United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R02-90/101
May 1990

EPA

Superfund Record of Decision:

Woodland Route 72 Dump, NJ

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. EPA/ROD/R02-90/101	2.	3. Recipient's Accession No.

4. Title and Subtitle
SUPERFUND RECORD OF DECISION
Woodland Route 72 Dump, NJ
First Remedial Action

5. Report Date: 05/16/90

6.

7. Author(s)

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U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

13. Type of Report & Period Covered: 800/000

14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

The 12-acre Woodland Route 72 Dump site is an abandoned hazardous waste dump in Woodland Township, Burlington County, New Jersey. The site is being remediated concurrently with another abandoned dump, the 20-acre Woodland Route 532 Dump site, located 3 miles from the Route 72 site. Both sites are in the Pinelands Preservation Area District of New Jersey. Several chemical manufacturing firms dumped chemicals and other wastes into trenches and lagoons or burned the waste at the sites from the early 1950s to 1962. An estimated total of 54,000 cubic yards (Route 72, 28,000 cubic yards; Route 532, 26,000 cubic yards) of surface material including surface soil, stream sediment, sludge, and debris at the sites are contaminated with wastes including tarry substances and paint residues. Furthermore, leaching from surface materials has resulted in the contamination of 300,000 cubic yards (Route 72, 130,000 cubic yards; Route 532, 170,000 cubic yards) of subsurface soil and ground water beneath both sites. This Record of Decision (ROD) addresses surface material and ground water remediation at both sites. A subsequent ROD will address subsurface soil. The primary contaminants of concern affecting the surface soil, sediment, sludge, debris, and ground water are VOCs including benzene, toluene, TCE and xylenes; organics including PAHs, pesticides, and phenols; radionuclides (e.g., uranium and thorium series); and metals including lead and
(See Attached Sheet)

17. Document Analysis a. Descriptors
Record of Decision - Woodland Route 72 Dump, NJ
First Remedial Action
Contaminated Media: surface soil, sediment, sludge, debris, gw
Key Contaminants: VOCs (benzene, toluene, TCE, xylenes), organics (PAHs, pesticides, phenols), radionuclides (uranium and thorium series), metals (lead, chromium)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report): None	21. No. of Pages: 95
	20. Security Class (This Page): None	22. Price

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

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

tract (Continued)

chromium.

The selected remedial action for this site includes excavation, further characterization, and offsite disposal at a permitted facility of 54,000 cubic yards (total from both sites) of contaminated surface soil, sludges, debris and sediment; offsite disposal of 19 cubic yards (total from both sites) of radiologically contaminated surface materials including a drum of radioactive pellets; ground water pumping and treatment with treatment to be determined during design (but anticipated to include air stripping, metals removal, biological treatment, and advanced oxidation or carbon adsorption) and reinjection of treated ground water; and ground and surface water monitoring. The total estimated present worth cost for the concurrent remedial actions at the Route 72 and Route 532 sites is $142,200,000, which includes an estimated present worth O&M cost of $114,000,000 for 30 years.

PERFORMANCE STANDARDS OR GOALS: Soil cleanup objectives have been based primarily on State standards and background levels including total VOCs 1 mg/kg, total chromium 100 mg/kg, pesticides (DDT and metabolites) 10 mg/kg, and lead 250-1,000 mg/kg (based on State risk assessment). Ground water nondegradation remedial goals are based on natural background levels for the Pine Barrens area including benzene 0.88 ug/l, pesticides (DDT and metabolites) 0.001 ug/l, toluene 1.2 ug/l, TCE 0.38 ug/l, total xylenes 1.0 ug/l, and phenol 0.15 ug/l.

ROD FACT SHEET

SITES

Name: Woodland Township Route 72 and Route 532 Sites
Location: Burlington County, Chatsworth, New Jersey
EPA Jurisdiction: EPA Region 2

FIRST OPERABLE UNIT ROD

Signature: May 16, 1990
Surface Material Remedy:
Off-Site Disposal of Surface Materials
Capital Cost: $1,200,000
Operation and Maintenance Costs: $21,000,000
Present Worth: $22,200,000

Ground Water Remedy:
Air Stripping, Metals Removal, Biological Treatment, Advanced Oxidation (1.9 mgd pumping rate)
Capital Cost: $27,000,000
Operation and Maintenance Costs: $93,000,000
Present Worth: $120,000,000

LEAD

Agency: NJDEP Remedial and Enforcement Leads
Primary USEPA Contact: Rick Robinson (212) 264-4425
Primary NJDEP Contact: Gerald Braun (609) 292-6709
Primary PRPs:
Rohm & Haas; 3M; Hercules, Inc.; SOHIO; Purex, Inc.; Industrial Trucking Service Corporation

WASTE

Type: Metals, volatile organics, semi-volatile organics, pesticides, and radiological
Medium: Drums, bulk waste, ground water and soils
Origin: Drums, bulk waste burial, lagoons and open pit burning.
Surface Material Estimates:
Route 72 - 28,000 cubic yards
Route 532 - 26,000 cubic yards
Combined radiological waste - 19 cubic yards
Ground Water Plume Estimate:
Route 72 - 1.5 miles to 1.8 miles long and 70 feet to 120 feet deep.
Route 532 - 4000 feet long by 25 feet to 50 feet deep. Plume discharges into a down-gradient cranberry bog..

DECLARATION STATEMENT

RECORD OF DECISION

WOODLAND TOWNSHIP ROUTE 72 SITE

Site Name and Location

Woodland Township Route 72 Site, Burlington County, New Jersey.

Statement of Basis and Purpose

This decision document presents the remedial action for the Woodland Township Route 72 in Chatsworth, New Jersey, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986 and, to the extent applicable, the National Oil and Hazardous Substances Pollution Contingency Plan. This decision document explains the factual and legal basis for selecting the remedy for this site.

The New Jersey Department of Environmental Protection concurs with the selected remedy. The information supporting this remedial action decision is contained in the administrative record for the site.

Assessment of the Site

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

Description of the Selected Remedy

The remedial action described in this document is the first of two planned operable units for the site. The remedy will be designed and implemented together with the selected remedial action for the nearby Woodland Township Route 532 site. This first operable unit action will address the remediation of contaminated surface materials, sediments and ground water at the site. The contaminated subsurface soils will be the subject of a future study and remedial action.

The major components of the selected remedy for the first operable unit include the following:

Surface Materials

- Excavation and further characterization of 28,000 cubic yards of contaminated surface materials and sediments (soil, sludges, debris, etc.),
- Disposal of the excavated materials at a permitted off-site facility,
- Off-site disposal of an estimated 19 cubic yards (combined total from the Route 72 and Route 532 sites) of radiologically contaminated surface materials. This material includes a drum containing radioactive pellets found at the Route 532 site.

Ground Water

- Extraction of the contaminated ground water plume, estimated to be 1.5 to 1.8 miles long, and 70 to 120 feet deep.
- Treatment of the extracted ground water prior to reinjection. The specific components of the treatment system will be developed during the remedial design. The feasibility study discussed treatment via air stripping, metals removal, biological treatment, and advanced oxidation. Activated carbon adsorption would be used as a contingency if the advanced oxidation process is determined to be unsuitable. Treatment of the ground water will continue for an estimated 30 years or until the remedial objectives are obtained.

Statutory Determinations

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

The selected remedy provides a permanent solution for the surface soils at the site and the underlying ground water. However, because hazardous substances will remain in subsurface soils above the health-based levels, this is an interim remedy. These contaminated subsurface soils will be the subject of a subsequent Record of Decision for the site.

Constantine Sidamon-Eristoff
Regional Administrator

5/16/90
Date

DECLARATION STATEMENT

RECORD OF DECISION

WOODLAND TOWNSHIP ROUTE 532 SITE

Site Name and Location

Woodland Township Route 532 Site, Burlington County, New Jersey.

Statement of Basis and Purpose

This decision document presents the remedial action for the Woodland Township Route 532 hazardous waste disposal site in Chatsworth, New Jersey, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986 and, to the extent applicable, the National Oil and Hazardous Substances Pollution Contingency Plan. This decision document explains the factual and legal basis for selecting the remedy for this site.

The New Jersey Department of Environmental Protection concurs with the selected remedy. The information supporting this remedial action decision is contained in the administrative record for the site.

Assessment of the Site

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

Description of the Selected Remedy

The remedial action described in this document is the first of two planned operable units for the site. The remedy will be designed and implemented together with the selected remedial action for the nearby Woodland Township Route 72 site. This first operable unit action will address the remediation of contaminated surface materials, sediments and ground water at the site. The contaminated subsurface soils will be the subject of a future study and remedial action.

The major components of the selected remedy for the first operable unit include the following:

Surface Materials

- Excavation and further characterization of 26,000 cubic yards of contaminated surface materials and sediments (soil, sludges, debris, etc.),
- Disposal of the excavated materials at a permitted off-site facility,
- Off-site disposal of an estimated 19 cubic yards (combined total from the Route 72 and Route 532 sites) of radiologically contaminated surface materials. This material includes a drum containing radioactive pellets found at the Route 532 site.

Ground Water

- Extraction of the contaminated ground water plume, estimated to be 4,000 feet long, and 25 to 50 feet deep.
- Treatment of the extracted ground water prior to reinjection. The specific components of the treatment system will be developed during the remedial design. The feasibility study discussed treatment via air stripping, metals removal, biological treatment, and advanced oxidation. Activated carbon adsorption would be used as a contingency if the advanced oxidation process is determined to be unsuitable. Treatment of the ground water will continue for an estimated 30 years or until the remedial objectives are obtained.

Statutory Determinations

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

The selected remedy provides a permanent solution for the surface soils at the site and the underlying ground water. However, because hazardous substances will remain in subsurface soils above the health-based levels, this is an interim remedy. These contaminated subsurface soils will be the subject of a subsequent Record of Decision for the site.

Constantine Sidamon-Eristoff
Regional Administrator

5/16/90
Date

DECISION SUMMARIES
WOODLAND TOWNSHIP ROUTE 532 AND ROUTE 72 SITES
RECORDS OF DECISION

SITE NAME, LOCATION, AND DESCRIPTION

The Woodland Township Route 532 site is approximately 20 acres in size and is located on tax block 4210, lot 1 in Woodland Township, Burlington County, New Jersey (Figure 1). The site is at the end of an unpaved access road approximately 1/8 mile south of Route 532. The unnamed site access road meets Route 532 approximately 1 1/8 miles west of the intersection of Route 532 and Route 72. Goodwater Run, an intermittent stream and Bayley Road border the site to the east. An unpaved forest fire control road runs along the southern edge of the site. The site is situated within a "special agricultural area" of the Preservation Area District of the New Jersey Pinelands. Active commercial cranberry bogs are located approximately 1 mile west-southwest of the site.

The Woodland Township Route 72 site is approximately 12 acres in size and is located on tax block 5501, lot 15 and tax block 6301, lot 1 in Woodland Township, Burlington County, New Jersey (Figure 1). The site is 1/4 mile south of Route 72 along Crawley Road. Crawley Road is an unpaved road and is labeled as Sooey Road on United States Geological Survey maps. Crawley Road meets Route 72 approximately 1 1/3 miles southeast of the intersection of Route 532 and Route 72. Crawley Road bisects the site and denotes the border between tax block 5501, lot 15 and tax block 6301, lot 1. Pope Branch, an intermittent stream, is located approximately 500 feet to the north and 1,000 feet west of the site. The site is situated in the Pinelands Preservation Area District. A "special agricultural area" with active commercial cranberry bogs is located approximately 1/2 mile northwest of the site.

The sites are approximately 3 miles apart at an average elevation of 125 feet above mean sea level. The Route 532 site has approximately 20 feet of relief, while the Route 72 site has roughly 10 feet of relief. Both sites are virtually devoid of vegetation and are characterized by loose sandy soils. Isolated areas of rusted and corroded drums, broken laboratory glassware, and solidified or partially solidified organic sludge cover the surface on both sites.

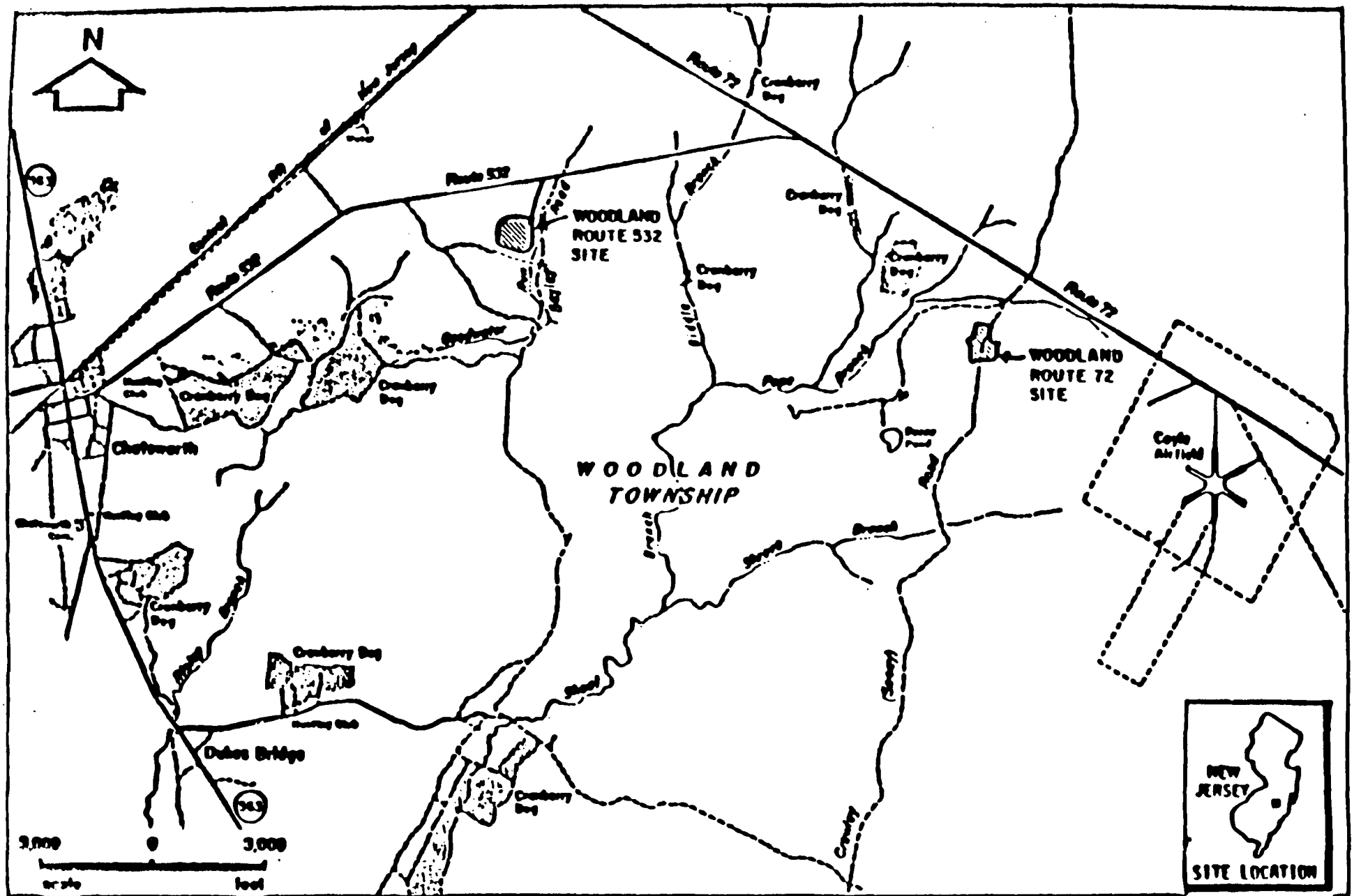


Figure 1
General Location Map

Both the Woodland 532 and 72 sites overlie the Cohansey and Kirkwood Aquifers. Of the two formations, the high-yielding Cohansey Aquifer is the major source of potable water for the area and also was impacted by the past disposal practices associated with the sites. No continuous clay unit exists to prevent downward migration of contaminants. In addition, the Woodland Township sites are located in a regional recharge area for these aquifers. The Cohansey Aquifer also provides the base flow of many regional surface water bodies (e.g. streams, bogs). The New Jersey Department of Environmental Protection (NJDEP) has designated the Cohansey Sand in the vicinity of the sites as GW-1.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Route 532 Site

Early records indicate ownership of the Route 532 site by Francis Estlow. In 1973, Estlow sold the property to Cohen, Weiss and Krell. In 1976, Airtime, Inc. purchased the property and subsequently sold it to its present owners, Joseph and Albert Spitzer.

An aerial photograph from 1951 shows that a pine forest existed in the study area prior to the beginning of disposal operations. The exact date disposal began is unknown. It is estimated to have begun between 1951 and 1956. The western half of the Route 532 site was organized into a series of bermed lagoons when disposal began. A 1956 photo indicates these lagoons contained black liquid waste. It was also evident from the photograph that this waste was released along an on-site road and flowed toward a depression.

By 1962, most of the disposal areas had been regraded. In a 1962 aerial photograph, new bull dozer scrape marks indicate that the disposal area was being enlarged. The black liquid, previously dumped on-site, had also breached the lagoon berm and was flowing into the nearby pine forest. A second flow was observed extending from the eastern border toward the path of Goodwater Run.

A 1984 photograph indicates that the site has remained essentially unchanged since 1962. Denuded areas can be observed where the two liquid flows moved off site. Partially buried drums are exposed on the downslope edge of former lagoons on the western half of the site and the downslope edge of the former on-site road. Partially buried drums and general refuse are piled

along former on-site roads in the eastern half of the site. No site controls were in place from 1962 to 1986. In 1986, potentially responsible parties (PRPs) constructed a security fence to restrict site access. Figure 2 presents a brief chronology of the Route 532 site.

Route 72 Site

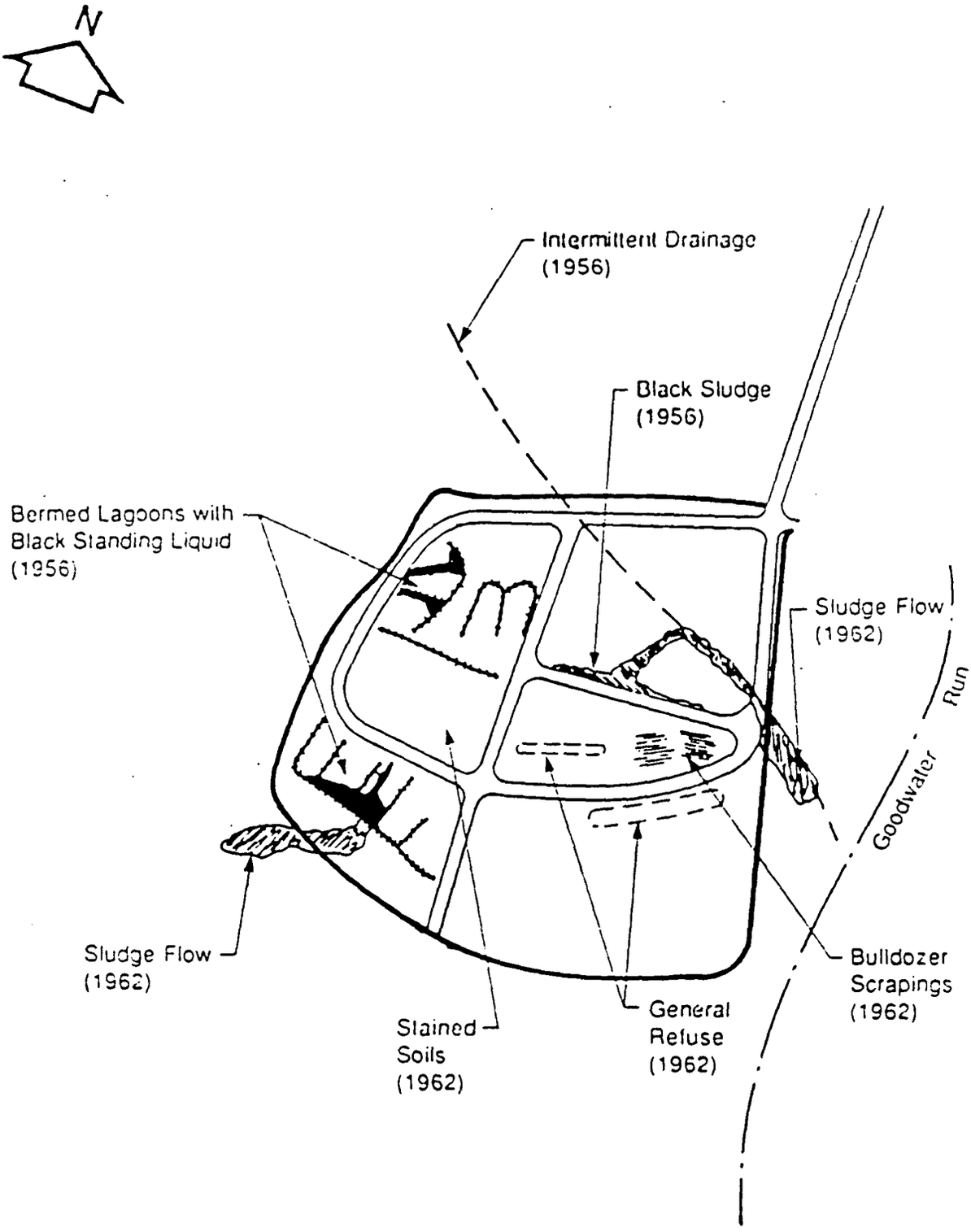
The Route 72 site was owned by Francis Estlow until 1957, when the property was purchased by Rudolf Kraus. Rudolf and/or Eleanor Kraus also owned Industrial Trucking Services Corporation, the company that reportedly transported the waste materials to the sites for disposal. Cohen, Weiss and Krell purchased the property in April 1964. It is unclear from Woodland Township records when the property was acquired by its current owner, Airtime, Incorporated.

