EPA/ROD/R04-93/146
1993

EPA Superfund
Record of Decision:

**PEAK OIL CO./BAY DRUM CO.
EPA ID: FLD004091807
OU 01
TAMPA, FL
06/21/1993**

RECORD OF DECISION OPERABLE UNIT 1 PEAK OIL SOURCE CONTROL

PEAK OIL/BAY DRUMS SITE

Brandon, Hillsborough County, Florida

Prepared By:

Environmental Protection Agency

Region IV

Atlanta, Georgia

RECORD OF DECISION
PEAK OIL SOURCE CONTROL
OPERABLE UNIT ONE
PEAK OIL/BAY DRUMS NPL SITE

DECLARATION

SITE NAME AND LOCATION

Peak Oil/Bay Drums Superfund Site
Brandon, Hillsborough County, Florida

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for Operable Unit One at the Peak Oil/Bay Drums Site in Brandon, Hillsborough County, Florida, which was chosen in accordance with the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments 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 file for this site.

The State of Florida, as represented by the Florida Department of Environmental Regulation (FDER), has been the support agency during the Remedial Investigation and Feasibility Study process for the Peak Oil/Bay Drums site. In accordance with 40 CFR 300.430, as the support agency, FDER has provided input during the process. Based upon comments received from FDER, it is expected that concurrence will be forthcoming; however, a formal letter of concurrence has not yet been received.

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 Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE REMEDY

The remedy selected by EPA for the Peak Oil/Bay Drums Site will be conducted in four separate operable units. Operable Unit One, which is addressed in this Record of Decision, will address the source of contamination which represents a principal threat at the Peak Oil Site through an in-situ treatment alternative which includes process technologies that will treat impacted soils, sediments and the ash pile. Operable Unit Two will address the appropriate remediation for the groundwater at the Peak Oil and Bay Drums Sites. Operable Unit Three will address the source of contamination at the Bay Drums Site. Operable Unit Four will address the appropriate remediation for the surrounding wetlands at the Peak Oil, Bay Drums and Reeves Southeastern Sites. Operable Units Two, Three and Four will be addressed in separate Records of Decision.

The major components of the selected remedy for Operable Unit One include:

- demolition of buildings, fence, and railroad tracks, where necessary, to construct the slurry wall;

- construction of a slurry wall around the impacted site soils;

- construction of a chain-link fence and placement of warning signs around the perimeter of the site;

- installation of a groundwater recovery system which includes extraction wells and collection header piping;

- installation of a mixing system to add necessary nutrients and dissolved oxygen (or hydrogen peroxide) to the groundwater for infiltration;

- installation of a delivery system (leach field piping or spray irrigation) to provide infiltration of treated groundwater;

- implement weekly maintenance and operation of in-situ treatment system;

- implement periodic monitoring to optimize the hydrodynamics of the extraction wells and infiltration field, track the effectiveness of the biodegradation and soil flushing processes, and maintain the levels of nutrients and oxygen in the media at proper levels to ensure biodegradation;

- solidification/stabilization of lead-impacted soil with concentrations above the remediation goal of 284 milligrams per kilogram (mg/kg);

- solidification/stabilization of the ash pile;

- on-site disposal of solidified/stabilized soil and ash;

- installation of a multimedia cap after in-situ treatment is completed;

- institution of deed restrictions;

- conduct five-year reviews after treatment is completed to evaluate the necessity of additional remedial actions.

The initial total present worth cost for the selected remedy as presented in the Feasibility Studies is $3,947,165.

STATUTORY DETERMINATION

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. The 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.

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

Figures

Tables

RECORD OF DECISION

Summary of Remedial Alternative Selection
Operable Unit One - Soils, Sediments and Ash
Peak Oil/Bay Drums Superfund Site
Brandon, Hillsborough County, Florida

1.0 Site Name, Location, and Description

The Peak Oil Site (the Site) is located in the north central section of Hillsborough County, Florida within the southeast quarter of Section 7, Township 29, South Range 20 East (see Figure 1.1). The Site is located south of State Road 574 (SR 574) and the CSX Railroad and approximately 0.25 miles west of Faulkenburg Road (see Figure 1.2).

As shown on Figure 1.2, the Peak Oil Site is approximately four acres in area (approximately three football fields side by side). The Site is located between the Reeves Southeastern Wire (SEW) parcel on the east and the Bay Drums Superfund Site on the west. The Reeves Southeastern Galvanizing (SEG) Superfund Site is located north of the Peak Oil Site, across SR 574. Just south of the Peak Oil Site is a Peoples Gas Company natural gas distribution center and a pile of discarded roofing materials. The Site currently has two warehouse-type buildings, a concrete block office building, a small storage shed, a small lagoon from which waste oil sludges were excavated during a previous EPA removal action, a 6,000 cubic-yard ash pile lined and covered with plastic liners (also from the previous EPA removal action), and a 400 cubic-yard soil pile. A concrete pad, 90 feet by 110 feet, is also located in the southeast corner of the site.

The closest residential areas to the site are single-family houses and mobile homes, located approximately 0.3 miles east of the Peak Oil Site across Faulkenburg Road. Other residential areas include single-family homes, approximately 0.75 miles north of the Peak Oil Site across SR 574 on Martin Luther King Avenue; single-family houses in an area approximately 1.2 miles west of the Peak Oil property near the intersection of U.S. Highway 301 and SR 574; and single-family residences and mobile homes in an area approximately 1.8 miles northeast of the Peak Oil property on Six Mile Creek Road.

Three wetlands are adjacent to the site, to the southwest, southeast, and northwest. Stormwater runoff drains primarily to the west, but a small part of the site drains to the southeast. The southwest corner of the site is subject to inundation during wet seasons due to the high groundwater table, but is not within any drainageway flood plain.

2.0 Site History and Enforcement Activities

The Peak Oil Facility was constructed and began operation in August 1954, under the ownership of Mr. John Schroter. Ownership of the company was transferred in 1975 to Mr. Robert Morris. Mr. Morris and his sons continued the operation of the business as a used oil re-refinery. After 1979, operations reportedly were limited to the resale of used oils as fuel and flotation oil and repackaging of virgin material.

Facility operations involved the use of a re-refining process to purify used oils and lubrication fluids. Used oils accepted at the facility for re-refining consisted primarily of used auto and truck crankcase oil, with some hydraulic oil, transformer fluid, and other used oils.

An acid/clay purification and filtration process was used to re-refine the oil. This process generated a low-pH sludge and oil-saturated clay, which were stored over the life of the facility in three separate impoundment areas (Lagoons No. 1, No. 2 and No. 3) in the southern portion of the site. Sludge storage Lagoon No. 1 was in use until sometime after 1960. Another sludge storage area was constructed further south of Lagoon No. 1. This area consisted of two large, unlined impoundments measuring approximately 90 feet by 100 feet each (Lagoon No. 2 and Lagoon No. 3). The two impoundments were connected by an oil/water separator. The locations of the lagoons are shown on Figure 2.1.

In approximately late 1979 or 1980, the company discontinued the re-refining process and shifted to filtering and blending used oil for resale. Several company employees have reported that spills and leaks continued to occur from on-site storage tanks, tanker trucks, oil/water separators, and other on-site equipment after the company shifted its operations from re-refining to filtering and blending. The former employees also reported that some wastes continued to be stored in the on-site lagoons after the shift to filtering and blending operations.

Lagoon No. 1 and Lagoon No. 3 were backfilled. However, the exact dates of backfilling are unknown. Lagoon No. 2 is the only impoundment on the site that was not backfilled. This lagoon originally contained up to approximately 12 feet of sludge. Overflow from Lagoon No. 2 was apparently directed to the oil/water separator to remove free oil, and the aqueous phase was discharged into Lagoon No. 3, to the east. EPA and the FDER conducted inspections at the Peak Oil and Bay Drum Sites and reported that various chemical constituents were present in site soils, including heavy metals, petroleum hydrocarbons, trace concentrations of polychlorinated biphenyls (PCBs), and solventtype chemical compounds.

In 1986, EPA initiated a removal action utilizing a mobile incinerator to treat approximately 4,000 cubic yards of acidic polychlorinated biphenyl (PCB) sludge found in Lagoon No. 2. Approximately 6,000 cubic yards of ash generated during the incineration process was placed on and covered with a protective plastic cover at the Site.

In 1984, the Peak Oil and Bay Drums Sites were jointly evaluated according to the Hazard Ranking System and proposed for listing on the National Priority List (NPL) with a score of 58.15. On June 10, 1986, the Peak Oil Site, combined with the adjacent Bay Drums Site, was placed on the NPL. In 1989, members of the Peak Oil Generators Group entered into a Consent Order with the EPA to conduct a remedial investigation/feasibility study (RI/FS) at the Peak Oil Site.

3.0 Highlights of Community Participation

In accordance with Sections 113 and 117 of CERCLA, EPA has conducted community relations activities at the Peak Oil Site to ensure that the public remains informed concerning activities at the site. During the numerous removal activities at the site, EPA issued press releases to keep the public informed. There was some local press coverage of EPA's activities, and EPA held meetings with local (county) and state officials to advise them of the progress at the site.

A community relations plan (CRP) was developed in 1988 and revised in 1989 to establish EPA's plan for community participation during remedial activities. Following completion of the RI/FS, a Proposed Plan fact sheet was mailed to local residents and public officials on August 12, 1992. The fact sheet detailed EPA's preferred alternative for addressing the source of contamination (Operable Unit One) at the Peak Oil Site. Additionally, the Administrative Record for the site, which contains site related documents including the RI and FS reports and the Proposed Plan, was made available for public review at the information repository in the Brandon Public Library. A notice of the availability of the Administrative Record for the Peak Oil Site was published in the Tampa Tribune on August 11, 1992 and again on August 17, 1992.

A 30-day public comment period was held from August 13, 1992 to September 13, 1992 to solicit public input on EPA's preferred alternative for Operable Unit One. Finally, EPA held a public meeting on August 18, 1992 at the Hillsborough Community College to discuss the remedial alternatives under consideration and to answer any questions concerning the proposed plan for the Site. EPA's response to each of the comments received at the public meeting or during the public comment period is presented in the Responsiveness Summary which is provided in Appendix A of this ROD.

A second fact sheet and Proposed Plan were generated for the ash pile located on the Peak Oil Site, since it was not discussed during the first group of community relations activities. The Proposed Plan was mailed out to concerned parties in February, 1993, notifying them of the selected remedy of treatment of the ash pile. A public meeting was held on February 24, 1993 in the Brandon Regional Library enabling concerned citizens to voice their opinions and obtain answers to questions which they might have. The public comment period occurred from February 20, 1993 to April 21, 1993. Announcements were placed in the Tampa Tribune on February 18, 1993 and February 23, 1993 which notified the public of the availability of the Administrative Record at the Brandon Regional Library.

This decision document presents the selected remedial action for the Peak Oil Site in Brandon, Florida, chosen in accordance with CERCLA, as amended by SARA, and to the extent practicable, the NCP. This decision is based on the Administrative Record for the site.

4.0 Scope and Role of Operable Unit

As with many Superfund sites, the problems at the Peak Oil/Bay Drums Site are complex. As a result, EPA has divided the remedy for the Site into four operable units (Ous). These are:

- OU One: Contamination in the soils, sediments and ash pile at the Peak Oil Site;
- OU Two: Contamination in the groundwater at the Peak Oil and Bay Drums Sites;
- OU Three: Contamination in the soils and sediments at the Bay Drums Site;
- OU Four: Contamination in the Wetlands at the Peak Oil, Bay Drums, and Reeves Southeastern Sites.

The remedial actions for OUs Two, Three and Four will be addressed in separate RODs.

OU One is addressed in this ROD. Potential direct contact with soils, sediments and ash and potential ingestion of groundwater contaminated above MCLs pose the principal threats to human health at the Peak Oil Site. The purpose of the remedy selected in this ROD is to prevent current or future exposure to contaminated soils, sediments and the ash pile and to prevent current or future migration of contaminants to the groundwater.

5.0 Summary of Site Characteristics

The climate in the Tampa area is characterized by mild winters and relatively long, humid, and warm summers. Spring and fall tend to be dry, with the majority of the rainfall falling in the summer.

5.1 Site Topography and Surface Features

The topography of the Peak Oil Site is relatively flat with three ponded areas and a lagoon. Surface elevations at the site have changed in the past year due to regrading by EPA's removal contractor but generally vary from about 39 feet to 42 feet mean sea level (MSL). Due to the site's elevation above MSL, tidal surges are not likely to impact the area. The surface slopes from the eastern to the western border of the site. Near the southern portion of the site, however, the soil surface slopes to the south.

As shown on Figure 2.1, Lagoon No. 2 is located in the southwest portion of the Peak Oil Facility. The three ponded areas are in the northwest sector of the property, adjacent to the two large warehouse buildings. The two depressions along the northern boundary of the property were formerly one continuous swale which has been divided at its midpoint by an earthen berm. These northern depressions retain standing water only during the rainy seasons or after heavy rainfall events. The pond in the northwest corner of the property is surrounded by thick vegetation. Because of the depth of this depression relative to the water table, water generally exists in this pond on a continuous basis and is approximately two feet deep. The pond which previously existed on the south side of the northwest building (Figure 2.1) was backfilled by the EPA removal action contractor in early 1991 before the Phase 2 investigation.

Currently, an ash pile of approximately 6,000 cubic yards, which was generated during EPA's removal action, is sitting on and covered with a plastic liner in the northeast portion of the Peak Oil Facility. EPA also constructed a concrete pad on the southeastern portion of the site as part of the incineration removal action. Although the southern part was later removed, approximately 7,000 square feet of the original pad still remain. Approximately 400 cubic yards of soil which were stockpiled on the Peak Oil Site during EPA's 1990 and 1991 Bay Drums and Peak Oil removal actions currently remain south of the large warehouse building.

As shown on Figure 2.1, four structures remain on-site. These are the two large sheet-metal warehouse buildings in the northwest corner of the site, a one-story concrete block office building just south of the warehouses, and a small storage shed south of the ash pile.

The site is surrounded by a chain-link fence and access is limited to two locked gates, one on the north property line and one near the southeast corner of the property.

Land use in the area is either industrial or undeveloped, with the nearest single family residential area being 0.3 miles east of the Peak Oil Site. It is anticipated that the primarily industrial character of the area surrounding the site will be maintained in the future.

5.2 Geology

5.2.1 Site Soils

The soils immediately underlying the Peak Oil Site are separated into two basic units: the surficial sands and the low-permeability unit of the upper Hawthorn Group (Figure 5.1). Although the composition of the surficial sand and low-permeability unit varies across the site, the two basic units are present.

5.2.2 Surficial Sands

The undifferentiated surficial sand unit varies in thickness from approximately 9 to 23 feet at the Peak Oil Site and from 9 to 37 feet in the study area, as determined by the Area-Wide Hydrologic RI (Canonie, 1992). Constituting the uppermost soil unit on the site, it consists primarily of poorly graded fine sands with varying amounts of silt. These sands are primarily brown in color, but occasional lenses of gray sand are encountered. The standard penetration numbers (or N Values) generally range between 5 and 30 blows per foot. Correlation of the N Values to the relative density of the soils indicates that most of the surficial sands are loose to medium in density.

The Unified Soil Classification System (USCS) soil types of the surficial sands are generally gravelly sands (SP) or gravelly to silty sands (SPSM). In a few isolated instances, trace amounts of clay are found in the sand unit, resulting in only a slight degree of cohesiveness to the soil.

Water content in the saturated zone of the surficial sands ranges from 15 to 20 percent, while water content in the vadose zone is generally less than 10 percent. Groundwater was typically encountered at depths ranging from two to four feet. Surficial sand samples tested for Ph exhibited values between 5.0 and 8.0. Laboratory constant-head permeability tests conducted on surficial sand samples resulted in hydraulic conductivity (K) values in the 10[-2]-to-10[-3] -cm/sec range. Additional information on the physical soil test results is contained in the Area-Wide Hydrologic RI (Canonie, 1992).

