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1999

EPA Superfund Record of Decision:

Imperial Oil Company/Champion Chemical Company Site OU 3
Morganville, NJ
9/30/1999

DECLARATION FOR THE RECORD OF DECISION

IMPERIAL OIL COMPANY/CHAMPION CHEMICAL COMPANY SUPERFUND SITE

SITE NAME AND LOCATION

Imperial Oil Company/Champion Chemical Company Superfund Site
Marlboro Township, Monmouth County, New Jersey

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the U.S. Environmental Protection Agency's selection of a third remedial action to address on-site soil, including the waste filter clay pile and the subsurface floating product, at the Imperial Oil Company/ Champion Chemical Company Superfund Site, in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA) [42 U.S.C. §9601-9675], and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan, as amended, 40 CFR Part 300. This decision document explains the factual and legal basis for selecting the remedy for the third operable unit of the site.

The New Jersey Department of Environmental Protection (NJDEP) has been consulted on the planned remedial action in accordance with CERCLA §121(f) [42 U.S.C. §9621(f)]. NJDEP concurs with EPA's selected remedy for the site. The information supporting this remedial action is contained in the Administrative Record for the site, the index of which can be found in Appendix B of this document.

ASSESSMENT OF THE SITE

Actual or threatened release of hazardous Substances from the Imperial Oil Company/Champion Chemical Company Superfund Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The remedial action described in this document represents the third of three planned operable units of the Imperial Oil Company/Champion Chemical Company Superfund Site. The initial remedy for the site, designated operable unit 1, included the remediation of off-site soils. The remedy for the second operable unit involved the remediation of contaminated ground water in the underlying aquifer. The remedy described in this ROD addresses contaminated soil and other materials (including waste filter clay and floating product) present on the main site.

The major components of the selected remedy include:

- Excavation of an estimated 83,000 cubic yards of soils containing contaminants above the selected remediation goals and disposal of this material at appropriate off-site facilities.

- Transportation of an estimated 27,000 cubic yards of the above soils which pose the principal threat (hot spots) to Resource Conservation and Recovery Act/Toxic Substances Control Act (RCRA/TSCA) hazardous waste disposal facilities. An estimated 19,000 cubic yards of this soil will be transported to a TSCA-permitted landfill and the other 8,000 cubic yards shipped to a RCRA-permitted landfill where the soil will receive appropriate treatment prior to disposal in accordance with RCRA requirements.

- Transportation of an estimated 56,000 cubic yards of the soils containing contaminants above the selected cleanup goals to an appropriate landfill. A portion of this soil be recycled as asphalt base material.

- Removal of an estimated 5,000 gallons of floating product via vacuum truck and transportation of this material to a TSCA-licensed incinerator.

- Dismantling of site buildings and tank farms, as necessary to complete the selected soil excavation and floating product removal activities.

- Backfilling of all excavated areas with clean fill.

- Restoration of the wetlands affected by cleanup activities.

DECLARATION OF STATUTORY DETERMINATION

The selected remedy meets the requirements for remedial actions set forth in CERCLA §121 in that it: (1) is protective of human health and the environment; (2) complies with Federal and State requirements that are legally applicable or relevant and appropriate; (3) is cost-effective; and (4) utilizes alternative treatment (or resource recovery) technologies to the maximum extent practicable.

However, the selected remedy for this operable unit does not satisfy the statutory preference for remedies that employ treatment as a principal element. The complex nature of the waste material at the site with elevated levels of both organic and inorganic contaminants, together with the limited space on the site property to construct a treatment plant limit the cost-effectiveness and implementability of the on-site treatment technologies available to treat all the waste. However, part of the principal threat waste, that is the floating product, will be thermally treated at a TSCA-licensed incinerator. In addition, an estimated 8,000 cubic yards of the principal threat soils will receive stabilization treatment to reduce the mobility of contaminants prior to disposal in a secure landfill. Although the selected remedy will treat a portion of the principal threat materials, the majority of the contaminated soils will be disposed of in a landfill.

Because this remedy will not result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a five-year review will not be required for this remedial action.

Jeanne M. Fox
Regional Administrator

9/30/99
Date

THE RECORD OF DECISION

DECISION SUMMARY

Imperial Oil Co., Inc./Champion Chemicals Superfund Site
Marlboro Township, Monmouth County
New Jersey
Operable Unit 3

United States Environmental Protection Agency
Region II
New York, New York
September 1999

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SITE NAME, LOCATION AND DESCRIPTION

The Imperial Oil Co., Inc./Champion Chemicals (IOC/CC) Superfund Site (the site) is located in the Morganville section of Marlboro Township in northwest Monmouth County, New Jersey (Figure 1). The Champion Chemical Company is the owner of the real property located on Lot 29, Block 122, Orchard Place in Morganville. The premises are currently leased to the Imperial Oil Company, Inc., which operates an oil blending facility.

Imperial Oil Company's operations occupy approximately 4.2 acres of the entire 15 acres of the site. A chain-link fence surrounds the active portion of the site. There are seven buildings on-site used for production, storage, and maintenance and there are also numerous above ground oil storage tanks located within four separate tank farm areas (see Figure 2). One of the buildings on-site, the Masonry Building, is no longer being used in any site operations. This building is almost 100 years old, in very poor condition, and is in danger of collapse. The western property line abuts the abandoned Central Railroad of New Jersey's Freehold and Atlantic Highlands Branch Main Line.

There are approximately 30 scattered residential properties along the surrounding roads. A small commercial center (Morganville) is located approximately two miles southeast of the site at the junction of Route 3 and Route 79. Two areas, known as Off-site Areas 1 and 2, are located approximately 220 feet and 700 feet northwest of the facility, respectively. The soil in these areas is contaminated with arsenic, lead, and polychlorinated biphenyls (PCBs) from the IOC/CC site. Two automobile scrap yards are located just to the northeast of the site boundary. Lake Lefferts, a swimming and recreational area, is located approximately 1.25 miles north of the site. Lake Lefferts has been identified as a potential potable water source for the area.

The site is located within the Matawan watershed of the Atlantic Coastal Drainage Basin. The topography of the site ranges from 120 feet above mean sea level (MSL) in the southwest corner of the site to 97 feet above MSL at the northern boundary. Surface water runoff at the site is to the north. During periods of heavy rainfall, water accumulates in a catchment area in the northern section of the site. This water and site runoff is contained by an earthen berm that extends along the northeastern fence line of the site. Three oil/water separators and an arsenic treatment unit are used to treat any runoff that collects in the area of the earthen berm. To the east of the berm is a man-made pond, known as the Fire Pond, which discharges to Birch Swamp Brook. Birch Swamp Brook, an intermittent stream in the vicinity of the site, flows through a bog northwest of the site, through a culvert under the rail line and through Off-site Areas 1 and 2, where the flow becomes constant. The stream empties into Lake Lefferts. Lake Lefferts empties into Raritan Bay. As a result of contaminant runoff from the IOC/CC site, sediments in Birch Swamp Brook contain elevated levels of contaminants including PCBs and total petroleum hydrocarbons (TPHs). Wetlands are located in the vicinity of the Fire Pond, Birch Swamp Brook and areas north of the IOC/CC facility.

The Englishtown Aquifer underlies the site. It is classified as GW-2 (Current and Potential Potable Water Supply) and is an important source of water supply for Monmouth and northern Ocean Counties. Twenty-eight residential wells were identified within a 1-mile radius of the site, none of which are used for potable drinking water. The Marlboro Township Municipal Utilities Authority supplies potable water to the residents in the vicinity of the site, and their supply wells, which draw water from the deeper Raritan-Magothy Aquifer, are located approximately two miles south (upgradient) of the site.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Historical Site Use

Industrial activities have been ongoing at the site since approximately 1912. Initially, ketchup and tomato paste was manufactured at the facility until approximately 1917, at which time it was converted to a chemical processing plant. The products of the chemical plant may have included arsenic acid and calcium arsenate, followed by the manufacturing of flavors and essences. In approximately 1950, the plant was purchased by Champion Chemical and became an oil reclamation facility. The oil reclamation process used diatomaceous earth, also known as filter clay, and caustic solution to remove heavy metals and PCBs from waste oil. The waste products of the oil reclamation process, including the contaminated waste filter clay and caustic solution, were disposed of on the site. This operation continued until approximately 1965. Imperial Oil Company leased the site from Champion Chemical in 1968 and began conducting oil blending operations, including mixing and repackaging unused (clean) oil for delivery. Currently, raw products (refined clean oil) are delivered by truck and transferred to above-ground tanks. Imperial Oil mixes and blends the oil for its customers.

Compliance History

In April 1981, a New Jersey Department of Environmental Protection (NJDEP) site inspection found oil-contaminated soils and numerous large puddles at the base of Tank Farms 1 and 2. The outfall area for the three oil/water separators was also inspected. This area showed oily surface water and oil-stained surface soils. The catchment area for the site surface water runoff, north of the separators, was also stained with oil. The results of NJDEP's 1981 analyses of soil and waste filter clay samples revealed high concentrations of TPHs, lead, arsenic, and PCBs.

In May 1981, the U.S. Environmental Protection Agency (EPA) conducted a limited sampling program at the off-site areas, Birch Swamp Brook and the waste filter clay pile. Results of analyses of the sediment samples from the stream bed of Birch Swamp Brook confirmed the presence of PCBs, TPHs, lead, and arsenic. The analytical results of the samples from the waste filter clay indicated that this material contained significant concentrations of PCBs.

In June 1981, a letter to EPA from Imperial Oil's consultant, Harold Seldin, indicated that in 1976, Imperial Oil had excavated contaminated soil and replaced it with clean sand in the area of the oil/water separators. An earthen berm was constructed and one oil/water separator was cleaned and repaired.

In June and August 1981, NJDEP conducted two site inspections and identified a number of potential sources of contamination. In August 1981, NJDEP conducted an inspection of the off-site waste oil contamination areas. During the inspection, two distinct areas of contamination were identified. The areas are located north of the Imperial Oil facility along the banks of Birch Swamp Brook and are referred to as Off-Site Areas 1 and 2. In both areas, the surface soils were visibly stained with oily material. The banks of the stream were also observed by NJDEP to be stained with oily residue. Vegetation in these areas was visibly stressed.

In December 1981, IOC/CC entered into an Administrative Consent Order (ACO) with the NJDEP in which IOC/CC agreed to cease discharging hazardous waste and other pollutants into the waters of the state and agreed to comply with specified discharge limits set forth by the New Jersey Pollutant Discharge Elimination System (NJPDES). In addition, the ACO required IOC/CC to repair the oil/water separators and dispose of the oil/water separator sludge in a manner acceptable to the NJDEP. Further, the ACO required the company to conduct an environmental assessment of the site to determine the nature and extent of contamination and implement a remedial plan for cleaning up the site.

In May 1982, the Imperial Oil Company contracted with Princeton Aqua Science (PAS) to conduct an evaluation of the site. During this investigation, seven test pits were excavated and sampled. In addition, four monitoring wells were installed. The purpose of the investigation was to assess the nature and extent of contamination in the soil and ground water at the site. The results of this investigation were presented in a report issued by PAS in January 1983. The analyses performed on the selected samples confirmed the presence of TPHs, PCBs, arsenic, and volatile organic compounds in the ground water and soil. A petroleum-like product layer was detected floating above the water table in certain monitoring wells during sampling. This material has contaminated soils, as well as groundwater that it has come into contact with. This material is referred to as floating product.

During the period 1983 through 1986, NJDEP maintained an on-going inspection and monitoring program of the site and surrounding areas. In addition, EPA and the Monmouth County Prosecutor's Office conducted investigations at the site, confirming that heavy metals, PCBs, and petroleum hydrocarbons were present in soil and ground water.

Removal and Remedial Response Actions to Date

The IOC/CC site was proposed for inclusion on EPA's National Priorities List (NPL) of Superfund sites on December 1, 1982. The site was formally added to the NPL on September 1, 1983.

A remedial investigation (RI) of the site was conducted by NJDEP. The RI was divided into multiple phases. The first phase was conducted in 1987 and a second phase in 1989/1990. The purpose of the RI was to: determine the nature and extent of contamination resulting from historic site activities; identify potential contamination migration routes; identify potential receptors of site contaminants; and characterize potential human health and ecological risks. The Final RI Report was issued in December 1996. This report describes the nature and extent of contamination in on-site soils, off-site soils, sediments, and ground water.

In September 1987, in order to evaluate an innovative technology for potential consideration for the cleanup of the site, EPA initiated a Superfund Innovative Technology Evaluation (SITE) demonstration program at the IOC/CC site. The technology demonstrated was the solidification/ stabilization process developed by Soiltech, Inc. of Houston, Texas. The results indicated that the solidification technology was effective in remediating elevated concentrations of metals in soil, but was ineffective in remediating PCBs and other organic compounds. A Technology Evaluation Report for the project was released in February 1990.

Removal Actions

Several removal actions have been completed by EPA at the IOC/CC site. In November 1991, as part of a removal action, EPA excavated the waste filter clay down to ground level. The waste filter clay was contaminated with PCBs, arsenic, lead, and TPHs. The excavated material (approximately 660 cubic yards) was disposed of at an approved Resource Conservation and Recovery Act (RCRA) landfill. Also, in 1991, EPA installed extraction wells to remove the floating product layer which lies above the ground water beneath the waste filter clay disposal area. The extraction wells and floating product removal system were installed as part of a removal action. The extracted floating product is temporarily stored in a 5,000 gallon on-site storage tank and properly disposed of off-site on a periodic basis, as necessary. In 1996, NJDEP assumed responsibility for the operation and maintenance of the floating product removal system. To date, approximately 15,000 gallons of floating product have been extracted and disposed of at a Toxic Substance Control Act (TSCA) regulated incinerator.

In April 1993, EPA began the removal of buried drums. These drums were found during the preparation of the ground surface for the installation of the wastewater treatment units for the floating product extraction system. Initial identification of the material from the buried drums indicated contaminated waste oil and sludge. The action involved the excavation and removal of the buried drums to minimize the possibility of further migration of contaminated materials already in the ground.

Remedial Actions
First Record of Decision

The first Record of Decision (ROD) for the site was signed in September, 1990 and selected a remedy for the first of several anticipated remedial actions, known as operable units (OUs). It addressed what is known as Off-site Areas 1 and 2. The major components of the ROD included: the installation of fencing to control access to the contaminated soil areas; the excavation and appropriate off-site disposal of contaminated soil from within the wetlands; and the restoration of affected wetlands. In September 1991, as part of the OU1 remedy, EPA installed the fence around Off-site Areas 1 and 2 to control access to the contaminated soil. The remedial design of this remedy was initiated in 1991.

From October 1994 through February 1995, as part of remedial design activities for OU1 of the site, NJDEP performed extensive soil sampling in areas adjacent to Off-Site Areas 1 and 2, including a number of residential properties bordering Birch Swamp Brook. These results indicated that a large area adjacent to Off-Site Areas 1 and 2 contain elevated levels of arsenic and lead. These soil sampling results are presented in the May 1995 report entitled, Field Sampling and Analysis Report (Kimball).

In January 1996, EPA entered into an Interagency Agreement (IAG) with the U.S. Geological Survey (USGS) for the performance of a study to determine the sources of arsenic contamination in soils in the vicinity of the site. Areas sampled included undisturbed wooded areas, former and existing orchard properties, on-site soils, and residential properties in the vicinity of the site. The study was completed in July 1996 and concluded that arsenic concentrations in the soils on four residential properties located adjacent to the Imperial Oil facility were related to operations previously conducted at the site. Other areas of arsenic contamination were attributed to the widespread application of arsenic-based pesticides on former orchard properties, as well as geological background and regional atmospheric distribution.

In September 1997, EPA issued an Explanation of Significant Differences (ESD) to modify the September 1990 ROD to include the remediation of four residential properties located adjacent to the Imperial Oil facility. The ESD also provided for the implementation of engineering controls in the vicinity of the Fire Pond and forested wetland areas of the site as a precautionary measure against potential recontamination of Off-site Areas 1 and 2, once remediated.

In March 1998, EPA initiated the excavation and disposal of the arsenic-contaminated soil found on the four residential properties. EPA excavated and disposed of approximately 6,488 cubic yards of soil from the properties. This work was completed in August 1998.

Second Record of Decision

A second ROD was signed in September 1992 to address the contaminated ground water and is referred to as OU2. The major components of the ROD included: the installation of extraction wells to extract the contaminated ground water ; the treatment of extracted ground water via precipitation of inorganic contaminants and carbon adsorption of organic contaminants; the discharge of the treated ground water to Birch Swamp Brook; the continuation of the floating product removal action that was initially undertaken by the EPA; and the appropriate environmental monitoring to ensure the effectiveness of the remedy. The NJDEP is currently operating the floating product extraction system. In addition, as part of remedial design activities, NJDEP has performed groundwater sampling activities to further define the nature and extent of the groundwater contaminant plume. Design activities related to the implementation of the ground water extraction and treatment system are ongoing.

Third Record of Decision

In November 1996, NJDEP collected and analyzed 40 additional soil samples at the site to fill data gaps in the remedial investigation of on-site soils. As stated above, the RI Report was issued in December 1996 and the Source Control Feasibility Study Report for Operable Unit 3 was completed in August 1998. An Addendum to the Feasibility Study Report was completed by NJDEP in January 1999 to address various modifications to the August 1998 Source Control Feasibility Study Report. These documents were used as the basis for the selection of a remedy for the contaminated soils at the facility and is the subject of this ROD which is also known as OU3.

Additional Studies

In August 1996, through the IAG with USGS, EPA tasked USGS to perform additional investigations to determine the source of contamination located within the floodplain of Birch Swamp Brook including two residential properties located adjacent to Birch Swamp Brook which contained elevated levels of arsenic. This study was performed to gather more information regarding the contamination on these properties, including whether the contamination was related to the IOC/CC site. The study concluded that some of the arsenic contamination on these properties is likely to be IOC/CC related, particularly those soils closest to Birch Swamp Brook and subject to the impacts of flooding and, therefore, deposition of contaminated sediments from the Brook.

From September through October 1997, NJDEP collected additional sediment samples in Birch Swamp Brook to further characterize the nature and extent of sediment contamination. The results of this sampling event are presented in the January 1998 report entitled, "Field Sampling and Analysis Report, Birch Swamp Brook Sediment Sampling". A total of 270 samples were collected from 193 locations and analyzed for PCBs and THPs.

Enforcement History

In September 1984, EPA issued General Notice letters to three potentially responsible parties, Imperial Oil Company, Champion Chemical Company and Mr. Emil Stevens pursuant to Section 107(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA) notifying them that they may be ordered to perform response actions deemed necessary by EPA to protect public health, welfare or the environment.

In 1987, Imperial Oil Company and the owner of the facility, Champion Chemical Company entered into a plea agreement, after being criminally indicted by the Monmouth County Prosecutor's Office for violations of environmental laws of the State of New Jersey. That same year, the case was settled with Imperial Oil Company and Champion Chemical Company entering into a plea agreement with the Monmouth County Prosecutor's Office. Part of the Plea Agreement required Imperial and Champion to contribute certain monies "payable to the Environmental Protection Agency through the office of the Monmouth County Prosecutor" to pay for environmental work to be performed at the Site. Originally, these monies were paid into an escrow account maintained by the Monmouth County Probation Department. In October 1994, the monies in the escrow account were transferred to the Superior Court of New Jersey Trust Fund Account. EPA received reimbursement from this Monmouth County fund in the amount of $251,685 when it removed and disposed of a contaminated waste filter clay pile at the facility. In September 1998, the Monmouth County Prosecutor's Office agreed to transfer the remainder of the money, $369,750, plus accrued interest, into an EPA special account for the site for the purpose of paying toward required building demolition.

In September 1989, EPA issued a Unilateral Administrative Order (UAO) to Imperial Oil Company and Champion Chemical Company for the delineation, characterization, removal and/or treatment and disposal of the on-site waste filter clay pile. This UAO was ultimately not complied with and EPA funded this action.

In August 1990, EPA sent General Notice letters to four potentially responsible parties (PRPs), Imperial Oil Company, Champion Chemical Company, Jersey Power & Light, and J and M Land Company, pursuant to Section 107(a) CERCLA, notifying them that they may be ordered to perform response actions deemed necessary by EPA to protect public health, welfare or the environment.

In September 1991, EPA issued UAOs to the above four PRPs to conduct the remedial design and remedial action for Off-site Areas 1 and 2. The PRPs declined to do the work required by the UAO. Utilizing CERCLA funds, the NJDEP is currently designing this remedy pursuant to a Cooperative Agreement with EPA.

On March 29, 1996, EPA filed a complaint against Champion Chemical Company and Imperial Oil Company in the Federal District Court of New Jersey to recover EPA's past costs incurred at the site. The complaint was later amended to include Mr. Emil Stevens as a defendant. The litigation is ongoing.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Imperial Oil Company has consistently received attention from area residents, municipal, state, county and federal officials as well as the local print media. In 1981, concerned residents organized the Burnt Fly Bog/Imperial Oil Company Citizens Advisory Committee (CAC). The CAC includes citizen representatives from Marlboro and Old Bridge Townships as well as officials from Monmouth and Middlesex Counties. NJDEP representatives have met regularly with this group since 1981 and continue to do so. In 1998, the Monmouth County Environmental Coalition received a Technical Assistance Grant from EPA to hire technical advisors to review documents and offer input into the remedial decision-making process.

Issues voiced over the years by the CAC and other members of the community include the operating status of the Imperial Oil Company, the potential for the IOC/CC site to contribute contamination to Lake Lefferts (located approximately 1.25 miles downstream of the IOC/CC site); the contamination of off-site properties by the IOC/CC site; and, the length of time it has taken to investigate and remediate the site.

Several public meetings have been held to present the findings of various studies conducted for the Site. In 1991, a public meeting was held to discuss the remedial alternatives that were evaluated for Off-site Areas 1 and 2 and to receive public comments. In 1992, a public meeting was held to discuss the alternatives for remediation of the ground water at the site and also to receive public comment. A public meeting was held in August 1996 to discuss the findings of the study by the USGS regarding the nature and source of off-site arsenic soil contamination.

The December 1996 Final RI Report, the August 1998 Source Control Feasibility Study Report and January 1999 Addendum, and the February 1999 Proposed Plan for the remediation of on-site soils were released to the public for comment on February 19, 1999. The public comment period ended on April 6, 1999. These documents were made available to the public at the following information repositories:

NJDEP
Bureau of Community Relations
401 East State Street, 6th Floor
Trenton, NJ

Monmouth County Library
1 Library Court
Marlboro, NJ

USEPA
Superfund Records Center
290 Broadway, 18th floor
New York, NY

On March 19, 1999, NJDEP conducted a pubic meeting at the Marlboro Township Municipal Building to inform local officials and interested citizens about the Superfund process, to discuss the findings of the Remedial Investigation, the Source Control Feasibility Study and the proposed remedial activities at the site, and to respond to any questions from the area residents and others who attended. NJDEP's written responses to the comments received at the public meeting and the written comments received during the public comment period are included in the Responsiveness Summary (see Appendix C).

SCOPE AND ROLE OF REMEDIAL ACTION

As with many Superfund sites, the problems at the IOC/CC site are complex. As a result, EPA and NJDEP have organized the cleanup of this site into three phases, or operable units.

<u>Operable Unit 1</u>: This includes the wetlands and off-site soils located in what is known as Off-site Areas 1 and 2 and also 4 residential properties located near the facility. Contamination associated with Birch Swamp Brook's sediment

and floodplains is currently being evaluated for inclusion in OU1.

Operable Unit 2: This includes contaminated ground water and the continuation of the floating product removal action that was initially undertaken by EPA.

Operable Unit 3: This is the subject of this ROD and includes the contaminated site soils, including the remaining waste filter clay material. This OU3 also modifies the OU2 floating product remedial action in that it selects a remedy of excavation and off-site disposal for the floating product. This is the last planned operable unit for the site.

SUMMARY OF SITE CHARACTERISTICS

The purpose of the RI conducted by NJDEP was to accomplish the following: identify the nature and extent of contamination at and/or emanating from the site; characterize the site geology and hydrogeology; and determine the risk to human health and the environment posed by the site. The December 1996 RI Report is a comprehensive report which covers the investigation of numerous contaminated media including, off-site soils, sediment, ground water, waste filter clay, floating product and on-site soils. The information summarized below is only information from the RI Report relevant to this Record of Decision, which addresses on-site soils and floating product.

Site Geology

Three primary geologic units and two others were identified at the site. The major geologic units identified were (1) fill; (2) the Englishtown Formation; and, (3) the Woodbury Clay Formation. These units are further described below.

Fill Material

With the exception of the area at the northern end of the site between the berm and Birch Swamp Brook, fill materials were identified at every test boring and surface-soil sampling location in the active portion of the site and in areas investigated adjacent to the site. The fill unit consists of sand, silt, and gravel, mixed with varying amounts of ash and waste filter clay, wood fragments, coal, bricks, and concrete rubble. This fill was observed to range in thickness from two feet near the northwestern and western fence line to 5.5 feet between the former waste pile area and the earthen berm.

A second fill deposit area was observed outside the fenced portion of the facility, south of the fire pond and west of the outparking area (see Figure 2). South of the Fire Pond, the fill consists of layers of black oil sludge, black and orange-stained silt and sand, and wood rubble to a depth of 12 to 15 feet. The sludge-like material was observed as deep as 14 feet. The fill west of the outparking area was observed to consist of sands and silts with angular course fragments, glass, and ash.

Englishtown Formation

The Englishtown Formation outcrops at ground surface just west of the western boundary fence line. The sand and silty clay formation ranges in depth across the site from 43 feet to 67 feet where the top of the Woodbury Clay Formation exists. Continuous zones from 10 to 15 feet in thickness of very poorly graded sand with few silty clay layers alternate with sandy zones where the silty clay is more prevalent. The western quadrant of the site exhibits a stiff black clay interbedded with a thin white quartz laminae ranging in thickness from 5 feet to 20 feet and found at depths ranging from 5 feet to 20 feet below ground surface.

Woodbury Clay

The Woodbury Clay is a substantial confining layer and was not penetrated by any of the site investigation borings. Data from well logs in the Morganville area indicate that this formation is greater than 700 feet deep.

Local Hydrogeology

Interpretation of local hydrogeologic conditions is based on water-level measurements, laboratory and in-situ hydraulic conductivity testing, grain size analysis, and interpretation of site geology. Two groundwater flow systems were identified at the site: (1) a local perched groundwater system, and, (2) the regional water table system, the Englishtown Aquifer.

Seasonally perched ground water was observed in the fill areas around the facility parking lot and south of the Fire Pond. Ground water was not consistently detected and the fill areas do not represent a significant groundwater system. The perched ground water around the former drum-wash building results from the silty clay layer identified along the western quadrant of the site. This perched ground water likely restricts the vertical migration of ground water to the Englishtown Formation at this location.

The Englishtown Aquifer is the major groundwater system underlying the site. The site lies within the recharge zone for this aquifer. Depth to the water table ranges from 2 to 14 feet across the site. The saturated thickness of the aquifer beneath the site ranges from 49 to 55 feet. The Englishtown Aquifer consists of two flow components: (1) a shallow flow component that discharges to the Fire Pond and Birch Swamp Brook; and (2) a deeper flow component that comprises the regional flow of the Englishtown Aquifer.

Ground water in the shallow part of the aquifer generally flows in a northerly direction, with local components to the east and west as influenced by topographic and geologic conditions. Ground water flow in the deep zone of the aquifer beneath the site flows northeast toward Raritan Bay.

<u>RI Soil Investigation</u>

A total of 56 soil borings to varying depths and 111 surface soil samples were collected from the vicinity of the IOC facility and from Off-site Areas 1 & 2 as part of the two phase RI to characterize the soil contamination at the site.

Numerous volatile compounds (VOCs), semi-volatile compounds (SVOCs), inorganic compounds, as well as pesticides and PCBs were detected in site soils. Figures 4 through 14 provide a summary of the soil findings.

RI sampling indicated that contaminated on-site soils contain elevated levels of numerous contaminants including, but not limited to: PCBs; arsenic; lead; beryllium; antimony; toluene; xylenes; ethylbenzene; pyrene; TPHs; bis(2-ethylhexyl)phthalate; and butylbenzylphthalate.

Primary areas of contamination include the area below the former waste filter clay pile, tank farm soils and fill area soils. These areas of concern are further described below.

<u>Waste Filter Clay (Former Waste-Pile Area) and Floating Product</u>

An area containing waste filter clay is identified on Figure 15 as the "Fill/Soil Surrounding Waste Pile". As stated above, in 1991 EPA excavated the waste filter clay pile down to ground level. The remaining waste filter clay and associated soils contain highly elevated levels of numerous contaminants including PCBs, TPHs, VOCs, SVOCs, pesticides, antimony, arsenic, beryllium, copper, lead, and mercury. Contaminants have migrated from the waste filter clay and surrounding soil via two transport mechanisms: (1) erosion of contaminated soil and waste filter clay, and (2) movement of floating product along the ground water /soil interface.

Much of the migration of contaminants from the former waste-pile area via erosion has been curbed by construction of the containment berm at the northern end of the facility and by removal of all the waste filter clay that was piled above grade in 1991. Waste filter clay remaining below grade has been covered with a protective liner since the removal of above-grade material to limit migration of this contaminated material. The original liner was replaced with a new liner in 1997.

The floating product is a continuing source of soil and groundwater contamination. Migration of contaminants associated with the waste filter clay continues via the movement of the petroleum-like floating product layer with ground water. Floating product identified at the site has been characterized prior to and during the installation of the floating product removal system in 1991 and the operation of that system since that time. As stated above, to date, this system has extracted 15,000 gallons of this highly contaminated petroleum-like material which lies in the interface of site soils and the shallow ground water .

Sampling reveals that the floating product contains elevated levels of contaminants including: toluene (1,460 parts per million (ppm)); ethylbenzene (48.4 ppm); xylenes (up to 188 ppm); napthalene (147 ppm); fluorene (14.8 ppm); and PCBs (409 ppm). Table 1 presents a summary of data results for the floating product from a 1996 sampling event. Migration of this product layer appears partly responsible for subsurface-soil contamination north and northeast of the waste filter clay. Most subsurface soil beneath the waste filter clay contains elevated concentrations of VOCs, SVOCs, TPH, and PCBs. Based on floating product thickness measurements obtained in March and April 1996, as part of the ground water remedial design and in July 1997, as part of the ground water plume recharacterization, it has been determined that the floating product has migrated north of the active portion of the site (i.e., beyond the berm) (see Figure 16). This indicates that the currently operating floating product extraction system, while limiting some migration, is not completely preventing the migration of this material.

Tank Farms

There are four tank farms located on the site. The tank farms are discreet areas housing over 50 tanks. Some of the tanks are used to store oil before blending and others are used to store blended oil. The tanks are constructed directly over site soils. During past site inspections, visible staining and oil puddles have been observed in the gravel and soils surrounding and underlying the tanks.

The RI data shows the widespread detection of a number of contaminants, particularly arsenic, in soils underlying and in the vicinity of the four tank farms (see Figure 15). Elevated arsenic levels were detected in subsurface soil samples collected from Tank Farms Nos. 1, 2, 3, and 4. The highest concentration of arsenic detected at the site, 6,120 ppm, was detected in soil within a tank farm. Other inorganics, including beryllium and antimony, have been detected in the tank-farm areas.

The large areas of soils containing elevated arsenic concentrations suggests that the arsenic is mobile. Elevated levels of arsenic detected in groundwater samples collected from monitoring wells located in the vicinity of the tank farms further indicates that arsenic is (or was at one time) in a soluble, or mobile form and that site soils, particularly soils in the vicinity of the tank farms, are a likely source of groundwater contamination.

Fill Deposits

Contaminated fill was placed west of the outparking area, south of the Fire Pond, and adjacent to the drum-washing building (see Figure 15). Much of the fill deposited south of the Fire Pond is likely to have come from past dredging of what is now the Fire Pond. Distinct and apparently continuous layers of oily sludge were observed in borings drilled through this fill material, suggesting the sludge may have been deposited as layers during Fire Pond dredging episodes. The primary contaminants detected in this area are TPHs. Elevated concentrations of inorganics were also detected, primarily in samples collected from the discrete sludge layers. Waste-oil-related VOCs were also detected, with the greatest concentrations observed in the sludge.

In the fill west of the outparking area, several samples contained elevated concentrations of TPHs, PCBs, arsenic, beryllium, and lead. Waste-oil-related SVOCs also were detected.

Fill up to four feet deep was observed adjacent to the former drum-washing building. TPHs, PCBs, arsenic, and lead were detected at elevated concentrations in surface and subsurface-soil samples collected from this area.

Data Gap Investigation

In November 1996, NJDEP collected soil samples at 40 locations on-site and in areas abutting the site to fill data gaps in the RI contamination assessment. The Data Gap Investigation was organized into four areas of concern: soils in and around the tank farms, fill south of the Fire Pond, soil beneath on-site paved areas, and miscellaneous soil samples in previously unsampled areas.

Comparison of analytical results from the Data Gap Investigation to results of sampling presented in the RI Report indicates a similar distribution of site contaminants. Arsenic and lead concentrations in Tank Farm No. 3 are approximately an order of magnitude greater than those detected during the RI and reinforce the interpretation in the RI Report that soil associated with the tank farms is a significant source of contamination. Please see Table 2 for a summary of the results of the Data Gap Investigation.

Summary of Soil Findings

In summary, soil contamination is prevalent throughout the on-site areas. The contaminants found in soils include, but are not limited to: PCBs (up to 1,590 ppm); arsenic (up to 6,120 ppm); lead (up to 3,720 ppm); beryllium (up to 2.9 ppm); antimony (up to 30 ppm); toluene (up to 3 ppm); xylenes (up to 3.3 ppm); ethylbenzene (up to 4.2 ppm); pyrene (up to 5 ppm); bis(2-ethylhexyl)phthalate (up to 12 ppm); and butylbenzylphthalate (up to 47 ppm). Further, floating product, which is highly contaminated with PCBs as well as other contaminants, continues to migrate at the site and is a source of further soil and groundwater contamination.

SUMMARY OF SITE RISKS

Human Health Risks

Based upon the results of the RI, a baseline human health risk assessment was conducted to estimate the risks associated with current and future site conditions. The baseline risk assessment estimates the human health risk which could result from the contamination at the site if no remedial action were taken. The baseline risk assessment for the site is presented in the December 1996 RI Report. In September 1999, EPA made some modifications to the risk assessment, which are presented in the September 1999 Risk Assessment Addendum for OU3. The Risk Assessment Addendum was placed in the Administrative Record for the site. The results of the Risk Assessment and Addendum are presented below.

Human Health Risk Assessment

A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: *Hazard Identification* - identifies the contaminants of concern at the site based on several factors such as toxicity, frequency of occurrence, and concentration. *Exposure Assessment* - estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed. *Toxicity Assessment* - determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of effect (response). *Risk Characterization* - summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks.

A baseline risk assessment was conducted to evaluate the potential risks to human health and the environment associated with the IOC/CC site in its current state. The risk assessment focused on contaminants in the soil which are likely to pose significant risks to human health. A summary of the contaminants of concern in soils is provided in Table 3.

This baseline risk assessment addresses the potential risks to human health by identifying several potential exposure pathways by which the public may be exposed to contaminant releases at the site under current and future land-use conditions. Based on the use of the site, the risk assessment focused on six areas, and identified potentially exposed populations for each area. Current exposure scenarios include facility maintenance workers exposed to soils in the tank farm area, utility workers exposed in the fenced portion of the site, construction/excavation workers exposed to soils under the old warehouse, industrial/facility workers in direct contact with soils in the waste pile, and child and youth trespassers exposed to surface soils outside the IOC/CC facility. Future exposure scenarios include child and adult residents exposed to onsite soils. Risk was estimated for both incidental ingestion and dermal contact. A total of 14 exposure pathways were evaluated under possible on-site current and future land-use conditions. The exposure pathways considered under future uses are listed in Table 4. The reasonable maximum exposure was evaluated.

Under current EPA guidelines, the likelihood of carcinogenic (cancer-causing) and noncarcinogenic effects due to exposure to site chemicals are considered separately. It was assumed that the toxic effects of the site-related chemicals would be additive. Thus, carcinogenic and noncarcinogenic risks associated with exposures to individual compounds of concern were summed to indicate the potential risks associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Noncarcinogenic risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and safe levels of intake (Reference Doses). Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects. RfDs, which are expressed in units of milligrams per kilogram per day (mg/kg-day), are estimates of daily exposure levels for humans which are thought to be safe over a lifetime (including sensitive individuals). Estimated intakes of chemicals from environmental media (*e.g.*, the amount of a chemical ingested from contaminated drinking water) are compared to the RfD to derive the hazard quotient for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds within a particular medium that impacts a particular receptor population.

An HI greater than 1.0 indicates that the potential exists for noncarcinogenic health effects to occur as a result of site-related exposures. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. The toxicity values, including reference doses, for the compounds of concern at the site are presented in Table 5. A summary of the noncarcinogenic risks associated with these chemicals for each exposure pathway is contained in Table 6.

It can be seen from Table 6 that the HI for noncarcinogenic effects from incidental ingestion of soil is 2.4 for construction/excavation workers exposed to soil under the old warehouse, 3.2 for industrial/facility workers exposed to soil in the waste pile, 2.6 for future adult residents exposed to onsite soils, and 24 for future child residents exposed to onsite soils. The HI for noncarcinogenic effects from dermal contact with soil is 2.1 for construction/excavation workers exposed to soil under the old warehouse, 51 for industrial/facility workers exposed to soil in the waste pile, 8.8 for future adult residents exposed to onsite soils, and 14 for future child residents exposed to onsite soils. Therefore, noncarcinogenic risks may occur from the exposure routes evaluated in the Risk Assessment. The noncarcinogenic risk was attributable to several compounds including arsenic and PCBs (Aroclor 1242, Aroclor 1248, and Aroclor 1260).

Potential carcinogenic risks were evaluated using the cancer slope factors developed by EPA for the contaminants of concern. Cancer slope factors (SFs) have been developed for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. SFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to generate an upper-bound estimate of the excess lifetime cancer risk associated with exposure to the compound at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes the underestimation of the risk highly unlikely. The SFs for the compounds of concern are presented in Table 7.

For known or suspected carcinogens, EPA considers excess upper-bound individual lifetime cancer risks of between E-04 to E-06 to be acceptable. This level indicates that an individual has not greater than approximately a one in ten thousand to one in a million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year period under specific exposure conditions at a site. Excess lifetime cancer risks estimated at the IOC/CC site were 8.5E-04 for the industrial/facility workers exposed to soils in the former waste pile area through dermal contact, 2.5 E-04 and 5.0E-04 for future adult residents exposed to onsite soils through incidental ingestion and dermal contact, respectively, and 5.8E-04 and 2.1E-04 for future child residents exposed to onsite soils through incidental ingestion and dermal contact, respectively. Excess lifetime cancer risks for other populations and pathways evaluated in this assessment were within EPA's acceptable risk range.

The cumulative upper-bound cancer risk at the site for future adult and child residents is 1.5E-03, while the risk to the industrial/facility workers is 9.1E-04. These cumulative risks take into account exposure through both incidental ingestion and dermal contact. Hence, the risks for carcinogens at the site exceed the high end of the acceptable risk range of E-04 to E-06 (see Table 8). The estimated total risks are primarily due to arsenic and PCBs. The risk calculations were based on reasonable maximum exposure scenarios. These estimates were developed by taking into account various conservative assumptions about the likelihood of a person being exposed to soil.

Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling
- exposure parameter estimation
- toxicological data

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources, including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the risk assessment provides upper-bound estimates of the risks to populations near the site, and is highly unlikely to underestimate actual risks related to the site.

More specific information concerning public health and environmental risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the risk assessment report.

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

Ecological Risks

A qualitative and/or semi-quantitative appraisal of the actual or potential effects of a hazardous waste site on plants and animals constitutes an ecological risk assessment. A four step process is utilized for assessing site-related ecological risks: *Problem Formulation* - a qualitative evaluation of contaminant release, migration, and fate; identification of contaminants of concern, receptors, exposure pathways, and known ecological effects of the contaminants; and selection of endpoints for further study. *Exposure Assessment* - a quantitative evaluation of contaminant release, migration, and fate; characterization of exposure pathways and receptors; and measurement or estimation of exposure point concentrations. *Ecological Effects Assessment* - literature reviews, field studies, and toxicity tests linking contaminant concentrations to effects on ecological receptors. *Risk Characterization* - measurement or estimation of both current and future adverse effects. Chapter 14 of the RI Report describes in detail the results of the site-wide ecological risk assessment performed at the IOC/CC site.

The environmental evaluation focused on how the contaminants would affect the site's natural resources. Natural resources include existing flora and fauna at the site, surface water, wetlands, and any sensitive species or habitats that may exist. The major types of biological habitats that exist at the site, and which were addressed in the Ecological Risk Assessment include: 1) wooded areas southeast of the Fire Pond and northeast of the facility; 2) the Fire Pond and an 0.5 acre wetland area downstream of the railroad culvert; 3) a shrub habitat in the vicinity of the power transmission lines which traverses Off-site Areas 1 and 2; and 4) a large wooded area to the west and north of Off-Site Areas 1 and 2.

Note that the Ecological Risk Assessment performed at the site covers ecological risks associated with site contaminants present in the four areas listed above. However, only area 1, listed above, is relevant to on-site areas which comprise Operable Unit 3, the subject of this document. On-site soils located within the fenced area of the site were not included in this assessment. However, the specific contaminants located within the fenced area of the site and in the areas included in the Ecological Risk Assessment are the same. Further, levels of the contaminants of concern detected within the fenced area of the site are higher compared to levels detected in the site areas included in the ecological risk assessment.

Therefore, the ecological risks for soils addressed by OU3 would be higher than those determined in the Ecological Risk Assessment. In addition, the Ecological Risk Assessment evaluated risks to terrestrial and aquatic receptors. However, Birch Swamp Brook is the surface water source evaluated to determine risks to aquatic receptors. Since Birch Swamp Brook will be addressed under another operable unit, the discussion below summarizes ecological risks posed to terrestrial receptors only. Also note that although the selected receptors have been observed, or are expected to be present in the vicinity of the site, since the IOC/CC facility is currently fenced and operating, it is believed that there is limited use by the terrestrial receptors selected.

Lists of the various plant, mammal, bird, and herptile (reptiles and amphibians) species observed or presumed to occur in the vicinity of the IOC/CC site are presented in Appendix P (Tables P-1 through P-4) of the RI Report. No federally or State listed or proposed threatened or endangered flora or fauna are known to occur in the immediate vicinity of the site.

A total of five receptor species were chosen to best represent the ecosystem of the site for purposes of evaluating ecological risk to terrestrial receptors as follows: (1) white-footed mouse (small mammal, omnivore); (2) wood thrush (small bird, omnivore); (3) eastern garter snake (reptile, carnivore); (4) red fox (predatory mammal, carnivore); and (5) red-tailed hawk (predatory bird, carnivore).

Sources of exposures to ecological receptors considered for this ecological assessment include surface soil (generally collected from 0 to 2 feet below ground surface) and surface water. Data from subsurface soils were not evaluated because these greater depths are not considered likely for potential contact with burrowing animals or roots of vegetation. Similarly, ground water data were not used in this ecological assessment because it is unlikely the ecological receptors can contact contaminants associated with ground water.

Exposure to contaminated constituents in surface soil and surface water may occur via several pathways. These include direct contact with (including ingestion of) surface water and surface soils and ingestion of biota which have bioconcentrated chemicals in their tissues.

The contaminants of concern selected for the ecological risk assessment were: PCBs; antimony.; arsenic; beryllium; lead; and bis-2(ethylhexyl)phthalate.

To provide estimates of chronic (long term) and acute exposure to terrestrial organisms, food web modeling was performed for lead and PCBs present in surface water and surface soil. Modeling of the other contaminants was not performed because of the lack of ingestion toxicity data available for these chemicals. The results of the food web modeling indicate that the potential for adverse ecological effects exists and the greatest exposures occur to organisms with the smallest home range (white footed mouse, wood thrush, and garter snake). Organisms with smaller home ranges would be expected to receive greater exposures because they would spend a greater proportion of their lives feeding in contaminated areas than would organisms with larger home ranges such as the fox and hawk.

In summary, the Ecological Risk Assessment concluded that exposure to the IOC/CC site soil and surface water by the various plant, mammal, bird, and herptile species in the vicinity of the site, if not addressed by the preferred alternative, or one of the other remedial alternatives considered, presents a current or potential future threat to the environment.

More specific information concerning public health risks and ecological risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in Chapters 13 and 14 of the RI Report.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs) and risk-based levels established in the Risk Assessment.

The following remedial action objectives were established to address on-site soils and floating product for the IOC/CC site:

1) restoring the soil to levels which would allow for future residential/recreational use without restrictions;

2) preventing human exposure to the on-site contaminated soils and waste filter clay material;

3) preventing ecological exposure to contaminated surface soils; and

4) eliminating continuing sources of contamination from on-

site areas to ground water, Birch Swamp Brook, the Fire Pond, and associated wetlands.

Soil clean-up numbers for the site were developed by EPA in accordance with the EPA's December 1991 A Risk Assessment Guidance for Superfund: Development of Risk-based Remediation Goals, and other guidance documents. Table 9 provides a complete summary of the selected remediation goals for each contaminant of concern identified at the site. For each contaminant, the selected remediation goal is the lesser of the risk-based soil criteria for residential use or the EPA calculated "Impact to Ground Water Soil Cleanup Criteria".

Soil cleanup levels for PCBs at the site are based on the toxicity reassessment developed by EPA since the original 1990 EPA "Guidance on Remedial Actions for Superfund Sites with PCB Contamination". For residential land use, an action level of 1 ppm is specified for PCBs. The 20 ppm cleanup level for arsenic is consistent with the New Jersey statewide background concentration. Although PCBs and arsenic are the most prevalent contaminants at the site, there are a number of other contaminants present. Soil cleanup standards were developed for these contaminants which are protective of human health and the environment.

The State of New Jersey has developed a State-wide soil cleanup criteria for PCBs of 0.49 ppm. EPA's cleanup level for PCBs is 1 ppm. The state's assessment of the data indicates implementation of the remedy utilizing EPA's remediation goals will also achieve NJDEP's remediation goals for unrestricted use. However, if applicable, the State agrees to fund all additional costs incurred during remedial action due to the application of NJDEP's more stringent cleanup criteria for any contaminant.

The areal and vertical extent of contaminated soil exceeding remediation goals was estimated based on a comparison of analytical results to the remediation goals developed by EPA. Areas exceeding remediation goals are shown in Figure 17. The total volume of soils exceeding remediation goals is estimated at 83,000 cubic yards (cy). The volume calculations were based on the commercial, rather than the residential remediation goals. However, EPA and NJDEP do not believe that changing the remediation goals to meet residential standards will add a significant volume to the soils that must be excavated. In addition, approximately 5,000 gallons of floating product, a continuing source of groundwater contamination, are estimated to be present at the site.

DESCRIPTION OF REMEDIAL ACTION ALTERNATIVES

CERCLA §121(b)(1), [42 U.S.C.§9621(b)(1)] mandates that each selected site remedy be protective of human health and the environment, be cost effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances. CERCLA §121(d), [42 U.S.C. §9621(D)], further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4), [42 U.S.C. §9621 (d)(4)].

Based on the remedial action objectives, NJDEP performed an initial screening process of potential alternatives that would address the contaminated soils and floating product at the site. The initial screening of the alternatives is described in greater detail in the August 1998 Final Source Control Feasibility Study (FS) Report and the January 1999 Addendum.

Several remedial technologies that could potentially meet remedial action objectives for the site were identified, formulated into remedial alternatives, and then evaluated for effectiveness, implementability, and cost. Following this evaluation, four remedial alternatives were retained for detailed analysis.

The four alternatives that received detailed analysis are:

Alternative 1: NO ACTION

Alternative 2: ON-SITE CONTAINMENT (w/Options A, B, C)

Alternative 3: EXCAVATION/OFF-SITE DISPOSAL/REUSE

Alternative 4: EXCAVATION/TREATMENT

The estimated capital cost, net present worth cost, and implementation time to successfully complete the cleanup under each alternative is presented below for comparison (and summarized in Table 7). The time to implement a remedial alternative reflects the estimated time required to construct the remedy, but does not include the time to prepare design documents or procure contracts. Actual costs and implementation times may differ.

Alternative 1: NO ACTION

Estimated Capital Cost: $ 0
Est. O&M Present Worth Cost (30 years): $ 295,000
Estimated Net Present Worth Cost: $ 295,000
Estimated Implementation Time: None

The National Contingency Plan (NCP) and CERCLA require the evaluation of a No Action alternative to be considered as a baseline for comparison with other remedial action alternatives. The No Action alternative does not include any remedial action activities to reduce the toxicity, mobility or volume of contamination or prevent or control exposure to contaminated soil at the site. This alternative includes a 30-year environmental monitoring program. The objective of the environmental monitoring program would be to monitor the impact of the existing sources of contamination on ground water and Birch Swamp Brook in the future. Because this alternative would result in contaminants remaining on site, institutional controls (e.g., a deed restriction) would be placed on the property that would restrict future use of the site. Because this alternative would result in contaminants remaining on-site above health based levels, a review of the site conditions would be conducted every five years to ensure that the remedy continues to provide adequate protection of human health and the environment.

Alternative 2A: RESTRICTED CONTAINMENT WITH PRINCIPAL THREAT (HOT SPOTS) REMOVAL

Estimated Capital Cost: $14,942,000
Est. O&M Present Worth Cost (30 years): $483,000
Estimated Net Present Worth Cost: $15,425,000
Estimated Implementation Time: 24 months

Alternative 2A involves the dismantling of the tank farms and other structures at the IOC facility to facilitate the excavation of the contaminated soil; dismantling the floating product removal system to facilitate the excavation of waste filter clay material and the floating product; and excavation and off-site disposal of 27,000 cy of soils which pose the principal threat (hot-spots). The hot-spot material includes an estimated 19,000 cy of soil to be transported to a TSCA-permitted landfill; an estimated 8,000 cy of soil to be transported to a RCRA-permitted landfill, where it will receive appropriate treatment prior to disposal (in conformance with RCRA requirements); and an estimated 5,000 gallons of floating product to be collected during the course of excavation which will be transported to a TSCA-permitted incinerator. In addition, this alternative includes the excavation and stockpiling of an estimated 56,000 cy of contaminated soil exceeding remediation goals prior to placement in an approximate three-acre containment system cell on-site. The containment cell would be constructed on the northern portion of the IOC/CC property and would have a bottom liner and leachate collection system. The soil would be dewatered before off-site disposal and on-site placement. The liner system would be constructed above the water table and would occupy the upper portion of the site's five-foot unsaturated zone. Leachate collected from the containment system cell would be removed by pumping directly into tanker trucks for appropriate off-site disposal. The approximate height of the Alternative 2A containment cell is 30 feet. The wetland areas affected by this alternative, estimated to be 0.5 acres, will be restored following the excavation and disposal activities.

This alternative would require a deed restriction to ensure that no intrusive activities would be performed on the capped area in the future since such activities would affect the cap's integrity. Because this alternative would result in contaminants remaining on-site above health-based levels, a review would be conducted every five years from the initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Alternative 2B: EXPANDED CONTAINMENT WITH PRINCIPAL THREAT (HOT SPOTS) REMOVAL

Estimated Capital Cost: $15,514,000
Est. O&M Present Worth Cost (30 years): $ 563,000
Estimated Net Present Worth Cost: $16,077,000
Estimated Implementation Time: 24 months

The components of Alternative 2B are the same as Alternative 2A except for the dimension of the containment system cell. This alternative involves the dismantling of the tank farms and other structures on the IOC facility to facilitate the excavation of the contaminated soil; dismantling the floating product removal system; and excavation and appropriate off-site disposal of the same estimated 27,000 cy of soils and 5,000 gallons of floating product which pose the principal threat (hot-spots). Similarly, this alternative includes the excavation and stockpiling of an estimated 56,000 cy of contaminated soil exceeding remediation goals prior to placement in an approximate 5.5-acre containment system cell (covering the entire fenced area of the IOC/CC site) complete with a bottom liner and leachate collection system. The approximate height of the Alternative 2B containment cell would be 16 feet. The wetland areas affected by this alternative, estimated to be 0.5 acres, will be restored following the excavation and disposal activities.

This alternative would require a deed restriction to ensure that no intrusive activities would be performed on the capped area in the future since such activities would affect the cap's integrity. Because this alternative would result in contaminants remaining on-site above health-based levels, a review would be conducted every five years from the initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Alternative 2C: PRINCIPAL THREAT (HOT SPOTS) REMOVAL WITH IN PLACE CONTAINMENT FOR ALL OTHER CONTAMINATION

Estimated Capital Cost: $13,111,000
Est. O&M Present Worth Cost (30 years): $ 387,000
Estimated Net Present Worth Cost: $13,498,000
Estimated Implementation Time: 18 months

Under Alternative 2C, following the removal and appropriate off-site disposal of an estimated 27,000 cy of soils and 5,000 gallons of floating product which pose the principal threat (hot-spots), the remaining 56,000 cy of contaminated soil on the IOC property would be capped in place on the site. A limited amount of contaminated soil located west of the northwest fence boundary would be excavated and consolidated on-site prior to capping. The estimated size of the cap under this alternative is four acres and, unlike Alternatives 2A and 2B, this alternative would not include a bottom liner and leachate collection system. The estimated height of the cap would be three feet. The wetland areas affected by this alternative, estimated to be 0.5 acres, will be restored following the excavation and disposal activities.

