants as soil washing reagents with a minimum reaction time of 30 minutes. Vapor treatment of fugitive emissions during operations, if required, will be by activated carbon. Spent carbon will be thermally regenerated or incinerated at a RCRA permitted facility. Wash liquid will be transported off site for treatment at a facility permitted to treat hazardous waste. Soil sampling will be conducted following treatment to ensure that soil cleanup levels have been met. The treated soil will be returned to the site. ARARs that will be met by this alternative are described on Table A-3 in Appendix A.

7.5 Alternative 5

This alternative entails excavation and on-site treatment of contaminated soil in a circulating bed combuster (CBC). A CBC uses high air velocity and circulating solids to create a turbulent combustion zone for efficient destruction of organic constituents. Based on the results of testing the incineration process on Tank 2 soil, a 36-inch-internal-diameter CBC unit operating at 1600^{O} F with a residence time of 30 minutes will be required to accomplish site remediation. Air sampling will be performed on the exhaust gases to assess the organic contaminant destruction efficiency and to verify compliance with emission requirements. Soil sampling will be performed on the thermally treated soil to verify that cleanup levels have

been met. The treated soil will then be returned to the site. ARARs that will be met by this alternative are described in Table A-4 in Appendix A.

7.6 Alternatives 6a and 6b

These alternatives involve excavation and on-site treatment of contaminated soil in a low temperature desorption (LTD) unit. The LTD unit includes an indirectly fired thermal processor, a vapor recovery unit, and either a gas phase carbon adsorption unit (Alternative 6a) or an incinerator operating at 1600°F to 1800°F (Alternative 6b) for treatment of the non-condensible fraction of the vapors. Treatability test results using the LTD process on soil from Tank 2 suggest that a soil processing temperature of 350°F and a residence time of 46 minutes will be sufficient to treat soil to meet the established cleanup levels (see Section 6.3). The condensate from the vapor recovery unit will be treated at the existing on-site UV/H_2O_2 treatment plant. Spent carbon (Alternative 6a only) will be thermally regenerated or incinerated at a RCRA permitted facility. Air sampling will be performed to assess compliance with emissions requirements and soil sampling will be performed to confirm that cleanup levels are met. Treated soil will be returned to the site. ARARs that will be met by these alternatives are described on Table A-5 in Appendix A.

7.7 Alternatives 7a and 7b

These alternatives are identical to Alternatives 6a and 6b, respectively, except that the condensate from the vapor recovery unit will be treated off site. The condensate will be transported in 55-gallon drums to a facility permitted to treat hazardous waste. Treated soil will be returned to the site. ARARs that will be met by these alternatives are described on Table A-5 in Appendix A.

7.8 Alternative 8

This alternative involves excavation and on-site treatment of contaminated soil using surface aerobic biodegradation. The excavated soil would be placed in a lined treatment cell with dimensions of approximately 73 x 73 feet and spread to a depth of 12 inches or less. Periodic tilling would be conducted to aerate the soil. Treatability testing conducted on soil from Tank 2 indicates that effective biodegradation of organic constituents to non-detectable levels can be accomplished in two weeks by stimulating the indigenous bacteria with nutrients and moisture. Soil sampling will be performed to assess whether cleanup levels have been met. Upon verification of cleanup, the treated soil will be returned to the site.

This alternative could be difficult to implement due to lack of space at the site. If the treatment cell needs to be constructed away from Tank 2 due to the lack of space, it will be located in an area where wildlife and wildlife habitat do not currently exist so that physical effects on the environment are reduced. ARARs that will be met by this Alternative are described on Table A-6 in Appendix A.

8 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The 14 remedial alternatives have been assessed using the nine evaluation criteria developed to address CERCLA requirements. The nine criteria are:

Threshold Criteria

1). Overall Protection of Human Health and the Environment

2). Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Primary Balancing Criteria

3) Long-Term Effectiveness and Permanence
4). Reduction of Toxicity, Mobility, or Volume (TMV)
5). Short-Term Effectiveness
6). Implementability
7). Cost

Modifying Criteria

8). State Acceptance
9). Community Acceptance

The following sections compare the 14 remedial alternatives in terms of each of the nine criteria.

8.1 Overall Protection of Human Health and the Environment

Alternative 1, No Action, would not provide adequate protection of human health and the environment. It would allow contaminants to remain on site and potentially to migrate to

ground water. The remaining 13 alternatives would meet the cleanup levels described in Section 6.3, thereby reducing the estimated total carcinogenic risk posed by the site by more than 90 percent to 4.5E-6 and reducing the estimated HHI to approximately 1.0.

8.2 Compliance with ARARs

Alternative 1 does not meet all of the ARARs, since potential ground water contamination does not meet California MCLs (22 CCR, Article 5.5, Section 64444.5) or the non-degradation policy (State Board Resolution No. 68-16), and since this alternative does not implement measures to restore the Tank 2 site.

The remaining 13 remedial alternatives will meet the current Federal, State and local ARARs identified during development of the OUFS (See Tables A-2 through A-6, Appendix A).

8.3 Long-Term Effectiveness and Permanence

This criterion addresses the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup levels have been met. Alternative 1, No Action, does not satisfy this criterion since no cleanup takes place. The remaining 13 alternatives represent permanent remedies. Each alternative is expected to meet the established cleanup levels and, in doing so, will provide long-term reliable protection of human health and the environment.

8.4 Reduction in Toxicity, Mobility, or Volume Through Treatment

This criterion refers to the ability of a remedy to reduce the toxicity, mobility and volume of the hazardous components present at the site. Alternative 1 does not reduce toxicity, mobility or volume since no cleanup takes place. The remaining alternatives will remove contaminants from the site, thereby satisfying the criteria for reducing the toxicity of the soil at the site. Only three of the alternatives, Alternatives 2a, 5, and 6b provide for the complete on-site destruction of contaminants. The remaining 10 alternatives do not meet the preference for technologies that permanently destroy contaminants, since they involve the off-site transportation of hazardous materials to permitted treatment facilities, or the potential for uncontrolled air emissions of contaminants (Alternative 8 only).

8.5 Short-Term Effectiveness

This criterion addresses the period of time needed to complete the remedy, and any adverse impacts on human health and the environment that may be posed during the construction and implementation, until cleanup levels are met. The period of time needed to complete the 14 alternatives are as follows:

Alternative 1	None
Alternatives 2a,2b,2c	6 months
Alternatives 3a,3b,3c	6 months
Alternative 4	6 months
Alternative 5	3 months
Alternatives 6a, 6b	3 months
Alternatives 7a, 7b	3 months
Alterative 8	3 months

Alternative 1 satisfies the preference for alternatives that minimize short-term adverse impacts on human health and the environment, since the site is currently covered with asphalt/concrete so that exposure pathways do not currently exist. The remaining 13 alternatives reduce the potential future health risk to the public by reducing the potential for transport of contaminants to ground water, however there are potential short-term exposures involved during the construction and operation of the alternative technologies. During construction of each alternative, workers could come in contact with contaminated soil. Workers will follow OSHA guidelines for work on hazardous waste sites. Residents in the area surrounding SAAD should not be exposed during construction except for the possible exception of slight increases in dust, which will be controlled through the use of dust control technologies. Twelve of the alternatives (all but Alternative 8) will have controlled air emissions so there is a potential for exposure to on-site personnel and off-site residents. Air emission control devices that use Thermal Vapor Control (Alternatives 2a & 3a) could potentially create dioxins. Additional monitoring of air emissions would be required for these alternatives. A health risk assessment (HRA) of the remedial alternatives indicates that the potential excess cancer risk to the MEI due to the expected emissions is less than one in one million, and the HHI for the MEI is less than 1.0. Health risks due to uncontrolled air emissions during soil aeration (Alternative 8) are also expected to be less than one-in-one-million (carcinogenic risk) and less than 1.0 (non-carcinogenic HHI).

Alternatives 3a, 3b, 3c, 4, 7a, and 7b also involve some short-term risk associated with the transport of hazardous liquid waste off site to a permitted treatment facility.

8.6 Implementability

Implementability refers to the technical and administrative feasibility of a remedy, including the availability of necessary materials and services. All of the alternatives can be implemented at the site, however treatment units specified in Alternatives 2c, 3c, 5, 6a, 6b, 7a, and 7b (the Vapor Recovery/Condensation Unit, the Incinerator, and the Low Temperature Desorption Unit) are less readily available than those specified in the other alternatives. Thermal Vapor Treatment of air emissions (Alternatives 2a and 3a) is currently an innovative technology and may, therefore, be more difficult to implement than other established technologies. Alternatives that require excavation of the contaminated soil (Alternatives 4, 5, 6a, 6b, 7a, 7b, and 8) would be more difficult to implement because excavation will be complicated by the presence of underground utilities in the area and the proximity of Building 320. Alternative 8 will also require more space than the other alternatives so that a treatment cell can be constructed.

8.7 Cost

This criterion evaluates the capital and operation and maintenance (O&M) costs and present worth of each alternative. These costs are as follows:

Alternative	Present Worth	Capital Cost	O&M Cost
Alternative 1	$ 0	$ 0	$0
Alternative 2a	$ 482,515*	$ 482,515*	$0
Alternative 2b	$ 614,414	$ 614,414	$0
Alternative 2c	$ 763,182	$ 763,182	$0
Alternative 3a	$ 482,791*	$ 482,791*	$0
Alternative 3b	$ 614,690	$ 614,690	$0
Alternative 3c	$ 766,145	$ 766,145	$0
Alternative 4	$ 666,348	$ 666,348	$0
Alternative 5	$ 2,507,494	$ 2,507,494	$0
Alternative 6a	$ 764,223	$ 764,223	$0
Alternative 6b	$ 770,849	$ 770,849	$0
Alternative 7a	$ 768,251	$ 768,251	$0
Alternative 7b	$ 774,876	$ 774,876	$0
Alternative 8	$ 701,116	$ 701,116	$0

*Does not include costs for monitoring potential dioxin emissions. These costs are not currently known since the degree of stringency required is not known for this innovative technology.

Since all of the alternatives require less than one year to complete, the estimated costs are capital costs. No recurring O&M costs are expected. Alternative 1 is the least expensive and

Alternative 5 is the most expensive remedy. The remaining 12 remedies have similar estimated costs, falling in the range of $483,000 to $775,000.

8.8 State Acceptance

This criterion indicates whether, based on its review of the information, the State concurs with, opposes or has no comment on the preferred alternative. The State of California has concurred with the selected alternative for cleanup of the soil at the Tank 2 site.

8.9 Community Acceptance

This criterion indicates whether the public concurs with, opposes, or has no comment on the preferred alternative. During the public meeting and comment period, the public requested information on the types of sampling and analyses performed by the Army, the time frame for remedial activity, the effects of rainfall, and the use of Superfund money. The public did not comment on or indicate concerns about the preferred alternative. Part III of this ROD contains the Responsiveness Summary from the public comment period and public meeting.

9 SELECTED REMEDY

Alternative 2b is the remedy selected for cleanup of the soil at the Tank 2 operable unit. This alternative will involve the use of extraction wells and a vacuum pump/rotary blower to extract hydrocarbon vapor from the subsurface soil. Extraction well sizing and the selection of the vacuum/blower will depend on the desired soil ventilation rate. The results of treatability testing suggest that a soil ventilation rate of 200 cfm can meet cleanup levels over a period of six months. For a 200 cfm unit, the extraction system will be made up of two-inch PVC wells, screened from nine to eighteen feet below grade. The number of extraction wells and their configuration are unknown and will be defined during design tests. The extraction wells will be connected to the vacuum pump/rotary blower with two-inch PVC pipe via an air/water separator used to separate entrained water from the extracted vapor. The extracted vapor will be treated by Gas Phase Adsorption, using an activated carbon unit consisting of series of approximately 2000-pound carbon canisters connected in parallel. The carbon will be changed out as necessary depending on contaminant loading, and the loaded activated carbon will be shipped off site to a carbon regeneration facility where the contaminants will be stripped. Typical organic destruction efficiencies are 90 percent. Entrained water, if any, will be collected for treatment in the existing on-site UV/H_2O_2 water treatment unit. Air sampling

will be performed to evaluate the effectiveness of the operation and compliance with the emissions requirements. The treated air stream using carbon adsorption will comply with the substantive requirements of the permit although the procedural requirements (such as paper work) are not required because the Superfund action is conducted entirely on site. Upon completion of the remedial action, confirmation sampling of the treated soil will be performed to ascertain that cleanup levels have been met. Details of the confirmation sampling will be presented in a future remedial action plan.

The itemized cost estimate for the selected alternative is shown in Table 7. Because the remedy is expected to take six months, recurring operation and maintenance costs are not expected. Therefore, Capital Cost equals the Present Worth of the Alternative.

The selected remedy is expected to meet performance standards, in the form of cleanup levels, as described in Section 6.3. By meeting the cleanup levels for soil, public health and the environment will be protected and all State and Federal ARARs, including Drinking Water MCLs, should be met now and in the future. Estimated final risk levels, based on the cleanup levels, are shown in Table 8.

Alternative 2b complies with ARARs and reduces the toxicity, mobility, and volume of the contaminants in soil equally as well as the other alternatives. The short-term effectiveness of Alternative 2b is the same or better than the remaining alternatives. Alternative 2b is easily implemented, and is less costly than other alternatives that could be implemented easily at the site.

The State of California concurs with the selected remedy.