In the lower portion of the sand unit, the clay and silt fraction appears to increase as the low-permeability unit of the upper Hawthorn Group is approached.

The second major unconsolidated sedimentary unit is the low permeability unit underlying the Peak Oil Site. The low-permeability unit is a component of the upper Hawthorn Group (Figure 5.1). The two basic characteristics of the low-permeability unit which distinguish it from the overlying sands are clay content and color. Thus, the surface of the low-permeability unit is generally determined by the contact between the silty sands of the surficial sand unit and the clayey sands and clays of the low-permeability unit. The color change from the predominantly brown sands to the green, blue, and gray clayey soils below is another distinguishing characteristic of this transition.

In contrast to the sands and silty sands in the overlying soil unit, the soils in the low-permeability unit generally contain sufficient quantities of clay to result in cohesiveness. In general, the soils may be classified as clayey sand (SC in the USCS) or sandy clay (CL or CH in the USCS). The SC soils, or clayey sands, generally contain between 25 and 50 percent fines which possess a significant degree of plasticity. Hydraulic conductivities in the SC soils are in the range of 10[-5] to 10[-6] cm/sec. The CL and CH soils are dominated by plastic fines with varying degrees of plasticity. The majority of clay specimens which were laboratory tested for geotechnical parameters are high-plasticity clays, or CH soils, with liquid limits greater than 50 percent and which plot above the A Line on the USCS Plasticity Chart. Hydraulic conductivities in the CL and CH soils are in the range of 10[-6] to 10[-9] cm/sec.

The SC, CL, and CH soils are characteristically green, blue, or gray or a combination of these shades. Brown clayey soils are sometimes encountered, but their occurrence is less frequent than the green-, blue-, and gray colored soils.

5.3 Surface Water Hydrology

Due to the flat topography of the site and the porous nature of the sandy surficial soils, runoff generally occurs only during and after heavy precipitation events. During moderate precipitation events, the majority of rainfall immediately percolates into the soils or flows to localized depressions where it evaporates or percolates. This section discusses the drainage patterns of runoff which occur during heavy rainfall. The discussion presented in this section is based on field observations and knowledge of the site topography after regrading activities conducted by the EPA.

Currently, runoff from the southwestern portion of the Peak Oil Site drains into the excavated depression of Lagoon No. 2, where it percolates into the water table. During the rainy season, Lagoon No. 2 sometimes overflows its banks and the land southwest of the site floods. During these periods, the area extending from Lagoon No. 2 to the railroad spur on the west and the Peoples Gas fenceline on the south is flooded.

Runoff from the southeastern portion of the site drains to the south into the cul-de-sac at the end of Reeves Road or into a roadside drainage ditch which begins at the western terminus of Reeves Road and slopes east. Water which enters this ditch may flow east along Reeves Road for approximately 400 feet and then passes south underneath the road via a culvert. After exiting this culvert, runoff stands and percolates in a small depression and areas of heavy vegetation south of Reeves Road.

Following EPA's regrading of the site in 1991, surface water runoff from the north-central portion of the site flows west toward the railroad spur along the west side of the site. During Phase 2 of the RI, Canonie installed a silt fence along the western site boundary to prevent off-site transport of sediment.

Surface water runoff from the extreme northern portion of the Peak Oil Site drains to the north into the depressions at the northwest corner of the Peak Oil property. A portion of the runoff may flow across the unpaved road which borders the north side of the Peak Oil Site and into the ditch to the immediate north (see Figure 1.2). This ditch parallels the southern side of the CSX Railroad. A culvert exists beneath the railroad and, at one time, apparently provided a connection from the ditch on the south side to the ditch on the north side. However, reconnaissance conducted by Canonie during the Phase 1 field investigation revealed that this culvert is buried by dry sediment, and there was no visible flow through this conduit. Water in the ditch onthe north side of the railroad flows north under SR 574 via a culvert and into the North Wetland.

5.4 Sampling Results

During the site source RI, soil, surface water, and sediment samples were collected at the site to determine the extent and nature of contamination. The RI also investigated the extent of impact of the contamination and the volume of material requiring cleanup.

Also, in a separate study, samples were collected to determine the characteristics of the ash pile located at the northeast corner of the site.

5.4.1 Soils

Sampling data indicates that site soils contain various organic and inorganic constituents throughout the former lagoon areas and the area south of the ash pile. Volatile organic compounds (VOCs), semi-volatile organic compounds, polychlorinated biphenyls (PCBs), and high concentrations of metals are found primarily in the upper eight feet of soil.

The most prevalent VOCs in site soils are toluene, ethylbenzene, and xylene. These constituents are present in Former Lagoon No. 1 and southwest of the ash pile. Chlorinated organic compounds were also detected in a small area of soils southwest of the ash pile and other localized areas. Polycyclic aromatic hydrocarbons (PAHs), most notably naphthalene, were also present primarily in an area extending from the northeast portion of the site southwesterly toward Lagoon No. 2. Various inorganic constituents were found in site soils with the primary metals impact associated with lead. Lead was present at concentrations above background in an area encompassing the former lagoons and stretching northwesterly toward the railroad spur. PCBs were found only in the area within and east of Former Lagoon No. 1.

A visible oily residue exists over the entire thickness (about 12feet) of surficial sand in the area of Former Lagoons No. 1 and No. 3 containing total petroleum hydrocarbons (TPHs) at concentrations of up to five percent at depths of 4.0 to 6.0 feet. Based on analytical testing and visual assessment, the major impacts of contamination on the soils at the site are related to waste oils and inorganic constituents (metals).

Volatile Organic Compounds in Soil

Twenty VOCs were detected in site soils (Figure 5.2 illustrates sampling locations). The most frequently detected VOCs were toluene (detected in 49 samples), xylenes (detected in 36 samples), and acetone (detected in 35 samples). Other VOCs detected in 20 or more samples include tetrachloroethene (PCE) and ethylbenzene.

The VOC with the maximum detected concentration was total xylenes [with concentrations ranging from 0.002 parts per million (ppm) to 94 ppm]. Xylenes were primarily found in Former Lagoon No. 1 and in the upper soils (0.0 to 8.0 feet) southwest of the ash pile. The highest concentration was found in Sample L9#2, which was collected at a depth of 10 to 12.5 feet in Former Lagoon No. 1. However, Sample L9#2 was the only sample in the lower soils (8.0 to 21.0 feet) that contained concentrations of total xylenes greater than 1.0 ppm.

PCE, the VOC with the second highest concentration (25 ppm), was primarily found in the area just southwest of the ash pile. As with xylenes, PCE was primarily found in the upper soils in this area. Samples G4#1 and E7#1, which are located in this area, contained 25 ppm and 21 ppm of PCE, respectively. No other soil samples on-site contained PCE at levels greater than 1 ppm.

Ethylbenzene and toluene, the VOCs with the next highest concentrations (both were detected at 20 ppm), were generally found in the same locations as xylenes. The highest concentrations of benzene (1.8 ppm), vinyl chloride (0.57 ppm), and trichloroethene (TCE) (2.7 ppm) were also detected in samples obtained from the soils south of the ash pile. The highest concentrations of three other VOCs were found in Boring L3, which was drilled through the concrete pad remaining from EPA's removal action of Lagoon No. 2 sludge. 1,1Dichloroethane (1,1-DCA) (3.5 ppm), 1,1,1- trichloroethane (1,1,1-TCA) (14 ppm), and methylene chloride (1.3 ppm) were detected in the upper sample from this boring.

In summary, VOCs were primarily found in soils less than eight feet deep with toluene, ethylbenzene, and xylenes being the most prevalent. These compounds were found primarily in Former Lagoon No. 1 and in the area southwest of the ash pile. Chlorinated organics were also detected in the area of soils southwest of the ash pile, beneath the concrete pad, and at low levels in other localized areas.

Semivolatile Organic Compounds in Soil

Twenty-seven SVOCs were detected in site soils, including several PAHs. The most frequently detected SVOCs were (in order of decreasing frequency of detection) phenanthrene, fluoranthene, pyrene, naphthalene, benzo(b)fluoranthene, and benzo(g,h,i)perylene. These compounds were detected in 26 to 37 samples of the 82 samples analyzed.

The highest concentration detected among the SVOC compounds was 65 ppm naphthalene (detected in Sample G4A#1), which was detected primarily in soils shallower than 8.0 feet in the area just south of the ash pile and in the former lagoons. Other SVOCs detected at concentrations over 10 ppm included acenaphthylene (16 ppm), anthracene and phenanthrene (both at 15 ppm), and fluoranthene (10 ppm).

As indicated in the Baseline Risk Assessment (RA) for the site, naphthalene is considered to be noncarcinogenic. Other PAHs which are considered to be noncarcinogens are acenaphthylene, acenaphthene, anthracene, benzo(g,h,i)perylene, fluoranthene, fluorene, 2-methylnaphthalene, phenanthrene, and pyrene. As with naphthalene, the total noncarcinogenic PAH concentrations are found primarily in the upper soils (0.0 to 8.0 feet) in an area stretching from the east boundary of the site just southeast of the ash pile toward the lagoon areas.

The PAHs which are considered in the RA to be potential carcinogens are benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-c,d)pyrene. A concentration of benzo(a)anthracene over 1.0 ppm was only detected in Boring F1, near the east boundary of the site just southeast of the ash pile. This sample was taken at a depth of 2.0 to 6.0 feet. Total carcinogenic PAH concentrations greater than 1.0 ppm were detected only in Boring L9, which was drilled in Former Lagoon No. 1, and Boring F-1 near the east side of the property.

In summary, various SVOCs, including PAHs, were detected in site soils. As with VOCs, PAHs were found primarily in soil shallower than 8.0 feet. The distribution of PAHs is somewhat different than the distribution of VOCs. PAHs were found in an area stretching from a point along the eastern fenceline just southeast of the ash pile, southwest toward Lagoon No. 2.

Organochlorine Pesticides and Polychlorinated Biphenyls in Soil

The only pesticide compound detected was alpha-BHC, which was detected at 0.014 ppm in Sample J9A#2. Seven different PCBs were detected in soil samples. Aroclor-1260 was detected in 28 samples with concentrations ranging from 0.035 ppm to 110 ppm. Aroclor-1260 concentrations over 50 ppm were detected in only two samples. These are Sample K4#1 (110 ppm), which was taken east of Former Lagoon No. 1 adjacent to the concrete pad at a depth of 2.0 to 4.0 feet, and Sample L9#2 (52 ppm), taken in Former Lagoon No. 1 at a depth of 10.0 to 12.5 feet. All other PCB Aroclors were detected in five or fewer samples, with the highest concentration detected at 6.6 ppm.

Based on the soil boring sample analysis and past investigations of the site, PCBs were detected primarily in the historical lagoon areas.

Inorganic Constituents in Soil

Many inorganic constituents in soil samples are naturally occurring in the environment. To focus the following discussion on inorganic constituents which may be of concern, the detected concentrations have been compared to ranges of background concentrations in soils near the Peak Oil, Reeves, and Bay Drums sites. Based on this comparison and consideration of the relative toxicity of the constituents (as ranked in the Baseline Risk Assessment (RA)), the inorganics which may be of concern or were detected above background levels are discussed below, beginning with the chemicals detected at the highest concentrations.

Lead: Lead was detected in 77 of 82 samples with concentrations ranging from 1.1 ppm to 2,950 ppm. Background concentrations of lead in the area are <50 ppm. The highest concentrations of lead were detected in the former lagoon areas, especially the Former Lagoon No. 1 area, where two concentrations above 1,000 ppm were found. Former Lagoon No. 3 is also impacted with concentrations of lead above 500 ppm. Generally, soils in the shallow depth interval (0.0-to-8.0-foot depth) contain higher concentrations of lead than the deeper interval (8.0-to-21.0-foot depth). The RA identified lead as an indicator chemical.

Zinc: Zinc concentrations were detected in 81 of the 82 samples, ranging from 1.5 ppm to 2,410 ppm (L9#1). Background concentrations of zinc in the area are <29 ppm. The area of zinc-impacted soil is similar in distribution to that of many site contaminants. Zinc was detected up to 2,410 ppm in the lagoon areas and in the region just south of the ash pile. Zinc concentrations in the lower interval near former Lagoon No. 3 were higher than in the upper interval. Concentrations of zinc up to 1,830 ppm were also detected along the eastern border of the site.

Barium: Barium was detected in 69 of 82 samples at concentrations from 0.61 ppm to 460 ppm

(L9#2). Concentrations above the background range (<51 ppm) were limited to the former lagoon areas (460 ppm), the concrete pad area (152 ppm), and some areas around the warehouse building (155 ppm). Barium was identified as an indicator chemical during the RA.

Chromium: Chromium was detected in 74 of 82 samples at concentrations ranging from 1.2 ppm to 104 ppm (N9A#2). Background concentrations of chromium in the area are <18 ppm. Concentrations near the higher end of the detected concentration range are located sporadically across the site, without any regular pattern of occurrence. Additionally, the locations of the higher concentration detections were not the same as other known site contaminants (i.e., higher concentrations found below 8.0 feet deep with lower concentrations in shallower soil). Therefore, chromium detected at the site may be naturally occurring and not the result of site activities.

Several additional inorganic elements were detected in former lagoon areas above background levels. These elements include arsenic, beryllium, cadmium, copper, manganese, and mercury. Other inorganic constituents detected above background levels include cobalt, which was found in the central portion of the site; cyanide, which was detected in the north-central portion of the site near Borings E7 and F9; and silver, which was found in the central site area and Former Lagoon No. 1 vicinity.

Generally, concentrations of inorganic constituents were detected in the Former Lagoons No. 1 and No. 3 areas and the area extending northwest from Lagoon No. 1. Also impacted is the soil south of the ash pile. Soils in the lower interval (8.0-to-21.0-foot soil depth) were less impacted than the upper interval; however, the lower interval soils, especially in the lagoon areas, do contain concentrations above background.

5.4.2 Surface Water and Sediments

Surface water and sediment samples were obtained from the ponded areas located in the northwest corner of the Peak Oil Site and from Lagoon No. 2. The results are discussed below. Figure 5.2 shows the sampling locations. It should be noted that the pond from which Samples PK-5 and PK-6 were taken during Phase 1 was filled in prior to Phase 2 and no longer exists.

5.4.2.1 Chemical Constituents Detected in Surface Water

Three VOCs were detected: acetone, carbon disulfide, and total-1,2-dichloroethylene. Acetone was detected in Sample PK-1R at 0.005 ppm and Sample PK-3R at 0.007 ppm. Total-1,2-dichloroethylene was detected in Sample PK-1R at 0.002 ppm and Sample PK-2R at 0.003 ppm. Carbon disulfide was detected in Sample PK-2R at 0.001 ppm. No VOCs were detected in Lagoon No. 2.

Nine SVOCs were detected at very low levels, five of which are PAHs. Concentrations of the PAHs, which were all detected in samples from Lagoon No. 2, are all in the parts-per-trillion (ppt) range. Based on the SVOC data from the five surface water samples, the pond water impacts appear to be minimal.

No PCBs were detected in surface water samples obtained on-site.

Seventeen metals and cyanide were detected in the surface water samples. Samples PK-5 and PK-6R, which were collected from the former pond south of the large warehouse building, contained the highest concentrations of all but three analytes (antimony, cyanide, and magnesium). This pond was filled in during recent EPA removal actions.

In the surface water remaining at the site, concentrations of three metals exceed EPA chronic

Ambient Water Quality Criteria (AWQC) for the protection of aquatic organisms. These metals are silver (AWQC of 0.00012 ppm), zinc (AWQC of 0.047 ppm), and lead (AWQC of 0.0032 ppm). The AWQC for silver and zinc are exceeded only at Samples PK-1, PK-2, and PK-3, which were taken in the ponded areas in the northwest corner of the site. The AWQC for lead is exceeded at all surface water sample locations.

