United States
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Agency

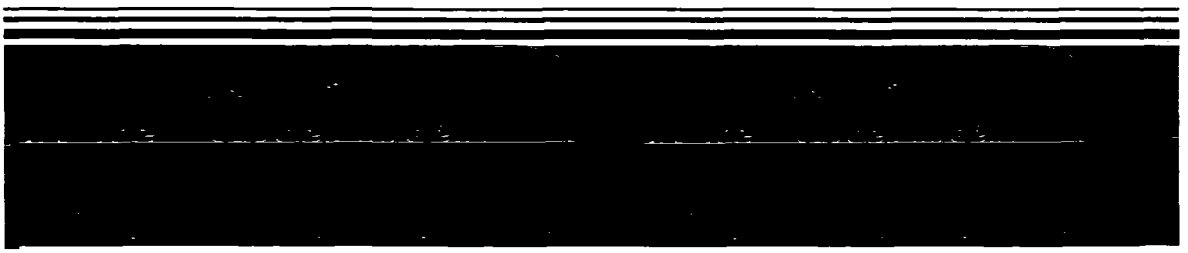
Office of
Emergency and
Remedial Response

EPA/ROD/R02-91/158
September 1991

EPA

Superfund Record of Decision:

Swope Oil & Chemical, NJ



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15. Supplementary Notes

16. Abstract (Limit: 200 words)

The 2-acre Swope Oil & Chemical site is a former chemical reclamation facility in Pennsauken, Camden County, New Jersey. Land use in the area is predominantly commercial and industrial, and Pennsauken Creek lies 0.8 miles northeast of the site. The estimated 10,000 residents use ground water from a public supply well screened in the lower underlying aquifer near the site as their drinking water supply. At the time site operations ceased, pertinent site features included a main building, distilling house, diked tank farm, open drum storage area, and an unlined lagoon. From 1965 to 1979, Swope Oil & Chemical used the site for the reclamation of chemicals. Site operations included buying, selling, manufacturing, and processing oils, chemicals, and paints, and discharging waste liquids and sludge to an excavated, unlined lagoon. Contaminated material also was contained within a diked tank farm and an exposed drum storage area. In 1975, State investigations showed that discharge of wastes to onsite drainage ditches had resulted in probable migration of chemicals to Pennsauken Creek via storm sewers. The owners were cited for several disposal violations in 1975, and again in 1979, when the site operations ceased. Beginning in 1984, PRPs removed drummed wastes and 3,000 tons of lagoon

(See Attached Page)

17. Document Analysis a. Descriptors

Record of Decision - Swope Oil & Chemical, NJ
Second Remedial Action
Contaminated Medium: soil
Key Contaminants: VOCs (PCE, TCE), other organics (DEHP, naphthalene)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 134
	20. Security Class (This Page) None	22. Price

(See ANSI-Z39.18) *See Instructions on Reverse*

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

EPA/ROD/R02-91/158
Swope Oil & Chemical, NJ
Second Remedial Action

Abstract (Continued)

sludge, and also fenced the perimeter of the site. Later in 1984, air strippers were installed by the water commission on Municipal Well 1 to remove VOC contamination detected in the aquifer. A 1985 Record of Decision (ROD) provided for removal, offsite disposal, and treatment of storage tanks and their contents; demolition of onsite buildings; and excavation and offsite disposal of PCB-contaminated soil and sludge area material. This ROD addresses remediation of subsurface soil, which continues to leach contaminants into ground water, as Operable Unit 2. Future actions will evaluate whether further source control measures or ground water actions are necessary. The primary contaminants of concern affecting the soil are VOCs including PCE and TCE, and other organics including DEHP and naphthalene.

The selected remedial action for this site includes treating onsite approximately 153,000 cubic yards of contaminated unsaturated soil using in-situ vacuum extraction with potential enhancement of biodegradation of soil contaminants, if the results of the treatability study so warrant; treating air emissions using carbon adsorption or thermal destruction prior to discharge, if necessary; and monitoring soil and ground water. The estimated present worth cost for this remedial action is $2,099,000, which includes estimated O&M costs of $397,500 for year 1 of the vapor extraction system and $234,200 a year for 5 years of ground water monitoring.

PERFORMANCE STANDARDS OR GOALS: Chemical-specific soil clean-up goals are based on New Jersey Interim Soil Action Levels and include 1 mg/kg for total VOCs and 10 mg/kg for semi-volatiles, and are designed to mitigate the threat of ground water contamination.

ROD FACT SHEET

SITE

Name:	Swope Oil and Chemical Company
Location/State:	Pennsauken Township, Camden Co., New Jersey
EPA Region:	II
HRS Score (date):	35.68 (August '82)
NPL Rank (date):	657 (March 1991)

ROD

Date Signed:	September 27, 1991

Selected Remedy

Subsurface Soil:	In-place treatment, utilizing soil vapor extraction with biodegradation, of contaminated subsurface soil.
Capital Cost:	$ 687,500
O & M (Vapor Extraction System):	$ 397,500 (first year)
O & M (Groundwater Monitoring Program):	$ 234,200 (five years)
Present Worth:	$ 2,099,000

LEAD

Enforcement, EPA
Primary Contact (phone): Joseph Gowers (212-264-5386)
Secondary Contact (phone): John La Padula (212-264-5388)

WASTE

Type:	Subsurface Soil - VOC's & Semi-VOC's Groundwater - VOC's.
Medium:	Soil and Groundwater.
Origin:	Pollution originated as a result of operations conducted at the Swope Oil and Chemical Company. The chemical reclamation operation conducted at this facility resulted in the on-site storage and disposal of hazardous materials.

DECLARATION STATEMENT

RECORD OF DECISION - OPERABLE UNIT TWO

SWOPE OIL AND CHEMICAL COMPANY

SITE NAME AND LOCATION

Swope Oil and Chemical Company
Pennsauken Township, Camden County, New Jersey

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Swope Oil and Chemical Company site, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. This decision is based on the administrative record for the site. The attached index identifies the items that comprise the administrative record upon which the selection of the remedial action is based.

The New Jersey Department of Environmental Protection and Energy concurs with the selected remedy.

ASSESSMENT OF THE SITE

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

DESCRIPTION OF THE SELECTED REMEDY

The remedy described in this document represents the second operable unit for the Swope site. Cleanup actions under the first operable unit have resulted in the removal of buildings, tanks, sludge and contaminated surficial soils from the site. This remedy will address contaminated subsurface soils which are acting as a source of groundwater contamination. The treatment of these subsurface soils is expected to mitigate the site's contribution to groundwater contamination, thereby addressing the principal threat to public health remaining at the site. Subsequent to completion of the selected remedy, EPA will determine whether it provides for adequate protection of groundwater, as well as the need for further source control or groundwater remedial measures.

The major components of the selected remedy include the following:

- In-place treatment, utilizing soil vapor extraction with biodegradation, of contaminated subsurface soils; and
- Implementation of a groundwater monitoring program, for a period of five years, to assess the effectiveness of the remedy and to evaluate whether groundwater remediation is warranted.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

A review will be conducted within five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Constantine Sidamon-Eristoff
Regional Administrator

9/27/94
Date

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DECISION SUMMARY

RECORD OF DECISION - OPERABLE UNIT TWO

SWOPE OIL AND CHEMICAL COMPANY

SITE NAME, LOCATION, AND DESCRIPTION

The Swope Oil and Chemical Company (Swope) site is located at 8281 National Highway, in an industrialized area in the Township of Pennsauken, Camden County, New Jersey. Route 130 passes approximately 1800 feet southeast of the site (Figure 1).

The Swope site, approximately two acres in size, is bounded to the southeast by National Highway, and to the north and southwest by railroad rights-of-way and warehouses (Figure 2). Numerous commercial and industrial properties are located within 0.5 mile of the site in all directions. The Pennsauken Municipal Landfill is located approximately 750 feet to the northwest. The nearest residential areas are in the Townships of Delair and Morrisville, which are located about 0.5 mile west and 0.8 mile southwest of the site, respectively. Pennsauken High School is located approximately 0.5 mile to the northeast.

The Swope site is underlain by the Potomac-Raritan-Magothy (PRM) Aquifer System, which is the major source of potable groundwater in the area. Two water supply wells, operated by the Merchantville-Pennsauken Water Commission, MPWC Well 1 and MPWC Well 2, are located approximately 275 feet southwest and 1500 feet northeast of the site, respectively. In addition, other water supply wells are located throughout Pennsauken Township. Only the lower aquifer of the PRM Aquifer System is used as a source of potable groundwater in the vicinity of the site.

The nearest body of surface water is the Pennsauken Creek, which is located 0.8 mile northeast of the site. Pennsauken Creek flows in a northwesterly direction to the Delaware River, which is located about 1.2 miles northwest of the site.

The Swope site is flat with no discernable surface features, except a security fence which restricts site access. Subsurface features, including underground storage tanks, septic tanks and septic lines, were removed during prior remedial activities.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

From 1965 to 1979, the Swope Oil and Chemical Company operated a chemical reclamation facility at the site. Facility operations included buying, selling, manufacturing, and processing oils, chemicals, and paints. Materials believed to have been processed at the site include phosphate esters, hydraulic fluids, paints and varnishes, solvents, oils, plasticizers, and printing ink. During operation of the facility, waste liquids and sludges were

discharged to an excavated, unlined lagoon. Contaminated material was also contained within a diked tank farm and an exposed drum storage area. When the facility ceased operating, significant site features included a main building, a distilling house, a diked tank farm, an open drum storage area, and an unlined lagoon.

In 1975, an inspector from the State Bureau of Air Pollution visited the site and recommended that the Bureau of Water Pollution Control inspect the site. In subsequent visits, officials observed discharges to drainage ditches on the site and probable migration towards Pennsauken Creek via storm sewers. The Swope Oil and Chemical Company was cited in 1975 for operating without proper permits, and again in 1979 for failure to prepare, maintain, or fully implement a Spill Prevention, Control and Countermeasures Plan. The company ceased operation in December 1979.

On October 17, 1983, a State Superfund Contract was signed by the United States Environmental Protection Agency (EPA) and the New Jersey Department of Environmental Protection (NJDEP) which provided funds for the performance of a Focused Feasibility Study on the drums and lagoon waste. This study was completed in February 1984.

On May 14, 1984, a group of potentially responsible parties (PRPs) entered into an Administrative Order on Consent with EPA to conduct the remedial activities recommended in the Focused Feasibility Study. Pursuant to this order, drummed waste and 3,000 tons of lagoon sludge were removed from the site. In addition, a fence was constructed around the site to restrict access and to prevent the public from coming into direct contact with the contaminants.

In May 1984, MPWC Well 1 was shut down due to the detection of contamination in the well. Since area-wide groundwater contamination occurs in the vicinity of MPWC Well 1, the Merchantville-Pennsauken Water Commission equipped the well with an air stripper to remove volatile organic compounds from groundwater, and returned the well to service in January 1989. Approximately 10,000 residents use water from this well.

A Remedial Investigation and Feasibility Study (RI/FS) were conducted by NUS Corporation for EPA from February 1984 to June 1985 in order to determine the nature and extent of contamination at the Swope site and to evaluate appropriate remedial alternatives. Based upon the findings of this RI/FS, a Record of Decision (ROD) was signed by EPA on September 27, 1985. This ROD specified a remedy for surficial contamination and provided for the performance of a Supplemental RI/FS to address groundwater contamination.

In August 1986, EPA entered into an Administrative Order on Consent with a group of 15 PRPs for the performance of the remedy for surficial contamination specified in the ROD. In September 1986, 8 PRPs entered into a separate Administrative Order on Consent with EPA for the performance of the Supplemental RI/FS and for the design and installation of a cap at the site.

In September 1987, ERT, a contractor for the PRPs, implemented an extensive sampling and analysis program to characterize both on-site and off-site soil contamination to a depth of approximately 18 inches, as well as tank contents. Data obtained during this sampling event were utilized to develop the engineering specifications for the surficial remediation program.

On September 17, 1988, ERT initiated the remedial action program to address surficial contamination at the site. Activities conducted as part of this program included the following:

- the removal and off-site disposal of tanks, with off-site treatment or incineration of tank contents,

- the demolition of on-site buildings,

- the excavation and off-site disposal of up to 1.5 feet of contaminated soil containing polychlorinated biphenyls (PCBs) at concentrations greater than 5 parts per million (ppm), and

- the excavation and off-site disposal of visibly contaminated material from the buried sludge area of the site.

The surficial remedial action program was completed by August 1989. Subsequent to excavation, certified clean backfill material was utilized to bring the site up to grade. The installation of a cap, which was a remedial activity specified by the 1985 ROD, was postponed to provide for the installation of monitoring wells and the performance of treatability studies during the Supplemental RI/FS.

The Supplemental RI/FS for the Swope site was initiated in October 1988 to evaluate the nature and extent of groundwater and subsurface soil contamination at the site and to develop appropriate remedial alternatives.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Supplemental RI/FS Report and Addenda, and the Proposed Plan for the Swope site were released to the public for comment on July 18, 1991. These documents were made available to the public in two information repositories maintained at the Pennsauken Municipal Building and the Pennsauken Township Library. The notice of availability of these documents was published in the

Philadelphia Inquirer on July 18, 1991. As part of EPA's public participation responsibilities under Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, a public comment period on these documents was held from July 18, 1991 to August 17, 1991. In addition, a public meeting to discuss the findings of the Supplemental RI/FS and to present EPA's preferred alternative to the public was held on August 1, 1991. Comments which were received by EPA during the public comment period are addressed in the Responsiveness Summary which is attached to this Record of Decision.

SCOPE AND ROLE OF OPERABLE UNIT TWO WITHIN SITE STRATEGY

The cleanup of the Swope site is being addressed in discrete phases referred to as operable units (OUs). They are described as follows:

- OU 1: Remediation of contaminated surface soil, sludges, tanks, tank contents, and buildings, and

- OU 2: Remediation of contaminated subsurface soil which continues to act as a source of groundwater contamination.

The OU 1 remedy, except for installation of a cap over the site, has been completed. This remedy has addressed potential threats to human health which may have resulted due to ingestion of, or dermal contact with surficial contamination. Additionally, this remedial action has resulted in the removal of surficial contaminants from the site, which were, or had the potential of, acting as a source of contamination of groundwater beneath the site. The objective of OU 2, which is the subject of this document, is to mitigate the leaching of organic subsurface soil contaminants into the groundwater. The selected remedy will remove and/or degrade volatile and semi-volatile organic contaminants in subsurface soil, thereby decreasing the amount of contaminants which may leach to the groundwater underlying the site. EPA further believes that remediation of subsurface soil contamination will result in a significant reduction in the levels of site-related groundwater contamination. Since the OU 2 remedy is expected to decrease migration of volatile and semi-volatile compounds from site soil into the groundwater, EPA has postponed a decision regarding the necessity of installation of the OU 1 cap until after implementation of the selected source control remedy. If it is determined that a cap is not required, this approach would allow for a greater degree of unrestricted future usage of the site.

The results of groundwater samples collected as part of the Supplemental RI indicate that the Swope site has contributed volatile organic contaminants to the shallow aquifer beneath the site, and may have contributed to the contamination of the deep aquifer. These results further indicate that other sources of groundwater contamination exist upgradient of the Swope site. Since EPA believes that the selected remedy will result in a significant reduction of site-related groundwater contamination, EPA has decided to postpone any decision regarding groundwater remedial measures, until the selected source control remedy has been completed.

Subsequent to completion of the selected remedy, EPA will determine whether it provides for adequate protection of groundwater and whether further source control measures, such as capping, or if groundwater remedial measures are necessary.

SUMMARY OF SITE CHARACTERISTICS

Site Geology

The Swope site is located within the Atlantic Coastal Plain physiographic province, which is underlain by a wedge of unconsolidated sediments that thickens and dips to the southeast toward the Atlantic Ocean. However, because the sediments thicken as they dip, the shallower sediments dip less than the deeper sediments.

The unconsolidated sediments in the vicinity of the Swope site are comprised of the Pleistocene-age Pennsauken Formation, which is underlain by the Cretaceous-age Magothy and Raritan Formations and the Potomac Group. The Swope site is located within the outcrop of the Potomac Group and the Magothy and Raritan Formations. The Cretaceous-age sediments comprise the Potomac-Raritan-Magothy Aquifer System, and these sediments lie on bedrock. At the Swope site, the upper 25 to 30 feet of the unsaturated zone, which represents the Pennsauken Formation, is composed of silty sand, with lenses of glaucontic sand, clay and some gravel. The remainder of the unsaturated zone and the shallow water-table aquifer, which was encountered during the Supplemental RI at depths ranging from 76 to 82 feet below land surface, consist of medium to coarse grained sand and gravel from the Raritan and Magothy Formations.

A semi-confining unit, consisting of clay with interbedded lenses of fine grained sand, was encountered at depths ranging from 132 to 157 feet below land surface. Below this unit, Potomac Group sediments, consisting of medium to course grained sand and gravel, comprise the deep aquifer. These sediments are underlain by bedrock.

Subsurface Soil

As part of the Supplemental RI, ten deep soil borings were drilled to the water table (approximately 80 feet below land surface) and subsurface soil samples were collected at five different depths. The results of this sampling event are presented in Table 1.

Volatile organic compounds constituted the contaminants detected most frequently and at the highest concentrations in subsurface soil. Volatile organic contaminants detected most frequently and at the greatest concentrations include acetone, toluene, xylene, ethylbenzene, 4-methyl-2-pentanone, trichloroethene, tetrachloroethene and 2-butanone. The maximum total volatile organic concentration (3,991 milligrams per kilogram (mg/kg)) for soil not remediated during the OU 1 remedial action was detected in a sample collected from boring B-6 at 14 to 16 feet. Elevated levels of volatile organic compounds were also detected in subsurface soil samples collected from borings B-4 (81 mg/kg), B-5 (291 mg/kg), B-8 (797 mg/kg) and B-9 (17 mg/kg).

Additionally, elevated levels of semi-volatile organic contaminants were also detected. Semi-volatile organic contaminants detected most frequently and at the greatest concentrations include bis(2-ethylhexyl)phthalate, naphthalene, phenol and isophorone. The highest concentration of semi-volatile organic contaminants (275 mg/kg) was detected in a sample collected from boring B-8 at 6 to 8 feet. Elevated levels of semi-volatile organic compounds were also detected in samples collected from borings B-4 (109 mg/kg), B-5 (42 mg/kg) and B-6 (229 mg/kg). Since borings B-5 and B-6 were installed within the former lagoon area, and borings B-8 and B-9 were installed in the former buried sludge area of the site, these results indicate that subsurface soil contamination at the Swope site is due to the past storage and waste disposal practices of the Swope Oil and Chemical Company.

The concentrations of inorganic constituents in subsurface soil were generally low, with the exception of arsenic and silver, which were each found at elevated levels in only one of fifty-five subsurface soil samples. Arsenic was detected in a sample collected from boring B-3 from 29 to 31 feet, at a concentration of 23 mg/kg. Silver was detected in a sample collected from boring B-10 from 59 to 61 feet, at a concentration of 7 mg/kg. Additionally, nickel and zinc were detected at elevated concentrations in one of two replicate samples collected from boring B-9 from 84 to 86 feet, but not in the duplicate sample collected from this location. Polychlorinated biphenyls were detected in two subsurface soil samples collected from the lagoon area. PCBs were detected at a concentration of 0.19 mg/kg and 0.93 mg/kg in soil samples collected from borings B-5 at 6 to 8 feet and B-6 at 6 to 8 feet, respectively.

Subsurface soil samples were not collected from the area of the former tank farm (Figure 2) at the time that the Supplemental RI soil boring program was conducted, because EPA was of the opinion that this area was underlain by a concrete pad. During performance of the OU 1 remedial action, it was determined that a concrete pad, which would have served to mitigate the infiltration of contaminants into soil in this area, did not exist beneath the tank farm. Therefore, the extent of subsurface soil contamination in this area is unknown.

The results of chemical analyses on subsurface soil samples indicate that volatile and semi-volatile organic contamination extends vertically to the water table, located approximately 80 feet below land surface. These sampling results further indicate that volatile organic contaminants were primarily detected at levels greater than the New Jersey Interim Soil Action Level (NJISAL) of 1 mg/kg for total volatile organics, to a depth of approximately 50 feet below land surface. It should be noted, however, that volatile organic contaminants were detected at concentrations above 1 mg/kg at depths greater than 50 feet in subsurface soil samples collected from boring B-1 at 74 to 76 feet and B-5 at 59 to 61 feet and 77 to 79 feet. Semi-volatile organic contaminants were detected at levels greater than the NJISAL of 10 mg/kg for total semi-volatile organics to a depth of approximately 30 feet below land surface.

Groundwater

Groundwater samples were collected from both the shallow unconfined and deep semi-confined aquifers. A total of 18 monitoring wells and public supply well MPWC 1 were sampled during two sampling rounds. Fifteen of these monitoring wells were sampled as part of the first sampling round in October and December of 1989. All 19 wells, including four downgradient monitoring wells installed after the first sampling round, were sampled during January 1990. Additionally, metals samples were collected from all 19 wells in May 1990 and analyzed for total metals, since samples were filtered during the first two sampling rounds.

Volatile organic contaminants were detected in all wells screened in both the shallow and deep aquifer underlying the Swope site. The ranges of concentrations of specific volatile organic compounds detected in upgradient and downgradient wells are provided in Table 2.

During the first sampling round, the levels of total volatile organics detected in shallow upgradient wells ranged from 37 micrograms per liter (ug/l) (well GM-6S) to 114 ug/l (well GM-5S). The levels of total volatile organics detected in shallow wells located on site ranged from 60 ug/l (well MW-1) to 443 ug/l (well GM-1S). Total volatile organics were detected at

concentrations ranging from 5 ug/l (well GM-6S) to 128 ug/l (well GM-5S) in shallow upgradient wells, and from 45 ug/l (well MW-1) to 676 ug/l (well GM-8S) in on-site and downgradient shallow aquifer wells during the second sampling round. These sampling results clearly indicate that higher concentrations of volatile organic contaminants were detected in shallow wells located on and downgradient of the site than in samples taken from wells in the shallow aquifer located upgradient from the site. These data support the conclusion that the Swope site has contributed to the contamination of shallow-aquifer groundwater.

The groundwater quality data presented in Table 2 indicate that some specific volatile organic compounds are present in shallow-aquifer groundwater at greater concentrations on and downgradient of the Swope site than upgradient. These contaminants include 1,1-dichloroethene, 1,1-dichloroethane, 1,2-dichloroethene, 1,2-dichloroethane, 1,1,1-trichloroethane, toluene, trichloroethene, tetrachloroethene, ethylbenzene and xylene. Of these compounds, 1,1-dichloroethene, 1,2-dichloroethene, 1,2-dichloroethane, 1,1,1-trichloroethane, trichloroethene, tetrachloroethene, and xylene were detected at levels which exceeded Federal and/or State Maximum Contaminant Levels (MCLs). Of the volatile organic compounds detected in upgradient shallow aquifer wells, 1,1-dichloroethene, 1,2-dichloroethene, chloroform, 1,2-dichloroethane, and trichloroethene were detected at concentrations exceeding Federal and/or State MCLs.