10 STATUTORY DETERMINATIONS

The Army's primary responsibility at this NPL site is to undertake remedial actions that achieve adequate protection of human health and the environment. Section 121 of CERCLA establishes several statutory requirements and preferences. These specify that when complete, the selected remedial action must comply with ARARs unless a statutory waiver is justified. The selected remedy must also be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute expresses a preference for remedies that significantly reduce the volume,

TABLE 7
COST ESTIMATE SUMMARY
SELECTED ALTERNATIVE:
SOIL VENTILATION, CARBON ADSORPTION TREATMENT OF VAPOR,
UV/H_2O_2 WATER TREATMENT

COST COMPONENT	NOTE	CONSTRUCTION COSTS ($)
Soil Ventilation System	1	59,333
Electrical Power Hookup	2	5,000
Activated Carbon Vapor Treatment	3	131,000
Electricity	4	2,700
Soil Gas Sampling and Analysis	1	included
Post Remediation Soil Sampling and Analysis	5*	23,430
Water Transport	6	200
UV/H_2O_2 Water Treatment	7	20
A/E SVS Monitoring	2	12,662
Mobilization Bonds and Insurance (5%)	8	11,717
Workplan/Final Design	2	24,864
Permit Preparation	2	7,778
Site Specific Safety Plan	2	14,084
Sampling Plan	2	10,680
Design Quality Control Plan	2	11,409
Chemical Data Management Plan	2	29,439
Startup/Final Reports	2	14,210
Interim Progress Reports	2	43,382
CONSTRUCTION COST SUBTOTAL		401,908
Bid Contingency (15%)	9	60,286
Scope Contingency (15%)	9	60,286
CONSTRUCTION COST TOTAL		522,481
Services During Construction (6%)	9	31,349
TOTAL IMPLEMENTATION COST		553,830
Conceptual Engineering Design Cost (6%)	9	33,230
Document Review/Construction Observation	10	27,355
TOTAL PROJECT COST	11	614,414

TABLE 7 (Continued)
COST ESTIMATE SUMMARY
SELECTED ALTERNATIVE:
SOIL VENTILATION, CARBON ADSORPTION TREATMENT OF VAPOR,
UV/H_2O_2 WATER TREATMENT

SELECTED ALTERNATIVE NOTES:

* Includes 10% markup for outside services

1. Based on Kleinfelder cost estimate 5/6/91
   Includes well installation
   Assumes 150 in-place cubic yards of soil to be remediated
   200 SCFM system
   4 month soil ventilation system operation includes soil gas sampling and analysis

2. Based on Kleinfelder Spec. No. 8976

3. Based on Kleinfelder cost estimate 7/10/91
   Includes vapor cooling system

4. Electricity cost = $0.08163/KWH for four month duration

5. Based on Kleinfelder cost estimate 2/5/91
   3 borings/6 samples
   EPA 8240, 8270, TCLP volatiles, TCLP semi-volatiles

6. Based on SAAD estimate of transport costs
   100 gallons water, 2 manhours/55 gallon drum = 4 hours

7. Based on SAAD estimate of tmt cost/gallon at tmt plant
   100 gallons water, .2 cents/gallon

8. Based on 5% of total construction cost
   excluding permits, workplan, safety plan, sampling plan
   chemical data management plan, design quality control plan,
   and reports preparation

9 Based on percentage of construction costs

10 Assume 48 hours of construction observation to review sampling results, remediation progress, weekly letter reports, and final summary report. Review of final design, workplan, safety plan, sampling plan, chemical data management plan, and design quality control plan.

11 Based on 1991 dollars

TABLE 8
ESTIMATED CARCINOGENIC AND NON-CARCINOGENIC RISKS AFTER REMEDIATION
TANK 2 OPERABLE UNIT

Exposure Pathway	Chemical	CDI (mg/kg-day)	Chem. Spec. Carcinogenic Risk	Pathway Carcinogenic Risk	Total Carcinogenic Risk	Chemical Specific HHI	Total Pathway HHI	Total Exposure HHI
FUTURE ON-SITE RESIDENT								
Soil Ingestion	2-Butanone	NA	NC			NA		
	Ethylbenzene	NA	NC			NA	4.6E-9	
	Tetrachloroethene	4.5E-9	2.3E-12	2.3E-12		4.5E-9		
	Xylene	6.1E-9	NC			6.2E-11		
Dermal Contact with Soil	2-Butanone	NA	NC			NA		
	Ethylbenzene	NA	NC			NA		
	Tetrachlorothene	2.1E-8	1.1E-11	1.1E-11		2.1E-8	2.1E-8	
	Xylene	3.5E-10	NC		4.5E-6	3.6E-12		1.2
Ground Water Ingestion	2-Butanone	4.6E-1	NC			7.3E-1		
	Ethylbenzene	2.8E-2	NC			8.4E-3		
	Tetrachloroethene	8.3E-3	4.2E-6	4.2E-6		8.3E-3	7.5E-1	
	Xylene	8.0E-1	NC			8.0E-3		
Inhalation of Waterborne Chemicals	2-Butanone	4.6E-1	NC			4.1E-1		
	Ethylbenzene	NI	NC			NI		
	Tetrachloroethene	8.3E-3	2.7E-7	2.7E-7		2.1E-2	4.3E-1	
	Xylene	NI	NC			NI		
FUTURE OFF-SITE RESIDENT								
Ground Water Ingestion	2-Butanone	5.8E-4	NC			8.8E-4		
	Ethylbenzene	4.4E-5	NC			1.3E-5		
	Tetrachloroethene	5.3E-5	2.7E-8	2.7E-8		5.3E-5	9.9E-4	
	Xylene	4.1E-3	NC		2.9E-8	4.2E-5		1.5E-3
Inhalation of Waterborne Chemicals	2-Butanone	5.8E-4	NC			5.0E-4		
	Ethylbenzene	NI	NC			NI		
	Tetrachloroethene	5.3E-5	1.7E-9	1.7E-9		1.3E-5	5.1E-4	
	Xylene	NI	NC			NI		

NA - Not appropriate because chemical does not exist in upper 3 feet of soil

NI - Not included because chemical is not an aliphatic. Therefore, by convention, it is not included in this exposure path.

NC - Not a Carcinogen

1 - Supplied by EPA, Dr. Gerald Hiatt, personal communication.

2 - IRIS (Integrated Risk Information System) 3 - Derived in PHE

toxicity, or mobility of the hazardous waste. The following sections discuss how the selected remedy meets the statutory requirements.

10.1 Protection of Human Health and the Environment

The selected remedy will remove contaminants from the soil so that the carcinogenic risk to Future On-Site Residents (the most exposed individuals) will be reduced from 4.5E-4 to 4.5E-6. The non-carcinogenic HHI will be reduced to approximately 1. By removing the contaminants from soil, no direct exposure to harmful concentrations in the soil or in the ground water should occur now or in the future.

10.2 Compliance with ARARS

Section 121 of CERCLA provides that, except under certain narrow exemptions, remedial actions shall comply with Federal and State laws that are applicable or relevant and appropriate to the contaminants and circumstances of the site. The process by which potential ARARs are identified, screened, and analyzed to determine if they actually are ARARs is described in "CERCLA Compliance with Other Laws Manual" (EPA, 1988).

There are three general classes of ARARs:

1. Chemical Specific - for example, a drinking water "MCL" defines a maximum acceptable concentration for drinking water;

2. Action Specific - for example, a landfill built to accept hazardous waste would have to meet RCRA 264, Subpart N regulations and associated requirements on design of the landfill;

3. Location Specific - for example, a hazardous waste landfill could not be built on a flood plain.

The selected remedy complies with all ARARs and To Be Considered criteria (TBCs) established for this site. The list of ARARs is contained in Appendix A. Table A-1 provides a comprehensive comparison of Federal, State, and local ARARs and TBCs to estimated chemical concentrations derived in the baseline PHE. Tables A-2 through A-6 summarize action-specific, chemical-specific, and site-specific ARARs for the remedial alternatives evaluated. Key among these ARARs are the Safe Drinking Water Act chemical-specific MCLs

and the requirements under the Clean Air Act which relate to the emission standards. No waivers are being invoked.

10.3 Cost Effectiveness

The selected alternative is cost-effective in mitigating the principal risk posed by the presence of contaminants in soil that could migrate to ground water in the future. The estimated cost of the selected alternative is $614,414, which is less than all of the remedial alternatives except Alternative 1 (No Action) and Alternatives 2a and 3a. However, the costs of Alternatives 2a and 3a may increase due to stringent requirements for monitoring dioxin emissions. Alternative 1 is not acceptable since it does not protect human health and the environment. Alternatives 2a and 3a may be difficult to implement since the treatment specified in these alternatives is an innovative technology. Therefore, the estimated cost of the selected alternative is reasonable considering the long-term protection of human health.

10.4 Utilization of Permanent Solutions and Alternative Treatment Technologies

The selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost effective manner. Of those alternatives that are protective of human health and the environment and comply with ARARs, the selected remedy provides the best balance of trade-offs in terms of long-term effectiveness and permanence; reduction in toxicity, mobility or volume achieved through treatment; short-term effectiveness; implementability; and cost, and also considering the statutory preference for treatment as a principal element and considering State and community acceptance.

10.5 Preference for Treatment as a Principal Element

The selected remedy satisfies the statutory preference for treatment as a principal element, since it will remove contaminants from soil at the Tank 2 Operable Unit. Contaminants will be transferred from the on-site soil to treatment canisters containing activated carbon. The activated carbon will then be transported off site for treatment and/or recycling.

11 DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the Tank 2 Operable Unit was released for public comment in August 1991. The Proposed Plan identified Alternatives 2a, 2b, and 2c as the Preferred Alternatives,

and stated that selection of one of these alternatives would be based on cost, contractor recommendation, and public input. Based on these three factors, Alternative 2b is the selected remedy for the Tank 2 Operable Unit. This does not represent a significant change from the Proposed Plan, since the three alternatives only differ in how air emissions will be treated. The Proposed Plan presented information on all three alternatives for treatment of the air emissions and requested public input and comment on the three alternatives.

RECORD OF DECISION
III. RESPONSIVENESS SUMMARY
SAAD - TANK 2 OPERABLE UNIT

BACKGROUND ON COMMUNITY INVOLVEMENT

At various times since 1979, formal news releases have been issued by the SAAD Public Affairs Office concerning contamination issues. The releases have provided the local media and general public with information on the status of investigative and remedial efforts and continuing action to protect public health and safety.

In October 1986, the Depot sent a news release to the media on the discovery of soil contamination after removing Tank 2. The public did not express specific concerns about contamination at the Tank 2 Operable Unit during the four-year period following the initial press release. To date, public concerns about the contamination at SAAD have mainly focused on (1) the potential for exposure to contaminated ground water that currently exists under the southwest corner of SAAD and off-site to the south and west of SAAD, and (2) the effects that contamination and remedial actions have on wildlife and wildlife habitat at the facility. These two concerns apply to other Operable Units defined at SAAD, but are not applicable to the Tank 2 Operable Unit since Tank 2 does not appear to have affected ground water at SAAD (based on the results of soil and ground water sampling) and because the Tank 2 area is industrial with no wildlife or wildlife habitat.

Contamination at the Tank 2 site is not expected to affect businesses in vicinity of the site, residential property values, or traffic patterns during site cleanup since this Operable Unit is located more than 1,000 feet from the nearest facility boundary and the selected remedy will not significantly change the number of vehicles going to or from the Depot each day. The public has expressed no concerns with these issues. If not remediated, contaminants at the Tank 2 Operable Unit could pose a long-term health risk to future on-site residents. No short-term or long-term human health or environmental risks should occur during or after remediation of this site by the selected alternative, providing that on-site workers follow standard OSHA guidelines for working with hazardous waste during remediation and dust control measures are implemented during construction. The public has expressed no concerns with short- or long-term health risks.

OVERVIEW

Notice was placed in local community daily newspapers announcing the availability of the Operable Unit Feasibility Study (OUFS) and Proposed Plan (PP) in the local information repositories at the California State University Library and the SAAD Visitor Center. Public review and comment was invited for a period of 30 days, from August 20 to September 19, 1991. No written comments were received.

A public information and comment meeting on the PP was held on August 20, 1991 at the Army Reserve Center. The meeting was attended by 39 people, representing the public, the Army, EPA, DTSC and RWQCB. During the public comment period and public meeting, the public made no comments on the Army's preferred alternative for cleaning up the soil at the Tank 2 Operable Unit. The public asked for clarification on several points of the plan during the public meeting. The Army's preferred alternative for soil cleanup is composed of in-situ soil ventilation with air emissions control and entrained (suspended) water treatment by ultraviolet-hydrogen peroxide. Three alternatives for air emissions control were described to the public:

1). Thermal Vapor Control
2). Gas Phase Carbon Adsorption
3). Vapor Recovery

The public did not express concerns or any preference for the type of air emissions control employed, and the Army subsequently selected Gas Phase Carbon Adsorption based on contractor recommendations and cost.

SUMMARY OF PUBLIC COMMENTS AND ARMY RESPONSES

The following questions were asked at the public meeting.

QUESTION #1:

Given some of the compounds that you have been looking for (polynuclear aromatics, halocarbons), are you using GC method analysis for detection or how do you come up with those levels? Was the analytical work done at SAAD? What does GCMS mean?

RESPONSE:

A variety of analytical methods have been used at the site, depending on the compounds of interest. The methods used are:

GC/MS (Gas Chromatograph/Mass Spectrometer) - used for the analysis of polynuclear aromatics, halocarbons, pesticides (including herbicides), aromatic volatile organic compounds, semi-volatile organic compounds.

GC (Gas Chromatograph) - used for the analysis of volatile organic compounds.

ICAP (Inductively Coupled Plasma Emission Spectroscopy) - used for the analysis of most metals.

AA (Atomic Adsorption) - used for the analysis of selected metals such as arsenic and mercury.

The analyses were performed by outside multi-state certified analytical laboratories to ensure that the results were acceptable to the EPA and the State of California.

QUESTION #2:

How close are the contaminant levels to the naturally occurring levels found in the ground?

RESPONSE:

The organic contaminants would not be found as naturally occurring because they are man-made chemicals. No contaminant metals, which could be found as naturally occurring at the site, were detected at the Tank 2 site.

QUESTION #3:

Are contaminants going down Morrison Creek?

RESPONSE:

Sampling in Morrison Creek indicates that contamination is not going off base to Morrison Creek.

QUESTION #4:

What is the timeframe for remediation?

RESPONSE:

The Army hopes to award a remedial construction contract and sign a Record of Decision this calendar year. The Remedial Action would then take place in 1992 and would be completed in approximately six months.

QUESTION #5:

How is Superfund money involved in the cleanup of the site?

RESPONSE:

The Department of Defense is not eligible to use public Superfund money on cleanup of its sites. The Department of Defense has a fund called the Defense Environment Restoration Account, which is essentially the military equivalent of Superfund. ~~Public~~ Superfund money is used to pay for EPA oversight costs.

QUESTION #6:

What effect will rain have on the distribution of contaminants? If the drought ends, will rain carry contaminants to ground water?

RESPONSE:

The Tank 2 site is paved over with asphalt and concrete, which greatly reduces the amount of rain water that can infiltrate through the soil in this area. Therefore, rainfall

will not have a large effect on the movement of contaminants at this site. There are also 84 ground water monitoring wells on base and off base that are sampled quarterly to detect contaminants that do reach ground water. Monitoring wells located upgradient and downgradient of Tank 2 (ground water generally flows from upgradient to downgradient) are used to assess whether contaminants from Tank 2 have impacted ground water. The contaminants found in ground water downgradient of Tank 2 are not the same as those found in the soil around Tank 2 . Soil samples were collected to evaluate how far contaminants from Tank 2 have already traveled toward ground water. At this time, it appears that contaminants have moved to a depth of 30 feet in one location, but most of the contaminants have only moved to an approximate depth of 18 feet. Based on this information, ground water (which is 80 feet below ground surface) does not appear to have been affected by the contaminants from Tank 2.