A 1951 aerial photograph of the site illustrates conditions prior to the waste disposal operation. Probable concrete pads, possible basement space, a utility building and a sidewalk can be observed. An unpaved road connected the site to the perimeter road of Coyle Airport. Crawley Road and a fire road north of the site were also present.

A 1956 photograph of this site shows several trenches elongated in an east-west direction in the northern third of the site. The trenches were located on both sides of Crawley Road. The central portion of the site was covered with general refuse and stained soils. Small depressions containing standing liquid were evident on the western half of the site. The southern portion of the site west of Crawley Road contained a wide depression with standing liquid in it. The southern portion of the site east of Crawley Road contained several shallow trenches oriented along a north-south axis.

The site layout has remained unchanged as seen in a 1962 photograph. However, the trenches were apparently deepened, and those in the northern and southern portions of the site contained a standing light-colored liquid.

A 1984 photograph indicates that the site has remained unchanged since 1962. The outlines of trenches and depressions can be observed. Drums, stained soils, and general refuse are identifiable in the central portion of the site. Much of the pine forest at the edge of the site has regenerated, while on-site disposal areas remain unvegetated. This site was also uncontrolled between 1962 and 1986. In 1986, PRPs constructed a security fence to restrict site access. Figure 3 presents a brief chronology of the Route 72 site.

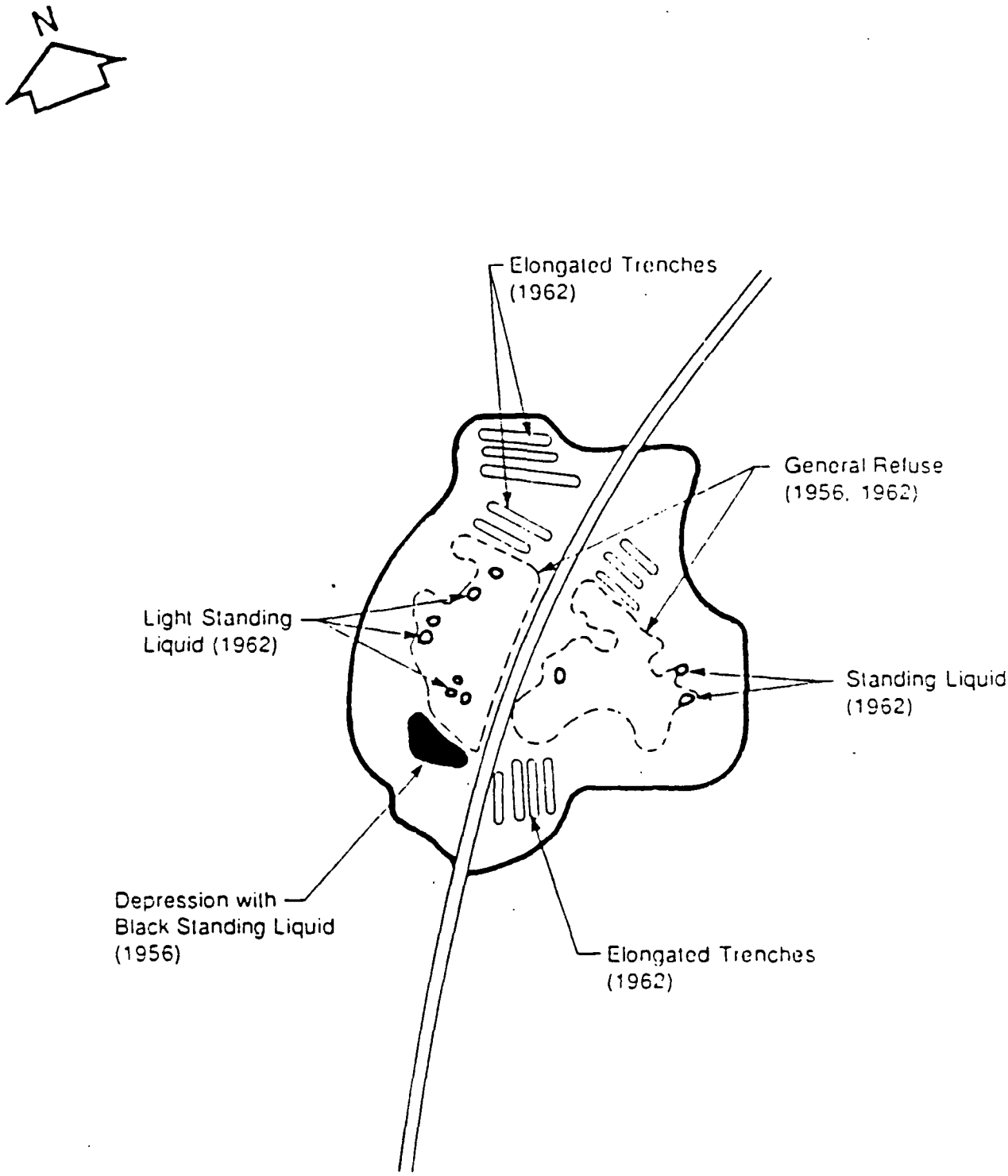


Not to scale

CDM

environmental engineers, scientists, planners & management consultants

Figure 2
Route 532 Site Disposal Areas



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CDM

environmental engineers scientists
planners & management consultants

Figure 2

Route 72 Site Disposal Areas

Feasibility Study for Woodland Township Route 532 and 72 Sites

Enforcement History

The Route 532 and Route 72 sites were operated jointly as an uncontrolled hazardous waste dump. The sites were used by several chemical manufacturing firms from the early 1950s until approximately 1962. During this time, Minnesota Mining and Manufacturing (3M) Company, Rohm and Haas Company, Standard Oil of Ohio, Incorporated (SOHIO), Hercules Incorporated, Manhattan Soap Company (a subsidiary of Purex Industries, Incorporated), and possibly other PRPs hired Industrial Trucking Services Corporation (a subsidiary of Better Materials Corporation) to dispose of chemicals and other wastes. The wastes were dumped into trenches and lagoons or were burned. There is no knowledge of which site was operated first, nor which site was closed first.

The New Jersey Department of Environmental Protection was advised of environmental problems at the sites by the Burlington County Health Department in April 1979. The NJDEP conveyed the information to the United States Environmental Protection Agency (USEPA). At about the same time, a biologist investigating endangered species for NJDEP also reported environmental problems at the site.

The NJDEP issued a directive on March 4, 1985 to Rohm and Haas, 3M and Hercules and other companies identified as PRPs to arrange for the investigation and remediation of the sites. On March 27, 1985, NJDEP entered into an Administrative Consent Order (ACO) with Hercules, Incorporated to help pay for the investigative and administrative costs. On July 6, 1987, NJDEP entered into a similar ACO with 3M, and Rohm and Haas Company.

On January 2, 1990, NJDEP entered into an ACO with Hercules, 3M, and Rohm and Haas. The purpose of this ACO was to compel the PRPs to remove and incinerate liquids and sludges from isolated locations on the sites' surfaces.

Prior Investigations

In December 1979, soil samples were collected by the PRPs' consultant. Phenols, cresols, benzene and xylenes were detected.

In September 1981, a field investigation report and a site inspection form was submitted to USEPA Region II by its Field Investigation Team (FIT) contractor. Monitoring wells were installed and ground water samples were collected and analyzed. Compounds detected in the ground water samples included chlorobenzene, 1,2-dichloroethane, ethylbenzene, tetrachloroethene, benzene, naphthalene, toluene, pentachlorophenol, and bis (2-ethylhexyl) phthalate.

The NJDEP personnel visited the site on May 3, 1983, and collected soil samples for analyses. The results indicated the presence of several volatile organics, polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs) and phthalates. Inorganic substances identified in the soil samples included arsenic, cadmium, chromium, copper, lead, nickel, silver and zinc.

During March and July of 1985, the PRPs collected soil and waste samples for analysis. Compounds identified in the soil and waste samples included benzene, toluene, ethylbenzene and 1-2 dichloroethane.

In 1986, the PRPs erected a temporary 6 foot-high chain-link fence around each site and undertook some minor erosion control measures.

Both the Woodland Township sites were placed on the National Priorities List during September 1983.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

On February 10, 1986, a public meeting was held to initiate the remedial investigation and feasibility study (RI/FS) aimed at determining the extent of contamination at these sites and at identifying feasible remedial actions. The RI/FS was conducted by the NJDEP. At the conclusion of the study process, on July 26, 1989, the RI/FS documents were placed in repositories. The Proposed Remedial Action Plan, along with a notice of the availability of the RI/FS, were released to the public on December 26, 1989. The documents and plan were made available to the public in both the Administrative Record and at information repositories maintained at the Woodland Township Municipal Building, the Pinelands Commission office, at NJDEP's Trenton office, and the USEPA's Region II New York City office.

The notice of availability was published in the Burlington County Times on December 26, 1989. A public comment period was held from December 26, 1989 to February 5, 1990. In addition, a public meeting was held in Chatsworth, New Jersey on January 31, 1990. At this meeting, representatives from NJDEP and Camp Dresser and McKee, the RI/FS contractor, answered questions about the two sites and the remedial alternatives under consideration. All responses to the comments received during this period are included in the Responsiveness Summary, which is part of the Record of Decision (ROD). These decision documents present the

selected remedial actions for the Woodland Township Route 532 and Route 72 sites, chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) and, to the greatest extent practicable, the National Contingency Plan (NCP). The remedial action decisions for these sites are based on the Administrative Record.

Based on comments received at the January 31, 1990 public meeting and during the public comment period, the local community, public officials, the New Jersey Pinelands Commission, and several interested companies generally support the agencies' preferred alternatives. Public comment focused on issues related to effects on commercial cranberry operations, ground water quality and availability during the remediation, Township review of documents, liability and reimbursement concerns, and specific issues relating to various components of the selected remedies. Detailed responses to these comments are contained in the Responsiveness Summary.

SCOPE AND ROLE OF THE FIRST OPERABLE UNIT

As with many Superfund sites, the problems at the Woodland Township Route 532 and Route 72 sites are complex. As a result, the NJDEP and USEPA organized the remediation efforts into two operable units.

- Operable Unit One - The first operable unit will address the remediation of 54,000 cubic yards of contaminated surface materials from both sites. This operable unit will also address the remediation of the contaminated ground water plumes originating from each site and associated surface water bodies.

  The Route 532 contaminated ground water plume is estimated to be 25 to 50 feet deep, 1,200 feet wide and 4,000 feet long. This contaminated ground water plume is discharging into a cranberry bog and bog reservoir. It is expected that the contaminated cranberry bog and bog reservoir surface water will be remediated as the Route 532 contaminated ground water plume is removed.

  Contaminated sediments of Goodwater Run will be remediated as surface materials.

  The Route 72 contaminated ground water plume is estimated to be 70 to 120 feet deep, 1,200 feet wide and is 1.5 to 1.8 miles long.

- Operable Unit Two - The second operable unit will address the remediation of contaminated subsurface soils.

The first operable unit addresses primary concerns about the sites by remediating the contaminated surface materials and contaminated ground water. Remediation of the surface materials will eliminate the principal risks associated with direct contact of these materials. Remediation of the ground water contamination will stop the continued expansion of the contaminant plume and begin the process of removing the contamination from the ground water.

The second operable unit will address the remediation of contaminated subsurface soils. This operable unit will reduce and/or eliminate the principal risks caused by these soils which act as a continued source of ground water quality deterioration. The ROD for the second operable unit will be prepared after additional testing and studies are completed.

SUMMARY OF SITE CHARACTERISTICS

The RI field activities were conducted in three phases from the fall of 1985 through the spring of 1988. Additional data collection was completed during the fall of 1989 to address potential public concerns.

The RI activities primarily consisted of sample collection and analysis of soils, wastes, ground water, potable wells, air, surface water, sediments, and cranberries. In addition to the sample collection activities, various additional efforts were conducted to characterize the sites. These activities included; geophysical surveys, radiological surveys, treatability studies for bioremediation of subsurface soils and ground water, soil gas surveys, aquifer slug tests, borehole logging by split spoon sampling, and soil head space screening.

Details of the RI activities are contained in the RI/FS reports. A summary of the site characteristics is presented below and is organized by the affected media.

Surface Materials, Subsurface Soils and Waste Definitions

For purposes of clarification, the site soils and wastes characteristics were categorized into surface materials and subsurface soils.

Surface materials include waste materials and soils which were directly contaminated by past waste disposal operations. The surface materials are across most of the sites and extend to a typical depth of 2 feet with a couple of isolated pockets projecting to a depth of 5 feet (i.e., depressions).

Radiologically contaminated materials will be removed during this operable unit. These materials include the radioactive drum containers at the Route 532 site and radiologically contaminated sources on or in the surface materials.

The subsurface soils are considered as the area of contamination resulting from the leaching of some contaminants from the overlying surface materials. The subsurface soil contamination is across most of the sites and extends from below the surface materials to the water table which is typically 12 feet below the ground surface.

Surface Materials

At the Route 532 site, approximately 26,000 cubic yards of contaminated surface materials are present. At the Route 72 site, there are approximately 28,000 cubic yards of contaminated materials. A variety of surface materials exist at the sites. These materials include: black tarry substances, rusted fragments of metal drums, paint residues, broken glass, heavily contaminated soils, and contamination caused by surface runoff from the sites in Goodwater Run sediment.

Compounds detected and their respective maximum concentrations include: lead (18,000 (parts per million) ppm); chromium (1,504 ppm); cresols (300 ppm); DDT and its metabolites (2,000 ppm); and bis (2-ethylhexyl) phthalate (2,300 ppm).

Radionuclide contamination was also found in small isolated locations at both sites. The estimated volume of this material is less than 19 cubic yards for both sites. Principal radionuclides identified and their respective maximum activities include: U-238 (1100 pico Curies per gram (pCi/g) wet); U-234 (1,000 pCi/g wet); Th-232 (4,500 pCi/g wet); Th-230 (700 pCi/g wet); and Th-228 (3,600 pCi/g wet).

Samples for Resource Conservation and Recovery Act (RCRA) characterization were collected from surface materials. Analytical results indicated that the materials would not be characterized as RCRA hazardous waste. Although the site wastes are not currently identified as hazardous wastes, ongoing data gathering may change this classification and subject the sites to RCRA applicability.

Subsurface Soils

At the Route 532 site, approximately 170,000 cubic yards of contaminated subsurface soils are present. At the Route 72 site there are approximately 130,000 cubic yards of contaminated subsurface soils.

The subsurface materials contain a variety of water soluble contaminants, and non-water soluble contaminants. The major compounds identified along with their respective maximum concentrations include: 1,2-dichloroethane (2,800 ppm); 1,1,2,2-tetrachloroethane (360 ppm); benzene (150 ppm); chloroform (110 ppm); bis (2-chloroethyl) ether (2,500 ppm); bis (2-ethylhexyl) phthalate (1,300 ppm); DDT and metabolites (134 ppm); styrene (1,300 ppm); toluene (5,000 ppm); ethylbenzene (4,300 ppm); and total xylenes (2,600 ppm).

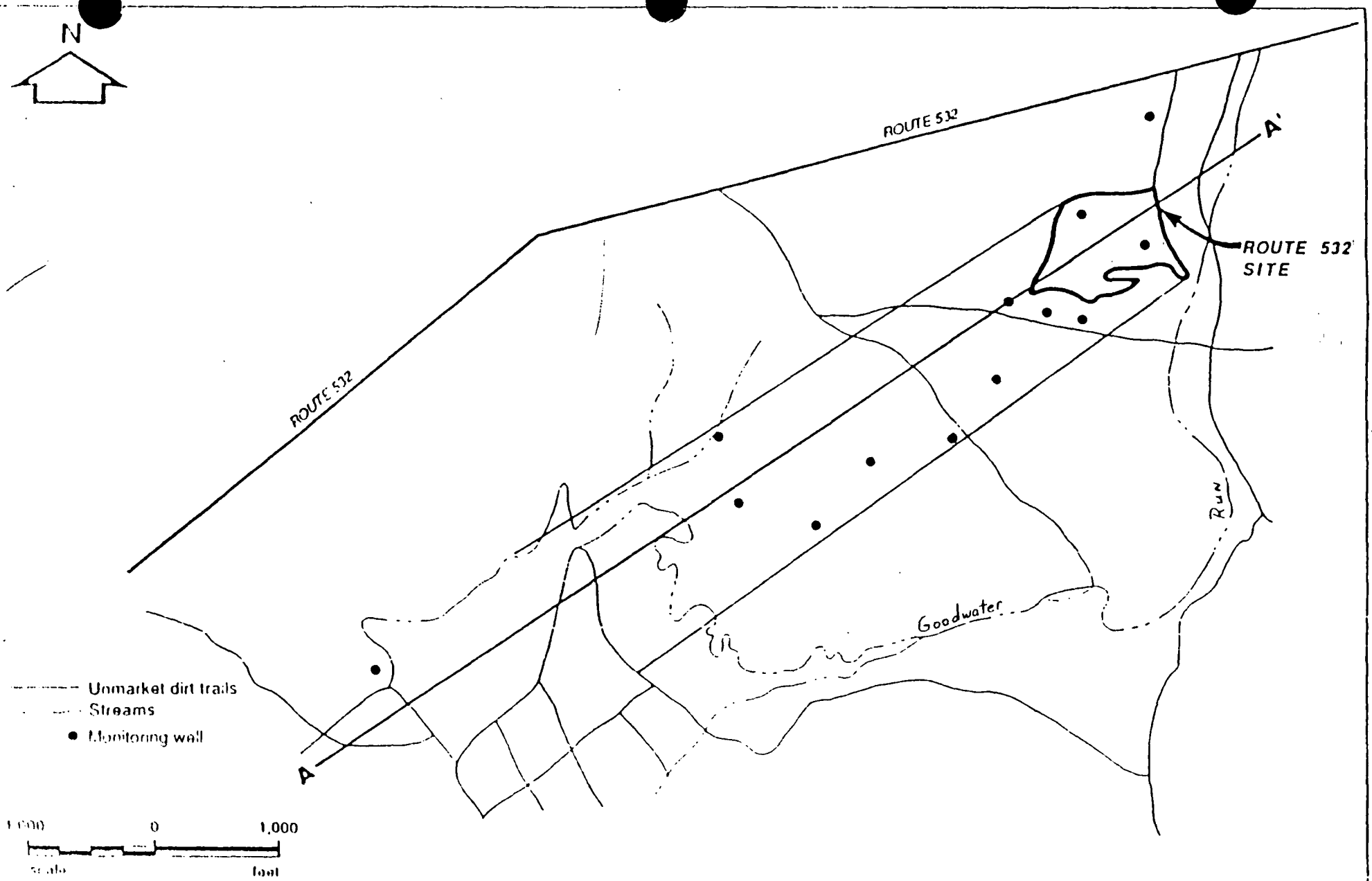
Ground Water

A ground water contaminant plume originating at the Route 532 site is located at a depth between 25 feet and 50 feet and is moving in a southwesterly direction at a rate of 2.1 feet per day. The plume is approximately 4,000 feet in length and discharges to a cranberry bog and adjacent bog reservoir. Figure 4 illustrates the extent of the Route 532 contaminated ground water plume.

The Route 72 contaminated ground water plume is located at a depth of 70 to 120 feet and is moving in a southwesterly direction to a projected distance of 1.5 to 1.8 miles. The plume is moving at a rate of 1.2 feet per day. If left unremediated, the plume may discharge to the Wading River approximately five miles away. Figure 5 illustrates the extent of the Route 72 contaminated ground water plume.