The concentrations of total volatile organic contaminants detected during the first sampling round in deep wells located upgradient of the site ranged from 227 ug/l (well GM-2D) to 331 ug/l (GM-5D). During this sampling round, volatile organic compounds were found in on-site and downgradient deep wells at concentrations ranging from 310 ug/l (well MPWC 1) to 367 ug/l (well GM-3D). During the second sampling round, total volatile organic contaminants were detected at levels ranging from 14 ug/l (well GM-2D) to 331 ug/l (well GM-5D) in upgradient wells screened in the deep aquifer, and from 24 ug/l (well GM-8D) to 279 ug/l (well GM-4D) in deep wells located on and downgradient of the site.

The deep-aquifer groundwater quality data presented in Table 2 indicate that specific volatile organic compounds were detected at marginally higher concentrations in on-site and downgradient wells than in upgradient wells. These compounds include vinyl chloride, 1,1-dichloroethene, 1,2-dichloroethene, 1,2-dichloroethane, 1,1,1-trichloroethane and benzene. All of these compounds, with the exception of 1,1,1-trichloroethane, were detected at levels which exceed Federal and/or State MCLs. Of the volatile organic compounds which were found in deep wells located upgradient of the site, 1,1-dichloroethene, 1,2-dichloroethene, chloroform, 1,2-dichloroethane, carbon tetrachloride, trichloroethene, and tetrachloroethene were

detected at concentrations in excess of Federal and/or State MCLs. The fact that some VOCs were found in the deep aquifer at higher levels in samples taken from on-site and downgradient wells than in upgradient wells suggests that the Swope site may be contributing to the contamination of the deep aquifer.

Semi-volatile organic compounds were detected in groundwater samples from both the shallow and deep aquifers. The maximum concentration of total semi-volatile organics was 146 ug/l, detected in deep downgradient well GM-7D. Of the semi-volatile organics, only bis(2-ethylhexyl)phthalate exceeded its New Jersey State MCL (5 ug/l) in shallow upgradient well GM-5S (11 ug/l) and deep downgradient well GM-7D (130 ug/l). A summary of the semi-volatile organic data is presented in Table 3.

As displayed in Table 4, arsenic, chromium, lead and mercury were detected at concentrations which exceed Federal and/or State MCLs or Action Levels. Arsenic was detected above the Federal and State MCL of 50 ug/l in only one well, GM-1S, at a concentration of 78.6 ug/l. Chromium was detected in upgradient shallow aquifer well GM-5S (77.5 ug/l) and in on-site and downgradient shallow wells GM-7S (123 ug/l), GM-8S (88.5 ug/l) and MW-2 (135 ug/l) at concentrations above the State MCL of 50 ug/l. Additionally, chromium was detected above the New Jersey State MCL in one upgradient deep well, GM-5D (54.1 ug/l). Lead was measured at a concentration above the Federal Action Level of 15 ug/l in on-site and downgradient shallow wells MW-2 (52.2 ug/l), MW-4 (17.9 ug/l), GM-7S (23.1 ug/l) and GM-8S (22.5 ug/l), and upgradient deep well GM-6D (17.4 ug/l). Mercury was present in groundwater from shallow on-site well MW-4 (6.0 ug/l) at a concentration in excess of the Federal and New Jersey State MCL of 2 ug/l. Mercury was also detected at concentrations slightly greater than the MCL in on-site and downgradient deep wells GM-7D (2.4 ug/l) and MPWC 1 (2.9 ug/l).

Iron and manganese were found in groundwater at levels which exceeded secondary Federal and/or State MCLs. Iron was detected in all wells at concentrations in excess of the MCL of 300 ug/l, except wells MW-1 and MPWC 1. Manganese was detected at concentrations in excess of the MCL of 50 ug/L in all wells except well GM-6S.

Summary

In summary, subsurface soil sampling results indicate that volatile and semi-volatile organic contaminants are present in the unsaturated zone, primarily in areas of the site which were used for the storage and disposal of liquids and sludges during facility operations. Furthermore, shallow aquifer groundwater sampling results indicate that the concentrations of volatile organic contaminants, many of which occur in subsurface soil, are greater on and downgradient of the site than upgradient. Based

upon the data, it was concluded that contaminants in the soil at the Swope site are migrating into the shallow aquifer groundwater. Groundwater quality data further suggest that contaminants in the soil at the Swope site may be migrating into the deep aquifer. The detection of volatile and semi-volatile organics in shallow and deep wells screened upgradient of the Swope site, as well as in monitoring wells at facilities located hydrologically side-gradient of the site, indicates that the Swope site is contributing to a larger regional groundwater contaminant plume.

Due to the continuing migration of volatile organic compounds into the groundwater and the potential for the migration of semi-volatile organic compounds into groundwater, soil contamination in the unsaturated zone is of concern. Specifically, soil which contain organics at levels which exceed the NJISALs of 1 mg/kg for total volatile organic contaminants and 10 mg/kg for total semi-volatile organic contaminants may pose a threat to groundwater quality. Approximately 153,000 cubic yards of soil are contaminated above these cleanup levels.

Generally, inorganic compounds were detected at low levels in unsaturated soil. Except for arsenic, inorganics detected above MCLs in groundwater were not detected at levels of concern in any of the subsurface soil samples. Arsenic was detected in only one subsurface soil sample in excess of the NJISAL of 20 mg/kg.

Sporadic occurrences of lead, mercury and arsenic at levels in excess of primary MCLs and/or Action Levels were observed during the May 1990 groundwater sampling round. Of the metals which were detected in groundwater during this sampling round, only chromium and lead were detected above a primary MCL or Action Level in more than one shallow well. The detection of elevated levels of chromium in a shallow upgradient well and in monitoring wells located at facilities which are hydrologically side-gradient of the Swope site may indicate the presence of an upgradient source.

SUMMARY OF SITE RISKS

A baseline Risk Assessment was conducted to evaluate potential site-related risks to human health and the environment which may result if no remedial action is taken. The Risk Assessment for OU 2 focuses on risks posed by contaminants detected in groundwater. The following discussion summarizes the findings of the Risk Assessment, as amended by EPA's Addendum to the Supplemental Feasibility Study and Risk Assessment.

As stated previously, the site and surrounding properties are currently zoned for industrial use. The nearest residential areas to the Swope site are in the Townships of Delair and Morrisville, which are located approximately 0.5 mile west and

0.8 mile southwest of the site, respectively. In addition, Pennsauken High School is located approximately 2000 feet to the northeast. Although Pennsauken High School land is zoned for residential use, development of residential dwellings on this land in the near future is not expected.

The Risk Assessment, as amended, identifies several potential exposure pathways by which the public may be exposed to site-related contaminants. The following potential exposure routes were identified:

(1) Dermal contact with shallow aquifer groundwater by future industrial workers while handwashing;

(2) Ingestion of groundwater by an industrial worker from a hypothetical potable well installed in the shallow aquifer downgradient of the site;

(3) Ingestion of groundwater by a resident from a hypothetical potable well installed in the shallow aquifer downgradient of the site; and

(4) Showering by a resident using water from a hypothetical potable well installed in the shallow aquifer downgradient of the site.

Risks associated with dermal contact and ingestion of site soil were not quantified in this assessment. It should be noted, however, that as part of the OU 1 remedial action, up to 1.5 feet of contaminated soil was removed from most of the site. In addition, sludge and visibly contaminated soil were removed to a depth of approximately 10 feet. Subsequently, clean backfill material was utilized to bring the site up to grade. Potential risks associated with the possibility of ingestion of, or dermal contact with contaminated soil, therefore, are considered to be minimal.

The Risk Assessment identified 14 constituents of concern (COCs) for shallow aquifer groundwater. These constituents were:

Noncarcinogens	Carcinogens
1,1-dichloroethane	1,1-dichloroethene
1,2-dichloroethene	1,2-dichloroethane
4-nitroaniline	tetrachloroethane
aluminum	trichloroethane
chromium	vinyl chloride
cyanide	arsenic
lead	
mercury	

A complete list of compounds detected in groundwater, including the detection frequency and upper-bound concentration of each compound, is provided in Table 6.

Noncarcinogenic risks are 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/kilogram/day (mg/kg/day), are estimates of daily exposure levels for humans which are thought to be safe over a lifetime (including sensitive individuals). EPA-verified RfDs are not available for all COCs, (i.e., 4-nitroaniline, aluminum and lead), therefore, risks associated with some of these chemicals could not be quantitatively assessed. RfDs for the COCs are presented in Table 7. Estimated intakes of compounds from environmental media (e.g., the amount of chemicals ingested from contaminated groundwater) are compared with the RfD to derive the hazard quotient for the contaminant in the particular media. The hazard index is obtained by adding the hazard quotients for all contaminants across all media that impact a particular receptor population.

A HI greater than 1 indicates that the potential exists for non-carcinogenic 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. HIs were calculated for the exposure scenarios assessed and are presented in Table 8. A HI of greater than 1 for the potential ingestion of shallow aquifer groundwater by either industrial workers or residents indicates that noncarcinogenic health effects would likely result, if the shallow aquifer were utilized as a potable water source in the vicinity of the Swope site.

Potential carcinogenic risks were evaluated using the cancer potency factors developed by EPA for compounds of concern. Cancer slope factors (SFs) have been developed by EPA's Carcinogenic Risk Assessment Verification Endeavor for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. SFs, which are expressed in units of $(mg/kg/day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg/day, to generate an upper-bound exposure to the compound at that intake level. SFs for the COCs are presented in Table 7. 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 unlikely.

For known or suspected carcinogens, EPA considers excess upper-bound individual lifetime cancer risks between 10^{-4} to 10^{-6} to be acceptable. This level indicates that an individual has not greater than a one in ten thousand to one in a million chance of developing cancer as a result of site-related exposure to a carcinogen under specific exposure conditions at the site. The potential cancer risks associated with the site are presented in Table 9. The cancer risk for use of shallow aquifer groundwater as a potable water source by residents was determined to be 1.8×10^{-3} (1.8 in a thousand) for an exposure duration of 30 years.

The quantitative risk characterization suggests that unacceptable noncarcinogenic and carcinogenic risks under current or future land-use conditions would exist, if the shallow aquifer was utilized as a potable water source in the vicinity of the site. Furthermore, the Supplemental RI concluded that a semi-confining unit separates the shallow and deep aquifers, and that leakage of groundwater to the deep aquifer occurs. The Swope site, therefore, may be contributing COCs to the deep aquifer, which is currently utilized as a potable water source.

Subsurface Soil

Volatile and semi-volatile organic contaminants in subsurface soil have migrated into the shallow aquifer which presents a threat to groundwater quality in the deep aquifer, which is a potable water source. Therefore, it is necessary to take a remedial action to remove contaminants from the subsurface soil, in order to reduce the site's contribution to groundwater contamination.

The NJISALs for volatile and semi-volatile organic compounds will be utilized as soil cleanup goals, in order to provide for groundwater protection. NJISALs are used to identify the presence of contamination in soil.

Risks associated with potential dermal contact with, or ingestion of contaminated subsurface soil were not quantified in this risk assessment, since direct human contact with soil at depth is not probable.

Actual or threatened releases of hazardous substances from this site, if not addressed by the preferred alternative, may present a current or potential threat to public health, welfare, or the environment through the continued presence of contaminants in subsurface soil.

Uncertainties

The procedures and inputs used to assess risks are subject to a wide variety of uncertainties. The main sources of uncertainty in this Risk Assessment include:

- environmental sampling and analysis,
- exposure parameter estimation, and
- toxicological values.

Uncertainty in environmental sampling arises mainly because of the potential for uneven distribution of constituents in environmental media. Therefore, there is significant uncertainty as to the actual levels of contaminants present. Analysis error results largely from errors inherent in the analytical methods and characteristics of the matrix being sampled.

As part of the exposure assessment, estimates are generated as to the frequency of exposure to chemicals of concern and the period of time over which the exposure would occur. These estimates serve as a source of uncertainty.

Uncertainties in toxicological values result due to extrapolation of the effects of high doses of compounds on animals to low doses in humans. Additional uncertainties result because of difficulties involved in determining the toxicity of chemical mixtures. The use of conservative assumptions and models during performance of the risk assessment addresses these uncertainties, so as to ensure that the potential site-related risks are not likely greater than those estimated.

Environmental/Ecological Assessment

The potential for environmental/ecological impacts was examined as part of the Supplemental RI. Due to the extensive nature of surficial activities performed as part of the OU 1 remedial action, little of the original site habitat remains. Surface soil has been removed to a depth of 1.5 feet over most of the site, and approximately 2 feet of clean fill has been placed over the underlying soil. Currently, the site unlikely supports any complex terrestrial ecosystem, but may support invertebrates and some small mammals. Since contaminated soil is no longer exposed, constituents present in the subsurface soil are not likely to be transported off site via erosional runoff or wind.

SCREENING OF REMEDIAL TECHNOLOGIES

The Swope site OU 2 remedial objective focuses on mitigating the leaching of volatile organic compounds and the potential for migration of semi-volatile organic compounds into groundwater.

During the Feasibility-Study process, a wide range of remedial technologies were evaluated to identify those appropriate to meet the OU 2 remedial objective. An evaluation of the alternatives that passed the initial screening process is presented in the next section.

Initially, technologies and process options were identified which were classified into four broad categories, namely, treatment technologies, containment options, institutional actions to reduce the potential for exposure to contaminants, and no remedial action with media monitoring. The technologies and process options considered, and the results of the initial screening processes are summarized below.

Institutional actions which were considered included site fencing and deed restrictions on the use of the site property. Since neither of these actions would aid in meeting the OU 2 remedial action objective of mitigating the leaching of subsurface soil contaminants into groundwater, they were eliminated from further consideration.

Site capping to reduce the mobility of site contaminants by restricting the infiltration of precipitation was considered as a containment option. A variety of capping materials and capping designs were evaluated. A clay and soil cap, consisting of a relatively impermeable clay layer overlaid by soil, was envisioned to be susceptible to cracking and to require maintenance and repair. Concrete, asphalt, and additive-derived caps were determined to be susceptible to cracking and weathering. A single-layer synthetic membrane cap was found to be prone to tearing, and is often punctured by burrowing animals and plant roots. Of the capping options considered, the multi-layer cap was determined to be the most reliable and, therefore, was carried through the initial screening process. This cap would consist of a layer of low permeability (e.g., clay or synthetic membrane) which would be covered with sand, topsoil and vegetation to protect the low permeability layer from the effects of the atmosphere.

Ex-situ (i.e., technologies involving the excavation of soil, prior to treatment) and in-situ (i.e., in-place treatment) technologies were also evaluated. Ex-situ treatment technologies were not carried through the initial screening process due to the difficulties that would be involved in excavating contaminated site soil to the depth of contamination within the spatial confines of the site. As displayed on Figure 2, the site is bounded to the northeast and southwest by railroad rights-of-way and warehouses, and to the southeast by National Highway. Excavation of site soil would, at a minimum, involve the disruption of a railroad spur as well as National Highway. In addition, the excavation of contaminated site soil would require shoring the sides of the excavation to about 80 feet to maintain the integrity of the excavation walls during soil removal. The shoring of the excavation walls to the depth of contamination would prove difficult and would result in the excavation of soil outside the physical boundaries of the site.

In-situ treatment technologies evaluated in the Supplemental FS included vitrification/glassification, solidification/fixation of contaminated soil, soil flushing, soil vapor extraction, enhanced volatilization, and biodegradation.

Vitrification/glassification involves melting soil to bind the contaminants in a glassy, solid matrix which is resistant to leaching. Large electrodes are installed in contaminated soil through which a high current of electricity is passed to melt the soil. Nonvolatile contaminants are bound in the vitrified mass, while organic compounds are destroyed by pyrolysis. Since this technology has not been proven to be implementable to the depth of contamination at the site, vitrification/glassification was eliminated from further consideration during the initial screening process.

The solidification/fixation technology involves immobilizing contaminants by binding them into an immobile, insoluble matrix. Generally, concrete or cement is mixed with contaminated soil, which become incorporated into the rigid matrix of the hardened concrete. Reviews of case studies indicate that this technology has not been proven to be an effective means to immobilize organic compounds. This technology, therefore, was not carried through the initial screening process.

Soil flushing involves the use of a solvent to solubilize contaminants attached to soil particles. Due to the non-homogeneous nature of the subsurface soil and the potential for preferential pathways to develop within the 80-feet deep vadose zone, soil flushing may only be of limited effectiveness. Since this technology may be only partially effective, it was screened out.

Soil vapor extraction involves the removal of volatile organic compounds from soil in the unsaturated zone by increasing the flow of air through the soil. Air is drawn from the surface of the site through extraction wells, which are screened within the contaminated soil. Volatilized contaminants contained within the soil gas are drawn from the subsurface environment through the extraction wells. A treatability study performed during the Supplemental FS demonstrated that a soil vapor extraction system would be an effective means to remove volatile organic contaminants from subsurface soil. This technology, therefore, was carried through into the alternative development stage.

The enhanced volatilization technology utilizes steam, hot air or electrical probes to raise the temperature of contaminants in soil, causing them to volatilize. If steam were utilized to heat the soil, condensate would be generated during the initial stages of the process, thereby providing a pathway by which contaminants could migrate to groundwater. In addition, this technology has only been demonstrated to be effective to a depth of about 30

feet. Therefore, enhanced volatilization was eliminated from further consideration during the initial screening.

In-situ biodegradation involves the use of microorganisms that are naturally occurring in soil to degrade organic contaminants. Oxygen and nutrients may be added to the subsurface environment to enhance microbial catabolism or co-metabolism of organic contaminants, resulting in the breakdown of these compounds. In-situ biodegradation has been successfully utilized to degrade nonhalogenated organic compounds, but has not been demonstrated to be effective in remediating halogenated organic contaminants. Since this is a proven technology for the remediation of soil contaminated with nonhalogenated organic contaminants, and non-halogenated organic contaminants comprise a significant portion of the subsurface soil contamination at the Swope site, this technology was carried through into the remedial alternative development stage.

SUMMARY OF REMEDIAL ALTERNATIVES

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), requires each selected site remedy to be protective of human health and the environment, cost-effective, and in accordance with statutory requirements. Permanent solutions to contamination problems are to be achieved wherever possible. The use of innovative technologies and on-site treatment are evaluated as a means to attain this goal. The remedial alternatives evaluated during the Supplemental FS are described below.

Alternative 1: No Action

Capital Cost:	$ 0
Annual Operation and Maintenance Cost:	$ 234,200
Present Worth Cost:	$ 1,014,000
Estimated Months to Achieve Remedial Action Objectives	NA

The National Contingency Plan requires that a No Action Alternative be evaluated at every site to provide a baseline against which other remedial alternatives may be compared. Under this alternative, EPA would take no further action to prevent or reduce the leaching of subsurface soil contaminants to groundwater. This alternative includes a five-year groundwater monitoring plan, which would involve the sampling of existing site wells on a quarterly basis to assess the impact of the contaminated subsurface soil on groundwater quality. Groundwater

samples would be analyzed for Target Compound List volatile and semi-volatile organic contaminants on a quarterly basis, and Target Analyte List metals on an annual basis.

This alternative would not provide for protection of human health and the environment. The toxicity, mobility and volume of the contaminants would not be reduced. Contaminated subsurface soil would remain on site and continue to act as a source of groundwater contamination.

Alternative 2: Soil Vapor Extraction with Biodegradation

Capital Cost:	$687,500
Annual Operation and Maintenance Cost (Groundwater Monitoring Program):	$234,200
First-Year Operation and Maintenance Cost (Vapor Extraction System):	$397,500
Present Worth:	$2,099,000
Estimated Months to Achieve Remedial Action Objectives:	18

Under this alternative, soil vapor extraction and biodegradation would be used to remove and/or degrade organic contaminants from unsaturated soil. Using the NJISALs of 1 mg/kg for total volatile organic compounds and 10 mg/kg for total semi-volatile organic compounds as cleanup goals, the estimated total volume of unsaturated soil requiring treatment is 153,000 cubic yards.

A typical soil vapor extraction system consists of a network of soil gas extraction and monitoring wells, which are installed within contaminated soil. The extraction wells are connected to a vacuum pump(s) which create(s) a negative pressure gradient within the contaminated soil, drawing air from the surface of the site through the contaminated soil and into the extraction wells. As the air passes through the unsaturated soil, volatile organics tend to vaporize and travel with the induced air stream to the extraction wells. Soil-gas monitoring wells are utilized to measure the induced pressure gradient to determine whether contaminated soil is being effectively ventilated. In addition, wells which are used to inject air either passively or actively into the subsurface environment, may be utilized to increase horizontal air flow through contaminated soil or to limit the system's influence to within the boundaries of the site.

During the design of the soil vapor extraction system, the magnitude of volatile organic emissions that may result due to operation of the system would be assessed to determine whether air pollution control equipment would be necessary. Air quality regulations (N.J.A.C. 7:27) require that state-of-the-art air pollution control technology be used for control of any source where the emission rate of total volatile organic compounds is in excess of 0.5 pound per hour and/or the rate of total toxic volatile organic contaminants is in excess of 0.1 pound per hour. Therefore, it may be necessary to treat the air stream by carbon adsorption or thermal destruction prior to discharge. The estimated cost of this alternative includes the cost of a thermal destruction unit.

The primary component of this alternative would be soil vapor extraction. In addition, biodegradation of site contaminants would be accomplished as a by-product of the soil vapor extraction process, because operation of a soil vapor extraction system would also serve to increase oxygen levels within contaminated soil, and thereby enhance the aerobic biodegradation of nonhalogenated organic contaminants by microorganisms which are present in soil. This process would be effective in degrading semi-volatile organic compounds which would not be removed with the induced air stream. The effectiveness of biodegradation depends on several factors including the presence of appropriate microorganisms, soil moisture content, oxygen content in the soil gas, the presence of nutrients, soil pH and soil temperature. If necessary, the contaminated soil could be inoculated with appropriate microorganisms, and nutrients could be injected into the subsurface environment through wells to enhance the aerobic biodegradation process.

During the design phase of the soil vapor extraction system, a treatability study would be conducted, utilizing EPA-approved methodologies, to evaluate the effectiveness of biodegradation at the site. This study would assess whether environmental factors, such as soil nutrients and moisture content or the number and type of microorganisms present in soil, could be altered to enhance the biodegradation of contaminants further.

During the operation of the soil vapor extraction system, subsurface soil and soil gas samples would be collected to evaluate the effectiveness of the system in remediating subsurface soil contamination. Subsurface soil samples would be collected at the site during the design of the soil vapor extraction system to characterize subsurface soil contamination further and to provide a baseline for determination of the effectiveness of the soil vapor extraction system in remediating subsurface contamination. During this sampling event, a subsurface soil boring(s) would be installed in the former tank farm area, and soil samples would be collected to the water table, to determine the nature and extent of subsurface soil

contaminat in this area. Concentrations of contaminants in soil gas ies, collected during operation of the soil vapor extractic system, would be evaluated to determine the continuing effectiveness of the em in remediating organic contaminants, as well as providing cation as to when soil samples should be collected to determi her soil cleanup goals have been met. Operation of the tre t system would continue until the soil cleanup goals have been m , or until EPA determines that operation of the system is no longer practical.

In addition, a five-year groundwater monitoring program, which would involve the sampling of all site wells on uarterly basis, would be conducted to provide groundwater ality data. Groundwater samples would be analyzed for Target Compound List volatile and semi-volatile organic contaminants on a quarterly basis, and Target Analyte List metals on an annual basis.

