Public Health Assessment for

JIS LANDFILL

SOUTH BRUNSWICK, MIDDLESEX COUNTY, NEW JERSEY

CERCLIS NO. NJD097400998

JULY 30, 1990

AMENDED

JUNE 10, 1991

ADDENDUM

AUGUST 25, 1995

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6), and in accordance with our implementing regulations 42 C.F.R. Part 90). In preparing this document ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. The revised document was released for a 30 day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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PUBLIC HEALTH ASSESSMENT ADDENDUM

JIS LANDFILL

SOUTH BRUNSWICK, MIDDLESEX COUNTY, NEW JERSEY

CERCLIS NO. NJD097400998

Prepared By:

New Jersey Department of Health
Environmental Health Service

Under Cooperative Agreement With The
Agency For Toxic Substances And Disease Registry

FOREWORD

The Agency for Toxic Substances and Disease Registry, ATSDR, is an agency of the U.S. Public Health Service. It was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act, also known as the *Superfund* law. This law set up a fund to identify and clean up our country's hazardous waste sites. The Environmental Protection Agency, EPA, and the individual states regulate the investigation and clean up of the sites.

Since 1986, ATSDR has been required by law to conduct a public health assessment at each of the sites on the EPA National Priorities List. The aim of these evaluations is to find out if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced. (The legal definition of a health assessment is included on the inside front cover.) If appropriate, ATSDR also conducts public health assessments when petitioned by concerned individuals. Public health assessments are carried out by environmental and health scientists from ATSDR and from the states with which ATSDR has cooperataive agreements.

Exposure: As the first step in the evaluation, ATSDR scientists review environmental data to see how much contamination is at a site, where it is, and how people might come into contact with it. Generally, ATSDR does not collect its own environmental sampling data but reviews information provided by EPA, other government agencies, businesses, and the public. When there is not enough environmental information available, the report will indicate what further sampling data is needed.

Health Effects: If the review of the environmental data shows that people have or could come into contact with hazardous substances, ATSDR scientists then evaluate whether or not there will be any harmful effects from these exposures. The report focuses on public health, or the health impact on the community as a whole, rather than on individual risks. Again, ATSDR generally makes use of existing scientific information, which can include the results of medical, toxicologic and epidemiologic studies and the data collected in disease registries. The science of environmental health is still developing, and sometimes scientific information on the health effects of certain substances is not available. When this is so, the report will suggest what further research studies are needed.

Conclusions: The report presents conclusions about the level of health threat, if any, posed by a site and recommends ways to stop or reduce exposure in its public health action plan. ATSDR is primarily an advisory agency, so usually these reports

identify what actions are appropriate to be undertaken by EPA, other responsible parties, or the research or education divisions of ATSDR. However, if there is an urgent health threat, ATSDR can issue a public health advisory warning people of the danger. ATSDR can also authorize health education or pilot studies of health effects, full-scale epidemiology studies, disease registries, surveillance studies or research on specific hazardous substances.

Interactive Process: The health assessment is an interactive process. ATSDR solicits and evaluates information from numerous city, state and federal agencies, the companies responsible for cleaning up the site, and the community. It then shares its conclusions with them. Agencies are asked to respond to an early version of the report to make sure that the data they have provided is accurate and current. When infomed of ATSDR's conclusions and recommendations, sometimes the agencies will begin to act on them before the final release of the report.

Community: ATSDR also needs to learn what people in the area know about the site and what concerns they may have about its impact on their health. Consequently, throughout the evaluation process, ATSDR actively gathers information and comments from the people who live or work near a site, including residents of the area, civic leaders, health professionals and community groups. To ensure that the report responds to the community's health concerns, an early version is also distributed to the public for their comments. All the comments received from the public are responded to in the final version of the report.

Comments: If, after reading this report, you have questions or comments, we encourage you to send them to us.

Letters should be addressed as follows:

Attention: Chief, Program Evaluation, Records, and Information Services Branch, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road (E-56), Atlanta, GA 30333.

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SUMMARY

The Jones Industrial Services (JIS) Landfill site is an approximately eleven acre landfill located on a 24 acre site in South Brunswick Town, Middlesex County, New Jersey. The landfill began operation in 1955. The New Jersey Department of Environmental Protection (NJDEP) had approved the operation of the landfill to accept industrial, agricultural, institutional wastes, chemicals, and waste oils in 1970. The landfill records document that sludges, solvents, pesticides, and industrial wastes, some of which are toxic and/or hazardous substances were accepted at the landfill from the 1960's through the early 1970's. The landfill was cited for numerous operational violations by the NJDEP during it's operational life. The landfill operation was closed in December, 1980. The JIS landfill site is currently classified as inactive and listed as # 51 on the United States Environmental Protection Agency National Priority List (USEPA NPL). Phase I and Phase II Remedial Investigations have been completed by NJDEP at the site (1988 and 1992 respectively). On-site and off-site soil and groundwater is contaminated with volatile organic compounds (VOCs), petroleum hydrocarbons, polychlorinated biphenyls, pesticides, and heavy metals. The landfill may have posed a public health hazard in the past, since the site information indicates that human exposure to volatile organic compounds (VOCs) and metals in domestic drinking water wells may have occurred. As a result, local residents were provided with municipal water connections in the area of the site, but domestic wells downgradient of the site may be currently utilized for non-potable purposes. Environmental data indicates that the landfill continues to impact the underlying groundwater quality. However, available data do not indicate that humans are presently being exposed to contaminants at levels expected to cause adverse health effects. Community concerns have been focused on the site impact to the groundwater quality in the area. Domestic wells in the area have been contaminated with VOCs and heavy metals. The ATSDR and the NJDOH consider the JIS landfill site to be a past public health hazard, based upon oral exposure of a chronic duration to contaminated groundwater (domestic wells), between 1962 and 1987, and **no apparent** public health hazard based upon the current conditions at the site. The data and information developed in the Public Health Assessment has been evaluated by ATSDR's Health Activities Recommendation Panel (HARP). The panel determined that local physicians should be provided with the appropriate copies of ATSDR's Case Studies in Environmental Medicine. No other health activities are planned at this time. ATSDR and the NJDOH have provided the appropriate copies of ATSDR's Case Studies in Environmental Medicine to local physicians. This site will be referred to the appropriate occupational agency for evaluation of potential exposures to employees currently working in recycling operations at the site. The NJDOH conducted a public comment period for the Public Health Assessment Addendum for the Jones Industrial Services (JIS) Landfill site from September 23, 1994 to October 28, 1994

BACKGROUND

A. SITE DESCRIPTION AND HISTORY

In 1975, one resident owner living near the Jones Industrial Services (JIS) landfill notified NJDEP Bureau of Solid Waste Management of suspected dimethyl sulfoxide (DMSO) contamination in his private well. The USEPA at the request of New Jersey Department of Environmental Protection and Energy (NJDEP) sampled and analyzed the residential well and found that the well water was contaminated with volatile organic compounds (VOCs).

The NJDEP had approved the operation of the landfill to accept industrial, agricultural, institutional wastes, and waste oils in 1970. At the request of NJDEP, the site owners installed five groundwater monitoring wells in 1975 at the property corners.

In February 1976, NJDEP conducted excavations on the site and found smashed 55-gallon drums in two excavations. The contents of the drums were analyzed and showed the presence of methylene chloride and a fungicide. During 1976-1980, NJDEP tried to curtail disposal operations, the operation continued during this period. The landfill operation was closed in December, 1980. The township of Monroe conducted groundwater sampling in 1984 and found that residents in vicinity of Bordentown Turnpike had contaminated domestic wells. At present they receive municipal water.

The JIS Landfill site is currently classified as inactive and listed on the United States Environmental Protection Agency National Priority List (USEPA NPL) as No. 51. The landfill portion of the site is inactive. The Phase I Remedial Investigation/Feasibility Study (RI/FS) on site was completed in 1988. The Agency for Toxic Substances and Disease Registry (ATSDR) initiated the Health Assessment in 1988 with the Environmental Health Service, New Jersey Department of Health (NJDOH) to assess the nature and magnitude of potential adverse health-effects associated with the site. In July 1990 (7-30-90), the NJDOH completed the Health Assessment for the community living near the site. The Phase II Remedial Investigation/Feasibility Study (RI/FS) was completed in July 1992. In August 1992 (8-10-92), a Site Review and Update (SRU) report was completed by NJDOH. This Public Health Assessment is being performed as an addendum to the previous NJDOH Health Assessment to include new data generated by Phase II RI/FS report as recommended in SRU report. The JIS Landfill is located on the border of South Brunswick and Monroe Townships. Please refer to site description on page 2 of the Health Assessment document (Appendix D) and summary of background and history on Page 1 of the Site Review and Update document(Appendix E).

B. SITE VISIT

On November 10, 1992, Narendra P. Singh, and Jeff Winegar with the Environmental Health Service, New Jersey Department of Health accompanied by NJDEP site manager, visited the JIS Landfill site. A representative from Jones Industrial Service accompanied us during this site inspection.

The following observations were made during the inspection:

On-Site:

- The JIS site is an approximately eleven acre landfill located on a 24 acre site, is bordered to the west by the New Jersey Turnpike and Cranbury South River Road to the east.

- An active waste collector-hauler operation is located on the eastern portion of the site. This operation consists of collecting waste material including metal pipes, asphalt and various rusted and broken metal pieces and their subsequent removal.

- The site is fenced with an entrance gate along the eastern site boundary. The site is posted with no trespassing and hazard signs. The site is also fenced on the western side facing the New Jersey Turnpike. The site is accessible through Cranbury-South River Road. The north and south side of the site is surrounded by trees.

- A 30 foot deep excavation pit remains on the eastern half of the site adjacent to the waste collecting/recycling operation. A huge pile of soil was present on the eastern side of the site. When asked about this, the person accompanying us from the company informed that it is being sold as fill material.

- The inactive landfill, which is capped, is on the western half of the site and, is bordered by the New Jersey Turnpike. Scant vegetation was present on the landfill area.

- On-site groundwater monitoring wells were observed.

- Although the site is fenced and warning signs are posted for the general public, at present workers involved in hauling and recycling operations have potential for exposure to the various physical hazards on the site including sharp metal objects, the 30 foot deep excavation pit, and the storage lagoon.

- Ongoing recycling operation is confined to the eastern side of the site.

Off-Site:

- A dirt road was observed along the western perimeter of the site.

- The JIS Landfill site is bordered to the west by the New Jersey Turnpike and to the east by Cranbury-South River Road. The north and south side of the site are bordered by an agricultural field and a plant nursery respectively.

C. DEMOGRAPHICS, LAND USE, AND NATURAL RESOURCES USE

Demographics

Approximately 670,000 people live in Middlesex County. According to the 1990 Census, 25,792 people live in South Brunswick Township, an increase of 50 percent since 1980, and 22,255 people live in Monroe Township, an increase of 40.3 percent since 1980.

Land Use

The JIS Landfill site is located on the border of South Brunswick and Monroe Townships in Middlesex County. Both South Brunswick and Monroe Townships are mostly agricultural, but there has been an ongoing growth of residential, commercial, and industrial facilities development in South Brunswick Township. The nearest residence is located less than a mile from the site.

Natural Resource Use

In December 1990, a NJDEP well use survey identified seven residents still had domestic wells near the site; however, it was determined that these wells were being used for non-potable purposes (not used for drinking water). At present, residents living adjacent to the site are supplied with municipal water. Municipal wells are located within 3 miles of the site.

The three formations underlying the JIS Landfill site include Raritan (Deepest), the Magothy (Middle), and the Pensauken (Shallow). The Raritan formation is the deepest and composed of Farrington Sand Aquifer and Woodbridge Clay. The thickness in the region of the site ranges from 150 to 400 feet. The Magothy (Middle) formation is 80 to 110 feet thick and includes the most developed Aquifer in Middlesex County: the Old Bridge Sand Aquifer. The Old Bridge Sand Aquifer exhibits a high degree of storage capacity. In addition, the Old Bridge Sand Aquifer is the primary source of public and industrial water supplies in the area of the site. The Pensauken formation consists of coarse to fine sands and is 0-70 feet in thickness. The Pensauken formation is utilized primarily for domestic wells.

Surface water features nearest the site are a tributary of Manalapan Brook approximately 0.5 miles east of the landfill, and a second tributary further northeast of the site. These tributaries flow in an easterly direction and discharge into Manalapan Brook approximately 2 miles from the site. The Manalpan Brook flows in a northwest direction and discharges into the South River approximately 6 miles from the site. Ground water depths in the Old Bridge Sand

aquifer are comparable to depths of the nearby surface waters and indicate that these tributaries and Manalapan Brook serve as the closest discharge area for the Old Bridge Sand aquifer, south of the site, approximately 12,000 feet away.

D. HEALTH OUTCOME DATA

There are multiple sources of health outcome data in New Jersey. State and local data for health outcome information include the New Jersey State Cancer Registry, Birth Defects Registry, Vital Statistics Records, Renal Dialysis network, and hospital discharge reports. Federal databases such as those maintained by the Department of Health and Human Services (National Cancer Institute, National Institute of Occupational Safety and Health, and ATSDR) are not site-specific but may be used for comparison and evaluation purposes. Health outcome data for the JIS Landfill site were not collected and evaluated. Please refer to health outcome data evaluation section.

COMMUNITY HEALTH CONCERNS

To understand some of the past concerns of the community, please refer to: Community Concerns (Page 3) in the Public Health Assessment document (Appendix D) and paragraph 5 on page 1 of Site Review and Update document (Appendix E). The primary community health concern associated with the JIS Landfill site relates to the groundwater contamination and the impact to domestic and commercial potable wells in the area. Many residents had contaminated domestic wells. Community health concerns associated with the JIS Landfill site include:

1. The length of time that the community may have been potentially exposed to site related contaminants prior to provision for municipal water supply.

2. The potential for long term adverse health effects specifically to the possibility of increased incidence of cancer in the residents exposed to contaminated well water.

The community health concerns have been minimal since the landfill was closed and public water was supplied to the area residents. These concerns are addressed in the Public Health Implications Section.

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

The data tables in this section list the site contaminants of concern. ATSDR and NJDOH evaluate these contaminants in the subsequent sections of the Public Health Assessment to determine whether exposure to them has public health significance. ATSDR and NJDOH select and discuss these contaminants based upon the following factors:

1. Concentrations of contaminants on and off the site.

2. Field data quality, laboratory data quality, and sample design.

3. Comparison of on-site and off-site concentrations with health assessment comparison values for (1) non-carcinogenic endpoints and (2) carcinogenic endpoints.

4. Community health concerns.

In the data tables that follow under the On-site Contamination subsection and the Off-site Contamination subsection, the listed contaminant does not mean that it will cause adverse health effects from exposures. Instead, the list indicates which contaminants will be evaluated further in the health assessment. When selected as a contaminant of concern in one medium, that contaminant will be reported in all media. The Data tables include the following acronyms:

- **CREG** = ATSDR Cancer Risk Evaluation Guide
- **EMEG** = ATSDR Environmental Media Evaluation Guide
- **RMEG** =Reference Dose Media Evaluation Guide, calculated from EPA's reference dose (RfD).
- **NA** = Not Analyzed
- **NJDEP** = New Jersey Department of Environmental Protection
- **NJ SAL** = New Jersey Soil Action Level
- **LTHA** = USEPA's Lifetime Health Advisory
- **NJ MCL** = NJ Maximum Contaminant Level
- **PPB** = Parts Per Billion
- **ND** = Not Detected
- **EPA MCLG** = USEPA Maximum Contaminant Level Goal
- **EPA MCL** = USEPA Maximum Contaminant Level
- **EPA PMCLG** = USEPA Proposed Maximum Contaminant Level Goal

- **PPM** = parts per million
- **EPA RfD** = USEPA Reference Dose
- **EPA RfC** = USEPA Reference Concentration
- **LTHA** = USEPA Lifetime Health Advisory

Comparison values for Public Health Assessments are contaminant concentrations in specific media that are used to select contaminants for further evaluation. These values include Environmental Media Evaluation Guides (EMEGs), Cancer Risk Evaluation Guides (CREGs), and other relevant guidelines. CREGs are estimated contaminant concentrations based on a one excess cancer in a million persons exposed over a lifetime. CREGs are calculated from EPA's cancer slope factors.

EPA's Maximum Contaminant Level Goal (MCLG) is a drinking water health goal. EPA believes that the MCLG represents a level that no known or anticipated adverse effect on the health of persons should occur which allows an adequate margin of safety. Proposed Maximum Contaminant Level Goals (PMCLGs) are MCLGs that are being proposed. Maximum contaminant levels (MCLs) represent contaminant concentrations that New Jersey or a Federal regulatory agency, eg. EPA, deems protective of public health (considering the availability and economics of water treatment technology) over a lifetime (70 years) at an exposure rate of 2 liters of water per day. MCLs are regulatory concentrations. EPA's Reference Dose (RfD) and Reference Concentration (RfC) are estimates of the daily exposure to a contaminant that is unlikely to cause adverse health effects.

A. ON-SITE CONTAMINATION

Under the authority of NJDEP the B&V Waste Science and Technology Corporation, conducted a Remedial Investigation/ Feasibility study (RI/FS) for JIS Landfill site, and presented its findings in December 1988 in the Phase I RI/FS report. The data generated by 1988 report was utilized in part to prepare the Health Assessment report of 1990 by NJDOH. At that time, data from the analysis of the following media were available for review: soil, surface water, groundwater, and air. For a review of environmental data from the 1988 RI/FS , please refer to: On-site Contamination (page 4 and 5) in the Health Assessment document, 1990 (Appendix D).