This alternative would require a deed restriction to ensure that no intrusive activities would be performed on the capped area in the future since such activities would affect the cap's integrity. Because this alternative would result in contaminants remaining on-site above health-based levels, a review would be conducted every five years from the initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Alternative 3: EXCAVATION/OFF-SITE DISPOSAL/REUSE

Estimated Capital Cost: $17,201,000
Est. O&M Present Worth Cost: $9,000
Estimated Net Present Worth Cost: $17,210,000
Estimated Implementation Time: 11 months

Alternative 3 involves the dismantling of the tank farms and other structures on the IOC facility to facilitate the excavation of the contaminated soil; dismantling the floating product removal system; excavation of all contaminated soil (which includes 27,000 cy of soil which poses the principal threat (hot-spots) and 56,000 cy of soil exceeding remediation goals); and the disposal of this estimated 83,000 cy of contaminated material and the 5,000 gallons of floating product in an appropriate off-site permitted facility. For the 27,000 cy of soil posing the principal threat, an estimated 19,000 cy of soil will be transported to a TSCA-permitted landfill and the other 8,000 cy to a RCRA-permitted landfill for disposal, where it will receive appropriate treatment prior to disposal in conformance with RCRA requirements. The 5,000 gallons of floating product (which is also principal threat material) will be disposed of in TSCA-permitted incinerator. The 56,000 cy of soil exceeding remediation goals will be transported to an appropriate landfill for disposal. Some of the soil may be eligible for soil recycling in a Class B permitted asphalt-batch plant. The excavated areas would be backfilled with clean soil. The affected wetlands would be restored. Under this alternative, soil which poses the principal threat (hot-spots) would be excavated similar to Alternative 2, except that, after dewatering (as necessary), all excavated material would be hauled off-site for disposal after it has been sampled and analyzed for its chemical characteristics. Accordingly, stockpile requirements are much lower than those required for Alternative 2 and stockpiling could occur within the area of excavation. Excavations would be backfilled with clean soil and the site returned to its existing grade. The wetland areas affected by this alternative, estimated to be 0.5 acres, will be restored following the excavation and disposal activities. Operation and maintenance activities would be performed on the wetlands after completion of the wetlands restoration.

Since the excavation and off-site disposal of all contaminated material under this alternative would result in the removal of all contaminants above EPA's cleanup levels and no contaminants would remain above health-based levels, the five-year remedy review would not be necessary. This alternative would allow for unrestricted future use of the site without any institutional controls.

Alternative 4: EXCAVATION/TREATMENT

Estimated Capital Cost: $38,131,000
Est. O&M Present Worth Cost: $9,000
Estimated Net Present Worth Cost: $38,140,000
Estimated Implementation Time: 18 months

Alternative 4 provides for the dismantling of the tank farms and other structures on the IOC facility to facilitate the excavation of the contaminated soil; dismantling the floating product removal system; excavation of the estimated 83,000 cy of contaminated material and 5,000 gallons of floating product; off-site disposal at a TSCA-permitted landfill of an estimated 5,000 cy of the 83,000 cy of material not amenable to treatment; and treatment of the remaining material in an on-site hydro-metallurgical extraction treatment system. The hydro-metallurgical extraction process consists of two steps: (1) a soil washing pretreatment step that cleans sand-sized particles and (2) an extraction step that cleans fines. For this treatment process, the remaining 78,000 cy of material would be stockpiled and screened for removal of large debris. The debris would be staged for transport to an off-site landfill. After screening, the fine soil and sediment would be then be treated in the hydro-metallurgical treatment unit. Following treatment, the treated soil would be supplemented with clean borrow soil and used to backfill the excavated areas. The sludge from the treatment system would be disposed of off-site. The wetland areas affected by this alternative, estimated to be 0.5 acres, will be restored following the excavation and disposal activities. Operation and maintenance activities would be performed on the wetlands after completion of the wetlands restoration.

Since the excavation and disposal of the materials posing the principal threat (hot spots) and treatment of the remaining contaminated soil under this alternative would result in the removal of all contaminants above EPA's cleanup levels and no contaminants would remain above health-based levels, the five-year remedy review would not be necessary. This alternative will allow for unrestricted future use of the site without any institutional controls.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, EPA considered the factors set out in CERCLA §121 [42 U.S.C. §9621], by conducting a detailed analysis of the viable remedial alternatives pursuant to the

NCP, 40 CFR §300.430 (e)(9) and OSWER Directive 9355.3-01. The detailed analysis consisted of an assessment of the individual alternatives against each of the nine evaluation criteria and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

The following "threshold" criteria are the most important and must be satisfied by any alternative in order to be eligible for selection:

1. *Overall protection of human health and the environment* addresses whether or not a remedy provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.

2. *Compliance with ARARs* (Applicable or Relevant & Appropriate Requirements) addresses whether a remedy would meet all of the applicable (legally enforceable), or relevant and appropriate (pertaining to situations sufficiently similar to those encountered at a Superfund site such that their use is well suited to the site) requirements of federal and state environmental statutes and requirements or provide grounds for invoking a waiver.

The following "primary balancing" criteria are used to make comparisons and to identify the major trade-offs between alternatives:

3. *Long-term effectiveness and permanence* refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

4. *Reduction of toxicity, mobility or volume through treatment* refers to a remedial technology's expected ability to reduce the toxicity, mobility, or volume of hazardous substances, pollutants or contaminants at the site.

5. *Short-term effectiveness* addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed

during the construction and implementation period, until cleanup goals are achieved.

6. *Implementability* refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed.

7. *Cost* includes estimated capital costs, operation and maintenance costs, and the present worth costs.

The following "modifying" criteria are considered fully after the formal public comment period on the Proposed Plan is complete.

8. *State acceptance* indicates whether, based on review of the RI/SCFS reports and the Proposed Plan, the State concurs with, opposes, and/or has identified any reservations with the selected alternative.

9. *Community acceptance* refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports. Factors of community acceptance to be discussed include support, reservation, and opposition by the community.

A comparative analysis of the six remedial alternatives (including Options A, B, and C for Alternative 2) relative to the evaluation criteria noted above follows:

<u>Overall Protection of Human Health and the Environment</u>

Alternative 1, No Action, was developed as a baseline with which to compare other alternatives. Because natural attenuation is the only mechanism that could potentially reduce concentrations of COCs in soil, implementation of this alternative would result in continued risk to human health and the environment for an undetermined period into the future. Accordingly, this alternative has been eliminated from consideration and will not be discussed further.

Alternatives 2A, 2B and to a lesser extent 2C, would be protective of human health and the environment. Each of the alternatives includes removal of principal threat (hot-spot) areas of contamination that could not be reliably contained on-site, and containment of the remaining contaminated soil exceeding remediation goals within an engineered cell (2A and 2B) and/or containment in-place beneath an impermeable cap (2C). Although contaminated soil exceeding remediation goals would remain on-site under each of the options of Alternative 2, placement within a cell and/or beneath an impermeable cap provides isolation from the environment, and offers protection of both human health and environmental receptors. Continued protection of human health and the environment would be dependent on effective execution of a maintenance program to maintain cap integrity and adherence to a strict deed restriction to ensure the cap is not breached in the future.

While Alternative 2C would be protective of human health from the exposure pathways related to the contaminated soil (incidental soil ingestion, dermal absorption and inhalation), it is not fully protective of the ground water. In Alternative 2C, contaminated soil exceeding remediation goals would be in direct contact with the ground water, which could contribute to the ground water contamination.

Alternative 3, Excavation/Off-site Disposal/Reuse, would be protective of human health and the environment. All areas of contamination exceeding remediation goals, not just the principal threat (hot-spot) areas of contamination, would be excavated and properly disposed of off-site. Therefore, all exposure pathways to the site contamination would be eliminated.

Alternative 4, Excavation/Treatment, would be protective of human health and the environment. All areas of contamination exceeding remediation goals would be excavated and treated on-site to reduce the contaminant levels to meet remediation goals before placement back on-site. The principal threat (hot-spot) contamination would be properly disposed of off-site. This would eliminate all exposure pathways to the contamination similar to Alternative 3.

Compliance with ARARs

All of the alternatives could be designed to comply with federal and state location-specific ARARs that regulate excavation, filling, and discharge into wetlands and floodplains. These alternatives could also be designed to comply with action-specific ARARs associated with the discharge of treated water, from soil dewatering, to Birch Swamp Brook; employ engineering controls to comply with federal and state air-quality standards for fugitive dust from remedial activities; and comply with RCRA, TSCA, U.S. Department of Transportation (DOT), and New Jersey hazardous and solid waste regulations that apply to the transport and disposal of waste material.

There are no chemical-specific ARARs for soil. However, EPA has developed soil cleanup criteria, referred to as remediation goals, that while not legally applicable, were selected by EPA for the cleanup of on-site soils for the site. In addition, because a portion of the site is classified as wetlands, all alternatives would need to comply with Section 404 of the Clean Water Act and federal Executive Order 11990 which requires federal agencies to take actions to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. A wetland restoration and monitoring plan will be prepared as part of the remedial design plan to address potential impacts to wetlands under all alternatives.

Long-Term Effectiveness and Permanence

Alternative 4 provides the greatest long-term effectiveness and permanence since the contaminated soils are excavated and treated to meet remediation goals prior to backfilling on-site. Treatment of soils exceeding remediation goals would eliminate the need for engineering and/or institutional controls and long-term monitoring. For Alternative 3, the excavation and off-site disposal/reuse of the contaminated soil also provides long-term effectiveness in eliminating future residual risk from the soil and also would eliminate the need for engineering and/or institutional controls at the site. However, it does not provide the permanence that the Alternative 4 treatment option provides because the contaminated soil is disposed of at off-site RCRA, TSCA, or special waste licensed landfills. These licensed facilities effectively isolate the waste materials such that future residual risks are negligible, however long term maintenance at these facilities would be required to assure protectiveness. Alternatives 2A, 2B, and 2C provide lesser long-term effectiveness and permanence than Alternatives 3 and 4, but they can effectively minimize residual risk to public health and the environment as long as the containment systems are properly maintained in the future and institutional controls are enforced.

Reduction of Toxicity, Mobility or Volume Through Treatment

For Alternatives 2 and 3, no treatment is proposed to reduce toxicity, mobility or volume except for (1) the estimated 5,000 gallons of floating product expected to be recovered during soil excavation, which would be destroyed by incineration at an appropriate TSCA-licensed incinerator, and (2) the 8,000 cy of tank farm soil that is estimated to exceed TCLP (Toxic Contaminant Leaching Procedure) threshold criteria for RCRA-characteristic hazardous waste which would be stabilized to reduce mobility of contaminants prior to disposal in a secure landfill (either on-site under Alternative 2 or off-site under Alternative 3). While no treatment is proposed beyond this, each of the alternatives, provides a reduction in contaminant mobility for all other contaminated material by containing the material in either an off-site properly licensed landfill or an on-site containment cell where contaminants are isolated from environmental transport mechanisms. Under Alternative 4, all soil exceeding remediation goals (except an estimated 5,000 cy which would not be amenable to treatment) would be treated using hydro-metallurgical extraction. Assuming an estimated 78,000 cy of soil is treated, a volume reduction of approximately 10% will leave an estimated 70,200 cy of cleaned soil to be backfilled on-site and approximately 7,800 cy of treatment sludge that would require off-site disposal as a hazardous waste at a properly licensed landfill.

Short-Term Effectiveness

Alternative 3 provides the greatest overall short-term effectiveness primarily because the work can be completed in the shortest period of time, an estimated 11 months from site preparation to wetlands restoration. Alternatives 2C and 4 are estimated to take 18 months to complete while Alternatives 2A and 2B are estimated to require the longest period of time to complete at 24 months.

Under each option of Alternative 2 and under Alternative 3, (a) residences near the site would be affected by noise and dust from remedial activities on the site and trucks hauling material on and off-site, (b) short-term risks to site workers would result primarily from dermal contact with contaminated materials and inhalation of contaminated dust during remediation, and (c) adjacent wetlands and Birch Swamp Brook are at risk of impact by soil runoff during excavation activities associated with the remediation. The negative impacts to nearby residences can be mitigated by implementing engineering controls to reduce fugitive dust and limiting work to normal working hours. The short-term risks posed to site workers can be addressed by implementing a site-specific Health & Safety Plan to minimize exposure to site contaminants. The short-term impacts to adjacent wetlands and Birch Swamp Brook can be mitigated by implementing proper controls in accordance with a site specific Erosion and Sedimentation Plan to be developed during the design of the remedy. In addition, any wetlands that are disturbed during implementation of the remedy can be restored after completion of the remediation.

Alternative 4 provides the least short term effectiveness because, in addition to the impacts posed by Alternatives 2 and 3, the soil treatment plant would be operational 24 hours per day and may cause a significant noise nuisance to nearby residences. In addition, a large area of wetlands would likely be adversely impacted during the implementation of this alternative because of the limited space at the site to construct the hydro-metallurgical treatment system, including a temporary wastewater treatment plant rated for 300 gallons per minute and the associated water storage basin required for the water recirculation needs of the treatment system.

Implementability

Alternative 3 is considered the easiest alternative to implement, because there are no significant technical or administrative implementability concerns. Excavation and disposal can be implemented with readily available equipment and construction methods utilizing well-demonstrated technologies. There exists sufficient capacity at off-site landfills for disposal of the estimated quantities of RCRA and TSCA regulated wastes. There are available soil recycling facilities in the area and several construction contractors in the region available to undertake the work. Alternative 3 is considered a final remedy and no additional remedial actions will be necessary once the remedial alternative is implemented. Some implementability issues for Alternative 3 are the same issues which are common to all of the alternatives, namely, (a) the western edge of the floating product is interpreted to be close to one of the transmission towers which raises concerns regarding the feasibility of using heavy equipment to excavate under electrical transmission lines and stability issues associated with excavating near the foundation of the transmission tower, (b) site access agreements would need to be obtained to disturb, remediate, and restore this area as well as the railroad embankment along the western boundary of the site where contamination exists, and (c) tank farms, and other structures would need to be dismantled. These issues could be resolved during the design of the remedy.

Alternatives 2A, 2B, and 2C are similar to Alternative 3 with regard to the manageable technical implementability concerns because containment technology equipment and methods are well-demonstrated and readily available. However, in addition to the common administrative implementability concerns described above, all of the options of Alternative 2 require substantial restrictions to the future use of the site in order to protect the waste containment systems that would be constructed. Also, a continual maintenance program to insure the integrity of the cap, continual future monitoring of the effectiveness of the remedy, and continual operation and maintenance of the leachate collection systems (under Alternatives 2A & 2B) are implementability issues unique to Alternative 2.

There are numerous logistical concerns related to the implementation of Alternative 4. In order to create adequate space for all of the components of the treatment system plant building and stockpiled/soil handling areas, contaminated soil in the way of the treatment plant construction would have to be excavated and stockpiled elsewhere on the site. The only available space on the IOC/CC property for these facilities would likely be in uncontaminated areas south or east of the Fire Pond which lie within the 100-year floodplain and would result in adverse impact to additional wetland areas. Special design features would need to be incorporated into the treatment plant design to mitigate the potential for inundation of the plant by flood waters and the associated release of hazardous substances into the environment.

Although treatability studies on petroleum-contaminated soil have indicated that hydro-metallurgical extraction may be effective for removing organic contaminants from soil, it has not been demonstrated beyond bench-scale testing. To demonstrate the effectiveness of the hydro-metallurgical extraction technology to treat soil with both inorganic and organic contamination, additional treatability studies would be required.

Cost

The capital, annual operation and maintenance (O&M), and present worth costs are presented in Table 10. Present worth costs for all the alternatives were calculated assuming a 5% interest rate and a 30-year O&M (where applicable).

For Alternative 1, No Action, there is no capital cost associated with the alternative. The O&M costs calculated for this alternative provide for periodic sampling of ground water and sediment adjacent to the site to monitor off-site contaminant migration. The assumed monitoring program includes quarterly sampling in year 1, bi-annual sampling during years 2-5, and annual sampling during years 6-30. The present worth cost of this sampling program is $295,000.

The capital cost for Alternative 2A is $14,942,000, including the construction of a three acre containment cell with bottom liner and mitigation of an estimated 0.5 acres of wetlands. The present worth costs for 30 years of O&M associated with monitoring and maintaining the containment system, including the installation of three ground water monitoring wells, is $483,000.

The capital cost for Alternative 2B is $15,514,000, including the construction of a 5.5-acre containment cell with a bottom liner and mitigation of an estimated 0.5 acres of wetlands. The present worth costs for 30 years of O&M associated with monitoring and maintaining the containment system, including the installation of three ground water monitoring wells, is $563,000.

The capital cost for Alternative 2C is $13,111,000, including the construction of a four-acre containment cell with no bottom liner and mitigation of an estimated 0.5 acres of wetlands. The present worth costs for 30 years of O&M associated with monitoring and maintaining the containment system, including the installation of three ground water monitoring wells, is $387,000.

The capital cost for Alternative 3 is $17,210,000. This includes all excavation and off-site disposal costs associated with this alternative, as well as mitigation of an estimated 0.5 acres of wetlands. Since all soils will be remediated to meet residential use standards, and all floating product will be removed, there are no O&M costs planned.

The capital cost for Alternative 4 is $38,140,000. This includes the cost of all excavation and treatment of the contaminated soil on-site (except for the estimated 5,000 cy of soil/waste pile material not amenable to treatment and 5,000 gallons of floating product requiring off-site disposal) and backfilling the excavated areas with treated soil. This alternative also includes the mitigation of an estimated 0.5 acres of wetlands. Since all soils will be remediated to meet residential use standards, and all floating product will be removed, there are no O&M costs planned.

On a comparative basis, the total costs for Alternative 4($38,140,000) are significantly greater than the total costs for Alternatives 2A ($15,425,000), 2B ($16,077,000), 2C ($13,498,000) and 3 ($17,210,000). When comparing the Alternative 2 options to Alternative 3, Alternative 2A costs 90% as much as Alternative 3, Alternative 2B costs 93% as much as Alternative 3, and Alternative 2C costs 78% as much as Alternative 3.

<u>State Acceptance</u>

NJDEP concurs with EPA's selection of Alternative 3 (Excavation/Off-site Disposal/Reuse) as the preferred remedy. It is noted that the remediation goals for the contaminants found at this site were developed by EPA to meet EPA's unrestricted use criterion. While NJDEP's unrestricted use criterion for the contaminants found at the site are in some cases more stringent than EPA's (i.e., NJDEP's criterion for PCBs is 0.49 ppm compared to EPA's 1.0 ppm), the state's assessment of the data indicates implementation of the remedy utilizing EPA's remediation goals will also achieve NJDEP's remediation goals for unrestricted use. However, if applicable, the State agrees to fund all additional costs incurred during remedial action due to the application of NJDEP's more stringent cleanup criteria for any contaminant.

Community Acceptance

Community acceptance was evaluated after the close of the public comment period. Written comments received during the public comment period, as well as verbal comments during the public meeting were evaluated.

The majority of comments received during the public comment period reflected the community's request that the site be remediated to allow for unrestricted future use of the property. The community was otherwise supportive of the selected remedy.

The current owner of the IOC/CC property and the current operator of the IOC/CC facility are opposed to the decision to excavate the majority of the contamination. They recommend a remedy that includes an evaluation of vacuum enhanced product removal to address the floating product and installation of a modified cap over the soil.

The attached Responsiveness Summary (Appendix C) addresses each of the comments received during the public comment period.

PRINCIPAL THREAT WASTES

For OU3, the principal threat wastes are highly toxic and/or mobile materials at the site. They include:

- waste filter clay materials;
- TSCA-regulated materials;
- Floating product; and
- contaminated soils underlying Tank Farms 1, 2, 3, and 4.

SELECTED REMEDY

Based upon consideration of the results of the RI/SCFS, the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, EPA and NJDEP have determined that Alternative 3 - Excavation/Off-site Disposal/Reuse is the appropriate alternative for remediating contaminated soil and floating product. Alternative 3 best satisfies the requirements of CERCLA §121 and the NCP's nine criteria for evaluating remedial alternatives, 40 CFR §300.430 (e)(9).

Alternative 3 is comprised of the following components:

- Excavation of an estimated 83,000 cubic yards of soils containing contaminants above the selected remediation goals and disposal of this material at appropriate off-site facilities.
- Transportation of an estimated 27,000 cubic yards of the soils which pose the principal threat (hot spots) to a RCRA/TSCA hazardous waste disposal facilities. An estimated 19,000 cubic yards of this soil will be transported to a TSCA-permitted landfill and the other 8,000 cubic yards to a RCRA-permitted landfill for disposal, where it will receive appropriate treatment in accordance with RCRA requirements.
- Transportation of an estimated 56,000 cubic yards of soils containing contaminants above the selected remediation goals to an appropriate landfill. A portion of this material may be recycled as asphalt base material.
- Removal of an estimated 5,000 gallons of floating product via vacuum truck and transportation of this material to a TSCA licensed incinerator.
- Dismantling of site buildings and tank farms, as necessary to complete the selected soil excavation and floating product removal.
- Backfilling of all excavated areas with clean fill.
- Restoration of the wetlands affected by cleanup activities.

The selection of Alternative 3 is based upon the comparative analysis of alternatives described above and provides the best balance of tradeoffs with respect to the nine evaluation criteria.

Alternative 3 is protective of human health and the environment, and can be performed in compliance with the chemical-specific cleanup criteria selected by EPA along with all other Federal or State requirements that are applicable or relevant and appropriate to this action. These include those ARARs that regulate: (a) excavation, filling, and discharge into wetlands and floodplains; (b) discharge of treated water to Birch Swamp Brook resulting from any dewatering necessary during excavation; (c) air-quality standards for fugitive dust during excavation; and (d) transportation and disposal of solid and hazardous waste.

Alternative 3 provides better short-term effectiveness than Alternative 4 and provides the best long-term effectiveness along with Alternative 4 (at less than one-half the cost of Alternative 4) because there is no long-term maintenance or monitoring of the integrity of the capping systems as required under the Alternative 2 options. While the Alternative 2 options rank highest in short-term effectiveness compared to Alternative 3 because of the increased volume of material transported off-site over public roads and the potential increased risk posed by this transportation, this increased risk is not considered substantial and all precautions required under Federal and State transportation laws will be complied with.

While Alternative 4 ranks highest in the Reduction of Toxicity, Mobility or Volume criteria and is a more permanent remedy than Alternative 3, the cost differential is too substantial to justify the incremental benefit under these criteria. Alternative 3 ranks equal to the containment options of Alternative 2 with regard to the Reduction of Toxicity, Mobility or Volume criteria and ranks higher than any of the Alternative 2 options under the permanence criteria when considering the site itself. Alternative 3 is cost effective as compared with the other alternatives, especially the Alternative 2 options.

Alternative 3 is also considered the most implementable of all of the alternatives. Excavation and disposal can be implemented with readily available equipment and construction methods utilizing well-demonstrated technologies. There exists sufficient capacity at off-site disposal facilities for all of the various waste mixtures involved, both hazardous and non-hazardous. Tank farms and other structures will need to be dismantled prior to excavation. In particular, the Masonry Building, as mentioned above, is abandoned and is in danger of collapse. This building is likely to be dismantled as an early action, during remedial design activities. Alternative 3 is considered a final remedy and no additional remedial actions will be necessary once the remedial alternative is implemented. The affected wetland areas will be restored following the excavation and disposal activities.

STATUTORY DETERMINATIONS

As was previously noted, CERCLA §121(b)(1) mandates that a remedial action must be (a) protective of human health and the environment, (b) cost-effective, and (c) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity, and mobility of the hazardous substances, pollutants, or contaminants at a site. CERCLA §121(d) further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA § 121(d)(4).

For the reasons discussed below, EPA and NJDEP have determined that the selected remedy meets the requirements of CERCLA §121.

Protection of Human Health and the Environment

The selected alternative (Alternative 3 - Excavation/Off-site Disposal/Reuse) is protective of human health and the environment and deals effectively with the threats to human health and the environment posed by the contaminants that exist at this site. All areas of contamination exceeding EPA's remediation goals for unrestricted use will be excavated and properly disposed of off-site.

Compliance with ARARs

The selected remedy will achieve compliance with all chemical-specific, action-specific, and location-specific ARARs that regulate excavation, filling, and discharge into wetlands and floodplains. There are no chemical-specific ARARs for soil. EPA has developed guidances, that while not legally enforceable, were considered by EPA in establishing cleanup levels (remediation goals) for the site.

The selected remedy will comply with action-specific ARARs associated with the discharge of treated water to Birch Swamp Brook; employ engineering controls to comply with federal and state air-quality standards for fugitive dust from remedial activities; and comply with RCRA, TSCA, U.S. Department of Transportation (DOT), and New Jersey hazardous and solid waste regulations that apply to the transport and disposal of waste material.

Location-specific ARARs for the selected remedy include: Executive Order 11990 (Wetlands Protection); the Wetlands Construction and Management Procedures (40 CFR, Appendix A); and Executive Order 11988 (Floodplain Management). Since a portion of the site is classified as wetlands, the soil remedy needs to comply with Section 404 of the Clean Water Act and federal Executive Order 11990 which requires federal agencies to take actions to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. Any actions which disturb or impact wetlands would additionally require development of a wetland mitigation plan.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent to which permanent solutions and alternative treatment technologies can be utilized in a cost effective manner at the IOC/CC site. Some of the material to be addressed through the selected remedy will be addressed by permanent solutions and/or resource recovery solutions. Specifically, the estimated 5,000 gallons of floating product will be permanently destroyed by incineration at a TSCA-licensed incinerator. In addition, some of the soil may be eligible for soil recycling in a permitted asphalt-batch plant. Further, an estimated 8,000 cubic yards of the site's most contaminated soils will receive stabilization treatment to reduce the mobility of contaminants prior to disposal in a secure landfill. While the remaining material will not receive any treatment, a reduction in contaminant mobility will be achieved by containing the material off-site in a properly licensed secure landfill.

Preference for Treatment as a Principal Element

The selected remedy utilizes treatment as a principal element to the maximum extent practicable. As previously indicated, the complex nature of the waste material at the site with elevated levels of both organics and inorganic contaminants, and the limited space on site to construct a treatment plant limit the cost effectiveness and implementability of the on-site treatment technologies available that would treat all the waste. However, part of the principal threat waste, that is the floating product, will be incinerated at a TSCA-licensed incinerator. In addition, an estimated 8,000 cubic yards of the principal threat soils will receive stabilization treatment to reduce the mobility of contaminants prior to disposal in a secure landfill. Although the selected remedy will treat a portion of the principal threat materials, most of the contaminated soils will be disposed of in a landfill. Therefore, the selected remedy does not satisfy the statutory preference for remedies that employ treatment as a principal element.

Cost-Effectiveness

Alternative 3, the selected remedy, affords the highest level of overall effectiveness proportional to its cost. The treatment alternative, Alternative 4, at a cost of $38,131,000 is over twice as expensive as the selected alternative ($17,201,000) and compares more favorably than the selected alternative in only one of the nine criteria (Reduction of Toxicity, Mobility, or Volume). While the various containment alternatives (Alternatives 2A, 2B and 2C) are slightly less costly (ranging from 78% to 93% of the cost of Alternative 3), they do not rank more favorably than the selected alternative in any of the nine evaluation criteria.

DOCUMENTATION OF SIGNIFICANT CHANGES

During the public comment period for the Proposed Plan (February 19, 1999 through April 6, 1999), extensive comment requesting that EPA and NJDEP reconsider the soil cleanup objectives for this operable unit were received. Specifically, a number of commentors recommended that the proposed cleanup criteria for PCBs, which was the EPA-developed industrial use standard of 13 ppm, be revised to allow for unrestricted future use of the site. These comments were made both verbally at the public meeting and in writing. The commentors included local elected officials, local health officials, community members, a community environmental group and technical experts representing the community.

Despite the fact that the land use of the site property currently is industrial, residential properties and ecologically sensitive resources border the site. As some of the commentors pointed out, a review of the remedial investigation data indicates that the selected remedy may achieve unrestricted (residential) future use cleanup criteria for PCBs by default, based on the spacial distribution of contaminants. Accordingly, the agencies have agreed to modify the proposed remediation goals which were derived based on future industrial use of the property to remediation goals that will be protective if the property were used in the future for residential purposes. This change does not affect the cleanup standard for every contaminant (see Table 9 for the list of selected remediation goals). Note that this modification changes the proposed remediation goal for PCBs from 13 ppm to a selected remediation goal of 1 ppm.

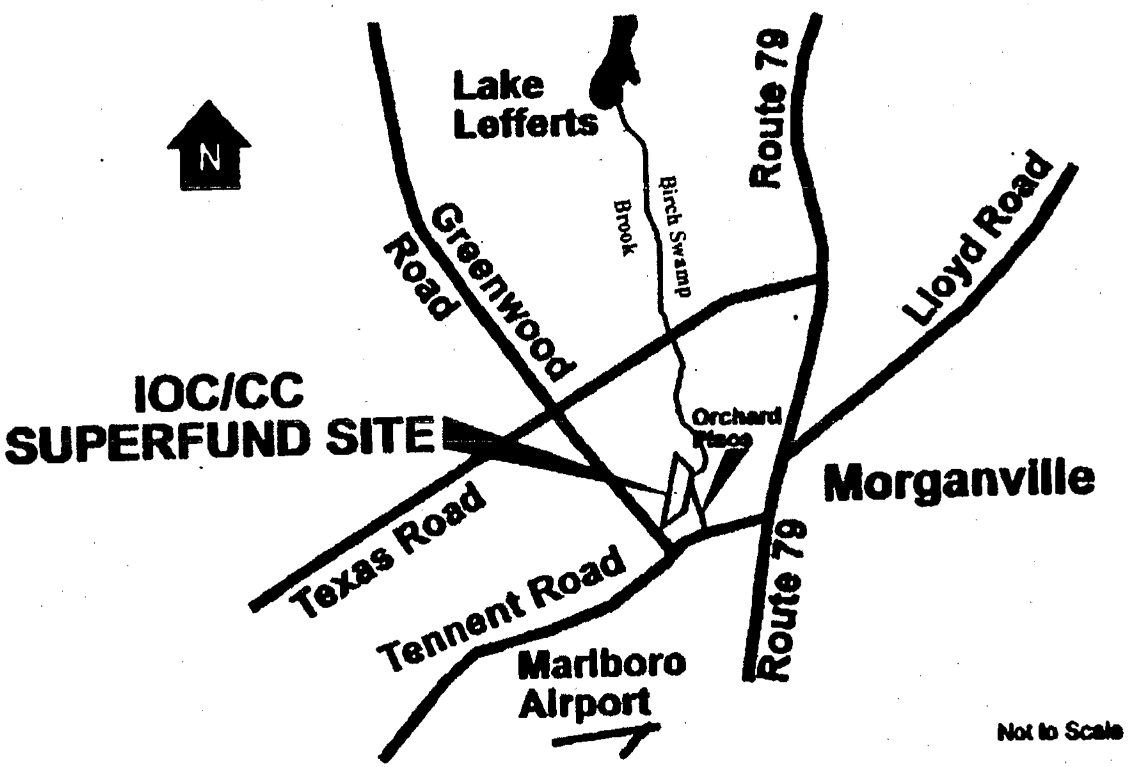
This modification of certain remediation goals to meet residential use criteria is not expected to significantly increase the costs to implement this remedy. Since meeting residential use standards will allow for unrestricted future use of the site, only a minor amount of O&M related to the restored wetlands will be required. A five year review of the selected remedy will not be required.

While NJDEP's unrestricted use criterion for the contaminants found at the site are in some cases more stringent than EPA's (i.e., NJDEP's criterion for PCBs is 0.49 ppm compared to EPA's 1.0 ppm), the state's assessment of the data indicates implementation of the remedy utilizing EPA's remediation goals will also achieve NJDEP's remediation goals for unrestricted use. However, if applicable, the State agrees to fund all additional costs incurred during remedial action due to the application of NJDEP's more stringent cleanup criteria for any contaminant.

FIGURES

FIGURE I

Site Location Map



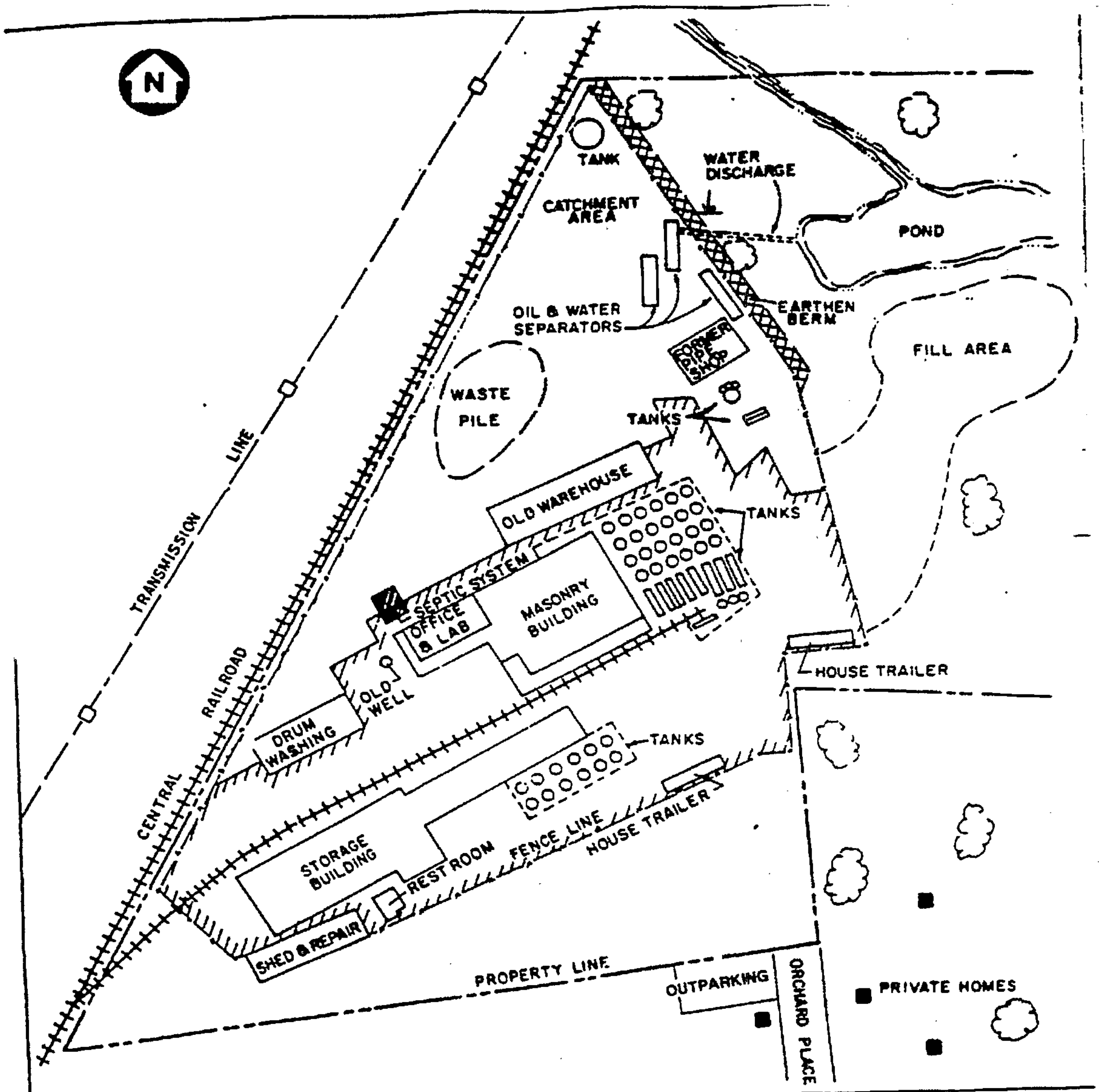


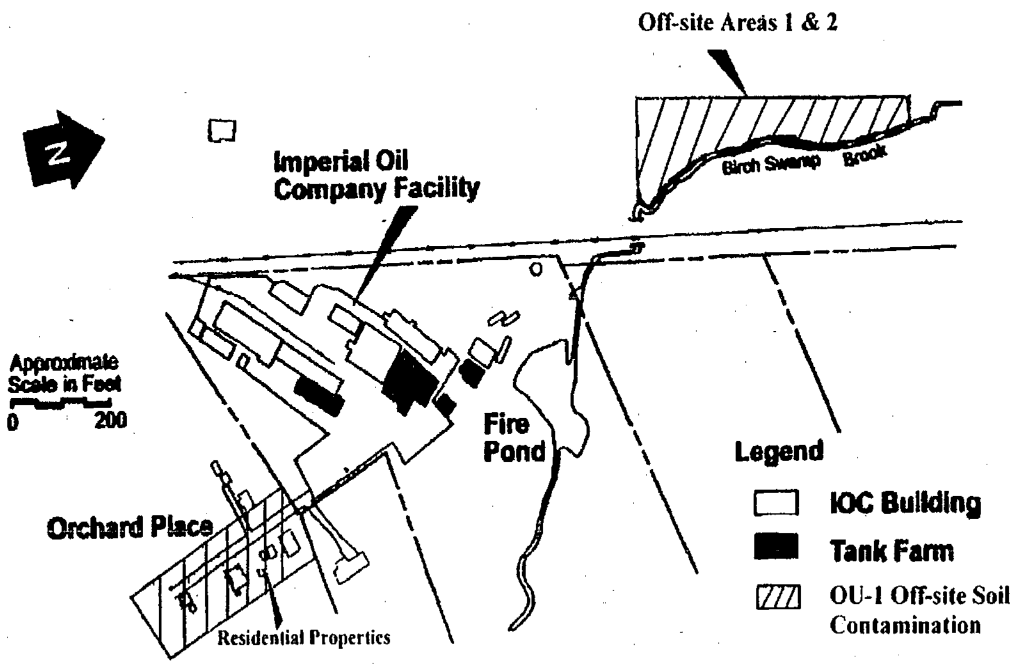
Figure 2

SCHEMATIC LAYOUT OF IMPERIAL OIL CO. FACILITY IMPERIAL OIL/CHAMPION CHEMICALS SITE MORGANVILLE, NEW JERSEY

E.C.JORDAN CO.

FIGURE 3

OU -1 OFF-SITE SOILS LOCATION MAP



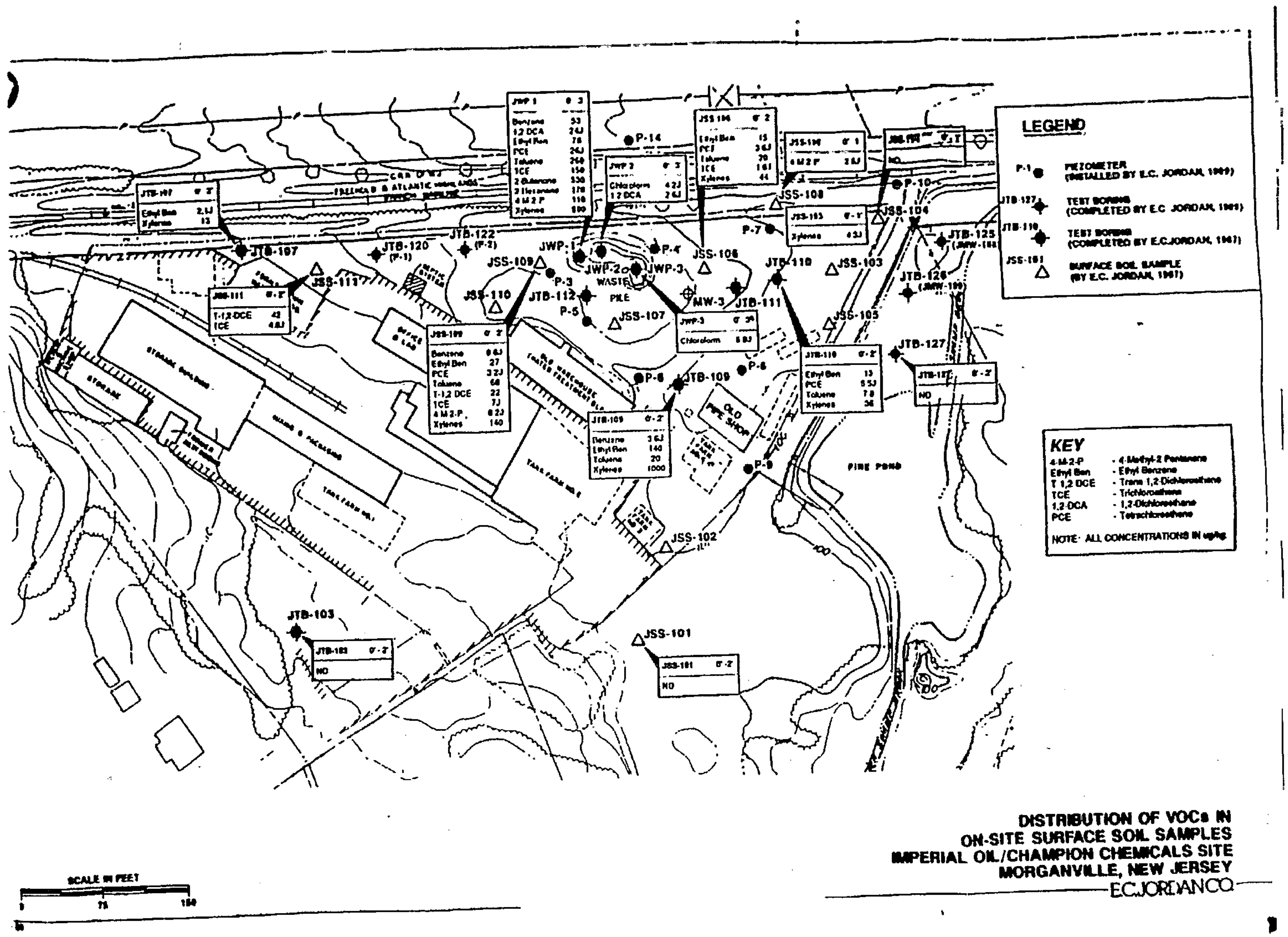

LEGEND
PIEZOMETER
TEST BORING
SURFACE SOIL SAMPLE
KEY
4-M-2-P
Ethyl Ben
- Ethyl Benzene
T 1,2 DCE
- Trans 1,2-Dichloroethene
TCE
- Trichloroethene
1,2-DCA
- 1,2-Dichloroethane
PCE
- Tetrachloroethene
FIRE POND
OLD PIPE SHOP
WASTE PILE
JTB-103
JSS-101
JSS-102
JTB-109
JTB-110
JTB-111
JTB-127
JSS-107
JSS-110
JWP-2
JWP-3
MW-3
SCALE IN FEET
DISTRIBUTION OF VOCs IN
ON-SITE SURFACE SOIL SAMPLES
IMPERIAL OIL/CHAMPION CHEMICALS SITE
MORGANVILLE, NEW JERSEY
E.C.JORDAN CO.

Figure 4

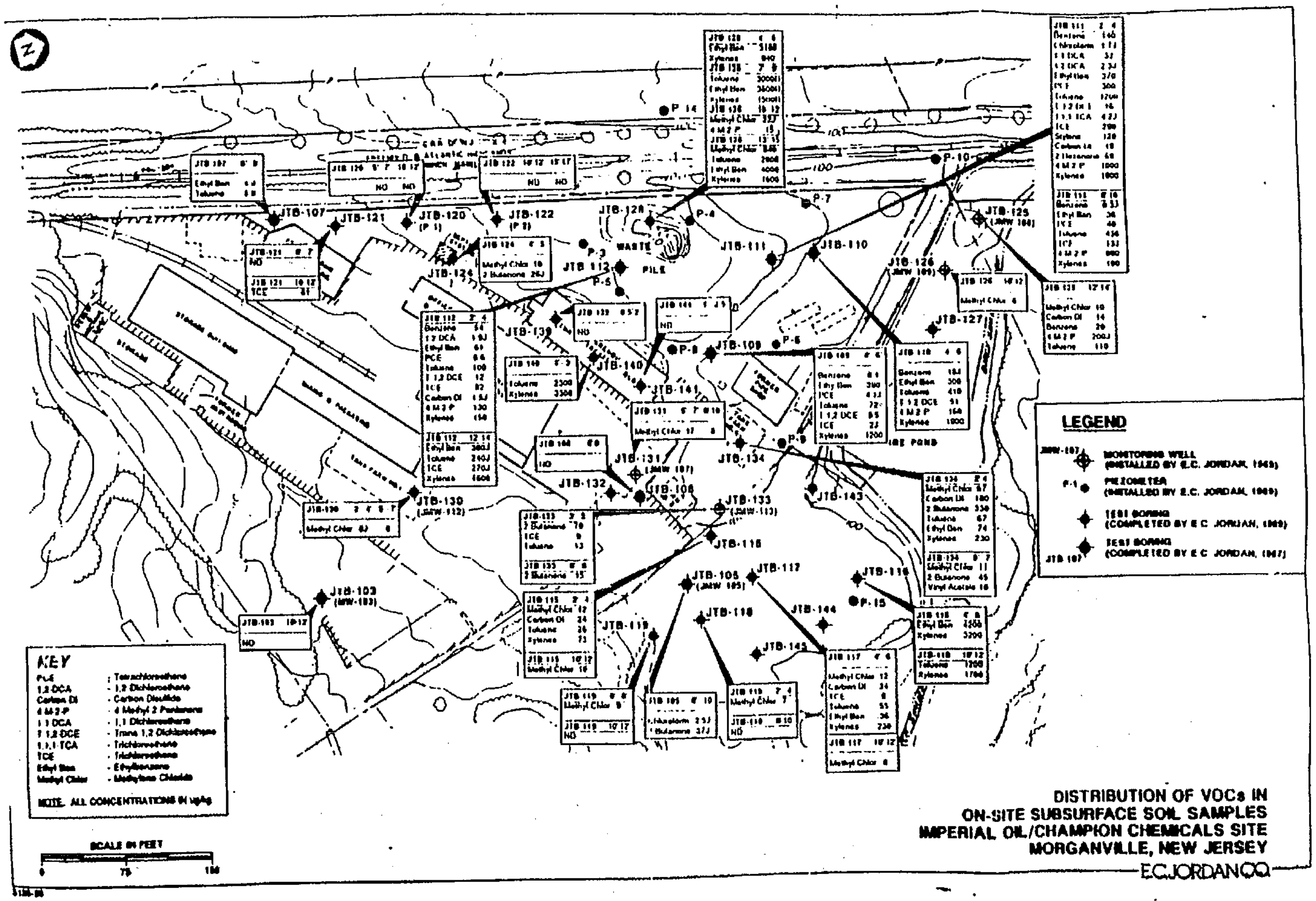
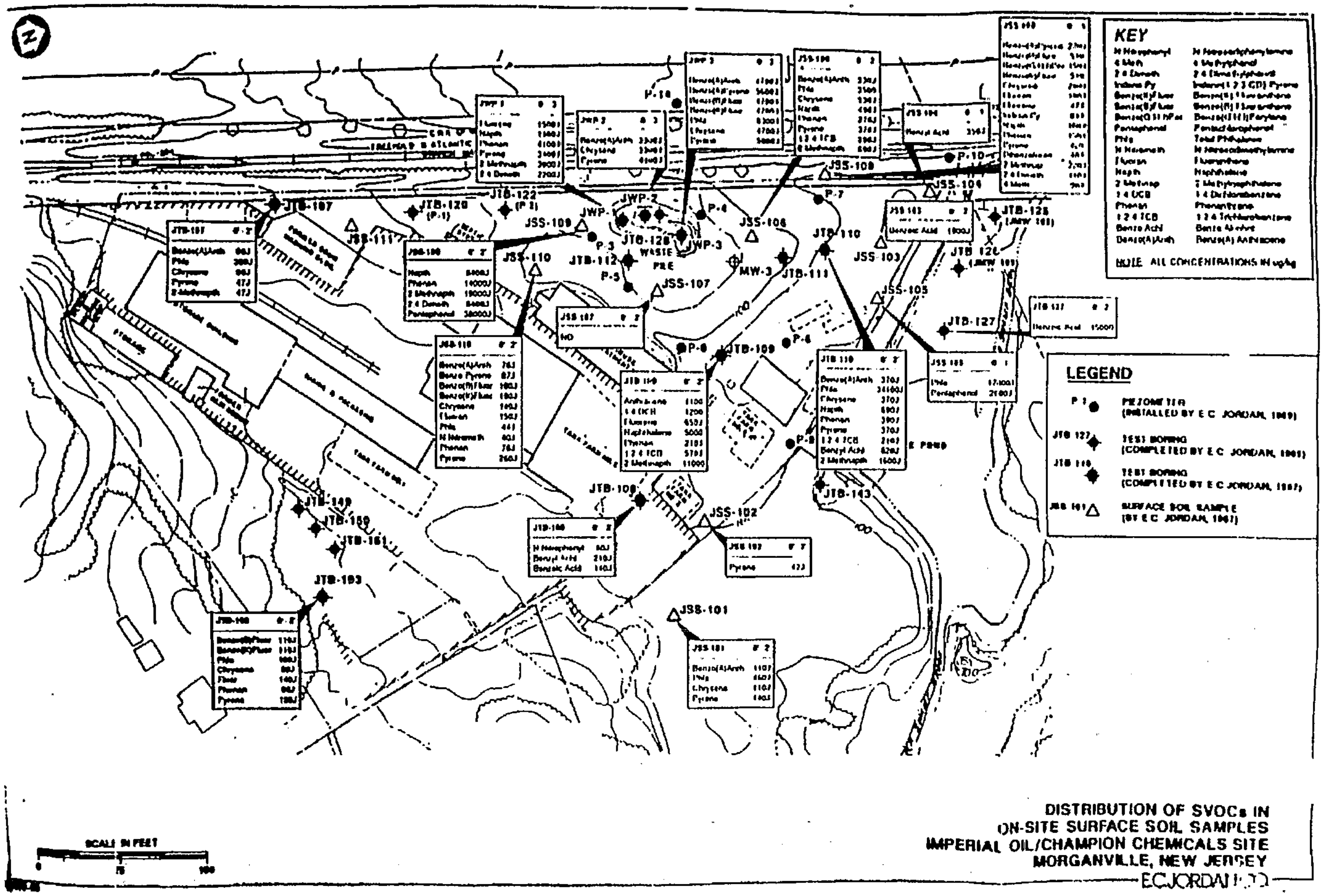

KEY
1,2 DCA - 1,2 Dichloroethane
Carbon Di - Carbon Disulfide
1,1 DCA - 1,1 Dichloroethane
TCE - Trichloroethene
Ethyl Ben - Ethylbenzene
NOTE: ALL CONCENTRATIONS IN ug/kg
SCALE IN FEET
0
75
150
LEGEND
MONITORING WELL
PIEZOMETER
TEST BORING
TEST BORING
DISTRIBUTION OF VOCs IN
ON-SITE SUBSURFACE SOIL SAMPLES
IMPERIAL OIL/CHAMPION CHEMICALS SITE
MORGANVILLE, NEW JERSEY
E.C.JORDAN CO.

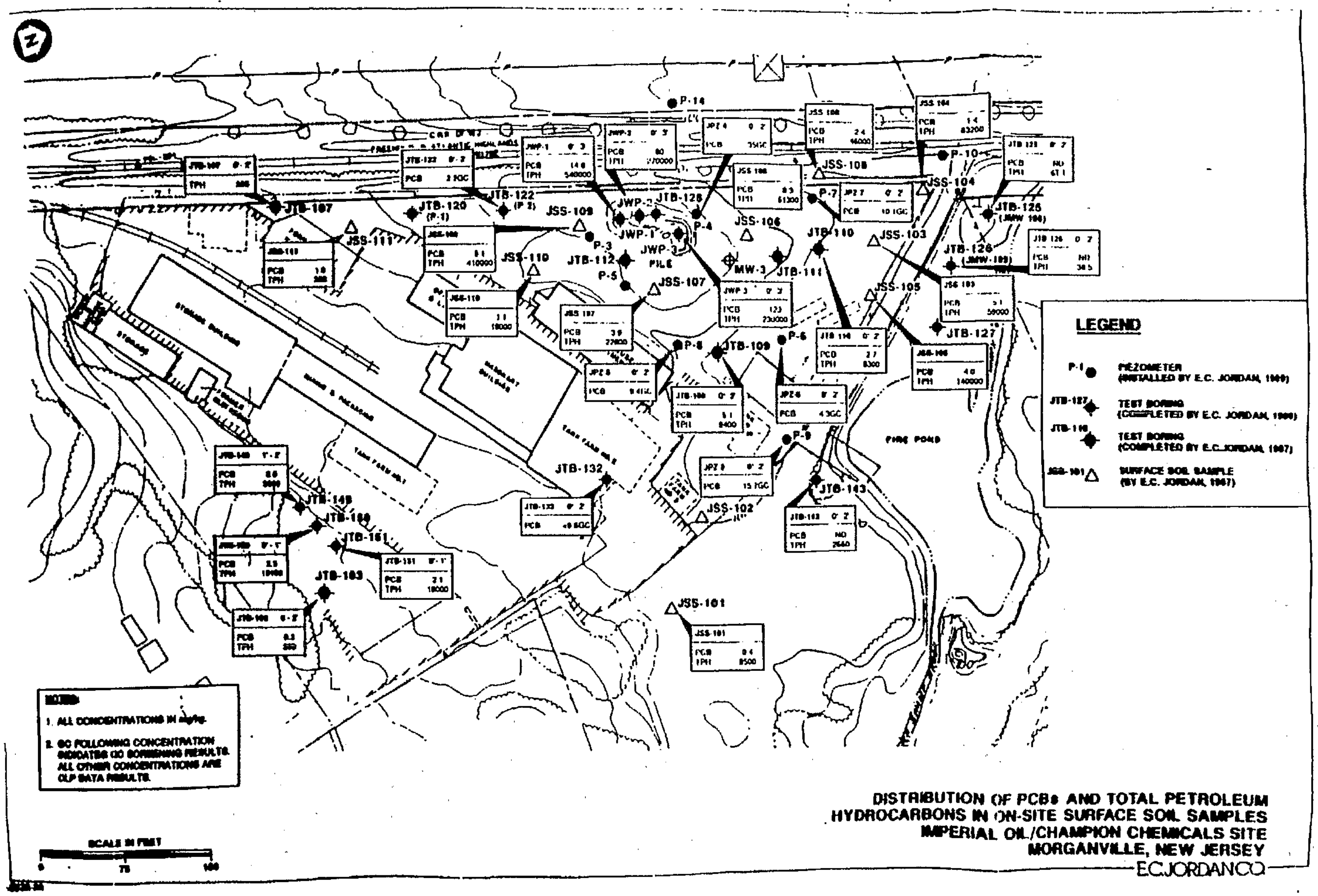
Figure 5

Figure 6



DISTRIBUTION OF SVOCs IN
ON-SITE SURFACE SOIL SAMPLES
IMPERIAL OIL/CHAMPION CHEMICALS SITE
MORGANVILLE, NEW JERSEY
E.C.JORDAN CO.

