United States
Environmental Protection
Agency

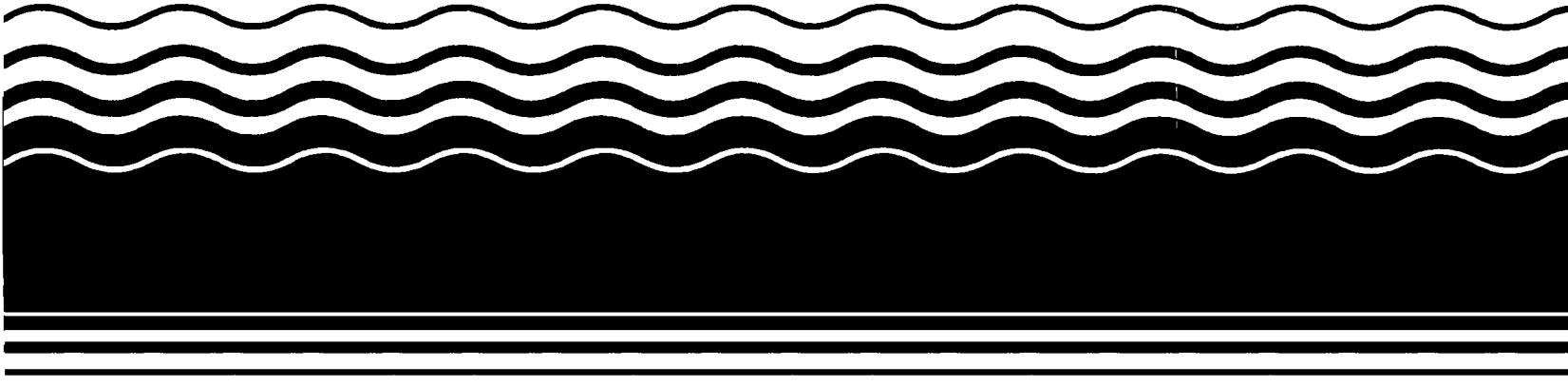
Office of
Emergency and
Remedial Response

EPA/ROD/R09-92/086
September 1992

EPA

Superfund Record of Decision:

Purity Oil Sales, 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/R09-92/086	2.	3. Recipient's Accession No.
4. Title and Subtitle SUPERFUND RECORD OF DECISION Purity Oil Sales, CA Second Remedial Action - Final			5. Report Date 09/30/92 6.
7. Author(s)			8. Performing Organization Rept. No.
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15. Supplementary Notes

PB93-964508

16. Abstract (Limit: 200 words)

The 6.8-acre Purity Oil Sales site is a former waste oil re-refining facility in the township of Malaga, Fresno County, California. Land use in the area is mixed agricultural, industrial, and residential, with the North Central Canal flowing along the southern border of the site. The town of Malaga surrounds the site at distances of about 1/2 mile or more. From 1934 to 1975, waste oil was re-refined onsite using a number of treatment processes, including clarification, chemical addition, dehydration, distillation, and filtration. During its history, the facility has changed ownership several times, and the property is now in the custody of the state. Oil and by-products from the re-refining process were stored in sumps and tanks and disposed of onsite in unlined pits. In 1973, at the request of the county, Purity Oil backfilled the waste pits with soil but did not remove any of the waste. Recent investigations have revealed that the most highly contaminated soil is in the former waste pit areas and extends from the surface to the ground water, and that the eastern 2.5 acres of the property demonstrates surface soil contamination to a 2-foot depth. In 1986 and 1987, two removal actions were initiated by the state and EPA, which involved removal of

(See Attached Page)

17. Document Analysis a. Descriptors

Record of Decision - Purity Oil Sales, CA
Second Remedial Action - Final
Contaminated Media: soil, sediment, debris
Key Contaminants: VOCs (benzene, PCE, TCE, toluene, xylenes), other organics (PAHs, pesticides), metals (arsenic, chromium, lead)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 50
	20. Security Class (This Page) None	22. Price

EPA/ROD/R09-92/086
Purity Oil Sales, CA
Second Remedial Action - Final

Abstract (Continued)

1,800 cubic yards of hazardous materials and 30,000 gallons of waste oil and water from an above-ground tank to be disposed of offsite. A 1989 ROD addressed remediation of the ground water and tanks, as OU1, and provided for the removal of seven above-ground tanks and their contents and allowed private well users downgradient of the site to be connected to city or county water systems. This ROD addresses a final remedy for OU2, the contaminated soil at the site. The primary contaminants of concern affecting the soil, sediment, and debris are VOCs, including benzene, PCE, TCE, toluene, and xylenes; other organics, including PAHs and pesticides; and metals, including arsenic, chromium, and lead.

The selected remedial action for this site includes constructing a slurry wall around the perimeter of the site to minimize migration of contaminants; excavating approximately 500 cubic yards of contaminated canal sediment and spreading them over the site; filling the excavated areas with 8,600 cubic yards of imported soil; applying foam to control emissions during excavation and slurry wall construction; transporting and disposing of rubble uncovered during the excavation process offsite, possibly at a RCRA facility; enclosing the entire length of the North Central Canal in a reinforced concrete pipe; treating 72,000 cubic yards of deep soil onsite using a soil vapor extraction (SVE) to remove VOCs; treating air emissions from the SVE process using carbon adsorption, prior to discharge to the air; disposing of spent activated carbon offsite at a permitted RCRA facility; covering the site with a RCRA multi-layer cap, with a retaining wall to support the cap; monitoring ground water; conducting environmental monitoring to ensure the integrity of the cap; and implementing institutional controls, including deed restrictions. The estimated present worth cost for this remedial action is $36,254,000, which includes an annual O&M cost of $741,000 for 9.4 years.

PERFORMANCE STANDARDS OR GOALS:

Chemical-specific soil clean-up goals were not provided; however, vadose zone monitoring will be performed to ensure that the SVE system is reducing the VOC mass so that it no longer threatens to contaminate ground water at levels above SDWA MCLs.

RECORD OF DECISION

For The

PURITY OIL SALES, INC.

Superfund Site,

Soils Operable Unit

Prepared by
The U.S. Environmental Protection Agency
Region IX
San Francisco, California

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PURITY OIL SALES RECORD OF DECISION

Soils Operable Unit

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Purity Oil Sales Site
Malaga, California

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Purity Oil Sales site, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) and, to the extent practicable, the National Contingency Plan (NCP). This decision is based on the Administrative Record for this site.

The State of California concurs with the selected remedy.

ASSESSMENT OF THE SITE

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.

DESCRIPTION OF THE REMEDY

This operable unit is the second action of two operable units for the site. The first operable unit involved remediation of the groundwater. This second operable unit addresses contaminated soil which is the source of the groundwater contamination. This action addresses the principal threats at the site through a combination of treatment and containment and is considered the final action to be taken by EPA at the site.

The major components of the selected remedy include:

- Treatment through Soil Vapor Extraction of soils from 14 feet below the surface to the water table;
- Capping the site in accordance with the Resource Conservation and Recovery Act Subtitle C requirements;
- Installing a slurry wall around the perimeter of the site;
- Conducting environmental monitoring to ensure the effectiveness of the remedial action.

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 this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

John Wise for

Daniel W. McGovern
Regional Administrator
U.S. Environmental Protection Agency,
Region IX

9.30.92
Date

DECISION SUMMARY

I. Site Name, Location and Description

The 6.8 acre Purity Oil Sales site is located approximately one-half mile south of the Fresno city limits, in the township of Malaga, California (Figure 1). The site is in a zone defined as heavy industrial under the Fresno County General Plan. The site is located in a mixed-use area and is surrounded by agricultural and industrial land on the west, a scrap iron yard on the north, a residential trailer park and market on the northeast, a propane distributor on the east, a small farm on the southeast, and a used auto parts business on the south. The North Central Canal flows along the southern boundary of the site (Figure 2).

About one-half mile to the west and southwest of the site are fields of oats, alfalfa, cotton, fruit trees, and grapes. The town of Malaga, which has a medium density residential area, surrounds the site at distances of about one-half mile and more.

The site is located in a non-attainment area for the following air quality standards: ozone, carbon monoxide (CO) and PM-10.

The Purity site and the surrounding areas do not provide habitat for or sustain any rare or endangered species of plant or animal. There are no signs of any significant wildlife or vegetation on the site itself, other than scrub grasses.

All structures on the site have been removed and the site has been partially regraded.

II. Site History and Enforcement Activities

Waste oil was re-refined at the site from approximately 1934 to 1975. Waste oil was collected from businesses such as service stations, car dealers, truck stops, electrical transformer yards, military facilities, and municipalities. The used oil was re-refined using a number of treatment processes including clarification, chemical addition, dehydration, distillation, and filtration. The oil and by-products from the re-refining process were collected and stored in sumps and storage tanks and were disposed of on-site in unlined sludge pits. A composite diagram of the approximate locations of the buildings, storage areas, and waste disposal areas from 1942 to 1973 is shown in Figure 3.

In 1973, Purity Oil Sales began complying with a Fresno County Superior Court Order to empty and backfill the waste pits. By early 1975, the waste pits had been completely filled with soil and demolition debris. However, no evidence is available to indicate that petroleum wastes stored in the pits were emptied during this period.