The data as presented in this Public Health Assessment report utilizes information from the Phase I RI/FS and Phase II RI/FS . The Phase II RI/FS report was published by B&V Waste Science and Technology Corporation in July 1992. During this phase additional groundwater monitoring wells and residential wells were sampled.

Soil (0 to 36 inches)

Soil samples (SS-1 through SS-14) were collected on January 4th and 5th, 1988 from within the JIS Landfill on-site pit area during the Phase I Remedial Investigation. All samples were collected and analyzed in accordance with NJDEP procedures. The soil samples were collected from a depth of 0 to 36 inches, and analyzed for volatile and semi-volatile organic compounds, pesticides, polychlorinated biphenyls, and inorganic compounds. Figure # 2 (Appendix B) shows soil sampling locations.

Surface soil sampling (0 to 3 inches deep) at the site was limited. Thus, limited data exist by which to assess the potential public health impact of exposure to contaminated surface soil. Table # 1 reports the contaminants of concern and concentration range detected in shallow soil samples (0 to 36 inches).

ATSDR uses surface soil data from 0 to 3 inches to assess the potential public health impact of exposure to contaminated surface soil. Soil sampling at site was limited to 0 to 36 inches.

The base neutral acid extractable compounds such as bis (2-ethylhexyl) phthalate (BEHP) and di-n-butyl phthalate were the most prevalent compounds in soil samples at levels below ATSDR comparison values. Pesticides were detected in soil sample SS-1 and consisted of 4,4'-DDT at levels below ATSDR comparison values. Arochlor 1260, a polychlorinated biphenyl was detected in SS-2, SS-5, SS-6, and SS-9 from the pit area. No ATSDR comparison value for Arochlor 1260 is available at present. Generally some metals were detected in low concentrations in all soil samples except SS-12 at levels below ATSDR comparison values. Volatile organics detected in soil samples consisted of methylene chloride, acetone, 1,1,1 trichloroethane, 2 butanone, trichloroethene, and 4 methyl 2-pentanone, all at levels below ATSDR comparison values except benzo(a)pyrene.

Soil (2-4 feet, 12-17 feet, and 25-28 feet)

Soil samples were collected from monitoring well bore holes between February 17 and March 9, 1988 during the Phase I Remedial Investigation. The samples were collected continuously in advance of the borings in monitoring well (MW-3) and (MW-6S), and at 5 feet intervals in (MW-1S), (MW-2), (MW-4), (MW-5), (MW-7S), (MW-9), (MW-10), (MW-11S), and (MW-12). All samples were collected and analyzed in accordance with NJDEP procedures. Three soil borings (MW-3,MW-4 and MW-5) were installed on-site in the vicinity of disposal pit. Soil samples were collected at 2-4 feet, immediately above the water table , and at approximately 5 feet intervals below the water table . Samples were analyzed for volatile and semi-volatile organic compounds, pesticides, polychlorinated biphenyls, inorganic compounds, and total petroleum hydrocarbons. Figure # 2 (Appendix B) shows all soil boring sampling locations. The most prevalent compounds in soil samples appear to be base neutrals, (specifically bis (2-ethylhexyl) phthalate [BEHP], ranging from 1.3 to 3.1 ppm), other base neutral compounds detected were di-n-butylphthalate, diethyl phthalate, all present at levels

below ATSDR comparison values. Pesticides were detected in (MW-5) boring soil sample at depth of 2-4 feet, and consisted of 4,4'-DDT, aldrin, dieldrin, and endrin, at levels below ATSDR comparison values. Arochlor 1260, a polychlorinated biphenyl, was not analyzed. Some metals were detected in low concentrations in all soil samples, these consisted of: arsenic, chromium, copper, lead, nickel, and zinc. Volatile organic compounds were not detected in significant concentrations in soil samples. The highest concentrations were detected in soil sample from the water table in (MW-5), and consisted of 2-butanone (0.21 ppm) and 4-methyl-2-pentanone (0.15 ppm). Table # 2 reports the contaminants of concern and concentration range detected in soil samples.

Groundwater - Monitoring wells

Groundwater samples were collected from fifteen monitoring wells between April 26 and 29, 1988, during the Phase I Remedial Investigation. The monitoring wells were screened in the upper and lower zones of the Old Bridge Aquifer at depths ranging from 14 to 120 feet. Fifteen monitoring well samples were analyzed for volatile and semi-volatile organic compounds, pesticides, polychlorinated biphenyls, and inorganic compounds. Figure # 3 (Appendix B) shows all groundwater monitoring well sampling locations.

The Old Bridge Aquifer is known to be contaminated (please refer to: Phase I groundwater monitoring wells sampling results in Health Assessment, July 1990, (Appendix # D). During the Phase II Remedial Investigation, 18 new wells were installed, to supplement Phase I groundwater sampling. Fourteen of these wells were monitoring wells, three were observation wells, and one was a pumping well. Groundwater samples were collected from twenty-nine monitoring wells (May and June, 1991), fifteen of which were installed during the Phase I Remedial Investigation. Twenty-nine monitoring well samples were analyzed for volatile and semi-volatile organic compounds, pesticides, polychlorinated biphenyls, and inorganic compounds. Monitoring wells MW-3,MW-4,MW-5, and MW-16 were located on-site.

Monitoring well MW-3 was located in the excavated pit on the JIS Landfill site immediately downgradient of the landfill. The predominant contaminants detected were volatile organic compounds (VOC's) consisting of methylene chloride, acetone, benzene, 1,2-dichloroethene, trichloroethene, toluene, and tetrachloroethene (Table 3). MW-5,located east of the landfill, also showed elevated levels of several VOC's above ATSDR's health comparison values (e.g, 1,1-dichloroethene, chloroform, 1,2-dichloroethane and chloromethane). The total concentration of volatile organics detected in MW-3 was 1,280.55 ppm. The compound detected with the highest concentration occurred at MW-3 was thiobis methane (1,100 ppm). Even though MW-4 was located in close proximity of MW-3, MW-4 had lower contaminant levels. The MW-3 (shallow well) ,which draws groundwater from a depth of 76 feet, had the highest levels (1,280.55 ppm) of volatile organics, whereas MW-16 (deep well), had a total of only 0.014 ppm volatile organics. A number of chemicals that were analyzed and detected in soil samples, (benzo(a)pyrene, di-n-Butylphthalate, bis(2-Ethylhexyl)phthalate, aroclor-1260, 4,4-DDT, 4,4-DDE, aldrin, and dieldrin) were not analyzed for in on-site monitoring well samples.

The inorganic analyses of the on-site monitoring well samples showed high concentrations of metals, primarily : lead, antimony, arsenic, and manganese. These were present in excess of New Jersey Site Remediation Program Cleanup Standards, as proposed in N.J.A.C. 7:26D, and to New Jersey State Groundwater Quality Standards as established in N.J.A.C. 7:9-66. Arsenic was detected, at levels above the ATSDR comparison value. Table # 3 reports the contaminants of concern and concentration ranges detected in on-site groundwater monitoring well samples.

Ambient Air

Ambient air monitoring was conducted at the JIS Landfill to characterize baseline air quality conditions in December, 1986. Additional air monitoring was conducted using a flame ionization detector in February and March 1988, during subsurface remedial investigations, as well as during drilling and boring to determine total organic contaminant concentrations in air, including methane. An organic vapor analyzer equipped with a gas chromatograph was used to discriminate between organic contaminants, and a photoionization detector was used to determine total organic contaminant concentrations in air, exclusive of methane.

The preliminary site survey was conducted in December 1986, along a path that followed the approximate fill area boundary zone of contamination and included the three landfill vent pipes. Organic vapors were detected ranging from 1 to >1000 ppm. 1-2 ppm of non-methane contaminants were detected with the photoionization detector. During subsurface remedial investigations in February and March 1988, moderate levels of non-methane volatile contaminants were detected. Air emissions of volatile compounds from the JIS landfill, both before and after the subsurface remedial investigations, consisted mostly of methane. Samples collected from subsurface borings showed elevated levels of non-methane VOC's. Air monitoring was also conducted during Phase II remedial investigation in March 1991. During well installation, purging, and sampling, high levels of VOC's were detected at MW-2S, MW-3, MW-5, MW-7S, MW-7D, MW-10I, MW-12, MW-18S, and MW-18I. The maximum level of 1000 ppm was detected at MW-18I using an organic vapor analyzer. Methane was detected at all these locations. Insufficient data exist to evaluate the potential for past exposure to contaminants in ambient air.

B. OFF-SITE CONTAMINATION

Soil (0 to 36 inches)

Soil sample locations as shown in Figure # 2 (Appendix B), SS-15, SS-16, and SS-17 were collected on January 4th and 5th, 1988 during Phase I Remedial Investigations. One surface soil and one surface water sample were collected at sampling point SS-15. Two additional soil samples (0-36 inches) were collected from a plant nursery southeast of the landfill, and designated as locations SS-16 and SS-17. Samples were analyzed for volatile and semi-volatile organic compounds, pesticides, polychlorinated biphenyls, and inorganic compounds. Surface soil sampling was limited (0-3 inches deep). Table # 4 reports the contaminants of concern and concentration ranges detected in soil samples.

The base neutral compounds (bis (2-ethylhexyl) phthalate [BEHP] and di-n-butylphthalate) were the most prevalent compounds detected, all present at levels below the ATSDR comparison values. Pesticides were detected in soil samples SS-16 and SS-17, consisting of 4,4'-DDE, at levels below the ATSDR comparison value. Volatile organics detected in soil samples consisted of methylene chloride and acetone, at levels below the ATSDR comparison values. Arsenic, cadmium, chromium and lead were detected in low concentrations.

Soil (0-2 feet, 40-42 feet, 65-67 feet)

Soil samples were collected at various depths from off-site monitoring well bore holes between February and March 1988, during the Phase I Remedial Investigation. Soil samples were analyzed for volatile and semi-volatile organic compounds, pesticides, polychlorinated biphenyls, and inorganic compounds. Figure # 2 (Appendix B) shows off-site soil boring sampling locations.

The most prevalent compounds detected in the off-site soil samples were base neutrals, including bis (2-ethylhexyl) phthalate (BEHP) and di-n-butylphthalate, all present at levels below ATSDR comparison values. Pesticides, consisting of 4,4'-DDT and 4,4'-DDE were detected in MW-1 and MW-2, at levels below ATSDR comparison values. Some metals were detected in low concentrations, including arsenic, chromium, and lead. The highest volatile concentrations were detected just above the water table in MW-2, at a depth of 45 to 47 feet, consisting of acetone and methylene chloride, at levels below ATSDR comparison values. Volatile organics were also detected in MW-7 and MW-9, located downgradient to the landfill, at levels below ATSDR comparison values. Table # 5 reports the contaminants of concern and concentration ranges detected in off-site soil samples.

Groundwater - Residential Wells

Five domestic wells from residences located within a one mile radius of the JIS Landfill site were sampled during the Phase I Remedial Investigation on December 15, 1987. All of these homes were connected to the public water system. Samples were analyzed for volatile organic compounds and inorganic compounds. Figure # 4 (Appendix B) shows all domestic well sampling locations (DGW-1, DGW-2, DGW-3, DGW-4 and DGW-5). Table # 6 reports the contaminants of concern and maximum concentrations detected in potable well samples.

Domestic wells DGW-1 and DGW-3 are no longer in operation, and these two wells (DGW-1 and DGW-3) were sampled with a portable submersible pump. The remaining wells (DGW-2,DGW-4 and DGW5) were sampled from an outside spigot or kitchen tap. The water sample analyses indicated the presence of volatile organic compounds consisting of methylene chloride, chloroform, 1,2-dichloroethane, benzene, 1,1,1-trichloroethane, trichloroethane, and toluene. In the sample from domestic well DGW-1, methylene chloride, chloroform, 1,2-dichloroethane and trichloroethene were detected at levels above ATSDR comparison values. Benzene was detected, in DGW-2, at level above ATSDR comparison values. Chromium, and

lead were also detected in this well above the NJDEP water quality standards. Cadmium was also detected at level above RMEG.

Additionally, six domestic wells were sampled during the Phase II Remedial Investigation, between March 14 and 22, 1991, from residences located within 1.5 miles east of the JIS landfill site. The samples were analyzed for volatile organic compounds and total metals. Figure # 4 (Appendix B) shows all domestic well sampling locations (DGW-6, DGW-7, DGW-8, DGW-9, DGW-10 and DGW-11). Table # 7 reports the contaminants of concern and maximum concentrations detected in potable well samples. Duplicate samples were taken from well DGW-7, DGW-8, and DGW-11, designated as DGW-7DL, DGW-8DL and DGW-11DL respectively.

Samples were collected from the water outlet nearest to the well. Sample DGW-8DL had the highest level of contamination, consisting of 1,2-dichloroethene, trichloroethene, benzene, tetrachloroethene, methylene chloride, and chloroform, at levels above ATSDR comparison values. Sample DGW-8 showed the presence of 1,1,2,2-tetrachloroethane, and 1,1,2-trichloroethane , at levels above ATSDR comparison values. Domestic well sample DGW-7DL was contaminated with methylene chloride, 1,1-dichloroethene, 1,2-dichloroethene, chloroform, trichloroethene, and benzene, at levels above ATSDR comparison values. Volatile organics were not detected in DGW-6 and DGW-10. DGW-11, contained low levels of methylene chloride and toluene. All the compounds detected in the domestic wells were also detected in the downgradient monitoring wells, except 1,1,2,2-tetrachloroethane and 1,1,2-trichloroethane. The inorganic analyses of the domestic well samples showed high concentrations of iron and manganese as compared to New Jersey State Groundwater Quality Standards. Cadmium in DGW-10 and chromium in DGW-9 were detected; however, only chromium exceeded health comparison values.

Groundwater - Monitoring wells:

Samples from twenty-nine monitoring wells, including fifteen monitoring wells which were installed during the Phase I Remedial Investigation, were analyzed for volatile and semi-volatile organic compounds, pesticides, polychorinated biphenyls, and inorganic compounds.

Phase II samples were collected between May 31 and June 19, 1991. Figure # 3 (Appendix B) shows all monitoring well sampling locations. Only monitoring wells MW-3, MW-4, MW-5 and MW-16 were located on-site, the rest of the monitoring wells were located off-site. Analytical results of off-site groundwater sampling showed that volatile organic compounds were detected frequently: acetone in fourteen wells; 1,2-dichloroethene in eight wells and; trichloroethene and benzene in seven wells each.

In general, shallow monitoring wells showed more contamination by VOCs than deep monitoring wells. Table # 8 shows contaminants of concern and their concentration range.

Volatile organic compounds, including methylene chloride, chloroform, 1,2-dichloroethane, trichloroethene, vinyl chloride, benzene and tetrachloroethene were detected at levels in excess of ATSDR comparison values. The upgradient monitoring wells (MW-1S, 1D, 14S, and 14D) showed lowest levels of organic contaminants. MW-13D and 19S also showed low levels of organic contaminants.

No significant volatile organics were detected in the deep monitoring wells except downgradient monitoring well MW-7D. Significant concentrations of volatile organics were detected in monitoring wells, MW-2S, 11S, 12, 18S, and 19I.

C. QUALITY ASSURANCE AND QUALITY CONTROL

In preparing this Public Health Assessment, ATSDR and NJDOH rely on the information provided in the referenced documents and assumes that adequate quality control measures were followed with regard to chain-of-custody, laboratory procedures, and data reporting. The validity of analysis and conclusions drawn for this Public health assessment is determined by the availability and reliability of the referenced information.

D. PHYSICAL AND OTHER HAZARDS

Although the JIS landfill site is partially fenced and posted with hazard and no trespassing signs, physical hazards do exist to on-site workers, primarily consisting of stockpiled materials due to on-going hauling/recycling operation. The storage lagoon and the water containment structures present physical hazards to on-site workers.

There are no known or suspected radiological or biological hazards associated with the site. Subsurface soil gas (methane) monitoring was conducted in February and March 1988, during the Phase I Remedial Investigation. Air emissions of volatile compounds from the JIS landfill, both before and after the subsurface remedial investigations, consisted almost exclusively of methane. Air monitoring during Phase II RI/FS in March 1991 detected methane emissions. A potential for possible asphyxiation hazard to on-site workers in confined spaces during remedial activities exists.

E. TOXIC CHEMICAL RELEASE INVENTORY DATA

The NJDOH conducted a search of the Toxic Chemical Release Inventory (TRI) in an attempt to identify any possible facilities that could be contributing to the environmental contamination near the JIS landfill. The TRI is compiled by USEPA and is based on estimated annual releases of toxic chemicals to the environment (air, water, soil, or underground injection) provided by certain industries.

The TRI search for the years from 1987 to 1990 did not list any reported emissions of chemicals relevant to the contaminants of concern identified at the JIS Landfill.

PATHWAYS ANALYSIS

To determine whether nearby residents are exposed to contaminants migrating from the site, NJDOH evaluates the environmental and human components that lead to human exposure. This pathways analysis consists of five elements: (1) a source of contamination; (2) transport through an environmental medium; (3) a point of human exposure; (4) route of human exposure; and (5) an exposed population.

