

**EPA Superfund  
Record of Decision:**

**JONES CHEMICALS, INC.  
EPA ID: NYD000813428  
OU 01  
CALEDONIA, NY  
09/27/2000**

## **RECORD OF DECISION**

**Jones Chemicals, Inc. Superfund Site  
Caledonia, Livingston County, New York**

**United States Environmental Protection Agency  
Region II  
New York, New York  
September 2000**

## DECLARATION FOR THE RECORD OF DECISION

### SITE NAME AND LOCATION

Jones Chemicals, Inc. Superfund Site  
Caledonia, Livingston County, New York

Superfund Site Identification Number: NYD000813428  
Operable Unit 1<sup>1</sup>

### STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the U.S. Environmental Protection Agency's selection of a remedy for the Jones Chemicals, Inc. Superfund site (Site), which is chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §9601 *et seq.*, and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300. This decision document explains the factual and legal basis for selecting the remedy for the Site. The attached index (see Appendix III) identifies the items that comprise the Administrative Record upon which the selection of the remedy is based.

The New York State Department of Environmental Conservation was consulted on the planned remedy in accordance with CERCLA Section 121(f), 42 U.S.C. §9621(f), and it concurs with the selected remedy (see Appendix IV).

### ASSESSMENT OF THE SITE

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

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<sup>1</sup> This response action applies a comprehensive approach; therefore, only one operable unit is required to remediate the site.

## DESCRIPTION OF THE SELECTED REMEDY

The major components of the selected remedy include the following:

- Treatment of soils in the Former Solvent Tank Source Area at the JCI Jones Chemicals, Inc. (Jones) plant grounds exceeding New York State soil cleanup objectives by in-situ soil vapor extraction;
- Extraction of contaminated groundwater in the Former Solvent Tank Source Area utilizing a network of recovery wells in the overburden and bedrock aquifers;
- Treatment of the extracted groundwater with the existing air stripper, which allows for the utilization of the treated water as noncontact cooling water within the Jones plant, and discharge of the noncontact cooling water to the on-Site lagoons until groundwater standards in the Former Solvent Tank Source Area are achieved;
- In-situ treatment of the dense nonaqueous phase liquid (DNAPL) in the aquifer underlying the Former Solvent Tank Source Area<sup>2</sup> with an oxidizing agent, such as potassium permanganate or hydrogen peroxide;
- Continued extraction and treatment of contaminated groundwater from the North Well;
- Discontinued pumping from the West Well to eliminate the potential to draw contaminants to deeper water-bearing zones;
- Monitored natural attenuation of the contaminated groundwater located outside the Former Solvent Tank Source Area and beyond the influence of the North Well; and
- Implementation of institutional controls (*i.e.*, deed restrictions) to limit future on-Site groundwater use to nonpotable purposes until groundwater cleanup standards are achieved.

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<sup>2</sup> The magnitude of the tetrachloroethylene (PCE) concentrations in the bedrock aquifer in the Former Solvent Tank Area indicates the potential presence of such PCE in the form of a DNAPL, a "principal threat waste." As noted above, this "principal threat waste" will be treated via the in-well injection of an oxidizing agent.

During the design phase, samples will be collected to optimize the placement of the extraction wells in the Former Solvent Tank Source Area and to better characterize the extent of the DNAPL contamination.

As part of a long-term groundwater monitoring program, groundwater samples will be collected and analyzed quarterly in order to verify that the level and extent of groundwater contaminants (*e.g.*, volatile organic compounds) are declining and that conditions are protective of human health and the environment. In addition, biodegradation parameters (*e.g.*, oxygen, nitrate, sulfate, methane, ethane, ethene, alkalinity, redox potential, pH, temperature, conductivity, chloride, and total organic carbon) will be used to assess the progress of the degradation process. If it is determined that monitored natural attenuation is not effective in restoring groundwater quality outside of the Former Solvent Tank Source Area in a reasonable time frame, then remedial actions, such as enhanced reductive dechlorination<sup>3</sup> or groundwater extraction and treatment, may be implemented.

## **DECLARATION OF STATUTORY DETERMINATIONS**

The selected remedy meets the requirements for remedial actions set forth in CERCLA Section 121, 42 U.S.C. §9621, in that it: 1) is protective of human health and the environment; 2) meets a level or standard of control of the hazardous substances, pollutants and contaminants, which at least attains the legally applicable or relevant and appropriate requirements under federal and state laws; 3) is cost-effective; and 4) utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. In keeping with the statutory preference for treatment that reduces toxicity, mobility, or volume of contaminated media as a principal element of the remedy, the contaminated groundwater will be collected and treated. In addition, the contaminated soil in the Former Solvent Tank Source Area and the DNAPL in the aquifer underlying the Former Solvent Tank Source Area will be treated in-situ.

This remedy will result in the reduction of hazardous substances, pollutants, or contaminants on-Site to levels that will permit unlimited use of and unrestricted exposure to the Site. However, because it may take more than five years to attain cleanup levels in the groundwater, a Site

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<sup>3</sup> Under this process, microbes remove the chlorine from the volatile organic compounds, allowing the compounds to further degrade into carbon dioxide and water.

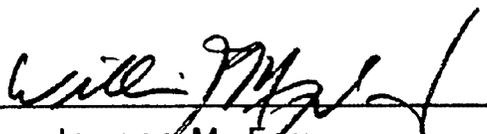
review may be conducted no less than once every five years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

## ROD DATA CERTIFICATION CHECKLIST

The ROD contains the remedy selection information noted below. More details may be found in the Administrative Record file for this Site.

- Chemicals of concern and their respective concentrations (see ROD, pages 5-7);
- Baseline risk represented by the chemicals of concern (see ROD, pages 8-13);
- Cleanup levels established for chemicals of concern and the basis for these levels (see ROD, Appendix II, Table 7);
- How source materials constituting principal threats are addressed (see ROD, pages 7-8);
- Current and reasonably-anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD (see ROD, page 8);
- Potential land and groundwater use that will be available at the Site as a result of the selected remedy (see ROD, page 36);
- Estimated capital, annual operation and maintenance, and total present-worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (see ROD, pages 38-39); and
- Key factors that led to selecting the remedy (*i.e.*, how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) (see ROD, pages 33-40).

### AUTHORIZING SIGNATURE

  
\_\_\_\_\_  
Jeane M. Fox  
Regional Administrator

9/27/10  
Date

**RECORD OF DECISION FACT SHEET  
EPA REGION II**

**Site**

Site name: Jones Chemicals, Inc. Site  
Site location: Caledonia, Livingston County, New York  
HRS score: 33.62  
Listed on the NPL: February 21, 1990

**Record of Decision**

Date signed: September 27, 2000  
Selected remedy: In-situ soil vapor extraction of the contaminated soil, groundwater extraction and treatment in the source area, in-situ dense nonaqueous phase liquid treatment, and monitored natural attenuation of the groundwater outside the source area.  
Capital cost: \$844,000  
Monitoring cost: \$237,000, annually  
Present-worth cost: \$2.3 Million (7% discount rate for 15 years)

**Lead**

EPA  
Primary Contact: George Jacob, Remedial Project Manager, (212) 637-4266  
Secondary Contact: Joel Singerman, Chief, Central New York Remediation Section, (212) 637-4258

**Main PRPs**

JCI Jones Chemicals, Inc.

**Waste**

Waste type: Volatile organic compounds  
Waste origin: On-Site spills  
Contaminated media: Soil and groundwater

**DECISION SUMMARY**

Jones Chemicals, Inc. Superfund Site  
Caledonia, Livingston County, New York

United States Environmental Protection Agency  
Region II  
New York, New York  
September 2000

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## **SITE NAME, LOCATION, AND DESCRIPTION**

The Jones Chemicals, Inc. site<sup>1</sup> (the "Site"), situated in a relatively flat, sparsely populated, lightly industrialized suburban area of the Village of Caledonia, includes the JCI Jones Chemicals, Inc. (Jones) plant. The site is bordered by Iroquois Road to the south, farmlands to the north, and homes to the east and west (see Figure 1). A construction company and a printing company are located immediately northwest of the plant. A golf course, baseball field, and tennis court are present immediately south of Iroquois Road. The site vicinity to the west and southwest is populated with light service industries, including hardware stores, gasoline stations, dry cleaners, restaurants, and other commercial businesses.

There are nine buildings located on the 10-acre manufacturing plant grounds, consisting of office space, drum storage sheds, interconnected warehouse buildings, a bleach manufacturing building, and a chlorine and sulfur dioxide repackaging building. The areas around the buildings are paved with asphalt. The Main Service Railway lines run west to east to the north of the buildings. A large area south of the buildings, facing Iroquois Road, is grass-covered. The area north of the buildings is known as the "North Property." The eastern portion of the North Property is covered by gravel; the western portion by grass. Three unlined lagoons are located to the northwest of the bleach manufacturing building. (See Figure 2.)

The plant property, which has been used for industrial purposes since 1939, is presently zoned industrial and light industrial; it is anticipated that the land use will not change in the future<sup>2</sup>.

The United States Environmental Protection Agency (EPA) is the lead agency for this Site; the New York State Department of Environmental Conservation (NYSDEC) is the support agency. The investigatory work at this Site was performed by Jones, the identified potentially responsible party (PRP), under an Administrative Order on Consent (AOC) with EPA.

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<sup>1</sup> Superfund Site Identification Number: NYD000813428.

<sup>2</sup> Source: Letter from Michelle M. Chapman, Code Enforcement Officer, Village of Caledonia, Caledonia, New York, to Joel Singerman, Chief, Central New York Remediation Section, EPA, dated May 23, 2000. (This letter is included in the Administrative Record file for this Site.)

## **SITE HISTORY AND ENFORCEMENT ACTIVITIES**

Jones purchased the majority of the plant property in 1939, which, at the time, included an orchard, agricultural fields, and pasture lands. Soon after the purchase of the property, Jones began the production of sodium hypochlorite (bleach). In 1942, Jones purchased properties located adjacent to the plant to the north and east, and began repackaging chlorine from bulk sources to cylinders and 1-ton containers there. Titanium tetrachloride was briefly manufactured between 1942 and 1943 for the U.S. Government during World War II for use in smokescreen operations. Repackaging of anhydrous ammonia and acids began in 1947. The production of aqua ammonia and bulk storage of hydrochloric, sulfuric, nitric, and hydrofluosilicic acids started in 1953. Between 1960 and approximately 1977, volatile organic compounds (VOCs), including tetrachloroethene (PCE), trichloroethene (TCE), toluene, 1,1,1-trichloroethane (1,1,1-TCA), methylene chloride, and Stoddard solvent, were repackaged from bulk to smaller containers for sale/distribution. Aqua ammonia was produced by combining water and ammonia until 1995.

In 1971, Jones began to transport commercial hazardous wastes not generated by Jones. The hazardous waste materials were temporarily stored on-Site prior to transport and disposal off-Site. Jones discontinued the transportation and on-Site storage of hazardous wastes in 1980.

Repackaging of chemicals from bulk to small containers has been one of the primary activities at the plant. These repackaged chemicals not only include the chemicals manufactured at the plant, but also those that were brought in bulk loads for redistribution. Materials brought in bulk form were generally stored in shipping containers (i.e., railroad tank cars or tanker trucks), aboveground storage tanks, and underground storage tanks. The majority of these tanks were taken out of service and removed between 1981 and 1986.

Commercial activities at the Site presently include the manufacturing of sodium hypochlorite through the reaction of chlorine and dilute sodium hydroxide, manufacturing of sodium bisulfite through the reaction of dilute sodium hydroxide and sulfur dioxide, repackaging and distribution of chlorine, sulfur dioxide, sodium hydroxide, and various acids, such as muriatic acid and hydrofluosilicic acid, from bulk to small containers, and the distribution of various inorganic water treatment chemicals, such as soda ash and lime.

The principal waste stream from the plant has been wastewater from tank washings, floor washings, and other waste liquids from handling and packaging. This waste stream is first treated by the on-Site elementary neutralization system through the addition of sulfur dioxide or caustic soda. The wastewater is then mixed in an approximately 1-to-99 ratio with noncontact cooling water. This mixture is then discharged to the infiltration lagoon system in accordance with a New York State Pollutant Discharge Elimination System (SPDES) permit.

Available records indicate that the sludge that forms in the infiltration lagoons (which were constructed in the mid-1950s) has been excavated at least three times. The excavated sludge from the first two excavation events was spread on the ground in the vicinity of the lagoons, while the sludge from the third excavation event was disposed of in a municipal landfill.

VOCs were first reported in July 1981 in the production wells at the plant and in the discharge water to the lagoons. A subsequent hydrogeologic investigation by Jones indicated the presence of VOCs in the soil and groundwater underlying the plant's property. In June 1986, relatively high concentrations of PCE at 1,160 and 765 micrograms per liter ( $\mu\text{g/l}$ ) were detected in the plant's production wells, referred to as the "North Well" and the "West Well," respectively (see Figure 2). The North Well, located in the northern portion of the plant property, has a capacity of 300 to 400 gallons per minute (gpm). The West Well, located in the western portion of the plant, has a capacity of approximately 15 gpm. The North Well and the West Well are screened in the overburden and bedrock aquifers, respectively.

Throughout the plant's operation, spills occurred during the handling of many of the above-mentioned chemicals, contaminating the Jones soil and underlying groundwater.

The Site was proposed for inclusion on the National Priorities List (NPL) in June 1988; it was listed on the NPL in February 1990.

On August 8, 1990, EPA notified Jones that EPA considered Jones a PRP with respect to the Site, and provided Jones with the opportunity to enter into an Administrative Order on Consent (AOC) with EPA to perform a remedial investigation and feasibility study (RI/FS) for the Site to determine the nature and extent of the contamination at and emanating from the Site and to identify and evaluate remedial alternatives. In March 1991, Jones entered into an AOC with EPA.

To comply with its SPDES permit and to collect data for treatability study work related to the RI/FS, in May 1996, Jones installed an air stripper to treat the noncontact cooling water from the North Well and the West Well prior to discharge to the lagoons. Monitoring of the discharge water indicates that VOCs are below detection limits after treatment.

The final RI and FS reports, completed by Jones' contractor pursuant to the 1991 AOC, were delivered to EPA in June and September 1999, respectively.

## **HIGHLIGHTS OF COMMUNITY PARTICIPATION**

The RI report, FS report, and Proposed Plan for the Site were made available to the public in both the Administrative Record and information repositories maintained at the EPA Docket Room in the Region II New York City office and two local information repositories: the Village of Caledonia Library, 3108 Main Street, Caledonia, New York and the Village of Caledonia Clerks Office, 30-95 Main Street, Caledonia, New York. A notice of availability of the above-referenced documents was published in the *Livingston County News* on July 20, 2000. A public comment period was held from July 20, 2000 to August 19, 2000. On August 14, 2000, EPA conducted a public meeting at the Caledonia-Mumford Central School, 99 North Street, Caledonia, New York, to present the findings of the RI/FS and answer questions from the public about the Site and the remedial alternatives under consideration and the preferred soil and groundwater alternatives.

The public generally supports the selected remedy. Public comment was related to Site contaminants, the threat to public and private water supplies, the risks posed by the Site, the selected soil and groundwater treatment processes, and the financing of the project. Responses to the comments received at the public meeting (no written comments were received) are included in the Responsiveness Summary (see Appendix V).

Since it is not anticipated that the industrial zoning of the plant property will change in the future, efforts were not made to solicit the public's views on the assumptions about reasonably anticipated future land use. Although it is not likely that the groundwater underlying the plant will be used for potable purposes in the foreseeable future, at the public meeting, representatives from EPA solicited community input on the potential future beneficial groundwater uses at the Site as a whole.

## **SCOPE AND ROLE OF OPERABLE UNIT**

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Section 300.5, defines an operable unit as a discrete action that comprises an incremental step toward comprehensively addressing Site problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a Site can be divided into a number of operable units, depending on the complexity of the problems associated with the Site. Operable units may address geographical portions of a Site, specific Site problems, or initial phase of an action, or may consist of any set of actions performed over time or any actions that are concurrent but located in different parts of a Site.

This response action applies a comprehensive approach; therefore, only one operable unit is required to remediate the Site. The primary objectives of this action are to control the sources of contamination at the Site, to minimize the migration of contaminants, to minimize any potential future health and environmental impacts, and to restore the groundwater to cleanup standards.

## **SUMMARY OF SITE CHARACTERISTICS**

The purpose of the RI, conducted from 1991 to 1999, was to determine the nature and extent of the contamination at and emanating from the Site. The results of the RI are summarized below.

### **Surface and Subsurface Soils**

The results of 19 soil samples collected across the Site showed PCE concentrations ranging from below detection to 330,000 micrograms per kilogram ( $\mu\text{g}/\text{kg}$ ) and TCE concentrations ranging from below detection to 320  $\mu\text{g}/\text{kg}$ . The highest soil concentrations of PCE and TCE were detected in a 150-foot by 20-foot area located at the Site of a former aboveground solvent tank (hereinafter, referred to the "Former Solvent Tank Area"), located in the western portion of the property. (See Figure 3.)

### **Groundwater**

The Site is underlain by two distinct stratigraphic zones, an upper overburden zone and an underlying bedrock zone, as shown in Figure 4.

The overburden zone consists of approximately 30 to 70 feet of glacial deposits (a mixture of gravel, sand, and silt). Groundwater elevations measured at the Site indicate that the principal groundwater flow direction in the overburden zone is toward the northeast. (See Figure 5.)

Carbonate bedrock (dolomite) is found below the glacial deposits. The surface of the bedrock slopes steeply to the west. Cores taken at the Site indicate that the upper portion of the zone (10 feet or less) is highly weathered and fractured. The groundwater yield within the bedrock occurs primarily in the weathered portion and/or through fractures. Groundwater elevation data indicates that groundwater flow in the bedrock is both to the west and northeast. There also appears to be an upward vertical gradient indicating flow from the deeper to shallower water-bearing zones. (See Figure 6.)

An approximately 1,500-foot (along the northeast–southwest axis) by 720-foot (along the north–south axis) groundwater VOC plume, consisting of primarily PCE, and its degradation products TCE and 1,2-dichloroethene (1,2-DCE), extends from the Former Solvent Tank Source Area to the east and the northeastern property boundary. Vertically, the contamination extends to at least 48 feet below the ground surface in the source area. (See Figure 7.)

Groundwater sampling results from the overburden aquifer in the Former Solvent Tank Area showed concentrations of PCE and TCE as high as 5,500 µg/l and 130 µg/l, respectively. Although there is groundwater contamination in the overburden aquifer outside the Former Solvent Tank Area, it appears that the North Well has helped to limit the migration of the plume (while 140 µg/l PCE was detected at the North Well, PCE concentrations significantly taper off beyond it, ranging from below detection to 22 µg/l). (See Figure 8.)

In the bedrock aquifer in the vicinity of the Former Solvent Tank Area, PCE and TCE were detected at concentrations as high as 62,000 µg/l and 100 µg/l, respectively. With the exception of the detection of 340 µg/l PCE in the West Well, relatively low concentrations of PCE and TCE (less than 10 µg/l) were detected outside the Former Solvent Tank Area. (See Figure 9.)

Periodic sampling of the Village of Caledonia's water supply wells from 1983 through 1989 showed the presence of PCE, TCE, and 1,1,1-TCA. In 1991, the Village installed an air stripper to treat the water prior to distribution. The results from March 21, 2000 sampling indicate that the contaminant concentrations meet drinking water standards prior to

treatment<sup>3</sup>. While the Jones plant's southern boundary is located approximately 700 feet from the Village of Caledonia's water supply wells, it has not been determined that the Site was the source of this contamination. Observing groundwater flow paths would ordinarily allow a determination as to whether or not the Site was a source of this contamination. However, since the groundwater flow path has been altered (the Village took a water supply well out of service in 1994 and the prolonged pumping of the on-Site production wells has altered the natural groundwater flow path), such a determination cannot be made.

There are two private residential wells located approximately one mile from the plant which have shown chlorinated solvent contamination. NYSDEC installed and is presently maintaining treatment systems on these wells. The contaminants found in these wells are only slightly above drinking water standards. Given the low levels of contamination and considering the distance of the wells from the Site, it is unlikely that the Site is the source. The source of the contamination of these wells has yet to be identified.

## **PRINCIPAL THREAT WASTE**

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a Site wherever practicable (NCP Section 300.430 (a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund Site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or acts as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a Site-specific basis through a detailed analysis of alternatives, using the remedy selection criteria which are described below. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

The magnitude of the PCE concentrations in the bedrock aquifer in the Former Solvent Tank Area indicates the potential presence of such PCE

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<sup>3</sup> The sample results are included in Table 1.

in the form of a DNAPL, a principal threat waste. Since much lower levels of PCE were detected in groundwater samples collected outside the Former Solvent Tank Area, it appears that the DNAPL may be limited to the source area.

## **CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES**

The plant property, which has been used for industrial purposes since 1939, is presently zoned industrial and light industrial; it is anticipated that the land use will not change in the future<sup>4</sup>.

The groundwater underlying the plant is contaminated. Although the plant's production wells provide noncontact cooling water for the plant after treatment, potable water for the plant is obtained from the Village of Caledonia's well system. Therefore, it is not likely that the groundwater underlying the plant will be used for potable purposes in the foreseeable future.

The Jones plant's southern boundary is located approximately 700 feet from the Village of Caledonia's water supply wells<sup>5</sup>. Based upon groundwater sampling results, it appears that the on-plant production wells are preventing the migration of contaminated groundwater beyond the property boundaries. Should the on-plant production wells cease to operate, the migration of contaminated groundwater beyond the plant boundaries might occur.

## **SUMMARY OF SITE RISKS**

Based upon the results of the RI, a baseline risk assessment was conducted to estimate the risks associated with current and future Site conditions. A baseline risk assessment is an analysis of the potential adverse human health and ecological effects caused by hazardous

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<sup>4</sup> Source: Letter from Michelle M. Chapman, Code Enforcement Officer, Village of Caledonia, Caledonia, New York, to Joel Singerman, Chief, Central New York Remediation Section, EPA, dated May 23, 2000. (This letter is included in the Administrative Record file for this Site.)

<sup>5</sup> Although the Village of Caledonia's water supply wells were contaminated in the past, they presently meet drinking water standards. It has not been determined that the Site was the source of this contamination.

substance releases from a Site in the absence of any actions to control or mitigate these under current and anticipated future land uses.

The complete risk information for this Site is available in the following documents, which are located in the Administrative Record: *Health Risk Assessment, Jones Chemicals, Inc. Facility, Caledonia, New York* (LFR Levine-Fricke, Inc., September 30, 1999) and *Jones Chemicals Site Risk Assessment for a Hypothetical Off-Plant Direct Contact with Contaminated Groundwater Scenario Where the On-Plant Production Wells Cease to Operate, Allowing the Migration of Contaminated Groundwater Beyond the Plant Boundaries* (U.S. Environmental Protection Agency, July 19, 2000).

### ***Human Health Risk Assessment***

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance exposure from a Site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing Site-related human health risks for reasonable maximum exposure scenarios.

*Hazard Identification:* In this step, the contaminants of concern (COC) at the Site in various media (i.e., soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

*Exposure Assessment:* In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil. Factors relating to the exposure assessment include, but are not limited to, the concentrations that people might be exposed to and the potential frequency and duration of exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

*Toxicity Assessment:* In this step, the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other noncancer health effects, such as changes in the normal functions of organs within the body (e.g.,

changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and noncancer health effects.

*Risk Characterization:* This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of Site risks. Exposures are evaluated based on the potential risk of developing cancer and the potential for noncancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a  $10^{-4}$  cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to Site contaminants under the conditions explained in the Exposure Assessment. Current Superfund guidelines for acceptable exposures are an individual lifetime excess cancer risk in the range of  $10^{-4}$  to  $10^{-6}$  (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk) with  $10^{-6}$  being the point of departure. For noncancer health effects, a "hazard index" (HI) is calculated. An HI represents the sum of the individual exposure levels compared to their corresponding reference doses. The key concept for a noncancer HI is that a "threshold level" (measured as an HI of less than 1) exists below which noncancer health effects are not expected to occur.

The baseline risk assessment began with selecting chemicals of concern in the various media that would be representative of Site risks. The primary COCs include PCE, TCE, and 1,2-DCE in the soil and groundwater media (see Table 2).

The potential human receptors evaluated were on-plant workers and off-plant adult and child residents (see Table 3). The baseline risk assessment evaluated the exposure that may potentially impact such receptors.

Based upon groundwater sampling results, it appears that the on-plant production wells are preventing the migration of contaminated groundwater beyond the property boundaries. The risk assessment evaluated the threat posed by a hypothetical off-plant direct contact with contaminated groundwater (e.g., through ingestion of groundwater and inhalation of volatiles released into indoor air from groundwater while showering in an enclosed space) where the on-plant production wells cease to operate, allowing the migration of contaminated groundwater beyond the plant boundaries.

The results of the risk assessment indicate that the estimated excess cancer risks for on-plant workers (see Table 4) and adult off-plant residents (see Table 5) were lower than or within the acceptable excess

cancer risk range of  $10^{-4}$  to  $10^{-6}$  (the highest total cancer risk was attributable to an adult off-plant resident at  $2.91 \times 10^{-5}$ ).

The estimated excess cancer risks for off-plant receptors under the hypothetical future-use scenario where the on-plant production wells are turned off, thus allowing contaminated groundwater to migrate off-plant, poses an unacceptable risk. The carcinogenic risk from exposure to contaminants in the overburden aquifer is  $2.0 \times 10^{-3}$  for the adult resident ( $1.9 \times 10^{-3}$  from ingestion and  $1.4 \times 10^{-4}$  from inhalation of volatiles while showering), and  $1.3 \times 10^{-3}$  for the child resident ( $1.1 \times 10^{-3}$  from ingestion and  $1.9 \times 10^{-4}$  from inhalation of volatiles while showering). The risk to a resident over the entire exposure duration of 30 years is  $3.3 \times 10^{-3}$  ( $3.0 \times 10^{-3}$  from ingestion and  $3.3 \times 10^{-4}$  from inhalation of volatiles while showering). The primary risk driver is PCE. In the assessment of risk from exposure to contaminants in the bedrock aquifer, the carcinogenic risk to the adult resident is  $1.6 \times 10^{-4}$  ( $1.5 \times 10^{-4}$  from ingestion and  $1.1 \times 10^{-5}$  from inhalation of volatiles while showering), and the risk to the child resident is  $1.0 \times 10^{-4}$  ( $8.5 \times 10^{-5}$  from ingestion and  $1.6 \times 10^{-5}$  from inhalation of volatiles while showering). The risk to a resident over the entire exposure duration of 30 years is  $2.6 \times 10^{-4}$  ( $2.4 \times 10^{-4}$  from ingestion and  $2.7 \times 10^{-5}$  from inhalation of volatiles while showering). As is the case with the overburden aquifer, the primary risk driver in the bedrock aquifer is PCE (see Table 6).

Total estimated HI values for individual chemicals and combinations of chemicals under current and future on-plant worker and adult off-plant residents exposure scenarios at the Site range up to a maximum of 0.1939 (attributable to an adult off-plant resident) (see Table 5). Since

the total estimated HI is less than unity (1.0), there is not a concern for potential chronic adverse noncancer health effects to such receptors.

The estimated HI for off-plant receptors under the hypothetical future-use direct contact with contaminated groundwater scenario (where the on-plant production wells are turned off) is estimated to exceed unity. In the overburden aquifer, the HI value for the adult resident is 15. For the child resident, the HI is 58. In the bedrock aquifer, the hazard to the adult resident is 1.1, while the hazard to the child resident is 4. (See Table 6.)

### Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling
- exposure parameter estimation
- toxicological data

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry analysis uncertainty can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

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

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

### **Ecological Risk Assessment**

Information from the NYSDEC Bureau of Wildlife indicates that there are no endangered or threatened plant or animal species at or in the vicinity of the Site. Therefore, EPA evaluated potential exposure pathways of the chemicals of concern (primarily PCE) for nonendangered and nonthreatened animal and plant species.

Since the Site includes an industrial facility, there is minimal habitat available for ecological receptors; however, the grassy areas could support some soil invertebrates, terrestrial mammals, and birds.

Soil samples from the Former Solvent Tank Source Area contained volatile organic compounds, some of which (e.g., PCE) are present in concentrations greater than conservative screening criteria considered protective of soil invertebrate species. Therefore, there is a potential for an unacceptable risk to burrowing animals that come into contact with these contaminated surface soils (zero to a two-foot depth).

Considering the depth to the surface of the groundwater (not less than 8 feet below the ground surface), direct contact with groundwater by ecological receptors is unlikely. Since there are no wetlands or surface water bodies in the immediate vicinity of the Site, there is no potential for contaminated groundwater to discharge into surface water. Therefore, groundwater is not considered to be an exposure pathway for ecological receptors.

### **Basis for Action**

Based upon the human health and ecological risk assessments, EPA has determined that the response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances from the Site into the environment.

### **REMEDIAL ACTION OBJECTIVES**

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

The following remedial action objectives have been established for the Site:

- Restore groundwater to levels which meet state and federal standards within a reasonable time frame;
- Mitigate the potential for chemicals to migrate from soils into groundwater; and
- Mitigate the migration of the affected groundwater.

## DESCRIPTION OF ALTERNATIVES

CERCLA §121(b)(1), 42 U.S.C. §9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARS, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a Site. CERCLA §121(d), 42 U.S.C. §9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARS under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4), 42 U.S.C. §9621(d)(4).

As was noted previously, principal threat wastes are those source materials that act as a reservoir for the migration of contamination to groundwater (such as the DNAPL potentially present in the source area at the Site). Principal threat wastes are those source materials considered to be highly toxic and present a significant risk to human health or the environment should exposure occur, or are highly mobile such that they, generally, cannot be reliably contained. The decision to treat these wastes is made on a Site-specific basis through a detailed analysis of alternatives, using the remedy selection criteria which are described below. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element<sup>6</sup>.

Detailed descriptions of the remedial alternatives for addressing the contamination associated with the Site can be found in the FS report. The FS report presents four soil remediation alternatives and five groundwater remediation alternatives. To facilitate the presentation and evaluation of these alternatives, the FS report's nine alternatives were reorganized in formulating the remedial alternatives discussed below.

The construction time for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate the performance of the remedy with the responsible parties, or procure contracts for design and construction. The present-worth costs for the alternatives discussed

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<sup>6</sup> *A Guide to Principal Threat and Low Level Threat Wastes*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, 9380.3-06FS, November 1991.

below are calculated using a discount rate of seven percent and a 15-year time interval.

The remedial alternatives are:

**Soil Remedial Alternatives**

**Alternative S-1: No Action**

Capital Cost:	\$0
Annual Operation and Maintenance Cost:	\$0
Present-Worth Cost:	\$0
Construction Time:	0 months

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative does not include any physical remedial measures that address the contaminated soils in the Former Solvent Tank Source Area.

Because this alternative would result in contaminants remaining on-Site, CERCLA requires that the Site be reviewed at least once every five years. If justified by this assessment, remedial actions may be implemented in the future to remove or treat the waste.

**Alternative S-2: Treatment of Contaminated Soils Using Soil Vapor Extraction**

Capital Cost:	\$365,000
Annual Operation and Maintenance Cost:	\$122,000
Present-Worth Cost:	\$684,000
Construction Time:	3 months

Under this alternative, VOC-contaminated soils in the Former Solvent Tank Source Area would be remediated by soil vapor extraction (SVE). Under this treatment process, air would be drawn through a series of wells to volatilize the solvents contaminating the soils in the unsaturated zone (above the water table). The extracted vapors would then be treated by granular activated carbon before being vented to the atmosphere.

The approximate dimensions of the source area are 150 feet long, 20 feet wide, and 15 feet deep, yielding an estimated volume of 1,700 cubic yards of contaminated soil.

While the actual period of operation of the SVE system would be based upon soil sampling results which demonstrate that the affected soils have been treated to the soil cleanup objectives as specified in the New York State Technical and Administrative Guidance Memorandum No. 94-HWR-4046 (TAGM), it is estimated that the system would operate for a period of three years.

Fencing would be installed around the source area for the duration of the treatment process to minimize worker exposure.

### **Alternative S-3: Excavation of Contaminated Soils and Off-Site Treatment/Disposal**

Capital Cost:	\$3,269,000
Annual Operation and Maintenance Cost:	\$0
Present-Worth Cost:	\$3,269,000
Construction Time:	1 year

This alternative includes excavating approximately 1,700 cubic yards of soil in the Former Solvent Tank Source Area which exceed soil TAGM objectives. The actual extent of the excavation and the volume of the excavated material would be based on post-excavation confirmatory sampling. Shoring of the excavation and extraction and treatment of any water that enters the trench would be necessary.

The excavated areas would be backfilled with clean fill and revegetated. All excavated material would be characterized and transported for

treatment/disposal at an off-Site Resource Conservation and Recovery Act (RCRA)-compliant facility. Because of the high levels of PCE that would be present in the excavated soil, it is likely that incineration would be the only viable form of treatment.

**Alternative S-4: Excavation of Contaminated Soils, On-Site Treatment via Low Temperature Thermal Desorption, and Redeposition**

Capital Cost:	\$1,154,000
Annual Operation and Maintenance Cost:	\$0
Present-Worth Cost:	\$1,154,000
Construction Time:	1 year

This alternative includes excavating approximately 1,700 cubic yards of soil in the Former Solvent Tank Source Area which exceed soil cleanup objectives as specified in the TAGM. The actual extent of the excavation and the volume of the excavated material would be based on post-excavation confirmatory sampling. Shoring of the excavation and extraction and treatment of any water that enters the trench would be necessary.

The excavated soil would be fed to a mobile Low Temperature Thermal Desorption (LTTD) unit brought to the Site, where hot air injected at a temperature above the boiling points of the organic contaminants of concern would allow them to be volatilized into gases and escape from the soil. The organic vapors extracted from the soil would then be either condensed, transferred to another medium (such as granular activated carbon), or thermally treated in an afterburner operated to ensure complete destruction of the volatile organics. The off-gases would be filtered through a carbon vessel. Once the treated soil achieved soil TAGM objectives, it would be tested in accordance with the Toxicity Characteristic Leaching Procedure (TCLP) to determine whether it constitutes a RCRA hazardous waste and, provided that it passes the test, it would be used as backfill material for the excavated area. Soil above TCLP levels would be either re-treated or disposed of at an approved off-Site facility, as appropriate.

## **Groundwater Remedial Alternatives**

### **Alternative GW-1: No Further Action and Long-Term Monitoring**

Capital Cost:	\$3,000
Annual Monitoring Cost:	\$51,000
Present-Worth Cost:	\$633,000
Construction Time:	3 months

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives.

The no further action remedial alternative would not include any physical remedial measures to address the groundwater contamination at the Site<sup>7</sup>. This alternative would, however, include a long-term groundwater monitoring program and the installation of some additional monitoring wells. Under this monitoring program, groundwater samples would be collected and analyzed annually.

Because this alternative would result in contaminants remaining on-Site, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, additional remedial actions may be implemented in the future.

### **Alternative GW-2: Source Area Extraction and Treatment, Monitored Natural Attenuation of the Plume Outside the Source Area, and Institutional Controls**

Capital Cost:	\$362,000
Annual Monitoring Cost:	\$81,000
Present-Worth Cost:	\$1,366,000
Construction Time:	4 months

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<sup>7</sup> Although, since May 1996, contaminated groundwater has been extracted from the North Well and the West Well, used as noncontact cooling water, treated, and discharged, the no further action alternative assumes that groundwater is no longer extracted from these wells.

Under this alternative, the affected groundwater in the Former Solvent Tank Source Area would be addressed through an extraction system in the overburden and bedrock aquifers. It is estimated that the groundwater extraction system would utilize one bedrock and two overburden wells to withdraw 400 gpm of contaminated groundwater. In addition, contaminated groundwater would continue to be extracted from the North Well, which would facilitate the capture of the plume beyond the Former Solvent Tank Source Area. The extracted groundwater would be treated by the existing air stripper and would then be used as noncontact cooling water within the plant prior to being discharged to the on-Site lagoons. To comply with New York State air guidelines, granular activated carbon treatment of the air stripper air exhaust stream may be necessary.

The contaminated groundwater located outside the Former Solvent Tank Source Area and beyond the influence of the North Well would be addressed through monitored natural attenuation, a variety of physical, chemical and biological processes which, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil and groundwater. These in-situ processes include biodegradation, dispersion, dilution, sorption, volatilization, and chemical or biological stabilization, transformation, or destruction of contaminants. Evidence of biodegradation of the PCE in the groundwater at the Site includes the presence of its breakdown products, TCE and 1-2 dichloroethene.

While preliminary modeling results indicate that it may take up to seven years to remediate the aqueous phase of the PCE in the Former Solvent Tank Source Area plume through groundwater extraction and treatment, and from 10 to 15 years for the contaminant plume located outside of the Former Solvent Tank Source Area to be restored through natural attenuation, the total remediation time for this alternative is expected to be much greater, since residual PCE DNAPL is suspected to be present in the Former Solvent Tank Source Area. Groundwater extraction and treatment can be effective in hydraulically containing DNAPL source zones, however, it is generally not completely effective in remediating these zones to groundwater standards.

As part of a long-term groundwater monitoring program, groundwater samples would be collected and analyzed quarterly in order to verify that the level and extent of groundwater contaminants (e.g., VOCs) are declining and that conditions are protective of human health and the environment. In addition, biodegradation parameters (e.g., oxygen, nitrate, sulfate, methane, ethane, ethene, alkalinity, redox potential, pH,

temperature, conductivity, chloride, and total organic carbon) would be used to assess the progress of the degradation process.

Institutional controls, such as deed restrictions limiting future groundwater use to nonpotable purposes only, would be established. Additionally, because of the potential that pumping of the West Well would draw contaminants to deeper water-bearing zones, pumping from the West Well would be discontinued.

Under this alternative, biodegradation parameters would be used to assess the progress of the degradation process. If it is determined that monitored natural attenuation is not effective in restoring groundwater quality outside of the Former Solvent Tank Source Area in a reasonable time frame, then more aggressive remedial action approaches, such as enhanced reductive dechlorination<sup>8</sup> or groundwater extraction and treatment, may be implemented.

Because this alternative would result in contaminants remaining on-Site, CERCLA requires that the Site be reviewed at least once every five years.

### **Alternative GW-3: Site-Wide Groundwater Extraction and Treatment, In-Situ Treatment of DNAPL, and Institutional Controls**

Capital Cost:	\$1,533,000
Annual Operation and Maintenance Cost:	\$215,200
Present-Worth Cost:	\$3,324,000
Construction Time:	6 months

Under this alternative, the affected groundwater would be addressed through an extraction system in the overburden and bedrock aquifers. It is estimated that the groundwater extraction system would utilize 10 overburden and six bedrock wells to withdraw 1,200 gpm of contaminated groundwater. These wells would be placed northeast of the lagoon system and in the vicinity of the Former Solvent Tank Source

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<sup>8</sup> Under this process, microbes remove the chlorine from the VOCs, allowing the compounds to further degrade into carbon dioxide and water.

Area. In addition, contaminated groundwater would continue to be extracted from the North Well, which would facilitate the capture of the plume beyond the Former Solvent Tank Source Area. A portion of the extracted water would be treated by the existing air stripper and would be used as noncontact cooling water within the plant prior to being discharged to the on-Site lagoons.

Because the present capacity of the air stripper would be exceeded, an additional air stripper would be constructed to treat the balance of the extracted groundwater. The treated water that was not used for noncontact cooling would be discharged to an infiltration gallery to be constructed to the northeast of the lagoon system. To comply with New York State air guidelines, granular activated carbon treatment of the air strippers' air exhaust streams may be necessary.

Preliminary modeling results indicate that, through groundwater extraction and treatment, it may take up to seven years to remediate the aqueous phase of the PCE in the Former Solvent Tank Source Area plume and up to eight years to remediate the contaminant plume located outside of the Former Solvent Tank Source Area.

