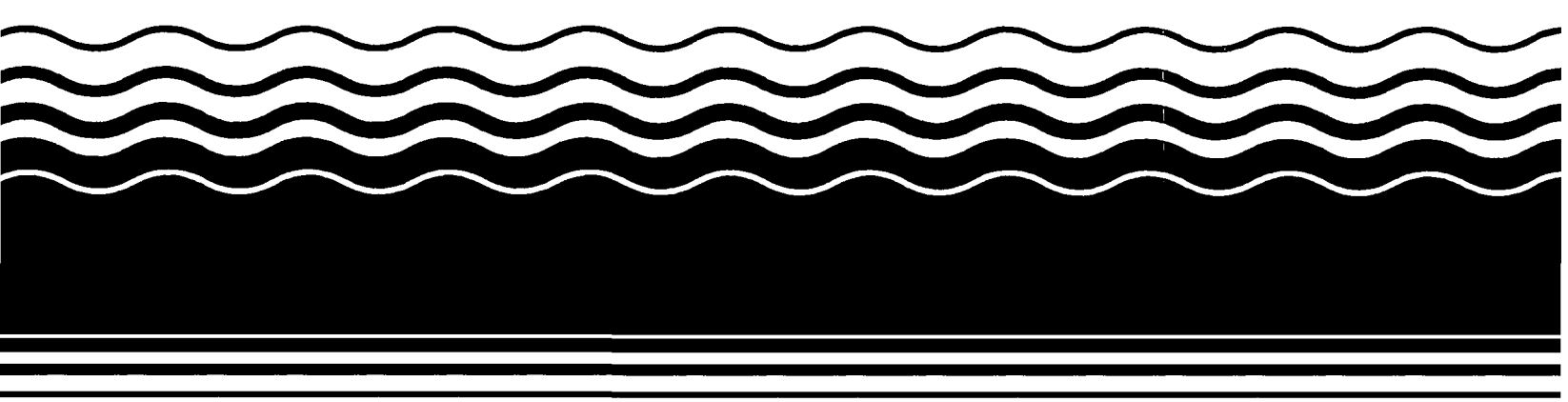
EPA/ROD/R02-95/249
August 1995

EPA Superfund Record of Decision:

JIS Landfill
South Brunswick Township, NJ
8/15/95



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

DATE: AUG 15 1995

SUBJECT: Record of Decision
JIS Landfill Site

FROM: Kathleen C. Callahan, Director (2ERRD) K. Callahan
Emergency and Remedial Response Division

TO: Jeanne M. Fox (2RA)
Regional Administrator

Attached for your approval is the Record of Decision (ROD) for the JIS Landfill Site, located in South Brunswick Township, Middlesex County, New Jersey. The selected remedial action addresses the first and final remediation of contaminated ground water.

The selected remedy calls for extraction and on-site treatment of contaminated ground water, installation of a modified New Jersey Department of Environmental Protection (NJDEP) hazardous waste cap, and provision of alternative water supply to residents with contaminated drinking water wells. The total estimated present-worth cost of the selected remedy is $14.3 million. The remedy is the same as the preferred alternatives presented in the Proposed Plan.

The remedial investigation and feasibility study reports, prepared by B&V Waste Technologies, Inc. for the NJDEP, and the Proposed Plan were released to the public for comment on November 28, 1994. A public comment period on these documents had been scheduled from November 28, 1994 through December 28, 1994. However, the public comment period was extended to February 6, 1995, upon request from the public. In addition, a public meeting to discuss these documents and the preferred remedy was conducted by the NJDEP on December 7, 1994. With the exception of comments from the potentially responsible parties, comments received during the public comment period generally supported the preferred remedial alternatives, and are addressed in the attached Responsiveness Summary.

The ROD has been reviewed by the NJDEP, and the appropriate program offices within Region II. Their input and comments are reflected in this document. The NJDEP has concurred with the selected remedy for the JIS Landfill Site, as indicated in the attached letter.

If you have questions or comments on this document, I would be happy to discuss them with you at your convenience.

Attachments

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SYMBOL --->	CNJS-I	NJSB-I	ORC-NJSUP	DD:NJP	ERRD:D	EPD	DRA	RA
SURNAME -->	HO/TENERELLA	BORSELLINO	FINN/ROONEY	FRISCO	CALLAHAN	RANDOL	[illegible]SZYNSKI	FOX
DATE ----->	8/11/95 8/11/95	8/8/11	8/14/95	8/14	8/15		8/16/95	

DECLARATION STATEMENT

RECORD OF DECISION

JIS Landfill

SITE NAME AND LOCATION

JIS Landfill
South Brunswick Township, Middlesex County, New Jersey

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the JIS Landfill site, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. This decision document explains the factual and legal basis for selecting the remedy for the 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 the JIS site, if not addressed by implementing the response action selected in this Record of Decision, may present an imminent and substantial threat to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The response action described in this document represents the first and only planned remedial phase or operable unit for the JIS Landfill site. The selected remedy addresses the remediation of contaminated ground water through capping of the landfill and active restoration of the aquifer.

The major components of the selected remedy include the following:

- provision of an alternative water supply for residents with contaminated drinking water wells;

- upgrading of the existing landfill cap to include:
  - 24 inches vegetated topsoil;
  - 12 inches soil drainage layer with a minimim 1 x 10^{-2} centimeters per second (cm/sec) permeability;
  - 30-mil textured synthetic material layer; and
  - 12 inches clay with a maximum 1 x 10^{-7} cm/sec permeability;

- extraction of contaminated ground water from the primary plume underlying the site;

- treatment of the contaminated ground water in a facility to be constructed on the site;

- disposal of the treated ground water on the site by a recharge trench; and

- implementation of a ground-water monitoring program to monitor the primary and secondary plumes, and to ensure the effectiveness and protectiveness of the remedy.

NJDEP will place well-use restrictions on well permits to prevent the installation of new wells in the contaminated portion of the Old Bridge Aquifer. Appropriate deed restrictions will be required for the landfill.

DECLARATION OF 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. The selected remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable, and it satisfies the statutory preference for remedies that employ treatment that reduce toxicity, mobility or volume as their principal element.

Because the selected remedy will result in hazardous substances remaining on the site above health-based levels, a five-year review pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation and Liability Act, as amended, is required. The purpose of the reviews is to ensure that the remedy continues to provide adequate protection of human health and the environment.

Jeanne M. Fox
Regional Administrator

8/15/95
Date

DECISION SUMMARY

RECORD OF DECISION

JIS Landfill

South Brunswick Township, Middlesex County, New Jersey

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

TABLE OF CONTENTS

APPENDICES

SITE NAME, LOCATION AND DESCRIPTION

The Jones Industrial Services (JIS) Landfill site is located on Cranbury South River Road (Route 535) in South Brunswick Township, Middlesex County, New Jersey (see Figure 1). The site is bordered on the west by the New Jersey Turnpike and a 36-inch diameter gas transmission pipeline located between the Turnpike and the landfill. The gas pipeline is owned by the Colonial Pipeline Company. The north side of the site borders an agricultural field while the south side adjoins a horticultural nursery. Residential areas of Monroe Township and the Borough of Jamesburg are located east of the site.

The site is designated as Block 17.010, Lots 9.05 and 9.06 on the South Brunswick Tax Map. The site covers approximately 24 acres and includes a 7.8-acre landfill adjacent to the New Jersey Turnpike, an inactive borrow pit, and a solid waste transfer station. Current operations at the site involve the solid waste transfer station.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

The site property was originally a farm. In 1950, Grandview Construction Corporation bought the property and began soil excavation activities at the site. By 1951, the site was being used as a borrow pit for the construction of the New Jersey Turnpike. Material excavated from the site was used as fill material for the Turnpike. In 1955, Jones Road Material Company bought the property, and began landfilling operations on part of the property. The JIS Industrial Services Company (JISCO) still owns, and formerly operated, the JIS Landfill. A related company, the JIS Industrial Services Corporation (JIS Corp.), was involved in the transportation and disposal of wastes, including hazardous substances, at the JIS Landfill. Mr. Donald Jones is the principal owner and officer of JISCO and JIS Corp. From the 1960s through the early 1970s, the landfill accepted a large variety of chemical, municipal, and industrial wastes. Based on available evidence, which includes letters, invoices, and hazardous waste reports, the landfill accepted hazardous substances, including acetone, benzene, ethylene dichloride, toluene, xylene, trichloroethene, and methylene chloride. All of these substances have been detected in the ground water.

In 1970, the New Jersey Department of Environmental Protection (NJDEP) approved the operation of the landfill to accept industrial, agricultural, and institutional wastes, tree stumps, dead animals, junk automobiles, chemicals, and waste oils. Approximately 50,000 to 65,000 cubic yards of waste were accepted annually at the landfill. The amount of hazardous waste in the landfill is difficult to precisely determine because most documents do not identify the quantities. However, one document

indicates that, during 1974, one particular company disposed of as much as 100,000 gallons of waste containing acetone, ethylene dichloride, toluene, and phenol at the site. Another document indicates that, during 1977, 990 gallons of waste containing acetone, benzene, chloroform, methylene chloride, ethanol, hexane, toluene, and xylene were disposed of at the site. These chemicals have been detected in the ground water.

In July 1975, in response to complaints regarding contamination of drinking water, the U.S. Environmental Protection Agency (EPA) sampled the drinking water well of a residence located adjacent to the site. An analysis of the sample revealed high levels of volatile organic compounds (VOCs), including trichloroethene, benzene, toluene, xylene, chloroform, trichloroethane, and dichloroethene. In addition, EPA sampled four on-site monitoring wells and four off-site potable wells. The additional sampling revealed VOC contamination in those wells. NJDEP concluded that the landfill was the source of the ground-water contamination affecting the wells because the landfill accepted industrial waste containing chemicals similar to the contaminants detected.

In December 1975, NJDEP ordered Mr. Jones, JISCO, and JIS Corp. (hereinafter referred to collectively as JIS) to cease all landfilling operations at the JIS Landfill. In January 1976, NJDEP brought suit in the Superior Court of New Jersey, seeking the closure of the landfill. In August 1976, the Court prohibited the disposal of additional chemical or hazardous substances at the landfill, but allowed JIS to accept other specified wastes.

In January 1980, EPA took another round of ground-water samples from the monitoring wells at the site and from nearby private wells. These samples continued to show significant ground-water contamination. The site was placed on the National Priorities List (NPL) on September 1, 1983. In June 1984, NJDEP revoked the landfill registration for the JIS Landfill, and in December 1985, the Appellate Division of the Superior Court of New Jersey issued an order for closure of the landfill.

From 1980 to 1985, JIS installed a solid waste cap over the landfill. To date, NJDEP has not approved the closure of the JIS Landfill because the cap did not comply with the closure requirements specified in the order.

From 1984 to 1988, the Monroe Township Health Department continued to sample private water supply wells for the township residents. Many of the residents in the vicinity of Bordentown Turnpike, downgradient from the landfill, had contaminated drinking water. Under a removal action, EPA provided these residents with bottled water from June 6, 1989 until they were permanently connected to the municipal water system in February 1992.

On May 20, 1986, NJDEP directed JIS to fund a remedial investigation and feasibility study (RI/FS) at the site. In October 1986, NJDEP selected B&V Waste Science and Technology Corp. to perform the RI/FS.

Subsequently, NJDEP identified 12 companies which generated and disposed of hazardous substances and/or hazardous wastes at the JIS Landfill. On March 27, 1987, NJDEP issued a Supplemental Directive to these companies to fund the RI/FS. In June 1987, these companies signed an Administrative Consent Order to fund the RI/FS. In a Second Supplemental Directive, dated December 14, 1988, NJDEP identified, and directed, eight additional companies to contribute towards the cost of the RI/FS. In Directive II, dated December 18, 1989, NJDEP identified nine additional companies. NJDEP directed these 9 companies and 23 previously identified parties to contribute towards the cost of the RI/FS. Subsequently, NJDEP identified four additional companies. On September 17, 1991, NJDEP issued Directive III to all 36 respondents to contribute towards the cost of the RI/FS.

Remedial Investigation and Feasibility Study

The remedial investigation (RI) was initiated in October 1986 by B&V Waste Science and Technology Corp. The purpose of the RI was to characterize the nature and extent of contamination, evaluate the integrity of the landfill cover and sideslope, and characterize potential risks to human health and the environment. Based on the information obtained during the RI, a feasibility study (FS) was undertaken to identify and screen remedial alternatives to address the contamination at the site. The RI/FS and Baseline Risk Assessment reports were completed in August 1993.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI/FS and the Proposed Plan for the site were released to the public for comment on November 28, 1994. These documents were made available to the public in the Administrative Record at the South Brunswick Municipal Building, South Brunswick Public Library, and information repositories at NJDEP and EPA Region II in New York. The notice of availability for the above-referenced documents was published in The Home News on November 26, 1994. The public comment period relative to these documents was scheduled from November 28, 1994 to December 28, 1994, and subsequently extended to February 6, 1995 upon request from the public.

On December 7, 1994, NJDEP held a public meeting at the South Brunswick Senior Citizens Center to inform local officials and interested citizens about the Superfund process, to discuss

proposed remedial activities at the site, and to respond to questions from area residents and other interested parties.

Responses to the comments received at the public meeting, as well as written comments received during the public comment period, are included in the Responsiveness Summary.

SCOPE AND ROLE OF RESPONSE ACTION

This response action addresses the remediation of contaminated ground water at the JIS Landfill site. It includes remedial alternatives to address source control and contaminated ground water, and focuses on the protection of human health and the environment. No other operable units are planned for the future.

SUMMARY OF SITE CHARACTERISTICS

Site Geology and Hydrology

The site is situated in the Atlantic Coastal Plain. Two major aquifers underlie the site: the Farrington Sand and the Old Bridge Sand. Both aquifers are major sources of potable water in Middlesex County. Ground water flows in a southeasterly direction. Residents in the immediate vicinity of the site are currently connected to a municipal water system. Based on information provided by Monroe Township and the New Jersey American Water Company, NJDEP estimates that as many as 115 residents located near Manalapan Brook, about 2 miles southeast (downgradient) of the site, may not receive municipal water and are presumed to use domestic wells as a source of drinking water.

The predominant land use in the vicinity of the site is agricultural/farmland, including crop, pasture and orchard/ horticulture, and residential. Areas to the west of the site, however, are mostly industrial, with much of the industry located in the South Brunswick Industrial Park.

Nature and Extent of Contamination

Ground Water

Ground-water contamination appears to be limited to the Old Bridge Aquifer. The predominant contaminants detected above Federal and State Safe Drinking Water Act Maximum Contaminant Levels (MCLs), and the respective range of concentrations in the primary and secondary plumes, are shown in **Table 1**.

The ground-water contaminants appear in two distinct zones of contamination, i.e., a primary plume and a secondary plume (see

Figures 2 and 3). The primary plume extends approximately 2,000 feet downgradient from the landfill. The highest concentration of total VOCs detected in the primary plume was 30,558 parts per billion (ppb). The secondary plume is located approximately 5,000 feet downgradient from the landfill, and extends approximately 8,500 feet downgradient from the landfill towards Manalapan Brook. The highest concentration of total VOCs detected in the secondary plume was 894 ppb. The contaminants in the secondary plume are similar to the contaminants in the primary plume, but at lower concentrations.

The contaminant levels in the secondary plume appear to change sporadically. Levels of trichloroethene (TCE) range from 6.9 ppb to 78 ppb within a very short distance. The sporadic nature of the contamination may be caused by the variable water usage for irrigation at a horticultural nursery located 1,000 feet downgradient of the site. The nature and distribution of contamination indicates that the variable nursery water usage may cause the levels of TCE at the nursery itself to be significantly lower than samples taken from side-gradient locations.

Sediments and Surface Water

On May 20, 1993, NJDEP collected sediment and surface water samples at three locations along Manalapan Brook and Manalapan Lake (located two miles downgradient from the landfill). The samples were analyzed for VOCs. No contaminants were detected.

Soils

Contaminants found in the surface and subsurface soils outside of the landfill include traces of arsenic, chromium, lead, 1,1,1-trichloroethane, phenanthrene, pyrene, Aroclor 1260 (a polychlorinated biphenyl or PCB compound), 4,4'-DDT, and 4,4'-DDE. The levels of predominant soil contaminants are summarized in Table 2.

Landfill Cap

JIS closed the landfill under a court order, which included closure requirements. The order required JIS to install a solid waste cover system consisting of a minimum of 18 inches of continuous low permeability clay with a maximum in-place permeability of 1×10^{-7} centimeters per second (cm/sec), overlaid by a minimum of 6 inches of vegetative soil cover.