NJDOH classifies exposure pathways into three groups: (1) "completed pathways", that is, those in which exposure has occurred, is occurring, or will occur; (2) "potential pathways", that is, those in which exposure might have occurred, may be occurring, or may yet occur; and (3) "eliminated pathways", that is, those that can be eliminated from further analysis because one of the five elements is missing and will never be present, or in which no contaminants of concern can be identified.

Based on the following pathways analysis, ATSDR and NJDOH estimate that about 100 persons have been exposed to site-related contamination. The potentially exposed population, located within a one-mile radius of the site, is estimated at about 48,000 persons. However, it is very unlikely that most of these persons have actually been exposed to site-related contaminants.

A. COMPLETED EXPOSURE PATHWAYS

Domestic Well Pathways

Exposure of residents living near the JIS Landfill to VOCs (Volatile Organic Compounds) through ingestion of domestic well water are likely to have occurred in the past prior to the availability of municipal water supplies. Residential connections to municipal water supplies occurred between 1987 and 1990. The landfilling operations reportedly began in 1955 and are documented since 1962. There are no data or information prior to 1975, when USEPA sampled and analyzed the residential wells and found that the well water was grossly contaminated with VOCs.

Residents may have been exposed by drinking domestic well water, breathing air in the home that has been contaminated with VOCs released during the use of tap water for purposes such as showers and dishwashing, and through direct contact with VOCs during hand-washing.

Ingestion of domestic well water (for a maximum period of 25 years) is the primary completed exposure pathway at the site. The table # 9 (Appendix A) summarizes the completed exposure pathway elements at the JIS landfill site. Past exposure to VOCs in domestic well water is further evaluated in the Public Health Implications section. The Phase II groundwater monitoring results indicates that the landfill continues to be a source of residual contamination to the shallow aquifer. The residents living near the JIS Landfill site are receiving potable water

from a public water system, thus the potential for present or future exposure to contaminated groundwater is unlikely.

B. POTENTIAL EXPOSURE PATHWAYS

Soil Pathways

Potential exposure pathways at the JIS Landfill are associated with on-site and off-site soils. Insufficient surface soil sample data exist to comprehensively determine the extent of surface soil contamination (0-3 inches deep) at the site. Limited soil sample data (0 to 36 inches) have suggested that areas adjacent to the landfill contain pesticides and inorganics at levels below ATSDR health comparison values. Available information do not indicate that on-site workers or trespassers are incidently coming in contact with soils were or are presently being exposed to contaminants at levels expected to cause adverse health effects.

Ambient Air Pathways

It has been documented through air monitoring during Phase I and II RI/FS, that the JIS Landfill generates methane gas as the by-product of waste decomposition. Methane gas, if present in sufficient concentrations, represents a potential hazard to on-site workers through asphyxiation in confined spaces. Table 10 (Appendix A) summarizes the elements of the potential exposure pathways at the JIS Landfill site.

PUBLIC HEALTH IMPLICATIONS

A. TOXICOLOGICAL EVALUATION

Introduction

In this section, NJDOH will discuss the health effects in persons exposed to specific contaminants. To evaluate health effects, ATSDR has developed a Minimal Risk Level (MRL) for contaminants commonly found at hazardous waste sites. The MRL is an estimate of daily human exposure to a contaminant below which non-cancer, adverse health effects are unlikely to occur. MRLs are developed for each route of exposure, such as ingestion and inhalation, and for the length of exposure, such as acute (less than 14 days), intermediate (15 to 364 days), and chronic (greater than 365 days). ATSDR presents these MRLs in the Toxicological Profiles. These chemical-specific profiles provide information on health effects, environmental transport, human exposure, and regulatory status. In the following discussion, NJDOH used ATSDR Toxicological Profiles for the contaminants of concern at the site. The NJDOH will use a USEPA Reference Dose (RfD) as a health guideline, when a MRL is not available. The RfD is an estimate of daily human exposure of a contaminant for a lifetime below which (non-cancer) health effects are unlikely to occur.

Residential Well Pathways

The toxicological evaluation of the completed exposure pathway at the JIS landfill is based upon a duration of twenty-five (25) years for the ingestion pathway. The use of a 25 year exposure duration represents the time from the earliest documented land filling operations at the site (1962) to the availability of a public water supply (1987-1990).

The toxicological effects of the contaminants detected in domestic wells at the JIS landfill site have been considered singly. The cumulative or synergistic effects of possible mixture of contaminants may serve to enhance their public health significance. Additionally, individual or mixtures of contaminants may have the ability to produce greater adverse health effects in children as compared to adult. Non-potable domestic usage of contaminated water (showers) may be associated with significant exposure through the inhalation and dermal contact routes. Current literature suggests exposure doses from these routes may approach those associated with direct ingestion (Reference #7). There is no data available to estimate the exposure doses to these secondary routes of exposure at the JIS landfill site. This toxicological discussion recognizes their potential contribution to exposure dose estimates and consequent public health implications. Cancer estimates are based on an intake of 2 liters of water per day for a 70 kilogram adult for a lifetime (70 years). Since exposure to most JIS landfill site residents would most likely have occurred during the period from 1962 to 1987 rather than a lifetime, the risk of developing cancer from ingestion of domestic well water for up to 25 years would be less than the risk for a lifetime of exposure.

Methylene Chloride

Exposure to methylene chloride through inhalation, skin contact, and ingestion has occurred in JIS Landfill site residents who used contaminated domestic well water. Based upon maximum levels of methylene chloride detected in domestic wells at the site, exposure doses were below the USEPA chronic oral RfD of 0.06 mg/kg/day. Calculated exposure dosages are also well below the Minimum Risk Level (MRL) for chronic oral exposure represented in the ATSDR Toxicological Profile for methylene chloride. At such concentrations, it is not likely that adverse health effects would occur.

USEPA considers methylene chloride to be a probable human carcinogen. Calculated Lifetime Excess Cancer Risk (LECR) shows that chronic oral exposure to methylene chloride at maximum concentrations found in domestic wells for a duration of 25 years would not be expected to result in an increased cancer risk.

Trichloroethene (TCE)

TCE exposure through skin contact and ingestion of groundwater from downgradient wells may have occurred in some residents that live near the site. No chronic oral MRL or RfD is available for trichloroethene to evaluate the potential for non-carcinogenic health effects. However, Estimated Exposure Doses (EED) calculated from the maximum reported

concentration of trichloroethene were well below the No Observed Adverse Effects Level (NOAEL) for animal studies presented in the ATSDR Toxicological Profile for this chemical. At such concentrations, it is unlikely that non-carcinogenic adverse health effects would occur.

Currently there is scientific debate regarding the carcinogenicity of TCE in humans. However, animal studies have shown that tumors can result from oral exposure to TCE. TCE is under consideration for placement into either probable human carcinogen or possible human carcinogen by the USEPA. NJDOH concur with USEPA regarding TCE's potential carcinogenicity in humans. Chronic oral exposure to TCE at maximum concentrations found in domestic wells for a duration of 25 years would not be expected to result in an increased cancer risk.

1,1-Dichloroethene

Site data indicate that exposure to 1,1-dichloroethene occurred among residents in the area of the JIS landfill site through the ingestion pathway, by using contaminated domestic well water for drinking and other domestic purposes. Based upon maximum levels of 1,1-dichloroethene detected in domestic wells at the site, exposure dosages are well below the Minimum Risk Level (MRL) for chronic oral exposure represented in the ATSDR Toxicological Profile for 1,1-dichloroethene. At such concentrations, it is not likely that adverse health effects would occur.

1,1-dichloroethene is considered by the USEPA to be a possible human carcinogen. Animals fed food that contained 1,1-dichloroethene developed liver and kidney disease. These amounts, however, are very much higher than those detected in domestic wells. The calculated Lifetime Excess Cancer Risk (LECR) associated with the chronic oral exposure for 1,1-dichloroethene indicates that exposure to 1,1-dichloroethene at maximum concentrations found in domestic wells for a duration of 25 years would result in no apparent increased cancer risk.

1,2-Dichloroethene

No health guideline is available to evaluate the potential for cancer and non-cancer health effects from exposure to 1-2-dichloroethene.

Chloroform

Based upon maximum concentrations of chloroform detected in domestic wells at the site, calculated exposure doses are significantly below the ATSDR MRL of 0.01 mg/kg/day for chronic oral exposure. At such concentrations, it is not likely that adverse health effects would occur. Chloroform is considered by the USEPA to be a probable human carcinogen. Chronic oral exposure to chloroform at maximum concentrations found in domestic wells for a duration of 25 years would be expected to result in a no apparent increased cancer risk as calculated by Lifetime Excess Cancer Risk (LECR).

1,1,2-trichloroethane

Based upon maximum levels of 1,1,2-trichloroethane detected in domestic wells at the site, exposure doses were below the USEPA chronic oral RfD of 0.004 mg/kg/day. There is no chronic oral MRL set for 1,1,2-trichloroethane. However, Estimated Exposure Doses (EED) calculated from the maximum reported concentration of 1,1,2-trichloroethane were well below the No Observed Adverse Effects Level (NOAEL) for animal studies presented in the ATSDR Toxicological Profile for this chemical. At such concentrations, it is unlikely that non-carcinogenic adverse health effects would occur.

1,1,2-trichloroethane is considered by the USEPA to be a possible human carcinogen. Chronic oral exposure to 1,1,2-trichloroethane at maximum concentrations found in domestic wells for a duration of 25 years would present no increased cancer risk as calculated by LECR.

Benzene

Site data indicate that exposure to benzene occurred among residents in the area of the landfill through the ingestion of contaminated groundwater. Presently there is no MRL or RfD for chronic oral exposure to benzene. However, exposure doses calculated from the maximum reported levels of benzene at the site were below the No Observed Adverse Effect Level (NOAEL) for animal studies presented in the ATSDR Toxicological Profile for Benzene. At such concentrations, it is not likely that non-carcinogenic adverse health effects would occur.

Benzene is considered by the USEPA to be a known human carcinogen. The Lifetime Excess Cancer Risk (LECR) associated with the chronic oral exposure route for benzene at the site for a duration of 25 years would present low increased risk of cancer.

Tetrachloroethene (PCE)

Based upon maximum levels of tetrachloroethene detected in domestic wells at the site, exposure doses were below the USEPA chronic oral RfD of 0.01 mg/kg/day. No chronic oral MRL is available. However, Estimated Exposure Doses (EED) calculated from the maximum reported concentration of tetrachloroethene were well below the No Observed adverse Effects Level (NOAEL) for animal studies presented in the ATSDR Toxicological Profile for this chemical. At such concentrations, it is unlikely that non-carcinogenic adverse health effects would occur. Currently there is scientific debate regarding the carcinogenicity of PCE in humans. However, animal studies have shown that tumors can result from oral exposure to PCE. PCE is under consideration for placement into either probable human carcinogen or possible human carcinogen by the USEPA. NJDOH concur with USEPA regarding TCE's potential carcinogenicity in humans. Chronic oral exposure to tetrachloroethene at maximum concentrations found in domestic wells for a duration of 25 years would present no apparent increased cancer risk, as calculated by Lifetime Excess Cancer Risk (LECR).

1,1,2,2-Tetrachloroethane

No MRL or RfD is available for 1,1,2,2-tetrachloroethane to evaluate the potential for non-cancer health effects. 1,1,2,2-tetrachloroethane is considered a probable human carcinogen by USEPA. Chronic oral exposure to 1,1,2,2-tetrachloroethane at maximum concentrations found in domestic wells for a duration of 25 years would result in no apparent increased cancer risk.

1,1,1-Trichloroethane

Estimated Exposure Doses (EED) calculated from the maximum reported concentration of 1,1,1-trichloroethane were well below the No Observed adverse Effects Level (NOAEL) for animal studies presented in the ATSDR Toxicological Profile for this chemical. At such concentrations, it is unlikely that non-carcinogenic adverse health effects would occur from exposure to 1,1,1-trichloroethane. No information is available to indicate that 1,1,1-trichloroethane causes cancer. The USEPA has determined that 1,1,1-trichloroethane is not classifiable as to its human carcinogenicity.

1,2-Dichloroethane

No MRL or RfD is available for 1,2-dichloroethane to evaluate the potential for non-cancer health effects. However, Estimated Exposure Doses (EED) calculated from the maximum reported concentration of 1,2-dichloroethane were well below the No Observed adverse Effects Level (NOAEL) for animal studies presented in the ATSDR Toxicological Profile for this chemical. At such concentrations, it is unlikely that non-carcinogenic adverse health effects would occur. USEPA considers 1,2-dichloroethane as a probable human carcinogen. The calculated Lifetime Excess Cancer Risk (LECR) associated with chronic oral exposure to 1,2-dichloroethane at maximum concentrations found in domestic wells for a duration of 25 years would present insignificant or no increased cancer risk.

Lead

Site data indicate that exposure to lead may have occurred among residents in the area of the landfill through the groundwater ingestion pathway. There is no current chronic oral exposure MRL or RfD for lead. Based upon maximum levels of lead detected in potable wells at the site, calculated exposure doses were below the NOAEL for animal studies represented in the ATSDR Toxicological Profile for Lead. In addition, maximum levels of lead found at the site in potable wells were below USEPA action level of 15 ppb.

Arsenic

Based upon maximum levels of arsenic detected in domestic wells at the JIS landfill site, exposure doses were below the USEPA chronic oral RfD of 0.0003 mg/kg/day. No chronic oral MRL is currently available. However, Estimated Exposure Doses (EED) calculated from the

maximum reported concentration of arsenic were below the No Observed Adverse Effects Level (NOAEL) for animal studies presented in the ATSDR Toxicological Profile for this chemical. At such concentrations, it is unlikely that non-carcinogenic adverse health effects would occur. Arsenic is considered by the USEPA to be a known human carcinogen. Chronic oral exposure to arsenic at maximum concentrations found in domestic wells for a duration of 25 years would present no apparent increased risk of cancer.

B. HEALTH OUTCOME DATA EVALUATION

Health outcome data for the JIS Landfill site were not collected and evaluated. Due to the relatively small affected population (11 households), available data bases would not yield observable results. The health status of those residents whose wells were effected by the site related contamination may best be determined by individual case investigation or other appropriate follow-up activity.

C. COMMUNITY HEALTH CONCERNS EVALUATION

The primary community concern regarding the JIS landfill site, was the impact of the site on the groundwater quality, specifically to the possibility of increased incidence of cancer in the residents exposed to contaminated domestic well water prior to municipal water line hook ups.

Estimated Exposure Doses (EED) calculated from the maximum reported concentration of various chemicals were well below the comparison values. At such concentrations, it is unlikely that non-carcinogenic adverse health effects would occur from exposure to these chemicals. However, Lifetime Excess Cancer Risk (LECR) associated with the chronic oral exposure route for benzene at the site for a duration of 25 years would present a low increased risk of cancer. Please refer to public health implications section of this document for a detailed description of the risk of cancer associated with various chemicals detected in domestic wells. The toxicological effects of the contaminants detected in domestic wells at the JIS landfill site have been considered singly. The cumulative or synergistic effects of possible mixture of contaminants may serve to enhance their public health significance. The public water line was extended to the residents located on the Bordentown-South Amboy Turnpike during September 1989 to March 1990. USEPA provided bottled water to the residents until they were connected to the municipal water main.

The concern was raised regarding use of private wells for commercial irrigation purposes. NJDEP well survey of 1991 indicated that no wells in the vicinity of JIS Landfill site are being utilized for commercial irrigation purposes.

Public Comment Period

The New Jersey Department of Health (NJDOH) conducted a comment period for the Public Health Assessment Addendum for the Jones Industrial Services (JIS) Landfill site from September 23, 1994 to October 28, 1994. The Public Health Assessment Addendum was placed in local repositories to facilitate commentary and reaction from the public at large. Additionally, the Public Health Assessment Addendum was circulated to the Middlesex County Department of Health for the purpose of soliciting commentary by local health officials.

A summary of commentary received by the NJDOH and associated responses are contained in Appendix F.

CONCLUSIONS

1. On the basis of the information reviewed, ATSDR and the NJDOH have concluded that JIS Landfill site in its present state poses **no apparent** public health hazard. Available data and information do not indicate that humans are presently being exposed to levels of contamination that would be expected to cause adverse health effects. However, this site posed a public health hazard as a result of past chronic human exposure to volatile organic and inorganic contaminants in domestic potable wells, at levels that may result in adverse health effects.

2. As discussed in the Environmental Contamination Section, human exposure to organic chemicals may occur, and may have occurred in the past via the non-potable domestic use of contaminated groundwater (domestic wells).

3. In the past, residents raised concerns regarding exposure to contaminated domestic well water. These were alleviated by providing bottled water to the residents until they were connected to the municipal water mains and by closure of the landfilling operation.

4. Sampling of downgradient municipal wells and commercial agricultural wells were not included in the Phase II RI/FS; however, municipal wells are sampled and analyzed periodically as required by New Jersey Water Quality Standards. The well survey conducted by NJDEP indicated that there are no wells in the vicinity of JIS Landfill site, which are being utilized for commercial agricultural purposes.

RECOMMENDATIONS

When indicated by public health needs, and as resources permit, the ATSDR and the NJDOH will evaluate additional relevant health outcome data and community health concerns, if available, is recommended.