Decision to Postpone Installation of a Cap

Alternative 2, as developed and evaluated in the Supplemental FS, originally included the installation of a multi-layer cap over the site, following treatment of contaminated subsurface soil. A cap was originally included as a component of this alternative, because the installation of a cap was a source control activity specified in the September 1985 Record of Decision for the Swope site. It should be noted, however, that extensive treatment of subsurface contamination was not envisioned when the 1985 remedy was selected. During preparation of the Proposed Plan, EPA reevaluated the need to cap the site in conjunction with the active treatment of subsurface soil contamination. EPA has determined that treatment of subsurface soil contamination alone may be adequate to protect the groundwater from continuing degradation. As a result, EPA has decided to postpone a decision regarding a cap, until after completion of the selected source control remedy. If it is later determined that a cap is not required, this approach would allow for a greater degree of unrestricted future usage of the site. Subsequent to completion of the selected remedy, EPA will evaluate whether this remedy provides for adequate protection of groundwater, and whether the installation of a cap or further source control actions are warranted.

EVALUATION OF ALTERNATIVES

Each of the alternatives was evaluated with respect to the nine criteria specified in the National Contingency Plan and utilized by EPA as part of the remedy selection process. These criteria are classified into four categories: environmental/public health protectiveness, compliance with cleanup standards, technical performance and cost. In addition, the selected remedy should result in permanent solutions to contamination problems and should use treatment to the maximum extent practicable. The nine

criteria are summarized below:

- Overall Protection of Human Health and the Environment: This criterion addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.

- Compliance with ARARs: This criterion addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements (ARARs) of Federal and State environmental statutes and/or provide a basis for invoking a waiver.

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

- Reduction of Toxicity, Mobility or Volume Through Treatment: This criterion addresses the anticipated performance of the remedy in terms of reducing the toxicity, mobility or volume of the contaminants of concern at the site.

- Short-term Effectiveness: This criterion refers to the period of time needed to achieve protection, as well as the remedy's potential to create adverse impacts on human health and the environment that may result during the construction and implementation phase.

- Implementability: Implementability is the technical and administrative feasibility of implementing a remedy, including the availability of materials and services required to implement a particular alternative.

- Cost: Cost includes the estimated capital and operation and maintenance costs of the remedy, and the net present worth cost.

- State Acceptance: This criterion indicates whether, based on its review of the Supplemental RI/FS and Addenda, the Proposed Plan and the ROD, the State of New Jersey concurs with the preferred alternative. The State has concurred with the preferred alternative.

- Community Acceptance: This criterion will be assessed following a review of the public comments received on the Supplemental RI/FS and Addenda and the Proposed Plan.

Overall Protection of Human Health and the Environment

The No Action Alternative for the Swope site consists of monitoring groundwater quality. No remedial measures which provide protection for human health and the environment in terms of soil contamination would be implemented as part of this alternative. Subsurface soil contamination would remain and would continue to act as a source of groundwater contamination.

Alternative 2, which involves soil vapor extraction with biodegradation, would actively remove subsurface soil contaminants and, thus, mitigate the leaching of organic subsurface soil contaminants to groundwater. Operation of the soil vapor extraction system would remove volatile organic contaminants, while enhancing the biodegradation of residual nonhalogenated organic contaminants. Alternative 2 would provide protection to human health and the environment by remediating subsurface soil contaminants which are acting as a source of groundwater contamination.

Compliance with ARARs

On-site soil vapor extraction with biodegradation (Alternative 2) would be conducted in compliance with Federal and State ARARs. Since no Federal or State regulations specify cleanup levels for the volatile and semi-volatile contaminants in soil at the site, NJISALs for volatile and semi-volatile organic compounds will be utilized as cleanup goals.

Due to the site's location within a New Jersey Coastal Zone, implementation of Alternative 2 would be, to the maximum extent practical, consistent with the New Jersey Coastal Zone Management Plan. Further, the requirements of N.J.A.C. 7:27-8.2(a)1 would have to be met, if a carbon adsorption or catalytic oxidation unit were necessary to control air emissions from the soil vapor extraction system. The on-site storage of drill cuttings generated during installation of vapor extraction and monitoring wells would be conducted in accordance with the requirements of Part 264 of the Resource Conservation and Recovery Act (RCRA), if these cuttings were to remain on site for more than 90 days. Alternatively, Part 265, Subparts I and J standards would be applicable, if storage of waste on site were less than 90 days. Off-site treatment and/or disposal would be conducted according to RCRA Part 262 standards which specify manifesting procedures, transport and record-keeping requirements. The shipment of hazardous wastes off site to a treatment facility would be consistent with OSWER Off-Site Policy Directive Number 9834.11, which ensures that facilities authorized to accept CERCLA generated waste materials will be in compliance with RCRA operating standards. RCRA Part 264, Subpart X standards are applicable to the soil vapor extraction process which would be used to treat contaminated subsurface soil.

Under the No Action Alternative, no remedial action would be taken to reduce the levels of contaminants in subsurface soil. Therefore, this alternative would not achieve the cleanup goals established for site soil.

Long-term Effectiveness and Permanence

The No Action Alternative would not prove to be effective in the long term. Alternative 2 would reduce volatile and semi-volatile organic compound concentrations in subsurface soil, which would reduce the amount of contaminants leaching into groundwater. Therefore, soil vapor extraction with biodegradation is expected to be effective in providing long-term reliable protection to human health and the environment.

Reduction of Toxicity, Mobility or Volume Through Treatment

The No Action Alternative would not provide any reduction of the toxicity, mobility or volume of contaminated soil at the Swope site. Soil vapor extraction with biodegradation would permanently remove or degrade organic contaminants in the soil matrix and, as a result, provide for a reduction in the volume of subsurface soil contaminants which may migrate into groundwater. Soil vapor extraction, by removing volatile organic contaminants from the site, will result in a significant reduction in toxicity and mobility of contaminants.

Short-term Effectiveness

Since no construction would occur under the No Action Alternative, this alternative would not pose any additional risk to nearby communities or on-site workers. However, under this alternative, subsurface soil would continue to act as a source of groundwater contamination. During implementation of Alternative 2, on-site workers may be exposed to contaminants via dermal contact or inhalation during installation of vapor extraction and monitoring wells. These health risks would be controlled through the use of protective clothing and respiratory protection, as necessary. Air quality monitoring and, if necessary, the installation of air emissions control equipment at vapor extraction wells would ensure the protection of human health and the environment during operation of the soil vapor extraction system. Soil vapor extraction with biodegradation should result in a significant reduction of subsurface soil contamination within 18 months of initiation of construction activities.

Implementability

The No Action Alternative would not pose any implementation problems, because no construction activities would be conducted under this alternative. Soil vapor extraction with biodegradation are proven technologies and could be implemented

at the site. Implementation of a soil vapor extraction system would require the installation of extraction wells, piping and vapor monitoring wells. Air pollution control equipment and vacuum equipment could be placed on a mobile trailer that would be parked at the site for the duration of the remedial activity. The biodegradation of site contaminants may require the balancing of environmental factors which affect the effectiveness of this technology. Therefore, activities such as the inoculation of contaminated soil with appropriate microorganisms or the injection of nutrients into the subsurface environment through wells, may be required to enhance the aerobic biodegradation of organic contaminants. Services and materials necessary for implementation of the selected remedy are readily available and no technical or administrative difficulties are foreseen.

Cost

Alternatives 1 and 2 have an estimated present worth cost of $1,014,000 and $2,099,000, respectively. The total capital, annual operation and maintenance (O&M), and present worth costs for each alternative are presented in Tables 10 and 11. It should be noted that the capital and O&M costs for Alternative 2 do not include costs which may be involved with enhancing aerobic biodegradation of contaminants. The capital cost for Alternative 2 also does not include the cost of performing a biodegradation treatability study, which would be conducted as part of this alternative.

State and Community Acceptance

A review of the State and public comments received on the Supplemental RI/FS and Addenda, and the Proposed Plan indicates that both the State and the community concur with the selected remedy. Public comments are addressed in the Responsiveness Summary, which is attached to this document.

SELECTED REMEDY

Based on consideration of the requirements of CERCLA, the results of the Supplemental RI/FS and Addenda, and public comments, EPA and the New Jersey Department of Environmental Protection and Energy have determined that Alternative 2, soil vapor extraction with biodegradation, is the most appropriate remedy for contaminated subsurface soil at the Swope site. Site risks have been identified as being primarily due to the potential for ingestion of contaminated groundwater. The results of the Supplemental RI indicate that contaminated soil at the Swope site is a source of groundwater contamination. The selected remedy will be effective in reducing the quantity of soil contaminants that are available to migrate into the groundwater.

The selected alternative involves the treatment of approximately 153,000 cubic yards of subsurface soil contaminated with volatile and semi-volatile organic contaminants utilizing in-situ soil vapor extraction with biodegradation. Since no Federal or State regulations specify cleanup levels for volatile and semi-volatile organic contaminants in soil at the site, NJISALs of 1 mg/kg for total volatile organic compounds and 10 mg/kg for semi-volatile organic compounds will be utilized as cleanup goals to provide for groundwater protection.

During the design phase of the soil vapor extraction system, a treatability study will be conducted, utilizing EPA-approved methodologies, to evaluate biodegradation at the site. This study will assess whether environmental factors, such as soil nutrient and moisture content, or the number and type of microorganisms present in soil, could be altered to enhance the biodegradation of contaminants further.

During implementation of the selected remedy, subsurface soil and soil gas samples will be collected to evaluate the effectiveness of the soil vapor extraction system in remediating subsurface soil contamination. Subsurface soil samples will be collected at the site during the design of the soil vapor extraction system to characterize subsurface soil contamination further and to provide a baseline for determining the effectiveness of the soil vapor extraction system in remediating subsurface contamination. During this sampling event, a subsurface soil boring(s) will be installed in the former tank farm area. Since storage of hazardous materials in this area may have resulted in releases of contaminants into site soil, and subsurface soil contamination beneath the tank farm was not investigated during the performance of the Supplemental RI, soil samples will be collected to the water table, to determine the nature and extent of possible subsurface soil contamination in this area. Concentrations of contaminants in soil gas samples, collected during operation of the soil vapor extraction system, will be utilized to evaluate the continuing effectiveness of the system in remediating organic contaminants, as well as providing an indication as to when soil samples should be collected to determine whether soil cleanup goals have been met.

A five-year groundwater monitoring program will be conducted to provide groundwater quality data. This will involve sampling site wells on a quarterly basis for Target Compound List volatile and semi-volatile organic compounds, and on an annual basis for Target Analyte List metals. Since several metals were sporadically detected at elevated levels in groundwater during the Supplemental RI, the analytical results of metals samples will be used to characterize metal contamination more fully. EPA may decide to modify the monitoring program (in terms of frequency and contaminant parameters), based upon the analytical results of groundwater samples collected during the initial

sampling event(s).

Operation of the treatment system will continue until cleanup goals have been met, or until EPA determines that operation of the system is no longer practical. Subsequent to completion of the selected remedy, EPA will determine whether the selected remedy provides for adequate protection of groundwater and whether any further source control measures, such as capping, or if groundwater remediation is necessary.

Air quality monitoring will be performed during construction and operation of the soil vapor extraction system. Air emissions from the soil vapor extraction system will meet air emission ARARs. If necessary, air emission control equipment will be utilized to meet air emission ARARs.

The total present worth cost of this alternative is estimated to be $2,099,000. This cost does not include the cost of conducting the biodegradation treatability study or the cost of any actions which may be taken to enhance the aerobic biodegradation of organic contaminants during operation of the soil vapor extraction system. The capital cost is estimated to be $687,500. O&M costs for the first year of operation of the soil vapor extraction system are estimated to be $397,500. Annual O&M costs for the groundwater monitoring plan are estimated at $234,200.

STATUTORY DETERMINATIONS

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that achieve adequate protection of human health and the environment. In addition, Section 121 of the CERCLA establishes several other statutory requirements and preferences. These specify that, when complete, the selected remedial action for a site must comply with applicable or relevant and appropriate environmental standards established under Federal and State environmental laws unless a statutory waiver is justified. The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity or mobility of hazardous wastes as its principal element. The following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy, which includes the in-situ vapor extraction of organic subsurface soil contaminants, will permanently reduce the quantity of contaminants in soil at the site. This remedy, therefore, will provide protection to human health and the

environment by reducing this source of groundwater contamination. Based upon the results of the Risk Assessment conducted for the Swope site, the potential ingestion of contaminated groundwater from the shallow aquifer which underlies the site presents an unacceptable future risk to human health. There are, however, no short-term threats associated with the selected remedy that cannot be readily controlled.

Compliance with Applicable or Relevant and Appropriate Requirements

Alternative 2, which includes in-situ soil vapor extraction with biodegradation, will comply with all Federal and State requirements which are applicable or relevant and appropriate to its implementation.

Cost-Effectiveness

The selected remedy is cost-effective and has been determined to be the only alternative which would be effective in meeting the remedial action objective of mitigating the migration or the potential for migration of organic contaminants to groundwater.

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

The selected remedy, Alternative 2, provides reliable protection of human health and the environment over the long term, and reduces the toxicity, mobility and volume of soil contaminants through treatment. This alternative can be implemented without resulting in any adverse impacts on human health and the environment during construction and operation. Services and materials necessary for implementation of the selected remedy are readily available and no technical or administrative difficulties are foreseen.

The State and community concur with the selected remedy, and it meets the statutory requirements to utilize permanent solutions and treatment technologies to the maximum extent practicable.

Preference for Treatment as a Principal Element

By treating soil contaminated with volatile and semi-volatile organic compounds in place with a soil vapor extraction system, the selected remedy addresses threats posed by the site using treatment technologies. Therefore, the selected remedy meets the statutory requirement to utilize permanent solutions and treatment technologies to the maximum extent practicable.

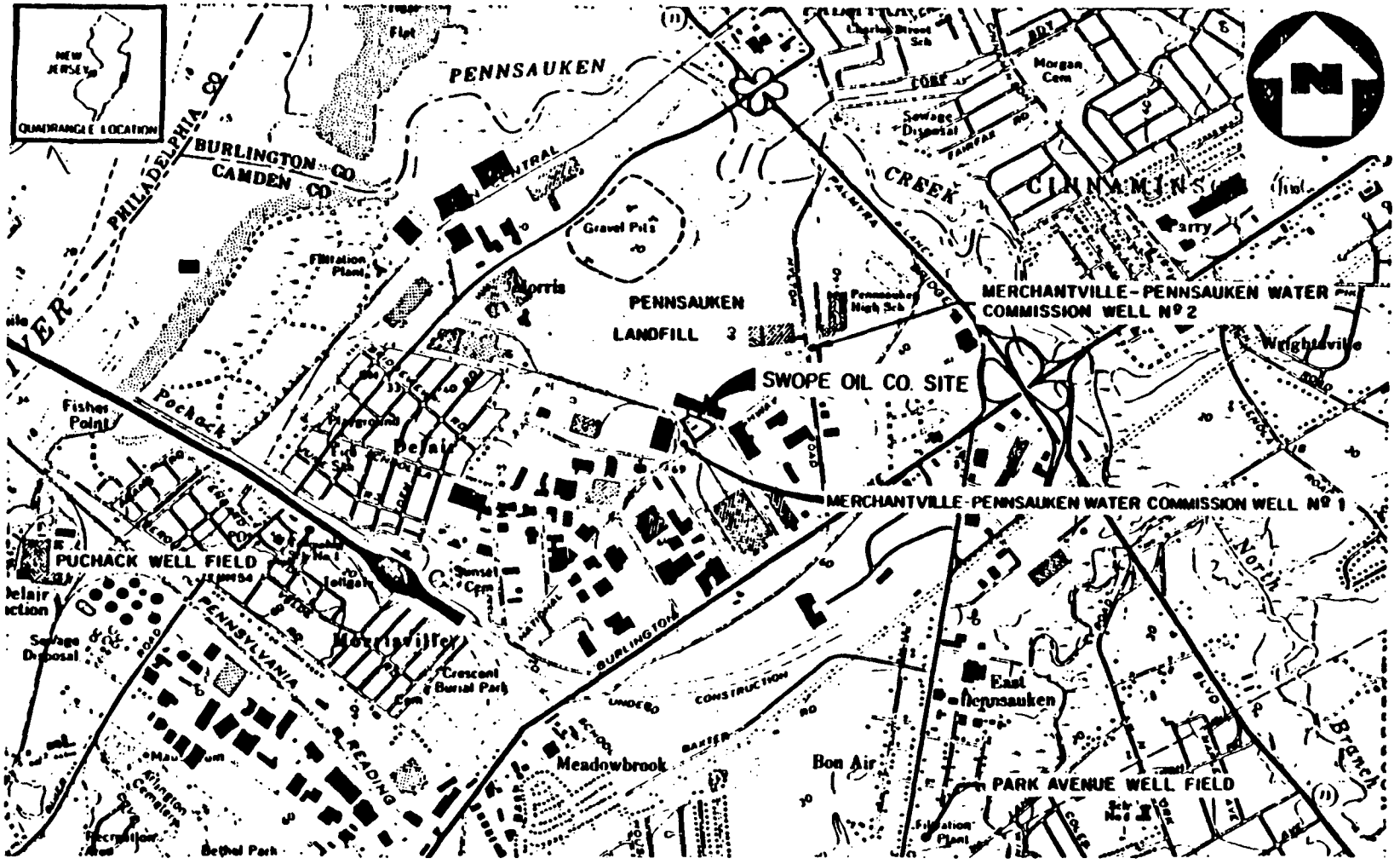
DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant changes in the preferred alternative, Alternative 2, Soil Vapor Extraction with Biodegradation, as presented in the Proposed Plan.

Subsequent to release of the Proposed Plan, EPA determined that the groundwater monitoring program to be implemented as part of the No Action Alternative and Alternative 2 should be expanded to provide for the collection of samples for total metals analyses. As a result, EPA revised the cost for implementing the No Action Alternative and the selected remedy, which were specified in the Proposed Plan, to include the cost for metals analyses. This revision to the scope of the groundwater monitoring program results in an increase of $52,900 in the estimated cost of conducting the five-year monitoring program.

APPENDIX A - FIGURES

FIGURE 1



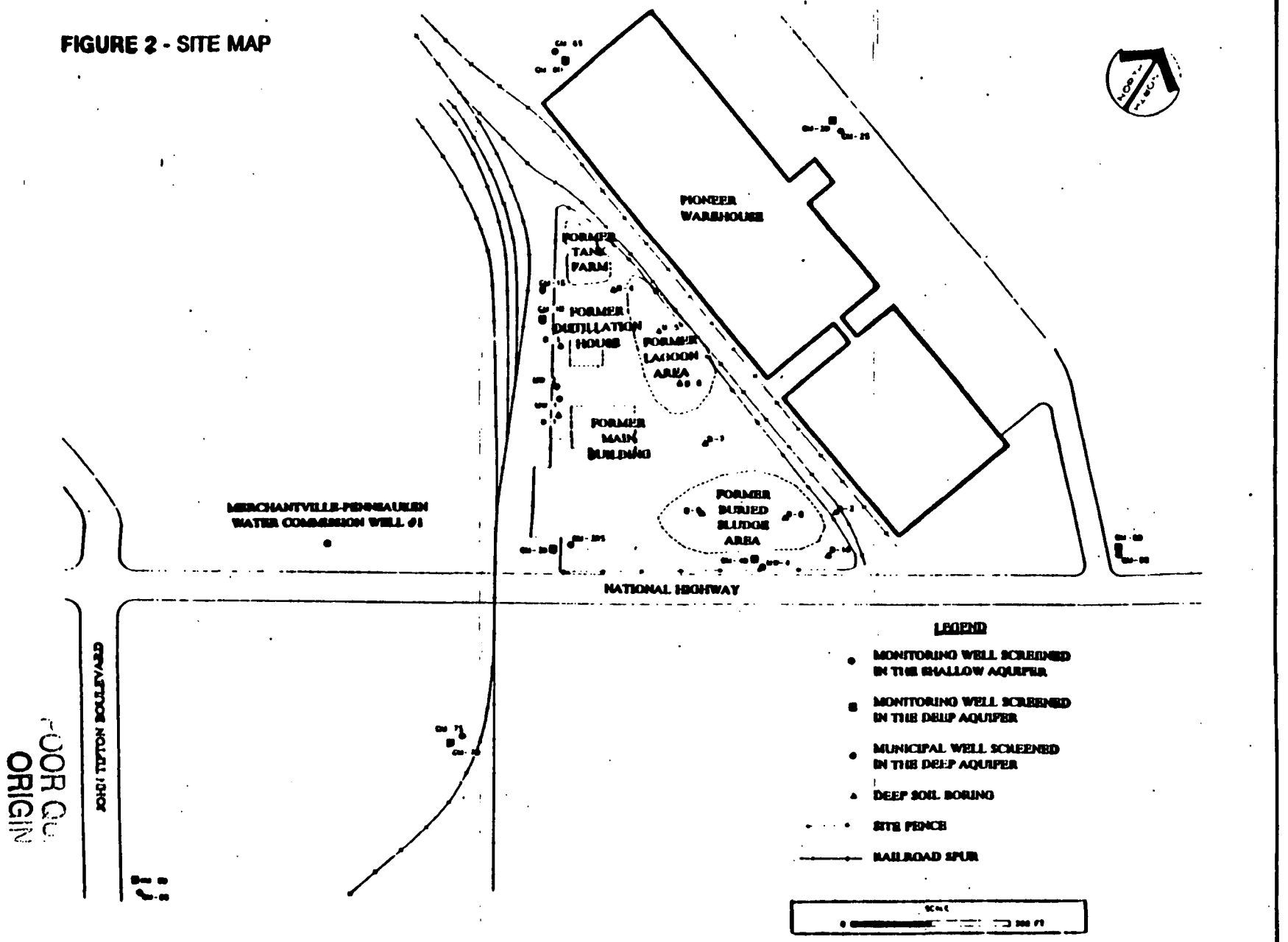
BASE MAP IS A PORTION OF THE U.S.G.S. CAMDEN, NJ - PA QUADRANGLE (7.5 MINUTE SERIES, 1967, PHOTOREVISED 1973).
CONTOUR INTERVAL 10'

POOR QUALITY ORIGINAL

LOCATION MAP
SWOPE OIL CO. SITE, PENNSAUKEN TWP, NJ
SCALE: 1"=2000'