The concentrations and types of contaminants vary considerably along the length of each of the plumes. In general, the concentration of contaminants is highest near the sites. The near-site ground water contaminants include volatile organics, semi-volatile organics and metals. The more mobile volatile organic compounds (e.g., 1,2-dichloroethane) and semi-volatile compounds (e.g., bis (2-chloroethyl) ether) are found down-gradient at lesser concentrations.

The ground water is contaminated with a variety of materials. The major compounds identified and their respective maximum concentrations include: 1,2-dichloroethane (170,000 (parts per billion) ppb); 1,1,2,2-tetrachlorethane (7,800 ppb); benzene (2,000 ppb); trichloroethene (1,300 ppb); bis (2-chloroethyl) ether (44,000 ppb); chloroform (1,200 ppb); and chromium (6,500 ppb total).



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planners & management consultants

Figure 4
Route 532 Site
Area of Contaminant Plume and Location of Cross-Section

Feasibility Study for Woodland Township Route 532 and 72 Sites

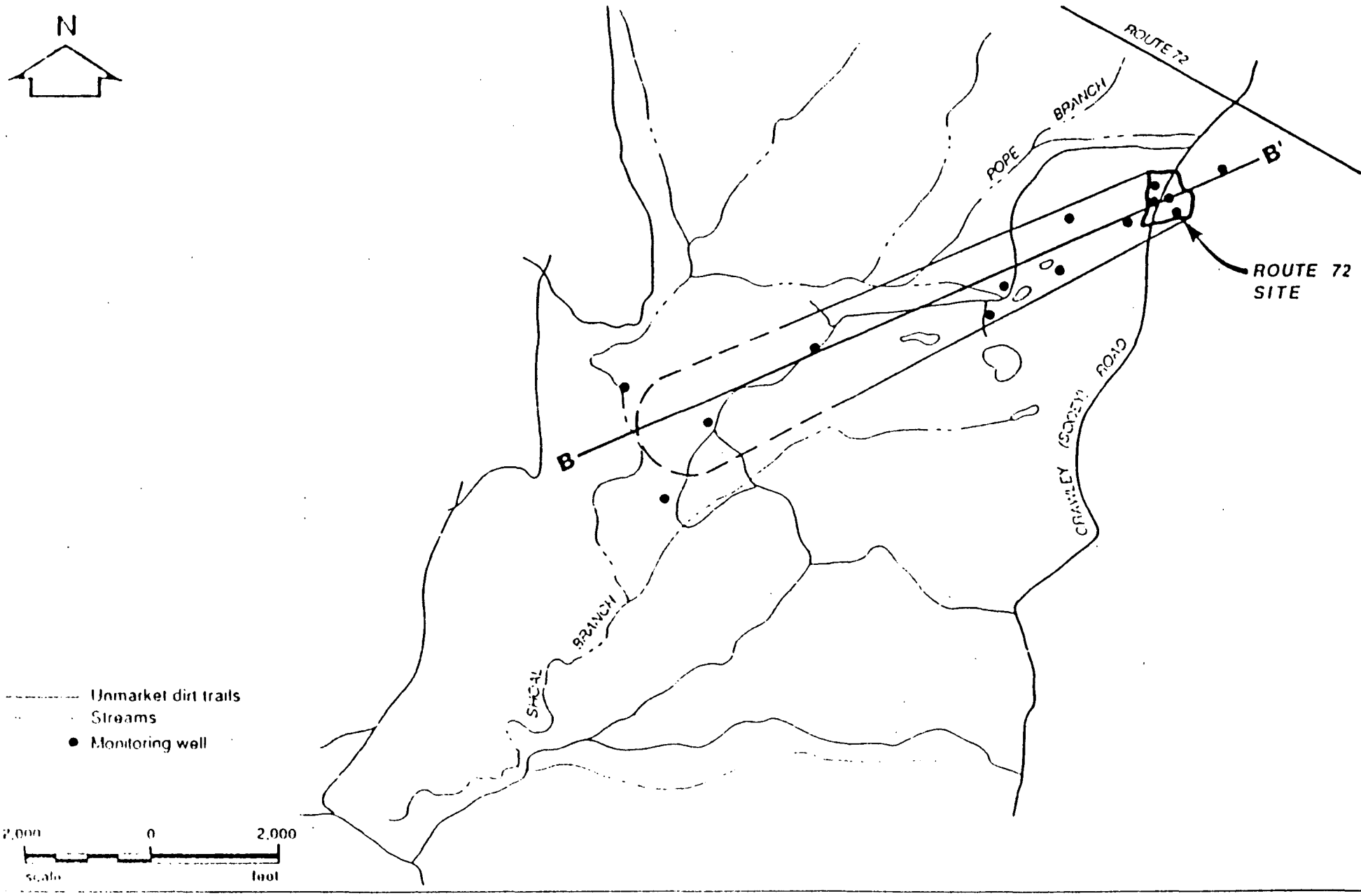

Figure 5

Route 72 Site

Area of Contaminant Plume and Location of Cross-Section

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planners & management consultants

Feasibility Study for Woodland Township Route 72 Sites

Surface Water and Sediment Investigations

Surface water contamination at the sites is limited to the cranberry bog and reservoir at the discharge point of the Route 532 plume. The reservoir is used solely as a water supply for cranberry growing operations. Low concentrations of organic compounds were found in the water and sediment samples.

One Hazardous Substance List (HSL) compound was detected in the sediments of Goodwater Run. Sediment sampling in Goodwater Run indicated the presence of zinc contamination located 500 feet downstream of the site. Elevated concentrations of zinc are an indication of site-related contamination.

Air Quality Investigation

Air samples were collected at both Woodland sites. Low levels of site related contamination were detected in the air under ambient conditions.

Potable Water Investigation

Results of the analysis of one potable well located between the sites detected no contamination. This well is not down-gradient from either of the Woodland sites' contaminated ground water plumes. Results of analyses of three wells in the village of Duke's Bridge, which is approximately 3.2 miles from the Route 72 site, also showed no contamination. These wells are hydrogeologically down gradient of the Route 72 site. The plume, however, is a significant distance (greater than 1 mile) from these wells. If unchecked, it is calculated that the contaminant plume will eventually be drawn into these potable water wells.

There are no other potentially impacted wells in the vicinity of the sites.

Cranberries

Samples were collected in the cranberry bog down gradient of the Route 532 site during the 1988 and 1989 fall harvests. Results of these samples indicated that they were not contaminated.

SUMMARY OF SITE RISKS

A baseline Risk Assessment evaluates the potential carcinogenic and non-carcinogenic risks and hazards to the public health and/or the environment that are associated with exposure to contaminants emanating from a site in the absence of site remediation. The risk evaluations are performed by: 1) identifying and characterizing the contaminants of concern; 2) identifying exposure pathways and probable receptors; 3) evaluating the toxicity of the contaminants found based on the concentrations detected; and 4) using the above information, calculating the extent and likelihood of expected impact.

A baseline Risk Assessment was prepared in July 1989 as part of the RI and is incorporated within that report as Section 4 and the Final Draft Addendum to the Remedial Investigation Report. The assessment was based on soil, surface water, sediment and ground water data collected during the RI. Because of the large number of chemicals detected, the data was screened in order to identify the principal chemicals of concern for detailed evaluation. The chemicals of concern include: DDT and its metabolites; benzene; bis (2-ethylhexyl) phthalate; 1,2-dichloroethane; trichloroethane; cresols; chromium; lead tetrachloroethane; chloroform; 1,1,2,2-tetrachloroethane; heptachlor; aldrin; chlorobenzene; PAHs; and toluene.

The public health risks associated with exposure to offsite indicator chemicals, under present site use, were estimated based on the following exposure pathways:

- Dermal absorption of contaminants in the surface soils and waste at both sites,
- Dermal contact and subsequent ingestion of contaminants in the surface soils and waste at both sites,
- Inhalation of volatile organics present in the ambient atmosphere at both sites,
- Inhalation of fugitive dusts predicted to be present in the ambient atmosphere at both sites.
- Dermal absorption and inhalation of contaminants from surface water during cranberry harvest.

The exposure pathways for future site use were based on the assumption that human beings will live at the sites. These estimates were based on the above exposure pathways with the addition of the following:

- Dermal absorption, ingestion, and inhalation of contaminants from ground water beneath the sites.

Risks and hazards were estimated for two basic exposure scenarios: present site use and future site use. In addition to the exposure pathways that are of concern under existing site conditions, future pathways could be created by the reuse of the sites. Current allowable uses of the Pine Barrens would allow development of residential dwellings, and perhaps such recreational facilities as campgrounds. The exposure risks associated with both of these uses were also evaluated.

Human Health Risks

Data collected during the RI was used to estimate the extent of human exposure to indicator chemicals.

For risk assessment purposes, individual pollutants were separated into two categories of chemical toxicity depending on whether they cause carcinogenic or non-carcinogenic effects.

Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g., $1x10^{-6}$ or 1E-6). An excess lifetime cancer risk of $1x10^{-6}$ indicates that, as a plausible upper bound, an individual has a one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site.

Potential concern for non-carcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. An HI greater then 1 indicates that adverse non-carcinogenic effects may occur.

Cancer potency factors (CPFs) have been developed by USEPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of milligrams per kilogram per day (mg/kg-day), are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer potency factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied.

Reference doses (RfDs) have been developed by USEPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting non-carcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals, that are not likely to be without an appreciable risk of adverse health effects. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse non-carcinogenic effects to occur.

Route 532 Site

Because humans presently do not come in contact with contaminated materials at the Route 532 site, the surface soils do not pose a risk to human health.

Under worst case conditions, humans would come into contact with contaminated materials resulting in a total carcinogenic risk of $5x10^{-4}$ (5 in ten thousand). The potential risks are associated with ingestion of soils and inhalation of volatile organics in the air. The non-carcinogenic hazards exceeded the HI of 1, indicating an inadequate margin of safety for human health. Ingestion of lead from the surface soils is the cause of the potential hazard. In addition, the future site use scenario includes use of the ground water for household activities. Under this scenario, a significant probable case carcinogenic risk of $1x10^{-3}$ (1 in a thousand) and a worst case carcinogenic risk of $1x10^{-2}$ (1 in a hundred) and non-carcinogenic hazard exists that exceeds a target risk by several orders of magnitude.

Even under the most probable future site use conditions, the ground water would still pose a carcinogenic risk greater than $9x10^{-3}$ (9 in a thousand) and a non-carcinogenic risk of 7.6, which significantly exceeds target risks of $1x10^{-6}$ (1 in a million) and a potential HI of 1, respectively.

Route 72 Site

For the Route 72 site, again, no carcinogenic risks or non-carcinogenic hazards exist under the most probable case for present use of the site. Under the future use of the site, a carcinogenic risk greater than $1x10^{-6}$ was calculated for ground water use. The carcinogenic risk was $1x10^{-2}$ for the most probable case. The HI was less than 1, indicating no cause for human health concerns.

Under the worst case scenario, the overall carcinogenic exceeds a target risk of $1x10^{-6}$ for present use of the site. The potential risks are associated with ingestion of contaminated surface soils and waste. The air pathway did not indicate a potential problem. The worst case non-carcinogenic hazard exceeded the HI of 1, indicating an inadequate margin of safety for human health. The pathway that caused the potential problem was the ingestion of lead from the surface soils.

In addition to the risks and hazards posed by the worst case scenario, future use of the site indicated a risk to human health via contact with the ground water. A total carcinogenic risk greater than $2x10^{-1}$ (2 in ten) was calculated for ground water use. This number exceeds a target risk of $1x10^{-6}$. The non-carcinogenic hazard also exceeded the HI of 1, indicating a potential cause of concern to human health.

Cranberry Harvest

The inhalation and dermal carcinogenic risks to workers are $1.43x10^{-8}$ (1.43 in a hundred million) for the most probable case scenario and $3.08x10^{-8}$ for the worst case scenario. These levels of potential carcinogenic risks indicate an acceptable risk to human health would be associated with worker activities under the most probable and worst case scenarios.

Environmental Risks

The Pinelands supports a variety of mammals, reptiles, fish and birds. Many of these are on the endangered or threatened species list of the Pinelands Comprehensive Management Plan. Sightings of several species have been noted for both sites. The Pine Barrens tree frog, corn snake, timber rattlesnake, and northern pine snake were sighted at the Route 532 site. Only the Pine Barrens tree frog was sighted at the Route 72 site.

Chemical contamination at the sites has had a detrimental effect on plant life. Stressed vegetation is apparent at both sites. The removal of natural vegetation from the sites has substantially reduced potential habitats. The physical hazards associated with surface waste and rusted out drums at the sites have reduced the desirability of the sites for inhabitation or use. The effect is that waste disposal has disturbed the fragile ecosystem at the Woodland Township sites.

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

DESCRIPTION OF ALTERNATIVES

Appropriate remedial technologies identified during the screening process were assembled into combinations to address the remedial action objectives and the goals listed below:

- To satisfy applicable or relevant and appropriate local, state, and federal requirements (ARARs), and,
- To reduce direct contact risks and stop continued degradation of the ground water.

The NJDEP has established cleanup objectives for soil as shown in Table 1. These objectives have been used and accepted by USEPA when evaluating cleanup plans, and, while not considered to be ARARs, will be used as cleanup objectives for the Woodland sites.

New Jersey Ground Water Quality Criteria and Maximum Contaminant Levels established pursuant to the Federal and State Safe Drinking Water Acts are applicable or relevant and appropriate Federal and State ground water requirements for this remedial action. Table 2 identifies the ground water remedial ARARs for the sites.

The Woodland sites are located in the Central Pine Barrens area. The N.J.A.C. describes the goal for ground water quality at these sites as natural background. Table 3 contains numerical values that represent natural background for ground water at these sites.

Separate sets of alternatives were developed for surface soils, unsaturated subsurface soils, and ground water. The current surface water and sediment contamination in the cranberry bog and bog reservoir are directly caused by the release of contaminated ground water. Separate remedial alternatives for surface water and sediment were not developed, because these water bodies will

TABLE 1

Soil Remedial Objectives for the Woodland Township Route 72 and Route 532 Sites

Contaminants	(mg/kg)
Total Volatiles	1
Total Acid Extractables	10
Total Base-Neutrals (excluding phthalates)	10
Total Phthalates	25
Antimony	10
Arsenic	20
Barium	400
Beryllium	1
Cadmium	3
Chlordane	1
Chromium (total)	100
Copper	170
(DDT) and metabolites	10
Lead	250 - 1000*
Mercury	1
Molybdenum	1
Nickel	100
Selenium	4
Silver	5
Thallium	5
Uranium and Thorium Series Radionuclides	**
Vanadium	100
Zinc	350

* The cleanup objective for lead is not representative of background concentrations. It is based on a risk assessment that has been completed by the New Jersey Department of Health.

** Cleanup shall be in accordance with 40 CFR 192.

TABLE 2

Ground Water Remedial ARARs for the Woodland Township Route 72 and Route 532 Sites

Contaminants	(ug/l)	Source
Aldrin/Dieldrin	0.003	1
Ammonia	500	1
Arsenic	50	1
Barium	1000	1
Benzene	1	2
Benzidine	0.1	1
Biological Oxygen Demand	3000	1
Cadmium	NB	1
Carbon tetrachloride	2	2
Chlordane	0.5	2
Chlorobenzene	4	2
Chloride	10,000	1
Chromium	NB	1
Coliform Bacteria	-	3
Color	None Noticeable	1
Copper	1000	1
Corrosivity	Non-Corrosive	3
Cyanide	200	1
DDT and metabolites	0.001	1
m-dichlorobenzene	600	2
p-dichlorobenzene	75	3
o-dichlorobenzene	600	2
1,2-dichloroethane	2	2
1,1-dichloroethylene	2	2
1,2-dichloroethylene (cis and trans)	10	2
2,4-dichlorophenoxyacetic acid	100	3
Ethylbenzene	700	4
Endrin	0.004	1
Fluoride	2000	1
Foaming Agents	500	1
Gross alpha activity	15 pCi/l	3
Gross beta activity	50 pCi/l	3
Hydrogen sulfide	50	2
Iron	300	1
Lead	50	1
Lindane	4	2
Manganese	50	1
Mercury	2	1

TABLE 2 (continued)

Ground Water Remedial ARARs for the Woodland Township Route 72 and Route 532 Sites

Contaminant	(ug/l)	Source
Methoxychlor	100	2
Methylene chloride	2	2
Nitrate-nitrogen	2000	1
Odor	None Noticeable	1
pH	4.2-5.8	1
Phenols	300	1
Polychlorinated biphenyls	0.001	1
Phosphate	700	1
Radionuclides	-	3
Radium	5	3
Selenium	NB*	1
Silver	50	3
Sodium	10,000	1
Strontium	8 pCi/l**	3
Sulfate	15,000	1
2,4,5-TP Silvex	10	3
Tetrachloroethylene	1	2
Toluene	2000	4
Total Dissolved Solids	100,000	1
Toxaphene	5	3
Trichlorobenzene	8	2
Trichloroethylene	1	2
Trihalomethanes	100	2
Tritium	20,000 pCi/l**	3
Turbidity	-	3
1,1,1-trichloroethane	26	2
Vinyl chloride	2	2
Xylenes	44	2
Zinc	5000	3

1). N.J.A.C. 7:9-6.6(a)
2). N.J.A.C. 7:10-5, N.J.A.C. 7:10-7, A-280
3). 40 CFR 141, 40 CFR 143
4). Proposed National Primary Drinking Water Regulations (EPA, 1989)

* NB - Natural Background - To be quantified prior to design of any treatment system
** Picocuries per liter

TABLE 3

Ground Water Remedial Goals[1] for the Woodland Township Route 72 and Route 532 Sites

Contaminant	(ug/l)
Aluminum	NB
Beryllium	NB
Beryllium (dissolved)	0.3
Benzene	0.88
Benzoic acid	1.0
bis (2-chloroethyl) ether	0.57
bis (2-chloroisopropyl) ether	0.57
bis (2-ethylhexyl) phthalate	0.25
2-butanone	1.0
Calcium	NB
Carbon tetrachloride	0.56
Chlorobenzene	1.2
Chloroform	0.32
2-chlorophenol	0.33
Cobalt	NB
DDT and its metabolites	0.001
1,2-dichlorobenzene	0.19
1.4-dichlorobenzene	0.44
1,2-dichloroethane	0.56
1,1-dichloroethene	0.56
1,2-Dichloropropane	1.2
Diethylphthalate	0.19
2,4-Dimethylphenol	0.27
Di-n-butyl phthalate	0.25
Ethylbenzene	1.44
Isophorone	0.22
Magnesium	NB
Methylene chloride	0.56
4-methyl-2-pentanone	1.0
2-methylnaphthalene	1.0
2-methylphenol	1.0
4-methylphenol	1.0
Naphthalene	0.16
Nickel	NB
N-nitrosodiphenylamine	0.19
Phenol	0.15
Potassium	NB
Styrene	1.05

TABLE 3 (continued)

Ground Water Remedial Goals[1]
for the Woodland Township Route 72 and Route 532 Sites

Contaminant	(ug/l)
1,1,2,2-tetrachloroethene	1.38
Tetrachloroethene	0.8
Toluene	1.2
trans 1,2-dichloroethene	0.32
Trichloroethene	0.38
2,4,5-trichlorophenol	0.27
Vanadium	NB
Xylenes, total	1.0

1). The remedial goals are method detection limits which were provided by the New Jersey Department of Environmental Protection
NB - Natural Background

be cleaned up once the flow of contamination in ground water is controlled. The implementation of each ground water alternative would stop this release, and result in surface water quality comparable to the final ground water quality.

Sediment contamination detected in Goodwater Run is a direct result of contaminated site soil erosion. The contaminated sediments will be handled in conjunction with the surface material remediation.

The remedial alternatives that were selected for detailed evaluation are described below. Due to the similarity of the contaminant and site characteristics, the analyses discussed below apply equally to both of the sites, unless specially referenced otherwise.

REMEDIAL ALTERNATIVES FOR SURFACE SOILS, WASTES AND DEBRIS

Alternative 1 - No Further Action for Surface Materials

Capital Cost:	$ 0
Operation and Maintenance (Present Worth [PW]):	$870,000
Total PW:	$870,000
Estimated Implementation Time:	0 Years

No additional remedial activities would be performed at the sites. This alternative would involve only maintenance of the fence surrounding the sites to limit access.

Alternative 2A - Off-Site Disposal of Surface Materials

Capital Cost:	$ 1,200,000
Operation and Maintenance (PW):	$21,000,000
Total PW:	$22,200,000
Estimated Implementation Time:	1 to 2 Years

For this alternative, approximately 26,000 cubic yards from the Route 532 site and approximately 28,000 cubic yards from the Route 72 site of waste materials and contaminated surface soils would be excavated and transported to an off-site RCRA facility permitted for disposal of hazardous materials. This technology is applicable to all the organic, metal, and waste materials excavated from the site, except for radiologically contaminated soils.