Health Activities Recommendation Panel (HARP) Statement

The data and information developed in the Public Health Assessment for the Jones Industrial Services Landfill, South Brunswick Township, New Jersey, has been evaluated by ATSDR's Health Activities Recommendation Panel (HARP) for appropriate follow-up with respect to health activities. The panel determined that local physicians should be provided with the appropriate copies of ATSDR's Case Studies in Environmental Medicine. No other health activities are feasible at this time because the exposed population is small and the community has not expressed any concerns for adverse health effects.

PUBLIC HEALTH ACTIONS

The Public Health Action Plan (PHAP) for the JIS Landfill site contains a description of the actions to be taken by ATSDR and/or NJDOH at or in the vicinity of the site subsequent to the completion of this Public Health Assessment. The purpose of the PHAP is to ensure that this health assessment not only identifies public health hazards, but provides a plan of action designed to mitigate and prevent adverse human health effects resulting from exposure to hazardous substances in the environment. Included, is a commitment on the part of ATSDR and NJDOH to follow-up on this plan to ensure that it is implemented. ATSDR will provide an annual follow up to this PHAP, outlining the actions completed and those in progress. This report will be placed in repositories that contain copies of this health assessment, and will be provided to persons who request it. The public health actions to be implemented by ATSDR/NJDOH are as follows:

Actions Taken:

1. Environmental Data and proposed remedial activities have been evaluated within the context of human exposure pathways and relevant public health issues.

2. ATSDR and the NJDOH have provided the appropriate copies of ATSDR's Case Studies in Environmental Medicine to local physicians.

Actions Planned:

1. ATSDR and the NJDOH will coordinate, as deemed necessary, with the appropriate environmental agencies to develop plans to implement the cease/reduce exposure and site characterization recommendations contained in this health assessment.

CERTIFICATION

The Public Health Assessment for the Jones Industrial Services Landfill site was prepared by the New Jersey Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the public health assessment was initiated.

Technical Project Officer, SPS, SSAB, DHAC

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this Public Health Assessment and concurs with its findings.

for Division Director, DHAC, ATSDR

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REFERENCES

1. B&V Waste Science and Technology Corporation Draft Report, Remedial Investigation/Risk Assessment for the Jones Industrial Services Landfill, Middlesex County, New Jersey. July 1992.

2. B&V Waste Science and Technology Corporation, Phase II Remedial Investigation: Field Sampling-Quality Assurance Project Plan, Jones Industrial Services Landfill, Middlesex County, New Jersey, October 1990.

3. Black & Veatch, Inc. Draft Report, Phase I Sampling Report for the Jones Industial Services Landfill, Middlesex County, New Jersey. December 1988.

4. ATSDR, Site Summary for Jones Industrial Services Landfill, Middlesex County, New Jersey. September 1988.

5. NJDEP, Fact Sheet for Jones Industrial Services Landfill. May , 1987.

6. NJDEP, Community Relations Plan for Jones Industrial Services Landfill. July, 1986.

7. Ram, N.M., Christman, R.F., and Cantor, K.P., Eds., "Significance and Treatment of Volatile Organic Chemicals in Water Supplies", Chelsea, Maine, Lewis Publishers, pp.485-504.

8. Agency for Toxic Substances and Disease Registry. Toxicological Profile for 1,2-dichloroethane. Atlanta: ATSDR, December 1989.

9. Agency for Toxic Substances and Disease Registry. Toxicological Profile for tetrachloroethylene, Atlanta, ATSDR, October, 1991.

10. Agency for Toxic Substances and Disease Registry.Toxicological Profile for 1,1,2-trichloroethane, Atlanta, ATSDR, December, 1989.

11. Agency for Toxic Substances and Disease Registry. Draft Toxicological Profile for Arsenic. Atlanta, ATSDR, March, 1989.

12. Agency for Toxic Substances and Disease Registry. Draft Toxicological Profile for 1,1,2,2-tetrachloroethane, Atlanta, ATSDR, December, 1989.

13. Agency for Toxic Substances and Disease Registry, Draft Toxicological Profile for Benzene. Atlanta: ATSDR, 1989.

14. Agency for Toxic Substances and Disease Registry, Draft Toxicological Profile for Cadmium, Atlanta, ATSDR, 1989.

15. Agency for Toxic Substances and Disease Registry, Draft Toxicological Profile for 1,1-Dichloroethene, Atlanta, ATSDR, 1989.

16. Agency for Toxic Substances and Disease Registry, Draft Toxicological Profile for Methylene chloride, Atlanta, ATSDR, 1991.

17. Agency for Toxic Substances and Disease Registry, Draft Toxicological Profile for Lead, Atlanta, ATSDR, 1990.

18. Agency for Toxic Substances and Disease Registry, Draft Toxicological Profile for Zinc, Atlanta, ATSDR, 1989.

19. Agency for Toxic Substances and Disease Registry, Draft Toxicological Profile for 1,2-Dichloroethene, Atlanta, ATSDR, 1990.

20. Agency for Toxic Substances and Disease Registry, Draft Toxicological Profile for Trichloroethylene, Atlanta, ATSDR, 1991.

21. Agency for Toxic Substances and Disease Registry, Draft Toxicological Profile for Chloroform, Atlanta, ATSDR, 1991.

APPENDICES

APPENDIX A -- Tables # 1 to # 10

APPENDIX B -- Figures

APPENDIX C -- Chronology of Events

APPENDIX D -- Preliminary Health Assessment, July 30, 1990

APPENDIX E -- Site Review and Update, September 2, 1992

APPENDIX F -- Response Summary

APPENDIX A

Table # 1 - Range of contaminant concentrations in on-site soil samples (0 to 36 inches).

Contaminant	Concentration Range-PPM	Comparison Value	
		PPM	Source
Methylene Chloride	.004 - .024	90	CREG
Acetone	.002 - .170	200	RMEG
1,1,1-Trichloroethane	ND - .008	none	none
2-Butanone	ND - .210	none	none
Trichloroethene	ND - .002	60	CREG
4-methyl-2-pentanone	.003 - .150	none	none
Di-n-Butylphthalate	0.14 - 5.40	200	RMEG
BEHP	.071 - 0.11	40	RMEG
Benzo(a)Pyrene	ND - 1.3	0.1	CREG
Aroclor-1260	.170 - .730	none	none
4,4-DDT	ND - .029	none	none
4,4-DDE	ND	2	CREG
Aldrin	ND	.04	CREG
Dieldrin	ND	.04	CREG
Arsenic	ND - 22	200	EMEG
Cadmium	ND	500	EMEG
Chromium	2 - 37	2000	RMEG
Lead	2 - 23	none	none

Source: Phase I Remedial Investigation Report for the JIS Landfill, December 1988

Table 2 - Range of Contaminant Concentrations in on-site soil samples (2-4, 12-17, and 25-28 feet).

Contaminant	Concentration Range-PPM	Comparison Value	
		PPM	Source
Methylene Chloride	ND - .001	90	CREG
Acetone	ND	200	RMEG
1,1,1-Trichloroethane	ND - .008	none	none
2-Butanone	ND - 0.21	none	none
Trichloroethene	ND - .002	60	CREG
4-methyl-2-pentanone	.003 - .150	none	none
Di-n-Butylphthalate	.034 - .067	200	RMEG
BEHP	1.3 - 3.1	40	RMEG
Benzo(a)Pyrene	NA	0.1	CREG
Aroclor-1260	NA	none	none
4,4-DDT	ND - .029	none	none
4,4-DDE	ND	2	CREG
Aldrin	.0027	.04	CREG
Dieldrin	.017	.04	CREG
Arsenic	ND - 6	200	EMEG
Cadmium	ND	500	EMEG
Chromium	2 - 11	2000	RMEG
Lead	2 - 5	none	none

Source: Phase I Remedial Investigation Report for the JIS Landfill, December 1988

Table 3 - Range of Contaminant Concentrations in on-site Groundwater, Monitoring Wells.

Contaminant	Concentration Range-PPM	Comparison Value	
		PPM	Source
Methylene Chloride	ND - 5.3	0.005	CREG
Acetone	ND - 3	1	RMEG
1,1,1-Trichloroethane	ND	0.2	LTHA
2-Butanone	ND - 1.7	none	none
Trichloroethene	ND - .04	0.003	CREG
Chloromethane	ND - 0.01	0.003	LTHA
Vinyl Chloride	ND - 0.18	0.0002	EMEG
1,1-Dichloroethene	ND - 0.004	0.00006	CREG
1,2-Dichloroethene	ND - 0.75	0.07	LTHA
Chloroform	ND - 0.008	0.006	CREG
1,2-Dichloroethane	ND - 0.17	0.0004	CREG
Benzene	ND - 7.9	0.001	CREG
Tetrachloroethene	ND - 0.003	0.0007	CREG
Toluene	ND - 4.7	2	RMEG
4-methyl-2-pentanone	ND - 3.4	none	none
Arsenic	ND - .014	0.00002	CREG
Cadmium	ND - 0.003	0.011	RfD
Chromium	ND - 0.016	0.18	RfD
Lead	0.0035 - 0.09	none	none

Source: Phase II Remedial Investigation Report for the JIS Landfill, July 1992

Table 4 - Range of contaminant concentrations in off-site soil samples (0 to 36 inches).

Contaminant	Concentration Range-PPM	Comparison Value	
		PPM	Source
Methylene Chloride	ND - .023	90	CREG
Acetone	ND - .860	200	RMEG
1,1,1-Trichloroethane	ND	none	none
2-Butanone	ND	none	none
Trichloroethene	NA	60	CREG
4-methyl-2-pentanone	ND	none	none
Di-n-Butylphthalate	ND - 5.4	200	RMEG
BEHP	ND - 2.1	40	RMEG
Benzo(a)Pyrene	NA	0.1	CREG
Aroclor-1260	ND	none	none
4,4-DDT	.015 - .620	none	none
4,4-DDE	ND - .160	2	CREG
Aldrin	ND	.04	CREG
Dieldrin	ND	.04	CREG
Arsenic	ND - 85	200	EMEG
Cadmium	ND - 3	500	EMEG
Chromium	2 - 43	2000	RMEG
Lead	ND - 19	none	none

Source: Phase I Remedial Investigation Report for the JIS Landfill, December 1988

Table 5 - Range of Contaminant Concentrations in off-site soil samples (0-2, 40-42,and 65-67 feet).

Contaminant	Concentration Range-PPM	Comparison Value	
		PPM	Source
Methylene Chloride	.001 - 0.01	90	CREG
Acetone	.007 - 0.86	200	RMEG
1,1,1-Trichloroethane	ND	none	none
2-Butanone	ND	none	none
Trichloroethene	ND	60	CREG
4-methyl-2-pentanone	ND	none	none
Di-n-Butylphthalate	.036 - .086	200	RMEG
BEHP	0.42 - 2.1	40	RMEG
Benzo(a)Pyrene	NA	0.1	CREG
Aroclor-1260	NA	none	none
4,4-DDT	.025 - 0.62	none	none
4,4-DDE	.028 - 0.16	2	CREG
Aldrin	ND	.04	CREG
Dieldrin	ND	.04	CREG
Arsenic	1 - 85	200	CREG
Cadmium	ND - 3	500	EMEG
Chromium	2 - 43	2000	RMEG
Lead	ND - 18	none	none

Source: Phase I Remedial Investigation Report for the JIS Landfill, December 1988

Table 6 - Maximum Contaminant Concentrations in off-site Groundwater, Residential Wells.

Contaminant	Maximum Conc. (PPM)	Well#	Comparison Value	
			PPM	Source
Methylene Chloride	0.047	DGW-1	0.005	CREG
Acetone	0.045	DGW-2	1	RMEG
1,1,1-Trichloroethane	0.002	DGW-1	0.2	LTHA
Trichloroethene	0.003	DGW-1	0.003	CREG
Chloromethane	NA	NA	0.003	LTHA
Vinyl Chloride	NA	NA	0.0002	EMEG
1,1-Dichloroethene	BMDL	BMDL	0.00006	CREG
1,2-Dichloroethene	0.005	DGW-1	0.07	LTHA
Chloroform	0.25	DGW-1	0.006	CREG
1,2-Dichloroethane	0.005	DGW-1	0.0004	CREG
Benzene	0.001	DGW2	0.001	CREG
Tetrachloroethene	BMDL	BMDL	0.0007	CREG
Toluene	0.003	DGW-3	2	RMEG
4-methyl-2-pentanone	NA	NA	none	none
Arsenic	ND	ND	0.00002	CREG
Cadmium	0.025	DGW-3	0.011	RfD
Chromium	0.071	DGW-3	0.18	RfD
Lead	0.07	DGW-3	none	none

Source: Phase I Remedial Investigation Report for the JIS Landfill, December 1988.

Table 7 - Maximum Contaminant Concentrations in off-site Groundwater, Residential Wells.

Contaminant	Maximum Conc. (PPM)	Well#	Comparison Value	
			PPM	Source
Methylene Chloride	0.006	DGW-8	0.005	CREG
Acetone	ND	ND	1	RMEG
1,1,1-Trichloroethane	0.01	DGW-7	0.2	LTHA
Trichloroethene	0.087	DGW-7	0.003	CREG
Chloromethane	ND	ND	0.003	LTHA
Vinyl Chloride	ND	ND	0.0002	EMEG
1,1-Dichloroethene	0.0032	DGW-7	0.00006	CREG
1,2-Dichloroethene	0.22	DGW-8	0.07	LTHA
Chloroform	0.029	DGW-7	0.006	CREG
1,1,2-Trichloroethane	0.011	DGW-8	0.0006	CREG
Benzene	0.37	DGW-8	0.001	CREG
Tetrachloroethene	0.025	DGW-8	.0007	CREG
Toluene	0.002	DGW-11	2	RMEG
Tetrachloroethane	0.01	DGW-8	0.0002	CREG
Arsenic	0.005	DGW-9	0.00002	CREG
Cadmium	0.003	DGW-10	0.011	RfD
Chromium	0.369	DGW-9	0.18	RfD
Lead	4.9	DGW-9	none	none

Source: Phase II Remedial Investigation Report for the JIS Landfill, July 1992

Table 8 - Range of Contaminant Concentrations in off-site Groundwater, Monitoring Wells.

Contaminant	Concentration Range PPM	Comparison Value	
		PPM	Source
Methylene Chloride	ND - 0.17	0.005	CREG
Acetone	ND - 0.89	1	RMEG
1,1,1-Trichloroethane	ND - 0.002	0.2	LTHA
2-Butanone	ND	none	none
Trichloroethene	ND - 0.077	0.003	CREG
Chloromethane	ND	0.003	LTHA
Vinyl Chloride	ND - 0.01	0.0002	EMEG
1,1-Dichloroethene	ND	0.00006	CREG
1,2-Dichloroethene	ND - 0.012	0.07	LTHA
Chloroform	ND - 0.048	0.006	CREG
1,2-Dichloroethane	ND - 0.005	0.0004	CREG
Benzene	ND - 0.24	0.001	CREG
Tetrachloroethene	ND - 0.19	0.0007	CREG
Toluene	ND - 0.007	2	RMEG
4-methyl-2-pentanone	ND	none	none
Arsenic	ND	0.00002	CREG
Cadmium	ND - 0.003	0.011	RfD
Chromium	ND - 0.02	0.18	RfD
Lead	ND - 0.016	none	none

Source: Phase II Remedial Investigation Report for the JIS Landfill, July 1992

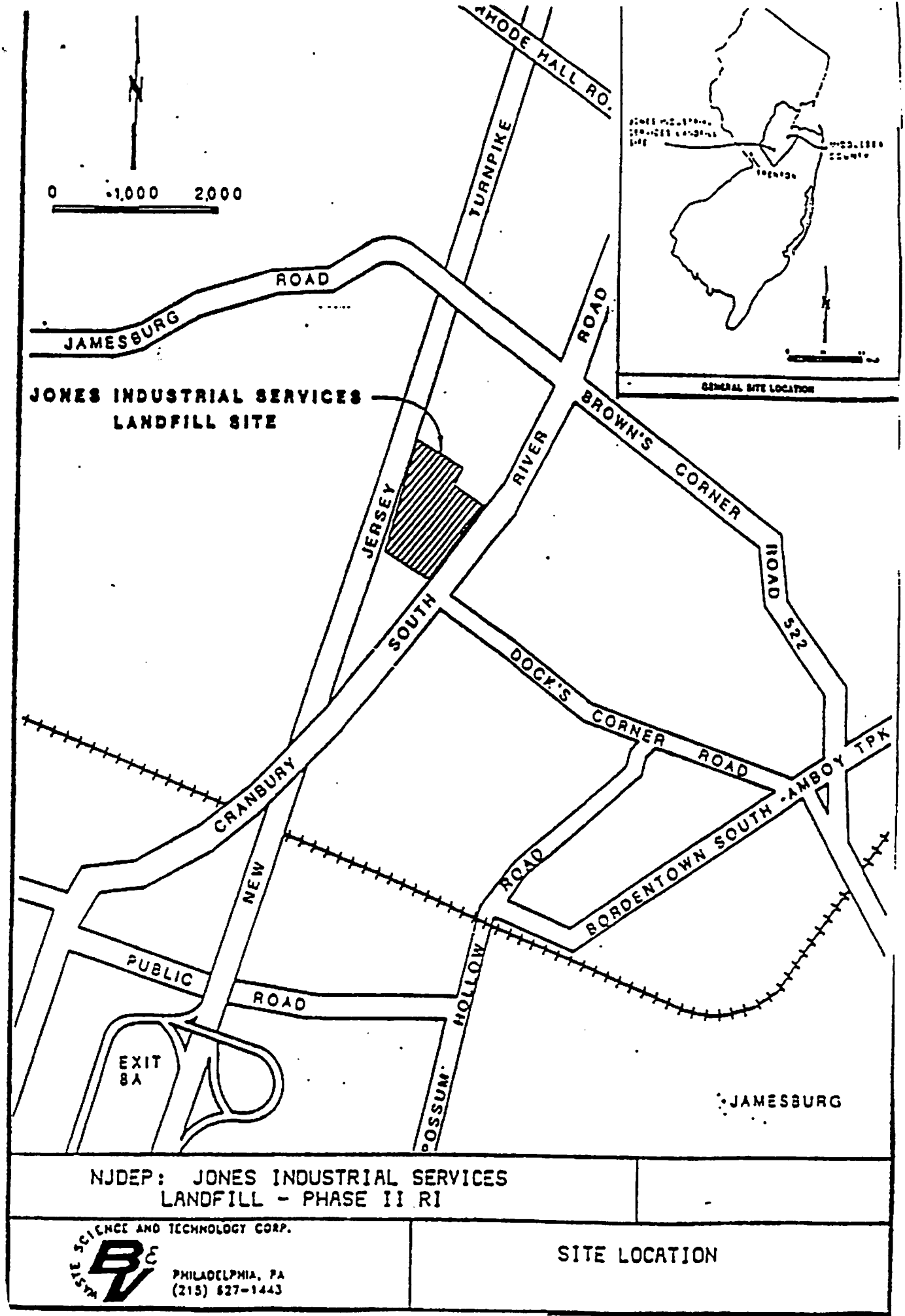
TABLE 9 - Completed Exposure Pathways.