NUS CORPORATION
A Halliburton Company

FIGURE 2 - SITE MAP



POOR QUALITY ORIGINAL

APPENDIX B - TABLES

Table 1

Deep Soil Boring Results

Constituents	Frequency of Detection	Range	Arithmetic Mean(a)	Location of Highest Detect
Volatile Organics				
Acetone	28/43	0.064 - 230	16.4	B-5 from 19' to 21'
2-Butanone	15/43	0.014 - 41	5.9	B-5 from 19' to 21'
1,1-Dichloroethane	1/43	* - *	0.05	B-3 from 29' to 31'
1,2-Dichloroethene	4/43	0.074 - 0.56	0.32	B-4 from 24' to 26'
Ethylbenzene	9/43	0.002 - 320	37.7	B-6 from 14' to 16'
2-Hexanone	1/43	* - *	0.24	B-8 from 14' to 16'
Methylene Chloride	17/43	0.0039 - 21	1.6	B-6 from 14' to 16'
4-Methyl-2-Pentanone	19/43	0.003 - 150	9.7	B-6 from 14' to 16'
Tetrachloroethene	4/43	0.052 - 360	91	B-6 from 14' to 16'
Toluene	13/43	0.0019 - 490	39.7	B-6 from 14' to 16'
1,1,1-Trichloroethane	2/43	0.12 - 130	65	B-6 from 14' to 16'
Trichloroethene	5/43	0.0041 - 620	120	B-6 from 14' to 16'
Vinyl Acetate	4/43	0.006 - 0.035	0.016	B-9 from 84' to 86'
Xylenes	12/43	0.0059 - 1900	169.8	B-6 from 14' to 16'
Semi-Volatile Organics				
Benzoic Acid	4/43	0.54 - 40	18	B-5 from 19' to 21'
Benzyl Alcohol	1/43	* - *	0.44	B-5 from 19' to 21'
Bis(2-ethylhexyl) phthalate	19/43	0.042 - 15	1.7	B-4 from 10' to 12'
Butylbenzylphthalate	1/43	* - *	0.063	B-6 from 29' to 31'
Diethylphthalate	5/43	0.044 - 0.19	0.096	B-1 from 74' to 76'
Dimethylphthalate	1/43	* - *	0.035	B-9 from 84' to 86'
Di-n-butylphthalate	6/43	0.04 - 0.076	0.05	B-9 from 24' to 26'
Di-n-octylphthalate	3/43	0.045 - 0.34	0.19	B-10 from 54' to 56'
Isophorone	8/43	0.039 - 1.0	0.30	B-4 from 39' to 41'
2-Methylnaphthalene	4/43	0.057 - 23	8.8	B-6 from 14' to 16'
2-Methyl Phenol	1/43	* - *	0.066	B-5 from 19' to 21'
4-Methyl Phenol	1/43	* - *	0.47	B-5 from 19' to 21'
Naphthalene	5/43	0.042 - 85	31.2	B-6 from 14' to 16'
N-Nitrosodiphenylamine	4/43	0.041 - 0.081	0.065	B-9 from 84' to 86'
Phenol	10/43	0.076 - 52	12.3	B-4 from 10' to 12'
Inorganics				
Aluminum	43/43	190 - 13,000	3,237	B-6 from 14' to 16'
Arsenic	29/43	0.25 - 23	5.5	B-3 from 29' to 31'
Barium	42/43	1.9 - 68	13.6	B-9 from 84' to 86'
Beryllium	18/43	0.29 - 2.0	0.69	B-3 from 29' to 31'
Calcium	37/43	54 - 1,090	366	B-5 from 19' to 21'
Chromium	43/43	2.0 - 74	13.9	B-1 from 29' to 31'
Cobalt	36/43	0.89 - 16	3.7	B-6 from 29' to 31'
Copper	19/43	1.3 - 110	10.8	B-9 from 84' to 86'
Cyanide	4/43	1.4 - 3.6	2.5	B-6 from 14' to 16'
Iron	43/43	210 - 31,000	6,651	B-5 from 19' to 21'
Lead	39/43	0.7 - 240	9.0	B-9 from 84' to 86'
Magnesium	37/43	20 - 2030	403	B-5 from 19' to 21'
Manganese	43/43	3.0 - 240	41.3	B-8 from 14' to 16'
Nickel	26/43	1.1 - 212	10.9	B-9 from 84' to 86'
Potassium	36/43	58 - 5,910	976	B-5 from 19' to 21'
Selenium	3/43	0.3 - 0.4	0.34	B-1 from 29' to 31'
Sodium	18/43	9.5 - 12,100	1,161	B-9 from 84' to 86'
Vanadium	43/43	2.9 - 90	25.0	B-3 from 29' to 31'
Zinc	36/43	3.2 - 438	24.2	B-9 from 84' to 86'

All concentrations are in milligrams per kilogram (mg/kg).

a Arithmetic mean using detects only.
* Constituent was only detected once.

Table 2

Summary of Volatile Organic Compounds Detected in Groundwater

Compounds	Upgradient Shallow Wells		Downgradient Shallow Wells		Upgradient Deep Wells		Downgradient Deep Wells	
	1st Round	2nd Round	1st Round	2nd Round	1st Round	2nd Round	1st Round	2nd Round
Vinyl Chloride	3J	---	2J-5J	5J	---	5J	2J-8J	8J-12
Methylene Chloride	---	2J	1J	---	---	2J-6	1J	---
Acetone	---	73-260E	---	31-500EJ	---	480E-540E	55	38-790E
Carbon Disulfide	---	---	---	---	---	---	3J	---
1,1 Dichloro-ethene	2J-5	1J-10	2J-14	6-14	3J-7	2J-7	5J-8	1J-8
1,1 Dichloro-ethane	3J-8	4J-10	4J-26	4J-38	11-17	8-28	16-21	10-19
1,2 Dichloro-ethene	20X-48X	3JX-26X	33X-170X	15-99X	120X-200EX	4JX-130X	190X-240X	11-110X
Chloroform	6	6	2J-8	2J-8	8-17	11-36	10-17	4J-17
1,2 Dichloro-ethane	5-6	4J-5	6-12	2J-11	6-9	5-18	6-24	2J-22
1,1,1 Trichloro-ethane	3J-16	4J-40	9J-47J	5-51	9-15	7-19	13-18	8-19
Carbon Tetra-chloride	3J	3J	1J-5	2J-3J	14-27	13-29	15-28	2J-29
1,2 Dichloro-propane	1J-9	1J-14	2J-3J	2J-3J	4J-5	4J-18	3J-7J	2J-9
Toluene	---	---	100	53-81	5	---	7J	2J
Trichloroethene	5	5-7	2J-60	2J-30	18-25	2J-31	22-24	3J-29
Benzene	2J	1J-2J	---	2J-3J	---	---	2J-7	2J-7
4 Methyl-2 Pentanone	---	---	---	94	---	---	---	---
2-Hexanone	---	---	---	190	---	---	---	---
Tetrachloroethene	2J-3J	2J-3J	3J-6	2J-7	13-15	2J-20	7J-14	3J-18
Chlorobenzene	4J	5-8	2J	1J-4J	---	---	---	1J-17
Ethylbenzene	---	1J	27	8-48	1J	---	---	---
Styrene	---	---	---	1J	---	---	---	---
Xylenes	---	1J	150X	180-220E	10X	---	---	---

All concentrations are in micrograms per liter (ug/L).

Upgradient shallow aquifer wells include GM-2S, GM-5S and GM-6S.
Downgradient shallow aquifer wells include MW-1, MW-2, GM-1S, GM-3RS, MW-4, GM-7S and GM-8S
Upgradient deep aquifer wells include GM-2D, GM-5D and GM-6D.
Downgradient deep aquifer wells include GM-1D, GM-3D, GM-4D, GM-7D, GM-8D and MPWC Well #1.
-- = Not Detected
J = Estimated Value
X = Combination of two or more isomers
E = Concentration exceeds calibration range of instrument

Table 3

Summary of Semi-Volatile Organic Compounds Detected in Groundwater

Compounds	Upgradient Shallow Wells		Dgradient Shallow Wells		Upgradient Deep Wells		Dgradient Deep Wells	
	1st Round	2nd Round	1st Round	2nd Round	1st Round	2nd Round	1st Round	2nd Round
Phenol	---	---	---	---	6J-10	---	---	---
1,2-Dichloro benzene	---	---	---	---	6J-11	---	---	2J
Naphthalene	---	---	---	8J	6J-9J	---	---	---
2-Methyl-napthalene	---	---	---	---	4J-6J	---	---	---
bis(2-Ethyl hexyl)phthalate	8J-11	3J	2J-3J	---	3J-9J	2J-3J	2J	7J-130
bis(2-Chloro ethyl)ether	---	---	---	---	---	3J	---	3J-4J
4-Nitroaniline	---	---	---	10J	---	---	---	11J-32J
4-Methylphenol	---	---	2J	---	---	---	---	---
Isophorone	---	---	6J	---	---	---	---	---
1,2,4 Trichloro benzene	---	---	---	4J	---	---	2J	2J-4J
N-Nitroso diphenylamine	---	---	---	---	---	---	---	2J

All concentrations are in micrograms per liter (ug/L).

Upgradient shallow aquifer wells include GM-2S, GM-5S and GM-6S.
Downgradient shallow aquifer wells include MW-1, MW-2, GM-1S, GM-3RS, MW-4, GM-7S and GM-8S
Upgradient deep aquifer wells include GM-2D, GM-5D and GM-6D.
Downgradient deep aquifer wells include GM-1D, GM-3D, GM-4D, GM-7D, GM-8D and MPWC Well #1.

-- = Not Detected
J = Estimated Value

Table 4

Summary of Inorganic Compounds Detected in Groundwater (Unfiltered Samples)

Compounds	Upgradient Shallow Wells	Downgradient Shallow Wells	Upgradient Deep Wells	Downgradient Deep Wells
Aluminum	1688-446	1168-36600	350-565	96.3B-4630
Arsenic	--------	4.0B-78.6	-------	2.0B-2.8B
Barium	55.0B-92.6B	69.4B-220	65B-111B	56.4B-155B
Beryllium	--------	2.2B-2.6B	--------	1.0B
Calcium	7340-15000	7300-26600	14400-28800	7930-32600
Chromium	11.0-77.5	11.4-135	3.4B-54.1	6.1B-48
Cobalt	15.3B	8.8B-74.4	11.5B-16.9B	8.8B-29.7B
Copper	6.2B-27.5	7.8B-210	8.8B-30.8	9.9B-52.1
Iron	357-1070	266-70400	388-1140	129-4120
Lead	4.6B-7.4	3.1B-52.2	5.1-17.4	2.3B-14.1
Magnesium	3700-8850	14908-13000	31808-49008	31408-46008
Manganese	35.9-242	150-3400	186-266	98.4-461
Mercury	1.9	.7-6	.5-1.1	.5-2.9
Nickel	18.0B-49.6	17.7B-117	21.3B-25.0B	14.7B-32.3B
Potassium	34308-12200	26608-12500	11800-37700	25008-17000
Selenium	-------	2.3B	-------	2.9B
Sodium	9290-25700	7070-24700	14300-20800	9030-30900
Vanadium	-------	7.3B-112	-------	14.7B-41.4B
Zinc	28.5-44.0	27.9-?3B	37.7-59.5	41.9-78.2

All concentrations are in micrograms per liter (ug/L).

Upgradient shallow aquifer wells include GM-2S, GM-5S and GM-6S.
Downgradient shallow aquifer wells include MW-1, MW-2, GM-1S, GM-3RS, MW-4, GM-7S and GM-8S
Upgradient deep aquifer wells include GM-2D, GM-5D and GM-6D.
Downgradient deep aquifer wells include GM-1D, GM-3D, GM-4D, GM-7D, GM-8D and MPUC Well #1.

-- = Not Detected
B = Analyte was detected at a concentration less than the Contract Required Detection Limit but greater than the Instrument Detection Limit.

TABLE 5

Occurrence of Constituents in the Shallow Aquifer Upgradient of the Swope Oil and Chemical Company Site, Pennsauken, New Jersey.

Constituents	Frequency of Detection[a]	Range	Arithmetic Mean[b]	UCL
Volatile Organics				
Acetone	2/6	73 - 260	167	757
Benzene	5/6	1 - 2	1.8	2.2
Carbon tetrachloride	2/6	3 - 3	3	3
Chlorobenzene	3/6	4 - 8	5.7	9.2
Chloroform	2/6	6 - 6	6	6
1,1-Dichloroethane	5/6	3 - 10	5.8	8.7
1,1-Dichloroethene	4/6	1 - 10	4.5	9.3
1,2-Dichloroethane	4/6	4 - 6	5	6
1,2-Dichloroethene	6/6	3 - 48	27	40
1,2-Dichloropropane	4/6	1 - 14	6.3	14
Ethylbenzene	1/6	• - •	1	-
Methylene chloride	1/6	• - •	2	-
Tetrachloroethene	5/6	2 - 3	2.6	3.1
1,1,1-Trichloroethane	5/6	3 - 40	13	28
Trichloroethene	5/6	5 - 7	5.4	6.3
Vinyl chloride	1/6	• - •	3	-
Xylenes	1/6	• - •	1	-
Acid and Base/Neutrals				
Bis(2-ethylhexyl) phthalate	4/6	3 - 11	6.3	11.0
Inorganics				
Aluminum	3/3	170 - 450	270	530
Barium	3/3	55 - 93	75	110
Calcium	3/3	7,300 - 15,000	12,000	19,000
Chromium	3/3	11 - 78	33	98
Cobalt	1/3	• - •	15	-
Copper	3/3	6.2 - 28	18	37
Iron	3/3	360 - 1,100	620	1,300
Lead	2/3	4.6 - 7.4	6.0	15
Magnesium	3/3	3,700 - 8,900	5,700	10,000
Manganese	3/3	36 - 240	120	300
Mercury	1/3	• - •	1.9	-
Nickel	2/3	18 - 50	34	130
Poussium	3/3	3,400 - 12,200	6,600	15,000
Sodium	3/3	9,300 - 26,000	16,000	31,000
Zinc	3/3	29 - 44	35	49
PCBs/Pesticides/Herbicides				
Gamma-BHC	2/6	0.086 - 0.33	0.21	0.98
Phenolics	3/6	0.036 - 0.08	0.06	0.09

All concentrations are reported in micrograms per liter (ug/L).

a x/y; where x = number of samples with analytical results above the detection limit, and y = the total number of samples analyzed.

b Arithmetic mean using detects only.

UCL Upper 95 percent confidence limit.

- Constituent was detected only once; 95 percent UCL cannot be calculated.

• Constituent was only detected once.

Upgradient shallow aquifer wells include GM-2S, GM-5S and GM-6S

Downgradient shallow aquifer wells include MW-1, MW-2, GM-1S, GM-3RS, MW-4, GM-7S and GM-8S

Concentrations have been rounded off

TABLE 6

Occurrence of Constituents in the Shallow Aquifer Downgradient of the Swope Oil and Chemical Company Site, Pennsauken, New Jersey.

Constituents	Frequency of Detection[a]	Range	Mean[b]	Arithmetic UCL
Volatile Organics				
Acetone	6/12	31 - 500	202	341
Benzene	3/12	2 - 3	2.7	3.6
Carbon tetrachloride	4/12	1 - 5	2.8	4.8
Chlorobenzene	4/12	1 - 4	2.5	4
Chloroform	6/12	2 - 8	5.5	7.8
1,1-Dichloroethane	12/12	4 - 38	17	23
1,1-Dichloroethene	6/12	2 - 14	9.2	13
1,2-Dichloroethane	11/12	2 - 12	6.8	8.6
1,2-Dichloroethene	12/12	15 - 170	59	84
1,2-Dichloropropane	4/12	2 - 3	2.5	3.2
Ethylbenzene	3/12	8 - 48	28	61
2-Hexanone	1/12	• - •	190	-
Methylene chloride	1/12	• - •	1	-
4-Methyl-2-pentanone	1/12	• - •	94	-
Styrene	1/12	• - •	1	-
Tetrachloroethene	8/12	2 - 7	4.8	6
Toluene	3/12	53 - 100	78	118
1;1,1-Trichloroethane	11/12	5 - 51	21	30
Trichloroethene	12/12	2 - 60	14	22
Vinyl chloride	4/12	2 - 5	3.5	5.5
Xylenes	3/12	150 - 220	183	243
Acid and Base/Neutrals				
Bis(2-ethylhexyl) phthalate	3/12	2 - 5	3.7	6.2
Isophorone	1/12	• - •	6	-
4-Methylphenol	1/12	• - •	2	-
Naphthalene	1/12	• - •	8	-
4-Nitroaniline	1/12	• - •	10	-
1,2,4-Trichlorobenzene	1/12	• - •	4	-
Inorganics				
Aluminum	7/7	120 - 37,000	9,900	20,000
Arsenic	4/7	4.0 - 79	24	67
Barium	7/7	69 - 220	130	170
Beryllium	2/7	2.2 - 2.6	2.4	3.7
Calcium	7/7	7,300 - 27,000	16,000	22,000
Chromium	7/7	11 - 140	63	100
Cobalt	7/7	8.8 - 74	37	55
Copper	7/7	7.8 - 210	55	110
Cyanide[c]	2/12	10 - 308	159	1,100
Iron	7/7	270 - 70,000	32,000	55,000
Lead	7/7	3.1 - 52	18	31
Magnesium	7/7	1,500 - 13,000	6,000	8,900
Manganese	7/7	150 - 3,400	980	1,800
Mercury	5/7	0.70 - 6.0	2.2	4.3
Nickel	7/7	18 - 120	59	87
Potassium	7/7	2700 - 13000	5800	xx
Selenium	1/7	• - •	2.3	-
Sodium	7/7	7,100 - 25,000	15,000	20,000
Vanadium	4/7	7.3 - 110	59	120
Zinc	7/7	28 - 240	100	160
PCBs/Pesticides/Herbicides				
Alpha-BHC	1/12	• - •	0.1	-
Gamma-BHC	5/12	0.044 - 0.18	0.08	0.14
Aroclor 1254	2/12	0.53 - 1.6	1.1	4.4
Phenolics	4/12	0.02 - 0.076	0.049	0.83

All concentrations are reported in micrograms per liter (ug/L).

a x/y; where x = number of samples with analytical results above the detection limit, and y = the total number of samples analyzed.
b Arithmetic mean using detects only.
c Cyanide was not analyzed for in the May 1990 sampling event and results from January 1990 were used.
UCL Upper 95 percent confidence limit.
- Constituent was detected only once; 95 percent UCL cannot be calculated.
• Constituent was detected once.
XX The UCL for Potassium was calculated using an incorrect mean concentration.

Concentrations have been rounded off

Upgradient shallow aquifer wells include GM-2S, GM-5S and GM-6S

TABLE 7

Acceptable Doses* (ADs), Cancer Slope Factors (CSFs), and USEPA Cancer Classification for Constituents of Concern at the Swope Oil and Chemical Company Site, Pennsauken, New Jersey.

Constituents	AD (mg/kg/day) (RfD)		CSF (mg/kg/day)$^{-1}$		Cancer Class
	Oral	Inhalation	Oral	Inhalation	
Volatile Organics					
Acetone	0.1[a]	(0.1)	–	–	D
1,1-Dichloroethane	0.1[a]	0.1[a]	–	–	C
1,1-Dichloroethene	0.009[b]	(0.009)	6.0E-1[b]	1.2E+0[b]	C
1,2-Dichloroethane	0.25[c]	0.025[c]	9.1E-2[b]	9.1E-2[b]	B2
1,2-Dichloroethene	0.02[b]	(0.02)	–	–	D
Ethylbenzene	0.1[a]	(0.1)	–	–	D
Methylene chloride	0.06[c]	0.9	7.5E-3	1.4E-2	B2
Tetrachloroethene	0.01[b]	(0.01)	5.1E-2[a]	3.3E-3[a]	B2
Toluene	0.3[a]	(0.3)	–	–	D
Trichloroethene	0.0074	(0.0074)	0.011	0.017	B2
1,1,1-Trichloroethane	0.09[a]	(0.3)	–	–	D
Vinyl chloride	0.0013[a]	(0.0013)	2.3E+0[a]	3.0E-1[a]	A
Xylene	2.0[a]	(2.0)	–	–	D
Acid and Base/Neutrals					
Bis(2-ethylhexyl)phthalate	0.02[b]	(0.02)	1.4E-2[b]	(1.4E-2)	B2
2-Methylnaphthalene	0.004[i]	(0.004)	–	–	D
Naphthalene	0.004[a]	(0.004)	–	–	D
4-Nitroaniline	0.8[f]	(0.8)	–	–	D
Phenol	0.6[a]	(0.6)	–	–	D
Inorganics					
Aluminum	NA	NA	NA	NA	D
Arsenic	0.001[a]	(0.001)	1.8E+0[a]	5.0E+1[b]	A
Chromium[j]	0.005[b]	0.0000006[b]	–	42[b]	A
Cyanide	0.02[b]	(0.02)	–	–	D
Lead	NA	NA	NA	NA	B2
Mercury	0.0003[a]	0.00005[b]	–	–	D

NOTE: Data in parenthesis indicate inhalation value not available; oral value used.

* Chronic ADs are listed; subchronic ADs are assumed to be 10 times the chronic AD. The term AD in this context is used synonymously with the term RfD.

a USEPA, 1990.
b IRIS, 1990.
c ATSDR, 1989a.
d USEPA, 1987.
e ATSDR, 1988b.
f No USEPA verified data available; AD derived from RTEC, 1985.
g ATSDR, 1989b.
h USEPA, 1986b.
i Assumes toxicity of naphthalene from USEPA, 1990.
j Criteria provided are for Chromium VI.

TABLE 8

NONCARCINOGENIC RISK ESTIMATES (HAZARD INDICES) FOR THE SWOPE OIL AND CHEMICAL COMPANY SITE

(ALL RISKS ARE FOR POTENTIAL EXPOSURE TO SHALLOW AQUIFER GROUNDWATER)

Route	Potentially Exposed Populations				
	Adult Worker		Residents		
	7 year exposure	20 year exposure	9-year exposure	30-year exposure	70-year exposure
Ingestion	1.3	1.3	3.8	3.8	3.9
Dermal	.0018	.0018	.0054	.0054	.0054
Inhalation	------	------	.059	.059	.059
Total Receptor Risk	1.3	1.3	3.9	3.9	3.9

TABLE 9

CARCINOGENIC RISK ESTIMATES FOR THE SWOPE OIL AND CHEMICAL COMPANY SITE

(ALL RISKS ARE FOR POTENTIAL EXPOSURE TO SHALLOW AQUIFER GROUNDWATER)

Route	Potentially Exposed Populations				
	Adult Worker		Residents		
	7 year exposure	20 year exposure	9-year exposure	30-year exposure	70-year exposure
Ingestion	1.4E-4	4.0E-4	5.3E-4	1.7E-3	4.2E-3
Dermal	1.9E-7	5.5E-7	------	2.5E-6	------
Inhalation	------	------	------	8.0E-5	------
Total Receptor Risk	1.4E-4	4.0E-4	5.3E-4	1.8E-3	4.2E-3

Table 10

Remedial Action Alternative 1 - No Action, Detailed Cost Analysis, Swope Oil and Chemical Company Site, Pennsauken, New Jersey.

Item	Description	Cost
A. Capital Cost		$0
B. Annual O&M (for groundwater monitoring on a quarterly basis for 5 years)		
Laboratory procurement; sample collection and project management:		$61,000
Groundwater Sample Analyses	VOC analyses: $450/sample * 120 samples	$54,000
	Semi-VOC analyses: $750/sample * 104 samples	$78,000
	Inorganic analyses: $200/sample * 26 samples	$5,200
Containerization and disposal of purged groundwater:		$36,000
Total:		$234,200
Present Worth (5 years)		$1,014,000
Soil Remedial Action Alternative 1 Total Cost:		$1,014,000

Table 11

Remedial Action Alternative 2 - Soil Vapor Extraction with Aerobic Biodegradation, Detailed Cost Analysis, Swope Oil and Chemical Company Site, Pennsauken, New Jersey.