The radiologically contaminated soils will be segregated for separate off-site disposal. If radionuclide contaminated soils are determined to be mixed Naturally Occurring or Acceleration Produced Radioactive Materials (NARM)/RCRA wastes, disposal would be in accordance with appropriate RCRA regulations for mixed wastes. Because of the current limitations on the off-site

treatment or disposal of mixed wastes caused by the unavailability of permitted disposal locations, the potential exists that these materials would have to be temporarily stored on site in accordance with appropriate RCRA mixed waste requirements until a treatment or disposal facility becomes available.

It is estimated that the surface materials can be excavated and removed from the site within a year, so completion of this alternative would not delay the implementation of subsurface soil or ground water remediation.

Alternative 2B - Off-Site Treatment and Disposal of Surface Materials

Capital Cost:	$ 1,200,000
Operation and Maintenance (PW):	$178,000,000
Total PW:	$179,200,000
Estimated Implementation Time:	1 to 2 Years

For this alternative, approximately 26,000 cubic yards from the Route 532 site and approximately 28,000 cubic yards from the Route 72 site of waste materials and contaminated surface soils would be excavated and transported to an off-site treatment and disposal facility. This technology is applicable to the organic, metal, and waste material excavated from the site.

Materials with radioactive contamination would be containerized for separate disposal. If the radioactively contaminated materials are determined to be mixed radiological and hazardous wastes, disposal would be in accordance with appropriate regulations for mixed wastes. Because of current limitations on the off-site disposal of mixed wastes, the potential exists that these materials would have to be stored on site until a treatment/disposal facility becomes available. This remedy is different from Alternative 2A, since it provides for off-site treatment of surface materials by thermal destruction prior to disposal, hence the large cost increase.

Alternative 3 - On-Site Encapsulation of Contaminated Surface Materials

Capital Cost:	$5,700,000
Operation and Maintenance (PW):	$3,100,000
Total PW:	$8,800,000
Estimated Implementation Time:	1 to 2 Years

Under this alternative, a landfill meeting the requirements of the New Jersey hazardous waste rules would be constructed at an on-site location. The construction of the hazardous waste landfill will occur over a relatively short period of time (one to two years). Because of this, completion of this alternative will not interfere with implementation of remedial actions for the subsurface soils or ground water.

The total volume of contaminated surface material that would be contained in this landfill is approximately 54,000 cubic yards. The landfill would be located in an area devoid of soil and ground water contamination, so that any leakage from the landfill can be detected in the monitoring well network that would surround the site.

The design of the landfill would meet or exceed New Jersey and Federal hazardous landfill requirements (N.J.A.C. 7:26-10 and 40 CFR 264.300, et al.). A double composite bottom-liner system, a leachate collection and detection system, and a double liner cap with venting are proposed to meet the appropriate design requirements.

Materials with radioactive contamination would be containerized for separate off-site disposal. If the radioactively contaminated materials are determined to be mixed radiological and hazardous wastes, disposal would be in accordance with appropriate regulations for mixed wastes. Because of current limitations on the off-site disposal of mixed wastes, the potential exists that these materials would have to be stored on site until a treatment/disposal facility becomes available.

Alternative 4 - On-Site High-Temperature Thermal Treatment of Surface Materials with Chemical Fixation of Metals

Capital Cost:	$ 4,500,000
Operation and Maintenance (PW):	$32,000,000
Total PW:	$36,500,000
Estimated Implementation Time:	6 Years

This alternative involves the excavation of contaminated surface materials from each of the sites and high-temperature thermal treatment of the soils in an on-site incinerator for the

destruction of organics. The treated materials would then be chemically fixed to decrease the leachability of any metals remaining after the high-temperature thermal treatment process. This remedy is estimated to require three years to implement at each site.

The activity at both sites would involve clearing and grubbing of any vegetation, excavation, incineration by thermal destruction, chemical fixation and soil re-emplacement, compaction, and covering with clean soil, and revegetation of both sites to the extent practicable to allow for subsurface soil remediation. Appropriate surface water and sedimentation control would be incorporated.

The radiologically contaminated soils will be segregated for separate off-site disposal. If radionuclide contaminated soils are determined to be mixed NARM/RCRA wastes, disposal would be in accordance with appropriate RCRA regulations for mixed wastes. Because of the current limitations on the off-site treatment or disposal of mixed wastes, the potential exists that these materials would have to be temporally stored on site in accordance with appropriate RCRA mixed waste requirements until a treatment or disposal facility becomes available.

Total volumes of 26,000 cubic yards at the Route 532 site and 27,000 cubic yards at the Route 72 site would be excavated. Following excavation, the contaminated soils would be taken to the staging area for treatment. After incineration, the treated soils would be tested for leaching of metals. Soil that leaches unacceptable quantities of metals would be chemically fixed in order to reduce the leachability of metals in the treated material. The treated material would be re-emplaced into excavated cells.

Alternative 5 - On-Site High-Temperature Thermal Treatment of Surface Materials with Vitrification of Metals

Capital Cost:	$ 4,500,000
Operation and Maintenance (PW):	$37,000,000
Total PW:	$41,500,000
Estimated Implementation Time:	11 Years

This alternative involves the same activities as those associated with Alternative 4, with the exception that some treated soils would be vitrified into a glass-like mass, crushed, and then re-emplaced at each site.

Treated soil would be tested for leaching of metals. Soil that leaches unacceptable quantities of metals would be treated in a

mobile vitrification unit, which would heat soils to a temperature at which they would fuse into an amorphous mass, thereby fixing the metals into a glasslike matrix. The fused material would then be crushed, and re-emplaced into the excavated areas at each site. Stack monitoring and perimeter monitoring systems would be installed and operated to monitor air emissions.

The radiologically contaminated soils will be segregated for separate off-site disposal. If radionuclide contaminated soils are determined to be mixed NARM/RCRA wastes, disposal would be in accordance with appropriate RCRA regulations for mixed wastes. Because of the current limitations on the off-site treatment or disposal of mixed wastes, the potential exists that these materials would have to be temporarily stored on site in accordance with appropriate RCRA mixed waste requirements until a treatment or disposal facility becomes available.

The sites would then be covered with clean soil, graded, and revegetated to the extent practicable to allow for subsurface soil remediation. The total time for complete remediation would be approximately 4 years for the Route 532 site and 7 years for the Route 72 site.

REMEDIAL ALTERNATIVES FOR SUBSURFACE SOILS

Alternatives 6, 6A, 7, 8, 9, 10, and 11 were identified in the FS to address subsurface soils. Subsurface soils are not discussed here, but will be addressed in supplemental RODs to be prepared at a later date. Prior to that time, treatability evaluations will be performed to assist in remedy selection.

REMEDIAL ALTERNATIVES FOR GROUND WATER

Alternative 12 - No Action for Ground Water

Capital Cost:	$ 780,000	
Operation and Maintenance (PW):	$4,400,000	(For 30 years)
Total PW:	$5,100,000	
Estimated Implementation Time:	0 Years	

Under this alternative, no action would be taken to contain or recover the contaminated ground water plumes. Public health would be protected by restricting human contact with the contaminated ground water.

If migration of the contaminant plume causes further contamination of surface waters or threatens existing drinking water supplies, this alternative would be reconsidered and additional remedial measures would be implemented.

Alternative 13 - Air Stripping, Metals Removal, and Biological Treatment (1.9 mgd Pumping)

Capital Cost:	$ 25,000,000	
Operation and Maintenance (PW):	$ 88,000,000	(For 30 years)
Total PW:	$113,000,000	
Estimated Implementation Time:	30 Years	

Under this alternative, the contaminant plumes at the sites would be extracted at an estimated rate of 1.9 million gallons per day (mgd) which is sufficient only to capture the present contaminant plumes at their estimated flow rates and extent. This pumping rate was developed to remediate the aquifer within a target period of 30 years. The same rate would be implemented under Alternatives 14, 15 and 16. Actual locations and pumping rates for the ground water remediation would be determined during the design.

It has been estimated that a total pumping rate of 400 gallons per minute (gpm) or 0.58 mgd would provide sufficient control for the Route 532 site. All wells would be screened through the contaminated zone, approximately 25 to 50 feet below the ground surface, and designed to capture as little clean water as possible. The combined effect of the three pumping wells has been calculated to provide a hydraulic barrier that would capture the estimated width of the plume.

It is estimated that this alternative would result in removal of the portion of Route 532 site plume volume, extending 2,000 feet down gradient, within 30 years, once the source is removed or immobilized. However, it is recognized that this alternative would proceed until the ground water remedial ARARs have been met. Concentrations in the down gradient plume discharging to surface water would also be monitored throughout this period, as would the surface water in the bog and bog reservoirs. Surface water samples would be collected over the same period of time.

It has been estimated that a total pumping rate of 965 gpm (1.34 mgd) would be needed to capture the present plume volume at the Route 72 site. Pumping barriers similar to those described for the Route 532 site would be used to capture the near-site and down gradient portions of the plume. The wells would pump from the contaminated interval between 70 and 120 feet below the ground surface.

This alternative has been estimated to capture the present volume of the Route 72 site plume in approximately 30 years, based on the same assumptions discussed for the Route 532 site. The sampling schedule would be the same as for the Route 532 site.

Water from each ground water extraction system would be transported through a piping system to a treatment plant located nearby. The effluent from the treatment plant would be piped back to each site and recharged into the aquifer. The method of recharge would be determined during the design.

Table 2 gives the site ARARs and Table 3 gives the goals for the aquifer quality. The sizing and performance requirements for each unit operation would be determined during design.

The conceptualized processing system for the ground water can be divided into the steps listed below:

- Acid Addition
- Air Stripping
- Metals Removal
- Filtration
- Biological Treatment

The design of the ground water capture and recharge system would be based on results of computer modeling of flow and transport in the aquifer underlying the sites. A comprehensive treatability study would be needed as an early step in the design of the treatment system. This study would define design and operating parameters for the treatment steps.

The treatment system is expected to achieve all remedial ARARs, except for some semi-volatile compounds, BOD and TDS. However, operating parameters can be adjusted to improve effluent quality as the influent concentration of these parameters decrease over time. The treatment process to remove metals will cause an increase in the level of TDS in the effluent above the standard established in N.J.A.C. 7:9-6.6(a). However, this higher level of TDS is expected to be present only while the metals precipitation unit is in operation. After treatment to remove metals has been completed and the operation of the precipitation unit has been reduced or ceased, the concentration of TDS in the effluent will be reduced.

<u>Alternative 14 - Air Stripping, Metals Removal, Biological Treatment, and Carbon Adsorption (1.9 mgd Pumping)</u>

Capital Cost:	$ 29,000,000
Operation and Maintenance (PW):	$133,000,000 (For 30 years)
Total PW:	$162,000,000
Estimated Implementation Time:	30 Years

The pumping and recharge scheme for this alternative is identical to that for Alternative 13. It was developed to remediate the contaminated ground water plumes within a target period of 30 years, based on the estimated extent and flow rates of the plumes.

The conceptualized process system for this alternative is based on the same criteria for the acid addition, air stripping, metals removal, and biological treatment steps as the treatment system in Alternative 13. The effluent from these treatment steps would be further treated by activated carbon. This system will achieve all remedial ARARs except the effluent requirements for BOD or TDS, but operating parameters can be adjusted to improve effluent quality as the influent concentrations of these parameters decrease over time. In addition, the remedial goals are expected to be reached as a result of treatment under this alternative.

The requirements for additional studies would be similar to those for Alternative 13. Additional treatability testing will be needed to define operating parameters for the carbon adsorption system. These tests are particularly important to estimate carbon usage which is the most significant cost factor in the carbon adsorption step, and which cannot be accurately estimated without testing.

Alternative 15 - Air Stripping, Metals Removal, Biological Treatment, and Advanced Oxidation (1.9 mgd Pumping)

Capital Cost:	$ 27,000,000
Operation and Maintenance (PW):	$ 93,000,000 (For 30 years)
Total PW:	$120,000,000
Estimated Implementation Time:	30 Years

The pumping and recharge scheme for this alternative is identical to that for Alternative 13. It was developed to remediate the contaminated ground water plumes within a target period of 30 years, based on the estimated extent and flow rates of the plumes.

The conceptualized process system is based on the same criteria for the acid addition, air stripping, metals removal, and biological treatment steps as in Alternative 13. The effluent from the system would then be dosed with hydrogen peroxide and passed through an ozone contactor. The advanced oxidation step can reduce concentrations of the readily oxidizable compounds (phenols and soluble PAHs). This treatment system will achieve all remedial ARARs except the effluent requirements for BOD or TDS, but operating parameters can be adjusted to improve effluent quality as the influent concentrations of these parameters decrease over time. In addition, the remedial goals are expected to be reached as a result of treatment under this alternative.

The requirements for additional studies would be similar to those for Alternative 13. Additional treatability studies also would be needed to define the operating parameters and optimize the performance and cost-effectiveness of the advanced oxidation step.

Alternative 16 - Air Stripping, Metals Removal, Biological Treatment, Carbon Adsorption, and Reverse Osmosis (1.9 mgd Pumping)

Capital Cost:	$ 40,000,000
Operation and Maintenance (PW):	$232,000,000 (For 30 years)
Total PW:	$272,000,000
Estimated Implementation Time:	30 Years

The pumping and recharge scheme for this alternative is identical to that for Alternative 13. It was developed to remediate the contaminated ground water plumes within a target period of 30 years, based on the estimated extent and flow rates of the plumes.

The conceptualized process system is based on similar criteria for the acid addition, air stripping, metals removal, biological treatment and carbon adsorption as in Alternative 14. A reverse osmosis (RO) step would be added to reduce BOD and TDS to meet the remedial ARARs in the initial discharge. In addition, the remedial goals are expected to be reached as a result of treatment under this alternative.

Effluent from the activated carbon will be further treated by RO to reduce BOD and TDS concentrations to within remedial ARARs in the initial discharge.

The requirements for additional studies would be similar to those for Alternative 13. Additional treatability studies would be needed to define design parameters for the carbon adsorption step, as described under Alternative 14.

Additional testing would also be needed to support selection of the RO membrane, and design of the RO plant.

Alternative 17 - Air Stripping, Metals Removal and Biological Treatment (3.2 mgd Pumping)

Capital Cost:	$ 31,000,000
Operation and Maintenance (PW):	$ 84,000,000 (For 30 years)
Total PW:	$115,000,000
Estimated Implementation Time:	10 Years

This alternative is identical to Alternative 13, except that the contaminant plumes would be extracted at an approximate rate of 3.2 mgd instead of 1.9 mgd.

Alternatives 17, 18, 19, and 20 are designed to remediate the sites at an accelerated rate. The pumping rate of 3.2 mgd would remediate the contaminated ground water plumes in approximately 10 years. Additional pumping wells would be necessary. The increased pumping would increase the magnitude of the drawdown and the extent of the effected area.

Alternative 18 - Air Stripping, Metals Removal, Biological Treatment and Carbon Adsorption (3.2 mgd Pumping)

Capital Cost:	$ 40,000,000	
Operation and Maintenance (PW):	$121,000,000	(For 30 years)
Total PW:	$161,000,000	
Estimated Implementation Time:	10 Years	

This alternative is identical to Alternative 14, except that 3.2 mgd would be extracted and the treatment system would have a larger capacity to accommodate the higher flow rate.

Alternative 19 - Air Stripping, Metals Removal, Biological Treatment and Advanced Oxidation (3.2 mgd Pumping)

Capital Cost:	$ 34,000,000	
Operation and Maintenance (PW):	$ 89,000,000	(For 30 years)
Total PW:	$123,000,000	
Estimated Implementation Time:	10 Years	

This alternative is the same as Alternative 15, except that 3.2 mgd would be extracted and the treatment system would have a larger capacity to accommodate the higher flow rate.

Alternative 20 - Air Stripping, Metals Removal, Biological Treatment, Carbon Adsorption and Reverse Osmosis (3.2 mgd Pumping)

Capital Cost:	$ 55,000,000	
Operation and Maintenance (PW):	$221,000,000	(For 30 years)
Total PW:	$276,000,000	
Estimated Implementation Time:	10 Years	

This alternative is identical to Alternative 16, except that 3.2 mgd would be extracted and the treatment system would have a larger capacity to accommodate the higher flow rate.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In accordance with the NCP, a detailed analysis of each remedial alternative is conducted with respect to each of nine detailed evaluation criteria. All selected remedies must at least attain the Threshold Criteria. The selected remedy should provide the

best trade-offs among the Primary Balancing Criteria. The Modifying Criteria were evaluated following the public comment period.

Threshold Criteria

- Overall Protectiveness of Human Health and the Environment - This criterion evaluates the adequacy of protection that the remedy provides while describing how risks are eliminated, reduced or controlled through treatment, engineering controls, and/or institutional controls.

- Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) - This criterion addresses whether a remedy will meet all of the ARARs of other Federal and State environmental statutes and/or provide grounds for invoking a waiver.

Primary Balancing Criteria

- Reduction of Toxicity, Mobility or Volume (TMV) - This criterion addresses the anticipated treatment performance of the remedy.

- Short-Term Effectiveness - This criterion refers to the speed with which the remedy achieves protection, as well as the remedy's potential to create adverse impacts on human health and the environment during the remedial action.

- Long-Term Effectiveness and Permanence - This criterion evaluates the magnitude of residual risk and the ability of the remedy to maintain reliable protection of human health and the environment over time once the remedial action has been completed.

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

- Cost - This criterion includes the capital and operation and maintenance costs of the remedy.

Modifying Criteria

- State Acceptance - This criterion indicates whether, based on its review of the Feasibility Study and Proposed Plan, the State of New Jersey concurs with, opposes, or has no comment on the preferred alternative.

Community Acceptance - This criterion evaluates the reaction of the public to the remedial alternatives and USEPA's Proposed Plan. Comments received during the public comment period and USEPA's responses to those comments are summarized in the Responsiveness Summary attached to this document.

REMEDIAL ALTERNATIVE FOR SURFACE SOILS, WASTES AND DEBRIS

Overall Protection of Human Health and the Environment:

Alternative 1 would not reduce the public health risk other than maintenance of the fences surrounding the sites. This alternative would allow continuation of adverse environmental conditions.

Alternatives 2A and 2B would remove the threats to public health and the environment stemming from contaminated surface soils at each site. The excavation of contaminated surface soils for transport to an off-site treatment, storage, and disposal (TSD) facility would minimize the potential for continued local releases of contamination.

Surface materials would be encapsulated on site in Alternative 3. The encapsulation facility would isolate the materials from the surrounding environment. Direct exposure threats will be removed. Precipitation will not be permitted to percolate through the facility and create more leachate which could further contaminate the ground water.

The high-temperature thermal treatment of Alternatives 4 and 5 should destroy most of the hazardous constituents. The chemical fixation of metals associated with Alternative 4 and the vitrification of metals associated with Alternative 5 would prevent future releases of contaminants to the water systems.

Compliance with ARARs:

To date, there are no promulgated Federal and State standards for cleanup of soils contaminated with organic compounds, or with nonradioactive metals. Therefore, no ARARs have been identified for remediation of most of the contaminants in soils at the site. However, NJDEP has established soil cleanup objectives for this remedial action (Table 1).

The ARARs were identified for PCBs and radionuclides. The Toxic Substance Control Act addresses disposal requirements of soils contaminated with PCBs above 50 ppm. This does not, however, influence site actions since, to date, no PCBs have been detected at the sites in concentrations above 5 ppm.

There are no applicable standards governing remediation of soil contaminated with radionuclides at the Woodland sites. Two sets of criteria have been considered as relevant and appropriate and "to-be-considered" for the remediation of radioactively contaminated soils. These are the Federal Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings (40 CFR 192) and Nuclear Regulatory Commission Guidelines, respectively.

Because these sites are located within the Pinelands Preservation area, The Pinelands Comprehensive Management Plan (N.J.A.C. 7:50-1.1, et seq.) is applicable to some construction activities.

Although the site wastes are not currently identified as hazardous wastes, ongoing data gathering may change this classification and subject the sites to RCRA applicability. The regulation is still considered as relevant and appropriate for some actions, such as the construction of an on-site landfill. This consideration is made in light of the environmentally sensitive location in which such a landfill would be constructed. The New Jersey Hazardous Waste Regulations are also considered in the same matter.

The New Jersey Air Pollution Regulations include provisions for the emission of combustion by products and chemical vapors into the atmosphere. These regulations are considered as applicable to many of the construction activities.

Alternative 1 does not comply with the soil cleanup objectives identified for these sites.