Figure 7



LEGEND
PIEZOMETER
TEST BORING
TEST BORING
(COMPLETED BY E.C.JORDAN, 1987)
SURFACE SOIL SAMPLE
(BY E.C. JORDAN, 1987)
FIRE POND
DISTRIBUTION OF PCBs AND TOTAL PETROLEUM
HYDROCARBONS IN ON-SITE SURFACE SOIL SAMPLES
IMPERIAL OIL/CHAMPION CHEMICALS SITE
MORGANVILLE, NEW JERSEY
E.C.JORDAN CO.

Figure 8

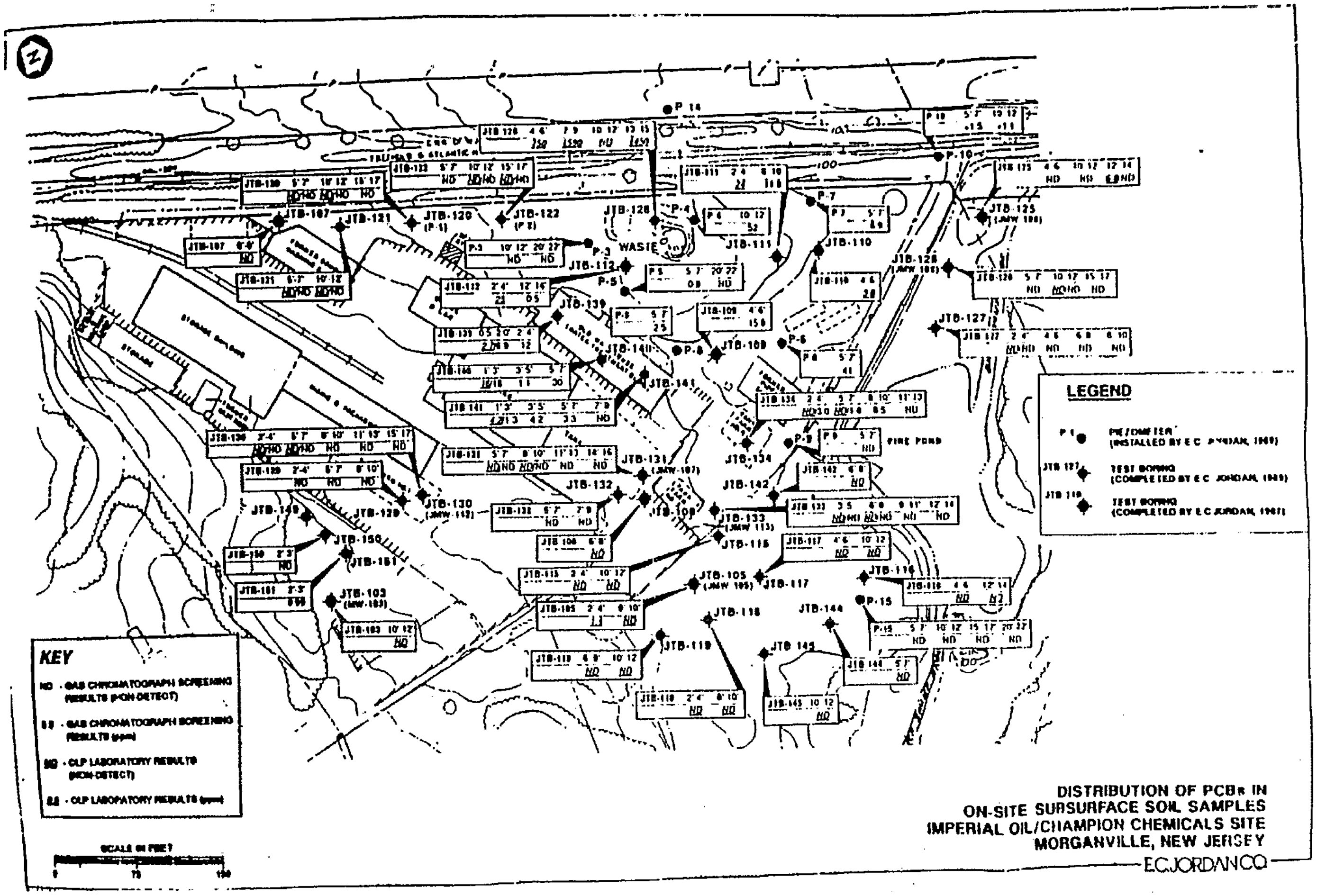
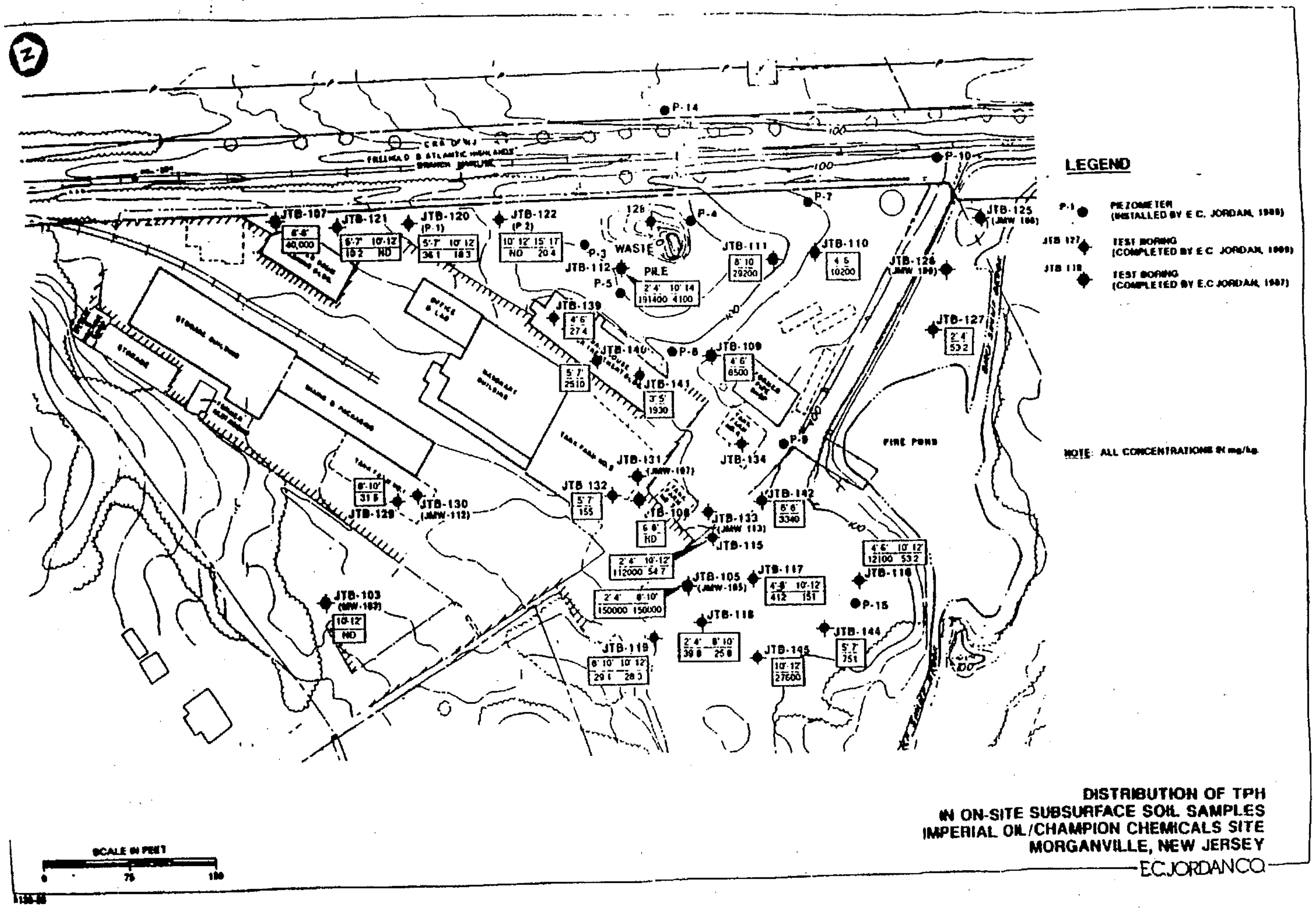
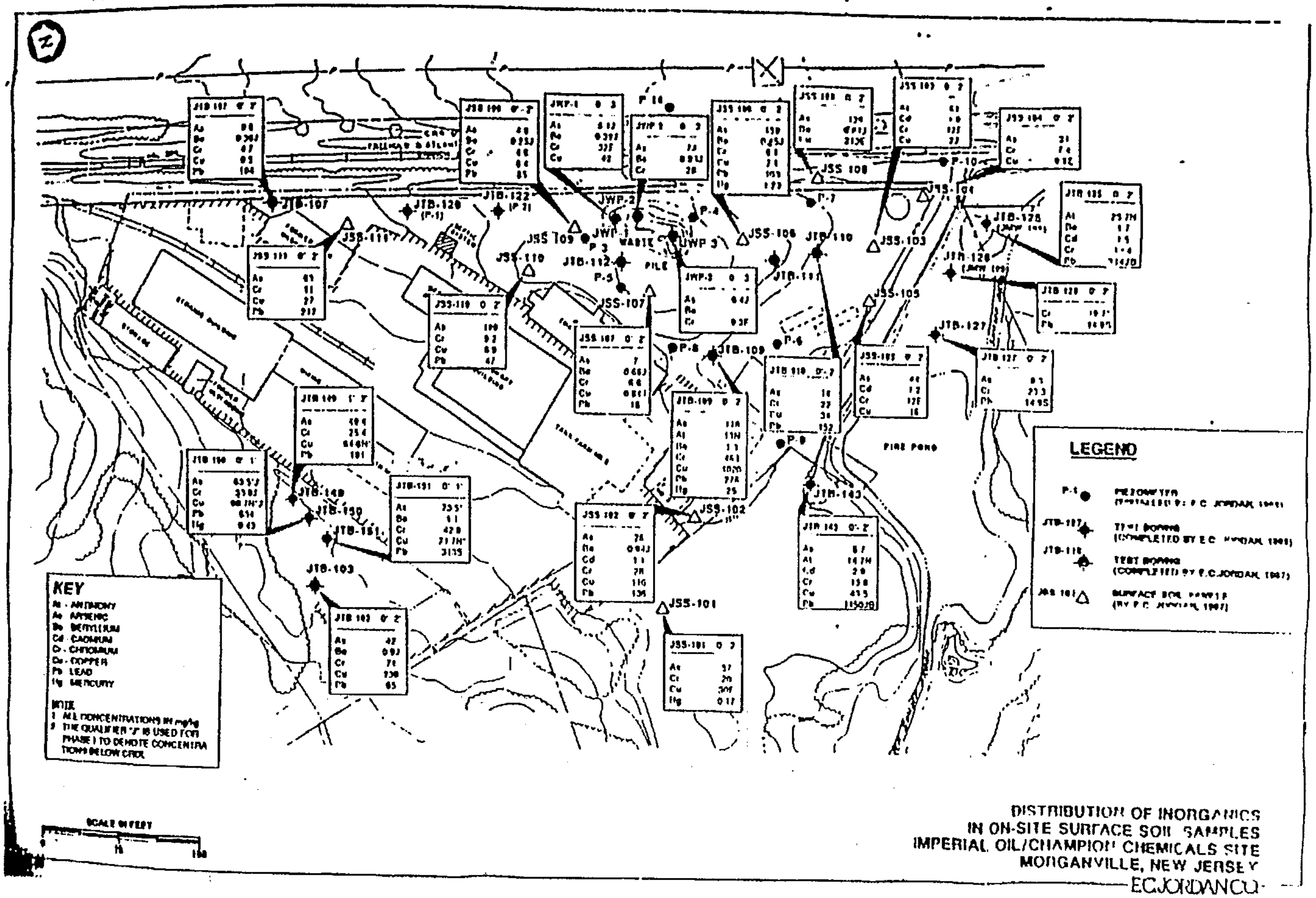

LEGEND
PIEZOMETER (INSTALLED BY E.C. JORDAN, 1989)
TEST BORING (COMPLETED BY E.C. JORDAN, 1989)
TEST BORING (COMPLETED BY E.C. JORDAN, 1987)
KEY
ND - GAS CHROMATOGRAPH SCREENING RESULTS (NON-DETECT)
- GAS CHROMATOGRAPH SCREENING RESULTS (ppm)
ND - CLP LABORATORY RESULTS (NON-DETECT)
- CLP LABORATORY RESULTS (ppm)
SCALE IN FEET
FIRE POND
WASTE
STORAGE BUILDING
DISTRIBUTION OF PCBs IN
ON-SITE SUBSURFACE SOIL SAMPLES
IMPERIAL OIL/CHAMPION CHEMICALS SITE
MORGANVILLE, NEW JERSEY
E.C.JORDAN CO.

Figure 9



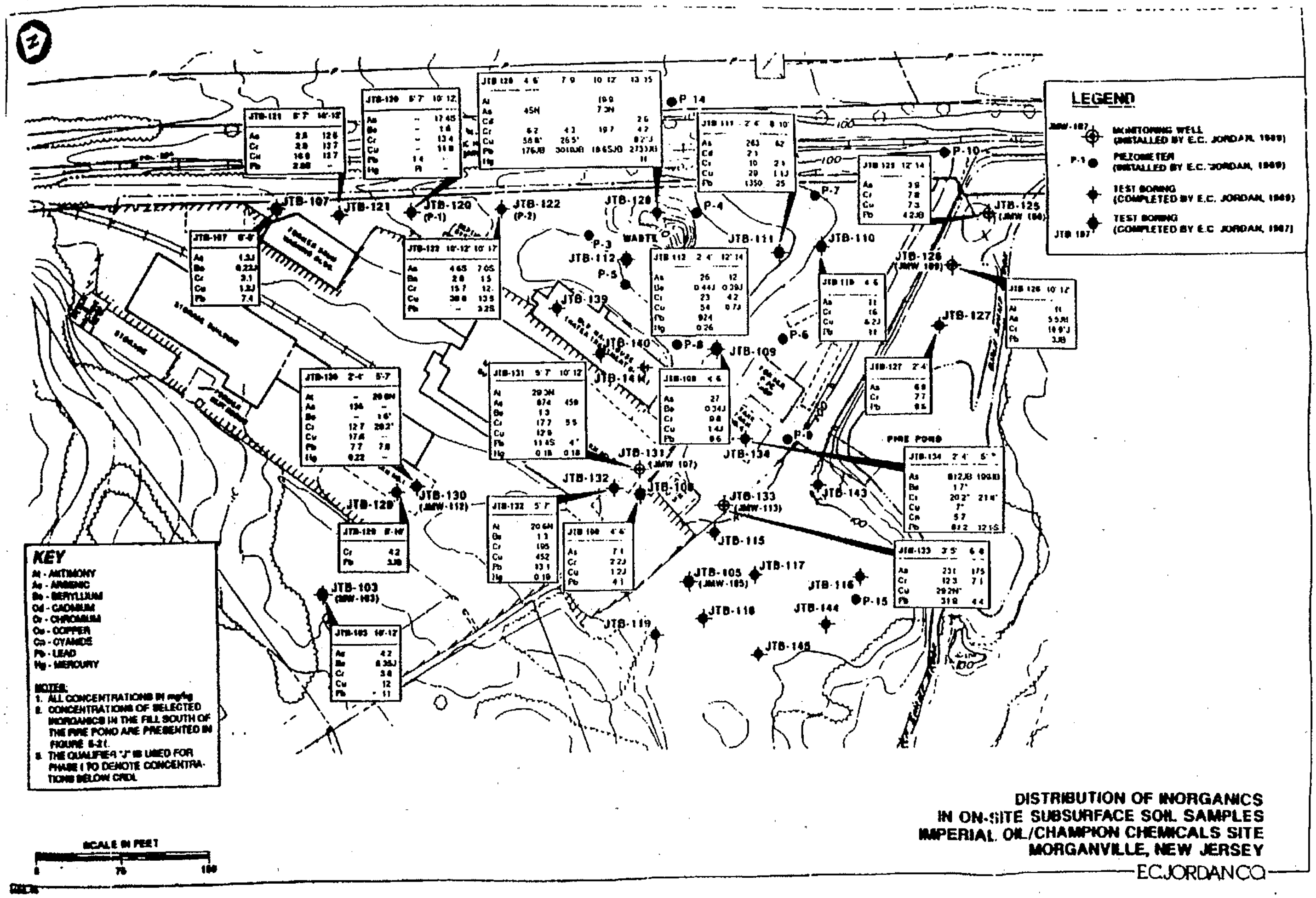
DISTRIBUTION OF TPH
IN ON-SITE SUBSURFACE SOIL SAMPLES
IMPERIAL OIL/CHAMPION CHEMICALS SITE
MORGANVILLE, NEW JERSEY
E.C.JORDAN CO.

Figure 10



LEGEND
KEY
DISTRIBUTION OF INORGANICS
IN ON-SITE SURFACE SOIL SAMPLES
IMPERIAL OIL/CHAMPION CHEMICALS SITE
MORGANVILLE, NEW JERSEY
E.C.JORDAN CO.

Figure 11



LEGEND
MONITORING WELL (INSTALLED BY E.C. JORDAN, 1989)
PIEZOMETER (INSTALLED BY E.C. JORDAN, 1989)
TEST BORING (COMPLETED BY E.C. JORDAN, 1989)
TEST BORING (COMPLETED BY E.C. JORDAN, 1987)
KEY
As - ARSENIC
Be - BERYLLIUM
Cd - CADMIUM
Cr - CHROMIUM
Cu - COPPER
Cn - CYANIDE
Pb - LEAD
Hg - MERCURY
NOTES:
1. ALL CONCENTRATIONS IN mg/kg
3. THE QUALIFIER "J" IS USED FOR PHASE I TO DENOTE CONCENTRATIONS BELOW CRDL
FIRE POND
SCALE IN FEET
0
75
150
DISTRIBUTION OF INORGANICS
IN ON-SITE SUBSURFACE SOIL SAMPLES
IMPERIAL OIL/CHAMPION CHEMICALS SITE
MORGANVILLE, NEW JERSEY
E.C.JORDAN CO.

Figure 12

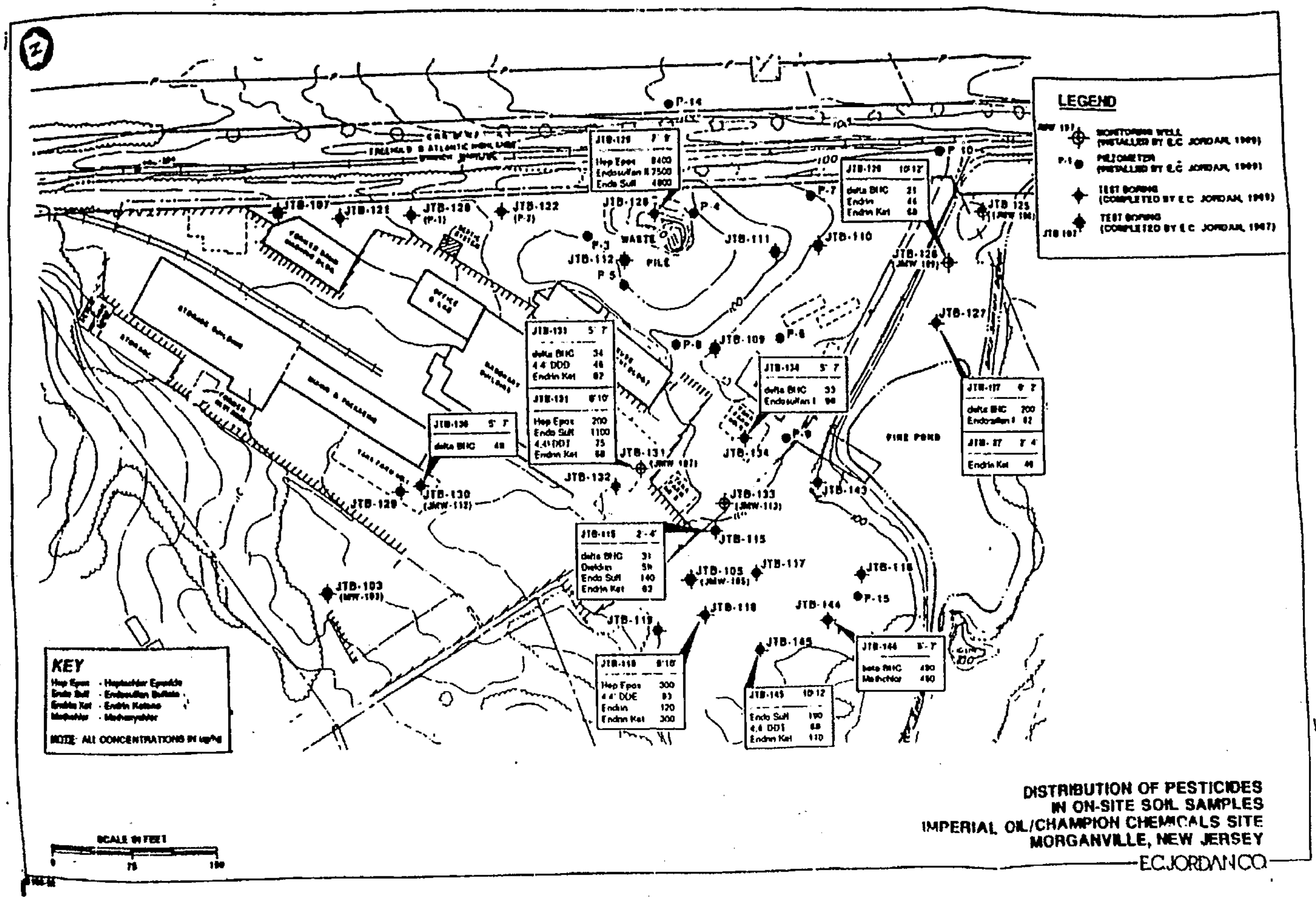
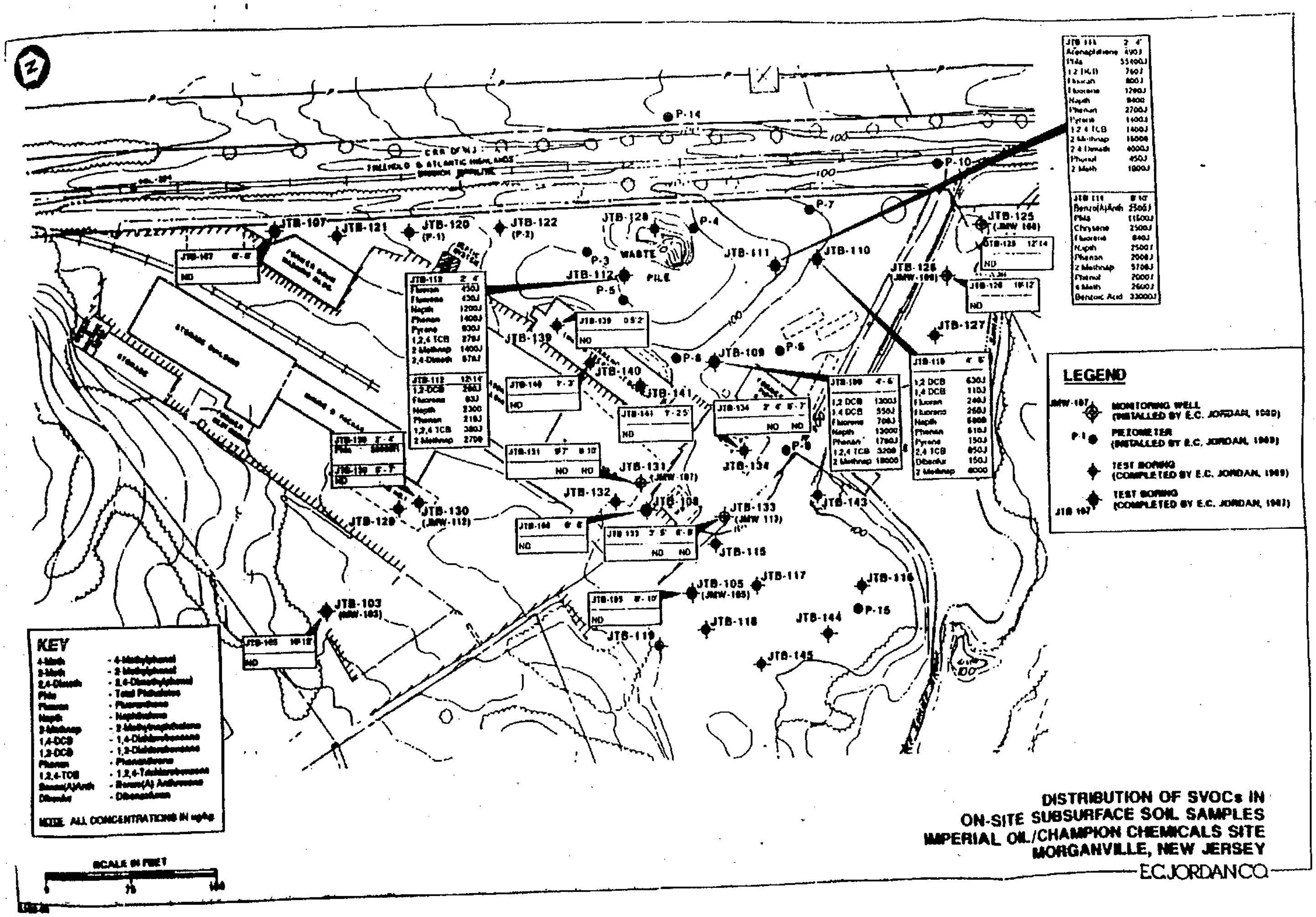
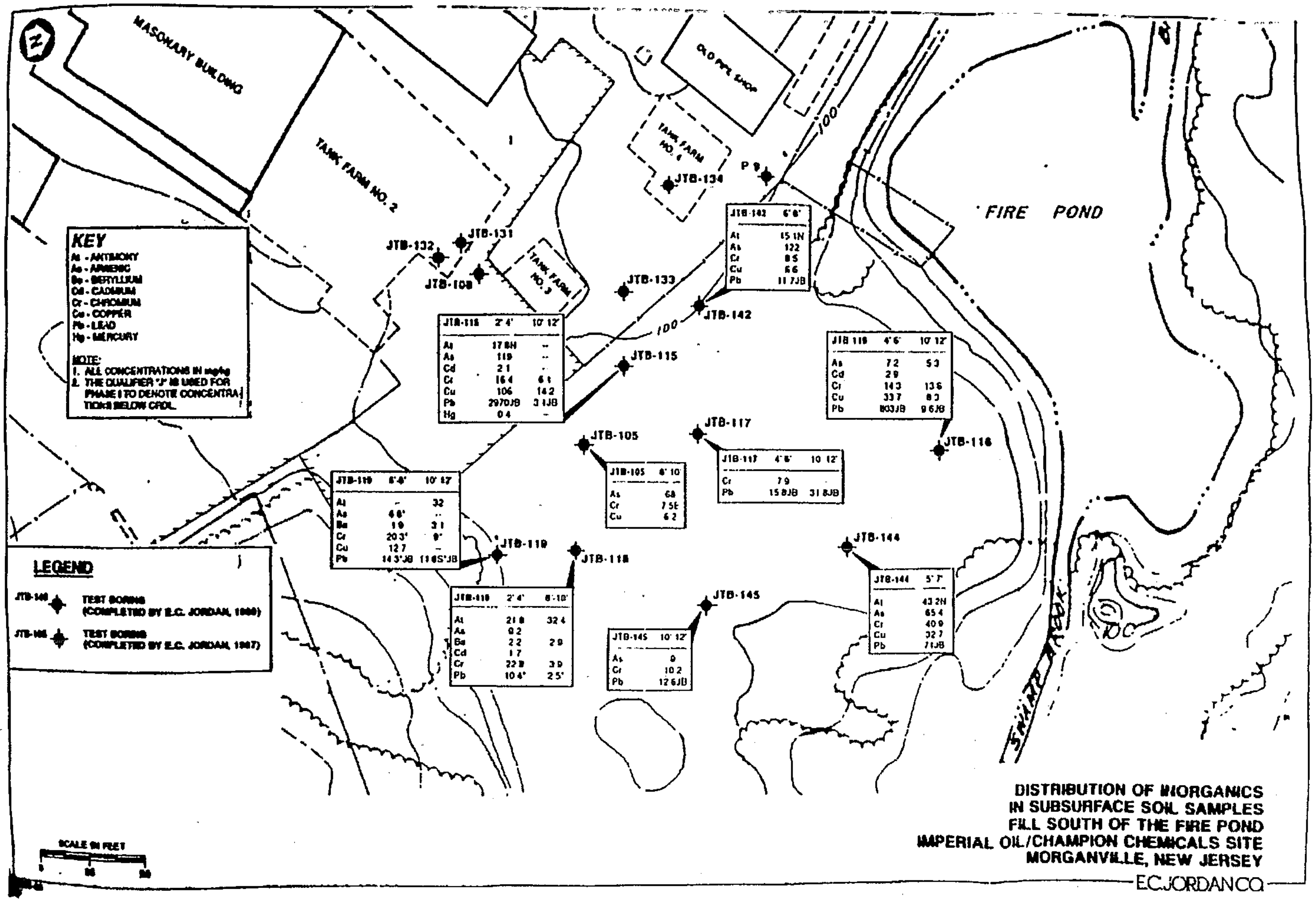

LEGEND
KEY
DISTRIBUTION OF PESTICIDES
IN ON-SITE SOIL SAMPLES
IMPERIAL OIL/CHAMPION CHEMICALS SITE
MORGANVILLE, NEW JERSEY
E.C.JORDAN CO.

Figure 13



DISTRIBUTION OF SVOCs IN
ON-SITE SUBSURFACE SOIL SAMPLES
IMPERIAL OIL/CHAMPION CHEMICALS SITE
MORGANVILLE, NEW JERSEY
E.C.JORDAN CO.
LEGEND
MONITORING WELL
PIEZOMETER
TEST BORING
TEST BORING
KEY
NOTE: ALL CONCENTRATIONS IN ug/kg
SCALE IN FEET
STORAGE BUILDING
STORAGE
WASTE
PILE
JTB-107
JTB-121
JTB-120
JTB-122
JTB-128
JTB-112
JTB-111
JTB-110
JTB-125
JTB-126
JTB-127
JTB-139
JTB-140
JTB-141
JTB-109
JTB-134
JTB-131
JTB-132
JTB-108
JTB-133
JTB-143
JTB-130
JTB-129
JTB-115
JTB-105
JTB-117
JTB-116
JTB-103
JTB-118
JTB-144
JTB-119
JTB-145
P-14
P-10
P-7
P-4
P-3
P-5
P-8
P-6
P-9
P-15

Figure 14



MASONARY BUILDING
TANK FARM NO. 2
OLD PIPE SHOP
TANK FARM NO. 4
TANK FARM NO. 3
FIRE POND
KEY
At - ANTIMONY
As - ARSENIC
Be - BERYLLIUM
Cd - CADMIUM
Cr - CHROMIUM
Cu - COPPER
Pb - LEAD
Hg - MERCURY
NOTE:
1. ALL CONCENTRATIONS IN mg/kg
2. THE QUALIFIER "J" IS USED FOR PHASE I TO DENOTE CONCENTRATIONS BELOW CRDL
JTB-132
JTB-131
JTB-108
JTB-133
JTB-134
P 9
JTB-142
JTB-115
JTB-105
JTB-117
JTB-116
JTB-119
JTB-118
JTB-144
JTB-145
100
JTB-115 2'4' 10' 12'
At 17 8H --
As 119 --
Cd 2 1 -
Cr 16 4 6 1
Cu 106 14 2
Pb 2970JB 3 1JB
Hg 0 4 -
JTB-142 6'8'
At 15 1N
As 122
Cr 8 5
Cu 6 6
Pb 11 7JB
JTB-116 4'6' 10' 12'
As 7 2 5 3
Cd 2 9
Cr 14 3 13 6
Cu 33 7 8 3
Pb 803JB 9 6JB
JTB-105 8' 10'
As 68
Cr 7 5E
Cu 6 2
JTB-117 4'6' 10' 12'
Cr 7 9 -
Pb 15 8JB 31 8JB
JTB-144 5'7'
At 43 2N
As 65 4
Cr 40 9
Cu 32 7
Pb 71JB
JTB-145 10' 12'
As 9
Cr 10 2
Pb 12 6JB
JTB-118 2'4' 8'-10'
At 21 8 32 4
As 9 2
Be 2 2 2 9
Cd 1 7
Cr 22 8 3 9
Pb 10 4' 2 5'
LEGEND
TEST BORING
TEST BORING
(COMPLETED BY E.C. JORDAN, 1987)
SCALE IN FEET
DISTRIBUTION OF INORGANICS
IN SUBSURFACE SOIL SAMPLES
FILL SOUTH OF THE FIRE POND
IMPERIAL OIL/CHAMPION CHEMICALS SITE
MORGANVILLE, NEW JERSEY
E.C.JORDAN CO.

Figure 15

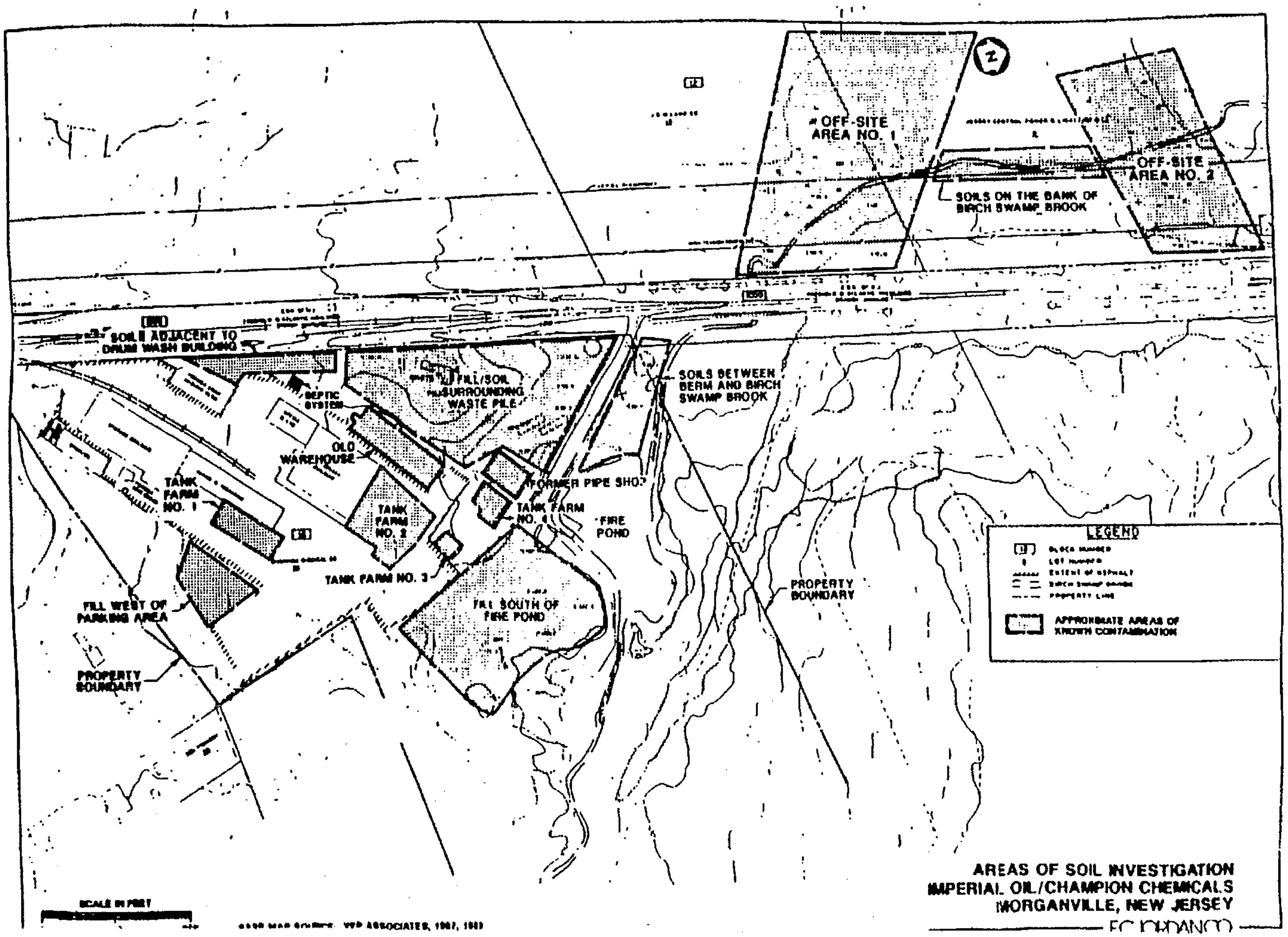

OFF-SITE AREA NO. 1
OFF-SITE AREA NO. 2
SOILS ON THE BANK OF BIRCH SWAMP BROOK
SOILS ADJACENT TO DRUM WASH BUILDING
FILL/SOIL SURROUNDING WASTE PILE
SEPTIC SYSTEM
SOILS BETWEEN BERM AND BIRCH SWAMP BROOK
OLD WAREHOUSE
FORMER PIPE SHOP
TANK FARM NO. 1
TANK FARM NO. 2
TANK FARM NO. 4
FIRE POND
TANK FARM NO. 3
FILL SOUTH OF FIRE POND
FILL WEST OF PARKING AREA
PROPERTY BOUNDARY
PROPERTY BOUNDARY
LEGEND
APPROXIMATE AREAS OF KNOWN CONTAMINATION
SCALE IN FEET
AREAS OF SOIL INVESTIGATION
IMPERIAL OIL/CHAMPION CHEMICALS
MORGANVILLE, NEW JERSEY
EC JORDAN CO

FIGURE 16

OU-3 DISTRIBUTION OF FLOATING PRODUCT

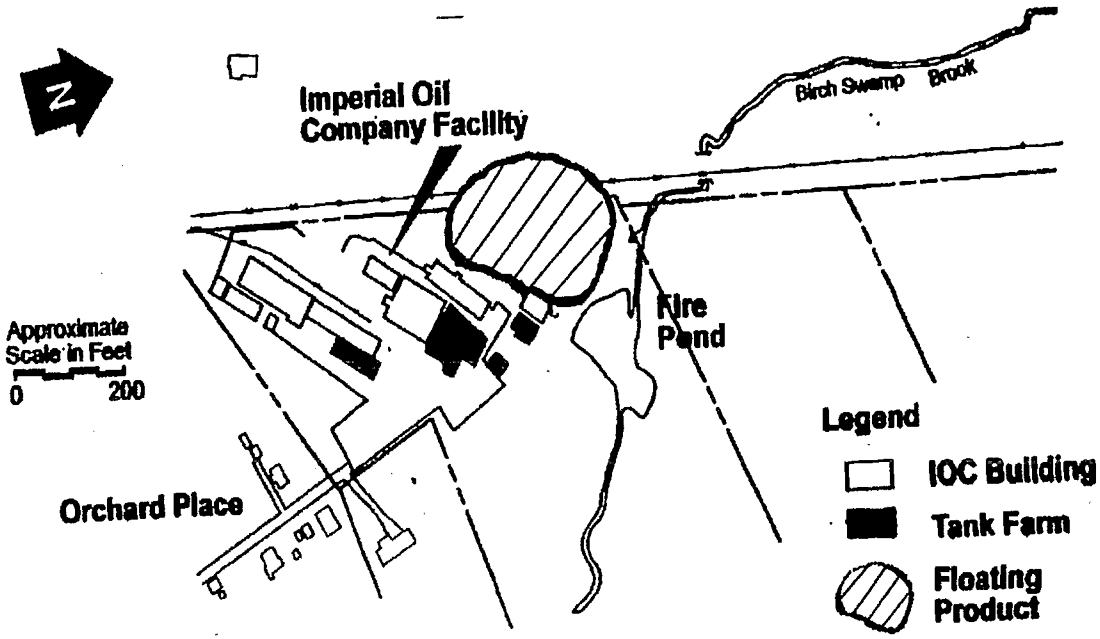
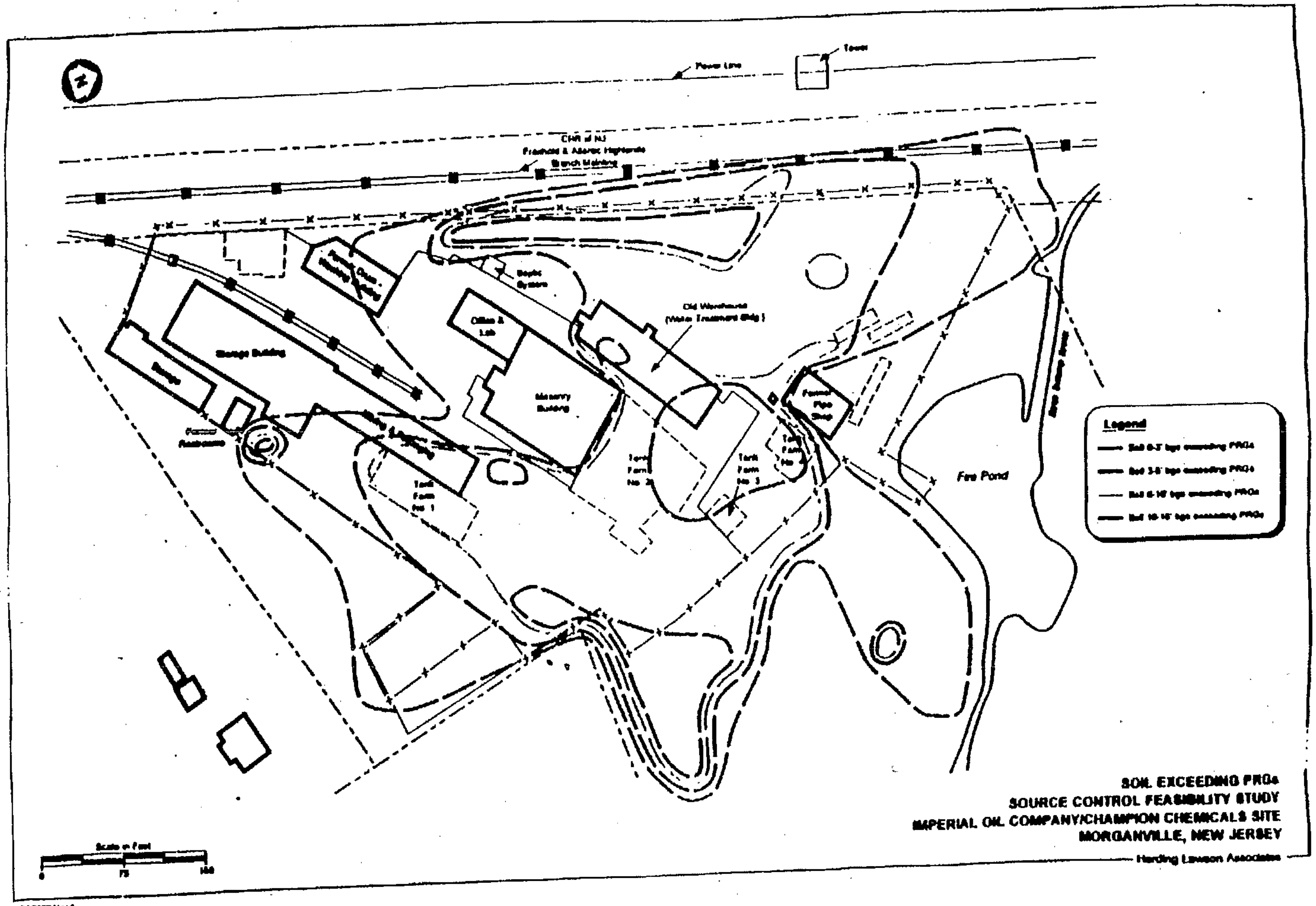


Figure 17


Power Line
Tower
CRR of NJ
Freehold & Atlantic Highlands
Branch Mainline
Septic System
Office & Lab
Old Warehouse
(Water Treatment Bldg.)
Storage Building
Storage
Masonry Building
Tank Farm No. 1
Fire Pond
Legend
SOIL EXCEEDING PRGs
SOURCE CONTROL FEASIBILITY STUDY
IMPERIAL OIL COMPANY/CHAMPION CHEMICALS SITE
MORGANVILLE, NEW JERSEY
Harding Lawson Associates
Scale in Feet
0
75
150

TABLES

Table 1
Summary of Results of Floating Product Analysis
December 1996

Parameter	Concentration (ppb)
Benzene	3,840
1,2-Dichlorobenzene	21,900
Ethylbenzene	48,400
Tetrachloroethylene	46,100
Toluene	1,460,000
Trichloroethylene	8,730
Total Xylenes	188,000
Butyl Benzyl phthalate	672,000
Di-n-butyl phthalate	88,300
Fluorene	14,800
Napthalene	147,000
Phenanthrene	48,300
1,2,4 Trichlorobenzene	78,700
Arsenic	3,600
Lead	15,300
PCBs	409,000

Table 2
Data Gap Investigation Results
Chemical Detected in the
Soils in Tank Farm No. 1

Chemicals	Concentration Range (ppm)
Volatile Organics	
Acetone	51
Semi-Volatile Organics	
Di-n-Butylphthalate	610
Bis(2-Ethylhexyl)phthalate	330
Pesticide/PCBs	
Alpha-BHC	2.5-95
Heptachlor	2.4-19
Aldrin	1.8-45
Heptachlor epoxide	17
Endosulfan I	7.2-7.5
4,4-DDE	2.8-23
Edrin	7.2
Endosulfan II	2.4-15
4,4-DDD	4-6.1
Endosulfan Sulfate	17
4,4-DDT	21
Edrin ketone	2.2-2.8
Edrin aldehyde	12-25
Alpha-Chlordane	1.6-12
Gamma-Chlordane	3.2
Arochlor-1248	1100
Arochlor-1260	120-900
Inorganics/TPHC	
Aluminum	810
Arsenic	2.7-486
Barium	4.7
Beryllium	0.1-8.8
Calcium	67.8
Chromium	2.8
Copper	2.5
Iron	1900
Lead	2.5-353

Table 2
Data Gap Investigation Results
Chemical Detected in the
Soils in Tank Farm No. 1 (con't)

Chemicals	Concentration Range (ppm)
Inorganics/TPHC (con't)	
Magnesium	65.6
Manganese	4.1
Nickel	0.87
Potassium	134
Vanadium	2.8
Zinc	8.9
Total Petroleum Hydrocarbon (TPHC)	130-37000

Table 2
Data Gap Investigation Results
Chemical Detected in the
Soils in Tank Farm No. 2

Chemicals	Concentration Range (ppm)
Volatile Organics	
Acetone	210
Tetrachloroethene	40
Toluene	45
Ethylbenzene	31
Xylene (total)	140
Pesticide/PCBs	
Alpha-BHC	37-310
Beta-BHC	26-240
Delta-BHC	1.9-15.
Gamma-BHC (Lindane)	10-82
Heptachlor	8.2-26
Aldrin	8.8-31
Heptachlor epoxide	1.6-22
Dieldrin	11-28
4,4-DDE	2.6-71
Edrin	14-70
Endosulfan II	6.4-300
4,4-DDD	14
4,4-DDT	2.4-140
Edrin ketone	60
Edrin aldehyde	10-170
Alpha-Chlordane	1.9
Gamma-Chlordane	1.1
Arochlor-1242	3000-5800
Arochlor-1260	1600-8000
Inorganics/TPHC	
Aluminum	3660
Antimony	1.1
Arsenic	7.8-216
Barium	301
Beryllium	1.3-6
Cadmium	0.45
Calcium	2230

Table 2
Data Gap Investigation Results
Chemical Detected in the
Soils in Tank Farm No. 2 (con't)

Chemicals	Concentration Range (ppm)
Inorganics/TPHC (con't)	
Chromium	48.4
Cobalt	21
Copper	286
Iron	11900
Lead	328-500
Magnesium	752
Manganese	98
Mercury	0.08
Nickel	88.8
Potassium	284
Selenium	1.3
Silver	0.35
Sodium	425
Vanadium	8.9
Zinc	1120
Total Petroleum Hydrocarbon (TPHC)	16000-55000

Table 2
Data Gap Investigation Results
Chemical Detected in the
Soils in Tank Farm No. 3 & 4

Chemicals	Concentration Range (ppm)
Volatile Organics	
Acetone	22
Trichloroethene	6
Tetrachloroethene	17
Toluene	-
Ethylbenzene	42
Xylene (total)	96
Semi-Organics	
Napthalene	2400
2-Methylnaphtalene	5000
Bis(2-Ethylhexyl)phthalate	1200
Pesticide/PCBs	
Alpha-BHC	2.0-2.5
Beta-BHC	-
Delta-BHC	-
Gamma-BHC (Lindane)	3.0
Heptachlor	-
Aldrin	1.4-33
Heptachlor epoxide	11-15
Endosulfan I	1.9-17
Dieldrin	5.9-8.4
4,4-DDE	3.1-17
Endrin	2.1-37
Endosulfan II	4.9-86
4,4-DDD	4.1-54
Endosulfan Sulfate	2.1-19
4,4-DDT	5.7-120
Edrin ketone	3.3-40
Edrin aldehyde	8.6-150
Alpha-Chlordane	2.1-27
Gamma-Chlordane	4.5-27
Arochlor-1242	190-2500
Arochlor-1260	120-2800

Table 2
Data Gap Investigation Results
Chemical Detected in the
Soils in Tank Farm No. 3 & 4 (con't)

Chemicals	Concentration Range (ppm)
Inorganics/TPHC (con't)	
Aluminum	4410
Antimony	-
Arsenic	7.4-6120
Barium	38.8
Beryllium	0.19-0.47
Cadmium	0.26
Calcium	1470
Chromium	22.8
Cobalt	2.3
Copper	36.8
Iron	18400
Lead	2-3720
Magnesium	923
Manganese	34.5
Mercury	0.04
Nickel	22.3
Potassium	645
Selenium	-
Silver	-
Sodium	93.3
Thallium	0.59
Vanadium	24.6
Zinc	45
Total Petroleum Hydrocarbon (TPHC)	73-72000

Table 2
Data Gap Investigation Results
Chemical Detected in the
Soils Beneath On-site Paved Areas

Chemicals	Concentration Range (ppm)
Volatile Organics	
Acetone	64-660
Carbon Disulfide	6-9
1,2 Dichloroethane	4
Chloroform	2
2-Butanone	53-110
Trichloroethene	680-1200
4-Methyl-2-Pentanone	56-58
Tetrachloroethene	-
Toluene	35-40
Ethylbenzene	19
Xylene (total)	130
Semi-Organics	
Napthalene	-
2-Methylnaphtalene	-
Di-n-Butylphthalate	320-520
Bis(2-Ethylhexyl)phthalate	380
Pesticide/PCBs	
Alpha-BHC	6.0-72
Beta-BHC	1.1-5.5
Delta-BHC	-
Gamma-BHC (Lindane)	3.4-11
Heptachlor	1.8
Aldrin	1.8-7.7
Heptachlor epoxide	2-3.1
Endosulfan I	1.1-17
Dieldrin	1.8-6.2
4,4-DDE	5.6-8.2
Endrin	3.5-14
Endosulfan II	4.2-50
4,4-DDD	2.4-7
Endosulfan Sulfate	4.4
4,4-DDT	2.5-48

Table 2
Data Gap Investigation Results
Chemical Detected in the
Soils Beneath On-site Paved Areas (con't)

Chemicals	Concentration Range (ppm)
Pesticide/PCBs	
Edrin ketone	3.6-9.3
Edrin aldehyde	6.6-35
Alpha-Chlordane	1.2-7.2
Gamma-Chlordane	1.4-1.9
Arochlor-1242	190-2500
Arochlor-1260	85-1500
Inorganics/TPHC	
Aluminum	1290-8250
Antimony	-
Arsenic	1.6-619
Barium	9.2-162
Beryllium	0.06-0.95
Cadmium	0.12-0.40
Calcium	188-1570
Chromium	5.5-22.6
Cobalt	0.91-10.8
Copper	3.7-25.8
Iron	10100-21900
Lead	1.3-253
Magnesium	69.9-679
Manganese	4.6-26.9
Mercury	0.04-734
Nickel	1.2-14.1
Potassium	264-2320
Selenium	0.75-1.7
Silver	-
Sodium	121
Thallium	1.2
Vanadium	12.2-54.9
Zinc	12-36
Total Petroleum Hydrocarbon (TPHC)	43-19000

Table 2
Data Gap Investigation Results
Chemical Detected in the
Fill Soils South of the Fire Pond
and
Tank Disposal Area

Chemicals	Concentration Range (ppm)
Volatile Organics	
Acetone	27
Carbon Disulfide	-
1,2 Dichloroethane	-
Chloroform	-
2-Butanone	-
Trichloroethene	-
4-Methyl-2-Pentanone	-
Tetrachloroethene	-
Toluene	-
Ethylbenzene	-
Xylene (total)	-
Semi-Organics	
Napthalene	-
2-Methylnaphtalene	-
Di-n-Butylphthalate	-
Bis(2-Ethylhexyl)phthalate	-
Pesticide/PCBs	
Alpha-BHC	-
Beta-BHC	-
Delta-BHC	-
Gamma-BHC (Lindane)	-
Heptachlor	-
Aldrin	-
Heptachlor epoxide	1.4
Endosulfan I	1.4-2.6
Dieldrin	-
4,4-DDE	4.7

Table 2
Data Gap Investigation Results
Chemical Detected in the
Fill Soils South of the Fire Pond
and
Tank Disposal Area (con't)