Item	Description	Cost
A. Capital Cost		
Well Installation	14 VES wells and 1,600 feet of overland piping	$48,000
Blower	One 30-Hp blower	$13,000
Air Emission Control	Catalytic oxidizer	$350,000
System Automation	Transducers, switches, alarm and controls	$14,000
Labor	Installation of blower and oxidizer unit	$8,000
Decon Facility	1,600 ft^2 insulated building ($36/$ft^2$)	$58,000
Subtotal:		$491,000
Engineering (15%):		$73,700
Contingency (25%):		$122,800
Total:		$687,500

Table 11 (continued)

Remedial Action Alternative 2 - Soil Vapor Extraction with Aerobic Biodegradation Detailed Cost Analysis, Swope Oil and Chemical Company Site, Pennsauken, New Jersey.

Item	Description	Cost
B. Annual O&M (for groundwater monitoring on a quarterly basis for 5 years)		
Laboratory procurement; sample collection and project management:		$61,000
Groundwater Sample Analyses	VOC analyses: $450/sample * 120 samples	$54,000
	Semi-VOC analyses: $750/sample * 104 samples	$78,000
	Inorganic analyses: $200/sample * 26 samples	$5,200
Containerization and disposal of purged groundwater:		$36,000
Total:		$234,200
Present Worth (5 years)		$1,014,000
C. First-year O&M (for VES system only)		
Electricity	Blower and oxidizer	$112,000
Chemicals	Caustic for neutralization	$10,000
Soil Samples (2 Sampling Rounds)	6 soil borings, 50 feet deep, 2-ft interval sampling, 150 soil samples total (VOC, semi-volatile organic compound and PCB analysis)	$76,000 $110,000
Air sampling	12 air samples (VOC analysis) (one/month)	$10,000
Subtotal:		$318,000
Contingency (25%)		$79,000
Subtotal:		$397,500
Soil Remedial Action Alternative 2 Total Cost:		$2,099,000

APPENDIX C - ADMINISTRATIVE RECORD INDEX

DOCUMENT NUMBER INDEX

Document Number: SOP-001-0001 To 0239 Date: 07/01/88

Title: Operations Plan for the Supplemental Remedial Investigation/Feasibility Study at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey (Second Revision)

Type: PLAN
Author: Wolfert, Michael F.: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-0240 To 0427 Date: 07/01/88

Title: Addendum to the Operations Plan for the Swope Oil and Chemical Company Site, Pennsauken, New Jersey (Second Revision)

Type: PLAN
Author: Wolfert, Michael F.: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-0428 To 0519 Date: 09/01/87

Title: Design Sampling Work Plan

Type: PLAN
Author: none: none
Recipient: none: Swope Oil Company site

Document Number: SOP-001-0520 To 0589 Date: 09/01/87

Title: Work Plan for Supplemental Remedial Investigation/Feasibility Study at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey (Second Revision)

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-0590 To 0854 Date: 03/01/91

Title: Supplemental Remedial Investigation Conducted at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey, Volume I of V

Type: REPORT
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-0855 To 0905 Date: 03/01/91

Title: Supplemental Remedial Investigation Conducted at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey - Volume II of V

Type: REPORT
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-0906 To 1333 Date: 03/01/91

Title: Supplemental Remedial Investigation Conducted at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey - Volume III of V

Type: REPORT
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-1334 To 1713 Date: 03/01/91

Title: Supplemental Remedial Investigation Conducted at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey, Volume IV of V

Type: REPORT
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-1714 To 1932 Date: 03/01/91

Title: Supplemental Remedial Investigation Conducted at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey, Volume V of V

Type: REPORT
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-1933 To 1933 Date: 05/22/91

Title: (Letter approving the Supplemental Remedial Investigation (RI) Report for the Swope Oil and Chemical Company site and forwarding the Addendum Report)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Nicoloro, Robert: ENSR
Attached: SOP-001-1934

Document Number: SOP-001-1934 To 2014 Parent: SOP-001-1933 Date: 05/01/91

Title: Addendum to the Supplemental Remedial Investigation for the Swope Oil and Chemical Company Site

Type: REPORT
Author: none: US EPA
Recipient: none: none

Document Number:-SOP-001-2015 To 2015 Date: 03/13/91

Title: (Letter discussing the obtaining of an Industrial Pretreatment Permit to discharge treated groundwater from the Swope Oil site)

Type: CORRESPONDENCE
Author: Loperfido, Samuel M., Jr.: Camden County Municipal Utilities Authority
Recipient: Gowers, Joseph A.: US EPA

Document Number: SOP-001-2016 To 2017 Date: 02/27/91

Title: (Letter advising of the results of discussions with the Camden County Municipal Utilities Authority (CCMUA) and the Pennsauken Sewerage Authority (PSA) with regard to the acceptance of treated groundwater from the Swope Oil site)

Type: CORRESPONDENCE
Author: Vernick, Arnold S.: Geraghty & Miller
Recipient: Gowers, Joseph A.: US EPA

Document Number: SOP-001-2018 To 2019 Date: 07/06/90

Title: (Letter approving the Feasibility Study (FS) work plan for the Supplemental RI/FS)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Diks, Diane: DeSoto

Document Number: SOP-001-2020 To 2020 Date: 04/17/90

Title: (Letter forwarding the attached memorandum addressing comments provided in EPA's February 5, 1990, memo in connection with the inorganic data validation for the deep soil boring program)

Type: CORRESPONDENCE
Author: Newton, Douglas J.: Geraghty & Miller
Recipient: Gowers, Joseph A.: US EPA
Attached: SOP-001-2021

Document Number: SOP-001-2021 To 2038 Parent: SOP-001-2020 Date: 04/10/90

Title: (Memorandum) US EPA Comments on the Inorganic Data Validation of the Soil Samples Collected at the Swope Oil and Chemical Company Site, Pennsauken, New Jersey, During the Deep Soil Boring Program

Type: CORRESPONDENCE
Author: none: Geraghty & Miller
Recipient: none: US EPA

Document Number: SOP-001-2039 To 2039 Date: 04/17/90

Title: (Letter forwarding the attached memorandum addressing comments provided in EPA's December 20, 1989, letter in connection with the Organic Data Validation for the deep soil boring program)

Type: CORRESPONDENCE
Author: Newton, Douglas J.: Geraghty & Miller
Recipient: Jackson, Amelia: US EPA
Attached: SOP-001-2040

Document Number: SOP-001-2040 To 2052 Parent: SOP-001-2039 Date: 03/29/90

Title: (Memorandum) US EPA Comments Concerning Swope Oil and Chemical Company Site Organic Data Validation for Soil Samples Collected During the Deep Soil Boring Program

Type: CORRESPONDENCE
Author: none: Geraghty & Miller
Recipient: none: US EPA

Document Number: SOP-001-2053 To 2055 Date: 11/01/89

Title: (Letter approving an amendment to the Operations Plan for the Supplemental RI/FS, location of downgradient wells, and a time extension for the Draft RI Report submittal)

Type: CORRESPONDENCE
Author: Pavlou, George: US EPA
Recipient: Diks, Diane: DeSoto

Document Number: SOP-001-2056 To 2057 Date: 10/20/88

Title: (Letter following-up on a telephone conversation indicating that EPA is in agreement with the list of analyses to be performed on the soil samples that will be collected at the Swope Oil site)

Type: CORRESPONDENCE
Author: Newton, Douglas J.: Geraghty & Miller
Recipient: Dunkelman, Thomas: US EPA

Document Number: SOP-001-2058 To 2060 Date: 10/14/88

Title: (Letter approving several changes to the Operations Plan (OP) for the Supplemental RI/FS at the Swope Oil site and forwarding additional comments on the Addendum of the OP)

Type: CORRESPONDENCE
Author: Czapor, John V.: US EPA
Recipient: Diks, Diane: DeSoto

Document Number: SOP-001-2061 To 2063 Date: 09/19/88

Title: (Letter describing concerns about the proposed locations for Wells GM-2D, GM-5S, and GM-5D. Soil boring location map attached)

Type: CORRESPONDENCE
Author: Newton, Douglas J.: Geraghty & Miller
Recipient: Dunkelman, Thomas: US EPA

Document Number: SOP-001-2064 To 2064 Date: 08/30/88

Title: (Letter stating that EPA approves the Operations Plan for the Supplemental RI/FS at the Swope Oil and Chemical Company site, as well as the Addendum to the Operations Plan)

Type: CORRESPONDENCE
Author: Czapor, John V.: US EPA
Recipient: Diks, Diane: DeSoto

Document Number: SOP-001-2065 To 2065 Date: 01/13/88

Title: (Letter stating that EPA approves the Swope Oil and Chemical Company Work Plan for the Supplemental RI/FS and that deep soil borings must be performed as part of the RI/FS)

Type: CORRESPONDENCE
Author: Czapor, John V.: US EPA
Recipient: Walenski, K.A.: DeSoto

Document Number: SOP-001-2066 To 2067 Date: 01/05/88

Title: (Letter confirming a December 7, 1987, conversation discussing the implementation of a soil boring program at the Swope Oil site)

Type: CORRESPONDENCE
Author: Guarraia, Philip D.: US EPA
Recipient: Walanski, K.A.: DeSoto

Document Number: SOP-001-2068 To 2073 Date: 10/20/87

Title: (Letter stating that EPA approves ERT's Design Sampling Work Plan (September, 1987) for the Swope Oil and Chemical Company site provided that the attached modifications are complied with during the appropriate activities)

Type: CORRESPONDENCE
Author: Guarraia, Philip D.: US EPA
Recipient: Nicoloro, Robert: ERT

Document Number: SOP-001-2074 To 2087 Date: 06/01/90

Title: Feasibility Study Work Plan, Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: Swope Cleanup Committee

Document Number: SOP-001-2088 To 2249 Date: 05/01/91

Title: Supplemental Feasibility Study for the Swope Oil and Chemical Company Site; Pennsauken Township, Camden County, New Jersey, Volume I of IV

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-2250 To 2380 Date: 05/01/91

Title: Supplemental Feasibility Study for the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey, Volume II of IV

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-002-0001 To 0242 Date: 05/01/91

Title: Supplemental Feasibility Study for the Swope Oil and Chemical Company Site, P[illegible]uken Township, Camden County, New Jersey, Volume III of IV

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-002-0243 To 0479 Date: 05/01/91

Title: Risk Assessment for the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey, Volume IV of IV

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Document Number:-SOP-002-0480 To 0494 Date: 07/01/91

Title: Shallow Ground-Water Monitoring Plan of the Supplemental Feasibility Study for the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-002-0495 To 0528 Date: / /

Title: Addendum to the Supplemental Feasibility Study and Risk Assessment for the Swope Oil and Chemical Company Site

Type: PLAN
Author: none: US EPA
Recipient: none: none

Document Number: SOP-002-0529 To 0542 Date: 07/01/91

Title: Superfund Program Proposed Plan: Swope Oil and Chemical Company Site, Pennsauken Township, New Jersey

Type: PLAN
Author: none: none
Recipient: none: none

Document Number: SOP-002-0543 To 0543 Date: 07/15/91

Title: (Letter amending and approving the May 1991 Supplemental FS and Risk Assessment Reports for the Swope Oil and Chemical Company site)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Nicoloro, Robert: ENSR

Document Number: SOP-002-0544 To 0546 Date: 12/13/90

Title: (Letter submitting New Jersey State applicable or relevant and appropriate requirements (ARARs) which pertain to the Swope Oil and Chemical site located in Pennsauken Township, New Jersey)

Type: CORRESPONDENCE
Author: Curtis, Ian R.: NJ Dept of Environmental Protection
Recipient: Gowers, Joseph A.: US EPA

Document Number: SOP-002-0547 To 0547 Date: 11/15/90

Title: (Letter in which EPA requests that the New Jersey Department of Environmental Protection (NJDEP) provide all New Jersey state ARARs regarding the discharge of treated groundwater from the site to the Pennsauken Creek and the Delaware River)

Type: CORRESPONDENCE
Author: Gowers, Joseph A.: US EPA
Recipient: Curtis, Ian R.: NJ Dept of Environmental Protection

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Document Number: SOP-002-0548 To 0548 Date: 06/04/90

Title: (Letter requesting additional New Jersey state ARARs)

Type: CORRESPONDENCE
Author: Gowers, Joseph A.: US EPA
Recipient: Curtis, Ian R.: NJ Dept of Environmental Protection

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Document Number: SOP-002-0549 To 0549 Date: 02/26/90

Title: (Letter requesting information regarding state ARARs and concerns as they pertain to the Swope Oil and Chemical Company site)

Type: CORRESPONDENCE
Author: Gowers, Joseph A.: US EPA
Recipient: Curtis, Ian R.: NJ Dept of Environmental Protection

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Document Number: SOP-002-0550 To 0578 Date: 09/30/86

Title: Administrative Order on Consent, Index No. II CERCLA-60113, Swope Oil Superfund Site

Type: LEGAL DOCUMENT
Author: Daggett, Christopher J.: US EPA
Recipient: none: various parties associated with the site

Document Number: SOP-002-0579 To 0590 Date: 09/05/86

Title: (107(a) Notice Letter - mailing list attached)

Type: CORRESPONDENCE
Author: Marshall, James R.: US EPA
Recipient: none: various PRPs

Document Number: SOP-002-0591 To 0596 Date: 04/28/86

Title: (107(a) Notice Letter - mailing list attached)

Type: CORRESPONDENCE
Author: Librizzi, William J.: US EPA
Recipient: none: various PRPs

Document Number: SOP-002-0597 To 0607 Date: 04/18/86

Title: (107(a) Notice Letter - mailing list attached)

Type: CORRESPONDENCE
Author: Librizzi, William J.: US EPA
Recipient: none: various PRPs

Document Number: SOP-002-0608 To 0617 Date: 04/06/89

Title: Health Assessment for Swope Oil Company, Pennsauken, Camden County, New Jersey CERCLIS No. NJD041743220

Type: PLAN
Author: none: Agency for Toxic Substances & Disease Registry (ATSDR)
Recipient: none: none

AUTHOR INDEX

Document Number: SOP-001-0428 To 0519 Date: 09/01/87

Title: Design Sampling Work Plan

Type: PLAN
Author: none: none
Recipient: none: Swope Oil Company site

Document Number: SOP-002-0529 To 0542 Date: 07/01/91

Title: Superfund Program Proposed Plan: Swope Oil and Chemical Company Site, Pennsauken Township, New Jersey

Type: PLAN
Author: none: none
Recipient: none: none

Document Number: SOP-001-0520 To 0589 Date: 09/01/87

Title: Work Plan for Supplemental Remedial Investigation/Feasibility Study at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey (Second Revision)

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-0590 To 0854 Date: 03/01/91

Title: Supplemental Remedial Investigation Conducted at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey, Volume I of V

Type: REPORT
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-0855 To 0905 Date: 03/01/91

Title: Supplemental Remedial Investigation Conducted at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey - Volume II of V

Type: REPORT
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-0906 To 1333 Date: 03/01/91

Title: Supplemental Remedial Investigation Conducted at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey - Volume III of V

Type: REPORT
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-1334 To 1713 Date: 03/01/91

Title: Supplemental Remedial Investigation Conducted at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey, Volume IV of V

Type: REPORT
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-1714 To 1932 Date: 03/01/91

Title: Supplemental Remedial Investigation Conducted at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey, Volume V of V

Type: REPORT
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-1934 To 2014 Parent: SOP-001-1933 Date: 05/01/91

Title: Addendum to the Supplemental Remedial Investigation for the Swope Oil and Chemical Company Site

Type: REPORT
Author: none: US EPA
Recipient: none: none

Document Number: SOP-001-2021 To 2038 Parent: SOP-001-2020 Date: 04/10/90

Title: (Memorandum) US EPA Comments on the Inorganic Data Validation of the Soil Samples Collected at the Swope Oil and Chemical Company Site, Pennsauken, New Jersey, During the Deep Soil Boring Program

Type: CORRESPONDENCE
Author: none: Geraghty & Miller
Recipient: none: US EPA

Document Number: SOP-001-2040 To 2052 Parent: SOP-001-2039 Date: 03/29/90

Title: (Memorandum) US EPA Comments Concerning Swope Oil and Chemical Company Site Organic Data Validation for Soil Samples Collected During the Deep Soil Boring Program

Type: CORRESPONDENCE
Author: none: Geraghty & Miller
Recipient: none: US EPA

Document Number: SOP-001-2074 To 2087 Date: 06/01/90

Title: Feasibility Study Work Plan, Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: Swope Cleanup Committee

Document Number: SOP-001-2088 To 2249 Date: 05/01/91

Title: Supplemental Feasibility Study for the Swope Oil and Chemical Company Site; Pennsauken Township, Camden County, New Jersey, Volume I of IV

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-2250 To 2380 Date: 05/01/91

Title: Supplemental Feasibility Study for the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey, Volume II of IV

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-002-0001 To 0242 Date: 05/01/91

Title: Supplemental Feasibility Study for the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey, Volume III of IV

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-002-0243 To 0479 Date: 05/01/91

Title: Risk Assessment for the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey, Volume IV of IV

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-002-0480 To 0494 Date: 07/01/91

Title: Shallow Ground-Water Monitoring Plan of the Supplemental Feasibility Study for the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-002-0495 To 0528 Date: / /

Title: Addendum to the Supplemental Feasibility Study and Risk Assessment for the Swope Oil and Chemical Company Site

Type: PLAN
Author: none: US EPA
Recipient: none: none

Document Number: SOP-002-0608 To 0617 Date: 04/06/89

Title: Health Assessment for Swope Oil Company, Pennsauken, Camden County, New Jersey CERCLIS No. NJD041743220

Type: PLAN
Author: none: Agency for Toxic Substances & Disease Registry (ATSDR)
Recipient: none: none

Document Number: SOP-001-1933 To 1933 Date: 05/22/91

Title: (Letter approving the Supplemental Remedial Investigation (RI) Report for the Swope Oil and Chemical Company site and forwarding the Addendum Report)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Nicoloro, Robert: EMSR
Attached: SOP-001-1934

Document Number: SOP-001-2018 To 2019 Date: 07/06/90

Title: (Letter approving the Feasibility Study (FS) work plan for the Supplemental RI/FS)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Diks, Diane: DeSoto

Document Number: SOP-002-0543 To 0543 Date: 07/15/91

Title: (Letter amending and approving the May 1991 Supplemental FS and Risk Assessment Reports for the Swope Oil and Chemical Company site)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Nicoloro, Robert: ENSR

Document Number: SOP-002-0544 To 0546 Date: 12/13/90

Title: (Letter submitting New Jersey State applicable or relevant and appropriate requirements (ARARs) which pertain to the Swope Oil and Chemical site located in Pennsauken Township, New Jersey)

Type: CORRESPONDENCE
Author: Curtis, Ian R.: NJ Dept of Environmental Protection
Recipient: Gowers, Joseph A.: US EPA

Document Number: SOP-001-2058 To 2060 Date: 10/14/88

Title: (Letter approving several changes to the Operations Plan (OP) for the Supplemental RI/FS at the Swope Oil site and forwarding additional comments on the Addendum of the OP)

Type: CORRESPONDENCE
Author: Czapor, John V.: US EPA
Recipient: Diks, Diane: DeSoto

Document Number: SOP-001-2064 To 2064 Date: 08/30/88

Title: (Letter stating that EPA approves the Operations Plan for the Supplemental RI/FS at the Swope Oil and Chemical Company site, as well as the Addendum to the Operations Plan)

Type: CORRESPONDENCE
Author: Czapor, John V.: US EPA
Recipient: Diks, Diane: DeSoto

Document Number: SOP-001-2065 To 2065 Date: 01/13/88

Title: (Letter stating that EPA approves the Swope Oil and Chemical Company Work Plan for the Supplemental RI/FS and that deep soil borings must be performed as part of the RI/FS)

Type: CORRESPONDENCE
Author: Czapor, John V.: US EPA
Recipient: Walanski, K.A.: DeSoto

Document Number: SOP-002-0550 To 0578 Date: 09/30/86

Title: Administrative Order on Consent, Index No. II CERCLA-60113, Swope Oil Superfund Site

Type: LEGAL DOCUMENT
Author: Daggett, Christopher J.: US EPA
Recipient: none: various parties associated with the site

Document Number: SOP-002-0547 To 0547 Date: 11/15/90

Title: (Letter in which EPA requests that the New Jersey Department of Environmental Protection (NJDEP) provide all New Jersey state ARARs regarding the discharge of treated groundwater from the site to the Pennsauken Creek and the Delaware River)

Type: CORRESPONDENCE
Author: Gowers, Joseph A.: US EPA
Recipient: Curtis, Ian R.: NJ Dept of Environmental Protection

Document Number: SOP-002-0548 To 0548 Date: 06/04/90

Title: (Letter requesting additional New Jersey state ARARs)

Type: CORRESPONDENCE
Author: Gowers, Joseph A.: US EPA
Recipient: Curtis, Ian R.: NJ Dept of Environmental Protection

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Document Number: SOP-002-0549 To 0549 Date: 02/26/90

Title: (Letter requesting information regarding state ARARs and concerns as they pertain to the Swope Oil and Chemical Company site)

Type: CORRESPONDENCE
Author: Gowers, Joseph A.: US EPA
Recipient: Curtis, Ian R.: NJ Dept of Environmental Protection

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Document Number: SOP-001-2066 To 2067 Date: 01/05/88

Title: (Letter confirming a December 7, 1987, conversation discussing the implementation of a soil boring program at the Swope Oil site)

Type: CORRESPONDENCE
Author: Guarraia, Philip D.: US EPA
Recipient: Walanski, K.A.: DeSoto

Document Number: SOP-001-2068 To 2073 Date: 10/20/87

Title: (Letter stating that EPA approves ERT's Design Sampling Work Plan (September, 1987) for the Swope Oil and Chemical Company site provided that the attached modifications are complied with during the appropriate activities)

Type: CORRESPONDENCE
Author: Guarraia, Philip D.: US EPA
Recipient: Nicoloro, Robert: ERT

Document Number: SOP-002-0591 To 0596 Date: 04/28/86

Title: (107(a) Notice Letter - mailing list attached)

Type: CORRESPONDENCE
Author: Librizzi, William J.: US EPA
Recipient: none: various PRPs

Document Number: SOP-002-0597 To 0607 Date: 04/18/86

Title: (107(a) Notice Letter - mailing list attached)

Type: CORRESPONDENCE
Author: Librizzi, William J.: US EPA
Recipient: none: various PRPs

Document Number: SOP-001-2015 To 2015 Date: 03/13/91

Title: (Letter discussing the obtaining of an Industrial Pretreatment Permit to discharge treated groundwater from the Swope Oil site)

Type: CORRESPONDENCE
Author: Loperfido, Samuel M., Jr.: Camden County Municipal Utilities Authority
Recipient: Gowers, Joseph A.: US EPA

Document Number: SOP-002-0579 To 0590 Date: 09/05/86

Title: (107(a) Notice Letter - mailing list attached)

Type: CORRESPONDENCE
Author: Marshall, James R.: US EPA
Recipient: none: various PRPs

Document Number: SOP-001-2020 To 2020 Date: 04/17/90

Title: (Letter forwarding the attached memorandum addressing comments provided in EPA's February 5, 1990, memo in connection with the inorganic data validation for the deep soil boring program)

