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Remedial Investigation Report
JCI/Jones Chemicals, Inc. Facility
Caledonia, New York
Administrative Order on Consent, Index No. II CERCLA-10210

June 8, 1999
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Prepared for
JCI/Jones Chemicals, Inc.
100 Sunny Sol Boulevard
Caledonia, New York 14423

Prepared by
LFR Levine·Fricke
3382 Capital Circle, N.E.
Tallahassee, Florida 32308-1568

LFR
LEVINE•FRICKE

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1.0 INTRODUCTION

This report presents an account of the Remedial Investigation (RI) completed by LFR Levine·Fricke (LFR) on behalf of JCI/Jones Chemicals, Inc., (Jones) Caledonia, New York ("the Site") as required by the Administrative Order on Consent, Index No. II, under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 10210 (the "Order"), Section VII (Work To Be Performed), Paragraph 23H, Task VIII: Draft Remedial Investigation Report. The U.S. Environmental Protection Agency (U.S. EPA) executed the Order on March 26, 1991.

The objective of the RI was to collect soil and groundwater samples to evaluate the nature and extent of contamination and any threat to human health and environment. The RI is consistent with the National Contingency Plan (NCP) and Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (U.S. EPA 1988a).

LFR conducted the RI at the Site in accordance with the various U.S. EPA-approved work plans prepared by Conestoga-Rovers & Associates (CRA). The work plans included the following:

- Work Plan, Supplemental Remedial Investigation/Feasibility Study (CRA 1993)
- Field Operations Plan, Supplemental Remedial Investigation/Feasibility Study: Volume I, Sampling and Analysis Plan (SAP; CRA 1992a)
- Field Operations Plan, Supplemental Remedial Investigation/Feasibility Study: Volume II, Quality Assurance Project Plan (QAPP; CRA 1992b)
- Field Operations Plan, Supplemental Remedial Investigation/Feasibility Study: Volume III, Health and Safety Plan (HSP; CRA 1992c)

LFR initiated the initial RI activities at the Site in 1994. The results obtained by LFR were considered with previously developed data (CRA 1984), and as required by the Order, were presented in the Site Summary Report (SSR; LFR 1996b). A presentation of the findings was made to the U.S. EPA and New York State Department of Environmental Conservation (NYSDEC) by LFR and Jones on May 29, 1998. Additional RI activities to further delineate the extent of affected groundwater at the Site were recommended by both the agencies. The additional RI activities were conducted by LFR in accordance with LFR (1998a and 1998b).

1.1 Purpose of Report

This report documents the methods and findings regarding the RI undertaken at the Site. The report fulfills the objectives of the RI identified in the Order and Work Plans (CRA 1993; LFR 1998a) and delineates the extent of the chemically affected area encountered during the RI. The RI served as the basis for human health and environmental risk assessment (LFR 1999). It will also serve as the basis for the Feasibility Study (FS) to be completed in the summer of 1999.

1.2 Scope of Work

The scope of work for the RI was presented to the U.S. EPA in the Work Plan (CRA 1993). The following were listed as the scope of work required for the RI/FS investigation at the Site:

- geophysical (electromagnetic) survey to locate the possible presence of underground storage tanks (USTs) and other utilities
- evaluation of hydraulic characteristics of the water-bearing zones
- determination of a Site-Specific Parameter List (SSPL)
- site drainage study to evaluate drainage patterns and chemical migration pathways
- wetlands evaluation and delineation
- cultural resources assessment
- soil sampling and analyses for the on-site soil investigation
- collection and analysis of groundwater samples for the hydrogeologic investigation
- preparation and submittal of the Identification of Candidate Remedial Technologies Technical Memorandum
- preparation and submittal of the SSR
- preparation and submittal of the Treatability Study Report
- preparation and submittal of the Human Health and Environmental Risk Assessment Report
- preparation and submittal of this RI report

1.3 Previous Submittals

In addition to the Work Plans (CRA 1993; LFR 1998a) described in Section 1.0, the following reports pertaining to the Site were prepared and submitted by LFR to U.S. EPA, NYSDEC, and other parties identified in the Order:

- Identification of Candidate Remedial Technologies Technical Memorandum on August 13, 1996 (LFR 1996a)
- Site Summary Report submitted on November 11, 1996 (LFR 1996b)
- Treatability Study Evaluation Report submitted on January 23, 1997 (LFR 1997)
- Human Health and Environmental Risk Assessment Report (LFR 1999)

As required by the Order, an FS report will be prepared and submitted in the summer of 1999.

2.0 SITE BACKGROUND

JCI/Jones Chemicals, Inc. is located east of State Route 5 and on the northern side of Iroquois Road in Caledonia, northwestern Livingston County, New York (Figure 1). The Site is centered on latitude 42°58'39"N and longitude 77°50'46"W and is situated in a relatively flat, sparsely populated, lightly industrialized suburban area of the Village of Caledonia. The Site is bordered by Iroquois Road to the south, farmlands to the north, and homes with acreage to the east and west. A lumberyard and a printing company are located immediately northwest of the Site. A golf course, baseball field, and tennis court are present immediately south of Iroquois Road (Figure 2). The site vicinity to the west and southwest is populated with light service industries such as hardware stores, gasoline stations, dry cleaners, restaurants, and other commercial businesses.

2.1 Present Operations

The Site has nine buildings that comprise office space, drum storage sheds, interconnected warehouse buildings, a bleach manufacturing building, and chlorine and sulfur dioxide repackaging building (Figure 2). A railway line known as the Main Service Railway enters from west, extends to within the eastern boundary, and runs to the north of the buildings.

Much of the Site is flat, and areas around the buildings are paved with asphalt. A large area south of the buildings, facing Iroquois Road, is landscaped with maintained lawn. The area north of the buildings is also known as the "north property." The east portion of the north property is covered by gravel, the west portion by grass. The drum storage sheds, also known as the "pole barns," which were originally located west of the warehouse/office complex, were moved north of the three on-site lagoons in 1994. A lagoon system, consisting of three unlined ponds, lagoons A, B, and C, is located on the north property of the Site.

Commercial activities at the Site presently include:

- manufacture of sodium hypochlorite (bleach) 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 minerals acids, such as muriatic acid and hydrofluosilicic acid, from bulk to small containers
- distribution of various inorganic water treatment chemicals such as soda ash and lime

The raw materials that are used in the production and distribution processes are stored in large aboveground storage tanks (ASTs) on site. These tanks range in size from

1,000 gallons to 16,300 gallons and have typically been constructed of stainless steel, fiberglass-reinforced plastic, cross-linked polyolefin, or other suitable synthetic material. Two approximately 500-gallon ASTs, containing #2 heating oil and diesel fuel, also exist on site.

The non-contact cooling water for the plant was originally supplied through three on-site production wells, the West Well, the Middle (South Well), and the East Well. The West and East Wells are completed in the upper portions of bedrock zone; the Middle Well is reportedly screened at the base of overburden zone overlying the bedrock zone. The West, East and Middle Wells were reported to be 45.3, 55.5, and 42.1 feet deep, respectively (CRA 1984). In response to increasing water capacity requirements, a fourth well, the North Well, was installed in March 1985 immediately south of the lagoons (Figure 2). The North Well is 4 feet in diameter and 24 feet below ground surface (bgs), and is completed in the overburden glacial outwash sediment. Groundwater from the North Well is extracted at approximately 280 gallons per minute (gpm). Because of their poor yields, groundwater withdrawal from the East and Middle Wells was discontinued. At the present time, groundwater usage is served entirely by the North and West Wells. The groundwater extraction rate from the West Well; however, is comparatively lower at 15 gpm. The on-site production wells are reported to pump continuously with periodic shut downs for maintenance (Gaffney 1998).

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 (ENS) through the addition of sulfur dioxide or caustic soda. The wastewater is then mixed in an approximately 1-to-99 ratio with non-contact cooling water (one part wastewater to 99 parts non-contact cooling water). This mixture is discharged to the lagoon system, in accordance with the New York State Pollutant Discharge Elimination System (SPDES), Permit No. NY0072079. The lagoon system, located on the north property (Figure 2), is comprised of three unlined lagoons (A, B, and C) and have been in operation at least since 1954 (U.S. EPA 1999). The discharge water to the lagoon is monitored on a continuous basis for total flow, a weekly basis for pH, and a bimonthly basis for volatile organic compounds (VOCs); and on a monthly basis for iron, chloride, sulfate, and total dissolved solids. Other waste material includes off-specification or contaminated products. These wastes are containerized in drums for off-site disposal.

A sludge forms in the lagoons when the non-contact cooling water mixes with the plant wastewaters. Available records indicate that the sludge has been excavated from the lagoons 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. The sludge samples were analyzed in accordance with Resource Conservation and Recovery Act (RCRA) extraction procedure (EP) toxicity testing protocols and were determined to be nonhazardous (CRA 1993).

2.2 Past Operational History

The operational history of the Site has been summarized from information obtained from photographic analysis (U.S. EPA 1999), CRA (1993), and Jones (Gaffney 1998). Table 1 summarizes historical activities at the Site.

Jones purchased the property on which the Site is located in August 1939. Prior to the Jones purchase, the Site included an orchard, agricultural fields, and pasturelands. Reportedly, the property had been used as a food packaging facility prior to purchase by Jones.

Soon after the purchase of the property, Jones began production of sodium hypochlorite (bleach). In 1942, Jones purchased adjacent properties to the north and east, and Jones began repackaging chlorine from bulk sources to cylinders and 1-ton containers (2,000 pounds). Titanium tetrachloride was briefly manufactured between 1942 and 1943. Repackaging of anhydrous ammonia and acids began in 1947. The production of aqua ammonia and bulk storage of hydrochloric, sulfuric, nitric, and hydrofluosilicic acids was started in 1953.

Between 1960 and approximately 1977, solvents and petroleum products, such as 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 distribution. Aqua ammonia was produced by combining water and ammonia until 1995.

In 1971, Jones began to transport commercial hazardous waste not generated by Jones. The hazardous waste materials were temporarily stored on site prior to transport and disposal off site; appropriate documents and manifests were maintained for the transportation of these wastes. The hazardous waste materials were stored on the former Agway Property, which was located on the eastern side of the Site, and also in the two pole barns, formerly located in the central portion of the Site immediately west of the warehouse/office complex (See Appendix A). Jones discontinued the transportation and on-site storage of hazardous waste 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 to the Site for redistribution.

Materials brought to the Site in bulk form were generally stored in shipping containers (i.e., railroad tank cars or tanker trucks), ASTs, and underground storage tanks (USTs). The tanks were typically constructed of stainless steel, fiberglass-reinforced plastic, or other suitable synthetic material. A list of the ASTs and USTs that were used at the Site, including capacity and contents of each, is provided in Table 2; the locations are shown in Figure 3. A majority of these tanks were taken out of service and removed between 1981 and 1986. During the removal of ASTs and USTs, soil samples were collected and analyzed, as required by NYSDEC. The analytical results indicated that product releases from these storage tanks and associated effects on the subsurface have been minimal (CRA 1993).

2.3 Aerial Photographs

Figures A-1 through A-4 in Appendix A present aerial photos of the Site along with the detailed analysis/descriptions for years 1938, 1954, 1974 and 1991, respectively. A more detailed analysis with aerial photographs is provided in U.S. EPA (1999) which includes years 1938, 1954, 1963, 1974, 1982, 1986, 1990, and 1991.

2.4 Air Stripping

Analytical results of water discharged to the lagoons had indicated the presence of VOCs, which primarily included chlorinated solvents such as PCE and its degradation products TCE and 1,2-dichloroethene (1,2-DCE). Chlorinated solvents were first reported in July 1981 in all on-site production wells (North, West, East, and Middle) and in discharge water to the lagoons; available historic analytical data are summarized in Table 3. Relatively high PCE concentrations of 1,160 and 765 micrograms per liter (μg/l) were detected in the North and West Wells, respectively. Subsequent hydrogeologic investigation by CRA (1984) reported the presence of VOCs in the on-site soil and groundwater.

The use of affected groundwater from North and West Wells as non-contact cooling water was continued in the manufacture of bleach prior to discharge into the lagoon. To address this problem and comply with the SPDES permit, Jones agreed to install an air stripper to treat the affected groundwater prior to discharge to the lagoon. In November 1994, LFR conducted hydraulic testing of the North and West Wells to design an air stripping tower to treat affected groundwater. An air-stripping tower, with the capacity of treating 500 gallons per minute (gpm), was installed in May 1996. Since 1996, affected groundwater from the North Well (approximately 280 gpm) and the West Well (approximately 15 gpm) has been treated prior to its being used as non-contact cooling water in the plant and subsequent discharged to the lagoons. Periodic monitoring of the discharge water indicates that VOCs are below method detection limits (MDLs; Gaffney 1998).

The Identification of Candidate Remedial Technologies Memorandum (LFR 1996a) identified air stripping as one of the remedial technologies in the potential extraction and treatment of affected groundwater at the Site. A Treatability Study Evaluation Report (TSER) for the air stripper, which was being used in the remediation of the affected groundwater from North and West Wells, was prepared by LFR in January 1997 (LFR 1997). The TSER provides the construction and design details of the air stripper as well as results of data collected during the treatability study. Results indicate that the air stripper is operating at a greater than 99.5 percent removal efficiency of chlorinated solvents (LFR 1997). The air stripper effluent samples analyzed continue to be below MDL for VOCs.

2.5 Village of Caledonia Production Wells

The Village of Caledonia production wells are located south of Iroquois Road. Drinking water from these production wells is supplied to all the residents in the Village of Caledonia, and to many of the residents within a 2-mile radius including the Town of Caledonia and Caledonia Mobile Home Park. Currently, there are two production wells, V-1 and V-2, which are 17.45 and 35 feet deep, respectively. A third production well (V-3), which existed on the east side of Park Place, was discontinued in 1994. At present, the quantity of water pumped from the well field generally ranges between 300,000 and 450,000 gallons per day (gpd). Reportedly, the production wells operate 24 hours per day with scheduled shutdowns for periodic maintenance.

VOCs, primarily 1,1,1-TCA (64 μg/l) and PCE (17 μg/l), were some of the chemicals detected in the production wells during periodic sampling between 1983 and 1989 (CRA 1993; Table 3). A limited study conducted by NYSDEC (Persson 1996) characterized the chemicals affecting the production wells, but did not determine the source.

Currently, extracted groundwater is treated using an air stripper prior to distribution. Recent sampling and analyses of the Village of Caledonia production wells including those by LFR (1996) indicated VOCs to be below the MDL of 1 μg/l. Groundwater investigation by CRA (1984) and the results of this RI indicate that the groundwater flow in the overburden aquifer is to the northeast.

It was previously determined by the Assistant Attorney General for the State of New York, Department of Law, that the State of New York is conducting an investigation of possible sources of contamination to the Village of Caledonia municipal water supply other than Jones (Privitera 1989).

2.6 Previous Investigations

CRA (1984) and Recra Research, Inc. (1985) have conducted previous investigations of the site; a brief summary of each is presented below. Table 3 presents selected groundwater monitoring data from these reports.

A summary of the ongoing investigation involving the LeHigh Valley Railroad Derailment Site in the Town of LeRoy is also presented below.

In addition, NYSDEC conducted field investigations off site to locate potential source(s) of chemicals that have been detected in the Village of Caledonia production wells. During this investigation, NYSDEC installed and sampled 10 monitoring wells completed in the overburden zone (DEC-1 to DEC-10; Figure 4). NYSDEC has not issued a report summarizing the investigation methods and the results of the groundwater sampling. Table 3 presents available groundwater quality data from these monitoring wells, obtained through various correspondences.

2.6.1 CRA (1984)

CRA conducted a hydrogeologic investigation in 1984 to assess the extent of chlorinated VOCs detected in groundwater and to investigate the hydrogeologic conditions at the Site (CRA 1984). The scope of the investigation included the installation and sampling of six monitoring wells (OP-1, OP-2, OP-3, OP-4, L-1, and L-3) in the overburden zone and three monitoring wells (BP-1, BP-2, and L-2) in the bedrock zone (Figure 4).

Groundwater analyses indicated the presence of chlorinated hydrocarbons, PCE, TCE, carbon tetrachloride, and chloroform in monitoring wells OP-3, L-1, and L-3. The concentrations of PCE ranged between the MDL and 900 μg/l, and the TCE concentrations ranged between the MDL and 87 μg/l. PCE concentrations in L-1 and OP-3 were 900 μg/l and 60 μg/l, respectively, and TCE concentrations in L-1 and OP-2 were 87 μg/l and 82 μg/l, respectively. Table 3 summarizes the groundwater analytical data.

The PCE concentrations detected in samples from the east, middle, and west on-site production wells were reported to be 120 μg/l, 4 μg/l, and 500 μg/l, respectively. The PCE concentration detected in the outfall to the lagoon system, during the same sampling event, was 430 μg/l.

Groundwater elevation maps prepared by CRA (1993) indicate that:

- With the Village of Caledonia production wells pumping and the on-site production wells not pumping, groundwater flow direction in the overburden zone appears to be eastward.
- With the Village of Caledonia production wells not pumping and the on-site production wells pumping, groundwater flow in the overburden zone appears to be towards the on-site production wells.
- With the Village of Caledonia production wells pumping and the on-site production wells pumping, groundwater flow in the overburden zone appears to be in the direction of wells being pumped.
- Under pumping and nonpumping conditions, groundwater flow in the bedrock zone appears to be toward the west.

The conclusions of the CRA (1984) study were:

- Chemicals detected in overburden-zone monitoring wells L-1 and L-3 were a result of discharging chemically affected waste water to the unlined lagoon system.
- Abandoned tanks and/or past plant activities could be the source of chemicals detected in monitoring well OP-3.
- Given the groundwater flow patterns described above and because no analytes were detected at the southern boundary of the Site, the analytes detected in samples

collected at the Site could not have affected the Village of Caledonia production wells.

2.6.2 Recra Research, Inc. (1985)

In August 1985, Recra Research, Inc., conducted a phase I investigation at the Site, on behalf of Jones (Recra Research, Inc. 1985). The objectives of the phase I investigation were to develop a site history by reviewing available data and to evaluate potential site risk using the U.S. EPA Hazard Ranking System (HRS). The U.S. EPA HRS was intended to provide a method to systematically assess potential risks to human health and the environment posed by uncontrolled hazardous waste sites.