REMAINING CONCERNS

All public questions expressed during the public meeting were addressed by the Army. No other concerns or questions were received during the public comment period.

RESPONSIVENESS SUMMARY

Attachment A

The Community Relations activities conducted at the Tank 2 Operable Unit on the SAAD facility to date have included the following:

- The Army issued a press release to local media describing the discovery of contamination at the Tank 2 Operable Unit in October 1986.

- The Army issued a Proposed Plan (PP) describing the preferred alternative for soil cleanup at Tank 2 and soliciting public involvement on August 16, 1991. The PP was mailed to contiguous property owners and numerous newspapers, radio, and television stations. In addition to the Administrative Record, the PP is available at the offices of the EPA, Region IX, and the DTSC in Sacramento, California.

- The Army held a public meeting on August 20, 1991 at the U.S. Army Reserve Center, 9376 Fruitridge Road in Sacramento, California. The meeting was recorded by a court reporter and a written text of the meeting is available in the Administrative Record.

- The Army opened a public comment period from August 19 to September 18, 1991. No written or oral comments were received during that time, except at the public meeting on August 20 (see preceding item).

APPENDIX A

ANALYSIS OF ARARS

TABLE A-1
TANK 2
COMPARISON OF CHEMICAL CONCENTRATION TO ARARS

Chemical	DTSC/EPA MCLs[1] (mg/l)	DTSC AALs[2] (mg/l)	Proposed RCRA Action Levels[3] Water/Soil (mg/l)/(mg/kg)	Land Ban Treatment Standards[4]: Wastewater/ non-Wastewater (mg/l)	Baseline Conc. in Soil* from PHE (mg/kg)	Proposed Treatment Cleanup Level (mg/kg)	Baseline GW MEI Conc. (mg/l)	Baseline GW AEI Conc. (mg/l)	Est. MEI after Remed. in water (mg/l)	Est. AEI after Remed. in water (mg/l)
Anthracene		0.02			.041		$1.6X10^{-5}$	$<1X10^{-10}$		
Benozoic Acid					.39		$3.7X10^{-2}$	$5.1X10^{-6}$		
Benzo(a)anthracene					1.3		$5.2X10^{-6}$	$<1X10^{-10}$		
Benzo(g,h,i)perylene					1.5		$5.2X10^{-6}$	$<1X10^{-10}$		
2-Butanone (MEK)			2/4000	0.05/.75	15	1.2	16	$8.3X10^{-4}$	1.28	$6.6X10^{-5}$
Chrysene					.3		$8.2X10^{-6}$	$<1X10^{-10}$		
4,4'-DDE			.0001/2		.0018		$2.3X10^{-9}$	$<1X10^{-10}$		
4-4'-DDT			.0001/2		.0038		$8.8X10^{-8}$	$<1X10^{-10}$		
Dibenzo(a,h)anthracene					1.5		$2.5X10^{-6}$	$<1X10^{-10}$		
Dieldrin			2X10-6/.04		.0078		$2.5X10^{-5}$	$<1X10^{-10}$		
2,4-Dimethylphenol					.72		$9.3X10^{-3}$	$3.2X10^{-8}$		
Ethylbenzene	0.68/0.7	2	4/8000	0.05/0.053	200	6	0.99	$6.3x10^{-5}$	.03	$1.9X10^{-6}$
Fluoranthene		0.02			2.9		$4.2X10^{-4}$	$<1X10^{-10}$		
Heptachlor epoxide	$1X10^{-5}/2X10^{-4}$	$2X10^{-5}$	4X10-6/.08		.0086		$2.1X10^{-4}$ +	$4.3X10^{-9}$		
Indeno(1,2,3-c,d)-pyrene					1.7		$6X10^{-6}$	$2.1X10^{-10}$		

*The baseline concentrations in soil are the site average concentrations of the individual chemicals detected at Tank 2, as calculated in the Public Health Evaluation.

1 = ARARs - will be met at ground water. DTSC MCLs are more stringent than EPA MCLs. Site cleanup levels will meet both at ground water.

2 = To be Considered Criteria - will be met at ground water.

3 = RCRA Corrective Action Levels (proposed) are To Be Considered Criteria. Site Cleanup levels meet these criteria for water and soil.

4 = Land Ban treatment standards for waste codes F001-F005. Site cleanup levels will meet both waste water and non-wastewater treatment standards. The wastewater standards will be met at ground water. The non-wastewater standards will be met in soil after remediation. These standards are ARARs.

+ = This estimated concentration is very conservative since it is based on an assumed uniform distribution of the contaminant. However, the contaminant was detected in only a few samples, so the actual concentration in ground water will be much lower than this estimate and is expected to meet ARARs and TBCs - See Section 6.3.

TABLE A-1 (Continued)
TANK 2
COMPARISON OF CHEMICAL CONCENTRATION TO ARARS

Chemical	DTSC/EPA MCLs[1] (mg/l)	DTSC AALs[2] (mg/l)	Proposed RCRA Action Levels[3] Water/Soil (mg/l)/(mg/kg)	Land Ban Treatment Standards[4]: Wastewater/ Non-wastewater (mg/l)	Baseline Conc. in Soil* from PHE (mg/kg)	Proposed Treatment Cleanup Level (mg/kg)	Baseline GW MEI Conc. (mg/l)	Baseline GW AEI Conc. (mg/l)	Est. MEI after Remed. in water (mg/l)	Est. AEI after Remed. in water (mg/l)
2-methylnaphthalene					.32		$1X6X10^{-3}$	$1.5X10^{-8}$		
4-Methylphenol					.04		$4.5X10^{-3}$	$1.2X10^{-7}$		
Napthalene		0.02			2.6		.015	$2.3X10^{-7}$		
Phenanthrene		0.02			2.7		$1X10^{-3}$	$< 1X10^{-10}$		
ephenol			20/50,000		.067		.026	$6.7X10^{-6}$		
Pyrene		0.02			2.4		$3.5X10^{-4}$	$< 1X10^{-10}$		
Tetrachloroethene (PCE)	.005/0.005	0.007	.007/10	0.079/0.05	18.7	0.2	0.29	$7.6X10^{-5}$	.003	$7.9X10^{-7}$
Xylenes	1.75/10	2	70/200,000	0.05/0.15	1174	23	28	$6.1X10^{-3}$	.55	$1.2X10^{-4}$

*The baseline concentrations in soil are the site average concentrations of the individual chemicals detected at Tank 2, as calculated in the Public Health Evaluation.

1 = ARARs - will be met at ground water. DTSC MCLs are more stringent than EPA MCLs. Site cleanup levels will meet both at ground water.

2 = To be Considered Criteria - will be met at ground water.

3 = RCRA Corrective Action Levels (proposed) are To Be Considered Criteria. Site Cleanup levels meet these criteria for water and soil.

4 = Land Ban treatment standards for waste codes F001-F005. Site cleanup levels will meet both waste water and non-wastewater treatment standards. The wastewater standards will be met at ground water. The non-wastewater standards will be met in soil after remediation. These standards are ARARs.

TABLE A-2
ARARs FOR SOIL VENTILATION SYSTEM

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Action Specific	Department of Toxic Substances Control (DTSC)	22 CCR, Article 20	▸ Requires preparation of a contingency plan for the facility to minimize hazards to human health and environment from fire, explosion, or release of hazardous waste to soil, air, or water.	▸ The site specific Health and Safety Plan prepared by the Contractor shall provide sufficient information and mitigation procedures for the protection of human health during the SVS operation. SAAD's overall site Contingency Plan will provide emergency procedures and other pertinent information, as required by this regulation.
		22 CCR, Article 24	▸ Applicable to hazardous waste facilities that store containers of hazardous waste.	▸ Waste generated during remedial activities will be considered potentially hazardous. Examples for this alternative are spent activated carbon or entrained water wastes which may require management as per the requirements of this ARAR regarding use and management of storage containers.
		22 CCR, Article 25	▸ Sets requirements for the design of tanks used for the treatment or storage of hazardous waste.	▸ The quantity of hazardous wastes generated during remedial activity is small and waste if any, will be stored in 55-gallon drums. Therefore, this ARAR should not be applicable.
		22 CCR 66392	▸ Permits by rule	▸ This alternative does not treat a hazardous waste (since the soil is remediated in-situ). A permit-by-rule process is not utilized. Thus, this ARAR should not be applicable.
		22 CCR Article 6	▸ Sets requirements for the generators of hazardous waste.	▸ With regards to off-site disposal of entrained water, if any, the Contractor may have to comply with the requirements as set forth by this ARAR regarding use of an EPA identification number, hazardous waste manifest, and recordkeeping.

TABLE A-2 (Cont.)
ARARs FOR SOIL VENTILATION SYSTEM

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Chemical Specific	DTSC	40 CFR 264, Subpart G 22 CCR, Article 23	▸ Sets requirements for closure and post-closure of hazardous waste management facilities.	▸ The regulations set forth in this ARAR are applicable to hazardous waste management facilities such as landfills and surface impoundments. Operation of waste management facility not anticipated. Thus, this ARAR should not be applicable.
	DTSC/EPA	22 CCR, Article Section 66268.40 and 66268.41/40 CFR 268	▸ For disposal of waste to land, sets treatment standards for RCRA and Non-RCRA waste categories.	▸ Waste are not being land disposed. Thus, this ARAR should not be applicable.
		40 CFR 261 22 CCR Article 11	▸ Identification and listing of hazardous waste. Numerous compounds detected at the Tank 2 site are listed as potential hazardous wastes. These regulations include specific testing criteria for determining hazardous waste characteristics.	▸ Wastes generated during remedial activity will be considered potentially hazardous. Examples for this alternative are spent activated carbon or entrained water. Wastes will be managed as hazardous waste unless shown not to be hazardous by testing according to this ARAR.
Site Specific	DTSC	22 CCR 66391	▸ Hazardous waste facility permit - contents of Part B of the application.	▸ Under this alternative, a hazardous waste facility is not being permitted. Thus this ARAR should not be applicable.
		22 CCR 67103	▸ Site Security	▸ The Contractor shall prevent the unknowing entry, and minimize the possibility of unauthorized entry of, persons or livestock in the area of the SVS operation.
		22 CCR 67220	▸ Notice in Deed to Property required for permitted disposal facilities.	▸ Since this alternative does not create a disposal facility, this ARAR is not applicable.

TABLE A-2 (Cont.)
ARARs FOR SOIL VENTILATION SYSTEM

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site/Action/Chemical Specific	EPA	Safe Drinking Water Act (SDWA) 42 USC300 40 CFR141	▸ Drinking Water Standards, including both enforceable MCLs.	▸ The following chemical specific regulatory requirements have been identified at the Tank 2 site: Constituent — Max. Contaminant Level mg/l Ethylbenzene 0.7 Heptachlor epoxide 0.0002 Tetrachloroethene 0.005 Xylenes 10
Chemical Specific	DTSC	22 CCR, Article 5.5, Section 64444.5	▸ Sets maximum contaminant levels for the primary drinking water constituents.	▸ The following chemical specific regulatory requirements have been identified at the Tank 2 site: Constituent — Max. Contaminant Level mg/l Ethylbenzene 0.680 Heptachlor epoxide 0.00001 Tetrachloroethene 0.005 Xylenes 1.750 ▸ Refer to section 7.2.2.3 for details on compliance.
Site/Action/ Chemical Specific	Regional Water Quality Control Board (RWQCB)	Porter Cologne Water Quality Control Act (CA Water Code)	▸ This Act coordinates regulatory control over all activities that may affect water quality.	▸ This ARAR generally requires the protection of beneficial uses of waters of the State. Specific requirements are addressed in other ARAR's presented in this Table.

TABLE A-2 (Cont.)
ARARs FOR SOIL VENTILATION SYSTEM

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site/Action/Chemical Specific	Regional Water Quality Control Board (RWQCB)	CVRWQCB-R5, Water Quality Control Plan (Basin Plan)	▸ This plan is the vehicle by which the CVRWQCB administers the CA Water Code. This Act establishes the responsibility of the RWQCB to supervise cleanup efforts at spill sites including approval of cleanup plans and verification of final cleanup.	▸ Contractor shall supply workplan and procedures to the RWQCB for review and approval.
		State Board Resolution No. 68-16	▸ Non-degradation policy.	▸ The contractor shall treat the soil to the required cleanup levels stated in Section 3.6 such that residual constituents will not degrade beneficial uses for ground water.
Site/Action/Chemical Specific	RWQCB	Proposition 65	▸ Safe Drinking Water and Toxic Enforcement Act. This Act prohibits the discharge of known carcinogens and reproductive toxins into a source of drinking water. The Act also requires a clear warning of potential significant exposures.	▸ The contractor will comply health risks due to operation of SVS by controlling air emissions, providing adequate site security and appropriate signage, and through implementation of a site-specific worker Health and Safety Plan. ▸ A HRA will be conducted to estimate acceptable emission levels. The HRA will be based on a one million cancer risk an opposed to one in a hundred thousand cancer risk required by Proposition 65.
		Title 23, Chapter 15, Discharges of Waste to Land.	▸ Chapter 15 outlines requirements for the design, construction, operation, and closure of waste containment facilities.	▸ The regulations in this Chapter establish waste and site classification and waste management requirements for waste treatment storage, or disposal in landfills, surface impoundments, waste piles, and land treatment facilities. Since the SVS operation does not entail any of the above, this ARAR should not be applicable.