Type: CORRESPONDENCE
Author: Newton, Douglas J.: Geraghty & Miller
Recipient: Gowers, Joseph A.: US EPA
Attached: SOP-001-2021

Document Number: SOP-001-2039 To 2039 Date: 04/17/90

Title: (Letter forwarding the attached memorandum addressing comments provided in EPA's December 20, 1989, letter in connection with the Organic Data Validation for the deep soil boring program)

Type: CORRESPONDENCE
Author: Newton, Douglas J.: Geraghty & Miller
Recipient: Jackson, Amelia: US EPA
Attached: SOP-001-2040

Document Number: SOP-001-2056 To 2057 Date: 10/20/88

Title: (Letter following-up on a telephone conversation indicating that EPA is in agreement with the list of analyses to be performed on the soil samples that will be collected at the Swope Oil site)

Type: CORRESPONDENCE
Author: Newton, Douglas J.: Geraghty & Miller
Recipient: Dunkelman, Thomas: US EPA

Document Number: SOP-001-2061 To 2063 Date: 09/19/88

Title: (Letter describing concerns about the proposed locations for Wells GM-2D, GM-5S, and GM-5D. Soil boring location map attached)

Type: CORRESPONDENCE
Author: Newton, Douglas J.: Geraghty & Miller
Recipient: Dunkelman, Thomas: US EPA

Document Number: SOP-001-2053 To 2055 Date: 11/01/89

Title: (Letter approving an amendment to the Operations Plan for the Supplemental RI/FS, location of downgradient wells, and a time extension for the Draft RI Report submittal)

Type: CORRESPONDENCE
Author: Pavlou, George: US EPA
Recipient: Diks, Diane: DeSoto

Document Number: SOP-001-2016 To 2017 Date: 02/27/91

Title: (Letter advising of the results of discussions with the Camden County Municipal Utilities Authority (CCMUA) and the Pennsauken Sewerage Authority (PSA) with regard to the acceptance of treated groundwater from the Swope Oil site)

Type: CORRESPONDENCE
Author: Vernick, Arnold S.: Geraghty & Miller
Recipient: Gowers, Joseph A.: US EPA

Document Number: SOP-001-0001 To 0239 Date: 07/01/88

Title: Operations Plan for the Supplemental Remedial Investigation/Feasibility Study at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey (Second Revision)

Type: PLAN
Author: Wolfert, Michael F.: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-0240 To 0427 Date: 07/01/88

Title: Addendum to the Operations Plan for the Swope Oil and Chemical Company Site, Pennsauken, New Jersey (Second Revision)

Type: PLAN
Author: Wolfert, Michael F.: Geraghty & Miller
Recipient: none: none

CHRONOLOGICAL INDEX

Document Number: SOP-002-0495 To 0528 Date: / /

Title: Addendum to the Supplemental Feasibility Study and Risk Assessment for the Swope Oil and Chemical Company Site

Type: PLAN
Author: none: US EPA
Recipient: none: none

Document Number: SOP-002-0597 To 0607 Date: 04/18/86

Title: (107(a) Notice Letter - mailing list attached)

Type: CORRESPONDENCE
Author: Librizzi, William J.: US EPA
Recipient: none: various PRPs

Document Number: SOP-002-0591 To 0596 Date: 04/28/86

Title: (107(a) Notice Letter - mailing list attached)

Type: CORRESPONDENCE
Author: Librizzi, William J.: US EPA
Recipient: none: various PRPs

Document Number: SOP-002-0579 To 0590 Date: 09/05/86

Title: (107(a) Notice Letter - mailing list attached)

Type: CORRESPONDENCE
Author: Marshall, James R.: US EPA
Recipient: none: various PRPs

Document Number: SOP-002-0550 To 0578 Date: 09/30/86

Title: Administrative Order on Consent, Index No. II CERCLA-60113, Swope Oil Superfund Site

Type: LEGAL DOCUMENT
Author: Daggett, Christopher J.: US EPA
Recipient: none: various parties associated with the site

Document Number: SOP-001-0428 To 0519 Date: 09/01/87

Title: Design Sampling Work Plan

Type: PLAN
Author: none: none
Recipient: none: Swope Oil Company site

Document Number: SOP-001-0520 To 0589 Date: 09/01/87

Title: Work Plan for Supplemental Remedial Investigation/Feasibility Study at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey (Second Revision)

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-2068 To 2073 Date: 10/20/87

Title: (Letter stating that EPA approves ERT's Design Sampling Work Plan (September, 1987) for the Swope Oil and Chemical Company site provided that the attached modifications are complied with during the appropriate activities)

Type: CORRESPONDENCE
Author: Guarraia, Philip D.: US EPA
Recipient: Nicolc-o, Robert: ERT

Document Number:-SOP-001-2066 To 2067 Date: 01/05/88

Title: (Letter confirming a December 7, 1987, conversation discussing the implementation of a soil boring program at the Swope Oil site)

Type: CORRESPONDENCE
Author: Guarraia, Philip D.: US EPA
Recipient: Walanski, K.A.: DeSoto

Document Number: SOP-001-2065 To 2065 Date: 01/13/88

Title: (Letter stating that EPA approves the Swope Oil and Chemical Company Work Plan for the Supplemental RI/FS and that deep soil borings must be performed as part of the RI/FS)

Type: CORRESPONDENCE
Author: Czapor, John V.: US EPA
Recipient: Walanski, K.A.: DeSoto

Document Number: SOP-001-0001 To 0239 Date: 07/01/88

Title: Operations Plan for the Supplemental Remedial Investigation/Feasibility Study at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey (Second Revision)

Type: PLAN
Author: Wolfert, Michael F.: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-0240 To 0427 Date: 07/01/88

Title: Addendum to the Operations Plan for the Swope Oil and Chemical Company Site, Pennsauken, New Jersey (Second Revision)

Type: PLAN
Author: Wolfert, Michael F.: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-2064 To 2064 Date: 08/30/88

Title: (Letter stating that EPA approves the Operations Plan for the Supplemental RI/FS at the Swope Oil and Chemical Company site, as well as the Addendum to the Operations Plan)

Type: CORRESPONDENCE
Author: Czapor, John V.: US EPA
Recipient: Diks, Diane: DeSoto

Document Number: SOP-001-2061 To 2063 Date: 09/19/88

Title: (Letter describing concerns about the proposed locations for Wells GM-2D, GM-5S, and GM-5D. Soil boring location map attached)

Type: CORRESPONDENCE
Author: Newton, Douglas J.: Geraghty & Miller
Recipient: Dunkelman, Thomas: US EPA

Document Number: SOP-001-2058 To 2060 Date: 10/14/88

Title: (Letter approving several changes to the Operations Plan (OP) for the Supplemental RI/FS at the Swope Oil site and forwarding additional comments on the Addendum of the OP)

Type: CORRESPONDENCE
Author: Czapor, John V.: US EPA
Recipient: Diks, Diane: DeSoto

Document Number: SOP-001-2056 To 2057 Date: 10/20/88

Title: (Letter following-up on a telephone conversation indicating that EPA is in agreement with the list of analyses to be performed on the soil samples that will be collected at the Swope Oil site)

Type: CORRESPONDENCE
Author: Newton, Douglas J.: Geraghty & Miller
Recipient: Dunkelman, Thomas: US EPA

Document Number: SOP-002-0608 To 0617 Date: 04/06/89

Title: Health Assessment for Swope Oil Company, Pennsauken, Camden County, New Jersey CERCLIS No. NJD041743220

Type: PLAN
Author: none: Agency for Toxic Substances & Disease Registry (ATSDR)
Recipient: none: none

Document Number: SOP-001-2053 To 2055 Date: 11/01/89

Title: (Letter approving an amendment to the Operations Plan for the Supplemental RI/FS, location of downgradient wells, and a time extension for the Draft RI Report submittal)

Type: CORRESPONDENCE
Author: Pavlou, George: US EPA
Recipient: Diks, Diane: DeSoto

Document Number: SOP-002-0549 To 0549 Date: 02/26/90

Title: (Letter requesting information regarding state ARARs and concerns as they pertain to the Swope Oil and Chemical Company site)

Type: CORRESPONDENCE
Author: Gowers, Joseph A.: US EPA
Recipient: Curtis, Ian R.: NJ Dept of Environmental Protection

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Document Number: SOP-001-2040 To 2052 Parent: SOP-001-2039 Date: 03/29/90

Title: (Memorandum) US EPA Comments Concerning Swope Oil and Chemical Company Site Organic Data Validation for Soil Samples Collected During the Deep Soil Boring Program

Type: CORRESPONDENCE
Author: none: Geraghty & Miller
Recipient: none: US EPA

Document Number: SOP-001-2021 To 2038 Parent: SOP-001-2020 Date: 04/10/90

Title: (Memorandum) US EPA Comments on the Inorganic Data Validation of the Soil Samples Collected at the Swope Oil and Chemical Company Site, Pennsauken, New Jersey, During the Deep Soil Boring Program

Type: CORRESPONDENCE
Author: none: Geraghty & Miller
Recipient: none: US EPA

Document Number: SOP-001-2020 To 2020 Date: 04/17/90

(Letter forwarding the attached memorandum addressing comments provided in EPA's February 5, 1990, memo in connection with the inorganic data validation for the deep soil boring program)

Type: CORRESPONDENCE
Author: Newton, Douglas J.: Geraghty & Miller
Recipient: Gowers, Joseph A.: US EPA
Attached: SOP-001-2021

Document Number: SOP-001-2039 To 2039 Date: 04/17/90

Title: (Letter forwarding the attached memorandum addressing comments provided in EPA's December 20, 1989, letter in connection with the Organic Data Validation for the deep soil boring program)

Type: CORRESPONDENCE
Author: Newton, Douglas J.: Geraghty & Miller
Recipient: Jackson, Amelia: US EPA
Attached: SOP-001-2040

Document Number: SOP-001-2074 To 2087 Date: 06/01/90

Title: Feasibility Study Work Plan, Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: Swope Cleanup Committee

Document Number: SOP-002-0548 To 0548 Date: 06/04/90

Title: (Letter requesting additional New Jersey state ARARs)

Type: CORRESPONDENCE
Author: Gowers, Joseph A.: US EPA
Recipient: Curtis, Ian R.: NJ Dept of Environmental Protection

Document Number: SOP-001-2018 To 2019 Date: 07/06/90

Title: (Letter approving the Feasibility Study (FS) work plan for the Supplemental RI/FS)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Diks, Diane: DeSoto

Document Number: SOP-002-0547 To 0547 Date: 11/15/90

Title: (Letter in which EPA requests that the New Jersey Department of Environmental Protection (NJDEP) provide all New Jersey state ARARs regarding the discharge of treated groundwater from the site to the Pennsauken Creek and the Delaware River)

Type: CORRESPONDENCE
Author: Gowers, Joseph A.: US EPA
Recipient: Curtis, Ian R.: NJ Dept of Environmental Protection

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Document Number: SOP-002-0544 To 0546 Date: 12/13/90

(Letter submitting New Jersey State applicable or relevant and appropriate requirements (ARARs) which pertain to the Swope Oil and Chemical site located in Pennsauken Township, New Jersey)

Type: CORRESPONDENCE
Author: Curtis, Ian R.: NJ Dept of Environmental Protection
Recipient: Gowers, Joseph A.: US EPA

Document Number: SOP-001-2016 To 2017 Date: 02/27/91

Title: (Letter advising of the results of discussions with the Camden County Municipal Utilities Authority (CCMUA) and the Pennsauken Sewerage Authority (PSA) with regard to the acceptance of treated groundwater from the Swope Oil site)

Type: CORRESPONDENCE
Author: Vernick, Arnold S.: Geraghty & Miller
Recipient: Gowers, Joseph A.: US EPA

Document Number: SOP-001-0590 To 0854 Date: 03/01/91

Title: Supplemental Remedial Investigation Conducted at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey, Volume I of V

Type: REPORT
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-0855 To 0905 Date: 03/01/91

Title: Supplemental Remedial Investigation Conducted at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey - Volume II of V

Type: REPORT
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-0906 To 1333 Date: 03/01/91

Title: Supplemental Remedial Investigation Conducted at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey - Volume III of V

Type: REPORT
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-1334 To 1713 Date: 03/01/91

Title: Supplemental Remedial Investigation Conducted at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey, Volume IV of V

Type: REPORT
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-1714 To 1932 Date: 03/01/91

Title: Supplemental Remedial Investigation Conducted at the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey, Volume V of V

Type: REPORT
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-2015 To 2015 Date: 03/13/91

Title: (Letter discussing the obtaining of an Industrial Pretreatment Permit to discharge treated groundwater from the Swope Oil site)

Type: CORRESPONDENCE
Author: Loperfido, Samuel M., Jr.: Camden County Municipal Utilities Authority
Recipient: Gowers, Joseph A.: US EPA

Document Number: SOP-001-1934 To 2014 Parent: SOP-001-1933 Date: 05/01/91

Title: Addendum to the Supplemental Remedial Investigation for the Swope Oil and Chemical Company Site

Type: REPORT
Author: none: US EPA
Recipient: none: none

Document Number: SOP-001-2088 To 2249 Date: 05/01/91

Title: Supplemental Feasibility Study for the Swope Oil and Chemical Company Site; Pennsauken Township, Camden County, New Jersey, Volume I of IV

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-2250 To 2380 Date: 05/01/91

Title: Supplemental Feasibility Study for the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey, Volume II of IV

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-002-0001 To 0242 Date: 05/01/91

Title: Supplemental Feasibility Study for the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey, Volume III of IV

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-002-0243 To 0479 Date: 05/01/91

Title: Risk Assessment for the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey, Volume IV of IV

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-001-1933 To 1933 Date: 05/22/91

Title: (Letter approving the Supplemental Remedial Investigation (RI) Report for the Swope Oil and Chemical Company site and forwarding the Addendum Report)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Nicoloro, Robert: ENSR
Attached: SOP-001-1934

Document Number: SOP-002-0529 To 0542 Date: 07/01/91

Title: Superfund Program Proposed Plan: Swope Oil and Chemical Company Site, Pennsauken Township, New Jersey

Type: PLAN
Author: none: none
Recipient: none: none

Document Number: SOP-002-0480 To 0494 Date: 07/01/91

Title: Shallow Ground-Water Monitoring Plan of the Supplemental Feasibility Study for the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey

Type: PLAN
Author: none: Geraghty & Miller
Recipient: none: none

Document Number: SOP-002-0543 To 0543 Date: 07/15/91

Title: (Letter amending and approving the May 1991 Supplemental FS and Risk Assessment Reports for the Swope Oil and Chemical Company site)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Nicoloro, Robert: ENSR

APPENDIX D - NJDEPE LETTER OF CONCURRENCE

State of New Jersey
Department of Environmental Protection and Energy
Office of the Commissioner
CN 402
Trenton, NJ 08625-0402
Tel. # 609-292-2885
Fax. # 609-984-3952

Scott A. Weiner
Commissioner

October 2, 1991

Mr. Constantine Sidamon-Eristoff
Regional Administrator
USEPA Region II
26 Federal Plaza
New York, NY 10278

Dear Mr. Sidamon-Eristoff:

Re: Record of Decision, Swope Oil, Pennsauken Township
Camden County, New Jersey

This is to formally notify the United States Environmental Protection Agency that the New Jersey Department of Environmental Protection and Energy has evaluated the selected plan for the remedial action at the Swope Oil Superfund Site and concurs with the remedy as stated in the final Record of Decision.

This Record of Decision is for the volatile and semi-volatile organic contaminated subsurface soils. It is understood that after the initiation of this remedial action, it will be determined whether ground water remediation will be necessary.

The components of the Record of Decision include:

* Vapor extraction system;
* Enhanced bioremediation;
* Quarterly ground water monitoring.

New Jersey fully appreciates the importance of the Record of Decision in the cleanup process and will continue to take all reasonable steps to ensure that the State's commitments in this area are met.

Sincerely,

Scott A. Weiner
Commissioner

SAW:PH/kj

APPENDIX A
Proposed Plan and Public Comments

ATTACHMENT A.1
Proposed Plan for the Swope Oil and Chemical Company Site

SWOPE OIL AND CHEMICAL COMPANY SITE
PENNSAUKEN TOWNSHIP, NEW JERSEY

EPA
Region 2

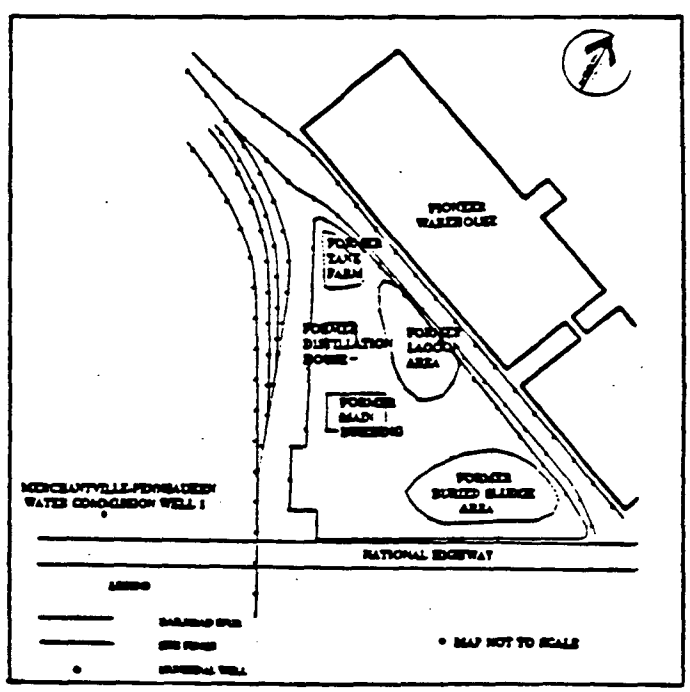
July 1991

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan describes the preferred alternative for remediation of contaminated subsurface soils at the Swope Oil and Chemical Company Superfund site (Swope site) in Pennsauken Township, Camden County, New Jersey. This document is issued by the U.S. Environmental Protection Agency (EPA), the lead agency for site activities, and the New Jersey Department of Environmental Protection (NJDEP), the support agency for this response action. EPA, in consultation with NJDEP, will select the remedy for the subsurface soils at the site, only after the public comment period has ended and information submitted during this time has been reviewed and considered.

THE COMMUNITY'S ROLE IN THE SELECTION PROCESS

EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986. This Proposed Plan summarizes information that can be found in greater detail in the Supplemental Remedial Investigation (RI) report, the Supplemental Remedial Investigation Addendum, the Supplemental



SITE MAP FOR THE SWOPE OIL AND CHEMICAL COMPANY SUPERFUND SITE

Feasibility Study (FS), the Risk Assessment, the Addendum to the Supplemental FS and Risk Assessment and other documents contained in the administrative record file for this site. EPA and NJDEP encourage the public to review these documents in order to gain a more comprehensive understanding of the site and the related Superfund activities conducted to date. These documents are available to the public in repositories at the following locations:

Pennsauken Township Library
5605 North Cresent Boulevard
Pennsauken, New Jersey 08110
(609) 665-5959

Hours: M,W,Thurs. 9:30am-9:00pm
T,F 9:30am-6:00pm
Sat. 10:00am-1:00pm

and

Clerk's Office
Pennsauken Municipal Building
5605 North Cresent Blvd.
Pennsauken, NJ 08110
(609) 665-1000

Hours: M-F 8:30am-4:30pm

EPA, in consultation with NJDEP, may modify the preferred alternative presented in this Proposed Plan and the Supplemental Feasibility Study based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified in this document.

DATES TO REMEMBER

July 18, 1991 - August 17, 1991
Public comment period for contaminated subsurface soil preferred remedy.

Thursday August 1, 1991
7:00pm - 9:00pm
Public Meeting at:

Pennsauken Municipal Building
5605 North Cresent Boulevard
Pennsauken, New Jersey 08110

EPA solicits input from the community on the cleanup methods proposed for each Superfund response action. EPA has set a public comment period from July 18, 1991 through August 17, 1991, to encourage public participation in the selection of a remedy for the Swope site. The comment period includes a public meeting at which EPA will discuss the Supplemental RI, Supplemental RI Addendum, Supplemental FS, Risk Assessment, the Addendum to the Supplemental FS and Risk Assessment and Proposed Plan, answer questions, and accept both oral and written comments.

The public meeting for the Swope site is scheduled for August 1, 1991, from 7:00pm to 9:00pm, and will be held at the Pennsauken Township Municipal Building, 5605 North Cresent Boulevard, Pennsauken, New Jersey 08110.

Comments will be summarized and responses provided in the Responsiveness Summary section of the Record of Decision. The Record of Decision will be the document that presents EPA's final selection for the subsurface soil cleanup. To send written comments or obtain further information, contact:

Joseph Gowers
Project Manager
U.S. Environmental Protection Agency
Emergency & Remedial
Response Division
26 Federal Plaza, Room 720
New York, New York 10278

All comments must be postmarked on or before August 17, 1991 for inclusion in the Record of Decision Responsiveness Summary.

SITE BACKGROUND

The site, approximately two acres in size, is located in an industrial complex in northern Pennsauken Township, Camden County, New Jersey. The triangular site is bounded on the southeast by National Highway, and on the north and southwest by railroad rights-of-way and warehouses (refer to site location map). The Pennsauken Creek and the Delaware River are located 0.8 miles northeast and 1.2 miles northwest of the site, respectively. Two municipal water supply wells operated by the Merchantville-Pennsauken Water Commission, MPWC Well 1 and MPWC Well 2, are located approximately 275 feet southwest and 1500 feet northeast of the site. Pennsauken High School is located approximately 0.5 miles northeast of the site. The nearest residential areas are in the Townships of Delair and Morrisville, which are located about 0.5 miles west and 0.8 miles southwest of the site, respectively.

From 1965 to 1979, the Swope Oil and Chemical Company operated a chemical reclamation facility that included buying, selling and processing solvents, oils, plasticizers, hydraulic fluids and other chemicals. In 1975, inspectors from NJDEP cited the Swope Oil and Chemical Company for operating without proper permits. The Swope Oil and Chemical Company was cited again in 1979 for failure to prepare, maintain, or fully implement a Spill Prevention, Control and Countermeasures Plan. The company ceased operation in December 1979.

During operation of the facility, waste liquids and sludges were discharged to an excavated, unlined lagoon. Contaminated material was also contained within a diked tank farm and an exposed drum storage area. When the facility ceased operating, significant site features included a main building, a distilling house, a diked tank farm, an open drum storage area, and an unlined lagoon.

A Focused Feasibility Study was completed by EPA in February 1984. On May 14, 1984, EPA entered into an

Administrative Order on Consent with a group of the Potentially Responsible Parties (PRPs) for the performance of the remedial activities recommended in the Focused Feasibility Study. Pursuant to this order, drummed waste and 3,000 tons of lagoon sludge were removed from the site. In addition, a fence was constructed around the site to restrict access and to prevent the public from coming into direct contact with the contaminants.

In May 1984, MPWC Well 1 was shut down due to the detection of volatile organic compounds in the well. Since area-wide groundwater contamination occurs in the vicinity of MPWC Well 1, the well was equipped with an air stripper to remove these compounds from groundwater, and returned to the water supply system in January 1989. It is believed that the Swope site, as well as a number of unidentified sources, may be contributing to the contamination of this well.

