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Office of
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Remedial Response

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September 1985

EPA

Superfund Record of Decision:

Swope Oil, NJ

TECHNICAL REPORT DATA

(Please read Instructions on the reverse before completing)

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16. ABSTRACT

The Swope Oil Company site is located in an industrial complex in northern Pennsauken Township, Camden County, New Jersey. Swope Oil operated a chemical reclamation operation at this two-acre site from 1965 until December 1979. Operations included buying, selling, dealing in, manufacturing, and processing, chemicals, chemical compounds and paints. Products **processed at the site included phosphate esters, hydraulic fluids, paints and varnishes, solvents, oils, plasticizers, and printing inks. Waste liquids and sludges from the Swope Oil operation were discharged to an excavated, unlined lagoon. Contaminated material was also ponded within a diked tank farm and in an exposed drum storage area. The Company, which ceased operation in December 1979, has declined to take any action at the site.**

The cost-effective remedial actions selected for this site include: construction of a cap; preparation of a supplemental RI/FS to evaluate the extent of ground water contamination and to develop and evaluate appropriate remedial alternatives; removal of tanks and buildings with offsite incineration, treatment (aqueous wastes) or disposal (non-incinerable wastes) of tank contents, and offsite disposal of tanks and building debris; excavation and offsite disposal of the buried sludge waste area; excavation of up to

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Swope Oil, NJ Contaminated Media: gw, soil Key contaminants: organics, PCBs, sludge		

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1.5 feet of contaminated soil containing PCBs greater than 5ppm and offsite disposal; excavation of up to 1.5 feet of contaminated soils below the lagoon containing PCBs greater than 5ppm and offsite disposal (this remedial action will be reevaluated should removal of 1.5 feet of soil not achieve the 5ppm goal); sampling, excavation and offsite disposal of contaminated soils containing greater than 5ppm PCBs in the parking lot area and along the railroad right-of-way adjacent to the lagoon. The estimated total capital cost for this remedial action is $5,590,356 and the O&M costs are estimated to be $33,000 per year.

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RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION

Site: Swope Oil Company, Pennsauken, New Jersey

Documents Reviewed

I am basing my decision on the following documents describing the analysis of cost-effectiveness of remedial alternatives for the Swope Oil site:

- Swope Oil Company Site Remedial Investigation and Feasibility Study, Pennsauken Township, New Jersey dated June 1985.

- Staff summaries and recommendations.

- Responsiveness Summary for the Swope Oil site.

Description of Selected Remedy

- Removal of tanks and buildings with off-site incineration, treatment or disposal of tank contents, and off-site disposal of tanks and building debris.

- Construction of a cap at the site.

- Preparation of a supplemental remedial investigation and feasibility study to evaluate the extent of groundwater contamination and to develop and evaluate appropriate remedial alternatives.

- Excavation and off-site disposal of the buried sludge waste area in the northeast corner of the site.

- Excavation of up to 1.5 feet of contaminated soil containing PCBs greater than 5 ppm and off-site disposal.

- Excavation of up to 1.5 feet of contaminated soils below the lagoon containing PCBs greater than 5 ppm and off-site disposal. Should additional sampling in this area during design determine that removal of 1.5 feet of soil will not achieve the 5 ppm goal, the remedial action for this area will be reevaluated.

- Sampling, excavation and off-site disposal of contaminated soils containing greater than 5 ppm PCBs in the parking lot area and along the railroad right-of-way adjacent to the lagoon.

Declarations

Consistent with the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA), and the National Contingency Plan (40 CFR Part 300), I have determined that the removal of tanks, buildings and debris as well as contaminated soils and sludges for transport and disposal to the appropriate RCRA and TSCA approved facilities in conjunction with capping the site is the selected remedial alternative for the Swope Oil site. I have also determined that a supplemental remedial investigation and feasibility study should be undertaken to address off-site groundwater contamination attributable to the site.

I have determined that the implementation of this alternative will provide adequate protection of public health, welfare and the environment. The State of New Jersey has been consulted and agrees with the proposed remedy.

I have also determined that the action being taken is appropriate when balanced against the availability of Trust Fund monies for use at other sites. In addition, removing the contaminated materials to the appropriate RCRA and TSCA approved facilities, capping the site, and conducting a supplemental remedial investigation and feasibility study to address groundwater contamination attributable to the Swope Oil site is cost-effective, implementable and technically sound when compared to other remedial action alternatives, and is necessary to protect public health, welfare and the environment.

September 27 1985

Date

Christopher J. Daggett

Christopher J. Daggett
Regional Administrator

SUMMARY FOR REMEDIAL ALTERNATIVE SELECTION

SWOPE OIL SITE

PENNSAUKEN TOWNSHIP, NEW JERSEY

Site Location & Description:

The Swope Oil Company Site is located in an industrial complex in northern Pennsauken Township, Camden County, New Jersey, at 8281 National Highway (see Figures 1 and 2). The 2-acre site is roughly triangular, bounded on the southeast by National Highway and on the southwest and north by railroad rights-of-way and warehouses. Pennsauken Creek is about 0.8 mile northeast of the site and the Delaware River is 1.2 miles to the northwest. A water supply well operated by the Merchantville-Pennsauken Water Commission (MPWC) is located less than 100 feet southwest of the site. Numerous other municipal wells are located in the area, especially to the west near the Delaware River. Pennsauken High School is about 0.5 mile to the northeast. The nearest residential areas are the townships of Delair and Morrisville, about 0.5 mile west and southwest, respectively.

Waste liquids and sludges from the Swope Oil operation were discharged to an excavated, unlined lagoon. Contaminated material is also ponded within a diked tank farm and in an exposed drum storage area.

Pertinent features of the Swope Oil Company site include two buildings, a diked tank farm, an open drum-storage area, and an unlined lagoon. Primary access to the site is via National Highway. A chain link fence erected by the potential responsible parties encircles the site. The main building is abandoned and contains equipment, and storage containers used by a producer of textile processing agents, Berg Laboratory, which had leased the site. A smaller structure, the "distilling house" contains equipment used in the reclaiming operation conducted by Swope Oil Company. A 10,000-gallon, No.5 fuel oil storage tank is located underground near the distilling house. Behind the distilling house is a drum storage area. Adjacent to the drum storage area are about sixteen 3,000- to 20,000-gallon storage tanks surrounded by a 10-inch earth dike. Several inches of bluegreen liquid have collected within the dike and near the drum storage area.

North of the main building is the unlined lagoon, estimated to be 100 feet long, 50 feet wide, and three to ten feet deep, containing 90,000 to 180,000 gallons of liquid and sludge. An 8-inch earth dike surrounds the lagoon. The liquid and sludge in the lagoon and the contents of the drums are currently being removed from the site by the potential responsibile parties.

Site History

Swope Oil Company operated a chemical reclamation operation from 1965 until December 1979. Operations included buying, selling, dealing in, manufacturing, and processing oils, chemicals, chemical compounds and paints. Products believed to have been processed at the site include phosphate esters, hydraulic fluids, paints and varnishes, solvents, oils, plasticizers, and printing ink.

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. Swope Oil 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, Containment and Countermeasure Plan. The company, which ceased operation in December 1979, has declined to take any action at the site because of limited finances.

On October 17, 1983, a State Superfund Contract was signed by both EPA and NJDEP. This contract provided funds for the performance of a focused feasibility study on the surface drums and lagoon waste, and for the development of a long term remediation plan to address the waste problems posed by the Swope Oil site.

On February 8, 1984, a draft focused feasibility study (FFS) was submitted to EPA. This report recommended the following:

1. Off-site disposal of drums.

2. Off-site disposal of lagoon liquid and sludge, and backfilling the lagoon prior to placing a temporary cap.

3. Installation of a security fence.

On May 14, 1984, a group of the potential responsible parties signed a consent order with EPA to undertake the actions described in the FFS prepared for the site. This work is currently underway and is expected to be completed in the near future.

Site Geology

The Swope Oil Site is located in Pennsauken Township, New Jersey, within the Atlantic Coastal Plain which is a sandy area characterized as a low-lying, gently rolling plain that ranges in altitude from sea level to above 33 feet. The Atlantic Coastal Plain is underlain by a wedge-shaped mass of unconsolidated sediments composed of clay, silt, sand, and gravel. This wedge-shaped deposit thins to a featheredge along the Fall Line and attains a thickness of over 6,000 feet at the tip of the southern edge of New Jersey. Although these deposits are covered by water further east, they continue to the edge of the continental shelf with a maximum thickness of about 8 to 10 miles.

The outcropping coastal plain sediments in the study area are the Potomac Group and the Raritan and Magothy Formations (PRM) deposits. The thickness of PRM deposits increases in a downdip (southeasterly) direction, reaching approximately 1400 feet in southeastern Camden County. In the Pennsauken Township area, they are less than 300 feet thick. Basically, PRM deposits consist of interbedded gravel, sand, silt, and clay, which are channel deposits characterized by limited areal extent, lenticular in shape, and interbedded with gravel, sand silt, and clay. Higher percentages of coarse-grained materials (sand and gravel) exist near the source area, while downdip fine-grained sediments (clay and silt) predominate, especially in the southeastern portion of Camden County.

The PRM aquifer is divided into three hydrologic units: upper, middle, and lower aquifers. The upper unit consists mainly of sands of the Magothy Formation, and the middle and lower units consist mainly of sands found in the Raritan Formation and the Potomac Group. The lower aquifer in the area is overlain by and hydraulically connected to Pleistocene deposits near the Delaware River where it is a water table (non-confined) aquifer. Locally, the presence of clay lenses (10 feet or more in thickness) makes the lower aquifer act as a semi-confined aquifer. In northern Camden County, PRM sediments form a highly productive aquifer.

REMEDIAL INVESTIGATION ACTIVITIES AND RESULTS

Remedial Investigation Activities

The remedial investigation of the Swope Oil site included the following activities:

- Collection of nine soil samples obtained from test borings on-site and priority pollutant analyses of all samples.

- A magnetometer survey

- Collection of nineteen surface soil samples and priority pollutant analyses of all samples

- Collection of samples from forty-one tanks and priority pollutant analyses of all samples

- Drilling of five monitoring wells in the unconfined aquifer

- Collection of fifteen groundwater samples from new monitoring wells and local potable wells and priority pollutant analyses of all samples

- A pump test of the lower aquifer

Remedial Investigation Results

The results of the remedial investigative activities indicated the following:

Laboratory analyses revealed that subsurface soils contained significantly lower levels of contaminants than surface soils. However, phthalates, PCBs, volatile organics and inorganic contaminants were detected in subsurface samples. Contamination was found at depths as great as 23 and 42 feet.

PCB contamination is widespread in surface soils on-site. All surface soil samples collected contained PCBs. Four types of PCBs were found: PCB-1242, PCB-1248, PCB-1254 and PCB-1260. PCB concentrations in surface soil samples were generally in the 50-500 ppm range. Test boring samples obtained at depths of 0-1.5 feet indicated a significant reduction in PCB concentrations when compared to surface soil samples. PCB levels below 1.5 feet depth are generally less than 1 ppm. Only one sample, along the southwest border of the site, contained PCBs greater than 500 ppm.

Surface soils are also highly contaminated with phthalate esters. Concentrations of phthalates ranged from 1 to 6000 ppm and bis (2-ethylhexyl) phthalate was found to be the most predominant phthalate contaminant. High concentrations of phthalates were found in surface soils and reduced levels in shallow test borings obtained at 0-1.5 feet depths.

Several organic and inorganic contaminants were detected in many of the surface soil samples. Tetrachloroethane, methylene chloride, naphthalene, ethylbenzene, total xylenes, phenol, trans-1,2-dichloroethene and 2-methyl naphthalene are organic compounds which were found. Also detected in the surface soil samples were inorganic contaminants including mercury, copper, chromium, cadmium and barium.

As a result of investigative activities, an area of buried sludge was identified at the site. A series of sixteen hand auger borings were used to estimate the limits of the sludge burial area. It is estimated that approximately 1,375 cubic yards of contaminated sludge remains buried on-site in an oval shaped area approximately 100x150 feet and 3 to 5 feet in thickness.

Laboratory analyses of samples of the sludge indicates the presence of xylene, phthalates, and PCBs. The results of a magnetometer survey conducted over the sludge burial area indicated that buried drums may have been disposed of with the sludge.

It is estimated that the forty-one tanks on-site contain 41,000 gallons of still bottoms and paint wastes. None of these tanks contained waste with PCB concentrations greater than 50 ppm.

Laboratory results of groundwater samples collected on-site and at nearby municipal wells indicated organic and inorganic contamination. The unconfined aquifer beneath the site contains volatile organics, including; tetrachloroethylene, 1,1,1-trichloroethane, trans-1,2-dichloroethene, and 1,1-dichloroethene. Bis (2-ethylhexyl) phthalate and di-n-octyl phthalate were base neutral contaminants detected. Inorganic contaminants including lead, chromium and mercury were found. Also detected were PCBs up to 1.7 ppb.

Samples taken from the confined aquifer beneath the site were determined to be contaminated with volatile organics, generally greater than 100 ppb, and mercury which at times exceeded the drinking water standards Maximum Concentration Limit (MCL) of 2 ppb. A pump test of National Highway Well No. 1, located adjacent to the site, indicated a high leakage rate from the unconfined to the confined aquifer. This leakage appears to be to the south of the site, where a window through the clay layer may exist. This indicates a direct route of contaminant migration from the upper to the lower aquifer. During non-pumping conditions, the downward velocity would be very low.

The municipal water supply well located adjacent to the site is screened in the lower aquifer. This municipal well was sampled in addition to three other municipal wells in the area. Three of the four off-site wells showed contamination though the specific compounds varied from one well to another. Although volatile organics were found in the municipal wells, only MPWC Well No. 1 contained the same contaminants that were found at the Swope Oil site. They included volatile organics and heavy metals. Due to the complex hydrogeology in the vicinity of the site, variously located pumping stresses upon the lower aquifer, and the industrialized nature of the area, it has been extremely difficult to determine the impact of the Swope Oil site, if any, on these other wells.

The current condition of the remaining tanks and process vessels and the contaminated surface soils pose a threat to the public and the environment. The materials contained in the tanks and in the soil provide a potential for harm for those who come in direct contact with them. Detrimental impacts to the local environment may result from the release of contaminants from these tanks.

Migration of pollutants into the underlying groundwater has added to the contamination of the unconfined and confined aquifers. The actual limit of groundwater contamination in these aquifers is currently unknown. The confined aquifer is a major source of drinking water in the surrounding area.

Screening of Remedial Action Technologies

The evaluation of the results of the remedial investigation provided the basis for establishing the cleanup goals and objectives for site remediation. The cleanup goals and objectives for the Swope Oil site include the following:

- Minimize the risk to the public from exposure to waste and contaminated soils on the site.

- Prevent the migration of contamination from wastes left on the site.

- Protect workers from on-site wastes during remedial action activities.

- Eliminate the future risk of ingestion by present and potential users from contaminated groundwater resulting from the Swope Oil site.

The initial step in the evaluation of remedial alternatives is the screening of potential remedial technologies. The screening procedure was used to eliminate those technologies which were technically infeasible or environmentally unacceptable. In addition, cost considerations were used in the technology screening process.

The results of the screening procedure identified the feasible remedial action components, which when integrated, resulted in establishing remedial alternatives.

REMEDIAL ALTERNATIVE COMPONENTS

The remedial alternative components for the Swope Oil site are separated into three categories as follows:

(1) Tank and Building Alternatives

(2) Contaminated Soil Alternatives

(3) Water Supply Alternatives

Cost estimates for all remedial alternatives are included in Appendix A.

Source Control/Removal and Disposal of Tanks and Building Waste

The alternatives discussed below will address the necessary remedial actions for the buildings, tanks, foundations, underground utilities and tank wastes.

Tank and Building Alternatives

T-1 No action

T-2 Tank and building removal; off-site incineration, treatment or disposal of tank contents. Off-site disposal (non-incinerable solids) of tanks and building debris.

T-3 Tank and building removal; off-site incineration, treatment or disposal of tank contents. On-site landfill disposal of the tank and building debris.

Alternative T-1

Under this alternative, no remedial action will be taken to address the tanks, buildings, and wastes remaining in the on-site tanks. A minimum action related to this alternative would include an inspection of the tanks and the sealing of any tank openings. The implementation of this alternative depends directly upon the selection of the no-action alternative for the remediation of soil contamination.

Alternative T-2

This alternative includes the removal of all buildings, tanks, their foundations and appurtenances, and the tank wastes. Underground utilities would be cleaned and sewer lines sealed. Salvageable equipment would be cleaned and decontaminated as required. Materials that cannot be salvaged would be loaded into trucks and hauled to an approved landfill.

The entire contents of the tanks will be removed as part of this alternative. The materials will be then be separated into aqueous wastes, organic phase wastes, and solid wastes (incinerable and non-incinerable). Incinerable waste solids and organic waste would be shipped off-site to a RCRA approved incineration facility. The non-incinerable solid waste material would be transported off-site to an approved RCRA disposal facility. The aqueous waste would be transported to an off-site to a RCRA approved treatment facility.

This alternative meets the goals of CERCLA and attains or exceeds federal environmental regulations.