Chemicals	Concentration Range (ppm)
Pesticide/PCBs (con't)	
Endrin	2.9
Endosulfan II	7.0
4,4-DDD	1.9-13
Endosulfan Sulfate	-
4,4-DDT	36
Edrin ketone	-
Edrin aldehyde	4.2-18
Alpha-Chlordane	-
Gamma-Chlordane	-
Arochlor-1242	-
Arochlor-1260	26-260
Inorganics/TPHC	
Aluminum	9990
Antimony	-
Arsenic	3.4-24.7
Barium	56
Beryllium	0.6-1.2
Cadmium	0.16
Calcium	2550
Chromium	21.5
Cobalt	17.5
Copper	16.5
Iron	19400
Lead	5.2-50.2
Magnesium	2930
Manganese	503
Mercury	-
Nickel	26
Potassium	3360

Table 2
Data Gap Investigation Results
Chemical Detected in the
Fill Soils South of the Fire Pond
and
Tank Disposal Area (con't)

Chemicals	Concentration Range (ppm)
Inorganics/TPHC (con't)	
Selenium	-
Silver	-
Sodium	118
Thallium	-
Vanadium	38.3
Zinc	100
Total Petroleum Hydrocarbon (TPHC)	49-98

Table 2
Data Gap Investigation Results
Chemical Detected in the
Near Old Warehouse

Chemicals	Concentration Range (ppm)
Volatile Organics	
Acetone	160
Carbon Disulfide	-
1,2 Dichloroethane	-
Chloroform	-
2-Butanone	-
Trichloroethene	-
4-Methyl-2-Pentanone	-
Tetrachloroethene	-
Toluene	-
Ethylbenzene	-
Xylene (total)	-
Semi-Organics	
Naphthalene	2400
2-Methylnaphtalene	5000
Di-n-Butylphthalate	-
Pyrene	-
Bis(2-Ethylhexyl)phthalate	-
Pesticide/PCBs	
Alpha-BHC	-
Beta-BHC	-
Delta-BHC	-
Gamma-BHC (Lindane)	-
Heptachlor	-
Aldrin	28-140
Heptachlor epoxide	130
Endosulfan I	21-71
Dieldrin	6.1-25
4,4-DDE	12-47
Endrin	28-120
Endosulfan II	32-66

Table 2
Data Gap Investigation Results
Chemical Detected in the
Near Old Warehouse (con't)

Chemicals	Concentration Range (ppm)
Pesticide/PCBs (con't)	
4,4-DDD	4.4-7.6
Endosulfan Sulfate	-
4,4-DDT	33-110
Endrin Ketone	15-22
Endrin Aldehyde	20-36
Alpha-Chlordane	11-72
Gamma-Chlordane	2.6-98
Arochlor-1242	1300-9900
Arochlor-1248	-
Arochlor-1254	3000
Arochlor-1260	940-1900
Inorganics/TPHC	
Aluminum	4360
Antimony	-
Arsenic	115-368
Barium	17
Beryllium	0.21-0.44
Cadmium	0.19
Calcium	946
Chromium	29.6
Cobalt	8.5
Copper	17.2
Iron	13200
Lead	10.8-44.7
Magnesium	290
Manganese	16.6
Mercury	-
Nickel	8.7
Potassium	839

Table 2
Data Gap Investigation Results
Chemical Detected in the
Near Old Warehouse (con't)

Chemicals	Concentration Range (ppm)
Inorganics/TPHC (con't)	
Selenium	-
Silver	-
Sodium	80.9
Thallium	-
Vanadium	35.2
Zinc	17.3
Total Petroleum Hydrocarbon (TPHC)	6500-40000

Table 2
Data Gap Investigation Results
Chemical Detected in the
Southwest of Parking Area

Chemicals	Concentration Range (ppm)
Volatile Organics	
Acetone	-
Carbon Disulfide	-
1,2 Dichloroethane	-
Chloroform	-
2-Butanone	-
Trichloroethene	-
4-Methyl-2-Pentanone	-
Tetrachloroethene	-
Toluene	-
Ethylbenzene	-
Xylene (total)	-
Semi-Organics	
Napthalene	-
2-Methylnaphtalene	-
Di-n-Butylphthalate	-
Bis(2-Ethylhexyl)phthalate	-
Pesticide/PCBs	
Alpha-BHC	-
Beta-BHC	-
Delta-BHC	-
Gamma-BHC (Lindane)	-
Heptachlor	-
Aldrin	-
Heptachlor epoxide	1.5
Endosulfan I	-
Dieldrin	-
4,4-DDE	-

Table 2
Data Gap Investigation Results
Chemical Detected in the
Southwest of Parking Area (con't)

Chemicals	Concentration Range (ppm)
Pesticide/PCBs (con't)	
Endrin	-
Endosulfan II	-
4,4-DDD	-
Endosulfan Sulfate	-
4,4-DDT	-
Edrin ketone	-
Edrin aldehyde	-
Alpha-Chlordane	-
Gamma-Chlordane	-
Arochlor-1242	-
Arochlor-1260	-
Inorganics/TPHC	
Aluminum	12200
Antimony	0.89
Arsenic	9-17.6
Barium	32.1
Beryllium	0.39-1.1
Cadmium	0.14
Calcium	649
Chromium	19.8
Cobalt	1.2
Copper	14.3
Iron	22200
Lead	1-25.2
Magnesium	616
Manganese	18.5
Mercury	-
Nickel	1.9
Potassium	1320
Selenium	-
Silver	-
Sodium	-
Thallium	-
Vanadium	50
Zinc	20
Total Petroleum Hydrocarbon (TPHC)	44-120

Table 2
Data Gap Investigation Results
Chemical Detected in the
Outside Northwest Fenceline

Chemicals	Concentration Range (ppm)
Volatile Organics	
Acetone	68
Carbon Disulfide	-
1,2 Dichloroethane	-
Chloroform	-
2-Butanone	-
Trichloroethene	-
4-Methyl-2-Pentanone	-
Tetrachloroethene	-
Toluene	14
Ethylbenzene	18
Xylene (total)	170
Semi-Organics	
Napthalene	-
2-Methylnaphtalene	-
Di-n-Butylphthalate	-
Pyrene	1100
Bis(2-Ethylhexyl)phthalate	-
Pesticide/PCBs	
Alpha-BHC	1.2
Beta-BHC	13
Delta-BHC	1.6-48
Gamma-BHC (Lindane)	41
Heptachlor	2.0-25
Aldrin	9-250
Heptachlor epoxide	5.2-290
Endosulfan I	5.3-240
Dieldrin	3.1-41
4,4-DDE	4.9-140
Endrin	2.7-250
Endosulfan II	14-270

Table 2
Data Gap Investigation Results
Chemical Detected in the
Outside Northwest Fenceline (con't)

Chemicals	Concentration Range (ppm)
Pesticide/PCBs (con't)	
4,4-DDD	4.4-26
Endosulfan Sulfate	3.9
4,4-DDT	12-230
Endrin Ketone	6.1-91
Endrin Aldehyde	13-250
Alpha-Chlordane	6.2-110
Gamma-Chlordane	3.0-14
Arochlor-1242	460-14000
Arochlor-1248	1500-10000
Arochlor-1260	300-7500
Inorganics/TPHC	
Aluminum	4470
Antimony	-
Arsenic	8.5-202
Barium	11.8
Beryllium	0.08-1.3
Cadmium	-
Calcium	493
Chromium	13
Cobalt	.75
Copper	9.3
Iron	10700
Lead	6.5-183
Magnesium	678
Manganese	19.8
Mercury	-
Nickel	1.7
Potassium	1610
Selenium	-
Silver	-
Sodium	-
Thallium	-
Vanadium	16.8
Zinc	15.5
Total Petroleum Hydrocarbon (TPHC)	520-49000

Table 3.1: Summary of COPCs and Exposure Point Concentrations
Imperial Oil - Tank Farm

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Soil/Tank Farm

Exposure Point	Chemical of Chemical	Minimum Concentration	Maximum Concentration	Units	Detection Frequency	Exposure Point Concentration	Statistical Measure
Soils in the Tank Farm Area	Aluminum	<10	9,800	mg/kg	2/4	9,800	MAX
	Arsenic	<2	231	mg/kg	3/4	231	MAX
	Beryllium	<1	1.7	mg/kg	2/4	1.7	MAX
	Cadmium	<1	1.1	mg/kg	1/4	1.1	MAX
	Chromium	12.3	28	mg/kg	4/4	28	MAX
	Copper	7	116	mg/kg	4/4	116	MAX
	Iron	<10	20800	mg/kg	2/4	20800	MAX
	Manganese	11.5	302	mg/kg	4/4	302	MAX
	Mercury	<0.02	0.22	mg/kg	1/4	0.22	MAX
	Vanadium	15.6	34.5	mg/kg	3/3	34.5	MAX

ug/kg: micrograms per kilogram: parts per billion
mg/kg: milligrams per likogram: parts per million
MAX Maximum Detected Concentration
95% UCL. 95% Upper Confidence Limit of the Mean

Table 3.2: Summary of COPCs and Exposure Point Concentrations
Imperial Oil - Fenced Portion of the Site

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Soil/Fenced Portion of the Site

Exposure Point	Chemical of Concern	Minimum Concentration	Maximum Concentration	Units	Detection Frequency	Exposure Point Concentration	Statistical Measure*
Soils in the Fenced Portion of the Site	Antimony	<6	13	mg/kg	1/19	4	95% UCL
	Arsenic	1.3	283	mg/kg	19/19	278	95% UCL
	Barium	6.7	668	mg/kg	19/19	280	95% UCL
	Beryllium	<0.5	1.3	mg/kg	10/19	0.48	95% UCL
	Cadmium	<0.5	2.1	mg/kg	3/19	0.65	95% UCL
	Chromium	4.6	463	mg/kg	19/19	65	95% UCL
	Copper	0.81	1020	mg/kg	19/19	335	95% UCL
	Iron	<10	29800	mg/kg	4/19	29800	Max
	Lead	<0.5	1350	mg/kg	15/19	1350	Max
	Manganese	3.5	189	mg/kg	19/19	55	95% UCL
	Mercury	<0.02	0.26	mg/kg	4/19	0.12	95% UCL
	Benzene	<5	140	ug/kg	7/19	23	95% UCL
	Total Xylenes	<5	1900	ug/kg	10/19	1900	Max
	Benzo[a]anthracene	<330	530	ug/kg	3/19	209	95% UCL
	Benzo[a]pyrene	<330	270	ug/kg	2/19	180	95% UCL
	Benzo[b]fluoranthene	<330	510	ug/kg	2/19	203	95% UCL
	bis(2-Ethylhexyl)phthalate	<330	17500	ug/kg	4/19	2341	95% UCL
	Indeno[123-cd]pyrene	<330	84	ug/kg	1/19	84	Max
	Naphthalene	<330	13000	ug/kg	9/19	13000	Max
	N-nitrosodimethylamine	<330	40	ug/kg	1/19	40	Max
	Pentachlorophenol	<330	38000	ug/kg	2/19	2491	95% UCL
	Aroclor 1242	<80	11000	ug/kg	16/19	11000	Max
	Aroclor 1260	<[illegible]	13000	ug/kg	16/19	13000	Max

ug/kg: micrograms per kilogram; parts per billion
mg/kg milligrams per kilogram; parts per million
MAX Maximum Detected Concentration
95% UCL 95% Upper Confidence Limit of the Mean
*The Statistical Measure is the lower value of the 95% UCL or the Maximum Detected Concentration.

Table 3.3: Summary of COPCs and Exposure Point Concentrations
Imperial Oil - Soils Under the Old Warehouse

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Soil/Under the Old Warehouse

Exposure Point	Chemical of Concern	Minimum Concentration	Maximum Concentration	Units	Detection Frequency	Exposure Point Concentration	Statistical Measure
Soils Under the Old Warehouse	Aluminum	4820	6,420	mg/kg	3/3	6,420	MAX
	Antimony	<12	31	mg/kg	2/3	31	MAX
	Arsenic	201	464	mg/kg	3/3	464	MAX
	Barium	<40	129	mg/kg	2/3	129	MAX
	Beryllium	<1	3.3	mg/kg	2/3	3.3	MAX
	Chromium	10.2	57.4	mg/kg	3/3	57.4	MAX
	Copper	<5	206	mg/kg	1/3	206	MAX
	Manganese	23	111	mg/kg	3/3	111	MAX
	Mercury	0.13	1.1	mg/kg	3/3	1.1	MAX
	Vanadium	19	36.7	mg/kg	3/3	36.7	MAX
	Total Xylenes	<5	3300	ug/kg	1/3	3300	MAX
	Aroclor 1016	<80	9000	ug/kg	2/3	9000	MAX
	Aroclor 1260	1900	7000	ug/kg	3/3	7000	MAX

ug/kg: micrograms per kilogram: parts per billion
mg/kg: milligrams per kilogram: parts per million
MAX Maximum Detected Concentration
95% UCL: 95% Upper Confidence Limit of the Mean

Table 3.4: Summary of COPCs and Exposure Point Concentrations
Imperial Oil - Soils in the Waste Pile

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Soil/Waste Pile

Exposure Point	Chemical	Minimum Concentration	Maximum Concentration	Units	Detection Frequency	Exposure Point Concentration	Statistical Measure
Soils in the Waste Pile	Arsenic	6.1	7	mg/kg	3/3	7	MAX
	Barium	248	676	mg/kg	3/3	676	MAX
	Beryllium	<0.5	0.83	mg/kg	2/3	0.83	MAX
	Chromium	9.3	32	mg/kg	3/3	32	MAX
	Copper	42	45	mg/kg	3/3	45	MAX
	Iron	5510	7050	mg/kg	3/3	7050	MAX
	Manganese	33	172	mg/kg	3/3	172	MAX
	Benzo[a]anthracene	<330	4700	ug/kg	2/3	4700	MAX
	Benzo[a]pyrene	<330	5600	ug/kg	1/3	5600	MAX
	Benzo[b]fluoranthene	<330	4700	ug/kg	1/3	4700	MAX
	Benzo[k]fluoranthene	<330	4700	ug/kg	1/3	4700	MAX
	Naphthalene	<330	1400	ug/kg	1/3	1400	MAX
	Aroclor 1242	<80	43000	ug/kg	2/3	43000	MAX
	Aroclor 1248	<80	5200	ug/kg	1/3	5200	MAX
	Aroclor 1260	9600	80000	ug/kg	3/3	80000	MAX

ug/kg micrograms per kilogram: parts per billion
mg/kg milligrams per likogram: parts per million
MAX Maximum Detected Concentration
95% UCL 95% Upper Confidence Limit of the Mean

Table 3.5: Summary of COPCs and Exposure Point Concentrations
Imperial Oil - Surface Soils Outside the Imperial Oil Facility

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Soil/Surface Soils Outside the Imperial Oil Facility

Exposure Point	Chemical of Concern	Minimum Concentration	Maximum Concentration	Units	Detection Frequency	Exposure Point Concentration	Statistical Measure
Surface Soils Outside the Imperial Oil Facility	Aluminum	<20	8,380	mg/kg	1/8	8,380	MAX
	Antimony	<6	26	mg/kg	1/7	26	MAX
	Arsenic	<2	73.5	mg/kg	6/8	73.5	MAX
	Barium	<40	229	mg/kg	5/8	229	MAX
	Beryllium	<0.5	1.7	mg/kg	8/8	1.7	MAX
	Cadmium	<0.5	1.5	mg/kg	1/8	1.5	MAX
	Chromium	12.4	428	mg/kg	8/8	428	MAX
	Copper	<5	236	mg/kg	6/8	236	MAX
	Iron	<20	31200	mg/kg	4/8	31200	MAX
	Lead	<0.5	534	mg/kg	6/8	534	MAX
	Manganese	<3	87.9	mg/kg	7/8	0.43	MAX
	Mercury	<0.02	0.43	mg/kg	3/8	1.2	MAX
	Vanadium	2	26.3	mg/kg	5/6	26.3	MAX
	Benzo[a]anthracene	<330	110	ug/kg	1/3	110	MAX
	Benzo[b]fluoranthene	<330	110	ug/kg	1/3	110	MAX
	Benzo[k]fluoranthene	<330	110	ug/kg	1/3	110	MAX
	d-BHC	<8	200	ug/kg	1/6	200	MAX
	Aroclor 1242	<80	2500	ug/kg	1/8	2500	MAX
	Aroclor 1260	<160	2600	ug/kg	5/8	2600	MAX

ug/kg: micrograms per kilogram; parts per billion
mg/kg: milligrams per likogram; parts per million
MAX Maximum Detected Concentration
95% UCL 95% Upper Confidence Limit of the Mean

Table 3.6: Summary of COPCs and Exposure Point Concentrations
Imperial Oil - Onsite Residential Use

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Soil/Onsite Residential Use

Exposure Point	Chemical	Minimum Concentration	Maximum Concentration	Units	Detection Frequency	Exposure Point Concentration	Statistical Method*
Onsite Residential Use	Aluminum	<20	8,380	mg/kg	8/24	8,380	Max
	Antimony	<6	26	mg/kg	3/23	8	95% UCL
	Arsenic	<20	464	mg/kg	22/24	336	95% UCL
	Barium	<40	229	mg/kg	20/24	118	95% UCL
	Beryllium	<0.5	3.3	mg/kg	13/24	1.2	95% UCL
	Cadmium	<0.5	1.9	mg/kg	5/24	0.69	95% UCL
	Chromium	3.7	463	mg/kg	24/24	103	95% UCL
	Iron	<10	31200	mg/kg	8/24	31200	Max
	Lead	<0.5	534	mg/kg	18/24	534	Max
	Manganese	<3	302	mg/kg	23/24	138	95% UCL
	Mercury	<0.02	1.1	mg/kg	8/24	0.44	95% UCL
	Silver	<1	6.1	mg/kg	4/24	1.8	95% UCL
	Vanadium	<10	36.7	mg/kg	7/8	39	95% UCL
	Total Xylenes	<5	1000	ug/kg	6/17	226	95% UCL
	Benzo[a]anthracene	<330	530	ug/kg	5/18	231	95% UCL
	Benzo[a]pyrene	<330	270	ug/kg	2/18	181	95% UCL
	Benzo[b]fluoranthene	<330	510	ug/kg	3/18	205	95% UCL
	Benzo[k]fluoranthene	<330	510	ug/kg	3/18	205	95% UCL
	bis(2-Ethylhexyl)phthalate	<330	17500	ug/kg	6/18	2853	95% UCL
	Indeno[123-cd]pyrene	<330	84	ug/kg	1/18	84	Max
	Naphthalene	<330	8400	ug/kg	5/18	8400	Max
	N-nitrosodimethylamine	<330	40	ug/kg	1/18	40	Max
	Pentachlorophenol	<330	38000	ug/kg	2/18	2950	95% UCL
	δ-BHC	<8	200	ug/kg	1/7	200	Max
	Aroclor 1242	<80	4100	ug/kg	11/23	4100	Max
	Aroclor 1260	<160	7000	ug/kg	17/23	7000	Max

ug/kg micrograms per kilogram; parts per billion
mg/kg milligra Minimum/maximum detected concentration.
MAX Maximum Detected Concentration
95% UCL 95% Upper Confidence Limit of the Mean
*The Statistical Measure is the lower value of the 95% UCL or the Maximum Detected Concentration.

Table 4

Selection of Exposure Pathways

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Onsite/ Offsite	Rationale for Selection/Exclusion of Exposure Pathway
Current/ Future	Soil	Soil	Tank Farm	Facility Maintenance Workers	Adult	Ingestion	Onsite	Area of IOC/CC site which is frequented by Facility Maintenace Workers
				Facility Maintenance Workers	Adult	Dermal Contact	Onsite	Area of the IOC/CC site which is frequented by Facility Maintenance Workers
			Fenced Portion of the Site	Utility Workers	Adult	Ingestion	Onsite	Restricted area of the IOC/CC site which is frequented by Utility Workers
				Utility Workers	Adult	Dermal Contact	Onsite	Restricted area of the IOC/CC site which is frequented by Utility Workers
			Soils Under the Old Warehouse	Construction/ Excavation Workers	Adult	Ingestion	Onsite	Area of the IOC/CC site which is accessible only to Construction/Excavation Workers
				Construction/ Excavation Workers	Adult	Dermal Contact	Onsite	Area of the IOC/CC site which is accessible only to Construction/Excavation Workers
			Soils in the Waste Pile	Industrial/ Facility Workers	Adult	Ingestion	Onsite	Industrial/Facility Maintenance Workers have access to this area of the site
				Industrial/ Facility Workers	Adult	Dermal Contact	Onsite	Industrial/Facility Maintenance Workers have access to this area of the site
			Surface Soils Outside the IOC/CC Facility	Child Trespassers/ Recreators	Child	Ingestion	Onsite	Areas outside the IOC/CC Facility are accessible to recreators and trespassers
				Child Trespassers/ Recreators	Child	Dermal Contact	Onsite	Areas outside the IOC/CC Facility are accessible to recreators and trespassers
			Onsite Soils	Future Residents	Adult	Ingestion	Onsite	Potential future residential use
				Future Residents	Adult	Dermal Contact	Onsite	Potential future residential use
			Onsite Soils	Future Residents	Child	Ingestion	Onsite	Potential future residential use
				Future Residents	Child	Dermal Contact	Onsite	Potential future residential use

Summary of Selection of Exposure Pathways

The table presents all exposure pathways considered for the risk assessment, and the rationale for the inclusion or exclusion of each pathway. Exposure media, exposure points, and characteristics of receptor populations are included.

Table 5

Non-Cancer Toxicity Data Summary

-Ingestion, Dermal Contact

Chemical of Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Absorption Efficiency (for Dermal)	Adjusted RfD (for Dermal)	Adjusted Dermal RfD Units	Primary Target Organ	Combined Uncertainty// Modifying Factors	Sources of RfD: Target Organ	Dates of RfD:
Aluminum	Chronic	1E+00	mg/kg-day			mg/kg-day	CNS	100	NCEA	08/25/99
Antimony	Chronic	4E-04	mg/kg-day	0.15	6E-05	mg/kg-day	Blood	1000	IRIS	08/25/99
Arsenic	Chronic	3E-04	mg/kg-day	0.95	3E-04	mg/kg-day	Skin	3	IRIS	08/25/99
Barium	Subchronic	7E-02	mg/kg-day	0.07	4.9E-03	mg/kg-day	NOAEL	3	IRIS	08/25/99
Beryllium	Chronic	2E-03	mg/kg-day	0.007	1.4E-05	mg/kg-day	Small Intestine	300	IRIS	08/25/99
Cadmium	Chronic	1E-03	mg/kg-day	0.025	2.5E-05	mg/kg-day	Kidney	10	IRIS	08/25/99
Chromium	Chronic	3E-03	mg/kg-day	0.025	7.5E-05	mg/kg-day	NOAEL	300	IRIS	08/25/99
Copper	Chronic	4E-02	mg/kg-day			mg/kg-day	-	-	HEAST	08/25/99
Iron	Chronic	3E-01	mg/kg-day			mg/kg-day	Liver	1	NCEA	08/25/99
Manganese	Chronic	2E-02	mg/kg-day	0.04-0.06	8E-04	mg/kg-day	CNS	1	IRIS	08/25/99
Mercury	Subchronic	1E-04	mg/kg-day	0.95	1E-04	mg/kg-day	CNS	10	IRIS	08/25/99
Silver	Chronic	5E-03	mg/kg-day	0.04	2E-04	mg/kg-day	Skin	3	IRIS	08/25/99
Vanadium	Chronic	7E-03	mg/kg-day	0.026	[illegible] 8E-04	mg/kg-day	NOAEL	100	HEAST	08/25/99
Benzene	Chronic	1E-03	mg/kg-day			mg/kg-day	Liver	1000	NCEA	08/25/99
Total Xylenes	Chronic	2E+00	mg/kg-day			mg/kg-day	CNS	100	IRIS	08/25/99
Benzo[a]-anthracene		NA	mg/kg-day	0.89		mg/kg-day				08/25/99
Benzo[a]-pyrene		NA	mg/kg-day	0.89		mg/kg-day				08/25/99
Benzo[b]-fluoranthene		NA	mg/kg-day	0.89		mg/kg-day				08/25/99
Benzo[k]-fluoranthene		NA	mg/kg-day	0.89		mg/kg-day				08/25/99
bis(2-Ethyl-hexyl)phthalate	Chronic	2E-02	mg/kg-day	0.89	2E-02	mg/kg-day	Liver	1000	IRIS	08/25/99
Indeno(123-cd)pyrene		NA	mg/kg-day	0.89		mg/kg-day				08/25/99
Naphthalene	Subchronic	2E-02	mg/kg-day			mg/kg-day	Body Weight	3000	IRIS	08/25/99
N-Nitroso dimethylamine		NA	mg/kg-day			mg/kg-day				08/25/99
Pentachloro-phenol	Chronic	3E-02	mg/kg-day	0.76	3E-02	mg/kg-day	Liver/ Kidney	100	IRIS	08/25/99
a-BHC	Subchronic	3E-04	mg/kg-day			mg/kg-day	Liver	1000	IRIS	08/25/99
Aroclor 1016	Subchronic	7E-05	mg/kg-day	0.80-0.96	7E-05	mg/kg-day	Developmental	100	IRIS	08/25/99
Aroclor 1242	Subchronic	2E-05	mg/kg-day	0.80-0.96	2E-05	mg/kg-day	Immunological	300	IRIS	08/25/99
Aroclor 1248	Subchronic	2E-05	mg/kg-day	0.80-0.96	2E-05	mg/kg-day	Immunological	300	IRIS	08/25/99
Aroclor 1260	Subchronic	2E-05	mg/kg-day	0.80-0.96	2E-05	mg/kg-day	Immunological	300	IRIS	08/25/99

Key to Table 5

NA. No information available
IRIS. Integrated Risk Information System, U.S. EPA
HEAST. Health Effects Assessment Summary Tables, U.S. EPA
NCEA: National Center for Environmental Assessment, U.S. EPA

Summary of Toxicity Assessment

This table provides non-carcinogenic risk information which is relevant to the contaminants of concern in soil. Consistent with draft EPA Guidance for Dermal Risk Assessment, oral toxicity data were not adjusted for those chemicals for which the oral absorption fraction exceeds 50%.

Table 6.1

Risk Characterization Summary - Noncarcinogens

Scenario Timeframe: Current
Receptor Population: Facility Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Noncarcinogenic Hazard Quotient		
					Ingestion	Dermal	Exposure Routes Total
Soil	Soil	Tank Farm	Aluminum	CNS	1 2E-03		1 2E-03
			Arsenic	Skin	9 0E-02	1 6E-01	2 5E-01
			Beryllium	Small Intestine	1 0E-04		1 0E-04
			Cadmium	Kidney	1 3E-04	3 0E-04	4 3E-04
			Chromium	NOAEL	1 1E-03		1 1E-03
			Copper	-	3 4E-04		3 4E-04
			Iron	Liver	8 1E-03		8 1E-03
			Manganese	CNS	1 8E-03		1 8E-03
			Mercury	CNS	2 6E-04		2 6E-04
			Vanadium	NOAEL	5 8E-04		5 8E-04
						TOTAL RISK:	2.6E-01

Table 6.2

Risk Characterization Summary - Noncarcinogens

Scenario Timeframe: Current
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Noncarcinogenic Hazard Quotient		
					Ingestion	Dermal	Exposure Routes Total
Soil	Soil	Fenced Portion of the Site	Antimony	Blood	4.7E-04		4 7E-04
			Arsenic	Skin	4 4E-02	7.5E-02	1 2E-01
			Barium	NOAEL	1.9E-04		1 9E-04
			Beryllium	Small Intestine	1.1E-05		1 1E-05
			Cadmium	Kidney	3 1E-05	7.0E-05	1 0E-04
			Chromium	NOAEL	1 0E-03		1 0E-03
			Copper	-	3 9E-04		3 9E-04
			Iron	Liver	4 9E-03		4 9E-03
			Manganese	CNS	1 3E-04		1 3E-04
			Mercury	CNS	5.6E-05		5 6E-05
			Benzene	Liver	1 1E-06		1 1E-06
			Total Xylenes	CNS	4 5E-08		4 5E-08
			Benzo[a]anthracene	-			
			Benzo[a]pyrene	-			
			Benzo[b]fluoranthene	-			
			bis(2-Ethylhexyl)phthalate	Liver	5.5E-06		5 5E-06
			Indeno[123-cd]pyrene	-			
			Naphthalene	Body Weight	3 1E-05		3 1E-05
			N-Nitrosodimethylamine	-			
			Pentachlorophenol	Liver/Kidney	3 9E-06	5 6E-05	6 0E-05
			Aroclor 1242	Immunological	2 6E-02	2 1E-01	2 4E-01
			Aroclor 1260	Immunological	[illegible]E-02	2 5E-01	2 8E-01
						TOTAL RISK:	6.4E-01

Table 6.3

Risk Characterization Summary - Noncarcinogens

Scenario Timeframe: Current
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Noncarcinogenic Hazard Quotient		
					Ingestion	Dermal	Exposure Routes Total
Soil	Soil	Soils Under the Old Warehouse	Aluminum	CNS	7.2E-03		7 2E 03
			Antimony	Blood	8 7E-02		8 7-02
			Arsenic	Skin	1.7E+00	6 3E-01	2 3E-03
			Barium	NOAEL	2.1E-03		2 1E-03
			Beryllium	Small Intestine	1'9E-03		1 9E-03
			Chromium	NOAEL	2.2E-02		2 2E 02
			Copper	-	5 8E-03		5 8E 03
			Manganese	CNS	6.3E-03		6 3E-03
			Mercury	CNS	1 2E-02		1 2E-02
			Vanadium	NOAEL	5 9E-03		5 9E-03
			Total Xylenes	CNS	1 9E-06		1 9E-06
			Aroclor 1016	Developmental	1 4E-01	8 5E-01	9 9E-01
			Aroclor 1260	Immunological	3 9E-01	6 6E-01	1 1E-01
						TOTAL RISKS:	4.5E+00

Table 6.4

Risk Characterization Summary - Noncarcinogens

Scenario Timeframe: Current
Receptor Population: Industrial/Facility
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Noncarcinogenic Hazard Quotient		
					Ingestion	Dermal	Exposure Routes Total
Soil	Soil	Soils in the Waste Pile	Arsenic	Skin	1.1E-02	3.9E-02	5.0E-02
			Barium		4.7E-03		4.7E-03
			Beryllium	Small Intestine	2.0E-04		2.0E-04
			Chromium	NOAEL	5.2E-03		5.2E-03
			Copper	-	5.5E-04		5.5E-04
			Iron	Liver	1.1E-02		1.1E-02
			Manganese	CNS	4.2E-03		4.2E-03
			Benzo[a]anthracene	-			
			Benzo[a]pyrene	-			
			Benzo[b]fluoranthene	-			
			Benzo[k]fluoranthene	-			
			Naphthalene	Body Weight	3.4E-05		3.4E-05
			Aroclor 1242	Immunological	1.1E+00	1.6E+01	1.7E+01
			Aroclor 1248	Immunological	1.3E-01	1.9E+00	2.0E+00
			Aroclor 1260	Immunological	2.0E+00	2.9E+01	3.1E+01
						TOTAL RISKS:	5.0E+01

Table 6.5

Risk Characterization Summary - Noncarcinogens

Scenario Timeframe: Current
Receptor Population: Recreators/Trespassers
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Noncarcinogenic Hazard Quotient		
					Ingestion	Dermal	Exposure Routes Total
Soil	Soil	Surface Soils Outside the IOC/CC Facility	Aluminum	CNS	3.3E-03		3 3E-03
			Antimony	Blood	2 5E-02		2 5E-02
			Arsenic	Skin	9 6E-02	1 2E-01	2 2E-01
			Barium	NOAEL	1.3E-03		1 3E-03
			Beryllium	Small Intestine	3 3E-04		3 3E-04
			Cadmium	Kidney	5 9E-04	2 9E-02	3 0E-02
			Chromium	NOAEL	5 6E-02		5 6E-02
			Copper	-	2.3E-03		2 3E 03
			Iron	Liver	4.1E-02		4 1E-02
			Manganese	CNS	1.7E-03		1 7E 03
			Mercury	CNS	1 7E-03		1.7E-03
			Vanadium	NOAEL	1.5E-03		1 5E-03
			Benzo[a]anthracene	-			
			Benzo[b]fluoranthene	-			
			Benzo[k]fluoranthene	-			
			d BHC	Liver	2.6E-04		2 6E-04
			Aroclor 1242	Immunological	4.9E-02	2.8E-01	3 3E-01
			Aroclor 1260	Immunological	5 1E-02	2 9E-01	3 4E-01
						TOTAL RISKS:	1.0E+00

Table 6.6.1

Risk Characterization Summary - Noncarcinogens

Scenario Timeframe: Future   Receptor Population: Resident   Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Noncarcinogenic Hazard Quotient		
					Ingestion	Dermal	Exposure Routes Total
Soil	Soil	Onsite Soils	Aluminum	CNS	1.1E-02		1.1E-02
			Antimony	Blood	2.7E-02		2.7E-02
			Arsenic	Skin	1.5E+00	2.6E+00	4.1E+00
			Barium	NOAEL	2.3E-03		2.3E-03
			Beryllium	Small Intestine	8.2E-04		8.2E-04
			Cadmium	Kidney	9.5E-04	2.2E-03	3.2E-03
			Chromium	NOAEL	4.7E-02		4.7E-02
			Iron	Liver	1.4E-01		1.4E-01
			Manganese	CNS	9.5E-03		9.5E-03
			Mercury	CNS	6E-03		6E-03
			Silver	Skin	4.9E-04		4.9E-04
			Vanadium	NOAEL	7.6E-03		7.6E-03
			Total Xylenes	CNS	1.5E-07		1.5E-07
			Benzo[a]anthracene	-			
			Benzo[a]pyrene	-			
			Benzo[b]fluoranthene	-			
			Benzo[k]fluoranthene	-			
			bis[2-Ethylhexyl]phthalate	Liver	2.0E-04		2.0E-04
			Indeno[123-cd]pyrene	-			
			Naphthalene	Body Weight	5.8E-04		5.8E-04
			N Nitrosodimethylamine	-			
			Pentachlorophenol	Liver/Kidney	1.3E-04	1.9E-03	2.0E-03
			d BHC	Liver	9.1E-04		9.1E-04
			Aroclor 1242	Immunological	2.8E-01	2.3E+00	2.6E+00
			Aroclor 1260	Immunological	4.8E-01	3.9E+00	4.4E+00
						TOTAL RISK:	1.1E+01

Table 6.6.2

Risk Characterization Summary - Noncarcinogens

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Noncarcinogenic Hazard Quotient		
					Ingestion	Dermal	Exposure Routes Total
Soil	Soil	Onsite Soils	Aluminum	CNS	1.1E-01		1 1E-01
			Antimony	Blood	2 6E-01		2 6E-01
			Arsenic	Skin	1.4E+01	4 4E+00	1 8E+01
			Barium	NOAEL	2 2E+02		2 2E+02
			Beryllium	Small Intestine	7.7E-03		7 7E-03
			Cadmium	Kidney	8 8E-03	3 6E-03	1 2E-02
			Chromium	NOAEL	4.4E-01		4 4E-01
			Iron	Liver	1.3E+00		1 3E+00
			Manganese	CNS	.8E-02		8E-02
			Mercury	CNS	5 6E-02		5.6E-02
			Silver	Skin	4.6E-03		4 6E-03
			Vanadium	NOAEL	7 1E-02		7.1E-02
			Total [illegible]nes	CNS	1 4E-06		1.4E-06
			Benzo[a]anthracene	-			
			Benzo[a]pyrene	-			
			Benzo[b]fluoranthene	-			
			Benzo[k]fluoranthene	-			
			bis[2-Ethylhexyl]phthalate	Liver	1 8E-03		1 8E-03
			Indeno[123-cd]pyrene	-			
			Naphthalene	Body Weight	5 4E-03		5 4E-03
			N-Nitrosodimethylamine	-			
			Pentachlorophenol	Liver/Kidney	1 3E-03	3.2E-03	4 5E-03

Table 6.6.2 (continued)

			d-BHC	Liver	8.5E-03		8.5E-03
			Aroclor 1242	Immunological	2.6E+00	3.7E+00	6.3E+00
			Aroclor 1260	Immunological	4.5E+00	6.4E+00	1.1E+01
						TOTAL RISK:	3.8E+01

Risk Characterization

Table D provides hazard quotients (HQs) for each route of exposure and the hazard index (sum of hazard quotients) for all routes of exposure. The Risk Assessment Guidance for Superfund (RAGS) states that, generally, a hazard index (HI) greater than 1 indicates the potential for adverse noncancer effects. The estimated HIs of 4.5 (Table D.3), 50 (Table D.4), 11 (Table D.6.1), and 38 (Table D.6.2) indicate that the potential for adverse noncancer effects could occur from exposure to contaminated soil containing arsenic and PCBs.

Table 7

Cancer Toxicity Data Summary

-Ingestion, Dermal Contact

Chemical of Concern	Oral Cancer Slope Factor	Absorption Efficiency (for Dermal)	Adjusted Cancer Slope Factor (for Dermal)	Slope Factor Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
Arsenic	1.5E+00	0.95	1.5E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	08/25/99
Benzene	2.9E-02		2.9E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	08/25/99
Benzo[a]anthracene	7.3E-01	0.89	7.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	08/25/99
Benzo[a]pyrene	7.3E+00	0.89	7.3E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	08/25/99
Benzo[b]fluoranthene	7.3E-01	0.89	7.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	08/25/99
Benzo[k]fluoranthene	7.3E-02	0.89	7.3E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	08/25/99
Indeno[123-cd]pyrene	7.3E-01	0.89	7.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	08/25/99
bis[2-Ethylhexyl]phthalate	1.4E-02		1.4E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	08/25/99
N-Nitrosodimethylamine	5.1E+01		5.1E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	08/25/99
Pentachlorophenol	1.2E-01	0.76	1.2E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	08/25/99
d-BHC	1.3E+00		1.3E+00	$(mg/kg\text{-}day)^{-1}$		IRIS	08/25/99
Aroclor 1016	2E+00	0.80-0.96	2E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	08/25/99
Aroclor 1242	2E+00	0.80-0.96	2E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	08/25/99
Aroclor 1248	2E+00	0.80-0.96	2E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	08/25/99
Aroclor 1260	2E+00	0.80-0.96	2E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	08/25/99

Key

— No information available
IRIS, Integrated Risk Information System, U.S. EPA

EPA Group:

A - Human carcinogen
B1 - Probable Human Carcinogen - Indicates that limited human data are available
B2 - Probable Human Carcinogen - Indicates sufficient evidence in animals associated with the site and inadequate or no e vidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

Summary of Toxicity Assessment

This table provides carcinogenic risk information which is relevant to the contaminants of concern in soil. Consistent with draft EPA Guidance for Dermal Risk Assessment, oral toxicity data were not adjusted for those chemicals for which the oral absorption fraction exceeds 50%.

Table 8.1

Risk Characterization Summary - Carcinogens

Scenario Timeframe: Current
Receptor Population: Facility Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk		
				Ingestion	Dermal	Exposure Routes Total
Soil	Soil	Tank Farm	Arsenic	1.5E-05	2.5E-05	4 0E-05
					TOTAL RISK:	4.0E-05

Table 8.2

Risk Characterization Summary - Carcinogens

Scenario Timeframe: Current
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk		
				Ingestion	Dermal	Exposure Routes Total
Soil	Soil	Fenced Portion of the Site	Arsenic	7.0E-06	1 2E-05	1 9E-05
			Benzene	1 1E-11		1.1E-11
			Benzo[a]anthracene	2 6E-09	1.9E-08	2.2E-08
			Benzo[a]pyrene	2.2E-08	1 6E-07	1.7E-07
			Benzo[b]fluoranthene	2 5E-09	1 9E-08	2 2E-08
			bis[2-Ethylhexyl]phthalate	5 5E-09	4 1E-09	9 6E-09
			Indeno[123-cd]pyrene	1 0E-09	7.7E-09	8.7E-09
			N-Nitrosodimethylamine	8 6E-08		8 6E-08
			Pentachlorophenol	1 3E-08	7 2E-08	8.5E-08
			Aroclor 1242	9 2E-07	3.0E-06	3.9E-06
			Aroclor 1260	1.1E-06	3 5E-06	4 6E-06
					TOTAL RISK:	2.8E-05

Table 8.3

Risk Characterization Summary - Carcinogens

Scenario Timeframe: Current
Receptor Population: Construction/Excavation Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk		
				Ingestion	Dermal	Exposure Routes Total
Soil	Soil	Soils Under the Old Warehouse	Arsenic	1.1E-05	4.0E-06	1.5E-05
			Aroclor 1016	2 9E-07	4.9E-07	7.8E-07
			Aroclor 1260	2.3E-07	3.8E-07	6.1E-07
					TOTAL RISKS:	1.7E-05

Table 8.4

Risk Characterization Summary - Carcinogens

Scenario Timeframe: Current
Receptor Population: Industrial/Facility
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk		
				Ingestion	Dermal	Exposure Routes Total
Soil	Soil	Soils in the Waste Pile	Arsenic	1 8E-06	6.3E-06	8.1E-06
			Benzo[a]anthracene	6.0E-07	9.0E-06	9.6E-06
			Benzo[a]pyrene	7.1E-06	1.1E-04	1.2E-04
			Benzo[b]fluoranthene	6.0E-07	9.0E-06	9.6E-06
			Benzo[k]fluoranthene	6 0E-08	9.0E-07	9.6E-07
			Aroclor 1242	1 5E-05	2.4E-04	2 6E-04
			Aroclor 1248	1 8E-06	2.9E-05	3.1E-05
			Aroclor 1260	2 8E-05	4.5E-04	4 8E-04
					TOTAL RISKS:	9.1E-04

Table 8.5

Risk Characterization Summary - Carcinogens

Scenario Timeframe: Current
Receptor Population: Recreators/Trespassers
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk		
				Ingestion	Dermal	Exposure Routes Total
Soil	Soil	Surface Soils Outside the IOC/CC Facility	Arsenic	7 4E-06	9 0E-06	1 6E-05
			Benzo[a]anthracene	5.4E-09	2 9E-08	3 4E-08
			Benzo[b]fluoranthene	5.4E-09	2 9E-08	3.4E-08
			Benzo[k]fluoranthene	5 4E-10	2 9E-09	3.4E-09
			d-BHC	1 7E-08		1.7E-08
			Aroclor 1242	3 4E-07	1 9E-06	2 2E-06
			Aroclor 1260	3.5E-07	2 0E-06	2.4E-06
					TOTAL RISKS:	**2.1E-05**

Table 8.6.1

Risk Characterization Summary - Carcinogens

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk		
				Ingestion	Dermal	Exposure Routes Total
Soil	Soil	Onsite Soils	Arsenic	2.4E-04	4.1E-04	6.5E-04
			Benzo[a]anthracene	7.9E-08	5.9E-07	6.7E-07
			Benzo[a]pyrene	6.2E-07	4.6E-06	5.2E-06
			Benzo[b]fluoranthene	7.0E-08	5.3E-07	6.0E-07
			Benzo[k]fluoranthene	7.0E-09	5.3E-08	6.0E-08
			bis[2-Ethylhexyl]phthalate	1.9E-08		1.9E-08
			Indeno[123-cd]pyrene	2.9E-08	2.2E-07	2.5E-07
			N-Nitrosodimethylamine	9.6E-07		9.6E-07
			Pentachlorophenol	1.7E-07	2.4E-06	2.6E-06
			d-BHC	1.2E-07		1.2E-07
			Aroclor 1242	3.9E-06	3.1E-05	3.5E-05
			Aroclor 1260	6.6E-06	5.3E-05	6.0E-05
					TOTAL RISK:	**7.5E-04**

Table 8.6.2

Risk Characterization Summary - Carcinogens

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk		
				Ingestion	Dermal	Exposure Routes Total
Soil	Soil	Onsite Soils	Arsenic	5.5E-04	1.7E-04	7.2E-04
			Benzo[a]anthracene	1.8E-07	2.4E-07	4.2E-07
			Benzo[a]pyrene	1.4E-06	1.9E-06	3.3E-06
			Benzo[b]fluoranthene	1.6E-07	2.2E-07	3.8E-07
			Benzo[k]fluoranthene	1.6E-08	2.2E-08	3.8E-08
			bis[2-Ethylhexyl]phthalate	4.4E-08		4.4E-08
			Indeno[123-cd]pyrene	6.7E-08	8.9E-08	1.6E-07
			N-Nitrosodimethylamine	2.2E-06		2.2E-06
			Pentachlorophenol	3.9E-07	9.8E-07	1.4E-06
			d-BHC	2.8E-07		2.8E-07
			Aroclor 1242	9.0E-06	1.3E-05	2.2E-05
			Aroclor 1260	1.5E-05	2.2E-05	3.7E-05
					TOTAL RISK:	7.9E-04

Risk Characterization

Table F provides carcinogenic risk estimates for the significant routes of exposure. These risk estimates are based on a reasonable maximum exposure and were developed by taking into account various conservative assumptions about the frequency and duration of exposure for each population, as well as the toxicity of each chemical. The COCs contributing most significantly the cumulative risks are arsenic and PCBs. See Tables F.4, F.6.1, and F.6.2 for these risk estimates.

Table 9

Soil/Waste Pile Contaminants & Remediation Goals

Imperial Oil Company/Champion Chemicals Site

	Maximum Detected Concentration* (mg/kg)	USEPA Soil Cleanup Criteria (mg/kg)		Remediation Goal (mg/kg)
Chemical	Soil	Residential	Impact to Groundwater Soil Cleanup Criteria	Soil
VOCs				
Benzene	0.023	0.62	0.03	0.03
Chloroform	0.0058	0.24	0.6	0.24
1,2-Dichloroethane	0.0023	0.34	0.02	0.02
1,2-Dichlorethene (total)	0.96	42	0.02	0.02
Ethylbenzene	0.81	1400	13	13
Styrene	0.12	4100	4	4
Tetrachloroethene	0.3	4.7	0.06	0.06
Toluene	2.3	580	12	12
Trichloroethene	0.79	2.7	0.06	0.06
Total Xylenes	3.3	1300	200	200
SVOCs				
Acenaphthene	0.49	2600	100	100
Anthracene	1.1	14000	100	100
Benzo[a]anthracene	4.7	0.56	2	0.56
Benzo[a]pyrene	5.6	0.056	8	0.056
Benzo[b]fluoranthene	4.7	0.56	5	0.56
Benzo[k]fluoranthene	4.7	5.6	49	5.6
bis[2-Ethylhexyl]phthalate	2.853	32	100	32
Butylbenzylphthalate	47	11000	100	100
Chrysene	4.7	56	160	56

Table 9 (continued)

Di-N-Butylphthalate	1.7	5500	1000	1000
Fluoranthene	1.5	2000	100	100
Fluorene	1.2	1800	100	100
Indeno[123-cd]pyrene	0.084	0.56	14	0.56
2-Methylnaphthalene	19	NA	84	84
Naphthalene	13	55	84	55
N-Nitrosodimethylamine	0.04	0.0087	NA	0.0087
Pentachlorophenol	2.95	2.5	0.03	0.03
Phenanthrene	14	NA	NA	NA
Pyrene	5	1500	4200	1500
Total PCBs	NA	1	50	1
Aroclor 1016	9	See Total PCBs		
Aroclor 1242	43	See Total PCBs		
Aroclor 1248	5.2	See Total PCBs		
Aroclor 1260	80	See Total PCBs		
1,2,4-Trichlorobenzene	3.2	480	5	5
TOC	540000	NA	NA	NA
Pesticides				
d-BHC	0.2	0.42	NA	0.2
Metals				
Aluminum	9800	75000	NA	75000
Antimony	31	30	5	5
Arsenic	464	0.38	29	20
Barium	676	5200	1600	1600
Beryllium	3.3	150	63	63
Cadmium	1.5	37	8	8
Chromium	428	210	NR	210
Copper	335	600	NA	2800
Iron	31200	22000	NA	22000

Table 9 (continued)

Lead	1350	400	NA	400
Manganese	302	3100	NA	3100
Mercury	1.1	22	2	2
Silver	1.8	370	34	34
Vanadium	39	520	6000	520

Remediation Goals based the Protection of Human Health Under a Residential Scenario are from the following sources:

1. *Risk Assessment Guidance for Superfund, Volume I - Human Health Evaluation Manual (Part B. Development of Risk-Based Preliminary Remediation Goals)* Interim (EPA/540/R-92/003) Office of Research and Development. December 1991.

2. US EPA Region IX Preliminary Remediation Goals; Residential Soil - Integrated Pathway; August 4, 1999

3. Remediation Goal for Arsenic is based on New Jersey Statewide Background Concentration (http://www.state.nj.us/dep/srp/regs/scc)

4. Remediation Goal for Lead is based on the IEUBK model and the protection of children.

5. Remediation Goal for PCBs is consistent with EPA policy.

Remediation Goals based on Impact to Groundwater are from the following sources:

1. *EPA Soil Screening Guidance: Technical Background Document* (EPA540/R-95/128) Office of Solid Waste and Emergency Response. May 1996.

2. New Jersey Department of Environmental Protection. Soil Cleanup Criteria: Impact to Groundwater Soil Cleanup Criteria. (http://www.state.nj.us/dep/srp/regs/scc)

Footnotes:

- *Maximum Detected Concentrations present in this table, were those used for purposes of risk assessment. Note that for some contaminants, higher levels were detected during the Data Gap Investigation (see Table 2 for the Data Gap Investigation results).
- mg/kg: milligrams per kilogram, or parts per million
- NA: Value for this chemical is not available.
- NR: Negligible risk via this exposure route.

Table 10

Summary of Cost Estimates for OU-3
Remedial Alternatives
for the
Imperial Oil Company/Champion Chemical Superfund Site

Alternatives	*Total Capital Cost*	*O&M Cost (Present Worth)*	*Net Present Worth Cost*
Alternative 1: No Action	$0	$295,000	$295,000
Alternative 2A: Containment Alternative A	$14,942,000	$483,000	$15,425,000
Alternative 2B: Containment Alternative B	$15,514,000	$563,000	$16,077,000
Alternative 2C: Containment Alternative C	$13,111,000	$387,000	$13,498,000
Alternative 3: Excavation/Off-site Disposal	$17,201,000	$9,000	$17,210,000
Alternative 4: Excavation/Treatment	$38,131,000	$9,000	$38,140,000

APPENDIX A

State of New Jersey
Department of Environmental Protection

Christine Todd Whitman
Governor

Robert C. Shinn, Jr.
Commissioner

SEP 24 1999

Ms. Jeanne M. Fox
Regional Administrator
U.S. Environmental Protection Agency
Region II
290 Broadway
New York, N.Y. 10007-1866

Dear Ms. Fox:

The Department of Environmental protection has evaluated and concurs with the selected remedy for the Imperial Oil Company/Champion Chemicals Superfund site as described below. This is the third of three planned operable units for the Imperial Oil Company/Champion Chemicals site. The selected remedy addresses the remediation of contaminated soil and other contaminated material (including waste filter clay and free/residual oil product) located on the main site.

The major components of the selected remedy include the following:

- Dismantle site buildings and tank farms, as necessary
- Excavation of an estimated 83,000 cubic yards of soils containing contaminants above the selected remediation goals and disposal of this material at appropriate off-site disposal facilities
- Transportation of an estimated 27,000 cubic yards of the soil and other material which pose the principal threat ("hot spots") to appropriate RCRA/TSCA hazardous waste disposal facilities
- Transportation of an estimated 56,000 cubic yards of soils containing contaminants above the selected remediation goals to appropriate off-site disposal facilities. A portion of this material may be recycled as asphalt base material.
- Removal of an estimated 5,000 gallons of free product via vacuum truck and transportation of this material to a TSCA licensed incinerator.
- Backfilling of all excavated areas with clean fill.
- Restoration of the wetlands affected by the cleanup activities.

The State of New Jersey appreciates the opportunity to participate in this decision making process and looks forward to future cooperation with the USEPA.

Sincerely,

Robert C. Shinn, Jr.
Commissioner

APPENDIX B

IMPERIAL OIL CO./CHAMPION CHEMICALS SUPERFUND SITE

ADMINISTRATIVE RECORD- OPERABLE UNIT 3

INDEX OF DOCUMENTS

Pre-Remedial Investigation/Feasibility Study Documents

1. Remedial Action Master Plan, prepared by Fred C. Hart Associates, 9/83

Remedial Investigation Documents

1. Health and Safety Plan, Imperial Oil Co., Inc/Champion Chemicals Site, Monmouth County, New Jersey, prepared by E.C. Jordan Co., 1/87
2. Quality Assurance Project Management Plan, Imperial Oil Co., Inc./Champion Chemicals Site, Monmouth County, New Jersey, prepared by E.C. Jordan Co., 1/87
3. Remedial Investigation of Imperial Oil Co./Champion Chemicals Site, Morganville, New Jersey - Final Report, Volumes I & II, prepared by ABB Environmental, December 1996
4. NJDEP Data Gap Investigation Sampling, performed by NJDEP in November 1996
5. NJDEP Waste Characterization Sampling, performed by NJDEP in April 1998

Health Assessment Documents

1. Health Assessment for Imperial Oil Co.,Inc/Champion Chemicals, CERCLIS No. NJD980654099, Marlboro Township, Monmouth County, authored by ATSDR July 1990
2. Site Review and Update: Imperial Oil Company Site by ATSDR,August 1992 and revised April 1993
3. ATSDR Exposure Investigation, Imperial Oil Co. Site, June 1995

4. ATSDR Public Health Consultation, Imperial Oil Co. Site, April 1995
5. Addendum to the Risk Assessment for Imperial Oil, OU3[1], September 1999, USEPA

Floating Product Recovery Documents

1. Work Plan: Free-Phase Floating Product Recovery System, Imperial Oil Co./Champion Chemical Co. Site, prepared by EPA Removal Action Branch, April 1992
2. Summary of Work Conducted at the Imperial Oil Site by Handex of New Jersey - November 1996 to June 1997

Feasibility Study Documents

6. Imperial Oil Treatability Study Report, prepared by USEPA Office of Research and Development - Risk Reduction Engineering Laboratory, August 1994
7. Final Source Control Feasibility Study, Imperial Oil Company/Champion Chemicals Site, Morganville, New Jersey, August 1998
8. Addendum to Source Control Feasibility Study by NJDEP, January 1999

Proposed Plan Documents

1. Proposed Plan - Imperial Oil Company Superfund Site, prepared by NJDEP March 1999

Record of Decision

1. Decision Summary for the Record of Decision - Imperial Oil Company/Champion Chemicals Site, Marlboro Township, Monmouth County, New Jersey - Operable Unit III, prepared by USEPA, September 1999.