The Phase I investigation assigned the following HRS scores to the Site:

- direct contact (Sdc) = 25.0
- potential for fire and explosion (Sfe) = 0
- migration potential (Sm) = 33.8
- groundwater exposure pathway (Sgw) = 58.2
- surface water exposure pathway (Ssw) = 6.4
- air exposure pathway (Sa) = 0)

Based on the HRS score, the Site was recommended by U.S. EPA for inclusion on the National Priority List (NPL). Subsequent to inclusion on the NPL, an RI/FS was required to evaluate soil and groundwater quality and potential human health and environmental risks associated with the NPL site via exposure pathways.

2.6.3 LeHigh Valley Railroad Derailment Site

Two 15,000-gallon railroad tank cars containing TCE ruptured during a December 1970 derailment of a LeHigh Valley Railroad freight train at the crossing of Gulf Road in the Town of LeRoy, New York (the area of derailment is located approximately 4 miles west of the Site). According to eyewitness reports, all the TCE spilled out and rapidly infiltrated the ground. The LeHigh Valley Railroad Company conducted limited cleanup activities.

Subsequent residential well sampling by the New York State Department of Health (NYSDOH) and the Genesee, Monroe, and Livingston Counties' Health Departments revealed the presence of TCE in several nearby potable/residential wells (NYSDOH 1996). The residential wells, which showed an exceedance of TCE above the drinking water standard of 5 μg/l, were provided with carbon filter systems by the U.S. EPA.

The RI and FS reports of the spill incident were issued Fall 1996 (NYSDEC 1996). Results indicated that TCE-affected groundwater extends from the spill site east and southeast toward Spring Creek (located between Caledonia and Mumford, New York).

- Spring Creek represents the eastern boundary of the extent of the affected groundwater. TCE (associated with the spill incident) has been detected in residential wells approximately 0.5 mile west and northwest of the Jones Site.

In 1997, a Record of Decision (ROD) was issued for the LeHigh Valley Derailment Site. The remediation addresses three major issues: (a) providing safe drinking water, (b) clean up of the spill site soil contamination, and (c) addressing the bedrock and groundwater contamination.

Although TCE was detected in the monitoring wells at the Jones Site, it appears to be a result of degradation of PCE, the parent chemical detected at the Site. TCE from the LeHigh Valley Derailment Site does not appear to affect the Jones Site.

3.0 FIELD INVESTIGATIONS

LFR began conducting field assessment activities for the RI at the Site in November 1994. The principal activities consisted of a geophysical survey, hydraulic testing, determination of SSPL, soil investigation, monitoring well installation, and soil and groundwater sample collection and analyses. All field assessment activities were conducted in accordance with the procedures and protocols described in the following approved work plan and field operations work plans:

- Field Operations Plan Supplemental RI/FS: Volume I. Sampling and Analyses Plan (SAP; CRA 1992a);
- Field Operations Plan Supplemental RI/FS: Volume II. Quality Assurance Project Plan (QAPP; CRA 1992b);
- Field Operations Plan Supplemental RI/FS: Volume III. Health and Safety Plan (HSP; CRA 1992c); and
- Work Plan Supplemental RI/FS (CRA 1993).

This section briefly describes the field activities conducted by LFR.

3.1 Geophysical Survey

Gartner Lee, Inc., conducted a geophysical survey on November 29 and 30, 1994. The survey involved the use of two electromagnetic (EM) instruments, the Geonics EM31 and the Geonics EM61.

The objectives of the survey were to:

- confirm the removal of the USTs identified below
- evaluate the possible presence of buried drums

The survey was conducted in the following areas of the Site (Figure 1 in Appendix B):

- Study Area 1: former USTs B3 through B8, located south of the main office building and along Sunny Sol Boulevard in the vicinity of the flagpole.
- Study Area 2: former USTs B1 and B2, located in the vicinity of the west production well.
- Study Area 3: north of the sulfur dioxide/chlorine department and east of the lagoon system.

Using the above electromagnetic instruments, targets such as USTs, piping, drums, and/or other buried objects are detected only through recognizable anomalies or as patterns against the background geophysical data collected. A brief report summarizing the methodologies and the results of the survey was forwarded to the U.S. EPA on March 16, 1995. The results of the survey are discussed in Section 6.1.

3.2 Determination of Site-Specific Parameter List

The objectives of determining an SSPL (CRA 1993) were to:

- evaluate qualitatively and quantitatively the nature of affected soil and groundwater at the Site
- identify site-specific chemical parameters to be incorporated in all sampling activities as part of the RI/FS investigation

LFR personnel conducted the fieldwork for the determination of the SSPL in August 1994, in accordance with the RI/FS Work Plan (CRA 1993):

- LFR collected three background soil samples, two close to the southern boundary of the Site (near Iroquois Road) and one along the property boundary north of monitoring well L-3 (Figure 5). The background soil samples were taken from depths of 0 to 2 feet bgs.
- LFR collected three subsurface soil samples for laboratory analysis, one each from near the former drum storage pole barn sheds, near the former aboveground acid storage tank pad (former tanks A10 through A15), and near the former solvent AST area and acid storage tank pad (former tanks A1 through A5). One soil sample was selected for laboratory analysis from all the split-spoon samples, based on headspace screening using an organic vapor analyzer (OVA). The sample with the highest headspace reading was submitted to the laboratory for analysis.
- LFR collected two sediment samples from shallow concrete sumps located between the bleach warehouse and the active railroad spur immediately north of the building.
- LFR collected groundwater samples from the on-site north and west production wells, overburden monitoring well OP-6, and overburden well L-3.

The soil, sediment, and groundwater samples were analyzed for:

- VOCs using EPA SW-846 Method 8240 (selected VOCs in groundwater samples were analyzed using EPA Method 524.2)
- semivolatile organic compounds (SVOCs) using EPA SW-846 Method 8270
- pesticides, including polychlorinated biphenyls (PCBs), using EPA SW-846 Method 8080
- metals using EPA SW-846 Method 6010
- mercury using EPA SW-846 Method 7471 (Manual Cold Vapor Technique)
- cyanide using EPA SW-846 Method 9012 (Colorimetric, Automated Ultraviolet Technique)

Results of the SSPL determination are discussed in Section 6.2.

3.3 On-Site Soil Investigation

LFR personnel conducted the on-site soil investigation in November 1995; additional soil samples were also collected in August 1998. The investigation included the collection of sediment samples, subsurface soil samples, and sludge samples. These sampling locations were proposed in the RI/FS Work Plan (CRA 1993) and are shown on Figure 5. Sediment samples were identified by the prefix "SD-," subsurface soil samples were identified by the prefix "SB-," and sludge samples were identified by the prefix "SL-." The sediment samples, subsurface soil samples, and sludge samples at selected locations were split with the U.S. EPA's oversight contractor, Malcolm-Pirnie, Buffalo, New York. All sample collection, preservation, and handling were conducted in accordance with the approved RI/FS work plan and field operation plans (CRA 1992a, 1992b, 1992c, 1993). The samples were analyzed for the SSPL by a U.S. EPA- and NYSDEC-approved laboratory (H2M Laboratory, Inc., Melville, New York).

All samples were packed in appropriate containers and shipped under chain-of-custody to the subcontract laboratory.

Section 5.3 discusses the analytical results. Soil samples from the continuous split-spoon sampling were also retained for lithologic descriptions. Detailed lithologic descriptions, including soil density and OVA readings, are provided in the soil boring logs in Appendix C.

Sediment and Sludge Sampling

The sediment and sludge samples were collected from depths of 0 to 0.5 foot bgs. The sediment samples were collected from sumps, dry wells, and/or discharge outfalls, while the sludge samples were collected in the vicinity of the lagoon system, in lagoon sludge spread areas and in the lagoon itself (Figure 5). Prior to collection, leaves and other debris were removed from the sampling location. The samples were collected using a decontaminated stainless-steel spoon. At sampling location where the soil was compacted, a pre-cleaned bucket auger was used to loosen the soil and was advanced to the desired depth. All samples were packed in appropriate containers and shipped under chain-of-custody to the subcontract laboratory for SSPL analysis.

Subsurface Soil Sampling

The subsurface soil samples were collected during a series of soil borings performed by Nothnagle Drilling, Scottsville, New York. The soil borings were advanced via the hollow-stem auger method. At each soil boring location, continuous split-spoon samples were collected to approximately the soil-groundwater interface (approximately 16 feet bgs). In selected soil borings (SB-12, SB-13, SB-14 and SB-15), continuous split-spoon samples were collected to depths beneath the USTs (8 to 12 feet bgs). The split-spoon samplers were 2 feet long and 2 or 3 inches in diameter. The 3-inch-diameter split-spoon samplers were used to obtain a larger sample volume when splitting samples with Malcolm-Pirnie.

Two samples from each soil boring location were submitted to the laboratory for SSPL analyses. The first soil sample for analysis was collected from 0 to 0.5 foot bgs; the second soil sample was selected for analysis by screening the split-spoon samples collected below 0.5 foot bgs using an organic vapor analyzer (OVA) with flame ionization detector (FID); the soil sample from depths below 0.5 foot bgs with the highest OVA reading was submitted for analysis.

3.4 Hydrogeologic Investigations

The hydrogeologic investigation at the Site consisted of monitoring well installation, a monitoring well top-of-casing survey, groundwater sampling, and level measurements in on-site and off-site monitoring and production wells. Discrete and multi-level groundwater sampling using direct-push sampling techniques was also conducted. A hydraulic (pumping) test of North and West Wells to aid in the design and construction of the air stripper was conducted.

3.4.1 Monitoring Well Installation

In April and May 1996, nine monitoring wells were installed at the Site to further assess groundwater quality and flow directions (Figure 4). Additional monitoring wells were installed in November 1997 and August 1998. The monitoring wells were installed by Nothnagle Drilling under LFR's supervision, following the procedures described in the RI/FS work plan and field operations plans (CRA 1992a, 1992b, 1992c, 1993). Seven of nine monitoring wells were installed in the overburden material; two were installed in the bedrock zone. In addition to the wells installed by LFR, 13 previously existing on-site monitoring wells, three existing on-site production wells, 10 previously existing off-site monitoring wells, and two Village of Caledonia production wells were included in the hydrogeologic investigation.

Except for two wells, the on-site overburden monitoring wells are identified by the prefix "OP" (e.g., OP-6); two previously installed on-site overburden monitoring wells are designated "L-1" and "L-3." Except for one well, the on-site bedrock monitoring wells are identified by the prefix "BP" (BP-6); one previously installed on-site bedrock monitoring well is designated "L-2." The off-site monitoring wells were installed by NYSDEC in the overburden material and are identified by the prefix "DEC" (e.g., DEC-1). The two Village of Caledonia production wells are identified as V-1 and V-2. Table 4 provides available monitoring well construction details for on-site and off-site monitoring and production wells.

Two piezometers (PZ-1 and PZ-2), installed for observation of drawdown data during the pumping tests, were also included in the study.

The monitoring wells installed by LFR within the overburden zone were installed using the hollow-stem auger method in an 8.5-inch nominal diameter borehole. Monitoring wells were constructed of 2-inch black steel riser pipe flush-jointed to a 5-foot stainless-steel screen of 0.010-inch opening size. A filter pack of quartz sand (U.S. Sieve No. 14–35 size) was emplaced around and approximately 2 feet above the screened interval in each well. A bentonite seal 2 feet thick was emplaced above the filter pack. The annular space above the bentonite seal was grouted from the bottom to the land surface with cement. The depths of the overburden monitoring wells were chosen such that the screened portion was at least 5 feet below the top of the groundwater table. Although the depths vary slightly, a majority of the monitoring wells within the overburden zone were completed to a total depth of 22 feet bgs and were screened between 17 and 22 feet bgs. OP-16 was installed in the source to a depth of 44 feet and was screened between 39 and 44 feet bgs. Because the previously existing monitoring well OP-4 was not truly screened in the overburden zone, but actually in the fractured bedrock, monitoring well OP-5 was installed to a depth of 22 feet bgs adjacent to OP-4.

Monitoring wells BP-5 and BP-6 were installed in the bedrock zone using the hollow-stem auger drilling method. However, because heaving sands and cobbles and boulders were encountered, the mud-rotary technique, using a drill bit and bentonite mud, was used to advance the borehole inside the hollow-stem augers. The hollow-stem augers were advanced after the drill bit cut the borehole. This method of installation continued unto the top of the first occurrence of competent bedrock. After drilling to the top of competent bedrock, the drilling bit was withdrawn, leaving the hollow-stem augers on the top of the competent bedrock. A 4-inch, black steel casing was inserted through the hollow-stem augers to the top of the bedrock. An inflatable packer was inserted inside the 4-inch steel casing to approximately 12 inches above the bedrock. The packer was inflated with nitrogen gas, and a cement mixture was pumped through the packer. This mechanism forced the cement into the annulus between the 4-inch steel casing and the hollow-stem augers. After the grout was observed at the ground surface, the hollow-stem auger was removed while additional cement was added to maintain a continuous cement envelope. Upon retrieval of all the auger flights, the 4-inch steel casing was driven into the bedrock using the 140-pound hammer to ensure its proper seating in the bedrock.

The cement mixture in the newly installed bedrock monitoring wells was allowed to cure for a minimum of 48 hours prior to drilling into the bedrock. The effectiveness of the cement seal was tested hydrostatically by filling the 4-inch casing with water and monitoring the water level for approximately 30 minutes. No drop in the water level was noticed, indicating effective cementation and seating of the 4-inch casing to the top of the bedrock.

After grout maturation and testing of the cement seal, a 3 7/8-inch drill bit was used to drill 15 feet into the bedrock. The 15 feet of "open-hole" interval was used as the monitoring zone for the bedrock monitoring wells.

All drilling equipment, including the split-spoon samplers, was decontaminated between each monitoring well locations following the procedures described in the RI/FS work plan and field operations plans. Potable water from the Village of Caledonia water supply was used for all decontamination and drilling purposes.

All newly installed monitoring wells were developed by a combination of surging and pumping until the groundwater was essentially sediment free and much of the turbidity had been removed. In addition, three previously existing monitoring wells, L-1, L-2, and L-3, were re-developed because purging during sampling indicated poor groundwater yield.

A majority of the monitoring wells were completed in aboveground steel meter boxes. A few monitoring wells located in areas of vehicular traffic were completed with flush-to-ground concrete pads and steel meter boxes. All monitoring wells were secured with locking caps.

Appendix C provides lithologic logs depicting subsurface lithology for all soil borings and selected monitoring wells. Lithologic logs were completed only for the deepest well in the monitoring well clusters and for those wells for which no lithologic logs were available in the proximity from previous investigations.

3.4.2 Top-of-Casing Survey

On May 1996 and November 1997, Craig E. Welch (Dansville, New York), professional surveyor, established top-of-casing elevations for the newly installed and previously existing on-site monitoring and production wells. The off-site monitoring wells, DEC-1 through DEC-10, were also surveyed. The top-of-casing elevation measurements for the on-site monitoring and production wells and off-site monitoring wells are listed in Table 4. The surveyor also surveyed the horizontal coordinates for all wells to facilitate preparation of the monitoring well location map (Figure 4).

3.4.3 Direct-push Sampling

To further delineate the extent of affected groundwater, discrete multi-level groundwater samples at numerous locations (DP-1 through DP-10; Figure 4) were collected in August 1998 using direct-push sampling techniques. Soil samples from DP-1, DP-2, and DP-3 were also collected.

Direct-push groundwater sampling was conducted by advancing a drive rod equipped with two feet of machine-slotted screen to the desired depth. A stainless steel mini-bailer was used to purge and sample groundwater for the analysis of chlorinated solvents. The bailer and drive rods were decontaminated between sampling intervals. Soil samples were collected via conventional split-spoon sampling technique. The samples were analyzed for PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride at Ecology and Environment Laboratories in Lancaster, New York.

3.4.4 Groundwater Sampling

In April/May 1996, LFR personnel sampled all newly installed and previously existing on-site monitoring and production wells. Groundwater and quality assurance/quality control (QA/QC) samples were collected for analysis for the SSPL. Additional rounds of groundwater samples (for VOCs only) were collected in November 1997 and August 1998. All samples were collected in accordance with the procedures described in the work plan and field operations plans. The samples from April/May 1996 and November 1997 events were analyzed by H2M Laboratory, Inc., Melville, New York whereas samples from the August 1998 event were analyzed by Ecology and Environment Laboratories, Lancaster, New York. Both laboratories are approved by U.S. EPA and NYSDEC. A summary of the validated analytical results of the samples, including QA/QC analysis, was forwarded to the U.S. EPA upon completion of each sampling event.

The newly installed overburden zone monitoring wells were sampled after a minimum elapsed time of 48 hours following installation, and the newly installed bedrock zone monitoring wells were sampled after a minimum elapsed time of two weeks after installation. Prior to sampling, between three and five well volumes were purged from the monitoring wells, and physical parameters, such as pH, specific conductance, and turbidity, were measured until they stabilized (Table 5). New disposable Teflon bailers were used to collect groundwater samples. The samples were collected in the sample containers provided by the subcontract laboratory. Appropriate acids and ice were used to preserve the samples. Following collection, the samples were shipped for next day delivery to the subcontract laboratory under chain-of-custody via a common carrier.

3.4.5 Groundwater Elevation Measurements

During the hydrogeologic investigation, Jones personnel measured depths to groundwater in each on-site and off-site well, using an electronic water-level meter, from the top-of-casing elevation marks established during the survey. To evaluate the effects of pumping wells on the groundwater flow regime, the depths to groundwater were measured (1) when the on-site production wells were in operation (during pumping) and (2) when the on-site production wells were shut down (during nonpumping). These depths were subtracted from the top-of-casing elevations to yield groundwater elevations relative to the survey datum. The depths to groundwater and groundwater elevations measured during pumping and nonpumping conditions are provided in Table 6. Groundwater elevations were used to generate contour maps to evaluate groundwater flow and hydraulic gradients.

3.4.6 Hydraulic Testing

Pumping Tests

Two pumping tests, associated with the design of the air stripper, were conducted by LFR on November 30 and December 1, 1994, to evaluate the hydraulic characteristics of the groundwater-bearing zones. The on-site North and West production wells were used as pumping wells. Prior to the start of the pumping tests, all on-site production wells that had the potential to influence the hydraulic flow regime were shut down for a period of at least 24 hours. After the pumping was started in the North and West production wells, the subsequent drawdown measurements in the pumping and respective, designated observation wells were measured at predetermined log intervals using an AquiStar 4-channel datalogger with associated pressure transducers. After the pump was shut down, recovery data in the pumping and observation wells were again recorded on the datalogger at the original log cycle. Groundwater concentrations were recorded prior to the start and during hydraulic testing in the pumping, designated observation, and selected monitoring wells. Water extracted during pumping was discharged to the lagoon system located on the north property.