To enhance the treatment of the residual DNAPL in the bedrock beneath the Former Solvent Tank Source Area, an oxidizing agent, such as potassium permanganate ( $\text{KMnO}_4$ ) or hydrogen peroxide ( $\text{H}_2\text{O}_2$ ), would be injected via a well. It has been estimated that the residual DNAPL would be treated within five years.

As part of a long-term groundwater monitoring program, groundwater samples would be collected and analyzed quarterly in order to verify that the level and extent of groundwater contaminants (e.g., VOCs) are declining and that conditions are protective of human health and the environment.

Institutional controls, such as deed restrictions limiting future groundwater use to nonpotable purposes only, would be established. Additionally, because of the potential that pumping of the West Well would draw contaminants to deeper water-bearing zones, pumping from the West Well would be discontinued.

Because this alternative would result in contaminants remaining on-Site above health-based levels, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, additional remedial actions may be implemented in the future.

**Alternative GW-4: Source Area Extraction and Treatment, In-Situ Treatment of DNAPL, Monitored Natural Attenuation of the Plume Outside the Source Area, and Institutional Controls**

Capital Cost:	\$479,000
Annual Monitoring Cost:	\$115,000
Present-Worth Cost:	\$1,623,000
Construction Time:	4 months

This alternative would be the same as Alternative GW-2, except, to enhance the treatment of the residual DNAPL in the bedrock beneath the Former Solvent Tank Source Area, an oxidizing agent, such as  $\text{KMnO}_4$  or  $\text{H}_2\text{O}_2$ , would be injected via a well.

Preliminary modeling results indicate it may take up to seven years to remediate the aqueous phase of the PCE in the Former Solvent Tank Source Area plume through groundwater extraction and treatment and from 10 to 15 years for the contaminant plume located outside of the Former Solvent Tank Source Area to be restored through natural attenuation. It has been estimated that the residual DNAPL would be treated within five years.

Under this alternative, biodegradation parameters would be used to assess the progress of the degradation process. If it is determined that monitored natural attenuation is not effective in restoring groundwater quality outside of the Former Solvent Tank Source Area in a reasonable time frame, then more aggressive remedial action approaches, such as enhanced reductive dechlorination or groundwater extraction and treatment, may be implemented.

Because this alternative would result in contaminants remaining on-Site above health-based levels, CERCLA requires that the Site be reviewed at least once every five years.

**COMPARATIVE ANALYSIS OF ALTERNATIVES**

In selecting a remedy, EPA considered the factors set out in CERCLA Section 121, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial alternatives pursuant to the NCP, 40 CFR §300.430(e)(9)

and OSWER Directive 9355.3-01 (*Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA: Interim Final, October 1988*). The detailed analysis consisted of an assessment of the individual alternatives against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

The following "threshold" criteria are the most important and must be satisfied by any alternative in order to be eligible for selection:

1. *Overall protection of human health and the environment* addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
2. Compliance with ARARs addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and regulations or provide grounds for invoking a waiver. Other federal or state advisories, criteria, or guidance are To-Be-Considered (TBCs). TBCs are not required by the NCP, but may be very useful in determining what is protective of a Site or how to carry out certain actions or requirements.

The following "primary balancing" criteria are used to make comparisons and to identify the major tradeoffs between alternatives:

3. *Long-term effectiveness and permanence* refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.
4. *Reduction of toxicity, mobility, or volume through treatment* is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.
5. *Short-term effectiveness* addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

6. *Implementability* is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.
7. *Cost* includes estimated capital and O&M costs, and net present-worth costs.

The following "modifying" criteria are used in the final evaluation of the remedial alternatives after the formal comment period, and may prompt modification of the preferred remedy that was presented in the Proposed Plan:

8. *State acceptance* indicates whether, based on its review of the RI/FS reports and Proposed Plan, the State concurs with, opposes, or has no comments on the selected remedy.
9. *Community acceptance* refers to the public's general response to the alternatives described in the RI/FS reports and Proposed Plan.

A comparative analysis of these alternatives based upon the evaluation criteria noted above, follows.

#### Overall Protection of Human Health and the Environment

Alternative S-1 (no action) would not be protective of human health and the environment, since it would not actively address the contaminated soils, which are a source of groundwater contamination.

Alternative S-2 (soil vapor extraction), Alternative S-3 (excavation of contaminated soils and off-Site treatment/disposal), and Alternative S-4 (excavation of contaminated soils and on-Site treatment via LTDD) would be protective of human health and the environment, since each alternative relies upon a remedial strategy and/or treatment technology capable of removing the source of groundwater contamination in the unsaturated zone. Under these alternatives, the contaminants would either be treated on-Site or treated/disposed of off-Site.

Alternative GW-1 (no further action) would be the least protective groundwater alternative in that it would result in no affirmative steps to restore groundwater quality to drinking water standards. Therefore, under this alternative, the restoration of the groundwater would take a significantly longer time in comparison to Alternative GW-2 (source area extraction and treatment and monitored natural attenuation of the

remainder of the plume), Alternative GW-3 (Site-wide extraction and treatment of the contaminated groundwater and in-situ DNAPL treatment), and Alternative GW-4 (source area extraction and treatment, in-situ DNAPL treatment, and monitored natural attenuation of the plume). Alternative GW-2 would be significantly more protective than Alternative GW-1 in that it would provide hydraulic containment and treatment of the affected groundwater at the source. This alternative would, however, rely upon natural attenuation to address the groundwater contamination outside the Former Solvent Tank Source Area. While Alternative GW-4 would result in the restoration of water quality in the aquifer more effectively than Alternative GW-2, since it would actively address the DNAPL, it would not restore the water quality in the plume as quickly as Alternative GW-3.

### Compliance with ARARs

There are currently no federal or state promulgated standards for contaminant levels in soils, only New York State soil cleanup objectives as specified in the TAGM (which are used as TBCs). Table 7 summarizes the soil cleanup objectives for the contaminants that are present in the soil at the Site.

Since the contaminated soils would not be addressed under Alternative S-1 (no action), this alternative would not comply with the soil cleanup objectives. Alternative S-2 (soil vapor extraction), Alternative S-3 (excavation of contaminated soils and off-Site treatment/disposal), and Alternative S-4 (excavation of contaminated soils and on-Site treatment via LTTD) would be implemented to attain the soil cleanup objectives specified in TAGM.

Under Alternative S-2, spent granular activated carbon from the SVE units would need to be managed in compliance with RCRA treatment/disposal requirements.

Alternative S-3 would be subject to New York State and federal regulations related to the transportation and off-Site treatment/disposal of wastes. Alternatives S-3 and S-4 would involve the excavation of contaminated soils, and would, therefore, require compliance with fugitive dust and VOC emission regulations. In the case of Alternative S-4, compliance with air emission standards would be required at the LTTD unit, as well. Specifically, treatment of off-gases would have to comply with New York State Air Guide 1 for the Control of Toxic Ambient Air Emissions and would be required to meet the substantive requirements of New York State Regulations for Prevention and Control of Air Contamination and Air Pollution (6 NYCRR Part 200 *et. seq.*).

EPA and NYSDEC have promulgated health-based protective Maximum Contaminant Levels (MCLs)(40 CFR Part 141), which are enforceable standards for various drinking water contaminants (chemical-specific ARARs). Although the groundwater at the Site is not presently being utilized as a potable water source, achieving MCLs in the groundwater is relevant and appropriate, because the groundwater at the Site is a potential source of drinking water. Table 7 summarizes the MCLs for the constituents present in the groundwater at the Site. The aquifer is classified as Class GA (6 NYCRR 701.18).

Alternative GW-1 (no further action) does not provide for any direct remediation of the groundwater and would, therefore, involve no actions to achieve chemical-specific ARARs. Alternative GW-2 (source area extraction and treatment and monitored natural attenuation of the remainder of the plume) would be effective in reducing groundwater contaminant concentrations below MCLs in the Former Solvent Tank Source Area by treating the dissolved-phase chemicals and hydraulically containing the affected groundwater at the source; however, this alternative would not be as effective in meeting ARARs as Alternative GW-4 (source area extraction and treatment, in-situ DNAPL treatment, and monitored natural attenuation of the plume), which would employ a more aggressive approach to addressing the DNAPL. Both alternatives would rely upon natural attenuation to address a portion of the contaminated groundwater in the plume. Alternative GW-3 (Site-wide groundwater extraction and treatment and in-situ DNAPL treatment) would be the most effective in reducing groundwater contaminant concentrations below MCLs, since it would include an aggressive approach to address the DNAPL and would include the collection and treatment of contaminated groundwater throughout the Site. Therefore, this alternative would achieve ARARs in the shortest period of time.

#### Long-Term Effectiveness and Permanence

Alternative S-1 (no action) would involve no active remedial measures and, therefore, would not be effective in eliminating the potential for contaminants to continue to migrate in soil and groundwater. Alternative S-2 (soil vapor extraction), Alternative S-3 (excavation of contaminated soils and off-Site treatment/disposal), and Alternative S-4 (excavation of contaminated soils and on-Site treatment via LTDD) would all be effective in the long term and would provide permanent remediation by either removing the wastes from the Site or treating them on-Site.

Alternatives S-2 and S-4 would generate treatment residuals which would have to be appropriately handled; Alternative S-3 would not generate such residuals.

Alternative GW-1 (no further action) would be only minimally effective in the long-term in restoring groundwater quality, since it would not rely on active measures. Alternative GW-2 (source area extraction and treatment and monitored natural attenuation of the remainder of the plume) would be significantly more effective than Alternative GW-1 in restoring groundwater quality. Although groundwater extraction and treatment can be effective in hydraulically containing DNAPL source zones, it is generally not completely effective in remediating these zones to groundwater standards. Therefore, since Alternative GW-2 would rely upon groundwater extraction to address the residual DNAPL, it would not be as effective as Alternative GW-3 (Site-wide groundwater extraction and treatment and in-situ DNAPL treatment) and Alternative GW-4 (source area extraction and treatment, in-situ DNAPL treatment, and monitored natural attenuation of the remaining plume), which both would utilize aggressive in-situ DNAPL treatment. Under Alternative GW-4, by aggressively addressing the contamination at the source area, it is expected that low levels of PCE (less than 22 µg/l) outside the source area would attenuate naturally in a reasonable time frame. Alternative GW-4 would not, however, provide the same long-term effectiveness and permanence with regard to this contamination as Alternative GW-3, which would actively remove contaminants from the entire plume. Alternative GW-3 would achieve drinking water standards outside the Former Solvent Tank Source Area more quickly than Alternative GW-4.

Alternatives GW-2, GW-3, and GW-4 would generate treatment residuals which would have to be appropriately handled; Alternative GW-1 would not generate such residuals.

#### Reduction in Toxicity, Mobility, or Volume Through Treatment

Alternative S-1 (no action) would provide no reduction in toxicity, mobility or volume. Under Alternative S-2 (soil vapor extraction) and Alternative S-4 (excavation of contaminated soils and on-Site treatment via LTDD), the toxicity, mobility, and volume of contaminants would be reduced through on-Site treatment. Under Alternative S-3 (excavation of contaminated soils and off-Site treatment/disposal), the toxicity, mobility, and volume of the contaminants would be reduced by removing the contaminated soil from the Site for treatment.

Alternative GW-1 (no further action) would be the least effective alternative in reducing the toxicity, mobility, or volume of contaminants in the groundwater through treatment, as this alternative involves no active remedial measures. All of the action alternatives would, to varying degrees, reduce the toxicity, mobility, or volume of contaminants in the groundwater through treatment, thereby satisfying CERCLA's preference

for treatment. Collecting and treating contaminated groundwater in the Former Solvent Tank Source Area under Alternative GW-2 (source area extraction and treatment and monitored natural attenuation of the plume) would actively reduce the toxicity, mobility, and volume of contaminants in this area. The addition of an oxidizing agent to address the DNAPL under Alternative GW-4 (source area extraction and treatment, in-situ DNAPL treatment, and monitored natural attenuation of the plume) would provide substantially greater reduction of the toxicity, mobility, and volume of contaminants than Alternative GW-2. Collecting and treating contaminated groundwater in the Former Solvent Tank Source Area and the remaining plume, and using an oxidizing agent to address the DNAPL under Alternative GW-3 (Site-wide groundwater extraction and treatment and in-situ DNAPL treatment) would provide the greatest reduction of toxicity, mobility, and volume of contaminants through treatment.

### Short-Term Effectiveness

Alternative S-1 (no action) does not include any physical construction measures in any areas of contamination and, therefore, would not present any potential adverse impacts to on-Site workers or the community as a result of its implementation. Alternative S-2 (soil vapor extraction) could result in some adverse impacts to on-Site workers through dermal contact and inhalation related to the installation of SVE wells through contaminated soils. In addition, interim and post-remediation soil sampling activities would pose some risk. Similarly, Alternatives S-3 (excavation of contaminated soils and off-Site treatment/disposal) and S-4 (excavation of contaminated soils and on-Site treatment via LTDD) could present some limited adverse impact to on-Site workers through dermal contact and inhalation related to post-excavation sampling activities. The risks to on-Site workers under all of the alternatives could, however, be mitigated by utilizing proper protective equipment.

Alternative S-3 would require the off-Site transport of contaminated waste material, which may pose the potential for traffic accidents, which could result in releases of hazardous substances.

Under Alternatives S-3 and S-4, disturbance of the land during excavation activities could affect the surface water hydrology of the Site. There is a potential for increased stormwater runoff and erosion during excavation and construction activities that would have to be properly managed to prevent or minimize any adverse impacts. For these alternatives, appropriate measures would have to be taken during excavation activities to prevent transport of fugitive dust and exposure of workers and downgradient receptors to volatile organic compounds.

Since no actions would be performed under Alternative S-1, there would be no implementation time. It is estimated that Alternative S-2 would require 3 months to install the SVE system and would require an estimated 3 years to achieve soil cleanup objectives. It is estimated that it would take one year to excavate and transport the contaminated soils to an EPA-approved treatment/disposal facility under Alternative S-3, and one year to excavate and treat the contaminated soils under Alternative S-4.

All of the groundwater alternatives could present some limited adverse impacts to on-Site workers through dermal contact and inhalation related to groundwater sampling activities. Alternative GW-2 (source area extraction and treatment and monitored natural attenuation of the plume), Alternative GW-3 (Site-wide groundwater extraction and treatment and in-situ DNAPL treatment), and Alternative GW-4 (source area extraction and treatment, in-situ DNAPL treatment, and monitored natural attenuation of the plume) could present slightly greater adverse impacts to on-Site workers, since these alternatives would involve the installation of extraction wells through potentially contaminated soils and groundwater. (Alternative GW-3 could pose the greatest risk since it would require the installation of the most extraction wells.) The risks to on-Site workers under all of the alternatives could, however, be minimized by utilizing proper protective equipment.

It is estimated that Alternative GW-1 would require three months to implement, since developing a long-term groundwater monitoring program and installing several monitoring wells would be the only activities that would be required. It is estimated that the groundwater remediation systems under Alternatives GW-2, GW-3, and GW-4 would be constructed in four, six, and four months, respectively.

Preliminary modeling results indicate it may take up to seven years to remediate the aqueous phase of the PCE in the Former Solvent Tank Source Area plume under Alternatives GW-2, GW-3, and GW-4. Residual PCE DNAPL is suspected to be present in the Former Solvent Tank Source Area. While groundwater extraction and treatment can be effective in hydraulically containing DNAPL source zones, it is generally not completely effective in remediating these zones to groundwater standards. Therefore, for Alternative GW-2, it is likely that the total remediation time frame for the aqueous phase of the PCE in the Former Solvent Tank Source Area plume would be significantly greater than the estimated 7-year time frame.

Under Alternative GW-3, it is estimated that it may take up to eight years to remediate the contaminant plume located outside of the Former

Solvent Tank Source Area through extraction and treatment. Under Alternatives GW-2 and GW-4, it is estimated that natural attenuation would address the contaminated groundwater located outside of the Former Solvent Tank Source Area in 10 to 15 years. Remediation time frames were not developed for Alternative GW-1 because of the difficulties in estimating a natural attenuation rate for the DNAPL in the Former Solvent Tank Source Area.

Under Alternatives GW-3 and GW-4, it is estimated that it would take five years to remediate the DNAPL via  $\text{KMnO}_4$  or  $\text{H}_2\text{O}_2$  injection.

The estimated time for the groundwater to be remediated Site-wide under all of the alternatives would have to be refined based on the results of groundwater monitoring and additional groundwater modeling.

### Implementability

Alternative S-1 (no action) would be easy to implement, as there are no activities to undertake. Alternative S-2 (soil vapor extraction), would be less difficult to implement than Alternative S-3 (excavation of contaminated soils and off-Site treatment) and Alternative S-4 (excavation of contaminated soils and on-Site treatment via LTTD), since contaminated soil excavation and handling would not be required. All three action alternatives would employ technologies known to be reliable and can be readily implemented. In addition, equipment, services, and materials needed for all three of these alternatives are readily available, and the actions under these alternatives would be administratively feasible. Sufficient facilities are available for the treatment/disposal of the excavated soils under Alternative S-3.

Monitoring the effectiveness of the SVE system under Alternative S-2 would be easily accomplished through vapor and soil sampling and analysis. Under Alternative S-3, monitoring the effectiveness of the excavation could be easily accomplished through post-excavation soil sampling and analysis. Monitoring the effectiveness of the LTTD system under Alternative S-4 could be easily accomplished through post-excavation and post-treatment soil sampling and analysis.

Alternative GW-1 (no further action) would be the easiest to implement as the only activity would be installing some additional monitoring wells and establishing a monitoring program. Since only a limited number of extraction wells would need to be installed, and since the existing groundwater treatment system would be utilized, the groundwater extraction systems related to Alternative GW-2 (source area extraction and treatment and monitored natural attenuation of the plume) and

Alternative GW-4 (source area extraction and treatment, in-situ DNAPL treatment, and monitored natural attenuation of the plume) would be relatively easy to implement. Alternative GW-3 (Site-wide groundwater extraction and treatment and in-situ DNAPL treatment), which would require the installation of more extraction wells than Alternatives GW-2 and GW-4 and the construction of an additional treatment system, would be slightly more difficult to implement than these alternatives.

Alternatives GW-2 and GW-4 would also involve monitoring of natural attenuation parameters to demonstrate that natural attenuation is reliably achieving the specified remedial goals. Alternatives GW-3 and GW-4 would be more complicated to implement than Alternative GW-2, since they would also require the injection of  $\text{KMnO}_4$  or  $\text{H}_2\text{O}_2$  to address the PCE DNAPL.

The groundwater extraction and treatment systems that would be used for Alternatives GW-2, GW-3, and GW-4 have been implemented successfully at numerous Sites to extract, treat, and hydraulically control contaminated groundwater.

The air stripping technology that would be used for Alternatives GW-2, GW-3, and GW-4 is proven and reliable in achieving the specified performance goals and is readily available.

The  $\text{KMnO}_4$  or  $\text{H}_2\text{O}_2$  injection technologies that would be used for Alternative GW-4 are emerging technologies that have been successfully implemented at a few Sites across the United States to treat DNAPL. Mixing tanks for  $\text{KMnO}_4$ , and injection pumps and all necessary appurtenances for  $\text{KMnO}_4$  and  $\text{H}_2\text{O}_2$  are readily available. Field tests may be required prior to designing a full-scale system. While utilizing  $\text{KMnO}_4$  would likely result in the introduction of trace metal impurities and manganese salts into the groundwater, it is expected that the levels would be below groundwater standards.

### Cost

The present-worth costs associated with the soil remedies are calculated using a discount rate of seven percent and a 3-year time interval. The present-worth costs associated with the groundwater remedies are calculated using a discount rate of seven percent and a 15-year time interval.

The estimated capital, operation, maintenance, and monitoring (OM&M), and present-worth costs for each of the alternatives are presented below.

Alternative	Capital Cost	Annual OM&M Cost	Present-Worth Cost
S-1	\$0	\$0	\$0
S-2	\$365,000	\$122,000	\$684,000
S-3	\$3,269,000	\$0	\$3,269,000
S-4	\$1,154,000	\$0	\$1,154,000
GW-1	\$3,000	\$51,000	\$633,000
GW-2	\$362,000	\$81,000	\$1,366,000
GW-3	\$1,533,000	\$215,200	\$3,324,000
GW-4	\$479,000	\$115,000	\$1,623,000

As can be seen by the cost estimates, Alternative S-1 (no action) is the least costly soil alternative at \$0. Alternative S-3 (excavation of contaminated soils and off-Site treatment) is the most costly soil alternative at \$3,269,000. The least costly groundwater remedy is Alternative GW-1, no further action, at a present-worth cost of \$630,000. Alternative GW-3 (Site-wide groundwater extraction and treatment and in-situ DNAPL treatment) is the most costly groundwater alternative at a present-worth cost of \$3,324,000. The significant difference in the cost of this alternative as compared to the other action alternatives is mainly attributable to the construction and operation of an additional groundwater treatment system under Alternative GW-3.

#### State Acceptance

NYSDEC concurs with the selected remedy; a letter of concurrence is attached (see Appendix IV).

#### Community Acceptance

Comments received during the public comment period indicate that the public generally supports the selected remedy.

Comments received during the public comment period are summarized and addressed in the Responsiveness Summary, which is attached as Appendix V to this document.

## SELECTED REMEDY

### Summary of the Rationale for the Selected Remedy

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, EPA and NYSDEC have determined that Alternative S-2 (SVE) and Alternative GW-4 (Former Solvent Tank Source Area extraction and treatment, in-situ DNAPL treatment, and monitored natural attenuation of the plume outside of the Former Solvent Tank Source Area) best satisfy the requirements of CERCLA Section 121, 42 U.S.C. §9621 and provide the best balance of tradeoffs among the remedial alternatives with respect to the NCP's nine evaluation criteria, 40 CFR §300.430(e)(9).

While all of the soil action alternatives would effectively achieve the soil cleanup levels, Alternative S-3, excavation of contaminated soils and off-Site treatment/disposal, and Alternative S-4, excavation and on-Site treatment, would be considerably more expensive than Alternative S-2. On the other hand, Alternative S-2 would take somewhat longer to achieve the soil cleanup objectives than the other action alternatives (3 years for SVE, as compared to 1 year for excavation and off-Site treatment/disposal and 1 year for on-Site treatment). While the contaminated soils are a continuing source of groundwater contamination, there are no immediate risks to human health or ecological risks posed by the contaminated soils. Considering the fact that the groundwater component of the selected remedy will address the contaminated groundwater, the increase in the time needed to clean up the soil will not be a significant concern. Therefore, EPA believes that Alternative S-2 will effectuate the soil cleanup while providing the best balance of tradeoffs among the alternatives with respect to the evaluating criteria.

Residual PCE DNAPL is suspected to be present in the bedrock aquifer underlying the Former Solvent Tank Source Area. While Alternative GW-2 (source area extraction and treatment and monitored natural attenuation of the remainder of the plume) would be effective in hydraulically containing the DNAPL source zone, it would not likely be effective in remediating this zone to groundwater standards.

Although Alternative GW-3 would provide Site-wide groundwater extraction and treatment, making it the most effective groundwater remediation alternative, EPA believes that Alternative GW-4 will result in the remediation of the contaminated groundwater located both in the Former Solvent Tank Source Area and outside of the Former Solvent Tank Source Area via a combination of in-situ treatment of the DNAPL, groundwater extraction and treatment, and monitored natural attenuation,

respectively, in a reasonable time frame and at a significantly lower cost than groundwater extraction and treatment under Alternative GW-3.

### Description of the Selected Remedy

The selected remedy involves:

- Treatment of soils in the Former Solvent Tank Source Area at the Jones plant grounds exceeding New York State soil cleanup objectives by in-situ SVE;
- Extraction of contaminated groundwater in the Former Solvent Tank Source Area utilizing a network of recovery wells in the overburden and bedrock aquifers;
- Treatment of the extracted groundwater with the existing air stripper, which allows for the utilization of the treated water as noncontact cooling water within the plant, and discharge of the noncontact cooling water to the on-Site lagoons until groundwater standards in the Former Solvent Tank Source Area are achieved;
- In-situ treatment of the DNAPL in the aquifer underlying the Former Solvent Tank Source Area with an oxidizing agent, such as  $\text{KMnO}_4$  or  $\text{H}_2\text{O}_2$ ;
- Continued extraction and treatment of contaminated groundwater from the North Well;
- Discontinued pumping from the West Well to eliminate the potential to draw contaminants to deeper water-bearing zones;
- Monitored natural attenuation of the contaminated groundwater located outside the Former Solvent Tank Source Area and beyond the influence of the North Well; and
- Implementation of institutional controls (*i.e.*, deed restrictions) to limit future on-Site groundwater use to nonpotable purposes only until groundwater cleanup standards are achieved.

During the design phase, samples will be collected to optimize the placement of the extraction wells in the Former Solvent Tank Source Area and to better characterize the extent of the DNAPL contamination.

As part of a long-term groundwater monitoring program, groundwater samples will be collected and analyzed quarterly in order to verify that the level and extent of groundwater contaminants (e.g., volatile organic compounds) are declining and that conditions are protective of human health and the environment. In addition, biodegradation parameters (e.g., oxygen, nitrate, sulfate, methane, ethane, ethene, alkalinity, redox potential, pH, temperature, conductivity, chloride, and total organic carbon) will be used to assess the progress of the degradation process. If it is determined that monitored natural attenuation is not effective in restoring groundwater quality outside of the Former Solvent Tank Source Area in a reasonable time frame, then remedial actions, such as enhanced reductive dechlorination<sup>9</sup> or groundwater extraction and treatment, may be implemented.

The selected remedy is believed to be able to achieve the ARARs more quickly, or as quickly as the other alternatives, but at a lower cost. Therefore, the selected remedy will provide the best balance of tradeoffs among alternatives with respect to the evaluating criteria. EPA and the NYSDEC believe that the selected remedy will be protective of human health and the environment, be cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The selected remedy will meet the statutory preference for the use of treatment as a principal element.

#### Summary of the Estimated Remedy Costs

The estimated capital, annual O&M, and present-worth costs for the selected soil remedy are \$365,000, \$122,000, and \$684,000, respectively. The estimated capital, annual O&M and monitoring, and present-worth costs for the selected groundwater remedy are \$479,000, \$115,000, and \$1,623,000, respectively. Tables 8 and 9 provide the basis for these cost estimates.

It should be noted that these cost estimates are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 percent of the actual project cost. These cost estimates are based on the best available information regarding the anticipated scope of the selected remedy. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedy.

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<sup>9</sup> Under this process, microbes remove the chlorine from the VOCs, allowing the compounds to further degrade into carbon dioxide and water.

## Expected Outcomes of the Selected Remedy

The results of the risk assessment indicate that under the hypothetical off-plant groundwater-use scenario, where the on-plant production wells are turned off, there is an unacceptable excess cancer risk and a chronic adverse noncancer health effect to such receptors. In addition, the ecological risk assessment indicated that the presence of contaminated surface soil in the Former Solvent Tank Source Area poses a potentially unacceptable risk to ecological receptors.

Under the selected remedy, the treatment of the contaminated soils, which will eliminate the source of the groundwater contamination, in combination with groundwater extraction and treatment in the source area, in-situ DNAPL treatment, and monitored natural attenuation of the groundwater outside the source area, will result in the restoration of water quality in the aquifer. The treatment of the contaminated soils will also eliminate the potential threat to ecological receptors.

The plant is presently used for light industry, and the plant's reasonably-anticipated future land use is industrial. Therefore, it is not anticipated that achieving the performance standards will alter that land use in the future. In addition, although on-plant wells provide noncontact cooling water for the plant after treatment, potable water for the plant is obtained from the Village of Caledonia's well system. Therefore, it is not likely that the groundwater underlying the plant will be used for potable purposes in the foreseeable future. Beyond the plant's property boundary, downgradient water supply wells could be used for potable purposes at present and in the future (until groundwater standards are met on-plant), due to the continued operation of the plant's production wells.

Under the selected remedy, it is estimated that it will require 3 years to achieve soil cleanup objectives and 10 to 15 years to achieve groundwater standards both in the Former Solvent Tank Source Area and beyond.

## **STATUTORY DETERMINATIONS**

Under CERCLA Section 121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent

practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a Site.

For the reasons discussed below, EPA has determined that the selected remedy meets these statutory requirements.

### Protection of Human Health and the Environment

The selected remedy will be protective of the environment in that the treatment of contaminated soil will eliminate contaminant-related concerns related to ecological receptors and will eliminate the source of the groundwater contamination. Groundwater extraction and treatment, in-situ DNAPL treatment in the Former Solvent Tank Source Area, and monitored natural attenuation of the groundwater outside the Former Solvent Tank Source Area will eventually achieve groundwater standards. The selected remedy will reduce exposure levels to protective ARAR levels or to within EPA's generally acceptable risk range of  $10^{-4}$  to  $10^{-6}$  for carcinogenic risk and below the HI of 1 for noncarcinogens in the groundwater. The implementation of the selected remedy will not pose unacceptable short-term risks or cross-media impacts that cannot possibly be mitigated. The selected remedy will also provide overall protection by reducing the toxicity, mobility, and volume of contamination through the treatment of the contaminated soils and the extraction/treatment of the contaminated groundwater.

### Compliance with Applicable or Relevant and Appropriate Requirements of Environmental Laws

While there are no federal or New York State soil ARARs, one of the remedial action goals is to meet NYSDEC soil cleanup objectives as TBCs. A summary of action-specific, chemical-specific, and location-specific ARARs which will be complied with during implementation of the selected remedy is presented below.

#### **Action-specific ARARs:**

- National Emissions Standards for Hazardous Air Pollutants (40 CFR Part 61)
- 6 NYCRR Part 257, Air Quality Standards
- 6 NYCRR Part 200, New York State Regulations for Prevention and Control of Air Contamination and Air Pollution

- 6 NYCRR Part 376, Land Disposal Restrictions
- 40 CFR 50, Air Quality Standards
- New York State Pollutant Discharge Elimination System (6 NYCRR Parts 750-758)
- Resource Conservation and Recovery Act (42 U.S.C. § 6901 *et seq.*)

**Chemical-specific ARARs:**

- Safe Drinking Water Act (SDWA) MCLs and nonzero MCLGs (40 CFR Part 141)
- 6 NYCRR Parts 700-705 Groundwater and Surface Water Quality Regulations
- 10 NYCRR Part 5 State Sanitary Code

**Location-specific ARARs:**

- Fish and Wildlife Coordination Act, 16 U.S.C. 661

**Other Criteria, Advisories, or Guidance To-Be-Considereds (TBCs):**

- New York State Air Guide—1 for the Control of Toxic Ambient Air Emissions
- New York Guidelines for Soil Erosion and Sediment Control
- New York State Air Cleanup Criteria, January 1990
- SDWA Proposed MCLs and nonzero MCL Goals
- NYSDEC Technical and Operational Guidance Series 1.1.1, November 1991
- Soil cleanup objectives specified in NYSDEC Technical Administrative Guidance Memorandum No. 94-HWR-4046.

**Cost-Effectiveness**

For the foregoing reasons, it has been determined that the selected remedy provides for overall effectiveness in proportion to its cost.

The estimated present-worth cost of the soil component of the selected remedy is \$684,000.

While all of the soil action alternatives would effectively achieve the soil cleanup levels, Alternative S-3, excavation of contaminated soils and off-Site treatment/disposal, and Alternative S-4, excavation and on-Site treatment, would be considerably more expensive than Alternative S-2, the selected soil alternative. On the other hand, Alternative S-2 will take somewhat longer to achieve the soil cleanup objectives than the other action alternatives (3 years for SVE, as compared to 1 year for excavation and off-Site treatment/disposal and 1 year for on-Site treatment). While the contaminated soils are a continuing source of groundwater contamination, there are no immediate risks to human health or ecological risks posed by the contaminated soils. Considering the fact that the groundwater component of the selected remedy will address the contaminated groundwater, the increase in the time needed to clean up the soil will not be a significant concern. Therefore, EPA believes that Alternative S-2 will effectuate the soil cleanup while providing the best balance of tradeoffs among the alternatives with respect to the evaluating criteria.

The estimated present-worth cost of the groundwater component of the selected remedy, using a discount rate of seven percent and a 15-year time interval, is \$1,623,000. Although Alternative GW-3 would provide Site-wide groundwater extraction and treatment, making it the most effective groundwater remediation alternative, EPA believes that Alternative GW-4 will result in the remediation of the contaminated groundwater located both in the Former Solvent Tank Source Area and outside of the Former Solvent Tank Source Area via a combination of in-situ treatment of the DNAPL, groundwater extraction and treatment, and monitored natural attenuation in a reasonable time frame and at a significantly lower cost than groundwater extraction and treatment under Alternative GW-3.

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

The selected remedy provides the best balance of tradeoffs among the alternatives with respect to the five balancing criteria set forth in NCP §300.430(f)(1)(i)(B), such that it represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site.

The soil component of the selected remedy will employ an alternative treatment technology (SVE) to reduce the toxicity, mobility, and volume

of the contaminants in the soil in the Former Solvent Tank Source Area. The selected remedy will permanently address this soil contamination.

With regard to the groundwater, the selected remedy will provide a permanent remedy and will employ treatment technologies to reduce the toxicity, mobility, and volume of the contaminants in the groundwater.

#### Preference for Treatment as a Principal Element

The statutory preference for remedies that employ treatment as a principal element is satisfied under the selected remedy in that contaminated soils will be treated in-situ and treatment will be used to reduce the volume of contaminated groundwater in the aquifer and achieve cleanup goals.

#### Five-Year Review Requirements

The selected remedy, once fully implemented, will not result in hazardous substances, pollutants, or contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure. However, it may take more than five years to attain remedial action objectives and cleanup levels for the groundwater. Consequently, a policy review may be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

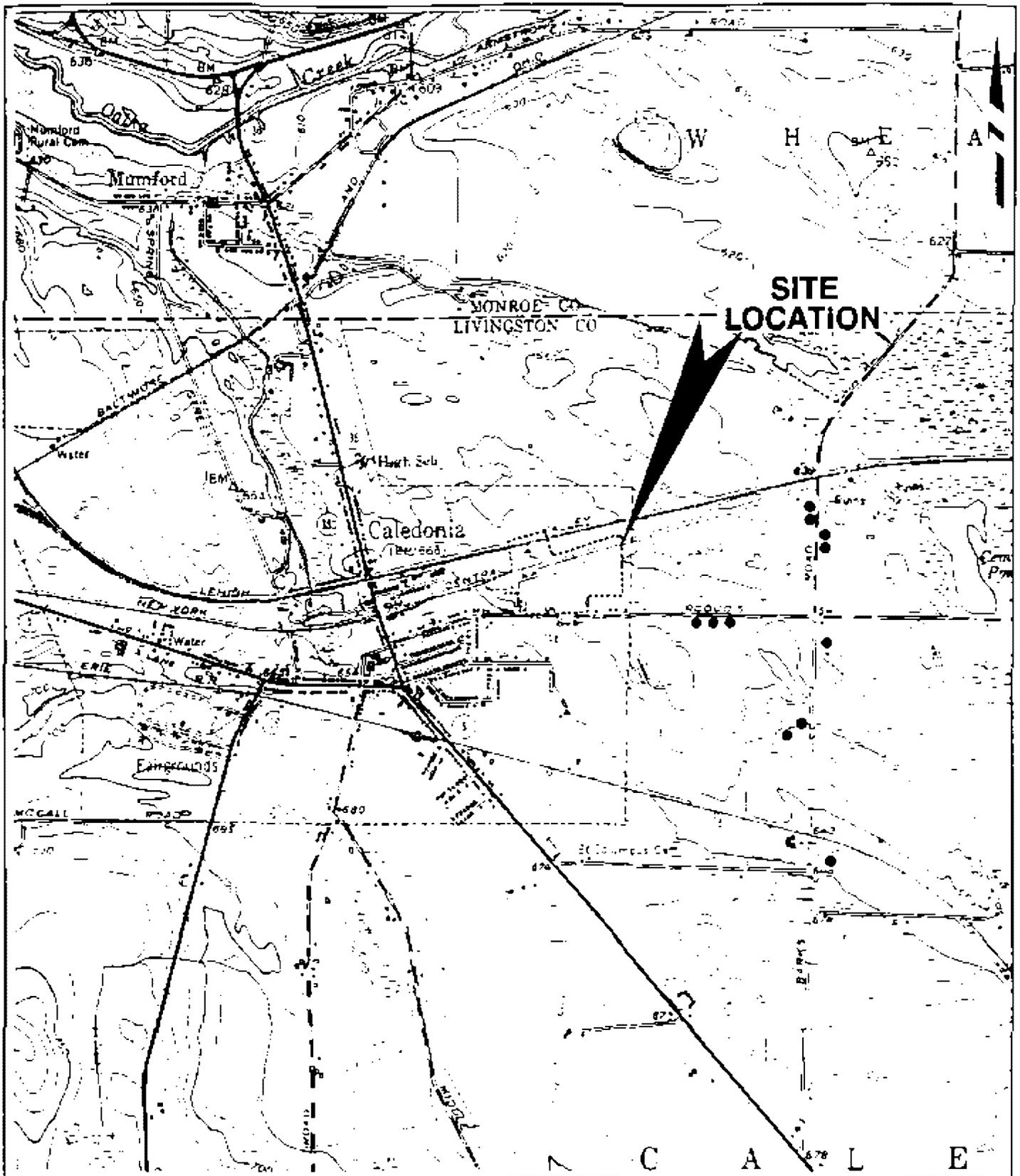
### **DOCUMENTATION OF SIGNIFICANT CHANGES**

The Proposed Plan, released for public comment on July 20, 2000, identified Alternative S-2, SVE, for the soil remedy. For the groundwater remedy, it identified Alternative GW-4, Former Solvent Tank Source Area extraction and treatment, in-situ DNAPL treatment, and monitored natural attenuation of the plume outside of the Former Solvent Tank Source Area. Based upon its review of the written and verbal comments submitted during the public comment period, EPA determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

**APPENDIX I**  
**FIGURES**

## FIGURES

Figure 1	Site Location Map
Figure 2	Site Map
Figure 3	Selected Analyte Concentrations in Soil Borings, Sediment, Sludge, and Direct-push Soil Samples
Figure 4	Generalized East-West Geologic Cross Section
Figure 5	Groundwater Elevation Contour Maps, Overburden Monitoring Wells
Figure 6	Groundwater Elevation Contour Maps, Bedrock Monitoring Wells
Figure 7	Generalized East-West Geologic Cross Section(Inset)
Figure 8	Isoconcentration Map of PCE in Groundwater, 17-25 Feet Below Ground Surface
Figure 9	Isoconcentration Map of PCE in Groundwater, 35-48 Feet Below Ground Surface



Source USGS Quadrangle Caledonia, New York, 1950  
 Photorevised 1987.

**LEGEND**

- Residential wells sampled  
 NYSDCH, 1996.