1. This document was prepared and issued concurrent with the Record of Decision for OU3.

APPENDIX C

Responsiveness Summary
Imperial Oil/Champion Chemical Superfund Site
Morganville, New Jersey

As part of their public participation responsibilities, the U.S. Environmental Protection Agency (EPA) and the New Jersey Department of Environmental Protection (NJDEP) held a public comment period from February 19 through April 6, 1999, for interested parties to comment on the Proposed Plan for Operable Unit 3 (OU3) of the Imperial Oil Company Inc./Champion Chemical Superfund Site (the site), located in Morganville, New Jersey. The Proposed Plan described the alternatives that EPA and NJDEP considered for remediating contaminated soils and floating product at the site.

NJDEP held a public meeting at the Marlboro Municipal Building on March 18, 1999 to discuss results of the Remedial Investigation and Source Control Feasibility Study (RI/SCFS) Reports and to present the NJDEP/EPA preferred alternative for remediation of the site. During the public meeting, representatives from NJDEP discussed the preferred remedy, answered questions, and received oral comments on the alternatives under consideration.

In addition to comments received during the public meeting, NJDEP received written comments throughout the public comment period. EPA's and NJDEP's responses to significant comments, both oral and written, received during the public meeting and public comment period, are summarized in this Responsiveness Summary. All comments summarized in this document were factored into EPA's and NJDEP's final determination of a remedy for cleaning up the third operable unit for the site. The selected remedy for OU3 is described in the Decision Summary of the Record of Decision for the site.

This Responsiveness Summary is divided into the following sections:

I. **Overview:** This section discusses EPA's and NJDEP's preferred alternative for remedial action.

II. **Background of Community Involvement:** This section briefly describes community relations activities for the site.

III. Public Meeting Comments and NJDEP's Responses: This section provides a summary of major issues and concerns, and expressly acknowledges and responds to all significant comments raised at the March 18, 1999 public meeting.

IV. Response to Written Comments: This section provides a summary of, and responses to, all written comments received during the public comment period.

Appendix A: Transcript of the March 18, 1999 public meeting.
Appendix B: Written comments received by NJDEP during the public comment period.
Appendix C: Proposed Plan.
Appendix D: Public Notice printed in the February 18, 1999 Asbury Park Press.

I. OVERVIEW

This is a summary of the comments and questions from the public regarding the Proposed Plan, dated March 1999, for remediation of the Imperial Oil Company/Champion Chemical (IOC/CC) Superfund Site, and NJDEP's and EPA's responses to those comments and questions.

At the initiation of the public comment period on February 19, 1999, NJDEP and EPA presented their preferred remedial alternative to address on-site soils and floating product. The preferred remedy to address these media includes: 1) the excavation and appropriate off-site disposal of an estimated 83,000 cubic yards of contaminated soil and 5,000 gallons of floating product; 2) soil recycling of a portion of the 83,000 cubic yards of soils in a permitted asphalt-batch plant, where eligible; and 3) restoration of impacted wetlands.

The preferred remedy differs from the remedy selected for the site only with respect to some soil cleanup goals applied to the cleanup. Modifications of the cleanup goals presented in the Proposed Plan were made in the Record of Decision in order to address concerns expressed during the public comment period. The public expressed concerns that the proposed cleanup standards, which were developed to be protective of human health and the environment for an industrial use scenario, would not be sufficiently protective, and cleanup standards which are protective for a residential use scenario should be selected, allowing for unrestricted future land use at the site. EPA and NJDEP have agreed to address this concern in the selected remedy, which selects cleanup standards for soils which would be protective under a residential use scenario. Therefore, no institutional controls relating to future land use will be required.

II. BACKGROUND OF COMMUNITY INVOLVEMENT

The RI/SCFS Reports and the Proposed Plan for the site were made available to the public at the information repositories for the site located at: Monmouth County Library, 1 Library Court, Marlboro, New Jersey 07746: NJDEP, Bureau of Community relations, 401 E. State Street, 6th Floor, Trenton, NJ; and EPA, Superfund Records Center, 290 Broadway, 18th floor, New York, NY. The notice of the availability of these documents was published in the Asbury Park Press on February 18, 1999. The public was given the opportunity to comment on the preferred alternative during the public comment period which began on February 19, 1999 and concluded on April 6, 1999. In addition, a public meeting was held on March 18, 1999 at the Marlboro Municipal Building to answer questions concerning the site and the remedial alternatives under consideration.

The IOC/CC site has consistently received attention from area residents, municipal, state, county and federal officials as well as the media. In 1981, concerned residents organized the Burnt Fly Bog/Imperial Oil Company Citizens Advisory Committee (CAC). The CAC includes citizen representatives from Marlboro and Old Bridge Townships as well as officials from Monmouth and Middlesex Counties. NJDEP representatives have met regularly with this group since 1981 and continue to do so. In 1998, the Monmouth County Environmental Coalition (MCEC) received a Technical Assistance Grant from the EPA to hire advisors to review technical documents and to assist the group in understanding the remedial activities at the site.

Issues voiced over the years by the CAC, the MCEC, and other members of the community include the operating status of the Imperial Oil Company, the potential for the IOC/CC site to impact Lake Lefferts (located approximately 1.25 miles downstream of the IOC/CC property); the contamination of off-site properties by the IOC/CC site; and the length of time it has taken to investigate and remediate the site.

III. PUBLIC MEETING COMMENTS AND NJDEP'S RESPONSES

Questions or comments are summarized in bold, followed by NJDEP's response.

Restricted vs. Unrestricted Use Standards

1. **Numerous community members, including State Senator John Bennett, Marlboro Township Mayor Matthew Scannapieco, Monmouth County Health Officer Lester**

Jargowsky, representatives of the CAC and the MCEC, stated strong opposition to the NJDEP/EPA proposal to remediate site soils only to a "restricted use" industrial cleanup criteria. Reasons for their opposition included:

a) Zoning -the property is currently zoned "commercial", which could result in future use of the property being accessible to children;
b) PCB data - according to the RI data, PCBs are generally found as a co-contaminant in waste oils, oil saturated soils and with arsenic. The data also shows that arsenic contamination in soils is more widespread than other contaminants of concerns. Therefore, in excavating the arsenic to the unrestricted cleanup level of 20 ppm (as called for in the Proposed Plan), it doesn't make sense to excavate PCBs to a less stringent level than "unrestricted use" criteria; and
c) Proximity to residents - the site is surrounded by residential areas and contaminated soil has the potential to become airborne. Accordingly, any cleanup level chosen other than the most stringent "unrestricted use" criteria would be unacceptable.

NJDEP's Response: EPA policy is to select remedial actions and associated cleanup criteria that are consistent with current land use and most likely future land use. The IOC/CC property has been an active industrial facility since 1912 and continues today as an industrial operation. The property is currently zoned for industrial/commercial activities. No information exists to indicate that the future use of this property will change. Accordingly, cleanup standards were proposed that reflected the current and projected future land use of the site.

However, at the public meeting, NJDEP acknowledged that all aspects of this comment, including the zoning issues, the distribution of arsenic and PCB contamination and the proximity of the site to a residential area, would be fully considered by EPA and NJDEP prior to a final remedial decision, and acknowledged that this same comment had been repeated, with much vigor, by numerous members of the community.

NJDEP also acknowledged that based on the spacial distribution of contaminants which are largely driving the cleanup at the site, namely arsenic and PCBs, it appears that by remediating the arsenic contaminated soils to the proposed level of 20 parts per million (ppm) and the PCBs to the proposed level of 13 ppm, it was likely that all detected PCB contamination (soil containing PCBs at levels greater than 1 ppm) was likely to be addressed. The community agreed with this determination, however, further requested that the Record of Decision (ROD) guarantee that residential standards be met for PCBs. Again, NJDEP indicated that this would be further considered prior to selection of the final remedy.

NJDEP and EPA have evaluated this comment and those submitted in writing which support this comment, and have agreed to revise the PRGs to meet residential standards. Please see the response to written comment 2, of this document for a more detailed response.

2. **Please explain the statement made to the Asbury Park Press stating that if the township owns the (IOC/CC) property in the future and wants to convert it to unrestricted use, they (the township) can go and clean it up further if necessary.**

NJDEP's Response: The policy for both EPA and NJDEP is to remediate sites to their "current" land use, or reasonablely expected future land use. This statement was made to explain that any future owner of any contaminated site in New Jersey which has been cleaned up to restricted use conditions is entitled to perform additional cleanup work to meet the "unrestricted use" criteria which would render the site suitable for unrestricted future use.

3. **What is the difference in cost between a residential and industrial cleanup for PCBs?**

NJDEP's Response: All available data for this site indicates that remediating the arsenic to the cleanup standard of 20 ppm (this standard for arsenic is the same for both the residential and industrial use scenario) and PCBs to the industrial standard derived for this site of 13 ppm, is likely to result in the remediation of PCBs to the federal unrestricted standard for PCBs of 1 ppm as well. Based on available data, wherever levels of PCBs are present above unrestricted use criteria (1 ppm), but less than restricted use criteria (13 ppm), arsenic and/or other site-related contaminants are also present in elevated levels requiring remediation. Accordingly, cleanup of these areas to achieve those contaminant criteria will remediate the low level PCB contaminated areas by default. Therefore, NJDEP does not anticipate that there will be any significant difference in the cost to achieve residential (unrestricted) use standards verses the cost to achieve industrial/commercial use standards for the site. NJDEP indicated that the request by the public to have the site remediated to meet residential standards would be further considered prior to selection of the final remedy.

NJDEP and EPA have evaluated this comment and those submitted in writing which support this comment, and have agreed to revise the PRGs to meet residential standards. Please see the response to written comment 2 of this document for a more detailed response.

4. **If there is no difference in cost to remediate PCBs to an unrestricted use, the property is surrounded by residential land, and there is the potential for water to flow off the site, why would you not clean up to residential standards?**

NJDEP's Response: As stated in response #1,above, the industrial standards were proposed based on the current and expected future land use at the site. As stated in response #3, above, it is expected that the PCB contamination would be remediated to the unrestricted use criteria of 1 ppm, even if the cleanup goal is the industrial use criteria of 13 ppm, based on the known spacial distribution of PCBs and other contaminants at the site. However, that expectation is based on all the sampling data obtained to date. During the actual cleanup, additional samples will be obtained at the bottom of the excavated area. These samples, referred to as post-excavation samples, are obtained to insure that no soil contamination exceeding the prescribed cleanup goals remains. It is possible that one or more of these post-excavation samples could exceed the unrestricted use soil cleanup criteria for PCBs. However, even if this were the case, the minimum depth of the excavation will be three feet, meaning a minimum of three feet of clean fill would cover the entire area of contamination, which eliminates any direct contact exposure scenario, regardless of the future use of the site.

NJDEP and EPA have evaluated this comment and those submitted in writing which support this comment, and have agreed to revise the PRGs to meet residential standards. Please see the response to written comment 2 of this document for a more detailed response.

5. **Based on the discussions at this evening's public meeting, will NJDEP recommend that the EPA use the**

state standards for remediation rather than the federal standards and will NJDEP also recommend that the site be cleaned up to unrestricted use standards? We do not agree that the federal industrial standard of 13 ppm for PCBs should be applied here rather than the state industrial standard of 2 ppm.

NJDEP's Response: NJDEP's staff at this meeting will emphasize to their management how emphatically everyone at this meeting expressed their desire to see that this cleanup result in the unrestricted use of the property. Those comments and preferences for cleaning the site to unrestricted use were considered prior to a final remedial decision. For clarification purposes, with respect to the use of a state versus a federal unrestricted use standard, the federal unrestricted use standard for PCBs is 1 ppm and the state standard is 0.49 ppm.

NJDEP and EPA have evaluated this comment and those submitted in writing which support this comment, and have agreed to revise the PRGs to meet residential standards. Please see the response to written comment 2 of this document for a more detailed response.

If any contamination remains at the site at levels higher that the state unrestricted use standard of 0.49 ppm for PCBs, but below the federal standard of 1 ppm PCBs, the state of New Jersey will expend state funds to remediate such soils. Therefore, the ROD guarantees that unrestricted use of the property will be achieved.

6. **How long until we (the community) hear feedback on whether the decision to guarantee the cleanup of PCBs to residential standards has been made?**

NJDEP's Response: The official response will be made in the Responsiveness Summary, which summarizes all written and oral comments received during the comment period. The Responsiveness Summary is part of the Record of Decision which will be made public after it has been approved by the Commissioner of NJDEP and the Regional Administrator of EPA, Region 2.

7. **We (the MCEC) would like to be a part of the decision-making process.**

NJDEP's Response: MCEC is involved in the decision making process. The MCEC's participation in reviewing and commenting on the Proposed Plan and providing verbal comments at the public meeting held on March 18, 1999 is direct participation in the decision making process, consistent with the NCP. In addition, the MCEC has been involved in several previous meetings and discussions with the agencies, involving a number of site issues prior to issuance of the Proposed Plan.

<u>Traffic and Safety Issues</u>

8. **Where will access roads for the construction phase be built?**

NJDEP's Response: For each of the traffic and safety issues voiced at the public meeting, the NJDEP will be seeking input from the appropriate local community officials as well as impacted residents represented by the MCEC and CAC throughout the design phase of the selected remedy. In addition, the local officials will be involved in the review and approval of pertinent sections of the construction operations plans prepared by the construction contractor, including the location of any necessary access roads.

9. **What are the plans to address fugitive dust on the property during the construction phase?**

NJDEP's Response: During a construction project, the goal is to have no dust leaving the property. Dust suppression measures, such as keeping the area wetted down during excavation, can be used to achieve this. Real-time aerosol monitors at the property boundary can also be set up during certain periods of excavation, if the site safety and health officer determines this is needed. As indicated in Response #8, above, the NJDEP will be seeking input from the appropriate local community officials, as well as impacted residents represented by the MCEC and the CAC throughout the design phase of the selected remedy.

10. **How will traffic safety issues, work hours, noise control, etc. be addressed?**

NJDEP's Response: As indicated in Response #8, above, the NJDEP will be seeking input from the appropriate local community officials (including Township public safety officials) as well as impacted area residents, and representatives of the MCEC and CAC throughout the design phase of the selected remedy. Each of the issues will be further addressed in the bid documents for the construction contract. The construction contractor selected, after open and competitive bidding, will be required to submit the final traffic plan. In general, we expect that hours of operation can be suitably restricted and other measures implemented to satisfy community concerns with traffic related safety, congestion, and noise.

11. **What controls will be in place in the event of heavy rains after the soil is excavated and prior to the area being backfilled?**

NJDEP's Response: An Erosion and Sediment Control Plan which is acceptable to the County Soil Conservation Service will be required as part of the design documents and will be available for review by the public.

<u>Other Issues</u>

12. **Will the free product in excess of the 5,000 gallons that is included in this alternative be left at the site in the area of the hot spots?**

NJDEP's Response: Free and residual product contamination will be removed in its entirety. It is estimated that 5,000 gallons of free product will be available for extraction via a vacuum truck during the course of the excavation. All residual product remaining "trapped" in the soil will be excavated and properly disposed of as part of the planned soil excavation. No threat to ground water will remain.

13. **What standard, state or federal, was used at Burnt Fly Bog and why?**

NJDEP's Response: In general, the selected cleanup criteria at the Burnt Fly Bog (BFB) site were driven by the goals of (1) to remove the majority of visibly contaminated soils and tars, and (2) to remove enough material such that new wetland restoration can be effectively implemented. Based on the nature and extent of the contamination at the Burnt Fly Bog site, the site was divided into 3 specific areas for purposes of remedy selection: The Westerly Wetlands; the Northerly Wetlands; and the Tar Patch Area. Because exposure to the contaminants of concern, PCBs and lead, were different in these three different areas, different sets of cleanup standards were selected for the three areas. The Westerly Wetlands will be remediated to a level of 5 ppm PCBs and 8,950 for lead. These values were developed based on a site-specific ecological risk assessment. This area will be further addressed by the installation of a fence and the anticipated sediment buildup from vegetative humification processes. For the Northerly Wetlands, residential cleanup standards of 1 ppm for PCBs and 400 ppm for lead were selected because the Northerly Wetlands are more easily accessible to trespassers. In addition, it will allow most of the contamination to be excavated, thus preventing the further spreading of PCBs and lead into the Tar Patch Area and the Westerly Wetlands. For the Tar Patch Area, the cleanup goal was based on visual contamination instead of numerical cleanup levels. However, excavation of this area is expected to meet the residential soil cleanup goals of 1 ppm for PCBs and 400 ppm for lead.

14. **Is it possible that any part of this cleanup could be delayed for long periods of time subject to negotiations with the existing company that is on the property?**

NJDEP's Response: The necessity to cease the current operations at the site during remediation will be addressed during the remedial design phase. It is anticipated that the property owner (Champion Chemical Co.) will cooperate with the regulatory agencies in achieving an effective remediation of the site in an expeditious manner. This would include the property owner's accommodation of the present tenant, Imperial Oil Co., during the disruption of their operations resulting from the unavailability of the site during the remediation phase.

15. **Was there any input from Imperial Oil Company in developing the remediation options? Were their business plans, in terms of vacating or moving the operation, tied to the cleanup decisions being made?**

NJDEP's Response: Imperial Oil was given a courtesy copy of the Draft Source Control Feasibility Study concurrent with the copies provided the local community officials. Any comments received were considered in the drafting of the Proposed Plan. The comments made by Imperial Oil related to their ongoing operations or inabilities to operate as a result of the proposed cleanup will be addressed with the property owner during the remedial design phase.

IV: RESPONSE TO WRITTEN COMMENTS

1. **At the public hearing the NJDEP proposed to remove PCBs to the "industrial level" of 15 ppm and stated that**

this would effectively produce a clean-up to the residential level of 0.5 ppm. Has the NJDEP considered the slope of the gradient of PCB contamination vs. distance from the center of the PCB "hot spots" and the quantity of PCB contamination left behind in the annulus in the distance between the radius of a concentration of 15 ppm and 0.5 ppm? If the slope of the gradient is shallow at this point and the radius of the "hot spot" is large, a substantial quantity of PCBs may remain on the site. How can the NJDEP claim that PCB removal to 15 ppm will effectively produce a clean-up to 0.5 ppm? (from Old Bridge Environmental Commission)

Response: A clear gradient of PCB contamination does not exist at the site. Additionally, the RI data indicates the "footprint" or areal extent of arsenic soil contamination above the 20 ppm arsenic cleanup criteria generally extends beyond the known areas of PCB contamination that exceeds the EPA's unrestricted-use criterion of 1 ppm for PCBs (NJDEP's unrestricted-use criteria for PCBs is 0.49 ppm). Accordingly, excavation of the arsenic-contaminated soil to meet the cleanup goal of 20 ppm of arsenic is likely to remediate the PCB-contaminated soils to meet both the EPA's and NJDEP's unrestricted-use criterion. Based on this determination, as well as other considerations, as discussed in the response to written comment 2, below, EPA has agreed to select 1 ppm as the cleanup goal for PCBs in soils in the OU3 Record of Decision. If any contamination remains at the site at levels higher that the state unrestricted use standard of 0.49 ppm for PCBs, but below the federal standard of 1 ppm PCBs, the state of New Jersey will expend state funds to remediate such soils. Therefore, the ROD guarantees that unrestricted use of the property will be achieved.

Further, as a point of clarification, the federal restricted (industrial) use standard for this site is 13 ppm for PCBs, the federal unrestricted (residential) use standard is 1 ppm for PCBs. The State of New Jersey's restricted use standard is 2 ppm for PCBs and the state's unrestricted use standard for PCBs is 0.49 ppm.

2. **Numerous letters were written in support of the preferred alternative with the provision that the on-site remediation result in the unrestricted (residential) use of the property. Letters were written by the following:**

Mayor Matthew Scannapieco, Marlboro Township

Lizabeth Poulson, Chairperson BFB/IO Citizens' Advisory Committee
Tina Freedman, President, Monmouth County Environmental Coalition
James Nicolard, Marlboro Township
Rachel Lulio, Marlboro Township

Editorials in support of cleaning up the site to unrestricted levels were also written by the Asbury Park Press and the News Transcript.

The community strongly feels that although the site exists as an industrial area that lies in a C-2 commercial zone, the area surrounding the contamination is residential. Therefore, residents should be protected from any future adverse impacts that could be caused by contamination remaining at the Imperial Oil site.

Response: NJDEP's and EPA's proposal (as presented in the Proposed Plan) to remediate the site to meet industrial use, rather than residential use, standards was based on the fact that the current and expected future land use at the IOC/CC site is commercial-industrial. Based on the concerns raised by numerous members of the community, NJDEP and EPA have reconsidered this proposal. Accordingly, the agencies have selected a final remedy for the site which will provide for the cleanup of this property to meet federal residential standards. This decision is supported by the fact that the site is located adjacent to residential properties, as well ecologically sensitive resources, including wetlands. EPA recognizes that under current zoning, the future use of the property could include a variety of commercial uses which could lead to a variety of different exposure scenarios. Further, a review of the patterns of contamination present in soils based on the data collected at the site indicates that modifying the remediation goals from the industrial use standards to federal residential use standards is not expected to significantly increase the amount of soil to be excavated or the cleanup costs.

Comments submitted by Cody Ehlers Group on behalf of the Imperial Oil Company, Inc. and the Champion Chemical

Company.

1. **The Source Control Feasibility Study (SCFS) does not reflect the extent, scope and location of the contamination in order to justify the extensive excavation and the potential effects on existing facility operations called for in the remedy selected.**

   Response: The goal of the SCFS is to identify and evaluate remedial alternatives for consideration in the remediation of the site. Therefore, the SCFS provides only a limited summary of the investigative efforts carried out by NJDEP and EPA to characterize the nature and extent of contamination at the site. As indicated in the Proposed Plan, all readers/reviewers of the SCFS and the Proposed Plan must refer to the complete Administrative Record, which includes the Remedial Investigation Report and all other historical reports and data upon which this remedial decision is based. The documents comprising the Administrative Record fully support the selected remedy. The locations of the Administrative Record for the site were provided in the Proposed Plan for this Operable Unit.

2. **The SCFS does not present any chemical data for the product at the Site. This data should be collected so that appropriate methods of product removal can be identified and evaluated.**

   Response: The overall purpose of the SCFS is to evaluate and screen various alternatives for addressing the contaminated soil found on the Imperial Oil site. It also summarizes chemical and other data that are contained in the Remedial Investigation (RI) Report for the site. Chemical data and other information regarding the floating product have been collected and are summarized in the December 1996 Remedial Investigation Report for the site. Further, chemical data and other information regarding the floating product is presented in a report dated June 22, 1997, which was prepared by a NJDEP contractor, entitled "Summary of Work Conducted at the Imperial Oil Site by Handex of New Jersey - November 1996 to June 1997" (Handex Report). The RI Report and the Handex Report are included in the Administrative Record for the site.

   EPA and NJDEP have extracted, stored, sampled and disposed of approximately 15,000 gallons of floating product at the site since 1991. The chemical data and physical properties of the product were fully evaluated before an appropriate method for addressing the product was identified. Based on this information, EPA and NJDEP believe that the excavation and disposal of the product are the appropriate methods for addressing this major source of soil and groundwater contamination. During the remedial design phase, details regarding the implementation of this portion of the remedy will be developed.

3. **The Preliminary Remediation Goals (PRGs) used should be revised to conform with NJDEP and EPA guidelines and practice regarding the remediation of industrial sites and with the National Contingency Plan.**

Response: The PRGs that were developed for this site are consistent with the NCP and EPA policies. The PRGs were developed in accordance with the EPA's December 1991 - A Risk Assessment Guidance for Superfund: Development of Risk-based Preliminary Remediation Goals, and other guidances. The PRGs are protective of the groundwater underlying the site and will meet federal residential use standards. As stated earlier in the Responsiveness Summary, EPA and NJDEP have modified the PRGs presented in the Proposed Plan , which were developed to meet industrial use standards, in order to meet residential use standards. This decision is supported by the fact that the site is located adjacent to residential properties. Further, a review of the patterns of contamination present in site soils based on the data collected at the site indicates that remediation of this site to meet residential standards is not expected to significantly increase the amount of soil to be excavated or the cleanup costs compared to a remediation to meet industrial standards.

Please see the response to Comment 2, above, for more information.

4. **In order to not be inconsistent with the NCP and with EPA guidelines on land use assumptions, the SCFS and Proposed Plan should be revised to include an evaluation of remedial action alternatives that use institutional controls based on an industrial use exposure scenario.**

Response: The No Action alternative presented in the SCFS was developed, as required by the NCP, to be considered as a baseline for comparison with other remedial action alternatives. This alternative would include institutional controls to restrict the future use of the site. However, based on the results of the risk assessment performed for the site, this alternative was determined to be not adequately protective of human health and the environment.

The SCFS also included an evaluation of a "Minimal Action" alternative, which was screened out prior to detailed analysis because it did not achieve the minimal threshold criteria of "Overall Protection of Human Health and the Environment". The Minimal Action alternative included fencing to prevent the public from coming into contact with contaminated soil and sediment on-site. However, contamination originating from sources on-site would continue to migrate into off-site areas by means of soil and sediment erosion and ground water transport. Allowing contamination to migrate unimpeded into off-site areas would result in the accumulation of contamination in depositional areas and the spreading of contamination into presently unaffected areas. Consequently, human and ecological receptors in off-site areas would be subjected to increasing risk as the contamination spread into areas of un-impacted habitat and/or that experience greater public use. Therefore, retaining the Minimal Action alternative for detailed analysis could not be justified.

5. **The SCFS should be revised to reflect an acceptable carcinogenic risk range of 10^{-4} to 10^{-6}; not NJDEP's target carcinogenic risk of 10^{-6}. Spending additional funds to remediate this site to cleanup levels that are more stringent than those used to remediate other CERCLA sites is not justified.**

Response: The Risk Assessment performed for the IOC/CC site is presented in the December 1996 RI Report. A portion of the Risk Assessment was revised and presented in the September 1999 Risk Assessment Addendum (OU3). The Risk Assessment and Addendum were developed in accordance with EPA's guideline for conducting risk assessments and, thus evaluate carcinogenic risks relevant to EPA's acceptable carcinogenic risk range of 10^{-4} to 10^{-6}. Non-carcinogenic risks were evaluated as well in the Risk Assessment. For a number of exposure scenarios evaluating in the Risk Assessment and Addendum, carcinogenic risks related to on-site soils at the IOC/CC site were higher than 10^{-4}, the high end of EPA's acceptable risk range. Therefore, it is clear that remediation of the soil is warranted.

If it is determined, based on the results of a risk assessment, that remediation is warranted at a site, cleanup levels are generally developed which are protective of human health based on the 10^{-6} carcinogenic risk criteria. The PRGs for the IOC/CC site were developed in accordance with EPA's guidelines. The PRGs were derived to assure protection of groundwater underlying the site as well as protection from unacceptable risks posed by direct contact with contaminants in the soil. Further, residential land use was considered in developing the PRGs, as explained above in this Responsiveness Summary. The PRGs selected are consistent with CERCLA, and appropriately reflect assumptions that are relevant to the IOC/CC site.

6. **NJDEP needs to explain the specific changes made to the 1990 risk assessment that led to the substantial changes and the unacceptable risks reported in the 1996 risk assessment.**

Response: The 1996 version of the risk assessment was updated to include the on-site residential future use scenario and to eliminate the exposure route of inhalation of dust from the on-site waste pile. In addition, the "Most Probable Case" and the "Realistic Worst Case" were changed to the "Average Exposure" and the "Reasonable Maximum Exposure." Updates to EPA risk assessment guidance between 1990 and 1996 were accounted for and incorporated into the risk assessments for the site. The risk assessment for the site is presented in the December 1996 Remedial Investigation Report. EPA and NJDEP believe that the changes made to the risk assessment calculations did not alter the fact that the contaminants found in the soils of the Imperial Oil facility pose an unacceptable risk to human health and the environment.

Further, in August 1999, it was determined that some errors were made in developing the carcinogenic and noncarcinogenic quantitative risks. These errors were corrected in the September 1999 Addendum to the Risk Assessment (OU3), which has been included in the Administrative Record for this site. Note that the errors resulted in modified risk numbers, but did not effect the summary of site risks which indicates that contaminated site soils present an unacceptable risk to human health and the environment. The quantified risk was still outside of EPA's and NJDEP's acceptable risk criteria.

7. **The December 1997 draft SCFS refers to EPA site-specific criteria in Table 4-1 as "Site-Specific Criteria transmitted to NJDEP on January 23, 1997". The supporting documentation should be included as an**

appendix and the methods and assumptions used to develop these criteria should be presented in the SCFS.

Response: A number of guidance documents, including the document entitled "A Risk Assessment Guidance for Superfund: Development of Risk-based Preliminary Remediation Goals" (RAGS), were used to develop the site-specific cleanup criteria for the site. RAGS contains methods and assumptions used to develop the "Site-Specific Clean up Criteria" for the site. The document was described in the March 18, 1999 Proposed Plan and August 31, 1998 Final Source Control Feasibility Study Report. Therefore, EPA and NJDEP do not believe that it is necessary to include the document as an addendum to the SCFS.

In September 1999, EPA prepared an Addendum to the Risk Assessment (OU3). In this addendum, EPA modified the risk numbers for a number of contaminants and also developed some modified cleanup numbers based on an assumed residential use of the property. In doing this EPA employed the following guidances:

a) *Risk Assessment Guidance for Superfund, Volume I - Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals)* Interim (EPA/540/R-92/003) Office of Research and Development. December 1991.

b) US EPA Region IX Preliminary Remediation Goals; Residential Soil - Integrated Pathway; August 4, 1999

c) Remediation Goal for Arsenic is based on New Jersey Statewide Background Concentration (http://www.state.nj.us/dep/srp/regs/scc)

d) Remediation Goal for Lead is based on the IEUBK model and the protection of children.

e) Remediation Goal for PCBs is consistent with EPA policy.

f) *EPA Soil Screening Guidance: Technical Background Document* (EPA540/R-95/128) Office of Solid Waste and Emergency Response. May 1996.

g) New Jersey Department of Environmental Protection. Soil Cleanup Criteria: Impact to Groundwater Soil Cleanup Criteria. (http://www.state.nj.us/dep/srp/regs/scc)

8. **The draft SCFS assumed the site would be used for**

residential purposes in the future and therefore some of the most cost-effective methods, such as deed restrictions, to address potential risks at the site were not adequately evaluated.

Response: All cleanup criteria and alternatives considered for the site in the final SCFS were based on the future use of the site remaining industrial. However, based on EPA's and NJDEP's evaluation of all comments received during the public comment period, the preferred alternative for addressing the soil contamination will meet PRGs that are protective of residential, as well as industrial use of the site. Therefore, institutional controls will not be required to regulate future land use. A deed restriction alone was evaluated in the SCFS, as part of the No Action alternative, and was determined not to be protective of human health and the environment. Deed restrictions would not be effective in addressing site-related risks resulting from the continued migration of uncontrolled contamination from soils and floating product. Therefore, EPA and NJDEP believe that the preferred alternative for remediating the site is most cost-effective method for addressing the risks associated with the site contaminants.

9. **The SCFS states that technologies that specifically address the recovery and/or the removal of free and residual product are not identified in the document because of the high viscosity of the free product and the low soil permeability. As a result, the only approach evaluated in the SCFS to address free and residual product was excavation. The Proposed Plan should be revised to evaluate: 1) vacuum enhanced product removal as a component of an industrial use alternative to address the presence of free and residual product; and, 2) installation of a modified cap over soil in the product and other site areas to address direct contact exposure risks that remain.**

Response: (1) Vacuum enhanced removal of the free product was evaluated by the NJDEP and USEPA, prior to the SCFS, when the agencies were conducting an engineering evaluation of the existing Floating Product Recovery system. This evaluation was completed by Handex Inc. under contract to the NJDEP. During this evaluation, Handex evaluated several technologies for enhancing product removal, including vacuum enhanced extraction. Handex concluded that vacuum enhanced extraction could not improve the effectiveness or efficiency of wellpoint extraction of this product due to the extremely high viscosity of the product and the unusually low permeability of the "filter cake" material. The agencies did replace the extraction pumps in the recovery system which did improve system operation. The results of Handex's efforts were conveyed to the Department's contractor who was hired to conduct the SCFS. Accordingly, vacuum enhanced product removal was quickly screened out of the alternatives evaluation. Overall, the agencies determined that the most cost effective solution, over the long-term was excavation of the product area to provide direct access to both free and residual product and saturated filter cake material.

2) With respect to the second part of this comment related to capping, the three containment options evaluated in the SCFS did include various capping options. The agencies are confident that the three sets of containment options evaluated in the report adequately provide a reasonable analysis of the containment technology.

10. **Since arsenic and other inorganic constituents are not present in site ground water in concentrations that require remediation, the sole reason for remediating the arsenic-containing soil in the tank farm area is to prevent direct contact. This can best be achieved by maintaining the site for industrial use and by installation of a modified cap.**

Response: Extensive arsenic contamination of the groundwater underlying the site is well documented in the RI Report. Data presented in the 1996 RI Report and summarized in Table 13-25 of the RI Report, clearly show impacts to on-site ground water by arsenic contaminated soils at the site (with on-site soil levels of arsenic as high as 6,120 ppm. The arithmetic mean concentration of arsenic in on-site groundwater samples is 14,082 ppb, with a maximum concentration of 71,200 ppb. For wells on the IOC/CC property, carcinogenic risk from ingestion of ground water was estimated at $8x10^{-01}$ and greater than unity for the most probable and realistic worst case scenarios, respectively. These risk greatly exceed EPA's and NJDEP's acceptable risk criteria. Therefore, EPA and NJDEP have determined that it will be necessary to remediate arsenic-contaminated soils, as well as site soils impacted by other contaminants, not only to address direct contact risks, but also to mitigate impacts to ground water through source removal.

11. **The risks to human health and the environment posed by the preferred remedial action should be accounted for and defined in the SCFS and in the Proposed Plan to properly evaluate these alternatives.**

Response: Risks to human health and the environment posed by all remedial alternatives are evaluated in the SCFS process under "short-term effectiveness", one of the five primary balancing criteria. Short-term effectiveness addresses the period of time needed to achieve the selected cleanup and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until cleanup goals are achieved. As stated in the Proposed Plan, the selected alternative, Alternative 3 provides the greatest overall short-term effectiveness compared to the other alternatives, primarily because the work can be completed in the shortest amount of time. Risks to human health and the environment posed by all alternatives are outlined and accounted for in the Proposed Plan, as well as mitigative measures necessary to address any risks. Short-term risks posed by the selected remedy can easily be managed through the implementation of a site-specific Heath and Safety Plan to be developed during the remedial design phase.

Appendix A

Transcript of Public Meeting

IN THE MATTER OF:)
)
IMPERIAL OIL SUPERFUND)
SITE)

TRANSCRIPT
OF
PUBLIC MEETING

PLACE: Marlboro Township Municipal Complex
Marlboro Township, New Jersey

DATE: March 18, 1999

PRESENT:

EDWARD PUTNAM, ASSISTANT DIRECTOR, NJDEP
JOSEPH MAHER, SITE MANAGER, NJDEP
MARK STEIMACK, PROJECT MANAGER, HARDING LAWSON ASSOCIATES

ALSO PRESENT:

TREVOR ANDERSON, USEPA
KIM O'CONNELL, USEPA
STEVEN BYRNES, NJDEP
MINDY MUMFORD, NJDEP
DAVID VAN ECK, NJDEP

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MR. PUTNAM: Good evening. We appreciate the interest. Tonight we're specifically here to talk about Operable Unit 3 for the Imperial Oil Champion Chemical site. We've placed a couple of poster boards up here to try to indicate the different operable units because obviously we're up to three now. But we do specifically have to just talk about three tonight. We will all still be available after the formal meetings end and the stenographer is turned off and we can answer any and all questions related to the other aspects of the case. But I need to get the Operable Unit 3 discussion finished and settled before we move on to anything else.

There were two handouts in the back and a sign-in sheet. The first is the agenda and it has with it attached a summary of the alternatives for a quick reference summary. The full proposed plan is also back there and you can read at your leisure. The comment period right now extends to April 6. We're taking oral comments here tonight and they'll be recorded and put into the formal responsiveness summary, and we will be taking written comments up until April 6th also.

I'm going to try to get through the up-front stuff as quick as possible and get through the presentation. Please hold all your questions until the end and then we're here the rest of the night to answer questions.

A quick reminder, there is a technical assistance grant awarded on this site to the Monmouth Environmental

Coalition. That grant is approximately $50,000 from the Environmental Protection Agency to enhance the citizen participation in the program. So if you are interested in joining that group, Tina Freedman is present. She's here. Just to let you know, as you can see we've got a whole crew up here of DEP people and we have some EPA people in the audience. And with that, let me get right to turning it over to Joe Maher to start off the presentation. Joe.

MR. MAHER: Okay. Mark, I think you can just -- let's just flip through these three slides on the operable units and let's just go the site location map to orient everybody with regard to where Imperial Oil is. Can everybody see that slide? Okay. That's better. Can you hear me now?

As you can see, the site is bordered by Greenwood Road, Texas Road, Tennant Road and Route 79. The entrance to the site is just off of Tennant Road onto a little spur of the street there known as Orchard Place, sometimes known as Orchard Street. Go the next slide there. Let's just take a look at the actual site itself. As you can see here to the left, Tennant Road, there's the entrance onto Orchard Place. The outlined area that you see there, the entire site is about 15 acres, but the active portion of the site is about 4.2 acres. The -- you can see a number of buildings. There's approximately seven buildings there. Those are for the administrative offices and the operations of Imperial Oil, the current tenant of the facility. The site itself is actually owned by Champion Chemical Company. The shaded areas that you see there are a number of tank farms. Those are above ground storage tanks. Imperial's operation is -- they don't really manufacture anything. It's one of oil blending and they bring in basically clean oils, store them in those above ground storage tanks and basically blend that to meet a particular customer's specifications.

The 4.2 acres is fenced. At the top of the slide there, you can see that the site is bordered by an abandoned railroad there. I don't know if you can distinguish, but up in the right-hand corner, would be the northwest corner, you see three yellow blocks there designated as oil water separators. That's the low area of the site. There is a berm between the fenced in area there and what you see is the blue-shaded area. That berm wasn't always there and that's, you know, caused a problem early on where contamination has run off the site into the water body and has traveled downstream. But the oil water separators are there to -- in heavy rainfall events there's the potential for residual contamination to picked up there and they go through that oil water separator. The oil is separated out. It's properly disposed of. The water that's collected goes through a little treatment system that Imperial Oil operates under a permanent discharge and intermittently as need discharged into that stream.

With regard to the site history, this place has been home to a number of manufacturing facilities since about 1912. From 1912 to about 1950, some of the manufacturing things done there were tomato paste and ketchup. The brunt of that period of time there were two different chemical companies that dealt in arsenical based products, arsenic based products manufacturing there. And for a short period of time, flavors and fragrances were manufactured there.

Champion Chemical bought the site in 1950 for the purposes of doing oil waste recycling and oil waste recycling was done there from 1950 to approximately 1965. They brought in waste oil and through a filter medium known as filter clay or diatomaceous earth and a caustic solution in various tanks, they took out the impurities of the waste oil, recovered the oil and unfortunately the waste products from that a lot of it was disposed of at the site. In 1969 Imperial Oil, the present operator of the facility, leased this property from Champion Chemical and they're the current operator there.

With regard to how the State of New Jersey got involved in this site, many, many years ago it was alleged that Imperial Oil was a potential responsible party, if you will. Materials were alleged to have left the Imperial Oil site and deposited on another Superfund site not too far away. Some people are familiar with the Burnt Fly Bog site which is about three miles away. Based on that, the State did some initial investigations. We did in fact determine that there were heavy metal contamination and PCB contamination. It's typical of the way we discovery many of our sites. And normally the first course of action when we -- when we identify a site like this as contaminated, we would normally attempt to negotiate with the potential responsible parties to get them to take an action, to investigate the site and ultimately to remediate the site. Many times, including this particular case, it's rather complicated. There were various owners/operators of the site. And rather than go through protracted legal negotiations to try to reach a settlement up front, luckily for the public we have a program called the Superfund Program where federal dollars are available to states to go in there, investigate the sites, clean them up and worry about cost recovery later. And that's in fact what we did at this particular site.

We applied to get on the national priorities list of Superfund sites. We successfully did that. That entitled the state to get money and with that money we performed what we term a remedial investigation and feasibility study. And with that, I'd like to turn it over to our contractor. With the money we got from EPA we contract out that work to an engineering firm. In this particular case, it was a company called E. C. Jordan from Portland, Maine. They're now known as Harding Lawson Associates. And I'd like to turn it over to Mark Stelmack who's the project manager for the Imperial Oil site with Harding Lawson Associates.

MR. STELMACK: As Joe mentioned, my company performed remedial investigation feasibility study for the site and I'll just briefly run through the steps of the RI process, some of which are shown on the slide. I don't know if you can read the words from there.

But first of all, it says conduct field investigation. We went out and collected samples from the site, soil samples, literally hundreds of soil samples collected across the site, sent these samples out to a lab for analysis of their chemical content. We sampled the soil at various depths across the site ranging from ground surface to as deep as 25 feet below the ground surface. Once the lab reports came back, we were able to find the nature and extent of contamination. We knew the types of chemicals that were there. We knew the levels and we knew the depth, vertical extent and the horizontal extent in the area.

At the same time, we also researched and identified the different regulations, both federal and state, that would -- we would need to adhere to when we began the cleanup, compiled those and published those in both the RI report and the feasibility study report. For example, wetlands regulations, they play an important part here because there are wetlands on the site. We had to identify which wetlands regulations we would need to conform to given he various cleanup activities that would occur. Also during review of the federal regulations during the feasibility study phase we compared the contaminant levels to the site cleanup criteria that was developed by the EPA for the site and that -- used to determine the extent of the cleanup, and those numbers are published in the proposed plan before -- also during the remedial investigation conducted a baseline risk assessment to determine the impacts or risks to both human health and ecological receptors or -- habitat that inhabits the site. And the general conclusion was that there are risks to both human health and the environment that would need to be addressed.

Next slide -- results of the remedial investigation allowed us to define the principal areas -- contamination which is identified in the tan colored area on this slide. In includes the lighter of the gray area. The gray areas -- facility, which are the four tank farms, also includes on the northern -- or actually the western part of the site -- the former waste pile, and several isolated locations where fill was brought in during activities on the site, non-native material scattered about -- different locations across the site. There are a host of different contaminants or chemicals in the soil -- Imperial Oil. The three primary contaminants found in the larger extent than others, and the three that would drive the cleanup, are PCBs, arsenic and waste oil related organics, otherwise known as TPH, or total petroleum hydrocarbons.

Next slide, please. We then moved into the feasibility study portion of the -- of the process, which is basically the preliminary engineering phase where we look at the different cleanup options. We start by identifying remedial action objectives, which were basically our goals, what did we want to accomplish when we -- when we clean up the site. Our next slide, which we won't show just yet, but has a synopsis of what those remedial action objectives are. We then identified potential technologies for containment, treatment and disposal of the waste, containment being one technology where we would take the waste, this contaminated soil, and basically encapsulate it, put it in a cell, or a box if you will, and it has a cover -- sides and the bottom on it, and store it on site. Treatment of the soil was another technology we looked at, basically cleaning up the soil such that it would be rendered clean and would be able to be returned to the site. We also looked at off-site disposal of the waste, basically putting the waste into trucks and then trucking it off to a licensed off-site disposal facility.

After identified those technologies we screen them based on their ability to perform the task, and the criteria we used were effectiveness, implementability and cost. And the ones that best met those criteria we retained for further use, and then the ones that didn't quite meet those criteria were limited effectiveness, basically means how well -- to meet our remedial objectives. Implementability is another word for the ease that -- which you could institute these alternatives. Do you need a lot of equipment? Do you need a lot of labor? Do you need a lot of room on the site? That kind of thing. And also we looked at the cost. Obviously the ones that were very, very costly would be most apt to be screened out.

We then -- we then took the technologies that were -- remained after the screening and formulated them into what are called alternatives, or options. And having developed those alternatives we performed a detailed analysis of those alternatives based on certain criteria developed by the NPA would be -- I'm showing those on the slide coming up. And then from the detailed analysis of the alternatives we were able to select -- alternative which we would be presenting later in this presentation.

Next slide -- remedial action objectives or the goals for the cleanup at Imperial Oil were basically to prevent human and ecological exposure to site contaminants, prevent human contact to the site contaminants and contact by wildlife that inhabit the site, and also to prevent further migration or spreading of the site contaminants. Some of the spreading may be caused by wind or water erosion or leaching of the contaminants down into the ground -- table. Next slide.

The soil remediation alternatives that we developed can be grouped into four different categories, first one being no action. Under Superfund law we have to look at the no action site. We kind of look at that to basically not addressing the problem directly but monitoring the site -- keeping a watch on it, kind of a baseline alternative that we could use to compare the other ones. Second category was on-site containment options, as I -- as I mentioned before, basically encapsulating this contamination site.

Third category is off-site disposal -- use, trucking the waste off site to license disposal facilities and if possible using the soils to be reused in other ways. One of the ways we can possibly use the soil under a reuse alternative -- Imperial Oil soil is to send it to an asphalt batching off site where it can be used in an asphalt batching process to make asphalt and build roads with it. Fourth category is treatment, and basically using the state-of-the-art, latest technologies for cleaning up chemicals in the soil, rendering them clean and being able to put the soil back on the site.

The different alternatives that we developed and evaluated, again, no action is alternative number one. There are no actions in this alternative that would directly address the soils themselves -- there's no treatment, there's no covering, there's no capping. Basically we would be monitoring -- and the sediment over a 30-year period. -- possible that alternative, in today's dollars, is $295,000. Next slide.

The next three slides are the three different containment options that we developed and evaluated. First one is alternative 2a -- probably be stricken, containment. You would excavate the soil on the site and encapsulate it in a cell which would isolate it from the environment without a lot of moisture to get into the contamination, nor would it allow the contamination to get out. It would prevent contact with the -- with the chemicals in the soil. We would be building that in approximately three-acre size in this alternative. And as I -- as I may have mentioned, the cover would be made out of clay, a combination of clay and synthetic material such as a plastic, and it would have sides and a bottom liner to it in this alternative.

Second action in this alternative is to take -- determining the hot spot soil, which is the most heavily contaminated soil, which reps about a third of the total soil mass in volume. And we would not encapsulate that in a cell on site, we would take that hot spot soil and dispose of it off site, transport it and dispose of it off site -- licensed off site -- facility. Cost of that alternative is about 50.4 million dollars.

The second containment alternative, alternative 2b, is termed expanded containment, very similar to 2a, the main difference being that the on-site containment cell is the largest cell, it would be spread over five and a half acre area rather than a three-acre area, resulting in a lower profile of the finished cell. The approximate height of the sale in this alternative is about 15 feet above the ground, whereas the height of the cell -- 2a is approximately 30 feet, so it's twice as high when completed. And, we would be taking one -- approximately one third of the soil, which is the hot-spot soil in this alternative in transporting and disposing of it on site. Cost of this alternative, approximately the same as 2a, 16 -- just -- 16 -- the third containment alternative is alternative 2c, called in place containment. Unlike 2a and 2b this one only has a cover over the top. There is no bottom lining to this alternative, therefore it's not quite as protective -- would prevent moisture from seeping in from the top -- the wastes in the soil on the site is still being -- come in contact -- ground level. And also similar to 2a and 2b we would -- we would be excavating the hot-spot soil, disposing it off site. This one's a little bit cheaper because it doesn't have the bottom liner, approximately 13 and a half million dollars.

Alternative three, moving away from the containment alternatives and getting into the off-site disposal for use, you would estimate the contaminated soil and remove it from the site in it s entirety. The hot spot soil would be removed to a licensed -- site landfill facility. The remaining two thirds of the more likely candidates would be shipped off to what's term a special waste camp going. And a portion of that industrial waste, landfill waste, if possible as I mentioned before we would try to reuse that -- send it most likely reuse candidate at this time would be an asphalt -- point, given the preliminary data that had, at this point chemical data, chemical data, we think approximately one quarter of the lightly contaminated soil my be available for use in an asphalt batching firm. Cost of that alternative, not much more than the containment alternative, 17.2 million dollars.

Last alternative that we looked at in detail is the treatment alternative. We would basically build a soil treatment facility in a building on site, treat the soil, excavate the soil, treat it in the -- in the facility and return it back to the ground at the site. The treatment that we identified that would be most likely to be able to handle the wide range of chemicals on the site is termed metallurgical extraction. It's a two-phase treatment process, the first phase being soil washing operation where the larger soil particles are cleaned, and the second phase being extraction phase where the smaller particles are cleaned.

The treatment alternative has several serious implications, one of which is -- requires a lot of -- quite a lot of space on the site to build treatment equipment. It would also be fairly noisy and would have to run approximately -- approximate -- it would have to run 24 hours a day, something to be considered as far as impact to residents in the area, not to mention the cost of this treatment alternative, approximately twice that of alternatives two and three. They're around 38 million dollars. And again, these costs are very -- they're preliminary in nature. They're -- we're in a preliminary engineering phase of the evaluations, and these costs could vary when it comes time to build or actually put the alternative into place. But relatively speaking they give you a fair idea of the -- of the cost for treatment versus containment. Next slide.

The criteria that we used to evaluate these alternatives and help us select a preferred alternative are ths4e nine that are listed here. And these are suggested or published as guides -- guidelines by the USEPA and they're used nationwide in Superfund sites to evaluate alternatives. And I'll go over them very quickly, the first one being overall protection of human health and the environment, how well does the alternative protect human health and ecological receptors or wildlife at the site. Second criteria is how well does it comply with the federal and state regulations and guidelines. Third criteria is its long-terms effectiveness and permanence, in other words, how well does it meet your cleanup objectives or response objectives, and is it -- is it a permanent solution or are you leaving some of the waste on site that has to be monitored over a period of time.

Fourth criteria is does it -- does the alternative reduce the toxicity, mobility or volume of the contaminants through treatment? Some of the containment alternatives don't include treatment. The fifth criteria is the short-term effectiveness. That's another term for how much impact does it have on the community during its implementation, is it going to be noisy, is it going to -- are there going to be a lot of -- truck traffic generated, dust, oiling, that kind of thing. Also protection of workers during the clean up is -- is a factor in short-term -- implementability is another criteria. Are the materials available to perform the cleanup? If it's a technology that needs special equipment is it available? How much spice is needed on the site, how much labor is needed, is the labor available -- costs comes into play. And the last two are support agency acceptance, and the very last one, community acceptance, how well is the alternative received by the community, and it's part of -- tonight is to solicit brief comments on the -- preferred alternative -- on the other ones that we've looked at.

I believe the next slide gets into the preferred alternative, which Joe will describe in a little bit more detail.

MR. MAHER: Okay. The proposed plan that everybody picked up in the back, as you can see, the State and EPA's preferred alternative is alternative three. Unlike many sites that we end up evaluating th seems to be the obvious choice. When you evaluate all the available info with -- it definitely provides the best balance of all the criteria that were just explained. It provides the best short-term effectiveness. It can be implemented in the quickest amount of time compared to the other alternatives. We estimate probably once we had approval to go forward, after the thing is designed and we're ready to actually start construction, the implementation time would probably be about 11 to 12 months compared to twice that amount of time for the other alternatives.

It also provides, we feel, the best long-term effectiveness. Although the treatment alternative would be the best when you look at that category, the cost is so prohibitive that, you know, although we're digging it up and carting this material off to another facility and therefore we're not reducing, you know, the toxicity or the mobility of the contaminants, it's taken to a facility that's pre-engineered to be protective, where a number of hazardous waste sites ends up taking their material. And so it is safe for the environment because all their -- all the engineering controls are built in up front. It -- it's certainly cost effective. When you compare it to the capping alternatives, for about seven to 10 percent more, you are ending up with a site that has a much more flexible long-term use with regard to the site. If we were to choose the capping as Mark described, the cells end up having to be above ground substantially, for one of them 16 feet in elevation above ground, the other one about 30 feet above ground. The reason for that is the groundwater table is so shallow and in order to put this liner system underneath, we can't go any further than about five feet into the ground which causes the cell to be above ground. So it certainly restricts the flexibility for any future use of the site.

By selecting alternative number three, there's no future monitoring that will be required. We are going to take all of the contamination and therefore unlike a cap system where certainly you're containing the contamination, there would have to be long-term monitoring, infinite monitoring to make sure the integrity of that cap is maintained and that, you know, there's no future migration of that contamination.

So let's -- again, we'll just go through the components of the preferred alternative. This is consistent with each of the alternatives. We estimate -- there's much more what we refer to as product at the site, but we feel when we excavate the site, we can probably get about 5,000 gallons of free product. That material is very concentrated, contaminated and that's part of the category that we are referring to as hot spot material. The hot spot material consists of the 5,000 gallons of free and residual product and the 27,000 cubic yards that you see at the bottom bullet of this slide. That particular material consists of what we call

TSCA regulated material. That's soils with PCB concentrations greater than or equal to 50 parts per million. And we also believe that in the tank farm areas, there's some very elevated arsenic levels. And one of the disposal criteria under the RCRA, the Resource Conservation and Recovery Act, that material would fill the discharge requirements for that and that would have to be disposed of as what we term as a hazardous waste which needs to go to a more sophisticated disposal facility, if you will.

The next slide. And so from the previous slide, there 80,000 -- 83,000 cubic yards of contaminated material, that's for each of the alternatives, and 27,000 of those cubic yards we'll refer to it as hot spot. The remaining 56,000 cubic yards would be disposed of to an off-site special waste landfill, as Mark described. We estimated in the feasibility study that approximately 14,000 cubic yards of that 56,000 could possibly be a candidate for recycling in this asphalt batch plan.

Once we excavate the site, we will bring in clean soil and back fill the entire area, regrade it and restore all the wetlands that we may impact as a result of building the entrance roads to get the contamination in and out, any disturbances that we have to make to actually implement the remedy.