The results of a landfill cap investigation indicate that the current landfill cover clay layer ranges in thickness from 9.0 inches to 19.9 inches, with an average clay thickness of 14.85

inches. The permeability of the clay layer ranges from 1.5×10^{-5} to 5.56×10^{-8} cm/sec, with an average permeability estimated to be 1×10^{-6} cm/sec. Furthermore, an examination of the cap revealed cracking and voids which give rise to conduits, therefore allowing a higher infiltration than would occur compared to a thoroughly mixed and well compacted homogeneous clay cap.

A vegetative top layer was required to promote drainage and minimize erosion or abrasion of the cap. The vegetative soil thickness of the current JIS Landfill cover varies from 3.6 inches to 20.9 inches with an average thickness of 9.0 inches. However, many areas on the top of the landfill are not supporting vegetative growth. This is most likely due to the poor organic content of the soil. Therefore, the existing cap does not meet the 1977 NJDEP capping requirements.

During the cap evaluation, the western slope of the landfill, adjacent to the New Jersey Turnpike, was assessed to determine slope stability under current conditions, utilizing site-specific soil properties. The slope was estimated to be marginally stable.

SUMMARY OF SITE RISKS

Based upon the results of the RI, a Baseline Risk Assessment was conducted to estimate the risks associated with current and future site conditions. The Baseline Risk Assessment estimates the human health and environmental risks which could result from the contamination at the site if no remedial action were taken.

Human Health Risk Assessment

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

The Baseline Risk Assessment began with selecting contaminants of concern that are representative of site risks. Chemicals of concern were identified for soil and ground water beneath the site. The contaminants of concern for soil (excluding the landfill) include 1,1,1-trichloroethane, phenanthrene, pyrene, Aroclor 1260, 4,4'-DDT, and 4,4'-DDE. The contaminants of concern for ground water include methylene chloride, benzene, tetrachloroethene, dichlorobenzenes, arsenic, lead, and copper.

The Baseline Risk Assessment evaluated the health effects which could result from exposure to contamination at the site, under current and future land-use scenarios. The site is a commercial property and there are no residents on site. Therefore, under current land use, on-site workers and off-site residents represent the likely populations to be exposed to site-related contaminants. The likelihood of future on-site residential land use is unlikely because JIS still owns and operates part of the site. Therefore, future land use was considered to be the same as current land use.

Under the current land-use scenario, the exposure pathways of concern include: incidental ingestion of, and dermal contact with, chemicals in the on-site soils outside of the landfill itself, for on-site workers; ingestion, inhalation and dermal contact with ground water for off-site residents using domestic wells in the Old Bridge Aquifer. On-site worker exposure to ground water was not evaluated because there are no domestic wells on site. Off-site residential exposure to on-site soil was not evaluated because access to the site is restricted by a fence. Exposure to contaminants in the landfill itself was not evaluated because the ingestion, inhalation, and dermal contact pathways are virtually eliminated by the existing landfill cap.

Since both current and future land use are the same, the exposure pathways of concern for future land use are the same as those for current land use. Therefore, for simplicity purposes, risk will be discussed with respect to on-site workers, off-site residents, and off-site workers.

For carcinogens, risk is represented in terms of an individual's likelihood of developing cancer as a result of exposure to a carcinogenic chemical present in the exposure media. For example, a cancer risk level of 1×10^{-3} indicates that an individual has a one-in-one thousand chance of developing cancer during his or her lifetime. Such a risk may also be interpreted as representing one additional case of cancer in an exposed population of one thousand people. EPA's acceptable cancer risk range is 1×10^{-4} to 1×10^{-6}, or a one-in-ten thousand to one-in-one million increased chance of developing cancer as a result of a site-related exposure to a carcinogen over a 70-year lifetime. Generally, if the lifetime excess cancer risk exceeds 1×10^{-4},

the contamination is of sufficient concern to warrant a remedial action. If the excess cancer risk falls between 1×10^{-6} and 1×10^{-4}, the need for a remedial action is evaluated on a site-specific basis. Finally, where the calculated lifetime excess cancer risk is below 1×10^{-6}, no remedial action is generally required.

To assess the overall potential for non-carcinogenic effects posed by more than one contaminant, EPA developed the Hazard Index (HI). This index measures the assumed simultaneous exposures to several chemicals, which could result in an adverse health effect. When the HI exceeds 1, there may be concern for potential non-carcinogenic health effects.

The results of the Baseline Risk Assessment indicate that site soils do not pose a risk to human health. However, contaminated ground water was found to pose a risk to off-site residents in both the current and future land-use scenarios. The carcinogenic risk to an off-site resident ranged from 1×10^{-6} to 4×10^{-4}, for each individual downgradient ground-water well. Carcinogenic risk for an off-site resident would have a total risk of 3×10^{-3}, using data from all monitoring wells. The risk was attributable to ingestion and inhalation of chemicals in the ground water.

Non-carcinogenic health effects are not likely for on-site workers. The calculated HI for this scenario did not exceed 1. However, non-carcinogenic health effects for an off-site resident were found to be likely. The HI was calculated to be 10, using data from all monitoring wells. The exposure pathways with the greatest potential risk (carcinogenic and non-carcinogenic) for an off-site resident are ingestion of chemicals in the ground water and dermal contact uses of ground water (i.e., bathing). Since there are no future-use restrictions which prohibit the use of the Old Bridge Aquifer as a source of potable water supply, the risk assessment assumes that future off-site residents might use this aquifer as an untreated source of potable water.

Ecological Risk Assessment

The objective of the Ecological Risk Assessment is to evaluate the actual or potential impacts to ecological receptors (i.e., flora and fauna) due to exposure to chemicals/contaminants or contaminated media identified at the JIS Landfill site.

The site itself includes small areas of old field habitat and upland hedgerow/shrubland habitat which do not support large populations of any species. Most of the site exists as disturbed grassy areas.

The land areas surrounding the site consist primarily of agriculture and small lowland oak forests. The nearest surface water body is Manalapan Brook in Jamesburg, approximately two miles east of the site. The Manalapan Brook is classified as a freshwater non-trout stream (FW2-NT). While a variety of endangered or threatened species may be found in the vicinity of the JIS Landfill site, no critical or sensitive habitats or areas were identified on the site.

Potential on-site ecological impacts are generally restricted to those animal species that come in contact with buried waste or contaminated ground water. Since the wastes in the landfill are buried below the normal burrowing depth of animals, there is no risk due to exposure of buried contaminants. No ecological routes of exposure to contaminated ground water exist on site. Off-site plants and animals could potentially be at risk should they inhabit areas where contaminated ground water discharges to a surface water body or wetland area.

Surface water and sediment samples taken along Manalapan Brook did not reveal any measurable contamination. Consequently, there is no evidence of ecological impact from the landfill along Manalapan Brook.

Uncertainties In Risk Assessment

The risk assessment process involves numerous conservative assumptions, all of which contributed to uncertainty in the risk evaluation. In general, sources of uncertainties associated with the risk assessment include: environmental sampling and analysis, exposure assessment, and toxicity assessment.

Uncertainties in environmental sampling arise in part from the potentially uneven distribution of chemicals in the media sampled.

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

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

populations near the site, and is highly unlikely to underestimate actual risks related to the site.

Conclusion

Based on the results of the Baseline Risk Assessment, NJDEP and EPA determined that contaminated ground water at the site poses an unacceptable risk to human health.

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

Remedial Action Objectives

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

Because the Baseline Risk Assessment established that the ground water at the site poses an unacceptable risk to human health, the following remedial action objectives were established:

Source Control

* Prevent or reduce further migration of contaminants from the landfill into the ground water.

Ground Water

* Prevent human exposure to contaminated ground water.
* Prevent further migration of contaminated ground water off site.
* Prevent the migration of contaminated ground water into the underlying aquifers.
* Reduce contaminant concentrations in the Old Bridge Aquifer to levels which do not exceed applicable Federal and State water quality standards.

DESCRIPTION OF REMEDIAL ALTERNATIVES

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), requires that each selected site remedy be protective of human health and the environment, comply with other statutory laws, be cost-effective, and utilize permanent solutions, alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

This Record of Decision (ROD) evaluates remedial alternatives for addressing ground-water contamination at the JIS Landfill site. Since the migration of hazardous substances in the landfill into the ground water is a pathway of concern, the FS included source control remedial alternatives to address the landfill. A detailed description of all of the alternatives may be found in the FS report.

The estimated capital cost, operation and maintenance cost, and present worth cost of each alternative discussed below are provided for comparison. The cost figures are in 1992 dollars because the FS was prepared in 1992. The present worth costs were calculated at a five percent discount rate in the FS. For the alternatives discussed below, the present worth costs were recalculated at a seven percent discount rate to comply with EPA Office of Solid Waste and Emergency Response Directive No. 9355.3-20 (June 25, 1993).

The estimated implementation time reflects only the time required to construct or implement the remedy, and does not include the time required to design the remedy, negotiate with the responsible parties, or procure contracts for design and construction.

Source Control Alternatives

The FS considered the following general response actions for the source control of the landfill: no action, limited action, cap improvements, and excavation/incineration.

Because the western slope of the landfill is steep and only marginally stable, a retaining structure may be required as part of any source control alternative involving cap improvements. The need for, and design of, a retaining wall would be determined during the Remedial Design phase. However, for the purpose of developing cost estimates of alternatives, NJDEP estimated that the cost of constructing a retaining wall at the JIS Landfill would be approximately $2.1 million. The cost of a retaining

wall is included in each of the capping alternatives discussed below.

Because the gas pipeline is located along the (marginally stable) western side of the landfill, construction activities at the landfill, such as installation of a retaining wall, may affect the integrity of the gas pipeline. To address safety concerns, each capping alternative below also includes an evaluation of the effects to the gas pipeline. Options, such as rerouting the gas pipeline, will be considered during the Remedial Design phase if warranted.

A gas collection system was installed by JIS when the landfill was first capped. Each capping alternative includes an evaluation of the existing landfill gas collection system, which would be conducted during the Remedial Design phase to determine whether additional controls are necessary to minimize gas migration.

A discussion of the remedial alternatives which received detailed analysis is provided below. Alternative SC 7, which consists of excavation and on-site incineration of the waste in the landfill, was analyzed in the FS. It did not pass the screening process because of the extremely high cost; therefore, this alternative is not included below.

Alternative SC 1: NO ACTION

Estimated Capital Cost: $0
Operation & Maintenance (O&M)/5 year review: $6,500
Present Worth: $14,000
Implementation Time: Not Applicable

CERCLA requires that a No Action alternative be evaluated at every site to establish a baseline for comparison to the other alternatives. Under this alternative, NJDEP and EPA would take no further action at the site.

Because this alternative would result in contaminants remaining on site, CERCLA requires that the site be reviewed at least every five years. If justified by the review, remedial actions would be evaluated at that time to address the contamination. The cost estimates above include the cost to perform this review.

According to EPA's Hydrologic Evaluation of Landfill Performance (HELP) model, the existing cap has an estimated infiltration rate of 3,300,000 gallons/year. The HELP model evaluates the movement of water through a landfill cover.

Alternative SC 2: LIMITED ACTION

Estimated Capital Cost: $45,000
O&M/5-year review: $6,500
Present Worth: $59,000
Implementation Time: 6 months

This alternative would consist of institutional controls to minimize potential risks associated with the wastes in the landfill. A fence would be constructed around the landfill to restrict access. As in the No Action alternative above, the site would be reviewed at least every five years. The cost estimates above include the cost to perform this review. Because this alternative would not include any improvements to the existing landfill cover, the infiltration rate would be the same as in Alternative SC 1 (i.e., 3,300,000 gallons/year).

Alternative SC 3: 1977 SOLID WASTE CAP

Estimated Capital Cost: $3,210,500
O&M 1st year: $301,700
O&M 2-30 years: $105,700
O&M/5-year review: $6,500
Present Worth: $4,719,000
Construction Time: 1.5 years

Alternative SC 3 would involve rebuilding and rehabilitating the existing cap on the landfill to conform to the 1977 NJDEP capping requirements for a solid waste landfill. The 1977 NJDEP Solid Waste Cap Alternative would include:

6 inches vegetated topsoil
18 inches clay with maximum 1 x 10^{-7} cm/sec permeability

A fence would be constructed around the landfill to restrict access. Operation and maintenance during the first year would include monitoring the cap and maintaining the vegetative cover. Long-term maintenance and monitoring would be implemented to ensure the integrity and effectiveness of the cap.

Based on the HELP model, this type of cap would reduce the current infiltration rate by approximately 92 percent. The overall thickness of this cap would be 24 inches on top of the waste.

As with the No Action alternative, the site would be reviewed at least every five years.

Alternative SC 4: AUGMENTED 1977 SOLID WASTE CAP

Estimated Capital Cost: $3,635,400
O&M 1st year: $301,700
O&M 2-30 years: $105,700
O&M/5-year review: $6,500
Present Worth: $5,144,000
Construction Time: 1.5 years

Alternative SC 4 would be identical to Alternative SC 3, except the design of the cap would be augmented by an additional 18 inches of topsoil to provide freeze and thaw protection. The Augmented 1977 Solid Waste Cap Alternative would include:

24 inches vegetated topsoil
18 inches clay with maximum 1 x 10^{-7} cm/sec permeability

The Augmented 1977 Solid Waste Cap is the same as the 1977 Solid Waste Cap (Alternative SC 3), except an additional 18 inches of topsoil would be added. A security fence would be installed around the landfill to restrict access to the cap.

Based on the HELP model, this cap would reduce the current infiltration rate by approximately 94 percent. The overall thickness of this cap would be 42 inches on top of the waste.

As with the No Action alternative, the site would be reviewed at least every five years.

Alternative SC 5: RESOURCE CONSERVATION AND RECOVERY ACT HAZARDOUS WASTE CAP

Estimated Capital Cost: $5,272,000
O&M 1st year: $311,400
O&M 2 - 30 years: $115,400
O&M/5-year review: $6,500
Present Worth: $6,403,000
Construction Time: 1.5 years

Alternative SC 5 would involve rebuilding the existing landfill cap to conform to the substantive requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA) for the closure of hazardous waste landfills.

The RCRA cap would include:

24 inches vegetated topsoil
12 inches soil drainage with minimum 1 x 10^{-2} cm/sec permeability (or geosynthetic materials with equivalent performance characteristics); a filter layer

20-mil flexible membrane liner
24 inches clay with maximum 1 x 10^{-7} cm/sec permeability

A security fence would be installed around the landfill to restrict access to the cap.

Based on the HELP model, this cap would reduce the current infiltration rate greater than 99.9 percent. The overall thickness of this cap would be at least 60 inches on top of the waste.

As with the No Action alternative, the site would be reviewed at least every five years.

Alternative SC 6: MODIFIED NJDEP HAZARDOUS WASTE CAP

Capital Cost: $4,557,300
O&M 1st year: $311,420
O&M 2 - 30 years: $115,400
O&M/5-year review: $6,500
Present Worth: $6,186,000
Construction Time: 1.5 years

This alternative was developed to provide a light weight hazardous waste capping system for the JIS Landfill site because of the steep sideslope. It would include a textured synthetic material layer that would increase friction along the landfill sideslopes, and provide greater stability. In addition, this cap would have a reduced unit weight and thickness. The Modified NJDEP Hazardous Waste Cap would include:

24 inches vegetated topsoil
12 inches soil drainage layer with minimum 1 x 10^{-2} cm/sec permeability
30-mil textured synthetic material layer
12 inches clay with maximum 1 x 10^{-7} cm/sec permeability

A security fence would be installed around the landfill to restrict access to the cap.

Based on the HELP model, this cap would reduce the current infiltration rate greater than 99.9 percent. This infiltration rate is virtually the same as the RCRA cap. The overall thickness of this cap would be at least 48 inches on top of the waste.

As with the No Action alternative, the site would be reviewed at least every five years.

Ground-Water Alternatives

The four remedial alternatives that were evaluated in the FS are: Ground-Water (GW) Alternative 1 - No Action, GW Alternative 2 - Limited Action, GW Alternative 3 - Entire Plume Capture and Treatment, and GW Alternative 4 - Primary Plume Capture and Treatment, and Provision of Alternative Water Supply.