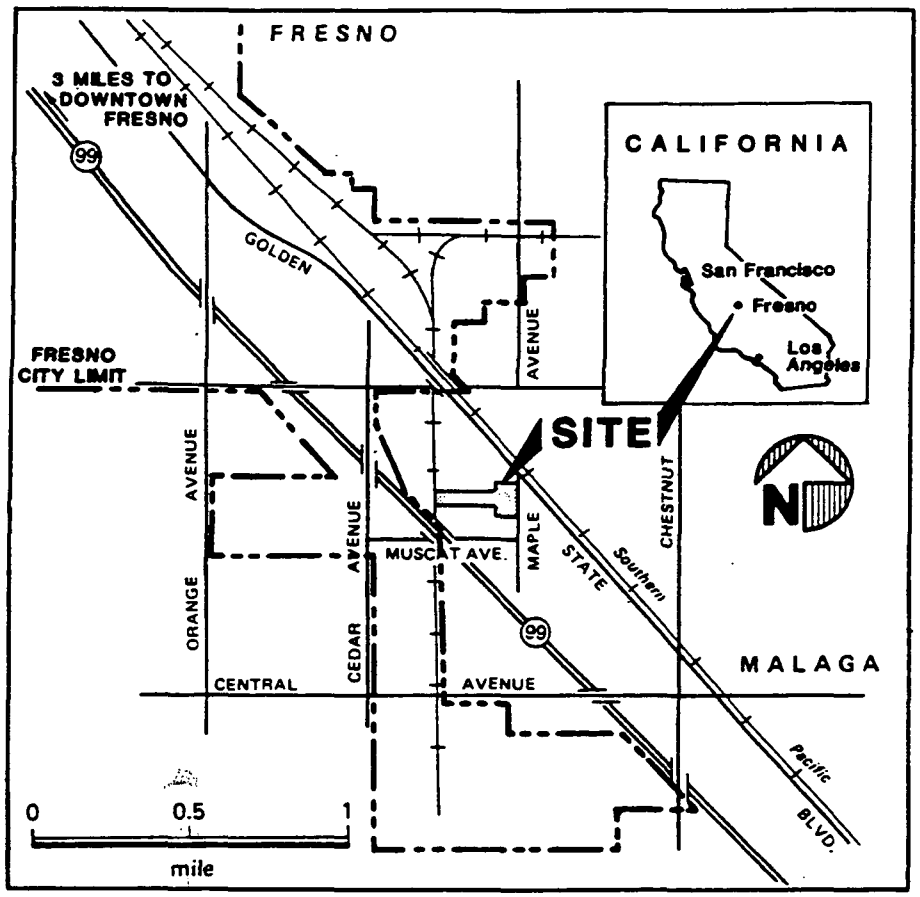


FIGURE 1

SITE LOCATION MAP

REMEDIAL INVESTIGATION REPORT
PURITY OIL SALES SITE
FRESNO, CALIFORNIA

RDD63320.RI

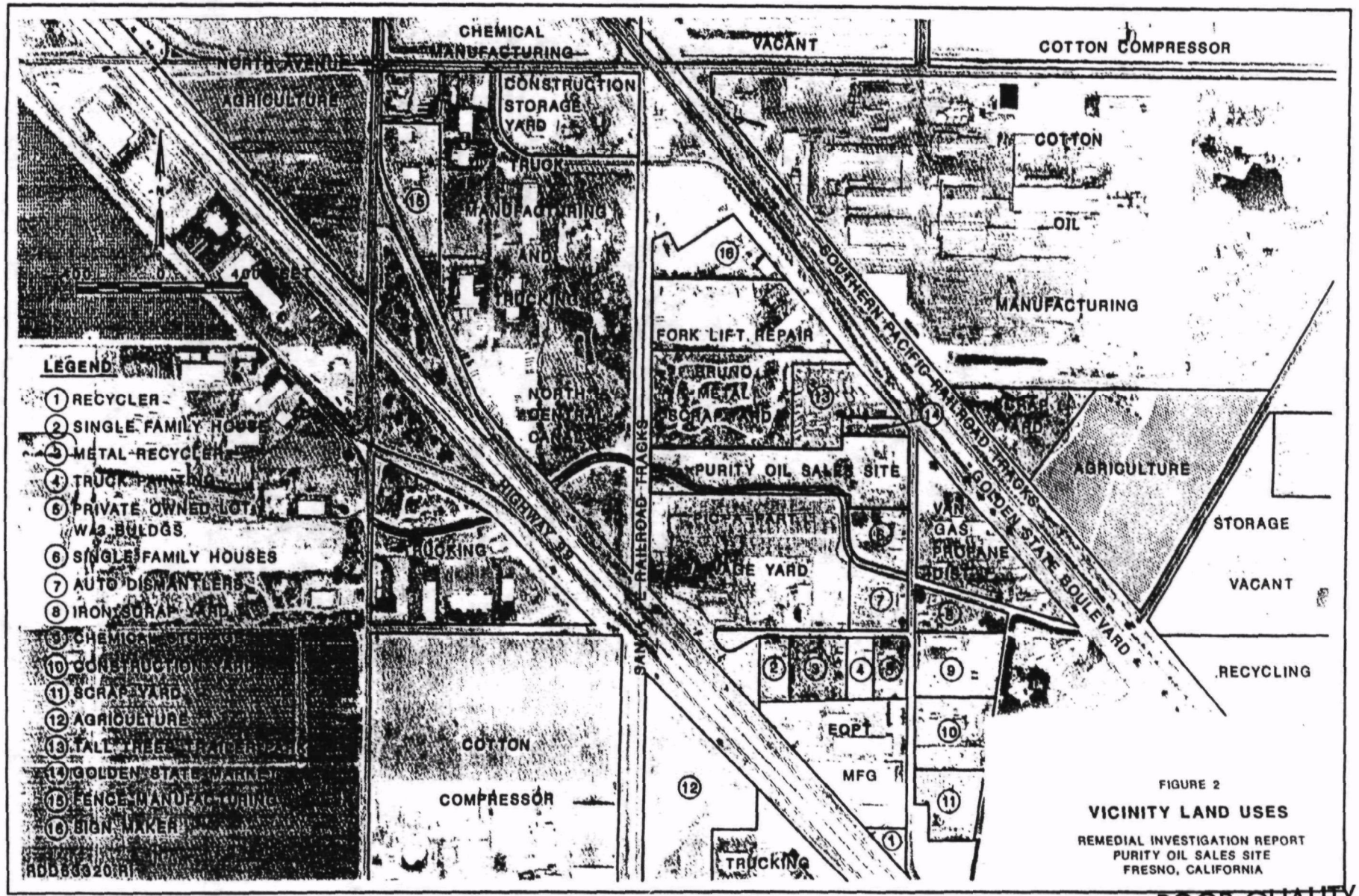
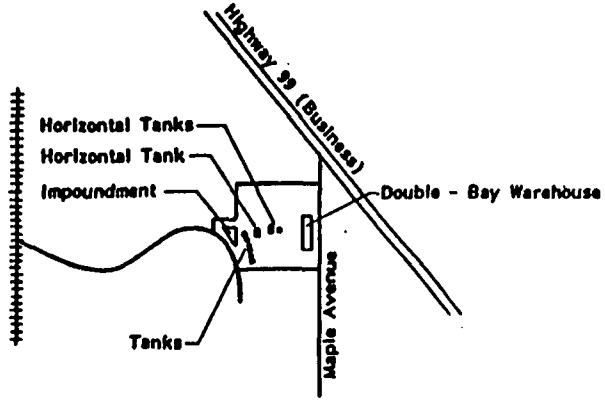


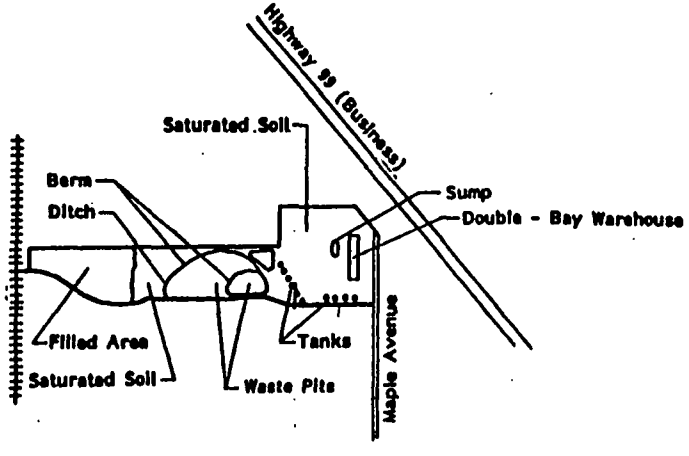
FIGURE 2

VICINITY LAND USES

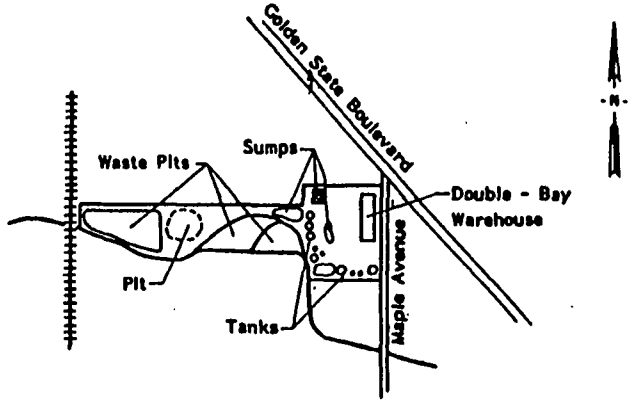
REMEDIAL INVESTIGATION REPORT
PURITY OIL SALES SITE
FRESNO, CALIFORNIA



a. May 19, 1942
Approximate Scale 1:5200



b. January 31, 1950
Approximate Scale 1:5300

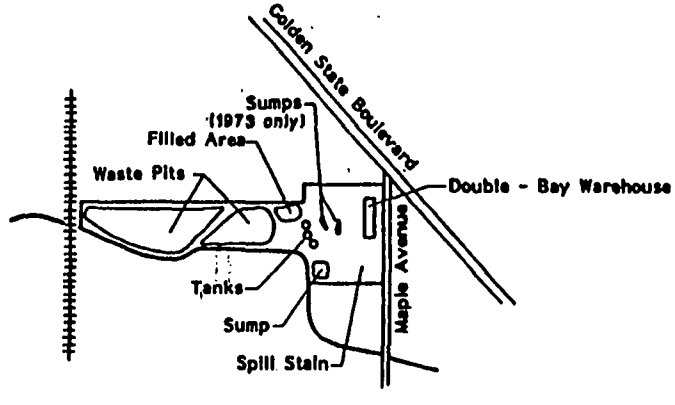


c. 1957 to 1967

--------Present in 1957 and 1961 Photographs

Present in 1957 Photograph Only

Approximate Scale 1:6000



d. 1970 to 1973
Approximate Scale 1:6000

REFERENCE: BACKGROUND REPORT, DOHS 1985

FIGURE 3

SITE LAYOUT 1942 - 1973

REMEDIAL INVESTIGATION REPORT
PURITY OIL SALES SITE
FRESNO, CALIFORNIA

3320.RI

During its history, the re-refining facility changed ownership several times. The original owners were William Dickey and Ray Turner, who operated the facility from 1934 to 1948. In 1948, William Siegfried and Robert Hall purchased the site as Paraco Oil, Inc. The site and facilities were sold to Michael Marcus of Purity Oil Sales, Inc., in 1965. In 1975, Michael Marcus filed for bankruptcy, and the site was held by the State of California for non-payment of taxes. The site was sold to an individual in 1979, who was granted a recision of the sale in 1982. The site was returned to the custody of the State of California where it remains today. Title of the property was returned to Purity Oil Sales, Inc. in 1984.

In February 1982, the EPA Emergency Response Team, the California Department of Toxic Substances Control (DTSC) and the California Regional Water Quality Control Board carried out a joint site investigation that included soil and groundwater sampling and air emissions monitoring. The site was placed on the National Priorities List in December 1982.

The Department of Toxic Substances Control was designated lead agency for the site and published a Remedial Investigation Report on May 12, 1986. During the state's remedial investigation, EPA's Emergency Response Team removed about 1,800 cubic yards of hazardous material from the site.

In January 1986, EPA assumed the lead for the site and expanded the remedial investigation work performed by the state to include additional soil and groundwater studies.

During September 1987, EPA's Emergency Response Team removed approximately 33,000 gallons of oil and water from one of seven above ground tanks to eliminate the potential for an oil spill.

EPA issued a Remedial Investigation Report in October 1988. A Feasibility Study and a Proposed Plan for Soil and Groundwater were issued in April 1989. The Regional Administrator signed a Record of Decision (ROD) for the Groundwater and Tanks Operable Unit on September 26, 1989.

EPA conducted two remedial actions in accordance with the ROD. In October 1991, seven large above-ground steel tanks and their contents were removed from the site. In March 1992, private well users downgradient of the site were connected to either the Malaga County Water District or the City of Fresno water system.

In May 1992, EPA issued a Soil Solidification Feasibility and Cost Evaluation Report and a Revised Soil Vapor Extraction and Cap Feasibility Study. A Revised Proposed Plan for Soil was issued in June 1992.

General Notice letters for the groundwater operable unit were issued to 108 Potentially Responsible Parties (PRPs) on April 19, 1990. EPA issued Special Notice letters for the groundwater

operable unit to 87 PRPs on April 1, 1991. After EPA and the PRPs failed to negotiate a settlement, EPA issued a Unilateral Administrative Order on September 30, 1991 to the California Department of Transportation, Chevron Corporation, Cummins West, Foster Poultry Farms, Morrison-Knudsen Engineers, Pacific Gas & Electric Company, Phillips Petroleum, Southern Pacific Transportation Company, and Unocal. The Administrative Order required the Respondents to design and construct a groundwater extraction, treatment, and disposal system. EPA issued General Notice letters for the soils operable unit on June 5, 1992 to the existing 87 PRPs and to 59 additional PRPs.

III. Highlights of Community Participation

The Remedial Investigation (RI) Report, the Feasibility Study (FS) Report, the Soil Solidification Feasibility and Cost Evaluation Report, the Revised Soil Vapor Extraction and Cap Feasibility Study, and the Revised Proposed Plan for Soil were released to the public in June 1992. These documents were made available to the public in both the Administrative Record and the information repository maintained at the Superfund Records Center in Region 9 and at the Fresno Central Library. The notice of the availability of these two documents was published in the Fresno Bee on June 8, 1992 and in the Spanish language newspaper Vida En El Valle on June 17, 1992. A public comment period was held from June 8, 1992 through July 10, 1992. A request for an extension to the public comment period was made by the California Department of Toxic Substances Control and the San Joaquin Valley Unified Air Pollution Control District. As a result, the public comment period was extended to August 10, 1992.

A public meeting was held on June 22, 1992. At this meeting, representatives from EPA answered questions about problems at the site and the remedial alternatives under consideration. A response to the comments received during this period is included in the Responsiveness Summary.

This decision document presents the selected remedial action for the Purity Oil Sales site in Malaga, California, chosen in accordance with CERCLA, as amended by SARA, and, to the extent practicable, the National Contingency Plan. The decision for this site is based on the Administrative Record.