PATHWAY NAME	EXPOSURE PATHWAY ELEMENTS					TIME
	SOURCE	ENVIRONMENTAL MEDIA	POINT OF EXPOSURE	ROUTE OF EXPOSURE	EXPOSED POPULATION	
DOMESTIC WELLS	JIS LANDFILL	GROUNDWATER	RESIDENCES (TAPS)	INGESTION, INHALATION SKIN CONTACT	RESIDENTS	PAST

TABLE 10 - Potential Exposure Pathways.

PATHWAY NAME	EXPOSURE PATHWAY ELEMENTS					TIME
	SOURCE	ENVIRONMENTAL MEDIA	POINT OF EXPOSURE	ROUTE OF EXPOSURE	EXPOSED POPULATION	
SOIL (DUSTS)	JIS LANDFILL	SOIL	LANDFILL	INGESTION INHALATION	WORKERS TRESPASSERS	PAST FUTURE
AMBIENT AIR (METHANE)	JIS LANDFILL	AMBIENT AIR	LANDFILL	INHALATION	WORKERS TRESPASSERS	PAST FUTURE

APPENDIX B



NJDEP: JONES INDUSTRIAL SERVICES
LANDFILL - PHASE II RI

WASTE SCIENCE AND TECHNOLOGY CORP.
PHILADELPHIA, PA
(215) 627-1443

SITE LOCATION

Figure # 1

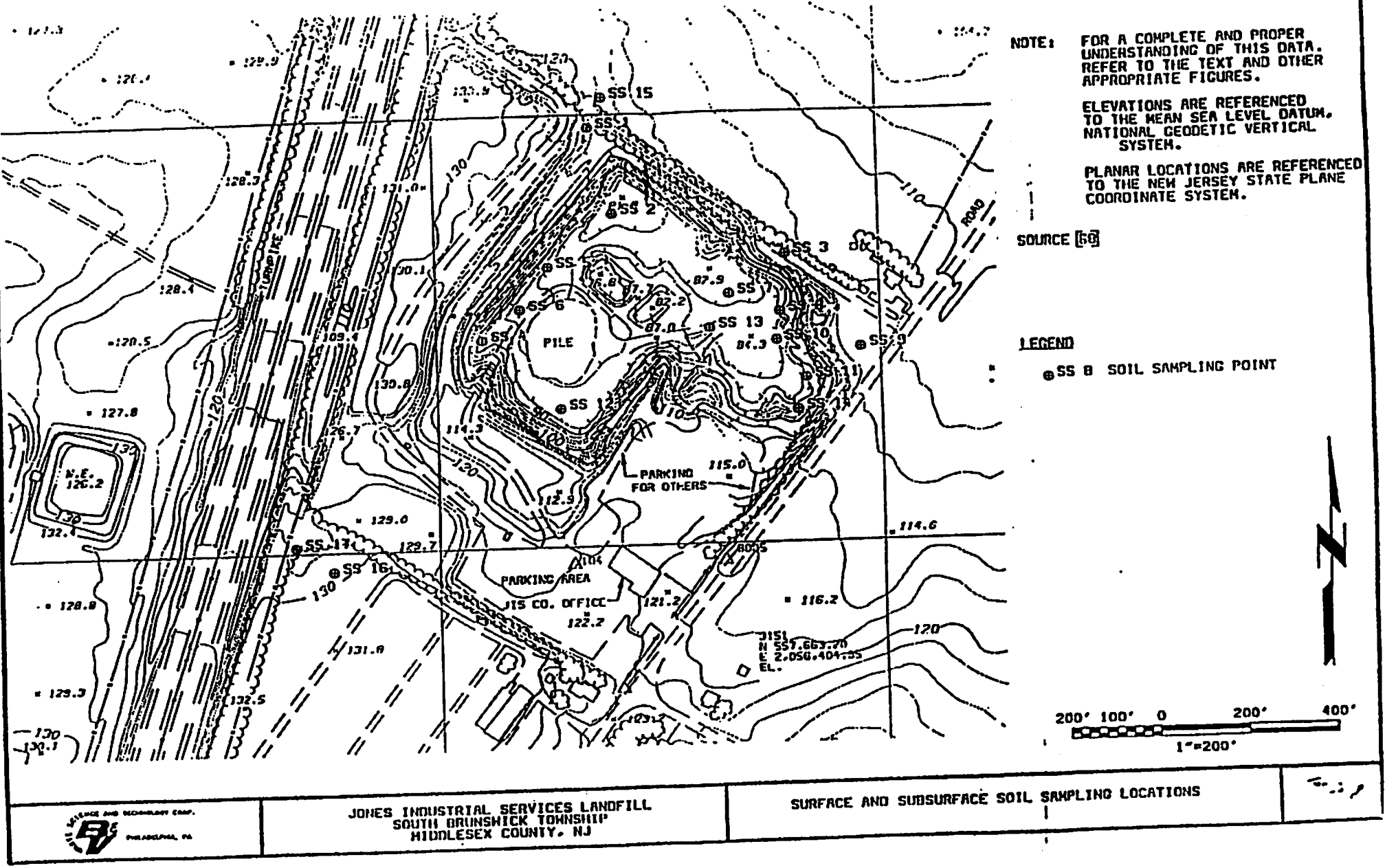

NOTE: FOR A COMPLETE AND PROPER UNDERSTANDING OF THIS DATA. REFER TO THE TEXT AND OTHER APPROPRIATE FIGURES.
ELEVATIONS ARE REFERENCED TO THE MEAN SEA LEVEL DATUM. NATIONAL GEODETIC VERTICAL SYSTEM.
PLANAR LOCATIONS ARE REFERENCED TO THE NEW JERSEY STATE PLANE COORDINATE SYSTEM.
SOURCE [5]
LEGEND
SS 8 SOIL SAMPLING POINT
PILE
PARKING FOR OTHERS
PARKING AREA
JIS CO. OFFICE
ROAD
TURNPIKE
N.E. 126.2
200' 100' 0 200' 400'
1"=200'
JONES INDUSTRIAL SERVICES LANDFILL
SOUTH BRUNSWICK TOWNSHIP
MIDDLESEX COUNTY, NJ
SURFACE AND SUBSURFACE SOIL SAMPLING LOCATIONS

Figure # 2

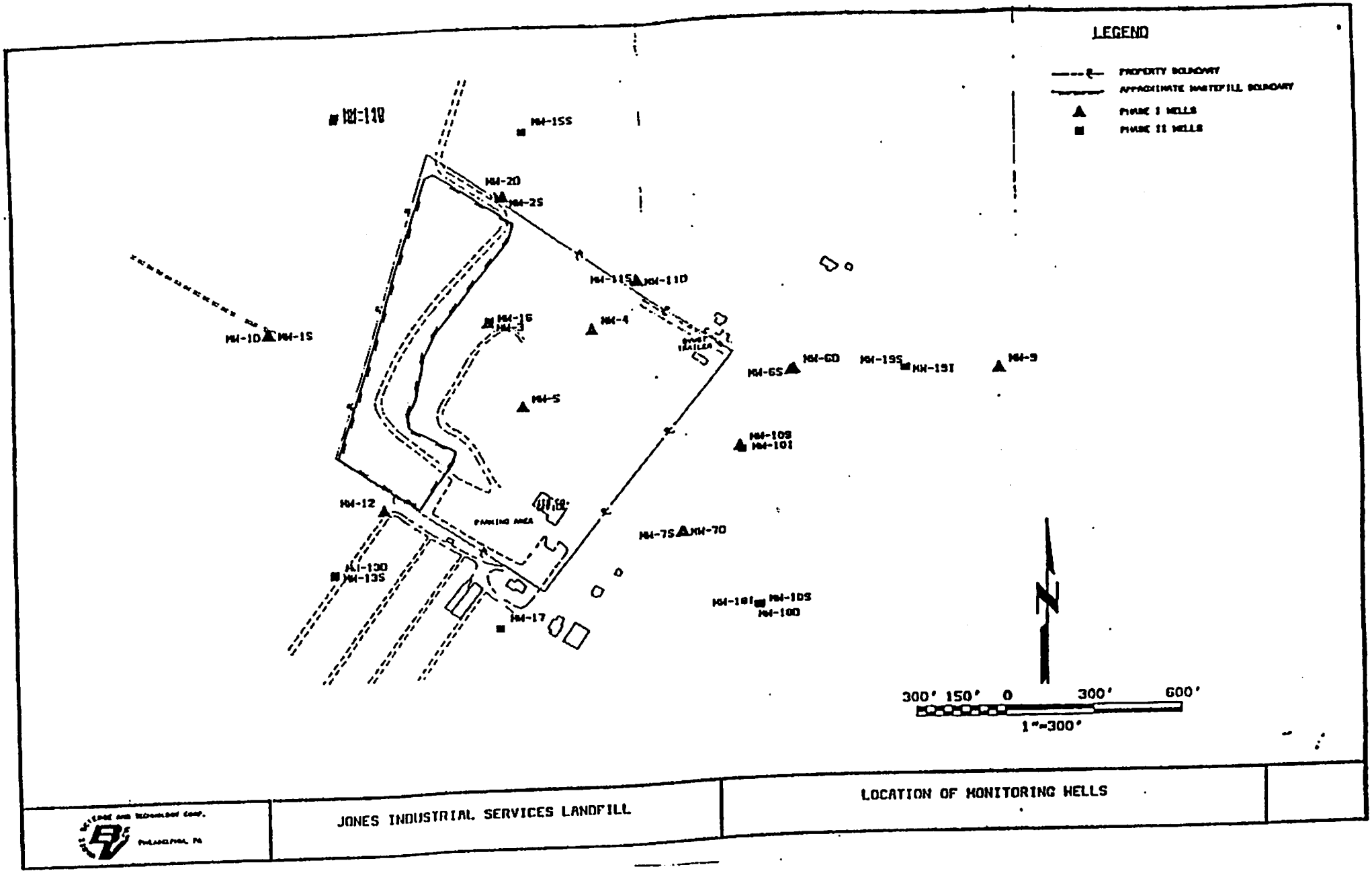

LEGEND
PROPERTY BOUNDARY
APPROXIMATE WASTEFILL BOUNDARY
PHASE I WELLS
PHASE II WELLS
MW-11S
MW-20
MW-2S
MW-11S
MW-11D
MW-16
MW-3
MW-4
MW-1D
MW-1S
MW-6S
MW-6D
MW-19S
MW-19I
MW-9
MW-5
MW-10S
MW-10I
MW-12
PARKING AREA
MW-7S
MW-7D
MW-13D
MW-13S
MW-18I
MW-18S
MW-18D
MW-17
300' 150' 0 300' 600'
1"=300'
JONES INDUSTRIAL SERVICES LANDFILL
LOCATION OF MONITORING WELLS

Figure # 3

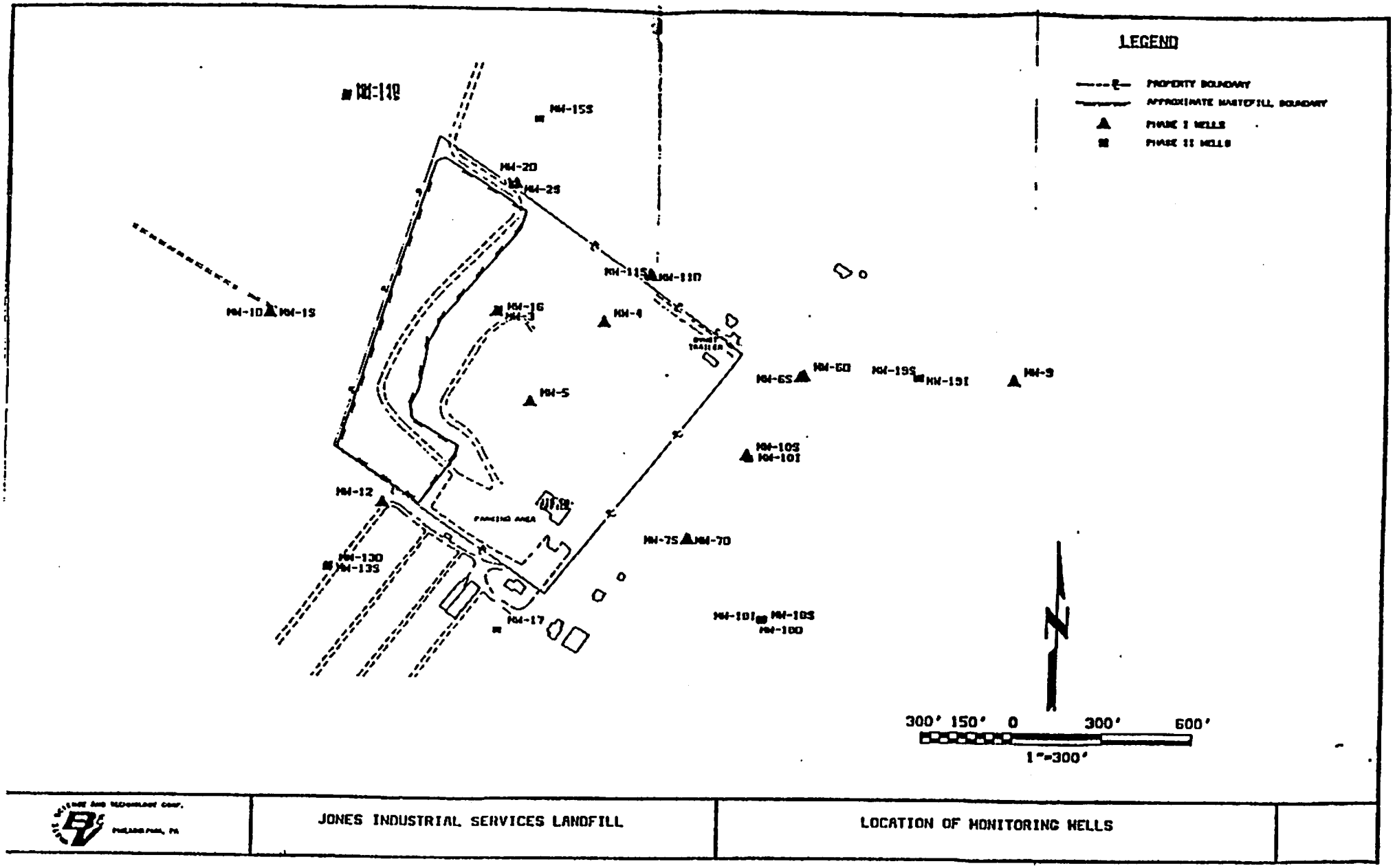

LEGEND
PROPERTY BOUNDARY
APPROXIMATE LANDFILL BOUNDARY
PHASE I WELLS
PHASE II WELLS
MW-15S
MW-20
MW-2S
MW-11S
MW-11D
MW-10
MW-1S
MW-16
MW-3
MW-4
MW-5
MW-6S
MW-6D
MW-19S
MW-19I
MW-9
MW-10S
MW-10I
MW-12
PARKING AREA
MW-7S
MW-7D
MW-13D
MW-13S
MW-17
MW-18I
MW-18S
MW-18D
300' 150' 0 300' 600'
1"=300'
JONES INDUSTRIAL SERVICES LANDFILL
LOCATION OF MONITORING WELLS

Figure # 4

APPENDIX C

CHRONOLOGY OF EVENTS

1955	JIS Landfill begins operation.
07/07/75	One resident owner notifies the NJDEP Bureau of Solid Waste Management of suspected dimethylsulfoxide(DMSO) contamination his domestic well.
07/28/75	The USEPA collects samples from the owner,s well at the request of NJDEP. First field visit to JIS Landfill by NJDEP personnel.
08/26/75	NJDEP issues Department Order to JIS Landfill to install additional monitoring wells by September 26, 1975, and to provide groundwater analysis by October 27, 1975.
10/03/75	USEPA report confirms that the well is grossly contaminated with organic chemicals.
11/06/75	Two JIS monitoring wells (hydraulically upgradient) are sampled by USEPA.
11/10/75	Little or no hydraulically upgradient contamination was detected by the USEPA.
12/02/75	All JIS wells and 4 off-site monitoring wells are sampled.
12/10/75	The presence of several volatile organic compounds is detected hydraulically downgradient of the JIS Landfill.
01/80	Ground water samples are collected from JIS monitoring wells and domestic wells in the vicinity. USEPA's test results show that the landfill is still causing gross chemical contamination of the ground water, with VOCs including chloroform, trichloroethylene, benzene, trichloroethane, toluene, and dichloroethane in one downgradient monitoring well.
12/12/80	JIS Landfill closes, capping of chemical waste disposal area and construction of new disposal area are not completed.
03/17/82	NJDEP inspection reveals that JIS is operating an unauthorized transfer station on the site of the solid waste disposal facility.
11/03/82	JIS meets with NJDEP personnel concerning a NJDEP's permit application to conduct the groundwater study.