Alternatives 2A and 2B would comply with the soil cleanup objectives since they would excavate and dispose of the surface materials off site. They would comply with all Federal and State regulations associated with transportation. The alternatives would meet all RCRA standards and guidelines (e.g., 40 CFR Part 262, 40 CFR 264, 40 CFR 265, OSWER Off-site Policy, etc.). A RCRA storage permit will be required for wastes which remain on site for greater than 90 days.

Alternative 2A may not meet the USEPA statutory deadline for RCRA Land Disposal Restrictions (LDRs) when they come into effect on November 9, 1990. These restrictions will require that soil and debris from Superfund sites be treated prior to disposal.

Because of the time necessary to design and construct a new landfill, Alternative 3 may not meet the USEPA regulations for RCRA LDRs when they come into effect on November 9, 1990. The

siting of the landfill would be in conflict with the Pinelands Comprehensive Management Plan (N.J.A.C. 7:50-6.75 and 6.81), which does not permit the construction of hazardous waste landfills within the New Jersey Pinelands.

Alternatives 4 and 5, due to the siting of an on-site incinerator, would not comply with the Pinelands Comprehensive Management Plan.

Reduction of Mobility, Toxicity, or Volume (MTV) of Contaminants through Treatment or Containment:

Alternative 1 offers no reduction in MTV of the contaminants.

Alternatives 2A and 3 provide for reduction in mobility, since they utilize containment to ensure that site wastes do not cause environmental degradation.

Alternatives 2B, 4, and 5 provide for reduction in the levels of organics through thermal treatment. They further provide for the reduction in the mobility of the remaining contaminants through either off-site containment (Alternative 2B), or immobilization (Alternatives 4 and 5).

Short-Term Effectiveness:

The short-term effectiveness of Alternative 1 relies on the enforcement of the security measures to discourage casual access to the sites.

Alternatives 2A, 2B, 3, 4, and 5 all have similar short-term risks. The risks are associated with the excavation and subsequent handling of the wastes. The short-term risks would be reduced by implementing dust control measures, the use of Level C or Level B personal protection equipment, and implementing other engineering controls. Other measures would include erosion control, sealed transport of waste and soils, and vehicle decontamination.

Long-Term Effectiveness:

Alternative 1 would provide poor long term effectiveness, since wastes are still available to the environment. The remedy is limited in its effectiveness, and provides for a continued source of direct contact and ground water contamination.

Alternatives 2A, 2B, 4 and 5 all provide permanent remedies for the surface soil contamination. Alternatives 2A and 2B removes the contaminated materials to a secure facility. The

high-temperature thermal treatment in Alternatives 4 and 5 provide permanent remedies for surface soil contamination. The chemical fixation and vitrification of residual material would require maintenance of the soil cover and monitoring of ground water and surface water to demonstrate the effectiveness of the remedies.

The design for Alternative 3 is expected to provide a reliable long-term remedial approach. Maintenance is required for erosion, vegetation, pumps, tanks and instruments. Monitoring is required for ground water, surface water, leachate and gas venting.

Implementability:

All the alternatives evaluated use widely applied technologies and have past proven performance. Alternative 1 would require fence maintenance and security patrols, all of which are local and readily available.

Alternatives 2A and 2B use technology currently available and use standard construction industry equipment and practices. Currently, there is sufficient landfill space to assure acceptance of the excavated material. Time is not a factor, and delays would not affect other remedial efforts.

The landfill construction in Alternative 3 uses widely applied technologies and proven engineering designs. The construction of the landfill is short term (1-2 years). The equipment, materials, and personnel necessary for the construction of a landfill would be available through local markets.

The high temperature thermal treatment of Alternatives 4 and 5 uses widely applied technologies with a history of reliable and effective performance. These remedies are estimated to require three years to implement at each site. The equipment materials and personnel necessary for the implementation of these alternatives would be available from a small number of vendors. A limitation is noted for Alternative 5, since vitrification units of the needed size are presently limited.

Cost:

The total cost includes estimated capital, and operation and maintenance costs. The cost comparisons for each alternative are shown in Table 4. Alternative 1 provides minimal protection for a total present worth cost of $870,000. Alternatives 2A and 2B remove the contaminated surface materials from the sites at total present worth costs of $22,200,000 and $179,200,000, respectively. Alternative 3 encapsulates the contaminated surface materials on site for a total present worth of $8,800,000. Alternatives 4 and 5 thermally treat the surface materials prior to contaminant immobilization for total present worth costs of $36,500,000 and $41,500,000, respectively.

State Acceptance:

As the lead agency for the investigation, the State of New Jersey participated in the selection of the remedy for the sites. The State, therefore, concurs with the selected remedy of Alternative 2A.

Community Acceptance:

The community had no opposition to the preferred remedy nor did they overly prefer any other alternative. Questions and answers raised during the public meeting are presented in the responsiveness summary.

A group of PRPs (Woodlands Private Study Group [WPSG]) supports Alternative 2A. Comments from the WPSG also indicate support for Alternative 3, however, the group offered no support for Alternative 4 or 5 and had no comment on Alternative 1 or 2B.

REMEDIAL ALTERNATIVES FOR GROUND WATER

Overall Protection of Human Health and the Environment:

Alternative 12 (No Action) would offer no protection of human health and the environment, since it would not address the existing contamination and would necessitate substantial restrictions on ground water use. Degradation of the Cohansey Sand Aquifer would proceed unchecked until the source of contamination has been depleted and the plume has been diluted, degraded, or has been completely discharged to surface water which would require a substantial period of time.

TABLE 4

Cost Summary Table for Remedial Alternatives of the Woodland Township Route 72 and Route 532 Sites

Remedial Alternatives for Surface Materials	Capital Costs[1]	Operation and Maintenance[1,2]	Total[1]
Alternative 1 - No Action	0.0	0.87	0.87
Alternative 2A - Off-Site Disposal	1.2	21.0	22.2
Alternative 2B - Off-Site Treatment and Disposal	1.2	178.0	179.2
Alternative 3 - On-Site Encapsulation	5.7	3.1	8.8
Alternative 4 - On-Site High Temperature Thermal Treatment with Chemical Treatment Fixation of Metals	1.5	35.0	36.5
Alternative 5 - On-Site High Temperature Thermal Treatment with Vitrification of Metals	1.5	40.0	41.5

TABLE 4 (continued)

Cost Summary Table for Remedial Alternatives of the Woodland Township Route 72 and Route 532 Sites

Remedial Alternatives for Ground Water	Capital Costs[1]	Operation and Maintenance[1,2]	Total[1]
Alternative 12 - No Action	0.78	4.4	5.2
Alternative 13 - Air Stripping, Metals Removal, Biological Treatment (1.9 mgd Pumping)	25.0	88.0	113.0
Alternative 14 - Air Stripping, Metals Removal, Biological Treatment, Carbon Adsorption (1.9 mgd Pumping)	29.0	133.0	162.0
Alternative 15 - Air Stripping, Metals Removal, Biological Treatment, Advanced Oxidation (1.9 mgd Pumping)	27.0	93.0	120.0
Alternative 16 - Air Stripping, Metals Removal, Biological Treatment, Carbon Adsorption, Reverse Osmosis (1.9 mgd Pumping)	40.0	232.0	272.0
Alternative 17 - Air Stripping, Metals Removal, Biological Treatment (3.2 mgd Pumping)	31.0	84.0	115.0
Alternative 18 - Air Stripping, Metals Removal, Biological Treatment, Carbon Adsorption (3.2 mgd Pumping)	40.0	121.0	161.0

TABLE 4 (continued)

Cost Summary Table for Remedial Alternatives of the Woodland Township Route 72 and Route 532 Sites

Remedial Alternatives for Ground Water	Capital Costs[1]	Operation and Maintenance[1,2]	Total[1]
Alternative 19 - Air Stripping, Metals Removal, Biological Treatment, Advanced Oxidation (3.2 mgd Pumping)	34.0	89.0	123.0
Alternative 20 - Air Stripping, Metals Removal, Biological Treatment, Carbon Adsorption, Reverse Osmosis (3.2 mgd Pumping)	55.0	221.0	276.0

1). Costs are expressed as $1,000,000.
2). Operation and maintenance costs are represented as net present value for each alternative.

Alternatives 13, 14, 15 and 16 all are similar in overall protection of human health and the environment. Ground water use within the area of contamination would be curtailed for any current users, and prohibited for new users throughout the period of remediation. Under these alternatives, no further degradation of the aquifer would occur. Some local disturbance is expected during construction and implementation of these alternatives. Air emissions would be monitored and controlled. Wetlands will be monitored for potential impacts.

Alternatives 17, 18, 19 and 20 would increase the ground water extraction and achieve remediation of the ground water in a shorter time frame. This would result in a significant increase in the magnitude of the drawdown and the extent of the affected area as compared to Alternatives 13, 14, 15 and 16. Further studies and modelling are required to fully estimate the impact this would have on the sites. An added impact would be realized due to the larger amount of construction activities associated with this alternative (e.g., larger pumping well systems, piping systems, treatment plant and possible infiltration basin, etc.).

Compliance with ARARs:

Although permits are not required for on-site facilities, substantive requirements must be met. The discharge from the air stripper off-gas treatment unit will meet the National Ambient Air Quality Standards and NJDEP requirements (N.J.A.C. 7:27-8.2 and N.J.A.C. 7:27-17). Any disposal off site, if necessary, will comply with either a RCRA Part A (Interim Status) or a RCRA Part B permit. Transporters hauling the waste would be required to have an USEPA identification number, meet the transportation requirements order RCRA (40 CFR Part 263). Construction will likely require review by the Pinelands Commission.

Alternative 12 would not meet any of the previously discussed ground water ARARs or remedial goals.

Alternative 13 is expected to achieve ground water ARARs for all contaminants, with the exception of some semi-volatiles, BOD and TDS. Remedial goals, with the exception of some semi-volatile compounds, BOD and TDS, should also be achieved as a result of treatment under this alternative.

Alternatives 14 and 15 would meet all ground water ARARs, with the exception of BOD and TDS in the initial discharge. Remedial goals for all contaminants with the exception of BOD and TDS should also be achieved as a result of treatment under these alternatives. At the end of the remedial action it is expected that concentrations of BOD and TDS should meet ARARs.

Alternative 16 is expected to meet all ground water ARARs and remedial goals.

Alternatives 17, 18, 19 and 20 will comply with the same ground water ARARs as the corresponding lower pumping rate alternatives. These alternatives will comply with the requirements set forth in N.J.A.C. 7:27-8.2 and N.J.A.C. 7:27-17.

Reduction of Toxicity, Mobility or Volume of Contaminants through Treatment or Containment:

Alternative 12 would not be effective in reducing the toxicity, mobility, and volume of contaminants in the ground water. Some reduction in toxicity could be expected through the natural processes.

Alternatives 13, 14, 15, 16, 17, 18, 19 and 20 all have air-stripping, metals removal and biological treatment in common. air stripping would result in the removal of the volatile organic compounds (VOCs) and bis(2-chloroethyl) ether. These constitute approximately 80 percent of the total mass of organic Target Compound List (TCL) compounds. Biological treatment would remove a significant portion of the remaining contaminants. The metals removal step would concentrate the metals into a solid phase, which would be disposed of off site as a hazardous material.

Alternatives 14 and 18 additionally incorporate carbon adsorption. The semi-volatile contaminants would be removed by adsorption to the carbon. The spent carbon would be either regenerated or disposed of off site as a hazardous material.

Alternatives 15 and 19 additionally incorporate advanced oxidation. This would provide additional removal of semi-volatile contaminants. However, complete oxidation of these compounds is not likely to occur, and products of partial oxidation are expected to remain. This process would not produce any sidestreams requiring disposal.

Alternatives 16 and 20 additionally incorporate reverse osmosis. Reverse osmosis and evaporation will concentrate the remaining dissolved contaminants into a waste stream that will require disposal off site.

Short-Term Effectiveness:

Alternative 12 would require administrative controls for security.

The Alternatives 13, 14, 15, 16, 17, 18, 19 and 20 have similar short-term effectiveness. The area is sparsely populated so risk will be minimal to the community. The workers, on site, will be

protected by a strict health and safety plan. The volatile compounds emitting from the ground water during treatment will be controlled by engineering practices.

The ozone generated in Alternatives 15 and 19 will be routed to the ozone contactor and, therefore, result in no exposure to workers. Hydrogen peroxide transportation, handling, and storage will be by the best engineering design.

The carbon adsorbent in Alternatives 14, 16, 18, and 20 will need to be replaced on a regular basis. The reverse osmosis components in Alternative 16 and 20 will reduce BOD and TDS concentrations and will increase truck trips but should not cause any hazards.

Long-Term Effectiveness:

The long-term effectiveness of Alternative 12 is only viewed in the ability of the aquifer to dilute or decay the contaminants in the plume.

Alternatives 13, 14, 15, 16, 17 ,18 ,19 and 20 all have good long-term effectiveness. The long-term effectiveness of the treatment based alternatives are permanent. Protection is provided by the alternatives' ability to remove contamination from the ground water.

Implementability:

Alternative 12 would not pose a problem in construction or maintenance for the fencing or monitoring system. This no-action alternative is readily implemented because no remedial action is being taken.

The unit processes proposed for Alternatives 13, 14, 15, 16, 17, 18, 19 and 20 for the treatment system have been used in many applications. The design and construction of these units do not pose any technical problems. The pumping rates were estimated by using a ground water model. The model predicted that remediation would be completed in either 30 years for Alternatives 13, 14, 15 and 16, or 10 years for Alternatives 17, 18, 19 and 20. The effectiveness of the treatment system would be monitored by periodic analysis of samples collected from influent and effluent streams, and other points in the treatment train to monitor system performance.

In Alternatives 15 and 19, the addition of an advanced oxidation step would present no unusual difficulties with respect to construction or operation. All equipment is readily available and has been used for a number of years in other applications. However, treatability studies would be necessary to optimize design parameters and determine the effectiveness of this process.

Alternatives 14 and 18 add carbon adsorption to the treatment train. This would present no unusual difficulties with regard to construction or operation. Treatability studies for carbon adsorption isotherm testing and pilot studies must be performed to define the actual design parameters.

Alternatives 16 and 20 add reverse osmosis to the treatment train of Alternatives 14 and 18. This addition is expected to present no unusual difficulties with regard to construction or operation. Reverse osmosis has been successful in removing dissolved contaminants from a variety of industrial and waste water streams. Pilot testing would be required to define design parameters.

Alternatives 17, 18, 19 and 20 all would need larger recharge basins or wells than the previous alternatives. The large aerial extent of the Route 532 site could accommodate a larger basin without clearing uncontaminated areas. The Route 72 site, however, would have to clear 240,000 square feet (approximately 6 acres) of uncontaminated area to accommodate the basin.

Cost:

The alternatives are presented in a cost comparison table in Table 4.

Alternative 12 provides minimal protection for a present worth of $5,200,000. Alternative 13 (a basic ground water treatment system for these sites - acid addition, air stripping, metals removal, filtration, and biological treatment) has a total present worth value of $113,000,000. Alternative 14 (Alternative 13 plus activated carbon adsorption) has a total present worth value of $162,000,000. Alternative 15 (Alternative 13 plus advanced oxidation) has an estimated total present worth of $120,000,000. Alternative 16 (Alternative 14 plus reverse osmosis) has a total present worth of $272,000,000. Alternative 17 (similar to Alternative 13 but designed for 3.2 mgd treatment) has a total present worth of $115,000,000. Alternative 18 (Alternative 17 plus activated carbon adsorption) has a total present worth of $161,000,000. Alternative 19 (Alternative 18

plus advanced oxidation) has a total present worth of $123,000,000. Alternative 20 (Alternative 18 plus reverse osmosis) has a total present worth of $276,000,000.

State Acceptance:

As the lead agency for the investigation, the State of New Jersey, participated in the selection of the remedy for the sites. The State, therefore, concurs with the selected remedy of Alternative 15.

Community Acceptance:

The community has no objection to the preferred remedy nor did they overly prefer any other alternative. Questions and answers raised during the public meeting are presented in the responsiveness summary.

The WPSG has expressed support for Alternative 14. Discussions with the WPSG indicated an interest in their part to pursue Alternative 15 in the design.

SELECTED REMEDY

The USEPA and the NJDEP have evaluated the remedial alternatives in accordance with Section 121 of CERCLA and Section 300.432 of the NCP and have developed a preferred remedial action for the Woodland sites based on the findings of the RI/FS and input by the public.

Assessments will be conducted before the remedial design. These include:

- Endangered species survey,
- Biological survey,
- Wetlands delineation and assessment,
- Initial habitat restoration evaluation which will be completed during the next operable unit,
- Floodplain impacts,
- Cultural resources survey,

- Increased ground water monitoring to determine the extent of potential radiological contamination. This increased monitoring will determine whether or not elevated radioactivity in some ground water samples is naturally occurring or indicative of ground water contamination.

Surface Materials

The USEPA and the NJDEP have selected Alternative 2A as the most appropriate remedy for surface materials at the sites. This would involve disposal of all contaminated surface materials at an acceptable off-site facility.

There are no promulgated Federal or State standards applicable for cleanup of soils contaminated with organic compounds or with nonradioactive metals at the Woodland sites. The remedial objectives are stated in Table 1. Surface soil samples were collected at off-site locations to estimate background concentrations of HSL contaminants and radionuclides. Based on these, background for phenols is in the range of 9.1 to 11.6 ppm.

Total phthalates and DDT and its metabolites were present at less than 1 ppm. Excavation and off-site disposal would remove the threats to public health and the environment stemming from contaminated surface materials at each site. This alternative meets and exceeds the remedial objectives for the sites by removing the surface materials from the site to off-site locations.

Implementation of Alternative 2A would require the temporary installation of staging and loading areas for the classification and removal of surface materials at the sites. The classification and removal of surface materials from the Route 72 and Route 532 sites would take less than 1 year. This remedy will comply with RCRA requirements for on-site storage of waste for greater than 90 days. The remedy will meet the substantive requirements of a permitted storage facility. The temporary staging and loading areas would then be taken from the sites and native vegetation will be reestablished.

Potential risks are associated with the remedy. These pertain almost exclusively to the excavation and transportation of the material. Volatilization of VOCs or suspension of particle-bound contaminants as fugitive dust would occur. These increased releases would be temporary, lasting only through active remediation. Fugitive dust impact would decrease rapidly with distance from the site.

On-site and perimeter emissions monitoring will be conducted to evaluate potential off-site migration of airborne contamination (e.g., organic vapors, fugitive dusts, radionuclides, etc.). Ground water monitoring will be implemented. The ground water monitoring program will determine the hydrologic effect associated with surface material excavation. If a concern is identified, appropriate contingency plans will be enacted to mitigate the concern.

Contingency plans would be developed to meet any problems, i.e., protective equipment for workers, plastic covers for temporary material storage, and water/surfactant sprays.

All modes of transportation from the site to an ultimate off-site disposal facility are acceptable from a public health perspective, assuming that the impact of an accidental release would be minimal. Wastes removed from the site with surface material would typically be bound within the soil matrix or semi-solid materials not likely to be lost to the environment if spilled. The environmental levels of contamination present in the surface material and the availability and implementation of a spill response plan suggest little impact in any case.

The excavation and disposal of contaminated material would allow full restoration of the natural site surface conditions, including re-establishment of an indigenous ecosystem (at the completion of the remedial actions for the sites). The net result would be to remove surface contamination to a secure location outside the Pinelands, which would substantially enhance the site environments. Suitable replacement soils will be placed on site to aid in the re-establishment of the sites after the remedial actions are completed.

This alternative uses standard construction industry equipment and practices, and does not rely on new, untested technologies or procedures.

Contact with representatives of six potential RCRA-permitted disposal facilities indicates that there is currently sufficient capacity available at each of the facilities to accept the surface materials from the Woodland sites. Availability of facilities and equipment does not at present represent a constraint for this alternative; however, the facility owners cannot project future demand for existing capacity or commitment of disposal space to other cleanup volumes.

The selected remedy for both sites for surface material remediation has an estimated total present worth of $22,200,000. The remedy will cost approximately $1,200,000 to construct. The NJDEP has estimated that operation and maintenance costs will be $21,000,000.

Ground Water

The USEPA and the NJDEP have selected Alternative 15 as the most appropriate remedy for ground water remediation at the sites. This would involve the installation of a ground water recovery system with an estimated flow of 1.9 mgd, consisting of air stripping, metals removal, biological treatment, and advanced oxidation or carbon adsorption.

Advanced oxidation is considered as an innovative process for this application. The process has been used in a limited number of ground water cleanups. The treatability studies conducted during the design will evaluate success of advanced oxidation. If this process is found to be deficient, a contingent remedy will be incorporated. The contingent remedy will be Alternative 14, which would replace advanced oxidation with activated carbon adsorption in the treatment system.