IV. Scope and Role of Operable Unit

As with many Superfund sites, the problems at the Purity Oil Sales site are complex. As a result, EPA organized the work into two operable units (OUs). These are:

. OU One: Contamination of the groundwater
. OU Two: Contamination in the soils.

EPA has already selected a groundwater treatment remedy for OU One in a ROD signed September 26, 1989. The OU One action is in the

remedial design stage and is being performed by PRPs under an Administrative Order. This ROD is for OU Two and addresses contaminated soil.

V. Summary of Site Characteristics

Soil contamination extends from the surface to the groundwater table, with the most highly contaminated layers occurring between 0-14 feet, in the location of the former waste pits. A cross section of site soils is shown in Figure 4.

Contaminated surface soils extend vertically to a depth of two feet and are defined as the eastern 2.5 acres of the site where the office and warehouses were located. Waste pits were not located in this area. These surface soils are contaminated with organic compounds, pesticides, oil and grease, and a variety of metals.

The levels of organic compounds in the surface soils are generally below the California Total Threshold Limit Concentration (TTLC) values for definition as a state hazardous waste. The pesticide concentration for 4,4-DDT exceeds the California TTLC value in one location. Four locations had PCB concentrations up to 11 parts per million (ppm), which is well below the TTLC value of 50 ppm. For inorganics, all metals except lead were detected at concentrations below the TTLC. The TTLC value for lead is 1,000 ppm. Lead concentrations range from 18,000 ppm to 27,000 ppm in surface soil. The pH of on-site surface soil samples vary from 0.9 to 8.1.

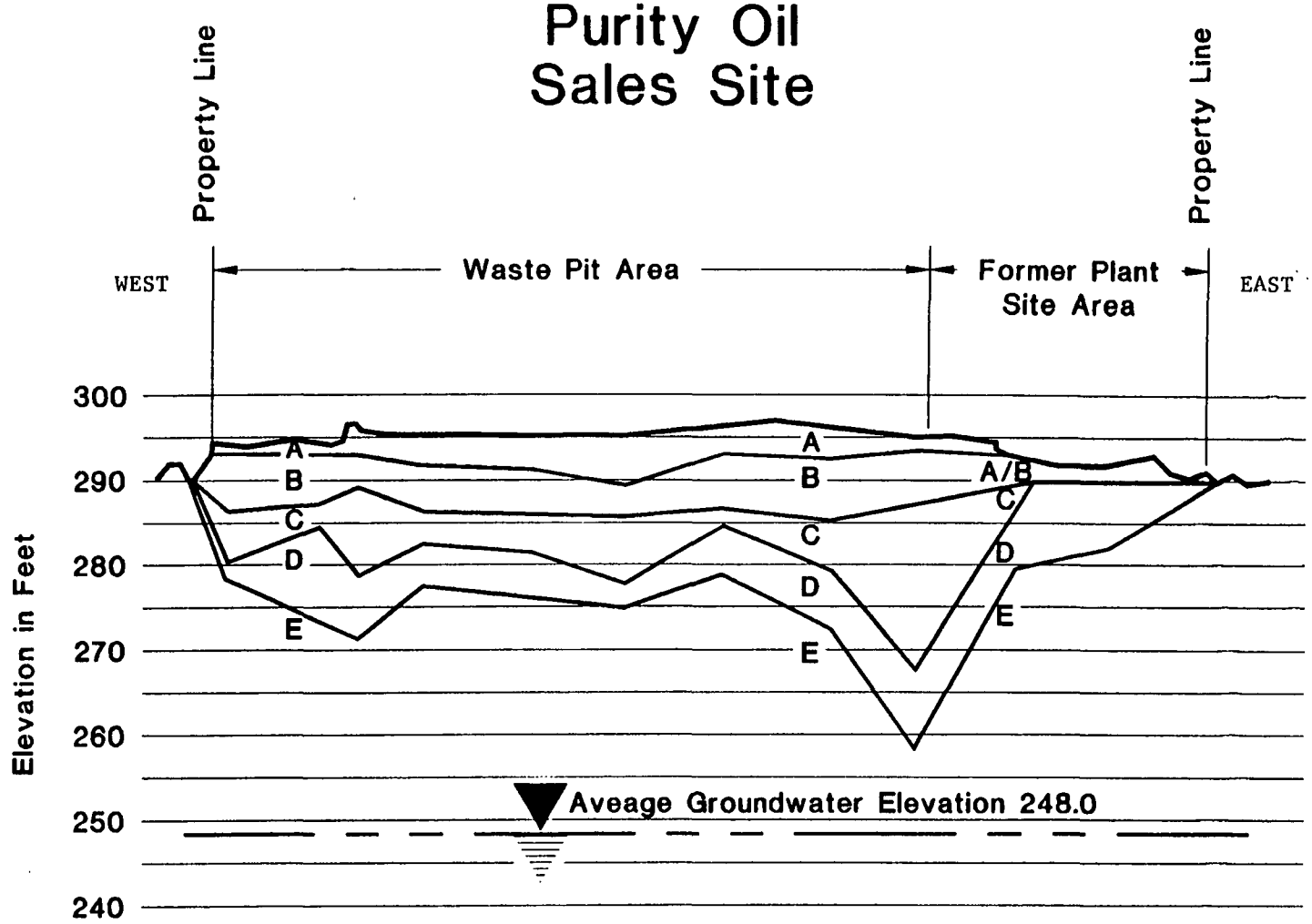
The surface soils have not been determined to be RCRA listed waste or RCRA characteristic waste based on the EP Toxicity test. TCLP has replaced EP Toxicity as the test method used by EPA to determine the leachability of toxic constituents. Toxicity is one characteristic that defines a waste as a Resource Conservation and Recovery Act (RCRA) hazardous waste. A Toxicity Characteristic Leaching Procedure (TCLP) test was not conducted for surface soils.

The waste pit area contains numerous organic compounds, including benzene, toluene, polyaromatic hydocarbons (PAHs), methylene chloride, phthalates, acetone, and numerous solvents. Below the waste pits, the organic compound concentrations decrease rapidly. Concentration levels range from < 10 to 50,000 ppm. Toluene was detected in most waste pit locations onsite, in concentrations ranging from 0.004 to 4,200 ppm. Toluene was also detected in off-site background borings. This off-site contamination is present north, south, and west of the site.

Samples from the waste pit area indicate elevated lead values and low pH values less than or equal to 2. The maximum concentration of lead in the buried waste is 19,600 ppm. The mean concentration of lead in the buried waste is 695 ppm. The state TTLC (1,000 ppm) and Soluble Threshold Limit Concentration (STLC) standard (5 ppm) for lead are exceeded. The state TTLC standard for organic lead (13 ppm) is also exceeded. The waste in layers B and C is RCRA characteristic based on exceedence of the federal TCLP standard of

Site Cross Section

Purity Oil Sales Site



LEGEND

A Soil, construction rubble, waste sludge
B Tar/sludge with soil
C Visually contaminated silty sand (native soil)
D Slightly contaminated silty sand
E Uncontaminated to slightly contaminated silty sand

Figure 4

5.0 ppm for lead. Figures 5-4 through 5-23 in the RI present the chemical investigation results from soil borings.

Lead concentrations in samples taken from locations along the slopes of the North Central Canal above the water surface ranged from 1,200 ppm to 13,000 ppm and exceed the state TTLC standard for lead of 1,000 ppm.

VI. Summary of Site Risks

The baseline risk assessment provides the basis for taking action and indicates the exposure pathways that need to be addressed by the remedial action. It serves as the baseline indicating what risks could exist if no action were taken at the site. This section of the ROD provides the results of the baseline risk assessment conducted for this site.

The particular chemicals of concern identified in the risk assessment are listed in Table 1. The toxicity profiles of the chemicals of concern are included in the Public Health Evaluation (CH2M Hill, 1989).

Acute toxic effects of lead, the primary soil contaminant, include encephalopathy, abdominal pain, hemolysis, liver damage, renal tubular necrosis, seizures, coma and respiratory arrest. Chronic exposure can affect the hematopoietic system, the nervous system, and the cardiovascular system. Lead inhibits several key enzymes involved in heme biosyntheses. One characteristic effect of chronic lead intoxication is anemia, by reduced hemoglobin production and shortened erythrocyte survival. In humans, lead exposure has resulted in nervous system injury including reduced hand-eye coordination, reaction time, visual motor performance, and nerve conduction velocity. Children appear especially sensitive to lead-induced nervous system injury. Lead can also affect the immune system and produce gingival lead lines. Epidemiological studies have indicated that chronic lead exposure may be associated with increased blood pressure in humans. Exposure to lead is associated with sterility, abortion, neonatal mortality, and morbidity. Organolead compounds are neurotoxic.

The exposure pathways of concern that were evaluated for potential health risks are 1) direct contact with contaminated site soils by trespassers and future on-site workers or residents, 2) inhalation of site dusts by current near-site residents or workers, and future on-site residents or workers, and 3) direct contact with contaminated canal sediments by trespassers, farm workers, and irrigation district workers.

The risks for the site were calculated for both on-site residential and occupational exposure. However, since the site is located in an area that is zoned industrial, it is unlikely that there will be future residential uses on-site. Residential exposure was assumed to occur 24 hours a day, 365 days a year for a 70-year period. Occupational exposure was assumed to occur five days per week for

Table 1
CONTAMINANTS OF CONCERN AT THE
PURITY OIL SITE

Acetone
Aldrin
Antimony
Arsenic
Barium
Benzene
Benzoic acid
Beryllium
Beta-BHC
Bis(2-ethylhexyl)phthalate
2-Butanone
Cadmium
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroform
Chromium
Cyanide
4,4-DDD
4,4-DDE
4,4-DDT
Di-n-butyl phthalate
1,1-Dichloroethane
1,1-Dichloroethene
1,2-Dichloroethane
Dieldrin
Diethyl phthalate
Endosulfan
Ethylbenzene
Gamma-BHC (Lindane)
Heptachlor
Heptachlor epoxide
Lead
Methylene chloride
N-nitrosodiphenylamine
Mercury
4-Methyl-2-pentanone
2-Methyl phenol
4-Methyl phenol
Napthalene
N-nitrosodiphenylamine
PAHs[a]
PCBs[b]
Phenol
Selenium
Silver
Styrene
Tetrachloroethene
Toluene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene
Vanadium
Vinyl chloride
Xylenes
Zinc

---

[a] PAHs which are considered carcinogenic are assessed as a group (Benzo[a]anthracene, Benzo[k]fluoranthene and Chrysene).

[b] PCBs are assessed as a group (Arochlor 1248, Aroclor 1254, Aroclor 1260).

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a 40 year period.

These calculations result in numbers called risk levels, which express the risk in terms of the chance of cancer occurring. A risk level of 1 in 1,000,000 means that one person out of one million people so exposed could develop cancer as a result of the exposure. This risk level is expressed in scientific notation as 1x10-6.

For a Superfund project, EPA's goal is to reduce risk for a site to within or above the range of 1 cancer in 10,000 (1x10-4) to 1 in 1,000,000 (1x10-6) persons.

For non-carcinogens (chemicals that do not cause cancer but may cause other adverse health effects), the risk level is calculated in terms of the Hazard Index (HI). The Hazard Index is a numerical indicator of the transition between acceptable and unacceptable exposure to multiple chemicals. If the HI exceeds 1.0, unacceptable non-carcinogenic health effects may result (e.g., kidney or liver disfunction). When the HI is less than 1.0, insignificant adverse health effects are expected.

Surface Soil and Buried Waste

The data summary for chemicals of concern in surface soil is shown in Table 2. The data summary for chemicals of concern in deep on-site soils is shown in Table 3.

Carcinogenic risk associated with both the surface soil and the buried waste was determined to be within, or below, the acceptable risk range. Risks for surface soil ingestion ranged from 3x10-6, (most probable occupational) to 7x10-5 (worst case adult residential). Risk associated with deep soil ingestion was calculated to be 6x10-7, most probable occupational exposure.

Hazard Indexes calculated for potential surface soil exposure through ingestion range from 2.8 (worst case adult residential; worst case occupational) to 39.4 (worst case 10-kg child residential exposure). The Hazard Index of soil below 1 foot was less than 1.0.