Alternative GW 3, Entire Plume Capture and Treatment, was not developed fully in the FS because of several factors. The contamination in the entire plume is spread over a large area and the concentrations vary widely. Furthermore, the concentrations of contaminants in the secondary plume are at low levels as compared to the primary plume. Remediation of the entire plume would require the installation of a large number of extraction wells over a one square mile area, with many of the wells needed to be located on residential property. Recent experience has shown that obtaining access for extraction well installation is extremely difficult and highly unlikely when impacting residential property. The piping network required to connect these wells with the treatment plant would be extensive and could have adverse impacts on major roadways. Since the concentrations of contaminants in the overall plume vary and the volume of ground water needed to capture the overall plume is high, the influent to the treatment plant would likely be very dilute, making effective treatment extremely difficult. In addition, natural attenuation of the secondary plume is likely to achieve the cleanup levels within 10 to 30 years, which is a typical time frame for active restoration. Because of these technical, engineering, and administrative difficulties, Alternative GW 3 was not considered further in the FS and is not discussed below.

GW Alternative 1 - NO ACTION

Estimated Capital Cost: 0
O&M/5-year review: $6,500
Estimated Net Present Worth Cost: $14,000
Implementation Time: None

CERCLA requires that a No Action alternative be evaluated at every site to establish a baseline for comparison to the other alternatives. Under this alternative, NJDEP and EPA would take no further action at the site.

Because this alternative would result in contaminants remaining on site, CERCLA requires that the site be reviewed at least every five years. If justified by the review, remedial actions would be evaluated at that time to address the contamination. The cost estimates above include the cost to perform this review.

GW Alternative 2 - LIMITED ACTION

Estimated Capital Cost: $45,000
O&M: $12,000
O&M/5-year review: $6,500
Estimated Net Present Worth Cost: $207,900
Implementation Time: 6 months

This alternative would consist of institutional controls and ground-water monitoring. NJDEP would place well-use restrictions on well permits to prevent the installation of new wells in the contaminated Old Bridge Aquifer. Ground-water sampling and analysis would be performed periodically to monitor contaminant migration.

Because this alternative would result in contaminants remaining on site, CERCLA requires that the site be reviewed at least every five years. If justified by the review, remedial actions would be evaluated at that time to address the contamination. The cost estimates above include the cost to perform this review.

GW Alternative 4 - PRIMARY PLUME CAPTURE AND TREATMENT, AND PROVISION OF ALTERNATIVE WATER SUPPLY

Capital Cost: $1,913,800
Alternative Water Supply: $690,000
O&M 1st year cost: $666,900
O&M 2-30 years: $441,500
O&M/5-year review: $6,500
Net Present Worth Cost: $8,097,000
Construction Time: 1 year

GW Alternative 4 involves pumping and treating the primary contaminated ground-water plume in the vicinity of the JIS Landfill site to meet State and Federal MCLs and/or the New Jersey Ground-Water Quality Standards (NJGWQS). The contaminated ground water would be treated by chemical oxidation/precipitation to remove metals and air stripping to remove VOCs. Carbon adsorption may be required to control air stripper emissions. The treated ground water would be discharged back to the Old Bridge Aquifer through a recharge trench. The exact number of extraction wells, well locations, pumping rates, and operating parameters would be determined during Remedial Design.

As many as 115 downgradient residents with private wells in the Old Bridge Aquifer could potentially be affected by contamination in the secondary plume. As part of this alternative, residents with contaminated wells would be provided with an alternate source of drinking water. NJDEP estimates that it would cost approximately $6,000 for each water main extension and connection. For the purpose of developing the cost of providing

an alternative water supply, a conservative estimate of $690,000 was used.

NJDEP would place well-use restrictions on well permits to prevent the installation of new wells in the contaminated portion of the Old Bridge Aquifer.

Under Alternative 4, a monitoring program would be developed during the design phase to verify the performance of the pump and treat system remediating the primary plume and the natural attenuation processes remediating the secondary plume. The secondary plume would be monitored at least annually, and evaluated every five years as part of the CERCLA five-year review requirement discussed below. If, based on the monitoring data, the estimated time period for natural attenuation of the secondary plume does not meet with NJDEP's and EPA's expectations, or NJDEP and EPA determine that natural attenuation will not remediate the ground water to levels protective of human health and the environment, then alternative aquifer restoration methods may be evaluated to address the contamination in the secondary plume. If necessary, such an alternative aquifer restoration method would be set forth in a subsequent decision document.

Because this alternative would result in contaminants remaining on site, CERCLA requires that the site be reviewed at least every five years. This review will include an evaluation of the ground-water monitoring data referenced above. The cost estimates above include the cost to perform this review.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In accordance with the National Oil and Hazardous Substances Pollution Contingency Plan, a detailed analysis of each remedial alternative was performed with respect to each of the nine criteria. This section discusses and compares the performance of the remedial alternatives under consideration against these criteria. These criteria were developed to address the requirements of Section 121 of CERCLA to ensure all important considerations are factored into remedy selection decisions. All selected remedies must at least satisfy the Threshold Criteria. The selected remedy should provide the best trade-offs among the Primary Balancing Criteria. The Modifying Criteria are evaluated following the public comment period.

Threshold Criteria

1. Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each

exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. Compliance with ARARs addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of Federal and State environmental statutes and requirements and/or provide grounds for invoking a waiver.

Primary Balancing Criteria

3. Long-term effectiveness and permanence refers to the magnitude of residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once remedial objectives have been met.

4. Reduction of toxicity, mobility or volume through treatment addresses the statutory preference for selecting remedial actions that employ treatment technologies that permanently and significantly reduce toxicity, mobility or volume of the hazardous substances as a principal element.

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

6. Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular alternative.

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

Modifying Criteria

8. State acceptance indicates whether, based on its review of the RI/FS and the Proposed Plan, the State supports, opposes, and/or has identified any reservations regarding the preferred alternative.

9. Community acceptance refers to the community's comments on the alternatives described in the Proposed Plan, and the RI and FS reports. Responses to public comments are addressed in the Responsiveness Summary of this ROD.

A comparative analysis of the remedial alternatives based upon the aforementioned evaluation criteria follows.

Overall Protection of Human Health and the Environment

Alternative SC 1 (No Action) and the Alternative SC 2 (Limited Action) would not protect human health and the environment because contaminants would continue to migrate into the ground water through infiltration. Alternatives SC 3 (1977 Solid Waste Cap), SC 4 (Augmented 1977 Solid Waste Cap), SC 5 (RCRA Hazardous Waste Cap), and SC 6 (Modified NJDEP Hazardous Waste Cap) would protect human health and the environment because cap improvements would reduce the infiltration of water through the wastes, thus reducing contaminant migration into the ground water.

Alternative GW 1 (No Action) and Alternative GW 2 (Limited Action) do not employ any treatment, and would not protect human health and the environment. Contaminants would remain in the ground water and continue to migrate. GW Alternative 4 would protect human health and the environment because it would require an alternative water supply for affected wells and provide further protection of human health through the issuance of well use restrictions on new permits. The contaminants in ground water are expected to be reduced, through active treatment of the primary plume and natural attenuation of the secondary plume, to levels that would be protective of human health and the environment within 10 to 30 years.

Compliance with ARARs

There are several categories of ARARs: action-specific, chemical-specific, and location-specific. Action-specific ARARs are technology or activity-specific requirements or limitations related to various activities of the project. Chemical-specific ARARs are usually numerical values which establish the amount or concentration of a chemical that may be found in, or discharged to, the ambient environment. Location-specific ARARs are restrictions placed on the concentrations of hazardous substances or the conduct of activities solely because they occur in a special location. A list of ARARs is included in **Table 3**.

Action-Specific ARARs

Because hazardous substances were disposed of in the landfill, the capping requirements in the NJDEP Hazardous Waste Regulations (NJAC 7:26-10.8) and RCRA Subtitle C (40 CFR 264.310) regulations pertaining to landfill closure are action-specific relevant and appropriate requirements.

Source Control Alternatives SC 1 (No Action), SC 2 (Limited Action), SC 3 (1977 Solid Waste Cap), and SC 4 (Augmented 1977 Solid Waste Cap), would not comply with ARARs because the caps associated with these alternatives do not meet the minimum design requirements specified in the applicable regulations. Alternative SC 5 would comply with all ARARs. Alternative SC 6 was developed (as a specialized modification of the Federal and State caps) to address the slope stability concerns specific to the JIS Landfill. For this alternative to be implemented, a waiver of the capping requirements of the New Jersey Hazardous Waste Landfill Closure Regulations (NJAC 7:26-10.8(i)2) would be required based upon technical impracticability considerations from an engineering perspective.

Chemical-Specific ARARs

Because ground water at the site is classified as Class II (i.e., drinking water), the following are considered relevant and appropriate requirements: National Primary Drinking Water Standards, New Jersey Safe Drinking Water Act Maximum Contaminant Levels for Hazardous Contaminants, and/or New Jersey Ground Water Quality Criteria (NJGWQC) established in the New Jersey Ground-Water Standards (NJAC 7:9-6.7). These ARARs are presented in **Table 4** for the contaminants of concern in the ground water. **Table 5** represents the cleanup goal for the aquifer, which was developed by selecting the most stringent criteria of the four ARARs for each contaminant.

Alternatives GW 1 and GW 2 would not comply with ARARs because contaminants at levels above the standards would remain at the site. Alternative GW 4 would comply with ARARs because contaminants in the primary plume would be treated until ARARs are attained. Natural attenuation of the secondary plume would comply with ARARs because the contaminants in the secondary plume are expected to meet the Federal and State MCLs and/or NJGWQC within 10 to 30 years. Carbon adsorption would be added to the air stripper if needed to comply with the NJDEP Regulations for Air Pollution Control.

Location-Specific ARARs

Because wetland areas are located downgradient from the site and may potentially be affected by the extraction of ground water, location-specific ARARs include the Wetlands Protection Act of 1970 and Executive Order 11990--"Protection of Wetlands."

The extraction wells and recharge trench would be designed to minimize impacts to the wetlands to the maximum extent practicable to comply with the location-specific ARARs.

Because Alternatives GW 1, GW 2, SC 1, and SC 2 do not provide overall protection of human health and the environment and do not comply with ARARs, they do not meet the threshold criteria that each alternative must meet in order to be eligible for selection. Therefore, these alternatives will not be discussed further.

Long-Term Effectiveness and Permanence

Alternatives SC 5 and SC 6 are more effective and reliable than Alternatives SC 3 and SC 4 because the cap designs allow the least amount of water infiltration and provide protection against damage due to freeze and thaw.

With respect to the primary plume, Alternative GW 4 is effective and reliable because contaminant concentrations in the primary plume would be reduced through treatment. The treatment system includes chemical oxidation/precipitation and air stripping, which are proven technologies. The provision of alternative drinking water supply to downgradient residents with private wells contaminated by the secondary plume offers long-term effectiveness and a permanent solution.

Reduction in Toxicity, Mobility or Volume

Alternative SC 3 provides the least reduction of mobility and volume, since it has the greatest amount of infiltration among the four capping alternatives. Alternative SC 4 provides greater reduction of mobility and volume than Alternative SC 3. Alternatives SC 5 and SC 6 provide the greatest reduction in mobility and volume because these two alternatives have the lowest infiltration rate. Toxicity would not be reduced by Alternatives SC 3, SC 4, SC 5, and SC 6 because cap improvements would reduce the infiltration of water through the wastes, but not treat the wastes themselves.

Alternative GW 4 would reduce toxicity, mobility, and the volume of contaminants in the primary plume through treatment. The mobility and volume of contaminants in the secondary plume would remain the same through natural attenuation; however, toxicity of the contaminants would decrease through degradation.

Short-Term Effectiveness

On-site remedial workers might be exposed to hazardous wastes or contaminated soil during the installation of the cap in Alternatives SC 3, SC 4, SC 5, and SC 6. A site-specific Health and Safety Plan would be developed and implemented to minimize the risks to workers.

The installation of extraction wells and sampling of monitoring wells associated with the implementation of Alternative GW 4 may expose workers to contaminants. These risks would be minimized by the use of personal protection equipment. Sludges produced from the treatment process would be disposed of at an appropriate off-site facility.

Implementability

Capping is a conventional and widely used method for waste containment at hazardous waste sites. The equipment, material, and contractors are readily available and would not pose a problem in that respect for Alternatives SC 3, SC 4, SC 5, and SC 6. However, the steepness of the landfill sideslope and the presence of the gas pipeline may make the implementation of these alternatives difficult.

Alternative GW 4 would be relatively easy to implement. The proposed treatment technologies are proven and reliable, and the equipment, materials, and specialists needed for implementation would be readily available.

Cost

Of the Source Control Alternatives, Alternative SC 3, costs the least, with an estimated present worth of $4,719,000. Alternative SC 4 would be the next expensive, with an estimated present worth of $5,144,000. Alternative SC 5 is the most expensive, with an estimated present worth of $6,403,000. Alternative SC 6 has an estimated present worth of $6,186,000.

Ground-Water Alternative GW 4 has an estimated present worth of $8,097,000.

State Acceptance

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

Community Acceptance

Community acceptance was evaluated after the close of the public comment period. Written comments received during the public comment period, as well as verbal comments during the public meeting on December 7, 1994, were evaluated. The response to those comments are addressed in the Responsiveness Summary.

SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, the NJDEP and EPA have determined that Alternatives SC 6 and GW 4 constitute the remedy that is protective of human health and the environment, and will maintain an adequate level of protection over time.

The ground-water cleanup levels for the JIS Landfill site are listed in **Table 5**.

The major components of the selected remedy include the following:

- provide an alternative water supply for residents with contaminated drinking water wells
- upgrade the existing landfill cap to consist of:
  24 inches vegetated topsoil
  12 inches soil drainage layer
  30-mil textured synthetic material layer
  12 inches clay with maximum 1 x 10^{-7} cm/sec permeability
- extract contaminated ground water from the primary plume underlying the site
- treat the contaminated ground water in a facility to be constructed on site
- dispose the treated ground water on the site by a recharge trench
- implement a ground-water monitoring program to monitor the primary and secondary plumes, and to ensure the effectiveness and protectiveness of the remedy

NJDEP will place well-use restrictions on well permits to prevent the installation of new wells in the contaminated portion of the Old Bridge Aquifer. Appropriate land-use restrictions will be required for the landfill. In addition, because this alternative would result in contaminants remaining on site, CERCLA requires that the site be reviewed at least every five years.

The goal of this remedial action is to restore the ground water to its beneficial use, in this case, a source of drinking water. However, NJDEP and EPA recognize that the selected remedy may not achieve this goal because of the technical difficulties associated with achieving ground-water cleanup levels. It may become apparent, during implementation or operation of the ground-water extraction/treatment system, that contaminant levels have ceased to decline and are remaining constant at levels higher than the remediation goal. In such a case, the system's

performance standards and/or the remedy may be reevaluated. Performance monitoring of the ground-water extraction and treatment system will be implemented. The data collected would be used to suggest system adjustments or modifications to provide more effective or efficient attainment of cleanup levels. Such adjustments or modifications may include: increasing or decreasing the extraction rate, initiating a pulsed pumping schedule, installing additional extraction wells (or drains), or ceasing extraction at wells where cleanup levels have been achieved. Monitoring data will be used to assess the effectiveness of the modifications implemented and may be used to re-assess the time frame required to achieve cleanup levels.

Monitoring will also be performed on at least an annual basis to evaluate the ongoing natural attenuation of the secondary plume. The secondary plume will be evaluated every five years as part of the CERCLA five-year review requirement. If, based on the monitoring data, the estimated time period for natural attenuation of the secondary plume does not meet with NJDEP's and EPA's expectations, or EPA and NJDEP determine that natural attenuation will not remediate the ground water to levels protective of human health and the environment, then alternative aquifer restoration methods may be evaluated to address the contamination in the secondary plume. If necessary, such an alternative aquifer restoration method would be set forth in a subsequent decision document.

Because the ground-water extraction system may adversely impact nearby wetlands, a wetlands assessment will be conducted during the design phase to evaluate the potential effects due to the extraction and discharge of ground water. In addition, supplemental data will be gathered from wetland areas downgradient from the site to ensure that there are no serious ecological effects caused by the contamination plume discharging to the surface in wetland areas. Adverse impacts to the wetlands will be mitigated through engineering controls to the maximum extent practicable.