JCI Jones Chemicals Inc

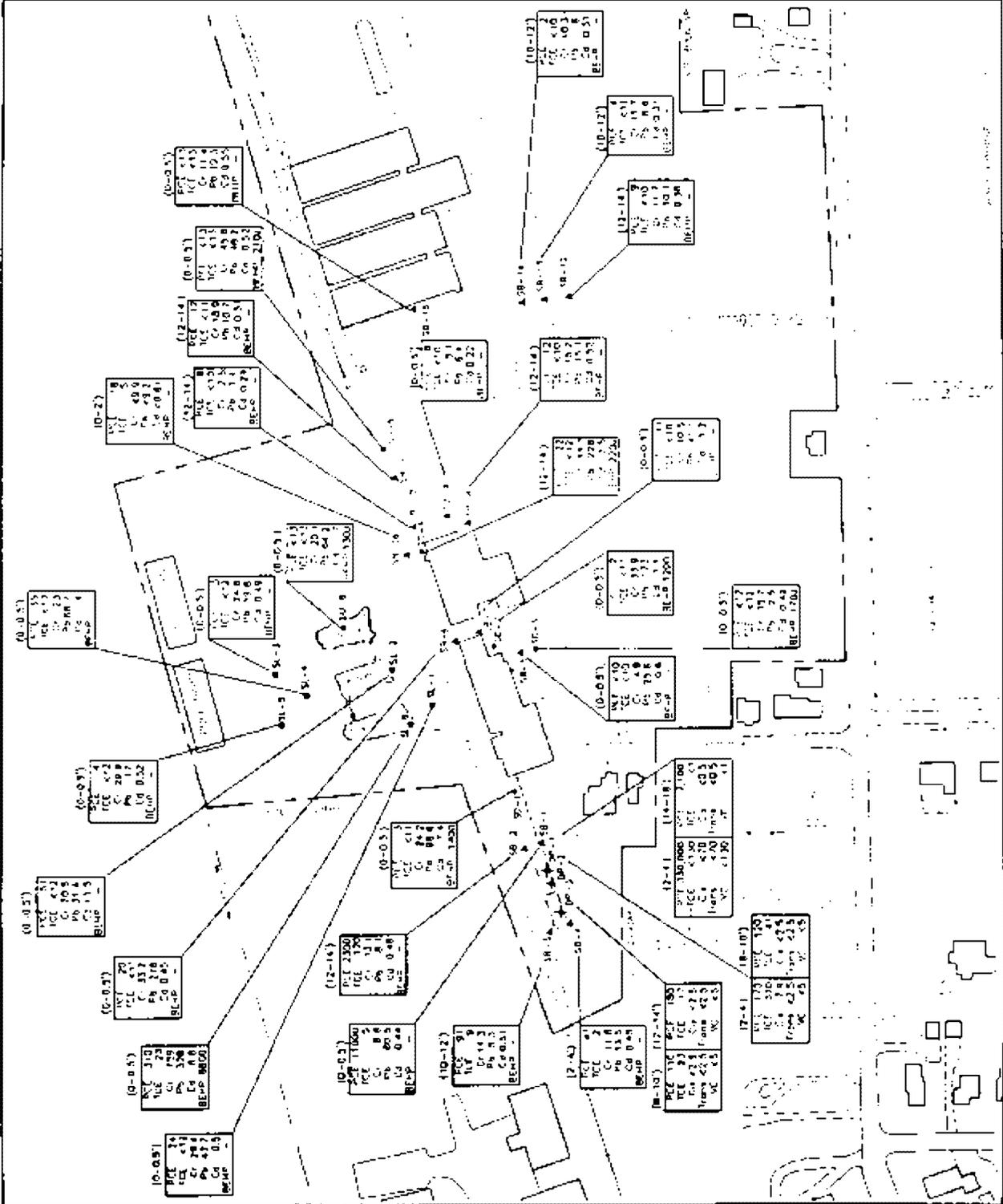
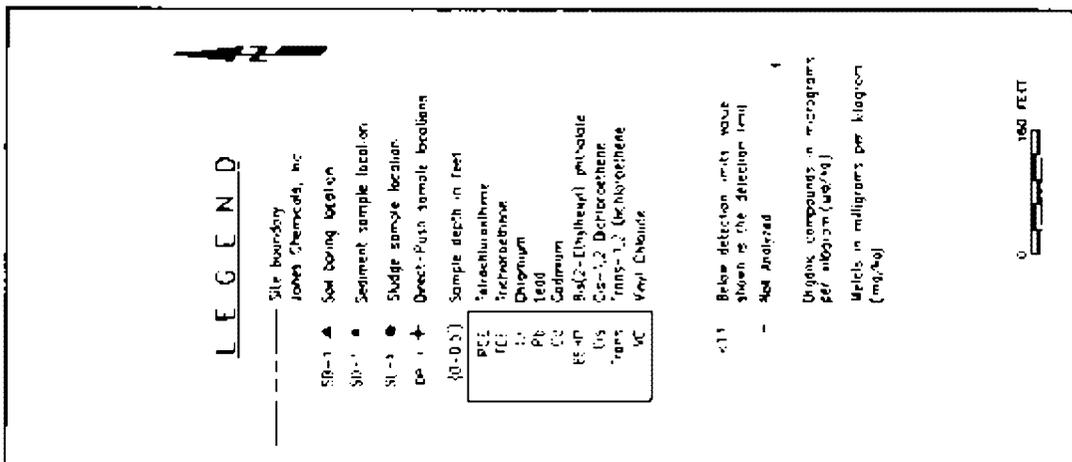
**Site Location Map**



Project No. 3165 C

**Figure 1**





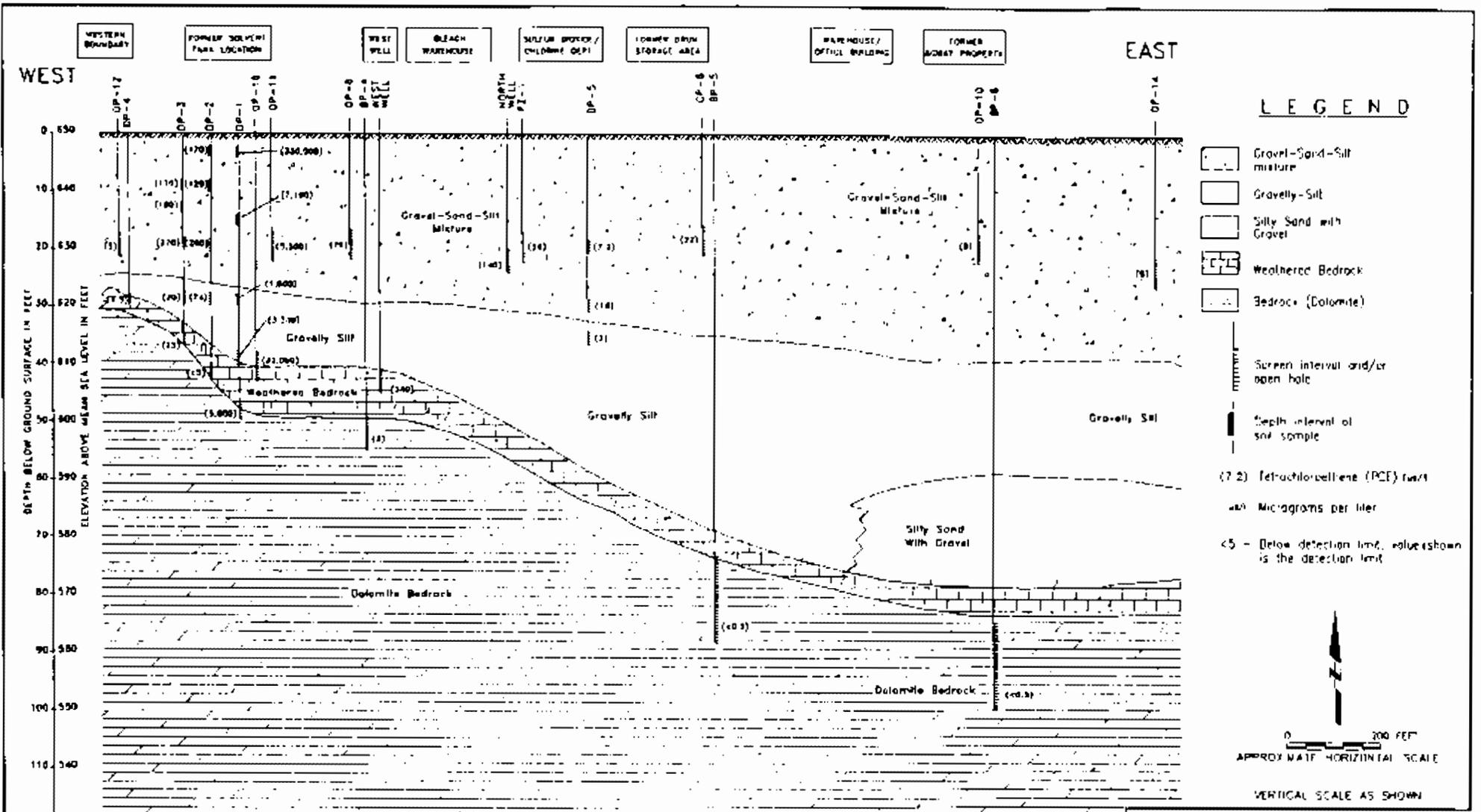
JCI / Jones Chemicals, Inc

**Selected Analyte Concentrations in Soil Borings, Sediment, Sludge, and Direct-push Soil Samples**

**LFPA**  
LABORATORY FOR ANALYTICAL PRACTICE

Project No. 3165-01

**Figure 3**



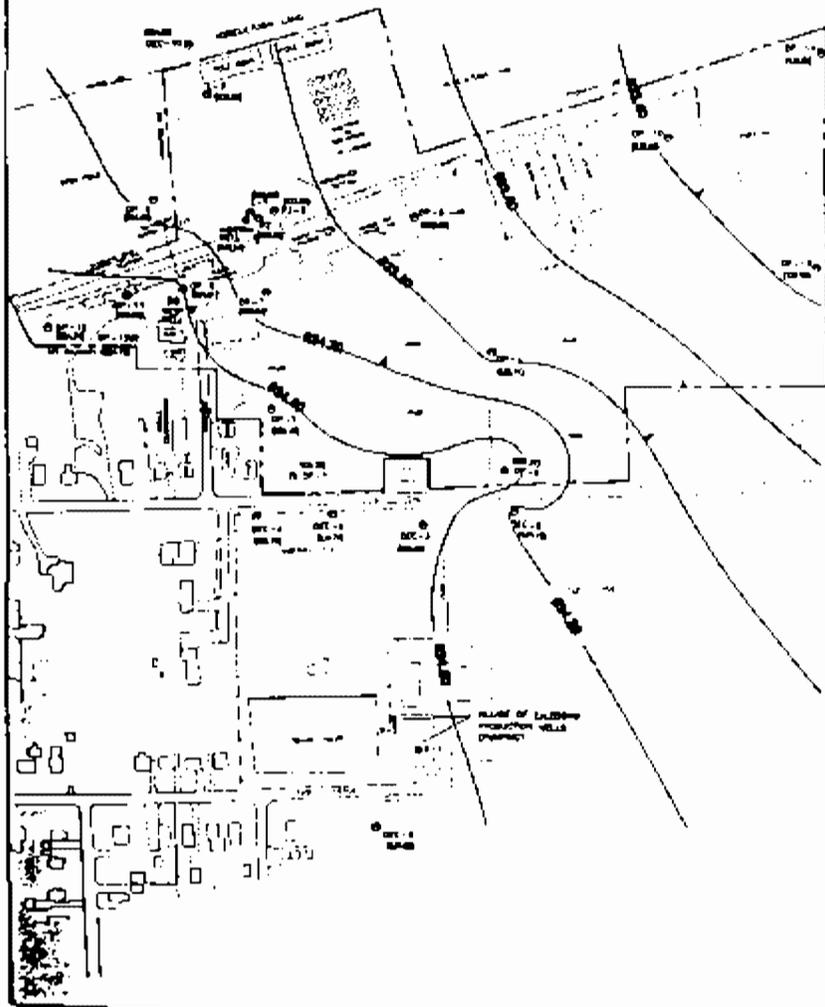
JCI / Jones Chemicals, Inc.  
**Generalized East-West Geologic Cross Section**



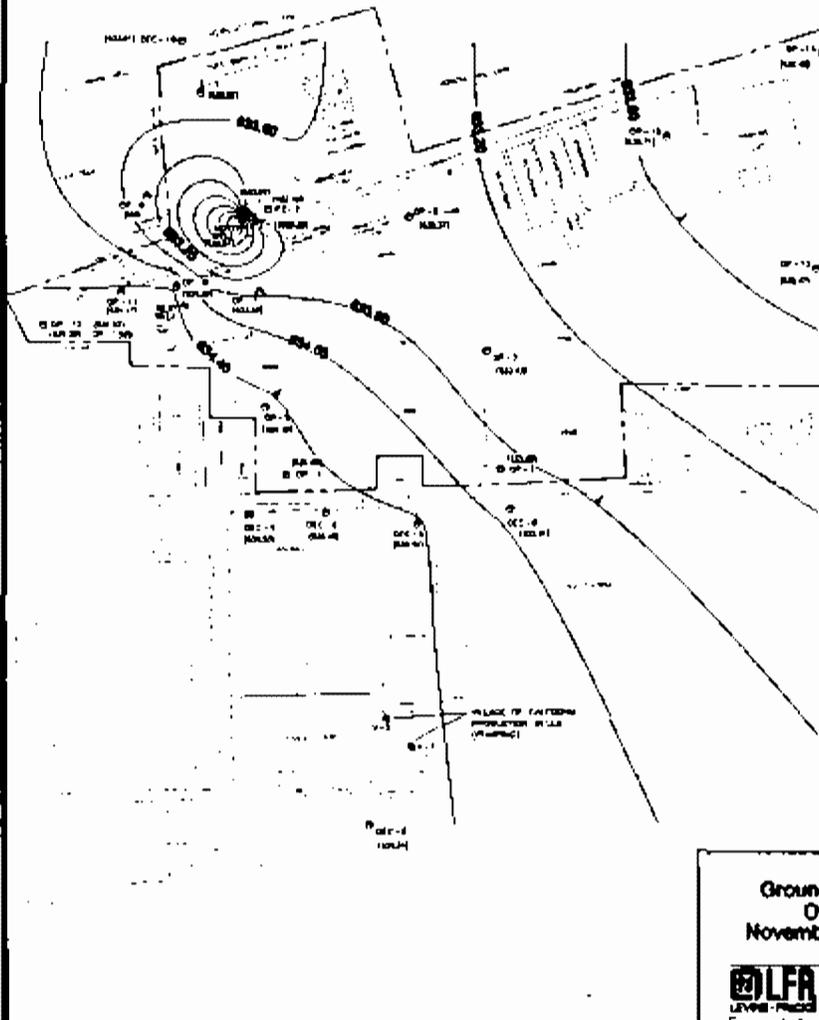
Project No. 3185.01

**Figure 4**

Groundwater Elevations-Overburden  
Monitoring Wells, December 1, 1987  
On-Site Production Wells: Not Pumping



Groundwater Elevations-Overburden  
Monitoring Wells, November 26, 1997  
On-Site Production Wells: Pumping



### LEGEND

- Monitoring well-Overburden
- ◻ Production wells  
North Well-Overburden  
West Well-Subrock
- Site boundary  
Jones Chemicals, Inc.
- (6.5.9) Groundwater elevation  
(11 MW10)
- Groundwater elevation contour  
(11 MW11)
- (N) Not included
- (NM) Not measured
- NOVD National Geodetic  
Vertical Datum
- Groundwater flow direction

0 500 FEET

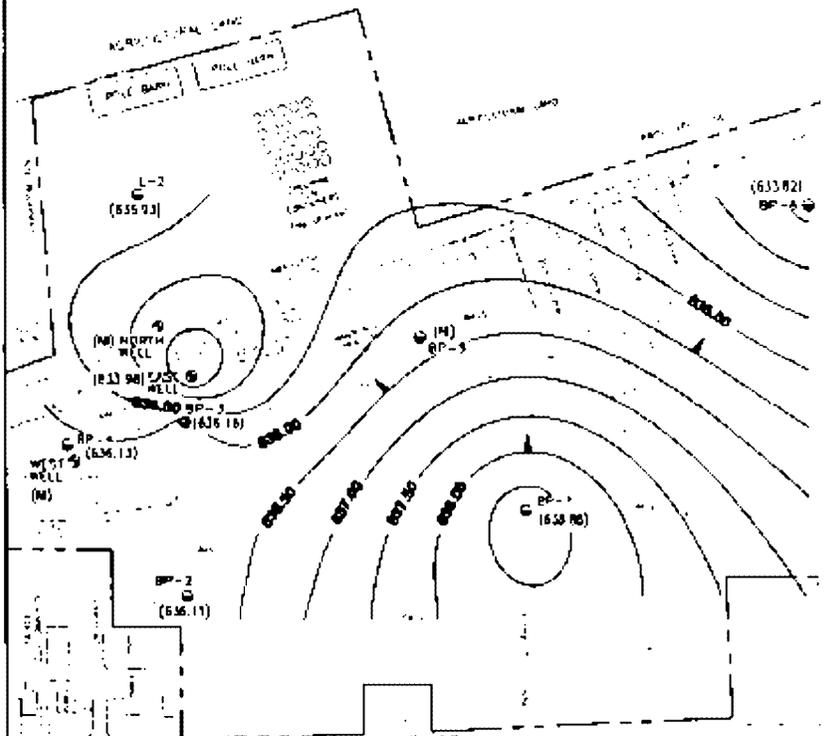
JCI / Jones Chemicals, Inc.  
Groundwater Elevation Contour Maps,  
Overburden Monitoring Wells  
November 26, 1996, and December 1, 1997  
Caledonia, New York



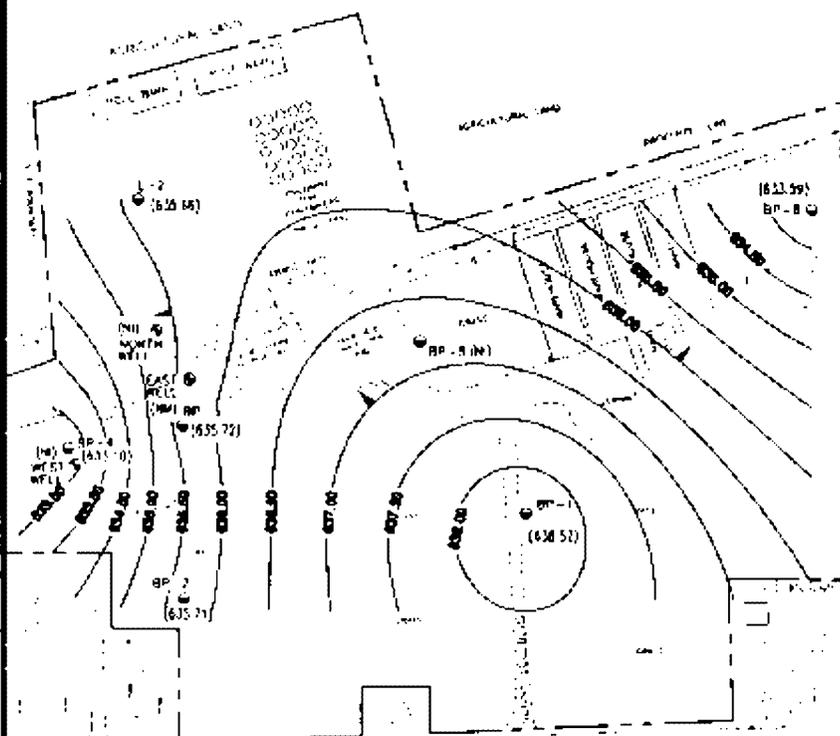
Project No. 3165.01

Figure 5

**Groundwater Elevations-Bedrock  
Monitoring Wells, December 1, 1997  
On-Site Production Wells: Not Pumping**



**Groundwater Elevations-Bedrock  
Monitoring Wells, November 28, 1997  
On-Site Production Wells: Pumping**



**LEGEND**

- Monitoring well-Bedrock
- ⊕ Production wells North Well-Overburden West Well-Bedrock
- ⊙ Former production well
- - - Site boundary Jones Chemical, Inc.
- (636.72) Groundwater elevation (IT MWD)
- 636.00 Groundwater elevation contour (IT MWD)
- (NI) Not included
- (NM) Not measured
- MWD National Geodetic Vertical Datum
- Groundwater flow direction

0 240 FEET

JCI / Jones Chemical, Inc.  
Groundwater Elevation Contour Maps.  
Bedrock Monitoring Wells  
November 28, 1996, and December 1, 1997  
Caledonia, New York



Project No. 3165 01

**Figure 6**

VILLAGE OF CALEDONIA  
PRODUCTION WELLS  
(PUMPING)

VILLAGE OF CALEDONIA  
PRODUCTION WELLS  
(PUMPING)

WESTERN  
BOUNDARY

FORMER SOLVENT  
TANK LOCATION

WEST  
WELL

BLEACH  
WAREHOUSE

SULFUR DIOXIDE/  
CHLORINE DEPT.

### LEGEND

- Gravel-Sand-Silt Mixture
- Gravelly Silt
- Weathered Bedrock
- Dolomite Bedrock

- Screen interval and/or open hole
- Depth interval of soil sample

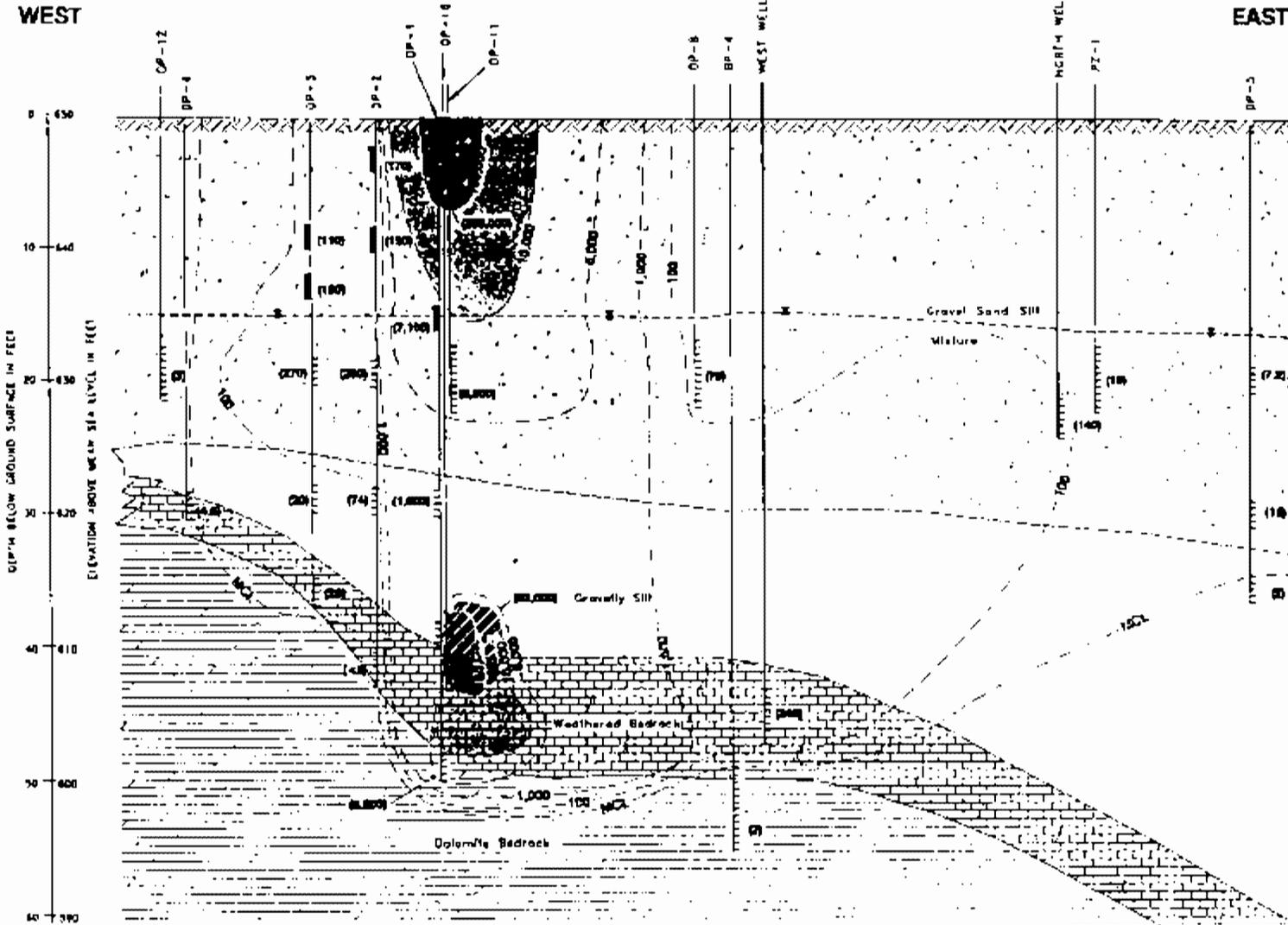
- Tetrachloroethene (PCE) limit
- Tetrachloroethene (PCE) contour limit
- Groundwater level
- Manganese per liter
- Maximum Containment Level of PCE (MCL) (5ug/l)
- Below detection limit, value shown is the detection limit

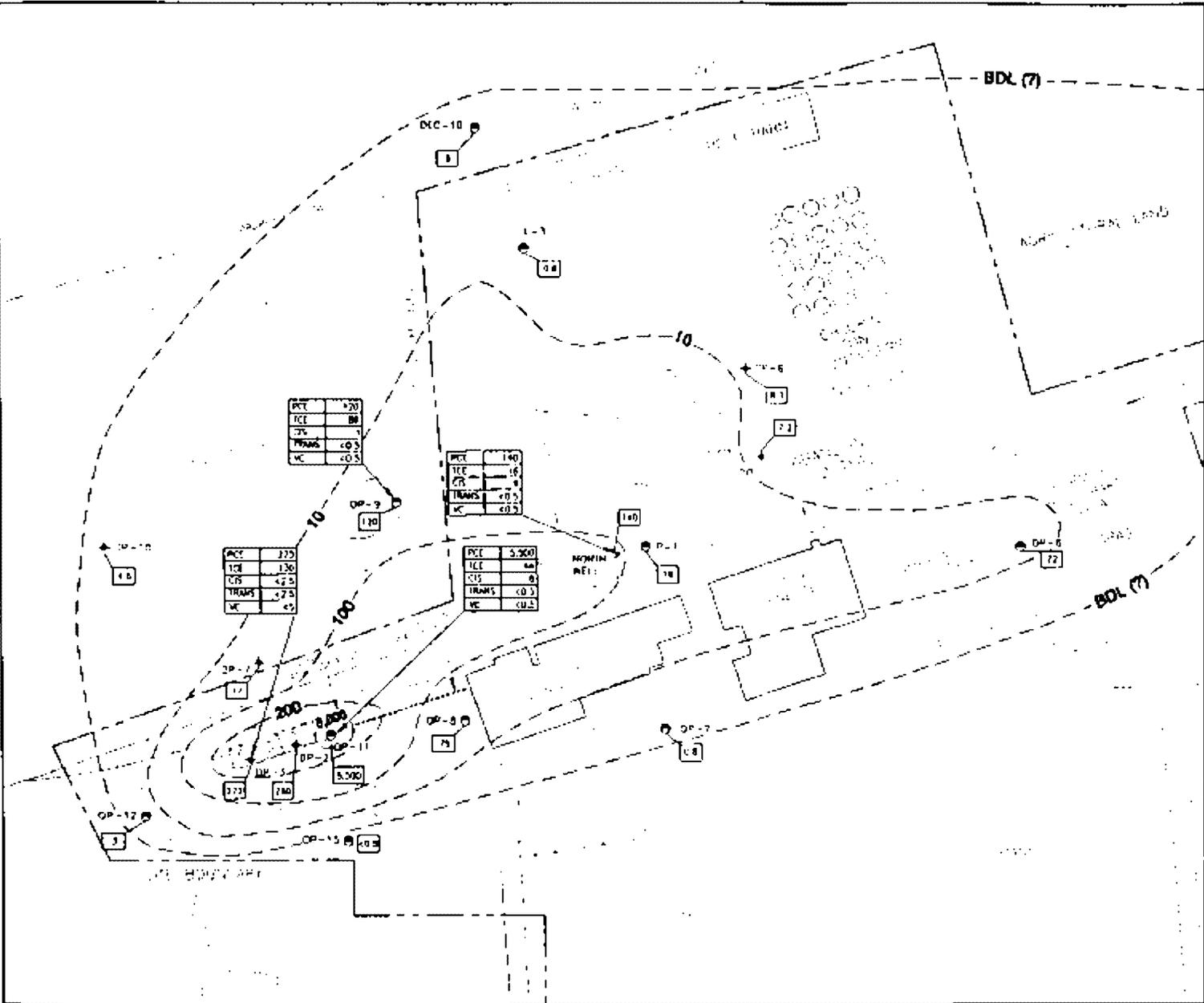
0 100 FEET  
APPROXIMATE HORIZONTAL SCALE  
VERTICAL SCALE AS SHOWN

JCI / Jones Chemicals, Inc.  
Generalized East-West Geologic  
Cross Section (Inset)

**LF**  
LEVINE-FRISCH  
Project No. 3185-01

Figure 7





### LEGEND

----- Site boundary

○ Monitoring well Overburden

● Production well

✦ Direct-Flush sample location

MCE Tetrachloroethene

PCE	Tetrachloroethene (µg/l)
TCE	Trichloroethene (µg/l)
CHL	Chloroethene (µg/l)
TRANS	Trans 1,2 Dichloroethene (µg/l)
VC	Vinyl Chloride (µg/l)

10 PCE Concentration (µg/l)

10 PCE inferred isoconcentration contour (µg/l)

µg/l Micrograms per liter

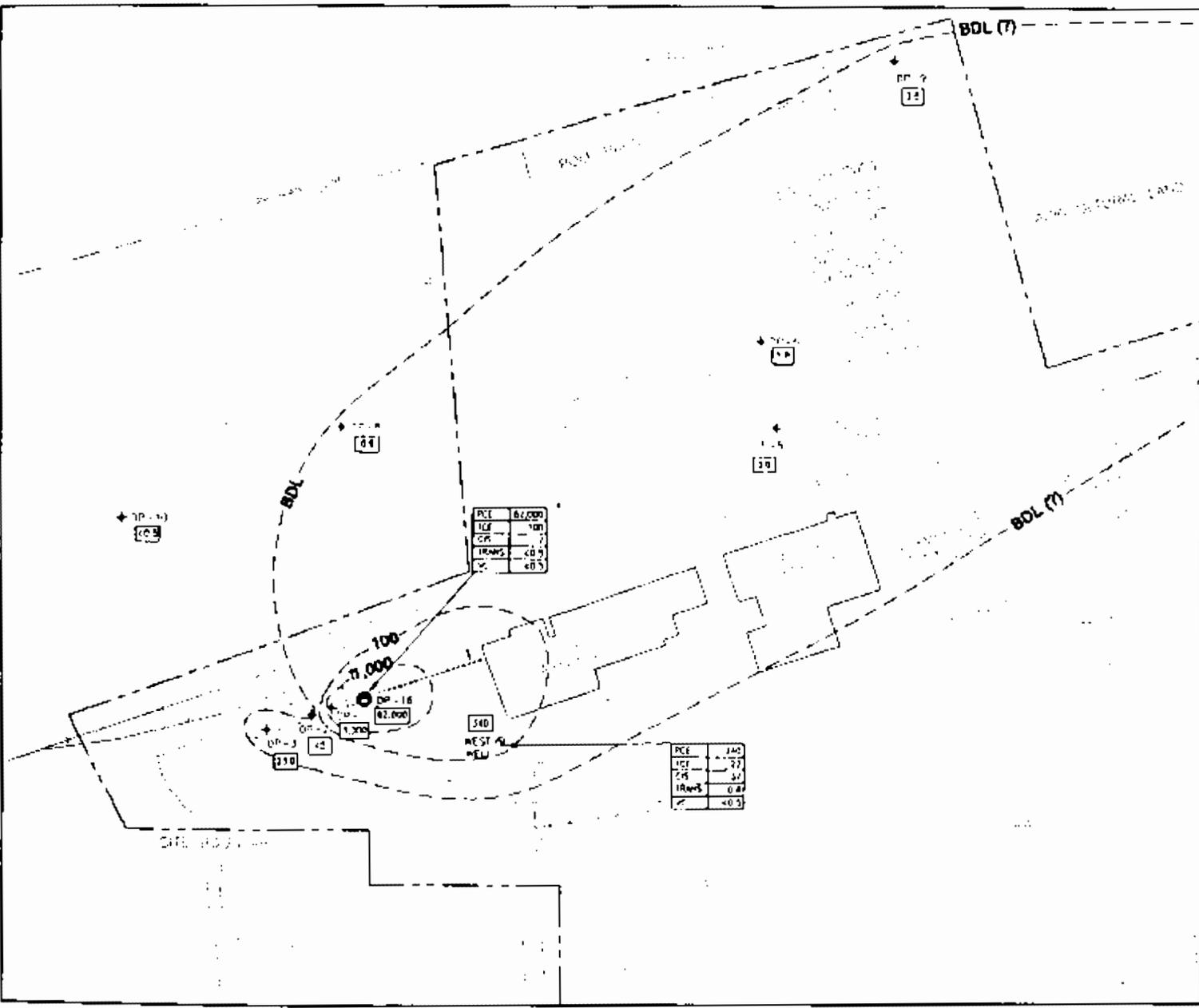
bgs Below ground surface

BDL Below detection limit

Notes: Shallow monitoring wells are between 20 and 25 feet in total depth. Direct-Flush points sampled between 17 and 20 feet bgs.

0 100 FT

JCI / Jones Chemicals, Inc  
**Isoconcentration Map of PCE in Groundwater,**  
 17 - 25 Feet bgs, August 17 - 22, 1998  
 Caledonia, New York



### LEGEND

- Site boundary
  - Jones Chemicals, Inc.
  - Monitoring well Overburden
  - ⊕ Production well
  - ⬆ Direct Push sample locations
  - PCE Tetrachloroethene
  - TCE Trichloroethene (sum)
  - DCE 1,2-Dichloroethene (sum)
  - TRANS 1,2-Dichloroethene (sum)
  - VC Vinyl Chloride (sum)
  - 70 PCE Concentration (sum)
  - 10 PCE isoc concentration contour (sum)
  - μg/l Micrograms per liter
  - bgs Below ground surface
  - 90L Base detection limit
- Note: OP-16 is 44 feet in total depth and West well is 48.5 feet in total depth. Direct-push points sampled between 35 and 40 feet bgs.
- 0 100 FEET

JCI / Jones Chemicals, Inc.  
**Isoc concentration Map of PCE in Groundwater,**  
**35 - 48 Feet bgs, August 17 - 21, 1988**  
**Caledonia, New York**

**LFR**  
 LIVES FRESH  
 Project No. 3165 01

**Figure 9**

**APPENDIX II  
TABLES**

## **TABLES**

Table 1	Sampling Results- Village of Caledonia water supply wells- March 21, 2000
Table 2	Approximate Concentrations of Potential Chemicals of Concern
Table 3	Selection of Exposure Pathways
Table 4	Summary of Receptor Risks and Hazards for Potential Chemicals of Concern - On-Site Worker
Table 5	Summary of Receptor Risks and Hazards for Potential Chemicals of Concern - Off-Site Adult Resident
Table 6	Future Groundwater Use - Hypothetical Scenario
Table 7	Summary of Soil and Groundwater Remediation Goals
Table 8	Soil Vapor Extraction - Costs
Table 9	Groundwater Remedy - Costs



**Wayland Laboratory Services**

**ELAP#11338**

Lisa Nurter Votipka, MT(ASCP)  
Laboratory Director  
1341 State Route 87  
P.O. Box 343  
Wayland, N.Y. 14575-0343

Telephone (716) 728-1850  
Fax (716) 728-1482

**CLIENT:** Village of Caledonia  
3095 West Main Street  
Caledonia, N.Y. 14423

**SAMPLE NUMBER:** M032100-7  
**SAMPLE DATE/TIME:** 3/21/00 07:30  
**DATE/TIME RECEIVED:** 3/21/00 14:30  
**DATE REPORTED:** 4/6/00  
**SAMPLED BY:** R. Fraw  
**SAMPLE LOCATION:** Inside Treatment Plant

**FEDERAL ID#:** 2501013  
**COUNTY:** Livingston  
**MATRIX:** Drinking Water

.....

**Volatile Organic Contaminants  
(EPA 502.2, units=ug/L)**

<u>Analysis</u>	<u>Result</u>
Benzene	<0.5
Bromobenzene	<0.5
Bromochloromethane	<0.5
Bromomethane	<0.5
n-Butylbenzene	<0.5
sec-Butylbenzene	<0.5
tert-Butylbenzene	<0.5
Carbon Tetrachloride	<0.5
Chlorobenzene	<0.5
Chloroethane	<0.5
Chloromethane	<0.5
2-Chlorotoluene	<0.5
4-Chlorotoluene	<0.5
Dibromomethane	<0.5
1,2-Dichlorobenzene	<0.5
1,3-Dichlorobenzene	<0.5
1,4-Dichlorobenzene	<0.5
Dichlorodifluoromethane	<0.5
1,1-Dichloroethane	<0.5
1,2-Dichloroethane	<0.5
1,1-Dichloroethene	<0.5
cis-1,2-Dichloroethene	<0.5
trans-1,2-Dichloroethene	<0.5
1,2-Dichloropropane	<0.5

*continued on next page.....*

WAYLAND LABORATORY SERVICES

ELAP #11338

Report Continued.

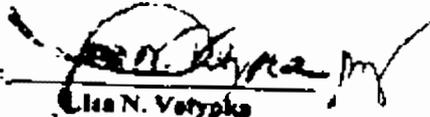
Sample Number M0J2100-7

1,3-Dichloropropane	<0.5
2,2-Dichloropropane	<0.5
1,1-Dichloropropene	<0.5
cis-1,3-Dichloropropene	<0.5
trans-1,3-Dichloropropene	<0.5
Ethylbenzene	<0.5
Hexachlorobutadiene	<0.5
Isopropylbenzene	<0.5
4-Isopropyltoluene	<0.5
Methylene Chloride	<0.5
n-Propylbenzene	<0.5
Styrene	<0.5
1,1,1,2-Tetrachloroethane	<0.5
1,1,2,2-Tetrachloroethane	<0.5
Tetrachloroethane	<0.5
Toluene	<0.5
1,2,3-Trichlorobenzene	<0.5
1,2,4-Trichlorobenzene	<0.5
1,1,1-Trichloroethane	<0.5
1,1,2-Trichloroethane	<0.5
Trichloroethene	<0.5
Trichlorofluoromethane	<0.5
1,2,3-Trichloropropane	<0.5
1,2,4-Trimethylbenzene	<0.5
1,3,5-Trimethylbenzene	<0.5
Vinyl Chloride	<0.5
o-Xylene	<0.5
m-Xylene	<0.5
p-Xylene	<0.5

Testing performed at ELAP#10248

Date of Analysis: 3/28/00

Results released by:

  
Lisa N. Votyka

P.O. Box 543, 2341 State Route 63, Wayland, NY 14572. Phone (716) 728-3850

**Table 2. Approximate Concentrations of Potential Chemicals of Concern  
JCI Jones Chemicals, Inc. Site, Caledonia, New York**

Potential Chemicals of Concern	Unsaturated Soil (mg/kg)	Groundwater Overburden Zone ( $\mu\text{g/l}$ )	Groundwater Bedrock Zone ( $\mu\text{g/l}$ )
Tetrachloroethene (PCE)	0.002-330	<1-62,000	<1-2
Trichloroethene (TCE)	0.002-0.320	<1-100	<1-8
1,2-Dichloroethene (1,2-DCE)	0.002-0.010	<1-37	<1-26
1,1-Dichloroethene (1,1-DCE)	<0.005	<1-2	<1
Vinyl Chloride	<0.005	<1	<1

**Notes:**

bgs = below ground surface

mg/kg = milligrams per kilogram

$\mu\text{g/l}$  = micrograms per liter

< = compound not detected; value is below the detection limit

SELECTION OF EXPOSURE PATHWAYS  
 JONI'S CHEMICALS, CALIFORNIA, BY SOURCE MANAGEMENT ZONE

Scenario Timeline	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway				
Current	Soil	Soil	Source Management Zone	Worker*	Adult	Ingestion	On Site	Quant	Soils within industrial facility				
					Adult	Dermal	On Site	Quant	Soils within industrial facility				
					Child	Ingestion	Off Site	None	Soils within industrial facility				
				Resident	Adult	Ingestion	Off Site	None	Soils within industrial facility				
					Adult	Dermal	Off Site	None	Soils within industrial facility				
					Child	Ingestion	Off Site	None	Soils within industrial facility				
	Indoor Air	Volatiles from soil and dust particles in ambient air	Well Water	Outdoor Worker	Adult	Inhalation	On Site	Quant	Soils within industrial facility				
					Resident	Adult	Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off site receptor			
					Child	Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off site receptor				
	Groundwater	Groundwater	Well Water	Outdoor Worker	Adult	Ingestion	On Site	None	Workers only have contact with treated groundwater				
					Adult	Dermal	On Site	None	Workers only have contact with treated groundwater				
					Resident	Adult	Combined**	Off Site	Quant	Residents currently live next to site where wells tap into shallow aquifer			
Resident				Adult	Dermal	Off Site	Quant	Residents currently live next to site where wells tap into shallow aquifer					
				Child	Combined**	On Site	Quant	Residents currently live next to site where wells tap into shallow aquifer					
				Child	Dermal	Off Site	Quant	Residents currently live next to site where wells tap into shallow aquifer					
Indoor Air	Vapors from chemicals dissolved in groundwater	Well Water	Outdoor Worker	Adult	Inhalation	On Site	Quant	Site is an industrial facility					
				Resident	Adult	Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off site receptor				
				Child	Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off site receptor					
			Resident	Adult	Combined**	Off Site	Quant	Residents currently live next to site where wells tap into shallow aquifer					
				Child	Combined**	On Site	Quant	Residents currently live next to site where wells tap into shallow aquifer					
				Child	Dermal	Off Site	Quant	Residents currently live next to site where wells tap into shallow aquifer					
Future	Soil	Soil	Source Management Zone	Worker*	Adult	Ingestion	On Site	Quant	Site is expected to remain industrial				
					Adult	Dermal	On Site	Quant	Site is expected to remain industrial				
					Child	Ingestion	Off Site	None	No on-site residents expected in the immediate future				
				Resident	Adult	Ingestion	On Site	None	No on-site residents expected in the immediate future				
					Adult	Dermal	On Site	None	No on-site residents expected in the immediate future				
					Child	Ingestion	Off Site	None	No on-site residents expected in the immediate future				
				Indoor Air	Volatiles from soil and dust particles in ambient air	Well Water	Outdoor Worker	Adult	Inhalation	On Site	Quant	Site is expected to remain industrial	
								Resident	Adult	Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off site receptor
								Child	Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off site receptor	
	Groundwater	Groundwater	Well Water	Outdoor Worker	Adult	Ingestion	On Site	None	On-site workers only have contact with treated groundwater				
					Adult	Dermal	On Site	None	On-site workers only have contact with treated groundwater				
					Resident	Adult	Combined**	Off Site	Quant	Residents live next to site where wells tap into shallow aquifer			
				Resident	Adult	Dermal	Off Site	Quant	Residents live next to site where wells tap into shallow aquifer				
					Child	Combined**	On Site	Quant	Residents live next to site where wells tap into shallow aquifer				
					Child	Dermal	Off Site	Quant	Residents live next to site where wells tap into shallow aquifer				
	Indoor Air	Vapors from chemicals dissolved in groundwater	Well Water	Outdoor Worker	Adult	Inhalation	On Site	Quant	Site is expected to remain industrial				
					Resident	Adult	Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off site receptor			
					Child	Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off site receptor				

Notes: \* The "worker" receptor will include on-site workers plus a typical maintenance worker working on site periodically.