Canal Sediment

Contaminant concentrations in canal sediments are summarized in Table 4. Lead accounts for over 98 percent of the hazard indexes for adult (HI = 3.95), 35-kg child (HI = 15.8) and 10-kg child (HI = 55.3) worst case exposure scenarios. The potential carcinogenic risks estimated for exposure to canal sediments through ingestion range from 6x10-8 (most probable adult occupational) to 2x10-6 (worst case adult trespass).

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

Table 2
DATA SUMMARY FOR CHEMICALS OF CONCERN IN SURFACE SOILS

Chemical of Concern	Observed Concentrations Maximum (ug/kg)	Observed Concentrations Mean (ug/kg)	Standard Deviation	Number of Detections/ Number of Samples
Aldrin	100	78	20	03/27
Antimony	8,400	3,300	1,000	01/27
Arsenic	22,000	8,500	5,700	26/27
Barium	1,120,000	295,500	306,000	27/27
Beryllium	1,500	600	200	03/27
Beta BHC	85	81.5	4.9	2/27
Bis(2-ethylhexyl)phthalate	7,800	--	--	01/27
Cadmium	17,000	3,800	3.3	27/27
Chromium	43,000	17,000	9,800	27/27
4,4-DDD	150	89.4	51.9	05/27
4,4-DDE	1,525	195	413	04/27
4,4-DDT	590	177	277	04/27
Dieldrin	350	139	183	03/27
Diethyl phthalate	150	--	--	01/27
Endosulfan	540	215	423	04/27
Heptachlor	170	102	212	01/27
Heptachlor epoxide	1,400	187	357	08/27
Lead	14,300,000	2,669,000	4,709,000	27/27
Mercury	900	190	210	16/27
PCB	12,400	4,045	4,883	05/27
Phenol	50,000	22,000	28,000	01/27
Silver	2,400	800	300	01/27
Zinc	1,410,000	344,900	417,000	27/27

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Table 3
DATA SUMMARY FOR CHEMICALS OF CONCERN IN
DEEP ONSITE SOILS

Chemical of Concern	Observed Concentrations Maximum (ug/kg)	Observed Concentrations Mean (ug/kg)	Standard Deviation	Number of Detections/ Number of Samples
Acetone	7,200	1,270	3,571	09/74
Barium	2,250,000	202,200	449,000	68/68
2-butanone	8,700	720	2,380	17/70
Bis(2-ethylhexyl)phthalate	12,000	3,345	5,301	12/67
Cadium	2,100	600	300	09/68
Carbon disulfide	770	247	357	03/23
Chlorobenzene	2,900	245	731	17/77
Chloroform	310	38	74	22/74
1,1-Dichloroethane	1,100	133	285	02/17
1,2-Dichloroethane	960	36.6	147.9	2/77
Ethylbenzene	19,000	882	2,672	25/77
Lead	11,700,000	695,000	2,220,000	67/68
Methylene chloride	620	284	218	06/74
4-Methyl -2-Pentanone	9,100	626	1,465	20/56
2-Methyl phenol	1,100	657	401	03/31
4-Methyl phenol	56,000	4,612	9,049	09/52
Naphthalene	91,000	6,682	13,040	23/77
PAHs	102,000	9,049	12,342	5/76
PCBs	1,975	544	837	3/23
Phenol	99,000	4,811	14,211	13/63
Selenium	1,200	600	600	03/68
Tetrachloroethene	3,200	310	736	24/100
Trichloroethene	10	6.8	2.4	29/77
1,1,1-Trichloroethane	4,100	201	771	05/74
Toulene	20,000	1,459	3,656	64/77
Xylene	120,000	6,485	19,275	30/62
Zinc	616,000	71,000	103,000	68/68

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Table 4
DATA SUMMARY FOR CHEMICALS OF CONCERN IN CANAL SEDIMENTS

Chemical of Concern	Observed Concentrations Maximum (ug/kg)	Observed Concentrations Mean (ug/kg)	Standard Deviation	Number of Detections/ Number of Samples
Barium	1,770,000	645,000	625,000	10/10
Beryllium	1,300	600	200	01/10
Bis(2-ethylhexyl)phthalate	100,000	38,300	34,490	02/10
Cyanide	4,400	1,320	1,100	10/10
4,4-DDD	280	80	133	04/10
4,4-DDE	19	--	--	01/10
Dieldrin	130	104	56	01/09
Endosulfan	230	149	272	01/10
Gamma BHC (Lindane)	84	47	32	01/09
Heptachlor	77	48	33	01/09
Heptachlor epoxide	1,400	210	425	04/10
Lead	13,200,000	3,815,000	5,017,000	10/10
Mercury	200	70	50	01/10
Naphthalene	54,000	29,500	23,699	02/10
Zinc	1,260,000	262,000	430,000	10/10

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to public health, welfare, or the environment.

VII. Description of Alternatives

A detailed evaluation of the alternatives for treatment of soil is presented in the April 12, 1989 Feasibility Study, the May 1992 Soil Solidification Feasibility and Cost Evaluation and the May 1992 Revised Soil Vapor Extraction and Cap Feasibility Study. Alternatives selected for discussion in the June 1992 Revised Proposed Plan for Soil are listed below.

Actual levels of soil contaminants vary with depth throughout the site. It should be noted that the 0-14 feet and 14-40 feet soil layers discussed are approximate levels only. Actual cleanup will depend on the depth of contamination at specific locations.

Alternative 1: No Action

The No Action Alternative serves as a "baseline" for developing the risk assessment, and its evaluation is required by law. It assumes that no action would occur at the site, allowing unrestricted access to contaminated soils.

Alternative 2: RCRA Equivalent Cap

Major Components of the Remedial Alternative. The major features of this alternative include covering the site with a multi-layer RCRA equivalent cap, and enclosing the North Central Canal in a reinforced concrete pipe.

Containment Components: The 6.8 acre site would be capped and closed as a RCRA Subtitle C landfill in accordance with the requirements specified in 22 CCR 66264.310 for landfill closure, which require a cap to have a permeability less than or equal to the permeability of the natural underlying soil.

The cap would be designed and constructed to promote drainage, minimize erosion of the cover, and provide long-term minimization of migration of liquids through the underlying soils. Consistent with the requirements of 22 CCR 66264.117, long-term operation and maintenance (O&M) would be conducted to monitor groundwater and to insure the integrity of the cap.

The cap proposed for the site (Figure 5) would consist of a 1 foot foundation layer, 2 feet of bentonite/clay mix, a high density polyethylene liner, 1 1/2 feet of sand followed by 2 feet of top soil, and a gas/drainage collection system. The total height of the cap would be 7 feet. A retaining wall to provide slope stability would be constructed around the cap. The top of the wall would be 5 feet above grade. The wall is anticipated to be 2 feet thick.

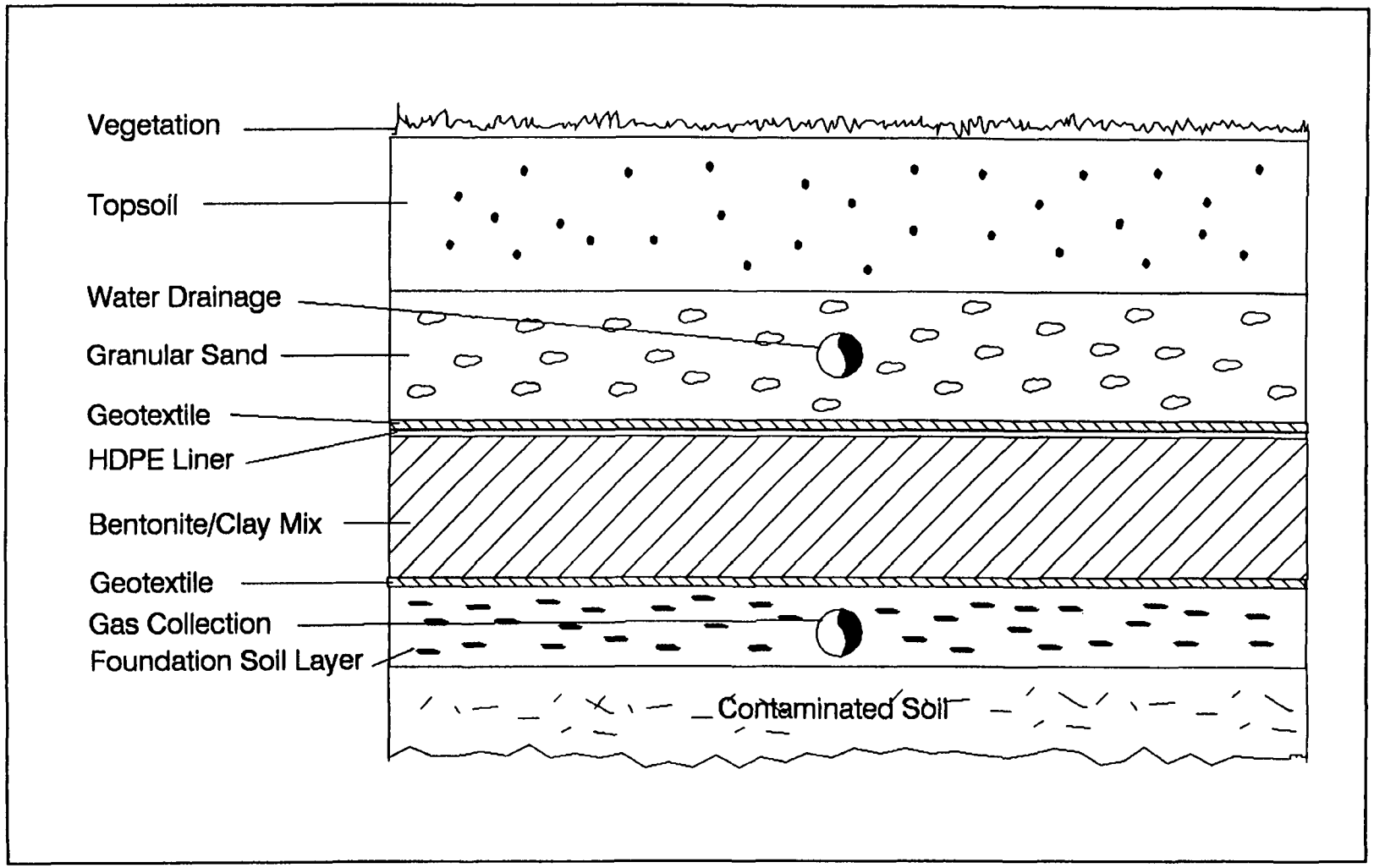

Figure 5: RCRA Equivalent Cap

Alternative 3: Soil Vapor Extraction (SVE) and RCRA Equivalent Cap with Slurry Walls

Major Components of the Remedial Alternative. The major features of this alternative include treating soils from 14 feet to the water table with Soil Vapor Extraction (SVE), constructing a slurry wall, covering the site with a multi-layer RCRA equivalent cap, constructing a retaining wall to support the cap, and enclosing the North Central Canal in a reinforced concrete pipe.

Treatment Components: Soil Vapor Extraction (Figure 6) is a process in which organic contaminants are volatilized from the soil, using a series of on-site air injection wells and extraction wells. The extracted Volatile Organic Compounds (VOCs) are then treated by carbon adsorption prior to discharge to the air. Carbon adsorption is a treatment system where the volatilized contaminants are forced through tanks containing activated carbon, a specially treated material that attracts the contaminants. The contaminants cling to the carbon, and the air leaving the system would meet air quality standards.

Soil from 0-14 feet is contaminated with oil and grease which would greatly inhibit the effectiveness of SVE wells. Therefore, SVE wells will treat soil from 14 feet to the water table. A significant amount of the VOCs in soil deeper than 14 feet (approximately 24,387 pounds) would be removed by the action of the SVE system. Approximately 25% or 17,950 pounds of VOCs in soil from 0-14 feet are expected to be drawn into the lower layers of soil and be treated by the SVE system. The SVE wells would be drilled through the RCRA cap and screened in Layers C,D, and E. The SVE system would operate in place underneath the cap.

Containment Components: Soil from 0-14 feet would be covered by a RCRA equivalent cap and surrounded by a slurry wall. See Alternative 2 for a discussion of a RCRA equivalent cap. A slurry wall acts as an underground barrier, surrounding the contaminated soil. The slurry wall, constructed of clay and soil, would be 25 feet deep which is 10 feet below the deepest level of Layer B, the most highly contaminated layer of soil.