TABLE A-2 (Cont.)
ARARs FOR SOIL VENTILATION SYSTEM

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site/Action/Chemical Specific	Environmental Protection Agency (EPA)	NPDES 40 CFR 122	▸ Discharge of liquid streams to surface waters.	▸ This alternative does not entail discharge of liquid streams to surface waters, therefore this ARAR should not apply.
Site/Action/Chemical Specific	Environmental Protection Agency (EPA)	40 CFR 264, Subpart F	▸ Release from solid waste management units.	▸ This ARAR is applicable to owners or operators of facilities that treat, store, or dispose of hazardous waste. It applies to surface impoundments, waste piles, land treatment units, or landfills. As the SVS operation does not entail any of the above, this ARAR should not be applicable.
		Land Ban 40 CFR 248	▸ Land disposal restrictions for RCRA and non-RCRA waste categories.	▸ This ARAR identifies hazardous wastes that are restricted from land disposal. Since SVS does not entail land disposal, this ARAR does not apply.
	EPA	Clean Air Act 40 CFR 61	▸ National Emissions Standards for Hazardous Air Pollutants.	▸ Air emissions from the remediation of the Tank 2 site would primarily comprise of PCE, 2-butanone, ethylbenzene, and xylenes which pursuant to Section 112 of the Act are not designated as hazardous air pollutants. Therefore the ARAR does not apply.
	EPA and ARB	40 CFR Part 50 et Seq. 17 CCR 60 204 et Seq..	▸ Clean Air Act and State Air Pollution Control Laws.	▸ California air pollution control laws are generally stricter and therefore, supercede the Federal Clean Air Act. Applicable state/local air district air pollution control laws are discussed below. Emission Sources are divided into Mobile and Stationary Sources. Stationary Sources may be regulated as new sources, Existing Sources, or granted a variance. New Source emission standards are enforced by a permit system. Administration and permits rests with the local air district.

TABLE A-2 (Cont.)
ARARs FOR SOIL VENTILATION SYSTEM

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Action/Site Specific	Sacramento Metropolitan Air Quality Management District (SMAQMD)	Rule 202, Section 301	▸ New Source Review.	▸ Reactive organic compounds will be emitted in excess of the limit of 0 lbs/day. This triggers the requirements for use of BACT. Best Available Control Technology (BACT). BACT is defined as the maximum control device or technique which is technologically feasible and cost effective. BACT is generally thermal destruction for reactive organics.
Chemical Specific	SMAQMD	CA Health and Safety Code, Section 41700	▸ General guideline, if SVS operation causes release of organic compounds to the atmosphere, then a case-by-case determination of public nuisance potential should be performed to verify compliance. Section 41700 states that discharges to air causing injury, detriment, nuisance annoyance; or endangers the comfort, repose, health, or safety, or causes injury or damage to business or property is prohibited.	▸ To comply with this ARAR, carcinogens emitted by SVS operation will require treatment prior to emission to the atmosphere. Emissions from treatment processes will be evaluated by the Contractor with regards to public effects and monitored and abated. A 10^{-6} criteria will be utilized. ▸ Based on results of SVS pilot testing, a HRA was conducted to estimate the effect of carcinogens emitted on local population. The results of HRA suggest health an excess cancer risk of 5.1×10^{-8} for tetrachloroethane.

TABLE A-2 (Cont.)
ARARs FOR SOIL VENTILATION SYSTEM

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Chemical Specific	EPA	F.R. 55(145):30865 July 27, 1990	▸ Cleanup levels under RCRA corrective actions.	▸ The proposed RCRA Sample Action Levels for the following chemical specific compounds identified at the Tank 2 site are TBCs and are as follows:

Semi-Volatile Organic Compounds

Name	Hazard Class	Soil Conc. (mg/kg)	Water Conc. (mg/kg)
Phenol	D	5.0 E4	2.0 E1

Pesticides/Dioxins

Name	Hazard Class	Soil Conc. (mg/kg)	Water Conc. (mg/kg)	Air Conc. $\mu g/m^3$
DDE	B2	2	1.0E-4	----
DDT	B2	2	1.0E-4	1.0E-2
Dieldrin	B2	4.0E-2	2.0E-6	2.0E-4
Heptachlor epoxide	B2	8.0E-2	4.0E-6	4.0E-4

TABLE A-3
ARARs FOR EXCAVATION AND ON-SITE SOIL WASHING

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Action Specific	Department of Toxic Substances Control (DTSC)	22 CCR, Article 20	▸ Requires preparation of a contingency plan for the facility to minimize hazards to human health and environment from fire, explosion, or release of hazardous waste to soil, air, or water.	▸ The site specific Health and Safety Plan prepared by the contractor should provide sufficient information and mitigation procedures for the protection of human health during the soil washing operation. SAAD's overall site Contingency Plan will provide emergency procedures and other pertinent information, as required by this regulation.
		22 CCR, Article 24	▸ Applicable to hazardous waste facilities that store containers of hazardous waste.	▸ Wastes generated during remedial activity will be considered potentially hazardous. Examples for this alternative are soil washing solution and spent carbon which may require managements as per the requirements of this ARAR regarding use and management of storage containers.
		22 CCR, Article 25	▸ Sets requirements for the design of tanks used for the treatment or storage of hazardous waste.	▸ Tanks used for storage of the soil washing solution or its components shall comply with the specific design and containment requirements outlined in this ARAR. In addition, the tank materials shall be compatible with the solutions stored in them. Tank design and containment information as well as monitoring and inspection plans will be submitted by the Contractor for agency review and approval.
		22 CCR 66392	▸ Permits by rule	▸ The contractor shall review SAAD's Part B Permit to ensure that requirements of this ARAR for this process are met under this permit. Where requirements are not met under the Part B Permit, the operator shall submit for approval his plan to meet these requirements.

TABLE A-3 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE SOIL WASHING

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Action Specific	Department of Toxic Substances Control (DTSC)	22 CCR, Article 6	▸ Sets requirements for the generators of hazardous waste.	▸ With regard to off-site disposal of soil washing liquid, the contractor shall comply with the requirements as set forth by this ARAR regarding the use of EPA identification number, hazardous waste manifest, and recordkeeping.
Chemical Specific	DTSC	40 CFR 264, Subpart G 22 CCR, Article 23	▸ Sets requirements for closure and post-closure of hazardous waste management facilities.	▸ The regulations set forth in this ARAR are applicable to hazardous waste management facilities such as landfills and surface impoundments. Operations of waste management facility is not anticipated. Thus, this ARAR should not be applicable.

TABLE A-3 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE SOIL WASHING

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Chemical Specific	DTSC/EPA	22 CCR, Article Section 66268.40 and 66268.41/40 CFR 268	▸ For disposal of waste to land, sets treatment standards for RCRA and Non-RCRA waste categories.	▸ The history of Tank 2 indicates that the tank was used for storage of waste solvents. The soil debris generated by excavation would therefore be a F001-F005 waste. Treatment Standards for reported soil constituent are:

F001 - F005 Spent Solvents	TCLP (mg/l)
Ethylbenzene	0.053
Tetrachloroethene	0.05
Xylenes	0.15
2-Butanone	0.75

Treatment standards for wastewater are:

F001 - F005 Spent Solvents	Concentration (mg/l) Wastewaters containing spent solvents
2-Butanone	0.05
Ethylbenzene	0.05
Tetrachloroethene	0.079
Xylenes	0.05

See Section 7.2.8.3 for details on compliance.

TABLE A-3 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE SOIL WASHING

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Chemical Specific	DTSC	40 CFR 261 22 CCR, Article 11	▸ Identification and listing of hazardous waste. Numerous compounds detected at the Tank 2 site are listed as hazardous wastes. These regulations include specific testing criteria for determining hazardous waste characteristics.	▸ Wastes generated during remedial activity will be considered potentially hazardous. Examples for this alternative are spent activated carbon or wash liquid. Wastes will be managed as hazardous waste unless shown not to be hazardous by testing according to this ARAR.
Site Specific	DTSC	22 CCR 66391	▸ Hazardous waste facility permit - contents of Part B of the application.	▸ Under this alternative, a hazardous waste facility is not being permitted. This ARAR should not be applicable.
		22 CCR 67103	▸ Site Security	▸ The contractor shall prevent the unknowing entry, and minimize the possibility of unauthorized entry of, persons or livestock in the area of the soil washing operation.
		22 CCR 67220	▸ Notice in Deed to Property required for permitted disposal facilities.	▸ Since this alternative does not create a disposal facility, this ARAR is not applicable.
Site/Action/Chemical Specific	EPA	Safe Drinking Water Act (SDWA) 42 USC300 40 CFR141	▸ Drinking Water Standards, including both enforceable MCLs and MCLGs.	▸ The following chemical specific regulatory requirements have been identified at the Tank 2 site: Constituent — Max. Contaminant Level mg/l Ethylbenzene — 0.7 Heptachlor epoxide — 0.0002 Tetrachloroethene — 0.005 Xylenes — 10

TABLE A-3 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE SOIL WASHING

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Chemical Specific	DTSC	22 CCR, Article 5.5, Section 64444.5	▸ Sets maximum contaminant levels for the primary drinking water constituents.	▸ The following chemical specific regulatory requirements have been identified at the Tank 2 site: Constituent — Max. Contaminant Level mg/l Ethylbenzene 0.680 Heptachlor epoxide 0.00001 Tetrachloroethene 0.005 Xylenes 1.750 Refer to Section 7.2.8.3 for details on compliance.
Site/Action/Chemical Specific	Regional Water Quality Control Board (RWQCB)	Porter Cologne Water Quality Control Act (CA Water Code)	▸ This Act coordinates regulatory control over all activities that may affect water quality.	▸ This ARAR generally requires the protection of beneficial uses of waters of the State. Specific requirements are addressed in other ARAR's presented in this Table.
		CVRWQCB-R5, Water Quality Control Plan (Basin Plan)	▸ This plan is the vehicle by which the CVRWQCB administers the CA Water Code. This Act establishes the responsibility of the RWQCB to supervise cleanup efforts at spill sites including approval of cleanup plans and verification of cleanup.	▸ The contractor shall supply information required by this ARAR in his work plan and procedures. This information shall be forwarded to the RWQCB for review and approval.
		State Board Resolution No. 68-16	▸ Non-degradation policy.	▸ The contractor shall treat the soil to the required cleanup levels stated in Section 3.6 such that residual constituents will not degrade beneficial uses for ground water.

TABLE A-3 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE SOIL WASHING

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site/Action/Chemical Specific	RWQCB	Proposition 65	▸ Safe Drinking Water and Toxic Enforcement Act. This Act prohibits the discharge of known carcinogens and reproductive toxins into a source of drinking water. The Act also requires a clear warning of potential significant exposures.	▸ The contractor will comply by controlling air emissions, providing adequate site security and appropriate signage, and through implementation of a site-specific worker health and safety plan. ▸ A HRA will be conducted to estimate acceptable emission levels. The HRA will be based on a one in a million cancer risk as opposed to a one in a hundred thousand cancer risk required by Proposition 65.
		Title 23, Chapter 15, Discharges of Waste to Land.	▸ Chapter 15 outlines requirements for the design, construction, operation, and closure of waste containment facilities.	▸ The regulations in this Chapter establish waste and site classification and waste management requirements for waste treatment storage, or disposal in landfills, surface impoundments, waste piles, and land treatment facilities. Since the soil washing operation does not entail any of the above, this ARAR should not be applicable.
Site/Action/Chemical Specific	EPA	NPDES 40 CFR 122	▸ Discharge of liquid streams to surface waters.	▸ This alternative does not entail discharge of liquid streams to surface waters, therefore this ARAR should not apply.
		40 CFR 264, Subpart F	▸ Release from solid waste management units.	▸ This ARAR is applicable to owners or operators of facilities that treat, store, or dispose of hazardous waste. It applies to surface impoundments, waste piles, land treatment units, or landfills. As the soil washing operation does not entail any of the above, this ARAR should not be applicable.

TABLE A-3 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE SOIL WASHING

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site/Action/Chemical Specific	Environmental Protection Agency (EPA)	Land Ban 40 CFR 268	▸ Land disposal restrictions for RCRA and non-RCRA waste categories.	▸ Upon the effective date of May 8, 1992, soil generated by excavation could be considered a non-waste water from a multi-source leachate. A comparison of the reported constituent values for treatment standards for F039 waste is as follows:

Chemical	Range of Detected Concentrations (mg/kg)	Landban total Composition (mg/kg)
Anthracene	.041	4.0
Benzoic Acid	.39	--
Benzo(a)anthracene	1.3	8.2
Benzo(g,h,i)perylene	.12 - 1.5	1.5
2-Butanone	.027 - 15	36
Chrysene	.05 - .3	8.2
4,4'-DDE	.0018	.087
4,4'-DDT	.0038	.087
Dibenzo(a,h)anthracene	1.5	8.2
1,2-dichloropropane	.002	18
Dieldrin	.003 - .0078	0.13
2,4-Dimethylphenol	.17 - .72	14
Ethylbenzene	.008 - 2100	6
Fluoranthene	.36 - 2.9	8.2
Heptachlor epoxide	.0086	.066
Indeno(1,23,-cd)pyrene	1.7	8.2
2-Methylnophthalene	.32	--
4-Methylphenol	.040	--
Naphthalene	.21 - 26	3.1
Phenonthrene	.22 - 2.7	3.1
Phenol	.035 - .067	6.2
Pyrene	.34 - 2.4	8.2
Tetrachloroethene	.003 - 39	5.6
Xylenes	.001 - 11000	28

TABLE A-3 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE SOIL WASHING

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Chemical Specific	EPA	Clean Air Act 40 CFR 61	▸ National Emissions Standards for Hazardous Air Pollutants.	▸ Air emissions from the remediation of the Tank 2 site would primarily comprise of PCE, 2-butanone, ethylbenzene, and xylenes which pursuant to Section 112 of the Act are not designated as hazardous air pollutants. Therefore, this ARAR does not apply.
		40 CFR Part 50 et seq. 17 CCR 60204 et seq.	▸ Clean Air Act and State Air Pollution Control Laws.	▸ California air pollution control laws are generally stricter and therefore, supercede the Federal Clean Air Act. Applicable state/local air districts air pollution control laws are discussed below. Emission Sources are divided into mobile and stationary sources. Stationary sources may be regulated as new sources, existing sources, or may be granted a variance. New source emission standards are enforced by a permit system. Administration of permits rests with the local air district.
Action/Site Specific	Sacramento Metropolitan Air Quality Management District (SMAQMD)	Rule 202, Section 301	▸ New Source Review. The purpose of this rule is to provide for the review of new stationary air pollution sources and to provide mechanisms by which authorities to construct such sources may be granted without interfering with the attainment or maintenance of ambient air quality standards.	▸ Reactive organic compounds will be emitted in excess of the limit of 0 lbs/day. This triggers requirement for use of BACT. BACT is defined as the maximum control device or technique which is technologically feasible and cost effective. BACT could be either carbon adsorption or incineration for the soil washing process.