The first pumping test was conducted on November 30, 1994, using the West production well. The west production well is located west of the bleach warehouse. The west well is 45.3 feet deep (bgs), 6 inches in diameter, and reportedly is screened (open hole) between approximately 37 and 45.3 feet bgs. During the test, the West Well was pumped at 15 gpm for approximately 7 hours (423 minutes). The subsequent drawdown levels were recorded in the West Well and in monitoring wells OP-4 and BP-4, which were designated as the observation wells. Observation well OP-4 is 45 feet deep (bgs) and screened between 40 and 45 feet bgs within the overburden glacial till material. It is located approximately 485 feet southeast of the West Well. Observation well BP-4 is 55 feet deep (bgs) and is screened between 50 and 55 feet bgs within the bedrock. It is located approximately 10 feet north of the west production well. After the pump was shut down, recovery data were recorded only in observation well OP-4 for a period of 66 minutes. The elapsed time, drawdown data, and recovery data are presented in Appendix D.

The second pumping test was conducted on December 1, 1994, using the North production well. The north production well is located on the north property, north of the bleach warehouse. The well is 24 feet deep (bgs), 4 feet in diameter, and reportedly screened approximately between 10 and 24 feet bgs. During the test, the North production well was pumped at 280 gpm for approximately 6 hours and 43 minutes. The subsequent drawdown levels were recorded in the west production well and in the designated observation wells PZ-1, PZ-2, and L-1 (Table D-1 in Appendix D).

- PZ-1 is 22 feet deep (bgs) and is screened between 12 and 22 feet bgs in the overburden material. It is located 26 feet east of the North Well.
- PZ-2 is 23 feet deep (bgs) and is screened between 13 and 23 feet bgs in the overburden material. It is located 70 feet east of the North Well.
- Monitoring well L-1 is 26 feet deep (bgs) and is screened between 21 and 26 feet bgs in the overburden material. It is located 12 feet North of the north well.

After the pump was shut down, recovery data were recorded in the North Well and in the designated observation wells for approximately 12 hours (Table D-1 in Appendix D). Section 4 evaluates and discusses the hydraulic testing data.

Slug Testing

A series of rising head slug tests were performed in monitoring wells OP-8, BP-4, OP-5, BP-2, OP-3, BP-1, and L-3 to provide estimated values of hydraulic conductivity of the overburden and bedrock zones. The tests were accomplished by lowering a slug (a polyvinyl chloride [PVC] pipe of known volume filled with sand) into the monitoring well. After the groundwater had equilibrated to its original elevation, the slug was rapidly withdrawn from the monitoring well. A datalogger with a pressure transducer was used to record the subsequent hydraulic head differences versus elapsed time. The hydraulic head differences were recorded on a logarithmic time scale to an accuracy of 0.01 foot.

Calculations of the hydraulic conductivity values for overburden and bedrock zone monitoring wells were inconclusive when using the equations of Bouwer and Rice (1976). The rapid (almost instantaneous) recovery of the hydraulic head to its equilibrium conditions upon withdrawal of the slug indicates that because of the highly transmissive nature of the subsurface material, the hydraulic conductivity values cannot be estimated via the slug test method.

4.0 PHYSICAL SETTING HYDROGEOLOGY

The Village of Caledonia was named by Scottish immigrants who settled the area beginning in 1799, Caledonia being the Roman name for Scotland. The Village of Caledonia is located in the northwestern part of Livingston County, which is in western New York State. The Village of Caledonia is located about 15 miles southwest of the City of Rochester. It is bordered on the north by the Town of Wheatland, Monroe County, and on the other three sides by the Town of Caledonia, Livingston County.

4.1 Topography, Drainage, and Climate

4.1.1 Topography

The topography of the Village of Caledonia is rolling to flat, with elevations ranging from about 710 feet above mean sea level (amsl) at the highest point to about to 640 feet amsl along Spring Creek to the west (Figure 1). Although the surrounding area has considerable relief, the Site itself is relatively flat, with surface elevations ranging between 640 and 660 feet amsl. The surface elevations at the Site are depicted in Figure 6. The two swales along Sunny Sol Boulevard and the three lagoons on the north property are some of the prominent surface features on the Site.

The vegetated areas to the north are covered with pasture grass and to the south are landscaped with turf grass and ornamental evergreen trees. The adjacent properties are mostly residential and municipal recreational areas vegetated in turf grass, ornamental shrubs and some hardwoods along property lines. Agricultural lands and wooded areas surround much of the developed area within the Village of Caledonia. Regionally, wetlands also exist west and south of the village within a 0.5- to 4-mile radius.

4.1.2 Drainage

The majority of the Village of Caledonia drains to Spring Creek located to the west. Spring Creek is a tributary of Oatka Creek, which eventually drains to the Genesee River. The Genesee River flows to the north, east, and south of the Village of Caledonia. The southern extreme portion of the village between Sandhill Road and Route 5 drains through marsh lands to Christie Creek and into the Genesee River.

The Soil and Water Conservation District map for Livingston County shows that the Site lies in a zone characterized by Palmyra type soils (USDA 1956). Palmyra soils are stony (up to 25 percent fragments greater than three inches) and are rated highly permeable, prone to seepage, and very poor for maintenance of swampy or surface water bodies. The natural surface-water features on the Site and its vicinity have been altered through the construction of asphalt pavement, grass areas, and the lagoon system. Surface water on Site infiltrates directly into the underlying soils; off-site migration of surface water was found to be none or minimal. The nearly flat topography and highly permeable soil are compatible with observations of the absence of surface water runoff from the Site. In the vicinity of the lagoon system on the north property, surface water drains directly into the lagoons. Storm-water drains are present in paved areas (Figure 2) to channel surface water to the underlying soil.

During periods of heavy rains, some ponding of surface waters has been observed on the Site in swales and other low-lying areas. Some areas of surface-water ponding occur near the entrance to the Site along Sunny Sol Boulevard, on the north property in the vicinity of the lagoons, and immediately northeast of the easternmost warehouse building. Five surface-water samples in the ponding areas (SW-1 through SW-5; Figure 6) were collected and analyzed for VOCs and metals. The analytical results of the surface-water for VOCs and metals sampling are discussed in Section 6.8.

The Flood Insurance Study for the Village of Caledonia from the Federal Emergency Management Agency (FEMA; 1980) was analyzed in reference to the Site. The source of authority for the Study is the National Flood Insurance Act, as amended. The Flood Insurance Zone maps divide the Village of Caledonia (Appendix E) area into zone of specific flood potential or hazard, as follows:

- Zone A0: Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet
- Zone A4: Special Flood Hazard Areas inundated by the 100-year flood
- Zone B: Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by water control structures
- Zone C: Areas of minimal flooding

The Site lies entirely within Zone C, an area of minimal flooding outside both the 100- and 500-year flood zones. Neither Flood Zone A nor Flood Zone B are closer than approximately 1 mile to the east (east of Barks Road) or closer than approximately 0.5 mile to the west (west of North Street).

The isolation of the Site from the flood-prone zones documents that floodplain management concerns are not applicable to the Site.

4.1.3 Climate

The climate of the Village of Caledonia is characteristic of western New York State, with warm summers and cold winters with moderate to heavy snowfall. Average daily temperatures range from 24 degrees Fahrenheit (°F) in January to 71°F in July. The average annual precipitation is 30 inches. Long continual droughts are rare, but periods of one or two months with a total rainfall of less than 3 inches are common. Rainy periods with low temperatures occur in the spring, and heavy showers are common in the summer. Snow occurs between November and March.

4.2 Wetlands and Ecological Assessment

4.2.1 Wetlands

The Federal Manual for Identifying and Delineating Jurisdictional Wetlands (U.S. EPA 1989) and the Army Corps of Engineers Wetlands Delineation Manual (1987) were used as guidance documents for evaluating Site activity impact on wetlands in the vicinity. The guidelines provide a series of staged levels of effort required to complete a wetlands delineation based on the adequacy of existing available data.

Detailed wetlands information for the Site and its vicinity was acquired through NYSDEC and other sources. The available data appear more than adequate to evaluate the impact of Site activity on recognized wetlands. The following list of information sources was considered in order to conduct Wetlands Delineation, which does not require on-site field inspection when sufficient data is available (Part IV, Section D, Subsection 1; U.S. EPA 1989):

- United States Geological Survey 1:24,000 scale quadrangle map
- National Wetlands Inventory Map
- Soil and Water Conservation District Soil Survey Map for Livingston County
- NYSDEC Wetlands Assessment of the Site Vicinity
- Site Base Map, Vegetation Map, and Contour Map

NYSDEC Region 8 Bureau of Wildlife identified seven wetlands (identification codes: CA-5, CA-4, CA-1, CA-9, CA-16, CA-15, and WH-8) within a 2-mile radius of the Site; the location of the wetlands are depicted on Figure 7. The 2-mile radius includes portions of northern Livingston and southern Monroe Counties. No wetlands were identified on the Site or adjacent properties.

The nearest wetland area, CA-1, is approximately 0.5 mile west of the Site, and is associated with Spring Creek. Both Spring Creek and CA-1 continue north into Monroe County where Spring Creek becomes a tributary to Oatka Creek. Wetland WH-8 was identified in southern Monroe County (Figure 7) approximately 2 miles northwest of the Site. WH-8 is associated with Oatka Creek, which flows from the west to the northeast, just north of Mumford (northwest of Site).

Wetland areas CA-16, CA-15, and CA-9 lie over 1.5 miles south and west of the Site. By far the largest complex of wetland areas, CA-4 and CA-5, is approximately 1 mile east of the Site covering a swath of land from southeast to northeast of the Site, terminating in Monroe County (Figure 7).

The Site characteristics which include flat topography, lack of off-site surface water runoff, highly permeable soils (Palmyra type), developed commercial, residential and recreational properties in the Site vicinity, and a lack of wetlands area on-site indicate that Site activities do not pose a potential concern to the wetlands.

4.2.2 Endangered Species/Wildlife Habitats

Information on ecologically sensitive areas within a 2-mile radius of the Site was obtained from NYSDEC and is depicted on Figure 7. These include two rare plants (marsh arrowgrass and green gentian), one endangered species of plant (prostrate juniper), a waterfowl concentration area, and two exemplary natural communities (marl pond shore and northern white cedar swamp).

Most of the recorded ecological sensitivities identified in Figure 7 are associated with the wetland areas. The ecological sensitive area closest to the Site is a prostrate juniper habitat located over 0.5 mile and is associated with the Spring Creek wetland area

CA-1. The remainder of the habitats recorded is associated with wetlands located over 1 mile or more from the Site.

The lack of on-site ecological sensitive areas, the long distances to wetlands areas, the lack of surface water runoff, and the developed site vicinity indicate that Endangered Species Act concerns are not applicable to the Site activities.

LFR contacted the NYSDEC Region 8, Bureau of Wildlife to inquire about ecological habitat and sensitive species identification at and in the vicinity of the Site. Mr. Jim Eckler, Fish and Wildlife Technician with NYSDEC, stated that NYSDEC maintains a database of special status species and habitats. Mr. Eckler reviewed the database and did not identify species or habitats of ecological concern in the area surrounding the Site. In a letter to LFR dated June 15, 1998, Mr. Eckler states that an examination of the NYSDEC file material reveals no records of "exemplary natural communities, significant wildlife habitats, or threatened, endangered, or rare species" at or in the vicinity of the Site. A copy of the letter is attached in Appendix F.

4.3 Cultural Resource Evaluation

A cultural resource evaluation was conducted for the Site under CERCLA guidelines. The identification of cultural resources on or eligible for listing on the National Registry of Historic Places was conducted with the cooperation and guidance of the New York State Office of Park, Recreation and Historic Places (OPRHP). The evaluation of cultural resources is a staged process that involves study of site-specific data by OPRHP staff including archaeologists and historians who are specialists in Caledonia-area. The OPRHP was supplied with the following:

- site map
- site vicinity map
- photographic documentation of the Site, adjacent properties and surrounding areas
- a description of Site history and RI/FS activities

On July 8, 1996, the OPRHP forwarded the findings of their review (OPRHP Project Review Number 96PR1376) of the Site in accordance with Section 106 of the National Historic Preservation Act of 1966. The OPRHP stated that the State Historic Preservation Office has concluded that RI/FS activities on the Site will have no effect upon cultural resources eligible for inclusion in the National Register of Historic Places. A copy of the letter is included in Appendix G.

5.0 HYDROGEOLOGICAL SETTING

5.1 Regional Geology

The Village of Caledonia lies in the Erie-Ontario Lowlands Physiographic Province of western New York, which encompasses the relatively low, flat areas lying south of Lake Erie and Lake Ontario. The 7.5-minute topographic quadrangle map (Caledonia Quadrangle) exhibits two significant features, a large delta built into the ancestral valley of the Genesee River (the site of a former glacial lake) and the current Genesee Valley (U.S. Geological Survey [USGS] 1987). Superimposed on the surface of the delta is a series of glacial meltwater stream channels that may have transported the vestiges of melting glacial ice. The channels are now occupied by streams and/or wetlands. The regional physiography shows the profound effects of recent (Wisconsinian) periods of glaciation and the final episodes of deglaciation. Features, such as the till-covered uplands, drumlin fields, and moraine deposits, reflect both the ice advances and stagnation events (Muller et al. 1988).

Glacial deposits, consisting of glacial till and outwash sediments, cover much of the region. The distribution of surficial soils in the region has been mapped by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) and presented in soil survey reports for Livingston County (1956). Generally, the report describes two soil types for the region: Palymyra Gravelly Loam (Pc) and Farmington Loam (Fa). These soil types are described as dark brown to grayish brown, very permeable, silty and gravelly soils.

Underlying these overburden glacial deposits is the bedrock of Paleozoic age, which is composed predominantly of carbonate and shale rocks. Regionally, the Syracuse, Camillus, Bertie, and Akron Formations of Silurian age, and the Onondaga Formation of Devonian age compose the bedrock (Isachsen et al. 1991; NYSDEC 1996).

The youngest bedrock formation exposed in the region (and encountered in the subsurface at the Site) is the Middle Devonian Onondaga Formation. The complete Onondaga Formation is reported to be 140 feet thick and includes the five members, which range in composition from being gray fossiliferous limestone to finely crystalline argillaceous limestone and dolomite. In ascending order, Edgecliff, Clarence, Nedrow Moorehouse, and Seneca limestone members make up the Onondaga Formation.

Regionally, the overburden sediments yield significant quantities of groundwater. Vast quantities of groundwater are transmitted through the glacial outwash channels that occur in the overburden deposits. Many of the glacial outwash channels have surface expressions of swamps or linear depressions. It is likely that in these glacial outwash sediments numerous buried interconnected channels exist that form important water-bearing zones. Within the overburden zone, the typical depths of significant water-bearing zones range between 12 and 40 feet bgs.

Within the bedrock, water-bearing zones have been identified in weathered portions and within fractures, which are prolific near the interface between the overburden sediments and the upper parts of the bedrock. The groundwater yield is significantly lower in the bedrock than in the overburden water-bearing zones.

5.2 Site Geology

Soil samples obtained during monitoring well installation were used to characterize the site-specific stratigraphy. The lithologic logs are provided in Appendix C. Figure 8 depicts a generalized east-west geologic section.

The lithologic logs indicate the Site is underlain by two distinct stratigraphic zones, an upper overburden zone and an underlying bedrock zone. The overburden zone can be grouped into two separate lithologic units consisting of an upper gravel-sand-silt mixture and lower gravelly silt. The gravel-sand-silt mixture unit includes varying amounts of gravels, sand, and silt, and was encountered from 25 to 40 feet bgs. The sediments range in color from dark gray to grayish brown and are typically well graded (poorly sorted), subangular, and dense. The gravels range in size from few millimeters to over three inches.

The gravel-sand-silt mixture unit grades below into the gravelly silt unit, which is characterized by sediments with decreasing amounts of gravel and increased silt content. The gravelly silt unit directly overlies the bedrock between the depths of 40 to 70 feet bgs.

A carbonate bedrock (dolomite) was encountered at depths ranging between 30 and 80 feet bgs. The surface of the bedrock was found to slope steeply to the west of the Site, between bedrock monitoring wells BP-4 and BP-6 (Figure 8). Split-spoon samples indicate the upper portions of the bedrock are highly weathered and fractured. The thickness of the weathered zone varies, but was found to be less than 10 feet thick. The dolomitic bedrock at the Site appears to be equivalent to the Onondaga Formation of Upper Devonian age. Because the bedrock monitoring wells were completed only within the first 15 feet of the competent bedrock, the thickness of the Onondaga Formation at the Site is not known. Regionally, the Onondaga Formation is believed to be approximately 140 feet thick.

5.3 Groundwater Flow Characteristics

During groundwater sampling events in April/May 1996, November 1997, and August 1998, it was observed that most overburden and bedrock monitoring wells yielded significant amounts of groundwater. However, a few overburden monitoring wells (L-1, L-3, OP-1, OP-3, and OP-4) and bedrock monitoring well BP-5 did not yield appreciable quantities of water or were purged dry during pumping. The overburden monitoring wells that do not yield significant amounts of water are likely screened in zones of finer grained, less permeable sediment. The groundwater yield within the bedrock zone occurs primarily in the weathered portion and/or through fractures. It is likely that monitoring well BP-5 is completed within a competent bedrock zone with relatively fewer fractures and less weathered material.

Groundwater flow in the overburden and bedrock zones was characterized separately. Groundwater measurements during pumping of the North and West Wells indicate that overburden and bedrock zones are hydraulically separated although some leakage might be present. Groundwater flow was evaluated by generating groundwater elevation contour plots for the overburden and bedrock zones during nonpumping and pumping of the on-site North and West production wells. The Village of Caledonia production wells (V-1 and V-2) were reported to be pumping when the groundwater elevations were being measured for this study. The groundwater elevations are provided in Table 6.

Horizontal hydraulic gradients were estimated for both periods when the on-site production wells were not pumping and for when the on-site production wells were pumping. There appears to be an upward vertical gradient indicating flow from the deeper to shallower water-bearing zones. The overburden zone yields vast quantities of water. Many production wells in the region and site vicinity are completed in the overburden zones.