Alternative 4: Excavation and On-site Incineration of Soil at 0-14 feet, SVE and Capping

Major Components of the Remedial Alternative. The major features of this alternative include excavation and treatment of soils at 0-14 feet with on-site incineration, stabilization of the incineration ash, treatment of soils from 14-40 feet with SVE, and covering the site with a soil and clay cap.

Treatment Components: Approximately 64,000 cubic yards of contaminated soil and canal sediment would be excavated and treated through rotary kiln incineration. The incineration process would destroy 99.99% of the principal organic hazardous constituents (POHCs) in soil from 0-14 feet. The results of a rotary kiln

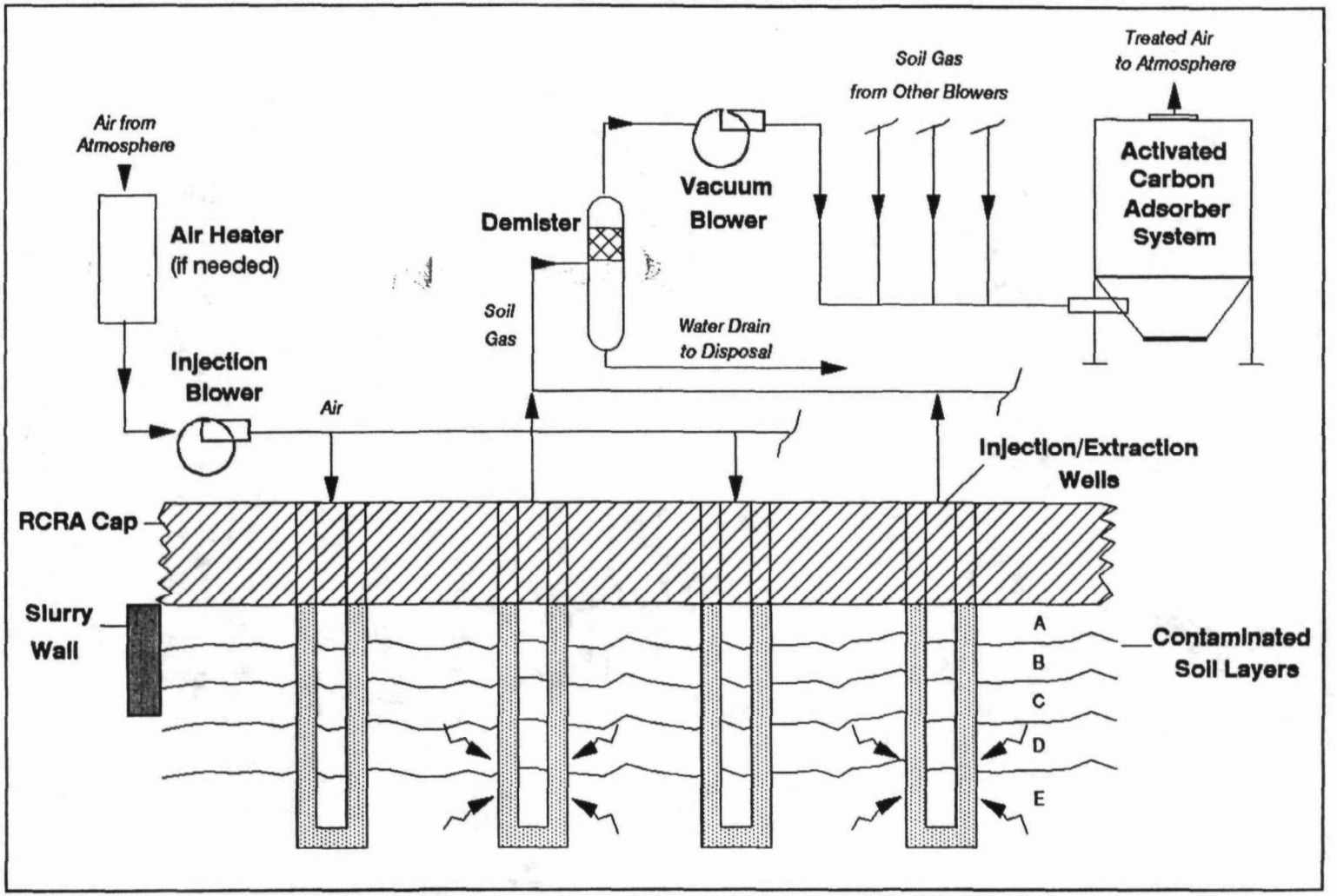

Figure 6 Soil Vapor Extraction System

incineration treatability study demonstrated that ash from the incinerator would fail the TCLP standard for lead. Therefore, ash would be solidified to immobilize lead in compliance with the Land Disposal Restrictions (LDR) treatment standard for lead of 5.0 milligrams/liter (mg/l).

Soil from 14-40 feet would be treated through SVE. See Alternative 3 for a discussion of SVE.

Containment Components: The site would be covered with a soil and clay cap. The soil and clay cap would consist of a 2 foot silty sand foundation layer, 2 to 3 feet of gravel and bentonite/clay mix, a 1 to 2 foot drainage sand layer followed by a 2 foot layer of top soil. The cap would be 8 feet high and would contain a drainage collection system.

Alternative 5: Excavation and Solidification of Soil at 0-10 Feet, SVE and Capping

Major Components of the Remedial Alternative: The major features of this alternative include excavation and treatment of soils at 0-10 feet with on-site solidification, treatment of soil from 14-40 feet with SVE and covering the site with a soil and clay cap.

Treatment Components: Approximately 38,000 cubic yards of material from Layer A and canal sediment would be excavated. Rubble larger than 3 feet in size would be removed from the excavated material and later returned to the excavation and backfilled with solidified material. The excavated material would be fed directly to a thermal unit to remove VOCs. The exhaust gas from the thermal unit would be treated in a venturi scrubber and a carbon adsorption system to remove particulates, sulfur dioxide, and VOCs. The material discharged from the thermal unit would be further screened to remove debris larger than 4 to 6 inches. This debris would also be backfilled with solidified material. The soil from the thermal unit would be transferred to a rotary mixer/blender (pugmill). Solid additives would be metered from storage bins or silos and fed to the pugmill. Similarly, measured flows of a liquid reagent would be fed into the pugmill. After mixing in the pugmill for a predetermined period, the processed soil would be discharged and placed back in the excavation.

Soils from 14-40 feet would be treated using SVE. See Alternative 3 from a discussion of SVE.

Containment Components: A soil and clay cap would be constructed over the stabilized material. See Alternative 4 for a discussion of the cap. The increase in site elevation due to solidification alone would be 2 feet. The total increase in site elevation due to solidification and installation of the cap would be 9 1/2 feet.

Alternative 6: Excavation and Solidification of Soil at 0-14 feet, SVE and Capping

Major Components of the Remedial Alternative. The major features of this alternative include excavation and treatment of soils at 0-14 feet with on-site solidification, treatment of soil at 14-40 feet with SVE and covering the site with a soil and clay cap.

Treatment Components: The treatment components for this alternative are similar to alternative 5. Approximately 64,000 cubic yards of material from Layers A and B and canal sediment would be excavated and treated in the thermal unit and then solidified.

Containment Components: A soil and clay cap would be constructed over the stabilized material. See Alternative 4 for a discussion of the cap. The increase in site elevation due to solidification alone would be 3 1/2 feet. The total increase in site elevation due to solidification and installation of the cap would be 11 feet.

Alternative 7: Excavation and Solidification of Soil Exceeding 500 ppm Lead, SVE and Capping

Major Components of the Remedial Alternative. The major features of this alternative include excavation and solidification of soils containing lead in excess of 500 ppm, treating the remaining soil with SVE, and covering the site with a soil and clay cap.

Treatment Components: The treatment components of this alternative are identical to Alternative 5. Approximately 69,680 cubic yards of soil containing lead in excess of 500 ppm and canal sediment would be excavated and treated in the thermal unit and then solidified.

Containment Components: A soil and clay cap would be constructed over the stabilized material. See Alternative 4 for a discussion of the cap. The increase in site elevation due to solidification alone would be 3/4 feet. The total increase in site elevation due to solidification and installation of the cap would be 11 1/4 feet.

Alternative 8: Excavation and Off-Site Treatment and Disposal of Soil at 0-14 Feet, SVE and Capping

Major Components of the Remedial Alternative. The major features of this alternative include excavation of soil from 0-14 feet and treatment and disposal at an off-site landfill, treatment of soil from 14-40 feet with SVE, and covering the site with a soil and clay cap.

Treatment Components: Approximately 64,000 cubic yards of contaminated soil and canal sediment would be excavated and transported off-site for treatment and disposal at a permitted hazardous waste disposal facility.

Soil from 14-40 feet would be treated using SVE. See Alternative 3 for a discussion of SVE.

Containment Components: The site would be covered with a soil and clay cap. See Alternative 5 for a discussion of the cap.

Table 5 provides cost estimates and cleanup times for each of the alternatives.

VIII. Nine Evaluation Criteria

EPA uses nine criteria, or standards, to evaluate alternatives for cleaning up a National Priorities List site. The nine criteria are summarized below:

1. Overall Protection of Human Health and the Environment

   Addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

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

   Addresses whether or not a remedy will meet all federal and state environmental laws and regulations, or provide grounds for waiving a particular ARAR.

3. Long-term Effectiveness and Permanence

   Refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

4. Reduction of Toxicity, Mobility and Volume (TMV) through Treatment

   Refers to the ability of a remedy to reduce the toxicity, mobility, and volume of the hazardous components present at the site.

5. Cost - 30-year present worth

   Evaluates the estimated capital, operation and maintenance costs of each alternative.

6. Short-Term Effectiveness

   Addresses the period of time needed to complete the remedy, and any adverse impact on human health and the environment that may be posed during the construction and implementation period, until the cleanup standards are achieved.

7. Implementability

   Refers to the technical and administrative feasibility of

TABLE 5

Alternative	Project Cost	Capital Cost	Annual Operation and Maintenance Cost	Estimated Cleanup Time in Years
#2 RCRA Equivalent Cap	$24,686,000	$8,016,000	$736,000	2
#3 SVE & RCRA Equivalent Cap	$36,254,000	$17,023,000	$741,000	9.4
#4 Incineration, 0-14 feet, SVE & Cap	$74,756,000	$57,780,000	$60,000	7.5
#5 Solidification 0-10 feet, SVE, Cap	$41,918,000	$31,992,000	$60,000	9.6
#6 Solidification 0-14 feet, SVE, Cap	$53,073,000	$40,752,000	$60,000	7.6
#7 Solidification 500 ppm lead SVE, Cap	$55,861,000	$42,942,000	$60,000	7.8
#8 Off-site Treatment & Disposal, 0-14 feet, SVE, Cap	$63,659,000	$49,066,000	$60,000	6.5

a remedy, including the availability of materials and services needed to carry out a particular option.

8. State Acceptance

Indicates whether, based on its review of the information, the state concurs with, opposes, or has no comment on the preferred alternative.

9. Community Acceptance

Indicates whether community concerns are addressed by the remedy, and whether or not the community has a preference for a remedy.

In order for an alternative to be eligible for selection, it must meet the first two criteria described above, called threshold criteria.

IX. Summary Analysis of Alternatives Against the Nine Criteria

An evaluation of the eight alternatives in relation to the nine decision making criteria is summarized below.

1. Overall Protection of Human Health and the Environment

All of the alternatives, with the exception of the "no action" alternative, meet this criterion by minimizing or eliminating the risks from direct contact with soils and by minimizing or eliminating the source of groundwater contamination.

2. Compliance with ARARs

All of the alternatives, with the exception of the "no action" alternative, meet this criterion. ARARs are not applied to the "no action" alternative since no activity is taking place.

Since the "no action" alternative is not protective of human health and the environment it will not be discussed further in the criteria analysis.

3. Long-term Effectiveness and Permanence

The alternatives involving treatment or removal of the upper layers of soil as well as treatment of the lower layers of soil, provide the highest degree of long-term effectiveness.