Alternative T-3

This alternative includes the removal of all buildings, tanks, foundations and appurtenances, and tank wastes. Underground utilities would be cleaned and sewer lines sealed. As part of this alternative, the entire contents of the tanks would be separated into aqueous, organic, and solid waste phases. The aqueous waste would be transported to an approved RCRA facility for treatment. Any incinerable waste solids and organic waste would be shipped off-site to a RCRA approved incineration facility. The non-incinerable solid waste would be transported off-site to an approved RCRA disposal facility.

Salvageable equipment would be cleaned and decontaminanted as required. The remaining demolition debris would be landfilled on-site with the contaminated soils. A detailed description of the on-site landfill is contained in the evaluation of contaminated soil alternatives.

This alternative meets the goals of CERCLA and attains or exceeds federal environmental requirements.

Source Control/Contaminated Soil Alternatives

The following remedial alternatives address the necessary remedial action for the contaminated soil and sludges currently on-site.

Contaminated Soil Alternatives

S-1 No action-monitoring

S-2 Cap site

S-3 Excavate 1.5 feet of soil*, landfill on-site, cap site

S-4 Excavate 1.5 feet of soil*, landfill off-site, cap site

S-5 Excavate 1.5 feet of soil*, incinerate off-site, cap site

S-6A Excavate sludge and 1.5 feet of soil*, incinerate sludge and soil hotspots off-site, landfill remaining soils on-site, cap site

S-6B Excavate sludge and 1.5 feet of soil*, incinerate sludge and soil hotspots off-site, landfill remaining soils off-site, cap site

S-6C Excavate sludge and 1.5 feet of soil*, incinerate soil hotspots, landfill soils and sludge on-site, cap site

S-6D Excavate sludge and 1.5 feet of soil*, incinerate soil hotspots, landfill soils and sludge off-site, cap site

S-7 Excavate soils to background concentrations of all contaminants, landfill disposal off-site

S-8 Excavate soils to background concentrations of all contaminants, incinerate off-site

*NOTE: For the purposes of developing cost estimates and otherwise evaluating the relative merits of the various alternatives, it was estimated that 1.5 feet of soil would need to be removed to reduce PCB levels to near background conditions. Excavation of 1.5 feet of soil would also remove a significant amount of the volatile organic contamination.

Alternative S-1

Under this alternative, no remedial action will be taken for the contaminated soil existing on-site. A long-term monitoring program of air, groundwater, surface water and sediment would be implemented. Groundwater monitoring wells constructed during the remedial investigation would be used to monitor the groundwater.

Alternative S-2

This alternative involves capping the entire site after the tanks, buildings and foundations are dismantled and removed. The contaminated soils would remain in place and be covered by a RCRA approved cap. This alternative would minimize the impact of contaminants at the site by reducing risks associated with direct contact and contaminant migration. A cap constructed over the site will minimize infiltration and act as a barrier to isolate the contaminated soil. A typical cross section of the cap is shown in Figure 3. The cap will consist of a low permeability clay (hydraulic conductivity $\leq 10^{-7}$ cm/sec) and a flexible membrane.

The cap would be constructed with clay brought in from off-site borrow areas. Total clay thickness would be 24 inches. On top of the clay barrier would be a 50 mil synthetic liner and a minimum 12-inch sand drainage layer which will act as a conduit for any water that infiltrates the topsoil. A geo-textile fabric would be placed on top of the drainage layer to minimize clogging. A minimum 24-inch cover layer of uncompacted topsoil, loam or organic material capable of supporting vegetation would be placed over the geotextile fabric.

Alternative S-3

This alternative involves excavating the top 1.5 feet of soil across the site for disposal in a landfill constructed on-site in compliance with TSCA and RCRA requirements. Following the excavation and disposal on-site of approximately 7,275 cubic yards of contaminated soil, the site would be capped.

The removal of the top 1.5 feet of soil will significantly reduce the high concentration of contaminants in the surface soils. This determination is based on the results of surface soil samples and soil boring samples. PCB concentrations in surface soil samples were generally in the 50-500 ppm range. Test boring samples obtained at depths of 0-1.5 feet indicated a significant reduction in PCB concentrations when compared to surface soil samples. PCB levels below 1.5 feet are generally less than 1 ppm. Similarly, high concentrations of phthalates were found in surface soils and reduced levels in shallow test borings obtained at 0-1.5 feet depths. Phthalate levels below 1.5 feet were generally less than 25 ppm.

This alternative meets the goals of CERCLA and attains or exceeds Federal environmental regulations.

Alternative S-4

This alternative involves excavating the top 1.5 feet of soil across the site. The PCB contaminated soil would be transported for disposal to RCRA and/or TSCA approved hazardous waste landfill. Following the soil excavation, the site would be capped.

This alternative meets the goals of CERCLA, and attains or exceeds Federal environmental regulations.

Alternative S-5

This alternative involves excavating the top 1.5 feet of soil across the site. The PCB contaminated soil would be transported off-site to an approved TSCA incineration facility, Following the soil excavation, the site would be capped.

This alternative meets the goals of CERCLA and attains or exceeds Federal regulations.

Alternative S-6A

This alternative involves the excavation of the top 1.5 feet of soil and the buried sludge. The sludge material, and the soils with PCB concentrations greater than 500 ppm, would be taken to a TSCA approved incineration facility. The remaining excavated material would be disposed of in an on-site landfill.

The on-site landfill would meet the requirements of RCRA and TSCA The bottom liner would be a combination of clay and synthetic material. A leachate collection and removal system would collect any leachate generated during the life of the landfill. A geotextile filter fabric would be placed between the waste and the leachate collection zone to prevent clogging of the collection zone by soil fines. The leak detection zone is directly beneath the liner and monitors the integrity of the liner. Both the leachate collection and leak detection zones would have a leachate collection system. The secondary liner would be a composite liner of synthetic membrane and clay. The membrane would have a minimum thickness of 30 mils. The clay barrier would be 24 inches thick and have a permeability of 10^{-7} cm/sec. A typical landfill cross-section is shown in Figure 4.

This alternative meets the goals of CERCLA and attains or exceeds Federal environmental regulations.

Alternative S-6B

This alternative involves the excavation of the top 1.5 feet of soil and the buried sludge. The sludge material and the soils with PCB concentrations greater than 500 ppm would be taken to a TSCA approved incineration facility. The remaining contaminated soil and sludges would be transported to off-site RCRA and/or TSCA approved hazardous waste management facilities for disposal. Following the excavation, the site would be capped.

This alternative meets the goals of CERCLA and attains or exceeds Federal environmental regulations.

Alternative S-6C

This alternative involves the excavation of the top 1.5 feet of soil and the buried sludge. Soils with PCB concentrations greater than 500 ppm would be transported to a TSCA approved incineration facility for disposal. The remaining excavated material would be disposed of in an on-site RCRA and TSCA approved landfill. Following the excavation, the site would be capped.

This alternative meets the goals of CERCLA and attains or exceeds Federal environmental regulations.

Alternative S-6D

This alternative involves the excavation of the top 1.5 feet of soil and the buried sludge. Soils with PCB concentrations greater than 500 ppm would be transported to a TSCA approved incineration facility for disposal. The remaining contaminated soil and sludges would be transported to off-site TSCA and/or RCRA approved hazardous waste management facilities for disposal. Following the excavation, the site would be capped.

This alternative meets the goals of CERCLA and attains or exceeds Federal environmental regulations.

Alternative S-7

This alternative includes the total removal of all contaminated soils, sludges and wastes to background concentration limits. The excavated material would be transported off-site and disposed in approved RCRA and/or TSCA approved hazardous waste management facilities for disposal. The estimated volume of material to be excavated would be 46,500 cubic yards. This is based on excavation to a depth of 13 feet. Following the excavation, the site would be backfilled with clean material. No long-term monitoring would be required for this alternative.

This alternative exceeds applicable or relevant environmental standards.

Alternative S-8

This alternative includes the total removal of all contaminated soil, sludge and wastes to background concentration limits. The excavated material would be transported to a TSCA approved incineration facility. The estimated volume of material to be excavated is 46,500 cubic yards. Following the excavation, the site would be backfilled with clean material.

This alternative exceeds applicable or relevant environmental standards.

Water Supply Alternatives

The results of investigative activities indicate that contaminants have been identified in the Potomac Raritan Magothy Aquifer, which supplies drinking water to local public supply wells. Pumping of National Highway Well No. 1 was stopped due to mercury contamination. National Highway Well No. 2 has also shown low levels of mercury, however, the levels of mercury contamination have not been significant enough to discontinue use of the water. To date, the evidence is not conclusive that National Highway Well No. 2 has been impacted by the Swope Oil site. Based on currently available information, it is not evident that the loss of National Highway Well No. 1, which had supplied 1.4 mgd to the water supply, will result in a shortfall to meet current demands.

The following remedial alternatives were considered to replace the water supply capacity which has been lost (National Highway Well No. 1) due to groundwater contamination from the Swope Oil site. It is noted that the alternatives were formulated and costed to replace both National Highway wells.

Alternative Water Supply Alternatives

W-1 No action, blending

W-2A Increase capacity at Park Avenue field, pump to site area via new pipeline

W-2B Increase capacity at Park Avenue field, pump to site area via existing distribution pipeline

W-3 Install new well, treat water prior to distribution

W-4 Pump Delaware River water, treat water prior to distribution

W-5 Purchase water from Camden

W-6 Purchase water from Philadelphia

Alternative W-1

This alternative does not include any physical remedial action. In addition, this alternative does not serve as a permanent remedy since mercury levels could rise to unacceptable levels above past recorded concentrations. Also, it relies strongly upon monitoring. Water from National Highway Well No. 2 would be mixed with water from Well No. 1 during peak demand periods. This alternative has temporary approval from the NJDEP. The blending of the two wells would result in potable water which contains less than 2 ppb mercury, based upon past mercury levels detected. The actual blend ratios would vary depending on the mercury content of the groundwater from each well.

This alternative attains applicable and relevant Federal public health or environmental standards.

Alternative W-2A

This alternative would involve pumping the excess capacity currently available at the existing Park Avenue wellfield and transporting the water to the National Highway area. The pumped water would be transported via a new 14-inch pipeline to the National Highway existing treatment facility.

Alternative W-2B

This alternative is similar to Alternative W-2A in that it would involve pumping excess capacity from the Park Avenue wellfield. The existing Park Avenue treatment facility would be expanded to accomodate the additional flow. Water would be treated and then transported to the National Highway vicinity via use of existing lines. However, a pump station would be added, along Crescent Boulevard, to maintain pressure in the system and to supply water to the storage tank on National Highway.

This alternative attains applicable and relevant Federal public health or environmental standards.

Alternative W-3

This alternative involves the drilling of a new well in an area free from the influence of the site in order to replace the wells lost due to contamination. Water obtained from the new well would be added to the distribution system following treatment. Since iron and managese levels have been found in many wells throughout the area, the treatment for these chemicals is included in this alternative. A package treatment unit would be placed at the same location as the well, in order to provide direct water service to the affected areas without a large reorganization of the distribution system.

This alternative attains applicable and relevant Federal public health or environmental standards.

Alternative W-4

The City of Philadelphia currently obtains a significant portion of its water supply from the Delaware River. Water is drawn from a surface intake and treated prior to entering the distribution systems. A water intake and treatment plant similar to that used by Philadelphia could be used to replace the water lost by the closing of National Highway wells. Water drawn from the river would be first sent to a grit removal/settling chamber. Chlorine would be added for partial oxidation of heavy metals. Following pH adjustment and floculation, remaining particulates would be removed via secondary settling and rapid filtration. If necessary, carbon adsorbtion would be used for removal of organics. Finally, the water would be chlorinated and flouridated before being added to the distribution system.

This alternative attains applicable and relevant Federal public health or environmental standards.

Alternative W-5

This alternative involves purchasing water from the City of Camden. The City of Camden supply line runs parallel to a Merchantville-Pennsauken Water Commission supply line along River Road. A connection currently exists between the two systems in the vicinity which would be used to transfer the drinking water.

This alternative attains applicable and relevant Federal public health or environmental standards.

Alternative W-6

This alternative involves the purchase of water from the City of Philadelphia. Currently, it is estimated that the City of Philadelphia has 100 million gallons of excess treatment capacity. A proposal has been made to allow for the sale of the excess capacity to the City of Camden and nearby areas. A water line could be constructed across the river, either suspended to a bridge or run under water. A portion of the capacity of this line could be used to supply the area of Pennsauken affected by the loss of the National Highway wells.

This alternative attains applicable and relevant Federal public health or environmental standards.

Community Relations

A public meeting was held on March 12, 1984 at the Pennsauken Township Municipal Building to discuss the proposed surface cleanup and the RI/FS. Notices of the meeting were sent to local officials and interested parties as outlined in the Swope Oil Community Relations Plan. Representatives of the Swope Oil Site Cleanup Committee and the press attended this meeting. At this meeting, EPA officials and their consultants discussed in detail the work to be conducted as part of the RI/FS for the site. In addition, a proposed Consent Order covering the cleanup of the lagoon and drummed waste, and installation of a security fence was discussed. Following the presentation, the meeting was concluded with a question and answer session.

A second public meeting was held on July 9, 1985 to discuss the results of the RI/FS. In addition, EPA officials tentatively recommended remedial alternative components T-2, S-6D and W-1. Letters were sent to local and county officials and other interested parties notifying them of the meeting. Copies of the draft RI/FS were sent to local officials and interested private parties for public review. Representatives of the Swope Oil Cleanup Committee attended this July 19, 1985 meeting. An EPA fact sheet was available to the public at the meeting. Following EPA's presentation on its remedial cleanup recommendation, officials responded to concerns and questions raised by the public. More detailed information regarding The Community Relations Program is included in the attached Responsiveness Summary.

Enforcement

A generator committee calling itself the Swope Oil Site Cleanup Committee has been formed from the approximately 100 potentially responsible parties (PRPs). In May 1984, the 12 PRPs entered into an administrative consent order with EPA to remove existing drums and waste from the lagoon. Also, they agreed to place a temporary cap over the lagoon after the waste material is removed and to construct a fence around the perimeter of the site. These activities have not yet been completed.

Representatives of the PRPs have attended two public meetings on the site and have submitted comments on the RI/FS. The PRPs are currently being given an opportunity to undertake the work described in this Record of Decision. Negotiations are expected to continue through September 1985.

EVALUATION OF ALTERNATIVES

Tanks and Building Alternatives

The no action alternative (T-1) was ruled out since leaving wastes on-site without remediation would not meet the technical requirements of RCRA. In addition, the removal of the tanks and their contents in conjunction with buildings and scattered debris would be required to implement any of the soil remediation alternatives other than no action. The proper construction and long-term effectiveness of a RCRA cap would be impacted should the existing buildings, tanks and debris remain. Leaving the tanks and buildings would raise concerns over the feasibility of prevention of infiltration through the cap at building perimeters; limit surface options required for cap design protection and encourage future building usage with potential detrimental impacts on cap integrity resulting from such usage. Also, the removal of the buildings would eliminate site obstacles to soil excavation and thereby make the overall cleanup less complex. Therefore, implementation of the no action alternative would fail to mitigate the hazards currently posed by the site in its existing condition.

Alternative T-3 involves the removal of tank waste for off-site disposal and on-site landfilling of building debris. This alternative is directly dependent upon the selection of an on-site landfill for the disposal of contaminated soil. Although alternatives S-6A and S-6C, which include the construction of an on-site RCRA and TSCA approved landfill, are less costly than off-site disposal, the siting of such a facility adjacent to a major municipal well would be in violation of the New Jersey regulations for siting new hazardous waste facilities. Therefore, implementation of this alternative was eliminated from consideration.

Contaminated Soil Alternatives

The no action alternative (S-1) was ruled out since it would not meet the goals and objectives established for site remediation. The potential future risk of ingesting contaminated groundwater by users in the vicinity of the site would remain since the source material would not be removed. Also, the migration of contaminants from waste remaining on-site and the exposure to the public from these contaminants at, and near ground level would not be eliminated.

The capping alternative (S-2) was eliminated from consideration because of the high levels of PCB waste which would remain on-site would be in violation of EPA's current PCB cleanup policy under TSCA.

Alternatives S-3 through S-5 included excavation of the top 1.5 feet of soil, disposal of excavated soil, and capping the site. However, these alternatives did not address the removal of the buried sludge, and possible buried drums, and therefore, were not considered for further evaluation because these materials can be expected to be continuing sources of groundwater contamination.

Alternatives S-6A and S-6C include excavation of the top 1.5 feet of soil and buried sludge and disposal of the non-hotspot PCB contaminated soil in an on-site TSCA/RCRA landfill. Although these alternatives are less costly than the recommended alternative, the siting of a hazardous waste landfill adjacent to a major municipal well would be in violation of the New Jersey regulations for siting new hazardous waste facilities. Therefore, the implementation of these alternatives was eliminated from consideration.

Alternatives S-7 and S-8 include the excavation of soil to background level concentrations of all contaminants, and disposal off-site in either RCRA and/or TSCA approved landfills or an approved TSCA incineration facility. These alternatives are far more costly than the selected alternative, and they provide only a minimal amount, if any, of additional benefit. The Agency has determined that excavation to background, in this case, is not cost-effective, as defined by the NCP. Therefore, these alternatives are not recommended as part of the overall remedial action.