STATUTORY DETERMINATIONS

The remedy selected by NJDEP and EPA for ground water and source control at the site complies with the requirements of Section 121 of CERCLA, as amended by SARA. The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable, or relevant and appropriate to this action, and is cost-effective. The selected remedy utilizes permanent solutions, and alternative treatment technologies or resource recovery technologies, to the maximum extent practicable. The statutory preference for treatment that reduces toxicity, mobility or volume will be satisfied by the selected remedy. The selected remedy provides the best balance

of trade-offs among the criteria. The following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy is protective of human health and the environment, dealing effectively with the threats posed by the contaminants which were identified.

The principal threat posed by the site is the hazardous substances in the landfill as it affects the ground water. The pathways associated with this threat include the infiltration of landfill contaminants into the ground water and the potential migration of contaminated ground water into the deeper aquifers. By minimizing infiltration, and extracting and treating the contaminated ground water, the threats to human health and the environment will be reduced. Contaminants in the ground water will be reduced to levels that are acceptable for drinking water.

Well-use restrictions will be placed on well permits to prevent the use of contaminated ground water before levels protective of human health are reached.

Compliance with ARARs

With the exception noted below, the selected remedy will comply with the substantive requirements of the statutes and regulations listed in **Table 4** to the extent they are applicable or relevant and appropriate to the remediation at this site.

Action-Specific ARARs

The selected remedy will meet the appropriate RCRA Subtitle C Regulations. However, pursuant to 40 CFR 300.430(f)(ii)(C), a waiver of the capping requirements of the New Jersey Hazardous Waste Landfill Closure Regulations set forth in NJAC 7:26-10.8(i)(2) is being invoked under this ROD. The basis for invoking this waiver is technical impracticability. The specific engineering design criteria for the cap established in the New Jersey Hazardous Waste Landfill Closure Regulations cannot be implemented due to slope instability concerns. Notwithstanding, the selected remedy will attain a standard of performance that is equivalent to that required under the New Jersey Hazardous Waste Landfill Closure Regulations. The remedy will meet the appropriate Federal and State guidelines and requirements for subsurface gas management systems.

Chemical-Specific ARARs

The contaminants of concern in the primary plume will be remediated to the cleanup levels listed in **Table 5**. The cleanup levels represent: the concentrations which would be attained in the treated water before discharge into a recharge trench, and the cleanup goal for the aquifer.

Natural attenuation of the secondary plume will comply with ARARs because the contaminants in the secondary plume are expected to meet the Federal and State MCLs and/or NJGWQC within 10 to 30 years.

Emissions from the air stripper will be designed to comply with the New Jersey Air Pollution Control Regulations for VOC and toxic emissions (NJAC 7:27-16 & 17).

Location-Specific ARARs

The substantive requirements of Executive Order 11990 and the Freshwater Wetlands Act (NJAC 7:7A-1.1 et seq.) will be met. The extraction wells and recharge trench will be designed and located to minimize impacts to the wetlands to the maximum extent practicable.

Advisories, Guidance and Criteria To Be Considered

The shipment of hazardous wastes off site to a treatment/disposal facility will be conducted in accordance with EPA's Office of Solid Waste and Emergency Response Directive No. 9834.11, "Revised Procedures for Planning and Implementing Off-site Response Actions." The intent of this directive is to ensure that facilities authorized to accept CERCLA-generated waste are in compliance with RCRA operating standards.

Cost-Effectiveness

Of the alternatives which most effectively address the threats posed by site contamination, the selected remedy provides for overall effectiveness in proportion to its cost. The estimated total project cost is $14.3 million.

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

Contaminants in the primary plume will be removed and treated before reinjection. Hazardous wastes generated by the treatment process will be disposed of at an approved off-site facility.

This will significantly reduce the toxicity, mobility and volume of the contaminants, and offers a permanent solution to the risks posed by the contaminated ground water.

Preference for Treatment as a Principal Element

With respect to the primary plume, the selected remedy satisfies the statutory preference for treatment as a principal element. The selected remedy reduces levels of contaminants in the ground water through treatment, using chemical oxidation/precipitation to remove metals and air stripping to remove VOCs, and thereby reducing the risk to human health.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the JIS Landfill site was released to the public on November 28, 1994. The Proposed Plan identified the preferred alternatives for ground-water and source control. EPA reviewed all written and verbal comments received during the public comment period. Upon review of these comments, EPA determined that no significant changes to the selected remedy, as it was originally identified in the Proposed Plan, were necessary.

APPENDIX I

FIGURES

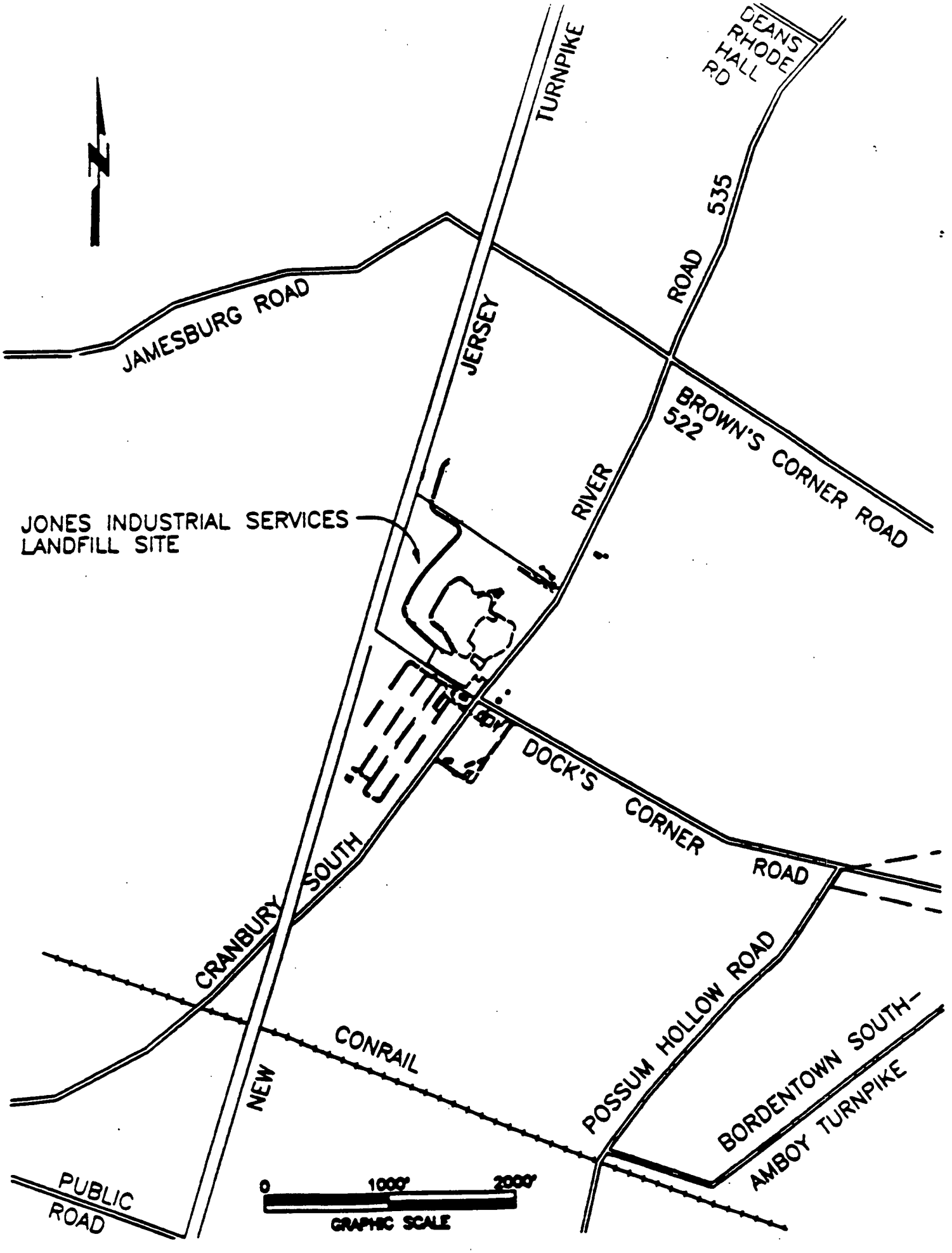

Figure 1. Jones Industrial Services (JIS) Superfund Site Location

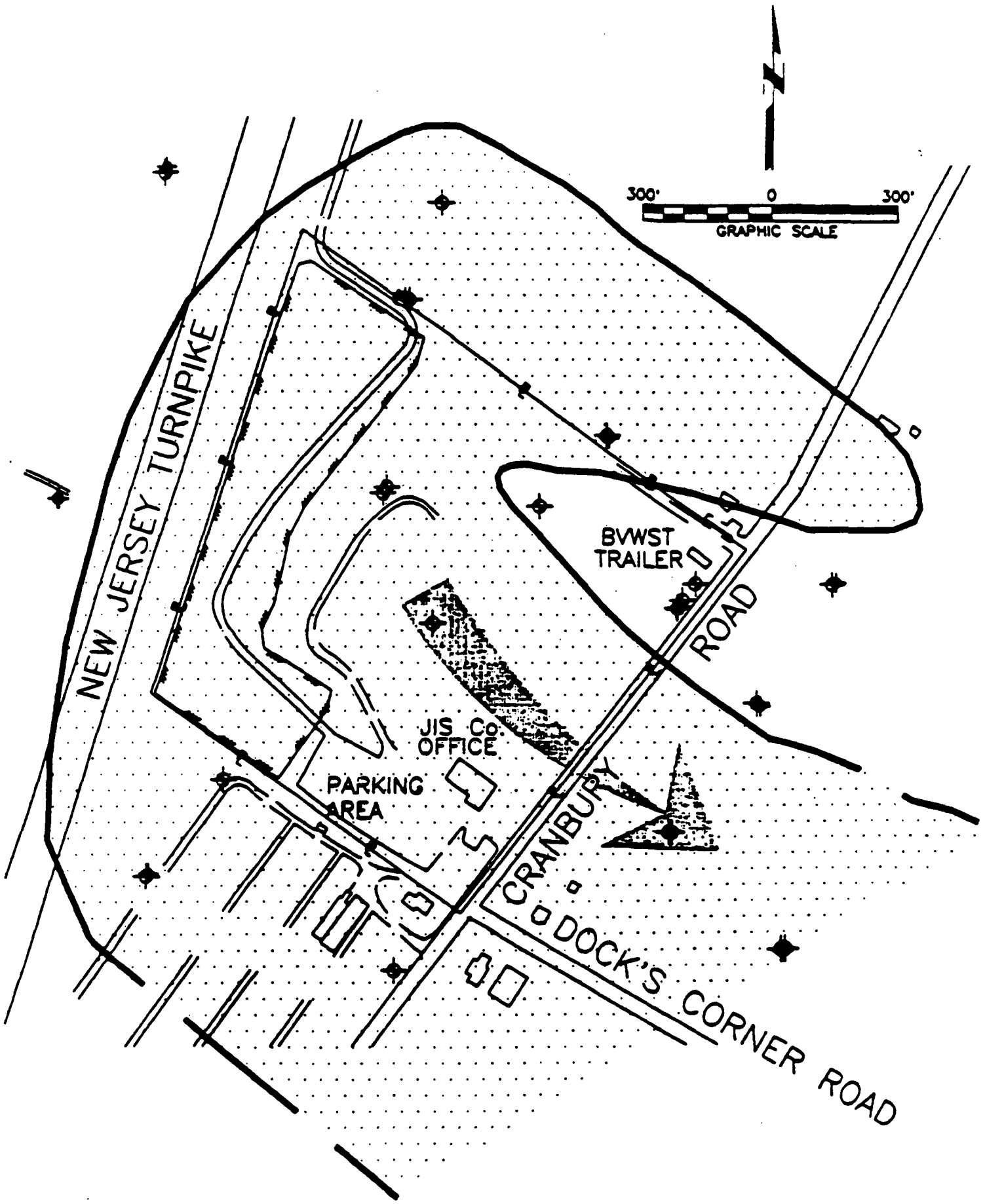

Figure 2. JIS Landfill Superfund Site
Primary Ground Water Contamination Plume

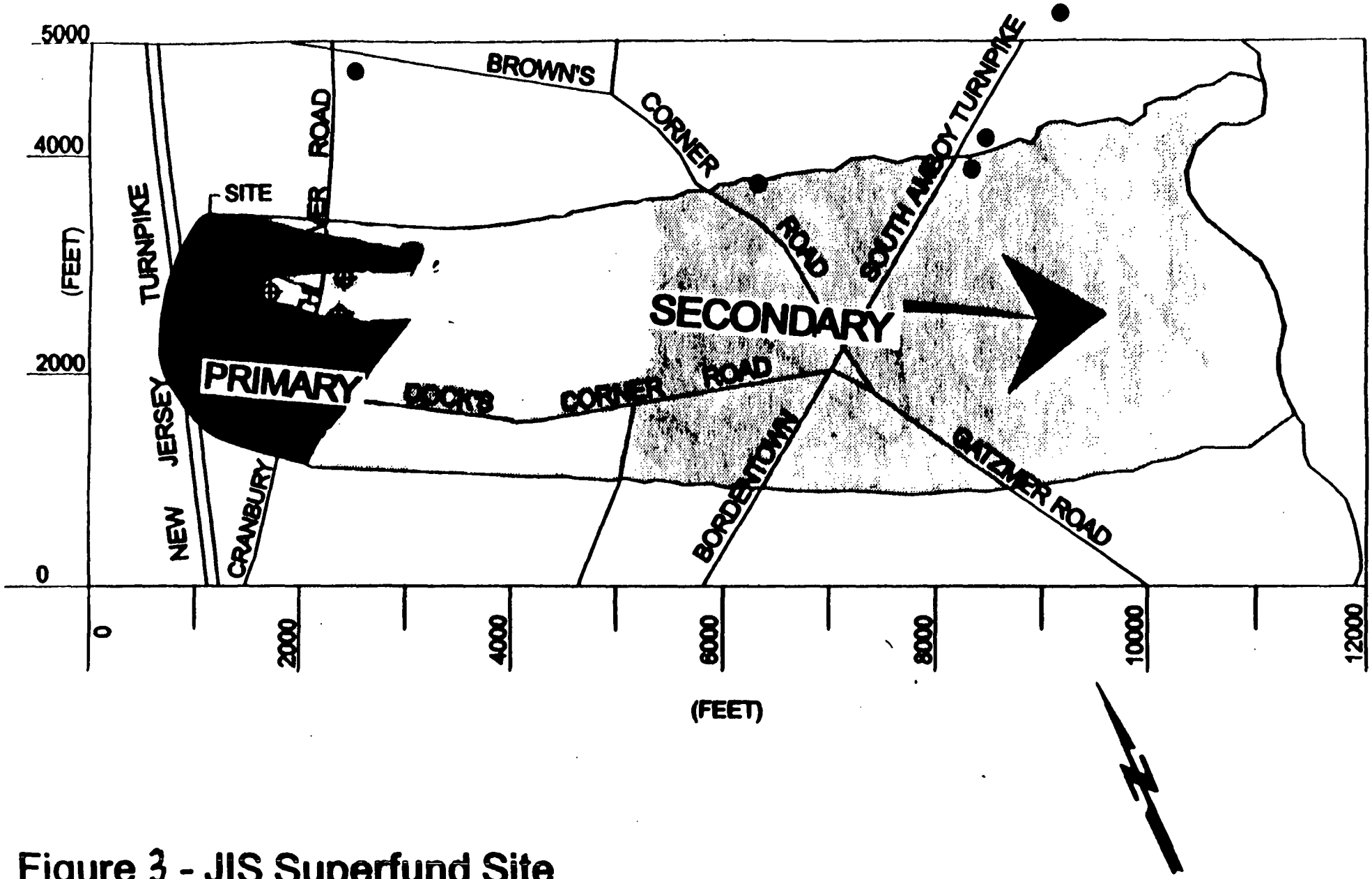

Figure 3.- JIS Superfund Site
Primary and Secondary Ground Water Contamination Plumes

APPENDIX II

TABLES

Table 1. Predominant Ground-Water Contaminants and Range of Concentrations Detected in parts per billion (ppb)		
Contaminant	Primary Plume	Secondary Plume[1]
antimony	81.8 - 82.8	Not Detected
benzene	14 - 7,900	6 - 370
chromium	10 - 26	7.2 - 11.2
1,2-dichloroethene (total)	2 - 750	28.3 - 220
ethylbenzene	5 - 480	Not Detected
lead	3.3 - 90	4.4 - 20.3
methylene chloride	3 - 5,300	0.9 - 6.4
toluene	2 - 4,700	0.6 - 2.3
trichloroethene	2 - 77	11.1 - 87
tetrachloroethene	3 - 190	1.2 - 2.5
vinyl chloride	3 - 180	Not Detected
xylenes	6 - 2,500	6 - 9.4

1 One hot spot contamination of unknown source is not reflected.

Table 2. Predominant Soil Contaminants and Range of Concentrations Detected in parts per million (ppm)		
Contaminant	Surface	Subsurface
arsenic	11.7 - 59.6	2.1 - 85.6
chromium	9.9 - 10.5	1.7 - 18.6
lead	4.0 - 23.7	1.7 - 18.6
1,1,1-trichloroethane	1 - 3	Not Detected
di-n-butylphthalate	140 - 5400	Not Detected
phenanthrene	140 - 2900[1]	Not Detected
pyrene	43 - 6900[2]	Not Detected
bis-2-ethylhexylphthalate	71 - 110	Not Detected
Aroclor 1260	170 -380[2]	Not Detected
4,4' DDE	98.0	28 - 160[1]
4,4' DDT	15 - 230[2]	25 - 620[2]

[1] Contaminant detected in two soil samples.