5.3.1 Overburden Zone Groundwater Elevations and Flow

Contour plots of groundwater elevations measured in the overburden zone monitoring wells during nonpumping and pumping of North and West Wells are shown on Figures 9 and 10 for May 1996 and November/December 1997 events, respectively. In May 1996, groundwater elevations (Figure 9) in the overburden monitoring wells, during nonpumping conditions, ranged from approximately 637.40 to 640.60 feet amsl. In November/December 1997, groundwater elevations (Figure 10) in the overburden monitoring wells were lower and ranged from 632.62 to 634.84 feet amsl. The difference in groundwater levels during these two periods appears to have been caused by seasonal variations. As indicated by the contour maps, the principal groundwater flow direction of the overburden zone is toward the northeast. The average hydraulic gradient across the Site was estimated 0.002 foot/foot (ft/ft).

During pumping of the North Well and West Well, groundwater flow in the overburden zone, with the exception of the area around North Well, is also toward northeast (Figures 9 and 10). A cone of influence due to pumping is present in the vicinity of the North Well. The cone of influence has an approximate radius of 200 feet around North Well. A steeper hydraulic gradient of 0.04 ft/ft was observed in the overburden zone in the vicinity of the North Well during pumping.

Groundwater elevations taken in overburden monitoring wells on May 16, 1996, during pumping conditions, were actually higher than elevations measured during nonpumping conditions on May 7, 1996 (Figure 9; Table 6). The slightly higher groundwater elevations during pumping conditions (May 16, 1996) appear to be related to precipitation.

5.3.2 Bedrock Zone Groundwater Elevations and Flow

Contour plots of groundwater elevations measured in the bedrock zone monitoring wells during nonpumping and pumping of North and West Wells are shown on Figures 11 and 12 for May 1996 and November/December 1997 events, respectively. In May 1996, the groundwater elevations during nonpumping conditions ranged from approximately 637.72 to 641.95 feet amsl. In November/December 1997, groundwater elevations during nonpumping conditions ranged from 633.82 to 638.88 feet amsl. The difference in groundwater levels during these two periods appears to have been caused by seasonal variations. As indicated by the contour maps, groundwater flow in the bedrock zone during nonpumping conditions was both to the west and northeast. A groundwater "mound," or divide, appears to occur at monitoring well BP-1, located in the central portion of the Site. East of BP-1, the groundwater flow is toward the northeast. The hydraulic gradient in the bedrock zone was estimated to range between be 0.005 and 0.008 ft/ft.

Pumping of the North and West Wells does not appear to have significant influence on the groundwater flow in the bedrock zone. As shown in Figures 11 and 12, groundwater flow in the bedrock zone during nonpumping conditions was both to the west and northeast. A slight influence due to pumping of the West Well can be observed between BP-4 and BP-3; the hydraulic gradient in the vicinity of the West Well during pumping is estimated to range between 0.008 and 0.01 ft/ft.

Anomalous groundwater elevations were observed in bedrock monitoring wells BP-1 and BP-5; the measured groundwater levels in BP-5 were significantly lower on many sampling dates (Table 6). The lower groundwater elevations in monitoring well BP-5 are attributed to poor recharge, which was observed during well development and groundwater sampling. Groundwater elevation from BP-5 was not included in generating contour maps.

5.4 Hydraulic Characteristics

The results of the hydraulic testing performed on the West and North Wells on November 29 and 30, 1994, and December 1 and 2, 1994, respectively, were analyzed using the computer graphical software AQTESOLV© (Duffield 1994). The elapsed time and drawdown and recovery measurements are presented in Table D-1 in Appendix D. Hydraulic parameters, such as transmissivity and storativity, were estimated using the Neuman curve-fitting (1974) and Theis curve-matching (1935) methods. Table 7 presents the hydraulic parameters computed through each of these methods.

Neuman Curve-Fitting Method

The Neuman curve-fitting method for unconfined water-bearing zones with partially penetrating wells (Neuman 1974) was selected to compute transmissivity, storativity (S), and specific yield (Sy) values based on the following assumptions:

- The aquifer is homogeneous, isotropic, or anisotropic, and of uniform thickness over the area influenced by the hydraulic testing.
- The aquifer has a seemingly infinite areal extent.
- The aquifer is unconfined and shows delayed water table response.
- The wells do not penetrate the entire thickness of the aquifer.
- Prior to pumping, the water table surface is horizontal (or nearly so) over the area that will be influenced by the test.
- The aquifer is pumped at a constant discharge rate.
- The diameter of the pumping well is small (i.e., storage capacity in the pumping well can be neglected).
- The flow to the pumping well is in an unsteady state.
- The ratio of specific yield to storativity is greater than 10 ($Sy/S > 10$).

Drawdown data for PZ-1 and PZ-2 observation wells were plotted on a log-log graph, and type A and B curves were computed. The type A and B curves were matched with the early-time and late-time data, respectively, to calculate transmissivity, storativity, and specific yield (Appendix D). The estimated hydraulic parameters are provided in Table 7. Transmissivity ranged from 28 to 41 square feet per minute (ft^2/min; 301,614 to 441,649 gpd per foot [gpd/ft]); the specific yield was estimated to be 0.1.

Theis Curve-Matching Method

Groundwater drawdown measurements and recovery data for observation wells PZ-1, PZ-2, and drawdown data for observation wells OP-4 and BP-4 were also analyzed using the Theis curve-matching method (Theis 1935). Computations using the Theis solution were based on the following assumptions:

- The aquifer is confined.
- The wells penetrate the entire thickness of the aquifer.
- The aquifer is homogeneous, isotropic, and of uniform thickness over the area influenced by the hydraulic testing.
- The aquifer has a seemingly infinite areal extent.
- Prior to pumping, the piezometric surface is horizontal (or nearly so) over the area that will be influenced by the test.
- The aquifer is pumped at a constant discharge rate.
- The diameter of the pumping well is small (i.e., storage capacity in the pumping well can be neglected).
- The flow to the pumping well is in an unsteady state.

For each observation well, the hydraulic testing data were plotted on a log-log graph. The type curve was matched with the data curve to compute the transmissivity and storativity values of the water-bearing zones (Appendix D). Table 7 presents the estimated hydraulic parameters. The transmissivity values ranged from 0.78 to 34 ft^2/min (8,400 to 366,246 gpd/ft); the storativity values ranged between 0.0003 and 0.323.

The hydraulic parameters estimated by either Neuman or Theis are in close agreement. However, the results of curve matching indicate that hydraulic parameters estimated by the Theis method for drawdown and recovery data for PZ-1 and PZ-2 may be the most accurate estimates for the shallow water-bearing sediments at the Site.

6.0 RESULTS AND DISCUSSION

6.1 Geophysical Survey

6.1.1 Results

Appendix B (Figure 1) shows the three study areas (Study Areas 1 through 3) surveyed during the geophysical survey and the results of the survey. Targets, such as USTs, piping, drums, and/or other buried objects, were detected only through recognizable anomalies or as patterns against the background geophysical data collected.

Study Area 1

The geophysical survey indicated five anomalies in Study Area 1 (Figure 2 in Appendix B).

- Anomaly 1A is related to a water line leading to the fire hydrant.
- Anomaly 1B is related to an abandoned line from an old storm-water (dry well) drain running underneath the employee parking area.
- Anomaly 1C appears to have been caused by fill material used to fill an excavation after the removal of a utility pole.
- Anomaly 1D: this area contained three 8,000-gallon USTs, which were removed on July 26, 1985. The anomaly is associated with the materials used to backfill the excavation pit.
- Anomaly 1E may be related to a buried pipe associated with the former USTs; however, it is believed that all pipes associated with the former USTs were aboveground.

Study Area 2

Two anomalies were detected by the geophysical survey in Study Area 2. These anomalies are depicted on Figure 3 in Appendix B.

- Anomaly 2A is related to a water line leading to a safety shower and eye wash station.
- Anomaly 2B is associated with an electric line that supplied lighting to the former UST area.

Study Area 3

In Study Area 3, four anomalies were detected by the geophysical survey. The anomalies are shown on Figure 4 in Appendix B.

- Anomaly 3A coincides with the steel-reinforced foundation of a former building.
- Anomaly 3B is related to a former line used to discharge to Lagoon C.
- Anomalies 3C–3E are associated with heterogeneous fill material used in the upgrade of the area.

6.1.2 Discussion

The results of the geophysical survey did not indicate the presence of USTs or other buried metallic product containers. Anomalies detected by the survey were related to former buried utilities, steel-reinforced building foundations, heterogeneous fill material, and/or materials used to backfill excavation pits.

6.2 SSPL Determination

LFR submitted a detailed report on behalf of Jones that summarized the field assessment and analytical results and included recommendations to the U.S. EPA regarding SSPLs on November 21, 1994 (LFR 1994). The SSPL was subsequently approved by the U.S. EPA on August 21, 1995 (U.S. EPA 1995).

6.2.1 Results

The results of groundwater, subsurface soil, and sediment sampling and analyses conducted at the Site to determine the SSPL indicated that:

- Groundwater samples contained VOCs, such as PCE (480 μg/l), TCE (30 μg/l), and cis-1,2-DCE (27 μg/l); and metals, such as cadmium (5.2 μg/l), chromium (133 μg/l), iron (147,000 μg/l), manganese (2750 μg/l), and lead (140 μg/l).

- Subsurface soil samples contained VOCs, such as PCE (2,500 μg/kg), TCE (30 μg/kg), and cis-1,2-DCE (10 μg/kg); and metals, such as chromium (25 milligrams per kilogram [mg/kg]) and lead (36.8 mg/kg).
- Sediment samples contained VOCs, such as cis-1,2-DCE (590 μg/kg); and metals, such as cadmium (30.5 mg/kg), chromium (400 mg/kg), and lead (1,210 mg/kg). In addition, low concentrations of SVOCs (bis(2-ethylhexyl)phthalate [BEHP] at 3,000 μg/kg) and pesticides, such as heptachlor epoxide (5.1 μg/kg), gamma-chlordane (9.6 μg/kg), endrin (5.8 μg/kg), and arochlor 1,254 (920 μg/kg), were also detected. The pesticides, which were detected only in the sediment samples, were attributed to commercial pesticides, which had been used for the treatment of termites at or near the Site.

6.2.2 Discussion

Based on the above findings, an SSPL was approved by the U.S. EPA for soil and groundwater characterization at the Site. The SSPL included VOCs and selected metals for groundwater samples; VOCs, SVOCs, and selected metals for sediment samples; and VOCs and selected metals for subsurface soil samples. Table 8 presents the SSPL as approved by the U.S. EPA (LFR 1994; U.S. EPA 1995).

6.3 Background Samples

Soil analytical results for VOCs of the three background samples BSS-1, BSS-2 and BSS-3 is presented in Table 9; analytical results of background soil samples for metals are presented in Table 10. Background soil samples were also analyzed for pesticides and PCBs but were not detected.

VOCs in the background samples were found to be below the MDL of 1 μg/l (Table 10). Concentrations of metals detected in the background samples were generally within reported values for the background concentration of the United States (NYSDEC 1994). Chromium levels in the background samples were estimated to range between 10.9 and 23.6 milligrams per kilogram (mg/kg). Magnesium was detected in relatively high concentrations of ranging between 15,000 to 80,100 mg/kg. Lead was found to range between 6.9 and 38.6 mg/kg. The concentrations of other metals in the background samples are presented in Table 10.

6.4 On-Site Soil Investigation

The on-site soil investigation was conducted in November 1994 (see Section 3.3); the sampling locations are shown on Figure 5, whereas the concentrations of selected analytes detected are shown on Figure 13. The samples were analyzed for the SSPL by the U.S. EPA-approved analytical methods. The analytical results of the soil samples are summarized in Tables 9 and 11 through 16. Additional soil samples near the PCE AST (Figure 5) were also collected in August 1998; however, these soil samples were analyzed for chlorinated solvents only (Table 17).

Analytical results of the soil samples show the primary chemicals detected were chlorinated solvents such as PCE and TCE. Toluene, total xylenes, and methylene chloride were also detected at low concentrations in a few samples. Acetone was detected in a few soil samples; however, acetone concentrations detected in soil samples is believed to be an artifact of decontamination (acetone was used as a solvent during decontamination of sampling implements). The VOCs detected in on-site soil samples exceeded the background soil concentrations.

Low concentrations of lead, chromium, iron, manganese, and cadmium detected in the soil samples were comparable to the concentrations detected in the background sample.

6.4.1 Volatile Organic Compounds in Soil—Results

Subsurface Soil Samples

Table 9 summarizes the results for the VOC analyses of subsurface soil samples (prefix "SB-"). Figure 13 shows the distribution of selected analyte concentrations. The results of direct-push soil sampling are presented in Table 17. The concentrations of PCE detected ranged between the MDL and 330,000 μg/kg; the concentrations of TCE detected ranged between the MDL and 320 μg/kg. The highest concentration of PCE (330,000 μg/kg) was detected in direct-push soil sample DP-1 (2–4 feet) collected in the former solvent tank area (Figure 3). The highest concentration of TCE (320 μg/kg) was detected in sample DP-2 (2–4 feet) also collected in the former solvent tank area (Figures 3 and 14).

Relatively low levels of PCE, ranging between 2J μg/kg (estimated value) and 20 μg/kg were detected in many surface and subsurface samples collected in the vicinity of the bleach warehouse at the Site (Table 9; Figures 3 and 12). TCE was detected in one soil boring (SB-16) at 5J μg/kg (estimated value).

Toluene concentrations detected ranged between the MDL and 36 μg/kg, and total xylene concentrations detected ranged between the MDL and 80 μg/kg. The highest concentrations of toluene and xylene were detected in sample SB-2 (12 to 14 feet), collected in the vicinity of the former toluene AST storage area (Figures 3 and 5).

Methylene chloride was detected in several soil samples across the Site. However, all detections in the soil samples were qualified with a "J" (estimated value). The highest concentration (520J μg/kg [estimated value]) of methylene chloride was detected in soil sample SB-1 (0- to 0.5-foot). In soil sample SB-12 (12–14 feet), which was collected in the former UST area, methylene chloride was detected at 28J μg/kg (estimated value; Figures 3 and 5).

Sludge Samples

Table 11 summarizes the results for VOC analyses of the sludge samples (prefix "SL-"), which were collected near the lagoon system (Figure 5). Figure 13 shows selected analyte concentrations in some of these samples; primarily chlorinated solvents were found to be present in all the sludge samples. The PCE concentrations detected in these samples ranged from 3J (estimated value) to 310 μg/kg. The highest concentration of PCE (310 μg/kg) was detected in sample SL-6, collected in Lagoon A. TCE, cis-1,2-DCE (total), xylene (total), and 2-butanone were also detected in sample SL-6 at 23J (estimated value) μg/kg, 260 μg/kg, 33 μg/kg, and 44 μg/kg, respectively.

Sediment Samples

Table 12 presents the results for the VOC analyses of sediment samples (prefix "SD-"). Figure 13 shows selected analyte concentrations in some of these samples. Low concentrations of PCE, toluene, and xylene (total) were detected in sediment samples collected on site. PCE concentrations detected ranged between 2J (estimated value) and 22 μg/kg; toluene concentrations detected ranged up to 9J (estimated value); and xylene (total) concentrations ranged between 5J (estimated value) and 16 μg/kg. The highest PCE concentration of 22 μg/kg was detected in sample SD-4, collected north of the sulfur dioxide and chlorine department (Figures 5 and 13).

Evaluating the Presence of Dense Nonaqueous Phase Liquids in Soil Samples

The highest PCE concentration of 330,000 μg/kg in the soil sample DP-1 (2–4 feet bgs) was used to evaluate the potential that residual DNAPL might be present at the Site. The partitioning calculation equations described in Feenstra et al. (1991) and Pankow and Cherry (1995) were used to evaluate whether the highest soil concentration of PCE (330,000 μg/kg) indicates residual DNAPL.

Initially, the hypothetical pore-water concentration of the constituent of interest is calculated from the measured total soil concentration by assuming equilibrium chemical partitioning between the solid phase, the pore water, and the soil gas, and assuming that no DNAPL is present. If DNAPL were present, then the calculated pore-water concentration would be greater than the pure phase solubility of PCE (i.e., > 150 mg/l). If no DNAPL is present, then the calculated pore-water concentration would be less than the pure phase solubility of PCE.

The following equations and assumptions were used:

$$C_w = \frac{C_t \rho_b}{K_d \rho_b + \varphi_w + H_c \theta_a}$$

C_w = pore-water concentration (milligrams per liter [mg/l] or micrograms per cubic centimeter [μg/cm^3])

C_t = total soil concentration (micrograms per gram [μg/g] or mg/kg dry weight)

ρ_b = bulk density of soil sample (grams per cubic centimeter [g/cm^3])

φ_w = water-filled porosity

θ_a = air-filled porosity

K_d = partition coefficient between pore-water and soil solids for the compound and temperature of interest (cubic centimeter per gram [cm^3/g])

H_c = dimensionless Henry's constant for the compound and temperature of interest

The value of ρ_b was estimated to be 1.72 g/cm^3; the total water-filled porosity (φ_w) was estimated to 0.3. For this exercise, the air-filled porosity (θ_a) was assumed to be zero (which results in a slight overestimation of the hypothetical pore-water concentration [C_w], thereby providing a "worst case scenario").

The value of K_d was estimated as:

$$K_d = K_{oc} \times foc$$

The value of K_{oc} for PCE at approximately 20 °C is 364 ml/g; the average fraction of organic carbon (foc) in samples at the Site was approximated at 0.005. Therefore,

$$K_d = 364 \times 0.005 = 1.82\ cm^3/g$$

Substituting the K_d value (1.82 cm^3/g) into the equation, the hypothetical pore-water concentration for soil sample DP-1 (2–4 feet bgs), in which the measured PCE concentration was 330,000 µg/kg or 330 mg/kg, was calculated to be:

$$C_w = \frac{330 \times 1.72}{(1.82 \times 1.72) + 0.3} = \frac{567.60}{3.43} = 165.48 mg/L$$

C_w > pure-phase solubility of PCE (150 mg/l), thereby suggesting the presence of DNAPL in the sample (DP-1).

The partitioning calculations indicate that PCE DNAPL is present at the Site, especially in the vicinity of the former solvent tank area.