The remaining alternative, S-6D, is cost-effective. Moreover, it appears that soils contaminated with PCBs at levels of 500 ppm or greater can be disposed of at a permitted landfill, rather than at an incinerator. As a result, a cost savings of approximately $170,000 can be realized. This figure is calculated assuming disposal of 145 cubic yards of PCB contaminated soil at a TSCA approved landfill as opposed to a TSCA approved incinerator.

Water Supply Alternatives

Alternatives W-2 through W-6 all require major expenditures to replace water supply capacity currently lost due to groundwater contamination resulting from the site. Currently, there is insufficient data to define the extent of the off-site groundwater plume as well as the future direction and pathways of migration of contaminants in the complex groundwater system. Implementation of alternatives W-2 and W-3 rely on increased pumping from existing wells or installation of a new well. Either of those options may impact plume migration and may be reliable only for a short period of time if the contaminants were induced toward these areas.

Alternatives W-4 through W-6 rely on development of new water supply sources and existing supply sources of other communities, which may be more appropriate if future studies indicate existence of regional water supply problems. Significant institutional and implementation concerns affect these options.

Based upon the above, alternative W-1, which includes blending water pumped from National Highway Well Nos. 1 and 2, if required to meet peak demand, and a continuation of the groundwater study to define the extent of groundwater impacts attributable to the Swope Oil site is the most viable water supply alternative.

Recommended Alternative

According to 40 CFR Part 300.68 (J), cost-effective is described as the lowest cost alternative that is technically feasible and reliable and which effectively mitigates and minimizes damages and provides protection of public health, welfare and the environment. A cost comparison of remedial alternatives is presented in Appendix A. The evaluation of the remedial alternatives in conjunction with the cost comparison leads to the conclusion that the combination of alternative components T-2, S-6D, and W-1 is the appropriate cost-effective alternative which achieves the recommended cleanup goals. This alternative includes: tank and building removal; off-site incineration, treatment or disposal of tank contents; off-site disposal of tank and building debris; excavation of sludge and contaminated soil, and off-site disposal; and capping of the site. Although alternative component S-6D includes incineration of PCB hotspots (PCBs >500 ppm), EPA believes that this contaminated soil can be disposed of in an environmentally acceptable manner at a TSCA approved landfill.

A supplemental remedial investigation and feasibility study will be conducted to determine the extent of groundwater contamination attributable to Swope Oil. This work will be coordinated with two other ongoing regional groundwater studies in the area. The United States Geological Service is currently conducting an extensive regional study of the PRM aquifer. The NJDEP is conducting a water supply study for Burlington, Camden and Gloucester counties. The results of this supplemental remedial investigation will be used to evaluate long-term remedial alternatives for the groundwater and water supply impacts currently identified.

The waste material contained in on-site tanks and vessels will be separated as follows:

- aqueous waste
- organic phase waste
- solid waste

Once separated and categorized, the wastes will be transported off-site to the appropriate incineration, treatment or landfill facilities in accordance with RCRA requirements. The existing buildings and related appurtances will be dismantled, wipe sampled and classified as hazardous or non-hazardous. All hazardous materials will either be decontaminated and disposed of in a municipal landfill or disposed of in an approved RCRA disposal facility. All underground pipes and tanks will be emptied and their contents properly disposed of prior to sealing of the pipes and filling the tanks. This will insure that the proposed cap will be properly constructed and will effectively reduce the migration of contaminants which remain after the soil excavation work.

Another component of the recommended alternative includes the excavation of the buried sludge and up to 1.5 feet of soil containing PCBs greater than 5 ppm. The sludges and soils will be transported to approved RCRA or TSCA facilities as appropriate.

The plan to remove up to 1.5 feet of contaminated soil is based on the laboratory results of surface soil samples and soil boring samples. PCB concentrations in surface soil samples were generally in the 50-500 ppm range. Test boring samples obtained at depths of 0-1.5 feet indicated much lower concentrations of PCBs. PCB levels below 1.5 feet depth are generally less than 1 ppm. Similarly, high concentrations of phthalates were found in surface soils and reduced levels in shallow test borings obtained at 0-1.5 feet depths.

The removal of the contaminated sludge and soils will significantly reduce the levels of PCBs and other chemical compounds on-site. The proposed extent of removal of PCB contaminated soils will be in compliance with EPA's Draft PCB Cleanup Policy dated August 23, 1985 which would establish a 10 ppm soil cleanup goal for the site. This level is considered prudent due to the proximity of the adjacent public water supply well and the potential for organics to enhance migration of the PCBs.

However, the State of New Jersey has established a more stringent PCB soil cleanup goal of 5 ppm based upon health risk assessments. For this site it is anticipated that the additional excavation to 5 ppm will have minimal, if any, impact on project costs. This soil removal action in conjunction with capping will mitigate the impacts posed by the site in its current condition.

Additional soil sampling will be performed during design in the parking lot area to determine the extent of soil removal and capping in this area.

The area of buried sludge will be excavated and transported off-site for disposal. PCBs, phthalates and xylene were the major contaminants detected in the sludge samples. A magnetometer survey overlying the area indicated that buried drums may have been disposed of in the sludge burial area. If buried drums exist in this area, they will also be transported off-site for disposal.

Due to the fact that surface soil samples obtained along the northern boundary of the site indicate PCB levels of concern, additional off-site sampling along the railroad tracks to the north of the site, especially in the area adjacent to the lagoon, will be performed during design. The results of this sampling and EPA's Draft PCB Cleanup Policy and the NJDEP PCB soil cleanup goal will be used to determine if any additional soil removal action is required. Any additional soil excavation will be included as part of the remedial action.

During remedial design activities, additional testing will be performed on soils underlying the existing lagoon after the removal of its contents. Currently, there exists insufficient data to define the degree of contamination in soils below the lagoon. During the evaluation of alternatives, it was assumed that 1.5 feet of contaminated soil would be excavated from under the lagoon. The actual extent of soil excavation required in this area will be determined during design based upon additional soil testing to be conducted under the lagoon in conjunction with the evaluation of capping requirements.

Following the completion of all soil and sludge excavation work, a cap compatable with RCRA requirements will be installed. Currently, EPA believes that construction of a cap over the site is necessary to minimize the migration of any residual contaminants. Soil testing will be performed after completion of the soil excavation effort. The test results will be used along with the Hydrologic Evaluation of Landfill Performance (HELP) model or similar model to determine the specific requirements of the cap.

The HELP model is a two dimensional hydrologic model of water movement across, into, and through landfills. The output of the HELP model can provide an approximation of leachate which may be generated at a site under specified conditions. The model accepts climatologic, soil and landfill design input data. The model's output takes into account such variables as surface storage, runoff, infiltration, percolation, evaporation, soil moisture storage and lateral drainage.

Cost Summary of Recommended Alternative

	Remedial Measure Components	Capital Cost	Present Worth of O & M	Total Cost Present Worth
1.	Tank & building removal and off-site disposal	$467,000	0	$467,000
2.	Excavation of soil & sludge, off-site disposal	$3,134,683*	0	$3,134,683*
3.	Cap site, monitoring and post closure maintenance	$1,488,671	$311,000	$1,799,671
4.	Groundwater RI/FS	$500,000	0	$500,000
	Total	$5,590,356	$311,000	$5,901,354

*Cost does not include any potential soil removal which may be necessary just beyond the site boundary.

Consistency With Other Environmental Laws

The recommended remedial alternative for the Swope Oil site will require the removal of an estimated 8650 cubic yards of contaminated soil and sludge. The excavated materials will be transported off-site for disposal at approved RCRA and TSCA facilities as appropriate. The waste material contained in on-site tanks and vessels will be separated into (1) aqueous waste, (2) organic waste and (3) solid waste. All wastes from the tanks and vessels will be transported from the site to the appropriate RCRA facilities for disposal (incineration, treatment, landfilling). The existing buildings, emptied tanks and appurtances will be sampled, and any hazardous material will be manifested for transport from the site for disposal at an approved RCRA landfill. Any non-hazardous materials will be transported and disposed of in a local landfill.

Constructing a cap over the site is another component of the recommended remedial alternative. The cap will be compatable with current RCRA requirements.

Operable Units

Since the recommended remedial alternative includes distinct individual components, it is possible that the remedial measures could proceed in a phased manner. The initial phase could include the removal and disposal of all surface wastes including the excavation of contaminated soil and sludge. Following this work, the site would be capped. A suppplemental remedial investigation and feasibility study will be performed to address groundwater contamination attributable to the Swope Oil site. This study can be performed simultaneously with the surface cleanup work.

Operation and Maintenance

Upon completion of the recommended remedial action, monitoring of the site will be conducted to evaluate the changes in quality of the local groundwater. Maintenance of the cap would also be required.

Future Actions

Schedule	Date
- Final Record of Decision	September 19[illegible]
- Continue negotiations with potential responsible paties	September 1985
- Obligate Design Funds (if necessary)	Pending CERCLA Reauthorization
- Amend State Superfund Contract (if necessary)	Pending CERCLA Reauthorization
- Initiate RI/FS	Pending CERCLA Reauthorization
- Initiate Surface Cleanup Design	Pending CERCLA Reauthorization
- Remedial Action Funding Obligation	Pending CERCLA Reauthorization
- Initiate Remedial Action	Pending CERCLA Reauthorization

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APPENDIX A

REMEDIAL ACTION ALTERNATIVE COST SUMMARY
SWOPE OIL COMPANY SITE

Tank and Building Alternatives		Capital Cost ($1,000)	Annual O&M Cost ($1,000)	Present-Worth Costs ($1,000)		
				Lowest	Baseline	Highest
T1	No action	0	0	0	0	0
T2	Tank, building, and utility removal; offsite incineration, offsite treatment (aqueous wastes), and offsite disposal (non-incinerable solids) of tank and building debris.	467	0	445	467	581
T3	Tank, building, and utility removal; offsite incineration, offsite treatment (aqueous wastes), offsite disposal (non-incinerable solids) of tank and building wastes, and onsite landfill disposal of the tank and building debris.	341	0	320	341	398
Soil Alternatives*						
S-1	No action with monitoring	0	90	839	848	858
S-2	Capping	1,489	33	1,586	1,800	2,043
S-3	Excavate 1-1/2 feet of soil, landfill on site, cap site	2,040	37	2,152	2,389	2,703
S-4	Excavate 1-1/2 feet of soil, landfill off site, cap site	4,126	33	3,960	4,437	5,476
S-5	Excavate 1-1/2 feet of soil, incinerate off site, cap site	12,628	33	11,611	12,837	16,545
S-6A	Excavate sludge and 1-1/2 feet of soil, incinerate sludge and hotspots off site, landfill remaining soils on site, cap site	4,372	37	4,253	4,721	5,735
S-6B	Excavate sludge and 1-1/2 feet of soil, incinerate sludge and hotspots off site, landfill remaining soils off site, cap site	6,409	33	6,015	6,720	8,440
S-6C	Excavate sludge and 1-1/2 feet of soil, incinerate hotspots, landfill soils and sludge on site, cap site.	2,298	37	2,387	2,647	3,040

APPENDIX A

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REMEDIAL ACTION ALTERNATIVE COST SUMMARY
SWOPE OIL COMPANY SITE
PAGE TWO

	Capital Cost ($1,000)	Annual O&M Cost ($1,000)	Present-Worth Costs ($1,000) Lowest	Baseline	Highest
S-6D Excavate sludge and 1-1/2 feet of soil, incinerate hotspots, landfill soils and sludge off site, cap site	4,795	33	4,583	5,106	6,342
S-7 Excavate soils to background, landfill disposal off site	17,463	0	15,700	17,463	19,914
S-8 Excavate soils to background, incinerate off site	71,411	0	60,714	71,411	85,774
Alternate Water Supply Alternatives					
W-1 No action, blending	0	0	0	0	0
W-2A Increase capacity at Park Avenue Field, pump to site area via new pipeline	2,718	35	2,655	3,050	3,445
W-2B Install well at Park Avenue Field, pump to site area via existing distribution system	3,606	4	3,598	3,648	3,691
W-3 Install new well, treat	5,225	301	3,864	8,062	12,098
W-4 Pump Delaware River water, treat	6,006	237	6,288	8,240	9,771
W-5 Purchase water from Camden	493	0	493	493	493
W-6 Purchase water from Philadelphia	NA	NA	NA	NA	NA

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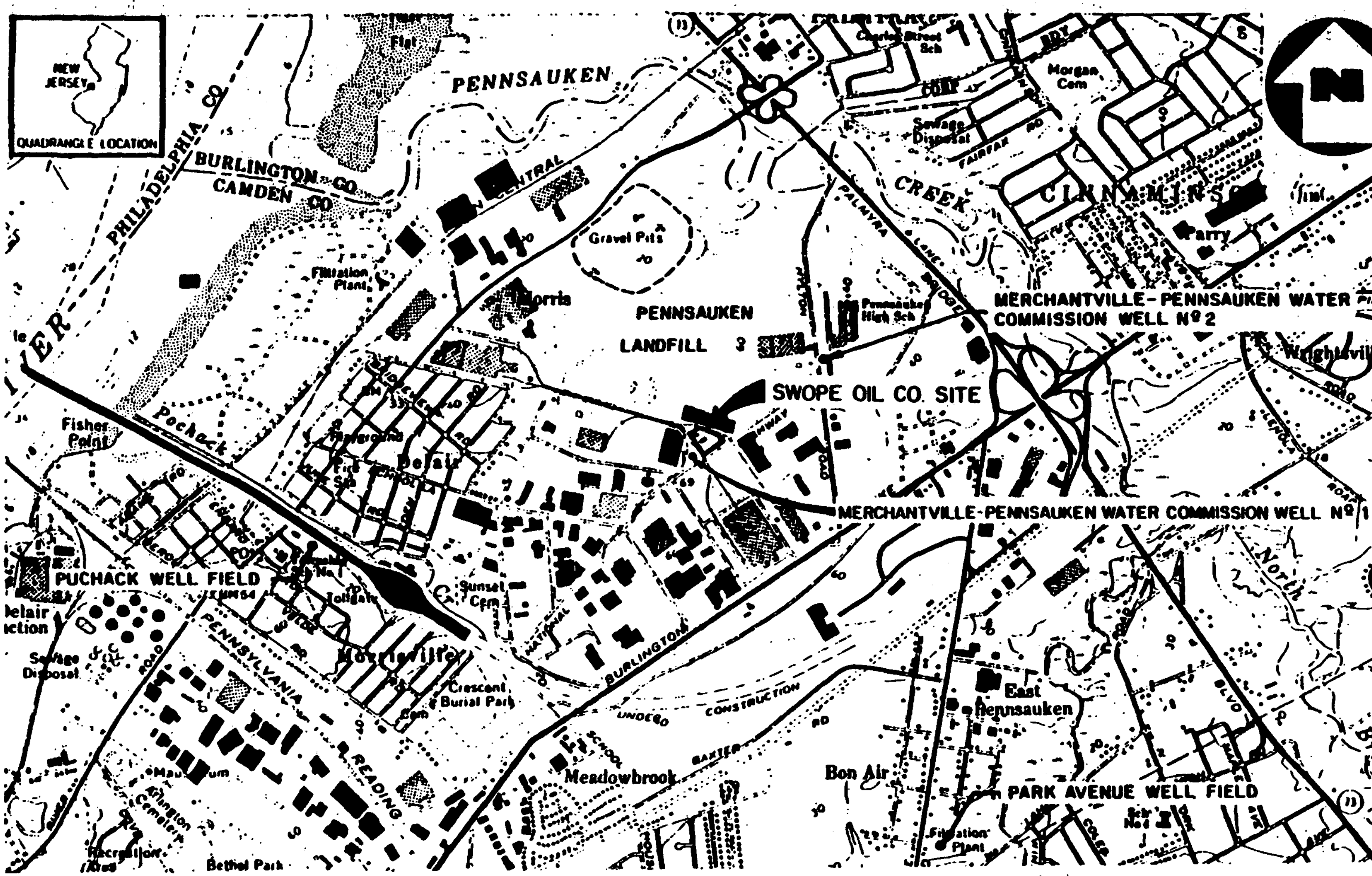
*Soil alternatives, except the no-action alternative, assume the tanks and buildings are removed prior to implementing the soil alternative.

The range of present-worth costs is based on the sensitivity analysis. Costs are in April 1985 dollars.

NA - Costs could not be determined, see text for explanation.