5.4.2.2 Chemical Constituents Detected in Sediments

Nine VOCs were detected in site sediment. The highest detected concentrations were 120 ppm total xylenes and 23 ppm ethylbenzene, detected in Sample PK-3 from the ponded area north of the large warehouse building. All other VOCs detected in on-site sediment samples were found at concentrations below 1 ppm.

Although all sediment samples contained at least one detectable concentration of a VOC, the sample from the pond area north of the large warehouse building contained concentrations of ethylbenzene (23 ppm), xylenes (120 ppm), and toluene (0.42 ppm), and Lagoon No. 2 contained only 0.04 ppm each of PCE and TCE, and 0.48 ppm of toluene.

Twenty-eight SVOCs were detected in sediment at the site. Of the compounds detected, 15 are PAHs. Pyrene was the most frequently detected PAH, detected in six samples at concentrations ranging from 0.21 ppm to 0.62 ppm. Bis (2-ethylhexyl)phthalate was the most frequent non-PAH compound detected (detected in five samples). It is also the SVOC with the highest detected concentration (220 ppm in Sample PK-4). Other detections of bis(2-ethylhexyl)phthalate were just above 1 ppm. Aside from this chemical, all other detected SVOC concentrations in sediments from ponded areas remaining at the site are below 1 ppm.

Generally, PAHs were detected at the highest concentrations in Lagoon No. 2, although the ponded area northeast of the small warehouse building is also impacted, especially with other semivolatiles. Aroclor-1260 was detected in seven of the eight sediment samples. However, at least one of the PCB Aroclors was found in each sediment sample. Sample PK-3, collected from the pond north of the large warehouse, contained the highest concentration of Aroclor-1260 in sediment at 37 ppm.

The following inorganic constituents were detected in sediment above the background levels or are of concern at the site.

Lead: Lead was detected above background (50 ppm) in all eight sediment samples. Concentrations were highest (1,450 ppm) in the pond west of the warehouse building. The lowest concentrations detected (152 ppm) were in the former pond, which, as mentioned earlier, was backfilled during the EPA removal action.

Zinc: Zinc was detected in all sediment samples at concentrations above background (29 ppm). The greatest concentration (918 ppm) was detected in the pond north of the warehouse building (PK-3). Other high concentrations (445 ppm and 559 ppm) were detected in the pond west of the warehouse building.

Other inorganic constituents which were detected above naturally occurring concentrations include antimony, barium, copper, cyanide, and manganese. Concentrations of these analytes were generally limited to the pond west and the pond north of the warehouse building.

In summary, concentrations of some inorganic constituents were detected above naturally occurring levels in all of the on-site pond sediments. However, the highest concentrations were generally limited to the pond west and the pond north of the warehouse building.

5.4.3 Ash Pile

Four discrete samples were collected from the ash pile. The sampling locations were based on the locations of existing holes in the protective cover resulting from previous sampling activities by the Agency for Toxic Substances and Disease Registry (ATSDR). Because these existing holes were spread evenly over the pile, no additional holes were made in the protective cover. Samples were collected using hand augers at depths below the ash pile surface at 18 to 48 inches. Continuous monitoring during sampling activities with an organic vapor analyzer (OVA), photoionization detector (HNu), and radiation meter yielded no response above background conditions. Material collected for the samples was dark black, fine grained and homogeneous in appearance.

Samples were analyzed for TPHs, metals, extractable organic compounds, pesticide/PCB compounds and purgeable organic compounds. Total concentrations of lead in the samples ranged from 2,500 to 5,600 mg/kg. TPH concentrations ranged from 400 to 3,000 mg/kg. Toxicity Characteristic Leaching Procedure (TCLP) metals, TCLP extractable organic compounds, TCLP pesticides/PCB compounds, TCLP purgeable organic compounds and TCLP dioxins/furans were also analyzed. Concentrations of barium in the TCLP extracts ranged from 0.19 to 0.26 mg/l and concentrations of cadmium in the TCLP extracts ranged from 0.058 to 0.074 mg/l. which are below regulatory levels. Concentrations of lead in the TCLP extracts exceeded the toxicity characteristics regulatory level of 5 mg/l in all four samples, with concentrations ranging from 26 to 31 mg/l. No regulated semi-volatile, pesticide/PCB compounds, or dioxin/furan contaminants were detected in the TCLP extracts.

6.0 Baseline Risk Assessment Summary

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 reports the results of the baseline risk assessment conducted for this site.

Generally, EPA evaluates site risks for all environmental media in one risk assessment and determines cumulative risk based on total exposure. However, due to the close proximity of the Bay Drums, Peak Oil and Reeves Southeastern sites, EPA is evaluating risks posed by groundwater exposure from all three sites in a separate Area-Wide Groundwater RI/FS and Baseline Risk Assessment. Since the soils, sediments, and surface waters evaluated in this study are a source for the groundwater contamination, the impact on groundwater is discussed briefly in this risk summary.

EPA conducted a separate risk assessment of the ash pile to determine human health risks and what risk based cleanup levels should be. The risk assessment was based on data from the four discrete samples collected from the ash pile. The ash pile risk assessment is discussed in Section 6.2.

6.1 Site Source Risk Assessment

6.1.1 Contaminants of Concern

Specific chemicals of concern were selected if the results of the risk assessment indicated that a contaminant might pose a significant current or future risk or contribute to a cumulative risk which is significant. The criteria for a significant risk was a carcinogenic risk level within or above the acceptable risk range, i.e. 1 x 10[-4] to 1 x 10[-6], or a hazard quotient greater than 0.1. The contaminants of concern in soils are beryllium, benzo (a) pyrene, dibenzo (a,h) anthracene, lead and PCBs. The sediment contaminants of concern are lead and PCBs. The ash pile contaminant of concern is lead. The air contaminants of concern are PCBs and tetrachloroethene. The surface water exposure pathway did not produce any significant risk levels.

The exposure point concentrations, with the exception of lead, are based on the 95% upper confidence limit (UCL) of the arithmetic average. Because of the input requirements for the Biokinetic/Uptake lead model, which was used to evaluate site lead exposure, the exposure concentrations reflect an arithmetic average concentration rather than a UCL. The soil UCLs are based on the uppermost sample from each boring. For this assessment all surface water bodies are assumed equivalent in their likelihood for exposure, therefore separate exposure concentrations were not determined for each water body. Air models were used to determine the potential airborne concentrations which could be released from contaminated soil. The exposure point concentrations for the site contaminants of concern are contained in Table 6-1.

Currently, site operations have been discontinued. Although onsite groundwater is not being used at the present time, it is classified as a Class II aquifer and therefore is a viable source of groundwater for future consumption. [The risks associated with exposure to groundwater are addressed in the Area-Wide Risk Assessment (Canonie, 1992).] The site is located in an area which is zoned for industrial uses. Zoning changes would have to occur before the site could be developed for residential purposes.

6.1.2 Exposure Assessment

The current exposure pathway which was evaluated was for a hypothetical trespasser scenario. For this scenario it was assumed that an individual trespassing on the site is exposed to chemicals in the soil and the ash pile through the dermal absorption and ingestion exposure routes. Exposure was assumed to occur to chemicals in the surface water and sediments of the site water bodies through wading activities. The assumed exposure routes for this scenario are dermal absorption of chemicals in the surface water and sediments and incidental ingestion of the sediments. Exposure to site contaminants may also occur via the inhalation exposure route. The trespasser was assumed to be between the ages of 6 and 15. Exposure assumption for the trespasser scenario are contained on Table 6-2.

Two potential future scenarios, industrial and residential, were evaluated. The exposure routes evaluated for the industrial scenario were incidental ingestion and dermal contact with surface soil and ash pile sediments, and incidental ingestion of sediments and dermal contact with surface water and sediments. On-site workers may also be exposed to airborne contaminants. Potential exposure pathways evaluated for the potential future on-site resident were: direct contact with and ingestion of site soils for an adult and child and inhalation of vapors. Exposure assumptions for the future exposure pathways are summarized in Table 6-2.

Table 6-1
Exposure Point Concentrations

Chemical	Concentration		
	Soil and Sediment (mg/kg)		
	Surface	Sediment	
Beryllium	0.3	NA	
Benzo(a)pyrene	0.6	NA	
Dibenz(a,h)anthracene	0.2	NA	
Lead[a]	325	1112	
PCBs[b]	10	38	
	Air (ug/cubic meter)[c]		
	Trespasser	Worker	Resident
PCBs[b]	8.6E-3	5.0E-3	5.0E-3
Tetrachloroethene	9.5E-2	2.9E-2	2.9E-2

<Footnotes>
NA Notation indicates that these chemicals were carried through the risk assessment but did not produce risks at levels of concern.
a Due to the requirements of the lead UBK model, the lead concentrations reflect the arithmetic mean rather than the 95% upper confidence limit.
b The PCB concentration represents the summation of the following aroclors; 1016, 1242, 1248, 1254 and 1260.
c The air concentration represents a concentration modeled from soil levels. The concentrations are averaged over the exposure period for each scenario, i.e. nine years for the trespasser and 30 years for the worker and resident.
</footnotes>

6.1.3 Toxicity Assessment

Slope factors (SFs) have been developed by EPA's Carcinogenic Assessment Group for estimating lifetime cancer risks associated with exposure to potentially carcinogenic contaminants of concern. SFs, which are expressed in units of (mg/kg-day)[-1], are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Slope factors are derived from results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). The SFs for the carcinogenic contaminants of concern are contained in Table 6-3.

As an interim procedure, until more definitive Agency guidance is established, Region IV has adopted a toxicity equivalency approach (TEF) methodology for evaluating carcinogenic PAHs. This methodology is based on each compound's relative potency to the potency of benzo (a)pyrene. The TEFs for the carcinogenic PAHs are contained in Table 6-3.

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to contaminants of concern exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of contaminants of concern from environmental media (e.g., the amount of a contaminant of concern ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). The RfDs for the noncarcinogenic contaminants of concern are contained in Table 6-3. Lead exposure was evaluated using the Uptake/Biokinetic (UBK) Model (version 4). This model can be used to predict blood lead concentrations resulting from environmental concentrations of lead. The Agency has adopted a blood lead benchmark of 10 micrograms per deciliter (10 ug/dl).

Table 6-2
Exposure Assumptions for Soil, Sediment and Air Pathways

Current Scenario

Parameter	Trespasser (Soil)	Trespasser (Sediment)
Ingestion Rate (mg/event)	100	100
Exposure Frequency (dy/yr)	20	4
Exposure Duration (yr)	9	9
Body Weight (kg)	35	35
Exposed Skin Area (cm[2])	2130	1520
Adherence Factor (mg/cm[2])	0.2	0.2
Absorption Rate (metals) (%)	0.1	0.1
Absorption Rate (organics) (%)	1	1
Exposure Time (hr/dy)	8	4

Future Scenarios

Parameter	Worker (Soil)	Worker (Sediment)
Ingestion Rate (mg/event)	50	50
Exposure Frequency (dy/yr)	220	30
Exposure Duration (yr)	30	30
Body Weight (kg)	70	70
Exposed Skin Area (cm[2])	2380	1960
Adherence Factor (mg/cm[2])	0.2	0.2
Absorption Rate (metals) (%)	0.1	0.1
Absorption Rate (organics) (%)	1	1
Exposure Time (hr/dy)	8	24

Parameter	Resident (Adult)	Resident (Child)
Ingestion Rate (mg/event)	50	100
Exposure Frequency (dy/yr)	220	280
Exposure Duration (yr)	30	5
Body Weight (kg)	70	16
Exposed Skin Area (cm[2])	2380	2500
Adherence Factor (mg/cm[2])	0.2	0.2
Absorption Rate (metals) (%)	0.1	0.1
Absorption Rate (organics) (%)	1	1
Exposure Time (hr/dy)	8	24

Table 6-3
Toxicity Values for Contaminants of Concern

Carcinogenic Slope Factors

Chemical	Slope Factor (mg/kg-dy)	Weight of Evidence	Source
Benzo(a)pyrene[a]	5.8	B2	ECAO
Beryllium	4.3	B2	IRIS
Dibenz(a,h)anthracene[a]	5.8	B2	ECAO
PCBs	7.7	B2	IRIS

Reference Doses (RfDs)

Chemical	Reference Dose (mg/kg-dy)[-l]	Critical Effect	Source
PCBs	1E-4	Reproductive Toxicity	ATSDR
Tetrachloroethene	1E-2	Hepatotoxicity	IRIS
Lead[b]			

<Footnotes>

a The toxicity equivalency factors (TEFs) used to evaluate the carcinogenic PAHs are:

Compound	TEF
Benzo(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.1
Chrysene	0.01
Dibenzo(a,h)anthracene	1.0
Ideno(1,2,3-c,d)pyrene	0.1

b Lead exposure was evaluated using the Uptake Biokinetic (UBK) model (0.4).

IRIS = Integrated Risk Management System
ECAO = Environmental Criteria and Assessment Office
ATSDR = Agency for Toxic Substances and Disease Registry
</footnotes>

6.1.4 Risk Characterization

For carcinogens, risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

Risk = CDI x SF, where:

risk = a unit less probability of an individual developing cancer;
CDI = chronic daily intake averaged over 70 years (mg/kg-day); and
SF = slope factor, expressed as $(mg/kg\text{-}day)^{-1}$.

These risks are probabilities that are generally expressed in scientific notation (e.g. 1×10^{-6}). Excess lifetime cancer risk of 1×10^{-6} indicates that, as a reasonable maximum estimate, an individual has a 1 in 1,000,000 additional chance of developing cancer as a result of site-related exposure to a carcinogen over a 70 year lifetime under the specific exposure conditions at a site. A summary of the potential current and future risks are contained in Table 6-4.

For current use, estimated exposure pathway risks from carcinogenic chemicals in site soils, sediments and surface water are below the risk range of 1×10^{-4} to 1×10^{-6}. The highest exposure pathway risk is 6×10^{-7} for the ingestion of surface soil by an on-site trespasser. The cumulative risk for the current trespasser scenario is 1×10^{-6}. The cumulative risks for the future potential exposure pathways do not exceed the protective risk range. The highest estimated future cumulative risk (2×10^{-5}) is for the future potential child resident. This risk is due to the potential ingestion of PCBs in surface soil.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., lifetime) with a reference dose derived for a similar exposure period. The ratio of exposure to toxicity is called a hazard quotient (HQ). By adding the HQs for all contaminants of concern that affects the same target organ (e.g., liver) within a medium or across all media to which a given population may reasonably be exposed, the hazard index (HI) can be generated.

The HQ is calculated as follows:
Noncancer HQ = CDI/RfD, where:

CDI = chronic daily intake;
RfD = reference dose;

and CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short term).

A summary of the potential current and future HQs are contained in Table 6-5. This table contains risk information for chemicals and/or pathways which have individual or cumulative HQs of greater than 0.1. The HQs for all current and future exposure pathways are below 1.0.

The assessment of lead in blood for current and future exposure indicates that 96% of exposed children would have blood lead levels below the Agency benchmark of 10 ug/dl. This study uses an average site lead concentration. There are individual areas on-site with lead concentrations exceeding the surface soil remediation goal. The cleanup goal for lead is protective of children and groundwater.

Table 6-4
Summary of Site Risks

Current Risks (Trespasser)

Chemical	Ingestion (Soil)	Ingestion (Sediment)
Benzo(a)pyrene	7E-8	NA
PCBs	5E-7	4E-7

Future Risks (Onsite Worker)

Chemical	Ingestion (Soil)	Dermal (Soil)	Ingestion (Sediment)
Benzo(a)pyrene	6E-7	NA	NA
Beryllium	2E-7	NA	NA
Dibenz(a,h)anthracene	1E-7	NA	NA
PCBs	4E-6	1E-6	2E-6

Future Risks (Child Resident)

Chemical	Ingestion (Soil)	Dermal (Soil)
PCBs	2E-5	1E-6

Future Risks (Adult Resident)

Chemical	Ingestion (Soil)	Inhalation (Air)
PCBs	2E-6	2E-6

Cumulative Risks

Scenario	Risk Level[a]
Current Trespasser	1E-6
Future Worker	1E-5
Future Resident (Child)	2E-5
Future Resident (Adult)	6E-6

<Footnotes>

a The cumulative risks may be slightly higher for some scenarios than the additive risks contained on this summary page due to the contribution of low level risks from other site contaminants.