In June 1985, EPA concluded the first Remedial Investigation and Feasibility Study (RI/FS). Based upon the findings of the RI/FS, a Record of Decision, addressing surface contamination, was signed by EPA on September 27, 1985.

In August and September 1986, EPA entered into Administrative Orders on Consent with a group of PRPs to perform the Remedial Action specified in the Record of Decision and to conduct a Supplemental RI/FS.

The Remedial Action addressing surficial contamination was initiated by the PRPs in the fall of 1988 and was essentially completed by August 1989. This program included the demolition and disposal of on-site buildings, the off-site disposal of tanks with off-site disposal or incineration of tank contents, the excavation and off-site disposal of up to 1.5 feet of soils contaminated with PCBs, and the off-site disposal of visibly contaminated materials from the buried sludge area of the site. Subsequent to excavation, clean backfill material was utilized to bring the site up to grade. The construction of a cap at the site, which was an activity specified by the September 1985 Record of Decision, was postponed to provide for the installation of monitoring wells and the performance of treatability studies during the Supplemental RI/FS.

SUMMARY OF THE SUPPLEMENTAL REMEDIAL INVESTIGATION AND ADDENDUM

The Supplemental RI for the Swope Oil and Chemical Company site was conducted from October 1988 to March 1991. The original objectives of the Supplemental RI/FS were to evaluate the extent of groundwater contamination at the site and to develop appropriate remedial alternatives. Based upon information obtained during the design phase of the surface remedy, EPA decided to expand the scope of the Supplemental RI to include the determination of the nature and extent of subsurface soil contamination at the site.

The following tasks were performed during the RI:

- pre-existing geological, geophysical, hydrological and chemical information was reviewed and evaluated;

- ten deep soil borings were drilled to define the site geology further and to sample soils for determination of the types and concentrations of contaminants existing in soils above the water table;

- fourteen additional monitoring wells were installed to define the site hydrogeology further and to determine the nature and extent of groundwater contamination. A total of eighteen monitoring wells and public supply well MPWC Well 1 were sampled during this investigation; and

- an aquifer test was conducted at the site to determine the direction of groundwater flow and the hydraulic relationship between the shallow and deep aquifers underlying the site.

The findings of the RI are as follows:

- Two aquifers were identified beneath the site. The first is a water table aquifer which begins at approximately 80 feet below land surface and extends down to approximately 135 feet below land surface. The second aquifer extends from approximately 170 feet to 240 feet below land surface. A-35 foot semi-confining layer composed primarily of silt and clay with interbedded layers of fine-grained sand separates the two aquifers.

- The direction of groundwater flow in both the shallow and deep aquifers is to the southwest. Deep aquifer groundwater in the vicinity of the site flows toward public supply well, MPWC Well 1, when this well is in operation.

- The highest levels of groundwater contamination in the shallow aquifer exist beneath and downgradient of the site, indicating that the site has contributed to the contamination of this aquifer. Contaminants present in the shallow aquifer consist primarily of volatile organic compounds. RI data further indicate that contaminated groundwater flows beneath the Swope site in the shallow aquifer from an upgradient source(s) and that the site's contaminant plume is part of a larger regional groundwater plume.

- Similar to the shallow aquifer, the highest levels of groundwater contamination in the deep aquifer generally exist beneath and downgradient of the Swope site. Contaminants present in the deep aquifer consist primarily of volatile organic compounds, many of which were also detected in the shallow aquifer. This suggests that the Swope site may be contributing to the contamination of deep aquifer groundwater. RI groundwater sampling results further indicate that contaminated groundwater

flows beneath the Swope site in the deep aquifer from an upgradient source(s) and that the site may, therefore, be contributing contaminants to a larger regional groundwater plume in the deep aquifer.

- Subsurface soil samples indicate the presence of volatile and semi-volatile organic compounds. The highest concentrations of these contaminants were detected in samples collected in the vicinity of the former Tank Farm Area, Lagoon Area and Buried Sludge Area. Significant levels of volatile and semi-volatile organic compounds were detected in subsurface soils to a depth of about 50 feet below land surface. Many of the volatile organic compounds detected in these soils are also present in groundwater beneath the Swope site. Accordingly, these soils represent a continuing and significant source of the contamination of groundwater.

SCOPE OF THIS OPERABLE UNIT

Based on the groundwater results of the 1985 RI, EPA concluded that investigation of the nature and extent of deep aquifer and off-site groundwater contamination was essential to address this medium appropriately. As a result, EPA decided to address contamination at the site in discrete phases, referred to as operable units, so that a remedy for surficial contamination could proceed, while additional groundwater investigations were being performed.

EPA designated surficial contamination as the first operable unit of site remediation. EPA's preferred alternative for the second operable unit, which is the subject of this document, focuses on the remediation of contaminated subsurface soils, which are a continuing source of groundwater contamination. EPA believes that remediation of the source material will result in a significant reduction of the groundwater contamination. As a result, EPA has decided to postpone a decision regarding groundwater remediation, until source control measures have been implemented. Groundwater monitoring will be required during and after the design and implementation phases of the selected source control alternative, in order to determine the effectiveness of these measures in mitigating groundwater contamination and whether future groundwater remediation would be required.

SUMMARY OF SITE RISKS

A baseline quantitative Risk Assessment was conducted to determine the risks presented by the presence of hazardous substances in groundwater which are attributable to the site. The Risk Assessment focussed on the identification of contaminants of potential concern and possible exposure pathways at the site.

The following exposure routes were assessed: 1) dermal contact with

contaminants in shallow aquifer groundwater; 2) drinking of groundwater from the shallow aquifer at the site; and 3) inhalation of contaminants volatilizing from groundwater during showering. Exposures for potential future workers at the site and for residents have been considered in this assessment. These exposure routes were assessed as hypothetical future pathways, since current pathways for exposure to shallow aquifer groundwater are not believed to exist. These analyses indicate that the greatest potential future human health risk presented by the site is from the drinking of contaminated groundwater.

Human health risks from the drinking of contaminated groundwater were calculated to have a Hazard Index of 3.8. A Hazard Index greater than 1 is considered to exceed the maximum recommended exposure. The cancer risk associated with residents drinking contaminated groundwater is 4.2×10^{-3} (4.2 in a thousand), which exceeds EPA's acceptable risk range of 10^{-6} - 10^{-4} (one in a million to one in ten thousand). It should be noted that although there are presently no users of shallow aquifer groundwater in the vicinity of the site, some groundwater does migrate from the shallow aquifer into the deep aquifer, which is currently utilized as a potable water source.

Risks associated with dermal contact and ingestion of site soils have not been quantified in this assessment. It should be noted, however, that as part of the remedial action conducted at the site from the Fall of 1988 to August 1989, up to 1.5 feet of contaminated soils were removed from most of the site. In addition, visibly contaminated material was removed to a depth of 10 feet. Subsequently, clean backfill material was utilized to bring the site up to grade. Potential risks associated with the possibility of ingestion of, or dermal contact with contaminated soils, therefore, are considered to be minimal.

SUMMARY OF ALTERNATIVES

The Superfund legislation requires each selected site remedy to be protective of human health and the environment, cost-effective, and in accord with statutory requirements. Permanent solutions to contamination problems are to be achieved wherever possible. The use of innovative technologies and on-site treatment are evaluated as a means to attain this goal.

During the FS process, a wide range of treatment technologies were identified and screened for use in applicable remedial alternatives. As described below, many of these technologies and alternatives were eliminated from further consideration due to physical conditions or other limitations at the site.

Ex-situ treatment options, which involve the excavation of contaminated soil prior to treatment, were screened out due to the difficulties involved in excavating contaminated site soils to a depth of approximately 50 feet within

the spatial confines of the site. As displayed on the site map, the site is bounded to the northeast and southwest by railroad rights-of-way and warehouses, and to the northwest by National Highway. Excavation of contaminated site soils would, at a minimum, involve the disruption of an active railroad spur as well as National Highway. In addition, the excavation of contaminated site soils would require shoring the sides of the excavation to maintain the integrity of the excavation walls during removal of soils. The shoring of the excavation walls to a depth of 50 feet would prove difficult and would require the excavation of soils outside the physical boundaries of the site.

In-situ or in-place treatment options evaluated in the FS include: vitrification/glassification, solidification/fixation, soil flushing, soil vapor extraction, enhanced volatilization and bioremediation. Vitrification/glassification was screened out, since this technology is not implementable to the depth of contamination at the site. Solidification/fixation techniques have not been proven to be effective in reducing the mobility of organic compounds and, therefore, were eliminated from further consideration. Soil flushing would involve washing organic contaminants from subsurface soils. This technology was eliminated because the contaminants would ultimately be transferred to the groundwater. Enhanced volatilization techniques were eliminated from consideration, due to the high cost associated with heating the soils to the temperature required to volatilize the organic contaminants, and since this technology has not been shown to be readily implementable to the depth of contamination at the site. In all, two treatment options, in-situ vapor extraction and bioremediation, were determined to be viable for remediation of contaminated site soils.

Institutional actions, such as site fencing and access restrictions, and containment options, such as capping, were also evaluated. Institutional actions were screened out, since they would not meet the remedial action objective of eliminating on-site subsurface soils as a source of contamination to groundwater. Of the capping alternatives evaluated in the FS, a multi-layer cap originally was determined to be the most reliable and, therefore, was retained for incorporation into applicable remedial alternatives.

The technologies that were not eliminated from consideration during the screening were assembled into remedial alternatives. The following provides a description of the remedial alternatives that were evaluated for the Swope site.

ALTERNATIVE 1 - NO ACTION

Capital Cost: 0

Annual Operation and Maintenance Costs: $222,000

Present Worth: $961,000

Months to Achieve Remedial Action Objectives: Not Applicable*

* Groundwater quality would be monitored quarterly for five years under this alternative.

Superfund regulations require that a No Action alternative be evaluated at every site to provide a baseline against which other remedial alternatives may be compared. Under this alternative, no action would be taken at the site to prevent or reduce the leaching of subsurface soil contaminants to groundwater. This alternative includes a five-year groundwater monitoring plan, which would involve the sampling of existing site wells on a quarterly basis, to assess the impact of the contaminated soils on groundwater quality.

ALTERNATIVE 2 - SOIL VAPOR EXTRACTION AND BIODEGRADATION

Capital Cost: $687,400

Annual Operation and Maintenance Costs: $222,000
(Groundwater Monitoring Program)

First-Year Operation and Maintenance Costs: $397,500
(Vapor Extraction System)

Present Worth: $2,046,100

Months to Achieve Remedial Action Objectives: 18*

* Groundwater quality would be monitored quarterly for five years under this alternative.

Under this alternative, a network of vapor extraction and passive air injection wells would be installed within contaminated subsurface soils at the site. The extraction wells would be connected to a blower(s) in order to create a vacuum within the subsurface soils. This vacuum would draw air from the site surface and the passive air injection wells through the contaminated subsurface soils, stripping volatile organic compounds from the subsurface environment. The air stream would then be passed through a catalytic oxidizer prior to discharge in order to regulate contaminant emissions. On-site storage and off-site treatment and/or disposal of drill cuttings generated during installation of vapor extraction wells will be conducted in accordance with the requirements of the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1986.

Additionally, operation of a vapor extraction system (VES) would add oxygen to the subsurface soils, thereby enhancing the natural aerobic biodegradation of non-halogenated organic contaminants. This process would prove effective in reducing the levels of semi-volatile organic compounds in subsurface soils. The inoculation of subsurface soils with appropriate microorganisms as well as the injection of nutrients into the subsurface would be considered during design of the VES, to determine if biodegradation of subsurface soil

contaminants could be enhanced.

Subsurface soil, soil gas and groundwater samples would be collected as part of this alternative to determine the effectiveness of the VES in remediating subsurface soil contamination. A quarterly groundwater monitoring program would be implemented to provide groundwater quality data for the above determination. Subsurface soil samples would be collected prior to operation of the VES to provide a baseline for determination of the effectiveness of the VES in remediating subsurface contamination. Contaminant concentrations in the soil gas samples, collected during operation of the VES, would indicate when soil samples should be collected to determine whether soil cleanup goals have been met. If cleanup levels have not been met, and the VES continues to remove significant quantities of contaminants, then operation of the VES would continue.

Decision to Postpone Installation of a Cap

Alternative 2, as developed and evaluated in the Supplemental FS, originally included the installation of a multi-layer cap over the site, following treatment of contaminated subsurface soils. A cap was originally included as a component of this alternative, since the installation of a cap was a source control activity specified in the September 1985 Record of Decision. It should be noted, however, that extensive treatment of subsurface contamination was not envisioned when the 1985 remedy was selected. During preparation of this Proposed Plan, EPA reevaluated the need to cap the site in conjunction with the active treatment of subsurface contamination. EPA has determined that treatment of subsurface soil contamination alone may be adequate to protect the groundwater from continuing degradation. As a result, EPA has decided to postpone a decision regarding a cap, until after implementation of the selected source control remedy. If it is later determined that a cap is not required, this approach would have the potential benefit of minimal institutional controls and would allow for a greater degree of unrestricted future site use. Subsequent to completion of the selected remedy, EPA will evaluate the effectiveness of this remedy in providing for groundwater protection and determine whether the installation of a cap or further source control actions are warranted.

Rationale for Selection

Each of the alternatives was evaluated against nine criteria utilized by EPA in the remedy selection process. These criteria fall into four categories: environmental/public health protectiveness, compliance with cleanup standards, technical performance, and cost. In addition, the selected remedy should result in permanent solutions to contamination problems and should use treatment to the maximum extent practicable. The nine criteria are

summarized below:

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

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

- Long-term effectiveness 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.

- Reduction of toxicity, mobility or volume through treatment is the anticipated performance of the remedy in terms of reducing the toxicity, mobility, or volume of the contaminants of concern in the environment.

- Short-term effectiveness addresses the period of time needed to achieve protection, and any adverse impacts on human health or the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

- Implementability refers to the technical and administrative feasibility of implementing a remedy, including the availability of materials and services required to implement a particular option.

- Cost includes estimated capital and operation and maintenance costs of the remedy, and the net present worth cost. A summary of the estimated costs for the remedial alternatives considered is presented in Table 1.

- State Acceptance indicates whether, based on its review of the RI and FS and the Proposed Plan, the State concurs with the preferred alternative. The State has concurred with the preferred remedy presented in this Proposed Plan.

- Community Acceptance will be assessed in the ROD following a review of the public comments received on the RI, RI Addendum, and FS reports and the Proposed Plan.

EPA, in consultation with NJDEP, is required to select the remedial alternative which provides the best balance among the nine criteria. However, the selected alternative must satisfy the first two criteria: protection of human health and the environment, and compliance with ARARs, unless a waiver is granted. The manner in which the alternatives address the criteria is presented below. Community comments and acceptance are being solicited at this time.

ALTERNATIVE 1 - NO ACTION

The No Action Alternative would offer no reduction in the toxicity, mobility or volume of contaminants in the subsurface soils. Since these soils would continue to serve as a source of groundwater contamination, this alternative would not protect human health and the environment or prove to be effective in the long term. This alternative presents little risk to on-site workers, since no construction activities would be implemented. However, this alternative would not reduce any of the existing site risks. Implementation of this alternative would be easy since it only involves the collection of groundwater samples.

ALTERNATIVE 2 - SOIL VAPOR EXTRACTION AND BIODEGRADATION

The remediation of contaminated subsurface soils through in-situ vapor extraction and biodegradation would protect human health and the environment by reducing potential risks to future users of groundwater. The toxicity, mobility and volume of subsurface soil contaminants would be reduced through in-situ vapor extraction. This alternative would employ only proven technologies and would be easily implemented at the site. Aerobic biodegradation of contaminants would occur during and after the operation of the vapor extraction system.

Since no Federal or State regulations specify cleanup levels for soils, New Jersey State Soil Action Levels will be utilized as soil cleanup goals to provide for groundwater protection. Operation of the soil treatment system would continue until the cleanup goals have been attained or until continued operation of the system proves technically impractical. An ARARs waiver would not be required if cleanup goals were not achieved, since New Jersey State Soil Action Levels are not promulgated ARARs.

In-situ soil vapor extraction would be conducted in compliance with State and Federal ARARs. In addition, due to the site's proximity to the Delaware River, implementation of this alternative would be consistent with the Coastal Zone Management Act. Off-site treatment and/or disposal of drill cuttings generated during installation of vapor extraction wells would be conducted in accordance with the requirements of RCRA, as amended by the Hazardous and Solid Waste Amendments of 1986.

This alternative would permanently reduce the migration of contaminants to groundwater and, therefore, would prove effective over the long term. In the short term, actions would be taken to reduce potential risks to on-site workers. These measures may include requirements for protective clothing and respiratory protection. Air emissions control equipment would be installed at the VES extraction wells to protect the community.

SUMMARY OF THE PREFERRED ALTERNATIVE

After careful consideration of all reasonable alternatives, EPA proposes utilizing Alternative 2 - Soil Vapor Extraction and Biodegradation for the remediation of contaminated subsurface soils at the Swope Oil and Chemical Company site. The preferred alternative provides the best balance among the alternatives with respect to the criteria used to evaluate remedies. Based upon the information available at this time, EPA believes that the preferred alternative would be protective, attain ARARs, be cost-effective, and would use permanent treatment technologies to the maximum extent practicable. Subsequent to implementation of this remedy, EPA will determine whether this remedial action provides for adequate protection of groundwater and whether any further source control measures, such as capping, or if groundwater remedial measures are necessary.

TABLE 1

SUMMARY OF REMEDIAL ALTERNATIVES

REMEDIAL ALTERNATIVE	PRESENT WORTH COST ($1,000)	TIME TO ACHIEVE REMEDIAL ACTION (MONTHS)*	COMMENTS
1: No Action	961	NA	Inadequate to protect human health and the environment.
2: Soil Vapor Extraction, and Biodegradation	2,046	18	Recommended Alternative for subsurface soil remediation. Protective; toxicity, mobility, and volume of contaminants reduced; easily implemented; cost-effective.

* Groundwater quality would be monitored quarterly for five years under these alternatives.

ATTACHMENT A.2
Public Notice

Proof of Publication of Notice in The Philadelphia Inquirer

Under Act No. 160, P.L. 877, July 9, 1976

Commonwealth of Pennsylvania
County of Philadelphia } ss.:

L. Cipriano being duly sworn deposes and says that THE PHILADELPHIA INQUIRER is a daily newspaper published at Broad and Callowhill Streets, Philadelphia County, Pennsylvania, which was established in the year 1829, since which date said daily newspaper has been regularly published and distributed in said County, and that a copy of the printed notice of publication is attached hereto exactly as the same was printed and published in the regular editions and issues of said daily newspaper on the following dates, viz.:

and the 18th day of July A. D. 19 91

Affiant further deposes that he is duly authorized by Philadelphia Newspapers, Inc., a corporation, publisher of THE PHILADELPHIA INQUIRER, a daily newspaper, to verify the foregoing statement under oath, and also declares that affiant is not interested in the subject matter of the aforesaid notice or publication, and that all allegations in the foregoing statement as to time, place and character of publication are true.

L. Cipriano

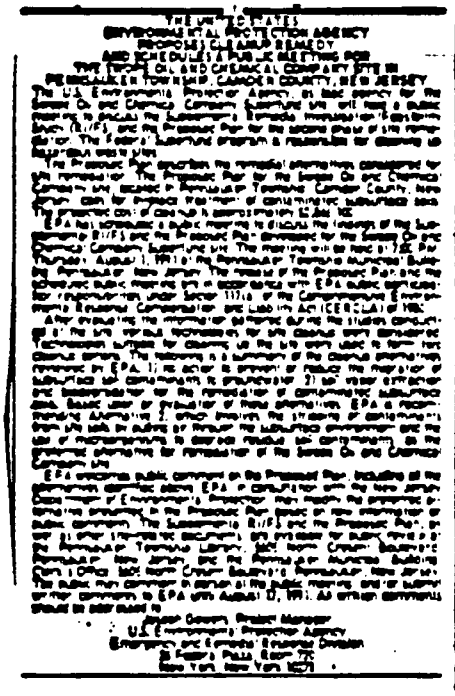
Sworn to and subscribed before me this 18th day of July 91

Notary Public.

My Commission Expires:

Notarial Seal
[illegible] Public
City of Philadelphia, Phila. County
My Commission Expires Nov. 7, 1992

Copy of notice or publication



POOR QUALITY
ORIGINAL

ATTACHMENT A.3
August 1, 1991 Public Meeting Attendance Sheet

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
PUBLIC MEETING
FOR
SWOPE OIL SUPERFUND SITE
PENNSAUKEN, NEW JERSEY

AUGUST 1, 1991
MEETING ATTENDEES

(Please Print)

NAME	STREET	CITY	ZIP	PHONE	REPRESENTING
Joe Dominguez	Dilworth, et al	Philadelphia, Pa.			Swope Committee
Roger Morris	One Plymouth Meeting	PA	19462	215-825-3800	BCM Engrs.
Case Verhaug	"	Collegeville Pa	19426	215-539-0700	Uniform Tubes
Walt Petrella	1 Nassau Pk Blvd	Princeton, NJ	08540	609 243-7855	CWM
Joe DiStefano	Pt of Indiana			609 778354	
[illegible]	401 E State St.	Trenton NJ	08625	(609) 633 1455	NJDEP
Robert Hayton	401 E State St	Trenton NJ	08625	"	"
Eric Rose	[illegible]	Mt. Laurel NJ	08054	609 [illegible]	JCA Assoc Inc
Carol Day	2840 Plaza Pl	Raleigh NC		919 571 1662	Geraghty & Miller
Mike Wilfert	E. B Ames	Plainview	NY	516-249-7600	" "
Dan Newton	125 East Bethpage	Plainview	NY	516-391-5252	" "
Betty Martinovich	"	"	"	516 249 7600	" "
Barbara Brown	123 So. Broad St.	Phila, PA	19109	(215) 895-7038	Swope Committee
Michael L Kramer	1600 The Fidelity Bldg	Phila PA	19109-1094	(215) 875-8520	Swope Committee
Curran	Cove Rd	Pennsauken	08110	825-9427	Curran
Michael Kenney	2308 48th	Pennsauken	08110	(609) 488-6885	Kenney

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
PUBLIC MEETING
FOR
SWOPE OIL SUPERFUND SITE
PENNSAUKEN, NEW JERSEY

AUGUST 1, 1991
MEETING ATTENDEES

(Please Print)

NAME	STREET	CITY	ZIP	PHONE	REPRESENTING
Dennis Frank	1302 Hickory	C.H.	08003	424-4494	Genesis
Loren Martin	600 Sentry Pkwy	Blue Bell PA	19422	215 832-0700	MWR, Inc.