Alternative 15's components include air stripping, metals removal, biological treatment and advanced oxidation. Air stripping would create new pathways that need control. Air pollution control measures would be required under NJDEP regulations and policy. Controls are currently available to reduce air emissions from water treatment to a low level.

Waste streams produced by the ground water treatment system would be treated and/or disposed off site. Treatment and/or disposal of wastes would comply with all ARARs.

On-site and perimeter monitoring will be conducted to evaluate potential off-site migration of airborne contamination (e.g., organic vapors, fugitive dusts, radionuclides, etc.). The air monitoring program will indicate the presence of any concerns for human health or the environment.

Ground water monitoring will be implemented to determine the hydrologic effect associated with the ground water extraction, treatment and re-injection system. The ground water monitoring will also be used to evaluate the effectiveness of the treatment and observe the movements of the ground water contamination plume.

No further contamination of the aquifer would occur under this alternative. The discharge of the down gradient plume at the Route 532 site is not expected to increase concentrations in the cranberry bogs and wetland area beyond present levels. There would be no impact on surface water from ground water discharge at the Route 72 site under this alternative. Ozone generated on site from the ambient air would be routed directly to the ozone

contactor. Any ozone in the off-gas would be converted to oxygen by the catalytic decomposer, eliminating the release of ozone to the atmosphere.

Implementation of Alternative 15 would require the construction of a treatment plant and the installation of pumping wells and piping. The exact location of the pumping wells and the exact combination of unit operations used in the treatment plant will be developed during the design process.

The initial discharge from this treatment system will be in excess of the ultimate ground water remedial ARAR for TDS in the aquifer. This is due to the addition of materials (calcium or sodium) during the metals removal process. The treatment system will be designed to minimize TDS levels in the effluent. The treatment process to remove metals will cause an increase in the level of TDS in the effluent. However, this higher level of TDS is expected to be present only while the metals precipitation unit is in operation. After treatment to remove metals has been completed and the operation of the precipitation unit has been reduced or ceased, the concentration of TDS in the effluent will be reduced. In addition, it is possible that the TDS ARAR can be re-evaluated to determine whether a less stringent ARAR adequately protects human health and the environment. Similar considerations exist for the remedial ARAR for BOD, though the resultant levels of BOD in the effluent would be only slightly above the ARAR for the aquifer. Based upon the ground water monitoring data, appropriate treatment modifications will be implemented.

Site-related radionuclide concentrations in the ground water contamination plume must meet the ground water ARARs for these sites at the end of the remediation.

Treated ground water would be discharged immediately up gradient from the disposal areas via reinjection wells or infiltration basins. Discharge to local surface waters is not recommended because of State requirements prohibiting new discharges to surface water bodies in the Central Pine Barrens and because of the distance (five miles) to the nearest river. Discharge to local sewage treatment plants (Pemberton or Mount Holly) is not recommended because none are located within a close proximity to the sites. In addition, these facilities do not have the sufficient capacity to handle this additional volume of water.

Pumping and treatment of the ground water would proceed until the remedial goals for the aquifer are met, which is expected to take approximately thirty years or until further recovery efforts produce no beneficial results and the remedial ARARs for the aquifer are met. Upon remediation, the wells would be shut down and the piping and the treatment plant would be disassembled and

removed from the sites. This alternative implements the best available technology for site remediation, within the specific constraints of the nature and extent of contamination.

The costs for this alternative include design and construction of the ground water treatment system, improvement of the roads leading to the treatment plant and recovery and monitoring wells, and associated piping and miscellaneous facilities. The total estimated capital cost for this alternative, including a 30 percent contingency, is $27.4 million.

The estimated annual costs, including a 30 percent contingency, are $11 million for the first year (including treatment of water captured during excavation), and $9.3 million for each year thereafter until remediation of the contaminated ground water plume is complete (30-year target period). An additional annual allowance of $330,000 is provided for legal, permitting, and engineering fees. The total estimated present worth of Alternative 15 is $120,000,000.

STATUTORY DETERMINATION

Overall Protection of Human Health and the Environment

The selected remedy is protective of both human health and the environment. The excavation and off-site disposal of the surface materials would remove the threats to public health and the environment. While this alternative would not reduce the toxicity, mobility, or volume of the contamination, it would substantially reduce the likelihood of future migration, and the resulting site related public health and environmental hazards. The risks associated with excavation and transportation will be eliminated by proper health and safety measures, engineering practices and contingency planning.

The ground water remediation will control and remove contaminants from the ground water system. The treatment system can remove VOCs, semi-volatiles and metals to achieve effluent concentrations equivalent to the remedial ARARs. In addition, remedial goals for these compounds are also expected to be achieved as a result of this remedial action.

Carcinogenic risks are estimated to exceed $1x10^{-6}$, and non-carcinogenic risks are estimated to exceed the HI of 1 target risk at both sites under the worst case scenarios. For most probable cases, risks do not exceed the carcinogenic $1x10^{-6}$ target risk and non-carcinogenic risk HI value of 1. Ingestion is the most significant pathway for exposure to soil contamination. Excavation and off-site disposal of surface materials will eliminate this pathway.

Compliance with ARARs

To date, there are no promulgated Federal or State standards for cleanup of soils contaminated with organic compounds. Two sets of criteria have been considered as relevant and appropriate or "to-be-considered" guidelines for the remediation of radioactively contaminated soils. These are the Federal Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings (40 CFR 192) and Nuclear Regulatory Commission Guidelines, respectively. Mixed waste materials stored on site will comply with RCRA mixed waste regulations.

New Jersey Ground Water Quality Criteria and Maximum Contaminant Levels established pursuant to the Federal and State Safe Drinking Water Acts are applicable or relevant and appropriate Federal and State ground water requirements for this remedial action.

The Woodland sites are located in the Central Pine Barrens area. The N.J.A.C. describes the goal for ground water quality at these sites as natural background. Table 3 contains numerical values that represent natural background for ground water at these sites.

If the ground water monitoring indicates the presence of radionuclide contamination, the treatment train will be designed to meet ground water radionuclide ARARs in the effluent.

Ambient air monitoring would be conducted in conformance with N.J.A.C. 7:26.1, et al.

Activities associated with the wetlands areas will require compliance with the New Jersey Freshwater Wetland Protection Act, Executive Order 11990, and the Clean Water Act (Section 404).

Although remedial activities are not expected to adversely impact endangered or threatened species or rare habitats, engineering design will minimize any unanticipated adverse impacts during site remediation.

Cost Effectiveness

The selected remedy is cost-effective because it has been determined to provide overall effectiveness proportional to its costs. The cost of Alternative 2A is the least costly that achieves the remedial objectives. It provides overall protection of both public health and the environment for $22,000,000. Alternative 15 is also the least costly to meet the ground water remedial ARARs, with the exception of BOD and TDS, at a cost of $120,000,000.

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

Of those alternatives that are protective of human health and the environment and comply with ARARs, USEPA and the State have determined that this selected remedy provides the best balance of trade offs in terms of long-term effectiveness and permanence, reduction in toxicity, mobility or volume achieved through treatment, short-term effectiveness, cost-effectiveness, implementability, and considering State and community acceptance.

While Alternative 2A would meet the remedial objectives for surface materials at the sites, it would not comply with the Superfund preference for treatment. Advantages presented by this remedy include a relatively short implementation period and low implementation costs.

Alternative 15 uses treatment technologies which provide a permanent solution for the cleanup of the contaminated ground water.

DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant changes from the Proposed Plan.

RESPONSIVENESS SUMMARY

Woodland Township Route 532 and Route 72 Superfund Sites
Woodland Township, Burlington County, New Jersey

Public Comment Period
December 26, 1989 to February 5, 1990

INTRODUCTION

From December 26, 1989 to February 5, 1990, the New Jersey Department of Environmental Protection (NJDEP) received input from residents, local officials, the New Jersey Pinelands Commission and other interested parties on the proposed remedy for the Woodland Township Route 532 and Route 72 sites located in Woodland Township, Burlington County, New Jersey. This responsiveness summary provides highlights of community involvement and NJDEP community relations activities at the sites during the remedial investigation and feasibility study (RI/FS) and public comment period. In particular, this document summarizes community relations, technical concerns and legal questions pertaining to the findings of the RI/FS and Proposed Plan expressed by residents, local officials and other interested parties.

OVERVIEW

At the public meeting, held on January 31, 1990, NJDEP formally presented its preferred remedy for the Woodland Township Route 532 and Route 72 Superfund sites. Separate alternatives were identified to address the remediation of contaminated surface soils and contaminated ground water. The preferred remedy for surface materials is Alternative 2A, Off-site Disposal of Surface Materials. This remedy would involve disposal of all contaminated surface soils to an acceptable off-site hazardous waste facility. Alternative 15 is preferred as the most appropriate remedy for ground water at the sites. This would involve the installation of a ground water recovery system with an estimated flow of 1.9 million gallons per day, consisting of air stripping, metals removal, biological treatment and advanced oxidation. This is considered to be the best available technology for remediation of the contaminated ground water underlying the Woodland sites. Subsurface soil remedial alternatives would be evaluated in a future FS.

Based on comments received at the public meeting and during the public comment period, the local community, state, county and local officials, environmental group representatives and several interested companies generally support the preferred alternatives selected by NJDEP and the United States Environmental Protection Agency (USEPA). Comments received from the public centered on issues such as ground water quantity and quality, affects on

commercial cranberry operations, wetland and wildlife concerns, township review of site plans, township liability and reimbursement issues and specific concerns relating to various components of the selected remedies.

These sections follow:

- Background on Community Involvement
- Summary of Comments Received during the Public Comment Period and NJDEP Responses
- Remaining Concerns
- Attachments: Written Comments submitted to NJDEP

BACKGROUND ON COMMUNITY INVOLVEMENT

Community interest in the Woodland Township Route 532 and Route 72 dump sites has been minimal since the sites were placed on the Superfund National Priorities List (NPL) in 1983. Most likely, the low population density in the area contributes to the lack of citizen involvement with the sites. There is only one residence in the immediate vicinity, although there is evidence of public recreational activities (footprints and tire tracks from trail motorcycles have been found on and around the sites). In 1986, fences were erected around both the Route 532 and Route 72 sites by the potentially responsible parties (PRPs) for the Woodland sites. Route 72 is heavily traveled in the summer months as an access route to the New Jersey shore area but there is minimal local traffic. There were some complaints of noxious odors during the 1950s and 1960s when waste disposal was being carried out, however there has only been one subsequent complaint, also of odors, in 1979. Two reported incidents exist of residents wandering onto the sites and requiring medical attention. Local and county officials acted as the primary catalysts in bringing the sites to the attention of the NJDEP, initially requesting assistance in sample analyses and visiting the sites with NJDEP officials.

Some of the key community issues surrounding these sites include concern for the integrity of the Cohansey Sand Aquifer, the potential for surface water contamination threatening a number of commercial cranberry bogs in the area, concern for endangered species such as the timber rattle snake and the corn snake, and an overall concern for the ecology of the area as part of the significant New Jersey Pinelands Preservation Area within the Pinelands National Reserve.

Community relations activities conducted for the Woodland Township dump sites to date have included:

- NJDEP preparation of a Community Relations Plan (July 1984)

- NJDEP conducted a public meeting at the Chatsworth Fire Hall to discuss the initiation of the RI/FS on February 10, 1986. Approximately 30 people attended, including citizens, local officials, PRP representatives and the media.

- NJDEP conducted potable well sampling episodes in 1985 at the one residence located in the immediate vicinity of the sites and again in June 1988 in the area of Dukes Bridge.

- NJDEP sampled the fall cranberry harvests of both 1988 and 1989 with the assistance of the Chatsworth Cranberry Association and Ocean Spray, Inc.

- On January 31, 1990, NJDEP conducted a second public meeting at the Chatsworth Elementary School to discuss the results of the RI/FS and the preferred alternatives preliminarily selected by NJDEP and USEPA to clean up the sites. Approximately 35 people attended, including citizens, local officials, the New Jersey Pinelands Commission's Executive Director and members of the media. A transcript of this meeting, together with other non-enforcement sensitive documents (e.g., RI/FS reports, Proposed Plan) related to the sites form the administrative record, which is available for public review at the following information repositories:

  Woodland Township Municipal Building
  Main Street
  Chatsworth, NJ 08019

  New Jersey Pinelands Commission
  P.O. Box 7, Springfield Road
  New Lisbon, NJ 08064

  New Jersey Department of Environmental Protection
  Division of Hazardous Site Mitigation
  401 East State Street
  Trenton, NJ 08625

SUMMARY OF PUBLIC COMMENTS AND AGENCY RESPONSES

Comments made at January 31, 1990 Public Meeting

- **Integrity of Ground Water and Surface Water Relating to Cranberry Bogs** - One resident questioned the amount of attention that will be given to ground water levels and ground water quality during the cleanup period. This resident stressed the need for specific water levels during various cranberry seasons and maintenance of specific water pH levels during the growing season to insure the health of the cranberry crop.

  Response - NJDEP agrees that the integrity of the area's cranberry bogs must be protected. Modeling of ground water and surface water quality will be required to insure their integrity. (A more detailed response is included under A.R. DeMarco comments on page 9.)

- **Wetlands and Wildlife Issues** - Another concern voiced at the meeting was the integrity of wetlands in the area of the sites and concern that care be taken to protect the wildlife in the area.

  Response - The wetlands and wildlife are a concern to NJDEP as well. NJDEP intends to protect the wetlands area and institute a wildlife protection plan for the species in the area.

- **Ground water Treatment and Movement** - A resident questioned whether the ground water flow would continue to move at its same pace when remedial action is initiated.

  Response - Once the ground water extraction and treatment system has been implemented, there would be no further migration of contaminants from the dump sites. The quality of the ground water would then begin to improve.

- **Township Concerns Regarding Site Review and Traffic Patterns** Township officials requested NJDEP to confirm that no vehicular traffic from the cleanup work would go through the Town of Chatsworth, and that Route 72 be used as an alternate route. Also, the Township requested that it be kept informed of all site activity and progress. The Township further requested that site vehicles be decontaminated before going into the Town of Chatsworth.

Response - Utilizing a traffic pattern that avoids the Town of Chatsworth would not present any problems. Vehicular traffic could easily use Route 72. The Township was also informed that it is NJDEP's intention to inform and involve the Township of all site activity and to update them routinely on progress made at the site. Assurance was also given that site vehicles will be decontaminated before leaving either of the sites.

- **Township Concerns Regarding Site Liability/Payment for Township Private Engineer** - A Woodland Township official voiced concerns over the Township's potential liability for a toxic waste site that the Township did not create. The official questioned whether payment to engineers hired by the Township to review site plans and other technical documents related to the cleanup of the Woodland's sites would be available.

  Response - Generally, under the Superfund program, owners, operators, transporters and generators are liable parties for hazardous waste sites. NJDEP is unaware of any evidence that the Township would fall within one of those categories, or would be otherwise liable for any other reason for the hazardous waste at the sites. With regard to the issue of engineering costs, three possible alternatives are available to Woodland Township to recover its costs resulting from oversight activities conducted pursuant to the Record of Decision (ROD). The first and most direct approach would be for the Township to discuss compensation of its expenses with the parties responsible for the contamination of the sites. To facilitate this effort, the Department has recently coordinated a meeting between the Township and representatives of several PRPs. The second approach available to the Township (if discussions with the PRPs prove unproductive) would be to file a lawsuit against the PRPs for costs and damages incurred by the Township. Finally, the third alternative available is for the Township to make a claim against the State's Spill Compensation Fund. The Township is alerted, however, to a one year statute of limitation which may limit its compensation from the Spill Fund.

- **Emergency Services - A resident on the Woodland Township rescue squad questioned why no one had contacted them as to the coordination of emergency services if the need should arise when cleanup work is being performed at the two sites.**

Response - NJDEP plans to hold a meeting with both Township and county emergency planning departments, the police department and fire and rescue personnel prior to conducting any remedial work at the Woodlands sites. At this meeting, the Health and Safety Plan for site work will be reviewed and discussed with an emphasis on local input into the plan.

- **Companies Involved with the Woodland Private Study Group (WPSG)** - A resident asked for the names of the companies in the WPSG and the names of other companies that are not cooperating with NJDEP's work at the Woodland sites.

  Response - The WPSG is comprised of - Rohm & Haas, 3M Corporation and Hercules, Inc. The companies that, to date, have not cooperated with NJDEP's program are - SOHIO, Manhattan Soap Co. (Purex, Inc.), Industrial Trucking, and Better Materials.

- **Land Ban/Target Date of Start of Cleanup** - A resident questioned the USEPA's regulations regarding the Land Ban and asked for a target date when cleanup work would start at the sites.

  Response - The Land Ban may not apply to the Woodlands sites or the work at the sites may be completed before the Land Ban goes into effect. There is no firm date yet as to when the Land Ban will be placed into effect, however, early November 1990 has been discussed by the USEPA. The activity of the WPSG should move quickly after the signing of the ROD. The WPSG signed an Administrative Consent Order (ACO) with the NJDEP in January 1990 to remove contaminated liquid materials from the two Woodland sites. Once the ROD is signed, the WPSG will be asked to implement the remainder of the cleanup.

- **Concerns Regarding Site Technology** - An inquiry was made by a resident concerning the proposed technology to be employed at the sites. Concerns centered on the effectiveness of the remedial techniques proposed for all three contaminated areas at the sites: ground water, surface soils and subsurface soils.

  Response - The techniques being considered for remediation of the Woodland sites have been used with success in the past. Advanced oxidation has not been used extensively in the area of ground water remediation but has been used to a

degree in treating drinking water. Treatability studies will be conducted to ascertain the effectiveness of this technique at these two particular sites. The soil removal technique is a successful and tested remedy.

- **Site Ranking System** - A resident questioned the method of ranking the Woodland sites on the Superfund NPL.

  Response - In the early 1980's, the Superfund ranking system was established to consider the threat of a site's proximity to residents, the threat of direct contact and other exposure routes, such as inhalation and ingestion, and the total impact to the environment posed by a particular site.

- **Request for Information on Other Sites** - A resident requested information on the Pioneer Smelting and the Minsei-Kogyo-Shoji site.

  Response - The resident was given the contact name and phone number of the Case Manager within NJDEP for Pioneer Smelting, Jim Groom (609) 633-0719 and the contact name and phone number of the Community Relations Coordinator for Minsei-Kogyo-Shoji, Susan Gall (609) 984-3081.

- **Cranberry Bog Reservoir - Risk Assessment** - A resident questioned whether the risk assessment performed for the sites included reference to the use of cranberry bog reservoirs for swimming, especially children.

  Response - Although a risk assessment was conducted as part of the RI/FS process, it did not specifically take into account risk associated with people (children) swimming in the cranberry bog reservoir. A review of the surface water data in this area indicates that contamination is limited to the irrigation ditches in the actual cranberry bog and a remote section of the marsh located upstream of the bog reservoir. Samples collected in the bog reservoir were generally free from contamination (of the five samples collected in the reservoirs, only one sample was contaminated at levels below the detection limit). Because of this lack of contamination, site related risks for individuals swimming in the bog reservoir are not anticipated.

Technical Comments Received in Writing from Environmental and Energy Consultants, Incorporated (EEC), on Behalf of the Woodlands Private Study Group

- **WPSG Comment** - The term "reservoir" should be defined in the ROD as a source of water supply for cranberry farming operations and not as a source of drinking water.

  Response - We concur with this comment. The ROD shall specifically state that the reservoir in question is utilized solely as a water supply for cranberry growing operations.

- **WPSG Comment** - The discharge point for the Route 72 site plume has not yet been determined, therefore, there is no reasonable expectation that the plume would eventually discharge to the Wading River.

  Response - We concur with this comment. Appropriate wording in the ROD will be incorporated to reflect the uncertainty of the discharge point of the Route 72 site plume.

- **WPSG Comment** - It should be clearly stated in the ROD that contamination by metals in the ground water is limited to on-site areas and is not evident in the downgradient plume.

  Response - We partially concur with this comment. Clarification on the extent of metal contamination in the downgradient portion of the plume will be incorporated in the ROD. The iron levels in the ground water plumes appear to be higher than background levels. Although the source of this iron may be indigenous, higher than expected levels may be mobilized in the ground water as a result of other contaminants present in the plume.

- **WPSG Comment** - WPSG disagrees with the NJDEP's interpretation of the New Jersey Administrative Code that the goal for ground water quality at these sites is natural background conditions.

  Response - N.J.A.C. 7:9-6.4(g) states that, "no degradation shall be allowed in ground water which constitutes an outstanding National resource...". Through its National and State designations, the Pinelands National Reserve indisputably falls into this category.