\*\* Combined exposure through the ingestion and inhalation routes.

SELECTION OF EXPOSURE PATHWAYS  
 JURISDICTIONAL CALCULATION BY LAGOON MANAGEMENT ZONE

Scenario Timeline	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On Site Off Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway		
Current	Soil	Soil	Lagoon Management Zone	Maintenance Worker	Adult	Ingestion	On Site	Quant	Soil is within industrial facility		
						Dermal	On Site	Quant	Soil is within industrial facility		
					Resident	Adult	Ingestion	Off Site	None	Soil is within industrial facility	
					Child	Dermal	Off Site	None	Soil is within industrial facility		
					Child	Ingestion	Off Site	None	Soil is within industrial facility		
					Dermal	Off Site	None	Soil is within industrial facility			
		Outdoor Air	Volatiles (from soil) and dust particles in ambient air	Maintenance Worker	Adult	Inhalation	On Site	Quant	Soil is within industrial facility		
	Resident				Adult	Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off-site receptor		
	Child				Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off-site receptor			
	Surface water	Surface water	Surface water	Surface water	Maintenance Worker	Adult	Ingestion	On Site	None	Maintenance workers do not have contact with surface water	
							Dermal	On Site	None	Maintenance workers do not have contact with surface water	
						Resident	Adult	Combined	Off Site	None	Surface water from lagoons do not migrates to off-site
						Child	Combined	Off Site	None	Surface water from lagoons do not migrates to off-site	
						Child	Combined	Off Site	None	Surface water from lagoons do not migrates to off-site	
					Dermal	Off Site	None	Surface water from lagoons do not migrates to off-site			
Outdoor Air					Vapors from chemicals dissolved in groundwater	Maintenance Worker	Adult	Inhalation	On Site	Quant	Maintenance workers sporadically visit the site
							Resident	Adult	Inhalation	Off Site	Quant
	Child	Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off-site receptor						
Future	Soil	Soil	Lagoon Management Zone	Maintenance Worker	Adult	Ingestion	On Site	Quant	Site is expected to remain industrial		
						Dermal	On Site	Quant	Site is expected to remain industrial		
					Resident	Adult	Ingestion	On Site	None	No on-site residents expected in the immediate future	
					Child	Dermal	On Site	None	No on-site residents expected in the immediate future		
					Child	Ingestion	On Site	None	No on-site residents expected in the immediate future		
					Dermal	On Site	None	No on-site residents expected in the immediate future			
		Outdoor Air	Volatiles (from soil) and dust particles in ambient air	Maintenance Worker	Adult	Inhalation	On Site	Quant	Site is expected to remain industrial		
	Resident				Adult	Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off-site receptor		
	Child				Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off-site receptor			
	Surface water	Surface water	Surface water	Surface water	Maintenance Worker	Adult	Ingestion	On Site	None	Maintenance workers will not have contact with surface water	
							Dermal	On Site	None	Maintenance workers will not have contact with surface water	
						Resident	Adult	Combined	Off Site	None	Surface water from lagoons do not migrates to off-site
						Child	Combined	Off Site	None	Surface water from lagoons do not migrates to off-site	
						Child	Combined	Off Site	None	Surface water from lagoons do not migrates to off-site	
					Dermal	Off Site	None	Surface water from lagoons do not migrates to off-site			
Outdoor Air	Vapors from chemicals dissolved in groundwater	Maintenance Worker	Adult	Inhalation	On Site	Quant	Site is expected to remain industrial				
			Resident	Adult	Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off-site receptor			
	Child	Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off-site receptor						

Notes: \* There are no workers as the Lagoon Management Area. However, maintenance workers may be sporadically present as it is area

\*\* Combined exposure includes ingestion and inhalation

SELECTION OF EXPOSURE PATHWAYS  
 JONES CHEMICALS, PALM BEACH, NY - SITE MANAGEMENT ZONE

Scenario Timeline	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On Site Off Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway			
Current	Soil	Soil	Site Management Zone	Worker*	Adult	Ingestion Dermal	On Site On Site	Quant Quant	Soils within industrial facility Soils within industrial facility			
				Resident	Adult	Ingestion Dermal	Off Site Off Site	None None	Soils within industrial facility Soils within industrial facility			
					Child	Ingestion Dermal	Off Site Off Site	None None	Soils within industrial facility Soils within industrial facility			
				Indoor Air	Volatiles from soil and dust particles in ambient air	Indoor Worker	Adult	Inhalation	On Site	Quant	Soils within industrial facility	
						Resident	Adult	Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off site receptor	
				Child	Inhalation		Off Site	Quant	Volatiles may migrate in ambient air to an off site receptor			
	Groundwater	Groundwater	Well Water	Indoor Worker	Adult	Ingestion Dermal	On Site On Site	None None	Workers only have contact with treated groundwater Workers only have contact with treated groundwater			
					Resident	Adult	Combined Dermal	Off Site Off Site	Quant Quant	Residents currently live next to site where wells tap into shallow aquifer Residents currently live next to site where wells tap into shallow aquifer		
				Child		Combined Dermal	Off Site Off Site	Quant Quant	Residents currently live next to site where wells tap into shallow aquifer Residents currently live next to site where wells tap into shallow aquifer			
				Indoor Air		Vapors from chemicals dissolved in groundwater	Indoor Worker	Adult	Inhalation	On Site	Quant	Site is an industrial facility
							Resident	Adult	Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off site receptor
				Child	Inhalation	Off Site		Quant	Volatiles may migrate in ambient air to an off site receptor			
Future	Soil	Soil	Site Management Zone	Worker*	Adult	Ingestion Dermal	On Site On Site	Quant Quant	Site is expected to remain industrial Site is expected to remain industrial			
				Resident	Adult	Ingestion Dermal	On Site On Site	None None	No on site residents expected in the immediate future No on site residents expected in the immediate future			
					Child	Ingestion Dermal	On Site On Site	None None	No on site residents expected in the immediate future No on site residents expected in the immediate future			
						Indoor Air	Volatiles from soil and dust particles in ambient air	Indoor Worker	Adult	Inhalation	On Site	Quant
				Resident	Adult			Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off site receptor	
					Child	Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off site receptor			
	Groundwater	Groundwater	Well Water	Indoor Worker	Adult	Ingestion Dermal	On Site On Site	None None	On site workers only have contact with treated groundwater On site workers only have contact with treated groundwater			
					Resident	Adult	Combined Dermal	Off Site Off Site	Quant Quant	Residents live next to site where wells tap into shallow aquifer Residents live next to site where wells tap into shallow aquifer		
				Child		Combined Dermal	Off Site Off Site	Quant Quant	Residents live next to site where wells tap into shallow aquifer Residents live next to site where wells tap into shallow aquifer			
				Indoor Air		Vapors from chemicals dissolved in groundwater	Indoor Worker	Adult	Inhalation	On Site	Quant	Site is expected to remain industrial
							Resident	Adult	Inhalation	Off Site	Quant	Volatiles may migrate in ambient air to an off site receptor
				Child	Inhalation	Off Site		Quant	Volatiles may migrate in ambient air to an off site receptor			

Notes: \* The work off receptor will include on site workers plus a typical maintenance worker working on a regular basis.  
 \*\* Combined exposure through the ingestion and inhalation routes.

**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS  
 REASONABLE MAXIMUM EXPOSURE  
 SOURCE MANAGEMENT ZONE, JONES CHEMICALS, CALEDONIA, NY**

Scenario Timeframe	Current/Future
Receptor Population	On Site Worker
Receptor Age	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Site Soil	Tetrachloroethene	3.00E-06	--	2.20E-06	5.20E-06	Tetrachloroethene	Liver	1.61E-02	--	1.18E-02	2.79E-02
			Trichloroethene	5.38E-10	--	3.94E-10	9.32E-10	Trichloroethene	Liver	2.29E-05	--	1.67E-05	3.95E-05
			(Total)	3.00E-06	--	2.20E-06	5.20E-06	(Total)	1.81E-02	--	1.18E-02	2.79E-02	
Soil and Groundwater	Air	Outdoor Air	1,1,1,2-Tetrachloroethane	--	2.21E-11	--	2.21E-11	1,1,1,2-Tetrachloroethane	Liver/Kidney	--	7.92E-06	--	7.92E-06
			Tetrachloroethene	--	1.40E-05	--	1.40E-05	Tetrachloroethene	Liver	--	1.78E-01	--	1.78E-01
			Trichloroethene	--	2.44E-08	--	2.44E-08	Trichloroethene	Liver	--	1.89E-03	--	1.89E-03
			1,2,4-Trimethylbenzene	--	NC	--	NC	1,2,4-Trimethylbenzene	Kidney	--	2.43E-04	--	2.43E-04
			(Total)	--	1.40E-05	--	1.40E-05	(Total)	--	1.80E-01	--	1.80E-01	
Total Risk Across Soil and Groundwater							1.9E-05	Total Hazard Index Across All Media and All Exposure Routes					2.09E-01
Total Risk Across All Media and All Exposure Routes							1.9E-05						

Total (Liver) HI =	2.09E-01
Total (Kidney) HI =	2.43E-04

Notes  
 NC = Not carcinogenic

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS  
 REASONABLE MAXIMUM EXPOSURE  
 SITE MANAGEMENT ZONE, JONES CHEMICALS, CALLEDONIA, NY

Scenario Timeframe	Current/Future
Receptor Population	On-Site Worker
Receptor Age	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Site Soil	Benzo(a)pyrene	2.42E-06	-	1.77E-06	4.19E-06	Chlordane	Liver	6.36E-07	-	4.66E-07	1.10E-06
			Chlordane	1.30E-11	-	1.91E-11	2.40E-11	Hexachlorobenzene	Liver	7.34E-04	-	5.37E-04	1.27E-03
			Dibenzo(a,h)anthracene	4.57E-07	-	3.36E-07	7.93E-07	Tetrachloroethene	Liver	5.87E-07	-	4.30E-07	1.02E-06
			Hexachlorobenzene	3.05E-07	-	2.48E-07	5.53E-07	Trichloroethene	Liver	6.12E-07	-	4.48E-07	1.06E-06
			Tetrachloroethene	1.09E-10	-	7.08E-11	1.69E-10	-	-	-	-	-	-
			Trichloroethene	1.44E-11	-	1.90E-11	2.50E-11	-	-	-	-	-	-
			(Total)	3.21E-06	-	2.35E-06	5.56E-06	(Total)	(Total)	7.35E-04	-	5.38E-04	1.27E-03
Soil and Groundwater	Air	Indoor Air	Benzo(a)pyrene	-	2.72E-08	-	2.72E-08	o,p'-DDE	Blood	-	2.22E-03	-	2.22E-03
			Chlordane	-	1.94E-08	-	1.94E-08	Dieldrin	Liver	-	6.72E-05	-	6.72E-05
			Dibenzo(a,h)anthracene	-	5.15E-09	-	5.15E-09	Hexachlorobenzene	Liver	-	1.94E-05	-	1.94E-05
			Hexachlorobenzene	-	8.86E-09	-	8.86E-09	Tetrachloroethene	Liver	-	2.02E-02	-	2.02E-02
			Tetrachloroethene	-	1.59E-06	-	1.59E-06	Trichloroethene	Liver	-	1.47E-02	-	1.47E-02
			Trichloroethene	-	1.89E-07	-	1.89E-07	-	-	-	-	-	-
			(Total)	-	1.34E-06	-	1.34E-06	(Total)	(Total)	-	3.72E-02	-	3.72E-02
Total Risk Across Soil and Groundwater				7.4E-06				Total Hazard Index Across All Media and All Exposure Routes					3.85E-02
Total Risk Across All Media and All Exposure Routes				7.4E-06									

Total [Liver] HI =	3.64E-03
Total [Blood] HI =	2.22E-03

Notes  
 NC = Not carcinogenic

**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS  
REASONABLE MAXIMUM EXPOSURE  
SOURCE MANAGEMENT ZONE, JONES CHEMICALS, CALEDONIA, NY**

Scenario: Timoniana	Current/Future
Receptor Population	Off-Site Resident
Receptor Age	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Site Soil	Tetrachloroethene	NCEP	--	NCEP	--	Tetrachloroethene	Liver	NCEP	--	NCEP	--
			Trichloroethene	NCEP	--	NCEP	--	Trichloroethene	Liver	NCEP	--	NCEP	--
			(Total)	--	--	--	--	(Total)	--	--	--	--	--
Soil and Groundwater	Air	Outdoor Air	1,1,1,2-Tetrachloroethane	--	2.80E-11	--	2.80E-11	1,1,1,2-Tetrachloroethane	Liver/Kidney	--	8.37E-08	--	8.37E-08
			Tetrachloroethene	--	1.78E-05	--	1.78E-05	Tetrachloroethene	Liver	--	1.89E-01	--	1.89E-01
			Trichloroethene	--	3.09E-08	--	3.09E-08	Trichloroethene	Liver	--	2.00E-03	--	2.00E-03
			1,2,4-Trimethylbenzene	--	NC	--	NC	1,2,4-Trimethylbenzene	Kidney	--	2.57E-04	--	2.57E-04
			(Total)	--	1.78E-05	--	1.78E-05	(Total)	--	1.91E-01	--	1.91E-01	
Total Risk Across Soil and Groundwater							1.8E-05	Total Hazard Index Across All Media and All Exposure Routes					1.91E-01
Total Risk Across All Media and All Exposure Routes							1.8E-05						

Total [Liver] HI =	1.91E-01
Total [Kidney] HI =	2.57E-04

Notes

NCEP = Not a complete exposure pathway

NC = Not carcinogenic

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS  
 REASONABLE MAXIMUM EXPOSURE  
 LAGOON MANAGEMENT ZONE, JONES CHEMICALS, CALEDONIA, NY

Scenario Timeframe	Current/Future
Receptor Population	On-Site Resident
Receptor Age	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Site Soil	1,2-Dichloroethene (total)	NCEP	--	NCEP	--	1,2-Dichloroethene (total)	Liver	NCEP	--	NCEP	--
			Tetrachloroethene	NCEP	--	NCEP	--	Tetrachloroethene	Liver	NCEP	--	NCEP	--
			Trichloroethene	NCEP	--	NCEP	--	Trichloroethene	Liver	NCEP	--	NCEP	--
			(Total)	--	--	--	--	(Total)	--	--	--	--	
Soil and Groundwater	Air	Outdoor Air	1,2-Dichloroethene (total)	--	NC	--	NC	1,2-Dichloroethene (total)	Liver	--	1.39E-03	--	1.39E-03
			cis-1,2-Dichloroethene	--	NC	--	NC	cis-1,2-Dichloroethene	Blood	--	3.27E-04	--	3.27E-04
			Tetrachloroethene	--	4.56E-08	--	4.56E-08	Tetrachloroethene	Liver	--	4.86E-04	--	4.86E-04
			Trichloroethene	--	8.42E-10	--	8.42E-10	Trichloroethene	Liver	--	5.46E-05	--	5.46E-05
			Vinyl Chloride	--	1.13E-05	--	1.13E-05						
			(Total)	--	1.13E-05	--	1.13E-05	(Total)	--	2.26E-03	--	2.26E-03	
Total Risk Across Soil and Groundwater							1.1E-05	Total Hazard Index Across All Media and All Exposure Routes					2.26E-03
Total Risk Across All Media and All Exposure Routes							1.1E-05						

Total (Liver) HI =	1.93E-03
Total (Blood) HI =	3.27E-04

Notes  
 NCEP = Not a complete exposure pathway  
 NC = Not carcinogenic

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPOs  
 REASONABLE MAXIMUM EXPOSURE  
 SITE MANAGEMENT ZONE, JONES CHEMICAL S., CALEDONIA, NY

Scenario Timeframe	Current/Future
Receptor Population	On Site Receptor
Receptor Age	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Site Soil	Benzo[a]pyrene	NCEP	--	NCEP	--	Chloroform	Liver	NCEP	--	NCEP	--
			Chloroform	NCEP	--	NCEP	--	Hexachlorobenzene	Liver	NCEP	--	NCEP	--
			Dibenz[a,h]anthracene	NCEP	--	NCEP	--	Tetrachloroethene	Liver	NCEP	--	NCEP	--
			Hexachlorobenzene	NCEP	--	NCEP	--	Trichloroethene	Liver	NCEP	--	NCEP	--
			Tetrachloroethene	NCEP	--	NCEP	--	--	--	NCEP	--	NCEP	--
			Trichloroethene	NCEP	--	NCEP	--	--	--	NCEP	--	NCEP	--
			(Total)	--	--	--	(Total)	(Total)	--	--	--	--	--
Soil and Groundwater	Air	Outdoor Air	Benzo[a]pyrene	--	3.44E-08	--	3.44E-08	1,1,2-Dichloroethene	Blood	--	2.35E-05	--	2.35E-05
			Chloroform	--	2.46E-08	--	2.46E-08	Chloroform	Liver	--	7.09E-05	--	7.09E-05
			Dibenz[a,h]anthracene	--	6.53E-09	--	6.53E-09	Hexachlorobenzene	Liver	--	2.05E-05	--	2.05E-05
			Hexachlorobenzene	--	1.12E-08	--	1.12E-08	Tetrachloroethene	Liver	--	2.19E-04	--	2.19E-04
			Tetrachloroethene	--	2.06E-08	--	2.06E-08	Trichloroethene	Liver	--	1.91E-04	--	1.91E-04
			Trichloroethene	--	2.04E-09	--	2.04E-09	--	--	--	--	--	--
			(Total)	--	1.00E-07	--	1.00E-07	(Total)	(Total)	--	5.25E-04	--	5.25E-04
Total Risk Across Soil and Groundwater							1.0E-07	Total Hazard Index Across All Media and All Exposure Routes					5.25E-04
Total Risk Across All Media and All Exposure Routes							1.0E-07						

Total (Liver) HI =	5.01E-04
Total (Blood) HI =	2.35E-05

Notes  
 NCEP = Not a complete exposure pathway  
 NC = Not carcinogenic

Table 5  
 Page 3 of 3

**Jones Chemical**

**Table 6, Page 1 of 6: Future Groundwater Use: Overburden Aquifer**

**RESIDENTIAL INGESTION OF TAP WATER: ADULT**

**EXPOSURE PARAMETERS**

**TOTAL 30 YR CANCER RISK :**

**3.03E-003**

	CANCER	NONCANCER
EXPOSURE DURATION (YEARS)	24	24
EXPOSURE FREQUENCY (DAYS/Y)	350	350
INGESTION RATE (L/DAY)	2	2
AVERAGING TIME (D)	25550	8760
BODY WEIGHT (KG)	70	70

TOTAL CANCER RISK	1.91E-003
TOTAL HI	1.10E+001

COMPOUND	Groundwater Conc (MG/L)	CANCER			NONCANCER		
		DOSE (MG/KG/D)	CPF	RISK	DOSE (MG/KG/D)	RfD	HQ
cis-1,2-dichloroethen	0.038	3.51E-004			1.04E-003	1.00E-002	1.04E-001
Chloroform	0.0038	3.57E-005	8.1E-003	2.18E-007	1.04E-004	1.00E-002	1.04E-002
trichloroethene	0.049	4.60E-004	1.1E-002	5.06E-006	1.34E-003	6.00E-003	2.24E-001
PCE	3.902	3.67E-002	5.2E-002	1.91E-003	1.07E-001	1.0E-002	1.07E+001
Dibromochloromethane	0.0012	1.13E-005	8.4E-002	9.47E-007	3.29E-005	2.00E-002	1.64E-003

**RESIDENTIAL INGESTION OF DRINKING WATER: CHILD (AGE 0 - 6)**

**EXPOSURE PARAMETERS**

TOTAL CANCER RISK	1.12E-003
TOTAL HI	2.57E+001

	CANCER	NONCANCER
EXPOSURE DURATION (YEARS)	6	6
EXPOSURE FREQUENCY (DAYS/Y)	350	350
INGESTION RATE (L/DAY)	1	1
AVERAGING TIME (D)	25550	2180
BODY WEIGHT (KG)	15	15

COMPOUND	Groundwater Conc (MG/L)	CANCER			NONCANCER		
		DOSE (MG/KG/D)	CPF	RISK	DOSE (MG/KG/D)	RfD	HQ
cis-1,2-dichloroethen	0.038	2.08E-004			2.43E-003	1.00E-002	2.43E-001
Chloroform	0.0038	2.08E-005	6.1E-003	1.27E-007	2.43E-004	1.00E-002	2.43E-002
trichloroethene	0.049	2.68E-004	1.1E-002	2.95E-006	3.13E-003	6.00E-003	5.22E-001
PCE	3.902	2.14E-002	5.2E-002	1.11E-003	2.48E-001	1.0E-002	2.48E+001
Dibromochloromethane	0.0012	6.58E-006	8.4E-002	5.52E-007	7.67E-005	2.00E-002	3.84E-003

Jones Chemical

Table 6, Page 2 of 6: Future Groundwater Use: Overburden Aquifer

RESIDENTIAL: INHALATION OF VAPORS AT THE SHOWER HEAD: ADULT

EXPOSURE PARAMETERS										
					CANCER		NONCANCER			
					DOSE	CPF	CANCER RISK	DOSE	RfD	HQ
COMPOUND	GW CONC (MG/L)	VOL. FRX (UNITLESS)	C(aMAX)	AIR CONC (MG/M3)	DOSE (MG/KG/D)	CPF	CANCER RISK	DOSE (MG/KG/D)	RfD	HQ
EXPOSURE DURATION (YEARS)			24	24	TOTAL CANCER RISK		1.16E-004	TOTAL 30 YR CANCER RIS		3.35E-004
EXPOSURE FREQUENCY (DAYS/Y)			350	350						
INHALATION RATE (M3/HR)			0.83	0.83	TOTAL HI:		2.91E+000			
TIME OF SHOWER (HR)			0.25	0.25						
TIME AFTER SHOWER (HR)			0.33	0.33						
WATER FLOW RATE (L/HR)			750	750						
BATHROOM VOLUME (M3)			12	12						
AVERAGING TIME (D)			25550	8760						
BODY WEIGHT (KG)			70	70						
					CANCER		NONCANCER			
					DOSE	CPF	CANCER RISK	DOSE	RfD	HQ
					(MG/KG/D)			(MG/KG/D)		
cis-1,2-dichloroethene	0.038	0.5	0.296875	0.23289331807	5.27E-004			1.54E-003		
Chloroform	0.0038	0.5	0.0296875	0.0232893319	5.27E-005	8.10E-002	4.27E-006	1.54E-004	8.6E-005	1.79E+000
trichloroethene	0.049	0.5	0.3828125	0.30030980603	6.79E-004	8.00E-003	4.07E-008	1.98E-003		
PCE	3.902	0.5	30.484375	23.9144665948	5.41E-002	2.0E-003	1.08E-004	1.58E-001	1.40E-001	1.13E+000
Dibromochloromethane	0.0012	0.5	0.009375	0.00735452586	1.65E-005			4.85E-005		

**Table 6, Page 3 of 6: Future Groundwater Use: Overburden Aquifer**

RESIDENTIAL SHOWER SCENARIO Child (0 to 6 years old)

		EXPOSURE PARAMETERS									
		CANCER	NONCANCER								
		-----	-----								
EXPOSURE DURATION (YEARS)		6	6	TOTAL CANCER RISK		2.18E-004					
EXPOSURE FREQUENCY (DAYS/Y)		350	350								
INHALATION RATE (M <sup>3</sup> /HR)		0.42	0.42	TOTAL HI		2.27E+001					
TIME OF SHOWER (HR)		0.5	0.5								
TIME AFTER SHOWER (HR)		0.5	0.5								
WATER FLOW RATE (L/HR)		750	750								
BATHROOM VOLUME (M <sup>3</sup> )		12	12								
AVERAGING TIME (D)		25550	2190								
BODY WEIGHT (KG)		15	15								
						CANCER		NONCANCER			
						-----		-----			
COMPOUND	GW CONC (MG/L)	VOL FRX (UNITLESS)	C <sub>a</sub> (MAX)	AIR CONC (MG/M <sup>3</sup> )	DOSE (MG/KG/D)	CPF	CANCER RISK	DOSE (MG/KG/D)	RFD	HQ	
cis-1,2-dichloroethene	0.038	0.5	0.59375	0.4453125	1.02E-003			1.20E-002			
Chloroform	0.0038	0.5	0.059375	0.04453125	1.02E-004	8.10E-002		1.20E-003	8.6E-005	1.39E+001	
trichloroethene	0.049	0.5	0.765625	0.57421875	1.32E-003	6.00E-003	7.93E-006	1.54E-002			
PCE	3.902	0.5	60.96875	45.7265625	1.05E-001	2.0E-003	2.10E-004	1.23E+000	1.40E-001	8.77E+000	
Dibromochloromethane	0.0012	0.5	0.01875	0.0140625	3.24E-005			3.78E-004			

Jones Chemical

Table 6, Page 4 of 6: Future Groundwater Use: Bedrock Aquifer

RESIDENTIAL INGESTION OF TAP WATER: ADULT

EXPOSURE PARAMETERS

	CANCER	NONCANCER
EXPOSURE DURATION (YEARS)	24	24
EXPOSURE FREQUENCY (DAYS/Y)	350	350
INGESTION RATE (L/DAY)	2	2
AVERAGING TIME (D)	25550	8760
BODY WEIGHT (KG)	70	70

TOTAL 30 YR CANCER RISK :

2.32E-004

TOTAL CANCER RISK	1.48E-004
TOTAL HI	9.61E-001

COMPOUND	Groundwater Conc (MG/L)	CANCER		NONCANCER			
		DOSE (MG/KG/D)	CPF	CANCER RISK	DOSE (MG/KG/D)	RfD	HQ
cis-1,2-dichloroethen	0.037	3.48E-004			1.01E-003	1.00E-002	1.01E-001
Benzene	0.0011	1.03E-005	5.5E-002	5.68E-007	3.01E-005	3.00E-003	1.00E-002
Trichloroethene	0.0078	7.33E-005	1.1E-002	8.06E-007	2.14E-004	6.00E-003	3.56E-002
PCE	0.297	2.79E-003	5.2E-002	1.45E-004	8.14E-003	1.0E-002	8.14E-001

RESIDENTIAL INGESTION OF DRINKING WATER: CHILD (AGE 0 - 6)

EXPOSURE PARAMETERS

	CANCER	NONCANCER
EXPOSURE DURATION (YEARS)	6	6
EXPOSURE FREQUENCY (DAYS/Y)	350	350
INGESTION RATE (L/DAY)	1	1
AVERAGING TIME (D)	25550	2190
BODY WEIGHT (KG)	15	15

TOTAL CANCER RISK	8.54E-005
TOTAL HI	2.24E+000

COMPOUND	Groundwater Conc. (MG/L)	CANCER		NONCANCER			
		DOSE (MG/KG/D)	CPF	CANCER RISK	DOSE (MG/KG/D)	RfD	HQ
cis-1,2-dichloroethen	0.037	2.03E-004			2.37E-003	1.00E-002	2.37E-001
Benzene	0.0011	6.03E-006	5.5E-002	3.32E-007	7.03E-005	3.00E-003	2.34E-002
Trichloroethene	0.0078	4.27E-005	1.1E-002	4.70E-007	4.99E-004	6.00E-003	8.31E-002
PCE	0.297	1.63E-003	5.2E-002	8.46E-005	1.90E-002	1.0E-002	1.90E+000

Jones Chemical

Table 6, Page 5 of 6: Future Groundwater Use: Bedrock Aquifer

RESIDENTIAL: INHALATION OF VAPORS AT THE SHOWER HEAD: ADULT

EXPOSURE PARAMETERS:

	CANCER	NONCANCER			
EXPOSURE DURATION (YEARS)	24	24	TOTAL CANCER RISK:	9.32E-006	TOTAL 30 YR CANCER RIS
EXPOSURE FREQUENCY (DAYS/Y)	350	350			2.75E-005
INHALATION RATE (M <sup>3</sup> /HR)	0.83	0.83	TOTAL HI	1.12E-001	
TIME OF SHOWER (HR)	0.25	0.25			
TIME AFTER SHOWER (HR)	0.33	0.33			
WATER FLOW RATE (L/HR)	750	750			
BATHROOM VOLUME (M <sup>3</sup> )	12	12			
AVERAGING TIME (D)	25550	8760			
BODY WEIGHT (KG)	70	70			

COMPOUND	GW CONC (MG/L)	VOL FRX (UNITLESS)	C <sub>1a</sub> MAX)	AIR CONC (MG/M <sup>3</sup> )	CANCER		NONCANCER			
					DOSE (MG/KG/D)	CPF	CANCER RISK	DOSE (MG/KG/D)	RFD	HQ
o,s-1,2-dichloroeth	0.037	0.5	0.2890625	0.226784547414	5.13E-004			1.50E-003		
Benzene	0.0011	0.5	0.00859375	0.006741648707	1.52E-005	2.90E-002	4.42E-007	4.45E-005	1.7E-003	2.62E-002
trichloroethene	0.0078	0.5	0.0609375	0.047804418103	1.08E-004	6.00E-003	6.49E-007	3.15E-004		
PCE	0.297	0.5	2.3203125	1.820245150862	4.12E-003	2.0E-003	8.23E-006	1.20E-002	1.40E-001	6.57E-002

**Table 6, Page 6 of 6: Future Groundwater Use: Bedrock Aquifer**

RESIDENTIAL SHOWER SCENARIO: Child (0 to 6 years old)

EXPOSURE PARAMETERS

	CANCER	NONCANCER		
EXPOSURE DURATION (YEARS)	6	6	TOTAL CANCER RISK	1.81E-005
EXPOSURE FREQUENCY (DAYS/Y)	350	350		
INHALATION RATE (M <sup>3</sup> /HR)	0.42	0.42	TOTAL HI	8.71E-001
TIME OF SHOWER (HR)	0.5	0.5		
TIME AFTER SHOWER (HR)	0.5	0.5		
WATER FLOW RATE (L/HR)	750	750		
BATHROOM VOLUME (M <sup>3</sup> )	12	12		
AVERAGING TIME (D)	25550	2190		
BODY WEIGHT (KG)	15	15		

COMPOUND	GW CONC (MG/L)	VOL FRX (UNITLESS)	C(a)MAX	AIR CONC. (MG/M <sup>3</sup> )	CANCER		NONCANCER			
					DOSE (MG/KG/D)	CPF	CANCER RISK	DOSE (MG/KG/D)	R/D	HQ
cis-1,2-dichloroeth	0.037	0.5	0.578125	0.43359375	9.98E-004			1.16E-002		
Benzene	0.0011	0.5	0.0171875	0.012890625	2.97E-005	2.90E-002	8.60E-007	3.46E-004	1.7E-003	2.04E-001
trichloroethene	0.0078	0.5	0.121875	0.09140625	2.10E-004	6.00E-003	1.26E-006	7.45E-003		
PCE	0.297	0.5	4.640625	3.48046875	8.01E-003	2.0E-003	1.60E-005	9.34E-002	1.40E-001	6.67E-001

**Table 7**  
**Summary of Soil and Groundwater Remediation Goals**  
**JCI Jones Chemicals, Inc.**  
**Caledonia, New York**

<b>Parameter</b>	<b>Soil Medium (mg/kg)<sup>1</sup></b>	<b>Groundwater Medium (µg/l)<sup>2</sup></b>
Tetrachloroethene	1.4	5
Trichloroethene	0.7	5
cis-1,2-Dichloroethene	NA	5
Trans-1,2-Dichloroethene	0.3	5
1,1-Dichloroethene	0.4	5
Vinyl Chloride	0.2	2

<sup>1</sup> Values are based on NYSDEC **TAGM** #HWR-94-4046: Soil Cleanup Objectives to Protect Groundwater Quality. Concentrations are presented in milligrams per kilogram.

<sup>2</sup> **MCL** values are based on New York State Groundwater Quality Standards 6 NYCRR Part 703.5. Concentrations are presented in micrograms per liter.

TABLE 8

## Soil Vapor Extraction

**Costs*****Direct Capital Costs***Soil Vapor Extraction Well Installation

Seven, 4-inch diameter PVC wells @ \$1,000 each .....	\$7,000
IDW disposal (as D039 code) @ \$350 per drum x 10 drums.....	\$3,500
Mobilization and demobilization .....	\$1,000
Per Diem - 3 person crew @ \$125 per day x 3 days .....	\$1,125

Soil Vapor Extraction Piping and Vaults

Surface removal and disposal @ \$2.00 per square foot (sf) x 400 sf.....	\$800
Surface repair - \$3.00 per sf x 400 sf.....	\$1,200
Excavation, backfill, and compaction of the trench - \$10 per ft x 200 linear feet (lf) .....	\$2,000
Pipe installation and testing - \$30 per foot x 200 feet.....	\$6,000
SVE well vaults, gauges, valves, well head connections, and concrete - \$1,500 per well x 7 wells .....	\$10,500
SVE equipment installation (lump sum).....	\$10,000

Equipment Costs

SVE system (e.g., structure, moisture, gauges, valves controls, and mufflers).....	\$35,000
GAC purchase and disposal costs @ \$4.50 per pound x 4,000 pounds .....	\$18,000
Transportation .....	\$4,000

Electrical Modifications

Lump sum.....	\$15,000
Site restoration .....	\$5,000

Confirmatory Direct-Push Soil Sampling

Mobilization/Demobilization .....	\$500
Soil sampling - \$200 per boring x 10 borings .....	\$2,000
Analysis by USEPA Method 8021	

Twelve samples x \$110 per sample .....	\$1,320
Two QA/QC samples x \$110 per sample .....	\$220
Sample shipping .....	<u>\$150</u>
Subtotal .....	\$124,315
Contingency @ 20% .....	<u>\$24,863</u>
<b>TOTAL.....</b>	<b><u>\$149,178</u></b>

***A4-3: Indirect Capital Costs***

Engineering design documents.....	\$40,000
Project management .....	\$15,000
Air permitting .....	\$10,000

Construction and Well Installation Oversight

Staff Engineer @ 12 hours per day x 15 days x \$85 per hour.....	\$15,300
Per diem, lodging, and vehicle - \$150 per day x 15 days .....	\$2,250
Travel to and from the site @ 20 hours x \$85 per hour, plus \$1,000 for airfare.....	<u>\$2,700</u>

System Startup and Shakedown

Staff Engineer @ 12 hours per day x 5 days x \$85 per hour .....	\$5,100
Technician @ 12 hours per day x 5 days x \$70 per hour .....	\$4,200
Per diem, lodging, and vehicle @ \$150 per day x 5 days x 2 people .....	\$1,500
Travel to and from the site @ 20 hours x \$155 per hour, plus \$2,000 for airfare .....	\$5,100
Startup equipment and sampling equipment .....	\$1,000
Off-gas sample analysis - 12 samples x \$300 per sample.....	\$3,600
Sample shipping - three shipments @ \$100 each.....	\$300
Construction completion and startup reporting.....	\$10,000

Confirmatory Direct Push Soil Sampling

Staff Engineer @ 12 hours per day x 2 days x \$85 per hour .....	\$2,040
Per diem, lodging, and vehicle @ \$150 per day x 2 days.....	\$300
Travel to and from the site @ 20 hours x \$85 per hour, plus \$1,000 for airfare.....	\$2,700
Sampling report .....	<u>\$10,000</u>

**TOTAL..... \$131,090**

**A4-4: Operation, Maintenance, and Monitoring**

Monthly Visits

Two technicians @ \$70 per hour x 12 hours each per visit x 12 visits ..... \$20,160  
Per diem, expendables, and field equipment – \$500 per visit x 12 visits..... \$6,000

Sample Analysis

Influent, effluent, and duplicate samples – \$250 each x 12 visits..... \$9,000  
Shipping – \$100 per event x 12 visits ..... \$1,200  
  
Electricity – 30 horsepower @ \$800 per horsepower per year..... \$24,000  
Annual repair costs ..... \$6,000

GAC Replacement

Replacement and disposal of spent GAC – \$4.50 per pound x 4,000 pounds ..... \$18,000  
Transportation..... \$2,000  
  
Annual report..... \$15,000

Subtotal ..... \$101,360  
Contingency @ 20% ..... \$20,272  
**TOTAL..... \$121,632**

The net present value of OM&M over the anticipated three years of the SVE system operation is \$319,201.

**TABLE 9**

**Source Area Extraction and Treatment, In-Situ Treatment of DNAPL, Monitored Natural Attenuation of the Plume Outside the Source Area, and Institutional Controls**

**COSTS**

**Institutional Controls/Other Controls**

***Direct Capital Costs***

It is assumed that this technology will have no mobilization-associated costs.

Staff Engineer @ 12 hours per day x 5 days x \$85 per hour .....	\$5,100
Per diem, lodging, and vehicle - \$150 per day x 5 days.....	\$750
Lagoon area fencing - 8-feet high, 900 linear feet x \$30/linear foot.....	\$27,000
Source area fencing - 8-feet high, 500 feet long @ \$30/linear foot.....	\$15,000
Warning signs .....	\$2,000
Subtotal .....	\$49,850
Contingency @ 20% .....	\$9,970
<b>TOTAL.....</b>	<b><u>\$59,820</u></b>

***Indirect Capital Costs***

Engineering and project management .....	\$10,000
Legal fees for deed restrictions.....	\$15,000
<b>TOTAL.....</b>	<b><u>\$25,000</u></b>

***Operation, Maintenance, and Monitoring Costs***

It is assumed that there will be no operation or maintenance costs for this technology. It is also assumed that this technology will not be used as a stand-alone technology; therefore, it does not have any monitoring costs.

**Monitored Natural Attenuation**

**Capital Costs**

It is assumed that there would be no direct or indirect capital costs for implementing this technology.