[2] Contaminant detected in three soil samples.

Table 3. Summary of Federal and State Applicable or Relevant and Appropriate Requirements (ARARs) for the JIS Landfill Site

FEDERAL ARARs	CITATION
National Primary Drinking Water Standards--Maximum Contaminant Levels	40 CFR Part 141
National Primary Drinking Water Standards--Maximum Contaminant Level Goals	40 CFR Part 141.50
Resource Conservation and Recovery Act (RCRA) Standards for Owners & Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities--Hazardous Waste Landfill Covers	40 CFR Part 264.300
Protection of Wetlands	Executive Order 11990
STATE ARARs	**CITATION**
New Jersey Safe Drinking Water Act--Maximum Contaminant Levels	NJAC 7:10-16
New Jersey Ground Water Quality Standards--New Jersey Ground Water Quality Criteria	NJAC 7:9-6.7
New Jersey Air Pollution Control Regulations--Volatile Organic Compounds	NJAC 7:27-16
New Jersey Air Pollution Control Regulations--Toxic Volatile Organic Compounds	NJAC 7:27-17
New Jersey Fresh Water Wetlands Protection Act	NJSA 13:9B-1
New Jersey Hazardous Waste Regulations--Hazardous Waste Landfill Covers	NJAC 7:26-10.8

TABLE 4. APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR CONTAMINANTS DETECTED IN THE GROUND WATER AT THE JIS LANDFILL SITE

in parts per billion

GROUND-WATER CONTAMINANT	FEDERAL MCL[1]	FEDERAL MCLG[2]	NJ MCL[3]	NJGWQC[4]
Acetone				700
Benzene	5	zero	1	0.2
Chlorobenzene	100	100	4	5
Chloroform				6
1,2-Dichlorobenzene	600	600	600	600
1,3-Dichlorobenzene			600	600
1,4-Dichlorobenzene	75	75	75	75
1,1-Dichloroethane				70
1,2-Dichloroethane	5	zero	2	0.3
1,1-Dichloroethene	7	7	2	1
cis 1,2-Dichloroethene	70	70	10	10
trans 1,2-Dichloroethene	100	100	10	100
1,2-Dichloropropane	5	zero	5	0.5
Ethylbenzene	700	700	700	700
Methylene chloride	5	zero	2	2
4-Methyl-2-Pentanone				400
Nitrobenzene				3
1,1,2,2-Tetrachloroethane				2
Tetrachloroethene	5	zero	1	0.4
Toluene	1,000	1,000	1	1,000
1,2,4-Trichlorobenzene	70	70	8	9
1,1,1-Trichloroethane	200	200	26	30
Trichloroethene	5	zero	1	1
Vinyl chloride	2	zero	2	0.08
Xylenes (total)	10,000	10,000	44	40
Antimony	6	6	6	2
Arsenic	50		50	0.02
Barium	2,000	2,000	2,000	2,000
Cadmium	5	5	5	4
Chromium (total)	100	100	100	100
Copper	1,300	1,300	1,300	1,000
Lead	15	zero	15	5
Manganese				50
Nickel	100	100	100	100
Zinc				5,000

1 National Primary Drinking Water Maximum Contaminant Level (MCL).

2 National Primary Drinking Water Maximum Contaminant Level Goal (MCLG). Only non-zero MCLGs are considered applicable or relevant and appropriate requirements.

3 New Jersey Safe Drinking Water Act Maximum Contaminant Level.

4 New Jersey Ground Water Quality Criteria.

TABLE 5. GROUND-WATER CLEANUP LEVELS FOR THE JIS LANDFILL SITE
in parts per billion (ppb)

GROUND-WATER CONTAMINANT	CLEANUP LEVEL (ppb)	PRACTICAL QUANTITATION LIMIT (ppb)
Acetone	700	
Benzene	0.2[◇]	1
Chlorobenzene	4	
Chloroform	6	
1,2-Dichlorobenzene	600	
1,3-Dichlorobenzene	600	
1,4-Dichlorobenzene	75	
1,1-Dichloroethane	70	
1,2-Dichloroethane	0.3[◇]	2
1,1-Dichloroethene	1[◇]	2
cis 1,2-Dichloroethene	10	
trans 1,2-Dichloroethene	10	
1,2-Dichloropropane	0.5[◇]	1
Ethylbenzene	700	
Methylene chloride	2	
4-Methyl-2-Pentanone	400	
Nitrobenzene	3[◇]	10
1,1,2,2-Tetrachloroethane	2	
Tetrachloroethene	0.4[◇]	1
Toluene	1	
1,2,4-Trichlorobenzene	8	
1,1,1-Trichloroethane	26	
Trichloroethene	1	
Vinyl chloride	0.08[◇, a]	5
Xylenes (total)	40	
Antimony	2[◇, a]	20
Arsenic	0.02[◇]	8
Barium	2,000	
Cadmium	4	
Chromium (total)	100	
Copper	1,000	
Lead	5[◇]	10
Manganese	50	
Nickel	100	
Zinc	5,000	

[◇] The cleanup level is the New Jersey Ground Water Quality Criteria (NJGWQC). Compliance with the NJGWQC will be determined by analytical measurements equal to, or less than, the specific Practical Quantitation Limit (PQL), as defined and established in NJAC 7:9-6, and shown above.

[a] Rigorous testing that produces a lower detection limit than the PQL may be required for this contaminant on a periodic basis.

RESPONSIVENESS SUMMARY

RECORD OF DECISION

JIS Landfill Site

South Brunswick Township, Middlesex County, New Jersey

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

RESPONSIVENESS SUMMARY

JIS LANDFILL SITE

South Brunswick Township, Middlesex County, New Jersey

INTRODUCTION

A responsiveness summary is required by Superfund policy. It provides a summary of citizens' comments and concerns received during the public comment period, and the New Jersey Department of Environmental Protection (NJDEP) and the United States Environmental Protection Agency (EPA) responses to those comments and concerns. All comments summarized in this document have been considered in the NJDEP and EPA final decision for selection of a remedial alternative for the JIS Landfill site.

OVERVIEW

The preferred remedial alternative, which was presented in the Proposed Plan, addresses source control and contaminated ground water at the site. The major components of the preferred alternative included extraction and on-site treatment of contaminated ground water, and disposal of treated ground water on the site by a recharge trench; upgrade of the existing landfill cap to meet Modified NJDEP Hazardous Waste cap; and provision of an alternative water supply to residents with contaminated drinking water wells.

SUMMARY OF COMMUNITY CONCERNS

Comments from the public comment period generally supported the remedial alternative chosen to remediate ground water at the site. Several commenters questioned the need to upgrade the existing landfill cap. Major concerns included how remedial activities would affect the natural gas pipeline, compensation for expenses associated with closing a contaminated residential well and water main hook up, health risks associated with the site, the funding source for the cleanup of the site, and the time frame for remediation. Several comments concerned the long time it took to reach this point from when ground-water contamination was first discovered.

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

The Remedial Investigation and Feasibility Study (RI/FS), and the Proposed Plan for the site were released to the public for comment on November 28, 1994. These documents were made

available to the public in the administrative record file at the EPA Docket Room in Region II, New York and the information repositories at the South Brunswick Municipal Building and the South Brunswick Public Library. The notice of availability for the above-referenced documents was published in The Home News on November 26, 1994. The public comment period on these documents was held from November 28, 1994 to December 28, 1994.

On December 7, 1994, NJDEP conducted a public meeting at the South Brunswick Senior Citizens Center, to inform local officials and interested citizens about the Superfund process, to review current and planned remedial activities at the site, and to respond to any questions from area residents and other attendees.

SUMMARY OF COMMENTS AND RESPONSES

The following is a summary of the comments provided at the public meeting and comments received during the public comment period, as well as NJDEP's and EPA's response to those comments.

COMMENTS RAISED DURING THE PUBLIC MEETING ON DECEMBER 7, 1994

1. **COMMENT:** Is Black & Veatch under investigation by the NJDEP for fraudulent billing?

RESPONSE: Black and Veatch is the NJDEP contractor who performed the RI/FS, and no, they are not under investigation. However, NJDEP is reviewing the contract with Black & Veatch to determine whether there are any discrepancies between the contract and the invoices. This is standard procedure.

2. **COMMENT:** When was the last set of ground-water samples taken?

RESPONSE: Ground-water monitoring wells were last sampled by Black & Veatch in late 1991-early 1992.

3. **COMMENT:** Was the first round of soil borings from the clay cap on the landfill taken by Black & Veatch analyzed incorrectly by Empire Soils?

RESPONSE: Eight soil borings of the landfill cap were taken by Black and Veatch. Permeability testing was performed on six of those samples by Empire Soils. NJDEP found that a portion of the analyses by Empire Soils were performed incorrectly. They were subsequently reanalyzed by Woodward-Clyde

Consultants. It was these reanalyzed results that were reported in the RI/FS.

4. COMMENT: There are 12 inches of clay in the [JIS] landfill cap. It's the same that's in every single landfill. The Brown and Ferris [South Brunswick] and the Monroe Township landfills both have 12 inches of clay. JIS installed a cap on the landfill under a 1977 court order. This cap was state-of-the-art. JIS has all the test results, but the NJDEP has never reviewed them.

RESPONSE: The reports submitted by JIS were reviewed and summarized and discussed in the RI/FS. NJDEP evaluated the existing landfill cap and concluded that the cap must be upgraded in order to protect human health and the environment. There is still significant ground-water contamination emanating from the landfill. Enhancing the existing cap to the Modified NJDEP Hazardous Waste Cap gives the required protection and is the best way to prevent further ground-water contamination. (See summary of written comments from Borrus et al. and A-Z Environmental COMMENT/RESPONSE 37 for further discussion on this topic).

5. COMMENT: JIS investigated initiating ground-water treatment at the site 9-10 years ago. If that system had been put in operation then, the ground-water remediation would be well underway now. The NJDEP never looked into this study.

RESPONSE: The history of the NJDEP's response to, and negotiations with, the owner of the landfill is beyond the forum of the public meeting (see COMMENT/RESPONSE 41 for further discussion on this issue).

6. COMMENT: What is the background ground-water quality?

RESPONSE: NJDEP sampled four monitoring wells on the western side of the NJ Turnpike, located upgradient of the JIS Landfill (MW-1S, MW-1D, MW-14S, and MW-14D). These wells reflect the background ground-water quality. Only one compound in one of the four wells exceeded the New Jersey Ground Water Quality Criteria (NJGWQC)--in MW-1S, lead was found at 16.5 parts per billion (ppb).

7. **COMMENT:** At the toe of the landfill, one monitoring well is contaminated and ten feet away, a deeper well is clean. Can the monitoring wells spread the ground-water contamination from one aquifer to another?

RESPONSE: All of the monitoring wells were installed in the Old Bridge Aquifer, which is above the clay layer that protects the deeper (Farrington Sands) aquifer.

8. **COMMENT:** Is the pumping well, PW-1, installed by the NJDEP used for reinjection of untreated ground water contributing to the spread of contamination?

RESPONSE: NJDEP used pumping well PW-1 for circulating ground water collected for testing purposes back into the plume, from which it was extracted, during the aquifer pump test for the RI. NJDEP was not degrading any ground water or spreading contamination by putting the ground water back into PW-1 because this well is located down-gradient from the well with the highest level of contamination.

9. **COMMENT:** Whose money is being, and will be, spent on cleanup of the JIS Landfill?

RESPONSE: The Remedial Investigation and Feasibility Study (RI/FS) was conducted using State funds; those funds were then reimbursed by a group of potentially responsible parties (PRPs) who disposed of wastes in the JIS Landfill. Once the remedy is selected in the Record of Decision, NJDEP will offer the PRPs the opportunity to undertake the cleanup. If the PRPs decline, then federal Superfund money and NJ Hazardous Discharge Bond money will be used to fund the cleanup. EPA and/or NJDEP would then attempt to recover these funds from the PRPs.

10. **COMMENT:** Can residents who used their own money to connect to a public water supply when their drinking water well was contaminated be reimbursed?

RESPONSE: There is a State fund under which residents could file a claim for reimbursement. The regulations associated with this fund have a one year statute of limitations for claims of this nature. If

residents did not file a claim within one year of connecting to public water, they are no longer eligible to file a claim.

11. COMMENT: How will putting a cap on the landfill address the contamination in the ground water?

RESPONSE: Upgrading the existing landfill cap to the NJDEP Modified Hazardous Waste Cap will ensure that no further contamination enters the ground water by reducing the infiltration of rainwater through the chemicals in the landfill. The pumping and treating of the ground water will draw contaminated ground water back towards the landfill so that it does not continue to spread away from the landfill. In order for the ground-water remedy to be effective, the existing landfill cap must be upgraded. See COMMENT/ RESPONSE 61 for further discussion on this topic.

12. COMMENT: Don't hazardous waste landfills usually have some type of liner to catch the leachate? Also, what's going to stop the leachate from continually flowing away from the landfill once you place a cap on it? And, how long will the contamination continue to emanate from the landfill?

RESPONSE: Current regulations require new hazardous waste landfills to have a bottom liner to prevent leachate from migrating out of the landfill. At the time this landfill was built, these requirements were not in place. Therefore, this particular landfill does not have a bottom liner. However, the new cap should significantly reduce, if not stop, the amount of leachate emanating from the landfill by preventing infiltration from passing through the wastes in the landfill. NJDEP cannot specifically calculate how long the leachate will continue to emanate from the landfill.

13. COMMENT: If the cap was ordered in 1977, and it wasn't done right, then why is it 1994 when we're finally doing something about it? Why has it taken NJDEP so long to get to the point of remediating the contamination?

RESPONSE: In December of 1975, NJDEP ordered the landfill to cease operations; litigation ensued until 1988.

This postponed the initiation of the actual investigation of the site. Superfund was created in 1980 to specifically handle sites such as JIS, where federal and state monies are used to investigate and remediate sites when PRPs are unwilling to take responsibility or are financially unable to conduct the work themselves. JIS was placed on the National Priorities List on September 1, 1983. The RI began in 1986 and was completed in 1992. The FS was initiated in 1991 and completed in 1993.

NJDEP first addressed the immediate risks from the site by offering impacted residents an alternative source of drinking water. Once this was accomplished, the RI was initiated to address long term risks. Although the time frame seems unnecessarily long, the complex nature of the site required several rounds of sampling before the site could be characterized.

14. COMMENT: Are heavy metals a concern at this site and in the secondary plume? How does the NJDEP plan on addressing the heavy metals migration?

RESPONSE: Heavy metals present in the primary plume will be treated with the rest of the ground-water contamination by chemical oxidation and precipitation to remove the metals. Heavy metal contaminant concentrations in the secondary plume are at lower levels and will be monitored at least annually. If the secondary plume does not naturally attenuate within a reasonable time frame, or is determined to be no longer protective of human health and the environment, other remedial alternatives will be evaluated to address the contamination. Much of the metals found in the secondary plume are attributed to be occurring in nature as part of the local geology.

15. COMMENT: The sampling of monitoring wells is too distant. You don't sample the monitoring wells consistently on a monthly or quarterly basis. Can you build into your procedures a plan that would definitely monitor these wells on a monthly or bimonthly basis?

RESPONSE: During the actual remedial work, monitoring wells will be sampled on a regular basis in accordance with the ground-water monitoring plan to be

developed during the design phase. The monitoring frequency will be determined during the design, but would probably be twice a year for the first five years. The ground-water monitoring results will be available to the public for review.