05/23/85	NJDEP's permit issued, incorporates landfill closure and analysis of 8 monitoring wells on site.
05/21/86	NJDEP issues request for JIS Landfill Remedial Investigation/Feasibility Study (RI/FS).
10/29/86	JIS Landfill Phase I RI/FS is initiated.
09/88	ATSDR's JIS Landfill site summary completed.
12/88	B&V Phase I RI/FS draft summary report completed.
07/30/90	NJDOH's Public Health Assessment document completed.
06/10/91	NJDOH's Public Health Assessment document amended.
08/10/92	NJDOH's Site Review and Update document completed.
07/92	B&V Phase II RI/FS summary report completed.

APPENDIX D

Health Assessment for

JIS LANDFILL

SOUTH BRUNSWICK TOWNSHIP, MIDDLESEX COUNTY, NEW JERSEY

CERCLIS NO. NJD097400998

JULY 30, 1990

AMENDED

JUNE 10, 1991

HEALTH ASSESSMENT
JONES INDUSTRIAL SERVICES LANDFILL
MIDDLESEX COUNTY
SOUTH BRUNSWICK TOWNSHIP, NEW JERSEY

Prepared by:
Environmental Health Service
New Jersey Department of Health

Prepared For:
Agency For Toxic Substances and Disease Registry (ATSDR)

OBJECTIVES

Phase I of the Remedial Investigation (RI) of Jones Industrial Services Landfill has been completed, and the Phase II work plan is currently being reviewed. The objectives of this Health Assessment, based upon the current stage of site remediation are to:

* Assess the nature and magnitude of health effects associated with the site;
* Identify, if necessary, immediate actions necessary to minimize exposure to hazards and contamination associated with the site;
* Identify, if necessary, deficiencies in information and/or data relating to the site;
* Document the concerns of the community with regard to the site;
* Review remedial activities in the context of their public health implications;
* Assess whether a follow-up health study or investigation is indicated based upon the degree of public health concern.

SUMMARY

The Jones Industrial Landfill site began as a 33 acre pit that had been excavated to provide soil needed during the construction of the New Jersey Turnpike. Landfilling operations

reportedly began in 1955. In the 1960's, as part of the landfilling operation, toxic chemicals were dumped into the pit. It is estimated that approximately 50,000 cubic yards of waste were disposed of annually. Bulk liquid chemicals, including industrial solvents and pesticides, are buried at the site. The Remedial Investigation/Feasibility Study for JIS was initiated in October 1986. Field work for Phase I of the RI has been completed. The site is currently ranked 45 of 110 Superfund sites in New Jersey. The primary pathway of concern is the domestic use of contaminated groundwater. Residents near the JIS landfill have experienced contamination of their well water since 1975. On-site contamination of groundwater and soil has occurred predominantly by volatile organic compounds (VOCs), pesticides and heavy metals. Off-site ground water contamination has occurred in South Brunswick and Monroe Townships. Private wells have been grossly contaminated by VOCs.

On the basis of the information reviewed, ATSDR and NJDOH have concluded that this site is of public health concern because humans have probably been exposed to VOCs, heavy metals, phthalates and pesticides at concentrations that may result in adverse health effects. The Jones Industrial Services Landfill site is being considered for appropriate follow-up health study and evaluation.

SITE DESCRIPTION

According to the Hazard Ranking System documentation and the site Fact Sheet compiled by the New Jersey Department of Environmental Protection (NJDEP), the Jones Industrial Services Landfill (JIS) site occupies a portion of the triangular block created by the intersection of the New Jersey Turnpike, Cranberry-South River Road (Rt 535), and Jamesburg Road. JIS Landfill began as a 33 acre pit that was excavated to provide soil needed during the construction of the New Jersey Turnpike. The site, which is surrounded by agricultural land, is located slightly north of N.J. Turnpike exit 8A in South Brunswick Township, Middlesex County, New Jersey. (Site-map appended)

Landfilling operations reportedly began in 1955, and are documented since 1962. The operational statement of JIS in 1976 indicated that 71,000 gallons of oil, 71 tons of non-ferrous metals, 129,000 gallons of liquid waste, and 171,000 tons of industrial solids were emptied into the pit in 1975. It is estimated that approximately 50,000 cubic yards of waste were disposed of annually. A DEP inspection on December 4, 1980, states that crushed drums were observed protruding through the walls of disrupted waste, as well as new drums at other locations on the site. Bulk liquid chemicals, including industrial solvents and pesticides, are buried at the site (NJDEP, Hazard

Ranking System; 8/10/82).

NJDEP closed the landfill in 1980, to enforce compliance with a 1977 Administrative Consent Order. In 1982, NJDEP filed a motion to enforce the regulations ensuring appropriate remediation. In 1983, JIS capped the top, but not the sides of the landfill and did not submit certification for the work performed. In 1984, JIS was ordered to implement groundwater decontamination. Also in 1984, NJDEP barred Mr. Jones from operating any facility under the Solid Waste Management Act.

Commercial agriculture exists in the vicinity of the site. Crops include corn, wheat, and cranberries. It is estimated that 395 acres of irrigated farmland exists within 3 miles of the site. Cranberry bogs are located within 3/4 mile of JIS. The surface water drainage from the vicinity of the site is used for boating, fishing, and other recreational activities (ATSDR Site Summary, 1988).

Rapid development is occurring in the area around the JIS site. The New Jersey Turnpike is being widened in the area. Contamination was reportedly encountered as the Turnpike encroached upon the landfill. The Department of Transportation is overseeing sampling of off-site areas to ascertain whether the combination of the New Jersey Turnpike construction and the presence of JIS may impact public health. Turnpike construction activity had been suspended pending study by the Department of Transportation.

COMMUNITY CONCERNS

Residents near the JIS landfill have experienced contamination of their well water since 1975 (NJDEP: Community Relations Plan for JIS Landfill; July 1986). Community concerns focused initially on getting the site listed for Superfund cleanup activity. On March 3, 1983, the Princeton Packet reported on the assault of a cameraman at the JIS site during the filming of a documentary entitled "In Our Water".

More recently, the Mayor of Jamesburg has expressed concern over the pollution problems experienced in wells near the perimeter of the town, and the impact of the site upon the municipality's development. City water lines have been extended to bring public water to 7 of 9 residences during the period 1987-1989.

SITE VISIT

Information used in this assessment includes information

provided by NJDEP and local government personnel who have been to the site. A site visit to JIS Landfill will be conducted by NJDOH personnel, and reported in the form of an addendum to this health assessment.

Access to this site is restricted by the owner, who maintains security by locked fences and watch dogs when workmen are not on site.

ENVIRONMENTAL CONTAMINATION AND PHYSICAL HAZARDS

This health assessment is primarily based both on the limited data collected during the 1970's before the Remedial Investigation and on the results of Phase I of the RI. The Phase I Remedial Investigation (RI) included sampling of the soils, groundwater and air. Since the site is located in an agricultural area of South Brunswick Township, and the major route of contaminant migration appeared to be associated with groundwater, most of the samples were limited to on-site or adjacent locations. Results of the RI indicate that certain surface and subsurface soils as well as groundwater in areas in and around the JIS landfill have been affected by both organic and inorganic contamination.

On-Site Contamination:

Soils:

Volatile organic compounds (VOCs), base/neutral compounds, and pesticides were present in the soil matrix of the on-site wastefill. The most prevalent compounds were base neutrals and the highest concentrations were typically found in surficial soils. Arochlor 1260, a polychlorinated biphenyl was detected along the western-most edge of the landfill.

A variety of organic compounds were found in soils at various locations. Polyaromatic hydrocarbons, phthalates and volatile organic compounds (VOCs) as well as pesticides were also found at various sampling points. Concentrations of metals, such as arsenic and cadmium, were elevated.

Relative similarities of physical properties of the soil samples throughout the study area are suggestive of low permeation and minimal vertical migration.

Groundwater:

It is evident that groundwater in areas underlying the site and in close proximity to the site have been impacted with

certain volatile and inorganic contaminants. The data indicate that several VOCs (totalling 133,050 ppb) were found in the upper regions of the Old Bridge Aquifer. The most contaminated well was MW-3. The deeper wells did not show VOC contamination. Metals including chromium, nickel, and cadmium were detected in some samples, at concentrations above Maximum Contaminant Levels (MCLs) in many of the on-site wells.

Air:

General air-quality information for New Jersey and the JIS vicinity was available from the NJDEP and there were no violations of the State Ambient Air-Quality Standards for criteria pollutants. Air emissions of volatile compounds from the JIS Landfill, both before and after the subsurface RI, consisted almost exclusively of methane. This could be a potential explosion or asphyxiation hazard in confined spaces. Samples collected from subsurface exploration sites revealed elevated levels of non-methane volatile contaminants.

Off-Site Contamination:

Municipal wells are located within 3 miles of the site. Based upon periodic routine sampling in accordance with the New Jersey Safe Drinking Water Act, the municipal wells are not contaminated.

The total concentrations of volatile organic compounds (VOCs) in domestic wells was reported to be as high as 3,645 ppb. Individual VOCs were detected in the range of 45-1,800 ppb. One domestic well contained very high levels of both trichloroethylene and methylisobutylketone (each with concentrations of 1,400-1,700 ppb). Other domestic wells reportedly contained levels of VOC's including benzene in the 2-5 ug/l range.

Volatile organic chemicals (VOCs) have been detected in potable water samples from homes that are approximately half a mile from JIS. The maximum concentration of VOCs in these potable wells is greater than 100 parts per billion. Residents using these wells were notified of the contamination in 1989 and supplied with bottled water. Phase II of the Remedial Investigation will investigate whether the JIS site is responsible for the contamination of the private wells.

On June 30, 1980, a radiological survey of seven private wells and one JIS monitoring well revealed no distribution of radioactive material within the aquifer.

The Hazard Ranking System document states that sampling has failed to detect surface water or ambient air contamination. The sampling plan that was used to sample and analyze the water and

air samples were not presented.

Table I lists the maximum concentrations of the chemicals that are considered to be contaminants of concern at the Jones Industrial Landfill Site. These chemicals were identified based on their toxicity, detected concentrations and environmental fate.

QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance/quality control (QA/QC) data on the analytic information was unavailable for review and evaluation. The validity of analytical results received from the Environmental Resources Management Inc. was reviewed by NJDEP. (Personal communication with Technical Coordinator, April 1990.) The NJDEP Data Validation Guidelines was used to evaluate the content of data packages, sample holding times, and blank sample quality. The data presented has been found to be acceptable by NJDEP.

DEMOGRAPHICS

In 1982, there were approximately 32,000 people, 340 private wells, and 5 public wells within a three mile radius of the site (in both South Brunswick and Monroe Townships). The closest residence is located approximately 400 feet from the site (ATSDR Site Summary, 9/14/88).

The Manalapan Brook and its tributaries serve as the closest discharge area for the Old Bridge aquifer. There are about 340 private wells within a 3 mile radius from this site. Commercial agriculture exists within this 3 mile radius. At the present time it is difficult to assess if the water used for irrigating these crops is contaminated.

Additional demographic information concerning the site should include: the size of the population adjacent to the site, the precise number of wells in the area, and the identification of sensitive populations.

ENVIRONMENTAL DATA GAPS

Review of the existing information and data generated during the Phase I Remedial Investigation of the JIS Landfill identified the following data limitations.

* Information on the extent of lateral and vertical groundwater contamination is limited.

* There is limited data on the deep aquifer underlying the site and the potential for off-site migration of contaminants through deeper zones cannot be evaluated.

* Background information on domestic wells downgradient of the site is not available.

* Inadequate groundwater and subsurface soil data limit characterization of the plume.

* Information on landfill design and landfill contents to evaluate their influence for actual and potential groundwater contamination is unavailable.

* There is no information on whether ground water is used for irrigation purposes.

EXPOSURE PATHWAYS

As the site has not yet been adequately characterized and inadequate information is available on the geophysical characteristics of the contaminant plume, it is difficult to identify all the environmental pathways that are applicable.

In Phase I of the RI, ground water, surface soil, and subsurface soil were identified as the primary media in which contamination has been detected. The major exposure pathways of concern to humans appear to be associated with contaminated off-site groundwater. The use or consumption of contaminated well water could lead to oral, dermal and respiratory exposure. The exposure potential for residents near the site using contaminated well water may be enhanced as a result of volatilization of contaminants during indoor use of contaminated water for activities such as drinking, cooking, bathing, showering and cleaning.

Additional potential exposure pathways are associated with breathing ambient and indoor air containing chemical vapors or aerosols, contact with contaminated soil or dust on-site, contact with contaminated soil transported off-site, or the consumption of wild or home grown plants and of animals that have been exposed to contaminants that have migrated from the site.

Exposure to chemicals contained within the landfill is apparently primarily limited to individuals working at this location. The exposure potential is from dermal contact with contaminated soil and by inhalation of aerosolized or resuspended chemicals.

The presence of drums on the site both visible and invisible, the contents of which are not known, pose an additional exposure risk.

To date, surface water has not been adequately characterized. If surface water is determined to be contaminated then other related exposure pathways exist and will be discussed in revisions to this health assessment.

PUBLIC HEALTH IMPLICATIONS

Several pollutants of concern have been detected but of primary concern are the VOCs which include compounds with carcinogenic potential such as vinyl chloride, benzene, chloroform and trichloroethylene. Long-term exposure to low concentrations of VOCs can impact the hepatic system, the central nervous system, the hematological system, and the renal system. Some of the VOCs (benzene and vinyl chloride) are demonstrated human carcinogens. Chronic exposure to vinyl chloride can result in systemic toxic effects such as disturbances of central nervous system, cardiovascular and gastrointestinal manifestations as well as pulmonary insufficiency can occur at high exposure levels. Vinyl chloride was detected in groundwater samples.

Chronic exposure to heavy metals such as arsenic, chromium, cadmium and nickel can result in disturbances of the nervous system, hematological system, the gastrointestinal system and renal system. Occupational epidemiologic studies have also demonstrated the carcinogenic potential of longterm exposures to chromium, cadmium and nickel. The presence of these metals in groundwater constitutes a public health concern.

Though public water was provided to highly contaminated residence(s) in 1981, the presence of VOCs in potable water constitute a public health concern.

CONCLUSIONS AND RECOMMENDATIONS

On the basis of the information reviewed, ATSDR has concluded that this site is of public health concern because humans have probably been exposed to hazardous substances at concentrations that may result in adverse health effects. As noted in the Environmental Pathways section, human exposure to VOCs and heavy metals is probably occurring and has probably occurred in the past via ingestion of contaminated groundwater and dermal contact with contaminated soil.

Many of the data gaps identified in this health assessment and recommendations in the Phase I RI, will be addressed by Phase

II Remedial Investigation study. Proposed activities include the following: (1) Determination of lateral and vertical groundwater contamination, (2) A magnetometer survey to identify potential metal drum locations, (3) An evaluation of the landfill cap and cover, and, (4) Modeling of the groundwater flow.

To date, city water lines have been extended to bring public potable water to 7 of 9 residences during the period 1987-1989. It is recommended that the remaining two nearby residences be provided with potable water supply at the earliest possible time.

Collection of additional data in the form of additional test borings, monitoring stations, analytical points etc. will serve to evaluate fully the need for source control in management of migration measures and alternatives for meeting these needs.

A well use survey as well as monitoring of wells used for irrigating commercial crops will serve to identify potential environmental and human exposure pathways and demonstrate contamination patterns. Hence, it is recommended that sampling points and strategies be chosen to satisfy these data needs.

In accordance with CERCLA as amended, the Jones Industrial Landfill site has been evaluated for appropriate follow-up with respect to health effects studies. Since human exposure to off-site contaminants has occurred in the past, this site is being considered for follow-up health studies. After consultation with Regional EPA staff and State and local health and environmental officials, the Division of Health Studies, ATSDR and NJDOH will determine if follow-up public health actions or studies are appropriate for this site.