NA Notation indicates that chemicals were carried through the risk assessment but did not produce risks at levels of concern.

</footnotes>

Table 6-5
Summary of Hazard Quotients[a]

Future Risks (Onsite Worker)

Chemical	Inhalation
PCBs	5E-2
Tetrachloroethene	6E-2
Cumulative	1E-1

Future Risks (Child Resident)

Chemical	Ingestion (Soil)
PCBs	4E-1
Lead[b]	

Future Risks (Adult Resident)

Chemical	Inhalation
PCBs	2E-1
Tetrachloroethene	3E-1
Cumulative	5E-1

<Footnotes>

a The hazard quotients are summarized in this table for which the cumulative hazard index is equal or greater than 0.1.

b The lead biokinetic model indicates that 96% of the potential future exposed population will have blood lead levels below the Agency benchmark of 10 ug/dl. This prediction is based on the arithmetic average of lead concentrations at the site. It should be noted that there are individual areas of the site where lead concentrations exceed the soil remediation goal.

</footnotes>

The level of confidence that one has in the information produced by the risk characterization process is dependent on the validity of the information used in the previous stages of the risk assessment. Although uncertainties are inherent in all four stages of a risk assessment, the most significant uncertainties in this assessment are probably associated with the toxicity assessment for carcinogenic PAHs and the evaluation of the dermal absorption exposure route.

Historically, the Agency has evaluated the carcinogenic PAHs by summing and estimating the risk with the carcinogenic slope factor for benzo(a)pyrene (BaP). The Agency recognizes that this could be an overly conservative approach and is currently evaluating the use of relative potency factors for assessing the carcinogenic potency of these compounds relative to BaP. Although there is some uncertainty with the relative potency approach, Region IV EPA has decided to use this method because we feel that it gives a better approximation of the risk associated with this class of chemicals.

Another area of uncertainty is the evaluation of the dermal absorption exposure route. There is not a large database for the dermal absorption of contaminants in soil. Consequently, there is considerable uncertainty associated with the assumptions for absorption and soil contact rate for dermal contact with soil and sediment.

The Area-Wide Groundwater Risk Assessment did not address current exposure since on-site groundwater is not currently being used. However, the risks associated with possible future exposure for workers or residents exceeds the risk range for both the shallow and deeper Floridan Aquifer, the current source of municipal water supplies in the area. For this reason, actual or threatened releases of hazardous substances from the site soils and sediments, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to the public health, welfare, or the environment. The endangerment is a result of the potential for further degradation of the area-wide groundwater via leaching of contaminants from the contaminated site soils and sediments.

6.2 Ash Pile Risk Assessment

6.2.1 Contaminants of Concern

Four discrete samples were collected from the ash pile and analyzed for target analyte metals, target compound list organics, total petroleum hydrocarbonds and toxicity characteristic leaching procedure (TCLP). The analytical data from the ash pile samples indicated that the only contaminant of concern is lead. The average concentration of lead in the four samples is 3,525 ppm. Concentrations of lead in the TCLP extracts also exceeded the regulatory level of5 mg/l in all four samples.

6.2.2 Exposure Assessment

The potential pathways for exposure to the lead in the ash pile are the same as those evaluated for the Site Source Risk Assessment. The exposure scenarios evaluated in the Site Source Risk Assessment were for a current trespasses, a future industrial worker and a future on-site resident.

6.2.3 Toxicity Assessment

Currently, there are no Agency-verified toxicological values (reference dose or cancer slope factor) for lead. Although lead has been classified as a probable human carcinogen (Group B2), EPA has not developed a cancer slope factor due to the considerable uncertainty associated with the experimental data. Also, lead does not appear to be a potent carcinogen and at low levels, the non-cancer effects of lead are of greatest concern for regulatory purposes.

The noncarcinogenic health effects of lead are generally correlated with level of lead in the blood. Lead is unique, in that, it is difficult to identify a blood lead level or threshold level below which there are no minimal health effects. Although no threshold is apparent, risks of effects appear more likely at blood lead levels of 10 to 15 ug/dl and higher. For this reason, the Agency has adopted a blood lead benchmark of 10 ug/dl.

Elevated blood lead levels are associated with a broad range of health effects. Some of these effects are interference with heme synthesis necessary for formation of red blood cells, anemia, kidney damage, impaired reproductive function, interference with vitamin D metabolism, impaired cognitive performance (as measured by IQ tests, performance in school, and other means), delayed neurological and physical development and elevations in blood pressure.

6.2.4 Risk Characterization

The Office of Solid Waste and Emergency Response (OSWER) Directive #9355.4-02 entitled "Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites" recommended that Superfund site soils for residential land use be remediated to 500 to 1000 mg/kg. This is based on the Centers for Disease Control (CDC) statement that "... lead in soil and dust appears to be responsible for blood levels in children increasing above levels when the concentration in the soil or dust exceed 500 to 1000 ppm."

Since this directive, the Environmental Criteria and Assessment Office of the Office of Research and Development (ECAO/ORD) has developed the Uptake/Biokinetic (UBK) Model which provides a method for predicting blood lead levels in populations exposed to lead in the air, diet, drinking water, indoor dust and soil. The model focuses on infants and young children as the most sensitive populations. OSWER recommends that this model should be used with a blood lead cutoff concentration of 10 ug/dl with 95% of the children exhibiting blood leads below that level to determine an acceptable maximum soil lead concentration.

A directive is currently being prepared by OSWER which will replace Directive #9355.4-02. This directive is recommending that 500 ppm (based on application of the UBK Model) be used as a preliminary remediation goal for lead in soil at CERCLA sites and an action level at RCRA corrective action sites. This 500 ppm value was derived to be protective of health for children (age 6 months to 7 years) by using national average values for lead concentration in water and air, average age-specific dietary intake rates and a bioavailability of lead from soils of 30%.

The average lead concentration in the ash pile (3525 ppm) not only exceeds the recommended remediation goal of 500 ppm but also exceeds the upper end of the range (1000 ppm) specified in the initial OSWER lead directive. In addition, the average lead concentration also exceeds the groundwater protection concentration of 284 ppm.

The UBK Models indicates that 500 ppm is the soil lead concentration which is protective for children. Currently, there is not an approved method for determining a soil lead level which is protective of adults. Since infants and children are the most vulnerable populations exposed to lead, it is generally felt that a higher level of lead could be used for a remediation goal at industrial sites. Until more information is available for determining a risk-based soil lead remediation goal, Region IV EPA recommends that the upper end of the OSWER range (1000 ppm) be used for industrial sites. However at this site, the groundwater protection concentration of 284 ppm is lower and should be used as the remediation goal for the ash pile.

6.3 Environmental Risks

The environmental risks at this site are being addressed in a separate study known as the Area-Wide Wetlands Impact Study. This study evaluates the ecological status of the wetlands associated with the Bay Drums, Peak Oil and Reeves Southeastern Sites. The results of this study are contained in the Area-Wide Wetlands Impact Study Report. The wetlands associated with these three sites will be addressed in a separate operable unit ROD.

7.0 Description of Remedial Alternatives

Soils and Sediments

The Peak Oil Site Source Feasibility Study report presents the results of a detailed analysis conducted on five potential source remedial action alternatives for the Peak Oil Superfund Site. These alternatives have been developed to address on-site soils and sediments which may act as a source of chemical migration into the groundwater, or may act as an exposure source at the site. This section of the Record of Decision presents a summary of each of the five alternatives that are described in the FS report. Alternative No. 1 - No Action Alternative No. 2 - Containment Alternative No. 3 - In-Situ Treatment Alternative No. 4 - Ex-Situ Treatment Alternative No. 5 - Off-Site Disposal

7.1 Alternative No. 1: No Action

Alternative No. 1 is divided into two subalternatives: strict no action and limited action. A no action alternative is required by the NCP to be carried through the detailed analysis to provide a baseline for comparison of other alternatives.

7.1.1 Alternative No. 1A: No Action

In the No Action alternative, no further remedial action would be taken at the Peak Oil Site. While EPA guidance allows the inclusion of environmental monitoring in this alternative, no measures may be taken to reduce the potential for exposure through the use of institutional controls, containment, treatment, or removal of contaminated soils or sediments. This alternative does not meet the remedial action objectives for preventing dermal contact or ingestion. As required by SARA, the no action alternative provides a baseline for comparison with other alternatives that provide a greater level of response.

The primary applicable or relevant and appropriate requirement (ARAR) for this alternative is the treatment technique action level for contaminants in groundwater from the Safe Drinking Water Act (SDWA). If no action is taken to treat or contain contaminated site soils, contaminants may continue to leach into the groundwater above the action levels. For this reason, Alternative 1A does not meet ARARs.

There is no cost associated with the No Action alternative.

7.1.2 Alternative No. 1B: Limited Action

Alternative No. 1B includes access restrictions and monitoring to protect human health and the environment. Under this alternative, no source control remedial measures would be undertaken at the Peak Oil Site. The major components of this alternative include:

. Maintenance of existing chain-link fence with replacement of warning signs around the site;

@ Deed restrictions to prevent development and use of the site;

@ Annual inspection and maintenance of the site fence and signs;

- Groundwater monitoring;

Access restrictions include the institution of deed restrictions, maintenance of the existing fence, and replacement of warning signs around the site. Deed restrictions would restrict future on-site development which is not compatible with the protection of human health and the environment. Warning signs would be replaced.

Monitoring includes annual maintenance of the fence and warning signs and groundwater monitoring. Annual maintenance is necessary to ensure that the fence and warning signs for the site are in good condition. Groundwater monitoring would be conducted as addressed in the Area-Wide FS no action alternative to observe any changes in contaminant levels and to assure protection of human health and the environment.

Summary of Remedial Alternative Evaluation:

The Baseline RA indicates that the risks posed by exposures to onsite soils for the scenarios evaluated are within the range considered generally protective of human health. The limited action alternative would not result in a reduction in risk from exposure to site soils.

In this alternative, certain chemicals present in the source area soils would continue to desorb into the groundwater system. The resultant concentrations in the groundwater system may exceed health- or environmental -based criteria. Therefore, protection of human health and the environment is not achieved by this alternative, and degradation of the surficial aquifer would continue.

Regarding long-term effectiveness and permanence of this alternative, the deed restrictions (restricting future on-site development) and maintenance of the fence and signs minimize health risks within the protective range. The reliability of this alternative is dependent on future implementation of the control measures. Five-year reviews of the site would be conducted to determine the need for additional remedial action.

This alternative would not reduce the toxicity, mobility, or volume of the impacted source soils. The volume of impacted soil may increase due to chemical constituent migration, and the toxicity may slowly decrease over time due to dilution and volatilization.

Implementation of this alternative would not result in additional short-term risk to the community or the environment.

The filing of deed restrictions is administratively feasible and would require the cooperation of the owner of record of the site. The annual fence and warning sign inspection and maintenance program would be easily implemented.

The estimated costs associated with this alternative are presented in Table 7-1. Assuming that the alternative is implemented for a 30-year period, the present-worth cost of this alternative is estimated to be $123,000.

7.2 Alternative No. 2: Containment

The primary objective of this alternative is to eliminate the mobility and exposure pathways of site chemicals by containment. Containment is achieved by the installation of a slurry wall around the site, placement of a multimedia cap over the area, and dewatering the surficial soils within the slurry wall. The major components of this alternative include:

- Demolition of site buildings, fence, and railroad tracks, where necessary, to construct the slurry wall and site cap;

- Construction of a slurry wall around the impacted site soils;

- Grading of the site in preparation of cap placement;

- Placement of a multimedia cap with perimeter drains to channel surface water runoff to the ditch south of Reeves Southeastern Wire and to the ditch north of the Peak Oil Site;

- Installation of monitoring wells in areas both within and outside the slurry wall;

- Installation of extraction wells to dewater surficial soils within the slurry wall as addressed in the Area-Wide FS;

- Construction of a chain-link fence and placement of warning signs around the perimeter of the slurry wall;

- Deed restrictions to prevent subsurface development and limit use of the site;

- Annual inspection, maintenance, and report of the cap, fence, and signs, and monitoring of water levels inside and outside the slurry wall;

- Groundwater monitoring;

- Five-year reviews of the site to evaluate the necessity of additional remedial actions.

Site preparation would be required to implement the main components of this alternative. Site preparation includes construction of adequate access roads to the site for construction vehicles and equipment delivery, installation of project offices and decontamination facilities, and demolition of existing site structures. Existing site structures include the following: two buildings located in the northwest corner of the site, two smaller buildings located in the central area of the site, and a concrete pad located in the southeast portion of the site.
A slurry wall would be constructed at the Peak Oil Site to contain impacted soil and to dewater the area within the slurry wall. Sections of the slurry wall may need to be constructed on adjacent properties. This is necessary for slurry wall installation in areas without contamination. Approval would have to be obtained from adjacent property owners in the form of easement agreements, leases, or outright purchases of adjacent properties. Construction of a slurry wall is detailed on Figure 7.1. The slurry wall would have a perimeter of approximately 2,000 feet and enclose an area of about six acres. The slurry wall will be composed of a clay material and will be keyed into the Hawthorn Formation at an average depth of 20 feet.

For this scenario, a multimedia cap would be constructed to cover the entire area enclosed by the slurry wall. Grading of the site would be conducted prior to placement of the cap. As shown on Figure 7.2, a two-foot compacted clay layer would be placed over the impacted soils. This soil cover would be compacted in six-inch lifts. A 60-mil synthetic liner would be placed over the clay layer. A one-foot sand layer would be placed above the liner to provide drainage. The top foot of cap would consist of topsoil to provide a root zone for vegetative growth. In order to prevent clogging of the sand drainage layer, a filter fabric would be placed between the topsoil and sand layer.

The topsoil would be vegetated to prevent erosion. The cap would have a minimum slope of two percent. Surface runoff would be controlled by drainage channels which direct runoff to the ditch south of Reeves SEW and the ditch north of the Peak Oil Site. Precipitation that percolates through the topsoil would flow laterally through the sand drainage layer and into the drainage channels. Ten extraction wells would be installed, as addressed in the Area-Wide FS, within the slurry wall to dewater the surficial soils and to ensure an inward hydraulic gradient is maintained. A pipe network would be installed to transfer extracted groundwater to a system proposed in the Area-Wide FS containment alternative for treatment. An oil/water separator would be installed (if necessary) for pretreatment of Peak Oil extracted groundwater.

This containment alternative also includes monitoring and access restrictions. Groundwater monitoring would be conducted within and outside the slurry wall to verify that the slurry wall is preventing contaminant migration and maintaining hydraulic control. Six monitoring well pairs would be installed to achieve this objective. Well sampling would be conducted semiannually the first three years and annually thereafter. A 30-year time period is used for comparative analysis. In addition, groundwater monitoring would be conducted as proposed in the Area-Wide Groundwater FS to verify chemicals of concern are not migrating off-site. Access restrictions include five-year reviews and deed restrictions. Construction of a new fence would be required around the slurry wall with appropriate warning signs.

Summary of Remedial Alternative Evaluation:

Construction of the slurry wall, regrading of the site, and installation of the multimedia cap would prevent degradation of the surficial aquifer system. The piezometric surface within the slurry wall would be lowered by dewatering, producing a net inward hydraulic gradient into the site area. By elimination of surface water infiltration and creating a net inward hydraulic gradient, degradation of the surficial aquifer system beyond the slurry wall would be eliminated. In addition, the potential for direct exposure to chemical constituents in on-site soils would be eliminated by the placement of a cap.

The multimedia cap would be constructed in a manner which complies with action-specific ARARs. The cap construction and site regrading would not impact the nearby wetlands. However, this alternative may not comply with groundwater ARARs because groundwater standards would not be achieved for the residual groundwater in the dewatered containment area.