16. COMMENT: What is meant by a reasonable time frame for natural attenuation, and can it be speeded up?

RESPONSE: A reasonable time frame for natural attenuation would be 30 years. There is no way to increase the rate of natural attenuation without active remediation.

17. COMMENT: Have the PRPs been fined so that they could help defray the cost of cleaning up the site? Does the NJDEP ever succeed in getting compensated for funds spent to clean up these sites or natural resource damages?

RESPONSE: No, the PRPs have not been fined because there are no fines associated with the regulations. The PRPs have not entered into an agreement with NJDEP or EPA to undertake or fund the cleanup at the JIS Landfill Site. Yes, NJDEP is successful in recovering costs and collecting natural resource damages.

18. COMMENT: The State of New Jersey, including NJDEP and Rutgers University, have disposed of wastes in the JIS Landfill. Are they paying for the remediation? Are they considered liable for the cleanup?

RESPONSE: According to the NJDEP, one state agency cannot sue another state agency. However, under CERCLA, a state can be considered liable for cleanup of a National Priorities List (NPL) site if it disposed of hazardous waste not related to a response action. Based on information available to EPA, there is insufficient evidence to support JIS's claim that the State of New Jersey, NJDEP, and Rutgers University disposed of hazardous waste at the JIS Landfill.

19. COMMENT: Why was Brown and Ferris [Browning Ferris] Industries taken off of the PRP list?

RESPONSE: NJDEP issued Browning Ferris Industries a Request for Information in 1989. Based on a review of the response, NJDEP determined that Browning Ferris Industries was not a PRP, and consequently was not included on the PRP list.

20. COMMENT: The State acts as if the owners of JIS were engaged in illegal activity by accepting wastes at the landfill when in actuality the landfill was licensed by the State during its operation.

RESPONSE: The NJDEP has never alleged any illegal activity on the part of the owners of JIS Landfill. However, under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as owner and operator of the JIS Landfill, they are liable for the cleanup of the site.

21. COMMENT: How big will the ground-water pump and treat facility be and what will it look like?

RESPONSE: Specific plans for the plant will not be drawn up until the design of the remedy is in progress. The plant itself will be located on-site. The NJDEP tries to make these plants as unobtrusive as possible.

22. COMMENT: Will the recovery wells be located on or off the site?

RESPONSE: Some recovery wells will be located on the JIS property while others may be installed across Cranbury-South River Road off JIS property.

23. COMMENT: At what rate is the plume of contamination travelling at and how was this rate calculated?

RESPONSE: The rate of migration of the ground water had been calculated at an average of 1.2 feet per day. That's based on the slope of the ground-water table and on the rate at which water flows through the soil in the aquifer, the Old Bridge Aquifer in this case. The plume is flowing in a southeast direction.

The slope of the aquifer is considered in the calculation of the ground-water flow. The change in aquifer elevation from one point to another is

considered and the type of geologic material it's flowing through is also considered. The rate of flow is a calculated value based on field tests.

24. COMMENT: How far below the ground surface is the ground water?

RESPONSE: Ground-water table elevations can vary with topography and seasonal rainfall. The ground-water table is about 70 feet above mean sea level (MSL). The ground surface at the JIS Landfill is about 130 feet above MSL, and about 85 feet above MSL in the pit next to the landfill. Therefore, the ground water is approximately 60 feet below the ground surface at the JIS Landfill, and approximately 15 feet below the ground surface at the pit adjacent to the landfill.

25. COMMENT: Have you determined to what depth wastes were deposited in the landfill? Are wastes in direct contact with the ground water?

RESPONSE: Aerial photographs of the area taken during the 1950s did not indicate that the borrow pit was excavated to the ground-water table. NJDEP did not install borings or monitoring wells through the landfill, so the exact depth of the waste and the exact depth of the ground-water beneath the waste is not known. However, monitoring wells MW-3 and MW-16 were installed in the pit 10 feet from the edge of the landfill, and the depth to ground water in these wells is 15 feet. The bottom of the pit adjacent to the landfill is most likely the lower limit for the deposition of any waste in the landfill. Since the depth to ground water is 15 feet below this level, this suggests that the waste is not in contact with ground water, and that there is a 15 feet unsaturated zone between the waste in the landfill and the ground-water table.

26. COMMENT: Has the NJDEP taken into consideration the 36-inch natural gas pipeline that runs between the landfill and the NJ Turnpike?

RESPONSE: Yes. NJDEP has contacted the Colonial Pipeline Company, the owner of the pipeline. They are willing to work with the NJDEP and ensure that

remedial activities are done safely to avoid rupturing the pipeline.

27. **COMMENT:** How might a resident get exposed to the contaminated ground water?

RESPONSE: Exposure to contaminated ground water could occur by ingesting and/or inhaling chemicals in the contaminated portion of the Old Bridge Aquifer. Residents with private wells in the contaminated portion of the Old Bridge Aquifer may be exposed by drinking water and/or showering.

28. **COMMENT:** How close to Manalapan Brook and Thompson Lake did you test the ground water?

RESPONSE: Ground water from a natural spring in Thompson Park was tested on May 26, 1993. The spring is 1,000 feet west of Manalapan Brook and 1,000 feet south of Lake Manalapan. No contamination above the NJGWQC was found in the ground-water sample.

29. **COMMENT:** What levels of contamination exists immediately across Cranbury-South River Road?

RESPONSE: The maximum contamination east of Cranbury-South River Road was in monitoring well MW-6D at 890 ppb of acetone. The NJGWQC for acetone is 700 ppb. For a full review of all chemicals found in MW-6D, please refer to the RI/FS report.

30. **COMMENT:** What is the next step in the Superfund process? Who selects the remedy?

RESPONSE: After the public comment period is over, NJDEP will review the comments received and respond to them in the Responsiveness Summary. The Responsiveness Summary is part of the Record of Decision. The Record of Decision selects the remedy after considering all the comments received. It is a formal decision document which is signed by EPA, with NJDEP concurrence. Once this document is signed, NJDEP will approach the PRPs and offer them a chance to implement the remedy. If they refuse, NJDEP will implement the remedy and sue the parties for three times the cost of the remediation (treble damages). Once it is determined who will go ahead with the

remediation, the Design Phase begins. This could take a year or more. Construction of the actual remedy may take two years or so. Of course, there may be delays in any phase depending on weather, unforeseen circumstances, etc. Optimistically, the soonest the pump and treat of the ground water would begin is approximately two years from now.

31. COMMENT: Are there any current health risks or hazards associated with the landfill right now, other than the ground water?

RESPONSE: The results of the Baseline Risk Assessment indicate that the landfill itself does not pose a risk to human health. However, the Baseline Risk Assessment does show a risk associated with the ground water.

32. COMMENT: Who will oversee the construction of the remedy to ensure that it is performed correctly?

RESPONSE: If PRPs conduct the remediation, there will be government oversight during all phases. If public funds are used, the NJDEP will hire all the consultants and contractors, and will have daily on-site presence during the construction. EPA will also oversee this as well.

33. COMMENT: Will the construction contract for remediation go to local contractors?

RESPONSE: If NJDEP conducts the remedial action, NJDEP is required to have open competitive bidding for the work. Therefore, engineering firms from other states are also eligible to bid for the work. Most contracts are generally awarded to New Jersey firms.

34. COMMENT: Who are the PRPs involved in JIS?

RESPONSE: At this time, the following parties are considered PRPs by NJDEP. PRPs include generators and transporters of hazardous waste disposed at the landfill, as well as the owner and operator of the JIS Landfill.

American Standard, Inc.
Applied Bioscience International, Inc.

BASF Corporation
Beatrice Foods Company
Bio/dynamics, Inc.
Cities Services Company
Columbian Chemical Company
Columbian Carbon Company
Covino Trucking Company
Delco Remy Div. of General Motors
Dow Jones and Company, Inc.
FMC Corporation
Frederick H. Levey Company, Inc.
General Electric Company
General Motors Corporation
Hartz Mountain Corporation
Helme Tobacco Company
Higgins Disposal Service, Inc.
J.I.S. Industrial Service Company
J.I.S. Industrial Service Corp.
Johnson & Johnson, Inc.
Mobil Oil Corporation
Mobil Research & Development Corp.
Occidental Petroleum Corporation
Ortho Pharmaceutical Corp.
Patterson Sargent Company
Phelps Dodge Corp.
Revlon, Inc.
Ronnie Packaging Company
Shell Chemical Company
Shell Oil Company
Squibb Corp.
Teledyne Packaging/Turner Tube
Textron, Inc.
Thor Metals Company, Inc.
Triangle Industries, Inc.
Triangle PWC
Triangle Pipe and Tube Co., Inc.
Warner Lambert Co.
Webcraft Packaging
Webcraft Technologies, Inc.
Container Corporation of America

Index of Written Comments Received

Borrus, Goldin, Foley Vignuolo, Hyman & Stahl;	Received 12/9/94
Township of Monroe, Environmental Commission;	Received 12/26/94
Hartz Mountain Corporation;	Received 12/27/94
Lorraine Orlando, William & Joan Herig, Stuart & Mary Ann Hagerty, Residents;	Received 12/27/94
Victor F. Janas, Resident;	Received 1/30/95
A-Z Environmental, Inc.;	Received 2/3/95
Environmental Resources Management, Inc.;	Received 2/6/95

Summary of Written Comments

Comments received from Borus, Goldin, Foley, Vignuolo, Hyman & Stahl representing JIS Industrial Services, Inc.

35. **COMMENT:** The Public Notice advertisement had a limited description of the Site Background and Current Status.

RESPONSE: Space limitations in the advertisement made a brief description of the Site Background and Current Status necessary. The purpose of this description is to give the reader a general overview of the site.

36. **COMMENT:** On October 30, 1985, JIS submitted to NJDEP a report prepared by French and Parrello Associates concerning the closure and capping of the JIS Landfill. The report concluded that, based on their field testing and inspections, the landfill closure conformed to NJDEP regulations. On November 26, 1985, Richard Gauck of Van Note-Harvey Associates confirmed the installation of the clay cap overlined [sic] with six inches of topsoil, with required permeability and thickness. Numerous requests were made to NJDEP to inspect and acceptance of the cap and closure. No response was received.

RESPONSE: These efforts by French & Parrello Associates, as well as all other efforts by other firms hired by JIS regarding the cap construction and integrity, are summarized and evaluated in great detail in Section 6.0 of the RI. This section of the RI provides all of the concerns and problems with the results of those reports. In addition, Black & Veatch performed their own field investigation and engineering evaluation of the landfill cap.

37. **COMMENT:** We request that NJDEP compare JIS Landfill with the closure at Monroe Township, South Brunswick (BFI), and Jackson landfills, where NJDEP-approved closure requirements were less stringent. The Spillatore Landfill was not covered at all. The same "liberality" applied to these landfills should apply to JIS Landfill.

RESPONSE: Remedies at NPL sites are selected on a site-specific basis. Of the landfills mentioned, all are on the NPL except the Spillatore Landfill.

Volatile organic compounds (VOCs) are the predominant contaminants at each of these landfills. The ground-water contamination at JIS is between 1 and 3 orders of magnitude greater [10 to 30 times greater] than the contamination at the Monroe, South Brunswick, and Jackson Landfills. Consequently, the preferred alternatives for the JIS Landfill Site included a ground-water remedy to address the contamination and upgrading the existing cap. In order for the ground-water remedy to be effective, the existing cap needs to be upgraded to minimize the infiltration of rainwater through the wastes in the landfill. The RI estimated that the infiltration rate of the existing cap is 3.3 million gallons per year. Upgrading the cap would virtually eliminate infiltration.

38. COMMENT: The proposed remediation of the JIS Landfill involves an area adjacent to the NJ Turnpike in which the Colonial Pipeline has an existing right-of-way for the maintenance of a 36-inch natural gas pipeline. The proposed remedy could have dangerous consequences in the disturbance of the existing pipeline. This area should be avoided.

RESPONSE: The Colonial Pipeline Company is aware of the preferred remedial action. They do not have any objections to the remedy outlined by the proposed plan as outlined at the public meeting and the Proposed Plan. The company requested that they be kept informed with the progress of the remediation effort.

Regarding the issue of risk associated with remedial activities close to the pipeline, the NJDEP will work closely with Colonial Pipeline Company to ensure safety.

39. COMMENT: In August 1984, JIS retained J.E. Rhodes Consulting Engineers for the purpose of oversight of the ground-water remediation project. In February 1985, the firm of Paulus, Sokolowski and Sartar completed an aquifer test for the project. One of the conclusions of the study suggested that contamination was being drawn to the site from off-site sources. NJDEP never followed up on the recommendation that monitoring wells be installed off the JIS property across from the NJ Turnpike to monitor ground-water contamination there.

Black & Veatch did not investigate this area and upgradient of JIS. All of these reasons support our request that you use reason and deliberate judgment in determining whether further remediation is necessary at this time.

RESPONSE: NJDEP considered the recommendation and installed four upgradient monitoring wells off the site across the NJ Turnpike: MW-1S, MW-1D, MW-14S, and MW-14D. These wells were sampled and are clean, indicating that no ground-water contamination is moving onto the site from any upgradient sources across the NJ Turnpike.

40. COMMENT: Is NJDEP presently investigating Black & Veatch for past performance and reasonableness of invoices?

RESPONSE: See RESPONSE/COMMENT 1.

41. COMMENT: In July 1986, Mr. Rhodes completed the design of a ground-water treatment facility for JIS. The facilities were constructed and ready for operation. A treatment system remained available for immediate use in site remediation. Its use would have dramatically reduced the off-site migration of any contamination now alleged. Despite the above action taken by JIS, at its expense, NJDEP undertook the RI/FS which resulted in the present public meeting.

RESPONSE: JIS hired J.E. Rhodes to perform a pilot scale air stripping test--a full scale ground-water treatment system was never constructed or operated. However, the NJDEP and EPA never prohibited JIS or other PRPs from implementing Intermediate Remedial Measures (IRMs) at their own expense. Regardless of whether they implemented IRMs or not, NJDEP and EPA were obligated under CERCLA to proceed with the RI to characterize the nature and extent of the contamination if PRPs chose not to.

42. COMMENT: Recent on-site (JIS) monitoring well results show no detectable VOCs above acceptable limits. We question the need for expensive remediation.

RESPONSE: JIS has not submitted any ground-water sampling and analytical information to NJDEP to verify the

results. We do not know the location of the wells from which the samples were taken. The wells could be located sidegradient from the contaminant plume, which would explain why no contamination was detected. We also do not know what chemicals the samples were analyzed for, whether the analytical methods were equivalent to NJDEP's, and whether the sampling followed NJDEP's Quality Assurance and Quality Control (QA/QC) protocol. JIS did not sample any of the NJDEP wells, therefore a comparison can not be made. The RI sampling indicates significant ground-water contamination above Federal and/or New Jersey Safe Drinking Water Act Maximum Contaminant Levels (MCLs) at the site, justifying the need for a remedial action.

43. COMMENT: The assumptions regarding ground-water contamination are stale and date back to sampling performed in July 1991. Out-of-date sampling results should not form the basis for the present remediation plan which is duplicative, expensive, and unnecessary.

RESPONSE: The data is not considered "stale" by NJDEP and EPA. The Proposed Plan is based on RI data collected between 1988 and 1991, plus additional data collected from Hydropunch and potable well samples collected during 1993. All of this data was collected and analyzed in accordance with EPA and NJDEP QA/QC requirements. Also, additional sampling will be conducted in the future during the Design/Construction phases, and a long-term monitoring program will start at the completion of the construction phase. Data collected during these activities may be used to suggest modifications to remedial activities at the site, if warranted.

44. COMMENT: The NJDEP approved the remediation of the Jackson Township Landfill which was larger and without a cap and involved a greater risk to surrounding residences than JIS. Why is the NJDEP requiring a much more stringent remediation plan for JIS? We request that NJDEP utilize the information and test results available to consider a discontinuance of any further remedial action in connection with this project, which will only serve to unnecessarily increase the costs associated with the RI/FS [sic].

RESPONSE: The ground-water quality at the Jackson Landfill meets the State's ground-water standards. In other words, there was no ground-water contamination, and consequently, no risk. A soil cap was placed on the site, since contaminants were not migrating into the ground water. The ROD called for "no further action".

In contrast to Jackson Landfill, ground-water contamination at JIS Landfill poses an unacceptable risk to human health and the environment, therefore, a remedial action is required.