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'

FIGURE 1

LOCATION MAP

SWOPE OIL CO. SITE, PENNSAUKEN TWP, NJ

SCALE: 1"=2000'

NUS CORPORATIC
A Halliburton Compa

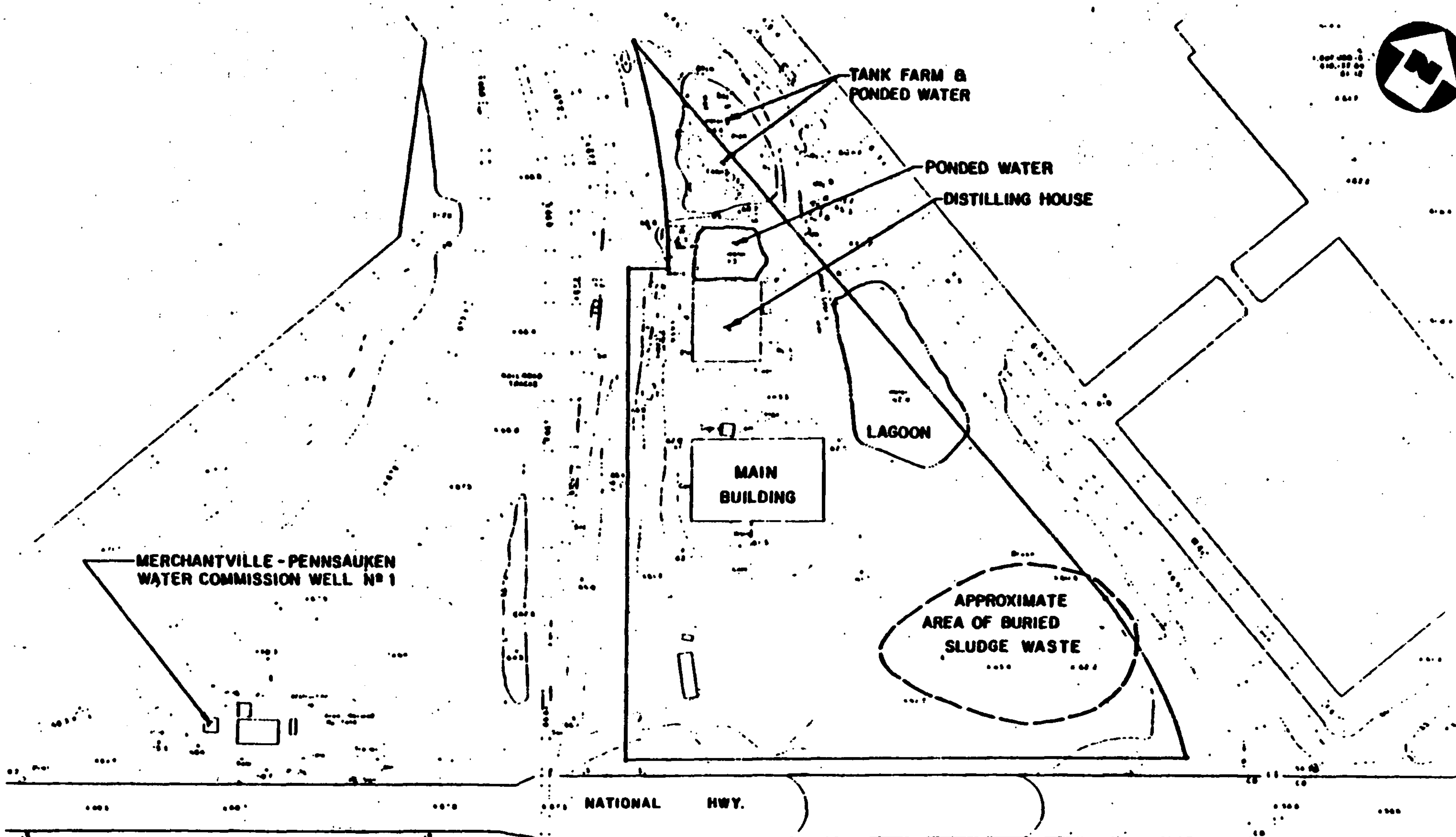


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FIGURE 2

SITE PLAN

SWOPE OIL CO. SITE, PENNSAUKEN TWP.,

SCALE: 1" = 60'

60 0 60

SCALE IN FEET

FIGURE 1-2

NUS
ORATION
on Company

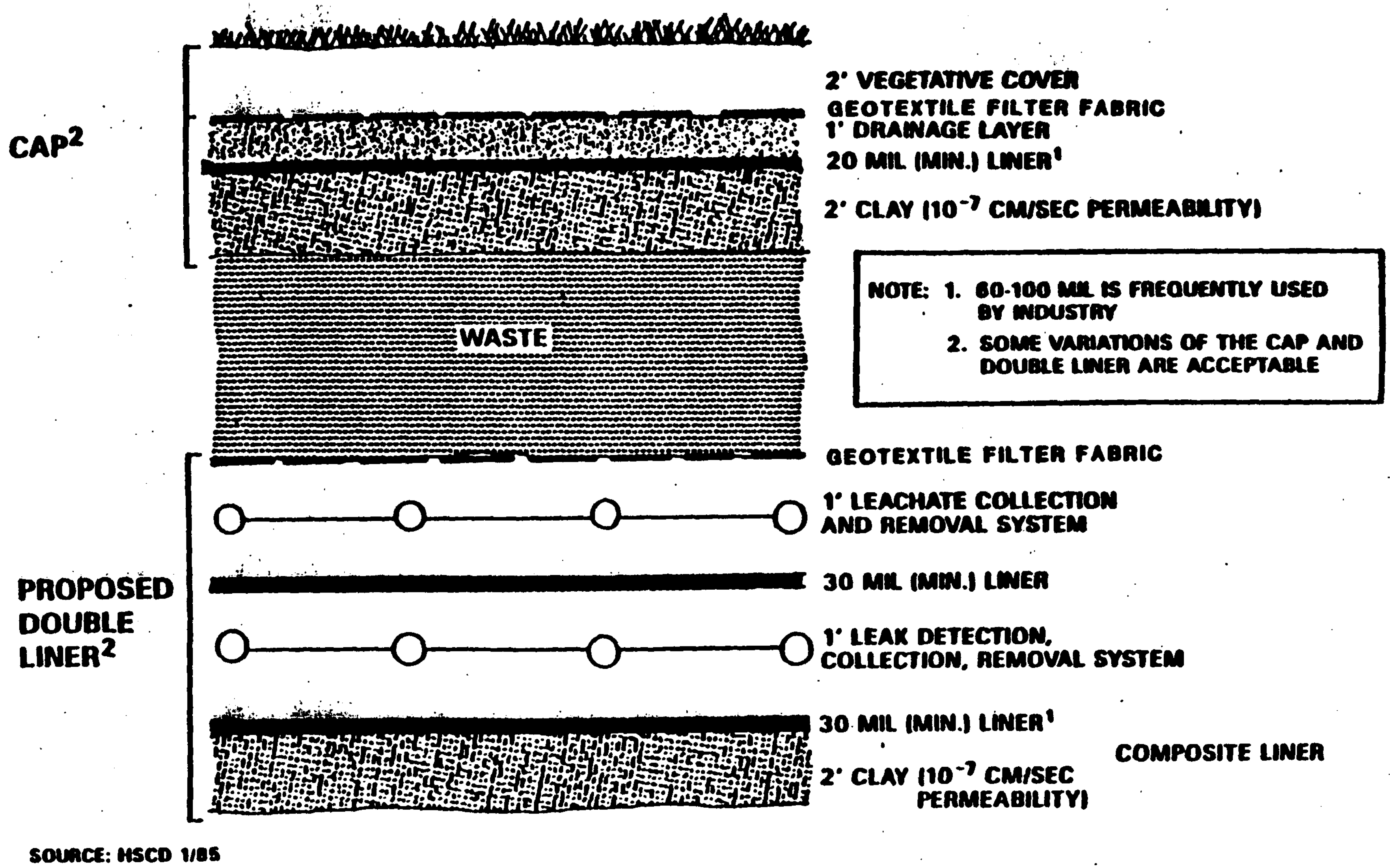

FIGURE 3

RCRA CAP AND DOUBLE LINER

SWOPE OIL CO. SITE, PENNSAUKEN TWP., NJ

NOT TO SCALE

NUS CORPORATION
A Halliburton Company

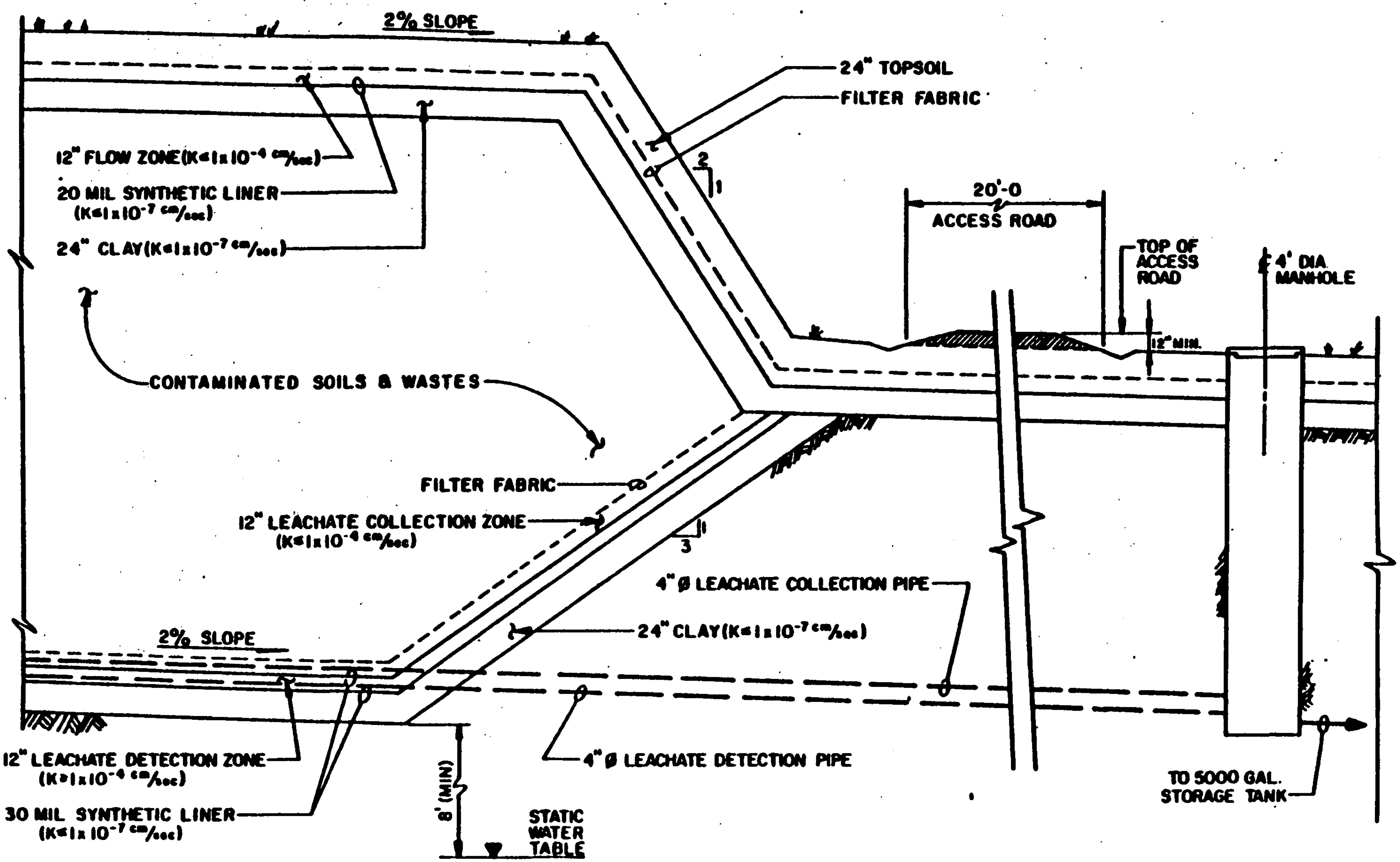

FIGURE 4

TYPICAL ONSITE LANDFILL CROSS-SECTION

SWOPE OIL CO. SITE, PENN[illegible]KEN TWP., NJ

NOT TO SCAL[illegible]

A Halliburton Company

REMEDIAL INVESTIGATION/FEASIBILITY STUDY

RESPONSIVENESS SUMMARY
FOR THE
SWOPE OIL SITE

PENNSAUKEN, NEW JERSEY

BASED ON COMMENTS FROM
PUBLIC MEETING OF JULY 9, 1985

TOPIC: WATER QUALITY

Issue: On a scale of 1 to 10, with 1 being poor and 10 being excellent, what do you consider the quality of the drinking water in the area to be now and in the future?

Discussion: We think the quality of the drinking water is good now. We are not sure of the extent of the groundwater contamination or the plume. We will not numerically scale the quality of the drinking water because we have not conducted enough groundwater testing to give a definite answer.

Issue: Do I have to drink bottled water?

Discussion: We don't feel that this is necessary. The water is being tested and, to date, it is meeting health requirements.

Issue: An article in the newspaper stated that the water was tainted.

Discussion: We did not see that article and, therefore, cannot comment on it.

Issue: What is an acceptable limit for contaminants in the water, with respect to our health?

Discussion: The quality of the water is being closely monitored. It is tested according to potable water quality limits in a state-certified laboratory, and the results indicate that the water is safe. The water that you are getting is from the public supply which is meeting public health standards.

TOPIC: ALTERNATIVE WATER SUPPLY

Issue: When will efforts begin to locate an alternative water supply?

Discussion: We will start immediately. Hopefully, we will drill new wells and have results in about 6 months.

Issue: As Vice President of the Merchantville-Pennsauken Water Commission, I would like a more definite answer. Fourteen months ago, we turned off well No. 1--is it usable or not? If we have a major dry period, we will need that well. We have an obligation to serve area communities with a water supply.

Discussion: We are actively investigating alternative sources of water at this time. However, we don't have any answers right now. We are definitely looking at ways that we can help if you should have a problem tomorrow.

TOPIC: ADMINISTRATIVE ISSUES

Issue: Can the township, at this point, be reasonably assured that the responsible parties involved are going to cover the costs entirely, based on whatever options are chosen?

Discussion: The government is prepared to implement a selected option with its own money but will give the potentially-responsible parties a chance to implement and pay for the remedy. If, in fact, the responsible parties choose to implement the selected option, the money in Superfund will be used for sites where there are no potentially responsible parties identified. Whether the allocation of funds is a combination of responsible party and government funds is unknown--but rest assured that funds either from the government or from the responsible parties will be made completely available to fund the option selected.

Issue: You said you have several recommendations--that you are recommending different options. This tends to make me believe that you're recommending the options to someone else. Is that the case? Who is the ultimate authority to say we'll implement Alternative 6 or Alternative 1, etc.? And when can the residents of our town expect the work to begin?

Discussion: We are saying "recommending" because all of our final decisions have to include public input; that is why we couldn't come here tonight and say "this is what we selected." What we are doing is recommending what we think is the best option that is cost-effective and does the job. Our recommendation will go to the Regional Administrator, Christopher Daggett; the decision does not have to be approved in Washington, D.C. A lot of that reponsibility has already been delegated to specific regions. A combination of our recommendations here and your input will determine what alternative will be implemented.

Issue: What about the time period? From the outcome of this meeting to Mr. Daggett's approval of the alternative, can you give us an indication of when a decision will be made?

Discussion: I would expect that the final decision would be made within the next 30 days. Between now and that period of time, we will be talking to the responsible parties to see whether, in fact, they will be prepared to implement this remedy. We will have to develop some planning for the excavation of onsite material, but this should occur rather quickly. It will be roughly 6 months before you start to see any removal of the material.

In all sincerity, if the responsible parties decide to go ahead and implement the alternative, the cleanup will probably be done faster than if the government does it.

Issue: As far as the alternative water supply options are concerned, how will the final option be selected? By cost or effectiveness?

Discussion: The problem with the alternative water supply is that cost really is not an issue. I think the issue is that we just have not developed enough data to identify the most appropriate alternative.

Sometime in the future, we will have another meeting similar to this one to discuss whatever recommendation you decide upon or whatever recommendation we would like to make to you. At that meeting, we would like to obtain your input just as we are doing now. We would then make a decision. Currently, what we are deciding upon is how best to clean up the site proper; that is, what we call visibly contaminated material, such as the tanks, the buildings, and the contents of both. In general, we would like to take all contaminated material off site and dispose of it either via incineration or in an approved landfill. In this particular case, we are not recommending that we build something on site and then put everything inside of it. We want to take the material away. We're just not sure what to do with the groundwater.

It would be very simple to say, "For another 3 million dollars, we could put a well 500 feet away and it will be okay."

But there is just enough doubt in our minds that we do not want to do that and then, a year or two from now, learn that the plume moved and that we should have drilled the well someplace else.

I really wish we had that data now, so that we could say what we want to do. But we don't. The State is currently evaluating the groundwater problem on a regional scale.

Hopefully, it will not be much longer before we have an answer; we just want to make sure it's the right answer.

TOPIC: DISPOSAL SITE AVAILABILITY

Issue: How lucky have you been in locating a place to incinerate and/or landfill the wastes?

Discussion: We have had problems ourselves. We think that we will have disposal availability, but we cannot be positive. Incinerators per se have not been the primary method of offsite disposal.

TOPIC: OTHER CONCERNS

Issue: What about air contamination from aluminum dust emissions on the site and in the area?

Discussion: We really don't have an answer for that. This meeting primarily addresses groundwater and potable water concerns.

Swope Oil Responsiveness Summary
Written Comments

As a result of the Swope Oil RI/FS public meeting held on July 9, 1985 in Pennsauken Township, the Agency received four letters (copies attached). The concerns raised in each of the letters and the Agency's response to these concerns are summarized below:

Letter Dated July 10, 1985 From Camden County Department of Health

Mr. David Sweeney of the Camden County Department of Health applauded EPA for its recommendation to complete the surface cleanup of the Swope Oil site. He indicated that the adjacent well was clearly impacted by the Swope Oil site, and he called for the replacement of the well's capacity using Superfund monies. He also indicated that blending of water from the impacted well would not be an acceptable long-term solution.