The selected alternative, Alternative #3, would leave waste in place in the upper layers. However, the waste will be isolated by the cap and slurry walls, thus eliminating direct contact with the waste material and minimizing leaching to groundwater. The selected alternative will undergo a review every 5 years to insure protection of human health and the environment as required by EPA when waste is left in place.

4. Reduction of Toxicity, Mobility and Volume through Treatment

All alternatives with the exception of Alternative #2, RCRA cap, would remove approximately 24,387 pounds of VOCs from soil below 14 feet through the action of the SVE system.

Alternative #3 assumes that 25% or 17,950 pounds of VOCs in the upper layers would move into the lower layers and be treated. The mobility of contaminants in all soil layers would be reduced by the cap and slurry walls.

The solidification alternatives, #5-#7, would reduce the toxicity, mobility and volume of both volatile organic and inorganic contaminants by heating the excavated waste to remove VOCs and then stabilizing the soil to encapsulate the inorganics, including lead.

Approximately 99.99% of the VOCs in the upper layers of soil would be destroyed through incineration, alternative #4. The incineration ash would be stabilized, thereby encapsulating the lead.

5. Cost

See Table 5. The total project cost is the present value of capital costs plus operation and maintenance costs.

6. Short-term Effectiveness

Alternative #2 would have the least short-term impacts on site workers and nearby residents and workers because there would be no excavation of the waste. All of the alternatives that have excavation components (Alternatives #3-7) would have short-term impacts on the community and workers due to air emissions generated during excavation. Air emissions would be controlled.

See Table 5 for estimated clean-up times.

7. Implementability

All of the alternatives employ treatment technologies that have been proven effective in the field. Additionally, treatability studies performed on site waste showed that incineration and stabilization were effective in treating the contaminated soil.

8. State Acceptance

The State Department of Toxic Substances Control supports the preferred alternative, Alternative #3.

9. Community Acceptance

No community members attended the June 22, 1992 public hearing on the Revised Proposed Plan for Soil or submitted written comments during the comment period. Potentially Responsible Parties submitted written comments which questioned the need for the SVE

system.

Table 6 provides a comparative analysis of the eight alternatives in relation to the nine criteria.

X. The Selected Remedy

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives using the nine criteria, and the lack of adverse public comments, both EPA and the State have determined that Alternative #3 (Soil Vapor Extraction and RCRA Equivalent Cap with Slurry Walls) is the most appropriate remedy for the Purity Oil Sales Site.

The first step in implementing this alternative, will be to construct a slurry wall along the site boundaries to minimize the migration of contaminants. The wall will be constructed by excavating a trench approximately 25 feet deep and 2 to 4 feet wide around the perimeter of the site. The trench will be filled with a slurry of soil mixed with bentonite clay. Rubble uncovered during excavation of the trench will depending on the level of contamination be transported off-site to an appropriate RCRA facility or disposed on-site. Foam will be applied as necessary to control emissions during construction of the slurry wall.

Following construction of the slurry wall, the site will be graded and all contaminated canal sediments will be excavated and spread over the site. It is estimated that approximately 500 cubic yards of sediment will require excavation. The western 2/3 of the site is 3 to 5 feet above the surrounding land due to the rubble used to fill the former waste pits. Approximately 8,600 cubic yards of imported soil will be used as fill material for the eastern 1/3 of the site. Foam will be applied during excavation and spreading of the canal sediment to control emissions. The entire length of the canal along the southern boundary of the site will then be enclosed in a reinforced concrete pipe.

The 6.8 acre site will then be covered with a cap capable of satisfying the requirements under RCRA Subtitle C for closure of a hazardous waste landfill. The cap should consist of a 1 foot foundation layer containing a gas collection system, 2 feet of bentonite/clay mix, a high density polyethylene (HDPE) liner, 1 1/2 feet of sand containing a drainage collection system, followed by 2 feet of top soil.

The gas collection system will deliver gases to a treatment system. The system will include a scrubber to remove sulfur dioxide (SO2) and a carbon adsorber to remove VOCs.

For SO2 removal, the treatment system will be designed for one scrubber to achieve a 95 percent SO2 removal efficiency. Scrubber blowdown, generated at an estimated rate of 16 gallons per day, will be shipped off-site for disposal.

TABLE 6

NINE CRITERIA LEVEL OF CONFIDENCE ANALYSIS

	ALT. 1	ALT. 2	ALT. 3	ALT. 4	ALT. 5	ALT. 6	ALT. 7	ALT. 8
PPHE	LOW	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH
ARARs	N/A	HIGH	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	HIGH
LTE&P	N/A	LOW	MEDIUM	HIGH	LOW	HIGH	HIGH	HIGH
STE	N/A	HIGH	HIGH	LOW	MEDIUM	MEDIUM	MEDIUM	MEDIUM
COST	N/A	$25	$36	$75	$42	$53	$56	$64
IMP.	N/A	HIGH	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	HIGH
RTMVT	N/A	LOW	MEDIUM	HIGH	LOW	HIGH	HIGH	HIGH
SA	N/A	LOW	HIGH	LOW	LOW	LOW	LOW	MEDIUM
CA	N/A	LOW	HIGH	LOW	MEDIUM	MEDIUM	MEDIUM	HIGH

PPHE - PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT
ARARs- COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS INCLUDING APPLICATION OF WAIVERS
LTE&P- LONG TERN EFFECTIVENESS AND PERMANENCE
STE - SHORT TERM EFFECTIVENESS
COST - TOTAL 30-YEAR PRESENT WORTH COST IN 1995 DOLLARS- IN MILLIONS
IMP. - IMPLEMENTABILITY
RTMVT- REDUCTION IN TOXICITY MOBILITY VOLUME THROUGH TREATMENT
SA - STATE ACCEPTANCE
CA - COMMUNITY ACCEPTANCE

ALT. 1- NO ACTION
ALT. 2- RCRA EQUIVALENT CAP
ALT. 3- RCRA EQUIVALENT CAP, SLURRY WALLS, RETAINING WALLS, SVE
ALT. 4- EXCAVATION, ON-SITE INCINERATION (0-14 FEET), SVE, CLAY CAP
ALT. 5- EXCAVATION, ON-SITE SOLIDIFICATION (29,000 CUBIC YARDS), SVE, CLAY CAP
ALT. 6- EXCAVATION, ON-SITE SOLIDIFICATION (55,000 CUBIC YARDS), SVE, CLAY CAP
ALT. 7- EXCAVATION, ON-SITE SOLIDIFICATION (69,680 CUBIC YARDS), SVE, CLAY CAP
ALT. 8- EXCAVATION, OFF-SITE SOLIDIFICATION (55,000 CUBIC YARDS), SVE, CLAY CAP

HIGH- HIGH LEVEL OF CONFIDENCE THAT CRITERION WILL BE ACHIEVED
MEDIUM- MODERATE LEVEL OF CONFIDENCE THAT CRITERION WILL BE ACHIEVED
LOW- LOW LEVEL OF CONFIDENCE THAT CRITERION WILL BE ACHIEVED
N/A- NOT APPLICABLE

For VOC removal, saturated gases from the scrubber will be heated by a natural gas fired duct burner to raise the gas temperature by approximately 20 degrees F to avoid condensation. One adsorber will be designed to achieve a 95 percent VOC removal efficiency. Another similar unit will be installed as a stand-by unit. It is assumed that 1 pound of activated carbon would adsorb 0.15 pounds of VOCs. The spent activated carbon will be disposed of off-site at a permitted RCRA facility.

A retaining wall will be constructed around the cap to provide slope stability. The wall will be designed to withstand the lateral movement from a maximum credible earthquake. It is anticipated that the top of the wall will be 5 feet above grade. The wall is anticipated to be approximately 2 feet thick and the foundation is anticipated to be approximately 3 feet deep.

Finally, SVE wells will be installed through the cap and screened in Layers C, D, And E. The radius of influence of the SVE system will cover the entire length and width of the site with the possible exception of the 2.5 acre "front yard" area and the .5 acre area south of the North Central Canal. Additional sampling and analysis will be performed in these areas during design to determine the nature and extent of contamination. If it is determined by EPA that the level of contamination in these areas poses a risk to human health and the environment, the design of the SVE system will insure that the radius of influence extends to these areas.

Based on a radius of influence of 30 feet, an air flow rate of 40 cfm and a VOC extraction rate of 0.5 lbs per day per well, EPA estimates that 58 wells will be required to cover the site.
All SVE wells will be screened as appropriate to provide coverage from 14 feet down to the water table. The wells will be designed to be used interchangeably as extraction or air injection wells.

A significant amount of the VOCs in soil deeper than 14 feet (approximately 24,387 pounds) will be removed by the action of the SVE system. Approximately 25% of 17,950 pounds of VOCs in soil from 0-14 feet are expected to be drawn into the lower layers of soil and be treated by the action of the SVE system. Tables 7 and 8 show the type and average concentration of the major VOCs in Layers A through E.

It is anticipated that four carbon adsorption systems, three active and one backup, will be needed to adsorb VOCs extracted from the soil. The amount of VOCs released to the atmosphere after treatment in the carbon adsorber will meet state and federal air quality standards.

Based upon the assumption that 25% of the VOCs in the upper layers will move downward, an operation period of approximately 80 months is anticipated for the SVE system. This assumes a system availability of 80 per cent due to maintenance. The actual operation time will be determined during design based on additional

TABLE 7
VOC CONCENTRATION IN SOIL LAYERS A & B

Contaminated Soil Layer	Type and Average Concentration of the Major Volatile Compounds[1]	
Layer A, average concentration of VOCs in soil	18,722 µg/kg (19 ppm)	
(Samples at depths of 1½ feet-5 feet)	Benzene	1.8%
	Ethylbenzene	6.6%
	Chlorobenzene	5.1%
	Toluene	28.8%
Total Soil in Layer A = 29,000 yd^3	Trichloroethylene	10.9%
	Tetrachloroethylene	6.5%
	Xylene	31.6%
	2-Butanone	8.4%
Total VOCs Present in Layer A	1,456 lb	
Layer B, average concentration of VOCs in soil	1,009,226 µg/kg (1,009 ppm)	
(Samples at depths of 5 feet - 12 feet)	Benzene	1.8%
	Ethylbenzene	15.1%
	Chlorobenzene	2.0%
	Toluene	29.1%
Total Soil in Layer B = 26,000 yd^3	Trichloroethylene	8.9%
	Tetrachloroethylene	6.3%
	Xylene	26.1%
	4-Methyl-2 Pentanone	2.5%
Total VOCs Present in Layer B	70,345 lb	

(1) The major compounds in Layer A are 97% of the total volatile organics in Layer A and the major compounds in Layer B are 88% of the total volatile organics present in Layer B.

TABLE 8 VOC CONCENTRATION IN SOIL LAYERS C, D, & E	
Contaminated Soil Layer	**Type and Average Concentration of the Major Volatile Compounds(1)**
Layer C, average concentration of VOCs in soil	134,134 µg/kg (134 ppm)
(Samples at depths of 12 feet-20 feet)	Benzene 1.6% Ethylbenzene 12.3% Chlorobenzene 7.0% Toluene 26.2% Trichloroethylene 6.8% Xylene 22.0% 2-Butanone 23.9%
Layer D & E, average concentration of VOCs in soil	42,512 µg/kg (43 ppm)
(Samples at depths of 20 feet - 39 feet)	Toluene 7.6% Trichloroethylene 35.9% Methylene Chloride 26.2% 4-Methyl-2 Pentanone 4.7% 2-Butanone 6.0%

(1) The major compounds in Layer C are 94% of the total volatile organics in Layer C and the major compounds in Layers D and E are 80% of the total volatile organics present in Layers D and E.

TOTAL VOCs IN LAYERS C,D AND E

Layer	Amount of Contaminated Soil (yd^3)	Amount of Volatile Compounds (lb)
Layer C	45,000	16,181
Layers D and E	72,000	8,206

testing.

Once the cap and SVE system are constructed, monitoring wells will be installed in accordance with RCRA in the vadose zone and groundwater to determine if hazardous constituents are migrating from the site.

In order to protect the cap, deed restrictions will be imposed on the site to prohibit future excavation. The site may be suitable for light industrial uses once cleanup levels have been achieved.

Applicable or Relevant and Appropriate Requirements (ARARs)

ARARs are federal and state standards, requirements or levels of control that Superfund remedies must meet. The ARARs identified for the selected alternative are listed in Appendix 1.