Comments received from Monroe Township Environmental Commission

45. COMMENT: The Environmental Commission of Monroe Township supports the NJDEP and EPA proposed recommendations concerning the JIS Landfill site: Source Control Alternative SC-6 (Modified NJDEP Hazardous Waste Cap), and Ground-Water Alternative 4 (Primary Plume Capture and Treatment, and Provision of Alternative Water Supply). The proposed remedy offers practical, permanent solutions, yet remain open to the possibility of having to take more aggressive action.

RESPONSE: The NJDEP appreciates the support of the Environmental Commission of Monroe Township.

Comments received from Hartz Mountain Industries

46. COMMENT: The Modified NJDEP Hazardous Waste Cap is estimated to eliminate approximately 99.9% of infiltration into the landfill. NJDEP also evaluated repair of the 1977 Cap, and upgrading the 1977 Cap (Augmented 1977 Cap). The 1977 Cap will eliminate approximately 92% of the infiltration; the Augmented 1977 Cap will eliminate 94% of the infiltration. No cost benefit or risk/benefit analysis has been performed to determine whether the additional 1 to 1.4 million dollar cost of the preferred remedy is justified by the marginal (5 to 7%) decrease in infiltration into the landfill.

RESPONSE: Cost effectiveness was considered in the selection of the preferred alternatives. The Modified NJDEP Hazardous Waste Cap is the preferred alternative because it provides the greatest reduction in

infiltration and it is light in weight. Minimizing the infiltration rate makes the groundwater remedy more effective. Although the 1977 Cap and the Augmented 1977 Cap both offer greater than 91% reduction in infiltration, the Modified NJDEP Hazardous Waste Cap was selected among the source control alternatives because it protects against freeze and thaw damage, offering greater long-term effectiveness and reliability than the 1977 Cap and the Augmented 1977 Cap. (See COMMENT/RESPONSE 49 for a discussion on risk/benefit analysis).

47. COMMENT: Any final decision on remedy selection and implementation should be held off until the reauthorization of CERCLA. The reauthorization may change the assumptions and legislative guidelines on which NJDEP's proposed remedy is based. This would eliminate the need to revisit these issues at a later time.

RESPONSE: There is no authority to defer remedy selection at an NPL site until Congress reauthorizes CERCLA. The timing of reauthorization is not certain.

48. COMMENT: Given that the 1977 cap does exist, and is likely to be upgraded, simple placement of a synthetic liner over the 1977 cap may accomplish the same purpose as the Modified Hazardous Waste Cap at a lower cost. This alternative should be evaluated before any decision is made.

RESPONSE: While the simple placement of a synthetic liner over the existing cap may improve impermeability, it is not a sufficient remedy in and of itself. Protection of a synthetic liner and the clay layer below it can only be attained by appropriate surface water drainage and frost protection layers that are called for in the preferred remedy. The reason the existing cap is in such bad shape is the lack of adequate cover material over the clay. This has lead to degradation by the elements from improper surface drainage, the inability for vegetation to grow on the cap, and freeze and thaw action.

49. COMMENT: A risk/benefit analysis should be performed to determine whether the incremental elimination of health risk justifies the anticipated high capital

expenditure associated with active ground-water remediation.

RESPONSE: The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) do not require risk/benefit analyses. However, they do require remedies selected at NPL sites to be cost-effective. In addition, CERCLA and the NCP do indicate that cleanup is necessary when the excess cancer risk associated with an NPL site exceeds the acceptable risk range of between 10^{-4} and 10^{-6} risk. The excess cancer risk associated with this site is 3×10^{-3}, which is outside the acceptable range, therefore, requiring a remedial response. NJDEP has evaluated the risk to human health and the environment in the Baseline Risk Assessment and evaluation of the various costs of different remedial alternatives in the Feasibility Study as required by CERCLA and the NCP, and have proposed the most cost-effective remedy.

50. COMMENT: Any ground-water remediation selection abide [sic] installation of the selected cap, and evaluation of its source control effectiveness. Once the source has been minimized or eliminated, natural attenuation may address ground-water contamination in the primary and secondary plume, thereby minimizing or eliminating the need for capital intensive ground-water remediation. CERCLA requires reevaluation of any remedy every five years, so continued monitoring will be an integral part of any capping remedy. We believe that the foregoing approach is sound, since all potable uses of the contaminated portion of the aquifer have been eliminated; well restrictions will be imposed on any future use; and no ongoing threat to public health or the environment presently exists.

RESPONSE: The capping remedy, in and of itself, would not adequately protect human health and the environment because contaminants in the ground water would continue to migrate off site. Contaminant levels in the primary plume are significantly above MCLs. Not implementing a ground-water remedy would not reduce the risks to downgradient users of ground water since there are no restrictions prohibiting the use of the Old Bridge Aquifer as a source of drinking water. In

addition, the high levels of metals contamination in the primary plume are not likely to naturally attenuate.

Comments received from Lorraine Orlando, William & Joan Herig, Stuart & Mary Ann Hagerty; Residents

51. COMMENT: Our drinking water wells were contaminated. We independently paid to have our water tested and pressured local governing boards to investigate and to check the direction and quality of the ground water. We gave up using the wells and bought water into our homes for drinking. We continued our pleas to out township for municipal hook up to avoid using our wells. Finally, in 1982, water service was brought into our area, costing each of us over $1,500 in expenses to hook up to the water line. We support any efforts by NJDEP to improve the situation at the site. We have suffered as a result of hazardous dumping that went unchecked at the JIS Landfill and incurred prematurely great expense to protect our families. We feel some compensation is due since we were affected by this terrible landfill and should be made at this time. We look to the Superfund for relief.

RESPONSE: The New Jersey Spill Compensation Fund and/or the Sanitary Landfill Closure Fund both provide for compensation to people who suffered damages from hazardous waste sites, spills or landfills. However, there are specific rules governing these funds. You may contact the NJDEP Environmental Claims Administration at (609) 633-2947 for more information.

Comments submitted by Victor F. Janas, a resident

52. COMMENT: What are the exact locations of monitoring wells DGW 9, 10 and 11?

RESPONSE: These wells are not monitoring wells, but private wells. All three wells were sampled once and have since been sealed or abandoned and thus are inaccessible for further sampling. DGW 9 was located at 109 Bordentown-South Amboy Turnpike; DGW 10 was located at 106 Bordentown-South Amboy Turnpike; and DGW 11 was located at 33 Bordentown-South Amboy Turnpike.

53. COMMENT: When were monitoring wells DGW 9, 10 & 11 tested, and for what parameters? What are the levels of contamination detected?

RESPONSE: These three wells were sampled on March 14, 1991 for total metals and volatile organic compounds. VOC concentrations ranged from 1-47.1 parts per million (ppm) in DGW 9; no VOCs were detected in DGW 10; and VOC levels ranged from 0.9-1.9 ppm in DGW 11. The concentrations of metals detected ranged from: 5.6-10,600 ppm in DGW 9; 3.8-408 ppm in DGW 10; and 4.8-49.7 ppm in DGW 11. The levels of metals detected in DGW 10 and 11 are not a concern because they are below health-based levels. For details of the analytical results of this sampling, please see the RI/FS.

54. COMMENT: Have DGW 9, 10 & 11 been sampled more than once? If so, are the levels of contamination increasing, decreasing or staying constant with time?

RESPONSE: DWG 9, 10, and 11 were sampled only once, during the RI. These private wells were subsequently closed; therefore, a trend cannot be determined.

55. COMMENT: Between 1984 and 1988, the Monroe Township Health Department found contamination in the wells of residents in the vicinity of Bordentown Turnpike. Have these wells been monitored since? If yes, are the levels increasing, decreasing, or remaining the same?

RESPONSE: From 1984 to 1988, the Monroe Township Health Department sampled private water supply wells for the township residents. Many of the residents in the vicinity of Bordentown Turnpike, downgradient from the landfill, had contaminated drinking water. EPA provided these residents with bottled water from June 6, 1989 until they were permanently connected to the municipal water system in February 1992. The contaminated private wells were closed and were not accessible for subsequent sampling. Therefore, a trend cannot be determined.

56. COMMENT: At the December 7, 1994 public meeting, a representative of JIS said he has his own test results indicating that either there is no problem, or the problem has been blown out of

proportion by the NJDEP consultant, or that the problem was not caused by JIS, but by other companies in the area. Mr. Putnam indicated that he was unaware of the data, though the JIS representative indicated he had tried to get NJDEP to look at it. Was the data available as Mr. Jones indicated and, if so, why was this data dismissed by the NJDEP? Where can a copy of JIS's test procedures and results be obtained?

RESPONSE: During the RI, Mr. Jones did submit some limited ground-water data which included total dissolved solids, biochemical oxygen demand, chemical oxygen demand, chloride, and concentrations of a few select metals and chemicals. We do not know whether the samples were collected in accordance with the appropriate protocols, or whether the results complied with NJDEP's QA/QC requirements. NJDEP told Mr. Jones that this data was not useful for the RI because it did not contain information on the full range of contaminants in the ground water.

NJDEP installed monitoring wells upgradient from the JIS Landfill. Sampling results of these wells do not indicate that upgradient industrial sources are contributing to the ground-water contamination at JIS.

All NJDEP test procedures and results are available in the Phase I and Phase II RI reports for the JIS Landfill. NJDEP does not have all of the JIS data. To get a copy of JIS's test procedures and results, you need to contact Mr. Jones directly.

57. COMMENT: Water has been observed bubbling up in the basement of homes in the "Meadows at Monroe" development in Monroe Township after severe rain storms. Could this water be contaminated? Will residents who collect this water and have it tested by an independent lab be reimbursed for the cost?

RESPONSE: Because the basements at the "Meadows at Monroe" development flood only after severe rainstorms and not at other times, NJDEP believes that the water is most likely rainwater due to poor drainage, and is not related to the JIS Landfill. NJDEP does not believe this water is contaminated because the "Meadows at Monroe" development are located

sidegradient from the contamination plume. In addition, no VOC contamination was found in Downgradient Well DGW 10, which is the closest well to the "Meadows at Monroe" development. NJDEP will not reimburse residents for the cost of sampling this water. We suggest that residents contact the local health department regarding the testing of this water.

58. COMMENT: How thick is the affected aquifer under the "Meadows at Monroe" development? Are sewer and water lines for this development sitting in the aquifer? How far below the houses does the contamination lie?

RESPONSE: The Old Bridge Aquifer is between 70 to 90 feet thick. NJDEP does not know where the sewer pipes and water lines are located in relation to the ground-water table at the "Meadows at Monroe" development. As explained in the previous response, NJDEP does not believe that the ground water underneath the Meadows at Monroe development is contaminated.

59. COMMENT: Will the NJDEP test the area of the "Meadows at Monroe" development to determine/confirm the depth and/or level of contamination below this development? To which state agency could a resident of this development make such a request?

RESPONSE: Because NJDEP does not have any indication on ground-water contamination based on sampling data from Downgradient Well DGW 10, there is no need to test the ground water beneath the "Meadows at Monroe" development.

60. COMMENT: Alternative SC-6 requires a waiver of the capping requirements of the Resource Recovery and Conservation Act (RCRA) Subtitle C and New Jersey Hazardous Waste Landfill Closure Regulations (NJAC 7:26-10.8(i)2). Is this design with a similar waiver being used anywhere in the United States? Is this design considered experimental?

RESPONSE: The cap design preferred for the JIS Landfill is not experimental. Very similar capping systems are being designed for other landfill sites on the NPL in New Jersey. The cap outlined for the JIS Landfill in the Proposed Plan used the Global

Landfill cap as its model. A waiver of the capping requirements of New Jersey Hazardous Waste Landfill Closure Regulations (NJAC 7:26-10.8(i) 2) was invoked in the 1991 Record of Decision for the Global Landfill.

61. COMMENT: Will Alternative GW-4 capture and treat the leachate that continues to leach from the landfill after it is capped? How long will the landfill waste continue to leach into the aquifer after the cap is completed?

RESPONSE: Alternative GW-4 will capture and treat all of the contaminated ground water in the primary plume. Alterative SC-6, the modified NJDEP Hazardous Waste Cap, will decrease the permeability of the existing cap, resulting in a decrease in the amount of rainwater infiltrating into the landfill, eventually drying it out, and eliminating the leachate source. During the design, an estimate will be made to determine how long it will take for the cap/pump and treat system to remediate the primary plume. However, this value cannot be accurately estimated at this time.

62. COMMENT: If CERCLA requires a No Action alternative be evaluated for comparison of other alternatives, why doesn't it require the comparative evaluation of upper end alternatives such as GW-7, capture of the entire ground-water plume? What is the standard dollar amount used to determine if an alternative is too costly?

RESPONSE: CERCLA requires that a No Action alternative be evaluated at every site to establish a baseline for comparison to the other alternatives.

There is no standard dollar amount used to determine if an alternative is too costly. Each alternative is evaluated according to its effectiveness.

Cost was not the only problem with the entire plume capture remedy. The concerns with entire plume capture were also technical efficiency and practicality. Capture and treatment of the entire plume would require extracting a large volume of water at relatively low levels of contamination that will likely naturally attenuate. However,

NJDEP will be further monitoring the secondary plume. Active aquifer restoration alternatives will be evaluated to address the contamination in the secondary plume should the time period to achieve the cleanup levels exceed NJDEP's and EPA's expectations, or in the event that natural attenuation is found to be no longer protective of human health and the environment.

63. COMMENT: According to the Implementability Criteria for Alternative Evaluation, the steepness of the landfill sideslope and the presence of the 36-inch gas pipeline may make the implementation of SC-6 difficult. Could that section of the landfill be removed and hauled to a properly designed landfill until the steep side slope and pipeline risks are reduced?

RESPONSE: Yes, removing a portion of the landfill is an option, however, removal of the landfill material would be difficult to do. Excavation of material for off-site handling will trigger requirements under the Resource Conservation and Recovery Act (RCRA), which would result in additional effort, added cost, and likely prove impractical due to Land Ban Restrictions under RCRA. It is generally against NJDEP policy to dig up a problem and just move it to another location.

If the steepness of the landfill sideslope makes it impossible to implement the remediation as proposed, the NJDEP will pursue rerouting the pipeline.

64. COMMENT: I do not agree that the NJDEP is handling this site in a timely manner, as was stated at the December 7, 1994 public meeting given that the problem was first discovered in 1975.

RESPONSE: See COMMENT/RESPONSE 13.

Comments received from A-Z Environmental, Inc., representing Mr. Donald Jones and JIS Landfill

65. COMMENT: Water quality is measured routinely in four existing on-site JIS monitoring wells since 1976 as part of the New Jersey Pollution Discharge Elimination System (NJPDES) permit. Assuming, historically, that the sampling data from the

monitoring wells met NJDEP QA/QC criteria, the data should be comparable to those of NJDEP analyses. Was the water quality data from the NJPDES permit and split samples weighed in assessing ground-water quality? If the results from additional tests show a similar pattern, it is doubtful that the pump and treat option will produce a significant improvement in ground-water quality over the background levels. NJDEP should compare the background levels in the immediate vicinity to those found on site and also to the background levels in the vicinity of neighboring industrial sites such as BASF and Phelps-Dodge.

RESPONSE: NJDEP installed four upgradient monitoring wells off the site across the NJ Turnpike to determine background (MW-1S, MW-1D, MW-14S, and MW-14D). These wells were sampled and are clean, indicating that no ground-water contamination is moving onto the site from any upgradient sources across the NJ Turnpike.

With respect to water quality data from the JIS monitoring wells, NJDEP cannot compare the JIS data to the RI data because we cannot assume that the sampling data complied with NJDEP QA/QC requirements. In addition, we do not know the location of the JIS wells that were sampled.

Water quality data submitted with JIS's NJPDES permit application was not considered in assessing ground-water quality for the site for the following reason. JIS did not submit complete documentation of its ground-water sampling and analysis effort, which was performed in 1982. Therefore, we cannot verify whether the sampling was performed in accordance with NJDEP protocols, or whether the sampling results complied with NJDEP QA/QC requirements.

66. COMMENT: Was the source and nature of the green color in the ground water from MW-18I ever identified?

RESPONSE: The green color in the ground water is fluorescein dye. This dye was reported to have been used in a ground-water tracer test at JIS in the early 1960s. It is not considered hazardous.

67. COMMENT: The water from MW-18I was allegedly pumped into DEP MW-1. Given the relative depth of DEP MW-1,

this pumping may have caused contamination of the deep aquifers and contaminated DEP MW-1.