  The Central Pine Barrens (GW-1 waters) was deliberately classified apart from the State's potable water aquifers (GW-2 waters) in recognition of its exceptional ecological significance. In order to maintain and protect the

designated uses of GW-1 waters a nondegradation policy was established [N.J.A.C. 7:9- 6.4(j)]. Nondegradation clearly implies maintenance of natural quality.

- **WPSG Comment** - The WPSG contends that the NJDEP's approach for determining a goal for ground water quality criteria (that background concentrations be considered even where the parameters do not have numerical criteria) is not in accordance with the Superfund Amendments and Reauthorization Act (SARA).

  Response - Because the State Ground Water Quality Criteria are promulgated under State law, they must be considered in establishing remedial goals for the Woodland Township sites.

- **WPSG Comment** - The WPSG asserts that even if NJDEP's interpretation of the narrative provided in the N.J.A.C. regarding "antidegradation" of ground water quality in the Central Pine Barrens is "to be considered", it is merely prospective and intended only to prevent further degradation of ground water quality.

  Response - The N.J.A.C. is not merely prospective. N.J.A.C. contains standards to which ground water at these sites must be restored.

- **WPSG Comment** - The WPSG is concerned, "that a ground water remediation goal to "non-detectable" levels based on analytical method detection limits (MDLs) is an imprecise remedial criteria that is both open-ended and subject to change as analytical methods change."

  Response - NJDEP is committed to specific numerical ground water quality goals. These goals are based on the analysis of appropriate analytical methods and uses method detection limits in defining non-detectable (Table 3 of the Record of Decision).

- **WPSG Comment** - The WPSG contends, "it is generally recognized even within the USEPA that it is technically unfeasible to achieve this level of remediation within the ground water plume and, on this basis, a variance should be granted by the USEPA due to technical impracticability as provided in section 121(d) of SARA. This is due to the inherent limitations of ground water recovery and control technology. The aquifer could be pumped indefinitely without achieving measurable further improvement in the quality of the aquifer."

Response - For the Woodland sites' ground water recovery system(s), the ultimate goal is to remediate the ground water to appropriate levels and to cease operation when the levels are attained or it is proven that further recovery efforts produce no beneficial result. It is not the intent of the Department to maintain pumping systems that produce no beneficial results. SARA requires a periodic review of the effectiveness/efficiency of the remedial action, which also includes evaluation of the pumping system. The Department believes that, if through this review process it is determined that the recovery system has met, exceeded or cannot technologically achieve further measurable improvement in the quality of the contaminated ground water plume, a decision may be made based upon site-specific data to cease operation of the ground water recovery/treatment system(s) and monitor the sites for a period of time following cessation of pumping operations.

- **WPSG Comment** - The WPSG recommends that, "The cleanup objectives should be applied at the point of reinjection (treatment plant effluent) and should be specified based on current MDLs."

  Response - If reinjection occurred outside of the contaminant plume, all of the Department's ground water cleanup criteria (including total dissolved solids (TDS) at 100 ppm) would have to be met at the point of reinjection and such discharge could cause no degradation in existing quality. If reinjection occurs inside of the contaminant plume boundaries, the point of compliance would be considered to be the furthest downgradient edge of the contaminant plume.

- **WPSG Comment** - The final location for recharge/reinjection of treated ground water must be carefully designed and requires additional studies in the pre-design phase of the project.

  Response - The recharge/reinjection location for alternative 15 is conceptual. Modification that improve the efficiency/effectivness of the pump and treat system will be evaluated in the design.

- **WPSG Comment** - Remedial objectives for the aquifer could possibly be met in less than thirty years depending on the design and components of the treatment plant.

  Response - The actual length of time for ground water pumping and treatment has not been predetermined. The pumping and treatment of ground water will proceed until the remedial goals for the aquifer are met, which is expected to

take approximately thirty years or until further recovery efforts produce no beneficial results and the remedial ARARs for the aquifer are met. The thirty-year time period was arbitrarily selected for design and cost purposes. The final selection of the treatment plant components will be made during the design phase. The results of treatability studies conducted during the design will be of critical importance in the final selection of the treatment system components.

- **WPSG Comment** - Concern expressed over the presence of radioactive soil contamination at the sites. In addition, a reference was made to the type of waste classification (NARM/RCRA mixed waste) as being inappropriate.

  Response - While it is acknowledged in the Proposed Plan that the radioactively contaminated material is a relatively small aspect of the site cleanup, these materials do pose special problems for their appropriate handling and disposal. As an example, the regulations identified as relevant and appropriate for these materials indicate the need to remove them to a radioactive waste facility. The special identification of this relatively small aspect of the cleanup is considered necessary to clearly identify that these materials will be handled in the appropriate manner. The special identification further clarifies the fact that these materials may have to be stored on site until an appropriate facility is available.

  The process of determining whether these materials will be classified as NARM/RCRA mixed wastes is still underway. The Proposed Plan clearly noted that this determination has not been made at this time.

- **WPSG Comment** - Request made that the NJDEP allow segregation of the surface waste from underlying soils, where practicable.

  Response - The RI data indicates that the surface soils at both the Route 72 and Route 532 sites are contaminated with water insoluble organic and inorganic contaminants. It is NJDEP's position that segregation of surface soils is not a feasible option due to the heterogeneous nature of the contamination. In addition, the water insoluble contaminants present in these soils may become the limiting factor of the subsequent operable unit.

Technical Comments Received in Writing From Hercules, Incorporated

- **Hercules Comment** - Hercules contends that, "using inappropriate standards to develop cleanup standards at the sites concerns the use of New Jersey Pollutant Discharge Elimination System (NJPDES) guidelines to require remediation of ground water to nondetect levels."

  Response - Ground water cleanup at the Woodland sites will be addressed under the promulgated New Jersey Ground Water Quality Standards, N.J.A.C. 7:9-6 et.seq.

- **Hercules Comment** - Hercules further contends that, "NJPDES guidelines are meant to apply to discharge points to surface and ground water."

  Response - Reference previous response.

- **Hercules Comment** - Hercules also contends that, "the cleanup objective of nondetect for the ground water far exceeds the requirements necessary to protect human health and the environment. A tremendous amount of resources will be expended with no significant benefit to human health or the environment."

  Response - N.J.A.C. 7:9-6.4(g) states that, "no degradation shall be allowed in ground water which constitutes an outstanding National resource...". Through its National and State designations, the Pinelands National Reserve indisputably falls into this category.

  The Central Pine Barrens (GW-1 waters) was deliberately classified apart from the State's potable water aquifers (GW-2 waters) in recognition of its exceptional ecological significance. In order to maintain and protect the designated uses of GW-1 waters a nondegradation policy was established [N.J.A.C. 7:9- 6.4(j)]. Nondegradation clearly implies maintenance of natural quality.

- **Hercules Comment** - Hercules questions, "the technical feasibility of achieving a nondetect concentration in the aquifer. When these levels were first proposed, Hercules opposed them because to our knowledge, there is not a single instance where it has been feasible to clean an aquifer to these levels."

Response - For the Woodland sites' ground water recovery system(s), the ultimate goal is to remediate the ground water to appropriate levels and to cease operation when the levels are attained or it is proven that further recovery efforts produce no beneficial results. It is not the intent of the Department to maintain pumping systems that produce no results. SARA requires the Department to revisit the site every five (5) years for the purpose of review of the effectiveness/efficiency of the remedial action, which also includes evaluation of the pumping system. The Department believes that, if through this review process, it is determined that the recovery system has met, exceeded or cannot technologically achieve further measurable improvement in the quality of the contaminated ground water plume, a decision may be made based upon site-specific data to cease operation of the ground-water recovery/treatment system(s) and to monitor the sites for a period of time following cessation of pumping operations.

- **Hercules Comment** - Hercules also questions the "technical feasibility of achieving nondetect concentrations in the aquifer at the Woodlands sites. USEPA headquarters has conducted an extensive survey of ground water treatment systems that have been operating at Superfund sites around the United States. They have found that the concentrations of contaminants in the ground water reach an asymptotic value which is generally above health based levels. In no case have they been able to achieve anything approaching nondetect."

  Response - Reference previous response.

- **Hercules Comment** - During the development of the Public Health Evaluation for the sites, NJDEP consistently used unrealistic exposure scenarios for determining the risk to human health and the environment from the sites.

  Response - NJDEP acknowledges the fact that assumptions utilized in the "worst case" exposure scenarios are very conservative and are unlikely to occur in the near future. The calculation of "worst case" exposure scenarios are consistent with USEPA guidance on risk assessment methodologies contained in USEPA/S40/1-89/002.

- **Hercules Comment** - The use of Nuclear Regulatory Commission guidelines and mill tailings standards for the remediation of radionuclides produce incorrect standards in this case.

Response - NJDEP has determined that the cleanup objectives selected for radioactive wastes at the sites are relevant and appropriate. A similar determination was made by the USEPA in connection with the radium contaminated residences in Glen Ridge and Montclair, New Jersey.

Technical Comments Received in Writing from the New Jersey Pinelands Commission

- **Pinelands Commission Comment** - The Commission supports NJDEP's preferred remedy for surface materials excavation and transportation to an off-site disposal facility (Alternative 2A) which is consistent with the requirements of the Pinelands Comprehensive Management Plan (CMP). The Commission stated that with the exception of Alternative 2B, the other alternatives identified to remediate surface soils are inconsistent with the requirements of the CMP.

- **Pinelands Commission Comment** - The storage of radioactive wastes would be inconsistent with the requirements of the CMP and would require a Waiver of Strict Compliance.

  Response - If the need should arise during remediation activities at the sites where radioactive wastes would be required to be stored temporarily, NJDEP intends to notify the Pinelands Commission as soon as such a situation occurs.

- **Pinelands Commission Comment** - The Commission supports NJDEP's preferred Alternative 15 to address ground water contamination at the sites. The remedial goal of natural background conditions for ground water quality is consistent with the CMP.

- **Pinelands Commission Comment** - The Commission advised NJDEP that the proposed remedial activities require application to the Pinelands Commission. It was suggested that an application be submitted as soon as possible to prevent any delays in implementing the proposed activities.

  Response - NJDEP agrees to follow this procedure for these sites and is now in the process of submitting the appropriate paperwork to the Pinelands Commission.

Technical Comments Received in Writing From A.R. DeMarco Enterprises, Incorporated

- **A.R. DeMarco Comment** - A general statement was made supporting the selection of Alternatives 2A and 15 as offering the best possibilities for the remediation of both the surface soils and ground water contamination. However, a concern was expressed that in the process of extracting

the hazardous materials from the ground water, environmental degradation of other types may occur, e.g., changes in surface water levels and quality which would adversely impact cranberry operations.

Response - NJDEP is aware of the critical importance of water quality and supply on cranberry production and will make every reasonable effort during design, construction and operation to minimize adverse impacts to the cranberry bogs and reservoirs.

- **A.R. DeMarco Comment** - NJDEP should provide assurances that there will be a sufficient quantity of water maintained at surface elevation for the irrigation, frost protection, harvest and winter flood of the cranberry bogs.

  Response - NJDEP assures that it will make every reasonable effort during the design and operation of the ground water collection and pumping system to minimize changes in surface water elevation of both the bogs and the reservoirs.

- **A.R. DeMarco Comment** - NJDEP should provide assurances that the quality of water, when it is returned after treatment, is similar to the quality of the existing surface water with regard to pH and nutrient concentration.

  Response - As a result of treatment for contamination, unavoidable changes in the natural chemical composition of ground water will occur. These changes include; a reduction in humic and other naturally occurring organics, a reduction of naturally occurring metals (most notably iron and manganese) and an increase in sodium and chloride. The impact of these changes on surface water quality cannot be predicted with absolute certainty at this time. This issue will be further evaluated during design and all reasonable efforts to minimize changes in surface water quality will be incorporated. Finally, pH will be adjusted at the end of the treatment process to desired levels.

- **A.R. DeMarco Comment** - NJDEP should put in place a monitoring program that will allow for immediate detection of changes in surface water for the duration of the cleanup period.

  Response - A monitoring program to determine normal surface water quality and elevation and changes as a result of pumping will be implemented during design and operation.

- **A.R. DeMarco Comment** - NJDEP should ensure that if changes in water quality and elevation occur which adversely affect cranberry production, cleanup procedures will be suspended until appropriate modifications are made.

  Response - No such assurances can be made at this time regarding cessation of ground water pumping and treatment. However, the monitoring program will allow NJDEP to detect and correct problems with water quality and elevation.

Technical Comments Received in Writing from MARC Associates, Incorporated (Consulting Engineers to Woodland Township)

- MARC Associates comments are included under the summary of public meeting comments and questions.

REMAINING CONCERNS

Some of the concerns and issues raised during the RI/FS process and subsequent public comment period will be addressed by NJDEP as the cleanup of the Woodland sites moves into the design phase. These include:

- Monitoring surface water quality and quantity in connection with commercial cranberry operations;
- Woodland Township oversight costs and reimbursement of engineering and technical assistance costs;
- radioactive waste classification and determination of appropriate disposal; and
- on-going negotiations with potentially responsible parties for future Administrative Consent Orders to deal with the ultimate cleanup of the sites.

ATTACHMENT

Public Comments

ENVIRONMENTAL AND ENERGY CONSULTANTS, INC

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February 2, 1990

Grace L. Singer, Chief
Bureau of Community Relations
Division of Hazardous Site Mitigation
New Jersey Department of Environmental Protection
CN 413
401 East State Street - 6th floor
Trenton, NJ 08625

Subject: Woodland Private Study Group Comments
on the Proposed Remedial Action Plan
Woodland Township Route 532 and 72 Sites

Dear Ms. Singer:

The purpose of this letter is to submit formal comments during the public comment period on behalf of the Woodland Private Study Group (WPSG) on the Proposed Remedial Action Plan - Woodland Township Route 532 and 72 sites. It is the understanding of the WPSG that these comments will be addressed in the Responsiveness Summary section of the Record of Decision (ROD) to be issued by the United States Environmental Protection Agency (EPA) and will become part of the Administrative Record for the sites.

In addition, the WPSG has previously submitted minutes of meetings, as well as several reports, comments and other written materials which are listed on the enclosed attachment. Although we do not anticipate that these other submissions will be separately addressed in the Responsiveness Summary section of the ROD, we hereby request that they also be made a part of the Administrative Record.

The following comments by the WPSG are presented sequentially by page and paragraph number of the Proposed Plan:

page 4, par. 3 *"The plume is approximately 4,000 feet in length and discharges to a cranberry bog and adjacent reservoir."*

Comment The WPSG believes that the description of the discharge point as a "reservoir" may infer that this body of water is utilized for drinking purposes, which is not the case. To avoid confusion, the Proposed Plan and the ROD should avoid the use of the term "reservoir" or clearly state early in the discussion that the reservoir is not a source of drinking water but rather serves as a water supply for cranberry farming operations.

page 4, par. 3 *"If left unchecked, the plume would be expected to discharge to the Wading River approximately five miles away."*

Comment The hydrogeological studies conducted as part of the Remedial Investigation (RI) by Camp, Dresser and McKee (CDM) for the New Jersey Department of Environmental Protection (NJDEP) were inconclusive as to the discharge point for this flow system. There is no reasonable expectation that the plume will dischjarge to the Wading River. Because of the depth of the plume and the downward gradient consistently detected by CDM, the actual point of eventual discharge is indeterminate. Until confirmed through further investigation, the discharge point for the Route 72 site plume can only be speculated and, therefore, the sentence should either be deleted or made consistent with the RI.

page 4, par. 4 *"In general, the concentrations of contaminants is highest near the site; the contaminants include volatile organics, semi-volatile organics and metals".*

Comment With regard to metals contamination in groundwater, it should be clearly stated that contamination by metals is not evident in the downgradient plume and is limited to onsite areas. The iron present in the downgradient plume is indigenous, i.e. derived from minerals in the soil, and should not be classified as contamination.

page 5, par. 1 *"The current surface water....."*

Comment The paragraph is confusing and does not adequately address the sediment remediation. We suggest the following text:

"The current surface water and sediment contamination is directly caused by the continuing discharge of contaminated groundwater. The removal of the continuing source of groundwater contamination (surface waste and soils), the remediation of subsurface soils, and the remediation of groundwater would stop this discharge thereby resulting in the remediation of surface water and sediments. Therefore, separate remedial alternatives for surface water and sediments were not developed".

page 5, par. 3 *"In addition, since the Woodland sites are in the Central Pine Barrens area, under the New Jersey Administrative Code the goal for groundwater quality at these sites is natural background conditions."*

Comment

While the New Jersey Groundwater Quality Criteria and Maximum Contaminant Levels (MCLs) established pursuant to the Federal and State Drinking Water Acts have been determined by NJDEP and EPA to be applicable or relevant and appropriate requirements (ARARs) for remediation of the sites, the WPSG has the following concerns relating to the goal of achieving background concentrations.

First, the WPSG disagrees with the NJDEP's interpretation of the New Jersey Administrative Code (NJAC) that results in the statement that "...the goal for groundwater quality at these sites is natural background conditions". In those portions of the NJAC that discuss groundwater quality standards (e.g. NJAC 7:9-6.1 et seq), there is no such statement made.

NJAC 7:9-6.5(f) (Groundwater designated uses and quality criteria) states "Class GW1 groundwater in the Central Pine Barrens shall be suitable for potable water supply, agricultural water supply, continual replenishment of surface waters to maintain the existing quantity and high quality of the surface waters in the Central Pine Barrens and other reasonable uses." The groundwater quality criteria for Class GW1 groundwater are presented in NJAC 7:9-6.6(a). Those groundwater quality criteria do not stipulate a goal for groundwater quality to natural background conditions except for cadmium, chromium (hexavalent) and compounds, and selenium and compounds.

CDM's Draft Feasibility Study (FS) report indicates on page 1-58 that "NJDEP's Division of Water Resources has directed that background concentrations be considered as applicable remedial criteria for groundwater classified as GW-1 (Dengler 1988). This requirement would be applied to parameters that do not have numerical criteria under NJAC 7:9-6.1, et seq.". This approach in determining a goal for groundwater quality is not in accordance with the Superfund Amendments and Reauthorization Act (SARA).

Should NJDEP determine that their discussions regarding antidegradation of groundwater represents a policy "to be considered (TBC)" rather than an ARAR, the WPSG believes that such a policy based on the narrative provided in the NJAC regarding antidegradation of groundwater quality in the Central Pine Barrens is prospective and intended to prevent further degradation of groundwater quality. Therefore, at the Woodland sites, the goal for groundwater quality is not required to be the aquifer's original quality prior to contamination. A groundwater cleanup to drinking water quality standards would constitute "high quality" water and, therefore, satisfactory remediation.

Notwithstanding the WPSG concerns regarding NJDEP's groundwater quality criteria for the sites, a groundwater remediation goal to "non-detectable" levels based on analytical method detection limits (MDLs) is an imprecise remedial criteria that is both open-ended and subject to change as analytical methods change.

Even if non-detectable concentrations were found to be a legitimate ARAR, it is generally recognized even within the EPA that it is technically infeasible to achieve this level of remediation within the groundwater plume and, on this basis, a variance should be granted by the EPA due to technical impractibility as provide in section 121(d) of SARA. This is due to the inherent limitations of groundwater recovery and control technology. The aquifer could be pumped indefinitely without achieving measurable further improvement in the quality of the aquifer.

To address these concerns, the WPSG makes the following recommendations:

1. The cleanup objectives should be applied at the point of reinjection (treatment plant effluent) and should be specified based on current MDLs.

2. Eventually, the concentration of residual contamination in the aquifer will not justify continued pumping. This "point of diminishing returns" is the time at which additional groundwater recovery and treatment will not result in any statistically significant improvement in groundwater quality. It should be based on a mathematical model that evaluates the asymptotic ("tailing") reduction of contamination over time.

page 5, par. 6 *Description of Alternative 2A*

Comment

The description of alternative 2A provides undue emphasis on the presence of radioactive contamination which, if a problem at all, is a minor one. The levels of radioactivity are so low that they do not fall within the levels regulated by the Federal Governmant.

In addition, the quantity of this material is so small that it constitutes less than 0.05% of the surface waste contamination and its presence does not warrant the elaborate discussion presented in the document.

The analysis of waste and soil samples for EP Toxicity parameters taken during the RI indicated that waste and soils at the sites were not EP Toxic. The waste and soils would not be considered RCRA hazardous wastes and, therefore, the description of this material as potential NARM/RCRA mixed waste is inappropriate.

Additional Comment

During the excavation of surface wastes, uncontaminated or slightly contaminated soils will be unavoidably excavated due to the nature of large-scale excavating equipment. The WPSG proposes that NJDEP allow segregation of the surface waste from underlying soils, where practicable. This would reduce the volume of material to be disposed off-site and, most importantly, materially reduce the risks associated with transportation without reducing the effectiveness of the cleanup.