This Health Assessment was prepared by the State of New Jersey, Department of Health, Environmental Health Service, under a Cooperative Agreement with the Agency for Toxic Substances and Disease Registry. The Division of Health Assessment and Consultation and the Division of Health Studies of ATSDR have reviewed this Health Assessment and concur with its findings.

REFERENCES

Superfund Documents:

Phase I Sampling Report for Jones Industrial Services Landfill, Middlesex County, New Jersey. By Black and Veatch Inc. December 1989.

NJDEP, Community Relations Plan for Jones Industrial Services Landfill, July 1986.

ATSDR, Site Summary for Jones Industrial Services Landfill, September 1988.

NJDEP, Documentation Records for the Hazard Ranking System, June 1982.

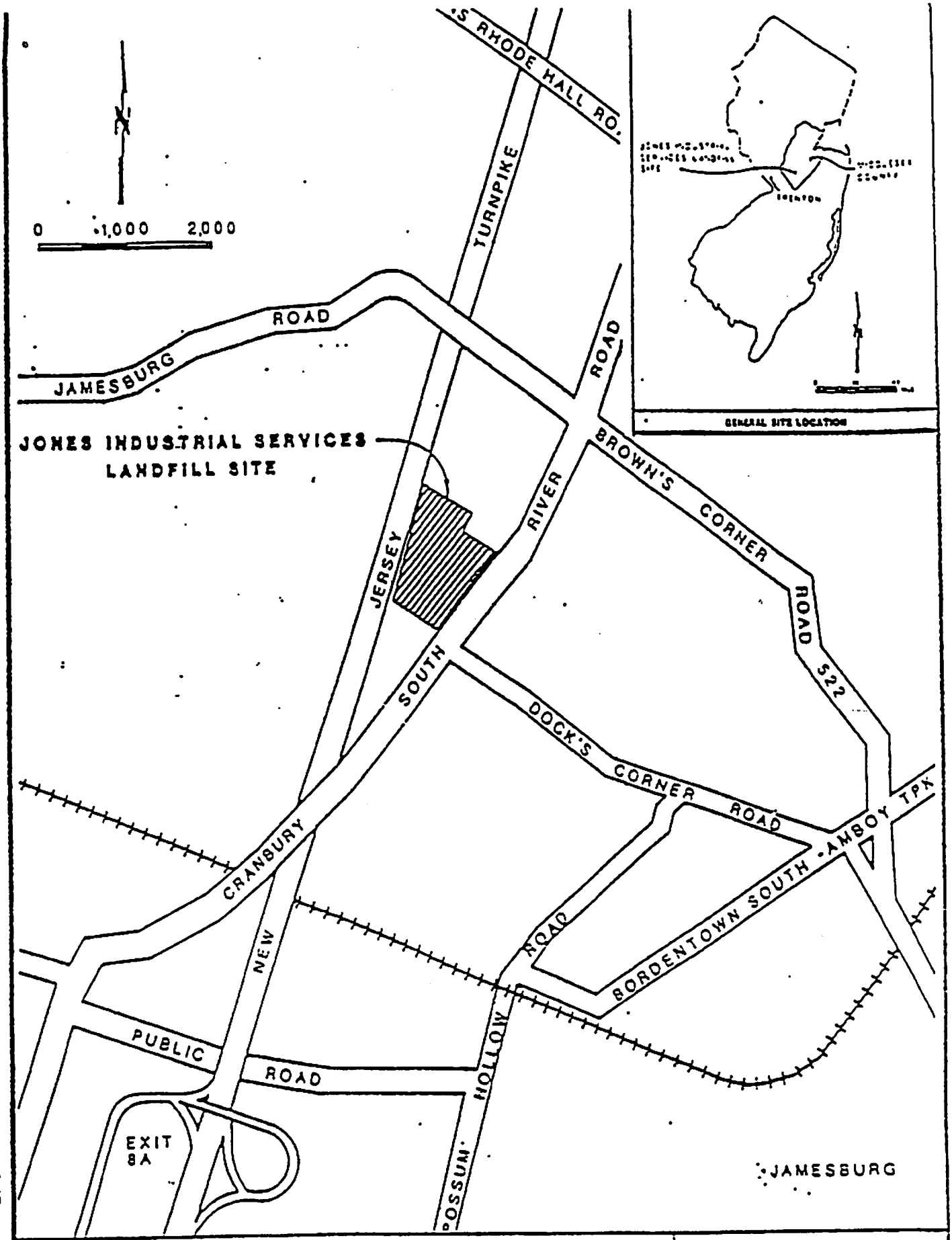
NJDEP, Fact sheet for Jones Industrial Services Landfill, May 1987.

Miscellaneous laboratory results 1975-1976.

Interviews:

Technical Coordinator, New Jersey Department of Environmental Protection/Hazardous Site Mitigation (NJDEP/Bureau of Environmental Evaluation and Risk Assessment.

Site Manager, NJDEP/Bureau of Site Management.



NJDEP: JONES INDUSTRIAL SERVICES LANDFILL - PHASE II RI

FIGURE 1

SITE LOCATION

WASTE SCIENCE AND TECHNOLOGY CORP.
PHILADELPHIA, PA
(215) 527-1443

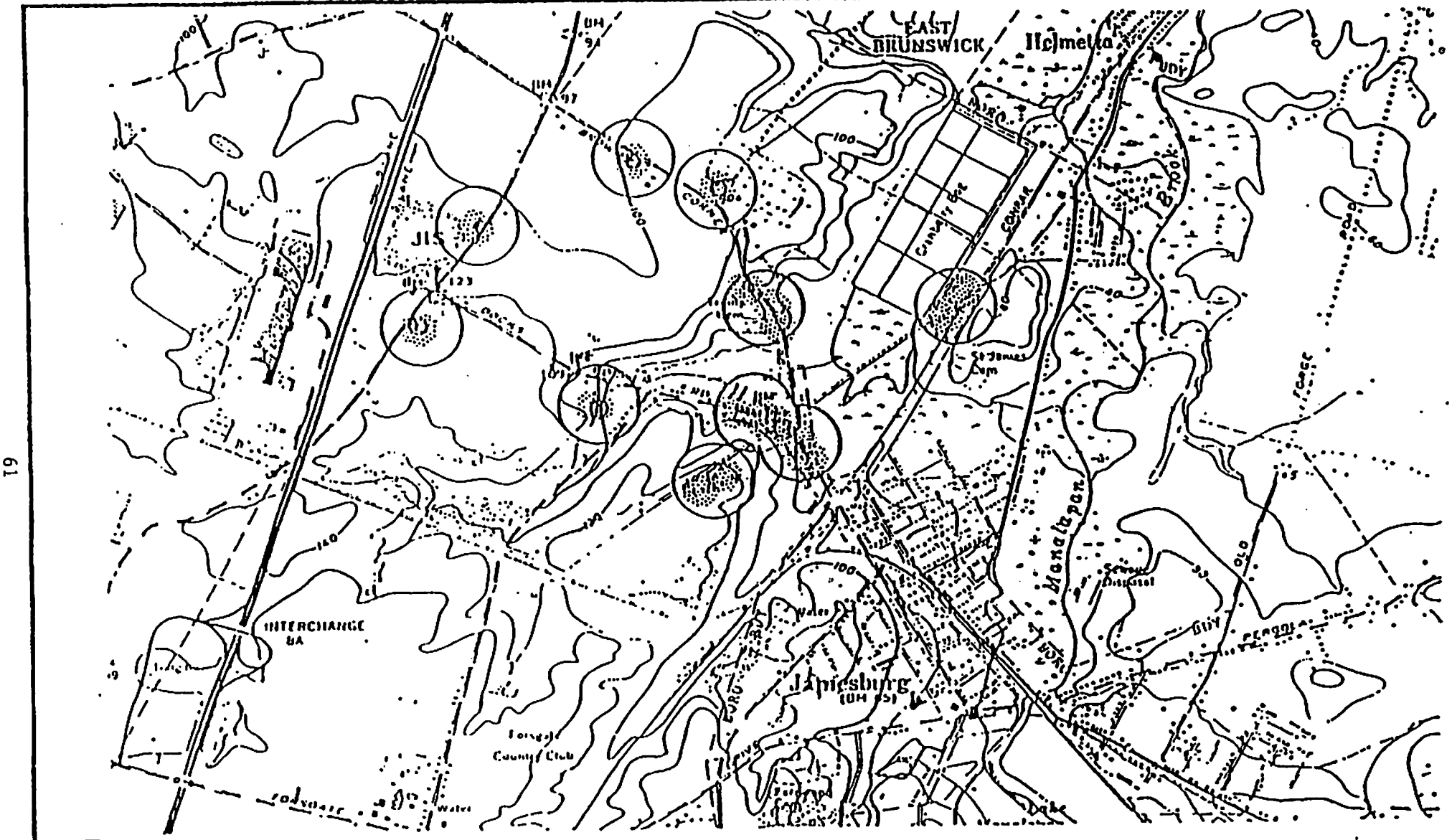
8-10-90/16:55 DNG#

TABLE I - Maximum Concentrations of Contaminants of Concern

Parameter	(ppb) Groundwater	(ppm) Surface Soil	(ppm) Soil
Volatile Organics:			
Vinyl Chloride	410	-	-
Methylene Chloride	2,000	-	-
Acetone	42,000	-	-
2-Butanone	-	-	0.210
Trans-1,2-Dichloroethylene	10,000	-	-
Chloroform	720	-	-
Benzene	31,000	-	-
4-Methyl-2-Pentanone	18,000	-	0.150
Tetrachloroethylene	750 J	-	-
Toluene	16,000	-	-
Ethylbenzene	23,000	-	-
Total Xylenes	11,000	-	-
Base/Neutral Compounds:			
Bis(2-Ethylhexyl)Phthalate	46	0.65	3.1
Di-n-Butylphthalate	4 J	5.40	0.084 J
Inorganics:			
Arsenic	-	59.6	-
Chromium	216	37.3	-
Cadmium	8.8	1.3	-
Nickel	67.7	10.9	-
Lead	59.2	20.3	-
Zinc	850	62.7	-
Copper	72.4	21.4	28.9
Pesticides/PCBs:			
Arochlor-1260	-	0.730	-
4,4'-DDT	-	0.230	0.620
4,4'-DDE	-	0.098	0.160 J

Source: Phase I Remedial Investigation Report, December 1989.

J = Estimated concentration.



SCIENCE AND TECHNOLOGY CORP. PHILADELPHIA, PA (215) 627-1443	NJDEP: JONES INDUSTRIAL SERVICES LANDFILL PHASE II RI	PROPOSED OFFSITE SUPPLY WELL INVESTIGATION

FIGURE 2

APPENDIX E

Site Review And Update

JIS LANDFILL

(a/k/a JONES INDUSTRIAL SERVICES, INC.)

SOUTH BRUNSWICK, MIDDLESEX COUNTY, NEW JERSEY

CERCLIS NO. NJD097400998

SEPTEMBER 2, 1992

REVISED

APRIL 20, 1993

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

REVISED SITE REVIEW AND UPDATE

JIS LANDFILL

(a/k/a JONES INDUSTRIAL SERVICES, INC.)

SOUTH BRUNSWICK, MIDDLESEX COUNTY, NEW JERSEY

CERCLIS NO. NJD097400998

Prepared by the
New Jersey Department of Health
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

Site Review and Update: A Note of Explanation

The purpose of the Site Review and Update is to discuss the current status of a hazardous waste site and to identify future ATSDR activities planned for the site. The SRU is generally reserved to update activities for those sites for which public health assessments have been previously prepared (it is not intended to be an addendum to a public health assessment). The SRU, in conjunction with the ATSDR Site Ranking Scheme, will be used to determine relative priorities for future ATSDR public health actions.

SUMMARY OF BACKGROUND AND HISTORY

The Jones Industrial Services (JIS) Landfill is on a 33-acre site in South Brunswick, Middlesex County, New Jersey (Figure 1). The site is bordered by the New Jersey Turnpike to the west and Cranbury-South River Road to the east. The landfill, which is within part of a former borrow pit, occupies about 11 acres of the site.

The landfill began operating in 1956. Landfill records document that chemical, municipal, and industrial wastes were accepted from the 1960s through the early 1970s. In 1975, the U.S. Environmental Protection Agency (EPA) documented the presence of volatile organic compounds (VOCs) in downgradient monitoring wells and in one residential well adjacent to the landfill. Between January 1976 and December 1980, the State of New Jersey took repeated actions against JIS to develop plans for groundwater remediation, waste removal, and redesign of a proposed disposal area. However, those remedial measures have never been implemented. JIS capped a portion of the landfill in November 1980, however, the cap failed to meet New Jersey's specifications for thickness and permeability. The landfill was closed by a court order on December 2, 1980. In 1983, and in 1985, JIS constructed the northern half of the current landfill cap, and in 1985, the southern half of the landfill was capped. Municipal water was made available to nearby residents in June 1981. In 1985, an NJDEP permit was issued to allow operation of a collector-hauler service on the site.

Groundwater and soil contamination was documented at the site during the December 1988 Phase I remedial investigation (RI). Off-site migration of groundwater contaminants was found to have affected ten private wells in the townships of South Brunswick and Monroe. The municipal water system was extended to one business and five residences. Bottled water was supplied to the affected residences until the connection to municipal water supply was completed in August 1989. A new water main extension is being installed to connect the four remaining residences to municipal water supply. Bottled water is being supplied to these residences. A Phase II RI is currently in progress.

In July 1990, the New Jersey Department of Health (NJDOH) completed a health assessment of the site. The primary completed exposure pathway identified in that assessment was the past exposure of nearby residents to VOCs in private well water by way of ingestion, inhalation, and direct contact. Potential exposure pathways included these: (1) past, present, and future exposure of on-site workers to organic compounds and metals in soil through ingestion, inhalation, and direct contact; and (2) past, present, and future exposure of on-site workers to VOCs in ambient air although inhalation.

The 1990 public health assessment identified the following community health concerns: (1) potential health effects associated with past exposure to contaminated private well water; (2) the need for site remediation; and, (3) the potential impact of groundwater contamination on private wells in the Borough of Jamesburg. The following public health concerns were identified in the 1990 assessment: (1) chronic exposure to low levels of VOCs and metals in private well water may result in cancer and noncancer health effects; (2) on-site physical hazards, including buried drums, stockpiled materials, storage lagoon, and methane emissions, could cause physical injury to site trespassers or on-site workers (i.e., those individuals could fall, drown, or be injured by explosions).

NJDOH categorized the site in 1990 as a public health hazard because people probably were exposed in the past to VOCs and metals in groundwater and soil, and people could be exposed currently at levels that may result in adverse health effects. In addition, NJDOH concluded that more information is needed to adequately assess the impact of the site on public health. The following recommendations were made:

- collect additional environmental data, including soil borings and agricultural and monitoring well samples;
- survey private well use;
- provide potable water to those residences with contaminated wells not yet connected to the municipal water system; and
- consider follow-up health activities.

CURRENT SITE CONDITIONS

On June 19, 1992, Ms. Laurie A. Pyrch of NJDOH conducted a site visit at the JIS Landfill. Ms. Pyrch was accompanied by the New Jersey Department of Environmental Protection and Energy (NJDEPE) site manager, a South Brunswick Health Department environmental sanitarian, and an environmental specialist from the Middlesex County Health Department, Solid Waste Control Program.

The area surrounding the site is primarily rural; land use is primarily agricultural. Several homes and businesses are near the site along Cranbury-South River Road and Jamesburg Road. A plant nursery is adjacent to the southern edge of the site. Additional businesses, including a large warehouse, are along the western side of the New Jersey Turnpike. Private residences are downgradient of the site in the area of Bordentown-South Amboy Turnpike.

A fence and entrance gate are at the eastern site boundary on Cranbury-South River Road. The site is also fenced along the New

Jersey Turnpike to the west. Heavy stands of trees form the site boundary to the north and south. A dirt access road is on the western perimeter of the site.

An active recycling/transfer operation occupies the eastern part of the site. Piles of various materials, including metal pipes, garbage dumpsters, office chairs, asphalt, and wood chips are being stored on site. The eastern part of the site is covered with soil. During the site visit, trucks were seen transporting materials off site; wood chips were being moved by a backhoe. A 30-foot-deep excavation covers about one-half of the eastern part of the site. An open storage lagoon is in the excavated pit, apparently the remains of past remedial activities conducted by the landfill owner. A lined temporary water containment built during the Phase II RI was seen in the pit.

The former landfill is on the western section of the site, adjacent to the New Jersey Turnpike. Small sections of the landfill are covered with vegetation; however, much of the landfill cap is eroded. Stressed vegetation was seen in the landfill area. Physical hazards at the site include large metal objects and other stockpiled materials, the storage lagoon, and the water containment structure.

From information gathered during the site visit and by reviewing documents, it does not appear that site conditions have changed significantly since completion of the 1990 NJDOH public health assessment. The remaining four residences were connected to the municipal water supply in May 1992.

In December 1990, an NJDEP well use survey identified seven residential wells near the site; however, it was determined that those wells are being used for nonpotable purposes. A Phase II RI is currently in progress to further delineate the nature and extent of groundwater contamination, and to characterize soil conditions at the site. In addition, a baseline risk assessment is being performed as part of that supplemental investigation. New site data and information, including the Phase II RI and baseline risk assessment, indicate that further public health evaluation is needed.