**Operation, Maintenance, and Monitoring Costs**

It is assumed that there would be no operation or maintenance costs for this alternative. It is assumed that groundwater samples will be collected quarterly for the first 2 years and then semiannually for 28 years from up to 20 groundwater monitoring wells. It is also assumed that the most Natural Attenuation Indicative Parameters will be analyzed at a laboratory, and that no additional shipping charges will be required.

Quarterly Monitoring

Two technicians @ \$70 per hour x 68 hours each per visit x 4 visits.....	\$38,080
Per Diem @ \$125 per day x 2 people x 4 visits x 5 days per visit.....	\$5,000
Vehicle @ \$400 per week x 4 weeks per year.....	\$1,600
Sampling equipment and materials @ \$1,800 per visit x 4 visits.....	\$7,200

Analysis by United States Environmental Protection Agency Method (EPA Method) 8021

Twenty samples from monitoring wells - \$110 each x 4 visits.....	\$8,800
Four QA/QC samples - \$110 each x 4 visits.....	\$1,600
Shipping - \$250 per visit x 4 visits.....	\$1,000

Analysis of Natural Attenuation Indicative Parameters

Twenty samples from monitoring wells @ \$200 each x 2 visits.....	\$8,000
Four QA/QC samples @ \$200 each x 2 visits.....	\$1,600

Annual Report..... \$30,000

Quarterly subtotal.....	\$102,880
Contingency @ 20%.....	\$20,576
<b>Quarterly Total.....</b>	<b><u>\$123,456</u></b>

Assuming 2 years of quarterly monitored natural attenuation and groundwater monitoring, the net present value of the quarterly sampling is \$223,211.

Semiannual Monitoring

Two technicians @ \$70 per hour x 68 hours each per visit x 2 visits.....	\$19,040
Per Diem @ \$125 per day x 2 people x 2 visits x 5 days per visit.....	\$2,500
Vehicle @ \$400 per week x 2 weeks per year.....	\$800
Sampling equipment and materials @ \$1,800 per visit x 2 visits.....	\$3,600

Analysis by United States Environmental Protection Agency Method (EPA Method) 8021

Twenty samples from monitoring wells @ \$110 each x 2 visits.....	\$4,400
Four QA/QC samples @ \$110 each x 2 visits.....	\$880
Shipping @ \$250 (each visit).....	\$500

Analysis of Natural Attenuation Indicative Parameters

Twenty samples from monitoring wells @ \$200 each x 2 visits.....	\$8,000
Four QA/QC samples @ \$200 each x 2 visits.....	\$1,600

Annual Report.....	<u>\$20,000</u>
--------------------	-----------------

Semiannual subtotal.....	\$61,320
Contingency @ 20%.....	<u>\$12,264</u>
<b>Semiannual total.....</b>	<b><u>\$73,584</u></b>

Assuming 28 years of monitoring, the net present value for semiannual monitoring is \$780,064. This number is derived by calculating the semiannual NPV for 30 years and subtracting the semiannual NPV for the initial 2 years that are addressed in the quarterly monitoring section.

The total net present value for 30 years of operation, maintenance, and monitoring for this technology is \$1,003,275.

**Source Area Pump and Treat**

***Direct Capital Costs***

Well Installation

Two 10-inch diameter wells to 30 feet bgs - \$12,000 each.....	\$24,000
One 6-inch diameter well to 55 feet bgs - lump sum.....	\$10,000
IDW disposal - 40 drums @ \$350 each.....	\$14,000
Convert existing west well to a monitoring well.....	\$1,000

Piping Trench (2 feet wide x 3.5 feet deep x 350 feet long)

Excavation – 350 feet long @ \$10 per foot.....	\$3,500
Piping - \$28 per foot x 350 feet x 2 wells.....	\$19,600
Electric conduit - \$7.75 per linear foot x 350 feet x 2 wells.....	\$5,425
Backfill and compaction – \$5 per foot x 350 feet.....	\$1,750
Surface replacement – \$5 per sf x 700 sf.....	\$3,500

Well Vaults

Installation – \$1,500 each x 3.....	\$4,500
Piping and appurtenances – \$1,200 each x 3.....	\$3,600

Extraction Pumps

Two Gravel well pumps - \$2,000 each.....	\$4,000
Bedrock zone well pump.....	\$1,500

Air Stripping Tower Modifications

Piping – Lump sum.....	\$6,000
Controls – Lump sum.....	\$10,000
Discharge – Lump sum.....	\$10,000

Surface Replacement

Six-inch pavement base @ \$1.11/sf x 1,000 sf.....	\$1,110
Two-inch asphalt pavement @ \$1.87/sf x 1,000 sf.....	\$1,870

Electrical Modifications

Lump sum.....	\$10,000
Site restoration.....	\$5,000

Subtotal.....	\$140,355
Contingency @ 20%.....	\$28,071
<b>TOTAL.....</b>	<b><u>\$168,426</u></b>

***Indirect Implementation Costs***

Engineering design documents.....	\$50,000
Project management.....	\$10,000
Air permitting (modifications to the existing air stripper).....	\$10,000

Construction Oversight

Staff Engineer @ 12 hours per day x 5 days x \$85 per hour .....	\$5,100
Per diem, lodging, and vehicle - \$150 per day x 5 days.....	\$750
Travel to and from the Site - 20 hours x \$85 per hour, plus \$1,000 for airfare.....	\$2,700

System Startup and Shakedown

Staff Engineer - 12 hours per day x 3 days x \$85 per hour .....	\$3,060
Technician - 12 hours per day x 3 days x \$70 per hour.....	\$2,520
Per diem, lodging, and vehicle @ \$250 per day x 3 days.....	\$750
Technician travel to and from Site - 20 hours x \$70 per hour, plus \$1,000 for airfare....	\$2,400
Start-up equipment.....	\$1,000
Influent and effluent sample analysis - 6 samples x \$110 per sample.....	\$660
Sample shipping .....	\$100
Construction completion reporting.....	\$20,000

**TOTAL.....\$109,040**

***Operation, Maintenance, and Monitoring Costs***

It is assumed that JCI will use the treated groundwater for its processes at the facility. It is also assumed that JCI personnel would conduct operation, maintenance and monitoring activities as part of their existing process. No additional labor costs or expenses will be caused by this technology for operation, maintenance, and monitoring during the anticipated 15 years for this technology to achieve remediation objectives. Groundwater monitoring costs associated with this technology are addressed in Monitored Natural Attenuation.

**Potassium Permanganate Injection Cost Estimate**

**Direct Capital Costs**

Well Installations

Mobilization/Demobilization.....	\$500
Per Diem and lodging, 2 man crew - \$50 per man per day x 3 days .....	\$300

*Injection Wells*

One 4-inch diameter well to 25 feet bgs.....	\$1,000
One 4-inch diameter well to 50 feet bgs.....	\$2,200
IDW disposal - 8 drums @ \$350 each.....	\$2,800

*Monitoring Wells*

Two 2-inch diameter wells to 25 feet bgs – \$500 each .....	\$1,000
Two 2-inch diameter wells to 50 feet bgs – \$1,200 each.....	\$2,400
IDW disposal – 20 drums @ \$350 each.....	\$7,000

Well Vaults and Piping

Installation, piping and appurtenances – \$1,500 each x 6 wells.....	\$9,000
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Mixing System and Equipment

System and equipment – Lump sum.....	\$10,000
System and equipment installation – Lump sum.....	\$15,000
Subtotal .....	\$51,200
Contingency @ 20%.....	\$10,240
<b>TOTAL.....</b>	<b><u>\$61,440</u></b>

***A9-2: Indirect Implementation Costs***

Engineering design documents.....	\$10,000
Project management .....	\$2,500
Injection permit and regulatory variance.....	\$10,000

Construction Oversight

Staff Engineer @ 12 hours per day x 5 days x \$85 per hour .....	\$5,100
Per diem, lodging, and vehicle – \$150 per day x 5 days.....	\$750
Travel to and from Site – 20 hours x \$85 per hour, plus \$1,000 for airfare.....	\$2,700

System Startup and Shakedown

Staff Engineer – 12 hours per day x 2 days x \$85 per hour .....	\$2,040
Technician – 12 hours per day x 2 days x \$70 per hour.....	\$1,680
Per diem, lodging, and vehicle @ \$250 per day x 2 days.....	\$500
Travel to and from the Site – 20 hours x \$155 per hour, plus \$2,000 for airfare.....	\$5,100
Start-up equipment.....	\$1,500
Groundwater sample analysis – 12 samples x \$200 per sample .....	\$2,400
QA/QC samples – 2 samples x \$200 per sample .....	\$400
Sample shipping– \$100 per event x 2 events .....	\$200
Construction completion reporting.....	\$10,000

**TOTAL..... \$54,870**

**Operation, Maintenance, and Monitoring Costs**

Monitoring - Annual Visit

Two technicians @ \$70 per hour x 10 hours each per day x 8 days.....	\$5,600
Per diem, expendables, and field equipment (\$500 per day x 8 days) .....	\$4,000
Annual Report/ Project Management.....	\$10,000

Operation

Annual KMnO <sub>4</sub> - purchase and transportation .....	\$4,000
Utilities (water and electricity) .....	\$2,000

Maintenance

Annual repair costs .....	\$3,000
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Subtotal .....	\$28,600
Contingency @ 20% .....	<u>\$5,720</u>
<b>TOTAL.....</b>	<b><u>\$34,320</u></b>

**APPENDIX III  
ADMINISTRATIVE RECORD INDEX**

JONES CHEMICALS, INC. FACILITY SITE  
ADMINISTRATIVE RECORD  
INDEX OF DOCUMENTS

**1.0 SITE IDENTIFICATION**

**1.4 Site Investigation Reports**

- P. 100001 - Report: Figure 1, Hazardous Ranking System Cover  
100091 Sheet, Jones Chemicals, Inc., Revised: June 20,  
1987, 2<sup>nd</sup> Revision: September 18, 1987.

**3.0 REMEDIAL INVESTIGATION**

**3.3 Work Plans**

- P. 300001 - Plan: Treatability Study Work Plan, Review of  
300032 Available Groundwater Treatment Technologies,  
Design and Operational Parameters for a Pilot Air  
Stripping System, Jones Chemicals, Inc.,  
Caledonia, New York, prepared by Conestoga-Rovers  
& Associates, prepared for U.S. EPA, Region II,  
March 1991.
- P. 300033 - Plan: Work Plan, Supplemental Remedial  
300383 Investigation/Feasibility Study, Jones Chemicals,  
Inc., Caledonia, New York, prepared by Conestoga-  
Rovers & Associates, prepared for U.S. EPA, Region  
II, March 1991.
- P. 300384 - Plan: Field Operations Plan, Supplemental RI/FS,  
300450 Volume I: Sampling and Analysis Plan (SAP), Jones  
Chemicals, Inc., Caledonia, New York, prepared by  
Conestoga-Rovers & Associates, prepared for U.S.  
EPA, Region II, June 1991.

- P. 300451 - Plan: Field Operations Plan, Supplemental RI/FS,  
300541 Volume II: Quality Assurance Project Plan (QAPP),  
Jones Chemicals, Inc., Caledonia, New York,  
prepared by Conestoga-Rovers & Associates,  
prepared for U.S. EPA, Region II, June 1991.
- P. 300542 - Plan: Field Operations Plan, Supplemental RI/FS,  
300643 Volume III: Health & Safety Plan (HSP), Jones  
Chemicals, Inc., Caledonia, New York, prepared by  
Conestoga-Rovers & Associates, prepared for U.S.  
EPA, Region II, June 1991.

### 3.4 Remedial Investigation Reports

- P. 300644 - Report: Site Summary Report, Remedial  
300810 Investigation, Jones Chemicals, Inc. Facility,  
Caledonia, New York, Administrative Order on  
Consent, Index No. II, CERCLA-10210, prepared by  
Levine-Fricke-Recon Inc., prepared for Jones  
Chemicals, Inc., November 11, 1996.
- P. 300811 - Report: Remedial Investigation Report, JCI/Jones  
301012 Chemicals, Inc. Facility, Caledonia, New York,  
Administrative Order on Consent, Index No. II  
CERCLA-10210, prepared by LFR Levine-Fricke,  
prepared for JCI/Jones Chemicals, Inc., June 4,  
1999.

### 3.5 Correspondence

- P. 301013 - Facsimile note to Mr. George Jacob, Remedial  
301015 Project Manager, U.S. EPA Region II, from Mr.  
Vance Puffer, Village of Caledonia, re: Sample  
data report of Volatile Organic Contaminants  
prepared by Wayland Laboratory Services, July 7,  
2000.

## 4.0 FEASIBILITY STUDY

### 4.3 Feasibility Study Reports

- P. 400001 - Report: Treatability Study Evaluation Report,  
400068 Jones Chemicals, Inc. Facility, Caledonia, New  
York, Administrative Order on Consent, Index No.

II, CERCLA-10210, prepared by Levine-Fricke-Sosch Inc., prepared for Jones Chemicals, Inc., January 23, 1997.

- P. 400069 - Report: Final Feasibility Study Report for JCI  
400207 Jones Chemicals, Inc. Facility, Caledonia, New  
York, Administrative Order on Consent, Index No.  
II, CERCLA 10210, prepared by LFR Levine-Fricke,  
prepared for JCI Jones Chemicals, Inc., February  
22, 2000.

#### **4.6 Correspondence**

- P. 400208 - Facsimile transmittal to Mr. George Jacob,  
400215 Remedial Project Manager, U.S. EPA, Region II,  
from Shekhar Melkote, P.G., Senior Hydrogeologist,  
LFR Levine Fricke, March 31, 2000. (Attachment:  
Letter (with attachments) to Mr. George Jacob,  
Remedial Project Manager, U.S. EPA, Region II,  
from E. Cambeiro, for Shekhar R. Melkote, P.G.,  
Senior Hydrogeologist, re: JCI Jones Chemicals,  
Inc. Superfund Site; Caledonia, New York,  
Administrative Order on Consent, Index No. II,  
CERCLA-10210, Feasibility Study Report: Final  
Document, March 31, 2000.)

#### **7.0 ENFORCEMENT**

##### **7.3 Administrative Orders**

- P. 700001 - Administrative Order on Consent for Remedial  
700029 Investigation/Feasibility Study, In the Matter of:  
The Jones Chemicals Site, Caledonia, New York,  
Jones Chemicals, Inc., Respondent, Index No. II  
CERCLA-10210, March 29, 1991.

#### **8.0 HEALTH ASSESSMENTS**

##### **8.2 Toxicological Profiles**

- P. 800001 - Report: Health Risk Assessment, Jones Chemicals,  
800250 Inc. Facility, Caledonia, New York, prepared by  
LFR Levine-Fricke Inc., prepared for Jones  
Chemicals, Inc., September 30, 1999.

### **8.3 Correspondence**

- P. 800251 - Memorandum to Mr. George Jacob, Remedial Project  
800251 Manager, EERD, New York Remediation Branch, from  
Ms. Gina Ferreira, Environmental Scientist, EPRD,  
Program Support Branch, re: Jones Chemical  
Proposed Plan, July 19, 2000.
- P. 800252 - Jones Chemicals Site, Risk Assessment for a  
800259 Hypothetical Off-Plant Groundwater Scenario,  
memorandum prepared by U.S. EPA, Region II, July  
19, 2000.
- P. 800260 - Jones Chemicals Site, Groundwater Remediation  
800260 Time Frames, memorandum prepared by U.S. EPA,  
Region II, July 19, 2000.

## **10.0 PUBLIC PARTICIPATION**

### **10.9 Proposed Plan**

- P. 10.00001 - Plan: Superfund Proposed Plan, Jones Chemicals,  
10.00018 Inc. Superfund Site, Caledonia, Livingston  
County, New York, prepared by U.S. EPA, Region  
II, July 2000.

### **10.10 Correspondence**

- P. 10.00019 - Letter to Mr. Joel Singerman, U.S. EPA, Region  
10.00019 II, from Ms. Michelle M. Chapman, Code  
Enforcement Officer, Village of Caledonia, New  
York, re: Zoning status of Jones Chemicals  
property, May 23, 2000.
- P. 10.00020 - Letter to Mr. Richard L. Caspe, Director,  
10.00020 Emergency and Remedial Response Division, U.S.  
EPA, Region II, from Mr. Michael J. O'Toole, Sr.,  
Director, Division of Environmental Remediation,  
New York State Department of Environmental  
Conservation, re: Jones Chemicals, ID No. 8-10-  
003, Proposed Plan, July 18, 2000.

**APPENDIX IV**  
**STATE LETTER OF CONCURRENCE**

**New York State Department of Environmental Conservation**  
**Division of Environmental Remediation, Room 260B**  
 50 Wolf Road, Albany, New York 12233-7010  
 Phone: (518) 457-5861 • FAX: (518) 485-8404  
 Website: www.dec.state.ny.us



SEP 22 2000

Mr. Richard L. Caspe  
 Director  
 Emergency and Remedial Response Division  
 U.S. Environmental Protection Agency, Region II  
 Floor 19 - E38  
 290 Broadway  
 New York, New York 10007-1866

Post-it® Fax Note	7671	Date	9/22	# of pages	1
To	Joel Singerman	From	Joe Moloughney		
Co/Dept	USEPA	Co.	NYSDEC		
Phone #		Phone #			
Fax #	212 637 3966	Fax #			

Dear Mr. Caspe:

**Re: Jones Chemicals, ID No. 8-26-003**  
**Record of Decision**

The New York State Department of Environmental Conservation (NYSDEC) and Department of Health (NYSDOH) have reviewed the Record of Decision dated September 2000 prepared by the EPA for this site. We understand the EPA's remedy for the site (Soil Alternative S-2, and Groundwater Alternative GW-4) includes vapor extraction of VOC contaminants from the Former Solvent Tank Source Area, in-situ DNAPL treatment via advanced oxidation, and the extraction and treatment of contaminated groundwater from the on-site plume. The extraction of groundwater will take place in the Former Solvent Tank Source Area. The extracted groundwater will be treated by the plant air stripper and discharged to the on-site lagoons. This discharge will meet the requirements of the existing NYSDEC SPDES Permit. We understand that the remaining on-site and off-site groundwater plume will not be collected but that a long-term groundwater monitoring program will be conducted to determine if groundwater quality improves sufficiently under natural conditions. If monitoring indicates that natural attenuation is not effective in remediating off-site groundwater contamination, active remedial measures will be considered. With this understanding, we concur with the Record of Decision for Jones Chemicals.

If you have any questions or need additional information, please contact Mr. Joseph Moloughney at (518) 457-0315.

Sincerely,

Michael J. O'Boyle, Jr.  
 Director  
 Division of Environmental Remediation

cc: J. Singerman/G. Jacob, USEPA  
 A. Carlson/M. VanValkenburg, NYSDOH  
 D. Napier, NYSDOH  
 R. Van Houten, Livingston Co. DOH

**APPENDIX V  
RESPONSIVENESS SUMMARY**

# **RESPONSIVENESS SUMMARY**

## **Jones Chemical Superfund Site**

### **INTRODUCTION**

This Responsiveness Summary provides a summary of citizens' comments and concerns received during the public comment period related to the Jones Chemicals, Inc. site (Site) remedial investigation and feasibility study (RI/FS) and the Proposed Plan, and provides the responses of the U.S. Environmental Protection Agency (EPA) and the New York State Department of Environmental Conservation (NYSDEC) to those comments and concerns. All comments summarized in this document have been considered in EPA and NYSDEC's final decision in the selection of a remedy to address the contamination at the Site.

### **SUMMARY OF COMMUNITY RELATIONS ACTIVITIES**

The July 2000 Proposed Plan, which identified EPA and NYSDEC's preferred remedy and the basis for that preference, and the RI/FS reports were made available to the public in both the Administrative Record and information repositories maintained at the EPA Docket Room in the Region II New York City office and two local information repositories: the Village of Caledonia Library, 3108 Main Street, Caledonia, New York and the Village of Caledonia Clerks Office, 30-95 Main Street, Caledonia, New York. The notice of availability for these documents was published in the *Livingston County News* on July 20, 2000. A public comment period was held from July 20, 2000 to August 19, 2000. On August 14, 2000, EPA conducted a public meeting at the Caledonia-Mumford Central School, 99 North Street, Caledonia, New York, to present the findings of the RI/FS and answer questions from the public about the Site and the remedial alternatives under consideration. Sixteen people, consisting of local residents, a representative of the media, a potentially responsible party (PRP) representative, and state and local government officials, attended the public meeting.

### **OVERVIEW**

The public generally supports the selected remedy, which includes, among other things, in-situ soil vapor extraction (SVE) to address the contaminated soil and groundwater extraction and treatment in the source area, in-situ dense nonaqueous phase liquid treatment, and monitored natural attenuation of the groundwater outside the source area to address the contaminated groundwater.

Responses to the comments received at the public meeting (no written comments were received) are summarized below. Attached to this

Responsiveness Summary are the following Appendices:

- Appendix V-a - Proposed Plan (July 2000)
- Appendix V-b - Public Notice published in the *Livingston County News* on July 20, 2000
- Appendix V-c - August 14, 2000 Public Meeting Sign-In Sheet
- Appendix V-d - August 14, 2000 Public Meeting Transcript

## **SUMMARY OF COMMENTS AND RESPONSES**

A summary of the comments provided at the August 14, 2000 public meeting, as well as EPA and NYSDEC's responses to them thereto, are provided below. The comments and responses have been organized into the following topics:

- Site Contaminants
- Threat to Public and Private Water Supplies
- Risks Posed by the Site
- Soil and Groundwater Treatment Processes
- Financing of the Project

### ***Site Contaminants***

**Comment #1:** A commenter asked what contaminants are present on-Site and whether the extent of the soil and groundwater contamination has been clearly defined.

**Response #1:** Site soils and groundwater are contaminated, primarily, with tetrachloroethylene (PCE) and trichloroethylene (TCE). The results of soil samples collected across the Site showed PCE concentrations ranging from below detection to 330,000 micrograms per kilogram ( $\mu\text{g}/\text{kg}$ ) and TCE concentrations ranging from below detection to 320  $\mu\text{g}/\text{kg}$ . The highest soil concentrations of PCE and TCE were detected in a 150-foot by 20-foot area located at the Site of a former aboveground solvent tank area referred to as the "Former Solvent Tank Source Area," on the western portion of the property.

An approximately 1,500-foot (along the northeast-southwest axis) by 720-foot (along the north-south axis) groundwater VOC plume, consisting of primarily PCE, and its degradation products TCE and 1,2-dichloroethene (1,2-DCE), extends from the Former Solvent Tank Source Area to the east and to the

northeastern property boundary. Vertically, the contamination extends to at least 48 feet below the ground surface in the source area.

Groundwater sampling results from the overburden aquifer in the Former Solvent Tank Area showed concentrations of PCE and TCE as high as 5,500 micrograms per liter ( $\mu\text{g/l}$ ) and 130  $\mu\text{g/l}$ , respectively. Although there is groundwater contamination in the overburden aquifer outside the Former Solvent Tank Area, it appears that the North Well (an on-plant production well) has helped to limit the migration of the plume (while 140  $\mu\text{g/l}$  PCE was detected at the North Well, PCE concentrations significantly taper off beyond the well, ranging from below detection to 22  $\mu\text{g/l}$ ). Based upon the data, it does not appear that contamination is migrating beyond JCI Jones Chemicals, Inc.'s property boundaries.

In the bedrock aquifer in the vicinity of the Former Solvent Tank Area, PCE and TCE were detected at concentrations as high as 62,000  $\mu\text{g/l}$  and 100  $\mu\text{g/l}$ , respectively. With the exception of the detection of 340  $\mu\text{g/l}$  PCE in the West Well, relatively low concentrations of PCE and TCE (less than 10  $\mu\text{g/l}$ ) were detected outside the Former Solvent Tank Area.

Based upon the data summarized above, EPA believes that the nature and extent of the soil and groundwater contamination have been clearly defined.

### ***Threat to Public and Private Water Supplies***

**Comment #2:** Several commenters inquired as to whether the Site poses a threat to the public and private water supplies located in the vicinity of the Site.

**Response #2:** The Site does not pose a threat to the public and private water supplies located in the vicinity of the Site.

Periodic sampling of the Village of Caledonia's water supply wells from 1983 through 1989 showed the presence of PCE, TCE, and 1,1,1-trichloroethane. In 1991, the Village installed an air stripper to treat the water prior to distribution. The latest sampling results (June 6, 2000) indicate that the contaminant concentrations meet drinking water standards prior to

treatment.

While the Site's southern boundary is located approximately 700 feet from the Village of Caledonia's water supply wells, it has not been determined that the Site was the source of this contamination. Observing groundwater flow paths would ordinarily allow a determination as to whether or not the Site was a source of this contamination. However, since the groundwater flow path has been altered (the Village took a water supply well out of service in 1994 and the prolonged pumping of the on-Site production wells has altered the natural groundwater flow path), such a determination cannot be made.

There are two private residential wells located approximately one mile from the plant which have shown chlorinated solvent contamination. NYSDEC installed and is presently maintaining treatment systems on these wells. The contaminants found in these wells are only slightly above drinking water standards. Given the low levels of contamination and considering the distance of the wells from the Site, it is unlikely that the Site is the source. The source of the contamination of these wells has yet to be identified.

No other private wells located in the vicinity of the Site show evidence of Site-related contamination.

### ***Risks Posed by the Site***

**Comment #3:** A commenter asked what are the risks that the Site poses.

**Response #3:** Based upon the results of the RI, a baseline risk assessment was conducted to estimate the risks associated with current and future Site conditions. A baseline risk assessment is an analysis of the potential adverse human health and ecological effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current and anticipated future land uses.

The potential human receptors evaluated were plant workers and off-Site adult and child residents. The baseline risk assessment evaluated the exposure that may potentially impact such receptors.

The results of the risk assessment indicate that the estimated excess risks for plant workers and trespassers were lower than or within the acceptable risk range.

Based upon the groundwater sampling results, it appears that the on-Site production wells are preventing the migration of contaminated groundwater beyond the property boundaries. The risk assessment evaluated the threat posed by a hypothetical scenario where the plant production wells cease to operate, allowing the migration of contaminated groundwater beyond the plant boundaries.

The estimated risks for off-Site residents under a hypothetical future-use scenario where the on-plant production wells are turned off, thus allowing contaminated groundwater to migrate off-Site, poses an unacceptable risk.

With regard to ecological receptors, soil samples from the Former Solvent Tank Source Area contained volatile organic compounds, some of which (e.g., PCE) are present in concentrations greater than conservative screening criteria considered protective of soil invertebrate species. Therefore, there is a potential for an unacceptable risk to burrowing animals that come into contact with these contaminated surface soils (zero to a two-foot depth).

Because the groundwater is about 8 feet below the ground surface, direct contact with groundwater by ecological receptors is unlikely. Since there are no wetlands or surface water bodies in the immediate vicinity of the Site, there is no potential for contaminated groundwater to discharge into surface water. Therefore, groundwater is not considered to be an exposure pathway for ecological receptors.

#### ***Soil and Groundwater Treatment Processes***

**Comment #4:** A commenter asked about the safety of the selected soil and groundwater treatment processes. They also asked whether these processes would adversely impact the air or groundwater.

**Response #4:** The selected soil and groundwater treatment processes

could result in some adverse impacts to on-Site remediation workers, but all of these potential risks would be readily mitigated by utilizing proper protective equipment.

Specifically, the selected soil remedy, SVE, could result in some adverse impacts to on-Site workers through dermal contact and inhalation related to the installation of SVE wells through contaminated soils. The selected groundwater remedy, source area extraction and treatment and monitored natural attenuation of the plume, could result in some adverse impacts to on-Site workers, since it involves the installation of extraction wells through potentially contaminated soils and groundwater. This alternative could also present some limited adverse impacts to on-Site workers through dermal contact and inhalation related to groundwater sampling activities.

The vapors extracted by the SVE process will be treated by granular activated carbon before being vented to the atmosphere. The extracted groundwater will be treated by an air stripper and, if necessary, granular activated carbon, prior to its use as noncontact cooling water within the plant. As such, the soil and groundwater treatment processes will not pose a threat to the public and will not adversely impact the air or groundwater.

**Comment #5:** A commenter asked where Jones Chemicals, Inc.'s wastewater is presently discharged. Another commenter asked whether the wastewater is tested prior to discharge.

**Response #5:** The principal waste stream from the plant is wastewater, which is comprised of wash water and other waste liquids generated from handling and packaging. This waste stream is first neutralized and then mixed in an approximately 1-to-99 ratio with noncontact cooling water, which is extracted from two on-Site production wells. This mixture is then discharged to an infiltration lagoon system in accordance with a New York State Pollutant Discharge Elimination System permit. In May 1996, JCI Jones Chemicals, Inc. installed an air stripper to treat the noncontact cooling water prior to discharge to the lagoons. Periodic monitoring of the noncontact cooling water is performed. This monitoring indicates that volatile organic contamination is below detection

limits after treatment.

**Comment #6:** Since the estimated volume of contaminated soil is only 1,700 cubic yards, a commenter asked why EPA is not proposing to excavate it and take it off-Site, rather than treating it in-situ.

**Response #6:** While excavation of the contaminated soils and off-Site treatment/disposal would effectively achieve the soil cleanup levels in approximately one year, as compared to 3 years for SVE, at a cost of \$3,269,000, the excavation and off-Site treatment/disposal alternative would be considerably more expensive than SVE (\$684,000). Although the contaminated soils are a continuing source of groundwater contamination, they do not pose an immediate human health or ecological risk. Considering the fact that the groundwater component of the selected remedy will address the contaminated groundwater, the increase in the time needed to clean up the soil would, therefore, not be a significant concern. Consequently, EPA believes that SVE would effectuate the soil cleanup while providing the best balance of tradeoffs among the alternatives with respect to the evaluating criteria.

**Comment #7:** A commenter asked for details as to how the SVE process works. Another commenter asked whether SVE is a proven technology and whether it has been used to remediate any sites.

**Response #7:** Under the SVE process, air is drawn through a series of underground, perforated pipes to volatilize the solvents contaminating the soils in the unsaturated zone (above the water table). The extracted vapors are then collected and treated by granular activated carbon before being vented to the atmosphere. The spent carbon is transported off-Site for treatment. While the SVE process is working, the concentrations of volatile organic compounds (VOCs) being recovered will be monitored. Based upon these data, when it appears that the recovery of volatile organic compounds has tapered off, soil borings will be collected to verify that the cleanup objectives have been met.

SVE is a proven technology that has been widely used at Superfund and non-Superfund sites nationwide. In New

York State, SVE was used at the Genzale Plating Company Superfund site, a metal-plating facility located in Franklin Square, New York with VOC contamination. After approximately one year of operation, confirmatory soil sampling established that the VOC cleanup levels had been met and the unit was shut down. SVE units are currently operating at the Mattiace Petrochemical Company Superfund site, an inactive chemical distribution facility located in Glen Cove, New York, the Pasley Solvents and Chemicals Superfund site, a former tank farm used for the storage of oils, solvents and chemicals in Uniondale, New York, the Rowe Industries Groundwater Contamination Superfund site, a motor and transformer manufacturer located in Sag Harbor, New York, the Solvent Savers Superfund site, a chemical waste recovery facility located in Lincklaen, New York, and in an industrial park associated with the Vestal Wellfield Superfund site, located in Vestal, New York.

### ***Financing of the Project***

**Comment #8:** A commenter asked who paid for the RI/FS and who will be paying to implement the selected remedy.

**Response #8:** In March 1991, JCI Jones Chemicals, Inc. entered into an Administrative Order on Consent (AOC) with EPA to perform an RI/FS for the Site to determine the nature and extent of the contamination at and emanating from the Site and to identify and evaluate remedial alternatives. Pursuant to the requirements of the AOC, JCI Jones Chemicals, Inc. also agreed to reimburse EPA for its oversight of the RI/FS. After the remedy is selected, EPA intends to commence negotiations with JCI Jones Chemicals, Inc. for the company's performance of the design and construction of the remedy.

**Appendix V-a**  
**July 2000 Proposed Plan**

# Jones Chemicals, Inc. Superfund Site

Caledonia, Livingston County, New York



July 2000

Region 2



## MARK YOUR CALENDAR

**July 20, 2000 - August 19, 2000:** Public comment period on the Proposed Plan.

**August 14, 2000 at 7:00 p.m.:** Public meeting at Caledonia-Mumford Central School, 99 North Street, Caledonia, NY 14223.

## COMMUNITY ROLE IN SELECTION PROCESS

EPA and NYSDEC rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the remedial investigation and feasibility study (RI/FS) reports and this Proposed Plan have been made available to the public for a public comment period which begins on July 20, 2000 and concludes on August 19, 2000.

A public meeting will be held during the public comment period at the Caledonia-Mumford Central School, 99 North Street, Caledonia, NY 14223 on August 14, 2000 at 7:00 P.M. to present the conclusions of the RI/FS, further elaborate on the reasons for recommending the preferred remedy, and to receive public comments.

Comments received at the public meeting, as well as written comments, will be documented in the Responsiveness Summary section of the Record of Decision (ROD), the document which formalizes the selection of the remedy.

## PURPOSE OF THE PROPOSED PLAN

This Proposed Plan describes the remedial alternatives considered for the Jones Chemicals, Inc. Superfund site and identifies the preferred remedial alternative with the rationale for this preference.

The Proposed Plan was developed by the U.S. Environmental Protection Agency (EPA) in consultation with the New York State Department of Environmental Conservation (NYSDEC). EPA is issuing the Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, and Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The alternatives summarized here are described in the remedial investigation and feasibility study (RI/FS) reports and other documents contained in the Administrative Record file for this site. EPA and the NYSDEC encourage the public to review these documents to gain a more comprehensive understanding of the site and Superfund activities that have been conducted at the site.

This Proposed Plan is being provided as a supplement to the RI/FS reports to inform the public of EPA and NYSDEC's preferred remedy and to solicit public comments pertaining to all the remedial alternatives evaluated, as well as the preferred alternative.

EPA's preferred soil remedy consists of soil vapor extraction. To address the contaminated groundwater, EPA's preferred remedy is groundwater extraction and treatment in the source area, in-situ dense non-aqueous phase liquid (DNAPL) treatment, and monitored natural attenuation of the groundwater outside the source area.

The remedy described in this Proposed Plan is the *preferred* remedy for the site. Changes to the preferred remedy or a change from the preferred remedy to another remedy may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after EPA has taken into consideration all public comments. EPA is soliciting public comment on all of the alternatives considered in the detailed analysis of the RI/FS reports because EPA and NYSDEC may select a remedy other than the preferred remedy.

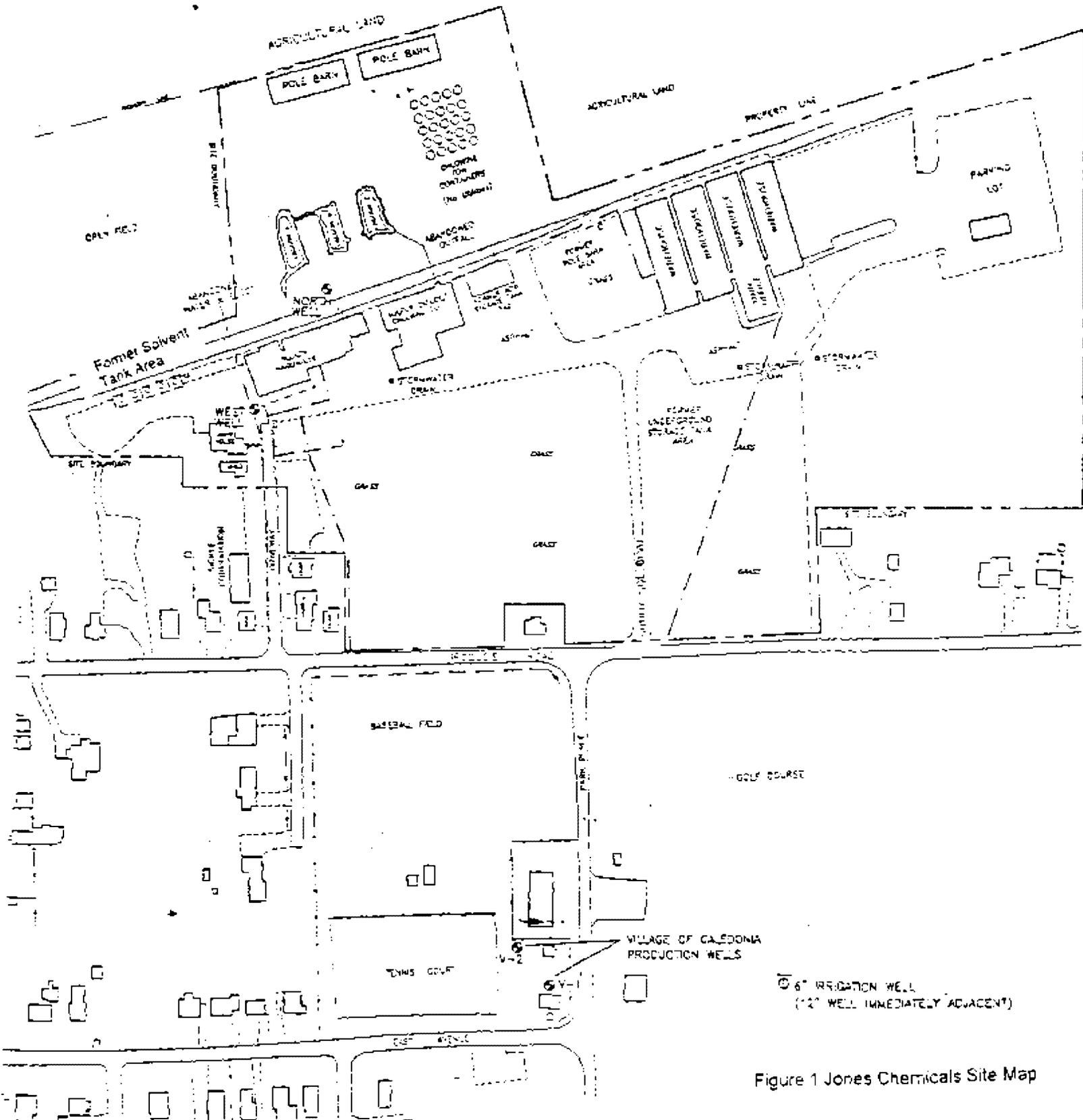
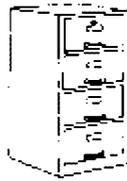


Figure 1 Jones Chemicals Site Map

The administrative record file, which contains the information upon which the selection of the response action will be based, is available at the following locations.



Village of Caledonia Library  
3108 Main Street  
Caledonia, NY 14423  
(716) 538-4512

Hours: Monday and Thursday, 2:00 p.m. to 5:30 p.m. and 7:00 p.m. to 9:00 p.m.; Tuesday, 10:00 a.m. to 5:30 p.m.; and Friday, 2:00 p.m. to 5:30 p.m.

Village of Caledonia Clerks Office  
30-95 Main Street  
Caledonia, NY 14423  
(716) 538-6565

Hours: Monday-Friday, 8:00 a.m. to 4:00 p.m.

USEPA-Region II  
Superfund Records Center  
290 Broadway, 18th Floor  
New York, NY 10007-1866  
(212) 637-4308

Hours: Monday-Friday, 9:00 a.m. - 5:00 p.m.

Written comments on this Proposed Plan should be addressed to:

George Jacob, Project Manager  
United States Environmental Protection Agency  
290 Broadway, 20<sup>th</sup> Floor  
New York, NY 10007-1866  
Telephone: (212) 637-4266  
Telefax: (212) 637-3966  
E-mail: jacob.george@epa.gov

### SCOPE AND ROLE OF ACTION

The primary objectives of this action are to control the sources of contamination at the site, to minimize the migration of contaminants, and to minimize any potential future health and environmental impacts.