And this final slide is a site layout. Again, the orange area is an imprint of where the contamination is. And I think that's it. At this point I'll just turn it over to Ed --

MR. PUTNAM: You want to give me some lights.

MR. MAHER: -- to entertain any questions here.

MR. PUTNAM: Okay. The -- there's a representative from Senator Bennett's office who has a statement to read. I'd like to do that first.

AUDIENCE: Unfortunately the Senator can't be here tonight, but he has prepared a statement. "I have been involved in the prodding of clean-up efforts on the Imperial Oil property since the Health Department first found evidence of widespread pollution on this property nearly 20 years ago. It is pitiful that while this site was declared a Superfund site 17 years ago, Imperial Oil was still able to receive federal Department of Defense contracts and is still able to operate an active business while taxpayers are asked to pay for the cleanup. It is shameful that the federal government has taken so long to take real action on this site and it is a disgrace that this site is only going to be cleaned to industrial level standards.

It is common knowledge that an industrial cleanup does not remove as much contamination as a residential cleanup, and it is common knowledge that there are residential communities nearby. I am thoroughly disgusted at this decision and plan on voicing my opposition to this industrial level cleanup until the decision is changed and encourage residents of the area to do the same."

I guess what the Senator basically wants to know is why it's only being cleaned up on industrial level standards?

MR. PUTNAM: Yeah. Basically if you recall the brief history we've presented, the site has been an industrial use since the early 1900s. And because of that long history of historic use, the most probable future use was going to remain industrial and that's what was chosen as the land use to clean up to.

Now a couple of things I want to point out in relation to that.. The data we have indicates that the three primary cleanup goals that are going to drive the cleanup are the arsenic level, total petroleum hydrocarbons and the PCB level. When you compare the industrial number to the unrestricted use number, you're really only looking at PCBs as having any significant difference as far as what's industrial and what's unrestricted use. The numbers come out to 13 parts per million versus essentially a half a part per million. Our data that we have doesn't really indicate that we have anywhere where there is that difference. Now we don't have every piece of data we could get, but the PCBs from what we've seen are either there or they're not in their entirety.

So we would hope that even though we're shooting for an industrial number of 13 on the PCBs, that we're not going to encounter that spot where it's going to be less than 13 but above a half. We think that, you know, it's either going to be there or not and the cleanup to go after that PCBs in general is going to achieve the unrestricted use number.

In addition, arsenic really overshadows almost all of the contaminated areas. So the arsenic level of 20, which is not affected, that's an unrestricted use number and it's also the number that you would use for the industrial number, that is going to be the main driver. When we achieve that, we achieve an unrestricted use for the property. And there is a huge overshadowing of arsenic. So we do expect the cleanup to actually achieve unrestricted use. It's just that this particular decision proposed here doesn't guarantee it.

Now the other part of the equation is community acceptance of the proposed remedy and that's what we're here for and this is your place to voice your opinion on this subject. Mayor, you want to --

AUDIENCE: Thank you. The questions that I have deal with that unrestricted cleanup --

MR. PUTNAM: Right.

AUDIENCE: -- associated with the industrial versus the residential. The alternative that's preferred, when I was hearing your presentation, removal of the liquids, removal of the soil to me takes the problem away. However, how does the alternative number three that is preferred, which seems to address the problem, how does that differ in a residential versus an industrial scenario?

MR. PUTNAM: With the information we have, we see no difference in the quantity of soil that would have to be removed to achieve essentially both. But we don't have a data point for every place on the site. So theoretically, there could be a place on the site where arsenic is below 20, total petroleum hydrocarbons is below the 10,000 number, and PCBs are below 13 but above the half. We don't see that happening at this point, but it could happen.

AUDIENCE: Well let me ask the question this way. Are you removing all of the liquids, the 5,000 gallons?

MR. PUTNAM: Yes.

AUDIENCE: Is that all of it?

MR. PUTNAM: That's all -- 5,000 gallons is what we think is going to leak out.

AUDIENCE: Are you removing all of the contaminated soil and are you removing all of the hot spot soil?

MR. PUTNAM: We expect to do that, yes.

AUDIENCE: So if you're removing all of the problem, why is there a difference between an industrial level and a residential level? I don't understand.

MR. PUTNAM: Procedurally there's a difference in that you have to pick a land use end point as far as the cleanup goal. In this particular circumstance, because of its historic use, industrial was picked. That sets a list of cleanup goals because of that. Also in this circumstance, which is unique, at this time with the data we don't see a difference between achieving the unrestricted use and the industrial number. It's just that the way you go through the procedure of choosing a remedy, you have to pick one. We picked it, but it really didn't result in a change in quantity or a change in cost.

AUDIENCE: Well I'm still a little bit confused, but you talk about the land use and this property is currently zoned C-2. It's not zoned industrial. It has an industrial use --

MR. PUTNAM: Right.

AUDIENCE: -- but the zoning is C-2. I'll tell you what those permitted uses are. In addition, it butts up to a residential zone and in addition, as you've already cleaned up Orchard Parkway where there are homes, you did clean that to a residential cleanup, did you not?

MR. PUTNAM: Well that was -- they had just arsenic and we cleaned up to 20 and 20 achieves both residential and --

AUDIENCE: These are the permitted uses and I must say that no one can predict what the future will be of Imperial Oil and what the use of that property is, but the current zoning does allow for general merchandise, food stores, apparel and accessories, eating and drinking establishments, variety stores, drug stores, liquor stores, florists, finance and insurance, personal services, business services, repair services, professional services, government buildings and grounds, and then there are some other conditional uses such as public utilities, motor vehicle and amusement arcades. Now some of those uses have significant impact on human consumption, such as restaurants, okay, arcades where children can be. And why should we be cleaning up something that we didn't cause, that you've identified as a problem, a Superfund problem, tremendous magnitude, why not clean it up to the residential standard? And since essentially you're taking everything away, both liquid and soil, if there's a little bit more that needs to be done to get that insurance, that assurance that it is to that total restricted residential standard, why don't we do it?

MR. PUTNAM: I can certainly take your comments back and --

AUDIENCE: Well that's the position of the administration. We'd like to go the full extent.

MR. PUTNAM: Yes.

AUDIENCE: And I still don't understand why it isn't. Once again, if everything's being taken away, that's what the standard should be then, the residential standard. Thank you.

MR. PUTNAM: Thank you. For any other questions, if you could come up and stand in front of the mike, state your name for the record.

AUDIENCE: Hi, Tina Freedman, Monmouth County Environmental Coalition, and Dr. Stephen Penangroth who is the technical advisor. I just want a -- I prepared a statement, but then I also want to engage in some questions, okay.

The preferred alternative should result in the cleanup to residential standards. All the contaminated soil is going to be removed. In the proposed plan, DEP is committing only to an industrial cleanup level. DEP should commit to a complete cleanup to residential levels. That way the site can be used without restrictions in the future.

The data in the RI/FS show that all the contaminated soil that poses a risk to human health will be removed including PCBs. That being the case, DEP should commit to -- and EPA should commit to making sure that this site is -- has unrestricted use.

Also you're committing to that all the arsenic is guaranteed off the site. It's just the PCBs that we're talking about, is that correct?

MR. PUTNAM: From what we can tell, although table one in the handout lists a whole lot of chemicals, the three that seem to be controlling the quantities to be excavated are the arsenic, total petroleum hydrocarbons and the PCBs. So the arsenic is unaffected by the 20 is a average state-wide background number, it is not based as unrestricted use. It's a background cutoff. The TPH is not -- is not really in question either. And the PCBs is really boiling down to the one that might make a difference.

AUDIENCE: I -- I know -- we'd like to see you guarantee the PCBs. I mean I know that it's --

MR. PUTNAM: I -- yeah.

AUDIENCE: -- it's unknown for you when you start cleaning up on what, you know, where you'll hit it and what the levels will be. But I don't know how it affects it financially and maybe that's what part of the problem is. I don't know if you're -- this cleanup, the PCBs are that much of an unknown that it's going to drive up the cost. Is that what you're considering?

MR. PUTNAM: It's not really a cost consideration. It's basically an observed land use decision to go with the industrial numbers. But, you know, I mean it was -- we're certainly, I think, going to hear a lot of that tonight and that's really the kind of comment we need to hear.

AUDIENCE: I know that Penangroth had some comments and questions.

MR. PUTNAM: Okay.

AUDIENCE: Thanks. No, I'd just like to follow up on what Tina said. It seems that the PCBs are going to come out, you know, the way you've laid out the soil remediation, the soil removal in the FS and in the proposed plan. So I guess -

MR. PUTNAM: I think it boils down the point of are we guaranteeing it or are we just going to hope it happens.

AUDIENCE: Right. But can't you -- yeah, but can't you -- I mean based on the data that you have, I mean that we all -- that we've all shared, you know, that you've shared with me --

MR. PUTNAM: Right.

AUDIENCE: -- just looking at the data, you're going to do it.

MR. PUTNAM: Right. It's going to happen.

AUDIENCE: It's going to happen. So why not -- I mean I guess I don't understand -- from a technical standpoint, I guess I don't quite understand the reluctance, you know, because you're going to do it, so why not say you're going to do it.

MR. PUTNAM: The process --

AUDIENCE: Is there something I'm missing here?

MR. PUTNAM: The process is ruled by procedures that on some accounts take into consideration the technical data and on other accounts are based simply on procedural guidelines that are set for the program.

AUDIENCE: Land use you mean.

MR. PUTNAM: Land use being one of them.

AUDIENCE: So this is basically a land -- just a land use decision.

MR. PUTNAM: A land use decision is really made independent of the data and then you put the two together and develop alternatives to meet the land use and the remediation goals based on the data. So you're making a land use decision independent of the data.

AUDIENCE: Right. Just to bring everybody sort of up to speed, there's 34 contaminants of concern that I counted in the table, and of those -- and 25 are going to be cleaned up to residential standards based on the industrial standards. In other words, the industrial or impact to groundwater standards that are used in the proposed plan are actually more stringent than the human health criteria. And then there's five where they're less stringent, but the actual levels on the site are cleaner than the human health. And that leaves four of those, one is PCBs which we're talking about. The other three are just are a couple of polynuclear aromatic hydrocarbons that are just two found at two locations in a waste clay filter pile. So they'll get cleaned up without any doubt. So it -- so really, you know, you've done the -- you've done the job.

MR. PUTNAM: I really -- I think I'm --

AUDIENCE: I'm just sort of -- I guess I'm kind of like the -- why not go that extra half a step, you know?

MR. PUTNAM: When you see it at the end of the process and you're looking back, you don't quite see how you got the difference. But if you start at the beginning and move forward, they really go on two different tracks and that's why you end up where you are. But certainly this is the comments we want to hear.

AUDIENCE: Thank you.

MR. PUTNAM: Thank you.

AUDIENCE: Ed, regarding the formation layers of the aquifer which we're talking about now, that's the 5,000 gallons of oil that's sitting on top of it, isn't that correct?

MR. PUTNAM: The 5,000 gallons of oil that we have in this alternative is basically what we feel is going to leak out of the oil contaminated soil hot spot when we pick it up. When we excavate that, we think it's naturally going to drain about 5,000 gallons. We have calculated there's probably 10 times that of actual free product in that soil, but it's not going to come out. So the other -- the hot spot soil --

AUDIENCE: You're only going to be able to get 5,000 instead of the 10,000.

MR. PUTNAM: Well we think 5,000 is going to fall out. We're currently taking out about five or six gallons -- I think about five or six gallons a day is what we're sucking out of it currently with the system we have. And we're -- you know, if you're looking at 50,000, which we're not going to get there, which is why we're digging it up. So, you know, we're going to make sure we dig up and capture all of the free flowing product.

AUDIENCE: So then you're going to base that 30 year monitoring on that site, I don't think that's acceptable.

MR. PUTNAM: Well if -- if we leave --

AUDIENCE: Because if you're leaving behind 5,000 --

MR. PUTNAM: No, we won't be leaving -- we won't be leaving -- the only thing potentially we're going to be leaving behind is PCB contaminated soil --

AUDIENCE: Within the formation -- within the formation.

MR. PUTNAM: Down -- yeah, it'll be at depth and --

AUDIENCE: Within the formation of the aquifer?

MR. PUTNAM: That -- that won't -- no, it won't be in the groundwater.

AUDIENCE: It's sitting right on top of the groun water. What makes you think that it won't get into the groundwater in 30 years or 40 years or 50 years?

MR. PUTNAM: Well PCBs don't -- don't really solubilize -- in the groundwater and we're -- we --

AUDIENCE: You're talking about sand soil in that area. It's very sandy.

MR. PUTNAM: We also -- one of the operable units in a groundwater treatment system and we won't turn that off until whatever is currently in the -- in the water has been taken out. I'm not -- we may or may not have to do some monitoring just to make sure that it doesn't solubilize, but we wouldn't expect it to. I mean when we're totally done, really the only thing left if you do have any, since where you do have some PCBs is going to be a deed restriction.

AUDIENCE: But can you promise the Township and the community that there will not be any residual left in that area?

THE COURT: Well it -- there won't -- there won't be anything that we feel is a threat to groundwater, because that's another criteria.

AUDIENCE: What is the level of PCBs in that contaminated area that we're talking about, in the liquid?

MR. PUTNAM: Oh, it goes up over 500 in some cases.

AUDIENCE: Okay. So we're dealing with --

MR. PUTNAM: But that's the level actually in the oil. PCBs really do not have an infinity to groundwater. The number in soil that we feel is protective of groundwater is 50, and we're going to get that anyway.

AUDIENCE: So if it's safe to sit there, why not just let it sit there, Ed? You know, if it's not going to move into the aquifer and it's sitting right on top of the aquifer, just leave it there.

MR. PUTNAM: The product is moving and it still represents a direct contact hazard because it's also in the soil.

AUDIENCE: So the product is moving, correct?

MR. PUTNAM: The product is currently moving. We're going to get all that out. The PCB level -- the industrial PCB level is a PCB level in soil, not in -- not in actual oil. All the free flowing oil is going to be taken off site.

AUDIENCE: You're sure that you can get it all out?

MR. PUTNAM: Yeah. Well we're going to have to dig it up to get it out --

AUDIENCE: Even though --

MR. PUTNAM: -- but we're sure we're going to get it all out. Yeah. Free flowing liquid also can't remain in the ground.

AUDIENCE: Well I still think that the 30 years is unacceptable at that site. I think we have to renegotiate those figures.

MR. PUTNAM: And get it -- and just get it to walk away, we don't have to do any more to it eventually.

AUDIENCE: Keep monitoring it.

MR. PUTNAM: Well I think if we leave something behind, the only thing I can think of that we leave behind is the PCBs.

AUDIENCE: How are you going to assure the Township and the community that there isn't something there? That's what I'm getting at.

MR. PUTNAM: You mean that we missed something?

AUDIENCE: Yeah.

MR. PUTNAM: We feel we've done a good job characterizing the site and we do what's called post excavation sampling to make sure we got all of it going down. You know, there's an off chance that we can miss something, but I think we've worked pretty hard. I don't think we're going to.

AUDIENCE: All right. Let's go to the access and ingress roads. Now you said you were going to be building them to get into that area. How are you going to do that?

MR. PUTNAM: Well, we have a conceptual model at this point. But the reality is after we -- when we get into what we call the remedial design, the actual laying out of the facilities we need laying out of the access road, we're going to have to sit down with the public safety officer here in the Township and figure out what is best. The current access goes by houses. That's not the greatest. If you do the math, we're talking about thousands of trucks going in and out of there.

AUDIENCE: That's right.

MR. PUTNAM: So Imperial Oil does own property I believe that goes all the way out to 79. So there is the ability to go in and out through that and actually create our own road with a pretty good buffer. But that's currently a wooded area. So it's really I think going to boil down to a public safety decision in looking at the couple of options and we'll work with the town on that.

AUDIENCE: Okay. Well I have to stand with the Mayor and with the people of the Township and the community when it comes to the difference between cleaning it up to the industrial level and bringing it up to residential. I mean we have been at this now, what, 24 years, Ed. And after 24 years, I think we owe it to the community to bring it up to residential, okay. So you can take that back to your boss.

MR. PUTNAM: Certainly will.

AUDIENCE: Thank you.

AUDIENCE: Ed, how are you?

MR. PUTNAM: Hi.

AUDIENCE: Saul Honick, Marlboro Township. We were around and this has gone through, if we count the terms that Matt and I have served, almost five administrations. I'd like to make a couple of comments. First of all, Liz was very kind to give me the article. Who is Mr. Petrone?

MR. PETRONE: Right here.

MR. PUTNAM: Ken Petrone.

AUDIENCE: Could you explain why you made the comment if the Township owns the property in the future and wants to convert it to unrestricted use, they can go and clean it up further if necessary? And when you address that, I would like to know the difference between the cost of residential cleanup as opposed to -- are you federal or state, by the way?

MR. PETRONE: State.

MR. PUTNAM: State.

AUDIENCE: State, okay. I have another question for you after that.

MR. PETRONE: Okay.

AUDIENCE: The difference between the cost and how you came -- because the quote comes off very cavalier.

MR. PUTNAM: Yes. And I think he -- let him explain the quote.

MR. PETRONE: Okay. It was taken a little bit out of context. What I was trying to say was that we -- we remediate sites to -- the policy for the agency is to remediate the site to the current land use. It does not remediate the site to a restricted use cleanup, does not prevent future residential use on the site. And that was the point that I was trying to emphasize. What I said was that any future owner of the site, if the site is cleaned up to a restricted use condition and any future owner of the site wants to come and develop it for a residential use, they can do that on a restricted use site as long as the controls are maintained in place.

AUDIENCE: All right.

MR. PETRONE: And beyond that, what I was saying that the future owner also has the opportunity to remediate further if they so choose to do that.

AUDIENCE: What is the cost between residential and the cost of cleanup for industrial?

MR. PUTNAM: At t .s time we see no difference in cost.

AUDIENCE: You see no difference in cost. Then if there's no difference in cost and we recognize the location of the property, the fact that it's surrounded by residential, could you tell me why you wouldn't go to a residential cleanup based on the fact of potential water going onto the site and going off the site in a natural flow of discharge or what have you?

MR. PUTNAM: Well the -- we don't see any instances where you're actually going to get a surface of number of PCBs that is going to be substantial. More than likely if it is found that there's a difference, it's going to be a depth. There's going to be back fill placed over it. I think again the reason why you get to where you get to, is you determine land use independent of the data and independent of the costs and the quantities.

AUDIENCE: Well that raises an issue of a 100 year --

MR. PUTNAM: Obviously it's pretty unanimous here, the comments are.

AUDIENCE: All right. It raises -- as far as off water, water going off the site, you have various levels of storms. In '83 we had a tremendous storm and the whole surface washed off and we were out there where the Imperial Oil abrogated their responsibility and we had to bring in the Township to protect the dikes. Now the fact of the matter that can happen again. And with the federal standard, which incidentally is much higher than the state standard -- lower than the state standard, do you know and you should know what the industrial cleanup for the state standard is?

MR. PUTNAM: For PCBs?

AUDIENCE: Yeah. All right. It's two parts per million as I've been informed while the federal is 13 parts per million. And the residential is two to five parts per million as opposed to .49 parts per million. I want to ask why the state is lowering their standards with regard to this federal standard. I mean we're supposed to be the most aware state with regard to cleanups. Why are you as state officials accepting a federal level of cleanup that is less than your own standard as a state body that you impose upon us? And then if we have people who come to the Planning Board for an approval, we go by state standards, not federal, which represents you inversely condemning the property right from the get go.

MR. PUTNAM: All right.

AUDIENCE: Now I'd like you to defend that position. How as a state official --

MR. PUTNAM: To some extent, I've been using the .49 number when I refer to the unrestricted use which is the state standard.

AUDIENCE: Okay. Residential.

MR. PUTNAM: The EPA residential standard is one, okay. So I -- when I talk here about going to an unrestricted use standard, I am taking it all the way down to a standard. Now let me go --

AUDIENCE: Well --

MR. PUTNAM: Now let me go back to the procedure of how the Superfund program works. The state standards are soil cleanup criteria. They are not promulgated regulations. Therefore they are not recognized by EPA to the extent that we can overrule one of their numbers. So federal -- because it's a federal project being conducted under the federal law, 13 becomes the number, okay. As long as the number is above .5, whether it's two or 13, we would still look to have the same institutional control, a deed restriction. So --

AUDIENCE: Then you -- then --

MR. PUTNAM: -- from a remedial standpoint, from out standpoint, allowing two or allowing 13 results in the same institutional control that we feel will be protective.

AUDIENCE: You're talking almost 200 percent --

MR. PUTNAM: So there's no reason for us to fight the two, 13 number.

AUDIENCE: You're talking, if my math is correct, almost from two to 10 is almost a 200 percent increase or some ridiculous figure, as to the difference between two and 13, if we divided and so on.

MR. PUTNAM: But we're talking about --

AUDIENCE: On percentage basis, as two is the base and 13, you're talking hundreds of percent increase you're allowing. And I --

MR. PUTNAM: Right. We're still talking two part per million versus 13.

AUDIENCE: It doesn't matter.

MR. PUTNAM: Well it does in the field. You very rarely --

AUDIENCE: Why did the state -- why did you as a -- listen. Why did you as a state agency which controls -- DEP which controls us, controls our regulation, sets rules for our safety, decided to a level that is so much lower than the federal level, why did you go to that level?

MR. PUTNAM: Our number does not have the legal authority to overrule the federal.

AUDIENCE: I'm not asking that. I'm not asking what the federal does.

MR. PUTNAM: Okay. Why did we accept it?

AUDIENCE: The legal authority stems from the fact that this came from the Superfund, it doesn't make it right. But we're raising an issue of percentage. We're raising an issue of a hundred year flood, wash off, water system, the fact it sits in the middle of a residential area, these are all the issues. And the bottom line is, I'm asking why you're not defending these levels against the federal express because they'll just cut and run and do it as fast as possible.

MR. PUTNAM: From our standpoint --

AUDIENCE: After 18 years.

MR. PUTNAM: -- even -- even the 13 number, although when you multiply it out, the reality in the field is that's not a significant difference when you start looking at field data because they're both very, very small numbers. All right.

AUDIENCE: Well, you can play in it. I'll take the two.

MR. PUTNAM: But when we're looking at how you would respond to two or 13 and whether we feel that's a threat to surface water or whether we feel it's -- what kind of threat it is, there's no -- there's no real difference to us and how we would take remedial action in protecting people from two, protecting people from 13.

AUDIENCE: You're defending your position. We're putting you on the spot.

MR. PUTNAM: So we have the same remedy regardless of those two numbers.

AUDIENCE: It's just incomprehensible to me why you wouldn't take the safer route, why you wouldn't remove as much as possible knowing the circumstances of the area, the history of the area. And to rely on quote, unquote, this was 100 years industrial area, the Mayor has corrected that with regard to the proper zoning, I just don't understand why if there's no difference in cost you would sit down with the feds and say this is what we are recommending to you. We want this to be at the state level. We're not in Mississippi. We're not in Arkansas. We're here in New Jersey. Why -- have you told them this is what you want or you just went down the path and agreed?

MR. PUTNAM: The proposed plan is a joint document between the agencies.

AUDIENCE: Well, I'll tell you, something's very wrong. And I agree with Senator Bennett and I hope it carries it through and we can talk to our Congressman also about it.

MR. PUTNAM: Thank you.

AUDIENCE: It's reality. The fact is because there aren't 200 people here won't prevent from the Township to exercise its right in Court. I'm sure the Mayor will pursue that. Another year in Court won't make a difference based on the time. And one other thing, what is the OSHA stand on this? Excuse me. What is the OSHA stand on this? If someone works in the area, goes across the ground, handles the soil at 13.

MR. PUTNAM: I think it's pretty substantial as far as OSHA. Thirteen would be a number that OSHA -- the OSHA number for PCPs would be a lot higher than 13.

AUDIENCE: Okay. Just thought I'd ask.

MR. PUTNAM: Thirteen would be --

AUDIENCE: But then it's a federal standard, isn't it?

MR. PUTNAM: Thirteen is based on a work day, not necessarily on OSHA standard working with the material.

AUDIENCE: Sorry.

MR. PUTNAM: You're going to make it unanimous?

AUDIENCE: Of course.

MR. PUTNAM: Okay.

AUDIENCE: Les Jargowski, Monmouth County Health Department. First of all, I'd like to strongly support the residential concept, the residential standards. It makes sense totally through. But I'd like to emphasize something and get your response back relative to the living environment, the people that are there during this construction. Beside the arsenic and total petroleum hydrocarbons and the PCBs, I seem to recall a few elevated readings of beryllium there on that property, that's correct, right?

MR. PUTNAM: It's -- it's a lot higher than our standard, but it's not so high that we need to take any immediate action with regard to it.

AUDIENCE: Okay. As a health officer in terms of potential dust, fugitive dust on that property, that would get my attention and I'm sure it gets your attention as well. And I'd like to hear more about how you're going to control, you know, fugitive dust and potential noise on that property? And how long of a period of time might the people have to endure that?

MR. PUTNAM: The -- when we do a -- when we do a remediation, our goal in dust is to have zero at the fence line. We don't want any dust going off the property. We basically use dust suppressants to achieve that. We have often, to the point where you have somebody standing there with a hose spraying material as it's being excavated if you have to. But we can set up real time aerosol monitors at the fence line to insure that we're getting that. And especially in this case with residential property so close to where we're going to excavate, I think we're going to have to really be diligent in emphasizing that zero tolerance on that.

As far as the noise, it's been my experience that the backup beepers on the equipment are the worst noise you can be if you're a resident listening to that eight hours a day. We're certainly cognizant of that. We will do our best to strike compromises. You know, we're certainly aware that we don't -- people sleep until 8:00 in the morning, we're not going to start work at six. But we want to try to achieve the greatest work day we can in order to get it done faster, but we recognize that that starts to really start to infringe on people's lives in the area. And if you have to, there are options related to removing the person who can't take it any more. But that's usually a last resort because that sometimes can be worse.

AUDIENCE: Okay. But those mechanisms are available and you are going to have full-time monitoring for any type of dust coming off there?

MR. PUTNAM: Well what we'll do is -- what we'd probably do is set up -- try a couple of things out, see what worked the best, set up the monitors to testify that and then we can probably just do periodic monitoring there because of we'd be looking at actually just implementing the dust plan. And as long as we continue to implement we know we're okay. But if we have to, if it really starts to be a problem, we can do real time aerosol monitoring at the fence line.

AUDIENCE: Okay. When you dig this big hole to go after the oil, you know, in the back there, what kind of controls are you going to have in place in case we get a real heavy downpour? And, you know --

MR. PUTNAM: We're going -- we're going to defer to the Soil Conservation Service. They really advise us on that. We'll sit down with them during the design and we'll lay out the -- basically as part of the soil erosion --

AUDIENCE: So that's a decision to be made further down the line with the Soil Conservation Service?

MR. PUTNAM: Yeah. We in essence defer to them on what they think is appropriate.

AUDIENCE: Okay. I think it's really important that you understand, I think I said it before, when the water's coming down there, it's really coming through there.

MR. PUTNAM: Yeah.

AUDIENCE: There's a flash flow in there and the water gets kind of deep there at times. Thank you.

MR. PUTNAM: Yeah. We recognize that. Thanks. Any other questions?

AUDIENCE: I have one question, Ed. If memory serves me well, doesn't -- didn't the standard at Burnt Fly Bog, wasn't that residential?

MR. PUTNAM: It was ecological based. The one area, yeah, was residential.

AUDIENCE: Right.

AUDIENCE: Was that federal or state residential?

MR. PUTNAM: Actually I think officially the federal, but the same thing occurred there where we saw no real difference in the data and the reality will probably be that we'll achieve the state standard.

AUDIENCE: So it was a state standard.

MR. PUTNAM: We believe we'll achieve the state standard there too.

AUDIENCE: There, that's what it achieved.

MR. PUTNAM: Yeah. And that was for the area up close to the halfway house. When you get further down in, you're into the ecological areas. Mayor?

AUDIENCE: Yes. Ed, when it comes to the actual work being done, the excavation, the truck movement and so forth, are you going to be coming to the Township to work that out with regards to our traffic and safety, certain hours when movement is less impactful, more safe with regards to our school buses, et cetera?

MR. PUTNAM: Most definitely.

AUDIENCE: We would like to sit down with you and make sure that it's minimal impact where it can be worked out and most likely or most appropriately safe.

MR. PUTNAM: Yeah. We -- we encourage -- well we will definitely sit down with public safety official or emergency management official, however it works, to go over the truck routes. We'll do it during the design. We'll look at what options are available to the contractor. He will then be able -- if there is limitations, he'll pick one of them and then when we actually hire the guy to do it, then we sit down with the contractor who's going to be telling trucks which way to go with your police and lay out the final plan. We also encourage them to hire the police as traffic control officers.

AUDIENCE: I'd just like to make one final comment. I think you've heard a lot from a number of people including myself with regards to that issue of industrial versus residential.

MR. PUTNAM: Yeah.

AUDIENCE: I know how I feel. I believe I know how some of the council members feel and you've heard from environmental people, the former Mayor, Saul Honick. We're going to push pretty hard on getting that assurance that residential level. Now I intend to write a letter. I intend to have the town council do a resolution. We're going to have support from Senator Bennett's office, I'm sure. That's why the representative was here. Do we send it to you? Do we send it to your bosses?

MR. PUTNAM: Well make sure --

AUDIENCE: We'll send it wherever we have to.

MR. PUTNAM: -- make sure a copy goes to the contact person and pick you, Mindy or Don?

MS. MUMFORD: My boss, Don.

MR. PUTNAM: Don Kakas is the person. Make sure he gets a copy of it. You can -- you can send it to anyone and everyone you like. Make sure Don gets a copy of it.

AUDIENCE: And I'm also -- and I'm also thinking that in addition to your agency and other people in the State, I think we need to send it to the federal people, the EPA, and I'd like to know those contacts.

MR. PUTNAM: Ultimately the decision is going to be made by the regional administrator, Gene --

AUDIENCE: All right. All right.

MR. PUTNAM: Or the deputy --

AUDIENCE: Can I just interject? You heard us speak.

You hear what the Senator says. Will you recommend to the federal to lower the standard to your standard?

MR. PUTNAM: I heard -- I heard a unanimous voice from the community that said they want an unrestricted use and that's what I'll take back with me.

AUDIENCE: Okay.

AUDIENCE: And you feel you could recommend that? You'll recommend that to the federal?

MR. PUTNAM: It's not really up to me to recommend it one way or the other. It's something that I take back with me and certainly we'll emphasize the unity and the strength which everyone has --

AUDIENCE: You'll take back this expression on part of the administration and the citizens.

MR. PUTNAM: I will -- I will take back --

AUDIENCE: The question is, what is your recommendation to your superior that this be followed or --

MR. PUTNAM: That's actually really considered confidential and I wouldn't really discuss it in public.

AUDIENCE: It's bizarre.

AUDIENCE: It is bizarre. They should be here tonight then.

AUDIENCE: It's bizarre.

AUDIENCE: Right.

MR. PUTNAM: We -- there's other reasons for that.

But internal discussions are considered confidential and what you see coming out is the position of everyone involved.

AUDIENCE: Ed, you clearly heard what we all had to say.

MR. PUTNAM: Yes, I did.

AUDIENCE: I don't know if anyone else wants to come and speak, but I implore upon you and the others here to take that message back clearly and loudly. I also would like to thank you for coming here and giving us the opportunity, to hear us, to hear what we had to say. And once again, it's been a long time in coming to getting to this point. You've heard people make comments about that. I really do think that we need to get it done, get it done to the best of the standards that are there for the benefit of the people not only here today, but those people that will be here tomorrow and the years on in the future. So once again, thank you for giving us this opportunity and let's make the message clear.

MR. PUTNAM: You're welcome.

AUDIENCE: Steve Gusman is my name. I'm vice president of the town council. And I concur with the Mayor in the matter that we would like to make it an unrestricted residential area as well. And we need to do whatever we can to make that happen. And if it's more money needs to be spent, then obviously more money needs to be spent. But to do it in a half-hearted kind of manner I think is a total waste of time for everybody. And we need to clean it up in the best way we can so that if in fact, as the Mayor said it's a C-2 zone, we have supermarkets or restaurants or whatever, it's certainly going to affect people in that area as well as people if in fact needs to be as far as a residential community as well. So we would appreciate you doing whatever is necessary. And as the Mayor said, town council probably will send a resolution to whoever and whatever to make it get done. And again, we thank you.

MR. PUTNAM: I would encourage that you do if that's the way it goes. That's definitely the kind of feedback we're looking for. Thank you.

AUDIENCE: I just want to ask again. If you can guarantee the arsenic, why can't you guarantee the PCBs? Give me a direct answer.

MR. PUTNAM: I'll give it to you. You choose the land use before you look at the data, okay. So you pick industrial land use and then you say okay, with industrial land use these are the remediation goals that we want to achieve. Then you take the data and compare it to that goal. With arsenic, the 20 number is an unrestricted use number that is already above the "industrial number" because the 20 is based on background levels, naturally occurring background levels. So that's a number that I -- you stop at. You go to 20 and that's where you stop and that's background. Nobody's allowed to go below background in cleanups. It's the other compounds where you start to see a difference between unrestricted use and industrial use.

AUDIENCE: So the conversation about the future land use of this property, you can then re-evaluate?

MR. PUTNAM: Well what you have here is, you know, you have the ninth criteria. EPA calls it a modifying criteria. Okay. So you have seven criteria that engineers evaluate and they come up with a recommendation based on the engineering of it. The softer modifying criteria are the support agency acceptance and the community acceptance. So the reason it's called modifying criteria is that the decision maker can use what he hears from those two things to modify the decision. So that's why I'm encouraging you to make those comments so that they are on the record and they will be addressed and if they do result in a modification --

AUDIENCE: And what is the process --

MR. PUTNAM: -- then you got what you want. If they don't, you'll have an additional explanation why they didn't.

AUDIENCE: Okay. We'd like to request that after the 30 day, comment that everyone gets to send you their comment, that how long a time between we submit our comments do we hear feedback on whether it's going to be modified or not?

MR. PUTNAM: You actually won't know until the decision is actually made final.

AUDIENCE: And when would that be?

MR. PUTNAM: It depends on the volume of the comments. I would expect -- you know, these comments on the land use are going to be one issue fairly simply to respond to. We're either going to do it or not and give a reason. If we get other technical comments, they make take a lot more time to respond to. The responsiveness summary is reviewed by the decision maker before they make the decision. So you don't get the official response until -- it all happens at once. The answers to the questions and the final decision are made at the same time. And that's when you hear.

AUDIENCE: Okay. And is -- we'd like to be a part of that process. I mean we'd like to kind of know where you're heading.

MR. PUTNAM: You'll probably get some feedback on this issue anyway because of the type of issue it is. But there may be a situation where other comments overshadow some other things too. So I can't guarantee that you're going to hear before a final decision is made. But if --

AUDIENCE: Well we'd like to request that we do.

MR. PUTNAM: Yeah. And if it is really the only issue, you probably will.

AUDIENCE: Bonnie Baldwin, resident. This is the most densely populated state in the country and to decide that one little plot of land that is pressured by residences all around it is very superficial, I think, in the long run of how things work. I'm not a scientist but I know on a March day like today there's an awful lot of stuff blowing around. It isn't confined to just a specific area that's been called industrial or commercial. It's blowing all over town. And it's the same with water. So you're talking about an area that is surrounded by people and kids and you're talking about, you know, a very high water table, land and water that moves through it, it seems really inadvisable to make a decision based on zoning or something like that when the reality is it's a process and it all moves and it should -- it should work for people and, you know, not just a business decision, but a decision for our generations that are coming up. So wisdom, we need wisdom.

AUDIENCE: One last one, I promise you. Is it possible that any part of this cleanup could be delayed for long periods of time subject to negotiations with the existing company that's on the property to vacate or move around on the property?

MR. PUTNAM: We're going to try to handle that concurrent with the remedial design.

AUDIENCE: Try to handle that? That means we could be another 20 years or --

MR. PUTNAM: Okay. Well the landowner as landowner has legal avenues available to them. And if a judge agrees with they -- if they don't want us to move and the judge agrees with them, then a judge is telling us not to move. But I can tell you this, that the only one who would delay it would have to be a judge. We would not delay it because of our discussions with the company.

AUDIENCE: Was this -- is this plan, when it was developed, was this -- was there input from Imperial Oil as you were developing these options?

MR. PUTNAM: No. They got, like some of the people here, got an advance copy of an earlier version of the feasibility study. We had a meeting with them. They indicated to us certain comments. Some of them were incorporated or addressed in the document, most weren't.

AUDIENCE: Because I was wondering if this was tied in with their business plans, you know, in terms of them vacating or moving or what or something was going on in the background?

MR. PUTNAM: Actually it isn't. We had our engineer -- our engineer did not consider that at all as to what was there already. And if you really -- if we went back to the slide, you would see that the area that we're saying needs to be investigated encompasses a lot of existing structures that are going to have to come down. So I mean we just looked at it as what needed to be done and if it happens, it happens.

Any other questions concerning the on-site proposed plan tonight? Okay. I'd like to thank you all for coming and giving us your passionate, enthusiastic and unanimous comment on the land use. We definitely will be taking this back with us. We'll officially end the meeting, but we'll still be available if anyone has any other questions for any other aspect. Thank you again.

(Hearing adjourned)

* * * * * * * * * *

CERTIFICATE

I certify that the foregoing is a correct transcript to the best of my ability from the record of proceedings in the above-entitled matter.

J & J COURT TRANCRIBERS, INC.
BY: BEATRICE A. CREAMER

DATED: March 22, 1999

Appendix B

Written Comments

Township of Marlboro
1979 Township Drive
Marlboro, New Jersey 07746
(732)536-0200 Fax: (732)972-7697
Matthew Scannapieco, Mayor

April 6, 1999

Mr. Donald J. Kakas, Section Chief Bureau of Community Relations
N.J. Department of Environmental Protection
P.O. Box 413
Trenton, N.J. 08625-0413

Dear Mr. Kakas:

As you know the Imperial Oil site has been on the Federal superfund list since 1982. I have spent the last eleven years working toward seeing the Imperial Oil site cleaned up, first as a Councilman, then as the Mayor of Marlboro Township. During this period, I have attended a number of meetings with the residents, the environmentalists, the E.P.A. and the D.E.P., along with the current property owners of the Imperial Oil site in hopes that some day this site will be cleaned up before someone becomes seriously ill. I can finally say that I think we are almost there.

I have reviewed the proposed plan for remediation of the Imperial Oil superfund site and would like to thank you, your staff, and the E.P.A. for the fantastic job you all did in presenting the plan to the Marlboro residents and the public at the March 18th Public Hearing. I believe that there was a sigh of relief that could be heard throughout the room that night as most envisioned an end to the long hard struggle.

Although I am pleased to see that the plan outlined by the D.E.P. will remediate the Imperial Oil site as well as the removal of the soil and sediments along the Birch Swamp Brook which could have a future impact on Lake Lefferts, I am disappointed in the proposed industrial clean-up. I understand it has been the policy to clean up the site based on the fact that Imperial Oil exists in an industrial area which currently lies in C2 commercial zone. The emphasis of this letter is to request that the D.E.P. and the E.P.A. require the clean up to be at a residential level of acceptance. The basis of the request is that although Imperial Oil exists in a commercial-industrial neighborhood, Birch Swamp Brook is not an industrial area, but a residential area. The Brook is on the northern end of the town and leads into Aberdeen Township through residential areas and ultimately leading to Lake Lefferts.

I feel that it is not an unreasonable request for the remediation to be based on acceptable levels of contamination for a residential clean up as the majority of the area affected by this contamination is currently residential use and will continue to be residential use in the future. The whole idea of the clean up process is to protect the residents and the families from any ill health that could be caused by the contamination spread from Imperial Oil. My job is to see that the utmost effort is put forth to help protect the residents of Marlboro and the surrounding areas.

To: Donald J. Kakas, Section Chief
Bureau of Community Relations
New Jersey Dept. of Environmental Protection
P.O. Box 413
Trenton, N.J. 0~~8~~8625-0413

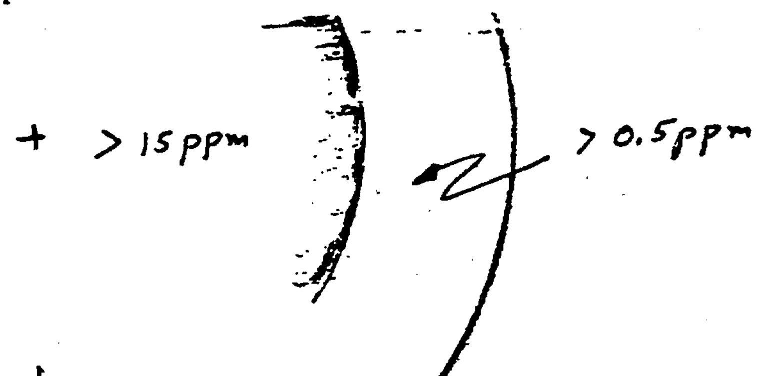
Cc: Office of the Mayor, Marlboro Township
Blanche Hoffman, chair Old Bridge Environmental Commission
Mayor Cannon, Mayor Old Bridge Township

From: Ernest Schmitz, Old Bridge Environmental commission

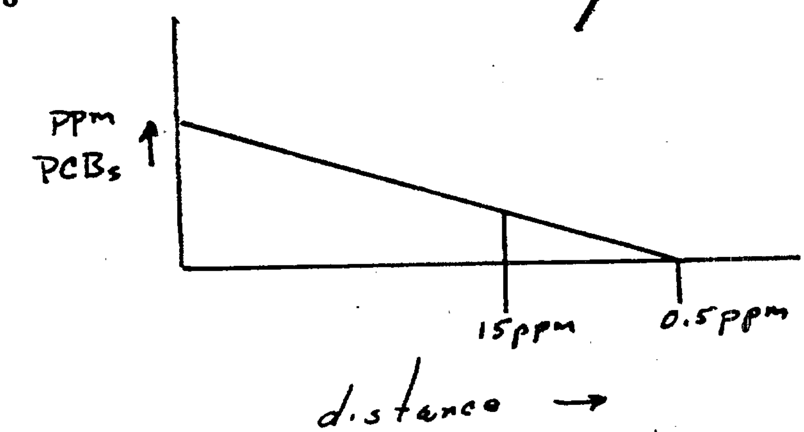
Subject: PCB's Concentration Imperial Oil Remediation

At the Public Hearing on March 18,1999 regarding the preferred clean-up method for Unit 3 of the Imperial Oil Site in Marlboro Township, the NJDEP proposed to remove PCBs to the industrial level of 15ppm and stated that this would effectively produce a clean-up to the residential level of 0.5ppm. Has the DEP considered the slope of the gradient of PCB concentration vs distance from the center of the PCB "hot spots" and the quantity of PCB contamination left behind in the annulus left in the distance between the radius of a concentration of 15ppm and that of 0.5ppm ? If the slope of the gradient is shallow at this point and the radius of the "hot spot" is large, a substantial quantity of PCBs may remain on site. How can the NJDEP claim that PCB removal to 15ppm will effectively produce a clean-up to 0.5 ppm ?

Sincerely;



Ernest Schmitz, (CSP retired)
33 Cymbeline Drive
Old Bridge, N.J. 08857-2798



3/20/99

Donald J. Kakas
Section Chief
Bureau of Community Relations

Dear Mr Kakas,

I am writing to join the other members of my community including Mayor Scannapieco + former Mayor Saul Hornik in urging you to clean up the Imperial Oil site to Residential standards.

It is incomprehensible to me not to select the highest standards and safest route for our community.
It is a waste of money not to follow through + do things correctly the first time, as this will no doubt come back to haunt us in many un-safe ways, such as groundwater + run-off. Please consider my appeal.

Thank you

Rachel Lollio
10 Cambridge Ct
Morganville, N
07751

15 Peach Tree Court
Marlboro NJ 07746

March 24, 1999

Mr. Donald J. Kahas,
Section Chief
Bureau of Community Relations
N.J. Department of Environmental Protection
Division of Publicly Funded Site Remediation
P.O. Box 413
Trenton NJ 08625-0413

Dear Mr. Kahas,

I am writing to you in regards to the DEP plan for remediation of the Imperial Oil Superfund site in Marlboro. In a March 24, 1999 News Transcript article it is stated that the cost of a cleanup to residential standards of the site would cost the same as a cleanup to industrial standards. Since this site is in a commercial, not industrial zone, is close to residential land and is in an environmentally sensitive area (above the Englishtown Aquifer and near Lake Lefferts), please consider cleaning up this site to residential standards. There does not appear to be any reason

(over)

THE MARLBORO BURNT FLY BOG/IMPERIAL OIL CITIZENS ADVISORY COMMITTEE

April 4, 1999

Mr. Donald J. Kakas, Section Chief
Bureau of Community Relations
N.J. Department of Environmental Protection
Division of Publicly Funded Site Remediation
P.O. Box 413
Trenton, NJ 08625-0413

Dear Mr. Kakas: Subject: Imperial Oil Superfund-Public Comment Period

As Chairwoman of the CAC, I fail to understand, after all of the years of working together to see a closure at this site, how we can possibly justify to our Community, anything less than a Residential standard cleanup.

I fully support Alternative #3, but with the proviso, that the cleanup be of the RESIDENTIAL standard.

Support for the RESIDENTIAL STANDARD, will ensure this Community, that working towards this end for the past 18 years, has not been in vain.

Respectfully,

Lizabeth Poulsen, Chairwoman

CC:
- Hon. M. Scannapieco, Marlboro Township
- Tina Freedman, President-MCEC
- Stephanie Luftglass, Marlboro Public Information Officer
- Edward Putnam, Assistant Director Remedial Planning & Design, NJDEP
- Joseph Maher, Site Manager, NJDEP
- Mindy Mumford, DEP Community Relations
- Trevor Anderson, Site Manager, USEPA
- Kim O'Connell, USEPA
- Jeanne Fox, Administrator, RegionII

The Monmouth County Environmental Coalition, Inc.
P.O. Box #1
Morganville, New Jersey 07751
(732) 970-0228

April 4, 1999

Mr. Donald J. Kakas, Section Chief
Bureau of Community Relations
N.J. Department of Environmental Protection
Division of Publicly Funded Site Remediation
P.O. Box 413
Trenton, NJ 08625-0413

RE: IMPERIAL OIL SUPERFUND SITE - PUBLIC COMMENT PERIOD

Dear Mr. Kakas:

On behalf of the Monmouth County Environmental Coalition, Inc., which continues it's active participation with Marlboro Township, surrounding communities, D.E.P. and E.P.A., through an E.P.A. TAG grant, we are responding to the proposed plan for Operable Unit #3 at the Imperial Oil Superfund site.

We support Alternative 3, excavation/Off-site Disposal/Reuse. The preferred alternative should result in a cleanup to residential standards verus the proposed industrial standard. The data in the RI/FS show that all of the contaminated soil that poses a risk to human health will be removed. This should also include PCB's. A residential standard cleanup will be more protective of human health and the environment therefore leaving the site without future restrictions and protective of current and future surrounding residential neighborhoods.

This community has worked diligently over an 18 year period to see a complete cleanup on this site. So has the DEP and EPA. Supporting the residential standard cleanup will ensure that future generations will benefit from the Superfund Program. Hopefully, one day, residents won't think of their back yard as "the Superfund" area of town, just a wonderful place to live.

Sincerely,

Tina Freedman
President-MCEC

cc: Hon. M. Scannapieco, Marlboro Township

Lizabeth Pouslen, CAC
Stephanie Luftglass, Marlboro Public Information Officer
Edward Putnam, Assistant Director Remedial Planning & Design, NJDEP
Joseph Maher, Site Manager, NJDEP
Mindy Mumford, DEP Community Relations
Trevor Anderson, Site Manger, USEPA
Kim O'Connell, USEPA
Jeanne Fox, Administrator, Region II

COMMENTS ON THE SUPERFUND PROPOSED PLAN

IMPERIAL OIL COMPANY AND CHAMPION CHEMICAL SITE
MORGANVILLE, NEW JERSEY

April 5, 1999

Prepared for:

Imperial Oil Company, Inc.
and
Champion Chemical Company

Prepared by:

The Cody Ehlers Group
60 East 42nd Street, Suite 1641
New York, NY 10165

TABLE OF CONTENTS

LIST OF TABLES

1.0 *INTRODUCTION*

The Cody Ehlers Group (CEG) has reviewed the Superfund *Proposed Plan* for the Imperial Oil Company and Champion Chemicals Site (i.e., the "Site") in Morganville, Monmouth County, New Jersey. The *Proposed Plan* was developed by the U.S. Environmental Protection Agency ("USSEPA) and the New Jersey Department of Environmental Protection ("NJDEP") and was issued by the NJDEP on March 18, 1999. CEG also reviewed the August 31, 1998 *Source Control Feasibility Study* ("SCFS") on which the proposed Plan is based. The SCFS was prepared by Harding Lawson Associates, Inc. ("Harding") for the NJDEP.

The focus of the Proposed Plan and the SCFS is the remediation of soil, sediment, waste filter clay and free and residual product that is on, under and bordering the Imperial Oil Company property. The environmental media and the remedial actions evaluated in the SCFS are referred to as Operable Unit 3 (OU-3) for the Site. The *Proposed Plan* identified one of the remedial action alternatives (i.e., Alternative 3: Excavation and Off-site Disposal or Reuse) as the remedial action preferred by the agencies for OU-3. The first two operable units address soil in two off-site areas (OU-1) and ground water on and off the Site (OU-2).

This document presents comments prepared by CEG on behalf of Imperial Oil Company based on its review of the information presented in the SCFS. The remainder of this document is structured as follows:

Section 2.0: Comments on Data Presentation and Evaluation
Section 3.0: Comments on the Remedial Action Objectives
Section 4.0: Comments on the Remedial Action Alternatives
Section 5.0: Summary

The source and year of the references used in preparing these comments on the SCFS are presented in the text in parenthesis. The full title, authors or source and date of the references used are listed in Section 6.0 of this document.

2.0 COMMENTS ON DATA PRESENTATION AND EVALUATION

The SCFS s does not clearly identify the soil and sediment selected for remediation and it does not adequately justify conclusions regarding free and residual product. These issues are discussed in Section 2.1 and Section 2.2, respectively.

2.1 DATA PRESENTATION

Section 4.2 of the SCFS, in conjunction with Figure 4-1 and Table 4-2, identifies approximately 83,000 cubic yards of soil and sediment to be remediated. the *Proposed Plan* requires that this material be excavated and removed off-site. This is an extraordinarily large quantity of material to be remediated for a single site covering less than 5 acres. As a direct result of Harding's evaluation of the data, the remedial action alternatives identified and evaluated in the SCFS all entail the excavation of an extensive amount of soil, which could significantly affect Imperial Oil Company operations. The SCFS and the *Proposed Plan* should link the presence of specific chemicals in Site soil to the extent, scope and location of the remedial actions called for in the *Proposed Plan*.

The chemicals that are present in Site soil which Harding concluded required remediation should have been identified in the SCFS through:

- a summary of the remedial investigation data;
- the evaluation presented in the risk assessment; and
- the manner in which USEPA guidance documents on acceptable concentrations for chemicals in soil were used.

The data and the data ev luation, s :h as the risk assessment or comparison to guidelines, th. was used · delineate 83,000 cubic yards of Site soil to be remediated should have been clearly defined.

Section 4.2 of the SCFS, however, only provides a very brief explanation of the manner in which soil and sediment selected for remediation was identified. Harding only states that the analytical results were compared to the Preliminary Remediation Goals (PRGs) developed in Section 4.1 and that the ". . . exceedance of PRGs were influenced by the presence of PCBs and inorganic constituents (primarily arsenic and beryllium) in samples analyzed." This comparison was used to identify approximately 62,815 cubic yards of soil and sediment to be remediated. The foundation for Harding's conclusion is wholly inadequate. *{Note: Sectic 3.0 of this document contains comments on the manner in which the SCFS se :ted and used various regulatory guidance on acceptable concentrations of chem :als in soil a PRGs for this Site.}*

Harding then explains that based ". . . on the interpreted distribution of free and residual product shown in Figure 1-11 . . " there is subsurface soil containing chemicals in concentrations above the PRGs in areas for which there is no chemical data (i.e., beyond the areas encompassing the initial soil and sediment quantity of 62,815 cubic yards). Therefore, Harding concludes that an additional 10,850 cubic yards of subsurface soil would need to be remediated from areas for which there is no chemical data. The total soil and sediment quantity of approximately 83,000 cubic yards was computed as the sum of:

- the 62,815 cubic yards exceeding PRGs;
- an additional 10,850 cubic yards of soil containing free and residual product;
- 1,560 cubic yards of sediment basin material; and
- a contingency factor of 10% (i.e., an additional 7,522 cubic yards).

A more thorough analysis and presentation of this data is needed. The costs for the remedial action alternatives evaluated in this document are significant, ranging from $12.9 million to $37.7 million. In addition, implementation of the Proposed Plan could significantly affect Imperial Oil Company operations. A remedy of this magnitude (i.e., 83,000 cubic yards) and remedial actions that significantly affect facility operations require that the data and analysis used in the remedy selection process be presented in a clear and thorough manner.

At a minimum, the following data presentation requirements contained in the New Jersey Technical Requirements for Site Remediation (i.e., the "NJDEP Technical Requirements") should have been used as guidance to prepare the SCFS:

- NJAC 7:26E-3.13(c)3 requires that a table be presented that summarizes all sampling results, including sample location, media, sample depth, field and laboratory identification numbers, analytical results, and comparison to applicable remediation standards organized by area of concern, and that all chemical concentrations exceeding the applicable remediation standards be identified.

- NJAC 7:26E-4.8(d)2 requires that sample locations maps be provided showing all soil, sediment and other sampling locations, sample depths, chemical concentrations, map scale and orientation and field identification numbers for all samples.