CURRENT ISSUES

The Phase I RI suggests that there is potential for further contamination of surrounding potable wells and the underlying aquifer. The Phase II RI is in progress to further define the extent of the off-site contaminant plume. Thus, past exposure to VOCs and metals and the potential for future contamination of private well water remains a public health concern.

Physical hazards were noted during the site visit. Thus, the potential for on-site workers to be exposed to physical hazards continues to be a public health concern.

During the site visit, an active recycling/transfer operation was noticed on the eastern part of the site. On-site workers were involved in several activities that disturbed the ground surface. The Phase I RI documented the presence of VOCs, base neutral compounds, and pesticides in on-site surface soils. Although ambient air quality does not appear to be of major concern at the eastern section of the site, air samples collected from subsurface exploration sites in the landfill area revealed elevated levels of non-methane volatile contaminants. The Phase II RI is currently in progress to further characterize the contamination at the site, which includes an evaluation of the landfill cap. Although an NJDEP permit was issued to operate a collector-hauler service in 1985, local officials report that there is no current operating permit. It could not be determined if on-site workers have received Occupational Safety and Health Administration training in accordance with 29 CFR 1910.120. Although current work areas seem to be confined to areas other than the landfill, on-site workers could be exposed to contaminants in certain site areas (e.g., through inhalation of volatilized and airborne soil and dust contaminants).

According to local and county officials, community health concerns include the potential site-related contamination of Monroe Township wells; the public health impact of current activities at the site, including high-volume truck traffic; and illegal dumping near the site.

CONCLUSIONS

1. Information from the Phase I RI and current site conditions indicate that the site continues to be of public health concern because of the potential for local residents to be exposed to VOCs and metals through the use of private well water. On-site workers could be exposed to soil contaminants and to physical hazards at the site.

2. Most of the recommendations made in the 1990 public health assessment are being implemented during the Phase II RI. NJDEP conducted a well use survey in December 1990 that identified seven residential wells near the site that were used for non-potable purposes. Monitoring well and subsurface soil sampling are being performed at the site, as specified in the 1990 Phase II Project Plan. Between 10 and 25 off-site supply well samples are being collected as part of the Phase II RI. Proposed sampling regions were chosen using information on known supply

well contamination and the southeastward direction of the contaminant migration plume (Figure 2). However, it is not known whether downgradient municipal wells or agricultural wells will be included in the supply well investigation, as was recommended in the 1990 public health assessment.

3. The Phase II RI is being performed to further characterize groundwater contamination and subsurface soil conditions.

4. New site information and data indicate that additional public health evaluation is needed to assess the potential for people to be exposed to site contaminants in the groundwater and on-site soil.

5. The data and information developed in this site review and update have been evaluated to determine if follow-up actions may be indicated. Further site evaluation is needed to determine public health actions.

RECOMMENDATIONS

Several recommendations were made in the 1990 public health assessment that have not been implemented by the appropriate regulatory agency. From an evaluation of current site conditions and site-related documents, the following recommendation (originally made in 1990) should be implemented:

- Sample groundwater from downgradient municipal and agricultural wells that may be potentially affected by the contaminant migration plume, if not included in the Phase II RI.

In addition, the following recommendations is made:

- Reevaluate the site through the public health assessment addendum process using new site data and information, including the Phase II RI and baseline risk assessment, when available.

DOCUMENTS REVIEWED

1. Jones Industrial Services Landfill, Phase II Remedial Investigation: Field Sampling-Quality Assurance Project Plan, B & V Waste Science and Technology Corporation, October 1990.

2. Jones Industrial Services Landfill, Draft Phase I Sampling Report, Black and Veatch Inc., December 1988.

Preparer of Report: Laurie A. Pyrch
Research Scientist II

APPENDIX F

RESPONSE SUMMARY

This response summary represents those comments and reactions to the Public Health Assessment Addendum received during the Public Comment Period described in the Community Concerns Evaluation section. Comments were received from residents of the Jamesburg Township, chairman of the Monroe Township Environmental Commission, and Environmental Resources Management, Inc. on behalf of JIS Committee. In some cases, similar commentary was received from various sources, while other concerns were expressed by individuals or groups. Comments and concerns have been grouped by content where possible and are followed by the consequent response.

Comment

Comments were received from residents of the Jamesburg Township regarding the radiological contamination of their domestic wells, which were tested by NJDEP in June 1980.

Response

The NJDOH was unable to verify or reject the results of domestic well sampling with regard to radiological contamination conducted by NJDEP in June 1980. Currently all the homes are connected to the public water supply system. The NJDOH will convey this concern to the NJDEP, attempt to verify radiological data, and provide a response to residents which addresses the public health significance, if any, of the well data.

Comment

Multiple comments were received from Environmental Commission of Monroe Township expressing concerns regarding the use of eastern portion of the site as an active waste collection-hauler facility, risk to on-site workers, and use of domestic well water for non-potable purposes. A recommendation was made to provide physician education to the risk associated with contaminants detected in domestic wells.

Response

Case Studies in Environmental Medicine was sent to area health care providers as part of Physicians education for Jones Industrial Services (JIS) site. Middlesex County Resource Guide prepared by Environmental Health Service (EHS) and case studies prepared by ATSDR on exposure history, benzene, polychlorinated biphenyls, and trichloroethylene was sent to eleven local primary health care providers. Other concerns have been addressed in the report.

Comment

Multiple technical comments were received from Environmental Resources Management, Inc. on behalf of JIS Committee.

Comment #1

No information was given in the PHAA (Public Health Assessment Addendum) as to what assumptions were made or how risks were calculated. This is not a stand-alone document and could give the public incorrect impressions of risk related to JIS. Assumptions and risk calculation methods should be presented in the PHAA.

Response to comment #1

This is a stand-alone document. The assumptions were made to calculate risks associated the JIS site. These assumptions are clearly stated in the report (Please refer to last paragraph on page 14 and Residential Well Pathway section on page 16). The primary community concern regarding the JIS landfill site , was the impact of the site on the groundwater quality and residents exposure to contaminated domestic well water in the past prior to municipal water line hook ups. The use of a 25 year exposure duration represents the time from the beginning of landfilling operations at the site (1962) to the availability of municipal water supplies (1987), was used to represent a worse case exposure scenario as contamination levels were not known prior to 1975. Cancer estimates are based on an intake of 2 liters of water per day for a 70 kilogram adult for a lifetime (70 years). Since exposure to most JIS landfill site residents would most likely have occurred during the period from 1962 to 1987 rather than a lifetime, the risk of developing cancer from ingestion of domestic well water for up to 25 years would be less than the risk for a lifetime of exposure.

Comment #2

Since the PHAA Report is provided to inform the general public regarding community health concerns related to JIS Landfill, no information is given to explain the basis for the conclusions and, ultimately, the recommendations of the report (i.e., parameters used to calculate the CREG, EMEG, etc.). The basis for all conclusion should be presented in the PHAA.

Comment #3

Available analytical data for each medium are compared to a variety of values, but are not compared consistently (i.e., several values may be available for each chemical, but only one value is provided for comparison values (CREG, greater than RMEG, greater than MCL, greater than MCLG????). Such a hierarchy should be developed and discussed.

Response to comment #2 and #3

There is a hierarchy for use of available comparison values. This is explained in detail in Public Health Assessment Guidance Manual. The Comparison Values (CVs) are media-specific concentrations that are used by health assessors to select environmental contaminants for further evaluation. CVs are not used as predictors of adverse health effects or for setting clean up levels. Media concentrations less than a CV are unlikely to pose a health threat, although health assessors still need to consider the total dose from multiple -media exposure. Media concentrations above a CV do not necessarily represent a health threat. There are two hierarchy levels for selecting CV for contaminants in soil. Hierarchy Level 1 consisting of Chronic EMEG, CREG and Cancer Classes. Hierarchy Level 2 consisting of Intermediate EMEG and RMEG. There are three hierarchy levels for selecting CV for contaminants in water. Hierarchy Level 1 consisting of Chronic EMEG, CREG and Cancer Classes. Hierarchy Level 2 consisting of Intermediate EMEG, RMEG, LTHA and CLHA. Hierarchy Level 3 consisting of MCL and MCLG.

comment #4

The PHAA does not take into account elevated background concentrations of metals found during the Remedial Investigation in wells upgradient from the JIS Landfill. These background concentrations and the JIS Committee's comments to NJDEP regarding the fact that background values were not considered, should be reviewed in order to properly assess the potential risks at JIS.

comment #5

The PHAA assumed incorrectly, that JIS was the source of the contaminants found in the domestic wells east-southeast of the JIS Landfill. Those assumptions apparently are based on similar erroneous assumptions included in the RI/RA prepared on behalf of NJDEP. There is no evidence that the domestic well contamination is in any way related to JIS. The distance of the wells from JIS and the predominance of chlorinated organic contaminants in the domestic wells contrasts clearly with the constituents at JIS which are predominantly aromatic organic chemicals. In addition, the higher concentrations of these constituents in the domestic wells relative to JIS point to the likelihood that a local source exists in the vicinity of Bordentown Pike. An alternative source of contamination was suggested by Mr. Rogers of the Monroe Township Utilities Authority in a letter presented in Section 4 of these comments.

Response to comment #4 and #5

The PHAA was prepared using analytical data presented in the Phase II RI/FS Report. All the compounds detected in the domestic wells were also detected in the downgradient monitoring wells, except 1,1,2,2-tetrachloroethane and 1,1,2-trichloroethane.

comment #6

The PHAA does not reflect the likelihood that laboratory contaminants such as acetone, chloroform, and methylene chloride originated in the laboratory and that concentrations of these contaminants were found as blank contaminants in Quality Assurance samples. These facts should be considered and many of the occurrences of the constituents should be ignored as discussed in Section 2 as Data Validation and QA issues.

comment #7

The PHAA does not indicate that pesticide residues were identified in off-site soil samples which were obtained in orchards, farm fields and a nursery near the JIS Landfill, places where such residues would be expected to be commonplace. These detections should not be considered as being potentially related to JIS.

comment #8

Phthalates found in off-site soils samples were likely introduced when soil samples were composited by mixing on plastic bags in the field as discussed in Section 2 - Field Observations. These phthalate values should be ignored and should not be considered in assessing risk in the PHAA.

Response to comment #6, #7 and #8

The PHAA was prepared using analytical data presented in the Phase II RI/FS Report. In preparing this Public Health Assessment Addendum, ATSDR and NJDOH rely on the information provided in the referenced documents and assumes that adequate quality control measures were followed with regard to chain-of-custody, laboratory procedures, and data reporting. The validity of analysis and conclusions drawn for this Public health assessment is determined by the availability and reliability of the referenced information.

comment #9

For the purposes of calculating risks an assumption was made in the PHAA that contamination from JIS reached remote domestic wells approximately 1 - 1.5 miles east-southeast of the JIS Landfill in 1962, the same year the landfill was first operated. Obviously, it would have taken many years for contamination to migrate 1 - 1.5 miles in the ground water from the JIS Landfill to the domestic wells in question. While there is no evidence to indicate that the contamination in the remote domestic wells had its source at the JIS Lanfill, under the worst case scenario, contamination could not have migrated to the remote domestic wells immediately upon initiation of the landfilling at JIS. Thus, the risk calculations based on the assumption that contaminated domestic well water could have been ingested over a 25-year period between 1962 and 1987, is incorrect and assumes an exposure scenario which could not possible have occurred. The potential exposure period for those consuming water from these wells should be a small fraction

of the 25-year period used in the PHAA or when retardation effects showing contaminant migration are considered, the exposure period should be near zero.

Response to comment #9

Exposure of residents living near the JIS Landfill to VOCs (Volatile Organic Compounds) through ingestion of domestic well water are likely to have occurred in the past prior to the availability of municipal water supplies. Residential connections to municipal water supplies occurred between 1987 and 1990. The landfilling operations reportedly began in 1955 and are documented since 1962. There are no data or information prior to 1975, when USEPA sampled and analyzed the residential wells and found that the well water was grossly contaminated with VOCs.

Residents may have been exposed by drinking domestic well water, breathing air in the home that has been contaminated with VOCs released during the use of tap water for purposes such as showers and dishwashing, and through direct contact with VOCs during hand-washing. Ingestion of domestic well water (for a maximum period of 25 years) is the primary completed exposure pathway at the site. The table # 9 (Appendix A) summarizes the completed exposure pathway elements at the JIS landfill site. Past exposure to VOCs in domestic well water is further evaluated in the Public Health Implications section. The Phase II groundwater monitoring results indicates that the landfill continues to be a source of residual contamination to the shallow aquifer. The residents living near the JIS Landfill site are receiving potable water from a public water system, thus the potential for present or future exposure to contaminated groundwater is unlikely.

The toxicological effects of the contaminants detected in domestic wells at the JIS landfill site have been considered singly. The cumulative or synergistic effects of possible mixture of contaminants may serve to enhance their public health significance. Additionally, individual or mixtures of contaminants may have the ability to produce greater adverse health effects in children as compared to adult. Non-potable domestic usage of contaminated water (showers) may be associated with significant exposure through the inhalation and dermal contact routes. Current literature suggests exposure doses from these routes may approach those associated with direct ingestion (Reference #7). There is no data available to estimate the exposure doses to these secondary routes of exposure at the JIS landfill site. This toxicological discussion recognizes their potential contribution to exposure dose estimates and consequent public health implications. Cancer estimates are based on an intake of 2 liters of water per day for a 70 kilogram adult for a lifetime (70 years). Since exposure to most JIS landfill site residents would most likely have occurred during the period from 1962 to 1987 rather than a lifetime, the risk of developing cancer from ingestion of domestic well water for up to 25 years would be less than the risk for a lifetime of exposure.

comment #10

All detected chemicals are evaluated regardless of the location and proximity to the site (i.e., background or upgradient data are not considered). Additionally, evaluated data included chemical concentrations that may be at naturally occurring levels (i.e., arsenic and chromium are detected in on-site soils at levels below available New Jersey background levels as published by NJDEPE (March 1992)). Constituents present at naturally occurring levels in New Jersey should be eliminated from JIS related considerations.

Response to comment #10

The PHAA was prepared using analytical data presented in the Phase II RI/FS Report. In preparing this Public Health Assessment Addendum, ATSDR and NJDOH rely on the information provided in the referenced documents and assumes that adequate quality control measures were followed with regard to chain-of-custody, laboratory procedures, and data reporting. The validity of analysis and conclusions drawn for this Public health assessment is determined by the availability and reliability of the referenced information.

comment #11

Chlorinated organic chemicals (trichlorioethene) are detected off-site; however, the chemicals detected on-site are predominantly aromatic organic chemicals (i.e., toluene). The absence of significant levels of degradation byproducts such as vinyl chloride on the site distinguishes the site from the area of off-site domestic well contamination. These differences should be carefully considered and the assumption that the constituents in the domenstic wells had JIS as a source should be rejected.

Response to comment #11

The PHAA was prepared using analytical data presented in the Phase II RI/FS Report. All the compounds detected in the domestic wells were also detected in the downgradient monitoring wells, except 1,1,2,2-tetrachloroethane and 1,1,2-trichloroethane.

comment #12

The most recent promulgated standards should be used for comparison purposes. The PHAA Report states that arsenic exceeds the NJDEP Soil Cleanup Guideline, yet the NJDEP Soil Cleanup Guideline for arsenic is 20 mg/kg (February 1994), while the highest reported arsenic consentration in soil samples at JIS is 6 mg/kg. The latest standards should be used and some concentrations cited should be eliminated as exceedances.

Response to comment #12

The PHAA was prepared using analytical data presented in the Phase II RI/FS Report. In preparing this Public Health Assessment Addendum, ATSDR and NJDOH rely on the information provided in the referenced documents and assumes that adequate quality control measures were followed with regard to chain-of-custody, laboratory procedures, and data reporting. The validity of analysis and conclusions drawn for this Public health assessment is determined by the availability and reliability of the referenced information.

comment #13

The Report fails to evaluate several items required for the preparation of a site health assessment (i.e., determining contaminants of concern associated with the site; evaluating environmental transport mechanisms and human exposure pathways). These items should be discussed and evaluated.

Response to comment #13

Please refer to Tables #1 to #8 and Pathway Analysis section on page 14.

comment #14

During the RI investigation NJDEP identified green fluorescent dye, Fluoroscein, in well 18I and other wells as much as approximately 700 feet from the JIS site boundary. A Fluoroscein dye tracer study was performed at JIS by the New Jersey Bureau of Public Health and Engineering from May 1958 to 1959. Migration of the Fluoroscein over a distance of only about 1,200 feet is indicated during the 34 years from the date of the test until the detection in the monitoring well in 1992. Such a migration rate indicates that contaminant migration in the aquifer is likely much too slow to allow contaminated domestic wells near Bordentown Pike to be related to JIS. The Fluorscein detection is mentioned in the NJDEP RI on pp. 4-68, 4-94, and 4-97, in Appendix 4A, and was discussed in the NJDEP RI on pp. 4-68, 4-94, and 4-97, in Appendix 4A, and was discuss in a report entitled, "Engineer's Report of J.I.S. Co. Sanitary Landfill Operation on Block 17, Lot 9A South Brunswick Township, Middlesex County, N.J. (June 1975)".

Response to comment #14

No such conclusion was drawn in RI report based upon detecting the dye in monitoring well 18I and other wells.

These comments were reviewed and added to the official file for this Public Health Assessment Addendum.