Cleanup Levels

The purpose of this response action is to control risks posed by direct contact with soils and canal sediments and to minimize the migration of contaminants to groundwater.

The purpose of the SVE system will be to reduce VOC mass in the vadose zone from 14 feet to the water table to a level that no longer threatens to contaminate groundwater at levels above MCLs. The threat to groundwater will be evaluated through vadose zone monitoring and vadose zone contaminant transport modeling. The Vadose Zone Transport Model (VLEACH) or a similar analytical tool determined acceptable by EPA, will be used to determine contaminant transport through the vadose zone. Vadose zone monitoring and modeling data will be used by EPA to determine the need for additional SVE or monitoring wells and to determine when to stop operating the SVE system. Modeling information will be supplemented by soil boring data taken between selected SVE wells and above and below the screened intervals for each layer.

A request to evaluate the need to continue operation of the SVE system will not be considered by EPA until the SVE system has operated for a minimum of one year. This will allow the SVE system to draw down and treat the most mobile VOCs in Layers A and B.

The groundwater monitoring system installed in compliance with RCRA Subtitle C requirements and the SVE system will be maintained in perpetuity. If it is determined that MCLs are being exceeded after the SVE system has ceased operating, the SVE system and/or the groundwater extraction wells will be re-activated under the direction of EPA.

XI. Statutory Determinations

Under CERCLA section 121, EPA must select remedies that are protective of human health and the environment, comply with applicable or relevant and appropriate requirements (unless a

statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principal element. The following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy protects human health and the environment through treatment of VOCs in soil deeper than 14 feet, thereby eliminating them as a source of groundwater contamination. Also, approximately 25% of the VOCs in the upper 14 feet of soil will be drawn down to the lower layers by the action of the SVE system and be treated.

The RCRA equivalent cap minimizes the risks from direct contact with soils. The cap and slurry wall significantly reduce the potential for rainwater to leach contaminants from the soil into the groundwater.

There are no short-term threats associated with the selected remedy that cannot be readily controlled. In addition, no adverse cross-media impacts are expected from the remedy.

Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy will comply with all ARARs. The ARARs are presented in Appendix 1.

Cost-Effectiveness

EPA believes this remedy will eliminate the risks to human health at an estimated cost of $36,254,000, therefore the selected remedy provides an overall effectiveness proportionate to its costs, such that it represents a reasonable value for the money that will be spent.

The selected remedy assures a high degree of certainty that the remedy will be effective in the long-term because of the significant reduction of the toxicity and mobility of the wastes achieved through SVE and cap with slurry walls respectively.

Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable

EPA and the State of California have determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the soils operable unit at the Purity Oil Sales site. Of those alternatives that are protective of human health and the

environment and comply with ARARs, EPA and the State have determined that this selected remedy provides the best balance in terms of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume achieved through treatment, short-term effectiveness, implementability, cost, while also considering the statutory preference for treatment as a principal element and considering state and community acceptance.

The selected remedy significantly reduces VOC levels, one of the principal threats posed by the soil. This remedy will cost less than treatment of all soil layers or off-site disposal. The selection of a remedy which treats the contaminated soil is consistent with program expectations that indicate that highly toxic and mobile wastes are a priority for treatment and is often necessary to ensure the long-term effectiveness of a remedy.

Lead, the other principal threat at the site, will not be treated. However, the cap and slurry wall will prevent direct contact with contaminated soil, thereby eliminating the exposure pathway for lead.

Preference for Treatment as a Principal Element

By treating the contaminated soils by SVE, the selected remedy addresses one of the principal threats posed by the site through the use of this treatment technology. By utilizing treatment as a significant portion of the remedy, the statutory preference for remedies that employ treatment as a principal element is satisfied.

XII. Documentation of Significant Changes

The Proposed Plan for the Purity Oil Sales site was released for public comment in June 1992. The Proposed Plan identified Alternative #3, treatment of soil from 14-40 feet with Soil Vapor Extraction, RCRA equivalent cap, slurry wall and enclosing the North Central Canal, as the preferred alternative for soil remediation. EPA reviewed all written and verbal comments submitted during the public comment period. Upon review of these comments, it was determined that areas beyond the planned RCRA cap which are contaminated due to past site activities will be investigated further during design.

Contamination exists in surface and deep soil off-site. If further sampling and analysis during design indicates that these areas pose a threat to human health and the environment they will be remediated consistent with the design of the selected alternative. It is anticipated that off-site surface soil contamination will be excavated and brought on-site to be covered by the cap and that off-site deep soil contamination will either be excavated and brought on-site or remediated in place using SVE.

APPENDIX A

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

FEDERAL ARARS

Citation	Requirement Description	A	RA
I. Resource Conservation and Recovery Act (RCRA) as amended by Hazardous and Solid Waste Amendments (HSWA) (42 USC 6901 et seq.) Hazardous Waste Control Act (HWCA) (Health and Safety Code Section 25100-25395)	RCRA is the federal law providing requirements for hazardous waste management including criteria for the identification of hazardous waste and specific standards for the design, operation, and closure of hazardous waste treatment, storage, or disposal units and facilities. EPA has authorized California to administer the RCRA program. State regulations will be cited for the authorized portions of the program. RCRA requirements are generally applicable to CERCLA actions when the following conditions are met: (1) the waste meets the RCRA criteria for a listed hazardous waste or a characteristic hazardous waste, and (2) the waste is treated, stored or disposed (as defined in 40 CFR 260.10) after the effective date of the RCRA requirement.		
A. Characteristics of Hazardous Waste (CCR 66261.1-66261.126)	RCRA identifies a solid waste as a hazardous waste if it exhibits the characteristic properties of ignitability, reactivity, toxicity, or for liquid or aqueous wastes, corrosivity. The RCRA toxicity characteristic is based upon the leachability of designated constituents as measured by the Toxicity Characteristic Leaching Procedure (TCLP). Specific chemicals identified at Purity Oil which are currently included in the toxicity criteria are:	X	

Chemical	EPA HW No.	TCLP Maximum Concentration (mg/l)
Arsenic	D004	5.0
Barium	D005	100.0
Benzene	D018	0.5
Cadmium	D006	1.0
Chlorobenzene	D012	100.0
Chloroform	D022	6.0
Chromium	D007	5.0
Heptachlor	D031	0.008
Lead	D008	5.0
Mercury	D009	0.2
Methyl Ethyl Ketone	D035	200.0
Selenium	D010	1.0
Silver	D011	5.0
Tetrachloroethylene	D039	0.7
Trichloroethylene	D040	0.5

A = Applicable
RA = Relevant and Appropriate

	FEDERAL ARARS			
	Citation	Requirement Description	A	RA
LOCATION SPECIFIC	I. RCRA Location Standards (22 CCR 66264.18)	Portions of new facilities where treatment, storage, or disposal of hazardous waste will be conducted must not be located within 61 meters (200 feet) of a fault which has had displacement in Holocene time. Facilities located in a 100-year floodplain must be designed, constructed, operated and maintained to prevent washout of hazardous waste by a 100-year flood. Because the intent of these location standards is to reduce the potential for release of hazardous constituents due to special environment conditions, they are relevant and appropriate for the proposed closure activities.		X
ACTION SPECIFIC	I. Resource Conservation and Recovery Act (RCRA) (42 USC 6901 et Seq.) Hazardous Waste Control Act (HWCA) (Health and Safety Code 25100-25395)	RCRA Subtitle C requirements provide action-specific ARARs for CERCLA actions if the CERCLA hazardous substance is also a RCRA hazardous waste, and the CERCLA action constitutes waste treatment, storage, or disposal as defined by RCRA. RCRA storage requirements are applicable to waste storage after the effective date of November 19, 1980. RCRA treatment requirements are applicable to any method, technique, or process, including neutralization, to change the character or composition of a hazardous waste to render it less hazardous. RCRA disposal includes placement of hazardous waste into a landfill, surface impoundment, or other management unit. Movement of a RCRA hazardous waste originally disposed before November 19, 1980 may invoke the land disposal restrictions. Requirements for RCRA-permitted facilities are generally applicable to CERCLA activities that consist of treatment, storage, or disposal (TSD) of hazardous waste.		
	A. Permitted Hazardous Waste Facilities (22 CCR 66264.10)	Requirements for RCRA TSD facilities are not applicable because the proposed closure activities do not include treatment, storage, or disposal of RCRA hazardous waste. However, the requirements are generally considered relevant and appropriate because the remedy's closure of the unit is similar to a RCRA landfill or surface impoundment.		
	1. Groundwater Protection (22 CCR 66264.90)	There are three types of groundwater monitoring for TSD facilities required under RCRA: detection monitoring, compliance monitoring and corrective action monitoring. The groundwater monitoring program must be designed and operated to verify that hazardous constituents have not		X

A = Applicable
RA = Relevant and Appropriate

	FEDERAL ARARS			
	Citation	Requirement Description	A	RA
ACTION SPECIFIC	1. (Continued)	migrated beyond the outer containment layer prior to the end of post-closure care. The regulations are applicable to "regulated units" which are surface impoundments, waste piles, landfills, and land treatment units that received hazardous wastes after July 26, 1982. The RCRA-equivalent closure would not meet the definition of regulated unit. However, the closure includes leaving untreated waste in the ground. Therefore, groundwater monitoring requirements are relevant and appropriate for assuring effective protection.		
	2. Land Treatment Unsaturated Zone Monitoring (22 CCR 66264.90)	Because all wastes are not removed from the disposal area, vadose zone (unsaturated zone) monitoring requirements that require monitoring of soil and soil-pore liquids as feasible to determine whether hazardous constituents are migrating, are relevant. This requirement should be considered appropriate only to the extent that the remedial design can feasibly incorporate vadose zone monitoring.		X
	3. Closure and Post-Closure (22 CCR 66264.110-66264.120)	RCRA closure of a "regulated unit" requires minimization of the need for further maintenance or control; minimization or elimination of postclosure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products; and disposal or decontamination of equipment, structures, and soils. Because this alternative leaves hazardous constituents in place, closure and post-closure requirements are relevant and appropriate. The landfill at the Purity Oil site should be closed pursuant to these regulations.		X
	4. Landfill Closure and Post-Closure Care (22 CCR 66264.310)	Closure of a landfill requires a final cover designed and constructed to: prevent the downward entry of water into the landfill for a period of at least 100 years; function with minimum maintenance; promote drainage and minimize erosion of the cover; accommodate settling and subsidence so that the cover's integrity is maintained; and have a permeability less than or equal to the permeability of natural subsoils present. After final closure, all post-closure requirements contained in 22 CCR 66264.117 through 66264.120, including maintenance and monitoring, must be complied with throughout the post-closure care period. In addition, a control system designed to collect gases emitted from the buried waste and convey these gases to a treatment device is required unless it is demonstrated that significant amounts of toxic or flammable gasses will not be emitted from the buried waste.		X

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FEDERAL ARARS			
Citation	**Requirement Description**	**A**	**RA**
5. Land Disposal Restrictions for Hazardous Debris (22 CCR 66268, General) (57 FR 160, Hazardous Debris Rule)	Land disposal restrictions are applicable to RCRA wastes that are excavated and placed either offsite or onsite. Debris is defined as materials that are primarily non-geologic in origin such as man-made synthetic manufactured materials, or construction and demolition materials. On August 18, 1992, EPA promulgated treatment standards to be attained prior to land disposal of debris which is a restricted RCRA waste.	X	
II. Clean Water Act (CWA) (33 USC 1251-1376; 40 CFR 100-199) A. National Pollutant Discharge Elimination System (NPDES) (40 CFR 122-125)	Both onsite and offsite discharges from CERCLA sites to surface waters are required to meet the substantive CWA NPDES requirements, including discharge limitations, monitoring requirements, and best management practices. Only offsite CERCLA discharges to surface waters must be NPDES-permitted. Stormwater runoff that is channeled to a receiving water body is included under this requirement.	X	
III. Clean Air Act (CAA) (42 USC 7401 et seq.) National Emission Standards for Hazardous Air Pollutants (NESHAPs) A. Fugitive Emissions Sources (40 CFR 61.240)	Standards are given in the regulation for equipment that either contains or contacts a liquid or gas that is at least 10% by weight volatile hazardous air pollutants (VHAP), defined as regulated substances *including benzene and vinyl chloride. Regulated equipment includes* pumps, compressor pressure relief devices, sampling connection systems, open-ended valves or lines, valves, flanges and other connectors, product accumulator vessels and control devices or systems. Although the treatment units at Purity Oil are not expected to process VHAP at concentrations in excess of 10% by weight, these standards are still considered relevant and appropriate because their intent is to regulate and minimize VHAP emissions.		X