TABLE A-3 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE SOIL WASHING

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Action/Site Specific	Sacramento Metropolitan Air Quality Management District (SMAQMD)	Rule 401	▸ Ringelmann Chart	▸ Atmospheric discharges from the site from any source (other than uncombined water vapor) for a period of more than three minutes in any one hour shall not be as dark or darker in shade as designation No. 1 on the Ringelmann Chart published by the U.S. Bureau of Mines. Nor shall the emissions be of such opacity as to obscure a human observer's view, or register on a certified in-stack opacity monitoring system at a level equal to or greater than Ringelmann designation No. 1.
Site/Action/Chemical Specific	SMAQMD	Rule 403	▸ Fugitive Dust	▸ Every reasonable precaution shall be taken not to cause or allow the emissions of fugitive dust from being airborne beyond the property line from which the emission originate. Reasonable precautions shall include, but are not limited to applying asphalt, oil, water or suitable chemicals for the control of dust on surfaces which can give rise to airborne matter. Other measures may be taken as approved by the Air Pollution Control Officer.
		Rule 404	▸ Particulate Matter	▸ No discharges shall be made to the atmosphere from any sources particulate matter in excess of 0.23 grams per dry standard cubic meter (0.1 grains per dry cubic foot).

TABLE A-3 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE SOIL WASHING

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site/Action/Chemical Specific	SMAQMD	Rule 405	▸ Dust and Condensed fumes.	▸ No discharges into the atmosphere shall be made from any source whatsoever of dust or condensed fumes in total quantities exceeding the following:

PROCESS WEIGHT AND ALLOWABLE DISCHARGE

Process weight per hour		Maximum discharge rate allowed for solid particulate matter (aggregate discharged from all points of process)		Process weight per hour		Maximum discharge rate allowed for solid particulate matter (aggregate discharged from all points of process)	
Kg/Hr	Lb/Hr	Kg/Hr	Lb/Hr	Kg/Hr	Lb/Hr	Kg/Hr	Lb/Hr
114	250	.65	1.39	1636	8000	3.95	8.28
136	300	.61	1.17	1864	9500	4.11	9.04
159	350	.66	1.23	4091	9000	4.25	9.36
182	400	.61	1.34	4318	9500	4.40	9.67
206	450	.65	1.44	4545	10000	4.55	10.0
227	500	.70	1.54	9455	12000	4.73	10.4
273	600	.79	1.73	6364	14000	4.91	10.8
318	700	.88	1.90	7273	16000	5.09	11.2
364	800	.94	2.07	8182	18000	5.25	11.5
409	900	1.01	2.22	9091	20000	5.36	11.8
455	1000	1.08	2.38	13636	30000	6.01	13.0
545	1200	1.21	2.66	18182	40000	6.32	13.9
636	1400	1.33	2.93	22727	50000	6.68	14.7
727	1600	1.45	3.19	27273	60000	6.95	15.3
818	1800	1.56	3.43	31818	70000	7.23	15.9
909	2000	1.66	3.66	36364	80000	7.48	16.4
1136	2500	1.91	4.21	40909	90000	7.68	16.9
1364	3000	2.15	4.72	45455	100000	7.86	17.3
1591	3500	2.36	5.19	90909	200000	9.27	20.4
1818	4000	2.56	5.64	136364	300000	10.23	22.5
2045	4500	2.74	6.07	181818	400000	10.96	24.1
2273	5000	2.95	6.49	227273	500000	11.55	25.4
2500	5500	3.13	6.89	272727	600000	12.09	26.6
2727	6000	3.36	7.27	318182	700000	12.55	27.6
2955	6500	3.47	7.64	363636	800000	12.91	28.4
3182	7000	3.64	8.00	409091	900000	13.32	29.3
3409	7500	3.80	8.36	454545 or more	1000000 or more	13.64	30.0

To use the table above, take the process weight per hour as such is defined below. Then find this figure on the table, opposite which is the maximum number of kilograms or pounds of contaminants which may be discharged into the atmosphere in any one hour. As an example, if "A" has a process which emits contaminants into the atmosphere and which process takes 3 hours to complete, he will divide the weight of all materials in the specific process, in this example, 7500, by 3, giving a process weight per hour of 2500 Kg. The table shows that "A" may not discharge more than 3.13 Kg in any hour during the process. Where the process weight per hour falls between figures in the left hand column, the exact weight or permitted discharged may be interpolated.

TABLE A-3 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE SOIL WASHING

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Action/Site Specific	SMAQMD	SMAQMD Rule 402 CA Health and Safety Code, Section 41700	▸ General guideline, if the soil washing operation causes release of contaminants to the atmosphere, then a case-by-case determination of public nuisance potential should be performed to verify compliance. These ARARs state that discharges to air causing injury, detriment, nuisance annoyance; or endanger the comfort, repose, health, safety, or causes or damage to business or property is prohibited.	▸ To comply with this ARAR, The contractor shall minimize the potential for emissions using BACT. A health risk assessment has been conducted to evaluate the effect of fugitive emissions on the receptors in the vicinity of the soil washing unit. The results are included in the "short term effectiveness" criteria for this alternative.

TABLE A-3 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE SOIL WASHING

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Chemical Specific	EPA	F.R. 55(145):30865 July 27, 1990	▸ Cleanup levels under RCRA corrective actions.	▸ The proposed RCRA Sample Action Levels for the following chemical specific compounds identified at the Tank 2 site are TBCs and are as follows:

Semi-Volatile Organic Compounds

Name	Hazard Class	Soil Conc. (mg/kg)	Water Conc. (mg/kg)
Phenol	D	5.0 E4	2.0 E1

Pesticides/Dioxins

Name	Hazard Class	Soil Conc. (mg/kg)	Water Conc. (mg/kg)	Air Conc. $\mu g/m^3$
DDE	B2	2	1.0E-4	—
DDT	B2	2	1.0E-4	1.0E-2
Dieldrin	B2	4.0E-2	2.0E-6	2.0E-4
Heptachlor epoxide	B2	8.0E-2	4.0E-6	4.0E-4

TABLE A-4
ARARs FOR EXCAVATION AND ON-SITE INCINERATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Action Specific	California Dept. of Health Services (DHS)	22 CCR, Article 20	▸ Requires preparation of a contingency plan for the facility to minimize hazards to human health and environment from fire, explosion, or release of hazardous waste to soil, air, or water.	▸ The site specific Health and Safety Plan prepared by the contractor should provide sufficient information and mitigation procedures for the protection of human health during incineration operation. SAAD's overall site Contingency Plan will provide emergency procedures and other pertinent information, as required by this regulation.
		22 CCR, Article 24	▸ Applicable to hazardous waste facilities that store containers of hazardous waste.	▸ The incineration operation does not entail on-site storage of hazardous waste. Therefore, this ARAR should not be applicable.
		22 CCR, Article 25	▸ Sets requirements for the design of tanks used for the treatment or storage of hazardous waste.	▸ The incineration operation does not entail application or use of tanks for soil decontamination.
		22 CCR 66392	▸ Permits by rule	▸ The contractor shall review SAAD's current Part B Permit to ensure that the requirements of this ARAR are met for this process under this permit. Where the requirements of this ARAR are not met for this process under the current permit, the operator shall submit for approval his plan to meet these requirements.
Action Specific	DHS	22 CCR, Article 30	▸ Sets requirements for operators of incinerators at permitted and interim status facilities.	▸ The contractor will comply with the requirements set forth by this ARAR with regards to waste analysis, operating conditions, monitoring and inspection, and may be required to demonstrate the effectiveness of the incineration process through a trial burn. These requirements include destruction and removal, efficiency of 99.99% for each constituent and HCl emissions of no more than 4 lbs/hr.

TABLE A-4 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE INCINERATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Chemical Specific	DTSC	40 CFR 264, Subpart G 22 CCR, Article 23	▸ Sets requirements for closure and post-closure of hazardous waste management facilities.	▸ The regulations set forth in this ARAR are applicable to hazardous waste management facilities such as landfills and surface impoundments. Operation of a waste management facility is not anticipated, Thus, this ARAR should not be applicable.
		40 CFR 261 22 CCR, Article 11	▸ Identification and listing of hazardous waste.	▸ The non-treated soil will be treated as a potential hazardous waste and classified according to this ARAR. The treated soil at the Tank 2 site is not considered a hazardous waste. In addition, there are no hazardous by-products of this process.
	DTSC/EPA	22 CCR, Article Section 66268.40 and 66268.41/40 CFR 268	▸ For disposal of waste to land, sets treatment standards for RCRA and Non-RCRA waste categories.	▸ The history of Tank 2 indicates that the tank was used for the storage of waste solvents. The soil debris generated by excavation would therefore be a F001-F005 waste. Treatment standards for reported soil constituents: F001 - F005 Spent Solvents — TCLP (mg/l) Ethylbenzene 0.053 Tetrachloroethene 0.05 Xylenes 0.15 2-Butanone 0.75 See Section 7.2.9.3 for details on compliance.
Site Specific	DTSC	22 CCR 66391	▸ Hazardous water facility permit - contents of Part B of the application.	▸ Under this alternative, a hazardous waste facility is not being permitted. This ARAR should not be applicable.
		22 CCR 67103	▸ Site Security	▸ The contractor shall prevent the unknowing entry, and minimize the possibility of, unauthorized entry of persons or livestock in the area of incineration operation.

TABLE A-4 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE INCINERATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site Specific	DTSC	22 CCR 67220	▸ Notice in Deed to Property required for permitted disposal facilities.	▸ Since this alternative does not create a disposal facilities, this ARAR is not applicable.
Site/Action/Chemical Specific	EPA	Safe Drinking Water Act (SDWA) 42 USC300 40 CFR141	▸ Drinking Water Standards, including both enforceable MCLs and MCLGs.	▸ The following chemical specific regulatory requirements have been identified at the Tank 2 site: Ethylbenzene — Max. Contaminant Level 0.7 mg/l Heptachlor epoxide — 0.0002 Tetrachloroethene — 0.005 Xylenes — 10
Chemical Specific	DTSC	22 CCR, Article 5.5, Section 64444.5	▸ Sets maximum contaminant levels for the primary drinking water constituents.	▸ The following chemical specific regulatory requirements have been identified at the Tank 2 site: Ethylbenzene — Max. Contaminant Level 0.680 mg/l Heptachlor epoxide — 0.00001 Tetrachloroethene — 0.005 Xylenes — 1.750 Refer to Section 7.2.9.3 for details on compliance.
Site/Action/Chemical Specific	RWQCB	Porter Cologne Water Quality Control Act (CA Water Code)	▸ This Act coordinates regulatory control over all activities that may affect water Quality.	▸ This ARAR generally requires the protection of beneficial uses of waters of the State. Specific requirements are addressed in other ARARs presented in this table.

TABLE A-4 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE INCINERATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site/Action/Chemical Specific	RWQCB	CVRWQCB-R5, Water Quality Control Plan (Basin Plan)	▸ This plan is the vehicle by which the CVRWQCB administers the CA Water Code. This Act establishes the responsibility of the RWQCB to supervise cleanup efforts at spill sites including approval of cleanup plans and verification of cleanup.	▸ The contractor shall coordinate site remedial activities with the RWQCB and comply with other requirements as set forth by this ARAR.
Site/Action/Chemical Specific	RWQCB	State Board Resolution No. 68-16	▸ Non-degradation policy.	▸ The contractor shall treat the soil to required cleanup levels stated in Section 3.6 such that residual constituents will not degrade beneficial uses for ground water.
		Proposition 65	▸ Safe Drinking Water and Toxic Enforcement Act. This act prohibits the discharge of known carcinogens and reproductive toxins into a source of drinking water. This Act also requires a clear warning of potential significant exposures.	▸ Because this alternative does not entail discharge of contaminants into a source of drinking water, this ARAR is not applicable. However, the contractor will minimize health risks due to operation of incinerator by controlling air emissions, providing adequate site security and appropriate signage, and through implementation of a site-specific health and safety plan. ▸ A HRA will be conducted to estimate acceptable emission levels. The HRA will be based on a one in a million cancer risk an opposed to one in hundred thousand cancer risk as required by Proposition 65.
Site/Action/Chemical Specific	EPA	Title 23, Subchapter 15 Discharges of Waste to Land.	▸ Subchapter 15 outlines requirements for the design, construction, operations, and closure of waste containment facilities.	▸ The regulations in this Subchapter establish waste and site classification and waste management requirements for waste treatment, storage, or disposal in landfills, surface impoundments, waste piles, and land treatment facilities. Since the incineration operation does not entail any of the above, this ARAR should not be applicable.

TABLE A-4 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE INCINERATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site/Action/Chemical Specific	EPA	NPDES 40 CFR 122	▸ Discharge of liquid streams to surface waters	▸ This alternative does not entail discharge of liquid streams to surface waters, therefore this ARAR should not apply.
Site/Action/Chemical Specific	Environmental Protection Agency (EPA)	40 CFR 264, Subpart F	▸ Release from solid waste management units.	▸ This ARAR is applicable to owners or operators of facilities that treat, store, or dispose of hazardous waste. It applies to surface impoundments waste piles, land treatment units, or landfills. As the incineration operation does not entail any of the above, this ARAR should not be applicable.

TABLE A-4 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE INCINERATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site/Action/Chemical Specific	EPA	Land Ban 40 CFR 268	▸ Land disposal restrictions for RCRA and non-RCRA waste categories.	▸ This ARAR identifies wastes that are restricted from land disposal. Upon the effective date of May 8, 1992 soil generated by excavation could be considered a non-waste water from a multi-source leachate. A comparison of the reported constituent values for treatment standards for F039 waste is as follows:

Chemical	Range of Detected Concentrations (mg/kg)	Landban total Composition (mg/kg)
Anthracene	.041	4.0
Benzoic Acid	.39	--
Benzo(a)anthracene	1.3	8.2
Benzo(g,h,i)perylene	.12 - 1.5	1.5
2-Butanone	.027 - 15	36
Chrysene	.05 - .3	8.2
4,4'-DDE	.0018	.087
4,4'-DDT	.0038	.087
Dibenzo(a,h)anthracene	1.5	8.2
1,2-dichloropropane	.002	18
Dieldrin	.003 - .0078	0.13
2,4-Dimethylphenol	.17 - .72	14
Ethylbenzene	.008 - 2100	6
Fluoranthene	.36 - 2.9	8.2
Heptachlor epoxide	.0086	.066
Indeno(1,23,-cd)pyrene	1.7	8.2
2-Methylnophthalene	.32	--
4-Methyphenol	.040	--
Naphthalene	.21 - 26	3.1
Phenonthrene	.22 - 2.7	3.1
Phenol	.035 - .067	6.2
Pyrene	.34 - 2.4	8.2
Tetrachloroethene	.003 - 39	5.6
Xylenes	.001 - 11000	28

TABLE A-4 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE INCINERATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Chemical Specific	EPA	Clean Air Act 40 CFR 61	▸ National Emissions Standards for Hazardous Air Pollutants.	▸ Air emissions from the remediation of the Tank 2 site would primarily comprise of PCE, 2-butanone, ethylbenzene, and xylenes which pursuant to Section 112 of the Act are not designated as hazardous air pollutants. Therefore, this ARAR does not apply.
		40 CFR Part 50 et seq. 17 CCR 60204 et seq.	▸ Clean Air Act and State Air Pollution Control Laws.	▸ California air pollution control laws are generally stricter and therefore supercede the Federal Clean Air act. Applicable state/local air district pollution control laws are discussed below. Emission sources are divided into mobile and stationary sources. Stationary sources may be regulated as new sources, existing sources, or may be granted a variance. New source emission standards are enforced by a permit system. Administration of permits rests with the local air district.