Annual maintenance of the multimedia cap, fence, and signs; continual maintenance and monitoring of the piezometric differential within the slurry wall; monitoring of groundwater quality across the slurry wall; and continued implementation of deed restrictions which restrict future on-site development at the site, are all required to assure the long-term effectiveness, integrity, and permanence of this remedial action. The overall long-term effectiveness of this alternative would be determined by five-year reviews of the site which would evaluate the need for additional remedial action.

This alternative eliminates migration of constituents from the site area and thus reduces the mobility of site chemicals. The toxicity and volume of the impacted source soil would remain essentially unchanged, however chemicals of concern which have desorbed from the soil into the groundwater would be removed by dewatering the site.

This alternative may result in short-term increase in exposure potential to the community and on-site workers. Construction of the slurry wall and cap may cause volatilization of organics or emission of impacted dust, thus resulting in temporary impacts to the ambient air quality.

The estimated construction time required to complete the remedial action portion of this alternative is 12 weeks.

The implementation of this alternative is directly influenced by the attainment of deed restrictions for the site and for easements and agreements for portions of property adjacent to the site where the cap would be constructed. The area over which the multimedia cap would be constructed includes both on- and off-site areas. Additionally, structures and railroad tracks would have to be removed.

This alternative utilizes proven and reliable construction methods which are readily implemented. Services for this alternative are readily available. The multimedia cap would be constructed using imported material which is also available. Therefore this alternative is technically implementable.

The cost estimate for this alternative is presented in Table 7-1. The estimated present-worth cost of this alternative is $1,683,000.

7.3 Alternative No. 3: In-Situ Treatment

This alternative includes in-situ treatment technologies to reduce mobility, toxicity, and volume of contaminants at the Peak Oil Site. In-situ treatment provides an alternative to ex-situ technologies which may cause short-term increases in contaminant exposure during excavation and treatment of impacted soils. In-situ technologies considered for this site include bioremediation, soil flushing, vacuum extraction/soil aeration, and stabilization. Effectiveness of in-situ methods, in most cases, must be determined on a site-specific basis using laboratory and pilot-scale treatability studies. For the purpose of conducting a detailed analysis, this alternative includes bioremediation and soil flushing as the primary in -situ process technologies. Vacuum extraction/soil aeration could be added during remedial design if it is determined that this process option is more effective at removing VOCs, which are found primarily in the northern section of the site. In addition, lead-impacted soil with concentrations above the soil remediation goal of 284 ppm (see Table 9-1) will be solidified/stabilized. The in-situ treatment alternative includes the site preparation, slurry wall construction, and multimedia cap construction components identified in Alternative No. 2. The major components of this alternative include:

- Demolition of buildings, fence, and railroad tracks, where necessary, to construct the slurry wall;
- Construction of a slurry wall around the impacted site soils (see Figure 7.1);
- Construction of a chain-link fence and placement of warning signs around the perimeter of the site;
- Excavation and solidification/stabilization of lead impacted soil with concentrations above the remediation goal of 284 ppm;
- On-site disposal of solidified/stabilized soil;
- Installation of a groundwater recovery system which includes extraction wells and collection header piping;
- Installation of a mixing system to add necessary nutrients and dissolved oxygen (or hydrogen peroxide) to the groundwater for infiltration;
- Installation of a delivery system (leach field piping or spray irrigation) to provide infiltration of treated groundwater;
- Implement weekly maintenance and operation of in-situ treatment system;
- Implement periodic monitoring to optimize the hydrodynamics of the extraction wells and

infiltration field, track the effectiveness of the biodegradation and soil flushing processes, and maintain the levels of nutrients and oxygen in the media at proper levels to ensure biodegradation;

- Install cap as discussed in the containment alternative after in-situ treatment is completed;

- Groundwater monitoring;

- Conduct five-year reviews after treatment is completed to evaluate the necessity of additional remedial actions.

Following site preparation and construction of the slurry wall for hydrogeologic control, a fence would be installed with appropriate warning signs.

Excavation and solidification/stabilization of lead-impacted soil with concentrations above the remediation goal of 284 mg/kg. Treatability studies shall be conducted to determine whether the lead-impacted soils will be solidified prior to the in-situ treatment of organic-contaminated soils. This is necessary due to the lead-impacted areas also being impacted with organic substances which may hinder the ability to meet solidification performance standards. If treatability studies illustrate that performance standards cannot be met, the solidification phase of remediation will occur after completion of the soil flushing/bioremediation phase (treatment of organics).

Groundwater recovery and recharge systems would be installed to: 1) provide adequate contact between treatment agents and impacted soils and 2) provide for complete recovery of surficial aquifer groundwater within the slurry wall.

A groundwater extraction scenario consisting of wells would be used to recover groundwater as shown on Figures 7.3 and 7.4. The surficial aquifer would be initially dewatered to approximately one to three feet above the low-permeability unit. This allows flushing of surficial sands and distribution of oxygen and nutrients to stimulate biodegradation. After initial dewatering, a steady-state groundwater recovery rate of 20 gpm was estimated, accounting for recharge which would result in flushing the aquifer within the slurry wall approximately two times per year.

The recovered groundwater would be transferred to a groundwater treatment system for heavy metals and treatment of organic compounds. Pretreatment may be required to remove certain substances (such as oil) that would not be compatible with a treatment system identified in the Area-Wide ROD. Integration with the Area-Wide ROD is required with this alternative because it combines in-situ soil treatment (soil flushing and bioremediation) with groundwater treatment. A treatability study would be required in the design phase to determine if surfactants can be used to enhance the soil flushing process.

A surface gravity delivery system which involves application of water for flushing directly to the surface is proposed for this

alternative. This system consists of distribution piping or spray irrigation as shown on Figure 7.3 which would provide adequate coverage of the site area. Due to the permeable nature of the site soils, a gravity surface delivery system would effectively allow percolation of water through the dewatered aquifer to the extraction zone.

In this scenario, treated groundwater from the groundwater treatment system would be transferred back to the Peak Oil Site for infiltration. Prior to recharge, mixing systems would be utilized to add nutrients (such as nitrogen and phosphorus) and oxygen to support microbial activity for biodegradation. Optimum nutrient mix can be determined by treatability studies. Biodegradation is dependent upon oxygen availability, and sufficient oxygen levels can be maintained by injecting hydrogen peroxide into the groundwater.

For this scenario the in-situ treatment period is estimated to be five years. After completion of the treatment period a multimedia cap would be placed over the site. The in-situ treatment alternative would require implementation with an Area-Wide groundwater alternative that would adequately treat the groundwater for surface recharge back into the surficial aquifer.

Summary of Remedial Alternative Evaluation:

This alternative would result in a reduction of organic and inorganic chemical concentrations in the Peak Oil Site source soils by in-situ treatment. Protection of groundwater by this alternative is provided by treatment of source soils, construction of a slurry wall, removal and treatment of the groundwater, and placement of a multimedia cap after completion of in-situ treatment. Environmental risks outlined in the Baseline RA are also reduced.

This alternative is expected to comply with chemical-, location-, and action-specific ARARs. Achievement of chemical-specific ARARs can only be assessed by performing treatability studies. Because source soils are flushed and bioremediated or stabilized during the in-situ treatment period, leachable contaminants, which may contribute to noncompliance with groundwater ARARs, may be reduced or eliminated. Impacted groundwater generated from this alternative would be treated in a groundwater treatment system to meet ARARs for groundwater recharge.

The long-term effectiveness of this alternative is provided by stabilization or biodegradation and flushing of leachable organic and inorganic compounds in site source soils. Placement of the multimedia cap after treatment would substantially reduce any exposure risks due to constituents not effectively removed by the in-situ treatment process. Five-year reviews of the site would be conducted to assure protection of human health and the environment.

The toxicity, mobility, and volume of the site hazards would be reduced by this alternative. Treatability studies would have to be conducted to determine the effectiveness of in-situ methods in reducing or removing site contaminants. In-situ treatment is proposed for five years, which would allow the surficial aquifer sands to be flushed approximately 10 times, two cycles per year.

Chemicals flushed into the groundwater from surficial sands are removed by the groundwater treatment system. After completion of the treatment period, verification sampling would be required to confirm the level of contaminant reduction.

The in-situ alternative requires minimal excavation of contaminated soils, which provides short-term effectiveness by reducing exposures to on-site workers and/or the community during the remedial action period. The insitu alternative would require an extended treatment period of approximately five years. Because implementation of this alternative would not increase short-term exposures or risks at the site, a longer treatment period would still provide adequate short-term effectiveness.

The implementation of this alternative is directly influenced by the attainment of deed restrictions for the site and easement agreements for portions of properties adjacent to the site, in order for the construction activities to be completed.

This alternative involves use of several standard construction techniques, including construction of the multimedia cap and slurry wall. Also, in-situ technology services are readily available.

The cost to implement this alternative is presented in Table 7-1. As shown, the present-worth cost of this alternative is estimated to be $3,221,000. This cost is based on a treatment period of five years.

7.4 Alternative No. 4: Ex-Situ Treatment

This alternative includes ex-situ treatment technologies to reduce mobility, toxicity, and volume of contaminants at the Peak Oil Site. Ex-situ technologies considered for this site include soil washing, high- and low temperature thermal desorption, bioremediation (bioreactor), and stabilization. The most appropriate treatment option or combination of ex-situ process technologies for the Peak Oil Site may be determined in the remedial design stage after treatability studies have been completed. For the purpose of conducting detailed analysis in this FS, two ex-situ alternatives will be analyzed which include soil washing and high-temperature thermal desorption as the primary ex-situ treatment technologies. Soil washing shall be designated as ex-situ treatment Alternative No. 4A and high-temperature thermal desorption as ex-situ treatment Alternative No. 4B. The ex-situ soil remedial alternatives presented in this section will require integration with the groundwater remedial alternatives presented in the Area-Wide FS. Proposed Area-Wide alternatives for groundwater include no action, containment, and four active restoration alternatives.

7.4.1 Alternative No. 4A: Soil Washing

This alternative requires the excavation and treatment of site source soils with soil washing as the primary technology to reduce mobility, toxicity, and volume of contaminants at the Peak Oil Site. The soil washing alternative includes the same site preparation, access restrictions, monitoring requirements, and slurry wall construction components as identified in Alternative No. 2. The major components of this alternative include:

- Demolition of buildings, fence, and railroad tracks which hinder construction of the slurry wall or excavation of soils;

- Installation of a slurry wall around the soils impacted above the established cleanup concentrations to control groundwater during excavation;

- Installation of dewatering sumps for dewatering site soils to the depth of excavation. Groundwater removed during dewatering would be treated by a groundwater treatment system;

- @ Construction of a fence around the slurry wall and placement of signs on the fence;

- Excavation of site soils requiring remediation;

- Air quality monitoring at the site perimeter during excavation activities;

- Excavation of impacted soil and treatment by soil washing;

- Stabilization of silt/clay fines impacted by inorganic constituents;

- Backfill of excavation with treated soil and grading of filled area;

- Regrade site and place soil cover to facilitate revegetation;

- Replacement of site fence signs;

- Annual inspection and maintenance of cap;

- Groundwater monitoring.

Following site preparation and construction of the slurry wall for dewatering, six dewatering sumps would be installed within the slurry wall to dewater the site for soil excavation. A water collection system would also be installed to transport the water to the designated groundwater treatment system which would be identified in the Area-Wide FS. A groundwater treatment system would have to be installed and operational before dewatering is initiated to treat extracted groundwater for discharge.

During dewatering, the soil washing treatment system would be mobilized for installation on the Peak Oil Site. The soil washing treatment system would require a construction and operation area of approximately 100 feet by 150 feet. To provide this area, preliminary soil excavation of contaminated surface soils may be required on the northern part of the site and stockpiled for future treatment. Clean backfill can be used for preliminary surface excavations to provide an adequate treatment area.

After initial dewatering and installation of the soil washing treatment system, open pit excavation and limited sheet pile excavation would be used to remove the source soil. Sheet pile excavation would be required for excavations that are sufficiently close to the slurry wall which could jeopardize its structural integrity. Dust and vapor suppressants may be utilized during excavation.

Soil washing would be used to initially treat the soils and separate the large-grained sands from the fine-grained silts and clays. Figure 7.5 shows the process diagram for soil washing. Because a significant fraction of the chemicals in a soil matrix tend to adsorb onto the silt, clay, or organic carbon portion of soil, the removal of these finer soil fractions by use of soil washing produces large-grained soils that can be backfilled into the excavation without stabilization or further treatment. Also produced are finer-grained soils which require treatment or stabilization. Water used in the treatment process would require further treatment for recycle or discharge.

Based on an estimated 46,000 cubic yards of impacted soil, 39,000 cubic yards of sands would provide clean backfill and 7,000 cubic yards of fines (approximately 15 percent of the surficial sands) would require further treatment or stabilization. This includes approximately 400 cubic yards of impacted soil which is located outside of the slurry wall. Excavations outside of the slurry wall would be backfilled with clean fill. Typical soil washing rates are about 5 to 20 tons per hour.

The soil fines would be stabilized after soil washing. Stabilization of the fines would prevent leaching of inorganic or organic chemical residues remaining in the fines. The stabilization process is shown on Figure 7.6. After stabilization of the soil fines, the stabilized material would be backfilled into the excavation and compacted. As a final measure, the site would be regraded and a soil cover would be applied to facilitate revegetation.

Summary of Remedial Alternative Evaluation:

This alternative would result in a permanent reduction of inorganic and organic chemicals. Residual fines resulting from the soil washing process would be stabilized. Protection of groundwater by this alternative is provided by soil washing, stabilization of fines, and by the slurry wall. Risks outlined in the Baseline RA are also substantially reduced.

This alternative would comply with all chemical-, location-, and action-specific ARARs. Because soil is treated and stabilized, this alternative would reduce or eliminate leaching of chemicals from source soils which may contribute to noncompliance with groundwater ARARs. Also, this alternative would meet applicable landfill disposal requirements and would meet RCRA Land Disposal Restrictions (LDRs). Soil which would be backfilled into the excavation after treatment and stabilization would comply with land disposal restrictions, and wastewater from the soil washing operation would meet appropriate ARARs for process wastewater discharge.

The long-term effectiveness of this alternative is assured by the removal of inorganic and organic compounds and stabilization of the residual fines. Continued implementation of the deed restrictions are required to restrict development of the site which is not compatible with protection of human health and the environment.

The toxicity, mobility, and volume of the site hazards would be substantially reduced by this alternative. However, a treatability study must be conducted to determine the achievable cleanup levels. Approximately 46,000 cubic yards of soil would be processed by soil washing and about 7,000 cubic yards of fines would be stabilized. The 7,000 cubic yards of fines for stabilization would bulk about 30 percent to produce 9,000 cubic yards of stabilized material for backfill into the excavation. Wastewater sludge produced by the soil washing process is included in this volume. Spent activated carbon may be produced during implementation of this alternative and would require regeneration at an appropriate facility.

Regarding the short-term effectiveness of this alternative, the community and/or workers around and on the Peak Oil Site may potentially be exposed to low levels of some metals or organics due to dust emissions or volatilization during excavation of soils. Dust or vapor suppressants would be used to reduce emissions. This alternative also includes air quality monitoring at the site perimeter to assess potential air impacts. Worker protection may be required for dermal contact and inhalation of dust.

The estimated time required to complete the remedial action portion of this alternative is 60 weeks.

The implementation of this alternative is directly influenced by the attainment of easements or access agreements and deed restrictions for the site and portions of property adjacent to the site in order for excavation and construction activities to be completed.

This alternative involves use of several standard construction techniques including construction of the cap and slurry wall. Although the soil washing technology is less common than the cap or slurry wall, services are readily available. The footprint size of the soil washing system is about 100 feet by 150 feet, and a treatability study is required.

The cost to implement this alternative is presented in Table 7-1. As shown, the present-worth cost of this alternative is estimated to be $13,908,000. This cost is based on excavation and treatment of 46,000 cubic yards of soil.