### SITE BACKGROUND

#### Site Description

The Jones Chemicals, Inc. site, situated in a relatively flat, sparsely populated, lightly industrialized suburban area of the Village of Caledonia, includes the JCI Jones Chemicals, Inc. (Jones) plant. The site is bordered by Iroquois Road to the south, farmlands to the north, and homes to the east and west. A construction company and a printing company are located immediately northwest of the plant. A golf course, baseball field, and tennis court are present immediately south of Iroquois Road. The site vicinity to the west and southwest is populated with light service industries, including hardware stores, gasoline stations, dry cleaners, restaurants, and other commercial businesses. (See Figure 1.)

There are nine buildings located on the 10-acre manufacturing plant grounds, consisting of office space, drum storage sheds, interconnected warehouse buildings, a bleach manufacturing building, and a chlorine and sulfur dioxide repackaging building. The areas around the buildings are paved with asphalt. The Main Service Railway lines run west to east to the north of the buildings. A large area south of the buildings, facing Iroquois Road, is grass-covered. The area north of the buildings is known as the "North Property." The eastern portion of the North Property is covered by gravel, the western portion by grass. Three unlined lagoons are located to the northwest of the bleach manufacturing building.

The plant property, which has been used for industrial purposes since 1939, is presently zoned industrial and light industrial, it is anticipated that the land use will not change in the future.<sup>1</sup>

#### Site Geology/Hydrogeology

The site is underlain by two distinct stratigraphic zones, an upper overburden zone and an underlying bedrock zone. The overburden zone consists of approximately 30 to 70 feet of glacial deposits (a mixture of gravel, sand, and silt). Groundwater elevations measured at the site indicate that the principal groundwater flow direction in the overburden zone is toward the northeast.

Carbonate bedrock (dolomite) is found below the glacial deposits. The surface of the bedrock slopes steeply to the west. Cores taken at the site indicate that the upper portion

<sup>1</sup> Source: Letter from Michelle M. Chapman, Code Enforcement Officer, Village of Caledonia, Caledonia, New York, to Joel Singerman, Chief, Central New York Remediation Section, EPA, dated May 23, 2000. (This letter is included in the Administrative Record file for this site.)

of the zone (10 feet or less) is highly weathered and fractured. The groundwater yield within the bedrock occurs primarily in the weathered portion and/or through fractures. Groundwater elevation data indicates that groundwater flow in the bedrock is both to the west and northeast. There also appears to be an upward vertical gradient indicating flow from the deeper to shallower water-bearing zones.

### Site History

Jones purchased the majority of the plant property in 1939, which, at the time, included an orchard, agricultural fields, and pasture lands. Soon after the purchase of the property, Jones began the production of sodium hypochlorite (bleach). In 1942, Jones purchased adjacent properties to the north and east, and began repackaging chlorine from bulk sources to cylinders and 1-ton containers there. Titanium tetrachloride was briefly manufactured between 1942 and 1943 for the U.S. government during World War II for use in smokescreen operations. Repackaging of anhydrous ammonia and acids began in 1947. The production of aqua ammonia and bulk storage of hydrochloric, sulfuric, nitric, and hydrofluosilicic acids started in 1953. Between 1960 and approximately 1977, volatile organic compounds (VOCs), including tetrachloroethene (PCE), trichloroethene (TCE), toluene, 1,1,1-trichloroethane (1,1,1-TCA), methylene chloride, and Stoddard solvent, were repackaged from bulk to smaller containers for sale/distribution. Aqua ammonia was produced by combining water and ammonia until 1995.

In 1971, Jones began to transport commercial hazardous wastes not generated by Jones. The hazardous waste materials were temporarily stored on-site prior to transport and disposal off-site. Jones discontinued the transportation and on-site storage of hazardous wastes in 1980.

Repackaging of chemicals from bulk to small containers has been one of the primary activities at the plant. These repackaged chemicals not only include the chemicals manufactured at the plant, but also those that were brought in bulk loads for redistribution. Materials brought in bulk form were generally stored in shipping containers (i.e., railroad tank cars or tanker trucks), aboveground storage tanks, and underground storage tanks. The majority of these tanks were taken out of service and removed between 1981 and 1986.

Commercial activities at the site presently include the manufacture of sodium hypochlorite through the reaction of chlorine and dilute sodium hydroxide, manufacture of sodium bisulfite through the reaction of dilute sodium hydroxide and sulfur dioxide, repackaging and distribution of chlorine, sulfur dioxide, sodium hydroxide, and various mineral acids, such as muriatic acid and hydrofluosilicic acid, from bulk to small containers and the distribution of various inorganic water treatment chemicals, such as soda ash and lime.

The principal waste stream from the plant has been wastewater from tank washings, floor washings, and other waste liquids from handling and packaging. This waste stream is first treated by the on-site elementary neutralization system through the addition of sulfur dioxide or caustic soda. The wastewater is then mixed in an approximately 1-to-99 ratio with noncontact cooling water. This mixture is then discharged to the infiltration lagoon system in accordance with a New York State Pollutant Discharge Elimination System (SPDES) permit.

Available records indicate that the sludge that forms in the infiltration lagoons (which were constructed in the mid-1950s) has been excavated at least three times. The excavated sludge from the first two excavation events was spread on the ground in the vicinity of the lagoons, while the sludge from the third excavation event was disposed of in a municipal landfill.

VOCs were first reported in July 1981 in the production wells at the plant and in the discharge water to the lagoons. A subsequent hydrogeologic investigation by Jones indicated the presence of VOCs in the on-site soil and groundwater. In June 1986, relatively high concentrations of PCE at 1,160 and 765 micrograms per liter ( $\mu\text{g/l}$ ) were detected in the plant's production wells, referred to as the "North Well" and the "West Well," respectively (see Figure 1). The North Well, located in the northern portion of the plant property, has a capacity of 300 to 400 gallons per minute (gpm). The West Well, located in the western portion of the plant, has a capacity of approximately 15 gpm. The North Well and the West Well are screened in

### **WHAT IS A "PRINCIPAL THREAT?"**

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430 (a)(1)(ii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or acts as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of alternatives, using the remedy selection criteria which are described below. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

the overburden and bedrock aquifers, respectively

Throughout the plant's operation, spills occurred during the handling of many of the above-mentioned chemicals. These spills contaminated the underlying groundwater.

The site was proposed for inclusion on the National Priorities List (NPL) in June 1988; it was listed on the NPL in February 1990.

To comply with its SPDES permit and to collect data for treatability study work related to the RI/FS, in May 1996 Jones installed an air stripper to treat the noncontact cooling water from the North Well and the West Well prior to discharge to the lagoons. Monitoring of the discharge water indicates that VOCs are below detection limits after treatment.

## RESULTS OF REMEDIAL INVESTIGATION

The results of the RI are summarized below

### Surface and Subsurface Soils

The results of 19 soil samples collected across the site showed PCE concentrations ranging from below detection to 330,000 micrograms per kilogram ( $\mu\text{g}/\text{kg}$ ) and TCE concentrations ranging from below detection to 320  $\mu\text{g}/\text{kg}$ . The highest soil concentrations of PCE and TCE were detected in a 150-foot by 20-foot area located at the site of a former aboveground solvent tank area (hereinafter, referred to the "Former Solvent Tank Area") (see Figure 1), located in the western portion of the property.

### Groundwater

An approximately 1,500-foot (along the northeast-southwest axis) by 720-foot (along the north-south axis) groundwater VOC plume, consisting of primarily PCE, and its degradation products TCE and 1,2-dichloroethene (1,2-DCE), extends from the Former Solvent Tank Source Area to the east and to the northeastern property boundary. Vertically, the contamination extends to at least 48 feet below the ground surface in the source area.

Groundwater sampling results from the overburden aquifer in the Former Solvent Tank Area showed concentrations of PCE and TCE as high as 5,500  $\mu\text{g}/\text{l}$  and 130  $\mu\text{g}/\text{l}$ , respectively. Although there is groundwater contamination in the overburden aquifer outside the Former Solvent Tank Area, it appears that the North Well has helped to limit the migration of the plume (while 140  $\mu\text{g}/\text{l}$  PCE was detected at the North Well, PCE concentrations significantly taper off beyond the well, ranging from below detection to 22  $\mu\text{g}/\text{l}$ ).

## WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance exposure from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

**Hazard Identification:** In this step, the contaminants of concern (COC) at the site in various media (i.e., soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

**Exposure Assessment:** In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil. Factors relating to the exposure assessment include, but are not limited to, the concentrations that people might be exposed to and the potential frequency and duration of exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

**Toxicity Assessment:** In this step, the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health effects, such as changes in the normal functions of organs within the body (e.g., changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health effects.

**Risk Characterization:** This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a  $10^{-4}$  cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions explained in the Exposure Assessment. Current Superfund guidelines for acceptable exposures are an individual lifetime excess cancer risk in the range of  $10^{-4}$  to  $10^{-6}$  (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk) with  $10^{-6}$  being the point of departure. For non-cancer health effects, a "hazard index" (HI) is calculated. An HI represents the sum of the individual exposure levels compared to their corresponding reference doses. The key concept for a non-cancer HI is that a "threshold level" (measured as an HI of less than 1) exists below which non-cancer health effects are not expected to occur.

In the bedrock aquifer in the vicinity of the Former Solvent Tank Area, PCE and TCE were detected at concentrations as high as 62,000 µg/l and 100 µg/l, respectively. With the exception of the detection of 340 µg/l PCE in the West Well, outside the Former Solvent Tank Area, relatively low concentrations of PCE and TCE (less than 10 µg/l) were detected.

The magnitude of the PCE concentrations in the bedrock aquifer in the Former Solvent Tank Area indicates the potential presence of such PCE in the form of a DNAPL, a principal threat waste. Since much lower levels of PCE were detected in groundwater samples collected outside the Former Solvent Tank Area, it appears that the DNAPL may be limited to a small area in the source area.

Periodic sampling of the Village of Caledonia's water supply wells from 1983 through 1989 showed the presence of PCE and 1,1,1-TCA. A limited study conducted by NYSDEC in 1996 characterized the chemicals affecting these wells, but did not identify a source. The Village installed an air stripper to treat the water prior to distribution in 1991. The latest sample results (June 6, 2000) indicate that the contaminant concentrations meet drinking water standards prior to treatment<sup>2</sup>. While the Jones Chemicals site's southern boundary is located approximately 700 feet from the Village of Caledonia's water supply wells, it has not been determined that the site was the source of this contamination. While both PCE and 1,1,1-TCA were detected in the Village's wells, 1,1,1-TCA has not been detected in groundwater samples collected from the Jones Chemicals site. Observing groundwater flow paths would ordinarily allow a determination as to whether or not the site was a source of this contamination. However, since the groundwater flow path has been altered (the Village took a water supply well out of service in 1994 and the prolonged pumping of the on-site production wells has altered the natural groundwater flow path), such a determination cannot be made.

There are two private residential wells located approximately one mile from the plant which have shown chlorinated solvent contamination. NYSDEC installed and is presently maintaining treatment systems on these wells. The contaminants found in these wells are only marginally above drinking water standards. Given the low levels of contamination and considering the distance of the wells from the site, it is unlikely that Jones Chemicals site is the source. The source of the contamination of these wells has yet to be identified.

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<sup>2</sup> The sample results are included in the Administrative Record file for this site.

## SUMMARY OF SITE RISKS

Based upon the results of the RI, a baseline risk assessment was conducted to estimate the risks associated with current and future site conditions. A baseline risk assessment is an analysis of the potential adverse human health and ecological effects caused by hazardous substance exposure in the absence of any actions to control or mitigate these under current and future land uses.

The human health and ecological risk estimates summarized below are based on current reasonable maximum exposure scenarios and were developed by taking into account various conservative estimates about the frequency and duration of an individual's exposure to the contaminants of concern (COCs), as well as the toxicity of these contaminants.

### Human Health Risk Assessment

As was noted above, the current land use of the site is industrial, and it is anticipated that the land use will not change in the future. In addition, although on-site wells provide noncontact cooling water for the plant after treatment, potable water for the plant is obtained from the Village of Caledonia's well system. Therefore, it is not likely that the groundwater underlying the site will be used for potable purposes in the foreseeable future.

The baseline risk assessment began with selecting chemicals of concern in the various media that would be representative of site risks. The primary COCs include PCE, TCE, and 1,2-DCE in the soil and groundwater media.

The potential human receptors evaluated were on-plant workers and trespassers and off-plant adult and child residents. The baseline risk assessment evaluated the exposure that may potentially impact such receptors.

Based upon the groundwater sampling results, it appears that the on-site production wells are preventing the migration of contaminated groundwater beyond the property boundaries. The risk assessment evaluated the threat posed by a hypothetical off-plant direct contact with contaminated groundwater (e.g., through ingestion of groundwater and inhalation of volatiles released into indoor air from groundwater while showering in an enclosed space) scenario where the on-plant production wells cease to operate, allowing the migration of contaminated groundwater beyond the plant boundaries.

The results of the risk assessment indicate that the estimated excess cancer risks for on-plant workers and trespassers were lower than or within the acceptable excess cancer risk range of  $10^{-4}$  to  $10^{-6}$  (the highest total cancer risk was attributable to a trespasser at  $2.91 \times 10^{-5}$ ).

The estimated excess cancer risks for off-plant receptors under the hypothetical future-use scenario where the on-plant production wells are turned off, thus allowing contaminated groundwater to migrate off-plant, poses an unacceptable risk.

Total estimated HI values for individual chemicals and combinations of chemicals under current and future on-plant worker and trespasser exposure scenarios at the site range up to a maximum of 0.1939 (attributable to a trespasser). Since the total estimated HI is less than unity (1.0), there is not a concern for potential chronic adverse non-cancer health effects to such receptors.

The estimated HI for off-plant receptors under the hypothetical future-use direct contact with contaminated groundwater scenario (where the on-plant production wells are turned off) is estimated to exceed unity.

### Ecological Risk Assessment

Information from the NYSDEC Bureau of Wildlife indicates that there are no endangered or threatened plant or animal species at or in the vicinity of the site. Therefore, EPA evaluated potential exposure pathways for non-endangered and non-threatened animal and plant species.

Since the site includes an industrial facility, there is minimal habitat available for ecological receptors; however, the grassy areas could support some soil invertebrates, terrestrial mammals, and birds.

Soil samples from the Former Solvent Tank Source Area contained volatile organic compounds, some of which (e.g., PCE) are present in concentrations greater than conservative screening criteria considered protective of soil invertebrate species. Therefore, there is a potential for an unacceptable risk to burrowing animals that come into contact with these contaminated surface soils (zero to a two-foot depth).

Considering the depth to the surface of the groundwater (not less than 8 feet below the ground surface), direct contact with groundwater by ecological receptors is unlikely. Since there are no wetlands or surface water bodies in the immediate vicinity of the site, there is no potential for contaminated groundwater to discharge into surface water. Therefore, groundwater is not considered to be an exposure pathway for ecological receptors.

### Summary of Human Health and Ecological Risks

The results of the risk assessment indicate that under the hypothetical off-plant groundwater use scenario where the on-plant production wells are turned off, there is an unacceptable excess cancer risk. Under all of the other on-plant scenarios, the estimated excess cancer risks are

lower than or within the acceptable excess cancer risk range. Therefore, there is not a concern for potential chronic adverse non-cancer health effects from chemicals at the site.

The total estimated HI values for all on-plant worker and trespasser exposure scenarios do not pose a concern for potential chronic adverse non-cancer health effects to such receptors. The estimated HI for off-plant receptors under the hypothetical future-use scenario, where the on-plant production wells are turned off, poses a chronic adverse non-cancer health effect to such receptors.

The presence of contaminated surface soil in the Former Solvent Tank Source Area poses a potentially unacceptable risk to ecological receptors.

Based upon the results of the RI and the risk assessment, EPA has determined that actual or threatened releases of hazardous substances from the site, if not addressed by the preferred alternative or one of the other active measures considered, may present a current or potential threat to the environment.

### REMEDIAL ACTION OBJECTIVES

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

The following remedial action objectives have been established for the site.

- Restore groundwater to levels which meet state and federal standards within a reasonable time frame.
- Mitigate the potential for chemicals to migrate from soils into groundwater, and
- Mitigate the migration of the affected groundwater.

### SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA §121(b)(1), 42 U.S.C. §9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARs, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently

and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA §121(d), 42 U.S.C. §9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4), 42 U.S.C. §9621(d)(4).

As was noted previously, principal threat wastes are those source materials that act as a reservoir for the migration of contamination to groundwater (such as the DNAPL potentially present in the source area at the site). Principal threat wastes are those source materials considered to be highly toxic and present a significant risk to human health or the environment should exposure occur, or are highly mobile such that they, generally, cannot be reliably contained. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of alternatives, using the remedy selection criteria which are described below. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

Detailed descriptions of the remedial alternatives for addressing the contamination associated with the site can be found in the FS report. The FS report presents four soil remediation alternatives and five groundwater remediation alternatives. To facilitate the presentation and evaluation of these alternatives, the FS report's nine alternatives were reorganized in formulating the remedial alternatives discussed below.

The construction time for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate the performance of the remedy with the responsible parties, or procure contracts for design and construction. The present-worth costs for the alternatives discussed below are calculated using a discount rate of seven percent and a 30-year time interval.

The remedial alternatives are:

### Soil Alternatives

#### Alternative S-1: No Action

Capital Cost:	\$0
Annual Operation and Maintenance Cost:	\$0
Present-Worth Cost:	\$0
Construction Time:	0 months

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative does not include any physical remedial measures that address the contaminated soils in the Former Solvent Tank Source Area.

Because this alternative would result in contaminants remaining on-site, CERCLA requires that the site be reviewed at least once every five years. If justified by this assessment, remedial actions may be implemented in the future to remove or treat the waste.

#### Alternative S-2: Treatment of Contaminated Soils Using Soil Vapor Extraction

Capital Cost:	\$365,000
Annual Operation and Maintenance Cost:	\$122,000
Present-Worth Cost:	\$684,000
Construction Time:	3 months

Under this alternative, VOC-contaminated soils in the Former Solvent Tank Source Area would be remediated by soil vapor extraction (SVE). Under this treatment process, air would be drawn through a series of wells to volatilize the solvents contaminating the soils in the unsaturated zone (above the water table). The extracted vapors would then be treated by granular activated carbon before being vented to the atmosphere.

The approximate dimensions of the source area are 150 feet long, 20 feet wide, and 15 feet deep, yielding an estimated volume of 1,700 cubic yards of contaminated soil.

While the actual period of operation of the SVE system would be based upon soil sampling results which demonstrate that the affected soils have been treated to the soil cleanup objectives as specified in the New York State Technical and Administrative Guidance Memorandum No. 94-HWR-4046 (TAGM), it is estimated that the system would operate for a period of three years.

Fencing would be installed around the source area for the duration of the treatment process to minimize worker exposure.

**Alternative S-3: Excavation of Contaminated Soils and Off-Site Treatment/Disposal**

Capital Cost	\$3,269,000
Annual Operation and Maintenance Cost	\$0
Present-Worth Cost	\$3,269,000
Construction Time:	1 year

This alternative includes excavating approximately 1,700 cubic yards of soil in the Former Solvent Tank Source Area which exceed soil TAGM objectives. The actual extent of the excavation and the volume of the excavated material would be based on post-excavation confirmatory sampling. Shoring of the excavation and extraction and treatment of any water that enters the trench would be necessary.

The excavated areas would be backfilled with clean fill and revegetated. All excavated material would be characterized and transported for treatment/disposal at an off-site Resource Conservation and Recovery Act (RCRA)-compliant facility. Because of the high levels of PCE that would be present in the excavated soil, it is likely that incineration would be the only viable form of treatment.

**Alternative S-4: Excavation of Contaminated Soils, On-Site Treatment via Low Temperature Thermal Desorption, and Redeposition**

Capital Cost:	\$1,154,000
Annual Operation and Maintenance Cost	\$0
Present-Worth Cost:	\$1,154,000
Construction Time:	1 year

This alternative includes excavating approximately 1,700 cubic yards of soil in the Former Solvent Tank Source Area which exceed soil cleanup objectives as specified in the TAGM. The actual extent of the excavation and the volume of the excavated material would be based on post-excavation confirmatory sampling. Shoring of the excavation and extraction and treatment of any water that enters the trench would be necessary.

The excavated soil would be fed to a mobile Low Temperature Thermal Desorption (LTTD) unit brought to the site, where hot air injected at a temperature above the boiling points of the organic contaminants of concern would allow them to be volatilized into gases and escape from the

soil. The organic vapors extracted from the soil would then be either condensed, transferred to another medium (such as granular activated carbon), or thermally treated in an afterburner operated to ensure complete destruction of the volatile organics. The off-gases would be filtered through a carbon vessel. Once the treated soil achieved soil TAGM objectives, it would be tested in accordance with the Toxicity Characteristic Leaching Procedure (TCLP) to determine whether it constitutes a RCRA hazardous waste and, provided that it passes the test, it would be used as backfill material for the excavated area. Soil above TCLP levels would be either re-treated or disposed of at an approved off-site facility, as appropriate.

**Groundwater Remedial Alternatives**

**Alternative GW-1: No Further Action and Long-Term Monitoring**

Capital Cost	\$3,000
Annual Monitoring Cost:	\$51,000
Present-Worth Cost:	\$633,000
Construction Time:	3 months

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives.

The no further action remedial alternative would not include any physical remedial measures to address the groundwater contamination at the site<sup>3</sup>. This alternative would, however, include a long-term groundwater monitoring program and the installation of some additional monitoring wells. Under this monitoring program, groundwater samples would be collected and analyzed annually.

Because this alternative would result in contaminants remaining on-site, CERCLA requires that the site be reviewed at least once every five years. If justified by the review, additional remedial actions may be implemented in the future.

<sup>3</sup> Although, since May 1996, contaminated groundwater has been extracted from the North Well and the West Well, used as noncontact cooling water, treated, and discharged, the no further action alternative assumes that groundwater is no longer extracted from these wells.

**Alternative GW-2: Source Area Extraction and Treatment, Monitored Natural Attenuation of the Plume Outside the Source Area, and Institutional Controls**

Capital Cost:	\$362,000
Annual Monitoring Cost	\$81,000
Present-Worth Cost	\$1,366,000
Construction Time:	4 months

Under this alternative, the affected groundwater in the Former Solvent Tank Source Area would be addressed through an extraction system in the overburden and bedrock aquifers. It is estimated that the groundwater extraction system would utilize one bedrock and two overburden wells to withdraw 400 gpm of contaminated groundwater. In addition, contaminated groundwater would continue to be extracted from the North Well, which would facilitate the capture of the plume beyond the Former Solvent Tank Source Area. The extracted groundwater would be treated by the existing air stripper and would then be used as noncontact cooling water within the plant prior to being discharged to the on-site lagoons. To comply with New York State air guidelines, granular activated carbon treatment of the air stripper air exhaust stream may be necessary.

The contaminated groundwater located outside the Former Solvent Tank Source Area and beyond the influence of the North Well would be addressed through monitored natural attenuation, a variety of physical, chemical and biological processes which, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil and groundwater. These in-situ processes include biodegradation, dispersion, dilution, sorption, volatilization, and chemical or biological stabilization, transformation, or destruction of contaminants. Evidence of biodegradation of the PCE in the groundwater at the site includes the presence of its breakdown products, TCE and 1,2-dichloroethene.

While preliminary modeling results indicate that it may take up to seven years to remediate the aqueous phase of the PCE in the Former Solvent Tank Source Area plume through groundwater extraction and treatment, and from 10 to 15 years for the contaminant plume located outside of the Former Solvent Tank Source Area to be restored through natural attenuation, the total remediation time for this alternative is expected to be much greater, since residual PCE DNAPL is suspected to be present in the Former Solvent Tank Source Area. Groundwater extraction and treatment can be effective in hydraulically containing DNAPL source zones, however, it is generally not

completely effective in remediating these zones to groundwater standards.

As part of a long-term groundwater monitoring program, groundwater samples would be collected and analyzed quarterly in order to verify that the level and extent of groundwater contaminants (e.g., VOCs) are declining and that conditions are protective of human health and the environment. In addition, biodegradation parameters (e.g., oxygen, nitrate, sulfate, methane, ethane, ethene, alkalinity, redox potential, pH, temperature, conductivity, chloride, and total organic carbon) would be used to assess the progress of the degradation process.

Institutional controls, such as deed restrictions limiting future groundwater use to nonpotable purposes only, would be established. Additionally, because of the potential that pumping of the West Well would draw contaminants to deeper water-bearing zones, pumping from the West Well would be discontinued.

Because this alternative would result in contaminants remaining on-site, CERCLA requires that the site be reviewed at least once every five years.

Under this alternative, biodegradation parameters would be used to assess the progress of the degradation process. If it is determined that monitored natural attenuation is not effective in restoring groundwater quality outside of the Former Solvent Tank Source Area in a reasonable time frame, then remedial actions, such as enhanced biodegradation or groundwater extraction and treatment, may be implemented.

**Alternative GW-3: Site-Wide Groundwater Extraction and Treatment, In-Situ Treatment of DNAPL, and Institutional Controls**

Capital Cost	\$1,533,000
Annual Operation and Maintenance Cost:	\$215,200
Present-Worth Cost	\$3,324,000
Construction Time	6 months

Under this alternative, the affected groundwater would be addressed through an extraction system in the overburden and bedrock aquifers. It is estimated that the groundwater extraction system would utilize 10 overburden and six bedrock wells to withdraw 1,200 gpm of contaminated groundwater. These wells would be placed northeast of the lagoon system and in the vicinity of the Former Solvent Tank Source Area. In addition, contaminated groundwater

would continue to be extracted from the North Well, which would facilitate the capture of the plume beyond the Former Solvent Tank Source Area. A portion of the extracted water would be treated by the existing air stripper and would be used as noncontact cooling water within the plant prior to being discharged to the on-site lagoons.

Because the present capacity of the air stripper would be exceeded, an additional air stripper would be constructed to treat the balance of the extracted groundwater. The treated water that was not used for noncontact cooling would be discharged to an infiltration gallery to be constructed to the northeast of the lagoon system. To comply with New York State air guidelines, granular activated carbon treatment of the air strippers' air exhaust streams may be necessary.

Preliminary modeling results indicate that, through groundwater extraction and treatment, it may take up to seven years to remediate the aqueous phase of the PCE in the Former Solvent Tank Source Area plume and up to eight years to remediate the contaminant plume located outside of the Former Solvent Tank Source Area.

To enhance the treatment of the residual DNAPL in the bedrock beneath the Former Solvent Tank Source Area, an oxidizing agent, such as potassium permanganate ( $\text{KMnO}_4$ ) or hydrogen peroxide ( $\text{H}_2\text{O}_2$ ), would be injected via a well. It has been estimated that the residual DNAPL would be treated within five years.

As part of a long-term groundwater monitoring program, groundwater samples would be collected and analyzed quarterly in order to verify that the level and extent of groundwater contaminants (e.g., VOCs) are declining and that conditions are protective of human health and the environment.

Institutional controls, such as deed restrictions limiting future groundwater use to nonpotable purposes only, would be established. Additionally, because of the potential that pumping of the West Well would draw contaminants to deeper water-bearing zones, pumping from the West Well would be discontinued.

Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the site be reviewed at least once every five years. If justified by the review, additional remedial actions may be implemented in the future.

#### **Alternative GW-4: Source Area Extraction and Treatment, In-Situ Treatment of DNAPL, Monitored Natural Attenuation of the Plume Outside the Source Area, and Institutional Controls**

Capital Cost	\$479,000
Annual Monitoring Cost	\$115,000
Present-Worth Cost	\$1,623,000
Construction Time	4 months

This alternative would be the same as Alternative GW-2, except, to enhance the treatment of the residual DNAPL in the bedrock beneath the Former Solvent Tank Source Area, an oxidizing agent, such as  $\text{KMnO}_4$  or  $\text{H}_2\text{O}_2$ , would be injected via a well.

Preliminary modeling results indicate it may take up to seven years to remediate the aqueous phase of the PCE in the Former Solvent Tank Source Area plume through groundwater extraction and treatment and from 10 to 15 years for the contaminant plume located outside of the Former Solvent Tank Source Area to be restored through natural attenuation. It has been estimated that the residual DNAPL would be treated within five years.

Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the site be reviewed at least once every five years.

Under this alternative, biodegradation parameters would be used to assess the progress of the degradation process. If it is determined that monitored natural attenuation is not effective in restoring groundwater quality outside of the Former Solvent Tank Source Area in a reasonable time frame, then remedial actions, such as enhanced biodegradation or groundwater extraction and treatment, may be implemented.

#### **EVALUATION OF ALTERNATIVES**

In selecting a remedy for a site, EPA considers the factors set forth in CERCLA §121, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial alternatives pursuant to the NCP, 40 CFR §300.430(e)(9) and OSWER Directive 9355.3-01. The detailed analysis consists of an assessment of the individual alternatives against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

- Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls
- Compliance with applicable or relevant and appropriate requirements addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and regulations or provide grounds for invoking a waiver.
- Long-term effectiveness and permanence refer to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.
- Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ
- Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved
- Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.
- Cost includes estimated capital and operation and maintenance costs, and net present-worth costs.
- State acceptance indicates whether, based on its review of the RI/FS reports and the Proposed Plan, the State concurs with, opposes, or has no comment on the preferred remedy at the present time.
- Community acceptance will be assessed in the ROD, and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports

A comparative analysis of these alternatives based upon the evaluation criteria noted above, follows

- Overall Protection of Human Health and the Environment

Alternative S-1 (no action) would not be protective of human health and the environment, since it would not actively address the contaminated soils, which are a source of groundwater contamination.

Alternative S-2 (soil vapor extraction), Alternative S-3 (excavation of contaminated soils and off-site treatment/disposal), and Alternative S-4 (excavation of contaminated soils and on-site treatment via LTTD) would be protective of human health and the environment, since each alternative relies upon a remedial strategy and/or treatment technology capable of removing the source of groundwater contamination in the unsaturated zone. Under these alternatives, the contaminants would either be treated on-site or treated/disposed of off-site.

Alternative GW-1 (no further action) would be the least protective groundwater alternative in that it would result in no affirmative steps to restore groundwater quality to drinking water standards. Therefore, under this alternative, the restoration of the groundwater would take a significantly longer time in comparison to Alternative GW-2 (source area extraction and treatment and monitored natural attenuation of the remainder of the plume), Alternative GW-3 (site-wide extraction and treatment of the contaminated groundwater and in-situ DNAPL treatment), and Alternative GW-4 (source area extraction and treatment, in-situ DNAPL treatment, and monitored natural attenuation of the plume). Alternative GW-2 would be significantly more protective than Alternative GW-1 in that it would provide hydraulic containment and treatment of the affected groundwater at the source. This alternative would, however, rely upon natural attenuation to address the groundwater contamination outside the Former Solvent Tank Source Area. While Alternative GW-4 would result in the restoration of water quality in the aquifer more effectively than Alternative GW-2, since it would actively address the DNAPL, it would not restore the water quality in the plume as quickly as Alternative GW-3.

- Compliance with ARARs

There are currently no federal or state promulgated standards for contaminant levels in soils, only New York State soil cleanup objectives as specified in the TAGM.

Since the contaminated soils would not be addressed under Alternative S-1 (no action), this alternative would not comply with the soil cleanup objectives. Alternative S-2 (soil vapor extraction), Alternative S-3 (excavation of contaminated soils and off-site treatment/disposal), and Alternative S-4 (excavation of contaminated soils and on-site treatment via LTTD) would be implemented to attain the soil cleanup objectives specified in TAGM

Under Alternative S-2, spent granular activated carbon from the SVE units would need to be managed in compliance with RCRA treatment/disposal requirements.

Alternative S-3 would be subject to New York State and federal regulations related to the transportation and off-site treatment/disposal of wastes. Alternatives S-3 and S-4 would involve the excavation of contaminated soils, and would, therefore, require compliance with fugitive dust and VOC emission regulations. In the case of Alternative S-4, compliance with air emission standards would be required at the LTTD unit, as well. Specifically, treatment of off-gases would have to comply with New York State Air Guide 1 for the Control of Toxic Ambient Air Emissions and would be required to meet the substantive requirements of New York State Regulations for Prevention and Control of Air Contamination and Air Pollution.

EPA and NYSDEC have promulgated health-based protective Maximum Contaminant Levels (MCLs), which are enforceable standards for various drinking water contaminants (chemical-specific ARARs). Although the groundwater at the site is not presently being utilized as a potable water source, achieving MCLs in the groundwater is relevant and appropriate, because the groundwater at the site is a potential source of drinking water. The aquifer is classified as Class GA (6 NYCRR 701.18).

Alternative GW-1 (no further action) does not provide for any direct remediation of the groundwater and would, therefore, involve no actions to achieve chemical-specific ARARs. Alternative GW-2 (source area extraction and treatment and monitored natural attenuation of the remainder of the plume) would be effective in reducing groundwater contaminant concentrations below MCLs in the Former Solvent Tank Source Area by treating the dissolved-phase chemicals and hydraulically containing the affected groundwater at the source; however, this alternative would not be as effective in meeting ARARs as Alternative GW-4 (source area extraction and treatment, in-situ DNAPL treatment, and monitored natural attenuation of the plume), which would employ a more aggressive approach to addressing the DNAPL. Both alternatives would rely upon natural attenuation to address a portion of the contaminated groundwater in the plume. Alternative GW-3 (site-wide groundwater extraction and treatment and in-situ DNAPL treatment) would be the most effective in reducing groundwater contaminant concentrations below MCLs, since it would include an aggressive approach to address the DNAPL and would include the collection and treatment of contaminated groundwater throughout the site. Therefore, this alternative would achieve ARARs in the shortest period of time.

#### • Long-Term Effectiveness and Permanence

Alternative S-1 (no action) would involve no active remedial measures and, therefore, would not be effective in eliminating the potential for contaminants to continue to migrate in soil and groundwater. Alternative S-2 (soil vapor extraction), Alternative S-3 (excavation of contaminated soils and off-site treatment/disposal), and Alternative S-4

(excavation of contaminated soils and on-site treatment via LTTD) would all be effective in the long term and would provide permanent remediation by either removing the wastes from the site or treating them on-site.

Alternatives S-2 and S-4 would generate treatment residuals which would have to be appropriately handled; Alternative S-3 would not generate such residuals.

Alternative GW-1 (no further action) would be only minimally effective in the long-term in restoring groundwater quality, since it would not rely on active measures. Alternative GW-2 (source area extraction and treatment and monitored natural attenuation of the remainder of the plume) would be significantly more effective than Alternative GW-1 in restoring groundwater quality. Although groundwater extraction and treatment can be effective in hydraulically containing DNAPL source zones, it is generally not completely effective in remediating these zones to groundwater standards. Therefore, since Alternative GW-2 would rely upon groundwater extraction to address the residual DNAPL, it would not be as effective as Alternative GW-3 (site-wide groundwater extraction and treatment and in-situ DNAPL treatment) and Alternative GW-4 (source area extraction and treatment, in-situ DNAPL treatment, and monitored natural attenuation of the remaining plume), which both would utilize aggressive in-situ DNAPL treatment. Under Alternative GW-4, by aggressively addressing the contamination at the source area, it is expected that low levels of PCE (less than 22 µg/l) outside the source area would attenuate naturally in a reasonable time frame. Alternative GW-4 would not, however, provide the same long-term effectiveness and permanence with regard to this contamination as Alternative GW-3, which would actively remove contaminants from the entire plume. Alternative GW-3 would achieve drinking water standards outside the Former Solvent Tank Source Area more quickly than Alternative GW-4.

Alternatives GW-2, GW-3, and GW-4 would generate treatment residuals which would have to be appropriately handled; Alternative GW-1 would not generate such residuals.

#### • Reduction in Toxicity, Mobility, or Volume Through Treatment

Alternative S-1 (no action) would provide no reduction in toxicity, mobility or volume. Under Alternative S-2 (soil vapor extraction) and Alternative S-4 (excavation of contaminated soils and on-site treatment via LTTD), the toxicity, mobility, and volume of contaminants would be reduced through on-site treatment. Under Alternative S-3 (excavation of contaminated soils and off-site treatment/disposal), the toxicity, mobility, and volume of the contaminants would be reduced by removing the contaminated soil from the site for treatment.

Alternative GW-1 (no further action) would be the least effective alternative in reducing the toxicity, mobility, or volume of contaminants in the groundwater through treatment, as this alternative involves no active remedial measures. All of the action alternatives would, to varying degrees, reduce the toxicity, mobility, or volume of contaminants in the groundwater through treatment, thereby satisfying CERCLA's preference for treatment. Collecting and treating contaminated groundwater in the Former Solvent Tank Source Area under Alternative GW-2 (source area extraction and treatment and monitored natural attenuation of the plume) would actively reduce the toxicity, mobility, and volume of contaminants in this area. The addition of an oxidizing agent to address the DNAPL under Alternative GW-4 (source area extraction and treatment, in-situ DNAPL treatment, and monitored natural attenuation of the plume) would provide substantially greater reduction of the toxicity, mobility, and volume of contaminants than Alternative GW-2. Collecting and treating contaminated groundwater in the Former Solvent Tank Source Area and the remaining plume, and using an oxidizing agent to address the DNAPL under Alternative GW-3 (site-wide groundwater extraction and treatment and in-situ DNAPL treatment) would provide the greatest reduction of toxicity, mobility, and volume of contaminants through treatment.

#### •Short-Term Effectiveness

Alternative S-1 (no action) does not include any physical construction measures in any areas of contamination and, therefore, would not present any potential adverse impacts to on-site workers or the community as a result of its implementation. Alternative S-2 (soil vapor extraction) could result in some adverse impacts to on-site workers through dermal contact and inhalation related to the installation of SVE wells through contaminated soils. In addition, interim and post-remediation soil sampling activities would pose some risk. Similarly, Alternatives S-3 (excavation of contaminated soils and off-site treatment/disposal) and S-4 (excavation of contaminated soils and on-site treatment via LTTD) could present some limited adverse impact to on-site workers through dermal contact and inhalation related to post-excavation sampling activities. The risks to on-site workers under all of the alternatives could, however, be mitigated by utilizing proper protective equipment.

Alternative S-3 would require the off-site transport of contaminated waste material, which may pose the potential for traffic accidents, which could result in releases of hazardous substances.

Under Alternatives S-3 and S-4 disturbance of the land during excavation activities could affect the surface water hydrology of the site. There is a potential for increased stormwater runoff and erosion during excavation and construction activities that would have to be properly managed to prevent or minimize any adverse impacts. For

these alternatives, appropriate measures would have to be taken during excavation activities to prevent transport of fugitive dust and exposure of workers and downgradient receptors to volatile organic compounds.

Since no actions would be performed under Alternative S-1, there would be no implementation time. It is estimated that Alternative S-2 would require 3 months to install the SVE system and would require an estimated 3 years to achieve soil cleanup objectives. It is estimated that it would take one year to excavate and transport the contaminated soils to an EPA-approved treatment/disposal facility under Alternative S-3, and one year to excavate and treat the contaminated soils under Alternative S-4.

All of the groundwater alternatives could present some limited adverse impacts to on-site workers through dermal contact and inhalation related to groundwater sampling activities. Alternative GW-2 (source area extraction and treatment and monitored natural attenuation of the plume), Alternative GW-3 (site-wide groundwater extraction and treatment and in-situ DNAPL treatment), and Alternative GW-4 (source area extraction and treatment, in-situ DNAPL treatment, and monitored natural attenuation of the plume) could present slightly greater adverse impacts to on-site workers, since these alternatives would involve the installation of extraction wells through potentially contaminated soils and groundwater. (Alternative GW-3 could pose the greatest risk since it would require the installation of the most extraction wells.) The risks to on-site workers under all of the alternatives could, however, be minimized by utilizing proper protective equipment.

It is estimated that Alternative GW-1 would require three months to implement, since developing a long-term groundwater monitoring program and installing several monitoring wells would be the only activities that would be required. It is estimated that the groundwater remediation systems under Alternatives GW-2, GW-3, and GW-4 would be constructed in four, six, and four months, respectively.

Preliminary modeling results indicate it may take up to seven years to remediate the aqueous phase of the PCE in the Former Solvent Tank Source Area plume under Alternatives GW-2, GW-3, and GW-4. Residual PCE DNAPL is suspected to be present in the Former Solvent Tank Source Area. While groundwater extraction and treatment can be effective in hydraulically containing DNAPL source zones, it is generally not completely effective in remediating these zones to groundwater standards. Therefore, for Alternative GW-2, it is likely that the total remediation time frame for the aqueous phase of the PCE in the Former Solvent Tank Source Area plume would be significantly greater than the estimated 7-year time frame.