RESPONSE: MW-18I, sampled during the Phase II Remedial Investigation, contained a total of 15 ppb VOCs. PW-1 was screened in the lower Old Bridge Aquifer. Downgradient of PW-1, and also screened in the Old Bridge, are MW-7D and MW-6D. These wells were also sampled during the Phase II RI and contained, respectively, 299 ppb and 890 ppb total volatile organic compounds. Results from these two wells show that the lower Old Bridge Aquifer, downgradient of PW-1, is much more contaminated than ground water taken from MW-18I. Therefore, the incident which is the subject of this comment would not increase the contamination in that part of the aquifer. See COMMENT/RESPONSE 8.

68. COMMENT: The existing cap was built in 1984 and completed in 1985, when Mr. Jones requested NJDEP approval. However, the request was neither denied nor granted at any time. The finding that the present clay (cap) on the landfill did not meet the NJDEP criteria at the time of construction was never communicated to either Mr. Jones or his consulting engineers.

RESPONSE: The finding that the current cap does not meet current NJDEP criteria was made after the RI was completed in 1993. Mr. Jones was notified that the results of the RI, which included an evaluation of the existing landfill cap, were available. The RI report and data were placed in the information repositories in September 1993.

Even if NJDEP had approved the cap in 1985, it would not change the selection of the preferred alternatives. The existing cap is being upgraded to make the ground-water remedy more effective by minimizing the infiltration of rainwater through the wastes in the landfill. The RI estimated that infiltration rate of the existing cap is 3.3 million gallons per year. Upgrading the cap would virtually eliminate infiltration.

69. COMMENT: The finding that the present clay and its thickness does not meet NJDEP criteria contradicts the engineer's report (Van Note-Harvey Associates, November 26, 1985 and April 3, 1987).

RESPONSE: NJDEP reviewed the Van Note-Harvey Associates report and found deficiencies (see Section 6.0 of the RI). NJDEP does not know the nature of the discrepancy between the Van Note-Harvey report and NJDEP's cap evaluation, but believes that the clay and soil layers may have reduced in thickness due to settling and erosion.

70. COMMENT: The NJDEP has not presented any data which supports the claim that the present clay cap is not capable of withstanding freeze and thaw conditions, jeopardizing the cap integrity.

RESPONSE: It is common engineering knowledge that the frost line is between 18 inches and 24 inches below the surface in this region. Freeze and thaw protection less than 18 inches will affect geologic material by creating cracks. The RI confirmed that the existing cap system does not have a uniform minimum of 18 inches of cover material over the clay layer in a large portion of the landfill. Ponded water on the surface is also evidence of improper storm water drainage control.

71. COMMENT: NJDEP should reevaluate the issue of adequacy of the present clay cover, and alternative solutions should be investigated in terms of effectiveness and cost.

RESPONSE: The FS and the Proposed Plan evaluated the adequacy of the existing clay cap; part of the evaluation included effectiveness and cost. The decision to implement the 1977 Solid Waste Cap was based on limited information. Since that time, a thorough investigation has been performed and completed. The results of the investigation concluded that the waste disposed of at the site would be considered hazardous under current standards.

72. COMMENT: The ground-water contamination plume has migrated at the rate of 1.2 feet per day (ft/day) and is therefore 1.4 miles off site since its discovery, not 12 miles as reported by the NJDEP.

RESPONSE: NJDEP did not report that the ground-water contamination plume is 12 miles from the JIS Landfill site. A member in the audience at the public meeting incorrectly stated that the plume

extended 12 miles. By straight calculation, assuming that landfilling operations began in 1965, the plume should extend approximately 2.5 miles from the landfill at this time. However, this has not been verified by ground-water sampling data.

Comments received from Environmental Resources Management, consultant for committee of potentially responsible parties.

73. COMMENT: JIS is erroneously linked to contamination of domestic wells. The distribution and types of compounds point to a local source near the domestic wells.

i. There is no rational basis for attributing chemical constituents in the domestic wells to JIS in view of the low concentrations of chemical constituents in the off-site monitoring wells at JIS.

ii. The higher concentrations of chlorinated organic compounds in the domestic wells indicate that there is a local source in the vicinity of the Bordentown Turnpike.

iii. The presence of similar constituents at JIS and in the domestic wells does not demonstrate a correlation between the two occurrences.

iv. Acetone, methylene chloride and chloroform detections in the monitoring wells could result from contamination in the laboratory by these common laboratory contaminants. The RI and Baseline Risk Assessment do not acknowledge this possibility. During the earlier NJDEP investigations, laboratory blanks were not included, which would have allowed laboratory contaminants to be identified. The lack of the blanks departs from accepted laboratory practices.

v. An analysis of the historical data using ground-water modelling demonstrates that JIS could not have been the source of contamination reported in the domestic wells.

RESPONSE: The following discussion explains the rationale why NJDEP believes that the contamination in the domestic wells is attributed to JIS.

i. NJDEP believes there is a rational basis for attributing the contamination in the domestic wells to JIS Landfill. The landfill began operating in 1962, and capped between 1980 and 1985. NJDEP believes that ground-water contamination detected in downgradient private wells is the result of contaminant migration from the JIS Landfill prior to capping, especially since the contaminants in the downgradient private wells are similar to the contaminants detected in the primary plume.

ii. NJDEP believes that the higher concentration of contaminants in downgradient private wells originated from JIS over the 18 years of its operation. This is demonstrated in the Secondary Plume Model in the RI (see Figure 5-10 of the RI).

iii. Twenty-one VOCs were detected in the ground water at JIS and 22 in the residential wells. Of the 22, 18 VOCs were also detected in the ground water at JIS. This is a very high correlation.

iv. Laboratory and field blanks were used during all phases of the RI (see Tables 4-5 and 4-10 in the RI report). Where the monitoring well results were less than three times the amount found in the associated field and/or lab blanks, the results were negated. In addition, when concentrations are between 3 and 5 times the blank concentration, or greater than 5 times the blank concentrations, then the sample result is designated as "qualified" or "real," respectively. Both "qualified" and "real" data are usable. This occurred in several samples where methylene chloride and acetone were found, but no chloroform results were negated.

v. No information was provided on the ground-water model that was used, the inputs, variables, and parameters. Therefore, NJDEP cannot comment on the accuracy of the model.

74. COMMENT: NJDEP's ground-water modeling results are inconclusive and biased.

RESPONSE: While the ground-water modeling performed by NJDEP's contractor was based on limited information, NJDEP believes that the results are indicative of the existing conditions. In addition, monitoring wells will be installed in

the area of the secondary plume during remedial design, and the additional data from these new wells should further refine the ground-water model at the site. Regardless, the results of the model are not driving the selection of the preferred remedy of the cap upgrade and primary plume pump and treat.

75. COMMENT: NJDEP has over stated the contaminant migration rate. A fluorescein dye tracer study was performed at JIS Landfill by the New Jersey Bureau of Public Health and Engineering from May 1958 to May 1959. Data shows that the fluorescein dye has migrated only 1,200 feet in approximately 33 years. This slow migration rate suggests that any constituents migrating from JIS could not have reached the domestic wells since the landfill opened.

RESPONSE: The data do not show that the dye has migrated only 1,200 feet, but that it has migrated at least 1,200 feet. Fluorescein dye was found in MW-18I, which is 1,200 feet from the landfill. Since there presently are no monitoring wells located more than 1,200 feet downgradient from the landfill, there is no way of knowing how far the dye has actually moved. Furthermore, we do not know whether there have been subsequent fluorescein dye tests.

76. COMMENT: NJDEP uses different ground-water flow directions in arriving at its conclusions. NJDEP erroneously concluded that ground water flowing from JIS in a south-southeasterly direction could have reached DGW 7 and the Iadeveia Nursery which are located due east of JIS. Low concentrations in the nursery well could indicate that the pumping well may be recovering clean water from the direction of JIS (from the west) and contaminated water from the domestic well area to the east. The lower concentrations could be the result of mixing of water drawn from these two directions.

RESPONSE: The general ground-water flow is in a south-southeasterly direction. However, localized lateral dispersion of the ground-water plume (to the northeast) as it progresses in a southeasterly direction, may have caused the contamination in the Iadeveia well. In addition, heavy pumping over the years for irrigation at the Iadeveia

nursery (and possibly other area nurseries) could have pulled the contaminant plume towards the north. This conclusion is based on NJDEP's technical evaluation of the data available. JIS has not provided any ground-water data that proves an error was made.

77. **COMMENT:** Concentration trends in Mr. Smith Jr.'s and nearby domestic wells suggest a nearby source of chemical constituents. NJDEP has not conducted a comprehensive investigation to identify potential sources of contamination reported in the domestic wells. NJDEP ignored the fact that there are several potential chemical constituent sources in the vicinity of the domestic wells, including: Mott Avenue Landfill, Iadeveia/Schneider Landfill, Fabcoa, former septic tank scavenger (Sanfords), and Mr. Smith Senior, who has been cited by the Middlesex county Health Department for illegally dumping wastes on his property.

RESPONSE: A comprehensive investigation was conducted by the NJDEP from 1984 to 1989 into the source of the pollution found in private wells at the Smith residence. The investigation included all of the potential sources mentioned. NJDEP concluded that the JIS Landfill was the source of the contamination in those wells based on its review of the information gathered during the investigation. Ground-water modelling in the RI indicated that JIS Landfill is the likely source of contamination in the secondary plume.

NJDEP does not believe that the contamination at DGW 11 is attributable to the Mott Avenue Landfill because DGW 11 is located sidegradient from the Mott Avenue Landfill. The Iadeveia/Schneider Landfill is located between DGW 8 and DGW 9. DGW 8 and DGW 9 are sidegradient from the Iadeveia/ Schneider Landfill, therefore, contamination in these wells is not attributable to the Iadeveia/ Schneider Landfill.

78. **COMMENT:** The 1977 Solid Waste Cap provides adequate protection.

a. The capping alternatives for a solid waste landfill are applicable to the JIS site.

b. The capping requirements in the Proposed Plan are not consistent with the FS report.

c. The estimated costs for the potential retaining wall along the NJ Turnpike edge of the site are unrealistically high, and should be reevaluated and documented by NJDEP.

RESPONSE:

a. NJDEP and EPA believe that the Modified NJDEP Hazardous Waste Cap is the appropriate cover system for the JIS Landfill site. The Modified NJDEP Hazardous Waste Cap is the preferred alternative because it provides the greatest reduction in infiltration and is light in weight. In addition, hazardous wastes were disposed at the JIS Landfill.

b. The capping requirements in the Proposed Plan differ slightly from the capping requirements in the FS because the cap designs in the FS considered recompacting the existing clay layer. The capping requirements in the Proposed Plan reflect cap design requirements specified by NJDEP and EPA guidelines for landfill closure, which assume that no cap exists. The capping alternatives in the Proposed Plan show the differences in the clay layers among the various caps, which allow for a technical comparison of cap components.

c. The cost for the potential retaining wall will be reevaluated during the design phase of the project. If the cost is overly conservative, the results would be that the alternative is more cost effective and therefore, supportable.

79. COMMENT: NJDEP's selection of the ground water treatment components is premature. The ground-water treatment system should not be finalized until treatability studies have been completed. A review of the ground-water chemistry indicates that the metals precipitation may not be necessary.

RESPONSE: The ground-water treatment system design is not finalized, and may be adjusted in the design phase if warranted.

80. **COMMENT:** NJDEP has overstated the level of risk.

a. The Risk Assessment erroneously fails to take into account decreases in contaminant concentrations between 1988 and 1991.

b. Neither degradation nor fate and transport mechanisms are accounted for.

c. Risk is grossly overestimated due to reliance on data which is not representative of the site.

d. Many constituents identified are common laboratory contaminants present at less than ten times the laboratory blanks or blanks were not included with samples.

e. The Risk Assessment erroneously incorporates data from domestic wells which are not linked to JIS.

RESPONSE:

a. The risk assessment for the JIS Landfill site was conducted in accordance with EPA's Risk Assessment Guidance for Superfund, which does not require a trend analysis to be taken into consideration to determine risk. The selection of the preferred alternative, which actively remediates the primary plume, did take into consideration the fact that contaminant concentrations appear to decrease in concentration with distance from the landfill, and that over time the contaminant concentration within the secondary plume will decrease through natural attenuation.

b. See response to (a) above.

c. Downgradient private well data used in the Baseline Risk Assessment is representative of the ground-water contamination that an off-site resident may be exposed. Risk assessments are inherently conservative, and consequently, may overestimate the level of risk.

d. While some constituents identified are lab contaminants, they are also contaminants that may have been disposed of at the landfill site. The "10 times" criteria mentioned is not used by the NJDEP in evaluating data.

NJDEP uses the "5 times" criteria as previously stated.

e. NJDEP and EPA believe that private well contamination is attributable to the JIS Landfill site, and therefore, it is appropriate to use this data in the Baseline Risk Assessment.

81. COMMENT: There are significant errors in the Proposed Plan:

a. The only confirmed concentration reported for copper is 30.4 ppb in upgradient well MW-14S. All other reported levels in downgradient wells are labelled with a "B" qualifier indicating the data is invalid. Based on this information, copper should not be identified as a ground-water contaminant in the primary plume.

b. NJDEP erroneously concluded that lead was a major contaminant at the JIS site. The lead concentration detected in upgradient well MW-14S (16.5 ppb) exceeds the range of lead levels detected in all wells located within the primary plume (13.5 to 3.3 ppb) except for the total lead concentration detected at well MW-5 (90 ppb), located approximately 400 feet downgradient of the landfill. Also, lead was not detected in the sample collected from well MW-5, which was analyzed for dissolved lead. Total lead analyses include lead sorbed to suspended soil particles collected in ground-water samples from monitoring wells which have not been extensively developed to remove particulate matter. As a result, total lead analyses for samples from monitoring wells often show elevated concentrations of lead which would not be present in potable water producing wells. In a producing well, dissolved constituents are generally present at much lower concentrations and would be the only constituents of primary concern. Thus, at JIS, the dissolved lead analyses should be the only results considered when judging whether lead concentrations in the ground water are of concern at the site.

c. The Proposed Plan incorrectly states that the highest concentration of total VOCs detected

in the primary plume was 30,558 ppb. This total includes 3,000 ppb of acetone, which was "B" qualified. This value is invalid and should not be included in the summation of organic compounds. The highest concentration should be 27,558 ppb.

RESPONSE:

a. Copper was found in 10 monitoring wells in the Phase I sampling, with a maximum concentration of 91 ppb in MW-4. "B" qualified data are not invalidated. Copper is not a contaminant of concern at the JIS Landfill site because the levels are below MCLs. However, copper is a contaminant because it is not naturally occurring in the ground water.

b. The NJGWQC for lead (total) is 5 ppb. Fifteen monitoring wells at JIS exceed the NJGWQC for lead, with a maximum of 90 ppb in MW-5. EPA's policy is to use unfiltered ground-water sampling data.

c. The 3,000 ppb of acetone was included in the total concentration of VOCs because "B" qualified results were not negated. A "B" qualified result indicated that the compound was also found in the associated blank, but at a level greater than 3 times the level in the blank. Only an "X" qualified result, indicating that the result was less than 3 times the amount found in the associated blank, was negated. Therefore, the 3,000 ppb of "B" qualified acetone was included in the total VOCs, and the correct number is 30,558 ppb total VOCs.

ROD FACT SHEET

SITE

Name : JIS Landfill Site
Location/State : South Brunswick, New Jersey
EPA Region : II
HRS Score (date): 45.14 (8/17/82)
Site ID # : NJD097400998

ROD

Date Signed: August 15, 1995
Remedy/ies: Containment, treatment, alternative water supply
Operating Unit Number: OU-1 (first and final)
Capital cost: $7.2 million (in 1992 dollars)
Construction Completion: 12/1998 (anticipated)
O & M in 1995-98: $0
1999: $978,300 (in 1992 dollars)
2000-29: $556,900 (in 1992 dollars)
O&M per five-year review: $13,000 (in 1992 dollars)
Present worth: $14.3 MILLION (7% discount rate; 30 years O & M assumed)

LEAD

State Lead (may be PRP lead pending negotiations)
Primary contact (phone): Zoe Kelman (609-633-0769)
Secondary contact (phone): Richard Ho (212-637-4372)
Main PRP(s): JIS Executive Committee
PRP Contact (phone): Carpenter, Bennett & Morrissey 201/628-7711

WASTE

Type: Metals, VOC
Medium: Soil & ground water
Origin: Landfill
Est. quantity: Unquantifiable