7.4.2 Alternative No. 4B: High-Temperature Thermal Desorption

This alternative includes treatment of impacted soil by high temperature thermal desorption (HTTD). Alternative No. 4 contains the same site preparation, access restrictions, monitoring requirements, and slurry wall construction components as identified in Alternative No. 2. Additionally, this alternative includes the site fence and signs, dewatering and soil excavation activities as are described in Alternative No. 4A. The major components of this alternative include:

- Demolition of buildings, fence, and railroad tracks which hinder construction of the slurry wall or excavation of soils;

- Installation of a slurry wall around the soils impacted above the established cleanup concentrations to control groundwater during excavation;

- Installation of dewatering sumps for dewatering site soils to the depth of excavation. Groundwater removed during dewatering would be treated by a groundwater treatment system;

- Construction of a fence around the slurry wall and placement of signs on the fence;

- Excavation of site soils requiring remediation;

- Air quality monitoring at the site perimeter during excavation activities;

- Excavation of impacted soil and treatment by high temperature thermal desorption;

- Stabilization of soil impacted by inorganic constituents;

- Backfill of excavation with treated soil and grading of filled area;

- Regrade site and place soil cover to facilitate revegetation;

- Replacement of site fence signs;

- Annual inspection and maintenance of soil cover;

- Groundwater monitoring.

Mobilization of the HTTD treatment system would occur during the dewatering process and after site preparation and slurry wall construction have been completed. The HTTD treatment system requires a footprint of approximately 150 by 150 feet for a total of 22,500 square feet. To provide this footprint, preliminary soil excavation of contaminated surface soils may be required on the northern part of the site and stockpiled for future treatment. Clean backfill can be used to fill preliminary surface excavations to provide an adequate treatment area.

Thermal desorption is a process that uses heat to vaporize organic contaminants from soil. Figure 7.7 is a general process diagram for a typical thermal desorption process. HTTD is not an incineration process because destruction of organic compounds is not the desired result. HTTD is a physical separation process which would volatilize organic contaminants from soil, but would not oxidize or destroy them. Contaminated soil is generally heated between 800 and 1,200 F (optimum process temperature determined based on treatability study) in the thermal desorption unit, driving off water and volatile compounds. Off-gases may be burned in an afterburner, condensed to reduce volume, or captured by carbon beds. Organic volatile compounds which can be condensed, produce a hydrocarbon product stream which can be sent off-site for recycle or incineration. Processing rates for the HTTD process are in the range of 3 to 25 tons/hr.

In this alternative, approximately 46,000 cubic yards would be excavated and processed by the HTTD process. This includes approximately 400 cubic yards of impacted soil which is located outside of the slurry wall. Excavations outside of the slurry wall would be backfilled with clean fill. Thermally treated soil would require stabilization for inorganic contaminants exceeding cleanup levels. Figure 7.6 shows a typical stabilization process. Stabilized soil would be backfilled in existing excavations. The site would then be regraded and a soil cover would be applied to facilitate revegetation.

Summary of Remedial Alternative Evaluation:

This alternative would result in a permanent reduction in the organic chemicals and stabilization of inorganics in the soils. Protection of groundwater by this alternative is provided by thermal treatment, soil stabilization measures and by the slurry wall. Risks outlined in the Baseline RA are also substantially reduced.

This alternative would comply with all chemical-, location-, and action-specific ARARs. Because soil is treated and stabilized, this alternative would reduce or eliminate leaching of contaminants from source soils which may contribute to noncompliance with groundwater ARARs. Also, this alternative would meet applicable landfill design and disposal requirements, and would meet closure requirements. Soil which would be backfilled into the excavation after treatment and stabilization would comply with LDRs, and wastewater from the thermal treatment operation would meet appropriate ARARs for process wastewater discharge. Air emissions would meet appropriate federal and state standards.

The long-term effectiveness of this alternative is assured by the removal of organic compounds and stabilization of inorganic constituents. Organic removal and inorganic stabilization are permanent. Continued implementation of the deed restrictions are required to restrict development of the site which is not compatible with protection of human health and the environment.

HTTD of the soils is expected to achieve cleanup goals for the organic constituents in the soil. Substantial reduction of the toxicity, volume, and mobility of the organics in the soils is provided by this thermal treatment. The mobility and toxicity of the inorganics in the soils would be reduced by stabilization. However, because of the addition of stabilizing material, the volume of inorganics-impacted soil is increased. The estimated increase in volume is 30 percent. Therefore, the 46,000 cubic yards of soil would increase to 60,000 cubic yards after stabilization. This additional volume of soil would be placed on-site and is expected to increase the elevation of the final grade by 1.5 to 2.0 feet. Approximately five gallons per minute of wastewater from the thermal treatment unit is expected to require treatment and discharge to a groundwater treatment system.

Regarding the short-term effectiveness of this alternative, the community and/or workers around and on the Peak Oil Site may potentially be exposed to low levels of some metals or organics due to dust emissions or volatilization during excavation of soils. Dust or vapor suppressants would be used to reduce emissions. This alternative also includes air quality monitoring at the site perimeter to assess potential air impacts. Worker protection may be required for dermal contact and inhalation of dust.

The estimated time required to complete the remedial action portion of this alternative is 57 weeks.

The implementation of this alternative is directly influenced by the attainment of easements or access agreements and deed restrictions for the site and portions of property adjacent to the site in order for excavation and construction activities to be completed. The substantive requirements of an air permit would have to be met for this treatment system.

This alternative involves use of several standard construction techniques, including construction of a slurry wall. The availability of the thermal treatment processing systems is limited, but at least two vendors provide this service.

The cost to implement this alternative is presented in Table 7-1. As shown, the present-worth cost of this alternative is estimated to be $24,155,000. This cost is based on excavation and treatment of 46,000 cubic yards of soil.

7.5 Alternative No. 5: Off-Site Disposal

The off-site disposal alternative consists of excavating impacted soil for off-site treatment at a RCRA-permitted Toxic Substance Disposal Facility (TSDF). This alternative would contain the same access restrictions, site preparation, and slurry wall construction components as Alternative No. 2. Because impacted soil and/or treated media would not remain on-site, a cap is not part of this alternative. Soil dewatering and excavation for this alternative would be the same as described for the ex-situ alternatives. The major components of this alternative include:

- Demolition of facilities, fence, and railroad tracks which hinder construction of slurry wall and excavation of soils;

- Installation of a slurry wall around the soils impacted above the established cleanup concentrations;

- Installation of dewatering sumps for dewatering site soils to the depth of excavation. Groundwater removed during dewatering would be treated by a groundwater treatment system;

- Excavation of site soils requiring remediation;

- Air quality monitoring at the site perimeter during excavation activities;

- Initial solidification of the site soils (if necessary) for transportation purposes;

- Off-site disposal at a regulated TSDF;

- Backfill of excavation with clean fill, and grading of filled area to drain surface water runoff to the ditch south of Reeves Southeastern Wire and to the ditch north of the Peak Oil Site;

- Removal of portions of the slurry wall to allow for future drainage of site area;

- Revegetation of site with indigenous plants.

For this alternative, due to the quantity of soil (46,000 cubic yards) to be removed from the site, preliminary waste profiling, scheduling, and necessary contracts would be required with permitted hazardous waste haulers and TSDFs. Excavation of the impacted source soils would be initiated after construction of the slurry wall and site dewatering.

LDRs require the soil to be treated before disposing into a RCRA landfill. LDR treatment standards may require the soil be incinerated to remove organics, and the resulting ash stabilized for inorganics. Existing capacity limits at commercially operated permitted incinerators would require that the excavation and transportation of impacted soil be conducted on a schedule compatible with incinerator capacity limits. The cost of this alternative is based on the incineration and stabilization of the soil.

Soils contaminated with PCBs over 50 ppm would require selective excavation and incineration at a Toxic Substance Control Act (TSCA)-approved and permitted incinerator. Approximately 1,300 cubic yards of soil would require shipment to a TSCA-approved incinerator. The remaining 44,700 cubic yards can be transported to a RCRA-permitted incinerator.

After impacted soils are removed from the site, clean soil would be imported to backfill the excavations. Portions of the slurry wall would be removed to allow proper drainage of the site area.

Summary of Remedial Alternative Evaluation:

Overall protection of human health and the environment is provided by this alternative by removing all impacted source soils from the site. However, because this alternative involves off-site disposal of the impacted soil, it is contrary to the statutory preference of SARA for on-site remedies.

The long-term effectiveness of this alternative is provided by the permanent removal of contaminants in the soil. No on-site residuals would remain in the source area. Off-site treatment and disposal is a reliable and adequate method for removal of the on-site hazard.

This alternative would comply with all chemical-, location-, and action-specific ARARs for the Peak Oil Site. This is accomplished by removing all source soils at the site. This alternative would comply with all LDRs.

This alternative effectively reduces toxicity, mobility, and volume of chemical constituents in the site soil. Assuming soils would require incineration and stabilization in order to meet LDRs, toxicity and volume of constituents in the soils at the off-site facilities would be reduced as well.

Approximately 44,700 cubic yards of soil would be disposed of as non-PCB-impacted soil at a RCRA facility, and the remaining 1,300 cubic yards of soil would be treated and disposed of at a TSCA/RCRA-approved facility.

Regarding the short-term effectiveness of this alternative, the transportation of impacted soil increases truck traffic in the site area, and thereby increases potential for an accident. The potential for exposure of persons and the environment to site contaminants because of potential wrecks by the transportation vehicle exists for this alternative. Additionally, potential for exposure by workers and the community to organic vapors or impacted dust during excavation activities exists. However, exposure to vapors and dust would be reduced by monitoring and by engineering controls (i.e., vapor or dust suppressants, air monitoring, and personal protective equipment).

The estimated time required to complete the remedial action portion of this alternative is 39 weeks. However, this time for completion assumes that there is adequate capacity at an off-site TSDF.

The implementability of this alternative is dependent on the acquisition of easements or purchase of property adjacent to the site. Additionally, removal of facilities and railroad tracks on and near the site would be necessary. However, this alternative is technically implementable.

The cost to implement this alternative is presented in Table 7-1. As shown, the present-worth cost of this alternative is estimated to be $120,103,000. This cost is based on the assumption that 46,000 cubic yards of soil would require incineration and stabilization due to LDRs.

Ash Pile

Based on RI results, the PRPs conducted a Feasibility Study (FS) under EPA's oversight to identify and evaluate appropriate remedial alternatives for minimizing risks to human health and the environment which could be caused by the contaminated ash pile at the site. EPA considered three alternatives.

7.6 Alternative No. 1: No Action

The National Contingency Plan (NCP) requires the development of a no action alternative as a basis for comparing other alternatives. Therefore, this alternative would mean no further action would be taken to reduce the risks posed by the ash pile contamination. The ash pile will remain at its current location with no maintenance of the protective plastic liner and/or cover.

Summary of Remedial Alternative Evaluation:

Protection of human health or groundwater will not be achieved with the no-action alternative because there will be no reduction of inorganic chemical concentrations nor will the chemicals of concern be immobilized.

This alternative will not comply with chemical-, location-, or action-specific ARARs because leachable contaminants which may contribute to noncompliance with groundwater ARARs will not be reduced or eliminated.

Because the no-action alternative does not meet the two threshold criteria of overall protection of human health and the environment or compliance with ARARs, it will not be carried through the other seven criteria.

There is no cost associated with the No Action alternative.

7.7 Alternative No. 2: Solidification/Stabilization and On-Site Disposal

- Solidification/Stabilization of ash pile using suitable solidifying/stabilizing reagents
- On-site placement of solidified/stabilized material over northern portion of the site and temporary coverage with an interim protective plastic cover
- Place multimedia cover over solidified mass after entire site treatment is completed

Alternative No. 2 involves the stabilization and solidification of the ash pile by the addition of a solidification reagent forming a high strength, low-permeability material with the contaminants encapsulated within the matrix of the material. The material will be spread out over the northern part of the site for approximately 1.2 acres. A protective plastic cover will be placed on the mound until the completion of the treatment of the entire site, at which time a multimedia cap will be placed on the solidified ash. This alternative reduces the leaching potential of the ash pile contaminants into the surficial aquifer.

Summary of Remedial Alternative Evaluation:

This alternative will not result in a reduction of inorganic chemical concentrations, but the chemicals of concern will be immobilized thereby reducing risks to human health and the environment.

This alternative will comply with chemical-, location-, and action specific ARARs.

The long-term effectiveness of this alternative is provided by solidification/stabilization of the leachable inorganic compounds in the ash pile. Eventually, placement of the multimedia cap after treatment of the entire site will add to the overall protectiveness of the remedy.

The mobility of the contaminants will be reduced by solidification/stabilization. However, for solidification, the volume of the ash pile may increase by up to approximately 10 percent. For the stabilization process, the volume of the ash pile is expected to remain constant or decrease due to the reduction of pore space in the ash caused by chemical bonding. The toxicity of the ash pile will remain unchanged, but the risk of exposure to the environment will be greatly decreased.

The cost of Alternative No. 2 is $726,165.

7.8 Alternative 3: Solidification/Stabilization and Off-Site Disposal

- Solidification/Stabilization of ash pile using suitable solidifying/stabilizing reagents

- Transportation and off-site disposal of solidified/stabilized material

This alternative calls for the same solidification and stabilization as in Alternative 2, but a different means of disposal. The material would be transported to an off-site landfill for disposal. The risk of contaminant exposure to human health and the environment will be greatly decreased by the removal of the material from the site.

Summary of Remedial Alternative Evaluation:

This alternative will provide overall protection of human health and the environment by solidifying/stabilizing and removing the entire ash pile from the site.

The long-term effectiveness of this alternative is provided by the permanent removal of contaminants in the ash pile area of the site. No onsite residuals will remain from the ash pile. Solidification/stabilization and off-site disposal is a reliable and adequate method for removal of the onsite hazard.

This alternative will comply with all chemical-, location-, and action-specific ARARs by solidifying/stabilizing and removing the ash pile from the site.

This alternative effectively reduces the toxicity, mobility and volume of the chemicals of concern in the ash pile at the site. If solidification is used, the volume may increase by up to 10 percent. The toxicity will remain unchanged, but risk of exposure will be greatly decreased.

The cost of this alternative for nonhazardous disposal is $1,124,550. The cost of this alternative for hazardous disposal is $6,198,390.

8.0 Comparative Analysis of Remedial Alternatives

A detailed comparative analysis was performed on the remedial alternatives developed for both the source material and ash pile during the FS and the modifications submitted during the public comment period using the nine evaluation criteria set forth in the NCP. The advantages and disadvantages of each alternative were compared to identify the alternative with the best balance among these nine criteria. A glossary of the evaluation criteria is provided in Table 8-1. According to the NCP, the first two criteria are labeled "Threshold Criteria", relating to statutory requirements that each alternative must satisfy in order to be eligible for selection. The next five criteria are labeled "Primary Balancing Criteria", which are technical criteria upon which the detailed analysis is primarily based. The final two criteria are known as "Modifying Criteria", assessing the public's and State agency's acceptance of the alternative. Based on these final two criteria, EPA may modify aspects of the specific alternative.

A summary of the relative performance of each alternative with respect to the nine evaluation criteria is provided in the following subsections. A comparison is made between each of the alternatives for achievement of a specific criterion.

Soils and Sediments

8.1 Overall Protection of Human Health and the Environment

The first criterion against which each of the remedial alternatives is analyzed in detail is that of overall protection of human health and the environment. CERCLA mandates that remedial actions provide this protection. Each remedial alternative is analyzed to determine whether it will eliminate, reduce, or control the risks identified in the Baseline RA. The remedial alternatives are also evaluated to determine whether unacceptable short-term or cross-media impacts will result from implementation. Overall protection of human health and the environment draws on the assessments of other evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness, and compliance with ARARs.