Tables and figures required by the NJDEP Technical Requirements are needed to make an informed decision regarding the need for and extent of soil and sediment remediation at the Site. The SCFS should have used this information to describe the specific chemicals that are present above the PRGs in particular soil and sediment areas (i.e., areas of concern). For example, some soil areas, such as Tank Farms #1, #2, #3, and #4, may contain only inorganic constituents that do not pose an unacceptable risk to ground water and pose only potential direct contact risks. Engineering controls (e.g., covers or caps) and institutional controls may be fully protective of human health and the environment in these areas. Other areas may contain only organic compounds present in concentrations above acceptable levels that can be addressed by a combination of removal, treatment, engineering controls and institutional controls. It is not possible for the public and the regulated community to judge the appropriateness of the remedy selected in the *Proposed Plan* if the specific chemicals that serve as the basis for the remediation of particular soil and sediment areas are not identified.

The presentation of the data should also be revised so that average chemical concentrations for specific depths can be calculated in accordance with the method described in the NJDEP Technical Requirements at 7:26E-4.8(c)3(i). The average concentration of specific chemicals in particular soil areas (i.e., areas of concern) should then be compared to acceptable levels. Comments on the PRGs used as acceptable levels in the SCFS and the *Proposed Plan* are discussed in Section 3.0. The NJDEP Technical Requirements accepts this approach to evaluating site data. This method of evaluating data would provide an adequate understanding of Site conditions, the soil areas to be addressed by remediation and the depth at which chemicals are present in soil in concentrations above acceptable levels.

These methods of presenting soil and sediment data are also needed to evaluate the removal of "hot spots" of soil, as described in the *Proposed Plan* for Alternative 3. These "hot spots" include 5,000 gallons of free product and 27,000 cubic yards of soil from the following areas:

waste filter clay:	5,000 cubic yards
soil containing free and residual product:	14,000 cubic yards
soil beneath tank farms #1, #2, #3, and #4:	8,000 cubic yards
Total "hot spot" volume of soil =	27,000 cubic yards

A better understanding of the chemicals present in this material, in particular the chemicals present in residual product, is needed in order to assess the potential risks posed by this material and to evaluate possible approaches to remedial actions. The presentation of the existing data should be improved as described above to clearly identify the basis for the decision presented in the *Proposed Plan* to remediate this material.

2.2 *DATA EVALUATION (FREE AND RESIDUAL PRODUCT)*

The SCFS and the *Proposed Plan* identified approximately 14,000 cubic yards of soil that contains free and residual product and that is located above and below the water table in the northeast section of the Site. All of the alternatives evaluated in the SCFS (except the No Action alternative) called for this material to be excavated and either disposed of off-site (i.e., Alternatives 2 and 3) or treated on-site (i.e., Alternative 4). The remedial action objectives for this material are defined in the *Proposed Plan* and in Section 2.0 of the SCFS as preventing exposures to chemicals of concern that leach from free and residual product to ground water.

The presence of free and residual product at the Site is probably the most important environmental condition to be addressed at the Site. The presence of volatile organic compounds (VOCs) in this material, which are more mobile than the other organic compounds and the inorganic constituents present in Site media and the presence of product below the water table requires that the information related to free and residual product be evaluated thoroughly. As a result, the evaluation of this data presented in the SCFS and used in the *Proposed Plan* should have been revised as follows:

- the "apparent" product thickness measurements should not have been used to evaluate remedial actions;
- the limitations to the data used to conclude that product is migrating should have been emphasized; and
- information on the characteristics of the product at the Site should have been presented and evaluated in the SCFS.

2.2.1 *Use of "Apparent" Product Thickness Measurements*

The extent of product present at the Site was determined by the measurement of apparent product thickness in a well at the time the measurements were recorded. Measurements of apparent product thickness have little or no relationship to the thickness of product that may be present in the surrounding soil (i.e., the formation). This is noted on page 1-10 of the SCFS where Harding acknowledges that: [B]ecause free product tends to accumulate in wells as a result of water table fluctuations, Figure 1-11 may not be representative of actual product thickness in the aquifer." During periods of low rainfall, water table elevations drop and product in adjacent soil flows into the wells or piezometers. The resulting product thickness in that well or piezometer, then, is greater than the actual thickness of product in the formation. As the water table rises, the product tends to stay within the well or piezometer. This process is repeated as water table elevations rise and fall. In addition, product accumulates very slowly in wells or piezometers in areas where actual product thickness is limited (i.e. 2 to 6 inches). The result is that the "apparent" product thickness is influenced more by the rise and fall of the water table than by the thickness of product in the formation.

To address this issue, actual product thickness in a formation is determined by conducting baildown tests. A baildown test involves the removal of as much product as possible from a well or piezometer as quickly as possible, then measuring the depth to product and depth to water frequently, until recovery has occurred. The data can then be analyzed according to the methods defined by Gruszczenski (1987) and Hughes, et al. (1988) to determine the actual thickness in the formation.

Unfortunately, this was not done during the remedial investigation for the Site. As a result, the product thickness measurements reported on Figure 1-11 of the SCFS and used in the *Proposed Plan* to define remedial actions bear no relationship to the actual depth of product. They should not have been used to decide the need for or the extent of remediation in this area.

2.2.2 *Product Migration*

Section 2.1.1 of the SCFS concludes t t product has migrated north of the active portion of the Site (i.e., beyond the berm) based on free and residual product thickness measurements observed in March and April 1996 and in July 1997. A comparison of the apparent product thickness measurements recorded in 1989 and 1996, as shown on Figure 1-11 of the SCFS, demonstrated that of the 14 wells and piezometers monitored for product thickness, only one well or piezometer contained product in 1996 that did not contain product in 1989. The apparent product thickness in piezometer P-10 was recorded as 5.88 feet in 1996. No product was observed in this piezometer in 1989.

There are a number of reasons why this single product thickness measurement is not a reliable indication that a significant amount or even any product has migrated. As described in Section 2.2.1 of this document, apparent product thickness measurements cannot be used to determine the actual thickness of a product layer in a formation. A limited (i.e., 2 to 6 inches) amount of product may have been present in the area around piezometer P-10 in 1989 but water levels may have been low, resulting in no accumulation of product when this piezometer was first installed. The successive rise and fall of the water table in this area from 1989 to 1996 may have resulted in the accumulation of 5.88 feet of product in piezometer P-10 without any migration of product to this area. In addition, piezometer P-10 is only about 100 feet from piezometer P-7, for which apparent product thickness was recorded as 9.3 feet and 8.1 feet in 1989 and 1996, respectively. Even if product has migrated to this one well, it is a minor change in the overall areal extent of product.

In addition, the SCFS should also note that apparent product thickness measurements decreased in 5 of the 14 wells and piezometers monitoring from 1989 to 1996. Of the remaining 9 wells and piezometers, apparent product thickness measurements increased in only 3 wells, including piezometer P-10, discussed above, and no product accumulation was observed in 6 of the wells and piezometers in 1989 or in 1996. A fair and reasonable evaluation of the data supports a different conclusion than the conclusion drawn in the SCFS, namely that the overall extent of the product is diminishing over time.

Finally, the conclusion that the product layer has migrated beyond the berm is not consistent with the location of piezometer P-10, where the only potential movement of product was identified. This piezometer is located beyond the western end of the berm, at the base of the railroad tracks. It is actually located south of the berm, i.e., closer to the center of the Site than the berm. As a result, the characterization by Harding that product has migrated beyond the berm is not substantiated by the data.

2.2.3 *Product Characterization*

The SCFS does not present any chemical data for the product at the Site. The only reference to characterization of the product layer is on page 2-2 of the SCFS, which states that the product layer contains over 50 milligrams per kilograms (mg/kg) of PCBs, but does not reference the specific data used to support this statement. A review of the data indicated that PCBs were detected in only one soil boring (JTB-128) at a concentration greater than 50 mg/kg. However, PCB concentrations in soil borings located in the product area less than 50 feet away (i.e., JTB-112) and 100 feet away (i.e., JTB-111) from JTB-128 were less than 50 mg/kg. The data that supports the conclusion that product contains PCBs in concentrations greater than 50 mg/kg appears to be limited to this one area (i.e., sample location JTB-128),

The U. S. Environmental Protection Agency (USEPA) has installed and operated a passive product recovery system in this area. Although the SCFS characterized the effectiveness of this system as not successful, it should present the data that has been collected during the operation of this system and should use it to evaluate the need for and extent of any future remedial actions. The product should have been characterized for PCB content, viscosity, specific gravity (to confirm that it is light non-aqueous phase liquid, or LNAPL) and the level of degradation and estimated exposure period. Other analytical methods, referred to as petroleum hydrocarbon fingerprinting tests, should also have been used during the operation of the USEPA system to characterize the product.

This information is critical to the identification, evaluation and selection of remedial actions for free and residual product. To the extent that this information has already been collected by the USEPA during the operation of the existing passive product recovery system, it should have been presented and used in the SCFS. This data should be collected so that appropriate methods of product removal can be identified and evaluated.

3.0 COMMENTS ON THE REMEDIAL ACTION OBJECTIVES

The SCFS relied on the risk assessment contained in the *Remedial Investigation Report* (Harding, 1996) and on various guidelines from the NJDEP and the USEPA to establish Preliminary Remediation Goals (PRGs) for soil and sediment. The NCP at 40 CFR 300.430(e)(2)(i) states that preliminary remediation goals should be modified as more information becomes available during the remedial investigation and feasibility study and that final remediation goals should be determined when the remedy is selected. Additional USEPA guidance on this issue (USEPA, 1991) states that the preliminary remediation goals should be modified based on the given waste management strategy selected at the time of remedy selection and on the balancing of the nine criteria defined in the NCP to evaluate remedial action alternatives. In summary, remediation goals should be modified as additional information, such as the volume of soil to be remediated, is obtained.

The SCFS and the *Proposed Plan* state that soil areas containing chemicals in concentrations above the PRGs are assumed to require remediation. These documents identified a total of 83,000 cubic yards of soil and sediment to be remediated. Refer to Figure 4-1 and Table 4-2 of the SCFS and to Section VIII (Alternative 3) of the *Proposed Plan*. Section 2.1 of this document commented that the SCFS does not present a thorough explanation of this data, including the necessary tables and figures. Section 2.1 concluded that the presentation of the data contained in the SCFS does not reflect the extent, scope and location of the contamination, yet this data was the primary factor in the evaluation and selection of a remedy. The need to link the extent of the remedy to the data collected during the remedial investigation is particularly acute in light of the extensive excavation and the potential effects on existing facility operations called for in the remedy selected in the *Proposed Plan*.

In addition, the PRGs used in this analysis should also be revised to conform with NJDEP and USEPA guidelines and practice regarding the remediation of industrial sites, and with the National Contingency Plan (NCP). The PRGs used by Harding were based on a number of overly conservative and unrealistic assumptions, leading to the conclusion that soil covering almost the entire area of the site, including the operating facility, would need to be remediated. These unrealistic assumptions regarding exposure, risk goals and other factors used to establish the PRGs should be re-evaluated.

There are five issues related to the remedial action objectives addressed in these comments. The issues, and the sections they are addressed in, are as follows:

Section 3.1: Use of an Industrial Exposure Scenario
Section 3.2: Use of a 10^{-6} Cancer Risk Goal
Section 3.3: USEPA Guidelines on Lead and Arsenic in Soil
Section 3.4: Differences Between the 1990 and 1996 Risk Assessment
Section 3.5: Use of USEPA Soil Screening Levels and RBC Table

3.1 *USE OF AN INDUSTRIAL EXPOSURE SCENARIO*

The *Proposed Plan* states that the USEPA and the NJDEP assumed that the most probable future use of the Site would be industrial based on the current land use of the Site. The factors listed below support the appropriateness of basing remedial decisions on the assumption that this Site will continue to be used for industrial purposes in the future:

- the 90 year industrial use of the Site and current operations (see Section 3.1.1 of this document);
- sections of the National Contingency Plan, or NCP, as amended (NCP, 1990) and USEPA guidance related to land use (see Section 3.1.2 of this document); and
- with other sections of the SCFS(see Section 3.1.3 of this document);.

Remediation of an industrial site to industrial cleanup standards is also consistent with NJDEP and USEPA brownfield initiatives. The regulatory brownfield initiatives seek to return abandoned industrial sites to productive use as industrial or commercial properties by tailoring the remedial actions to the limited types of exposures associated with non-residential use. Clearly, the NJDEP and the USEPA have acknowledged through these brownfield properties that, in many cases, the industrial use of a site will not change in the future. These brownfield initiatives would certainly never seek to demolish an existing industrial facility that wishes to remain in operation so that the property could be cleaned up to residential standards.

3.1.1 *History of Industrial Site Use*

The use of an industrial exposure scenario to develop cleanup levels for the Site is consistent with the 90 year history of the Site as an industrial facility and with the current industrial operations. The *Proposed Plan* acknowledges that the Site has been used for a variety of industrial operations since at least 1912. The *Proposed Plan* also states that some of the industrial operations that have been performed at the Site at various times during this period include:

- the production of tomato ketchup and tomato paste;
- the production of calcium arsenide and arsenic acid; and
- the production of flavors and essences, oil reclamation activities and asphalt production.

As described in the *Proposed Plan*, Imperial Oil Company leased the Site from Champion Chemicals in 1968 and began conducting oil blending operations, including mixing and repackaging unused (clean) oil for delivery. Currently raw products (refined clean oil) are delivered by truck and transferred to above-ground tanks.

The Site has been used for industrial operations for a considerable amount of time. In fact, most of the brownfield sites that the NJDEP and the USEPA acknowledge will always be industrial sites have not demonstrated the history of industrial activity that characterizes the Imperial Oil Company and Champion Chemicals Site. As a result, the assumption used in the *Proposed Plan* that the Site will continue to be used for industrial purposes is appropriate.

3.1.2 *The NCP, USEPA Guidance and Land Use*

The types of activities a Site will be used for determines the types of exposures, the level of potential risk and the nature and extent of the remedial actions to be considered. In response, sections of the preamble and the text of the NCP and specific USEPA guidance address the types of uses that should be presumed for a site when an appropriate cleanup strategy is being developed.

The preamble to the NCP (Fed. Reg., Volume 55, No. 46, March 8, 1990; page 8710) states the following: "The assumption of residential land use is not a requirement of the program . . . " It also acknowledges that institutional controls can control exposure and that their effectiveness in controlling risks can be considered in evaluating the effectiveness of a remedial alternative.

Section 300.430(a)(1)(iii) of the NCP specifically states that the USEPA expects to use institutional controls such as water use and deed restrictions to supplement engineering controls as appropriate for short and long term management to prevent or limit exposure to hazardous materials and that institutional controls may be used as a component of the completed remedy. In fact, the NCP (at 40 CFR 300.5) accepts permanent relocation of a resident at a Superfund site as a remedial action when "such relocation is more cost-effective than and environmentally preferable" to off-site disposal.

The USEPA has further clarified the manner in which land use should be evaluated for Superfund sites in a 1995 guidance document (USEPA, 1995). This guidance references the section of the NCP discussed above and provides the following information with respect to land use and assumptions regarding future land use:

- *("Developing Remedial Action Objectives", page 7)* "In cases where the future land use is relatively certain, the remedial action objective generally should reflect this land use."

- *("Land Use Considerations in Remedy Selection", page 8)* "The volume and concentration of contaminants left on-site, and thus the degree of residual risk at a site, will affect future land use. For example, a remedial alternative may include leaving in place contaminants in soil at concentrations protective for industrial exposures, but not protective for residential exposures. In this case, institutional controls should be used to ensure that industrial use of the land is maintained and to prevent risks from residential exposures."

- *("Institutional Controls", page 9)* "In such cases, institutional controls will play a key role in ensuring long-term protectiveness and should be evaluated and implemented with the same degree of care as is given to other elements of the remedy."

- *("Institutional Controls", page 10)* "Suppose, for example, that a selected remedy will be protective for industrial land use and low levels of hazardous substances will remain on site. An industry may still be able to operate its business with the selected remedy in place. Institutional controls, however, generally will need to be established to ensure the land is not used for other, less restricted purposes, such as residential use, or to alert potential buyers of any remaining contamination."

- *("Future Changes in Land Use", page 10)* "Where waste is left on-site at levels that would require limited use and restricted exposure, EPA will conduct reviews at least every five years to monitor the site for any changes. Such reviews should analyze the implementation and effectiveness of institutional controls with the same degree of care as other parts of the remedy. Should land use change, it will be necessary to evaluate the implications of that change for the selected remedy, and whether the remedy remains protective."

In order to not be inconsistent with the NCP and with USEPA guidelines on land use assumptions, the SCFS and the *Proposed Plan* should be revised to include an evaluation of remedial action alternatives that use institutional controls based on an industrial use exposure scenario.

3.2 *USE OF A 10^{-6} EXCESS CANCER RISK GOAL*

Section 2.6.4 of the SCFS acknowledges that the NCP (at 40 CFR 300.430(e)(2)(i)) defines an acceptable exposure level as concentration levels that represent an excess upper bound lifetime carcinogenic risk to an individual of between 10^{-4} to 10^{-6}. However, the SCFS develops remedial action objectives for this particular Site based on a reduction of the total potential carcinogenic risk to levels less than 10^{-6}. The 10^{-6} risk level is presented as the target carcinogenic risk level established by the NJDEP "because it is more stringent and consistently applied."

The NJDEP target carcinogenic risk of 10^{-6} is arbitrary and it is not consistent with the NCP. The fact that the NJDEP target level is more stringent than the NCP acceptable carcinogenic risk range does not justify its use. The NCP and CERCLA, which govern remedial decisions at Superfund sites, have established that it is unlikely that sites containing chemicals posing risks within the 10^{-4} to 10^{-6} range will require remediation. This is the standard by which Superfund sites across the country have been judged. Spending additional funds to remediate this Site to cleanup levels that are more stringent than those used to remediate other CERCLA sites is not justified.

It is also doubtful that the 10^{-6} risk level is consistently applied. Many of the environmental statutes or guidance developed pursuant to the Clean Water Act, the Clean Air Act, RCRA and the Safer Drinking Water Act are based on acceptable carcinogenic risk levels lower than 10^{-6}. As a result, many of the applicable or relevant and appropriate requirements (i.e., the "ARARs") identified in the SCFS are based on an acceptable carcinogenic risk level of less than 10^{-6}.

The preamble to the NCP addressed this issue as follows (see Fed. Reg., Volume 55, No. 46, March 8, 1990, page 8717):

> "In the Superfund program, remediation decisions must be made at hundreds of diverse sites across the country. Therefore, as a practical matter, the remediation goal for a medium typically will be established by means of a two-step approach. First, EPA will use an individual lifetime excess cancer risk of 10^{-6} as a point of departure for establishing remediation goals for the risks from contaminants at specific sites. While the 10^{-6} starting point expresses EPA's preference for setting cleanup levels at the more protective end of the risk range, it is not a presumption that the final Superfund cleanup will attain that risk level."

> "The second step involves consideration of a variety of site-specific or remedy-specific factors. Such factors will enter into the determination of where within the risk range of 10^{-4} to 10^{-6} the cleanup standard for a given contaminant will be established."

The preamble to the NCP also contains the following discussion on the same page:

> "EPA believes that other risk levels may be protective when the 10^{-6} risk level will not be attained at a site due to the factors

described above. Moreover, establishing 10^{-6} as the single cleanup level, i.e., the only level considered protective, would be incongruous with CERCLA's requirement to comply with ARARs. Many ARARs, which Congress specifically intended be used as cleanup standards at Superfund sites, are set at risk levels less stringent than 10^{-6}."

The USEPA has further clarified its position on an acceptable carcinogenic risk range of 10^{-4} to 10^{-6} in a 1991 guidance document (USEPA, 1991). This guidance states that remedial actions are generally not warranted at sites where the cumulative carcinogenic risk to an individual based on reasonable maximum exposures for both current and future land use is less than 10^{-4}. This guidance also states that the records of decision for remedial actions taken at sites posing risks within the 10^{-4} to 10^{-6} risk range must explain why remedial action is warranted.

As a result, the SCFS should be revised using the NCP acceptable carcinogenic risk range of 10^{-4} to 10^{-6} in place of the NJDEP target carcinogenic risk range of 10^{-6}. The sections of the SCFS that define the remedial action objectives, the PRGs, the volume of soil and sediment to be remediated and the nature and extent of the remedial action alternatives that were evaluated should be revised to reflect an acceptable carcinogenic risk range of 10^{-4} to 10^{-6}.

3.3 *USEPA GUIDANCE ON LEAD AND ARSENIC IN SOIL*

As discussed in Section 2.1 of this document, the SCFS is not clear as to which chemicals present in Site soil and sediment require that this material be remediated. However, there are several references to the potential risks posed by lead and arsenic in Site soil that appear to have been contributing factors in the decision to remediate this material. The SCFS should be revised to reflect the current and future industrial use of this property, as discussed earlier in Section 3.1, and to reflect USEPA guidance on the potential risks posed by lead and arsenic in soil. Information on USEPA guidance regarding the potential risks posed by lead and arsenic in soil is discussed below.

3.3.1 *Lead in Site Soil*

The *Proposed Plan* establishes a " PRG for lead in soil of 400 parts per million (ppm). This is based on a potential direct contact exposure for lead in soil. The table lists "NA" for lead concentrations in soil that are protective of ground water and define this notation as "Value for this chemical is not available." This is consistent with the fact that the remediation of inorganic constituents in Site soil to protect ground water is probably not needed based on the limited presence of lead in ground water.

The contamination assessment summary presented in Section 2.0 of the SCFS contained only incidental references to lead in the description of the chemicals for which specific soil areas are being remediated. However, the only potential risks identified in the risk assessment component of the 1990 draft version of the remedial investigation report (i.e., Section 13.0) that exceeded the acceptable level of risk defined in the NCP (i.e., 10^{-4} to 10^{-6} carcinogenic risk and a health quotient of 1.0 for non-carcinogenic constituents) were identified in that document as due to the presence of lead in Site soil. The potential risks for the "Reasonable Worst Case" exposure scenarios were attributed to lead for the following three areas:

AREA	EXPOSURE AND POPULATION	NON-CARCINOGENIC RISK (REASONABLE WORST CASE)	NOTES
Areas abutting IOC property	children, dermal contact and incidental ingestion	2.6	99% attributable to lead
Off-Site Areas	children, dermal contact and incidental ingestion (dirt biking)	6.0	98% attributable to lead
Off-Site Areas	children, inhalation (dirt biking)	1.4	95% attributable to lead

As a result, the only area included in OU-3 that the 1990 risk assessment concluded posed a potentially unacceptable risk was the area abutting the IOC property. Almost all (99%) of this potential risk was attributed in the report to the presence of lead in Site soil. However, a recent USEPA guidance document (USEPA, 1997) explains that the USEPA has no reference doses or potency slope for inorganic lead and, as a result, it not possible to calculate risk-based concentrations. The USEPA finds lea to be ubiquitous in all media and is in the process of developing a computer model to predict children's blood lead level concentrations using lead levels in various media. This 1997 USEPA document directs the reader to a directive from the USEPA Office of Solid Waste on risk assessments and cleanups of residential soil lead for guidance on this issue in the interim.

The USEPA guidance on lead in soil (USEPA, 1994) explains that a lead concentration of 400 ppm in soil is used as a benchmark for further evaluation. The guidance notes that this is also the lead concentration used as a screening level in CERCLA and that the screening level is not a "cleanup standard" nor a "cleanup goal". Refer also to Section 3.5 of this document for additional information on USEPA soil screening levels. Rather, it is a lead concentration above which there is enough concern to warrant a site-specific study of risks. The guidance also states (page 11) that within the range of 400 to 5,000 ppm of lead in soil, the degree of risk reduction activity should be commensurate with the expected risk posed by the bare soil, considering both the concentration of lead in soil and the likelihood of children's exposure.

- A review of the Site data indicates that with respect to on-site soil, including the areas abutting the IOC property, lead was present in only four samples in concentrations above the 400 ppm residential exposure PRG. None of the samples contained lead in concentrations above 5,000 ppm and most of the samples collected from on-site soil did not contain lead in concentrations greater than 400 ppm.

The SCFS and the *Proposed Plan* should be revised to address the presence of lead in Site soil in a manner that is consistent with current USEPA guidance on managing the potential risks related to the presence of lead in soil at Superfund sites. The data on lead (and other chemicals) in Site soil should be re-formatted as discussed in Section 2.1 and the future exposure scenarios should be limited to industrial uses of the Site as discussed in Section 3.1. The re-formatted data, including average lead concentrations in Site soil in particular areas (i.e., areas of concern), should be compared to the 400 ppm to 5,000 ppm level. In addition, the containment methods discussed in the USEPA guidance document (USEPA, 1994) referenced above should be evaluated in the SCFS and the *Proposed Plan*.

3.3.2 *Arsenic in Site Soil*

The *Proposed Plan* establishes a PRG for arsenic in soil of 20 ppm. This concentration was based on potential direct contact exposures for arsenic in soil in residential and industrial areas. Section 4.2 of the SCFS identifies 62,850 cubic yards of soil containing chemicals in concentrations exceeding the PRGs and stated that these exceedances were influenced by the presence of PCBs, arsenic and beryllium. Section 2.1.2 of the SCFS identified the soil beneath Tank Farms #1, #2, #3, and #4 as containing elevated concentrations of arsenic. It appears from Figure 4-1, which the SCFS uses to identify the soil to be remediated, that the presence of arsenic in tank farm soil is responsible for a significant portion of the 62,850 cubic yards of Site soil to be remediated.

The SCFS contains a number of references to the fact that inorganic constituents in ground water are not likely to be associated with Site soil but are likely to be a result of high turbidity in ground water, which tends to accumulate and concentrate naturally occurring inorganic constituents. In fact, the NJDEP conducted a separate ground water investigation at the Site in July 1997 using a slow purge technique to reduce the effects of turbidity in ground water data. The SCFS states in Section 2.2 that as a result of this work, arsenic was detected in ground water in elevated concentrations in two discrete locations. As a result, the decision to remediate Site soil containing arsenic is based on the potential direct contact risks and not to protect ground water.

However, the USEPA is currently evaluating a number of uncertainties regarding the manner in which the potential risks associated with arsenic are being evaluated by the agency. A 1989 document (USEPA, 1989) for the agency's Science Advisory Board concluded that USEPA's risk assessments should take into account studies showing the humans can detoxify low levels of arsenic. For this and other reasons, a USEPA guidance document on acceptable arsenic concentrations in soil (USEPA, 1997) refers to an agency risk management policy for arsenic dating from 1988 that considers risk levels of up to 10^{-3} for arsenic to be acceptable. The acceptable risk-based concentration for arsenic in soil presented in the USEPA guidance (USEPA, 1997) for a 10^{-3} risk level and a direct contact, industrial exposure would be 3,800 ppm. The acceptable risk level concentration for arsenic as a non-carcinogen is 610 ppm for industrial exposures.

The SCFS and the *Proposed Plan* should address the presence of arsenic in Site soil in a manner that is consistent with current USEPA guidance on managing the potential risks related to the presence of arsenic in soil. The data on arsenic (and other chemicals) in Site soil should be re-formatted as discussed in Section 2.1 and the future exposure scenarios should be limited to industrial uses of the Site as discussed in Section 3.1. The re-formatted data, including average arsenic concentrations in Site soil in particular areas (i.e., areas of concern) such as the tank farm area, should be compared to the 610 ppm non-carcinogenic risk-based concentration contained in the USEPA guidance (USEPA, 1997) for arsenic in soil. If Site soil, in particular the soil in the tank farm area, contains arsenic in concentrations above this level, containment and similar methods to prevent direct contact should be evaluated in the SCFS.

3.4 *DIFFERENCES BETWEEN 1990 AND 1996 RISK ASSESSMENTS*

The 1990 risk assessment for the Site (i.e., Section 13.0 of the 1990 version of the *Remedial Investigation Report*) found that the only exposure for which a non-carcinogenic health index exceeding the acceptable value of 1.0 for a reasonable maximum exposure scenario involved neighborhood children exposed to soil in Site areas abutting the IOC property. As discussed in Section 3.3.1, 99% of these risks were attributed to lead. No other exposure pathways led to a non-carcinogenic health index greater than 1.0 and none of the exposure scenarios evaluated in the 1990 risk assessment resulted in a carcinogenic risk that exceeded the acceptable NCP carcinogenic risk range of 10^{-4} to 10^{-6}.

Table 1 of this document presents a summary of the non-carcinogenic health indices reported in the 1990 risk assessment for various exposure scenarios. A summary of the carcinogenic risks reported in the 1990 risk assessment for various exposures are listed in Table 2 of this document.

The methods to be used to assess risks at Superfund sites were defined by the USEPA in a 1989 guidance document (USEPA, 1989a). There have been some relatively minor changes in the toxicity factors used by USEPA but the fundamental approach, default values and assumptions used in risk assessments for Superfund sites have not changed.

However, the 1996 risk assessment for the Site summarized in Section 2.6 of the SCFS concluded that the same data and the same exposure pathways used in the 1990 risk assessment now resulted in unacceptable carcinogenic and non-carcinogenic risks. A list of the 1996 non-carcinogenic health indices is presented in Table 1 of this document and a list of the 1996 carcinogenic risks is presented in Table 2. The tables also list the ratio of the 1990 to the 1996 risk levels. The tables demonstrate that despite the fact that both risk assessments used the same Site data and the USEPA risk assessment protocols have not changed since 1989, the risks reported in the 1996 risk assessment were from 3 to over 8,000 times higher than the risks calculated in the 1990 risk assessment for the same exposure pathways.

Part of this increase may be due to the inappropriate use of a residential exposure scenario for Site soil in the 1996 risk assessment, as discussed in Section 3.1 of this document. Since the 1990 risk assessment concluded that the Site does not pose unacceptable risks and, consequently, does not provide a justification for remedial actions, the difference between the 1990 and 1996 risk assessments needs to be explained. Therefore, the NJDEP needs to explain the specific changes made to the 1990 risk assessment (e.g., exposure assumptions, potency factors, reference doses, etc.) that led to the substantial changes and the unacceptable risks reported in the 1996 risk assessment.

In addition, waste pile chemical data should not be used in the 1996 risk assessment. As discussed in Section 2.6.5 of the SCFS, between 87% and 96% of the estimated carcinogenic risk and 100% of the estimated non-carcinogenic risk to facility maintenance workers and to utility workers (i.e., the only potential industrial use exposure scenarios) are associated with potential inhalation exposures to fugitive dust emissions from the waste pile. A Superfund Removal Action conducted by the USEPA in November 1991 resulted in the removal of the above ground waste filter clay material from the Site and its disposal in an off-site landfill. This material, and the chemicals contained in this material, are no longer present at the Site and this data should not have been used in the 1996 risk assessment. The limited statement contained in Section 2.6.5 of the SCFS that the removal of waste-pile material above grade reduced the potential for inhalation exposures does not adequately address this issue.

3.5 USE OF USEPA SOIL SCREENING LEVELS

Table 4-1 of the SCFS lists the guidance values used to establish PRGs for the Site. These guidance values are introduced in Section 3.2.1 of the SCFS as "To Be Considered" criteria. "To Be Considered" criteria are not promulgated standards and do not carry the same weight in evaluating remedial actions at CERCLA sites as do ARARs. Table 4-1 lists a set of criteria as "USEPA Site-Specific Criteria" and notes that these are "Site-specific criteria provided by the USEPA". The December 1997 draft version of the SCFS refers to these criteria in Table 4-1 as "Site-specific criteria transmitted to NJDEP on January 23, 1997." Section 4.1 of the SCFS contains the following information regarding these criteria:

- The site-specific criteria were developed by USEPA.
- They are based on future industrial use of the site.
- Include ··teria for the protection of ground water.
- They ar health based criteria that consider the effects of human exposur· via incidental ingestion.

No other description or supporting documentation is presented or described that would explain how these criteria were developed. The January 23, 1997 correspondence from the USEPA to the NJDEP which contained the USEPA "site-specific" criteria should be included as an appendix and the methods and assumptions used to develop these criteria should be presented in the SCFS.

The USEPA "site-specific" soil criteria presented in Table 4-1 of the SCFS were compared to:

- the USEPA Region III Risk-Based Cor entration Table (USEPA, 1997); and
- the USEPA Soil Screening Guidance Technical Background Document (USEPA, 1996a).

This comparison shows that the majority of these "site-specific" USEPA criteria were obtained from these USEPA guidance documents. This comparison demonstrated that the USEPA "site-specific" ground protection criteria listed for 30 of the 34 chemicals shown on Table 4-1 are identical to the ground water protection criteria listed in the USEPA guidance document (USEPA, 1996a) as national soil screening levels. The comparison also showed that the USEPA "site-specific" industrial use direct contact criteria for 29 of the 34 chemicals listed in Table 4-1 are equal to one-half of the industrial direct contact screening level listed in the USEPA Risk Based Concentration Table.

Clearly, these are not "site-specific" cleanup goals but, instead, are national soil screening levels developed to assess site conditions early in the remedial investigation and feasibility study process. The USEPA Risk-Based Concentration Table and the USEPA Soil Screening Guidance explain that the chemical concentrations presented in these documents are soil screening levels and are not to be used as final cleanup criteria. The intent of the USEPA in developing these soil screening levels is described in Section 1.1 of the USEPA Soil Screening Guidance as follows:

1. "SSLs are not national cleanup standards. SSLs alone do not trigger the need for response actions or define "unacceptable" levels of contaminants in soil. In this guidance, "screening" refers to the process of identifying and defining areas, contaminants, and conditions, at a particular site that do not require further Federal attention. Generally, at sites where contaminant concentrations fall below SSLs, no further action or study is warranted under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)."
2. "Generally, where contaminant concentrations equal or exceed SSLs, further study or investigation, but not necessarily cleanup, is warranted."
   and
3. "SSLs developed in accordance with this guidance are based on future residential land use assumptions and related exposure scenarios. Using this guidance for sites where residential land use assumptions do not apply could result in overly conservative screening levels."

Similarly, the USEPA Region III Risk-Based Concentration Table contains this guidance:

> "To summarize, the table should generally not be used to (1) set cleanup or no-action levels at CERCLA sites or RCRA Corrective Action sites, (2) substitute for EPA guidance for preparing baseline risk assessments, or (3) determining if a waste is hazardous under RCRA."

Based on this information, the SCFS should be revised to:

- acknowledge that the chemical concentrations referred to on Table 4-1 as "USEPA 'Site-Specific' Criteria" are screening levels and should only be used to determine which soil and chemicals require further study; and
- that this would only be one of a number of factors to be considered in establishing final remediation goals.

In addition, the SCFS and the *Proposed Plan* need to justify an industrial exposure remediation goal for 29 of the 34 chemicals listed that is equal to one-half of the USEPA Region III Risk-Based Concentration Table (USEPA, 1997). The soil cleanup criteria presented in the USEPA Region III Risk-Based Concentration Table already incorporates a number of very conservative assumptions. Consequently, the use of one-half of the USEPA Region III RBC Table values as cleanup goals is arbitrary and unnecessarily conservative.

4.0 *COMMENTS ON THE REMEDIAL ACTION ALTERNATIVES*

Sections 2.0 and 3.0 of this document presented comments on the manner in which the data is presented and evaluated and on the remedial action objectives established to determine the nature and extent of remedial actions at the Site. This section provides comments on the development and evaluation of the remedial action alternatives. These comments have been grouped into the following sections:

Section 4.1: Remedial Action Alternative Recommendations
Section 4.2: Potential Off-site Impacts of OU-3 Alternatives

4.1 *REMEDIAL ACTION ALTERNATIVE RECOMMENDATIONS*

There are a number of alternate approaches to remediating the Site that are effective in protecting human health and the environment, that pose fewer short-term effects, and are more cost-effective than the alternatives evaluated in the SCFS and the *Proposed Plan*. The SCFS and the *Proposed Plan* should be revised to include remedial action alternatives that incorporate the following alternative approaches to the Site:

- acknowledge the industrial use of the Site;
- evaluate in-situ treatment and removal of free and residual product;
- evaluate a modified cap containment system that is consistent with the existing use of the Site;
- consider the use of utility corridors to reduce exposures to maintenance and other on-site workers.

Additional information on these alternative approaches is presented in Sections 4.1.1 through 4.1.4.

4.1.1 *Acknowledge Industrial Use*

The SCFS and the *Proposed Plan* stated that the remedy was based on the assumption that the Site would continue to be used for industrial purposes in the future. However, the remedial action alternatives presented in the *Proposed Plan* were first evaluated in the draft versions of the SCFS (e.g., December 1997) that assumed the Site would be used for residential purposes in the future. As a result, some of the most cost-effective methods to address potential risks at industrial sites were not adequately evaluated.

For example, an industrial use alternative should include deed restrictions to prevent alternate uses of the Site and to limit the disturbance of Site soil in the future. Adherence to these restrictions would be monitored as part of USEPA's five year review of CERCLA sites (USEPA, 1995). This industrial use alternative should seek to incorporate current operations, including existing buildings, access control and on-site maintenance as part of the remedial actions designed to minimize or eliminate potential exposures to the chemicals in Site soil.

This approach, either independently or in conjunction with the other recommendations presented in this section, would provide a similar level of protection to human health and the environment as do the alternatives evaluated in the SCFS. However, an industrial use alternative can be implemented at a significantly lower cost and would not pose the potential implementability concerns and short-term effects associated with the alternatives evaluated in the SCFS.

4.1.2 *In-Situ Treatment and Removal of Free and Residual Product*

Section 5.0 (page 5-3) of the SCFS states that technologies that specifically address the recovery and/or the removal of free and residual product are not identified in the document because of the high viscosity of the free product and the low soil permeability. As a result, the only approach evaluated in the SCFS to free and residual product was excavation.

Product removal methods should have been evaluated in the SCFS. There are product recovery technologies available that are a significant improvement on the passive product recovery system installed at the Site in 1991 and operated by the USEPA. The SCFS characterized the effects of this system as limited, allegedly due to the high viscosity of the product and the low hydraulic conductivity of the soil. There are several methods currently available for removing high viscosity petroleum product from low permeability soil. Some methods, such as hot air, hot water and steam injection, are routinely used in the petroleum industry to recover crude oil. These methods have been modified for use in removing petroleum product from spill sites.

One technology that has been demonstrated to be a significant improvement over passive product recovery systems is vacuum enhanced product removal. These systems use a high pressure vacuum to forcibly remove both free and residual product from subsurface soil located above and below the water table. These systems remove contaminated ground water, free and residual product and volatile organic compounds (as vapors) from subsurface soil. Vapors are treated above ground and the resulting product and ground water mixture is separated. The product is transported to an off-site incinerator for destruction and the ground water is treated and discharged. Treated ground water can also be heated and re-injected into the formation to promote product removal.

More important, however, is the fact that these systems enhance the flow of air through the unsaturated subsurface soil. This promotes the biodegradation of the petroleum constituents that comprise the majority of the free and residual product. In addition, the rapid removal of ground water that occurs when this system is in use causes ground water levels to decrease below the residual saturation level. This action physically removes the product attached to soil particles but it also exposes the soil that was previously below the water table to air, enhancing the biodegradation of product and other, dissolved constituents in this soil zone.

Demonstration and full-scale projects using this technology have been conducted and reported by the U. S. Air Force, the Port Authority of New York and New Jersey, the Xerox Corporation and others. These studies were used to determine that vacuum enhanced product removal can remove almost two to three gallons of product through biodegradation for every gallon of product that is removed as a liquid.

Overall, vacuum enhanced product removal can be expected to remove 60% to 80% of the constituents that constitute free and residual product within the first three years of operation. The constituents that remain are relatively immobile. If these constituents cannot be removed by vacuum enhanced product removal, it is very unlikely that they would migrate under natural conditions in the future. Vacuum enhanced product removal offers several distinct advantages over the remedial action alternatives that were evaluated in the SCFS:

- Vacuum enhanced product removal treats and destroys between 60% to 80% of the constituents present in free and residual product in the first three years of operation. All but one of the alternatives evaluated in the SCFS simply relocate these constituents to either an on-site or an off-site landfill containment cell. As a result, vacuum enhanced product removal satisfies the preference for treatment contained in the NCP and in the NJDEP Technical Requirements, as described in Section 6.0 of the SCFS. The NCP states that the evaluation of alternatives shall also consider the preference for treatment as a principal element and the bias against off-site land disposal of untreated waste (40 CFR 300.430(f)(1)(ii)(E)).

- Vacuum enhanced product removal is performed in-situ, and does not require the excavation of this material. Almost all of the alternatives evaluated in the SCFS require this material to be excavated. In-situ treatment and removal (for off-site incineration) eliminates the potential short-term fugitive emissions, erosion and vehicle traffic impacts associated with an excavation scenario and does not require that the existing industrial facility be demolished.

- Vacuum enhanced product removal can be used to remove free and residual product at greater depths than can be achieved through excavation. Vacuum enhanced product removal aerates previously saturated soil and the physical removal and biodegradation it provides can be used to enhance the remediation of the ground water aquifer beneath the product area. This approach would be more effective in removing the volatile organic compounds and the semi-volatile organic compounds from Site ground water than would the planned conventional pump-and-treat ground water remedy.

For these reasons, the *Proposed Plan* should be revised to evaluate vacuum enhanced product removal as a component of an industrial use alternative to address the presence of free and residual product.

4.1.3 *Modified Cover Containment System*

Section 7.4 of the SCFS describes and evaluates an alternative (i.e., Alternative 2C) that entails removing approximately 27,000 cubic yards of "hot spot" soil for off-site disposal and capping the remaining soil in place. The "hot spot" soil to be removed consists of approximately 5,000 cubic yards of soil beneath the former waste filter clay pile, 14,000 cubic yards of soil containing free and residual product and 8,000 cubic yards of arsenic-containing soil beneath the tank farm area. As discussed in Section 4.1.2 of this document, the petroleum constituents and PCBs present in the soil beneath the former waste pile area and in the free and residual product area can be removed using an in-situ vacuum enhanced product removal system. The physical product removal, soil bioremediation and ground water extraction components of this system would reduce constituent concentrations to levels that are protective of ground water. Direct contact exposure risks that remain, if any, can then be addressed by installing a modified cap over soil in the product and other Site areas.

This approach is consistent with the assumption contained in the *Proposed Plan* that future use of the Site will be for industrial purposes. The existing industrial operation would continue, but residential use of the property in the future would be prohibited.

The modified cap would also be installed over the arsenic-containing soil in the tank farm area. Recent ground water sampling conducted by the NJDEP using low flow sampling techniques that limit turbidity in ground water samples has demonstrated that arsenic and other inorganic constituents are not present in Site ground water in concentrations that require remediation. As a result, the sole reason for remediating the arsenic-containing soil in the tank farm area is to prevent direct contact. Direct contact with this soil can best be achieved by maintaining the Site for industrial use and by the installation of a modified cap. Sediment from the fire pond and from Birch Swamp Brook can be consolidated onto the area of the Site where the cap is to be installed.

The modified cap can be constructed of a 6 to 12 inch thick layer of asphalt pavement. The existing asphalt cap should be incorporated into the new modified cap. Much of the asphalt for this cap can be obtained by using Site soil in the product area that contains acceptable concentrations of PCBs. This material can be used in an on-site or off-site asphalt batch plant to generate a 5 to 11 inch thick asphalt binder course. A 1 inch thick wearing course using commercially produced asphalt would then be placed to complete the cap. The existing buildings would remain and the cap would be installed between these structures.

This modified cap would eliminate direct contact with Site soil, prevent fugitive emissions and eliminate erosion and the potential for off-site migration of Site-related constituents. Since the vacuum enhanced product removal system would address the potential impacts to ground water from organic compounds in soil and arsenic in Site soil does not pose a risk to ground water, the only exposure pathway for which the modified cap needs to be designed is direct contact. As a result, a permeable asphalt pavement mix can be used in the modified cap. The permeable asphalt cap would reduce and possibly eliminate storm water runoff from the Site.

4.1.4 *Utility Corridors*

One of the potential exposure pathways evaluated in the risk assessment was the potential for a maintenance worker to occasionally come into contact with subsurface soil containing Site-related chemicals during the repair of underground utility lines. The risk assessment contained in the 1990 version of the *Remedial Investigation Report* determined that the potential risks for this exposure pathway were well below the NCP acceptable risk levels for carcinogenic and for noncarcinogenic constituents. However, the risk assessment contained in the 1996 version of the *Remedial Investigation Report* (Harding, 1996) determined otherwise, i.e., that risks for utility workers would be unacceptable. Section 3.4 of this document questions the reasons for this change, since the same data were available and the same risk assessment protocols were in place in 1990 and in 1996.

Nevertheless, potential risks related to subsurface utility workers can be addressed by installing utility corridors. Utility corridors are trenches of uncontaminated soil placed around underground utility lines. In this way, workers maintaining underground utilities in the future would not be exposed to Site-related chemicals in soil. The trenches can be installed around existing utilities or the utility lines can replaced in a trench containing uncontaminated soil that would be installed for that purpose. The soil removed from the trench can be consolidated onto the site, in areas to be covered by the modified cap described in Section 4.1.3.

It is unlikely that Site soil poses unacceptable risks to workers maintaining underground utility lines. However, utility corridors should be evaluated in the SCFS and in the *Proposed Plan* as part of an in-situ treatment and containment remedy that does not require extensive excavation of soil and would not impact existing facility operations.

4.2 POTENTIAL OFF-SITE IMPACTS OF OU-3 ALTERNATIVES

The *Proposed Plan* does not address the potentially significant impacts to surrounding areas that would be posed by implementation of the excavation remedy. The *Proposed Plan* calls for the excavation and off-site disposal of 83,000 cubic yards of soil. The fugitive emissions, dust, noise and vehicle traffic associated with this type of remedial action are significant. The risks to human health and the environment posed by this remedial action should be accounted for and defined in the SCFS and in the *Proposed Plan* to properly evaluate these alternatives.

5.0 SUMMARY

The issues discussed in this document should be addressed in a revised SCFS. The principle issues are summarized as follows:

- The SCFS identified approximately 83,000 cubic yards of soil and sediment to be remediated. As a direct result of the evaluation of the data presented by Harding in the SCFS, the remedial action alternatives identified and evaluated in that document all entail the excavation of an extensive amount of soil and the demolition and removal of the operating Imperial Oil Company facility. The SCFS needs to clearly depict the data and the data evaluation, such as the risk assessment or comparison to guidelines, that was used by Harding to delineate 83,000 cubic yards of Site soil to be remediated. The data presentation needs to be revised so that the reasons for Hard[illegible] conclusions regarding the extent, scope and location of the reme[illegible] b[illegible] understood.

- A residential exposure scenario should not have been used to devel[illegible] the final remediation action objectives. The need to revise the remedial action objectives in the SCFS to reflect current and future industrial use of the Site is supported by *(refer to Section 3.1 of this document.)*:
  1. The requirements of the NCP and guidance provided by the USEPA regarding land use.
  2. The 90 year industrial use history of the Site.
  3. The regulatory support of recent brownfield initiatives.
  4. The acknowledgment in the SCFS that institutional controls can be effective in preventing residential use of the Site in the future.

- A 10^{-6} target carcinogenic risk level for CERCLA sites in the state of New Jersey is inconsistent with the NCP and USEPA guidance, which specifically define an acceptable carcinogenic risk range of 10^{-4} to 10^{-6}. The remedial action objectives presented in the SCFS should be revised to reflect the NCP definition and USEPA guidance on acceptable carcinogenic risk levels. *(Refer to Section 3.2 of this document.)*

- The use of USEPA Soil Screening Levels (SSLs) as remedial goals is inappropriate. This USEPA guidance specifically states that these screening levels should not be used as final remediation goals. *(Refer to Section 3.5 of this document.)*

- The potential off-site impacts associated with the excavation and off-site disposal alternative evaluated in the SCFS (i.e., Alternative 3), such as the dust generation, wind-blown soil, erosion and the number of vehicles that will need to enter and leave the Site, could be significant. As a result, the potential risks associated with these activities should have been evaluated in the SCFS. *(Refer to Section 4.3 of this document.)*

In addition, revisions are also needed to the SCFS and the *Proposed Plan* to address USEPA guidance on lead and arsenic in soil *{refer to Section 3.3}* and the differences between the 1990 and the 1996 risk assessments *{refer to Section 3.4}*.

Finally, the SCFS and the *Proposed Plan* should be revised to evaluate an alternative that would be effective in protecting human health and the environment, does not require that the existing facility be demolished, and poses fewer short-term effects and is more cost-effective than the alternatives evaluated in the SCFS. Section 4.1 of this document discusses the following technologies that should be considered in developing such an alternative:

- an industrial future use exposure scenario;
- in-situ treatment and removal of free and residual product (e.g., vacuum enhanced product removal);
- a modified cap containment system; and
- utility corridors.

Such low-cost, low-impact technologies can be used to address the potential risks posed by the Site without posing significant off-site impacts and can be implemented at a cost far below that of the remedy selected in the *Proposed Plan*.

6.0 *REFERENCES*

Harding Lawson Associates, Inc. (Formerly ABB Environmental Services) 1996. *Final Remedial Investigation Report, Imperial Oil Company and Champion Chemicals Site, Morganville, New Jersey*; Harding Environmental Services, Inc.; Prepared for the New Jersey Department of Environmental Protection; December 1996.

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USEPA, 1996. *Soil Screening Guidance: User's Guide*; USEPA Office of Solid Waste and Emergency Response; EPA/540/R-96/018; April 1996. *{Note: The current appendix A, Generic SSLs, was obtained from the USEPA internet web site in April 1999.}*

USEPA, 1996a. *Soil Screening Guidance: Technical Background Document*; USEPA Office of Solid Waste and Emergency Response; EPA/540/R-95/128; July 1996.

USEPA, 1997. *Risk Based Concentration Table*; Jennifer Hubbard, Toxicologist, Superfund Technical Support Section (3HS41); October 1, 1998.

Appendix C

Proposed Plan

Proposed Plan

Imperial Oil Company Superfund Site

Marlboro Township, Monmouth County — March 18, 1999

I. PURPOSE OF THE PROPOSED PLAN

This Proposed Plan describes the remedial alternatives considered for the Imperial Oil Company, Inc./ Champion Chemicals (IOC/CC) Superfund Site ("the site") to remediate the contaminated soil found at the main site and presents the remedial alternative preferred by NJDEP and USEPA along with the rationale for this preference. The actions described in this document represent the third and final Operable Unit for the site. The first Operable Unit (OU1) addressed off-site soil contamination and the second (OU2) addressed groundwater contamination. This Operable Unit addresses soil contamination found on the property in the vicinity of the operating plant. The preferred alternative for Operable Unit 3 is Alternative 3 - Excavation/Off-site Disposal/Reuse.

This document was developed by the U.S. Environmental Protection Agency (EPA) and the New Jersey Department of Environmental Protection (NJDEP). The NJDEP is issuing the Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, and Section 300.430(f) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The Proposed Plan is being provided to inform the public of NJDEP's and USEPA's preferred remedy and to solicit public comments pertaining to all the remedial alternatives evaluated, including the preferred remedy. Changes to the preferred remedy, or a change from the preferred remedy to another remedy, may be made, if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after EPA and NJDEP have taken into consideration all public comments.

The Proposed Plan summarizes the information presented in the Remedial Investigation (RI) Report (December, 1996), Source Control Feasibility Study (FS) Report (August, 1998), and the Addendum to the Source Control Feasibility Study (Addendum) Report (January 1999.) These Reports should be consulted for a more detailed description of the nature and extent of contamination at the site and all the remedial alternatives evaluated.

II. COMMUNITY ROLE IN THE SELECTION PROCESS

USEPA and NJDEP rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the RI and FS Reports, the Addendum to the FS Report, the Proposed Plan, and supporting documentation have been made available to the public for a public comment period which begins on February 19, 1999 and concludes on April 6, 1999.

A public meeting will be held during the public comment period at the Marlboro Township Municipal Building on Thursday, March 18, 1999 at 7:00 p.m. to present the conclusions of the RI and FS Reports, to elaborate further on the reasons for recommending the preferred remedial alternative, and to receive public comments.

Comments received at the public meeting, as well as written comments, will be documented in the Responsiveness Summary Section of the Record of Decision.

Dates to Remember
February 19, 1999 through April 6, 1999
Public Comment Period

Thursday, March 18, 1999 at 7 p.m.
Public Meeting at the Marlboro Township Municipal Building
Marlboro Township, NJ

(ROD), the document which formalizes the selection of the remedy.

All written comments should be addressed to:

Mr. Donald J. Kakas, Section Chief
Bureau of Community Relations
New Jersey Department of Environmental Protection
Division of Publicly Funded Site Remediation
P.O. Box 413
Trenton, New Jersey 08625-0413
(609) 984-3081

Copies of the Final RI Report, FS Report, Addendum to the FS Report, Proposed Plan, and supporting documentation which support the selection of this response action are available locally at:

Monmouth County Library
1 Library Court
Marlboro, New Jersey 07746
(732) 536-9406

Copies of the Final RI Report, FS Report, Addendum to the FS Report, Proposed Plan, and supporting documentation are also available at the following locations:

New Jersey Department of Environmental Protection
Bureau of Community Relations
401 East State Street, 6th Floor
Trenton, New Jersey 08625-0413
(609) 984-3081

U. S. Environmental Protection Agency
Superfund Records Center, 18th Floor
290 Broadway
New York, New York 10007-1866
(212) 637-4308

EPA, in consultation with NJDEP, will select a remedy for the site only after the public comment period has ended and the information submitted during that time has been reviewed and considered.

III. SITE BACKGROUND

The Imperial Oil Company/Champion Chemicals (IOC/CC) site is located in the Morganville section of Marlboro Township in northwest Monmouth County. Champion Chemical Company is the owner of the real property located on Lot 29, Block 122, Orchard Place in Morganville. The premises are leased to the Imperial Oil Company, Inc., which operates an oil blending facility.

Imperial Oil Company's operations occupy approximately 4.2 acres of the entire 15 acres of the site. A chain-link fence surrounds the active portion of the site. There are seven buildings on-site used for production, storage, and maintenance and there are also numerous above ground oil storage tanks (see Figures 1 & 2). The western property line abuts the abandoned Central Railroad of New Jersey's Freehold and Atlantic Highlands Branch Main Line.