EPA Response

EPA is negotiating with the potential responsible parties (PRPs). If the PRP's do not consent to undertake the site cleanup, the Agency will do so using Superfund monies. As part of the remedial action, EPA will perform a supplemental remedial investigation and feasibility study (RI/FS) to determine the extent of groundwater contamination attributable to the Swope Oil site and determine the appropriate long-term remedial action for the groundwater and water supply related impacts.

Letter Dated July 9, 1985 From The City of Camden

Mr. Melvin Primas, Mayor of the City of Camden expressed his concern that the Swope Oil site may be the source of a regional groundwater problem. He feels that no final action be taken until completion of the NJDEP contaminated well field study.

EPA Response

EPA feels that the surface cleanup of the site should begin as soon as possible. A remedial investigation which will determine the extent of the groundwater contamination resulting from the Swope Oil site is being recommended as part of the remedy for the site. The results of the NJDEP regional groundwater study will be considered. It is believed that the results of this remedial investigation will determine if Swope Oil has contributed to the regional groundwater contamination problem.

Letter Dated July 15, 1985 From KMD Associates

Mr. Edward Korab of KMD Associates, the consultant for the Merchantville Pennsauken Water Commission recommended the construction of a new well, pump system, and distribution feed main to replace the capacity lost by the contamination of National Highway Well No. 1. The new well would be located approximately 2,000 feet south of National Highway along the median area of Route 130.

EPA Response

EPA feels that additional remedial investigation work is necessary to determine the extent of groundwater contamination resulting from the Swope Oil site prior to undertaking any long-term remedial alternative, for the water supply impacts currently identified.

The implementation of the alternative, identified by Mr. Korab, may indeed provide potable water to the Merchantville Pennsauken water system. However, without knowing the extent of the groundwater impacts, resulting from Swope Oil, the useful life of any new well cannot be ascertained. Therefore, the Agency has recommended that additional remedial investigative work be completed prior to the the evaluation of alternatives and subsequently the selection of a long-term remedial alternative.

Letter Dated August 1, 1985 From Mr. John F. Stoviak

Mr. Stoviak's letter was submitted on behalf of certain members of the Swope Site Cleanup Committee who have been participating in the surface cleanup. In his letter, he expresses his agreement with EPA's recommendation that a more comprehensive hydrogeological investigation, followed by a feasibility study be undertaken. He indicates the Committee's desire to perform this work. In addition, he provides a proposal for the surface cleanup of the Swope Oil site. Attached to his letter were comments provided by their consultant Geraghty & Miller Incorporated on the Draft Swope Oil RI/FS report.

EPA Response

EPA has provided as part of this Record of Decision a point for point response to the technical questions and concerns raised by Mr. Stoviak and Geraghty and Miller. That response is attached. With regard to the proposal to pump National Highway Well No.1, EPA believes that a decision on this issue cannot be made until additional hydrogeological data is made available. In response to the PRP's proposed remedy, EPA's Record of Decision has provided in detail, its rationale for the selected remedial action. On August 21, 1985 representatives of the Swope Cleanup Committee met with EPA officals to discuss in detail the proposed site cleanup. Another meeting is in the process of being scheduled.

NUS CORPORATION

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R-33-8-5-10

September 12, 1985

NUS Project Number S758

Mr. Donald Lynch
U. S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Subject: Swope Oil Company Site Remedial Investigation/ Feasibility Study (RI/FS)
Response to Comments on the Swope Oil Company Site Draft RI/FS Report

Dear Mr. Lynch:

In a letter to Mr. K. A. Walanski, P.E., Corporate Environmental Engineer for DeSoto, Inc., dated July 29, 1985, Geraghty & Miller, Inc., (G&M) proposed preliminary remedial measures and studies for the Swope Oil Company Site. Following are several comments concerning the proposed remedial measures and studies.

- G&M initially states that "insufficient data exist pertaining to the site to adequately select and design appropriate remedial measures." However, remedial measures pertaining to surface soil remediation, surface water remediation, and eventual capping of the site are proposed.

- Task 1 is titled "Excavation and Removal of 'Hotspot' to Offsite Facility." This would involve the excavation and removal of all visibly contaminated soil (soil which is oil-stained). If it is assumed that "hotspots" are soils containing PCBs at concentrations greater than 500 ppm, the definition used in the draft RI/FS report, then the proposed method of identifying "hotspots" as visibly oil-stained areas must be disputed. A correlation between PCB concentration, or any other contaminant concentration, and visible oil stains has not been established. It is highly unlikely that visible oil stains will correlate with PCB concentrations greater than 500 ppm and is therefore not recommended as a means of identifying such "hotspots."

  It must be noted that the letter from Dilworth, Paxson, Kalish & Kauffman to Ms. Carole Peterson, U. S. Environmental Protection Agency (USEPA), dated August 1, 1985, does indicate that soils containing PCB levels in excess of 500 ppm would be excavated for incineration. However, a separate task also calls for the removal and disposal of visibly contaminated soil. Again, it is our opinion that visual observation of soil contamination is not recommended as a means of identifying soils for removal and disposal.

- Task 2 addresses remediation of ponded water on site. The task description indicates that the water would be tested for volatile organic compound content and treated off site if determined to be contaminated. Data collected during the Remedial Investigation (RI) indicate that the ponded liquid in the tank farm contains, in addition to volatile organics, extractable organics, low levels of PCB 1254, and heavy metals, including lead at a concentration greater than the drinking water maximum contaminant level. The ponded liquid behind the distilling house also contains similar contaminants. Thus, testing for volatile organic content only would be insufficient to characterize the ponded water on site.

- In Task 4, G&M proposes that "PW-1 should be pumped on a continuous basis . . . in order to contain and prevent further spread of the plume." The idea behind this approach is that the contaminated plume over which PW-1 exerts influence through pumping would be controlled, thereby minimizing contaminant migration to other wells in the area pumping this aquifer.

  Based on the hydraulic connection between the upper and lower aquifers observed in this study, the upper aquifer contaminants will be drawn into the lower aquifer, admittedly under controlled conditions. The advisability of this approach from the standpoint of further lower aquifer deterioration is uncertain without more extensive hydrogeological data. From a management of migration approach with the specific objective of protecting other pumping wells, this alternative is viable. However, in our opinion, this pumping should only be considered as a short-term remedy.

  Also to be considered, upon the development of additional hydrogeologic data, is pumping the upper aquifer with the same objective as stated above.

- In Task 5, Eventual Capping of the SOCC Site, G&M states that "It is recognized that some type of cap may be needed for the site. Presently available data is insufficient to determine the type of cap required and the size of the area over which it must be placed." It is our opinion that the data from surface and subsurface soil samples are sufficient to show the widespread nature of surface soil contamination at the site, and are thus sufficient to evaluate the type and size of the cap required. G&M states in the same task description "... the wastes are at land surface and soils containing high levels of contaminants are approximately one to two feet below land surface." This statement showing a general understanding of the degree of surface soil contamination at the site appears to be contradictory to the previous statement that insufficient data are available to determine the type and size of cap.

- G&M makes no mention of tank content, tank, and building remediation. It must be noted that the letter from Dilworth, Paxson, Kalish & Kauffman to Ms. Carole Peterson, USEPA, dated August 1, 1985, does propose disposal of tank contents, dismantling of the buildings and disposal of the building contents and demolition debris, and plugging of all site utilities.

Following please find the responses to the comments made by Geraghty & Miller, Inc., regarding the Swope Oil Company Site draft Remedial Investigation/Feasibility Study (RI/FS) Report. The responses have been listed in the same order as the comments.

GENERAL OVERVIEW AND CONCLUSIONS

1. A review of the contaminants found in Tables 4-4 and 4-5 in the draft RI/FS report indicates there is a subset of contaminants that are common to the onsite lagoon, the upper aquifer onsite monitoring wells, and the offsite lower aquifer. The common contaminants are as follows:

   - 1,1,1-trichloroethane
   - 1,1-dichloroethane
   - trans-1,2-dichloroethene
   - 1,1-dichloroethene
   - trichloroethene

   These contaminants are typical industrial solvents. Table 4-6 of the draft RI/FS report indicates that the Swope Oil Company probably processed used solvents as feedstocks (i.e., Tanks 30, 32, 34).

   The above mentioned common contaminants are regarded as highly mobile in soil/groundwater systems (see Appendix D of the draft RI/FS report). The sandy soils, high conductivity, and appreciable recharge (30.48 - 55.88 cm/yr) from precipitation are conducive to contaminant leaching and groundwater transport as solutes by advection. It is entirely conceivable that contaminants percolated and/or leached from the soil to the groundwater and were transported by advection with the groundwater. Data from the RI field activities indicate that the upper aquifer is responsive to pumping in the lower aquifer. This information implies that the lower aquifer is not completely confined and that groundwater does, in fact, move between the two zones. Contaminants dissolved in the groundwater will therefore be transported with the groundwater.

   On this basis, it is reasonable to conclude that the contaminants measured in the National Highway Well No. 1 (PW-1) are, at least in part, a consequence of previous dumping of Swope Oil Company process wastes into the lagoon and other places on the site.

While some contaminant concentration reduction by adsorption to organic materials, by diffusion, and by chemical/biological reactions would be expected during transport, such mechanisms would not be expected to dissipate contaminant concentrations entirely within the relatively small area of the Swope Oil Company Site region of impact.

2. At the direction of NJDEP, monitoring wells were not installed in the confined aquifer. NUS did not attempt to determine groundwater flow direction in the confined aquifer under non-pumping conditions of PW-1. However, it is known that groundwater flow direction in the confined aquifer during pumping of PW-1 is radially toward PW-1. It is also known that a change in groundwater flow direction and gradient exists in the water table aquifer under pumping conditions of PW-1. Therefore, contaminants could migrate from the water table aquifer to PW-1 via the hydraulic connection.

3. There is a possibility that PW-1 may also be contaminated by offsite sources. Until monitoring wells are installed in the confined aquifer, the possibility of PW-1 being contaminated by offsite sources cannot be properly addressed.

4. It is the belief of NUS that there is a sufficient number of monitoring wells to establish site contamination. The scope of work was not intended to delineate in detail contaminant plumes or address offsite sources. In addition, physical constraints (buildings, tanks, ponded liquid, and the lagoon) limited the number and location of monitoring wells installed on the site.

5. There is a downward hydraulic gradient under static water level conditions. The water level of PW-1, which is screened in the confined aquifer, is -26 feet msl, or 91 feet below the ground surface elevation (see p. 3-38 of the draft RI/FS report) versus water table elevations of approximately -16 feet msl (see the hydrographs in Appendix A of the draft RI/FS report).

   The clay layer appears to be extensive across the site. However, when PW-1 was pumped at 1,000 gpm for 24 hours, a drawdown of 0.5 feet was recorded in MW-3. MW-1 and MW-4 were also monitored during the pump test, and drawdowns of 0.44 feet and 0.40 feet, respectively, were recorded. A change in groundwater flow direction and gradient occur in the upper aquifer during pumping conditions of PW-1 versus non-pumping conditions, as shown on Figures 3-8 and 3-10 in the draft RI/FS report.

   The clay layer was <u>not</u> encountered at all monitoring wells. MW-2 was not drilled to a depth sufficient to contact the clay. The cross-section does show the clay as continuous across the site with inferred contacts. The cross-section shown in the report is only one vertical plane that cuts through the site. A cross-section of an area to the south of the site would show the clay layer as discontinuous.

Reports on the regional geology of the study area indicate that the unconsolidated sediments vary in thickness, lateral extent, lithology, and water bearing characteristics (Vowinkel, E. F., and W. K. Foster, 1981), as indicated on p. 3-7 of the draft RI/FS report.

6. Water levels for the monitoring wells were taken over a period of 9 months (see the hydrographs in Appendix A of the draft RI/FS report). This information served as a sufficient baseline for water level data under non-pumping conditions of PW-1. The pump test lasted less than 2 days, thus ruling out the possibility of water level changes due to seasonal water level fluctuations.

   Stage-level changes in the Delaware River will not affect the pump test data since the distance of the site from the Delaware River is greater than 1 mile.

7. The scope of work was not structured to identify sources of contamination other than the Swope Oil Company Site. Other potential sources cannot be ruled out as contributors to the contamination of PW-1.

8. A total of nineteen (19) surface soil samples were collected on site. All of these soil samples showed PCB contamination. Additional sampling will be required in minor portions of the site to further define the extent of PCB contamination.

   Excavation of 1-1/2 feet of soil was proposed in several remedial alternatives to remove the majority of contaminated soil. Data from the uppermost soil samples from the test borings, composite samples generally from 0 to 1-1/2 feet in depth, indicate that removal of soil to 1-1/2 feet should in most areas remove PCBs to less than 1 ppm and phthalates to less than 25 ppm (data from TB-3 indicate somewhat higher levels in the uppermost sample.) Since these samples were composites from the sampling interval, including surface soil that generally contained PCBs in the 50-500 ppm range and phthalates in the 20-1,000 ppm range, it is probable that the concentrations of PCBs and phthalates at the 1-1/2 feet depth are less than 1 ppm and 25 ppm, respectively, in most cases.

<u>Responses to Summary of Non-Supportable Conclusions</u>

p.3-49 The observed drawdowns in the monitoring wells during the pumping test showed a direct hydraulic connection between the water table aquifer and the confined aquifer, implying the existence of a leaky clay layer. The change in gradient and flow direction in the upper aquifer under pumping conditions supports the statement that the clay deposits are not continuous.

p.3-50 The horizontal flow rate was calculated as follows:

The permeability of the lower aquifer at PW-2 is defined as

$K = T(b \times 7.48)$

Where K = permeability (ft/day)
T = transmissivity (38,800 gpd/ft)
b = aquifer thickness (230-167 = 63 ft)

$$K = \frac{38{,}800}{63 \times 7.48}$$

$$K = 82.33 \text{ ft/day}$$

Velocity is defined by the following equation:

$$V = \frac{K\,I}{n}$$

I = hydraulic gradient = Δh/ΔL in ft/ft
V = velocity in ft/day
K = permeability in ft/day
n = effective porosity (0.15)
Δh = change in water levels between pumping and non-pumping conditions in the confined aquifer (feet)
ΔL = distance between PW-1 and PW-2 (1,500 feet)

The pumping water level at PW-2 is -50 msl. The non-pumping water level at PW-1 is -21 feet msl. Therefore, the potentiometric head difference between PW-1 and PW-2 is:

$-50 - (-21) = 29 \text{ feet} = \Delta h$

The horizontal flow velocity in the confined aquifer is thus

$$V = \frac{82.33 \text{ ft/day} \times 29 \text{ ft}}{1500 \text{ ft} \times 0.15}$$

$$V = 10.61 \text{ ft/day}$$

The downward vertical flow velocity through the clay is defined as

$$V = \frac{K\,I}{n}$$

Where K = 4.5×10^{-7} cm/sec or 1.276×10^{-3} ft/day (the highest permeability value for the clay from Table 3-6 of the draft RI/FS report)

I = gradient (2.1 ft at PW-1 - see the response to the comment on p.3-42 of the draft RI/FS report)

n = porosity of clay (0.30)

Therefore, the velocity (V) is calculated to be

$$V = (1.276 \times 10^{-3})(2.1)/0.30$$

$$V = 8.9 \times 10^{-3} \text{ ft/day}$$

p.4-6 Several data points were incorrectly labelled in Appendix C of the draft RI/FS report. Specifically, the last 3 data points on page 10 and the first 5 data points on page 11 were incorrectly labelled as National Highway Well #2 (PW-2) data in the "source" column. However, the "sample number" and "CLP number" columns correctly identify these samples as being from National Highway Well #1 (before treatment). Valid analytical data indicate that PW-2 is not contaminated with volatile organics.

p.4-36 The major pathway for contaminant migration through soils to the groundwater is logically the column of soil extending from the base of the lagoon (the major source of contamination) through the unsaturated zone to the water table. No test borings have been drilled in this area. Consequently, the major pathway has not been characterized. Soil samples taken from test borings provide evidence of vertical contaminant migration. Soil samples from borings 6, 7 and 9 showed some volatile organic contamination. A sample from boring 6, which is located west of the lagoon, was found to contain 1,1,1-trichloroethane, 1,1,2-trichloroethane, trans-1,2-dichloroethene, and trichloroethene (soil sample TB-6A).

The lagoon and the soil directly beneath is believed to be a major source of contaminants affecting the groundwater. It is also likely that other soils in or near the region of the saturated zone are contaminated with liquid contaminants which have percolated to their present location after many years. Such subsurface "hotspots" can act as discrete continuous sources of groundwater contamination.

The primary mechanism for contaminant migration through soils is leaching from the soil to the interstitial water (pore space water) or other water. One measure of the leaching potential of an organic contaminant in soils is the chemicals soil/sediment adsorption coefficient, Koc. Koc may be thought of as the ratio of the amount of chemical adsorbed on a solid per unit weight of organic carbon in the soil or sediment to the concentration of the chemical in solution at equilibrium. Koc is defined as follows:

$$Koc = \frac{\mu g \text{ contaminant adsorbed/gram organic carbon}}{\mu g \text{ contaminant dissolved/mL solution}}$$

The interpretation of this equation is that for slightly or moderately soluble organic chemicals, there will always be an equilibrium solubility concentration of the contaminant in solution. Consequently, if a significant quantity of soil is contaminated, such as the lagoon, soil column beneath the lagoon, or other subsurface "hotspot," such contaminated soils can be acting as sources of contaminants that are leaching into the groundwater. The solvent for leaching (i.e., the water needed for dissolution of contaminants from the soil particles) can be groundwater recharge precipitation or interstitial water. Interstitial transport without groundwater or recharge precipitation would tend to be a slow but persistent process.

p.4-38 See the response to the comment on p.4-36.

p.4-42 See the response to Item 1 under General Overview and Conclusions and the response to the comment on p.3-49 in this section.