Under Alternative GW-3, it is estimated that it may take up to eight years to remediate the contaminant plume located outside of the Former Solvent Tank Source Area through extraction and treatment. Under Alternatives GW-2 and GW-4, it is estimated that natural attenuation would address the contaminated groundwater located outside of the Former Solvent Tank Source Area in 10 to 15 years. Remediation time frames were not developed for Alternative GW-1 because of the difficulties in estimating a natural attenuation rate for the DNAPL in the Former Solvent Tank Source Area.

Under Alternatives GW-3 and GW-4, it is estimated that it would take five years to remediate the DNAPL via  $\text{KMnO}_4$  or  $\text{H}_2\text{O}_2$  injection.

The precise time required for the groundwater to be remediated site-wide under all of the alternatives would have to be determined based on the results of groundwater monitoring and additional groundwater modeling.

#### • Implementability

Alternative S-1 (no action) would be easy to implement, as there are no activities to undertake. Alternative S-2 (soil vapor extraction), would be less difficult to implement than Alternative S-3 (excavation of contaminated soils and off-site treatment) and Alternative S-4 (excavation of contaminated soils and on-site treatment via LTTD), since contaminated soil excavation and handling would not be required. All three action alternatives would employ technologies known to be reliable and can be readily implemented. In addition, equipment services, and materials needed for all three of these alternatives are readily available, and the actions under these alternatives would be administratively feasible. Sufficient facilities are available for the treatment/disposal of the excavated soils under Alternative S-3.

Monitoring the effectiveness of the SVE system under Alternative S-2 would be easily accomplished through vapor and soil sampling and analysis. Under Alternative S-3, monitoring the effectiveness of the excavation could be easily accomplished through post-excavation soil sampling and analysis. Monitoring the effectiveness of the LTTD system under Alternative S-4 could be easily accomplished through post-excavation and post-treatment soil sampling and analysis.

Alternative GW-1 (no further action) would be the easiest to implement as the only activity would be installing some additional monitoring wells and establishing a monitoring program. Since only a limited number of extraction wells would need to be installed, and since the existing groundwater treatment system would be utilized, the groundwater extraction systems related to Alternative GW-2 (source area extraction and treatment and monitored natural attenuation of the plume) and Alternative GW-4

(source area extraction and treatment, in-situ DNAPL treatment, and monitored natural attenuation of the plume) would be relatively easy to implement. Alternative GW-3 (site-wide groundwater extraction and treatment and in-situ DNAPL treatment), which would require the installation of more extraction wells than Alternatives GW-2 and GW-4 and the construction of an additional treatment system, would be slightly more difficult to implement than these alternatives.

Alternatives GW-2 and GW-4 would also involve monitoring of natural attenuation parameters to demonstrate that natural attenuation is reliably achieving the specified performance goals. Alternatives GW-3 and GW-4 would be more complicated to implement than Alternative GW-2, since they would also require the injection of  $\text{KMnO}_4$  or  $\text{H}_2\text{O}_2$  to address the PCE DNAPL.

The groundwater extraction and treatment systems that would be used for Alternatives GW-2, GW-3, and GW-4 have been implemented successfully at numerous sites to extract, treat, and hydraulically control contaminated groundwater.

The air stripping technology that would be used for Alternatives GW-2, GW-3, and GW-4 is proven and reliable in achieving the specified performance goals and is readily available.

The  $\text{KMnO}_4$  or  $\text{H}_2\text{O}_2$  injection technologies that would be used for Alternative GW-4 are emerging technologies that have been successfully implemented at a few sites across the United States to treat DNAPL. Mixing tanks for  $\text{KMnO}_4$ , and injection pumps and all necessary appurtenances for  $\text{KMnO}_4$  and  $\text{H}_2\text{O}_2$  are readily available. Field tests may be required prior to designing a full-scale system. While utilizing  $\text{KMnO}_4$  would likely result in the introduction of trace metal impurities and manganese salts into the groundwater, it is expected that the levels would be below groundwater standards.

#### • Cost

The present-worth costs associated with the soil remedies are calculated using a discount rate of seven percent and a 3-year time interval. The present-worth costs associated with the groundwater remedies are calculated using a discount rate of seven percent and a 15-year time interval.

The estimated capital, operation, maintenance, and monitoring (OM&M), and present-worth costs for each of the alternatives are presented below.

Alt.	Capital Cost	Annual OM&M Cost	Present-Worth Cost
S-1	\$0	\$0	\$0
S-2	\$365,000	\$122,000	\$684,000
S-3	\$3,269,000	\$0	\$3,269,000
S-4	\$1,154,000	\$0	\$1,154,000
GW-1	\$3,000	\$51,000	\$633,000
GW-2	\$362,000	\$81,000	\$1,365,000
GW-3	\$1,533,000	\$215,200	\$3,324,000
GW-4	\$479,000	\$115,000	\$1,623,000

As can be seen by the cost estimates, Alternative S-1 (no action) is the least costly soil alternative at \$0. Alternative S-3 (excavation of contaminated soils and off-site treatment) is the most costly soil alternative at \$3,269,000. The least costly groundwater remedy is Alternative GW-1, no further action, at a present-worth cost of \$630,000. Alternative GW-3 (site-wide groundwater extraction and treatment and in-situ DNAPL treatment) is the most costly groundwater alternative at a present-worth cost of \$3,324,000. The significant difference in the cost of this alternative as compared to the other action alternatives is mainly attributable to the construction and operation of an additional groundwater treatment system.

- State Acceptance

NYSDEC concurs with the preferred remedy.

- Community Acceptance

Community acceptance of the preferred remedy will be assessed in the ROD following review of the public comments received on the RI/FS reports and this Proposed Plan.

## **PREFERRED REMEDY**

### Description of the Preferred Remedy

Based upon an evaluation of the various alternatives, EPA and NYSDEC recommend Alternative S-2, SVE, for the soil remedy. The preferred alternative to address the groundwater contamination is Alternative GW-4, Former Solvent Tank Source Area extraction and treatment, in-situ DNAPL treatment, and monitored natural attenuation of the plume outside of the Former Solvent Tank Source Area.

Under the preferred soil alternative, VOC-contaminated soils in the Former Solvent Tank Source Area would be remediated by SVE. Under this treatment process, air would be drawn through a series of wells to volatilize the solvents contaminating the unsaturated zone. The extracted vapors would then be treated by granular activated carbon before being vented to the atmosphere.

Under the preferred groundwater alternative, the affected groundwater in the Former Solvent Tank Source Area would be addressed through an extraction system in the overburden and bedrock aquifers. The extracted groundwater would be treated by the existing air stripper and would be used as noncontact cooling water within the plant prior to being discharged to the on-site lagoons. To enhance the treatment of the DNAPL located in the Former Solvent Tank Source Area, an oxidizing agent, such as  $\text{KMnO}_4$  or  $\text{H}_2\text{O}_2$ , would be injected via a well. In addition, contaminated groundwater would continue to be extracted from the North Well, which would facilitate the capture of the plume beyond the Former Solvent Tank Source Area. The contaminated groundwater located outside the Former Solvent Tank Source Area and beyond the influence of the North Well would be addressed through monitored natural attenuation.

During the design phase, samples would be collected to optimize the placement of the extraction wells in the Former Solvent Tank Source Area and to better characterize the extent of the PCE DNAPL contamination.

As part of a long-term groundwater monitoring program, groundwater samples would be collected and analyzed quarterly in order to verify that the level and extent of groundwater contaminants (e.g., VOCs) are declining and that conditions are protective of human health and the environment. In addition, biodegradation parameters (e.g., oxygen, nitrate, sulfate, methane, ethane, ethene, alkalinity, redox potential, pH, temperature, conductivity, chloride, and total organic carbon) would be used to assess the progress of the degradation process.

Institutional controls, such as deed restrictions limiting future groundwater use to nonpotable purposes only, would be established. Additionally, because of the potential to draw contaminants to deeper water-bearing zones, pumping from the West Well would be discontinued.

### Basis for the Remedy Preference

While all of the soil action alternatives would effectively achieve the soil cleanup levels, Alternative S-3, excavation of contaminated soils and off-site treatment/disposal, and Alternative S-4, excavation and on-site treatment, would be considerably more expensive than Alternative S-2. On the other hand, Alternative S-2 would take longer to achieve the soil cleanup objectives than the other action alternatives (3 years for SVE, as compared to 1 year for

excavation and off-site treatment/disposal and 1 year for on-site treatment). While the contaminated soils are a continuing source of groundwater contamination, there are no immediate risks to human health or ecological risks posed by the contaminated soils. Considering the fact that the groundwater component of the preferred remedy would address the contaminated groundwater, the increase in the time needed to clean up the soil would not be a significant concern. Therefore, EPA believes that Alternative S-2 would effectuate the soil cleanup while providing the best balance of trade-offs among the alternatives with respect to the evaluating criteria.

Residual PCE DNAPL is suspected to be present in the bedrock aquifer underlying the Former Solvent Tank Source Area. While Alternative GW-2 (source area extraction and treatment and monitored natural attenuation of the remainder of the plume) would be effective in hydraulically containing the DNAPL source zone, it would not likely be effective in remediating this zone to groundwater standards.

Although Alternative GW-3 would provide site-wide groundwater extraction and treatment, making it the most effective groundwater remediation alternative, EPA believes that Alternative GW-4 would result in the remediation of the contaminated groundwater located both in the Former Solvent Tank Source Area and outside of the Former Solvent Tank Source Area via a combination of in-situ treatment of the DNAPL, groundwater extraction and treatment, and monitored natural attenuation, respectively, in a reasonable time frame and at a significantly lower cost than groundwater extraction and treatment under Alternative GW-3.

EPA and NYSDEC believe that the preferred remedy will be protective of human health and the environment, will comply with ARARs, will be cost-effective, and will utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The preferred remedy will also meet the statutory preference for the use of treatment as a principal element

**Appendix V-b**  
**July 20, 2000 Public Notice**



**THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
INVITES PUBLIC COMMENT ON THE PROPOSED REMEDY FOR  
THE JONES CHEMICALS, INC. SUPERFUND SITE**

The U.S. Environmental Protection Agency (EPA) and the New York State Department of Environmental Conservation (NYSDEC) will hold a public meeting on

**August 14, 2000 at 7 p.m.**

**in the Caledonia-Mumford Central School, 99 North Street, Caledonia, NY**

**to discuss the findings of the Remedial Investigation and Feasibility Study (RI/FS)  
and the Proposed Plan for the Jones Chemicals, Inc. Superfund site.**

EPA is issuing the Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, and Section 300.430(f) of the National Contingency Plan.

The primary objectives of this action are to control the sources of contamination at the site, to minimize the migration of contaminants, and to minimize any potential future health and environmental impacts. The main features of the preferred remedy include soil vapor extraction to address the contaminated soil, and source area groundwater extraction and treatment, in-situ groundwater hot spot treatment, and monitored natural attenuation of the groundwater outside the source area.

The remedy described in this Proposed Plan is the preferred remedy for the site. Changes to the preferred remedy or a change from the preferred remedy to another remedy may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after EPA has taken into consideration all public comments. EPA is soliciting public comment on all of the alternatives considered in the detailed analysis of the RI/FS report because EPA and NYSDEC may select a remedy other than the preferred remedy.

The administrative record file, which contains the information upon which the selection of the response action will be based, is available at the following locations:

**Village of Caledonia Library  
3108 Main Street  
Caledonia, NY 14423**

**Village of Caledonia Clerks Office  
30-95 Main Street  
Caledonia, NY 14423**

Responses to the comments received at the public meeting and in writing during the public comment period, which runs from July 20, 2000 - August 19, 2000, will be documented in the Responsiveness Summary section of the Record of Decision, the document which formalizes the selection of the remedy.

All written comments should be addressed to

**George Jacob, Project Manager  
United States Environmental Protection Agency  
290 Broadway, 20th Floor  
New York, NY 10007-1866**

**Telefax: (212) 637-4266 3966  
E-mail: jacob.george@epa.gov**

**Appendix V-c**  
**August 14, 2000 Public Meeting Sign-In Sheet**

**JONES CHEMICALS, INC.**

**PUBLIC MEETING**

Monday, August 14, 2000

7:00 p.m.

Caledonia-Mumford Central School

99 North Street, Caledonia, NY

NAME	ADDRESS
Matthew Daneman	3155 Richter St. Lakewood NY 14423
Ethel Perkins	3173 Jane St Caledonia NY 14423
Tom Perkins	3173 Jane St " "
Janet Hinkel Citizens' Environmental Coalition	425 Elmwood Ave Bflo, NY 14222
TIM GAFFNEY Jones Chemicals, Inc.	21 Stoney Oak Circle Caledonia NY 14423
J. Pallyland	290 Strand Ave Caledonia 14423
Tim Anderson	3271 Clover St CALEDONIA, NY 14423
Jane Hanna	23 Clinton Pl. Fairport
Debbie Davis Mayor	3157 East Ave Caledonia

**Appendix V-d**  
**August 14, 2000 Public Meeting Transcript**

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UNITED STATES OF AMERICA  
ENVIRONMENTAL PROTECTION AGENCY

-----x  
IN THE MATTER OF

United States Environmental Protection  
Agency's presentation of the results of  
the remedial investigation and proposed  
clean-up plan for Jones Chemicals, Inc.,  
Superfund Site, Village of Caledonia,  
Livingston County, New York

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PUBLIC HEARING

Location: Caledonia-Mumford Central School  
99 North Street  
Caledonia, New York 14223

Date: August 14, 2000

Time: 7:15 p.m.

Reported By: Francis J. LeoGrande

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Appearing on Behalf of Environmental  
Protection Agency:

Joel Singerman, Section Chief  
George Jacob, Project Manager

Also Appearing:

Deborah Faberman, Livingston County  
Department of Health

Joseph M. Moloughney, NYSDEC

David Napier, NYS Department of Health

\* \* \*

1  
2 (AUGUST 14, 2000; 7:15 P.M.)

3 MR. SINGERMAN: I want to welcome you to  
4 the Jones Chemicals Superfund public meeting.  
5 My name is Joel Singerman. I'm from the  
6 Environmental Protection Agency. I'm speaking  
7 on behalf of Michael Basile the Community  
8 Relations Coordinator who was supposed to be  
9 here tonight -- so he won't be attending today.

10 First again, I'm Joel Singerman. With me  
11 is George Jacob, the project manager. We also  
12 have with us Joe Moloughney with the New York  
13 State Department of Environmental Conservation,  
14 Dave Napier, Department of Public Health, and  
15 Debbie Farberman from the Livingston County  
16 Department of Health.

17 Before we start the meeting I would like  
18 to call your attention to the fact that we have  
19 several handouts in the back, and there's also  
20 an attendance sheet that we would like to you  
21 sign. If you haven't signed it yet we ask you  
22 to sign it before you leave so that we can make  
23 sure that you're on our mailing list.

24 The purpose of tonight's meeting is this  
25 is how we will discuss the results of the



1  
2 Canal, shocked the Nation and highlighted the  
3 fact that past waste disposal practices were not  
4 safe.

5 In 1980 Congress responded with the  
6 creation of the Comprehensive Environmental  
7 Response, Compensation, and Liability Act, more  
8 commonly know as Superfund. The Superfund law  
9 provides a Federal fund to be used in the  
10 cleanup of uncontrolled and abandoned hazardous  
11 waste sites and for responding to emergencies  
12 involved in hazardous substances. Uncontrolled  
13 the abandon hazardous waste heights, the  
14 hazardous substances.

15 In addition, EPA was empowered to compel  
16 those parties that are responsible for these  
17 sites to pay for or to conduct the necessary  
18 response actions.

19 The work to clean up a Superfund site is  
20 very complex and takes place in many stages.

21 Once a site is discovered an inspection  
22 further identifies the hazards and contaminants.  
23 A determination is then made whether to include  
24 the site on the Superfund National Priorities  
25 List, a list of the Nation's worse hazardous

1  
2 waste sites.

3 Sites are placed on the National  
4 Priorities List primarily on the basis of scores  
5 obtained from a ranking system which evaluates  
6 the relative risks posed by the site. Only  
7 sites on the National Priorities List are  
8 eligible for remedial work financed by  
9 Superfund.

10 The selection of a remedy for a Superfund  
11 site is based upon two studies: A remedial  
12 investigation and a feasibility study.

13 The purpose of the remedial investigation  
14 is the determine the nature and extent of the  
15 contamination at and emanating from the site and  
16 the associated risk to public health and  
17 environment.

18 The purpose of a feasibility study is to  
19 identify and evaluate remedial alternatives to  
20 address the site's contamination problems.

21 Public participation is a key feature of  
22 the Superfund process. The public is invited to  
23 participate in all these decisions that will be  
24 made at the site through the Community Relations  
25 Program. Town meetings such as this one are

1  
2 held as necessary to keep the public informed  
3 about what has happened and what is planned for  
4 a site.

5 The public is also given the opportunity  
6 to comment on the results of the investigations  
7 and studies conducted at the site and proposed  
8 remedies.

9 After consideration of public comments on  
10 the results of the studies and investigations,  
11 EPA proposes a remedy and receives public  
12 comments on that, and that's why we're here  
13 tonight.

14 Following the public comments to proposed  
15 remedy, a Record of Decision is signed. It's a  
16 document which identifies a basis for the  
17 preference to the remedy that was selected.

18 Following the selection of remedy, the  
19 site enters the design phase where the plans and  
20 specifications associated with the selected  
21 remedy are developed.

22 The remedial action, which is the  
23 hands-on construction work, follows the  
24 completion of design.

25 Following completion of all construction

1  
2 work at the site, the site is monitored as  
3 necessary; and once the site no longer poses a  
4 threat to public health or the environment it  
5 can be deleted from the National Priorities  
6 List.

7 Now George will discuss the basis about  
8 the site, history, and a few other items.

9 MR. JACOB: Good evening. Welcome to the  
10 public meeting again. I'm George Jacob with  
11 USEPA, the project manager for Jones Chemicals  
12 Superfund site.

13 What you see on the screen is a site map.  
14 My apologies for not having a more legible map.  
15 A couple of things -- few things I would like to  
16 out there. The pointer that you see, that's the  
17 former solvent tank area. In my discussions  
18 I'll mention that area a few times. Then you  
19 have the lagoons there, that also will be  
20 mentioned. Then you have two production wells  
21 there, north well and west well. One other  
22 thing I would like to show is the Village of  
23 Caledonia wells (indicating).

24 With that I'll get into my discussions.  
25 I basically want to give you a brief overview of

1  
2 the background of the site, the remedial  
3 investigations and the feasibility study  
4 conducted which led to a proposed remedy. I  
5 hope you all received a copy of the proposed  
6 plan. I'm going to give you a brief overview of  
7 that, and at the end of the discussion if you  
8 have any questions we will be happy to answer  
9 that.

10 Okay, background. Jones Chemicals site  
11 is located at 100 Sunny Sol Boulevard, in the  
12 Village of Caledonia. This company has been in  
13 operation since 1932. The main operations of  
14 the site, manufacturing of chemicals and  
15 repackaging of chemicals from bulk containers to  
16 small containers for resale -- sale or  
17 distribution.

18 To give you an example, between 1960 and  
19 approximately 1977 volatile organic compounds --  
20 from here on I'll mention as VOCs -- included  
21 tetrachloroethene and trichloroethene. From  
22 here on I'll use the commonly-known names as PCE  
23 and TCE. Among other VOCs, these VOCs were  
24 repackaged from bulk containers to smaller  
25 containers, and the site had underground storage

1  
2 tanks containing solvents and above-ground  
3 solvent tanks containing solvents. So with the  
4 repacking operation, after a number of years of  
5 operation spills occurred over the years, and it  
6 contaminated certain area, the former solvent  
7 tank area, the soils in there, and the  
8 underlying groundwater.

9 Storage tanks I have mentioned, to review  
10 potential for the contamination, Jones removed  
11 three underground storage tanks in 1985 which  
12 contained solvents, also all the above-ground  
13 storage tanks containing solvents that was  
14 removed in 1990; and the site was proposed for  
15 inclusion in the Superfund National Priorities  
16 List as proposed in June 1988 and was listed on  
17 the Superfund National Priorities List in 1990.

18 Then in 1991 Jones signed a consent order  
19 with the United States EPA that is to perform  
20 remedial investigation and feasibility study.  
21 That was done in 1991. And early 1991 Jones  
22 began the remedial investigation and feasibility  
23 study. This was done under the oversight of  
24 EPA, and the study was to determine the nature  
25 and extent of the contamination at and emanating

1  
2 from the site; and two, identify and evaluate  
3 remedial alternatives.

4 And in 1996 to comply with New York State  
5 waste-to-water discharge permit, also known as  
6 the SPDES permit, to comply with that permit and  
7 collect data for the feasibility study work  
8 related to the remedial investigation and  
9 feasibility study, Jones installed an air  
10 stripper to treat the noncontact cooling water  
11 from the production wells which I mentioned,  
12 north well and west well, the production wells;  
13 and after the treatment was discharged to  
14 lagoons, and that test indicates that they were  
15 achieving 99.5, or about, percent efficiency.

16 That leads us to remedial investigation.  
17 In 1994 Jones submitted documents related to the  
18 remedial investigation study, and they began the  
19 field work in 1994. Investigation included  
20 mainly surface and subsurface soils and  
21 groundwater.

22 Okay, the results of the remedial  
23 investigation, soil, the results of 19 soil  
24 samples collected from across the site showed  
25 PCE and TCE contamination. The former solvent

1  
2 tank area had the highest contamination of --  
3 highest soil concentration of PCE and TCE, and  
4 at the same area in the deep bedrock we  
5 suspected a PCE hot spot. And groundwater,  
6 approximately -- the hot spot was approximately  
7 1,500 foot to 720 foot groundwater VOC plume  
8 consisting of primarily PCE, and it's  
9 degradation products of PCE, 1,2-dichloroethene,  
10 extends from the former solvent tank source area  
11 to the east and to northeastern property ground.  
12 Particularly, the contamination extends to at  
13 least 48 feet below the ground level in that  
14 source area.

15 Risk assessment. Risk assessment study  
16 was conducted. Based on the results of the  
17 remedial investigation study and the assessment  
18 study, EPA has determined that actual or  
19 threatened release of the hazardous substances  
20 from the site if not addressed by the preferred  
21 alternative or one of the other active measures  
22 present there, may present current or potential  
23 threat to the environment. We have taken a  
24 hypothetical future risk scenario, which is if  
25 the production wells stop pumping there, what

1  
2 will happen, and under that scenario, also we  
3 found that if it stops pumping, that could allow  
4 contaminated groundwater to migrate off plant,  
5 which could cause an unacceptable risk. Again,  
6 that's a hypothetical scenario. The same thing  
7 with if no action is taken there is a potential  
8 for an environmental threat, too.

9 Now I would like to present the site, the  
10 two media, soil and groundwater. For soil  
11 remediation -- for soil remediation  
12 alternatives: Number one, no action. The  
13 Superfund program requires that a no-action  
14 alternative be considered as a baseline for  
15 combating with the other alternatives. The  
16 no-action remedial alternative, that's not doing  
17 any physical, remedial measures that addresses  
18 the contaminated soils in the former solvent  
19 tank source area. That's no action.

20 The second one, treatment of contaminated  
21 soils using soil vapor extraction. Under this  
22 alternative, contaminated soils in the former  
23 solvent tank source area would be remediated by  
24 soil vapor extraction. Under this treatment  
25 process air would be drawn through a series of





1  
2 again, estimated to be one year.

3 Those are the four remedies for the soil  
4 media. Now I would like to bring you to  
5 groundwater remediation alternatives.

6 Number one, no further action and  
7 long-term monitoring. Again, the Superfund  
8 program requires that no-action alternative be  
9 considered as a baseline for comparison with the  
10 other alternatives. Here there is no further  
11 action because there is also a remedy in place,  
12 which is the air stripper that I mentioned  
13 before.

14 If we go with the no further action, that  
15 would include or assume that the groundwater is  
16 no longer extracted from those production wells.

17 And the second alternative for  
18 groundwater is source area extraction and  
19 treatment, monitored natural attenuation of the  
20 plume outside the source area, and institutional  
21 controls.

22 Under this alternative the affected  
23 groundwater in the former solvent tank source  
24 area would be addressed through the groundwater  
25 extraction system, and extracted groundwater be

1  
2 treated by the existing air stripper and would  
3 then used as noncontact cooling water within the  
4 plant, and the contaminated groundwater located  
5 outside the former solvent tank source area and  
6 beyond the influence of the production wells  
7 would be addressed through monitored natural  
8 attenuation, a variety of physical, chemical and  
9 biological processes which under favorable  
10 conditions act without human intervention to  
11 reduce the mass, toxicity, mobility volume, or  
12 concentration of contaminants in the soil and  
13 groundwater.

14 Some examples of this in-situ processes  
15 include biodegradation, dispersion, dilution,  
16 sorption, volatilization, and chemical or  
17 biological stabilization, transformation, or  
18 destruction of contaminants.

19 It is estimated that it will take over 15  
20 years to clean up the groundwater under this  
21 alternative.

22 That leads me to the third groundwater  
23 alternative. Site-wide groundwater extraction  
24 and treatment, in-situ treatment of DNAPL --  
25 again, that's a PEC hot spot -- and

1  
2 institutional controls.

3 Under this alternative the affected  
4 groundwater would be addressed through a  
5 groundwater extraction system. It is estimated  
6 that groundwater extraction system would utilize  
7 about 16 regional wells. In addition,  
8 contaminated groundwater would continue to be  
9 extracted from the existing production well  
10 which would facilitate the capture of the plume  
11 beyond the source area. A portion of the  
12 extracted groundwater would be treated by the  
13 existing air stripper and would be used as  
14 non-contact cooling water within the plant prior  
15 to being discharged to the on-site lagoons.

16 Because the present capacity of the air  
17 stripper would be exceeded an additional air  
18 stripper would be constructed to treat the  
19 balance of the extracted groundwater. The  
20 treated water that was not used for non-contact  
21 cooling would be discharged to an infiltration  
22 gallery to be constructed to the northeast of  
23 the lagoon system. To comply with the New York  
24 State air guidelines, the air exhaust from the  
25 air stripper will be treated as well.



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These are the remedial alternatives for groundwater and soil.

And now the evaluation process, we use a nine-step criteria. The first one is protecting of human health and environment.

Number 2, compliance with applicable or relevant and appropriate requirements.

Number 3, reduction of mobility, toxicity, or volume through treatment.

Number 4, long-term effectiveness.

Number 5, implementability.

Number 6, short-term effectiveness.

Number 7, community acceptance. That's why we are here in front of you.

Number 8, state acceptance. We have been working closely with the State and the State representatives are here.

And number 9, cost.

The remedies that I have described to you, I would like to show you the cost of them.

For the soil remedies the first remedy, no action, capital cost is nothing.

Second remedy, 365,000.

Third remedy, 3.2 million.

1  
2           And the fourth remedy, approximately  
3 1.1 million.

4           It's the same thing with the groundwater  
5 remedies. First one, no further action, capital  
6 cost of \$3,000.

7           Second remedy, approximately 362,000  
8 capital cost.

9           Third, approximately 1.5 million.

10          And the last one, 479,000 capital cost.

11          Based on all these studies the preferred  
12 soil remedies that we are proposing to you are,  
13 for the soil, we propose the second soil remedy,  
14 which is treatment of contaminated soils using  
15 soil vapor extraction; and the preferred  
16 groundwater remedies, the fourth one, source  
17 area extraction and treatment, in-situ treatment  
18 of the PCE hot spot, monitored natural  
19 attenuation of the plume outside the source  
20 area, and institutional controls. And the cost  
21 of the preferred remedies, again, is -- both put  
22 together, the capital cost is under a million  
23 dollars. Thank you.

24          MR. SINGERMAN: Okay, the preferred  
25 remedy that George has described is just that, a

1  
2 EPA preferred remedy. We don't make a decision  
3 until we consider public comments following the  
4 comment period closing.

5 We're hoping that we can select a remedy  
6 for this site by the end of September, and  
7 subsequent to that we would negotiate the design  
8 and construction remedies with Jones, and so  
9 we're hoping that perhaps by maybe next spring  
10 or summer we may have the design underway and  
11 maybe another year or so after that we would  
12 have -- say after a year or so of design, we  
13 would have construction underway, perhaps, two  
14 years from now. That's just a rough schedule.  
15 It could be shorter, it could be quicker. It's  
16 anyone's guess.

17 As a reminder all the documents that are  
18 relevant to this proposed plan, the proposed  
19 plan, the investigation and study, they're all  
20 located in the repository identified in page 2  
21 of the proposed plan; and also, you have until  
22 the 19th of August to submit your comments to  
23 us.

24 In a minute you're going to have an  
25 opportunity to present any questions you might

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2 have. We have a stenographer present, so if you  
3 do ask questions or comments we ask you identify  
4 yourself and identify either your affiliation or  
5 address. And so at this point if there are any  
6 questions we'll be happy to try to respond to  
7 them.

8 In the back.

9 LEON CRANSWORTH: My name is Leon  
10 Cransworth, 501 Barker Road in the Town of  
11 Caledonia.

12 Have you done a profile study of where  
13 the contamination is in relation to elevation on  
14 the ground --

15 MR. SINGERMAN: In the groundwater or the  
16 soil?

17 LEON CRANSWORTH: Both.

18 MR. SINGERMAN: Well, we've taken samples  
19 in the ground -- in the groundwater and soil, so  
20 we have a pretty good idea of where the  
21 contamination is in the soil and where it is in  
22 the groundwater.

23 LEON CRANSWORTH: Height-wise?

24 MR. SINGERMAN: Yes. I mean, for the  
25 soil we're not -- again, keep in mind the way

1  
2 you investigate is basically take samples. We  
3 took 19 samples of the soil. You have to  
4 interpret and make presumptions between the  
5 point you're talking samples, but we feel we've  
6 pretty well characterized what's there. After  
7 we do the treatment if we select the remedy we  
8 identified, soil vapor extraction, we'll go back  
9 out and take samples again to make sure we  
10 cleaned up. Same with the groundwater. We have  
11 to treat the groundwater down to drinking water  
12 standards. So we'll continue to monitor that  
13 groundwater, and the treatment process is not  
14 turned off until the groundwater has met  
15 groundwater standards for a sustained period of  
16 time.

17           So the answer is yes, we think we've  
18 characterized the contamination; but again, it's  
19 not an exact science, but we have safety  
20 mechanisms in place during the course of the  
21 implementation of the groundwater remedies such  
22 that we can keep track of how things are  
23 working. So we don't need to know exactly where  
24 everything is. That's the bottom line to that.

25           Does that answer the question?

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LEON CRANSWORTH: Yes.

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MR. SINGERMAN: Anymore questions?

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MARY REED: My name is Mary Reed, and I live in Caledonia, and for the first 14 years that we were here, which has been early 1950s, we lived in what today would be termed the seepage lagoon that Jones Chemicals came out with. I have a grave concern for what Jones may be doing or has done. I guess I need to say what it has done. I'm pretty confident. I spoke before the State Commission on hazardous Waste in March of 1998 in Albany, and I am a cancer survivor, breast cancer survivor. I do believe that the seepage, the concerns of the TCEs from the seepage lagoons of that perhaps as much as we can ever prove will, has affected, will affect a fetus of one of my children, and I have also seen the vast numbers of breast cancer survivors within a very short distance, less than a quarter of a mile, and they say all the lagoons are the waste vessels of Jones Chemicals. Our pet dog for many years, for 14 years, would go down into those pools and come up totally brown. We would spend tons of money

1  
2 curing this dog. That was before we knew, knew  
3 what was happening.

4 My question is our water, which I know is  
5 a universal question. It's not something --  
6 what this treatment at the exorbitant cost, what  
7 warranty -- is there any warranty -- I'm sure  
8 there isn't -- that can be given to us that it's  
9 not going to seep into our underground water  
10 system?

11 I've been working very close on a Well  
12 Health Committee that has been formed in the  
13 Village to monitor and hopefully control what's  
14 happening to our spring-fed wells, but -- and I  
15 talked many times with Mr. Basile. I'm very  
16 sorry for the death -- I was hoping he would be  
17 here tonight -- of his mother. But I'm very  
18 concerned that taking and removing soil and  
19 putting it back -- we also have been through a  
20 costly -- personally ourselves, a costly  
21 environmental clean-up, worked very closely to  
22 the EPA and DEC, and not through the benefits of  
23 a Superfund site, but through a very, very  
24 six-year-long term expensive environmental  
25 clean-up, working with environmental issues on

1  
2 our own private property; and moving the soil  
3 that was supposedly contaminated in that  
4 situation cost us a great deal of money, not to  
5 take to Niagara Falls, but to take to Ohio, and  
6 I don't -- I guess I fail to see what it's --  
7 what taking and removing soil with whatever  
8 system we have that we think we're going to  
9 purify it? Is this something that -- you said  
10 50 years down the road -- did you say 50 or 15,  
11 I'm sorry?

12 MR. SINGERMAN: 15. That's for the  
13 groundwater. With what we're proposing for soil  
14 is the vapor extraction, basically what we do is  
15 put pipes into the ground and draw -- you draw  
16 volatile organics off the soil. By using the  
17 vacuum you're drawing contaminants out of the  
18 ground and treating it. There will be no  
19 excavation. We estimate it will probably take  
20 about three years for the soil to reach the  
21 clean-up levels and probably 15 years -- it's  
22 estimated 10 to 15 years to treat the  
23 groundwater; and we believe based upon the fact  
24 that we -- such a high production -- the  
25 production wells was pumping at such a high

1  
2 rate, that basically prevented the off-site  
3 migration and leaching at this point. So it  
4 seems to me to be drawn towards production  
5 levels rather than beyond.

6 When this process is all done, when we  
7 completed the soil remediation and the  
8 groundwater has been treated and standards have  
9 been maintained for a number of years, we will  
10 still continue to monitor, but we think that  
11 once -- once we eliminated the source and once  
12 we've eliminated the hot spot at depth, that  
13 we'll be in a position to delete the site from  
14 the National Priorities List because it will no  
15 longer pose a threat to health and environment.

16 MARY REED: I think it's probably been  
17 proven from 1980 until when we first became very  
18 aware of soil and what -- of how toxic an  
19 environment we were living in, that many of us  
20 are the un -- the ones that have survived the  
21 breast cancer, no one can ever lay it to what it  
22 may be, but the big point we have to drive home  
23 is how safe can this process be for what will  
24 continue to be our groundwater and air supply?

25 MR. SINGERMAN: Well, the objective to

1  
2 cleaning the soil is primarily to prevent a  
3 future source of groundwater contamination.

4 MARY REED: Of groundwater.

5 MR. SINGERMAN: Of groundwater. So by  
6 removing contaminants from the soil -- what  
7 happens every time it rains you have the  
8 rainwater picking up contamination in the soil  
9 and perking it down into the water table.  
10 Again, like I said, based upon the data that we  
11 have, it does not appear that at this point in  
12 time there's any migration of contamination  
13 beyond the property boundary because the  
14 production wells were pumping such a high rate,  
15 they basically modified the natural groundwater  
16 flow. So in addition to that, with their  
17 growth, the production wells will still continue  
18 to pump, and in addition we will be placing  
19 additional wells to accelerate the removal  
20 groundwater contaminant.

21 So the whole objective is to prevent --  
22 is to eliminate the source of ground  
23 contaminations in the soil, and then to remove  
24 contaminations from the groundwater, actively at  
25 the source and then through natural processes

1  
2 downgrade. Primarily at the disposal area, what  
3 we call the source area, there's very high  
4 levels of contamination in soil and groundwater;  
5 but beyond that point the levels drop off  
6 significantly. So that's why we're proposing  
7 natural attenuation, it's a natural process to  
8 disperse, leaching, degradation, that the  
9 present chemicals will degrade by themselves.

10 MARY REED: The monitoring of this, is  
11 this something that is on the Superfund level?  
12 I mean, is this something that --

13 MR. SINGERMAN: The monitoring of the --

14 MARY REED: Well, of our groundwater.

15 MR. SINGERMAN: Well, the monitoring on  
16 the site, that was part of that process. I  
17 believe the Department of Health has been  
18 monitoring the private wells in the area. So I  
19 don't -- perhaps the Department of Health wants  
20 to discuss what they found in your wells.

21 MR. NAPIER: The public wells, Mary --  
22 and we've talked. The public wells were  
23 examined. The Village public wells have been  
24 contaminated, and that's why an air stripper was  
25 put in, in '91, installed to remove that, and to

1  
2 make it safe from contamination; but it's been,  
3 off the top of my head, I think three or four  
4 years since there's been any identification of  
5 volatile organics in the Village well supply.  
6 So at the present time there hasn't, in a couple  
7 years, any volatile chemicals in the well  
8 supply. I've example occasionally wells around  
9 the periphery of the plant, private wells, and  
10 we found two wells with some volatile  
11 contamination that we haven't been able to trace  
12 back to Jones, but Jones Department of  
13 Environmental Conservation did put carbon  
14 filters on those two private wells to make sure  
15 they had safe water; and they are continually  
16 monitored to make sure they have clean water.

17 UNIDENTIFIED SPEAKER: How close are the  
18 wells to the Town?

19 MR. NAPIER: On the Wheatland Center  
20 Road.

21 UNIDENTIFIED SPEAKER: On what side of  
22 the tracks?

23 MR. NAPIER: Up to Norr River.

24 UNIDENTIFIED SPEAKER: There was tracks  
25 by the -- you know where the lumber yards are?

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MR. NAPIER: Out near the gas company,  
right over --

UNIDENTIFIED SPEAKER: On the south side  
of where the tracks are? The gas company is on  
the south side.

MR. NAPIER: Yes, it would be on the  
south side.

UNIDENTIFIED SPEAKER: A lot of this is  
on the north side of the tracks down here.

MARY REED: And again, I believe that --  
I really -- I strongly believe that our  
monitoring has been very faithful and -- but  
I -- I do go back on my knowing -- knowing that  
the standards were lowered by the State by 10  
percent in the '80s so that they could comply  
with what was going on.

MR. NAPIER: Well, they weren't lowered  
so they could comply. The lowering of the  
standards actually made them out of compliance  
so they could take more action. That was the  
case. The standards were higher. They were  
like 50 parts per billion for the volatiles, and  
they lowered it to 5; and that's when we made  
the Village put the air stripper in.

1  
2 MARY REED: And the air stripper is in  
3 Jones Chemicals?

4 MR. NAPIER: Well, there's two air  
5 strippers. There's one in the Village supply,  
6 and Jones has an air stripper on their  
7 production well where they're pumping water.

8 UNIDENTIFIED SPEAKER: Where does the  
9 water go that Jones discharges --

10 MR. NAPIER: They have a SPDES discharge  
11 permit to discharge that water.

12 UNIDENTIFIED SPEAKER: Back in the water?

13 MR. NAPIER: I'm not sure. It the --

14 UNIDENTIFIED SPEAKER: And that's tested  
15 before it goes to the lagoons?

16 MR. MOLOUGHNEY: Right, all that water  
17 that leaves that air stripper. It's not tested  
18 continuously, but it is periodically checked.

19 One thing we have to remember is we're  
20 talking about the volatile compounds. By their  
21 very nature they evaporate very quickly. Air  
22 strippers, what they're currently doing and  
23 what's on the Village wells, they're extremely  
24 effective in moving the volatiles out of the  
25 water. What it does is have an air release of

1  
2 the compounds, but it's extremely effective in  
3 removing it from water. So anything that goes  
4 back to the lagoons is cleaned by the air  
5 strippers before it goes back there. And the  
6 ultimately the EPA is banking on -- because  
7 they're so volatile, they're easy to remove by  
8 the air stripper and they're fairly easy to  
9 treat if we make active attempt to do it.

10 ANDY GREEN: I'm Andy Green, Caledonia.  
11 As far as we get rain and it goes down through  
12 the ground with this chemicals, right, that's  
13 the water you pump out and the air stripper has  
14 to take the chemicals out and put it back in the  
15 lagoons. Why not take the ground out of there  
16 and get rid of it. 1,700 cubic yards is not a  
17 lot. Did you make a mistake? Is it 17,000?