APPENDIX B

Swope Site Cleanup Committee's Comments on the Proposed Plan and the Addendum to the Supplemental Feasibility Study and Risk Assessment

ATTACHMENT B.1
July 31, 1991 Comment Letter from the Swope Site Cleanup Committee Concerning the Addendum to the Supplemental Feasibility Study and Risk Assessment

LAW OFFICES

DILWORTH, PAXSON, KALISH & KAUFFMAN

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8520

July 31, 1991

FOR INCLUSION IN
THE ADMINISTRATIVE RECORD

Mr. Raymond Basso
United States Environmental Protection Agency
Region II
Jacob K. Javits Federal Building
New York, New York 10278

Re: Swope Site Cleanup Committee Comments on the Addendum to the Supplemental Feasibility Study and Risk Assessment for the Swope Oil and Chemical Company Site, located in Pennsauken Township, Camden County, New Jersey

Dear Mr. Basso:

We have received a copy of your July 15, 1991, letter to Robert Nicoloro which enclosed the Agency's Addendum to the Supplemental Feasibility Study and Risk Assessment ("Addendum Report") for the Swope Oil and Chemical Company Site. Although more detailed technical comments will follow, we wanted to respond to several issues in the Addendum Report.

The Addendum Report appears to discuss New Jersey Soil Action Levels ("NJSALs") as if they might be the cleanup goals for the remediation of the subsurface soils at the Swope site. See Addendum Report, p. 14. The only purported basis for the use of NJSALs is that EPA's contractor, Camp, Dresser & McKee ("CDM"),

could not verify the Soil Remediation Levels ("SRLs") which were properly derived by Geraghty & Miller, the Swope Site Cleanup Committee's consultant, as part of the Risk Assessment for the site. See Addendum Report, p. 6. However, as you well know, there are several key technical questions which have prompted the Agency to approve CDM's repeating the SRL verification effort with Geraghty & Miller's assistance. In light of this fact, EPA's apparent decision to disregard the SRLs is at best premature and at worst a dereliction of Agency responsibility.

In any event, the use of NJSALs as cleanup standards would be wholly inappropriate. As was correctly noted in the Agency's Proposed Plan of July, 1991, which was developed pursuant to the public participation requirements of CERCLA Section 117(a), NJSALs "are not promulgated ARARs". Proposed Plan, p. 12 (July 1991); see also Addendum Report, p. 14 (stating that there are no ARARs which dictate soil remediation levels). At most, the NJSALs fall within the To Be Considered ("TBC") category of environmental guidelines. However, as is stated in the Preamble to the National Contingency Plan, "TBCs should not be required as cleanup standards in [40 C.F.R. 300.400(g)(3)] because they are, by definition, generally neither promulgated nor enforceable so they do not have the same status under CERCLA as ARARs". Preamble to the National Oil and Hazardous Substances Pollution Contingency Plan, 55 Fed. Reg. 8665 (March 8, 1990)(emphasis added). The Preamble further provides that "EPA believes that TBCs are meant to compliment the use of ARARs by EPA, states, and PRPs, not to be in competition with ARARs." Id.

Here, the Agency's apparent attempt to involve NJSALs as if they were ARARs -- despite the fact that it has recognized that NJSALs are not ARARs -- is clearly at odds with the express language of the National Contingency Plan. Moreover, EPA's apparent invocation of NJSALs at this late stage in the remedy-selection process could be construed as an attempt by the Agency to evade the procedural safeguards in the NCP requiring the Agency to consider, inter alia, the implementability, technical feasibility and cost effectiveness of a selected remediation plan prior to the selection of that remedy. Accordingly, the reference to NJSALs in the Addendum Report should be deleted.

In addition to being inappropriate and unenforceable as a cleanup standard under the NCP, it should be noted that NJSALs are also inapplicable to soil remediation plans. Under the New Jersey Environmental Cleanup Responsibility Act, N.J.S.A. 13:1K-6 et seq., soil action levels are merely used by the New Jersey Department of Environmental Protection ("NJDEP") to determine whether remediation may be required. Once NJDEP determines that remediation is required, cleanup standards are developed on a case-by-case basis depending on site characteristics.[1] N.J.S.A. 13:1K-

[1] Ironically, this is exactly the approach used by Geraghty & Miller in the Risk Assessment to derive the SRLs.

10(a). Significantly, however, NJSALs are not used as cleanup remediation standards -- not even by the NJDEP, the agency that developed them.

Based on the foregoing, NJSALs are inapplicable and unenforceable as subsurface soil cleanup standards. Accordingly, it is recommended that the Agency reconsider the use of SRLs which were properly developed in the Risk Assessment. The Swope Site Cleanup Committee is prepared to discuss the issues raised in this letter at any time. Indeed, we are hopeful that an agreement can be reached on this issue shortly.

Sincerely,

Michael L. Krancer

Barbara A. Brown

Barbara A. Brown

On behalf of the Swope Site Cleanup Committee

cc: Peter M. Abel, Esq.
Bernard Reilly, Esq.
Mr. Rodney J. McQueen
Mr. Barry L. Sams
Mr. Charles E. Stauber
Leonard F. Charla, Esq.
Mr. Anthony Montalbano
Mr. Radford A. Mead
David B. MacGregor, Esq.
Ronda P. Bayer, Esq.
Bonnie Fine Kaufman, Esq.
Joel R. Herz, Esq.
Patricia Hick, Esq.
Mr. Joseph Gowers
Mr. John LaPadula

ATTACHMENT B.2

August 1, 1991 Comment Letter from Geraghty & Miller Concerning the Addendum to the Supplemental Feasibility Study and Risk Assessment

GERAGHTY & MILLER, INC.
Environmental Services

Ground Water Engineering Hydrocarbon Remediation Education

August 1, 1991

FOR INCLUSION IN THE ADMINISTRATIVE RECORD

VIA FEDERAL EXPRESS

Raymond Basso, Chief
New Jersey Superfund Branch II
United States Environmental Protection Agency
Region II
Jacob K. Javits Federal Building
New York, New York 10378

Dear Mr. Basso:

Geraghty & Miller, Inc. and the Swope Site Cleanup Committee have reviewed the United States Environmental Protection Agency (USEPA) Addendum to the Supplemental Feasibility Study (FS) for the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey and are pleased that the supplemental FS has been approved by the USEPA. We have the following comments concerning the FS addendum.

ISSUES CONCERNING REMEDIAL ALTERNATIVES AND RISK CHARACTERIZATION

NO ACTION ALTERNATIVE

The December 1990 supplemental FS report included and evaluated a no action alternative. At the direction of the USEPA, a no action alternative was not developed and evaluated as part of the May 1991 Supplemental FS. In the April 19, 1991 USEPA comment letter regarding the supplemental FS, General Comment 13 stated that "The current no action alternatives assessed in the Supplemental FS Report should be modified

to provide for the implementation of monitoring programs for contaminated media at the Swope Site." At a meeting held on May 13, 1991 at the USEPA Region II office, attended by Geraghty & Miller, the Swope Site Cleanup Committee, Camp, Dresser & McKee (CDM), John LaPadula, Patricia Hick, and Joseph Gowers, the USEPA reiterated its request that the May 1991 report be revised such that the no action alternative include institutional controls.

BIODEGRADATION OF SUBSURFACE SOIL CONTAMINANTS

As discussed in the Response to USEPA and NJDEP Comments on the Supplemental Feasibility Study Report for the Swope Oil and Chemical Company Site, it must be noted that semivolatile organic compounds are not detected at concentrations significantly higher than soil remediation levels (SRLs).

Residual semivolatile organic compound concentrations will be permanently reduced by natural biodegradation that is enhanced by soil vapor extraction (SVE), as discussed in the May 1991 Supplemental FS Report and the aforementioned response document.

INSTALLATION OF A MULTI-LAYER CAP

In the supplemental FS, SVE was considered in conjunction with a multi-layer cap because the installation of a cap was a source control activity specified in the September 1985 Record of Decision for the Swope Site. We concur with the USEPA's decision to defer a final determination on the need for a cap until the completion of the vapor extraction system (VES) operation. However, in the absence of a cap, careful consideration must be given to the operational time needed for the VES. At the point of diminishing returns with respect to constituent recovery from soils, the cost-effectiveness of further operation of the system must be considered. We agree with the USEPA Addendum to the Supplemental FS Report that operation of the VES should cease when significant quantities of constituents are no longer being removed.

VAPOR EXTRACTION SYSTEM PERIOD OF OPERATION

Soil vapor extraction (SVE) does not reach permanent steady-state operation. Ground-water extraction does reach permanent steady-state operation, but SVE does not.

The effectiveness of the VES will be determined by evaluating constituent concentrations in extracted soil gas (air samples taken of extracted soil gas at a point before the air blower influent), subsurface soils (soil boring samples at various depths), and ground water.

SHALLOW GROUND-WATER MONITORING PLAN

As part of the supplemental Feasibility Study, Geraghty & Miller prepared and submitted The Shallow Ground-Water Monitoring Plan of the Supplemental Feasibility Study (July 1991). The purpose of the ground-water monitoring program is to evaluate the quality of ground water beneath the Swope site throughout the operation of the VES. Ground-water samples collected during the first and fourth quarters will be analyzed for VOCs and semivolatile organic compounds by using EPA Methods 624 and 625, respectively. Because of the low mobility of semivolatile organic compounds, samples collected during the second and third quarters will be analyzed for VOCs only.

As stated in the supplemental RI report (March 1991), water quality data for the deep aquifer is insufficient to conclusively demonstrate that the Swope site has impacted ground-water quality in the deep aquifer. Although Geraghty & Miller agrees with the USEPA that ground-water samples should be collected from wells screened in the deep aquifer as part of the proposed monitoring program, samples should be analyzed for VOCs only and not semivolatile organic compounds. Specifically, semivolatile organic compound analyses should not be performed on ground-water samples collected from the deep aquifer for the following reasons.

- Impacts, if any, of semivolatile organic compounds on water quality conditions in the deep aquifer would first be observed in the shallow aquifer wells.

- Semivolatile organic compounds have been detected less frequently and at lower concentrations than VOCs in both shallow and deep wells.

- Semivolatile organic compounds have a lower mobility than VOCs and the impacts, if any, to water quality would first be noted based on a review of VOC data.

DEEP AQUIFER GROUND-WATER CONTAMINATION

As stated in both the supplemental RI and FS reports, there is a marginal difference between upgradient and downgradient water quality in the deep aquifer and the water quality data is not sufficient to conclude that the Swope site has impacted water quality in the deep aquifer. In addition, as stated in the USEPA Proposed Plan at the Swope site (July 19, 1991), "...RI ground-water sampling results further indicate that contaminated ground water flows beneath the Swope site in the deep aquifer from an upgradient source(s)..."

SOIL REMEDIATION LEVELS (SRLs)

On July 31, 1991, Sally Odland of CDM telephoned Frank Jones of Geraghty & Miller (Risk Assessment Group) and stated that CDM was able to duplicate the SRLs presented in the Supplemental FS Report, using the same model and input parameters discussed in that report.

APPENDIX A: SPECIFIC COMMENTS ON THE SUPPLEMENTAL FEASIBILITY STUDY REPORT AND THE RISK ASSESSMENT

The comments included in this Appendix have been addressed in the Supplemental RI and FS Reports, and the responses to USEPA and NJDEP comments on these reports with the exception of the following comment:

PAGE 20, FIRST FULL PARAGRAPH, THIRD SENTENCE

Comment: The sentence indicates that the future ground-water exposure scenario applies a 7-year exposure duration for hand washing and a 20-year exposure duration for ingestion of ground water. It should be noted that a 25-year exposure duration should have been utilized for this combined exposure scenario. Use of the 25-year exposure duration would provide a more conservative estimate of risks that may result from use of shallow aquifer ground water.

Response: The December 4, 1990 Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual Supplemental Guidance "Standard Exposure Factors" indicates that an individual is assumed to work 25 years at the same location (95th percentile value). This guidance was issued after the original Supplemental FS Report submittal date (December 7, 1990). This value (25 years) could have been incorporated into the May 1991 Supplemental FS Report (document with revisions as per USEPA comment), but was not as this was not requested by the USEPA in their comment letters (April 19, 1991 and July 15, 1991) or at the meeting held on May 13, 1991 at the USEPA Region II office.

If you have any questions concerning these comments, please do not hesitate to call.

Sincerely,

GERAGHTY & MILLER, INC.

Doug Newton
Principal Scientist/Project Manager

Betty Martinovich
Principal Engineer/Project Engineer

Arnold S. Vernick, P.E.
Vice President/Project Officer

DN:BM ASV:MFW:pg
bmso61.ltr

Michael Wolfert
Vice President/Project Officer

ATTACHMENT B.3
August 5, 1991 Comment Letter from Michael L. Krancer,
Regarding the Preferred Remedy

LAW OFFICES

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DIRECT DIAL (215) 875- 8520

August 5, 1991

Mr. Joseph Gowers
United States Environmental
Protection Agency
Region II
26 Federal Plaza
Room 720
New York, NY 10278

Re: Swope Superfund Site/Notice Letter to Triangle Publications

Dear Mr. Gowers:

Thank you for your letter of July 24, 1991 addressed to "Triangle Publication, c/o Dilworth, Paxson" regarding the Swope Superfund Site. In that letter, you state that EPA is taking this opportunity to notify Triangle "once again" that information available to EPA indicates that the company is a potentially responsible party with respect to the Site.

As you know, this firm represents Triangle, which is now known as News America Publications Inc., and others with respect to the Site. We do not agree with the Agency's suggestion that Triangle is liable with respect to the Site and we believe that we have meritorious defenses to liability. In any event, as you know, News America has cooperated with the Agency in the implementation of remedial actions performed via three Administrative Orders on Consent and News America will entertain settlement discussions with respect to the implementation of the further component of remediation outlined in the Proposed Plan provided that other parties participate and to the extent that a reasonable Remedial Design can be agreed upon.

Also, your letter erroneously refers to EPA's current proposal for remediation applicable to subsurface soil only. Of course, the proposed remedial alternative applies to both subsurface soil and groundwater. The Agency itself has recognized this on numerous occasions. Just a sampling of occassions on which EPA has recognized this are the following. Raymond Basso, in a letter dated May 21, 1991, stated that "EPA believes that remediation of the source material would result in the reduction of the contamination of the groundwater". Also, EPA's Addendum to the Supplemental Feasibility Study and Risk Assessment for the Swope Oil and Chemical Company Site notes that EPA believes that soil vapor extraction would be effective in reducing subsurface soil contamination and thereby reduce contaminant migration into the groundwater.

Sincerely,

Michael L. Krancer

MLK/ls

ATTACHMENT B.4

August 15, 1991 Comment Letter from Geraghty & Miller Concerning the Proposed Plan

GERAGHTY & MILLER, INC.
Environmental Services

Ground Water Engineering Hydrocarbon Remediation Education

August 15, 1991

FOR INCLUSION IN THE ADMINISTRATIVE RECORD

VIA FEDERAL EXPRESS

Raymond Basso, Chief
New Jersey Superfund Branch II
United States Environmental Protection Agency
Region II
Jacob K. Javits Federal Building
New York, New York 10378

Dear Mr. Basso:

Geraghty & Miller, Inc. and the Swope Site Cleanup Committee have reviewed the United States Environmental Protection Agency (USEPA) Proposed Plan for the remediation of contaminated subsurface soils at the Swope Oil and Chemical Company (Swope) site and have the following comments concerning this plan:

SITE BACKGROUND

Page 4, Paragraph 1

As discussed in the supplemental Remedial Investigation (RI) report and reiterated in the November 6, 1990 and June 27, 1991 letters to the USEPA, the difference between upgradient and downgradient ground-water quality in the deep aquifer is marginal. As such, these data do not conclusively demonstrate that the Swope site has impacted water quality in the deep aquifer. Since MPWC Well 1 is completed in the deep aquifer, these data do not conclusively demonstrate that the Swope site has impacted water quality in this well. As stated by the USEPA, there are a number of unidentified sources that may be contributing to the contamination of this well.

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SUMMARY OF THE SUPPLEMENTAL REMEDIAL INVESTIGATION AND ADDENDUM

Page 5, Paragraph 2, Note 4

It should be noted that some volatile organic compounds (VOCs) but not all VOCs were reported at higher concentrations downgradient than upgradient of the Swope site in the deep aquifer. In fact, some VOCs were reported at higher concentrations upgradient than downgradient of the site in the deep aquifer. Therefore, these data do not conclusively demonstrate that the Swope site has impacted water quality in the deep aquifer. This has been discussed in detail in the supplemental RI and Feasibility Study (FS) reports, as well as the November 6, 1990 and June 27, 1991 letters submitted to the USEPA.

SUMMARY OF SITE RISKS

Page 6, Paragraph 1

In this paragraph it is indicated that only risks presented by the presence of hazardous substances in ground water were evaluated in the Swope site risk assessment (Geraghty & Miller, Inc., Supplemental Feasibiljty Study for the Swope Oil and Chemical Company Site, Pennsauken Township, Camden County, New Jersey, Volume IV of IV, May 1991). Risks presented by the presence of hazardous substances in subsurface soils were also evaluated and quantified in the site risk assessment.

Page 6, Paragraph 2

This paragraph does not include the following three exposure routes which were assessed in the site risk assessment: (1) oral, dermal, and inhalation exposure to subsurface soils by a future construction worker; (2) oral, dermal, and inhalation exposure to subsurface

soils by a future adult resident; and (3) oral, dermal, and inhalation exposure to subsurface soils by a future child resident.

Page 7, Paragraph 1

This paragraph states that human health risks from the drinking of contaminated ground water were calculated to have a hazard index of 3.8 and an excess lifetime cancer risk of 4.2×10^{-3}. It should be noted that these values are calculated for a resident that lives in the same home for 75 years and drinks 2 liters of water per day, 365 days per year.

Page 7, Paragraph 2

This paragraph states that risks associated with dermal contact and ingestion of site soils have not been quantified in the site risk assessment. While it is true that extensive soil remediation has been performed by the PRPs, and potential risks associated with contact with soils at the site are considered to be minimal, nine future hypothetical scenarios (construction worker, adult resident, and child resident subject to oral, dermal, and inhalation exposure to subsurface soils) were evaluated quantitatively in the site risk assessment (Geraghty & Miller, Inc., May 1991). The hazard indices and excess lifetime cancer risks for the exposure to subsurface soil scenarios were calculated and found to be below the values typically deemed "acceptable" by the USEPA.

SUMMARY OF ALTERNATIVES

Page 9

Alternative 2 should be entitled "Ground-Water Monitoring Program, Soil Vapor Extraction, and Natural Biodegradation." The annual operation and maintenance (O&M) cost for the ground-water monitoring program is estimated to be $222,000. Therefore, the present worth O&M for this program, at an interest rate of 10 percent and an inflation rate

of 5 percent, over a 5-year period would be $967,503. The capital cost of $687,400 is that capital cost estimated for the vapor extraction system (VES), only. As stated in Table 7-1 of the Supplemental FS Report (Geraghty & Miller, Inc., May 1991), the first year O&M estimated cost that was calculated for the operation of a VES at the Swope site was $281,000. Therefore, the total estimated cost for Alternative 2 is $967,503 plus $687,400 plus $281,000, or $1,935,903, for one year of VES operation. This estimated cost does not include any costs for bioremediation enhancement.

Page 9, Paragraph 3

It is stated in this paragraph that the effluent air stream from the air blower will be passed through a catalytic oxidizer. It should be noted that for purposes of cost estimation, worst case scenarios were considered. Thus, catalytic oxidation as a means of air emission control represents a worst case scenario. The actual air emission control equipment that is to be included in the final VES design will be determined during the remedial design (RD) phase of this project.

If you have any questions concerning these comments, please do not hesitate to call.

Sincerely,

GERAGHTY & MILLER, INC.

Douglas J. Newton
Principal Scientist/Project Manager

Betty Martinovich
Principal Engineer/Project Engineer

Arnold S. Vernick
Vice President/Project Officer

Michael Wolfert
Vice President/Project Officer

DJN/BM/ASV/MW:pg

APPENDIX C
Letter from EPA's Contractor Concerning Geraghty & Miller's Vadose Zone Modeling and Proposed Soil Remediation Levels

CDM FEDERAL PROGRAMS CORPORATION

September 13, 1991

Mr. Joseph Govers
U.S. Environmental Prrotection Agency
26 Federal Plaza
Nev York, Nev York 10278

PROJECT: TES V, Contract:68-W9-0002
Work Assignment C02032
Svope Oil and Chemical Site
Pennsauken, Nev Jersey

DOCUMENT NO.: TESV-C02032-LR-CDXH

SUBJECT: Reservations concerning Soil Remediation Levels Derived by the PRP using a Vadose-Zone Transport Equation

Dear Joe:

This letter synthesizes CDM FEDERAL PROGRAMS CORPORATION's (CDM FPC) evaluation of the soil remediation levels derived by the PRP contractor, Geraghty and Miller, using a modified contaminant transport equation for the Svope Oil and Chemical Site in Pennsauken Tovnship, Nev Jersey. Our comments are based on extensive reviev of the PRP's data and the equations used, as presented in the PRP Feasibility Study, including sensitivity analysis of the equation to various parameters. This summarizes our comments as presented to EPA in our technical revievs, dated January 23, 1991, and June 24, 1991, of the draft and final FS reports and our June 27 letter report revieving the PRP equation and presenting additional SRL calculations performed by CDM FPC.

The "Model"

The model used to calculate soil remediation levels is a simplified solution to the one-dimensional partial differentiation equation used for saturated flov contaminant transport, for compounds which decay with time and are adsorbed by the soil matrix. As such, it is probably more appropriate to refer to the model as an equation, or an analytical solution.

The analytical solution is a one-dimensional transport equation developed by Van Genuchten and Alves (1982) to estimate the attenuation of organic chemical constituents in the saturated zone. The analytical "model" vas not designed as a "vadose-zone transport model". It has been modified by the Gradient Corporation (in a presentation of analytical models at the "Management of Manufactured Gas Plants" seminar organized by the Gas Research Institute in Chicago

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in 1988) to represent unsaturated zone contaminant transport by assuming a constant average groundwater velocity through the unsaturated zone, which is assumed to equal the recharge rate at the site. The revised equation specifically calculates the concentration of a chemical compound in the leachate as it moves through the unsaturated zone at a specified soil depth and transport time.

The fate of a chemical constituent in the soil column depends on its mobilization, volatilization, and decomposition rates. Contaminant transport through the unsaturated zone is extremely complex, and requires large amounts of data input to adequately describe characteristic processes affecting the transport of chemical compounds. The modified Van Genuchten equation only considers aerobic biological decay of organic compounds, but ignores important physical and chemical processes in the unsaturated zone such as:

- volatilization
- adsorption
- soil moisture characteristics
- time-dependent infiltration
- oxygen transport
- mass fluxes of constituents between air, water, and hydrocarbon phases
- the associated exchanges between each phase.

As such, the "model" does not simulate true field conditions. Rather, due to the simplistic analytical approach and generalized assumptions inherent in the solution, this method grossly oversimplifies a very complex transport system. In addition, the sensitivity analyses performed by CDM FPC (letter report dated June 27, 1991) indicated that the equation's results are very sensitive to small changes in the decay rate and the fraction of organic carbon applied to the equation. More importantly, significant fluctuations in calculated SRL's occurred depending on the method chosen to calculate the complementary error function (erfc) values.

Consequently, CDM FPC has little confidence in the applicability of the SRL results calculated by Geraghty and Miller, and believes soil remediation levels should be based on more empirical solutions.

If you have any questions concerning these comments, please do not hesitate to contact me at (212) 393-9634.

Sincerely,

CDM FEDERAL PROGRAMS CORPORATION

Sally Odland

Sally Odland
Work Assignment Manager