6.4.2 Volatile Organic Compounds in Soil—Discussion

Subsurface Soil Samples

Results of subsurface soil sample analyses for VOCs show that the primary chemicals detected were chlorinated solvents such as PCE and TCE. Toluene, total xylenes, and methylene chloride were also detected in a few samples. Acetone, which was detected in several samples, is believed to be an artifact of equipment decontamination.

- The source of PCE and TCE detected in soil borings SB-1 through SB-4 appears to be related to the former aboveground solvent tank storage area (former ASTs A1 through A5; Figure 3). The significant concentrations of PCE (330,000 μg/kg) detected in direct-push sample DP-1 (2–4 feet bgs) represent source area on Site. PCE concentrations of this magnitude indicate the presence of dense non-aqueous phase liquids (DNAPLs).

The PCE detected in sludge samples, taken near the lagoon system, were probably caused by the discharge of affected groundwater from the North or West Well prior to the installation of the air stripper. Sludge from the lagoons is removed periodically to enhance infiltration; the excavated sludge is characterized and disposed off site. With the installation of air stripper in May 1996 to treat non-contact cooling water from North and West Well prior to discharge, the sludge may no longer appear to be a concern as far as VOCs are concerned.

The source of low concentrations of PCE (ranging between 2J μg/kg and 20 μg/kg) detected in soil borings SB-6, SB-8, SB-9, SB-10, SB-11, and SB-16 (in the vicinity of the bleach warehouse and the former acid storage tanks area) appears to be related to the routine handling of chlorinated solvents, which were distributed at the Site between 1960 and 1980. TCE was also detected in one soil boring SB-16 at 5 μg/kg, located between the railroad tracks north of the bleach warehouse (Figures 5 and 13).

The Recommended Soil Cleanup Objective (RSCO) for PCE is 1.4 mg/kg and for total VOCs is less than 10 mg/kg (NYSDEC 1994). Remediation of soil in the former solvent tank area was addressed in the Identification of Candidate Remedial Technologies Technical Memorandum (LFR 1996).

Toluene and xylenes (total) were detected at low concentrations, ranging between the MDL and 80 μg/kg in soil borings SB-2, SB-3, SB-4, SB-6, SB-11, and SB-13 (Figures 5 and 13). Toluene and xylenes (total) appear to be related to the handling of petroleum chemicals at the Site. A 10,000-gallon AST used to store toluene was located in the former solvent tank storage area in the vicinity of samples SB-2, and SB-3, and USTs used to store gasoline were located along Sunny Sol Boulevard in the vicinity of soil boring SB-13. The toluene and xylenes (total) concentrations are below the respective NYSDEC (1994) RSCOs (i.e., 1.5 mg/kg for toluene and 1.2 mg/kg for total xylenes).

The source of the methylene chloride concentration detected in soil boring SB-12 (Figure 4) appears to be related to the former 8,000-gallon UST (B5) which had been used to store methylene chloride until June 1982 (Figure 3). Methylene chloride was also detected in several other soil borings across the Site. Methylene chloride concentrations (all detections were qualified as "J" [estimated value]) in the soil samples are most likely attributed to the past on-site storage and handling of this chemical. Soil sample SB-1 (collected from 0 to 0.5 feet bgs) was the only sample that exceeded the NYSDEC (1994) RSCO of 0.1 mg/kg for methylene chloride.

Sludge Samples

Low concentrations of PCE and other chemicals detected in sludge samples SL-1 through SL-6 appear to be related to the discharge of VOC-affected groundwater to the lagoon system. Groundwater was discharged to the on-site lagoon system until May 1996, when an air stripper was installed to treat groundwater prior to its discharge to the on-site lagoons. With the installation of the air stripper and periodic excavation of the sludge material, detected chemicals in the sludge samples do not appear to be a concern.

Sediment Samples

PCE detected in sediment sample SD-4 (22 μg/kg) may be associated with the abandoned outfall that had been used to discharge waste water to the on-site lagoon system. The low concentrations of VOCs in SD-1 and SD-2 appear to be related to the routine discharge of rinse water to sumps and/or drains at the Site. (Sediment samples were collected from sumps, storm water drains and/or in areas of discharge outfalls.)

6.4.3 Metals in Soil—Results

Subsurface Soil Samples

Table 13 presents the results for the metals analyses of subsurface soil samples. Figure 5 shows soil sampling locations and Figure 13 depicts the selected analyte concentrations. Cadmium, chromium, iron, lead, and manganese were the target analytes as required by the SSPL. The detected concentrations of each of these analytes in the subsurface soil samples and in the background samples are:

- **Cadmium:** Concentrations in the subsurface samples ranged between 0.22 and 1.5 mg/kg. The highest concentration of cadmium (1.5 mg/kg) was detected in SB-8 (0–0.5 feet), collected in the southeast corner of the sulfur dioxide/chlorine department. The background concentration of cadmium was below MDL of 0.5 mg/kg.
- **Chromium:** Concentrations in the subsurface samples ranged between 2.5 and 74.6 mg/kg. The highest concentration of chromium (74.6 mg/kg) was detected in sample SB-10 (0–0.5 feet), collected in the northwest corner of the former acid storage tank pad area (Figure 5). The background concentrations of chromium detected ranged from 10.9 to 23.6J (estimated value) mg/kg.
- **Iron:** Concentrations in the subsurface samples ranged between 2,680 and 51,300 mg/kg. The highest concentration of iron (51,300 mg/kg) was detected in sample SB-10 (0–0.5 feet) collected in the vicinity of the former acid storage tank pad area (Figure 5). The background concentrations of iron detected ranged between 10,600 and 26,200 mg/kg.
- **Lead:** Concentrations in the subsurface samples ranged between 1.4 and 216 mg/kg. The highest concentration of lead (216 mg/kg) was detected in sample SB-6

(0–0.5 feet), collected in the northeast corner of the bleach warehouse (Figures 5 and 13). The background concentrations of lead detected ranged between 6.9 and 38.6 mg/kg.

- **Manganese:** Concentrations in the subsurface samples ranged between 91 and 1,310 mg/kg. The highest concentration of manganese was detected in sample SB-11 (12–14 feet), collected in the northeast corner of the former acid storage tank pad area (Figure 5). The background concentrations of manganese detected ranged between 286 and 586 mg/kg.

Sludge Samples

Table 14 presents the distribution of metals concentrations detected in the sludge samples.

- **Cadmium:** Concentrations ranged between 0.49 and 11.5 mg/kg.
- **Chromium:** Concentrations ranged between 20.5 and 159 mg/kg.
- **Iron:** Concentrations ranged between 19,000 and 171,000 mg/kg.
- **Lead:** Concentrations ranged between 17 and 328 mg/kg.
- **Manganese:** Concentrations ranged between 422 and 557 mg/kg.

The highest concentrations of chromium, iron, and lead were detected in sludge sample SL-6, collected in lagoon A. The highest concentration of manganese was detected in sample SL-3, collected north of lagoon B (Figure 5). The highest concentration of cadmium was detected in sludge sample SL-2, collected just south of lagoon B.

Sediment Samples

Table 15 presents the distribution of metals concentrations detected in the sediment samples.

- **Cadmium:** Concentrations ranged from 0.49 to 7.4 mg/kg; the highest concentration was detected in sample SD-1, collected west of the bleach warehouse.
- **Chromium:** Concentrations ranged from 15.7 to 45.6 mg/kg; the highest concentration was detected in sample SD-5, collected north of the former pole barn area.
- **Iron:** Concentrations ranged from 13,100 to 36,700 mg/kg; the highest concentration was detected in sample SD-3, collected south of the bleach warehouse.
- **Lead:** Concentrations ranged from 2.5 to 228 mg/kg; the highest concentration was detected in sample SD-4, collected northeast of the sulfur dioxide/chlorine department.

- **Manganese:** Concentrations ranged from 157 to 678 mg/kg; the highest concentration was detected in sample SD-4, collected northeast of the sulfur dioxide/chlorine department.

6.4.4 Metals in Soil—Discussion

The results for metals analyses of subsurface, sludge, and sediment samples indicate relatively low concentrations of metals. A majority of these metals detected slightly exceed the metals concentrations reported in the three background soil samples taken on site. Some of these metals (iron and manganese) are also known to occur naturally and reported to have nutritional value. Because naturally occurring background metals were difficult to characterize in an industrial and developed setting such as the Site, the metals concentrations were compared to the regional concentrations. With the exception of cadmium, the concentrations of metals detected at the Site are close to the reported background levels for the eastern United States (NYSDEC 1994). The reported background concentration ranges for cadmium, chromium, iron, lead, and manganese in the eastern United States are (NYSDEC 1994):

• Cadmium	0.1-1 mg/kg
• Chromium	1.5-40 mg/kg
• Iron	2,000-550,000 mg/kg
• Lead	200-500 mg/kg
• Manganese	50-5,000 mg/kg

The concentrations of cadmium, chromium, and iron were comparable to the concentrations detected in the background soil samples collected during SSPL determination (LFR 1994). The means of the concentrations of cadmium, chromium, iron, lead, and manganese detected in the three background soil samples were 0.250 mg/kg, 19 mg/kg, 15,903 mg/kg, 22 mg/kg, and 439 mg/kg, respectively. The means of the concentrations of these metals in the 16 soil samples collected across the Site were 0.693 mg/kg, 19 mg/kg, 12,935 mg/kg, 57 mg/kg, and 339 mg/kg, respectively.

A comparison of the detected metals concentrations in the samples with the concentrations detected in background samples indicates that limited portions of the Site (areas of chemical handling and waste-water discharge, such as former acid storage tank areas, outfalls to drains and/or sumps, and the lagoons) may be affected by low concentrations of metals.

6.4.5 Semivolatile Organic Compounds in Soil—Results

In accordance with the SSPL, only the sediment samples (prefix "SD-") were analyzed for SVOCs. In addition, because the U.S. EPA was submitting one sludge sample (SL-6, collected in lagoon A; Figure 5) for analysis for SVOCs, Jones also decided to submit sample SL-6 for analysis for SVOCs. Table 16 presents the analytical results of the U.S. EPA- and Jones-initiated SVOC analyses.

Petroleum-Related

The analytical results indicate the presence of several petroleum-related chemicals in the sediment samples, including, but not limited to, phenanthrene, anthracene, fluoranthene, pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, and benzo[a]pyrene. In samples SD-1 through SD-4, concentrations of several petroleum-related chemicals were detected at low concentrations (below the quantitation limits) and are therefore qualified as "J" (estimated value) in Table 16. Hexachlorobenzene was detected at 2,100 μg/kg in sample SD-4.

In sample SD-5, collected north of the former pole barn area, concentrations of petroleum-related compounds were detected at relatively higher concentrations (Table 16). The detected concentrations ranged between 300 μg/kg and 8,300 μg/kg.

Other SVOCs, such as hexachloroethane, 2-methylnaphthalene, and fluorene, were detected in the sediment samples. However, the concentrations of these chemicals were below quantitation limits and are qualified as "J" (estimated value) in Table 16.

Bis(2-ethylhexyl)phthalate

In addition to petroleum-related chemicals, BEHP was detected in all the sediment samples, SD-1 through SD-6, and in sludge sample SL-6. The concentrations of BEHP detected ranged from 130 J (estimated value) to 6,800 μg/kg. The highest concentration of BEHP was detected in sample SL-6, collected in lagoon A.

6.4.6 Semivolatile Organic Compounds in Soil—Discussion

Petroleum-Related

The source of these chemicals is not known, but is believed to be associated with petroleum-related chemicals (e.g., diesel, heating oil, fuel oil) formerly handled on site. The concentrations of a majority of the SVOCs detected at the Site are low and well below the respective NYSDEC (1994) RSCOs. For example, the RSCOs for phenanthrene, anthracene, fluoranthene, pyrene, 2-methylnaphthalene, and fluorene are 50 mg/kg, 50 mg/kg, 50 mg/kg, 50 mg/kg, 36.4 mg/kg, and 50 mg/kg, respectively. Although the concentrations of benzo[a]pyrene were above the NYSDEC (1994) RSCO of 1.1 mg/kg, these concentrations are below the Soil Cleanup Objectives to Protect Groundwater (NYSDEC 1994). The concentrations of benzo[b]fluoranthene and benzo[k]fluoranthene detected in soil sample SD-5 exceeded the NYSDEC (1994) RSCO of 1.1 mg/kg.

Bis(2-ethylhexyl)phthalate

The source of BEHP is not known, but BEHP is commonly used in vacuum pumps, as a plasticizer for PVC, in resins and elastomers, as an inert ingredient in pesticides, as a detector of leaks in respirators, and in testing air filtration systems. BEHP was detected in background samples BSS-1 (Table 16). The BEHP concentrations at the Site were below the NYSDEC (1994) RSCO of 50 mg/kg.

6.5 Groundwater Sampling Analyses

Results of groundwater samples collected in April/May 1996, November 1997, and August 1998 are presented and discussed in this section. Results indicate that chlorinated solvents, PCE and TCE, are the primary chemicals of concern at the Site. PCE concentrations detected in groundwater were as high as 41 percent of its pure-phase solubility of 150,000 μg/l indicating the presence of DNAPLs in the subsurface. Extensive groundwater sampling indicate that the higher PCE levels are limited mainly to the source area where former solvent tanks were stored (Figure 3). A chlorinated solvent plume appears to have originated from this source area and affected a large portion of the Site.

Other chemicals detected at the Site include lead, chromium, manganese, and iron, which were reported to be present in several monitoring wells on Site.

6.5.1 Volatile Organic Compounds in Groundwater—Results

Table 18 presents the results of monitoring well groundwater sample analyses for VOCs; the results of direct-push groundwater samples are present in Table 17. Figure 14 shows the vertical distribution of PCE on a generalized geologic cross section. Isoconcentration maps of PCE at depths of 17 to 22 feet bgs, 27 to 30 feet bgs, and 35 to 48 feet bgs are depicted on Figures 15, 16 and 17, respectively.

Most recent sampling (August 1998; Table 18) indicate that PCE concentrations in groundwater range between the MDL and 62,000 μg/l; and TCE concentrations range between the MDL and 100 μg/l. Relatively high PCE concentrations were detected in the nested well cluster OP-11 and OP-16, in the source area at 5,500 μg/l and 62,000 μg/l, respectively. OP-11 is screened between 17 and 22 feet bgs whereas OP-16 is screened deeper from 39 and 44 bgs. As shown on Figure 14, significant PCE concentrations are present in former solvent AST area. PCE, owing to its relatively high specific gravity (1.61) appears to have migrated vertically downward through the gravel-sand-silt mixture and gravelly silt to the deeper bedrock zone.

Outside the former solvent tank source area, concentrations of PCE decrease to relatively low levels. In OP-12 and DP-4, located on the western Site boundary (Figure 14), PCE decreased to 3 μg/l at 22 feet bgs, and 4.5 μg/l at 31 feet bgs. In overburden and bedrock wells OP-8 and BP-4, located hydraulically downgradient of the source area, PCE was detected at 79 and 2 μg/l, respectively.

The lateral extent of PCE-affected groundwater is depicted on PCE isoconcentration maps in Figures 15, 16, and 17. In shallow water-bearing sediments, at depths ranging between 17 and 22 feet bgs (Figure 15), PCE concentrations in groundwater range from 5,500 μg/l in the source area to 4.6 and 6 μg/l on the plume boundary.
At intermediate depths of 27 and 30 feet bgs, PCE levels range from 1,600 μg/l in the

source area to 2.8 μg/l and 3.1 μg/l on the plume boundary. In the deeper water-bearing sediments significant PCE concentrations are present, ranging from 62,000 μg/l in the source area to 3.6 μg/l in the plume boundary. PCE was also detected in groundwater samples from the open field to the north of the former solvent tank source area. In OP-9, located in the open field, PCE was detected at 120 μg/l (Figure 15).

Relatively high PCE concentrations of 340 and 140 μg/l were detected in the West and North production wells. The production wells may have been affected by high PCE concentrations because of pumping. Since the operation of the air stripper in May 1996, the PCE concentrations in North Well have decreased from 570 μg/l (1996) to 140 μg/l (1998). However, PCE concentrations in the West Well have remained approximately the same (Table 18).

With the exception of the source area, relatively low concentrations of chlorinated solvents appear to be present in the bedrock zone. Recent sampling in August 1998 detected 2 μg/l of PCE in BP-4. Slightly higher levels of PCE and TCE (at 15 and 14 μg/l, respectively) were detected in BP-4 during May 1996 sampling event. The presence of relatively higher levels of cis-1,2-DCE (26 μg/l) in BP-4 compared with decreasing PCE and TCE concentrations (Table 18; August 1998) suggest that PCE may be undergoing natural attenuation. Similarly, the absence of PCE and the detection of TCE and cis-1,2-DCE at 8 and 13 μg/l in BP-1 may indicate natural attenuation.

6.5.2 Volatile Organic Compounds in Groundwater—Discussion

The U.S. EPA (1992) issued guidelines for estimating the potential occurrence of DNAPLs at Superfund sites using groundwater concentrations. According to the guidelines, the potential for DNAPL occurrence is high when the groundwater concentrations of a specific analyte exceed one to several percent of the pure-phase solubility of that analyte. The highest concentration of PCE detected (62,100 μg/l in OP-16) represents approximately 41 percent of the pure-phase solubility of PCE. Given the high concentrations of PCE in source area wells or direct-push samples, it is likely that DNAPLs are present in the release area where the solvent tanks were formerly located.

The soil and groundwater analytical data indicate that the source of the PCE is the former solvent tank storage area in the western portion of the Site (in the vicinity of monitoring well OP-11 and OP-16). The elevated concentrations appear to be limited primarily to the source area.

PCE appears to extend from the former solvent tank source area to east of sulfur dioxide/chlorine department, and to the northeastern property boundary in the vicinity of the pole barns. The approximately length and width of the PCE affected groundwater is 1,100 feet (along the northeast–southwest axis) and 500 feet (along the north–south axis). Vertically, PCE in the source area extends to at least 48 feet bgs in the source area. Chlorinated solvents were below or at MDL in monitoring wells OP-13 and OP-14, located along the eastern boundary of the Site.

- The lack of significant reduction of PCE and TCE (between 1996 and 1998) indicates that natural attenuation will not be effective at the Site. However, the decreasing levels of PCE and TCE and the increasing levels of cis-1,2-DCE, as observed in monitoring wells outside the source area, may indicate slight potential for natural attenuation of chlorinated solvents, especially in the leading edges of the affected groundwater plume. However, appropriate geochemical indicator parameters will be necessary to evaluate the potential for natural attenuation of chlorinated solvents at the Site.