Because the Baseline RA shows the risks due to exposure to site soils are within the range considered adequately protective of human health for current site conditions, all alternatives evaluated in the source control FS will provide protection of human health insofar as exposure to soils and sediments is concerned. However, the risk to human health associated with exposure to groundwater is unacceptable. Currently, concentrations of chemicals above MCLs exist in the surficial aquifer at the Peak Oil Site. Concentrations of these chemicals in site source soils contribute to the elevated (above MCLs) groundwater concentrations. Therefore, cleanup concentrations which are considered protective of groundwater were established. All of the alternatives, except the No-Action Alternative, are protective of human health and the environment by eliminating, reducing, or controlling risk through treatment of soil contaminants, engineering controls, and/or institutional controls. Since the No-Action Alternative (Alternative No. 1) does not eliminate, reduce or control any of the exposure

Table 8-1

GLOSSARY OF EVALUATION CRITERIA

THRESHOLD CRITERIA:

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.

Compliance with ARARs - addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and/or provides grounds for invoking a waiver.

PRIMARY BALANCING CRITERIA:

Long-Term Effectiveness and Permanence - refers to the magnitude of residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

Reduction of Toxicity, Mobility, or Volume Through Treatment addresses the anticipated performance of the treatment technologies that may be employed in a remedy.

Short-Term Effectiveness - refers to the speed with which the remedy achieves protection, as well as the remedy's potential to create adverse impacts on human health and the environment that may result during the construction and implementation period.

Implementability - is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement the chosen solution.

Cost - includes capital and operation and maintenance costs.

MODIFYING CRITERIA:

State Acceptance - indicates whether the State concurs with, opposes, or has no comment on the Proposed Plan.

Community Acceptance - the Responsiveness Summary in the appendix of the Record of Decision reviews the public comments received from the Proposed Plan public meeting and the public comment period. pathways, it is therefore not protective of human health or the environment and will not be considered further in this analysis as an option for the soil wastes.

The most permanent protection of the environment is provided by Alternative No. 5 because the source soil is removed, thus removing the source of surficial aquifer degradation at the site.

Alternatives No. 3 and No. 4 treat the source soils. This is a permanent solution to the degradation of the surficial aquifer; however, depending on the ability of treatment to meet cleanup goals, some chemicals may remain on-site. Therefore, these alternatives are considered slightly less permanent than Alternative No. 5 at protecting the environment at the site.

Alternative No. 2 contains the impacted source soils within the slurry wall. Because groundwater is not treated by this alternative, chemicals would remain in the surficial aquifer within the slurry wall. Therefore this alternative is less protective of the environment than Alternatives No. 3, No. 4, or No. 5.

8.2 Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

The second evaluation criterion in the detailed analysis of alternatives is compliance with ARARs. Each remedial alternative is assessed to determine whether it will attain the requirements that are applicable, or relevant and appropriate, under the federal and state environmental laws. Unless a waiver is justified, the remedial alternative must be in compliance with all chemical-specific, location-specific, or action-specific ARARs.

Alternative No. 5 would comply with all chemical-, location-, and action-specific ARARs for the Peak Oil Site. This is accomplished by removing all source soils at the site. This alternative would also comply with all land disposal restrictions.

Alternatives No. 3 and No. 4 would comply with all chemical-, location-, and action-specific ARARs. Because soil is treated, these alternatives would reduce or eliminate source soil contribution to groundwater which could result in exceeding ARARs. Also, Alternative No. 4 would meet applicable landfill design, operation, and closure requirements. For Alternative No. 4, soil which would be backfilled into the excavation after treatment and stabilization, would comply with land disposal restrictions, and wastewater from the treatment operations can meet appropriate ARARs for process wastewater discharge. Air emissions from the high-temperature thermal desorption unit of Alternative No. 4B would meet appropriate standards. For Alternative No. 3, groundwater would be adequately treated to meet appropriate ARARs for recharge.

Alternative No. 2 would not comply with all ARARs. The cap would be constructed in a manner which complies with action-specific ARARs. The cap construction and site regrading would not damage the nearby wetlands. Therefore, location-specific ARARs would be achieved. However, surficial groundwater contained within the slurry wall would not be treated in this alternative, and thus would not be in compliance with groundwater ARARs.

8.3 Long-Term Effectiveness and Permanence

The third evaluation criterion for the detailed analysis is the long-term effectiveness and permanence of the remedial action. The degree to which each remedial alternative provides a long-term, effective, and permanent remedy is assessed, and the degree of certainty that the alternative will be successful in achieving the response objectives is evaluated. This assessment includes factors such as an evaluation of the magnitude of the risks remaining at the conclusion of remedial activities, the degree to which treated residuals remain hazardous (considering volume, toxicity, mobility, and propensity to bioaccumulate), the adequacy and reliability of controls (such as slurry walls, caps, and the integrity of off-site landfills), and the potential exposure pathways and risks posed should the remedial action require replacement.

Long-term effectiveness is provided by Alternative No. 5 because source soils are completely removed. Also, the removal and disposal techniques used for this alternative are considered reliable and adequate as long-term remedies. Five-year reviews would not be necessary for this alternative because all source contamination is removed from the site.

Alternatives No. 3 and 4 have adequate long-term effectiveness, but because stabilized soil would remain on-site after implementation of these alternatives, continued implementation of deed restrictions and maintenance are required. Although, in relation to one another, Alternative No. 4 has the capacity to achieve lower cleanup levels than Alternative No. 3, the long-term effectiveness of these alternatives is relatively the same.

Alternative No. 2 is dependent upon control measures to be effective. Whereas Alternatives No. 3 through No. 5 provide treatment and a permanent reduction in contamination, Alternative 2 relies upon a greater amount of engineering controls, inspection, and maintenance to assure effectiveness. Five-year site reviews are necessary for Alternative 2.

8.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

The fourth evaluation criterion for the detailed analysis is the reduction of toxicity, mobility, or volume through treatment or recycling. Each alternative is evaluated against this criterion to assess the anticipated performance of the treatment technologies used in the alternative to achieve the reduction in toxicity, mobility, and/or volume of the principal threats. CERCLA requires that a preference be given to treatment alternatives which reduce the toxicity, mobility, or volume of hazardous constituents. As part of this analysis, the evaluation considers the following:

1. The treatment or recycling processes proposed and the waste materials the processes will handle;

2. The amount of hazardous substances destroyed, treated, or recycled;

3. The degree of expected reduction in toxicity, mobility, or volume of the waste due to treatment or recycling and the specification of which reduction(s) are occurring;

4. The degree to which treatment is irreversible;

5. The types and quantities of residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate of the hazardous substances which may remain in the residuals;

6. The degree to which treatment reduces the inherent hazards posed by the principal threats.

The maximum reduction of toxicity, mobility, and volume of chemical constituents in the site soil is provided by Alternative No. 5. Soils would be incinerated or otherwise treated off-site at treatment and disposal facilities, thus reducing the toxicity and volume of constituents in the soils at the site. Alternative No. 4B is expected to achieve cleanup goals for the organic constituents in the soil. The toxicity, volume, and mobility of the organics in the soils would be substantially reduced. Stabilizers which would be added to the thermally treated soils are expected to eliminate the mobility and toxicity of the metals in the soil. However, because of the addition of stabilizing material, the volume of remediated soil is increased. The estimated increase in volume is approximately 30 percent. Therefore, the 46,000 cubic yards of thermally treated soil would increase to 60,000 cubic yards after stabilization.

Approximately five gallons per minute of wastewater from the thermal treatment unit is expected to require treatment.

The toxicity, mobility, and volume of site impacted soil would be substantially reduced by Alternative No. 4A. However, a treatability study must be conducted to determine the achievable cleanup levels. Approximately 46,000 cubic yards of soil would be processed by soil washing and about 7,000 cubic yards of fines would be stabilized. The 7,000 cubic yards of fines for stabilization would bulk about 30 percent to produce 9,000 cubic yards of stabilized material for backfill into the excavation. Wastewater sludge produced by the soil washing process is included in this volume.

Alternative No. 3 substantially reduces the mobility of site chemicals. Toxicity and volume of chemicals are also reduced. A treatability study is required to estimate the achievable cleanup levels.

Alternative No. 2 eliminates migration of constituents from the site and thus reduces the mobility of site chemicals. However, the toxicity and volume of the impacted source soil would remain essentially unchanged.

8.5 Short-Term Effectiveness

The fifth criterion, short-term effectiveness, addresses the effectiveness of the alternative during construction and operation of the remedial action. Alternatives are evaluated with respect to their effects on human health and the environment, including the risks to the community posed by implementation of the action, protection of the workers during implementation and the reliability and effectiveness of protective measures available to the workers, potential impacts to the environment caused by the remedial alternative and the effectiveness and reliability of mitigative measures which could be employed during implementation, and the time required to achieve the final response objectives.

Alternatives No. 2 and No. 3 result in small, if any, short-term effects. Construction of these alternatives may result in short-term increase in exposure potential to the community and on-site workers. Construction of the slurry wall may cause volatilization of organics into the air or emission of impacted dust, thus resulting in temporary impacts to the ambient air quality. The time to complete Alternative No. 2 is 12 weeks and the time required for the slurry wall phase of Alternative No. 3 is 4 weeks.

Regarding the short-term effectiveness of Alternative No. 4, the community and/or workers around and on the Peak Oil Site may potentially be exposed to low levels of some metals or organics due to dust emissions or volatilization during excavation of soils. This alternative includes air quality monitoring at the site perimeter to assess potential air impacts. If unacceptable concentrations are detected in air during excavation, work would be discontinued until the concentrations subside. Worker protection may be required for dermal contact and inhalation of dust.

It is expected that Alternatives No. 4A and No. 4B would require 60 and 57 weeks, respectively, to implement.

Alternative No. 4B has, in addition to the short-term effects listed above, the potential of air emissions from the thermal treatment unit. Although monitoring would be used to protect workers and the environment, potential of exposure is present. Therefore, this alternative has less short-term effectiveness than Alternative No. 4A.

In Alternative No. 5, transportation of impacted soil increases truck traffic in the site area, and thereby increases potential for vehicular accidents. The potential for exposure of persons and the environment to site chemicals because of potential wrecks by the transportation vehicle exists for this alternative. Additionally, potential for exposure of workers and the community to organic vapors or impacted vapor and dust during excavation activities exists. However, exposure to vapors and dust would be reduced by monitoring and by engineering controls (i.e., vapor, dust suppressants, air monitoring, and personal protective equipment). This alternative is expected to require only 39 weeks to implement.

8.6 Implementability

The sixth criterion upon which the detailed analysis of remedial alternatives is based is implementability. This criterion involves analysis of ease or difficulty of implementation, considering the following factors:

1. Technical feasibility, that is, the feasibility to reliably construct, operate, and monitor the effectiveness of a remedial action, as well as potential technical difficulties or unknowns associated with construction or operation;

2. Administrative feasibility, that is, the feasibility of obtaining permits or rights-of-way for construction or operation, and coordinating interagency approvals or activities;

3. Availability of services and materials for a treatment method or technology, such as the availability of disposal capacity, off-site treatment or storage capacity, availability of equipment or specialists, and availability of special resources (e.g., catalysts, polymers, or borrow clays). All alternatives reviewed are administratively and technically implementable. The most easily implemented alternative for remediation at the Peak Oil Site is the limited action alternative. Implementation of deed restrictions would be required, which is administratively feasible. The inspection of the site fence and warning signs, as well as five-year reviews, are easily implemented.

Common to the remainder of the alternatives are several items which are critical to implementation. The implementability of each of these alternatives is dependent on the acquisition of easements or purchase of property adjacent to the site for the construction of the slurry wall. The attainment of access agreements and construction of the slurry wall are both considered administratively and technically implementable. Additionally, removal of facilities and railroad tracks on and near the site would be necessary for all the remaining alternatives.

Alternatives No. 2 and No. 3 require access to the adjacent areas because of the construction of the multimedia cap within the confines of the slurry wall. Additionally, these alternatives require implementation of site fence, signs, and cap inspection and maintenance programs, as well as five-year site reviews.

Alternatives No. 2 and No. 3 utilize proven and reliable construction methods and services which are readily implemented and available. Minimal construction is required with these alternatives. Alternative No. 3 includes installation of an in-situ treatment system and a treatability study.

Alternative No. 4A is the fourth most easily implemented alternative. The availability of the soil washing system is not considered to be a problem. The construction and operation area of approximately 100 feet by 150 feet, which can be situated in the northwest corner of the site. As noted in earlier sections, a treatability study is required for this alternative.

Almost equally as implementable as the soil washing alternative is Alternative No. 4B. The availability of the treatment system is slightly less than the soil washing system, but it also is generally available. The construction and operation area of 150 feet by 150 feet for this treatment system can be situated in the northwest corner of the site. This alternative also requires a treatability study.

Alternative No. 5 is counter to the statutory preference of SARA, and is contingent upon limited TSDF capacity. However, this alternative is technically and administratively implementable.

8.7 Cost

The seventh criterion for detailed analysis of alternatives is cost. Both capital and operational and maintenance (O&M) costs are considered. The accuracy of the cost estimates is generally within the range of -30 percent to +50 percent. To facilitate comparison of alternatives with expenditures occurring over different time periods, all costs are presented in terms of present worth. A discount rate of 10 percent has been utilized as recommended by the Office of Management and Budget (OMB) guidance (OMB Circular No. A-94).

In the Feasibility Study, engineering, legal, and administrative costs were assumed to equal 15 percent of the direct capital costs and contingency costs were assumed to equal 20 percent of the direct capital costs for each alternative.

Costs for the five alternatives are listed below in ascending order of magnitude.

Alternative No. 1A: No cost
Alternative No. 1B: Present-worth cost = $123,000;
Alternative No. 2: Present-worth cost = $1,683,000;
Alternative No. 3: Present-worth cost = $3,221,000;
Alternative No. 4:
- No. 4A: Present-worth cost = $13,908,000;
- No. 4B: Present-worth cost = $24,155,000;

Alternative No. 5: Present-worth cost = $120,103,000.

8.8 State Acceptance

This criterion assesses the technical and administrative issues and concerns the state may have regarding each of the remedial alternatives. Many of these concerns are addressed through compliance with applicable ARARs.

The State of Florida, as represented by the Florida Department of Environmental Regulation (FDER), has been the support agency during the Remedial Investigation and Feasibility Study process for the Bay Drums site. In accordance with 40 CFR 300.430, as the support agency, FDER has provided input during this process. Based upon comments received from FDER, it is expected that concurrence will be forthcoming; however, a formal letter of concurrence has not yet been received.

8.9 Community Acceptance

This criterion assesses the issues and concerns the public may have regarding each of the remedial alternatives. This criterion is addressed in the Responsiveness Summary, Appendix A of this document.

Based on comments made by citizens and government officials at the public meeting held on August 18, 1992, and those received during the public comment period, the Agency perceives that the community believes that the overall selected remedy of In-Situ Treatment for contaminated soils and sediments will effectively protect human health and the environment.

Ash Pile

8.10 Overall Protection of Human Health and the Environment

Alternative 1 will not be protective of human health nor the environment as metals from the untreated ash will not be solidified/stabilized and may become available for human exposure, or may potentially leach into the aquifer. Both Alternatives 2 and 3 will provide protection of human health and the environment because the metals in the ash pile will be stabilized, and unable to leach into the surficial aquifer. Alternative 3 is the most permanent solution because the ash pile will be removed from the site, this eliminating all site risks associated with it.

8.11 Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Alternative 1 will not comply with chemical-, location-, and action-specific ARARs as the contaminants in the untreated ash pile may leach into the groundwater thus exceeding ARARs. Both solidification/stabilization alternatives will comply with all ARARs for the Peak Oil Site. This is accomplished by stabilizing the metals which will eliminate any contaminant contribution to groundwater that could result in exceeding ARARs. The solidification will also comply with Land Disposal Restrictions (LDRs) for Alternative 3.

Because Alternative No. 1 does not meet the criteria for protection of human health and the environment or compliance with ARARs, it is not carried through the other criteria.