<u>Response to Specific Comments Referenced to Report Section and Page</u>

p.ES-1 All groundwater samples for metals analysis were filtered through a 0.45 micron filter prior to preservation as described in the Site Operations Plan.

p.ES-2 Subsurface soil sampling procedures, as outlined in the Site Operations Plan, were followed.

As stated previously, the scope of the groundwater monitoring program was limited.

p.ES-3 See the response to the previous comment.

p.ES-4 This comment was previously addressed in the response to the comment on p.3-49.

p.ES-6 (First Paragraph) The potential for offsite groundwater contamination resulting from sources on the Swope Oil Company Site was addressed as Item 1 under the Response to General Overview and Conclusions section.

p.ES-6 (Last Paragraph) National Highway Well No. 1 (PW-1) is not presently being used for consumption; hence, there is no operating exposure pathway. However, the well has not been closed by a legal mandate and could be used at anytime. If for any reason, the deep aquifer at the National Highway Well No. 1 location is used for human consumption or domestic use, the exposure pathway will be complete. Hence, a potential health risk exists as a result of chemical contamination.(1)

p.ES-7 The statement in the draft RI/FS report identifies a completed exposure pathway for the Park Avenue Well 2 and Puchack Well 2 based on samples collected during the RI. The statement addresses the public health concern associated with these sources of water. The statement makes no mention of the source of contamination in these wells.(1)

p.3-1 The draft RI/FS report has outlined the limitations of the subsurface investigation and includes a recommendation for additional studies.

p.3-13 The transmissivity values discussed on this page are regional values and are not intended for site-specific situations.

p.3-14 The last sentence in Section 3.2.3.3 should only reference Figure 3-4 and not Table 3-4.

The distance drawdown curves (Figure 3-4 in the draft RI/FS report) with non-leaky artesian characteristics were developed based on regional hydrogeologic information, not site-specific hydrogeologic information. These curves wre presented in the regional geology section of the report and were presented as general background information.

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(1) Health risk assessments are conducted by scientists, but they are not "classical science" in the strictest sense. For regulatory purposes, risk assessments represent a tool that can be used to analyze scientific evidence in order to evaluate the relationship between exposure to toxic substances and the potential occurrence of disease. The risk assessment process involves, on one extreme, scientifically verifiable findings, and, on the other extreme, judgments about the use of various kinds of scientific information. No one should be misled into believing that results using present techniques have the status of incontrovertible scientific agreement. Despite its uncertainties, however, risk assessment is the <u>only</u> tool EPA has for discriminating among environmental health problems. (USEPA, December 1984, Risk Assessment and Management: Framework for Decision Making. EPA 600/9-85-002. Washington, DC.)

p.3-17 and p.3-19 Sampling protocols were outlined in the Site Operations Plan.

p.3-36 It is believed that G&M is commenting on page 3-26, not page 3-36. On page 3-26 there is a typographical error. The text should reference the reader to Table 3-7. The scales for the data plots given in Appendix A are analyzed according to: Bouwer, H. and R. C. Rice (1976). These data are plotted correctly and are not reversed.

p.3-27 The statement in the text should read: "The well is screened from 195 to 200 feet and from 210 to 230 feet below ground level. Both screens are located below a 20 foot thick clay."

p.3-31 The report stated that "...this clay deposit <u>may</u> be extensive in the area and <u>may</u> act as a confining lower-layer for the upper aquifer."

Drawing S758-01 does show thin facies changes from clay to silt and vice versa.

p.3-36 The text should indicate that the Delaware River is located west of the site.

p.3-38 Drawdown in the water table aquifer monitoring wells during pumping of PW1 proves that there is a direct hydraulic connection between the upper and lower aquifers. Assumptions that were made <u>before</u> the pumping test was conducted were disproved after the pump test results were evaluated.

p.3-39 The anticipated drawdown in MW3 was assumed for conditions where the pumping well and observation wells were in the same hydrologic unit. This was disproved when the drawdown in MW3 was less than anticipated.

Figure 3-8 and Figure 3-10 show a change in groundwater flow direction and gradient between non-pumping and pumping conditions.

p.3-42 The value of 4.5×10^{-7} cm/sec was considered as a highest permeability value for analysis to give a worst case leakage estimate.

The vertical gradient can be calculated based on the following information.

Pumping level of PW-1 = 124 feet
Water level in unconfined aquifer = 81 feet
Clay thickness = 20 feet

The gradient is therefore (124-81)/20 = 2.15 ft/ft

The connection of the two aquifers and the results for the pumping test were previously discussed in response to items 5 and 6, General Overview and Conclusions.

p.3-43 Calculations to substantiate this claim are located in the text on p.3-43 and in Table 3-9.

Refer to pumping test data for information proving the existence of a "window" in the clayey layer.

p.3-47 There was a fluctuation in the discharge during the first minute of the pumping test. This data was not used for interpretation purposes. An average pumping rate of 13.71 gpm was used for the calculation of transmissivity.

p.3-48 A vertical gradient of 2.1 ft/ft was given earlier in the text.

p.3-49 and p.3-50 The continuity of the clay layer, the calculation of the horizontal flow velocity, and the vertical gradient through the clay have all been discussed previously.

p.4-2 The title of Table 4-1 should be renamed "Concentration Ranges of Chemical Contaminants Detected in Environmental Samples Taken During the Remedial Investigation."

p.4-3 The following information should be added to the Base/Neutral Section of Table 4-1:

PP No.	69B
CAS No.	117-84-0
Contaminant	di-n-octyl phthalate
Groundwater	
µg/l	2K-58
Obs/sample	2/19

p.4-4 Problems with the pumping equipment precluded sampling MW2.

1.7 µg/l PCB 1254 corresponds to a soil PCB concentration of 85.2 µg/kg given a Koc of log 4.53 and 0.1 percent soil organic carbon content. PCB 1254 soil concentrations ranged from 91.3-10,290 µg/kg in the borings and from 970-2,300,000 µg/kg in the surface soil.

While it is true that the PCB 1254 detections in MW's 1 and 5 could be due to drilling or sampling procedures, protocols for preventing such errors were inplace and there is no evidence that they were breached. On the other hand, it is obvious that the PCB contamination in subsurface and surface soils is more than adequate to have generated groundwater concentrations of PCB 1254 equal to and even well in excess of the 1.7 µg/l observed in MW1 and 5. While the speculative conclusion forwarded by G&M is plausible, the explanation provided, based on empirical and theoretical evidence, is more plausible. This conclusion is also substantiated by the occurance of PCB 1254 in surface water samples. See the response to G&M comment 4-36 for a discussion of organic contaminant leaching.

Several of the volatile organic contaminants found in MW-3, including 1,1,1-trichloroethane, tetrachloroethene, and 1,1-dichloroethene, exceed Preliminary Protective Concentration Limits (PPCLs). The contamination can therefore be considered major.

p.4-6 All groundwater samples submitted for metals analysis were filtered.

The typographical errors in Appendix C relating to the identification of data for PW-2 were discussed previously.

The Swope Oil Company was known to have processed solvents from different sources and those mentioned by G&M (except landfills) could very well have been sources of material processed at the site.

p.4-7 This is a correct statement.

p.4-8 See the response to G&M comment p.4-6. Table 4-4 is correct.

Historical analytical data for PW-1 were obtained from the Merchantville-Pennsauken Water Commission and from NJDEP. Some data were received verbally, and copies of some data sheets were obtained. It could not be determined if the data had been validated. Also, the historical record appeared to be incomplete. For these reasons, historical analytical data were not included in the test.

p.4-9 See the response to G&M comment 4-6 concerning volatile organic contamination in PW-2. The next to last sentence on this page contains a typographical error. PW-1 is located adjacent to the site, not PW-2.

p.4-15 The adequacy of soil data was previously discussed in reference to G&M proposed remedial measure Task 5 and in response to General Overview and Conclusion Item 8.

p.4-19 Data validation was conducted by EPA Region II for all analytical data for samples sent to Contract Laboratory Program (CLP) laboratories. The validation process was conducted before any data were released to NUS. Thus, all data used in the draft RI/FS report were considered valid. Invalidated data were not used to assess site contamination. Invalid data points have been included in Appendix C and are marked with the letter I in the "value" and "Rel" columns.

p.4-20 Six organic contaminants are mentioned on this page as compounds detected in the sludge, two of which have been detected in MW-3. These two contaminants, bis(2-ethylhexyl)phthalate and di-n-octyl phthalate, have passed EPA validation and are considered valid. It is only the opinion of G&M that these data are questionable. Thus, the sludge could be the source of the common contaminants found in MW-3.

p.4-36 See the response to the previous G&M comment for p.4-36.

p.4-39 See the reponse to the first G&M comment for p.4-36.

p.4-40 The word permeability should be substituted for the word transmissivity.

The groundwater velocity in the confined aquifer was previously addressed in the response to G&M comment on p.3-50.

p.4-41 The typographical errors in Appendix C concerning the labeling of volatile organic data for PW-2 have already been discussed. No volatile organics have been detected in PW-2.

p.4-42 It is our opinion that the aquifer contaminants would not differ significantly over a 3-month period.

See the response to General Overview and Conclusion Item 1 and 2 for a discussion of contaminant migration.

Sec. 7 Analytical data for samples collected from the tanks are presented in Appendix C. Building and tank removal will be required if a cap is to be placed on the site.

An asphalt cap is susceptible to cracking, and was therefore screened from further consideration (see p.6-7 in the draft RI/FS report).

Responses to Miscellaneous Comments

p.3-25 Table 3-6 contains a typographical error. The value of 18.41 g/cm^3 should be 1.841 g/cm^3.

p.3-13 The value is incorrect and will be changed.

Table 4-2 MW-2 was not sampled because of mechanical problems with the well and sampling equipment. The values for bis(2-ethylhexyl)phthalate and di-n-octyl phthalate in MW-3 passed EPA validation and are considered valid.

Figure 3-8 G&M note that two organic contaminants (acetone and total xylenes) were detected in MW-5 but not in MW-1. However, it must also be noted that four other organic contaminants (1,1,1-trichloroethane, tetrachloroethene, bis(2-ethylhexyl)phthalate, and PCB-1254) were detected in both wells. While MW-5 is upgradient of MW-1, MW-5 is also downgradient of the northwest corner of the lagoon area where sludge was buried.

MW-4 is located adjacent to the area of buried sludge along the southeastern side of the site, possibly the source of contamination in MW-3 and MW-4.

Drawing S758-01 The higher water level in MW-1 than in MW-2 on the date measured, January 31, 1985, is probably the result of measurement error. As indicated on Table 3-5 of the draft RI/FS report, the water level in MW-2 was measured five times. Three water level readings in MW-2 (July 11, 1984; March 5, 1985; and April 1, 1985) show close agreement with the water levels in MW-1. The other two readings show water level differences of approximately 2 inches.

Appendix C The respective values for calcium, chloride, and nitrate for samples collected April 10, 1985 were the same for National Highway Wells 1 and 2. The reported values are not typographical errors. The values passed EPA validation and are thus considered valid.

When contaminants are detected in blank samples, EPA validation protocols outlined on p.5-3 and 5-4 of the draft RI/FS report are followed. All samples in question were analyzed by CLP laboratories and the analytical results were validated by EPA prior to release to NUS.

General — Historical analytical data for PW-1 were obtained from the Merchantville-Pensauken Water Commission and from NJDEP. Some data were received verbally, and copies of some data sheets were obtained. It could not be determined if the data had been validated. Also, the historical record appeared to be incomplete. No data were available for the period prior to 1982, the period of active site operation. It is possible that some or all site-related contaminants appeared in PW-1 during this period. For these reasons, historical analytical data were not included in the text.

If you have any questions concerning this response to comments, please call me.

Very truly yours,

Richard M. Ninesteel
Project Manager

Approved for Submittal,

Donald R. Brenneman
Regional Manager
Region II

RN/slk

MELVIN R. PRIMAS, JR.
MAYOR

CITY OF CAMDEN
OFFICE OF THE MAYOR

July 9, 1985
hand delivered at
public meeting

Mr. Donald Lynch
Project Manager
Environmental Protection Agency
26 Federal Plaza
New York, New York, 10278

re: Swope Oil Site Work

Dear Mr. Lynch,

On behalf of the City of Camden, I would like to express my concern with respect to the findings of NUS and reserve the right to submit additional written testimony for the record.

Preliminary review by City staff seems to still point toward Swope as a source of contamination to the regional groundwater.

The City of Camden requests that no final action be taken reguarding site mitigation activities until the completion of the NJDEP contaminated well field study currently underway. The area near the confluence of the Delaware River and Pennsauken Creek represents too valuable a regional water resource to allow a less than complete mitigation of the ground water contamination.

Thank You for your assistance in this matter. If you have any questions, please contact Mr. Frederick Martin, Jr., of my staff at 609-757-7680.

Sincerely,

Melvin R. Primas,
Mayor

cc: F. Martin,Jr, Dept. of Utilities
Distribution List

CITY HALL / SIXTH AND MARKET STREETS / CAMDEN, NEW JERSEY 08101 / (609) 757-7200

BOARD OF CHOSEN FREEHOLDERS
Jung H. Cho
[illegible]
Health Coordinator

Camden County
DEPARTMENT OF HEALTH
1800 Pavilion, 2101 Ferry Ave., Camden, N.J. 08104
Phone: (609) 757-8600

July 10, 1985

Donald Lynch, P.E.
N.J. Remedial Action Branch
U.S.E.P.A.
26 Federal Plaza, Room 402
New York, N.Y. 10278

Dear Mr. Lynch:

Regarding the Remedial Investigation and Feasability Study of the Swope Oil Site in Pennsauken, New Jersey, we agree that further hydrogeological investigation is necessary to determine the extent of contaminant plumes from this site. The remedial alternatives regarding the tanks, building, utilities, sludge and soils will remove the threat of immediate health problems at the site and should be initiated as soon as possible.

Our "comment" involves the contamination of the Merchantville Pennsauken Water Commission Well Number 1. We feel that this well has clearly been impacted by this hazardous waste site. The impact of the Swope Oil site is that not only has the groundwater in the area of the site been degraded but that the resource of the well has been effectively taken from the residents of Pennsauken and Merchantville. We feel that the eventual remediation of the site should not only consider treating the groundwater at the site but also replacement of the well's capacity for the Merchantville Pennsauken water system using Superfund monies. We don't believe that the "blending" of water from well #1 with other uncontaminated Merchantville Pennsauken system water is an acceptable future alternative and that this well should be formally condemned by NJDEP. The well is now not being used voluntarily by the Merchantville Pennsauken Water Commission, this leaves the potential for future use open.

In conclusion, our department applauds the steps being taken to protect the health of the citizens of Pennsauken Camden County and stress that this hazardous waste site has not only damaged the environment but has also impacted the infrastructure of this community in its reduction of potable water capacity.

Yours truly,

David Sweeney

David Sweeney
Administrative Analyst

DS:ra
cc: Pennsauken BOH-MGB
Pennsauken Merchantville Water
DEP
Bernard Sebastian

KMD ASSOC. Korab, McConnell & Dougherty Assoc, P.A.
Engineering, Land Surveying & Land Planning

July 15, 1985

U.S. Environmental Protection Agency
Region II
26 Federal Plaza
New York, N.Y. 10278

Attn: Mr. Donald Lynch, PE

Re: MPWC - Swope Oil Site - National Highway Well #1

Dear Mr. Lynch:

This response is being prepared on behalf of the Merchantville & Pennsauken Water Commission.

The Commission has reviewed the various reports and the evaluation of remedial alternatives.

The Commission believes that the most cost effective and beneficial alternative to this matter is the construction of a new well pump system and distribution feed main to the National Highway Treatment Plant. The Commission feels that a satisfactory location would be in the median area of N.J. Route 130.

This site is located approximately 2000 feet from National Highway and the Commission feels that this is an ideal and expedient solution to replacement of National Highway Well #1.

The estimated cost of such an alternative would be $600,000.00.

Test wells in this area would indicate existing ground water quality and the Commission urges these tests be taken as soon as possible.

We have included sketches outlining this proposal for your review.

KMD ASSOC. Korab, McConnell & Dougherty Assoc, P.A.
Engineering, Land Surveying & Land Planning

Please review this alternative and advise the Commission of your intentions on this matter.