There are approximately 30 scattered residential properties along the surrounding roads. A small commercial center (Morganville) is located approximately 2 mile southeast of the site at the junction of Route 3 and Route 79. Two automobile scrap yards are located just to the northeast of the site boundaries. Lake Lefferts, a swimming and recreational area, is located approximately one mile north of the site. Lake Lefferts has been identified as a potential potable water source for the area.

The site is located within the Matawan watershed of the Atlantic Coastal Drainage Basin. The topography of the site ranges from 120 feet above mean sea level (MSL) in the southwest corner of the site to 97 feet above MSL at the northern boundary. Surface water runoff at the site is to the north. During periods of heavy rainfall, water accumulates in a catchment area in the northern section of the site. This water and site runoff is contained by an earthen berm that extends along the northeastern fence line of the site. Three oil/water separators and an arsenic treatment unit are used to treat any runoff that collects in the earthen berm. To the east of the berm is a man-made pond known as the Fire Pond which discharges to Birch Swamp Brook. Birch Swamp Brook, an intermittent stream at the site, flows through a bog northwest of the site, through a culvert under the rail line and through Off-site Areas 1 and 2, and subsequently drains into Lake Lefferts. Lake Lefferts empties into Raritan Bay. The two areas, known as Off-site Areas 1 and 2, are located approximately 220 feet and 700 feet northwest of the facility, respectively. The soil in these areas is contaminated with arsenic, lead, and polychlorinated biphenyls (PCBs). Off-site Areas 1 and 2 are being addressed as part of the OU1 remediation.

The Englishtown Aquifer underlies the site. It is classified as GW-2(Current and Potential Potable Water Supply) and is an important source of water supply for Monmouth and northern Ocean Counties. Twenty-eight residential wells were identified within a 1-mile radius of the site, none of which are used for potable drinking water. The Marlboro Township Municipal Utilities Authority supplies the potable water to the residents in the vicinity of the site and their supply wells, which draw water from the deeper Raritan-Magothy Aquifer, are located approximately two miles south (upgradient) of the site.

Industrial activities have been ongoing at the site since approximately 1912. Initially, ketchup and tomato paste was manufactured at the facility until approximately 1917, at which time it was converted to a chemical processing plant. The products of the chemical plant may have included arsenic acid and calcium arsenate, followed by the manufacturing of flavors and essences. In approximately 1950, the plant was purchased by Champion Chemical and became an oil reclamation facility. The oil reclamation process used diatomaceous earth (filter clay) and caustic solution to remove heavy metals and polychlorinated biphenyls (PCBs) from waste oil. The waste products of the oil reclamation process, including the contaminated filter clay and caustic solution, were disposed of on the site. This operation continued until approximately 1965. Imperial Oil Company leased the site from Champion Chemical in 1968 and began conducting oil blending operations, including mixing and repackaging unused (clean) oil for delivery. Currently, raw products (refined clean oil) are delivered by truck and transferred to above-ground tanks. Imperial Oil mixes and blends the oil for its customers. The IOC/CC site initially came to the attention of regulatory authorities in September 1978. The results of NJDEP's 1981 analyses of soil and waste filter clay pile samples revealed high concentrations of petroleum hydrocarbons, lead, arsenic, barium, and PCBs.

In December 1981, the IOC/CC entered into an Administrative Consent Order (ACO) with the NJDEP in which the IOC/CC agreed to cease discharging of hazardous waste and other pollutants into the waters of the state and agreed to comply with specified discharge limits set forth by the New Jersey Pollutant Discharge Elimination System (NJPDES). In addition, the ACO required the IOC/CC to repair the oil/water separators and dispose of the oil/water separator sludge in a manner acceptable to the NJDEP.

The IOC/CC site was proposed for inclusion on the EPA's National Priorities List (NPL) of Superfund sites on December 1, 1982. The site was formally added to the NPL on September 1, 1983.

During the period 1983 through 1986, NJDEP maintained an on-going inspection and monitoring program of the site and surrounding areas. In addition, EPA and the Monmouth County Prosecutor's Office conducted investigations at the site, confirming that heavy metals, PCBs, and petroleum hydrocarbons were present in soil and ground water.

A remedial investigation (RI) of the site was conducted by NJDEP's contractor, E.C. Jordan Company. The RI was divided into two phases. The first phase was conducted in 1987 and the other phase in 1989/1990. The purpose of the RI was to: determine the nature and extent of contamination resulting from historic site activities; identify potential contamination migration routes; identify potential receptors of site contaminants; and characterize potential human health risks and related environmental impacts. The Draft RI was completed in 1990 by E.C. Jordan.

In September 1990, EPA issued a Record of Decision (ROD) for the remediation of Off-site Areas 1 and 2 (Operable Unit 1 (OU1)). The major components of the ROD included: the installation of fencing to control access to the contaminated soil areas; the excavation and appropriate off-site disposal of contaminated soil from within the wetlands; and the restoration of affected wetlands.

In September 1991, EPA installed the fence around Off-site Areas 1 and 2 to control access to the contaminated soil.

In November 1991, as part of a removal action, EPA excavated the waste filter clay pile down to ground level. The waste clay pile was contaminated with PCBs, arsenic, lead, and total petroleum hydrocarbons. The excavated material (approximately 660 cubic yards) was disposed of in an approved Resource Conservation and Recovery Act (RCRA) landfill. Also, in 1991, EPA installed extraction wells to remove a petroleum-like product layer (floating product) from the groundwater beneath the waste filter clay pile. The extraction wells and floating product removal system were installed under a removal action. The extracted floating product is being stored in an on-site storage tank before disposal. In 1996, NJDEP assumed responsibility for the operation and maintenance of the floating product removal system. To date, approximately 10,000 gallons of the floating product have been extracted and disposed of at a Toxic Substance Control Act (TSCA) regulated incinerator.

In September 1992, EPA issued a ROD for the remediation of the contaminated groundwater (Operable Unit 2 (OU2)). The major components of the ROD included: the installation of extraction wells to extract the contaminated groundwater; the treatment of extracted groundwater via precipitation of inorganic contaminants and carbon adsorption of organic contaminants; the discharge of the treated groundwater to Birch Swamp Brook; the continuation of the floating product removal action that was initially undertaken by the EPA, and the appropriate environmental monitoring to ensure the effectiveness of the remedy.

In November 1996, NJDEP collected and analyzed additional soil samples at the site to complete the remedial investigation work. The RI Report was finalized in December 1996 and the Source Control Feasibility Study Report for Operable Unit 3 was completed in August 1998. The Addendum to the Source Control Feasibility Study Report was completed in January 1999.

In September 1997, EPA issued an Explanation of Significant Differences (ESD) to modify the September 1990 ROD to include the remediation of four residential properties located adjacent to the Imperial Oil facility and the implementation of engineering controls in the vicinity of the Fire Pond and forested wetland areas of the site. In March 1998, EPA initiated the excavation and disposal of the contaminated soil found on the four residential properties. EPA excavated and disposed of approximately 5,700 cubic yards of soil from the properties. In August 1998, EPA completed the work and restored the properties.

IV.REMEDIAL INVESTIGATION SUMMARY

The IOC/CC RI Report identified the following contaminated media/areas:

1. Off-site contaminated residential and wetland soil
2. On-site and off-site ground water contamination
3. Floating product (also referred to as free and residual product) which underlies the waste filter clay material
4. On-site waste filter clay material
5. On-site soil contamination
6. Birch Swamp Brook sediment contamination

The off-site contaminated residential and wetland soils are being addressed as part of OU1. The on/off-site groundwater contamination is being addressed as part of OU2. The remedial designs for OU1 and OU2 are underway. EPA and NJDEP plan to include the remediation of Birch Swamp Brook sediment contamination as part of OU1. Since the floating product is a continuing source of groundwater and soil contamination at the site, the floating product will be addressed as part of Operable Unit 3 (OU3). OU3 will also address the waste filter clay material and the on-site soil contamination.

The RI results related to the contaminated waste filter clay material, the floating product and the on-site soil indicate that the waste filter clay material, the floating product, and the on-site soil are contaminated with volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), PCBs, metals, and total petroleum hydrocarbons(TPH).

The contaminants found in the waste filter clay material, the floating product, and the on-site soil include: PCBs (up to 128.2 part per million (ppm)), arsenic (up to 6,120 ppm), and lead (up to 3,720 ppm), benzene (up to 0.42 ppm), toluene (up to 2.3 ppm), xylene (up to 3.3 ppm), ethylbenzene (up to 0.81 ppm), pyrene (up to 5.0 ppm), bis(2-ethylhexyl)phthalate (up to 12 ppm), and butylbenzyl phthalate (up to 47 ppm).

V. SUMMARY OF SITE RISKS

Based upon the results of the RI, a baseline risk assessment was conducted to estimate the risks associated with current and future site conditions. The baseline risk assessment estimates the human health and ecological risk which could result from the contamination at the site if no remedial action were taken.

The baseline risk assessment is presented in Chapter 13 of the RI Report and addresses all contaminated media identified at the site. The ecological risk assessment is presented in Chapter 14 of the RI. The discussion of risk presented below addresses only risks posed by soil contamination found on the IOC facility, the waste filter clay material, and the floating product, since these are the media addressed in this Proposed Plan.

BASELINE HUMAN-HEALTH RISK ASSESSMENT

A four-step process is utilized for assessing site-related human health risks for different exposure scenarios:

1. *Hazard Identification*—contaminants of concern at the site are identified based on several factors such as toxicity, frequency of occurrence, and concentration.

2. *Exposure Assessment*—estimates the magnitude of actual and/or potential human exposures the frequency and duration of these exposures. and the pathways (e g . ingesting contaminated well water) by which humans are potentially exposed.

3 *Toxicity Assessment*—determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response).

4. *Risk Characterization*—summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative (e.g., non-cancer and one-in-one-million excess cancer risk) assessment of site-related risks.

The Baseline Risk Assessment began with selecting contaminants of concern (COC) which have inherent toxic effects that are likely to pose the greatest concern to human health. The COCs for the contaminated soil at the Imperial Oil site are listed below:

Carcinogens:	**Non-Carcinogens:**
Arsenic	Antimony
Benzene	Butylbenzylphthalate
Beryllium	Chromium III
bis(2-Ethylhexyl)phthalate	Copper
carcinogenic PAHs	Di-N-butyl Phthalate
Chloroform	1,2-Dichloroethene (total)
1,2-Dichloroethane	Ethylbenzene
PCBs	Lead
Trichloroethene	Noncarcinigenic PAHs
Tetrachloroethene	Styrene
Toluene	1,2,4-Trichlorobenzene
Total Xylenes	

An important factor to consider in the risk assessment is the assumed future use of the site. Based on the current land use of the site, which is industrial, EPA and NJDEP assumed that the most probable future use of the site would be industrial. The current land use of the site has the potential to impact facility maintenance workers, utility workers, excavation workers, and neighborhood children playing in areas abutting the fenced portion of the site.

Potential exposure pathways include dermal absorption and incidental ingestion of the contaminated soil by facility maintenance workers, utility workers, excavation workers, and neighborhood children playing in areas abutting the fenced portion of the site. Exposure assumptions were made for average and reasonable maximum (RME) exposure scenarios. Exposure intakes (doses) were calculated for each receptor for all pathways considered.

Under current EPA guidelines, the likelihood of carcinogenic and non-carcinogenic effects due to exposure to site-related chemicals are considered separately. Non-carcinogenic risks were assessed by calculation of a Hazard Index (HI), which is an expression of the chronic daily intake of a chemical divided by its safe or Reference Dose (RfD). An HI that exceeds 1.0 indicates the potential for non-carcinogenic effects to occur. Carcinogenic risks were evaluated using a cancer Slope Factor (SF), which is a measure of the cancer-causing potential of a chemical. Slope Factors are multiplied by daily intake estimates to generate an upper-bound estimate of excess lifetime cancer risk. For known or suspected carcinogens, EPA has established an acceptable cancer risk range of 10^{-4} to 10^{-6} (one-in-ten thousand to one-in-one million). The State of New Jersey's acceptable risk standard is one-in-one million (10^{-6}).

The estimated cancer risk associated with the soil on the IOC facility for facility maintenance and utility workers is $5x10^{-4}$ (five-in-ten thousand). For excavation workers and neighborhood children, the cancer risks are $2x10^{-5}$ (two-in-one hundred thousand) and $2x10^{-4}$ (two-in-ten thousand), respectively. HIs of 5 are estimated for both the facility maintenance and utility workers. The HIs for excavation workers and neighborhood children are 2 and 7, respectively.

ECOLOGICAL RISK ASSESSMENT

A baseline ecological risk assessment was conducted for the site. The Ecological Risk Assessment involves a qualitative and/or semi-quantitative appraisal of the actual or potential effects of a hazardous waste site on plants and animals. The primary objectives of this assessment are to identify the ecosystems, habitats, and populations likely to be found at the site and to characterize the contaminants, exposure routes and potential impacts on the identified receptors.
The baseline ecological risk assessment of the area indicates PCBs, arsenic, and lead in the surface soil of the main site are a source of further sediment contamination to Birch Swamp Brook and may pose risks to wildlife.

Excavation of the contaminated soil will reduce wildlife exposures to . : contaminants.

VI. REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs) and risk-based levels established in the risk assessment.

Based on the site conditions, nature of contaminants, migration pathways, and conclusions of the risk assessment, the following specific remedial action objectives have been established for this site:

- prevent human exposure to the on-site contaminated soil
- prevent human exposure to the contaminated free and residual product located above the groundwater table
- prevent the further migration of soil contaminants to groundwater
- prevent migration of contaminated surface water, soil, and sediments from on-site areas to Birch Swamp Brook, the fire pond, and associated wetlands, and
- prevent ecological exposure to contaminated surface soil.

Soil clean-up numbers for the site were developed in accordance with the EPA's December 1991 ARisk Assessment Guidance for Superfund: Development of Risk-based Preliminary Remediation Goals. The Preliminary Remediation Goals (PRGs) for OU3 were developed from the soil clean-up numbers that were obtained from the guidance document, which includes protection of groundwater from the contaminated soil. Also, the PRGs are based on a future industrial land use scenario. The PRGs for the site are presented in Table 1 of this Proposed Plan.

Actual or threatened releases of hazardous substances from the site, if not addressed by the preferred alternative or one of the other appropriate alternatives considered, may present an imminent and substantial endangerment to the public health, welfare, or the environment.

VII. SCOPE AND ROLE OF ACTIONS

The problems at the site are complex. As a result, NJDEP and EPA have separated the site remediation into phases or operable units. OU1 will address soil contamination in Off-site Areas 1 and 2. In addition, EPA and NJDEP are planning to incorporate the remediation of the contaminated sediment in Birch Swamp Brook and the Fire Pond as part of OU1. OU2 will address contaminated groundwater associated with the site.

The subject of this Proposed Plan for OU3 is the remediation of the contaminated soil found on the IOC facility, the saturated waste filter clay material and the floating product underlying the waste filter clay material. These areas of contamination are considered the sources of the groundwater contamination and Birch Swamp Brook sediment contamination.

VIII. SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected site remedy be protective of human health and the environment, be cost effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

Based on the remedial action objectives, NJDEP performed an initial screening process of potential alternatives that would address the contaminated soil at the site. The initial screening of the alternatives is described in greater detail in the August 1998 AFinal Source Control Feasibility Study (FS) Report.

Several remedial technologies that could potentially meet remedial action objectives for the site were identified, formulated into remedial alternatives, and then evaluated for effectiveness, implementability, and cost. Following this evaluation, four remedial alternatives were retained for detailed analysis.

The four alternatives that received detailed analysis are:

Alternative 1: NO ACTION

Alternative 2: ON-SITE CONTAINMENT (w/Options A, B, C)

Alternative 3: EXCAVATION/OFF-SITE DISPOSAL/REUSE

Alternative 4: EXCAVATION/TREATMENT

The estimated capital cost, net present worth cost, and implementation time to successfully complete the cleanup under each alternative is presented below for comparison. Actual costs and implementation times may differ.

For OU3, the principal threat (hot-spot) materials are defined as:

Waste filter clay materials;

TSCA regulated material (i.e., soils with PCB concentrations greater than or equal to 50 ppm);

Floating product (Free and residual product); and

Contaminated soils underlying Tank Farms Nos. 1, 2, 3, and 4.

CERCLA requires that a review of the site conditions be conducted every five (5) years if contamination remains that does not allow for unrestricted use of the site. In the event the selected remedial action does not allow for unrestricted use, five (5) year monitoring as required under CERCLA will be implemented.

Alternative 1: NO ACTION

Estimated Capital Cost:	$ 0
Estimated O&M Present Worth Cost:	$ 295,000
Estimated Present Worth Cost:	$ 295,000
Estimated Implementation Time:	None

The National Contingency Plan (NCP) and CERCLA require the evaluation of a No Action alternative to be considered as a baseline for comparison with other remedial action alternatives. The no action alternative involves no remedial actions to reduce the toxicity, mobility or volume of contamination or prevent or control exposure to contaminated soil and sediment at the site. This alternative does include a 30-year environmental monitoring program. The objective of the environmental monitoring program would be to monitor the impact the existing sources of contamination would have on ground water and Birch Swamp Brook in the future. Because this alternative would result in contaminants remaining on site, CERCLA requires that a review of the site conditions be conducted every five (5) years and this component is included in the alternative.

Alternative 2A: RESTRICTED CONTAINMENT WITH PRINCIPAL THREAT (HOT SPOTS) REMOVAL

Estimated Capital Cost:	$14,942,000
Estimated O&M Present Worth Cost:	$ 483,000
Estimated Net Present Worth Cost:	$15,425,000
Estimated Implementation Time:	24 months

Alternative 2A involves the dismantling of the tank farms and other structures at the IOC Facility to facilitate the excavation of the contaminated soil, dismantling the floating product removal system to facilitate the excavation of the waste filter clay material and the free product, excavation and off-site disposal of 27,000 cy of soils which pose the principal threat (hot-spots), which includes an estimated 19,000 cy of soil to be transported to a TSCA-permitted landfill, an estimated 8,000 cy of soil to be transported to a RCRA-permitted landfill, where it will receive appropriate treatment prior to disposal in conformance with RCRA requirements; and 5,000 gallons of free product to be transported to a TSCA-permitted incinerator. In addition, this Alternative includes the excavation and stockpiling of an estimated 56,000 cy of contaminated soil exceeding PRGs prior to placement in an approximate 3-acre containment system cell on-site. The containment cell would be constructed on the northern portion of the IOC/CC site and would have a bottom liner and leachate collection system. The soil would be dewatered before off-site disposal and on-site placement. The liner system would be constructed above the water table and would occupy the upper portion of the site's five-foot unsaturated zone. Leachate collected from the containment system cell would be removed by pumping directly into tanker trucks for appropriate off-site disposal. The approximate height of the Alternative 2A containment cell is 30 feet. Institutional controls would be implemented to restrict access to the containment system. The affected wetland areas will be restored following the excavation and disposal activities.

Alternative 2B: EXPANDED CONTAINMENT WITH PRINCIPAL THREAT (HOT SPOTS) REMOVAL

Estimated Capital Cost:	$15,514,000
Estimated O&M Present Worth Cost:	$ 563,000
Estimated Net Present Worth Cost:	$16,077,000
Estimated Implementation Time:	24 months

The components of Alternative 2B are the same as Alternative 2A except for the dimension of the containment system cell. This Alternative involves the dismantling of the tank farms and other structures on the IOC Facility to facilitate the excavation of the contaminated soil, dismanting the floating product removal system, excavation and appropriate off-site disposal of the same estimated 27,000 cy of soils which pose the principal threat (hot-spots) and 5,000 gallons of free product. The excavation and stockpiling of an estimated 56,000 cy of contaminated soil exceeding PRGs prior to placement in an approximate 5 5-acre containment system cell covering the entire fenced area of the IOC/CC site complete with a bottom liner and leachate collection system. The approximate height of the Alternative 2B containment cell would be 16 feet. Institutional controls would be implemented to restrict access to the containment system. The affected wetland areas will be restored following the excavation and disposal activities.

Alternative 2C: PRINCIPAL THREAT (HOT SPOTS) REMOVAL WITH IN PLACE CONTAINMENT FOR ALL OTHER CONTAMINATION

Estimated Capital Cost:	$13,111,000
Estimated O&M Present Worth Cost:	$ 387,000
Estimated Net Present Worth Cost:	$13,498,000
Estimated Implementation Time:	18 months

Under Alternative 2C, following the removal and appropriate off-site disposal of an estimated 27,000 cy of soils which pose the principal threat (hot-spots) and 5,000 gallons of free product, the remaining contaminated soil on the IOC property would be capped in place on the site. A limited amount of contaminated soil located west of the northwest fence boundary would be excavated and consolidated on-site prior to capping The estimated size of the cap under this alternative is 4 acres and, unlike Alternatives 2A and 2B, this alternative would not include a bottom liner and leachate collection system. Similar to Alternative 2B, the estimated height of the cap would be 3 feet. Institutional controls would be implemented to restrict access to the cap. The affected wetland areas will be restored following the excavation and disposal activities.

Alternative 3: EXCAVATION/OFF-SITE DISPOSAL/ REUSE

Estimated Capital Cost:	$17,201,000
Estimated O&M Present Worth Cost:	$ 9,000
Estimated Net Present Worth Cost:	$17,210,000
Estimated Implementation Time:	11 months

Alternative 3 involves the dismantling of the tank farm and other structures on the IOC Facility to facilitate the excavation of the contaminated soil, dismantling the floating product removal system, excavation of all contaminated soil, which includes 27,000 cy of soil which poses the principal threat (hot-spots), 56,000 cy of soil exceeding PRGs, and the disposal of this estimated 83,000 cy of contaminated material and the 5,000 gallons of free product in the appropriate off-site permitted landfill. For the 27,000 cy of soil posing the principal threat, an estimated 19,000 cy of soil will be transported to a TSCA-permitted landfill and the other 8,000 cy to a RCRA-permitted landfill for disposal, where it will receive appropriate treatment prior to disposal in conformance with RCRA requirements. The 5,000 gallons of free product will be disposed of in TSCA-permitted incinerator. The 56,000 cy of soil exceeding PRGs will be transported to an appropriate landfill for disposal. Some of the soil may be eligible for soil recycling in a Class B permitted asphalt-batch plant. The excavated areas will be backfilled with clean soil. The affected wetlands would be restored. Under this alternative, soil which poses the principal threat (hot-spots) would be excavated similar to Alternative 2, except that, after dewatering (as necessary), all excavated material would be hauled off-site for disposal after it has been sampled and analyzed for its chemical characteristics. Accordingly, stockpile requirements are much lower than those required for Alternative 2 and stockpiling could occur within the area of excavation. Excavations would be backfilled with clean soil and the site returned to its existing grade. If the implementation of this Alternative does not result in the allowance of unrestricted future use of the site, institutional controls will be implemented to restrict the future use of the site to industrial use only The affected wetland areas will be restored following the excavation and disposal activities.

Alternative 4: EXCAVATION/TREATMENT

Estimated Capital Cost:	$38,131,000
Estimated O&M Present Worth Cost:	$9,000
Estimated Net Present Worth Cost:	$38,140,000
Estimated Implementation Time:	18 months

Alternative 4 involves the dismantling of the tank farm and other structures on the IOC Facility to facilitate the excavation of the contaminated soil, dismantling the floating product removal system, excavation of the estimated 83,000 cy of contaminated material and 5,000 gallons of free product, off-site disposal at a TSCA-permitted landfill of an estimated 5,000 cy of the 83,000 of material not amenable to treatment, and treatment of the remaining material in an on-site hydrometallurgical extraction treatment system. The hydrometallurgical extraction process consists of two steps: (1) a soil washing pretreatment step that cleans sand-sized particles and (2) an extraction step that cleans fines. For this treatment process, the remaining 78,000 cy of material would be stockpiled and screened for removal of large debris. The debris would be staged for transport to an off-site landfill. After screening, the fine soil and sediment would be then be treated in the hydrometallurgical treatment unit. Following treatment, the treated soil would be supplemented with clean borrow soil and used to backfill the excavated areas. The sludge from the treatment system would be disposed of off-site. If the implementation of this Alternative does not result in the allowance of unrestricted future use of the site, institutional controls will be implemented to restrict the future use of the site. The affected wetland areas will be restored following the excavation and disposal activities.

IX. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In accordance with the NCP, a detailed analysis of each remedial alternative was conducted with respect to each of the nine (9) criteria for selecting a site remedy. This section discusses and compares the performance of the remedial alternatives under consideration against these criteria. The nine criteria are described below. All selected alternatives must at least attain the Threshold Criteria. Alternatives that do not provide protection of human health and the environment are eliminated from further consideration. The selected alternative should provide the best trade-offs among the Primary Balancing Criteria. The Modifying Criteria will be evaluated following the public comment period.

A. THRESHOLD CRITERIA:

Overall Protection of Human Health and the Environment addresses whether a remedy provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.

Compliance with ARARs (Applicable or Relevant & Appropriate Requirements) addresses whether a remedy will meet all of the ARARs under Federal and State environmental statutes, and/or provides grounds for invoking a waiver.

B. PRIMARY BALANCING CRITERIA:

Long-term Effectiveness and Permanence refers to expected 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 addresses the statutory preference for selecting remedial actions that employ treatment technologies that permanently and significantly reduce toxicity, mobility or volume of the hazardous substances as a principal element.

Short-term Effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until cleanup goals are achieved.

Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

Cost includes estimated capital costs, operation and maintenance costs, and net present worth costs.

C. MODIFYING CRITERIA:

State Acceptance indicates whether, based on review of the RI/FS reports and the Proposed Plan, the State concurs with, opposes, or has no comment on the preferred alternative.

Community Acceptance will be assessed in the Record of Decision (ROD) following a review of the public comments received on the RI/FS reports and the Proposed Plan.

X. COMPARATIVE ANALYSIS

Described below is a comparison of the six remedial alternatives (including Options A, B, and C for Alternative 2) relative to the evaluation criteria used during the detailed analysis of alternatives. The purposes of the comparative analysis are to identify the advantages and disadvantages of the alternatives relative to one-another, and to aid in the selection of a remedial alternative for soil at the IOC/CC site.

A. Comparison of Threshold Criteria

Because the selected remedy must be protective of human health and the environment and comply with ARARs, EPA has designated (1) overall protection of human health and the environment, and (2) compliance with ARARs, as the two threshold criteria. An alternative must meet both criteria to be eligible for selection as the preferred site remedy.

Overall Protection of Human Health and the Environment

Alternative 1, No Action, was developed as a baseline with which to compare other alternatives. Because natural attenuation is the only mechanism that could potentially reduce concentrations of COCs in soil, implementation of this alternative would result in continued risk to human health and the environment for an undetermined period into the future.

Alternatives 2A, 2B and to a lesser extent, 2C, would be protective of human health and the environment. Each of the alternatives includes removal of principal threat (hot-spot) areas of contamination that could not be reliably contained on-site, and containment of the remaining contaminated soil exceeding PRGs within an engineered cell (2A and 2B) and/or in-place beneath an impermeable cap (2C). Although contaminated soil exceeding PRGs would remain on-site under each of the options of Alternative 2, placement within a cell and/or beneath an impermeable cap provides isolation from the environment, and offers protection of both human health and environmental receptors. Continued protection of human health and the environment would be dependent on effective execution of a maintenance program to maintain cap integrity. While Alternative 2C would be protective of human health, it is not fully protective of the groundwater. In Alternative 2C, contaminated soil exceeding PRGs would be in direct contact with the groundwater and would contribute to the groundwater contamination.

Alternative 3, Excavation/Off-site Disposal/Reuse, would be protective of human health and the environment. All contamination exceeding PRGs, not just the principal threat (hot-spot) areas of contamination, would be excavated and properly disposed of off-site. Therefore, all exposure pathways to the site contamination would be eliminated.

Alternative 4, Excavation/Treatment, would be protective of human health and the environment. All contamination exceeding PRGs would be excavated and treated on-site to reduce the contaminant levels to meet PRGs before placement back on-site. The principal threat (hot-spot) contamination would be properly disposed of off-site. This would eliminate all exposure pathways to the contamination similar to Alternative 3.

Compliance with ARARs

All of the Alternatives (except the No Action Alternative) could be designed to comply with federal and state location-specific ARARs that regulate excavation, filling, and discharge into wetlands and floodplains. These alternatives would comply with action-specific ARARs associated with the discharge of treated water to Birch Swamp Brook, employ engineering controls to comply with federal and state air-quality standards for fugitive dust from remedial activities, and comply with RCRA, TSCA, U.S. Department of Transportation (DOT), and New Jersey hazardous and solid waste regulations that apply to the transport and disposal of waste material.

B. Comparison of Primary Balancing Criteria

Long-term Effectiveness and Permanence

Alternative 4 provides the greatest long-term effectiveness and permanence since the contaminated soil is excavated and treated to meet PRGs prior to backfilling on-site. Treatment of soils exceeding PRGs would eliminate the need for engineering and/or institutional controls and long term monitoring. For Alternative 3, the excavation and off-site disposal/reuse of the contaminated soil also provide the greatest long term effectiveness in eliminating future residual risk to contaminated soil on-site and also would eliminate the need for engineering and/or institutional controls at the site. However, it does not provide the permanence that the Alternative 4, treatment option provides because the contaminated soil is disposed of at off-site RCRA, TSCA, or special waste licensed landfills. These licensed facilities effectively isolate the waste materials such that future residual risks are negligible but are not permanent. Alternative 2A, 2B, and 2C provide lesser long-term effectiveness and permanence than Alternatives 3 and 4, but they can effectively minimize residual risk to public health and the environment as long as the containment systems are properly maintained in the future and institutional controls are enforced. Of all the alternatives, Alternative 1 provides the least amount of long-term effectiveness and permanence, because the soil and sediment would not be remediated and engineering and institutional control would not be implemented to mitigate the risks to human and ecological receptors.

Reduction of Toxicity, Mobility or Volume Through Treatment

For Alternatives 2 and 3, no treatment is proposed to reduce toxicity, mobility or volume except for (1) the estimated 5,000 gallon of free product expected to be recovered during soil excavation which would be destroyed by incineration at an appropriate TSCA-licensed incinerator and (2) the estimated 8,000 cy of Tank Farm soil that exceeds TCLP (Toxic Contaminant Leaching procedure) threshold criteria for RCRA-characteristic hazardous waste which would be stabilized to reduce mobility of contaminants prior to disposal in a secure landfill (either on-site under Alternative 2 or off-site under Alternative 3). While no treatment is proposed beyond this, each of the alternatives, excluding Alternative 1, provides a reduction in contaminant mobility for all other contaminated material by containing the material in either an off-site properly licensed landfill or an on-site containment cell where contaminants are isolated from environmental transport mechanisms. Under Alternative 4, all soil exceeding PRGs (except 5,000 cy of waste filter clay) would be treated using hydrometallurgical extraction. Assuming an estimated 78,000 cy of soil is treated, a volume reduction of approximately 10% will leave an estimated 70,200 cy of cleaned soil to be backfilled on-site and approximately 7,800 cy of Atreatment sludge that would require off-site disposal as a hazardous waste at a properly licensed landfill.

Short-Term Effectiveness

Alternative 3 provides the greatest overall short-term effectiveness primarily because the work can be completed in the shortest period of time, an estimated 11 months from site preparation to site restoration. Alternatives 2C and 4 are estimated to take 18 months to complete while Alternatives 2A and 2B are estimated to require the longest period of time to complete at 24 months.

Under each option of Alternative 2 and under Alternative 3, (a) residences near the site would be affected by noise and dust from remedial activities on the site and trucks hauling material on and off-site; (b) short term risks to site workers would result primarily from dermal contact with contaminated materials and inhalation of contaminated dust during remediation; and (c) adjacent wetlands and Birch Swamp Brook are at risk of impact by soil runoff during excavation activities associated with the remediation. The negative impacts to nearby residences can be mitigated by implementing engineering controls to reduce fugitive dust and limiting work to normal working hours The short term risks posed to site workers can be addressed by implementing a site-specific Health & Safety Plan to minimize exposure to site contaminants. The short term impacts to adjacent wetlands and Birch Swamp Brook can be mitigated by implementing proper controls in accordance with a site specific Erosion and Sedimentation Plan. In addition, any wetlands that are disturbed during implementation of the remedy can be restored after completion of the remediation.

Alternative 4 provides the least short term effectiveness because, in addition to the impacts posed by Alternatives 2 and 3, the soil treatment plant would be operational 24 hours per day and may cause a significant noise nuisance to nearby residences. In addition, a large area of wetlands would likely be adversely impacted to implement this remedial alternative because of the limited space at the site to construct the hydrometallurgical treatment system including a temporary wastewater treatment plant rated for 300 gallons per minute and the associated water storage basin required for the water recirculation needs of the treatment system.

Implementability

Alternative 3 is considered the easiest to implement, because there are no significant technical or administrative implementability concerns. Excavation and disposal can be implemented with readily available equipment and construction methods utilizing well-demonstrated technologies. There exists sufficient capacity at off-site landfills for disposal of the estimated quantities of RCRA and TSCA regulated wastes. There are available soil recycling facilities in the area and several construction contractors in the region available to undertake the work. Alternative 3 is considered a final remedy and no additional remedial actions will be necessary once the remedial alternative is implemented. The only administrative implementability issues for Alternative 3 are the same issues which are common to all of the alternatives; namely, (a) the western edge of the free and residual product is interpreted to be close to one of the transmission towers which raises concerns regarding the feasibility of using heavy equipment to excavate under electrical transmission lines and stability issues associated with excavating near the foundation of the transmission tower, (b) site access agreements would need to be obtained to disturb, remediate, and restore this area as well as the railroad embankment along the western boundary of the site where contamination exists.

Alternatives 2A, 2B, and 2C are similar to Alternative 3 with regard to the insignificant technical implementability concerns because containment technology equipment and methods are well-demonstrated and readily available. However, in addition to the common administrative implementability concerns described above, all of the options of Alternative 2 require substantial restrictions to the future use of the site in order to protect the waste containment systems that would be constructed. Also, a continual maintenance program to insure the integrity of the cap, continual future monitoring of the effectiveness of the remedy, and continual operation and maintenance of the leachate collection systems (under Alternatives 2A & 2B) are implementability issues unique to Alternative 2.

There are numerous logistical concerns related to the implementation of Alternative 4. In order to create adequate space for all of the components of the treatment system plant building and stockpiled/soil handling areas, contaminated soil in the way of the treatment plant construction would have to be excavated and stockpiled elsewhere on the site. The only available space on the IOC/CC property for these facilities would likely be in uncontaminated areas south or east of the Fire Pond which lie within the 100-year floodplain and would result in adverse impact to additional wetland areas. Special design features would need to be incorporated into the treatment plant design to mitigate the potential for inundation of the plant by flood waters and the associated release of hazardous substances into the environment. The reliability of the hydrometallurgical extraction technology to treat soil/sediment with both inorganic and organic contamination will require treatability studies to demonstrate its effectiveness.

Although treatability studies on petroleum-contaminated soil have indicated that hydrometallurgical extraction may be effective for removing organic contaminants from soil and sediment, it has not been demonstrated beyond bench-scale testing. Consequently, treatability studies on representative samples of IOC/CC soil and sediment would be necessary to determine the effectiveness of this technology for attaining PRGs in IOC/CC soil.

Cost

Total costs range from $295,000 for Alternative 1 to $38,140,000 for Alternative 4. The total cost for Alternative 4 is significantly greater than the total costs for Alternatives 2A ($15,425,000), 2B ($16,077,000), 2C ($13,498,000) or 3 ($17,210,000).

When comparing the Alternative 2 options to Alternative 3, Alternative 2A costs 90% as much as Alternative 3, Alternative 2B costs 93% as much as Alternative 3, and Alternative 2C costs 78% as much as Alternative 3.

C. Comparison of Modifying Criteria

State Acceptance

The preferred alternative, as discussed in the following section, is acceptable to NJDEP.

Community Acceptance

Community acceptance of the preferred alternative will be assessed in the ROD following review of the public comments received on the Final Source Control Feasibility Study and this Proposed Plan.

XI. PREFERRED ALTERNATIVE

Based upon an evaluation of the various alternatives, USEPA and NJDEP recommend **Alternative 3 - Excavation/Off-site Disposal/Reuse** as the preferred alternative for remediating contaminated soil, waste pile material, free product, and the fill areas adjacent to the Fire Pond at the IOC/CC site. Based on all currently available information, Alternative 3 is selected as the preferred alternative because it appears to provide the best balance of trade-offs among the alternatives with respect to the criteria used to evaluate them.

Alternative 3 is protective of human health and the environment, and can be performed in compliance with the chemical specific cleanup criteria prescribed by EPA along with all other Federal or State requirements that are applicable or relevant and appropriate to this action including those ARARs that regulate (a) excavation, filling, and discharge into wetlands and floodplains; (b) discharge of treated water to Birch Swamp Brook resulting from any dewatering necessary during excavation; (c) air-quality standards for fugitive dust during excavation; and (d) transportation and disposal of solid and hazardous waste, and is cost effective.

Alternative 3 provides better short term effectiveness than Alternative 4 and provides the best long-term effectiveness along with Alternative 4 (at less than one-half the cost of Alternative 4) because there is no long term maintenance or monitoring of the integrity of the capping systems as required under Alternative 2. While

Alternative 2 ranks highest in short-term effectiveness compared to Alternative 3 because of the increased volume of material transported off-site over public roads and the potential increased risk posed by this transportation, this increased risk is not considered substantial and all precautions required under Federal and State transportation laws will be complied with.

While Alternative 4 ranks highest in the Reduction of Toxicity, Mobility or Volume criteria and is a more permanent remedy than Alternative 3, the cost differential is too substantial to justify the incremental benefit under these criteria. Alternative 3 ranks equal to the containment options of Alternative 2 with regard to the Reduction of Toxicity, Mobility or Volume criteria and ranks higher than any of the Alternative 2 options under the permanence criteria when considering the site itself.

Alternative 3 is also considered the most implementable of all of the Alternatives. Excavation and disposal can be implemented with readily available equipment and construction methods utilizing well-demonstrated technologies. There exists sufficient capacity at off-site disposal facilities for all of the various waste mixtures involved, both hazardous and non-hazardous. Alternative 3 is considered a final remedy and no additional remedial actions will be necessary once the remedial alternative is implemented. Institutional controls would be implemented to restrict access to the site and to prevent residential use. The affected wetland areas will be restored following the excavation and disposal activities.

XII. FUTURE ACTIONS

After NJDEP has presented the preferred alternative at the public meeting and has received any comments and questions during the public comment period, EPA and NJDEP will summarize the comments and provide its responses in a document called the Responsiveness Summary. The Responsiveness Summary will be appended to the Record of Decision, which will describe the final alternative selected by EPA and NJDEP and will provide the EPA and NJDEP rationale for their selection.

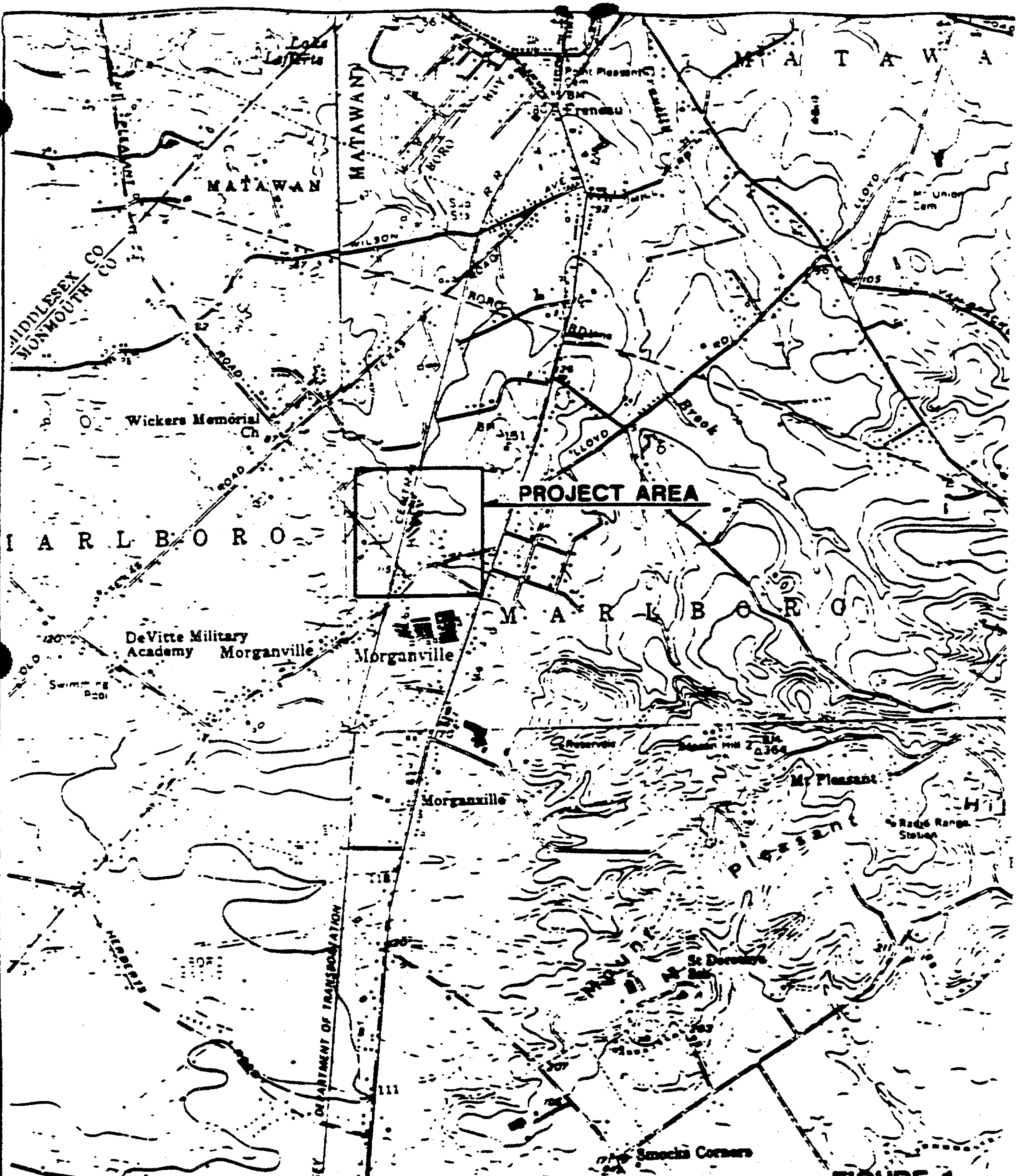
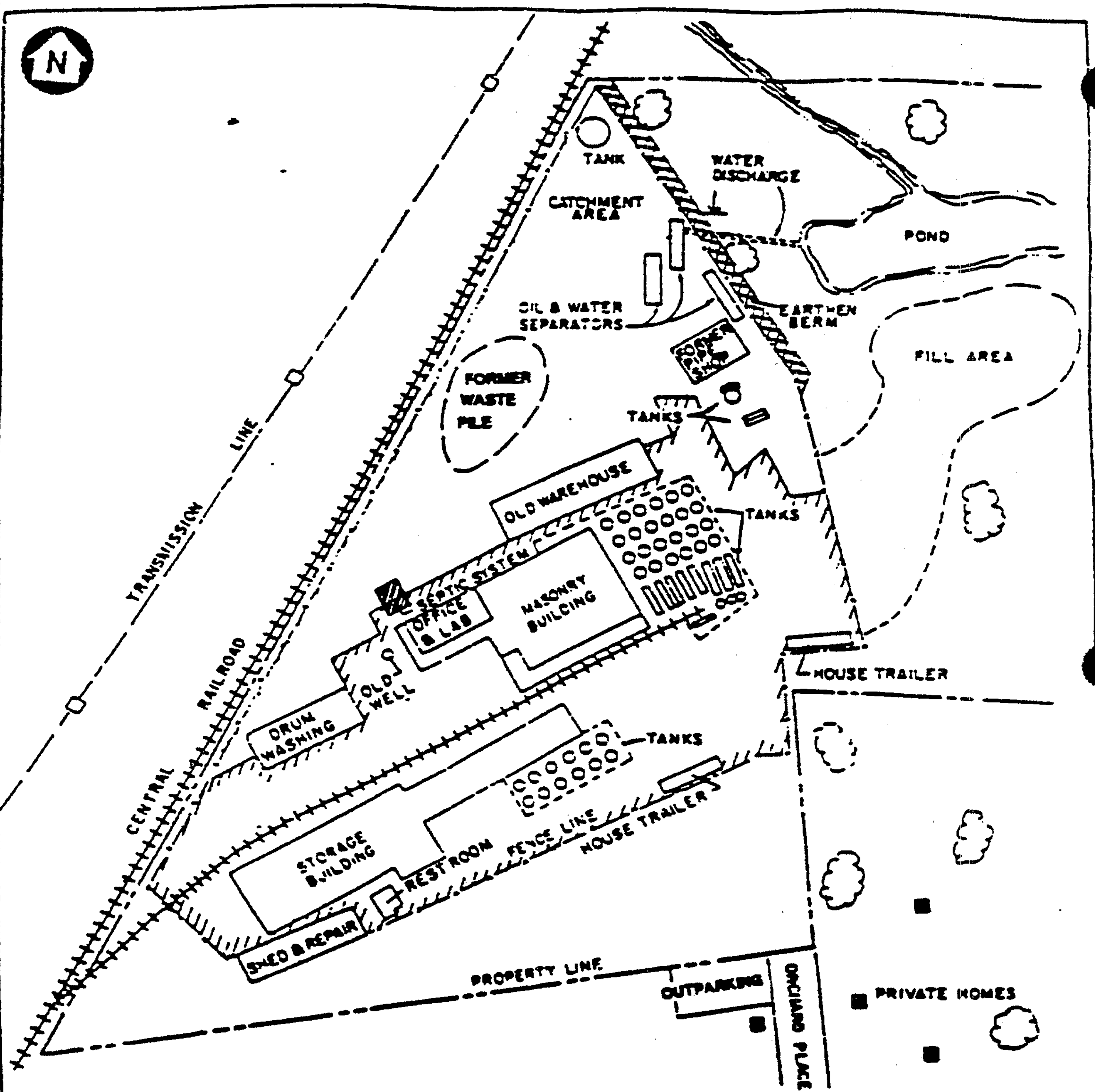


FIGURE 1
SITE LOCATION MAP
SOURCE CONTROL FEASIBILITY STUDY
IMPERIAL OIL COMPANY/CHAMPION CHEMICALS SITE
MORGANVILLE, NEW JERSEY

Harding Lawson Associates

9222-01



LEGEND

EXTENT OF PAVED AREA

SCALE IN FEET

0 100 200

FIGURE 2

SCHEMATIC LAYOUT OF IMPERIAL OIL CO. FACILITY
SOURCE CONTROL FEASIBILITY STUDY
IMPERIAL OIL COMPANY/CHAMPION CHEMICALS SITE
MORGANVILLE, NEW JERSEY

Harding Lawson Associates

9222-81

TABLE 1

SOIL AND SEDIMENT CLEAN-UP CRITERIA
SOURCE CONTROL FEASIBILITY STUDY
IMPERIAL OIL COMPANY/CHAMPION CHEMICALS SITE

	MAXIMUM DETECTED CONCENTRATION[1] (mg/kg)	USEPA SOIL CLEAN-UP CRITERIA[2] (mg/kg)		PRELIMINARY REMEDIATION GOAL (mg/kg)
CHEMICAL	SOIL	INDUSTRIAL	IMPACT TO GROUNDWATER SOIL CLEAN-UP CRITERIA	SOIL
VOCs				
Benzene	0.42	99	0.03	0.03
Chloroform	0 0058	470	0 6	0.6
1,2-Dichloroethane	0.0023	31	0.02	0.02
1,2-Dichloroethene (Total)	0.960	63	0.02	0.02
Ethylbenzene	0.810	100,000	13	13
Styrene	0.120	410,000	4	4
Tetrachloroethene	0.300	55	0.06	0.06
Toluene	2.300	200,000	12	12
Trichloroethene	0.790	260	0.06	0.06
Total Xylenes	3.300	100,000	200	200

SVOCs				
Acenaphthene	0 490	61,000	570	570
Anthracene	1 100	310,000	12,000	12,000
Benzo(a)anthracene	4 700	3 9	2	2
Benzo(a)pyrene	5 600	0.39	8	0.39
Benzo(b)fluoranthene	4 700*	3 9	5	3.9
Benzo(k)fluoranthene	4 700*	39	49	39
Bis(2-ethylhexyl)phthalate	12,000	200	3,600	200
Butylbenzyl phthalate	47 000	200,000	930	930
Chrysene	4 700	390	160	160
Di-n-butylphthalate	1 700	200,000	2,300	2,300
Fluoranthene	1 500	41 000	4 300	4 300
Fluorene	1 200	41 000	560	560
2-Methylnaphthalene	19 000	82,000	84	84
Naphthalene	13,000	41,000	84	84
Phenanthrene	14,000	NA	NA	NA
Pyrene	5,000	31 000	4,200	4,200
Total PCBs	128,200	13	10-25	13
SVOCs Continued				
1,2,4-Trichlorobenzene	3,200	510	5	5
Total Organic Contaminants	540,000	NA	NA	

Antimony	31.1	410	5	5
Arsenic	6,120	20	29	20
Beryllium	8.8	1	63	1
Chromium III	463	1,000,000	NR	1,000,000
Copper	1,020	38,000	NA	600
Lead	3,720	1,000	NA	400

Notes:

mg/kg = milligrams per kilogram

B = Not a contaminant of concern for this medium.

NA = Value for this chemical is not available.

ND = Not detected.

NR = Negligible risk via this exposure route.

1 = Maximum detected concentration reported during the remedial investigation and the data-gap investigation.

2 = Site-specific criteria provided by the U.S. Environmental Protection Agency.

Appendix D

Public Notice

Public Meeting and Comment Period

For the Proposed Plan for Remediation of Operable Unit 3 at the Imperial Oil Company Superfund Site
Marlboro Township, Monmouth County, New Jersey

Public Meeting:	**Thursday, March 18, 1999 at 7:00 p.m.** **Marlboro Township Municipal Courtroom** **1979 Township Drive** **Marlboro, New Jersey**
Comment Period:	**February 19, 1999 through April 6, 1999**

Site Background and Current Status

The Imperial Oil Company Superfund site is located on Orchard Street in Marlboro Township, Monmouth County. The four acre facility has been operated by several different industries since the early 1900s. Currently Imperial Oil Company operates an oil blending and repackaging business at the site under a lease agreement from Champion Chemicals.

In 1983 the U S. Environmental Protection Agency placed the site on the National Priorities List of Superfund sites. The New Jersey Department of Environmental Protection began a Remedial Investigation (RI) at the site in 1985 to determine the nature and extent of the contamination. The RI revealed that both on-site and off-site soils had been contaminated by past industrial operations at the facility. In addition, the RI concluded that a plume of ground water contamination was present in the underlying Englishtown Aquifer, and a layer of oil product was floating on the water table where the waste filter clay pile was located. Contamination was also found in the sediments of Birch Swamp Brook, which originates near the northeastern border of the site and drains into Lake Lefferts, approximately 1 25 miles away.

Remediation of the site has been divided into several Operable Units. Operable Unit 1 addresses off-site soils contaminated with heavy metals and PCBs. Operable Unit 2 addresses the remediation of contaminated ground water. Operable Unit 3 addresses the remediation of on-site soils and sediment contaminated with volatile organic compounds, petroleum hydrocarbons, heavy metals and PCBs. Feasibility Studies were performed for each operable unit.

Proposed Plan and Preferred Alternative

The Proposed Plan, based on the Remedial Investigation and Feasibility Study reports, describes the remedial alternatives considered for Operable Unit 3 and identifies the preferred remedial alternative along with the rationale for this preference. The remedial alternative preferred by the NJDEP is ***excavation with off-site and reuse disposal options.*** This alternative includes the following components:

- Excavation of contaminated soil and sediment
- Transportation of acceptable soil and sediment to off-site reuse facilities
- Transportation of remaining soil and sediment to appropriate off-site disposal facilities
- Backfilling excavation areas with clean borrow soil

Documents Available for Review in Repositories

Copies of the Remedial Investigation, Source Control Feasibility Study, Proposed Plan and other site-related documents will be available for review beginning February 19, 1999 at the following locations:

Marlboro Township Library
1 Library Court
Marlboro, NJ 07746
(732) 536-9406

USEPA, Region II
Superfund Records Center, 18th Floor
290 Broadway
New York, NY 10007-1866
(212) 637-4308

NJDEP
401 East State Street
Trenton, NJ 08625-0413
(609) 777-1976

Community Role in the Remediation Process

NJDEP solicits public comments on the Proposed Plan during the public comment period which runs from February 19, 1999 through April 6, 1999. No decision on remedial action will be made until all public comments are evaluated. The Record of Decision for the remediation will include a summary of both the oral and written comments received and the NJDEP responses to these comments. Written comments on the Proposed Plan should be directed to:

Donald J. Kakas, Section Chief
Bureau of Community Relations
New Jersey Department of Enviromental Protection
PO Box 413
Trenton, NJ 08625-0413

Questions should be directed to Mindy Mumford, the Community Relations Coordinator for this project, at (609) 777-1976

ROD FACT SHEET

SITE

Name : Imperial Oil/Champion Chemical Superfund Site
Location/State : Monmouth County/New Jersey
EPA Region : 02
HRS Score (date):33.87 (12/82)
Site ID # : NJD980654099

ROD

Date Signed: September 30, 1999
Remedies: Excavation/Off-site Disposal/Reuse)
Operable Unit Number: OU-3
Capital cost: $17,201,000 (in 1999 dollars)
Construction Completion: 11 months
O & M in 1999: $9,000
Present worth: $17,210,000

LEAD

Remdial/Enforcement: Remedial
EPA/State/PRP: State
Primary contact: Trevor Anderson (212)-637-4425
Secondary contact: Joseph Maher (609)-633-0765
Main PRP(s): Imperial Oil & Champion Chemical Company
PRP Contact (phone): N/A

WASTE

Type: metals, PCBs, VOC, SVOC
Medium: soil
Origin: on-site disposal of contaminated material
Est. quantity: 83,000 cu.yd., 5,000 gal.