The concentrations of PCE and TCE detected in groundwater at the Site exceed the Groundwater Standards/Criteria of 5 µg/l established by NYSDEC (1994).

6.5.3 Metals in Groundwater—Results

Table 19 presents the results for metals analyses of groundwater samples. The analytical results represent total metals because groundwater samples analyzed were unfiltered. Because of particles such as silt and clay in the groundwater samples, the concentrations of metals in the unfiltered groundwater samples tended to be high. The concentrations of the metals detected in groundwater at the Site were:

- **Cadmium:** Concentrations were found to be below the MDL.
- **Chromium:** Concentrations were below the MDL in all the monitoring wells, with the exception of OP-6 and BP-5. In wells OP-6 and BP-5, the chromium concentrations were reported to be 20.6 and 57.6 µg/l, respectively.
- **Iron:** Concentrations in groundwater ranged from 16.2 to 83,900 µg/l; the highest concentration of iron (83,900 µg/l) was detected in monitoring well OP-2.
- **Lead:** Concentrations were below the MDL and/or at the quantitation limits in all the monitoring wells, with the exception of OP-6. In well OP-6, the lead concentration was reported to be 49.6 µg/l. In the former on-site East production well, lead was detected at 40.8 µg/l.
- **Manganese:** Concentrations ranged between 0.70 and 2,320 µg/l; the highest concentration of manganese (2,320 µg/l) was detected in monitoring well OP-2.

6.5.4 Metals in Groundwater—Discussion

The source of the metals detected at low concentrations in groundwater is not known. However, these metals are known to occur naturally (Shacklette and Boerngen 1984). The concentration of metals detected on Site are below the background concentrations reported for the region (NYSDEC 1994).

6.6 Evaluation/Validation of Laboratory Data

All analytical data were evaluated and validated upon receipt from the laboratory in accordance with U.S. EPA (1988b and 1988c) and LFR (1991). A brief description of problems associated with the laboratory data and of qualifiers assigned is provided in Appendix H.

6.7 Physical Parameters of Groundwater

Table 5 presents the measurements of physical parameters (pH, specific conductance, and turbidity) collected during groundwater sampling.

- **pH:** measured pH of the groundwater ranged from 6.99 to 8.92. pH in majority of the wells was approximately 7.3.
- **Specific conductance:** measured specific conductance ranged between 860 and 2,460 micromhos per centimeter (μmhos/cm); the average of the specific conductance measurements is 1,900 μmhos/cm. The highest specific conductance measurement (2,460 μmhos/cm) was recorded in monitoring well BP-5.
- **Turbidity:** measured values ranged from 1.79 to greater than 200 nephelometric turbidity units (NTUs); the average turbidity is below 40 NTUs.

6.8 Residential Wells

NYSDOH collected samples from residential wells in the vicinity of the Site between 1991 and 1995 (NYSDOH 1996); Table 3 provides the analytical results for these samples. VOC concentrations (PCE and TCE) were detected at or slightly above the Groundwater Standards/Criteria (NYSDEC 1994) in 2 of 10 residential wells. In the well located at the 112 Wheatland Center Drive residence, the most recent analyses (November 8, 1993) detected PCE and TCE concentrations at 5 μg/l and 1.5 μg/l, respectively. In the well at 166 Wheatland Center Drive, 1,2-DCE (total) was detected at 12 μg/l; PCE and TCE concentrations were reported below the NYSDEC (1994) Groundwater Standards/Criteria of 5 μg/l. Both these residential wells are located approximately 0.75 miles east of the Site.

6.9 Surface Water Samples

Five surface water samples were collected from areas of ponding on Site and analyzed for VOCs and metals. The location of surface water samples SW-1 through SW-2 are shown on Figure 6; the analytical results for VOCs and metals are provided in Tables 20 and 21, respectively. VOCs were not detected above the MDL of 1 μg/l. Metals such as chromium and cadmium were detected in a few samples in concentrations ranging from 0.20 to 0.60 μg/l. The metals detected in surface waters are comparable to the background samples (in soil; see Table 10) and do not appear to be a concern.

7.0 SUMMARY OF HEALTH RISK ASSESSMENT

As required by the Order, a Health Risk Assessment (HRA) was prepared by LFR and submitted on November 25, 1998. U.S. EPA reviewed the HRA and provided comments on April 27, 1999. At the present time, LFR is revising the HRA and expects to submit it to U.S. EPA on June 11, 1999.

RI data compiled to date were used to evaluate potential health risks and impacts to ecological receptors at and in the vicinity of the Site. The methods and assumptions developed in this HRA are consistent with U.S. EPA and NYSDEC risk assessment methodologies for evaluating releases of chemicals from the environment and associated human health risks. For this HRA, it was assumed that the Site will remain industrial into the foreseeable future. Therefore, the potential human receptors evaluated in this document were on-site workers and off-site adult and child residents. The HRA evaluates the exposure pathways that may potentially impact the on-site and off-site receptors evaluated. It should be noted that the current and anticipated future use of the Site will remain industrial, and off-site residential, commercial, and agricultural.

In an effort to prevent the dilution of estimated risks by jointly considering small areas with high concentrations with large areas with low concentrations, the Site was divided into three Risk Management Zones in this HRA based on soil and groundwater quality at the Site. The three zones are defined below:

- *Source Management Zone:* includes the area on the westernmost end of the Site where significant levels of PCE was detected in soils/groundwater in vicinity of the former solvent storage tank source area.
- *Lagoon Management Zone:* included the three lagoons A, B, and C and the immediately surrounding area.
- *Site Management Zone:* Included the remainder of the Site.

The results of the HRA are presented in LFR (1999) and will be considered in the preparation of the FS report.

8.0 CONCLUSIONS

Based on the RI field and analytical data gathered to date the following conclusions have been developed for the Site.

8.1 Geophysical Survey

The results of the geophysical survey did not indicate the presence of any USTs, drums, or large buried metallic objects/containers. Magnetic anomalies were found to be associated with a water main, abandoned pipes, steel-reinforced foundations for buildings, and/or fill material.

8.2 SSPL Determination

The SSPL for the Site includes VOCs, SVOCs, and selected metals, such as cadmium, chromium, iron, manganese, and lead.

8.3 On-Site Soil Investigation

- Based on lithologic logs, the subsurface at the Site is underlain by two distinct stratigraphic units, an upper overburden zone and a basal bedrock zone. The overburden zone consists of an upper gravel-sand-silt mixture and an underlying gravelly silt unit. The gravel-sand-silt mixture unit is highly permeable, yielding prolific quantities of groundwater; many production wells in the area are completed in this unit. The gravelly silt unit is far less permeable primarily and does not yield significant quantities of groundwater. The thickness of the overburden zone ranges between 30 and 80 feet bgs. The overburden sediments grade sharply into the carbonate bedrock. The bedrock zone consists primarily of aphanitic dolomite. The bedrock was found to slope steeply to the east.
- The results of soil sample analyses indicated the presence of VOCs, primarily PCE and TCE, in soil at the Site. The PCE concentrations detected ranged between the MDL and 330,000 μg/kg, and the concentrations of TCE detected ranged between the MDL and 320 μg/kg.
- The highest soil concentrations of PCE were detected in the former solvent tank storage area, located in the western portion of the Site. The distribution of the chemicals in the soil indicate the former solvent tank storage area appears to be the source of chlorinated solvents detected on site.
- The partitioning calculations (Pankow and Cherry 1995) using the highest PCE concentration (330,000 μg/kg) detected in soil samples indicate the presence of residual DNAPL at the Site.
- The concentrations of cadmium, chromium, iron, lead, and manganese detected in site soil samples are close to the reported background metals concentrations for the region States (NYSDEC 1994).

8.4 Hydrogeologic Investigations

- Groundwater flow in the overburden zone when the on-site North and West production wells were not pumping was toward the northeast. The average hydraulic gradient across the Site was 0.002 ft/ft. During pumping of the North and West Wells, groundwater flow in the overburden zone, with the exception of the area around North Well, is also toward northeast. A cone of influence due to pumping is present in the vicinity of the North Well. The cone of influence has an approximate radius of 200 feet around North Well. A steeper hydraulic gradient of 0.04 ft/ft was observed in the overburden zone in the vicinity of the North Well during pumping.

- Groundwater flow in the bedrock zone during nonpumping conditions was both to the west and northeast. A groundwater "mound," or divide, appears to occur at monitoring well BP-1, located in the central portion of the Site. East of BP-1, the groundwater flow is toward the northeast. The hydraulic gradient in the bedrock zone was estimated to range between be 0.005 and 0.008 ft/ft. Pumping of the North and West Wells does not appear to have significant influence on the groundwater flow in the bedrock zone. Groundwater flow in the bedrock zone during nonpumping conditions was both to the west and northeast. A slight influence due to pumping of West Well; the hydraulic gradient in the vicinity West Well during pumping is estimated to production wells was estimated to range between 0.008 and 0.01 ft/ft.
- A slight upward hydraulic gradient is present indicating potential groundwater flow from deep to shallow water-bearing sediments.
- The results of the pumping test performed on the North production well indicated the transmissivity values for the overburden zone ranged from 28 to 41 ft2/min or 302,400 to 442,800 gpd/ft. The transmissivity in the bedrock well BP-4, monitored during hydraulic testing of the West production well, was estimated to be 6 ft2/min or 64,800 gpd/ft.

8.5 Groundwater Sampling Analytical Results

- The results of groundwater sample analyses indicated chlorinated solvents such as PCE and TCE were the most frequently detected VOCs in groundwater at the Site. Groundwater sampling and analysis conducted in August 1998, indicate that the concentrations of PCE ranged between the MDL and 62,000 μg/l and TCE concentrations ranged between the MDL and 100 μg/l. The highest concentrations of PCE (62,000 μg/l) and TCE (100 μg/l) were detected in monitoring well OP-16. The PCE concentrations detected in the on-site North and West production wells were 140 and 340 μg/l, respectively. In the North Well, PCE concentrations decreased from 570 μg/l (1996) to 140 μg/l (1998) whereas they remained approximately the same in the West Well. No VOCs were detected in the Village of Caledonia production wells V-1 and V-2. Relatively low concentrations of PCE or TCE (less than 10 μg/l) were detected in the bedrock zone.
- The PCE concentration of 62,000 μg/l in OP-16 represents approximately 41 percent of the pure-phase solubility of PCE indicating the presence of DNAPL at the Site.
- The groundwater analytical data corroborate the soil data and indicate the source of the PCE is the former aboveground solvent tank storage area in the western portion of the Site (in the vicinity of monitoring well OP-11 and OP-16).
- PCE appears to extend from the former solvent tank source area to east of sulfur dioxide/chlorine department, and to the northeastern property boundary in the vicinity of the pole barns. The approximate length and width of the PCE affected groundwater is 1,100 feet (along the northeast–southwest axis) and 500 feet (along the north–south axis). Vertically, PCE in the source area extends to at least 48 feet

bgs in the source area. There does not appear to be off-site migration of chemicals to east.

- The lack of significant reduction of PCE and TCE over several rounds of sampling (between 1996 and 1998) may indicate that natural attenuation via biotic processes will not be effective at the Site. However, the decreasing levels of PCE and TCE and the increasing levels of cis-1,2-DCE, as observed in monitoring wells outside the source area especially in bedrock wells, may indicate slight potential for natural attenuation of chlorinated solvents.

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TABLES

Table 1: Site History, Jones Chemicals, Inc., Caledonia, New York

Month/Year	Activity
August 1939	Jones purchased Caledonia plant site from Bertha M. Oakes. Began sodium hypochlorite (bleach) production by the reaction of chlorine and dilute sodium hydroxide.
c. 1942	Jones began repackaging chlorine from bulk to cylinders and ton (2,000-pound) containers.
August 1942	Jones purchased north property, a small field north of plant from F. J. O'Brien/Caledonia Industrial Committee and began production of titanium tetrachloride in "smoke house" by the reaction of titanium dixoide and chlorine.
c. 1943	Jones discontinued titanium tetrachloride production.
c. 1947	Jones began repackaging anhydrous ammonia. Jones began repackaging acids.
c. 1953	Jones began production of aqua ammonia. Jones began bulk storage of acids, eventually including hydrochloric, sulfuric, nitric, and hydrofluosilicic acids.
c. 1960	Jones began repackaging of solvents, which included tetrachloroethene (PCE), trichloroethene (TCE), and toluene. Jones installed solvent bulk storage for PCE, TCE, and toluene.
c. 1961	Jones began small bulk deliveries of PCE to local dry cleaners and other users.
October 1970	Jones purchased warehouse from Agway. Agway owned warehouse from 3/1951 to 10/1970.
c. 1971	Jones began waste transportation business.
c. 1972	Jones converted former Agway underground storage tanks (USTs) from petroleum products to 1,1,1-trichloroethane, methylene chloride, and stoddard solvent.
c. 1973	Jones began repackaging sulfur dioxide.
September 1974	Jones obtained first discharge permit to lagoons.
c. October 1977	Jones constructed two pole barns for solvent drum storage. Jones discontinued large volume of small bulk deliveries of PCE to local users.

Table 1: Site History, Jones Chemicals, Inc., Caledonia, New York (continued)

Month/Year	Activity
1980	Jones discontinued on-site storage of waste generated off site. Caledonia site included in NYSDEC registry of inactive hazardous waste sites.
June 1982	Jones discontinued use of Agway USTs.
October 1983	Jones installed elementary neutralization system (ENS).
1984	Jones discontinued waste transportation.
June 1985	Jones discontinued redrumming chlorinated solvents.
1985	Jones removed former Agway USTs.
1986	Jones removed petroleum USTs.
1988	Jones removed former Agway heating oil UST.
1990	Jones removed PCE and TCE aboveground storage tanks.

Notes:

c. = circa (about)

Source: CRA 1993; Gaffney 1996.

Table 2: Storage Tank Inventory, Jones Chemicals, Inc., Caledonia, New York

Tank Designation *(see Figure 3)*	Aboveground Storage Tanks			
	Number	Contents	Capacity (gallons)	Status
A16	001	Fuel oil #2	500	In service
A17	003	Fuel oil #2	500	Removed
A18	004	Diesel fuel	300	In service
A19	005	Unleaded gasoline	200	Removed
A1	006	Toluene	9,042	Removed
A2	007	Trichloroethylene	9,042	Removed
A3	008	Nitric acid 67%	8,000	Removed
A4	009	Sulfuric acid 93%	8,000	Removed
A5	010	Perchloroethylene	6,670	Removed
A6	011	Ammonium hydroxide 29.4%	4,600	Removed
A6	012	Ammonium hydroxide 29.4%	7,240	Removed
A6	013	Ammonium hydroxide 29.4%	8,880	Removed
A20	014	Algaecide 50%	6,000	Removed
A21	015	Sodium hydroxide 50%	12,000	In service
A7	016	Sodium hypochlorite 12.5%	12,000	Removed
A7	017	Sodium hypochlorite 12.5%	12,000	In service
A8	018	Sodium hydroxide	12,000	In service
A8	019	Sodium hydroxide	12,000	In service
A10	020	Soft water	15,000	In service
A11	021	Ferric chloride 30%	16,300	In service
A12	022	Ferric chloride 30%	16,300	Removed
A13	023	Hydrochloric acid 31%	12,000	In service
A14	024	Hydrofluosilicic acid 23 - 26%	12,000	In service
A15	025	Hydrofluosilicic acid 23 - 26%	12,000	In service
A22	026	Sodium hypochlorite 12.5%	1,000	Removed
A23	027	Hydrochloric acid 31.45%	1,000	Removed
028	028*	Anhydrous ammonia 100%	9,500	Removed
029	029*	Sulfur dioxide 100%	9,625	Removed
030	030	Sodium hypochlorite	1,000	Removed
031	031	Sodium hydroxide 18%	12,000	In service
A9	032	Sodium bisulfite 38%	4,500	In service
033	033	Sodium hypochlorite 15%	1,100	In service
034	034	Sodium hypochlorite 12.5%	11,900	In service

Table 2: Storage Tank Inventory Jones Chemicals, Inc. Caledonia, New York (continued)

Tank Designation *(see Figure 3)*	Underground Storage Tanks				
	Number	Contents	Capacity (gallons)	Date Usage Discontinued	Date Removed
B1,B2	NA	Diesel fuel	2,000	Unknown	-- / -- /86
B3	NA	Stoddard solvent	8,000	6/ -- /82	7/26/85
B4	NA	1,1,1-Trichloroethane	8,000	6/ -- /82	7/26/85
B5	NA	Methylene chloride	8,000	6/ -- /82	7/26/85
B6	NA	Unleaded gasoline	8,000	11/ -- /86	12/10/86
B7	NA	Regular gasoline	1,000	11/ -- /86	12/10/86
B8	NA	Diesel fuel	8,000	11/ -- /86	12/10/86
B9	NA	Heating oil	500	Unknown	6/8/88

Notes:

NA = not applicable

* = nonstationary rail cars

Aboveground tank designation 002 was incorrectly assigned to underground Tank B9; therefore, Tank 002 designation does not appear on above table.

Source: CRA 1993; Gaffney 1996.