TABLE A-4 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE INCINERATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Action/Site Specific	Sacramento Metropolitan Air Quality Management District (SMAQMD)	Rule 202, Section 301	▸ New Source Review. The purpose of this rule is to provide for the review of new stationary air pollution sources and to provide mechanisms by which authorities to construct such sources may be granted without interfering with the attainment or maintenance of ambient air quality standards.	▸ The contractor shall comply with the requirements set by this ARAR such as the use of BACT, the attainment of air quality standards, and the possible preparation of a permit application to construct and to operate the incineration unit.
Site/Action/Chemical Specific	SMAQMD	Rule 401	▸ Ringlemann Chart	▸ Atmospheric discharges from the site from any source (other than uncombined water vapor) for a period of more than three minutes in any one hour shall not be as dark or darker in shade as designation No. 1 on the Ringelmann Chart published by the U.S. Bureau of Mines. Nor shall the emissions be of such opacity as to obscure a human observer's view, or register on a certified in-stack opacity monitoring system at a level equal to or greater than Ringelmann designation No. 1.
		Rule 403	▸ Fugitive dust	▸ Every reasonable precaution shall be taken not be cause or allow the emissions of fugitive dust from being airborne beyond the property line from which the emission originates reasonable precautions shall include, but are not limited to applying asphalt, oil, water or suitable chemicals for the control of dust on surfaces which can give rise to airborne matter. Other measures may be taken as approved by the Air Pollution Control Officer.
		Rule 404	▸ Particulate Matter	▸ No discharges shall be made to the atmosphere from any source particulate matter in excess of 0.23 grams per dry standard cubic meter (0.1 grains per dry cubic foot).

TABLE A-4 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE INCINERATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site/Action/Chemical Specific	SMAQMD	Rule 405	▸ Dust and condensed fumes	▸ No discharges into the atmosphere shall be made from any source whatsoever of dust or condensed fumes in total quantities exceeding the following:

PROCESS WEIGHT AND ALLOWABLE DISCHARGE

Process weight per hour		Maximum discharge rate allowed for solid particulate matter (aggregate discharged from all points of process)		Process weight per hour		Maximum discharge rate allowed for solid particulate matter (aggregate discharged from all points of process)	
Kg/Hr	Lb/Hr	Kg/Hr	Lb/Hr	Kg/Hr	Lb/Hr	Kg/Hr	Lb/Hr
114	250	.43	1.00	3630	8000	3.95	8.70
136	300	.51	1.12	3864	8500	4.11	9.04
159	350	.64	1.23	4091	9000	4.25	9.36
182	400	.61	1.34	4318	9500	4.40	9.67
205	450	.68	1.44	4545	10000	4.55	10.0
227	500	.74	1.56	6455	12000	4.73	10.4
273	600	.79	1.73	6364	14000	4.91	10.8
318	700	.86	1.90	7273	16000	6.09	11.2
364	800	.94	2.07	8182	18000	6.23	11.5
409	900	1.01	2.22	9091	20000	6.36	11.8
455	1000	1.08	2.38	13636	30000	8.91	13.0
545	1200	1.21	2.66	18182	40000	8.32	13.9
636	1400	1.33	2.93	22727	50000	8.98	14.7
727	1600	1.45	3.19	27273	60000	8.95	15.3
818	1800	1.56	3.43	31818	70000	7.23	15.8
909	2000	1.66	3.66	36364	80000	7.45	16.4
1136	2500	1.91	4.01	40909	90000	7.66	16.9
1364	3000	2.10	4.72	45455	100000	7.86	17.3
1591	3500	2.36	5.19	90909	200000	9.27	20.4
1818	4000	2.50	5.64	136364	300000	10.23	22.5
2045	4500	2.76	6.07	181818	400000	10.98	24.1
2273	5000	2.95	6.49	227273	500000	11.59	25.6
2500	5500	3.13	6.89	272727	600000	12.09	26.6
2727	6000	3.30	7.27	318182	700000	12.55	27.6
2955	6500	3.47	7.64	363636	800000	12.91	28.4
3182	7000	3.64	8.00	409091	900000	13.32	29.3
3409	7500	3.80	8.36	454545	1000000 or more	13.64	30.0

To use the table shown, take the process weight per hour or rate is defined below. Then find this figure on the table, opposite which is the maximum number of kilograms or pounds of contaminants which may be discharged into the atmosphere in any one hour. As an example, if "A" has a process which emits contaminant into the atmosphere and which process takes 3 hours to complete, he will divide the weight of all materials in the specific process, in this example, 7500, by 3, giving a process weight per hour of 2500 Kg. The table shows that "A" may not discharge more than 3.13 Kg in any hour during the process. Where the process weight per hour falls between figures in the left hand column, the exact weight or permitted discharged may be interpolated.

TABLE A-4 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE INCINERATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site/Action/Chemical Specific	SMAQMD	SMAQMD Rule 402 CA Health and Safety Code, Section 41700	▸ General guideline, if the incineration operation causes release of contaminants to the atmosphere, then a case-by-case determination of public nuisance potential should be performed to verify compliance. These ARARs state that discharges to air causing injury, detriment, nuisance annoyance; or endanger the comfort, repose, health, safety, or causes or damage to business or property is prohibited.	▸ The contractor shall minimize the potential for emissions through the use of BACT. A health risk assessment has been conducted to evaluate the effect of emissions on the receptors in the vicinity of the incineration unit. The results are included under the "short term effectiveness" criteria for this alternative.

TABLE A-4 (Cont.)
ARARs FOR EXCAVATION AND ON-SITE INCINERATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Chemical Specific	EPA	F.R. 55(145):30865 July 27, 1990	▸ Cleanup levels under RCRA corrective actions.	▸ The proposed RCRA Sample Action Levels for the following chemical specific compounds identified at the Tank 2 site are TBCs and are as follows:

Semi-Volatile Organic Compounds

Name	Hazard Class	Soil Conc. (mg/kg)	Water Conc. (mg/kg)
Phenol	D	5.0 E4	2.0 E1

Pesticides/Dioxins

Name	Hazard Class	Soil Conc. (mg/kg)	Water Conc. (mg/kg)	Air Conc. $\mu g/m^3$
DDE	B2	2	1.0E-4	---
DDT	B2	2	1.0E-4	1.0E-2
Dieldrin	B2	4.0E-2	2.0E-6	2.0E-4
Heptachlor epoxide	B2	8.0E-2	4.0E-6	4.0E-4

TABLE A-5
ARARs FOR EXCAVATION AND LOW TEMPERATURE DESORPTION (LTD)

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Action Specific	Department of Toxic Substances Control (DTSC)	22 CCR, Article 20	▸ Requires preparation of a contingency plan for the facility to minimize hazards to human health and environment from fire, explosion, or release of hazardous waste to soil, air, or water.	▸ The site specific Health and Safety Plan prepared by the contractor should provide sufficient information and mitigation procedures for the protection of human health during LTD operation. SAAD's overall site Contingency Plan will provide emergency procedures and other pertinent information, as required by this regulation.
		22 CCR, Article 24	▸ Applicable to hazardous waste facilities that store containers of hazardous waste.	▸ Wastes generated during remedial activity will be considered potentially hazardous. Examples for this alternative include condensate and/or spent carbon which may require management per the requirements of this ARAR with regards to use and management of storage containers.
		22 CCR, Article 25	▸ Sets requirements for the design of tanks used for the treatment or storage of hazardous waste.	▸ The quantity of hazardous waste generated during remedial activity will be small and waste will be collected in 55-gallon drums. Because tanks are not utilized, this ARAR should not be applicable.
		22 CCR 66392	▸ Permits by rule	▸ The contractor shall review SAAD's current Part B Permit to ensure that the requirements of this ARAR are met for this process under this permit. Where the requirements of this ARAR are not met for this process under the current permit, the operator shall submit for approval his plan to meet these requirements.
		22 CCR, Article 6	▸ Sets requirements for the generators of hazardous waste	▸ With regards to off-site disposal of the condensate, the contractor will comply with the requirements as set forth by this ARAR regarding the use of an EPA identification number, hazardous waste manifest, and recordkeeping.

TABLE A-5 (Cont.)
ARARs FOR EXCAVATION AND LOW TEMPERATURE DESORPTION (LTD)

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Action Specific	DTSC	22 CCR, Article 31	▸ Sets requirements for operators/ owners of interim status facilities utilizing thermal technologies for the treatment of hazardous waste.	▸ The contractor will comply with the requirements set forth by this ARAR with regards to waste analysis, operating conditions, and monitoring and inspection.
Chemical Specific	DTSC	40 CFR 264, Subpart G 22 CCR, Article 23	▸ Sets requirements for closure and post-closure of hazardous waste management facilities.	▸ The regulations set forth in this ARAR are applicable to hazardous waste management facilities such as landfills and surface impoundments. Operation of a waste management facility is not anticipated. Thus, this ARAR should not be applicable.
	DTSC/EPA	22 CCR, Article Section 66268.40 and 66268.41/40 CFR 268	▸ For disposal of waste to land, sets treatment standards for RCRA and Non-RCRA waste categories.	▸ The history of Tank 2 indicates that the tank was used for the storage of waste solvents. The soil debris generated by excavation would therefore, be a F001-F005 waste. Treatment standards for reported constituents are: F001 - F005 Spent Solvents — TCLP (mg/l) Ethylbenzene 0.053 Tetrachloroethene 0.05 Xylenes 0.15 2-Butanone 0.75 See Section 7.2.10.3 for details on compliance.

TABLE A-5 (Cont.)
ARARs FOR EXCAVATION AND LOW TEMPERATURE DESORPTION (LTD)

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Chemical Specific	DTSC	40 CFR 261 22 CCR, Article 11	▸ Identification and listing of hazardous waste. Numerous compounds detected at the Tank 2 site are listed as hazardous wastes. These regulations include specific testing criteria determining hazardous waste characteristics.	▸ Wastes generated during remedial activity will be considered potentially hazardous. Examples for this alternative are spent carbon and/or condensate. Wastes will be managed as hazardous waste unless shown not be hazardous by testing according to this ARAR.
Site Specific	DTSC	22 CCR 66391	▸ Hazardous water facility permit - contents of Part B of the application.	▸ Under the alternative, a hazardous waste facility is not being permitted. Thus, this ARAR should not be applicable.
		22 CCR 67103	▸ Site Security	▸ The contractor shall prevent the unknowing entry, and minimize the possibility of, unauthorized entry of persons or livestock in the area of LTD operation.
		22 CCR 67220	▸ Notice in Deed to Property required for permitted disposal facilities.	▸ Since this alternative does not create a disposal facility, this ARAR is not applicable.
Site/Action/Chemical Specific	EPA	Safe Drinking Water Act (SDWA) 42 USC300 40 CFR141	▸ Drinking Water Standards, including both enforceable MCLs and MCLGs.	▸ The following chemical specific regulatory requirements have been identified at the Tank 2 site:

Constituent	Max. Contaminant Level mg/l
Ethylbenzene	0.7
Heptachlor epoxide	0.0002
Tetrachloroethene	0.005
Xylenes	10

TABLE A-5 (Cont.)
ARARs FOR EXCAVATION AND LOW TEMPERATURE DESORPTION (LTD)

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Chemical Specific	DTSC	22 CCR, Article 5.5, Section 64444.5	▸ Sets maximum contaminant levels for the primary drinking water constituents.	▸ The following chemical specific regulatory requirements have been identified at the Tank 2 site: Constituent — Max. Contaminant Level mg/l Ethylbenzene 0.680 Heptachlor epoxide 0.00001 Tetrachloroethene 0.005 Xylenes 1.750 Refer to Section 7.2.10.3 for details on compliance.
Site/Action/ Chemical Specific	RWQCB	Porter Cologne Water Quality Control Act (CA Water Code)	▸ This Act coordinates regulatory control over all activities that may affect water Quality.	▸ This ARAR generally requires the protection of beneficial uses of waters of the State. Specific requirements are addressed in other ARARs presented in this table.
		CVRWQCB-R5, Water Quality Control Plan (Basin Plan)	▸ This plan in the vehicle by which the CVRWQCB administers the CA Water Code. This Act establishes the responsibility of the RWQCB to supervise cleanup efforts at spill sites including approval of cleanup plans and verification of final cleanup.	▸ The contractor shall supply information required by this ARAR in his workplan and procedures. This information shall be forwarded to the RWCQB for review and approval.
		State Board Resolution No. 68-16	▸ Non-degradation policy.	▸ The contractor shall treat the soil to require clean up levels stated in Section 3.6 such that residual constituents will be degrade beneficial uses for ground water.

TABLE A-5 (Cont.)
ARARs FOR EXCAVATION AND LOW TEMPERATURE DESORPTION (LTD)

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site/Action/Chemical Specific	RWQCB	Proposition 65	▸ Safe Drinking Water Act and Toxic Enforcement Act. This Act prohibits the discharge of known carcinogens and reproductive toxins into a source of drinking water. The Act also requires a clear warning of potential significant exposures.	▸ The condensate generated during LTD operation will be treated prior to discharge. Further, the contractor will comply by controlling air emissions, providing adequate site security and appropriate signage, and through implementation of site specific health and safety plan. ▸ A HRA will be conducted to acceptable emission levels. The HRA will estimate one in a million cancer risk as opposed to one in one thousand as suggested by Proposition 65.
		Title 23, Chapter 15 Discharges of Waste to Land.	▸ Chapter 15 outlines requirements for the design, construction, operations, and closure of waste containment facilities.	▸ The regulations in this Chapter establish waste and site classification and waste management requirements for waste treatment, storage, or disposal in landfills, surface impoundments, waste piles, and land treatment facilities. Since the LTD operation does not entail any of the above, this ARAR should not be applicable.