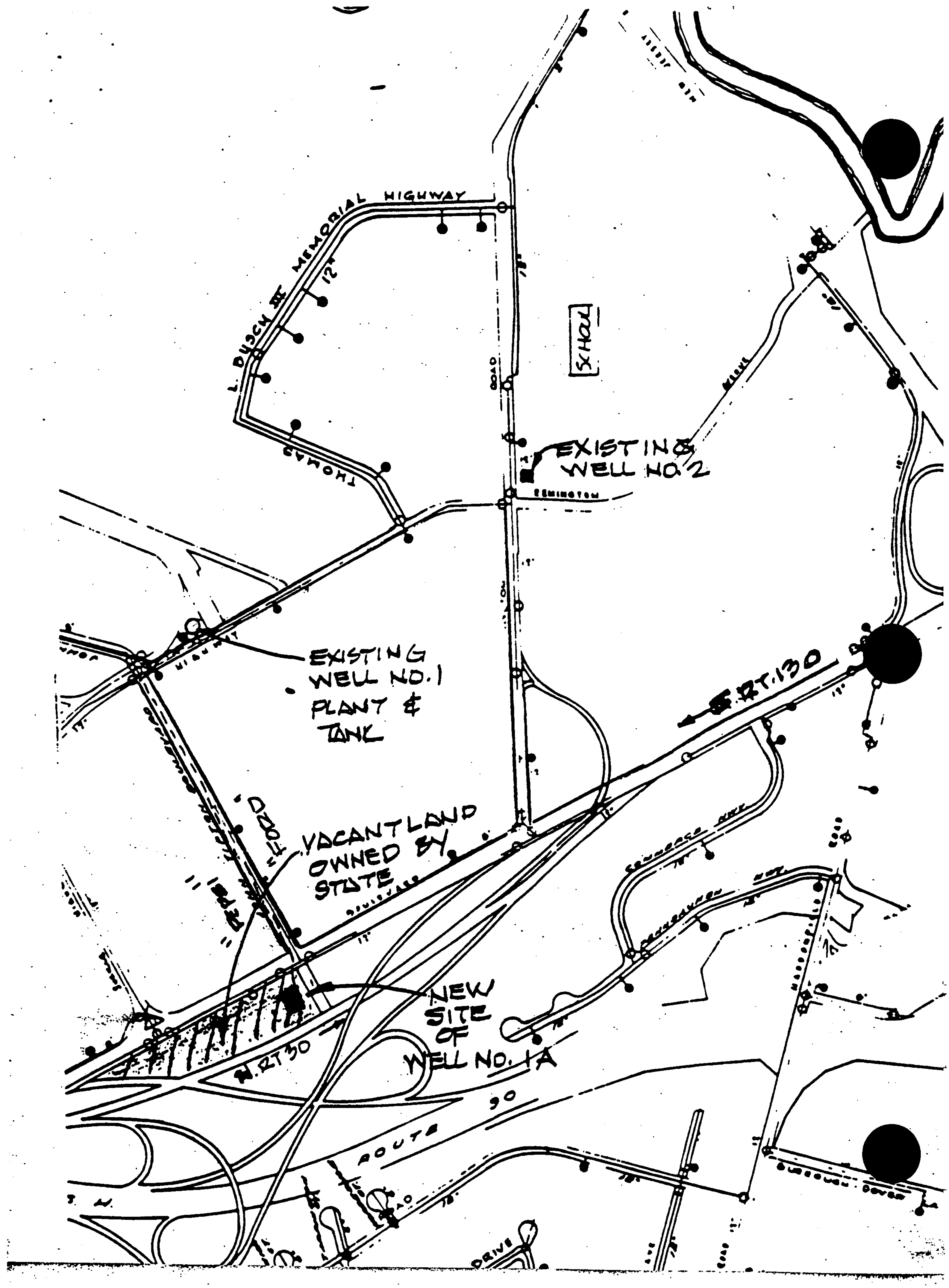
Should there be any questions, please feel free to contact me.

Respectfully submitted,

E.A. Korab, PE

EAK:mg

cc: MPWC
R. Brown
L. Holland


EXISTING WELL NO. 2
EXISTING WELL NO. 1 PLANT & TANK
VACANT LAND OWNED BY STATE
NEW SITE OF WELL NO. 1A
RT. 130
RT. 30
ROUTE 30
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August 1, 1985

Ms. Carole Peterson
Hazard Assessment Section
Hazardous Waste Site Branch
U.S. EPA - Region II
26 Federal Plaza
New York, NY 10278

HAND DELIVERED

Dear Ms. Peterson:

This letter and its attachments constitute the comments of certain members of the Swope Site Cleanup Committee to the draft Remedial Investigation/Feasibility Study ("RI/FS") for the Swope Oil Superfund site located in Pennsauken, New Jersey.

A. As our consultants have pointed out in their attached comments, the draft RI/FS provides insufficient data upon which the Agency can make a rational decision as to an appropriate remedial program for the Swope site at this time. We therefore agree with the Agency's recommendation that a more comprehensive hydrogeological investigation, followed by a Feasibility Study, be undertaken. The Committee strongly desires to perform the additional groundwater studies recommended by the draft RI/FS. As the Agency is well aware, the Swope site is located in a heavy industrial area and there exists in the vicinity of the Swope site many other potential sources of groundwater contamination. Accordingly, we believe that it would be improper for the scope of the contemplated groundwater study to be substantially broader than an investigation to determine the extent and significance of contamination, if any, resulting from the Swope site.

Accordingly, this shall constitute our formal request that the Agency permit the Committee to undertake a more comprehensive hydrogeological investigation to determine the presence and extent of contaminant plumes, if any exist, resulting from the Swope site.

Furthermore, the Committee strongly desires to perform any Feasibility Study which may be necessary to evaluate potential groundwater remedial alternatives. This letter shall also constitute the Committee's formal request that EPA permit the Committee to undertake this Feasibility Study. Geraghty & Miller has estimated that the groundwater study will take approximately six months after approval of a work plan.

B. In addition, because the draft RI/FS provides insufficient data, the selection and full implementation of alternative S-6D, which has been tentatively selected by the Agency, would be premature, arbitrary and capricious and an abuse of discretion by the Agency. Furthermore, full implementation of alternative S-6D is inappropriate because it is not cost effective. CERCLA requires that responses be cost effective. 42 U.S.C. §9605(7). The National Contingency Plan directs EPA to choose the appropriate extent of remedy which it determines is cost effective. 40 C.F.R. §300.68(j). The "cost-effective" remedy is defined as that remedy which is the lowest cost alternative that is technologically feasible and reliable and which effectively mitigates and minimizes damage to, and provides adequate protection of, public health, welfare or the environment. 40 C.F.R. §300.68(j). Here, the draft RI/FS admits that the capping plan (Alternative S-2) is an effective remedy which would cost one-third the amount of Alternative S-6D. Therefore, alternative S-6D is clearly not the cost effective remedy in this case.

However, without admitting any liability or obligation, and despite the critical comments of its consultants Geraghty & Miller concerning the draft RI/FS, the Committee requests that the Agency agree to permit it to voluntarily implement the following steps at the Swope site pending the collection of additional data:

1. <u>To dismantle the presently existing structures at the site and properly dispose of the contents of the buildings as well as the demolition debris.</u> The Committee is willing to take this measure as a gesture of good faith and our continued willingness to cooperate with the Agency in resolving the Swope situation;

2. <u>To remove and properly dispose of any residual waste material in the tanks, steam clean the tanks, and remove them from the site;</u>

3. To plug all sewer lines and any pipes which are found beneath the existing structures;

4. To pump and remove surface water from areas in which ponding has occurred;

5. To grade the area to control surface water run-off and prevent further ponding on the site;

6. To excavate, remove and incinerate soil with PCB levels in excess of 500 ppm;

7. To remove and dispose of the sludge;

8. To remove and dispose of visibly contaminated soil.

As a precautionary measure, the Committee proposes that National Highway Well #1, which is currently shut down, be pumped. We are advised by our consultants Geraghty & Miller that the pumping of National Highway Well #1 will assist in containing any possible migration of contaminants which may currently be located beneath the site, whatever their source.

The Committee feels that these measures are consistent with the National Contingency Plan and further are consistent with the CERCLA goals of effectively preventing, mitigating and minimizing damage to, and providing adequate protection of, public health, welfare and the environment.

C. Finally, we feel that a significant number of speculative comments and wholly unsupportable conclusions are misleadingly presented in the draft RI/FS as scientifically provable findings. Accordingly, all such speculative findings should be deleted, including those contained in the Executive Summary alleging an increased risk of cancer. Additional unsupportable conclusions of the draft RI/FS are referenced on pages 4-6 of Geraghty & Miller's comments.

The Committee is hopeful that the Agency will agree to these proposals and that we may be permitted to implement this plan forthwith.

Sincerely,

John F. Stoviak
on behalf of certain members of
the Swope Site Cleanup Committee
who have been participating
in the surface cleanup

JFS:fad
Enclosures
cc w/enclosures: William K. Sawyer, Esquire
Mr. Donald Lynch, P.E.

GERAGHTY & MILLER, INC.
Ground-Water Consultants

July 29, 1985

Mr. K.A. Walanski, P.E.
Corporate Environmental Engineer
DeSoto, Inc.
Administrative and Research Center
1700 South Mount Prospect Road
Des Plaines, Illinois 60018

Dear Mr. Walanski:

Geraghty & Miller, Inc. (G&M) has reviewed the RI/FS report submitted by NUS Corp. for the SOCC site in Pennsauken, New Jersey, and we have concluded that insufficient data exists pertaining to the site to adequately select and design appropriate remedial measures. G&M has taken this opportunity to propose to the PRPs several preliminary remedial steps and further studies which would provide an adequate data base upon which a final remedial plan can be designed.

The proposed preliminary remedial measures and studies are as follows:

Task 1: Excavation and Removal of "Hotspot" to Offsite Facility
Task 2: Surface-Water Control Measures
Task 3: Additional Soil and Ground-Water Studies
Task 4: Pumping of Merchantville-Pennsauken National Highway Well 1 to Contain Contaminated Ground Water in the Confined Aquifer
Task 5: Eventual Capping of the SOCC Site.

A discussion of each task follows.

Task 1. Excavation and Removal of "Hotspot" to Offsite Facility

All visibly contaminated soil (soil which is oil-stained) will be excavated and removed from the SOCC site and properly disposed in a Hazardous Waste Facility (HWF). Areas containing sludge deposits will be excavated and removed from the site and contained in a HWF.

Task 2. Surface-Water Control Measures

All surface water at the SOCC site (particularly water ponded in the lagoon and the tank farm) will be removed, tested for total volatile organic compound content and if determined to be contaminated, will be treated offsite.

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After all ponded water is removed, areas at the SOCC site where surface water is known to pond will be graded in a manner to encourage proper drainage and prevent the ponding of surface water. Care will be taken to protect the monitoring wells at the SOCC site during the grading operation.

Task 3. Additional Soil and Ground-Water Studies

This program will be designed to provide the additional data which is necessary to select the appropriate remedial measures for the SOCC site. The focus of the study will be to define the potential pathways for contaminants to enter the ground-water system at the SOCC site and the extent of ground-water contamination in the unconfined and confined aquifers.

Generally, the program will entail: the collection and retention of soil cores for chemical analyses to determine the presence/absence of contaminants from the land surface to the water table; the installation of monitoring wells in the unconfined and confined aquifers to determine ground-water flow directions and water quality in both aquifers, and describe upgradient water quality; and a ground-water monitoring program utilizing the existing and proposed monitoring wells and Merchantville-Pennsauken National Highway Well 1. Each well will be used to obtain water-level and water quality data. The program will extend over a period of six months and will provide a statistically valid data base.

Task 4. Pumping of Merchantville-Pennsauken National Highway Well 1

The well is presently contaminated with volatile organic compounds and mercury and has been shutdown. The plume of contaminated ground water that PW-1 taps and over which it probably exerted some control through pumping, is now free to further migrate in the aquifer in response to existing hydraulic gradients.

PW-1 should be pumped on a continuous basis or as much as possible and at as high a rate as feasible in order to contain and prevent the further spread of the plume. If PW-1 remains shutdown, the ground-water plume may move and contaminate presently clean portions of the confined aquifer.

Task 5. Eventual Capping of the SOCC Site.

It is recognized that some type of cap may be needed for the site. Presently available data is insufficient to determine the type of cap required and the size of the area over which it must be placed. Installation of a cap at this time would be premature. Installation of a cap at present would also be premature because if it is determined, based on the additional site investigative work, that onsite remedial work is required to address the ground-water contamination problem, then a significant portion of a cap would be damaged in carrying out this remedial work.

Additional site investigations are required before a decision on the type and size of cap can be made. These investigations are described above. There are two basic ways for solid waste to cause ground-water contamination: either by percolation of rainfall through the waste to form leachate and then movement of the leachate to the water table, or by ground water coming in contact with the wastes by flowing through them and dissolving contaminants from the waste. Capping of the site would significantly minimize infiltration of precipitation and therefore, preclude generation of leachate.

At the SOCC site the depth to water below land surface is approximately 80 feet while the wastes are at land surface and soils containing high levels of contaminants are approximately one to two feet below land surface. Therefore, ground water cannot flow through the wastes to produce leachate.

Capping the areas of contamination at the SOCC site would remove the site as a source of contamination, if it is indeed shown to be a significant source through the extra site investigation discussed above.

We hope that these alternatives are acceptable to you. Please call if you have any questions or require additional information.

Sincerely,

GERAGHTY & MILLER, INC.

Christopher Creed
Staff Scientist

Douglas R. MacCallum
Senior Scientist

Michael F. Wolfert
Associate

CC:DRM:MFW:me

GERAGHTY
& MILLER, INC.
Ground-Water Consultants

July 30, 1985

Mr. K.A. Walanski, P.E.
Corporate Environmental Engineer
DeSoto, Inc.
Administrative and Research Center
1700 South Mount Prospect Road
Des Plaines, Illinois 60018

Re: Review, Evaluation, and Comments on the Swope Oil and Chemical Company (SOCC) Remedial Investigation/Feasibility Study (RI/FS)

Dear Mr. Walanski:

As requested, Geraghty & Miller, Inc. has reviewed the RI/FS work plan and the RI/FS report prepared by the EPA Contractor (NUS Corporation) for the SOCC site located in Pennsauken Township, New Jersey. Based on the findings reported by NUS in the SOCC RI/FS, it is our opinion that sufficient data does not exist to determine what remedial measures, if any, are appropriate for the SOCC site. Briefly, our review of the RI/FS reveals that adequate and appropriate remedial alternatives cannot be determined or implemented until supportive data are developed indicating: (1) the extent of contamination attributable to the SOCC site and the impact of any such contamination on the unconfined (shallow) and confined (deep) aquifer; (2) the extent of soil contamination at the SOCC site; and (3) the pathway, if any, for the contamination at land surface to reach the unconfined aquifer. Absence of such data prevents proper selection and implementation of any remedial plan addressing soil contamination and possible ground-water contamination at this time. Furthermore, it is impossible to determine the areal extent and composition of a cap for the site at this time due to the undefined extent of soil contamination.

Our comments and opinions on the above documents have been separated into four main categories. The first category contains a general overview of the reports and our major conclusions. The second section lists conclusions made in the NUS report which are not supported by the data. The third section contains detailed comments referenced to specific report pages. The final section describes miscellaneous errors and inconsistencies that are less significant than the discussions in the other sections.

GENERAL OVERVIEW AND CONCLUSIONS

Review of the RI/FS report prepared by NUS Corporation for the SOCC site has revealed several major deficiencies in the planning and implementation of the field work, data interpretation, and reporting. These are summarized as follows.

1. Data developed to date relating surficial contamination at the SOCC site to the contamination in PW-1 (tapping the confined aquifer) are speculative and totally inadequate to prove any connection between the alleged source and contaminated well.

2. Because monitoring wells were not installed in the confined (deep) aquifer, the direction of ground-water movement in this aquifer cannot be determined with confidence and, therefore, it cannot be known if contaminants could migrate to PW-1 from beneath the SOCC site if they exist there in the deep aquifer (which is not known at present).

3. Because monitoring wells were not installed in the confined aquifer it cannot be determined if there is a plume of contaminants traceable from the SOCC site to PW-1. Additionally, due to the lack of monitoring wells, the water quality in the confined aquifer upgradient (direction unknown at present) of the SOCC site cannot be determined. Therefore, the possibility of PW-1 being contaminated by offsite sources cannot be adequately addressed at present.

4. Although monitoring wells have been installed on the SOCC site in the unconfined (shallow) aquifer, the number and distribution are not suf-

ficient to adequately describe water quality conditions onsite and the quality conditions of water flowing onto the site.

5. All available data, which includes geologic logs, geophysical logs, cross sections, and pumping test data strongly indicate that the unconfined and confined aquifers are hydraulically distinct units separated by a continuous clay layer. Although the clay layer has a very low permeability, a downward hydraulic gradient could allow leakage of water through this unit. However, data on such a vertical gradient have not been produced.

The suggestion in the NUS report that a "window" exists in the clay is totally speculative and contradicted by all available data. The report states that the clay layer is extensive and acts as a confining layer between the unconfined and confined aquifers. The clay layer was encountered at all monitoring wells at the SOCC site and was logged during the drilling of PW-1. In addition, the geologic cross section (Drawing S758-01) included in the NUS report shows the clay layer as a continuous unit.

6. Sufficient pre-test and post-test water-level data were not collected from the unconfined aquifer monitoring wells measured during the 24-hour test on Production Well 1 (confined aquifer) and therefore, the cause of water-level declines observed in these wells during the test cannot be confidently determined. Pumpage of National Highway Well 1 or any other well in the site vicinity, stage-level changes in the Delaware River, or seasonal regional water-level changes or any combination of the above are all possible factors which could cause the observed water-level declines.