Table 3
Historical Groundwater Quality Data
Monitoring, Production, and Area Residential Wells
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Sampling Date	Compound *(concentrations in µg/l)*								
		BDCM	Chloroform	DBCM	1,1-DCA	1,2-DCE	MC	PCE	1,1,1-TCA	TCE
MONITORING WELLS										
OP-1	10/17/85	<1	<1	<2	<1	<1	<1	<1	<1	<1
	06/16/86	<1	<1	<2	<1	<1	<1	<1	<1	<1
OP-2	10/17/85	<1	<1	<2	<1	12.0	<1	<1	<1	1.4
	07/06/89	NA	NA	NA	NA	1.6	NA	NA	NA	ND
OP-3	10/17/85	<1	<1	<2	<1	<1	<1	60.0	16.0	57.0
	07/06/89	2.4	53.0	NA	NA	5.6	NA	18.0	10.0	26.0
OP-4	10/17/85	<1	<1	<2	<1	<1	<1	<1	<1	<1
	06/16/86	<1	<1	<2	<1	<1	<1	<1	<1	<1
BP-1	10/17/85	<1	<1	<2	<1	12.0	<1	<1	<1	18.0
BP-2	10/17/85	<1	<1	<2	<1	1.3	<1	<1	<1	1.2
	06/16/86	<1	<1	<2	<1	<1	<1	<1	<1	<1
L-1	10/17/85	<1	23.0	<2	<1	<1	<1	440.0	<1	42.0
	06/16/86	<1	35.0	<2	<1	39	<1	210.0	1.6	106.0
	08/09/84	NA	6.5	NA	NA	NA	NA	900	NA	87
L-2	10/17/85	<1	<1	<2	<1	<1	<1	<1	<1	<1
	06/16/86	<1	<1	<2	<1	<1	<1	<1	<1	<1

Table 3
Historical Groundwater Quality Data
Monitoring, Production, and Area Residential Wells
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Sampling Date	Compound *(concentrations in µg/l)*								
		BDCM	Chloroform	DBCM	1,1-DCA	1,2-DCE	MC	PCE	1,1,1-TCA	TCE
L-3	07/10/84	<5	<5	9	<5	<5	<5	<5	<5	<5
	08/09/84	NA	6.9	NA	NA	NA	NA	<7	NA	7.1
DEC-1	10/17/85	<1	<1	<2	<1	<1	<1	<1	<1	1.5
	06/16/86	<1	<1	<2	<1	<1	<1	<1	<1	1.5
	07/06/89	NA	ND	NA	ND	0.6	NA	NA	2.6	0.9
DEC-2	10/17/85	<1	<1	<2	<1	<1	<1	<1	<1	<1
	06/16/86	<1	<1	<2	<1	<1	2.6	<1	<1	<1
	03/27/87	<1	<1	<2	<1	<1	<1	<1	<1	<1
DEC-3	10/17/85	<1	<1	<2	<1	<1	<1	<1	3.8	5.6
	06/16/86	<1	<1	<2	<1	<1	<1	<1	3.3	5.6
	07/06/89	NA	ND	NA	ND	ND	NA	NA	2.8	2.4
DEC-4	10/17/85	<1	<1	<2	<1	<1	<1	<1	4.7	4.5
	06/16/86	<1	<1	<2	<1	<1	<1	<1	<1	<1
	07/06/89	NA	NA	NA	1.0	NA	NA	NA	0.7	1.4
DEC-5	10/17/85	<1	<1	<2	<1	<1	<1	<1	3.1	3.1
	06/16/86	<1	<1	<2	<1	<1	<1	<1	3.4	2.9
	03/27/87	<1	<1	<2	<1	<1	<1	<1	<1	1.4
	07/06/87	NA	NA	NA	ND	NA	NA	NA	72.0	4.1
DEC-6	10/17/85	<1	<1	<2	<1	<1	<1	<1	2.5	3.0
	06/16/86	<1	<1	<2	<1	<1	<1	<1	4.8	4.6

Table 3
Historical Groundwater Quality Data
Monitoring, Production, and Area Residential Wells
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Sampling Date	Compound *(concentrations in µg/l)*								
		BDCM	Chloroform	DBCM	1,1-DCA	1,2-DCE	MC	PCE	1,1,1-TCA	TCE
	07/06/89	NA	ND	NA	ND	ND	NA	NA	2.6	1.0
DEC-7	10/17/85	<1	<1	<2	<1	<1	<1	<1	8.6	6.0
	06/16/86	<1	<1	<2	1.5	<1	<1	<1	4.0	4.3
	03/27/87	<1	<1	<2	3.6	<1	<1	<1	109.0	6.0
	07/06/89	NA	ND	NA	1.1	NA	NA	NA	26.0	2.9
DEC-8	10/17/85	<1	<1	<2	<1	<1	<1	<1	18.0	2.7
	06/16/86	<1	<1	<2	<1	12	<1	<1	<1	1.7
DEC-9	10/17/85	<1	<1	<2	<1	<1	<1	27.0	<1	<1
DEC-10	10/17/85	<1	<1	<2	<1	<1	<1	42.0	<1	<1
	06/16/86	<1	<1	<2	<1	<1	<1	22.0	1.1	<1
PRODUCTION WELLS										
East	07/22/81	NA	NA	NA	NA	NA	NA	72	5	<1
	10/12/82	NA	NA	NA	NA	NA	NA	23	1	4
	08/02/83	NA	78	NA	NA	15	NA	430	<1	32
	08/09/84	NA	35	NA	NA	NA	NA	43	4	7
	06/16/86	<1	<1	<2	<1	2.2	<5	11	<1	2
	01/30/90	2.21	70.0	<2	<1	8.61	10.5	81.3	1.65	7.42
West	07/22/81	NA	NA	NA	NA	NA	NA	271	<1	7
	10/12/82	NA	NA	NA	NA	NA	NA	214	<1	8

Table 3
Historical Groundwater Quality Data
Monitoring, Production, and Area Residential Wells
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Sampling Date	Compound *(concentrations in µg/l)*								
		BDCM	Chloroform	DBCM	1,1-DCA	1,2-DCE	MC	PCE	1,1,1-TCA	TCE
	08/02/83	NA	<1	NA	NA	<1	NA	410	<1	16
	08/09/84	NA	2	NA	NA	NA	NA	226	<1	10
	10/17/85	<1	<1	<2	<1	6.7	<1	580.0	<1	14
	06/16/86	<10	<10	<20	<10	<10	<10	765.0	<10	14
	01/30/90	<1	<1	<2	<1	12.1	<1	89.3	<1	5.25
Middle	07/22/81	NA	NA	NA	NA	NA	NA	1	<1	4
	10/12/82	NA	NA	NA	NA	NA	NA	8	<1	<1
	08/02/83	NA	<1	NA	NA	<1	NA	2	<1	6
	08/09/84	NA	2	NA	NA	NA	NA	8.2	<1	3.8
	10/17/85	<1	3.4	<2	<1	<1	<1	4.2	<1	5.1
	06/16/86	<1	<1	<2	<1	4.1	<1	370.0	<1	66.0
North	10/17/85	<1	23.0	<2	<1	3.4	16.0	370.0	<1	66.0
	06/16/86	<10	48.0	<20	<10	44.0	<50	1160.0	<10	88.0
	01/30/90	<10	<10	<20	<10	226.0	10.3	646.0	<10	36.0
Village 1	07/22/81	NA	NA	NA	NA	NA	NA	<1	5	5
	10/12/82	NA	NA	NA	NA	NA	NA	<1	3	5
	08/02/83	NA	<1	NA	NA	<1	NA	17	<1	<1
	08/09/84	NA	2	NA	NA	NA	NA	<1	<1	8
	10/17/85	<1	<1	<2	<1	<1	<1	<1	<1	1.2
	06/16/86	<1	<1	<2	<1	<1	<1	<1	1.3	<1
	07/06/89	NA	NA	NA	NA	NA	NA	NA	18.0	1.3
Village 2	07/06/89	NA	NA	NA	0.5	NA	NA	NA	64.0	5.1

Table 3
Historical Groundwater Quality Data
Monitoring, Production, and Area Residential Wells
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Sampling Date	Compound *(concentrations in µg/l)*								
		BDCM	Chloroform	DBCM	1,1-DCA	1,2-DCE	MC	PCE	1,1,1-TCA	TCE
Lagoon*	11/04/81	NA	NA	NA	NA	NA	NA	23	ND	4
	06/21/83	NA	NA	NA	NA	NA	NA	232	15	9
	08/02/83	NA	NA	NA	NA	6.3	NA	310	NA	16
	02/07/84	NA	NA	NA	NA	1.5	NA	430	ND	13
RESIDENTIAL WELLS										
112 Wheatland	11/19/91	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	6	<0.5	2
	12/11/91	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5	<0.5	2
	04/07/92	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4	<0.5	1
	07/08/92	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.2	<0.5	2
	11/17/92	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3	<0.5	1
	04/21/93	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.6	<0.5	1
	11/08/93	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5	<0.5	1.5
166 Wheatland	12/11/91	<0.5	<0.5	<0.5	<0.5	9	<0.5	<0.5	<0.5	2
	04/07/92	<0.5	<0.5	<0.5	<0.5	10	<0.5	<0.5	<0.5	2
	07/08/92	<0.5	<0.5	<0.5	<0.5	5.9	<0.5	<0.5	<0.5	1.8
	10/06/92	<0.5	<0.5	<0.5	<0.5	12	<0.5	<0.5	<0.5	2
	04/21/93	<0.5	<0.5	<0.5	<0.5	10	<0.5	<0.5	<0.5	0.8
	11/08/93	<0.5	<0.5	<0.5	<0.5	12	<0.5	<0.5	<0.5	1.5
189 Wheatland	12/91	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
197 Wheatland	3/95	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
279 Barks	10/91	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
360 Barks	2/92	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
471 Barks	2/92	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Table 3
Historical Groundwater Quality Data
Monitoring, Production, and Area Residential Wells
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Sampling Date	Compound *(concentrations in μg/l)*								
		BDCM	Chloroform	DBCM	1,1-DCA	1,2-DCE	MC	PCE	1,1,1-TCA	TCE
3414 Iroquois	3/95	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
3418 Iroquois	11/91	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
3422 Iroquois	3/95	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Notes

Sampled By:

07/22/81	Recra Research, Inc. (1985)
10/12/82	Recra Research, Inc. (1985)
08/02/83	Recra Research, Inc. (1985)
08/09/84	Recra Research, Inc. (1985)
11/04/81	Conestoga-Rovers & Associates (1984)
06/21/83	Conestoga-Rovers & Associates (1984)
08/02/83	Conestoga-Rovers & Associates (1984)
02/07/84	Conestoga-Rovers & Associates (1984)
10/17/85	Conestoga-Rovers & Associates (1993)
06/16/86	Conestoga-Rovers & Associates (1993)
03/27/87	Conestoga-Rovers & Associates (1993)
07/06/89	Conestoga-Rovers & Associates (1993)
01/30/90	Conestoga-Rovers & Associates (1993)

* = outfall to lagoon
NA = no data available and/or not analzyed
ND = not detected
BDCM = bromodichloromethane
DBCM = dibromochloromethane
1,1-DCA = 1,1-dichloroethane
1,2-DCE = 1,2-dichloroethene
MC = methylene chloride
PCE = tetrachloroethene
1,1,1-TCA = 1,1,1-trichloroethane
TCE = trichloroethene

All residential wells sampled by the New State Department of Health (Napier (1996).

Table 4
Monitoring Well Construction Data
Jones Chemicals, Inc.
Caledonia, New York

Well ID	TOC Elevation (feet NGVD)	Well Depth Depth (feet bgs)	Monitoring Zone	Screen Interval (feet bgs)	Well Diameter (inches)	Installation Date	Installed By
OP-1	648.465	30.0	Overburden	25-30	4	06/21/84	CRA
OP-2	650.555	25.3	Overburden	20.3-25.3	4	06/20/84	CRA
OP-3	649.800	31.0	Overburden	26-31	4	NA	CRA
OP-5	650.620	22.0	Overburden	17-22	2	04/24/96	LFR
OP-6	651.460	21.0	Overburden	16-21	2	08/23/94	LFR
OP-7	648.785	23.0	Overburden	18-23	2	04/23/96	LFR
OP-8	652.025	22.0	Overburden	17-22	2	04/23/96	LFR
OP-9	645.465	22.0	Overburden	17-22	2	04/26/96	LFR
OP-10	653.790	22.0	Overburden	17-22	2	04/25/96	LFR
OP-11	653.610	22.0	Overburden	17-22	2	04/25/96	LFR
OP-12	652.980	22.0	Overburden	17-22	2	04/29/96	LFR
OP-13	660.205	31.0	Overburden	26-31	2	11/18/97	LFR
OP-14	653.025	26.0	Overburden	21-26	2	11/19/97	LFR
OP-15	652.660	24.0	Overburden	19-24	2	11/19/97	LFR
OP-16	NS	44.0	Intermediate	39-44	2	08/19/98	LFR
BP-1	650.815	113.5	Bedrock	Open Hole (15 ft.)	6	06/26/84	CRA
BP-2	652.100	75.0	Bedrock	Open Hole (15 ft.)	4	06/18/84	CRA
BP-3	648.990	60.0	Bedrock	Open Hole (5 ft.)	2	02/06/87	CRA
BP-4	652.435	55.0	Bedrock	Open Hole (5 ft.)	2	02/11/87	CRA
BP-5	652.050	90.0	Bedrock	Open Hole (15 ft.)	2	05/02/96	LFR
BP-6	653.800	101.0	Bedrock	Open Hole (15 ft.)	4	05/02/96	LFR
L-1	650.420	21.0	Overburden	16-21	4	06/26/84	CRA
L-2	650.560	67.5	Bedrock	Open Hole (15 ft.)	4	05/30/84	CRA
L-3	649.755	20.0	Overburden	15-20	4	05/24/84	CRA
North Well	650.435	24.0	Overburden	NA	48	03/85	NA
East Well	651.090	55.5	Bedrock	NA	6	NA	NA
West Well	652.340	45.3	Bedrock	NA	6	NA	NA
V-1	NS	NA	NA	NA	NA	NA	NA
V-2	NS	NA	NA	NA	NA	NA	NA
PZ-1	649.885	22.0	Overburden	12-22	2	11/29/94	LFR

Table 4
Monitoring Well Construction Data
Jones Chemicals, Inc.
Caledonia, New York

Well ID	TOC Elevation (feet NGVD)	Well Depth Depth (feet bgs)	Monitoring Zone	Screen Interval (feet bgs)	Well Diameter (inches)	Installation Date	Installed By
PZ-2	649.510	23.0	Overburden	13-23	2	11/29/94	LFR
DEC-1	645.125	23.5	Overburden	21-23.5	NA	12/21/83	NYSDEC
DEC-2	642.930	25.5	Overburden	23-25.5	NA	12/22/83	NYSDEC
DEC-3	643.000	17.5	Overburden	15-17.5	NA	12/22/83	NYSDEC
DEC-4	645.445	34.0	Overburden	NA	NA	10/30/84	NYSDEC
DEC-5	657.095	37.0	Overburden	NA	NA	10/31/84	NYSDEC
DEC-6	643.985	26.0	Overburden	NA	NA	11/01/84	NYSDEC
DEC-7	655.445	27.5	Overburden	25-27.5	NA	11/01/84	NYSDEC
DEC-8	645.905	31.5	Overburden	NA	NA	09/10/85	NYSDEC
DEC-9	649.245	27.0	Overburden	24.5-27	NA	09/12/85	NYSDEC
DEC-10	649.535	19.0	Overburden	16.5-19	NA	09/12/85	NYSDEC

Notes:

TOC = top of casing
NGVD = National Geodetic Vertical Datum
bgs = below ground surface
NS = not surveyed
NA = not available
CRA = Conestoga-Rovers & Associates
LFR = LFR Levine·Fricke
NYSDEC = New York State Department of Environmental Conservation

Table 5
Groundwater Sampling Physical Parameters
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Sampling Date	Time (hours)	Temperature °C	pH	Specific Conductance (micromhos/cm)	Turbidity (NTUs)
OP-1	04/30/96	17:00	NM	7.30	2,060	33
	11/19/97	12:30	10.7	7.35	1,340	7.66
	08/21/98	15:50	10.5	7.35	1,746	14.30
OP-2	04/30/96	16:03	NM	7.50	1,430	16
	11/19/97	11:10	10.1	7.32	1,469	14
	08/20/98	14:00	11.3	7.26	1,878	10.13
OP-3	05/01/96	08:52	NM	7.30	1,600	50
	11/19/97	14:10	10.3	7.50	1,146	16.3
	08/20/98	11:50	11	7.16	1,517	15.9
OP-5	04/29/96	11:00	NM	7.40	1,740	29
	11/19/97	09:41	10.8	7.41	1,022	28
	08/20/98	16:45	11.1	7.29	1,296	46.5
OP-6	04/30/96	10:05	NM	7.30	1,570	29
	11/20/97	10:06	13.3	7.13	1,118	56.8
	08/21/98	15:10	16.1	7.14	1,075	40
OP-7	04/29/96	13:47	NM	7.30	1,660	28
	11/21/97	13:15	11.5	7.18	1,062	22
	08/21/98	14:05	13.2	7.31	1,163	45.8
OP-8	04/29/96	16:15	NM	7.30	1,470	12
	11/21/97	13:30	10.8	7.00	1,132	10.6
	08/21/98	16:15	12.7	7.35	1,179	9.95
OP-9	05/01/96	10:00	NM	7.30	1,250	2
	11/20/97	11:30	8.6	7.40	1,130	>200
	08/22/98	09:20	11.5	7.19	1,129	23.2
OP-10	05/02/96	09:15	NM	7.40	1,180	45
	11/21/97	09:15	NA	NA	NA	NA
	08/21/98	08:40	12.7	7.45	891	87.5
OP-11	05/02/96	09:55	NM	7.40	1,140	35
	11/21/97	14:15	11.5	7.01	1,157	68.3
	08/22/98	11:30	16.5	6.99	1,054	71.5
OP-12	05/02/96	10:15	NM	7.40	1,180	23
	11/20/97	14:30	10.6	7.43	901	>200
	08/22/98	10:00	13.4	7.27	881	>200
OP-13	11/20/97	15:30	10.2	7.70	779	35.7
	08/20/98	09:20	9.6	7.33	874	27.5

Table 5
Groundwater Sampling Physical Parameters
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Sampling Date	Time (hours)	Temperature °C	pH	Specific Conductance (micromhos/cm)	Turbidity (NTUs)
OP-14	11/20/97	15:50	10.6	7.54	1,151	>200
	08/20/98	10:00	9.2	7.38	996	43.4
OP-15	11/20/97	16:05	10.9	7.70	1,234	156
	08/20/98	14:45	11.4	7.39	1,087	95.6
OP-16	08/20/98	14:15	13.2	7.21	1,993	54.5
BP-1	04/30/96	11:12	NM	7.40	1,870	15
	11/19/97	15:10	9.4	7.36	1,399	2.94
	08/20/98	15:55	10.3	7.35	1,996	3.06
BP-2	04/29/96	10:07	NM	7.40	2,115	1
	11/18/97	16:05	10	7.34	1,469	2.48
	08/20/98	17:15	10.6	7.23	2,180	40.4
BP-3	04/29/96	11:55	NM	7.40	2,140	16
	11/21/97	11:40	10	6.99	1,942	22.5
	08/21/98	14:10	11.8	7.33	1,942	89.8
BP-4	04/29/96	17:00	NM	7.30	2,110	25
	11/21/97	13:50	9.6	7.01	1,986	5.73
	08/21/98	16:30	11.3	7.29	1,955	1.93
BP-5	05/23/96	10:54	NM	7.30	6,940	41
	11/21/97	14:50	10.0	10.67	9,456	20
	08/20/98	17:10	13.2	8.92	1,705	>1,000
BP-6	05/23/96	10:24	NM	7.30	1,880	1
	11/19/97	16:50	9.6	7.28	1,511	0.76
	08/21/98	10:45	11.3	7.30	2,420	2.14
PZ-1	04/30/96	12:40	NM	7.50	1,540	3
	11/21/97	10:30	9.4	7.40	1,492	42.2
	08/22/98	10:45	9.0	7.29	1,416	95.3
L-2	04/30/96	15:07	NM	7.40	2,170	26
	11/21/97	09:30	11.4	9.30	1,633	22.7
	08/22/98	11:30	10.8	7.15	2,380	27.2
L-3	04/30/96	15:24	NM	7.40	1,590	29
	11/21/97	10:00	9.5	7.06	1,647	>200
	08/22/98	10:30	13.8	7.30	1,293	239