TABLE A-5 (Cont.)
ARARs FOR EXCAVATION AND LOW TEMPERATURE DESORPTION (LTD)

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site/Action/Chemical Specific	EPA	NPDES 40 CFR 122	▸ Discharge of liquid streams to surface waters.	▸ This alternative does not entail discharge of liquid streams to surface waters, therefore this ARAR should not apply.
Site/Action/Chemical Specific	Environmental Protection Agency (EPA)	40 CFR 264, Subpart F	▸ Release from solid waste management units.	▸ This ARAR is applicable to owners or operators of facilities that treat, store, or dispose of hazardous waste. It applies to surface impoundments waste piles, land treatment units, or landfills. As the LTD operation does not entail any of the above, this ARAR should not be applicable.

TABLE A-5 (Cont.)
ARARs FOR EXCAVATION AND LOW TEMPERATURE DESORPTION (LTD)

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Chemical Specific	EPA	Land Ban 40 CFR 268	▸ Land disposal restrictions for RCRA and non-RCRA waste categories.	▸ This ARAR identifies wastes that are restricted from land disposal. Upon the effective date of May 8, 1992 soil generated by excavation could be considered a non-waste water from a multi-source leachate. A comparison of the reported constituents values for treatment standards for F039 waste is as follows:

Chemical	Range of Detected Concentrations (mg/kg)	Landban total Composition (mg/kg)
Anthracene	.041	4.0
Benzoic Acid	.39	--
Benzo(a)anthracene	1.3	8.2
Benzo(g,h,i)perylene	.12 - 1.5	1.5
2-Butanone	.027 - 15	36
Chrysene	.05 - .3	8.2
4,4'-DDE	.0018	.087
4,4'-DDT	.0038	.087
Dibenzo(a,h)anthracene	1.5	8.2
1,2-dichloropropane	.002	18
Dieldrin	.003 - .0078	0.13
2,4-Dimethylphenol	.17 - .72	14
Ethylbenzene	.008 - 2100	6
Fluoranthene	.36 - 2.9	8.2
Heptachlor epoxide	.0086	.066
Indeno(1,23,-cd)pyrene	1.7	8.2
2-Methylnophthalene	.32	--
4-Methylphenol	.040	--
Naphthalene	.21 - 26	3.1
Phenonthrene	.22 - 2.7	3.1
Phenol	.035 - .067	6.2
Pyrene	.34 - 2.4	8.2
Tetrachloroethene	.003 - 39	5.6
Xylenes	.001 - 11000	28

TABLE A-5 (Cont.)
ARARs FOR EXCAVATION AND LOW TEMPERATURE DESORPTION (LTD)

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Chemical Specific	EPA	Clean Air Act 40 CFR 61	▸ National Emissions Standards for Hazardous Air Pollutants.	▸ Air emissions from the remediation of Tank 2 site would primarily compose of PCE, 2-butanone, ethylbenzene, and xylenes which pursuant to Section 112 of the Act are not designated as hazardous air pollutants. Therefore, this ARAR does not apply.
	EPA and ARB	40 CFR Part 50 et seq. 17 CCR 60204 et seq.	▸ Clean Air Act and State Air Pollution Control Laws.	▸ California air pollution control laws are generally stricter and therefore supercede the federal Clean Air Act. Applicable state/local air districts pollution control laws are discussed below. Emission sources are divided into mobile and stationary sources. Stationary sources may be regulated as new sources, existing sources, or may be granted a variance. New source emission standards are enforced by a permit rests with the local air districts.
Action/Site Specific	Sacramento Metropolitan Air Quality Management District (SMAQMD)	Rule 202, Section 301	▸ New Source Review. The purpose of this rule is to provide for the review of new stationary air pollution sources and to provide mechanisms by which authorities to construct such sources may be granted without interfering with the attainment or maintenance of ambient air quality standards.	▸ The contractor shall comply with the requirements set by this ARAR such as the use of BACT, the attainment of air quality standards, and the possible preparation of a permit application to construct and to operate the LTD unit.
Site/Action/Chemical Specific	SMAQMD	Rule 401	▸ Ringlemann Chart	▸ Atmospheric discharges from the site form any source (other than uncombined water vapor) for a period of more than three minutes in any one hour shall not be as dark or darker in shade as designation No. 1 on the Ringlemann Chart published by the U.S. Bureau of Mines. Nor shall the emissions be of such opacity as to obscure a human observer's view, or register on a certified in-stack opacity monitoring system at a level equal to or greater than Ringlemann designation No. 1.

TABLE A-5 (Cont.)
ARARs FOR EXCAVATION AND LOW TEMPERATURE DESORPTION (LTD)

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site/Action/Chemical Specific	SMAQMD	Rule 403	▸ Fugitive dust	▸ Every reasonable precaution shall be taken not to cause or allow the emissions of fugitive dust from being airborne beyond the property line from which the emission originates. Reasonable precautions shall include, but are not limited applying asphalt, oil, water or suitable chemicals for the control of dust on surface which can give rise to airborne matter. Other measures may be taken as approved by the Air Pollution Control Officer.
		Rule 404	▸ Particulate Matter	▸ No discharges shall be made to the atmosphere from any source particulate matter in excess of 0.23 grams per dry standard cubic meter (0.1 grains per dry cubic foot).

TABLE A-5 (Cont.)
ARARs FOR EXCAVATION AND LOW TEMPERATURE DESORPTION (LTD)

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site/Action/Chemical Specific	SMAQMD	Rule 405	▸ Dust and condensed fumes	▸ No discharges into the atmosphere shall be made in any one hour from any source whatsoever of dust or condensed fumes in total quantities exceeding the following:

PROCESS WEIGHT AND ALLOWABLE DISCHARGE

Process weight per hour		Maximum discharge rate allowed for solid particulate matter (aggregate discharged from all points of process)		Process weight per hour		Maximum discharge rate allowed for solid particulate matter (aggregate discharged from all points of process)	
Kg/Hr	Lb/Hr	Kg/Hr	Lb/Hr	Kg/Hr	Lb/Hr	Kg/Hr	Lb/Hr
114	250	.45	1.00	3630	8000	3.95	8.70
136	300	.51	1.12	3864	8500	4.11	9.04
159	350	.56	1.23	4091	9000	4.25	9.36
182	400	.61	1.34	4318	9500	4.40	9.67
205	450	.65	1.44	4545	10000	4.53	10.0
227	500	.70	1.54	6455	12000	5.73	12.6
273	600	.79	1.73	6364	14000	6.01	13.2
318	700	.86	1.90	7273	16000	6.09	13.4
364	800	.94	2.07	8182	18000	9.23	13.6
409	900	1.01	2.22	9091	20000	8.36	13.8
455	1000	1.08	2.38	13636	30000	8.91	13.0
545	1200	1.21	2.66	18182	40000	9.31	13.5
636	1400	1.33	2.93	22727	50000	9.68	14.7
727	1600	1.45	3.19	27273	60000	9.95	15.0
818	1800	1.56	3.43	31818	70000	7.23	15.9
909	2000	1.66	3.66	36364	80000	7.43	16.4
1136	2500	1.91	4.21	40909	90000	7.66	16.9
1364	3000	2.15	4.72	45455	100000	7.86	17.3
1591	3500	2.36	5.19	90909	200000	9.27	20.4
1818	4000	2.56	5.64	136364	300000	10.23	22.6
2045	4500	2.74	6.07	181818	400000	10.95	24.1
2273	5000	2.91	6.49	227273	500000	11.55	25.4
2500	5500	3.13	6.89	272727	600000	12.09	26.6
2727	6000	3.30	7.27	318182	700000	12.56	27.6
2955	6500	3.47	7.64	363636	800000	12.91	28.4
3182	7000	3.64	8.00	409091	900000	13.32	29.3
3409	7500	3.80	8.36	454545 or more	1000000 or more	13.64	30.0

To use the table above, take the process weight per hour as such is defined below. Then find this figure on the table, opposite which is the maximum number of kilograms or pounds of contaminants which may be discharged into the atmosphere in any one hour. As an example, if "A" has a process which emits contaminant into the atmosphere and which process takes 3 hours to complete, he will divide the weight of all materials in the specific process, in this example, 7500, by 3, giving a process weight per hour of 2500 Kg. The table shows that "A" may not discharge more than 3.13 Kg in any hour during the process. Where the process weight per hour falls between figures in the left hand column, the exact weight or permitted discharged may be interpolated.

TABLE A-5 (Cont.)
ARARs FOR EXCAVATION AND LOW TEMPERATURE DESORPTION (LTD)

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Action/Site Specific	SMAQMD	SMAQMD Rule 402 CA Health and Safety Code, Section 41700	▸ General guideline, if the LTD operation causes release of contaminants to the atmosphere, then a case-by-case determination of public nuisance potential should be performed to verify compliance. These ARARs state that discharges to air causing injury, detriment, nuisance annoyance; or endanger the comfort, repose, health, safety, or causes or damage to business or property is prohibited.	▸ To comply with this ARAR, the contractor shall minimize the potential for emissions through the use of BACT. A health risk assessment has been conducted to evaluate the effect of emissions on the receptors in the vicinity of the LTD unit. The results are included under the "short term effectiveness" criteria for this alternative.

TABLE A-5 (Cont.)
ARARs FOR EXCAVATION AND LOW TEMPERATURE DESORPTION (LTD)

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Chemical Specific	EPA	F.R. 55(145):30865 July 27, 1990	▸ Cleanup levels under RCRA corrective actions.	▸ The proposed RCRA Sample Action Levels for the following chemical specific compounds identified at the Tank 2 site are TBCs and are as follows:

Semi-Volatile Organic Compounds

Name	Hazard Class	Soil Conc. (mg/kg)	Water Conc. (mg/kg)
Phenol	D	5.0 E4	2.0 E1

Pesticides/Dioxins

Name	Hazard Class	Soil Conc. (mg/kg)	Water Conc. (mg/kg)	Air Conc. $\mu g/m^3$
DDE	B2	2	1.0E-4	—
DDT	B2	2	1.0E-4	1.0E-2
Dieldrin	B2	4.0E-2	2.0E-6	2.0E-4
Heptachlor epoxide	B2	8.0E-2	4.0E-6	4.0E-4

TABLE A-6
ARARs FOR EXCAVATION AND SURFACE AEROBIC BIODEGRADATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Action Specific	Department of Toxic Substances Control (DTSC)	22 CCR, Article 20	▸ Requires preparation of a contingency plan for the facility to minimize hazards to human health and environment from fire, explosion, or release of hazardous waste to soil, air, or water.	▸ The site specific Health and Safety Plan prepared by the contractor should provide sufficient information and mitigation procedures for the protection of human health during biodegradation operation. SAAD's overall site Contingency Plan will provide emergency procedures and other pertinent information, as required by this regulation.
		22 CCR, Article 24	▸ Applicable to hazardous waste facilities that store containers of hazardous waste.	▸ The biodegradation operation does not entail on-site storage of hazardous waste. Therefore, this ARAR should not be applicable.
		22 CCR, Article 25	▸ Sets requirements for the design of tanks used for the treatment or storage of hazardous waste.	▸ In this case, the biodegradation does not entail application or use of tanks for soil decontamination. Thus, this ARAR does not apply.
		22 CCR 66392	▸ Permits by rule	▸ The contractor shall review SAAD's current Part B Permit to ensure that the requirements of this ARAR are met for this process under this permit. Where the requirements of this ARAR are not met for this process under the current permit, the operator shall submit for approval his plan to meet these requirements.
Action Specific	DTSC	22 CCR, Article 28	▸ Sets requirements for land treatment at interim status facilities.	▸ The contractor shall design the treatment cell to control runoff and minimize wind dispersion. The treatment cell will be underlaid with a plastic liner to preclude contamination of the surface soil and to prevent the migration of contamination to the vadose zone. Since the treatment process will be conducted for one to two months, vadose zone monitoring should not be required.

TABLE A-6 (Continued)
ARARs FOR EXCAVATION AND SURFACE AEROBIC BIODEGRADATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Action Specific	DTSC	22 CCR, Chapter 30	▸ Sets requirements for liner containment at land treatment facilities.	▸ Requires double LCRS containment if unsaturated zone monitoring is impractical. The contractor will submit his liner design to DTSC for review and approval.
		40 CFR 264, Subpart G 22 CCR, Article 23	▸ Sets requirements for closure and post-closure of hazardous waste management facilities.	▸ The regulations set forth in this ARAR are more applicable to hazardous waste management facilities such as landfills. Since the operation of a waste management facility is not anticipated, this ARAR should not be applicable.
Chemical Specific	DTSC/EPA	22 CCR, Article Section 66268.40 and 66268.41/40 CFR 268	▸ For disposal of waste to land, sets treatment standards for RCRA and Non-RCRA waste categories.	▸ The history of the Tank 2 site indicates that the tank was used for the storage of waste solvents. The soil debris generated by excavation would therefore be a F001-F005 waste. Treatment standards by reported soil constituents are: F001 - F005 Spent Solvents — TCLP (mg/l) Ethylbenzene — 0.05 Tetrachloroethene — 0.05 Xylenes — 0.15 2-Butanone — 0.75 Refer to Section 7.2.14.3 for details on compliance.
		40 CFR 261 22 CCR, Article 11	▸ Identification and listing of hazardous waste. Numerous compounds detected at the Tank 2 site are listed as hazardous wastes. These regulations include specific testing criteria for determining hazardous waste characteristics.	▸ The non-treated soil will be treated as a potential hazardous waste and classified according to this ARAR. The treated soil is not considered a hazardous waste. By-products (i.e. run-off water) will be recycled in the biodegradation area until treated.