7. Based on data presented to date, contamination of National Highway Well 1 cannot be attributed to activities at the SOCC site. Because of the industrialized nature of the area, other potential sources are as likely causes of contamination as SOCC.

8. Because approximately one-third of the site was not studied, the determination of PCB extent in surficial soils is not sufficient to determine what remedial actions are needed for the entire site. Specifically, the alternative presented by NUS to excavate 1.5 feet of soil from the site is arbitrary and exceeds any reasonable remedial effort.

SUMMARY OF NON-SUPPORTABLE CONCLUSIONS

Page

3-49: "The clay deposits are not continuous." Data presented in the NUS reports contradict this statement. Boring logs from PW-1 and the monitoring wells installed under NUS supervision report a clay layer at all well locations. The 24-hour pumping test at PW-1 indicated that there is no direct connection between the shallow and deep aquifers, implying the existance of a continuous clay layer.

"The clay deposits may be pinching out to the south of the site." No data are presented in the NUS report (in the form of boring logs and geophysical logs) from the vicinity south of the SOCC site and PW-1 to indicate that the clay zone pinches out south of the site. Until such data are presented the statement is speculative.

3-50: "Under PW-1 pumping conditions, the horizontal ground-water flow ve-

Page

locity in the confined aquifer is estimated to be 10.61 ft/day (3,870 ft/yr)." NUS has not presented any data (in the form of water-level measurements or aquifer testing in the confined aquifer) to properly predict the horizontal flow rate or direction in the confined aquifer.

"Under PW-1 pumping conditions, the downward vertical velocity through the clay deposits is about 8.9×10^{-3} ft/day (3.2 ft/yr)." Estimates of vertical flow velocities through the confining unit (the clay deposit) cannot be made until a vertical flow gradient has been calculated. Based on the information presented in the NUS report, a vertical gradient has not been calculated at the SOCC site.

4-6: "...National Highway Well 2 has not yet shown any volatile organic contamination..." Contrary to this statement, PW-2 is contaminated with volatile organic compounds as indicated in Appendix C.

4-36: NUS lists three mechanisms for environmental contamination at the SOCC site: "Percolation of contaminants from the lagoon, tank farm and ponded surface water through the soils to the ground water." "Percolation of contaminants through the soil to the ground water from spillage due to handling, processing, and disposal of chemicals used or processed at the site" and "movement of contaminants into the soil and ground water following spillage over the surface of the site." The alleged environmental contamination with respect to

Page

ground water beneath the site is unsubstantiated as no continuous pathway between the contaminant source and ground water has been shown to exist.

4-38: "Movement of the site-associated chemicals as constituents of the ground water is the major route of contaminant migration associated with the site." No evidence of contamination throughout the entire thickness of the unsaturated zone has been demonstrated. The shallow water table well (MW-2) has not been sampled. If the site were the source of deeper ground-water contamination (Monitoring Wells 1, 3, 4, and 5) contamination would likely be present in the intervening zones.

4-42: "Mobile contaminants seem to move fairly well from the upper to lower aquifer depending upon the influence of the dominant cone of depression of the time." There is no evidence supporting this statement. A continuous clay layer, which separates the shallow and deep aquifer acts as a confining unit between the aquifers. The clay unit retards the vertical movement of ground water. It is unlikely that mobile contaminants "move fairly well" between aquifers.

SPECIFIC COMMENTS REFERENCED TO REPORT SECTION AND PAGE

ES-1: The claim that "ground water in the unconfined aquifer beneath the site is contaminated, primarily with volatile organics and heavy metals," is based on one round of analysis of samples from four

Page

wells. It is not known (by us) whether the samples for metals' analyses were passed through a 0.45-micron filter prior to preservation for shipment, as proper protocol dictates. No data were provided on sampling and analytical techniques.

ES-2: The reported subsurface soil contamination to a depth of at least 40 feet at only one location could be the result of improper sampling techniques that resulted in contamination of that sample.

As noted, the area is heavily industralized and a landfill is located some 3,000 feet north of the site. No mention is made of the possibility that off-site sources may be responsible for ground-water contamination beneath the site. Data from any on-going or completed studies of ground-water contamination in the area should have been researched and included in this report.

ES-3: Although the subsurface investigation was not intended to identify sources of ground-water contamination other than the Swope Oil Company site, other sources should have been investigated at least as noted above. We believe that this is a major deficiency.

ES-4: The statement that "the leakage appears to be to the south of the site where a window through the clay might exist" is speculative.

ES-6: First paragraph. At this point, we do not believe sufficient data exist to attribute any off-site contamination to the Swope Oil Company site.

Page

ES-6 Last paragraph. Since PW-1 is not in use, there is no completed exposure pathway for individuals using the lower aquifer for consumption and hence no health risk.

ES-7: The implication that the Swope Oil Company site is responsible for risks associated with Park Avenue Well 2 and Puchack Well 2 is totally unwarranted.

3-1: NUS states that the scope of work was designed to abide by the request made by the NJDEP to avoid installing monitoring wells in the confined aquifer to prevent cross contamination between aquifers. Geraghty & Miller, Inc. is of the opinion that if the confined aquifer is already contaminated (based on the preliminary analysis water samples from PW-1), then the cross contamination issue is a minor concern. In addition, the NJDEP has drilling specifications designed specifically to prevent the cross-contamination of water-bearing zones during monitoring well installation. Until monitoring wells are installed in the confined aquifer, the pathway for contaminants to enter the confined aquifer cannot be properly determined.

3-13: The discussion of transmissivities for the confined aquifer fails to to clarify the purpose of evaluating several sets of data from production wells in the area. The data are not presented and the calculated transmissivity values and storage coefficients vary considerably. The wide range in values indicates that the data cannot be applied to site-specific situations.

Page

3-14: At the bottom of the second paragraph, there is a discussion of drawdown in various pumping wells versus distance and time. The referenced Table 3-4 and Figure 3-4 do not agree with the interpretation described in the text. Table 3-4 is an inventory of five monitoring wells screened in the unconfined aquifer and two production wells screened in the confined aquifer and not a series of wells screened in the confined aquifer. The distance drawdown curves shown on Figure 3-4 are for an aquifer with non-leaky artesian characteristics. The text describes the aquifer as leaky artesian and therefore the drawdowns shown are much greater than would actually occur.

3-17 and 3-19 This section of the text describes the test boring field program. There are no references to the decontamination of the augers or split-barrel samplers between borings and sample intervals. A soil sampling protocol must be submitted to verify that cross contamination did not occur between samples.

3-36: The first paragraph describes the analysis of data collected during the performance of slug tests. The scales for the data plots given in Appendix A apparently are reversed. Time is usually plotted on the logarithmic scale and the change in head is plotted on the arithmetic scale. The last sentence of the first paragraph is inconsistent with Tables 3-5 and 3-6. These tables list the laboratory data only and not the hydraulic conductivity data calculated from the "slug" tests.

Page

3-27: In the second paragraph, the two screens in PW-1 are described as being separated by 20 feet of clay. As illustrated on Drawing S758-01, the screened intervals of this well are both below the 20-foot thick clay layer.

3-31: The report states in the third paragraph that the clay layer is extensive and acts as a confining layer between the unconfined and confined aquifers. However, at several other places in the text it is suggested that the clay is discontinuous or that a "window" exists which is contrary to all existing data. The last paragraph states that the clay changes to silt. The geologic cross-section (Drawing S758-01) does not show this.

3-36: In the second paragraph it is stated that the Delaware River is situated southwest of the SOCC site. The location diagram shows the Delaware River to be west of the site.

3-38: In Section 3.3.3.4 the reasoning behind pumping PW-1 for a 24-hour period is described. The basic assumpiton that the unconfined and confined aquifers constitute one hydrological unit is a contradiction of all previous statements made in this report concerning the aquifers. A 20-foot thick clay unit separates the two aquifers and they must be considered separate.

3-39: The first paragraph contradicts the previous statement by reporting that the drawdown in MW 3 was less than anticipated and indicate

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that the two aquifers are not part of the same hydrological unit.

The discussion of the findings from the pumping test with reference to Figures 3-8, 3-9, 3-10 is incorrect. The water-level contours prior to and at the end of the test indicate that the ground-water flow direction in the unconfined aquifer remained the same during pumping of PW 1.

In the last paragraph, three possibilities of discharge of water from the unconfined aquifer are listed. One additional possibility was not mentioned. A decline in the water table could simply be the result of lateral movement of water away from the SOCC site in the unconfined aquifer.

3-42: In the second paragraph it is mentioned that the permeability value of the clay is 4.5×10^{-7} cm/sec. A value of 5.4×10^{-8} cm/sec is referenced in the report. In the same paragraph, the vertical gradient through the clay is reported to be 2 ft/ft. There are no data to substantiate this estimate. The leakage estimate of 17,000 gallons per day (gpd) would be reduced to approximately 1,700 gpd using the permeability value of 5.4×10^{-8} cm/sec.

In the last paragraph a deflection of water-table contours after pumping is described. This is not illustrated on the water-level contour maps. The estimate of 500,000 gpd is absurd because the pumping test did not indicate that a direct connection exists be-

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tween the two aquifers. Data are not available that indicate a window exists in the clay layer.

3-43: In the second paragraph it is stated that the radius of influence of National Highway Well 2 (PW-2) extends into the study area. No data are presented to defend this statement.

In Section 3.3.3.6, the first paragraph states that ground-water velocities will be affected by pumping patterns. The pumping patterns are the result of a hydraulic connection through a "window" in the clay. Again, there is no evidence of a "window" in the clay.

3-47: Figure 3-11 shows the results of a pumping test where the discharge (Q) was not constant. Also, the discharge was apparently greater than 16 gpm during the first minute of the pumping test. Maintaining a constant discharge rate during a pumping test is a major requisite in developing interpretable data.

3-48: The vertical velocities presented in the second paragraph were calculated without presenting a vertical gradient. The numbers are not considered reliable unless a vertical gradient is given.

3-49 and 3-50 Some of the conclusions are questionable or incorrect because there is no evidence that the clay zone is not continuous; evidence is not presented indicating that the clay deposits pinch out to the south of the site; data are not given on which to base the estimate of the horizontal ground-water flow velocity under PW-2 pumping conditions;

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and the estimate of vertical downward velocity in the clay while PW-1 is pumping cannot be determined without a vertical gradient.

4-2: The title of Table 4-1 is inappropriate as contaminants listed are not necessarily associated with the site. According to this table and Table 4-2, carbon tetrachloride and chlorobenzene were never detected on or beneath the site. Two compounds, 1,1-dichloroethane and 1,1-dichloroethene, were not detected in test borings, surface soil or surface water at the site. Their presence in monitoring wells does not mean that they are site-associated.

4-3: As stated on p. 4-4, 58 ug/L of di-n-octyl phthalate was found in MW3. Table 4-1 does not so indicate.

4-4: No explanation is given for the lack of analytical data for MW2. The trace amounts of PCB-1254 reported for MW 1 and MW 5 are questionable. The results could be erroneous or the result of contamination attributable to drilling techniques or improper or careless sampling procedures (PCB's are reportedly widespread in soil at the site).

The maximum amount of total volatiles found beneath the site in MW3 (114 ppb) is relatively low and hardly indicative of a major contamination source.

4-6: Sample collection techniques are not described. If samples collected for dissolved metals' analysis are not filtered, the results may

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indicate concentrations in excess of those actually present in dissolved form (fine sand, silt and clay particles may have various contaminants adsorbed to them which are dissolved by acidic sample preservatives).

PW-2 does show volatile organic contamination according to results given in Appendix C.

PW-1 contains only six volatiles that are also present in on-site monitoring wells. These are all compounds that could be attributable to a number of sources such as dry cleaning establishments, auto repair facilities, many types of manufacturing plants, and landfills.

4-7: Carbon tetrachloride, found in PW-1, was not detected in any on-site monitoring well.

4-8: The high concentration values shown for PW-1 apparently are actual values for PW-2 and have been typed in the wrong column.

4-9: The historical data showing that the concentration of mercury in PW-1 fluctuates above and below 2.0 ppb are not given nor is any information on sampling techniques.

Contrary to Table 4-4, PW-2 does contain volatile organics according to Appendix C. The author evidently based his conclusion that it does not on Table 4-4.

PW-2 is not located adjacent to the site.

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4-15: No soil samples were collected over about one third of the site; therefore, the overall distribution of PCB's is not known and the extent of remedial measures cannot be determined.

4-19: A number of analyses on this page were considered invalid by NUS; this raises questions as to the extent of quality control measures and the validity of other data.

4-20: MW 3 is located downgradient of the buried sludge. With the exception of 58 ug/L of bis (2-ethylhexyl) phthalate and 58 ug/L of di-n-octyl phthalate, the well does not contain constituents common to the sludge. As noted previously, the reported results for the two phthalates are questionable. Thus, there are insufficient data to indicate that the sludge is contributing to ground-water contamination; the need for its removal is questionable.

4-36: The alleged environmental contamination with respect to ground water beneath the site is unsubstantiated as no continuous pathway between the contaminant source and ground water has been shown to exist.

4-39: See preceding. No evidence of contamination throughout the entire thickness of the unsaturated zone has been demonstrated. The shallow water table (MW 2) has not been sampled. If the site were the source of deeper ground-water contamination (Monitoring Wells 1, 3, 4, and 5), contamination would likely be present in the intervening zones.

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4-40: Transmissivity is not measured in centimeters per second.

No data exist to calculate the velocity of ground-water flow in the confined aquifer.

4-41: Mercury was not the only contaminant detected in PW-2.

4-42: There is no basis for assuming that "upper aquifer contaminants were similar in April 1984 to those actually observed in July 1984."

There is no evidence that "mobile contaminants seem to move fairly well from the upper to the lower aquifer depending upon the influence of the dominant cone of depression at the time."

REMEDIAL ALTERNATIVES

Section 7

Results of RI did not show any levels of hazardous chemicals or materials in the tanks or buildings. Therefore, demolition of existing tanks and buildings exceeds any reasonable remedial effort.

Covering of all soils and sludges with asphalt should be considered to minimize leachate production and chances for direct contact.

All other remedial alternatives in regard to the soils are excessive and extremely expensive.

No action should be taken in regard to supplying water to compensate for the shutdown of PW-1 because additional studies are needed to determine the source(s) of contaminants found in this well.

MISCELLANEOUS COMMENTS

On page 3-25, Table 3-6 lists the results of laboratory analysis of Shelby tube soil samples. The density of a soil sample for MW3 appears to be inaccurate. The reported value of 18.41 g/cm^3 is an order of magnitude greater than for the other samples in the table and probably reflects a decimal place error.

The third paragraph on page 3-13 presents a discussion of the amount of water that large-diameter wells yield in the area. Based on the range of yields presented, the average of 720 gallons per minute (gpm) is incorrect.

Table 4-2 gives analytical results for samples collected from four of the five monitoring wells which were installed on site. No explanation is given as to why MW 2 was not sampled. The reported presence of 58 ug/L of bis(2-ethylhexyl) phthalate and 58 ug/L of di-n-octyl phthalate in MW 3 is suspect. According to Table D-1 in the Appendix, the former compound is classified as being "very immobile" while the latter is "slightly mobile." We question the presence of both compounds in equal concentrations.

According to Figure 3-8, which indicates the direction of ground-water flow, MW 5 is upgradient of MW 1. However, 41 ug/L of acetone and 30 ug/L of total xylenes were detected in MW 5; none were present in MW 1. This raises the possibility that an off-site source of contamination exists. MW 4 is also at an apparent upgradient location and exhibits a degree of contamination similar to that of MW 3 which is downgradient. This further substantiates the possibility of an off-site source.

Drawing S758-01 indicates that, on the date measured, the water level in MW 1 was higher than that in MW 2. Both wells are screened in the unconfined aquifer, MW 1 at a greater depth than MW 2. The head difference indicates that there is an upward component of ground-water flow which would preclude downward migration of ground water and/or contaminants. The gradient might be reversed under pumping conditions; no such data were presented.

A number of questions are raised by the analytical data presented in Appendix C. For example, the 4/10/84 analyses for National Wells 1 and 2 indicate that each well had a calcium concentration of 4.1 mg/L, chloride 11.5 mg/L and nitrate 4.44 mg/L. For two wells located some distance apart to have exactly the same concentrations of three constituents is unusual. If typographical errors are the reason, other data become suspect. The 7/12/84 sample blank was reported to contain 66 mg/L COD, 38 ug/L acetone, 6.1 ug/L chloroform, and 8.6 ug/L methylene chloride. The 7/10/84 blank was reported to have 440 mg/L nitrate, 254 mg/L total dissolved solids, 30 ug/L acetone, 5 ug/L chloroform, and 7 ug/L methylene chloride. An error on a "traffic report" made it impossible to differentiate between samples for PW-1 and PW-2 (7/10/84). These unexplained results raise questions about quality control or the lack thereof and cast further aspersions on the validity of other data.

Since it is implied that the Swope Oil Company site is responsible for contamination of PW-1, historical analytical data for this well should have been presented and compared with estimated ground-water velocities. A lack of correlation between travel time and initial detection of contamination in the well could point to another source.

Please call if you have any questions or wish to discuss anything further.

Sincerely,

GERAGHTY & MILLER, INC.

Christopher Creed
Staff Scientist

Douglas R. MacCallum
Senior Scientist

Michael F. Wolfert
Associate

CC:DRM:MFW:me

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