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FEDERAL ARARS			
Citation	**Requirement Description**	**A**	**RA**
B. Benzene Waste Operation Standards (40 CFR 61.344)	Owners or operators of chemical manufacturing plants, coke by-product recovery plants, petroleum refineries, or RCRA-permitted hazardous waste facilities that treat, store, or dispose of hazardous waste (TSDFs) from these three types of facilities must comply with benzene emission standards if they manage a total quantity of benzene in excess of 10 megagrams per year (11 tons/year). These standards include general treatment and operation requirements and specific requirements for surface impoundment (defined as waste management units containing liquids wastes or wastes with free liquids), tanks, containers, and oil-water separators. The surface impoundment operation standard requires that the unit be equipped with a cover that does not release detectable benzene emissions as indicated by an instrument reading less than 500 ppmv above background. Again, the treatment units at Purity Oil are not expected to manage in excess of 10 megagrams per year of benzene, but these standards are still relevant and appropriate.		X

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STATE ARARS				
	Citation	Requirement Description	A	RA
CHEMICAL SPECIFIC	I. Hazardous Waste Control Act (HWCA) (Health and Safety Code Section 25100-25395)	HWCA provides the state law for the management of hazardous waste including the state criteria for the identification of hazardous waste and standards for the design, operation, and closure of hazardous waste treatment, storage, and disposal facilities. While this program closely parallels the federal RCRA program it contains some components with requirements in excess or more stringent than RCRA.		
	A. Criteria for Identifying Hazardous Waste (22 CCR 66261.1-66261.126)	Hazardous waste may be identified according to any of the following criteria according to specified test procedures. Toxicity Criteria: Toxicity of hazardous waste is established by LD_{50} or LC_{50} criteria. Persistent and Bioaccumulative Toxic Substances: Total Threshold Limit Concentrations (TTLCs) and Soluble Threshold Limit Concentrations (STLCs) have been established to identify hazardous waste. Chemicals detected at Purity Oil that have STLC or TTLC values are the following:	X	

Chemical	STLC(mg/l)	TTLC(mg/kg)
Arsenic	5	500
Barium	100	10,000 (excludes Ba SO_4)
Cadmium	1.0	100
Chromium (total)	560	2,500
Copper	25	2,500
Lead	5	1,000
Mercury	0.2	20
Nickel	20	2,000
Silver	5	500
Trichloroethylene	209	2040
Vanadium	24	2,400
Zinc	250	5,000

Corrosivity Criteria: If, when a waste is mixed with an equivalent weight of water, a liquid is produced which corrodes steel according to EPA SW-846 Test Method 1110 SW-846, it is a hazardous waste.

List of Special Wastes: These include baghouse and scrubber wastes such as from APCD's and drilling muds from oil and gas wells.

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	STATE ARARS			
	Citation	Requirement Description	A	RA
LOCATION SPECIFIC	I. Porter-Cologne Water Quality Act (WC 13000-13806) (23 CCR 2510-2533) Class I Waste Management Units	New waste management units shall have a 61-meter (200-foot) setback from any known Holocene earthquake fault (23 CFR 2531). New and existing hazardous waste management units shall be immediately underlain by natural geologic materials with a permeability of not more than 10^{-7} cm/sec and shall not be located where porous soil could impair the ability of natural geologic materials to act as a barrier to vertical fluid movement. New and existing Class I units (hazardous waste management units) shall also be located outside of floodplains subject to inundation by floods with a 100-yr return period (23 CFR 2531). Alternatives to these standards may be considered under certain conditions if the standard is not feasible and the alternative is consistent with the performance goal and affords equal protection against water quality impairment. (See 23 CCR 2510 for specific conditions under which alternatives may be considered). These standards are relevant and appropriate for the RCRA cap because their intent is to prevent the release of hazardous waste through unusual environmental events.		X
ACTION SPECIFIC	I. Hazardous Waste Control Act (HWCA) (Health and Safety Code Section 25100-25395)			
	A. Environmental Monitoring for Interim Status and Permitted Facilities (22 CCR 66264.90)	This article contains the requirements for the environmental monitoring of air, soil, and water for on-site facilities that treat, store, or dispose of hazardous waste. General requirements include a provision for groundwater monitoring. In addition, the requirements are relevant and appropriate for closure and post-closure monitoring assuming that the redisposed waste is nonhazardous.		X
	B. Landfill Closure and Post Closure (22 CCR 66268.310)	Closure of a landfill requires a final cover designed and constructed to: prevent the downward entry of water into the landfill for a period of at least 100 years; function with minimum maintenance; promote drainage and minimize erosion of the cover; accommodate settling and subsidence so that the cover's integrity is maintained; and have a permeability less than or equal to the permeability of natural subsoils present. After final closure, all post-closure requirements contained in 22 CCR 66264.117 through 66264.120, including maintenance and monitoring, must be complied with throughout the post-closure care period. In addition, a control system designed to collect gases emitted from the buried waste and convey these gases to a treatment device is required unless it is demonstrated that significant amounts of toxic or flammable gasses will not be emitted from the buried waste.		X

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	STATE ARARS			
	Citation	Requirement Description	A	RA
ACTION SPECIFIC	C. Closure and Post-Closure for Interim Status and Permitted Facilities (22 CCR 66264.110-66264.120)	A hazardous waste management unit facility shall be closed in a manner that minimizes the need for further maintenance and controls, minimizes, or eliminates postclosure escape of hazardous waste, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters, or the atmosphere. Closure shall be completed within 90 days after receiving the final volume of hazardous waste. When closure is completed, all facility equipment and structures shall be properly disposed of, or decontaminated by removing all hazardous waste and residues. Post-closure care, including environmental monitoring, shall continue as long as the waste presents a potential threat to the environment. Closure and post-closure care requirements are relevant and appropriate because it proposes to leave either untreated or treated waste at the site within engineered containment systems. It is relevant and appropriate for the monitoring and containments used for the untreated waste and the wastes treated in situ.		X
	II. Porter-Cologne Water Quality Act (WC 13000-13806; 23 CCR 1050-2836).	The Porter Cologne Water Quality Act provides broad statutory authority to protect water quality by regulating waste disposal and requiring hazardous waste cleanup. Regulations for monitoring and corrective action are applicable to "persons responsible for discharges at waste management units which are closed, abandoned, or inactive on the effective date of the regulations," meaning that the SWRQC and the RWQCB have jurisdiction over waste disposal sites abandoned prior to the enactment of requirements (§ 2510.(g)). Porter-Cologne delegates standard-setting authority to the RWQCBs. The Central Valley RWQCB has not promulgated specific treatment performance standards.		
	A. Water Quality Monitoring for Classified Waste Management Units (23 CCR 2550)	Monitoring is required to detect leaks from waste management units and a corrective action program is required if leaks are detected. A waste management unit is broadly defined as an area of land where hazardous, designated, or nonhazardous waste is discharged. Owners and operators of new or existing landfills and surface impoundments shall monitor groundwater, surface water and the unsaturated zone as feasible. This requirement is applicable and generally complements the federal RCRA and state HWCA monitoring requirements.	X	

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	STATE ARARS			
	Citation	Requirement Description	A	RA
ACTION SPECIFIC	B. Discharges of Waste to Land, Construction and Operation Requirements for Waste Management Units (23 CCR 2510-2601)	Waste management unit standards include design, construction, operation, and closure requirements for surface impoundments. Although alternative designs may be allowed if they are equally protective of water quality, specific requirements for Class I, or hazardous waste management units include the following: - New and existing waste management unit landfills must be operated to ensure that wastes will be a minimum of five feet above the highest anticipated elevation of groundwater. - Cutoff walls are required where there is a potential for lateral movement of fluid; the walls must be constructed a minimum of 5 feet into natural geologic material with a permeability of 10^{-7} cm/s or less. - Clay liners shall be at least 2 feet thick, of 90% relative compaction and maximum permeability of 1×10^{-6} cm/sec. - New and existing units must be closed with a cover consisting of 2 feet of foundation material, 1 foot of compacted top soil (permeability equal to the bottom liner), and the final cover must be graded to prevent ponding or erosion. - Post-closure care including monitoring, leachate collection, and cover maintenance must continue for as long as wastes present a threat to water quality. These standards are applicable under the assumption that hazardous wastes would be left in place at the closed unit.	X	
	III. San Joaquin Valley Unified Air Pollution Control District Rules and Regulations	The San Joaquin Valley Unified Air Pollution Control District has authority to implement the federal and state air quality management programs in Fresno through the State Implementation Plan. However, Fresno County Air Pollution Control District (FAPCD) "Rules and Regulations" remain in effect in Fresno County until the corresponding San Joaquin Valley Unified Air Pollution Control District Rules and Regulations are promulgated in the State Code of Regulations. The District is completing "Rules and Regulations" and has issued the following that may serve as ARARs for Purity Oil.		
	A. Rule 220.1 - New and Modified Stationary Source Review	All new stationary sources which emit affected pollutants (pollutants including VOCs, NO_x, SO_x, PM_{10}, lead, and reduced sulfur compounds, are subject to the following requirements:	X	

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RA = Relevant and Appropriate

STATE ARARS			
Citation	**Requirement Description**	**A**	**RA**
A. (Continued)	- Use of Best Available Control Technology (BACT) for emissions, - Emission offsets for nonattainment pollutants, and - Air quality modeling to show that NAAQS or CAAQS are not violated or an existing violation is not made worse. These requirements apply to proposed remedial activities including in situ vapor extraction and air pollution control device emissions.	X	
IV. Fresno County Air Pollution Control District (FAPCD) Rules and Regulations			
A. Rule 401 - Visible Emissions	Air contaminants shall not be emitted for a period longer than three minutes if they are darker than Number 1 on the Ringlemann Chart.	X	
B. Rule 404 - Particulate Matter Concentrations	Emissions may not contain more than 0.23 grams/m^3 of particulate matter at standard conditions.	X	
C. Rule 405 - Particulate Matter Emission Rates	Emission shall not exceed the values given by the following equations. $E = 3.59\ P^{0.62}$ $\quad P \leq 30$ tons/hour $E = 17.31\ P^{0.16}$ $\quad P > 30$ tons/hour Where: E = emissions in pounds per hour P = process weight in tons per hour	X	
D. Rule 406 - Sulfur Compounds	Sulfur compounds (measured as SO_2) shall not exceed 0.2 percent by volume of any discharge to atmosphere.	X	
E. Rule 408 - Fuel Burning Equipment	Equipment that burns fuel for the primary purpose of producing heat must not exceed the following emission limits: - Sulfur Compounds: 200 pounds per hour (Calculated as SO_2) - Nitrogen oxides: 140 pounds per hour (Calculated as NO_2) - Combustion Contaminants: 10 pounds per hour. Theses limit would apply to any air pollution control devices or process that use combustive processes.	X	

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OTHER REQUIREMENTS	
Document	**Requirement Description**
These guidelines provide the standard for compliance with previously cited RCRA requirements.	
I. RCRA Technical Guidance Document "Final Covers on Hazardous Waste Landfills and Surface Impoundments."	These guidelines specify a multilayer cover consisting of the following layers from top to bottom: • Vegetation/Soil: 60 cm (2 ft.) • Filter (Nominal Thickness) • Drainage: 30 cm (1 ft.) • Low Permeability Flexible Membrane Liner: 20 mil (minimum) • Low Permeability Soil: 60 cm (2 ft.) Optional layers and layer modifications include the addition of a gravel top surface for erosion control and the removal of the drainage layer in arid climates, the addition of biotic barriers to prevent damage by animals, and the addition of a gas vent layer to control gas emissions.
II. RCRA Groundwater Monitoring: "Technical Enforcement Guidance Document."	This comprehensive guidance document provides procedures to be followed for groundwater monitoring at RCRA TSD facilities.