TABLE A-6 (Continued)
ARARs FOR EXCAVATION AND SURFACE AEROBIC BIODEGRADATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site Specific	DTSC	22 CCR 66391	▸ Hazardous water facility permit - contents of Part B of the application.	▸ Under this alternative, a hazardous waste facility is not being permitted. Thus, this ARAR should not be applicable.
		22 CCR 67103	▸ Site Security	▸ The contractor shall prevent the unknowing entry, and minimize the possibility of, unauthorized entry of persons or livestock in the area of biodegradation operation.
		22 CCR 67220	▸ Notice in Deed to Property required for permitted disposal facilities.	▸ Since this alternative does not create a disposal facility, this ARAR is not applicable.
Site/Action/Chemical Specific	EPA	Safe Drinking Water Act (SDWA) 42 USC300 40 CFR 141	▸ Drinking Water Standards, including both enforceable MCLs and MCLGs.	▸ The following chemical specific regulatory requirements have been identified at the Tank 2 site: Constituent — Max. Contaminant Level mg/l Ethylbenzene 0.7 Heptachlor epoxide 0.0002 Tetrachloroethene 0.005 Xylenes 10
Chemical Specific	DTSC	22 CCR, Article 5.5, Section 64444.5	▸ Sets maximum contaminant levels for the primary drinking water constituents.	▸ The following chemical specific regulatory requirements have been identified at the Tank 2 site: Constituent — Max. Contaminant Level mg/l Ethylbenzene 0.680 Heptachlor epoxide 0.00001 Tetrachloroethene 0.005 Xylenes 1.750 Refer to Section 7.2.14.3 for details on compliance.

TABLE A-6 (Continued)
ARARs FOR EXCAVATION AND SURFACE AEROBIC BIODEGRADATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Chemical Specific	RWQCB	Porter Cologne Water Quality Control Act (CA Water Code)	▸ This Act coordinates regulatory control over all activities that may affect water quality.	▸ This ARAR generally requires the protection of beneficial uses of waters of the State. Specific requirements are addressed in other ARARs presented in this table.
Site/Action/Chemical Specific	RWQCB	CVRWQCB-R5, Water Quality Control Plan (Basin Plan)	▸ This plan is the vehicle by which the CVRWQCB administers the CA Water Code. This Act establishes the responsibility of the RWQCB to supervise cleanup efforts at spill sites including approval of cleanup plans and verification of final cleanup.	▸ The contractor shall supply information required by this ARAR in his work plan and procedures. This information should be forwarded to the RWQCB for review and approval.
Site/Action/Chemical Specific	RWQCB	State Board Resolution No. 68-16	▸ Non-degradation policy.	▸ The contractor shall treat the soil to the required cleanup levels stated in Section 3.6 such that residual constituents will be degrade beneficial uses for ground water.
Site/Action/Chemical Specific	RWQCB	Proposition 65	▸ Safe Drinking Water and Toxic Enforcement Act. This Act prohibits the discharge of known carcinogens and reproductive toxins into a source of drinking water. This Act also requires a clear warning of potential significant exposures.	▸ The Contractor will comply by controlling air emissions, providing adequate site security and appropriate signage, and through implementation of a site specific worker health and safety plan. A HRA will be conducted to estimate acceptable emission levels. The HRA will be based on a one million cancer risk required by Proposition 65.

TABLE A-6 (Continued)
ARARs FOR EXCAVATION AND SURFACE AEROBIC BIODEGRADATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site/Action/Chemical Specific	RWQCB	Title 23, Chapter 15 Discharges of Waste to Land.	▸ Chapter 15 outlines requirements for the design, construction, operations, and closure of waste containment facilities.	▸ The operator of the biodegradation process shall construct a treatment cell with a plastic liner to preclude migration of contaminants to the vadose zone. The treatment cell would be properly sloped to effectively manage surface run-on or run-off for recycling into the treatment cell. In addition, the ARAR requires the liner structures to contain the probable maximum precipitation (which exceeds a 25 year storm requirement of 40 CFR 264) and withstand a maximum credible earthquake.
Site/Action/Chemical Specific	EPA	NPDES 40 CFR 122	▸ Discharge of liquid streams to surface waters	▸ This alternative does not entail discharge of liquid streams to surface waters, therefore this ARAR should not apply.
	Environmental Protection Agency (EPA)	40 CFR 264, Subpart F and Subpart L	▸ Release from solid waste management units.	▸ This ARAR is applicable to owners or operators of facilities that treat, store, or dispose of hazardous waste. It applies to surface impoundments waste piles, land treatment units, or landfills. The biodegradation unit operator must comply with the requirements of this ARAR. However, the state requirements for waste piles are more stringent than the Federal regulations. See Title 23, Chapter 15 and Title 22 Division 4, Chapter 30.

TABLE A-6 (Continued)
ARARs FOR EXCAVATION AND SURFACE AEROBIC BIODEGRADATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Site/Action/Chemical Specific	EPA	Land Ban 40 CFR 268	▸ Land disposal restrictions for RCRA and non-RCRA waste categories.	▸ This ARAR identifies wastes that are restricted from land disposal. Upon the effective date of May 8, 1992, soil generated by excavation could be considered a non-waste water from a multi-source leachate. A comparison of the reported constituent values for treatment standards for F039 waste is as follows:

Chemical	Range of Detected Concentrations (mg/kg)	Landban total Composition (mg/kg)
Anthracene	.041	4.0
Benzoic Acid	.39	--
Benzo(a)anthracene	1.3	8.2
Benzo(g,h,i)perylene	.12 - 1.5	1.5
2-Butanone	.027 - 15	36
Chrysene	.05 - .3	8.2
4,4'-DDE	.0018	.087
4,4'-DDT	.0038	.087
Dibenzo(a,h)anthracene	1.5	8.2
1,2-dichloropropane	.002	18
Dieldrin	.003 - .0078	0.13
2,4-Dimethylphenol	.17 - .72	14
Ethylbenzene	.008 - 2100	6
Fluoranthene	.36 - 2.9	8.2
Heptachlor epoxide	.0086	.066
Indeno(1,23,-cd)pyrene	1.7	8.2
2-Methylnophthalene	.32	--
4-Methylphenol	.040	--
Naphthalene	.21 - 26	3.1
Phenonthrene	.22 - 2.7	3.1
Phenol	.035 - .067	6.2
Pyrene	.34 - 2.4	8.2
Tetrachloroethene	.003 - 39	5.6
Xylenes	.001 - 11000	28

TABLE A-6 (Continued)
ARARs FOR EXCAVATION AND SURFACE AEROBIC BIODEGRADATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Chemical Specific	EPA	Clean Air Act 40 CFR 61	▸ National Emissions Standards for Hazardous Air Pollutants.	▸ Air emissions from the remediation of Tank 2 site would primarily comprise of PCE, 2-butanone, ethylbenzene, and xylenes which pursuant to Section 112 of the Act are not designated as hazardous air pollutants. Therefore, this ARAR does not apply.
Chemical Specific	EPA and ARB	Clean Air Act 40 CFR Part 50 et. seq. 17 CCR 60204 et. seq.	▸ Clean Air Act and State Air Pollution Control Laws.	▸ California air pollution control laws are generally stricter and therefore supercede the Federal Clean Air Act. Applicable state/local air districts air pollution control laws are discussed below. Emission sources are divided into mobile and stationary sources. Stationary sources may be regulated as new sources, existing sources, or may be granted a variance. New source emission standards enforced by a permit system. Administration of permits rests with the local air district.
Action/Site Specific	Sacramento Metropolitan Air Quality Management District (SMAQMD)	Rule 202	▸ New Source Review. The purpose of this rule is to provide for the review of new stationary air pollution sources and to provide mechanisms by which authorities to construct such sources may be granted without interfering with the attainment or maintenance of ambient air quality standards.	▸ Reactive organic compounds will be emitted in excess of the limit of 0 lb/day. This triggers the requirement for use of BACT. BACT is defined as the maximum technique or control device which is technologically feasible and cost effective. In this case, BACT could be covering the excavated soil which is being bioremediated.

TABLE A-6 (Continued)
ARARs FOR EXCAVATION AND SURFACE AEROBIC BIODEGRADATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Action/Site Specific	SMAQMD	Rule 401	▸ Ringlemann Chart	▸ Atmospheric discharges from the site form any source (other than uncombined water vapor) for a period of more than three minutes in any one hour shall not be as dark or darker in shade as designation No. 1 on the Ringlemann Chart published by the U.S. Bureau of Mines. Nor shall the emissions be of such opacity as to obscure a human observer's view, or register on a certified in-stack opacity monitoring system at a level equal to or greater than Ringlemann designation No. 1.
		Rule 403	▸ Fugitive dust	▸ Every reasonable precaution shall be taken not to cause or allow the emissions of fugitive dust from being airborne beyond the property line from which the emission originates. Reasonable precautions shall include, but are not limited applying asphalt, oil, water or suitable chemicals for the control of dust on surface which can give rise to airborne matter. Other measures may be taken as approved by the Air Pollution Control Officer.
		Rule 404	▸ Particulate Matter	▸ No discharge shall be made to the atmosphere from any source particulate matter is excess of 0.23 grams per dry standard cubic meter (0.1 grains per dry cubic foot).

TABLE A-6 (Continued)
ARARs FOR EXCAVATION AND SURFACE AEROBIC BIODEGRADATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Action/Site Specific	SMAQMD	Rule 405	▸ Dust and condensed fumes	▸ No discharges into the atmosphere shall be made in any one hour from any source whatsoever of dust or condensed fumes in total quantities exceeding the following:

PROCESS WEIGHT AND ALLOWABLE DISCHARGE

Process weight per hour		Maximum discharge rate allowed for solid particulate matter (aggregate discharged from all points of process)		Process weight per hour		Maximum discharge rate allowed for solid particulate matter (aggregate discharged from all points of process)	
Kg/Hr	Lb/Hr	Kg/Hr	Lb/Hr	Kg/Hr	Lb/Hr	Kg/Hr	Lb/Hr
114	250	.48	1.00	3636	8000	3.96	8.78
136	300	.81	1.12	3864	8500	4.11	9.04
159	350	.56	1.23	4091	9000	4.25	9.36
182	400	.61	1.34	4318	9500	4.40	9.67
205	450	.65	1.44	4545	10000	4.55	10.0
227	500	.70	1.54	6455	12000	4.79	10.4
273	600	.79	1.73	6364	14000	4.91	10.8
318	700	.88	1.90	7273	16000	5.09	11.2
364	800	.94	2.07	8182	18000	5.23	11.5
409	900	1.01	2.22	9091	20000	5.36	11.8
455	1000	1.08	2.38	13636	30000	5.91	13.0
545	1200	1.21	2.66	18182	40000	6.32	13.9
636	1400	1.33	2.93	22727	50000	6.68	14.7
727	1600	1.45	3.19	27273	60000	6.96	15.3
818	1800	1.56	3.43	31818	70000	7.23	15.9
909	2000	1.66	3.66	36364	80000	7.45	16.4
1136	2500	1.91	4.21	40909	90000	7.68	16.9
1364	3000	2.15	4.72	45455	100000	7.86	17.3
1591	3500	2.36	5.19	90909	200000	9.27	20.4
1818	4000	2.56	5.64	136364	300000	10.23	22.5
2045	4500	2.76	6.07	181818	400000	10.96	24.1
2273	5000	2.95	6.49	227273	500000	11.56	25.4
2500	5500	3.13	6.89	272727	600000	12.09	26.6
2727	6000	3.30	7.27	318182	700000	12.55	27.6
2955	6500	3.47	7.64	363636	800000	12.91	28.4
3182	7000	3.64	8.00	409091	900000	13.32	29.3
3409	7500	3.80	8.36	454545 or more	1000000 or more	13.64	30.0

To use the table above, take the process weight per hour as each is defined below. Then find this figure on the table, opposite which is the maximum number of kilograms or pounds of contaminants which may be discharged into the atmosphere in any one hour. As an example, if "A" has a process which emits contaminant into the atmosphere and which process takes 3 hours to complete, he will divide the weight of all materials in the specific process, in this example, 7500, by 3, giving a process weight per hour of 2500 Kg. The table shows that "A" may not discharge more than 3.13 Kg in any hour during the process. Where the process weight per hour falls between figures in the left hand column, the amount weight or permitted discharged may be interpolated.

TABLE A-6 (Continued)
ARARs FOR EXCAVATION AND SURFACE AEROBIC BIODEGRADATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Action/Site Specific	SMAQMD	Rule 402 CA Health and Safety Code, Section 41700	▸ General guideline, if the biodegradation operation causes release of contaminants to the atmosphere, then a case-by-case determination of public nuisance potential should be performed to verify compliance. These ARARs state that discharges to air causing injury, detriment, nuisance annoyance; or endanger the comfort, repose, health, safety, or causes or damage to business or property is prohibited.	▸ To comply with this ARAR, the contractor shall minimize the potential for emissions through the use of BACT. A health risk assessment has been conducted to evaluate the effect of emissions on the receptors in the vicinity of the biodegradation unit. The results are included under the "short term effectiveness" criteria for this alternative.

TABLE A-6 (Continued)
ARARs FOR EXCAVATION AND SURFACE AEROBIC BIODEGRADATION

TYPE	SUBMITTING AGENCY	ARAR	DESCRIPTION	COMMENTS/IMPACTS
Chemical Specific	EPA	F.R. 55(145):30865 July 27, 1990	▸ Cleanup levels under RCRA corrective actions.	▸ The proposed RCRA Sample Action Levels for the following chemical specific compounds identified at the Tank 2 site are TBCs and are as follows:

Semi-Volatile Organic Compounds

Name	Hazard Class	Soil Conc. (mg/kg)	Water Conc. (mg/kg)
Phenol	D	5.0 E4	2.0 E1

Pesticides/Dioxins

Name	Hazard Class	Soil Conc. (mg/kg)	Water Conc. (mg/kg)	Air Conc. $\mu g/m^3$
DDE	B2	2	1.0E-4	----
DDT	B2	2	1.0E-4	1.0E-2
Dieldrin	B2	4.0E-2	2.0E-6	2.0E-4
Heptachlor epoxide	B2	8.0E-2	4.0E-6	4.0E-4

APPENDIX B

ADMINISTRATIVE RECORD DOCUMENTS

ADMINISTRATIVE RECORD DOCUMENTS		SUBMITTAL DATE
1.	Analytical Results Summary, Tank 2 Field Investigation	August 2, 1991
2.	Potential California ARARs	August 2, 1991
3.	Tank 2 Public Health Evaluation	August 5, 1991
4.	Technology Screening Tables	August 2, 1991
5.	Tank 2 Treatability Study/Additional Treatability Testing Reports	July 19, 1991
6.	Tank 2 Alternatives Public Health Evaluation	July 8, 1991
7.	Tank 2 Public Health Evaluation of the Soil Venting System	July 17, 1991
8.	Mobility Assessment of Contaminants at Tank 2 Site	August 14, 1991
9.	Detailed Cost Estimates	August 2, 1991
10.	Proposed Action Plan - Tank 2	August 16, 1991