The remaining soils will have relatively low levels of contamination, very similar to the subsurface soil contamination, and could be treated on-site in conjunction with the remedial action for subsurface soils. This approach addresses the most significant contamination (surface waste) in the shortest time frame possible while allowing the segregated soils with relatively low levels of contamination to be treated on-site, a preference under SARA.

page 7, par. 2 &
page 9, par. 5 *The issue of upgradient discharge of treated groundwater.*

Comment The WPSG believes the final location for recharge/ reinjection of treated groundwater (recharge basins and reinjection into wells constructed upgradient of the sites or over the contaminated soils, or downgradient reinjection) requires additional studies in the pre-design phase of the project. The design of the reinjection system must be carefully designed to ensure that reinjection ddoes not result in the loss of hydraulic control of the plume or unduly prolonged treatment time.

While the WPSG computer models support the use of downgradient reinjection wells over infiltration basins, pre-design studies including, but not necessarily limited to, groundwater monitoring, aquifer testing, additional groundwater flow modeling and surface water flow modeling should be conducted to determine the optimal design of the groundwater collection and reinjection system.

page 9, par. 3 *"In a similar manner, the final selection of the treatment plant components...."*

Comment The Proposed Plan and ROD should acknowledge the potential for more than one treatment plant to be built and that a final determination will be made during a predesign stage.

Also, the actual treatment components may, or may not, include the individual components listed under alternative 15, depending upon the outcome of the treatability studies which must be conducted to properly select the best technology.

page 9, par. 6 *"Pumping and treatment of the groundwater would proceed until the remedial objectives for the aquifer are met, which is expected to take approximately thirty years."*

Comment NJDEP should acknowledge that, depending on the final design of the groundwater treatment system, the remedial objectives for the aquifer could be met in less than thirty years if the cleanup objectives are based upon the statistical analysis described above.

The WPSG appreciates the opportunity to comment on NJDEP's Proposed Plan for the Woodland sites. Should you have any questions concerning these comments, please feel free to contact me.

Very truly yours,

Richard J. Grzywinski, P.E.
President

RJG/pm

cc: Woodland Private Study Group
Thomas R. Buggey, EEC

LIST OF WPSG COMMENT DOCUMENTS
PREVIOUSLY SUBMITTED TO NJDEP

July 15, 1987	Letter from R. Gryzwinski of EEC to K. Psarianos of NJDEP. Re: Comments on ARARS, Woodland Township Sites.
July 29, 1987	Letter from R. Gryzwinski of EEC to K. Psarianos of NJDEP. Re: Comments on Phase III Work Plan, Woodland Township Sites.
August 24, 1987	EEC Report submitted to K. Psarianos of NJDEP. *Review of the Draft Remedial Investigation Report for the Woodland Township Route 532 and Route 72 Hazardous Waste Sites.*
October 8, 1987	EEC Report submitted to K. Psarianos of NJDEP. *Review of the Draft Task 3 Report for the Woodland Township Route 532 and Route 72 Hazardous Waste Sites.*
January 12, 1988	Letter from R. Gryzwinski of EEC to K. Psarianos of NJDEP. Re: Comments on Final Draft RI Report, Woodland Township Sites.
January 21, 1988	Letter from R. Gryzwinski of EEC to K. Psarianos of NJDEP. Re: Comments on Task 3 Report Supplement (Memorandum on Identification of Remedial Alternatives), Woodland Township Sites.
March 11, 1988	Letter from R. Blickwedel of EEC to K. Psarianos of NJDEP transmitting ECOVA letter to R. Gryzwinski of EEC. Re: Comments on Biosystems' Report on the Feasibility of In-Situ Bioreclamation at the Woodland Township Sites.
August 26, 1988	Letter from R. Gryzwinski of EEC to K. Psarianos of NJDEP. Re: Comments on Phase 3 RI Addendum, Volumes 1 and 2.
August 1988	EEC report submitted to K. Psarianos of NJDEP. *Recommended Remedial Alternatives, Route 532 and Route 72 Sites, Woodland Township, Burlington County, New Jersey.*
August 1988	EEC report submitted to K. Psarianos of NJDEP. *Site Characterization Report, Route 532 and Route 72 Sites, Woodland Township, Burlington County, New Jersey.*
August 1988	EEC report submitted to K. Psarianos of NJDEP. *Route 72 Site Plume Definition-Status Report.*

August 1988	EEC report submitted to K. Psarianos of NJDEP. *Soil Flushing Study-Status Report-Route 532 and 72 Sites.*
August 1988	EEC report submitted to K. Psarianos of NJDEP. *Groundwater Recovery and Reinjection Report-Route 532 and 72 Sites.*
August 1988	EEC report submitted to K. Psarianos of NJDEP. *Groundwater Treatability Study Report-Route 532 and 72 Sites.*
November 11, 1988	Letter from R. Gryzwinski of EEC to K. Psarianos of NJDEP. Re: Comments on Draft Feasibility Study, Woodland Township Sites.
January 16, 1989	Letter from R. Gryzwinski of EEC to K. Psarianos of NJDEP. Re: Groundwater ARARs.

HERCULES

Hercules Incorporated
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January 31, 1990

Ms. Grace Singer, Chief
Bureau of Community Relations
Division of Hazardous Site Mitigation
New Jersey Department of Environmental Protection
CN 413
401 East State Street - 6th floor
Trenton, New Jersey 08625

Re: Comments to the Woodlands Township Superfund RI/FS

Dear Ms. Singer:

The final Remedial Investigation/Feasibility Study (RI/FS) reports for the Woodlands Township Superfund Sites (Sites) were issued for public comment on December 22, 1989. Hercules Incorporated (Hercules), as one of the alleged potentially responsible parties (PRPs) at the Sites, was one member of a three member steering committee during the preparation of the RI/FS. The other two members of the committee were from the New Jersey Department of Environmental Protection (NJDEP). Accordingly, Hercules had a minority voice in the preparation of the RI/FS reports but we have several concerns with the reports as they currently stand. All of these concerns have been brought to the attention of the New Jersey Department of Environmental Protection (NJDEP) during the development of the RI/FS but were not acted upon.

Our primary concern with the RI/FS reports are discussed in the following comments. These comments have been segregated into two categories. These two categories are: 1) Public Health Evaluation, and 2) Applicable, Relevant, and Appropriate Requirements (ARARs) and the development of cleanup objectives. Other secondary concerns include the method of selecting and ranking remedial alternatives and the changes in ranking between the draft FS and the final FS. These secondary concerns, which were included in previous comments, are included herein and will not be repeated in this letter.

Public Health Evaluation

During the development of the Public Health Evaluation for the Sites, NJDEP consistently used unrealistic exposure scenarios for determining the risk to human health and the environment from the Sites. This resulted in a vast over estimation of the risks associated with the Sites.

Examples of the unrealistic scenarios are abundant. Two examples follow:

1) In evaluating the future human health exposure it was assumed that a residence would be located directly above the plume of contamination and water for all household consumption would be taken directly from the plume. This scenario is ludicrous for the Route 532 site because the residence would have to be located in the middle of a swamp for it to apply. Also, both sites are located in the Pinelands Preservation area where future residential development is severely restricted by the State of New Jersey, thus eliminating the possibility of this scenario occurring.

2) In evaluating the worst case risk at the site for present use, it was assumed that children 10 to 15 years of age would spend two-thirds of the total time they are outdoors at the site every week, for 20 weeks, every year, for 6 consecutive years. This scenario, which is patently ridiculous in and of itself, was used even though it would take a child over one hour to travel to and from the Sites from either the town of Chatsworth or the town of Dukes Bridge.

ARARs and the Development of Cleanup Objectives

Standards which NJDEP used to set cleanup levels at the Sites seldom met the EPA definition of Applicable, Relevant or Appropriate. There are two primary examples of incorrect standards being used to set cleanup objectives. The first of these is the use of Nuclear Regulatory Commission (NRC) guidelines and mill tailings standards for the remediation of radionuclides. The NRC guidelines are used for decontamination of equipment and facilities prior to release for unrestricted use and have no relevance to soil contamination. The mill tailings standards were developed for two specific elements (radium-226 and radium 228 and their parent elements) and not for material similar to what was found at the Sites. In addition, the radioactive levels which were measured are below levels what are regulated by NRC.

The second, and far more important, instance of using inappropriate standards to develop cleanup standards at the Sites concerns the use of NPDES guidelines to require remediation of groundwater to nondetect levels. NPDES guidelines are meant to apply to discharge points to surface and groundwater. They were never designed to be used as a cleanup objective for an aquifer.

Several other concerns need to be raised while discussing the issue of remediating the synthetic organics in the groundwater to nondetect levels. First, the cleanup objective of nondetect for the groundwater far exceeds the requirements necessary to protect human health and the environment. A tremendous amount of resources will be expended with no significant benefit to human health or the environment. These additional resources would be much better spent at other locations where there is a risk to health or the environment.

The second concern has to do with the technical feasibility of achieving a nondetect concentration in the aquifer. When these levels were first proposed Hercules opposed them because to our knowledge there is not a single instance where it has been feasible to clean an aquifer to these levels. When NJDEP persisted in going forward on this course Hercules asked that Camp, Dresser and McKee (CDM), NJDEP's consultant, be charged with evaluating the technical feasibility of reaching nondetect concentrations in the aquifer. CDM did not do this however. Instead CDM determined that it was feasible to reach nondetect levels in the effluent from the water treatment plant. This is far different from actually remediating the aquifer to nondetect levels.

The final point again has to do with the technical feasibility of achieving nondetect concentrations in the aquifer at the Woodlands Sites. EPA Headquarters has conducted an extensive survey of groundwater treatment systems that have been operating at Superfund sites around the United States. They have found that the concentrations of contaminants in the groundwater reach an asymptotic value which is generally above health based levels. In no case have they been able to achieve anything approaching nondetect.

If it is conceded that a cleanup criteria of nondetect concentrations is an ARAR, which we do not concede, the requirement should have been waived because of technical infeasibility. This is in accordance with Section 121, Cleanup Standards, Subparagraph (d)(4)(C) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendment and Reauthorization Act (SARA) of 1986.

EPA Headquarters has recently issued guidance to the Regions instructing them to make realistic evaluations of the cleanup level that will be achieved and putting those evaluations in the Records of Decision for their sites. At a minimum they are to have a contingency plan in the event that the cleanup objectives in the ROD are not met.

* * * * * * * * * * * *

Since Hercules, as a minority member of the steering committee, has raised these issues previously during the preparation of the RI/FS, we do not expect NJDEP to respond to these comments. However, we want the comments to be made a part of the administrative record. In addition, Hercules wants their comments in the RI/FS which have been previously submitted to NJDEP to be a part of the record as well.

Sincerely,

J. Louis Graham /jk

J. Louis Graham
Sr. Environmental Engineer
Hercules Incorporated

JLG/
3839v

The Pinelands Commission

P.O. Box 7, New Lisbon, N.J. 08064 (609) 894-9342

January 30, 1990

Ms. Grace L. Singer
Bureau of Site Management
Division of Hazardous Site Management
New Jersey Department of
Environmental Protection
401 East State Street
CN-413
Trenton, New Jersey 08625

Please Always Refer To This Application No.

Re: App. No. 85-0967.02
Woodland Sites
Proposed Remedial Action Plan
Woodland Township

Dear Ms. Singer:

The staff of the Pinelands Commission has reviewed the Proposed Remedial Action Plan (PRAP) for the hazardous sites in Woodland Township. The following comments are offered regarding the recommended remedial alternatives as they relate to the requirements of the Pinelands Comprehensive Management Plan (CMP):

1. Surface Materials and Soils. The PRAP indicates that the preferred remedial alternative for the surface materials and soils is the excavation and transportation of these materials to an off-site disposal facility. This alternative would be consistent with the requirements of the CMP which prohibit the disposal of hazardous waste within the Pinelands Area.

   With the exception of alternative 2b, the other alternatives identified in the PRAP for remediation of the surface contaminants are inconsistent with the requirements of the CMP. Alternative 3 would, in effect, create a hazardous waste landfill within the Preservation Area of the Pinelands and would be prohibited by N.J.A.C. 7:50-6.77. Alternatives 4 and 5 would require the development of large scale soil and waste treatment facilities within the Preservation Area. Land use within the Preservation Area is strictly limited to

those low-intensity uses that are compatible with maintaining the integrity of the area. Alternative 4 would also be inconsistent with the requirements of the CMP because the sites would not be fully restored by the treatment. The sites would be lost as habitat for significant species of native Pineland wildlife and plant species in violation of N.J.A.C. 7:50-6.34.

The remedial alternatives that do not comply with the requirements of the CMP could be pursued if a Waiver of Strict Compliance with the standards were approved. A Waiver could be approved by the Commission only if a compelling public need for the waiver was established based upon specific criteria identified in the CMP. The criteria require a demonstration that no feasible alternatives exist outside the Pinelands Area to meet the public need and no better alternatives exist within the Pinelands Area. As alternatives 2a and 2b represent feasible alternatives, a waiver to permit the development of the other alternatives for surface materials could not be approved. Alternative 2a is, therefore supported by the Commission.

It is noted that all of the remedial alternatives include containerizing and removing the radioactive wastes from the site. The PRAP indicates that these wastes might be stored on-site if a disposal facility is not available. The storage of radioactive wastes would be inconsistent with the requirements of the Comprehensive Management Plan and would require a Waiver of Strict Compliance.

2. Groundwater. The CMP requires that the surface and groundwater within the Pinelands Area be protected from degradation. The PRAP indicates that the remedial goal for ground water quality at the sites is natural background conditions. This goal is consistent with the water quality standards of the CMP.

Alternatives that would attain the remedial goal for groundwater are acceptable to the Commission. Alternative 15 is identified as the preferred alternative in the PRAP. This alternative includes the pumping, treatment and injection of the contaminated groundwater. The PRAP indicates that this treatment option would meet the remedial goals for groundwater with the exception initially of total dissolved solids (TDS) and biological oxygen demand (BOD) prior to the injection of treated groundwater into the contaminant plume. As the remedial objectives for TDS and BOD would be met prior to the conclusion of the clean up through the continuing pumping and treatment of the contaminant plume, this proposal could be considered to be consistent with the groundwater quality standards of the CMP.

The Commission staff has previously advised the Division that the proposed remedial activities require application to the Pinelands Commission. In order to prevent any delays in implementing the remedial plan, it is suggested that an application for the proposed remedial activities be submitted as soon as possible.

Your cooperation in this matter has been appreciated. if there are any questions, please contact Kathleen Swigon of our staff.

Sincerely,

Terrence D. Moore
Executive Director

TDM/KS/scb
cc: Mr. Kevin Psarianos,
NJ DEP
Mr. Terrence D. Moore
Ms. Susan Uibel

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A.R. DeMARCO ENTERPRISES INC.

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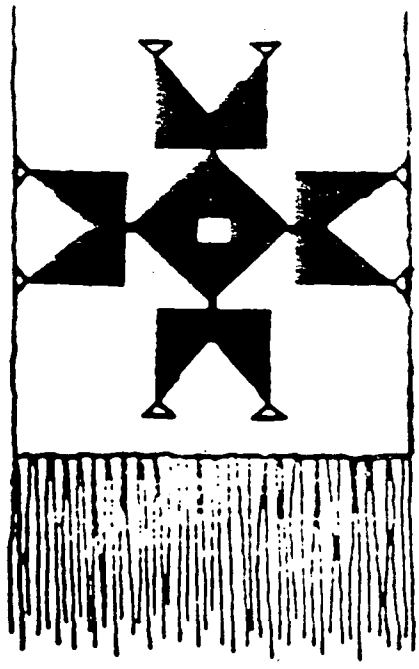

January 19, 1990

NJ Department of Environmental Protection
Division of Hazardous Site Mitigation
CN 413
Trenton, NJ 08625

Attention: Debra Miller

Dear Ms Miller:

Because of our proximity to the Woodland Township Route 532 Hazardous Waste Site, we continue to support the efforts of both the DEP and the Woodland Private Study Group to clean up the site as quickly and efficiently as is reasonably possible. We are confident that the selection of Alternatives 2A and 15 in the Proposed Plan offer the best possibilities for the remediation of both the surface and groundwater contamination.

We are, however, concerned that in the process of extracting the hazardous materials from the groundwater, environmental degredation of other kinds may occur, viz. the lowering of surface water levels and the changes in surface water quality. These changes may not only impact directly on the 140 acres of nearby cranberry production, but also on over 200 adjacent acres of wetlands and associated biota.

The surface water elevations in the cranberry bog reservoirs must be maintained to assure enough water for irrigation, frost protection, winter flood and harvest. A drop of even a few inches at critical times of the year would be disastrous to the cranberry crop. Similarly, changes in the surface water quality, particularly changes in the pH (which must be maintained at 4.7 or lower) and nutrient concentrations, could be severely injurious.

Therefore, we recommend that whatever methods of hazardous waste cleanup are used, the DEP provide assurances that:

1. There will be a sufficient quantity of water maintained at surface elevation that is adequate for the irrigation, frost protection, harvest and winter flood of our cranberry bogs.

2. The quality of water, when it is returned after treatment, is similar to the quality of the existing surface water with regard to pH and nutrient concentration.

3. There will be a monitoring program that will allow for immediate detection of changes in surface water quality and elevation for the duration of the cleanup period.

4. If changes in water quality and elevation occur that adversely affect cranberry production, cleanup procedures will be suspended until the appropriate modifications are made.

If you have any questions regarding this matter, please contact me at your convenience.

Sincerely,

J. Garfield DeMarco

JGD:ddh

MARC ASSOCIATES, INC.
Consulting Engineers
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ENGINEERING
SURVEYING
PLANNING
GRANTS

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(609) 726-1611

February 2, 1990

Bureau of Community Relations
Division of Hazardous Site Mitigation
CN 413
Trenton, NJ 08625

Attn: Grace L. Singer, Bureau Chief

Re: Proposed Remedial Action Plan
Hazardous Waste Sites
Woodland Township
Route 72 and Route 532
Marc File No. 90-1328

Dear Ms. Singer:

In my capacity as Township Engineer for the Township of Woodland I have been directed to assemble the thoughts and concerns of the Governing body and the Planning/Zoning Board relating to the cleanup of the Woodland Route 72 and Route 532 Hazardous Waste Sites.

The Woodland Township Committee and the Woodland Township Planning Board recognize the importance of cleaning up toxic wastes in our environment. Many, if not most, of the Township's residents choose to live here, in part, because of the clean air and water and the absence of congestion found in nearby urban and suburban areas. We further recognize that the residents of Woodland Township are those most likely to be affected by the toxic waste at both the Route 72 and Route 532 sites and therefore we urge thorough and expeditious remediation of the sites. We will be as cooperative and supportive of the efforts of DEP and the Woodland Private Study Group as we are able.

The residents of Woodland Township will also be those most affected by the cleanup efforts. We respectfully request the following of both the DEP and WPSG for the duration of the remedial operations which, we understand, may last several decades:

I. That all construction related to remediation on both sites be subjected to site plan review by the Planning Board.

II. The vehicular traffic related to both the construction and operational phases of remediation approach the sites via Route 72 and not the village of Chatsworth.

III. That the cranberry and blueberry industries, which form the basis of the Woodland Township economy, be protected from changes in groundwater and surface water levels and degradation of water quality.

IV. That the Pinelands and wetlands surrounding the site suffer no ecological degradation during either the construction or operational phases.

V. That the Township be held harmless from any liabilities or legal actions that may arise during the entire construction and cleanup phase that is directly or indirectly involved with the remedial operation.

VI. Woodland Township is a Pinelands Community, containing a vast majority of undevelopable land, and does not have a tax base capable of absorbing the professional fees that will be expended during these projects. The Township Committee, cognizant of the fact that input from their appointed professionals will be required throughout the remediation process, requests that the DEP support their efforts to obtain funding for these services, whether through the posting of escrows by the responsible parties, aquisition of grants, or other sources.

VII. That the Township Committee, the Township Planning/Zoning Board, and their appointed professionals be copied on all correspondence relating to the cleanup.

We thank you for the time and effort which you have expended in developing the remedial investigation/feasibility study thus far and look forward to the cooperative efforts of implementing the plan.

If you have any questions of require further information feel free to contact this office at (609) 267-5115.

Sincerely,
MARC ASSOCIATES, INC.

Richard J. Hammerschlag AWD

Richard J. Hammerschlag, P.E., P.P.

RJH/AWD/lk
cc: Mayor and Committee
Woodland Township Planning Bd. Members
Mark DeMarco, Esq.
Marvin Schlosser, Esq.
Mr. Ferdinand Metzger, NJDEP
Mr. Kevin Psarianos, NJDEP
Mr. Frank Brill
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