18 MR. SINGERMAN: No, 1,700.

19 ANDY GREEN: Because 1,700 is not a lot  
20 of area. Why don't we get that out of there? I  
21 had to get mine out of there.

22 MR. NAPIER: Times have changed. Times  
23 have changed in how we approach a lot of this.  
24 It used to be we did what you did, take it out  
25 of the ground and put it someplace else where

1  
2 you might have another problem. And we learned  
3 in very recent years that there's better ways to  
4 treat it in place. Rather than take it from one  
5 spot and moving it to someplace else and having  
6 all the handling problems and maybe create  
7 another problem where you put it, treat it in  
8 place. Leave it there and treat it there and  
9 take care of it there.

10 ANDY GREEN: Logically, it could be  
11 treated better on top of the ground than it can  
12 15 feet under the ground.

13 MR. NAPIER: Not necessarily.

14 ANDY GREEN: You can watch it and the put  
15 bugs in there and the treatment.

16 MR. NAPIER: Yes, but then you have a  
17 handling problem and you create more exposure.  
18 You know, I'm with the Health Department.  
19 There's more potential for exposure when you  
20 excavate that soil because you make it more air  
21 borne, people are handling it, you're hauling it  
22 around and moving it. There's much more  
23 potential for exposure to it.

24 MR. SINGERMAN: And if you look at the  
25 time frame, you're talking one year to dig it up

1  
2 and take it off and three years to treat it at  
3 the location. We also evaluate what we're  
4 getting for the increased cost of taking it off.  
5 For the two extra years we can have basically  
6 the same remedy that's just as effective at  
7 substantially less cost. Remember George went  
8 through all the criteria. Cost is criteria.  
9 There's also a preference for treatment is one  
10 of the criteria. You've got the mobility,  
11 toxicity or volume through treatment. So if  
12 we're just picking it up and moving it somewhere  
13 else, you know, it's not -- it's basically not  
14 the EPA's preference. We rather do something  
15 that treats it.

16 ANDY GREEN: Now, you're going to sink  
17 how many wells in this area and how deep?

18 MR. SINGERMAN: Part of the design would  
19 determine exactly how many wells we'll put in.  
20 We have to go back out -- we took 19 samples  
21 during design. We'll go out and take more  
22 samples and better define the area that has to  
23 be treated, because from that then we'll scope  
24 out how many wells, what depth and whatever.  
25 But your point, it's just visually conceptual at

1

2 this point and we have to fine tune it.

3

4 ANDY GREEN: You can take care of it by  
5 putting in wells and pumping water out --

6

7 MR. SINGERMAN: No, these are not water  
8 wells.

9

10 MR. NAPIER: Not for the soil.

11

12 ANDY GREEN: How do you treat wells at  
13 that point?

14

15 MR. SINGERMAN: No, what we do -- what it  
16 is, is volatile organics are basically adhering  
17 to soil particles. You have air spaces between  
18 the soil particles. By putting up the wells --  
19 they're called wells -- they're called wells,  
20 but they're not water wells. Just imagine pipes  
21 put in the ground. They're -- they're -- and  
22 basically what you do is create a vacuum, draw  
23 air through it, and what that does is pulls the  
24 volatile organics off the soil particles into  
25 the air spaces and sucks them up. So it  
continues to draw that -- again, they're called  
volatile organics, meaning that if -- they come  
off very easily.

26

27 ANDY GREEN: So they're all going to have  
28 a power vent?

29

1  
2 MR. NAPIER: Not each well. You  
3 manifold -- you tie them together.

4 ANDY GREEN: You tie them together lie  
5 nine to ten foot underground?

6 MR. SINGERMAN: Well, the point you tie  
7 them together may be below the frost line so the  
8 pipe don't freeze. You have to work it out. We  
9 have them all connected going to some location  
10 that has some type of vacuum that draws the  
11 material. What is drawn out -- whatever  
12 contaminants are removed will be treated and you  
13 can continue the cycle; and again, the three  
14 years is how long it takes to draw everything  
15 out.

16 ANDY GREEN: Now, you suck that chemical  
17 off through turbine pump or whatever, and that  
18 goes where? It doesn't go to the air, does it?

19 MR. SINGERMAN: No, it gets collected.  
20 It's collected and treated.

21 MR. NAPIER: It will be treated before  
22 it's discharged.

23 ANDY GREEN: And that will be set up out  
24 the take it out of the ground and put it high  
25 enough so that --

1  
2 MR. NAPIER: What is emitted through the  
3 pipe should be clean air and that will be all  
4 monitored.

5 MARY REED: And there's no warranty after  
6 this three-year period that there won't be more  
7 exceeding grounds.

8 MR. NAPIER: There will be soil tests.  
9 After getting done with three years that we've  
10 talked about, we'll put more borings and take  
11 more soil samples to verify that it has cleaned  
12 it up like it was supposed to.

13 MR. SINGERMAN: It may take less time,  
14 too. It may take a year. It's an estimate. It  
15 may take more time; it may take less time.  
16 Jones is not off the hook until it's clean. So  
17 they will have to operate the system until it's  
18 clean, until the EPA is satisfied that the  
19 contamination in the soil has been cleaned.

20 UNIDENTIFIED SPEAKER: Now, chemical-wise  
21 you've got a list of all the chemicals you think  
22 in is in that soil and they all can be sucked  
23 out of that soil, or are some going to stay  
24 permanently in the soil.

25 MR. SINGERMAN: There's not that many

1  
2 chemicals really present. PCE is the primary  
3 chemical in the soil; but basically, all the  
4 contaminants in the soil that are the problem  
5 for us are volatile organics. There are other  
6 contaminants; but again, we don't have them at  
7 the site. PCBs, if you had PCBs at the site you  
8 could not use vacuum to draw them off. You  
9 can't draw metals; but volatile organics, by  
10 their very nature are easy to draw off.

11 UNIDENTIFIED SPEAKER: And you can draw  
12 them all off, the volatiles?

13 MR. SINGERMAN: Yes. We've done this  
14 successfully at other sites. I mean, it's not  
15 experimental. It's basically proven technology.  
16 This has been used at other sites.

17 UNIDENTIFIED SPEAKER: And that will be  
18 there for a lifetime. The one we had west of  
19 town that will be there a lifetime; through the  
20 west of town, that will be there forever?

21 MR. NAPIER: Through Lehigh Valley?

22 UNIDENTIFIED SPEAKER: That puts a lot in  
23 my mind about what's going on down there.

24 MR. NAPIER: What you have down there is  
25 on the other side of the tracks. That's a

1  
2 totally different situation there. That's a  
3 much different situation than what we have here  
4 to deal with.

5 MR. MOLOUGHNEY: Yes, I can speak to  
6 that. I'm the project manager for the other  
7 site for the State, for both sites for the  
8 State. I think what we have there is a much  
9 larger volume, and we waited 30 years before we  
10 did anything. Here, after our investigation we  
11 are pretty confident despite the size of the  
12 Jones plant and the size of the property and  
13 building, the actual area where there's the most  
14 contamination and the site where the spill was  
15 is a fairly localized and small area. It's easy  
16 to get to and easy to get in for the treatment  
17 system. Much opposite what have at Lehigh  
18 Valley.

19 UNIDENTIFIED SPEAKER: This sat down  
20 there and --

21 MR. MOLOUGHNEY: Right. This has been  
22 there quite some time.

23 UNIDENTIFIED SPEAKER: I have a brother  
24 there, and we have a whole great --

25 MARY REED: We can tell you horror

1  
2 stories of chemicals.

3 UNIDENTIFIED SPEAKER: We can tell you  
4 horror stories.

5 MR. MOLOUGHNEY: One of the beneficial  
6 aspects of the Jones being there, they've been  
7 pumping water for what they use almost  
8 continuously. Just by using water for their  
9 plant they've been capturing a lot of these  
10 chemicals before they move too far. They  
11 haven't captured all the them, but their wells  
12 are pretty close to where all the contamination  
13 is. They're catching most of it before it  
14 leaves the property, but you have the lime rock  
15 there, and there's nothing there to capture it,  
16 so that needs to --

17 UNIDENTIFIED SPEAKER: You have someplace  
18 where this vapor extraction sytem has --

19 MR. MOLOUGHNEY: Yes, we do it all the  
20 time.

21 UNIDENTIFIED SPEAKER: Be specific.

22 MR. MOLOUGHNEY: Okay, well, for the  
23 Lehigh site.

24 MR. NAPIER: There's a house right down  
25 in Mumford we did it for a petroleum spill about

1  
2 three years ago, and worked down there with DEC.  
3 Not this program. It was a fuel spill and  
4 basically it was the same type of system,  
5 there's an accidental spill of fuel oil that got  
6 into the soil in and around the basement, and we  
7 used soil extraction to take that out.

8 UNIDENTIFIED SPEAKER: How long did it  
9 take?

10 MR. NAPIER: Oh, a year and a half  
11 probably, and to be honest a fuel oil is not as  
12 easy readily extractable as what these compounds  
13 are. It's a little heavier, and it would take a  
14 little longer.

15 MR. MOLOUGHNEY: And if you go to any gas  
16 station that is more than 20 years old, if you  
17 take a close look at the gas station, there's a  
18 little shed or shack or treatment facility on  
19 the side, and they have a little air stack going  
20 off, and probably they're doing a combination of  
21 air stripping and soil vapor extraction for the  
22 type of chemicals they're using. It's used  
23 everywhere.

24 JANE HANNA: Jane Hanna. You said that  
25 the lagoons are still being used; is that

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correct?

MR. MOLOUGHNEY: Yes.

JANE HANNA: So that's being added to what's there?

MR. MOLOUGHNEY: I'm not sure. I think there may be miscommunication. The way Jones is using the plants currently, they're discharging any -- they use their wells for water. They collected all this with water with their wells. Before they discharge it to the lagoon the State makes them clean it through the air stripper they installed. So they're basically discharging clean water back into the lagoons.

JANE HANNA: But they're still putting something back in the lagoons?

MR. NAPIER: Clean water.

MR. MOLOUGHNEY: Clean water -- yes.

JANE HANNA: There's two air strippers, correct?

MR. MOLOUGHNEY: Yes.

JANE HANNA: We're going to add more wells, pipes, everything is going into the atmosphere, how often are those facilities monitored; daily? Weekly? Monthly? Quarterly?

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MR. MOLOUGHNEY: For the air discharges?

JANE HANNA: Anything released into the air?

MR. MOLOUGHNEY: Tim, can you answer --

TIM GAFFNEY: Yes. Tim Gaffney from Jones Chemicals, also a resident of the Village of Caledonia, and I would be happy to talk with anybody any time about any of the technologies that Joel and George have talked about tonight.

Just to go back and answer your question on the groundwater as well as what was talked about with the soil test, I just want to go back to the soil question for a minute. There will be no emissions from the soil vapor extraction system that's going in. Even though when you look at the front of the plant it's enormous in size, the area of soil contamination that we're talking about with the extraction system is probably less than the surface area of the stage here. It's a small area where we had an above-ground solvent tank approximately from 1960 to 1980, give or take in there. These -- these perforated pipes actually go underneath the contamination of the soil and blow air up

1  
2 through the soil. They're collected in these  
3 vapor recovery wells, and they're sent to carbon  
4 filters, to these cannisters that have carbon in  
5 that and the vapors are absorbed to into the  
6 carbon. The carbon then goes to an off-site  
7 disposal site for incineration or landfill or  
8 some other type of hazardous waste treatment.

9 We have another Jones Chemicals facility  
10 out in the San Jose, California, area that had  
11 an extremely large spill of the same chemical  
12 back in the early 1980s, and we used the  
13 identical technology that the EPA is  
14 recommending to all of us to be used at this  
15 site and much greater surface area, much greater  
16 concentration, much more difficult soil to work  
17 with as far as bleeding the vapors out of the  
18 soil, and we turned that system off in under  
19 five years out there.

20 So we do -- someone asked the question,  
21 we do -- Jones Chemicals has a real life example  
22 of this technology in the soil working. So I  
23 would be happy to talk to anybody about it.  
24 Like I said, I'm a resident of the Village of  
25 Caledonia. In addition to being in charge of

1  
2 environmental affairs for all of Jones  
3 Chemicals, and we feel this is the most  
4 practical way to deal with the soil  
5 contamination that's on the property down where  
6 our solvent tank used to be. We understand  
7 there's excavation that can be done and other  
8 types of measures, but when you go through the  
9 nine criteria that George explained and you  
10 start comparing the alternative against the  
11 other alternatives, this is the one that makes  
12 the most sense. It does have a track record.  
13 Joe with the DEC has used it. We're confident  
14 that this is going to work. If we didn't have  
15 the track record ourselves at another site we  
16 would be a little worried about it ourselves.

17 As far as the groundwater is concerned, I  
18 think it's important to know that this is a  
19 closed-loop system that we're talking about. We  
20 have a pond or lagoon, whatever terminology you  
21 want to use, that sits out back of the facility,  
22 and we require about 400 gallons of water a  
23 minute to cool our product, and we extract it  
24 out of the ground, both in the shallow and the  
25 deep water bearing zone, and it goes through the

1  
2 air stripper. It's virtually similar to the air  
3 stripper that the Village of Caledonia also has.  
4 The air stripper takes the volatile organics out  
5 of the water and clean water is put back into  
6 the pond.

7 We monitor for our permit with the DEC  
8 twice a month to collect samples, and we test  
9 for everything from volatile organic compounds  
10 to various metals, pH, chlorine, which is the  
11 main product that we've handled there for 50  
12 years; and since the air stripper has been in,  
13 which I believe is a little over four years, we  
14 haven't had one exceedence for any VOC that I'm  
15 aware. We have had an exceedence for sulfate,  
16 but that's been attributed to the low water  
17 table in Caledonia. We have nothing in our  
18 process that contributes sulfate whatsoever to  
19 the groundwater. So that's been corrected with  
20 all the rain this summer. As far as what's  
21 going into the pond, it's clean water. It's  
22 super clean. There's no VOCs detected  
23 whatsoever. We have tests twice a month that  
24 show that.

25 Why is there two air strippers?

1  
2 Basically because the products of contamination  
3 are different. The Village -- the Village's  
4 contamination is 1,1,1-trichloroethane, the two  
5 chemicals here are perchloroethylene and  
6 trichloroethylene.

7 At least back into the early 1980s when  
8 we have data -- we don't have data prior to  
9 that -- the flow of water in our region is  
10 actually from the Village of Caledonia's barns  
11 to our site when our wells are pumping. The  
12 water does not flow from Jones Chemicals to the  
13 Village or to the park or to the golf course or  
14 to where the Village wells are, contrary to  
15 popular belief. At least since the early 1980s  
16 when we monitored that and had these wells, that  
17 has been the case. Prior to that we don't know  
18 because the issue hadn't come up. We have had  
19 these extraction wells for our cooling process  
20 well before 1982. We have had our lagoons well  
21 before 1982. We have had our discharge permit  
22 with the DEC well before 1982.

23 All I'm trying to say there is most  
24 likely at those times the conditions were also  
25 the same. There's no data to support, confirm

1  
2 or refute that, but that's my belief, and I've  
3 spent almost 15 years with Jones, this being one  
4 of the more important projects, if not the most  
5 important project being the resident here that I  
6 have, it's my belief the two systems are not  
7 connected and that's why they're separate  
8 treatment units there.

9 We like the remedy that they put  
10 together. We know that the air stripper works.  
11 We put that in four years ago. Jones paid for  
12 that. Jones is not getting Superfund money for  
13 paying for any of this. It's being paid for  
14 strictly out of operational funds. There's no  
15 insurance coverage for this. This is a major  
16 project for us, and I personally as well many  
17 people in the company have spent tens of  
18 thousands of hours on this project, and we're  
19 very happy that after this length of time that  
20 it has taken for us to get to this point, that  
21 we're at the point now when we're going to  
22 actually make more headway than we have in the  
23 last four years by having this air stripper in  
24 place.

25 So that's my speech for the night. I

1  
2 would be more than happy to answer any questions  
3 for anybody on any of this. The documents are  
4 public knowledge. I work in Caledonia now, not  
5 in Florida, not in Leroy. The company is not  
6 being sold. It's not going bankrupt. Any other  
7 rumors you've heard in town are not true. It's  
8 a great company, and we're excited to be working  
9 with the EPA to try to make it better.

10 UNIDENTIFIED SPEAKER: Where do you live  
11 in the Village?

12 TIM GAFFNEY: I live down on Stony Hill  
13 Circle. I've lived in Caledonia for about 12  
14 years.

15 MR. SINGERMAN: Any other questions?

16 VERONICA LAUGHLIN: Mr. Gaffney, would  
17 you clarify something you just said?

18 MR. SINGERMAN: Identify your name,  
19 please.

20 VERONICA LAUGHLIN: I'm Veronica  
21 Laughlin. I live on Grand --

22 The thing that Jones is paying for  
23 themselves is treatment the company began on its  
24 own; is that correct, to remedy this condition?

25 TIM GAFFNEY: Yes.

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VERONICA LAUGHLIN: Where does the Superfund come in?

MR. SINGERMAN: First of all, the Superfund is basically slang for the Comprehensive Environmental Response, Compensation, and Liability Act. The Superfund itself is basically a fund for when we have parties that are unwilling or unable to basically take whatever -- take the action as necessary to clean up the site. In this case we have Jones that has financed the investigation at the site, and we hope to negotiate with them and also to design the construction remedy described if it's selected. So really there aren't any Superfund monies being used.

UNIDENTIFIED SPEAKER: There are or aren't?

MR. NAPIER: Are not.

MR. SINGERMAN: Not.

VERONICA LAUGHLIN: There are not because they're willing to do it, but if they weren't willing or spurned the proposed --

MR. SINGERMAN: First, we can force them to use it. We can take measures to try to

1  
2 convince them it's in their best interest. The  
3 Government -- it usually costs more money for  
4 the Government to do something than for them.  
5 If they were unwilling to do any work -- like,  
6 for example, if we negotiate design construction  
7 and we don't come to an agreement and we have to  
8 enforce the measures, we can't convince them to  
9 take action, that's the purpose of the  
10 Superfund. But in this case they're a willing  
11 participant. I don't know how much they've  
12 spent, but it's a lot of money, and they'll be  
13 spending a lot more money because you see what  
14 this remedy is going to cost over the lifetime,  
15 about \$684,000 for the soil and 1.6 million for  
16 the groundwater. So that's, you know, a lot of  
17 money they'll still have to spend in the future.  
18 So we expect they'll negotiate and come on a  
19 settlement and do the designed construction.

20 We have Superfund monies for the sites  
21 for which -- like I said, where we have parties  
22 who are not able or willing, and we have parties  
23 where we can't identify them; they went bankrupt  
24 and disappeared. That's what it's for.

25 VERONICA LAUGHLIN: It's very unlikely,

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because I think we all have different concept of what the Superfund is.

MR. NAPIER: An example of what the Superfund is for is like the -- Road, that's on the State and Federal Superfund list, and because they haven't been able to get or find any reasonable party State or Federal money will be used to clean that up.

MARY REED: I thought it had to exceed \$50,000?

MR. NAPIER: There's no dollar amount that I know of.

MR. SINGERMAN: There's no price on it.

DEBBIE BANGUY: I'm Debbie Banguy from Caledonia. I spoke to Mike Basile about this. He called me about two weeks ago. I mean, I heard all the stories about Jones and all this, and he explained to me the same thing you did. I didn't realize Jones was paying for this entire thing. That I felt was Superfund money, and I would to have to say I'm very happy to see that Jones is taking control of this and paying for it themselves.

MR. SINGERMAN: In addition, not only are

1  
2 they paying for the study, they're paying for  
3 the oversight, paying for this meeting, paying  
4 for the air fare. By signing the consent decree  
5 they agreed to pay oversight costs and, you  
6 know, administrative costs. So it's not only  
7 their cost, but also EPA's costs and also the  
8 State's cost.

9 DEBBIE BANGUY: And I talked to Will  
10 Wadsner who is in this charge of the -- I was  
11 concerned, also, hearing so many rumors that  
12 Jones are staying, and he said that yes they  
13 have a smaller group of people working there,  
14 but they are looking to enlarge, and they're  
15 trying to change their image. And I think doing  
16 something like this will help them. It made me  
17 feel a lot better about Jones, too, just knowing  
18 that they're doing this. They're paying for  
19 this themselves. Thanks for mentioning that,  
20 letting people know.

21 JANE HANNA: I still have the same  
22 question. The question is what goes into the  
23 air, how often are you going to monitor?

24 MR. MOLOUGHNEY: Okay, currently it's not  
25 monitored, and I can explain. The reason for

1  
2 that is we know how much water is going in and  
3 how much contaminant is going in and we can  
4 figure out based on how much is going in how  
5 much is going out. That does not meet the  
6 criteria for the State permit. It's far below  
7 what the State will require for an active permit  
8 and monitoring. However, with additional  
9 treatment that they're going to add and as they  
10 start pumping more water that will be  
11 re-evaluated. If it exceeds the threshold  
12 requiring a permit we will have to go through  
13 that process. Currently it's not monitored  
14 because we know it's below a certain level.  
15 That's the best answer I can give you.

16 MR. NAPIER: Remember, it's just the one  
17 source. It's just the groundwater that Jones is  
18 currently pumping and treating on the wells.  
19 The air stripper on the Village wells is not  
20 producing any of these VOCs because there's no  
21 water coming in. The carbon treatment will be  
22 able to remove the VOCs before it's discharged.

23 MR. SINGERMAN: And when the EPA takes  
24 any action, we have to comply with all  
25 environmental requirements. So -- there are air

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2 discharge requirements. So we will guarantee  
3 that -- if unacceptable levels of discharge are  
4 not being treated it has to be shut down. So  
5 there will be treatment to prevent that from  
6 happening. Let's say something goes wrong; the  
7 system gets shut down so the system can be  
8 checked. It's not going to be allowed to  
9 continue running. We're not going to allow that  
10 to occur.

11 JANE HANNA: I'm sure you would not, but  
12 my question was do you do it, and the answer  
13 was, no, you do not.

14 MR. NAPIER: Not right now.

15 MR. MOLOUGHNEY: Maybe to enlighten you a  
16 little more. There is no State-wide level of  
17 how much goes into the air before we issue a  
18 permit. Every air source is checked separately.  
19 There's a whole list of criteria we go through  
20 based on how much air flow is being used. How  
21 high is the stack from the ground where the  
22 nearest people are. We come up with a number  
23 based on all these things, put together a  
24 threshold level in each place it's unique. Here  
25 when those calculations were done, the amount

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2 coming out is below that, so we don't conduct  
3 any monitoring.

4 JANE HANNA: My other question is the  
5 people in this room are taking this as serious  
6 to bring in professionals, and this has been out  
7 there for how many years. My question is why  
8 does an individual build their home, sink a  
9 well, and have a well that's been in existence  
10 for a hundred years and we have the situation  
11 and we do not check every well in the Town of  
12 Caledonia?

13 MARY REED: We're a well.

14 JANE HANNA: We do not check every well  
15 in the town of Caledonia, correct?

16 MR. NAPIER: For what; for these  
17 chemicals?

18 JANE HANNA: No, we do not check every  
19 well in Caledonia for --

20 MR. NAPIER: That's what I'm asking you;  
21 what do you want them checked for, these  
22 volatile organic compounds or what?

23 JANE HANNA: I don't know that I need to  
24 classify a chemical when there's a situation and  
25 some of the chemicals are known and some of the

1  
2 other chemicals are not known why we wouldn't be  
3 checking every individual's well. If they're  
4 going through that expense and they're going  
5 through the time to present this, I have some  
6 difficulty when the Mayor goes and gets our  
7 Village water aerated and we have people who are  
8 not on that, why we're not going out, knocking  
9 on their door and saying we have a situation.  
10 We would like to come in and we would like to do  
11 a check. We're going to set up a schedule, but  
12 just like we're not checking air, we're not  
13 checking water; and those are the two things --

14 MR. NAPIER: Well, I have checked a lot  
15 of water. There may be a few people here who  
16 could verify that.

17 JANE HANNA: No, my question is why can't  
18 we check every well --

19 MR. NAPIER: I can't do the water in  
20 every well or --

21 JANE HANNA: I'm asking that.

22 MR. NAPIER: But I have in the Jones  
23 site, and any private wells I could find  
24 anywhere close to them I sampled them and I  
25 found the two which had a low level, and we put

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filters on.

JANE HANNA: Well, I think it's more than one person can do be and the there's other facts here.

MR. NAPIER: Well, the other thing is private citizens can have their wells tested as well. I have a protocol and EPA does, too, for programs. We only investigate sites such as Lehigh Valley and other sites where there's a known source. We investigate that and sample any wells we feel necessary. Between the meetings today and tonight I went and took samples on the Lehigh Valley well for someone that called me. There was a concern, and I sampled it. I have to have a reason, some suspected cause.

JANE HANNA: It's right here. This is it.

MR. NAPIER: There's a limitation of how far this contamination goes.

JANE HANNA: I'm not talking about contamination. I'm talking about people who build a home, sink a well or have one that's been in existence many, many years. If everyone

1  
2 is willing to do all of this I don't understand  
3 why we can't go through the community and check  
4 everybody's water source.

5 MR. NAPIER: It's a nice thought, but  
6 it's not practical for the State to do it. As I  
7 say, homeowners can do that. Every homeowner  
8 should test it for bacteriological contaminants.  
9 You can't get a mortgage through a bank unless  
10 you do a bacterial sample. You really should do  
11 it for the nitrates. Ideally you should also  
12 have it checked for lead, arsenic, barium, stuff  
13 like that. You should do it for all volatiles  
14 like here. Let alone from this site, you could  
15 have a gasoline spill from another site near  
16 your house or neighbor that could contaminant  
17 your well. There's a lot more sources than  
18 we're talking about here tonight. You're right,  
19 they should be sampled.

20 JANE HANNA: So the answer is, one, you  
21 do not test the air; and, two, you do not go to  
22 all the homes and test the wells, correct?

23 MR. NAPIER: No, we do not.

24 JANET HINKEL: Janet Hinkel. I think I  
25 can address that. I'm here from Citizens

1  
2 Environmental Coalition. I'm representing Judy  
3 Robinson who is our Western New York Director of  
4 CEC, and we are here because it is a historic  
5 moment in this country in that all source water  
6 or drinking water is being addressed. The  
7 Federal government has mandated that every state  
8 assess possible contamination of its drinking  
9 water and the susceptibility of contaminants to  
10 that drinking water. So the reason I am here  
11 tonight is to inform you about the program and  
12 ask you some questions of how it relates  
13 specifically to this site.

14 And first, if I can briefly tell you the  
15 goals of this program and how it relates to  
16 Caledonia, and then I'll ask my specific  
17 question.

18 The goals of this program are three-fold.  
19 One is to find out exactly where the water comes  
20 from. We know in Caledonia, we know a lot of it  
21 is springwater; but where is that water coming  
22 from before it gets to the spring? Possible  
23 contamination sources is the second goal by  
24 creating an inventory. And then the third goal  
25 is to create -- or to assess the possibility of



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going to be kept clean from contamination of this site.

I just want to briefly mention for the benefit of everyone here, if you would like to leave your name with me or phone number or address I can send you more information about this program and information about a fall meeting we're going to have, an educational meeting about exactly what we're going to be doing with the Town of Caledonia.

MR. NAPIER: You should point out that that program is for public water supplies. It does not cover individual wells these are talking about.

MR. NAPIER: It does not cover private well; strictly public.

UNIDENTIFIED SPEAKER: They are meeting with the Well Committee on Wednesday night of this week to discuss this program with --

JANET HINKEL: The fact that we are talking about public water does not exclude people with private wells from participating in the program.

If you could address -- I know you

1  
2 mentioned earlier on the pumps, one of the  
3 proposals was the pumps and if they stopped  
4 working how that would contaminate the water  
5 supply and how that's going to be prevented, and  
6 also how far this plume has reached in this  
7 period of flux of having cleaned the town wells  
8 and before the new remediation goes in.

9 MR. SINGERMAN: Based on the property  
10 data we have, the migration -- contamination of  
11 groundwater has not migrated beyond the property  
12 bounds of Jones Chemicals. As far as the  
13 scenario we mentioned that is Jones' wells  
14 ceased operation, that that would present a  
15 threat, one thing we would like to negotiate in  
16 implementation of the remedy we selected, we  
17 would likely include in the consent decree, a  
18 legally binding document enforced by the court,  
19 that Jones would have to continue operating the  
20 wells if they go bankrupt or move or whatever.  
21 They're going to have to at least commit to  
22 continue to operate those wells as long as the  
23 groundwater does not meet drinking water  
24 standards.

25 JANET HINKEL: I'm sorry, I must have

1  
2 misunderstood. I thought you said town wells  
3 are contaminated.

4 MR. SINGERMAN: Village wells are  
5 contaminated.

6 JANET HINKEL: I'm sorry, Village.

7 MR. SINGERMAN: We don't know Jones is  
8 the source. I think it was Tim that was  
9 mentioning, he was saying based on the data from  
10 the early '80s it does not appear -- they  
11 haven't collected any data before that, but we  
12 have no indication that Jones is the source of  
13 that contamination, and there's no really way to  
14 know because the production wells altered the  
15 natural groundwater flow; and I believe the  
16 Village had three wells and now it has two, and  
17 there's no way to do that except for Jones to  
18 turn off the production wells, and I don't think  
19 they're in a position to do that because they  
20 would have to shut down.

21 We ran that scenario because in the  
22 process of doing a risk assessment we have to  
23 evaluate present use and the future use  
24 scenario, and one worse case Jones turns off the  
25 wells for whatever reason and someone has a well

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beyond the property boundary, and we presume that well becomes contaminated because of the migration of the water, because the flow now as a result of the production wells toward the production wells hasn't allowed the contamination to migrate. So that was the future years hypothetical scenario, which is a basis for our taking action. Basically a risk assessment is the basis for taking action.

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So we demonstrated that is a potential for the future risk in the hypothetical use of groundwater if the wells should discontinue operating.

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Also, there is a threat to the animals that may burrow into the contaminated soil. We're not saying this is going to happen, but for the risk assessment we undertake the worse case scenario, and that's a risk we undertake.

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There's no risk for someone putting a well on the plant property because they're not public water and it is currently zoned industrial and there's no expectation there's going to be houses built in the future until the zoning changes, but the risk assessment says it

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remains industrial.

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JANET HINKEL: Thank you.

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MR. JACOB: To stress that point, that is a worse case scenario. We assumed for the future, if it happens, to protect the environment and the public health. Since we have evaluated that, we have made sure that we have a mechanism to address that. Like Joel said, what we do is in the consent decree, in a legally binding document, we'll -- you know, we'll address this issue and we'll make sure that scenario will never happen, or if it happens we have a way to address it. Okay?

MR. SINGERMAN: If Jones no longer needs cooling water they're going to have to keep pumping that as the remedy indicates. In 10 or 15 years when the water meets the standards, they can stop; but until we say okay they have to keep pumping.

MARY REED: Is it the EPA who determined that the contaminant is just in the groundwater.

MR. SINGERMAN: Yes. Well, it was Jones' contractor under EPA oversight. Their contractor went out a collected samples, and we

1  
2 had people going out and watching the sampling  
3 and selecting that and observing that based upon  
4 that data which goes through rigorous quality  
5 assurance controls to make sure of the quality  
6 of the data. Based upon the data we've -- you  
7 know, we've concluded that the contamination  
8 does not appear to have migrated past the  
9 property boundary.

10 MR. MOLOUGHNEY: At present.

11 MR. SINGERMAN: Right.

12 MR. MOLOUGHNEY: I think we want to  
13 clarify that's based on today, what we know  
14 about the property today. Historically, we  
15 don't have the data. The wells never existed or  
16 we never monitored 20 years ago. We can't say  
17 what used to happen, but today we can say it's  
18 within the property line.

19 MARY REED: Because I believe it's a  
20 major concern of the residents that we have  
21 contamination perhaps from many different sites  
22 that have been using TCEs in the past and  
23 probably currently are and just how much  
24 enforcement DEC or EPA has in enforcing them  
25 because so much of them are used for printing,

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cleansing. TCE has been used --

MR. NAPIER: It's a very common solvent.

MARY REED: We're not trying to personalize it with Jones Chemicals, but the whole controls situation makes many of us residents very concerned about our cancer numbers and, you know, whether our water going to be, as much as we can determine, safe for our kids and grandchildren.

MR. MOLOUGHNEY: There are two questions back here (indicating).

TIM ANDERSON: Tim Anderson, Clover Street. And I guess we've had 19 soil tests taken and Tim, you had the private contractor take the samples, were they all on Jones' lands? Did they extend past Jones' land, and possibly you could put the map up and show some locations.

TIM GAFFNEY: I was going to expand on the gentleman's question about 19 samples. There were 19 discrete soil samples taken in the investigation, but there's approximately 40 groundwater monitoring wells all over the property; on the property boundaries, on the

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2 corners, in the hot spots that you've been  
3 hearing about. And before a monitoring well is  
4 put in, there's a soil boring. What that means  
5 is they drill down to the water table, and every  
6 two feet that soil is sampled; and from that we  
7 were able to select those other 19 samples. So  
8 it wasn't just 19 samples that were taken.  
9 There were a ton of groundwater samples, that  
10 before they were a groundwater well, it was a  
11 soil boring where samples had been taken. And  
12 that was done -- I think the first well probably  
13 went in 1984, 1983, something like that. So  
14 when I first heard you say 19 samples, oh my  
15 God, 19 samples, this is an eight-acre piece of  
16 property, that's not enough. But those samples  
17 were discretely selected in the areas of  
18 concern.

19           And another thing I wanted to point out,  
20 Mr. Reed, I think, asked the question about the  
21 contaminants and the chemicals that may be on  
22 the property. When we first started we sampled  
23 the volatile organics, but since then we also do  
24 the herbicides, pesticides, PCBs, metals; and  
25 those were compared to the samples George and

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2 Joel was taking about. And in those it was just  
3 the VOCs and specifically the two solvents that  
4 we're talking about that were above the action  
5 levels that we had to address. I think the  
6 question came up, will this venting system or  
7 vacuum system suck up other contaminants. Any  
8 other contaminants that are there are below the  
9 action levels; so that is to say if the solvent  
10 weren't there, would we be doing any work at  
11 all? Probably not. But we did do sampling for  
12 all kinds of chemicals, not just the two that  
13 were put up on the board tonight.

14 MR. JACOB: I want to clarify something.  
15 I think Mrs. Reed asked was it a Jones  
16 contractor that did the sampling. Yes, it was a  
17 Jones contractor who did the sampling, but they  
18 go through a selection process and the  
19 contractor is approved by EPA, and the samples  
20 are witnessed by EPA and/or the State and even  
21 there are taken split samplings. It's not we  
22 don't trust them. They take half, the State  
23 takes the other half to an independent lab and  
24 we compare the results. So to clarify your  
25 question, it's a Jones contractor, an approved

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contractor, and we have witnessed or split -- or have done split sampling with them.

UNIDENTIFIED SPEAKER: You said that the samples that were taken show contamination not beyond the property of Jones Chemicals; is that true?

MR. MOLOUGHNEY: Excuse me?

UNIDENTIFIED SPEAKER: You said the samples showed there was no contamination beyond the property?

MR. MOLOUGHNEY: Right, the soil contamination is all limited to the plant, in term of the groundwater.

UNIDENTIFIED SPEAKER: Groundwater, yes.

MR. MOLOUGHNEY: Anything that we have detected, again, above standards -- you know, drinking water standards -- the boundary appears -- it appears to be within the property. That's not to say 10 feet on this side, if you go 20 feet over you're not going to find a similar response. But everything --

UNIDENTIFIED SPEAKER: Where I'm going is you said that, and then the gentleman next to you said that he took care of two houses for

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filtration.

MR. MOLOUGHNEY: Right.

UNIDENTIFIED SPEAKER: That doesn't sound like the product is just on there.

MR. MOLOUGHNEY: Right, I agree, it doesn't. We've looked at these wells and we've had a lot of discussion, Dave and myself and our folks in Avon about that, and what is the source of that contamination in those two wells?

There's a possibility it's related to Jones. There's also a possibility that there's -- and this is my personal belief and, you know, other people -- it's a hard -- it's a tough call for all of us to take as professionals in this. My personal feeling is that there may be another source nearby there that's contributing to that.

UNIDENTIFIED SPEAKER: I agree, I was picking that direction to go in.

MR. MOLOUGHNEY: That's fairly complicated. If we look at the numbers, the types of compounds that are detected in the Jones water versus the wells near there, they're slightly different. There's different chemicals in a couple of the wells. One of the wells was

1  
2 higher actually than in the Jones plumes.

3 UNIDENTIFIED SPEAKER: How did you pick  
4 those two houses?

5 MR. NAPIER: I did that, and that was  
6 because those are the only wells I could find.

7 UNIDENTIFIED SPEAKER: What about the  
8 wells on Iroquois Road?

9 MR. NAPIER: I have done Iroquois Road  
10 and haven't found any on Iroquois Road. I went  
11 up Iroquois Road and left and right on Wheatland  
12 Center Road.

13 UNIDENTIFIED SPEAKER: Barks Road?

14 MR. NAPIER: I'm trying to think of  
15 Barks.

16 UNIDENTIFIED SPEAKER: Off Wheatland  
17 Center.

18 MR. NAPIER: But going to the right, yes,  
19 I've done some wells up there, too.

20 MR. SINGERMAN: Again, based upon our  
21 samples we're saying at this time during the  
22 time we've taken samples in the '90s we don't  
23 see contamination migrating beyond the property  
24 line. We don't know what happened before that  
25 time.

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UNIDENTIFIED SPEAKER: I've had my well tested a couple of times -- I think it's called Detox 88 substances -- and it cost about \$125 each time. So homeowners can do that, but you pay for that.

MR. NAPIER: Yes, it's expensive, you're right.

MR. SINGERMAN: Anymore questions?

MARY REED: The rural wells, there is nothing mandatory for their testing, unless perhaps --

MR. NAPIER: The only thing mandatory, if you go to a bank for financing the banks make you do a bacteriological testing.

MARY REED: And I think there's some concern the contamination if it is in groundwater has gone to the rural --

MR. NAPIER: You go to Leroy with the geology out there, there's very little soil. Whereas with the Jones land, the bedrock is 80, 90 feet --

TIM GAFFNEY: Not even.

MR. NAPIER: Right, so it's 30 or 40 feet of soil on the fractured rock that allows water

1  
2 to move very easily. So there could be someone  
3 40 miles away, and if they've had a leaking gas  
4 tank it could be in your water.

5 MR. SINGERMAN: Any other questions?

6 Again, if there are no more questions,  
7 again, the comment period ends on the 19th. If  
8 you think of something you can contact George  
9 and, you know, try to get your comments in by  
10 the end of the comment period. We'll stick  
11 around after the meeting if anyone has any  
12 questions. Thank you for coming.

13 (TIME: 8:50 P.M.)

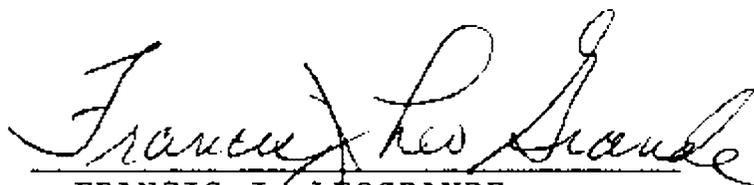
14 \* \* \*

## C E R T I F I C A T I O N

STATE OF NEW YORK:  
COUNTY OF WAYNE:

I, FRANCIS J. LEOGRANDE, being a  
Shorthand Reporter and Notary Public in and for  
Wayne County, New York, do hereby certify that I  
reported in machine shorthand the proceedings in  
the above-styled cause, and that the foregoing  
pages were typed by computer-assisted  
transcription under my personal supervision and  
constitute a true record of this proceeding.

WITNESS my hand in the County of Wayne,  
State of New York.



FRANCIS J. LEOGRANDE  
Notary Public in and  
for Monroe County, New York