8.12 Long-Term Effectiveness

Long-term effectiveness will be provided by both solidification/stabilization alternatives (Alternative 2 and 3) because the metals will be stabilized during the solidification process. However, Alternative 3 will provide additional long-term effectiveness due to the fact that the solidified ash pile will be removed from the site.

8.13 Reduction of Toxicity, Mobility, or Volume

The solidification process used in both Alternative 2 and 3 will reduce the mobility of the chemicals of concern. However, the volume may increase by up to approximately 10 to 20 percent. For the stabilization process, the volume of the pile is expected to remain constant or may decrease due to the reduction of pore space in the ash caused by chemical bonding. The off-site disposal for Alternative 3 will achieve the maximum reduction of the mobility, toxicity, and volume of the contaminants in the ash pile because the ash pile will be removed from the site.

8.14 Short-Term Effectiveness

Alternative 2 will result in small, if any, short-term effects. Some fugitive dust may be generated during the solidification process. However, this may be reduced by using proper engineering controls. Alternative 3 may also result in the generation of fugitive dust during solidification, but engineering controls can reduce this effect.

8.15 Implementability

All alternatives reviewed are administratively and technically implementable. The most easily implemented alternative is the no action alternative. Alternative 2 uses proven reliable construction methods that are readily implementable and available. The administrative feasibility of off-site disposal in Alternative 3 may be complicated by the problems associated with landfill acceptance of waste from a Superfund site. Also, this alternative is counter to the statutory preference of SARA for on-site remedies.

8.16 Cost

Alternative 1 has no costs associated with it since no further action would be taken. Alternatives 2 and 3 were ranked based on the total costs presented. Alternative 2 was significantly lower in costs due to the high transportation and disposal costs associated with Alternative 3. The costs are listed below:

Alternative No. 1: No Action = No Cost
Alternative No. 2: Solidification/On-Site Disposal= $726,165
Alternative No. 3: Solidification/Off-Site Disposal
Nonhazardous Disposal = $1,124,550
Hazardous Disposal = $6,198,390

8.17 State Acceptance

The State of Florida, as represented by the Florida Department of Environmental Regulation (FDER), has been the support agency during the Remedial Investigation and Feasibility Study process for the Bay Drums site. In accordance with 40 CFR 300.430, as the support agency, FDER has provided input during this process. Based upon comments received from FDER, it is expected that concurrence will be forthcoming; however, a formal letter of concurrence has not yet been received.

8.18 Community Acceptance

Based on comments made by citizens and government officials at the public meeting held on February 24, 1992, and those received during the public comment period, the Agency perceives that the community believes that the selected remedy of solidification/stabilization of the ash pile with on-site disposal will effectively protect human health and the environment.

The public comments that were expressed during the public meeting and the public comment period have been addressed in the Responsiveness Summary, Appendix A.

9.0 Selected Remedy

Based upon consideration of the requirements of CERCLA, the NCP, the detailed analysis of the RI/FS, the risk assessment, and public and state comments, EPA has selected Alternative No. 3 for soils and sediments and Alternative No. 2 for the ash pile at the Peak Oil site. At the completion of this remedy, the risk associated with this site has been calculated at 10^{-4} which is determined to be protective of human health and the environment. The total present worth cost of the soil and sediment selected remedy, Alternative No. 3, is estimated at $3,221,000, which when added to the cost of the ash pile remedy of $726,165 yields a total project cost of $3,947,165.

9.1 Source Control

Source control remediation will address the contaminated soils/sediments and the ash pile at the site. Source control shall include installation of a slurry wall around the site, excavation, solidification/stabilization and on -site disposal of lead-impacted soils/sediments, solidification/stabilization and on-site disposal of the ash pile, dewatering of surficial aquifer, treatment of surficial groundwater[1], in-situ soil flushing/bioremediation, and capping of the site. Following source control remediation, institutional controls will be placed on the site.

<Footnote>1 The alternatives for groundwater treatment are outlined in the Area-Wide Hydrologic Remedial Investigation and Baseline Risk Assessment report. The selected groundwater remedy will be presented in the Peak Oil/Bay Drums Operable Unit 2 Record of Decision.</footnote>

9.1.1 The major components of source control to be implemented include:

. Construction of a slurry wall around the impacted site soils. The slurry wall will be composed of a clay material and will be keyed into the Hawthorn Formation at an average depth of 20 feet.

. Excavation and solidification/stabilization of leadimpacted soil with concentrations above the remediation goal of 284 mg/kg. The solidified material will be comprised of a pozzolan Portland cement mixture which involves a combination of Portland cement and fly ash or other pozzolans to produce a relatively high-strength low permeability monolith. Treatability studies shall be conducted to determine whether treatment of the organic-contaminated soils is necessary prior to solidification of the soils contaminated with lead. This is necessary due to the areas being contaminated with lead also being contaminated with organic substances which may hinder the ability to meet solidification performance standards. If treatability studies illustrate that performance standards cannot be met, the solidification phase of remediation will occur after completion of the soil flushing/bioremediation phase (treatment of organics) outlined below.

. Stabilization/Solidification of the lead-impacted soils and ash pile.

. On-site disposal of the solidified/stabilized soil and ash.

. Installation of a groundwater recovery system which includes extraction wells and collection header piping.

. Extraction and treatment of the groundwater (See Footnote #1 on page 74).

. Installation of a bioremediation mixing system to add necessary nutrients and dissolved oxygen (or hydrogen peroxide) to the treated groundwater for infiltration. The nutrients are introduced to the soils via the treated groundwater to propagate indigenous species or microorganisms which are capable of digesting the organic contaminants in the soil.

. Installation of a delivery (soil flushing) system (leach field piping or spray irrigation) to provide infiltration of the treated groundwater back into the soils.

. Installation of a multimedia cap after in-situ treatment is completed. The cap will be a typical cap comprised of, but not limited to, two feet of compacted clay, covered by a synthetic membrane, a one-foot layer of sand, and a layer of soils capable of supporting indigenous plants. The cap will be in accordance with guidelines found in the EPA publication Final Covers on Hazardous Waste Landfills and Surface Impoundments, (EPA 530-SW-89-047, July 1989).

. Groundwater monitoring to ensure that groundwater ARARs are being met.

. Placement of institutional controls on the property such as permanent deed restrictions or zoning controls which prohibit any development of the site or any construction activities that may damage the treatment system or cap.

. Five-year reviews to assess whether additional remedial actions are necessary.

9.1.2 Performance Standards

Performance standards for the treatment of soils/sediments were developed to protect human health, to prevent contamination of the groundwater and to be in compliance with ARARs. Treatment shall continue until the remaining soils/sediments are at or below the selected remediation goals. All treatment shall comply with ARARs. Testing methods approved by EPA shall be used to determine whether the performance standards have been achieved. Tables 9-1 and 9-2 list the remediation goals for chemicals of concern in the soils and sediments, respectively.

The remediation goal for lead in the ash pile is 284 mg/kg.

The remediation goals for lead and bis(2-ethylhexyl)-phthalate are based upon protection of groundwater, and the remediation goal for Aroclor1260 is based upon the EPA recommendation for remediation goals for PCBs in soils in industrial areas. The PCB remediation goal information is found in the EPA publication Guidance on Remedial Action for Superfund Sites with PCB Contamination, (EPA/540/G-90/007, August 1990).

The FS for the site identified tetrachloroethylene, 1,1,1trichloroethane and trichloroethylene as contaminants of concern with suggested remediation goals of 0.17 mg/kg, 4.60 mg/kg and 0.31 mg/kg, respectively. It was determined that these remediation goals were extremely low for soils and therefore would not be included in the ROD as contaminants of concern. However, analyses will be conducted to ensure that levels of these contaminants in the soil are such that groundwater ARARs are being met.

The volume of soil and sediment at the site requiring cleanup is estimated to be approximately 46,000 cubic yards. The volume of ash requiring remediation is estimated to be approximately 6,000 cubic yards.

For soils, sediments and ash that are contaminated with lead exceeding the remediation goal of 284 mg/kg, solidification is required. Based in part of on suggestions found in the EPA publication Stabilization/Solidification of CERCLA and RCRA Wastes, (EPA/625/6-89/022, May 1989), and in consultation with EPA and FDER solidification personnel, EPA has determined that the performance standards listed in Table 9-3 for the solidified material are appropriate.

9.1.3 General Component

The in-situ treatment alternative (Alternative No. 3) requires a groundwater treatment system since it combines in-situ soil treatment (soil flushing and bioremediation) with groundwater treatment. Surficial groundwater and contaminants flushed from soils within the slurry wall are withdrawn by a recovery system and treated by a physical, chemical, or biological aboveground technique, and then treated water is recharged by an infiltration system.

Prior to recharge, a mixing system is used to add nutrients (such as nitrogen and phosphorus) and oxygen to support microbial activity. Hydrogen peroxide or an air mixing system may be used to provide the needed dissolved oxygen.

If necessary, prior to recharge, a surfactant can be mixed with the water to enhance leaching or organic compounds present in the soil into the groundwater. A surfactant is usually added to reduce the interfacial tension between organic constituents and water.

TABLE 9-3
SOLIDIFICATION PERFORMANCE STANDARDS
PEAK OIL SUPERFUND SITE
TAMPA, FLORIDA

Parameter	Performance Standard	Testing Methodology
Permeability	< 1x10[-7]	EPA Method 9100-SW846
Unconfined Compressive Strength	> 250 psi	ASTM 1633-84
Leachability	< 5 mg/l Lead	TCLP
Leachability	< 1x10[-12] mg/l	Modified ANS 16.1

Because certain performance standards may not be determined until the Remedial Design phase, it shall be understood that the list of performance standards in this section is not exclusive and may be subject to addition and/or modification by the Agency in the RD/RA phase.

Groundwater monitoring will be conducted and five-year reviews will be required to assess whether additional remedial actions are appropriate after the in-situ treatment period.

The capital cost for this alternative is $2,793,000 and the operation and maintenance costs for the alternative are $428,000. The cost of treatment for the ash pile is $726,165. The total present worth cost of the alternative is $3,947,165.

10.0 Statutory Determinations

Under its legal authority, EPA's primary responsibility at Superfund sites is to undertake remedial actions that achieve adequate protection of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that, when complete, the selected remedial action for this site must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws 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 includes preference for remedies that employ treatment technologies that permanently and significantly reduce the toxicity, mobility or volume of hazardous wastes as their principle element. The following sections discuss how the selected remedy for this site meets these statutory requirements.

10.1 Protective of Human Health and the Environment

The selected remedy protects human health and the environment by reducing the organic and inorganic chemical concentrations in the source soils by both in-situ treatment and solidification, and in the ash pile by solidification/stabilization. Protection of groundwater is provided by treatment of source soils, construction of a slurry wall, removal and treatment of the surficial groundwater, and placement of a multimedia cap after completion of the in-situ treatment. Also, risks associated with exposure to the ash pile will be reduced.

10.2 Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

The selected remedy of installation of a slurry wall around the site, excavation, solidification/stabilization and on-site disposal of lead-impacted soils/sediments and ash, dewatering of surficial aquifer, treatment of surficial groundwater, in-situ soil flushing/bioremediation, and capping of the site will comply with all applicable or relevant and appropriate requirements (ARARs). The ARARs are presented below:

Chemical-Specific ARARs

@ Safe Drinking Water Act, 40 CFR 141.11-141.16, 141.50141.51. Relevant and appropriate in development of soil action levels for Aroclor-1260, Bis(2-ethylhexyl)-phthalate and lead which are protective of site groundwater.

. Florida Drinking Water Standards, FAC 17-550. Maximum contaminant levels for Aroclor-1260, Bis(2-ethylhexyl)-phthalate and lead are relevant and appropriate for soil action levels protective of site groundwater.

. Florida Groundwater Classes, Standards and Exemptions, FAC 17-520. Relevant and appropriate in the development of cleanup levels which are protective of site groundwater.

. Polychlorinated Biphenyls (PCBs) Spill Cleanup Policy, 40 CFR Part 761. Relevant and appropriate in the development of cleanup levels for PCB-contaminated soils.

. EPA Guidance on Remedial Actions for Superfund Sites With PCB Contamination, (EPA/540/G-90/007, August 1990). To be considered in the development of cleanup levels for PCB-contaminated soils.

. Clean Air Act, 40 CFR 50. Provides National Ambient Air Quality Standards which are relevant and appropriate to lead and particulate emissions resulting from remedial activities conducted at the site.

. Florida Ambient Air Quality Standards, FAC 17-2.3. Relevant and appropriate to remedial activities conducted at the site which may generate lead and particulate emissions.

. RCRA Toxicity Characteristics Rule, 55 FR 11798. Relevant and appropriate in providing performance standards for lead for TCLP testing of stabilized material.

Location-Specific ARARs

. Endangered Species Act, 50 CFR Part 402. Applicable to remedial activities conducted at a site located in the area of a critical habitat for endangered or threatened species.

. Florida Rules on Hazardous Waste Warning Signs, FAC 17736. Identifies requirements applicable to signs around perimeter and at entrances of site.

Action-Specific ARARs

. Florida Air Pollution Rules, FAC 17-2.1. Applicable to remedial activities conducted at the site which may generate air emissions.

10.3 Cost Effectiveness

EPA believes that the selected remedy will reduce the risk to human health and the environment from the soils, sediments and ash at a cost of $3,947,165. Of the four source alternatives (3, 4A, 4B, and 5) and the two ash pile alternatives (2 and 3) that provide high levels of long term protectiveness, Alternative No. 3 for the soils and sediments and Alternative No. 2 for the ash pile are the most cost effective. Alternatives No. 4A and 4B provide approximately the same amount of long term protectiveness, but are much more costly than Alternative No. 3. And Alternative No. 5, although it removes all contaminated material from the site and provides a 100% degree of reduction of risk to human health and the environment at the site, it is significantly higher than the other three source alternatives. For the ash pile, Alternative No. 3 also removes all treated material from the site and provides a 100% degree of reduction of risk to human health and the environment at the site. However, the cost was significantly higher than Alternative No. 2.

10.4 Utilization of Permanent Solutions to the Maximum Extent Practicable

EPA has 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 source control operable unit at the Peak Oil Site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that this selected remedy provides the best balance of trade-offs in terms of long-term effectiveness and permanence, reduction in toxicity, mobility or volume through treatment, shortterm effectiveness, implementability, and cost, while also considering the statutory preference for treatment as a principle element and considering state and community acceptance.

The selected remedy will effectively reduce or immobilize the contaminants in the soils, sediments and ash and will prevent any further direct risk to human health or threat to the groundwater.

10.5 Preference for Treatment as a Principal Element

Both organic and inorganic constituents were identified at the Peak Oil Site. The selected remedy will achieve substantial risk reduction by permanently treating and containing the contamination. This alternative would be protective of human health and the environment, is cost-effective, and will meet all Federal and State requirements.

The remedy selected in this ROD provides the best balance of the evaluation of the nine criteria EPA applies to every alternative. It would take approximately 5 years to reach protective cleanup levels for the site. However, site contaminants would be contained within the site area during the entire time by the slurry wall which will be built around the site. This cleanup method will also provide long-term protection to groundwater.

11.0 DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for Operable Unit 1 of the Peak Oil Site which was released for public comment in August 1992 identified Alternative 3 as the preferred alternative for soil and sediment remediation. EPA reviewed all written and verbal comments submitted during the public comment period from August 13, 1992 through September 13, 1992. Comments received during the comment period expressed concern that the Proposed Plan did not address the appropriate treatment and disposal of the ash pile located at the Peak Oil site. EPA evaluated the comments and determined that the ash pile should be addressed as part of the Operable Unit One source control Record of Decision.

The PRPs conducted a focused RI/FS on the ash pile in November 1992. A second Proposed Plan which addressed the preferred alternative for remediation of the ash pile was issued to the public in February 1993. A second public meeting was conducted on February 24, 1993 to address the preferred alternatives for remediation of the groundwater and the preferred alternative for remediation of the Peak Oil ash pile. The selected remedy for the ash pile is included in this Record of Decision.