Table 5
Groundwater Sampling Physical Parameters
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Sampling Date	Time (hours)	Temperature °C	pH	Specific Conductance (micromhos/cm)	Turbidity (NTUs)
JCI Airstripper Effluent	11/20/97	14:25	10.5	8.02	1,275	0.29
North Well	04/30/96	09:06	NM	7.30	1,474	0
	11/18/97	11:01	11.5	7.55	1,253	0.08
	08/21/98	13:35	RE	7.11	1,366	3.69
West Well	04/30/96	09:21	NM	7.40	2,090	0
	11/20/97	10:30	10.5	7.15	1,476	25.2
	08/21/98	13:15	11.7	7.39	1,923	1.79
East Well	05/01/96	10:47	NM	7.50	1,840	2
	11/18/97	12:42	10.7	7.26	1,464	44.1
	08/21/98	11:40	10.8	7.32	2,250	170.8
V-1	11/18/97	10:30	11.3	7.41	860	0.06
V-2	11/20/97	14:05	12.6	7.77	1,240	1.32
Village Water	11/20/97	14:10	11.2	7.87	1,274	0.25

Notes:

°C = degrees Celsius

NTU = nephelometric turbidity unit

NM = parameters not measured because of insufficient water sample

RE = recording error

Table 6
Groundwater Elevation Data Sets
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Monitoring Zone	Measurement Date	TOC Elevation (feet NGVD)	Groundwater (feet BTOC)	Groundwater Elevation (feet NGVD)	On-Site Production Well Status[a]
OP-1	Overburden	05/07/96	648.47	8.51	639.96	Not Pumping
		05/16/96		8.11	640.36	Pumping
		07/22/96		10.24	638.23	Not Pumping
		07/19/96		10.06	638.41	Pumping
		09/09/96		12.68	635.79	Not Pumping
		09/06/96		12.60	635.87	Pumping
		12/01/97		13.77	634.70	Not Pumping
		11/26/97		13.99	634.48	Pumping
		09/08/98		13.68	634.79	Not Pumping
		09/11/98		13.72	634.75	Not Pumping[b]
OP-2	Overburden	05/07/96	650.56	11.57	638.99	Not Pumping
		05/16/96		11.14	639.42	Pumping
		07/22/96		13.26	637.30	Not Pumping
		07/19/96		13.06	637.50	Pumping
		09/09/96		15.65	634.91	Not Pumping
		09/06/96		15.59	634.97	Pumping
		12/01/97		15.65	634.91	Not Pumping
		11/26/97		16.90	633.66	Pumping
		09/08/98		16.62	633.94	Not Pumping
		09/11/98		16.71	633.85	Not Pumping[b]
OP-3	Overburden	05/07/96	649.80	11.12	638.68	Not Pumping
		05/16/96		10.71	639.09	Pumping
		07/22/96		12.75	637.05	Not Pumping
		07/19/96		12.57	637.23	Pumping
		09/09/96		15.13	634.67	Not Pumping
		09/06/96		15.06	634.74	Pumping
		12/01/97		16.09	633.71	Not Pumping
		11/26/97		16.37	633.43	Pumping
		09/08/98		16.08	633.72	Not Pumping
		09/11/98		16.20	633.60	Not Pumping[b]

Table 6
Groundwater Elevation Data Sets
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Monitoring Zone	Measurement Date	TOC Elevation (feet NGVD)	Groundwater (feet BTOC)	Groundwater Elevation (feet NGVD)	On-Site Production Well Status[a]
OP-5	Overburden	05/07/96	650.62	10.73	639.89	Not Pumping
		05/16/96		10.34	640.28	Pumping
		07/22/96		12.45	638.17	Not Pumping
		07/19/96		12.25	638.37	Pumping
		09/09/96		14.86	635.76	Not Pumping
		09/06/96		14.78	635.84	Pumping
		12/01/97		15.92	634.70	Not Pumping
		11/26/97		16.13	634.49	Pumping
		09/08/98		15.84	634.78	Not Pumping
		09/11/98		15.89	634.73	Not Pumping[b]
OP-6	Overburden	05/07/96	651.46	13.08	638.38	Not Pumping
		05/16/96		12.65	638.81	Pumping
		07/22/96		14.62	636.84	Not Pumping
		07/19/96		14.46	637.00	Pumping
		09/09/96		16.96	634.50	Not Pumping
		09/06/96		16.84	634.62	Pumping
		12/01/97		17.80	633.66	Not Pumping
		11/26/97		18.09	633.37	Pumping
		09/08/98		17.82	633.64	Not Pumping
		09/11/98		15.95	635.51	Not Pumping[b]
OP-7	Overburden	05/07/96	648.79	10.11	638.68	Not Pumping
		05/16/96		9.74	639.05	Pumping
		07/22/96		12.70	636.09	Not Pumping
		07/19/96		11.56	637.23	Pumping
		09/09/96		13.95	634.84	Not Pumping
		09/06/96		13.95	634.84	Pumping
		12/01/97		14.85	633.94	Not Pumping
		11/26/97		15.22	633.57	Pumping
		09/08/98		14.85	633.94	Not Pumping
		09/11/98		15.02	633.77	Not Pumping[b]

Table 6
Groundwater Elevation Data Sets
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Monitoring Zone	Measurement Date	TOC Elevation (feet NGVD)	Groundwater (feet BTOC)	Groundwater Elevation (feet NGVD)	On-Site Production Well Status[a]
OP-8	Overburden	05/07/96	652.03	12.47	639.56	Not Pumping
		05/16/96		12.08	639.95	Pumping
		07/22/96		14.11	637.92	Not Pumping
		07/19/96		13.92	638.11	Pumping
		09/09/96		16.42	635.61	Not Pumping
		09/06/96		16.38	635.65	Pumping
		12/01/97		17.42	634.61	Not Pumping
		11/26/97		17.65	634.38	Pumping
		09/08/98		17.38	634.65	Not Pumping
		09/11/98		17.45	634.58	Not Pumping[b]
OP-9	Overburden	05/07/96	645.47	6.86	638.61	Not Pumping
		05/16/96		6.40	639.07	Pumping
		07/22/96		8.40	637.07	Not Pumping
		07/19/96		8.23	637.24	Pumping
		09/09/96		10.60	634.87	Not Pumping
		09/06/96		10.52	634.95	Pumping
		12/01/97		11.39	634.08	Not Pumping
		11/26/97		Inaccessible	Undetermined	Pumping
		09/08/98		11.46	634.01	Not Pumping
		09/11/98		11.47	634.00	Not Pumping[b]
OP-10	Overburden	05/07/96	653.79	16.39	637.40	Not Pumping
		05/16/96		15.96	637.83	Pumping
		07/22/96		17.79	636.00	Not Pumping
		07/19/96		17.60	636.19	Pumping
		09/09/96		20.02	633.77	Not Pumping
		09/06/96		19.93	633.86	Pumping
		12/01/97		20.83	632.96	Not Pumping
		11/26/97		21.08	632.71	Pumping
		09/08/98		20.46	633.33	Not Pumping
		09/11/98		21.03	632.76	Not Pumping[b]

Table 6
Groundwater Elevation Data Sets
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Monitoring Zone	Measurement Date	TOC Elevation (feet NGVD)	Groundwater (feet BTOC)	Groundwater Elevation (feet NGVD)	On-Site Production Well Status[a]
OP-11	Overburden	05/07/96	653.61	13.84	639.77	Not Pumping
		05/16/96		13.43	640.18	Pumping
		07/22/96		15.53	638.08	Not Pumping
		07/19/96		15.35	638.26	Pumping
		09/09/96		17.90	635.71	Not Pumping
		09/06/96		17.85	635.76	Pumping
		12/01/97		18.92	634.69	Not Pumping
		11/26/97		19.14	634.47	Pumping
		09/08/98		18.88	634.73	Not Pumping
		09/11/98		18.93	634.68	Not Pumping[b]
OP-12	Overburden	05/07/96	652.98	13.16	639.82	Not Pumping
		05/16/96		12.75	640.23	Pumping
		07/22/96		14.86	638.12	Not Pumping
		07/19/96		14.67	638.31	Pumping
		09/09/96		17.22	635.76	Not Pumping
		09/06/96		17.15	635.83	Pumping
		12/01/97		18.24	634.74	Not Pumping
		11/26/97		18.48	634.50	Pumping
		09/08/98		18.19	634.79	Not Pumping
		09/11/98		18.25	634.73	Not Pumping[b]
OP-13	Overburden	12/01/97	660.21	27.31	632.90	Not Pumping
		11/26/97		27.54	632.67	Pumping
		09/08/98		27.46	632.75	Not Pumping
		09/11/98		27.55	632.66	Not Pumping[b]
OP-14	Overburden	12/01/97	653.03	20.41	632.62	Not Pumping
		11/26/97		20.63	632.40	Pumping
		09/08/98		20.60	632.43	Not Pumping
		09/11/98		20.67	632.36	Not Pumping[b]
OP-15	Overburden	12/01/97	652.66	17.91	634.75	Not Pumping
		11/26/97		18.14	634.52	Pumping
		09/08/98		17.86	634.80	Not Pumping
		09/11/98		17.93	634.73	Not Pumping[b]

Table 6
Groundwater Elevation Data Sets
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Monitoring Zone	Measurement Date	TOC Elevation (feet NGVD)	Groundwater (feet BTOC)	Groundwater Elevation (feet NGVD)	On-Site Production Well Status[a]
OP-16	Intermediate	09/08/98	Not Surveyed	17.69	638.27	Not Pumping
		09/11/98		17.87	638.31	Not Pumping[b]
BP-1	Bedrock	05/07/96	650.82	8.87	641.95	Not Pumping
		05/16/96		8.17	642.65	Pumping
		07/22/96		10.78	640.04	Not Pumping
		07/19/96		10.61	640.21	Pumping
		09/09/96		12.55	638.27	Not Pumping
		09/06/96		12.51	638.31	Pumping
		12/01/97		11.94	638.88	Not Pumping
		11/26/97		12.30	638.52	Pumping
		09/08/98		13.12	637.70	Not Pumping
		09/11/98		13.21	637.61	Not Pumping[b]
BP-2	Bedrock	05/07/96	652.10	12.05	640.05	Not Pumping
		05/16/96		11.73	640.37	Pumping
		07/22/96		13.75	638.35	Not Pumping
		07/19/96		13.76	638.34	Pumping
		09/09/96		15.78	636.32	Not Pumping
		09/06/96		15.87	636.23	Pumping
		12/01/97		15.99	636.11	Not Pumping
		11/26/97		16.39	635.71	Pumping
		09/08/98		16.58	635.52	Not Pumping
		09/11/98		16.79	635.31	Not Pumping[b]
BP-3	Bedrock	05/07/96	648.99	8.91	640.08	Not Pumping
		05/16/96		8.62	640.37	Pumping
		07/22/96		10.56	638.43	Not Pumping
		07/19/96		10.59	638.40	Pumping
		09/09/96		12.60	636.39	Not Pumping
		09/06/96		57.43	591.56	Pumping
		12/01/97		12.83	636.16	Not Pumping
		11/26/97		13.27	635.72	Pumping
		09/08/98		13.39	635.60	Not Pumping
		09/11/98		13.51	635.48	Not Pumping[b]

Table 6
Groundwater Elevation Data Sets
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Monitoring Zone	Measurement Date	TOC Elevation (feet NGVD)	Groundwater (feet BTOC)	Groundwater Elevation (feet NGVD)	On-Site Production Well Status[a]
BP-4	Bedrock	05/07/96	652.44	12.37	640.07	Not Pumping
		05/16/96		14.33	638.11	Pumping
		07/22/96		14.06	638.38	Not Pumping
		07/19/96		16.53	635.91	Pumping
		09/09/96		16.09	636.35	Not Pumping
		09/06/96		16.57	635.87	Pumping
		12/01/97		16.31	636.13	Not Pumping
		11/26/97		19.34	633.10	Pumping
		09/08/98		16.88	635.56	Not Pumping
		09/11/98		16.99	635.45	Not Pumping[b]
BP-5	Bedrock	05/07/96	652.05	83.50	568.55	Not Pumping
		05/16/96		49.58	602.47	Pumping
		07/22/96		16.53	635.52	Not Pumping
		07/19/96		16.77	635.28	Pumping
		09/09/96		15.65	636.40	Not Pumping
		09/06/96		15.66	636.39	Pumping
		12/01/97		71.83	580.22	Not Pumping
		11/26/97		74.85	577.20	Pumping
		09/08/98		73.84	578.21	Not Pumping
		09/11/98		71.77	580.28	Not Pumping[b]
BP-6	Bedrock	05/07/96	653.80	16.07	637.73	Not Pumping
		05/16/96		15.63	638.17	Pumping
		07/22/96		17.58	636.22	Not Pumping
		07/19/96		17.44	636.36	Pumping
		09/09/96		19.61	634.19	Not Pumping
		09/06/96		19.57	634.23	Pumping
		12/01/97		19.97	633.83	Not Pumping
		11/26/97		20.21	633.59	Pumping
		09/08/98		20.94	632.86	Not Pumping
		09/11/98		21.54	632.26	Not Pumping[b]

Table 6
Groundwater Elevation Data Sets
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Monitoring Zone	Measurement Date	TOC Elevation (feet NGVD)	Groundwater (feet BTOC)	Groundwater Elevation (feet NGVD)	On-Site Production Well Status[a]
L-1	Overburden	05/07/96	650.42	11.89	638.53	Not Pumping
		05/16/96		11.79	638.63	Pumping
		07/22/96		13.41	637.01	Not Pumping
		07/19/96		13.60	636.82	Pumping
		09/09/96		15.66	634.76	Not Pumping
		09/06/96		15.64	634.78	Pumping
		12/01/97		16.47	633.95	Not Pumping
		11/26/97		17.35	633.07	Pumping
		09/08/98		16.52	633.90	Not Pumping
		09/11/98		16.57	633.85	Not Pumping[b]
L-2	Bedrock	05/07/96	650.56	10.79	639.77	Not Pumping
		05/16/96		10.34	640.22	Pumping
		07/22/96		12.39	638.17	Not Pumping
		07/19/96		12.31	638.25	Pumping
		09/09/96		14.36	636.20	Not Pumping
		09/06/96		14.33	636.23	Pumping
		12/01/97		14.63	635.93	Not Pumping
		11/26/97		14.90	635.66	Pumping
		09/08/98		15.13	635.43	Not Pumping
		09/11/98		15.19	635.37	Not Pumping[b]
L-3	Overburden	05/07/96	649.76	11.26	638.50	Not Pumping
		05/16/96		10.75	639.01	Pumping
		07/22/96		12.78	636.98	Not Pumping
		07/19/96		12.58	637.18	Pumping
		09/09/96		14.79	634.97	Not Pumping
		09/06/96		14.85	634.91	Pumping
		12/01/97		15.76	634.00	Not Pumping
		11/26/97		15.88	633.88	Pumping
		09/08/98		15.83	633.93	Not Pumping
		09/11/98		15.84	633.92	Not Pumping[b]

Table 6
Groundwater Elevation Data Sets
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Monitoring Zone	Measurement Date	TOC Elevation (feet NGVD)	Groundwater (feet BTOC)	Groundwater Elevation (feet NGVD)	On-Site Production Well Status[a]
PZ-1	Overburden	05/07/96	649.89	11.35	638.54	Not Pumping
		05/16/96		11.08	638.81	Pumping
		07/22/96		12.90	636.99	Not Pumping
		07/19/96		12.92	636.97	Pumping
		09/09/96		15.14	634.75	Not Pumping
		09/06/96		15.13	634.76	Pumping
		12/01/97		15.94	633.95	Not Pumping
		11/26/97		16.64	633.25	Pumping
		09/08/98		15.99	633.90	Not Pumping
		09/11/98		16.07	633.82	Not Pumping[b]
PZ-2	Overburden	05/07/96	649.51	11.00	638.51	Not Pumping
		05/16/96		10.63	638.88	Pumping
		07/22/96		12.54	636.97	Not Pumping
		07/19/96		12.47	637.04	Pumping
		09/09/96		14.77	634.74	Not Pumping
		09/06/96		14.73	634.78	Pumping
		12/01/97		15.59	633.92	Not Pumping
		11/26/97		16.06	633.45	Pumping
		09/08/98		15.63	633.88	Not Pumping
		09/11/98		15.71	633.80	Not Pumping[b]
North Well	Overburden	05/07/96	650.44	11.89	638.55	Not Pumping
		05/16/96		13.35	637.09	Pumping
		07/22/96		13.41	637.03	Not Pumping
		07/19/96		15.10	635.34	Pumping
		09/09/96		15.64	634.80	Not Pumping
		09/06/96		15.71	634.73	Pumping
		12/01/97		16.50	633.94	Not Pumping
		11/26/97		19.80	630.64	Pumping
		09/08/98		16.49	633.95	Not Pumping
		09/11/98		16.47	633.97	Not Pumping[b]

Table 6
Groundwater Elevation Data Sets
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Monitoring Zone	Measurement Date	TOC Elevation (feet NGVD)	Groundwater (feet BTOC)	Groundwater Elevation (feet NGVD)	On-Site Production Well Status[a]
West Well	Bedrock	05/07/96	652.34	12.28	640.06	Not Pumping
		05/16/96		44.68	607.66	Pumping
		07/22/96		13.97	638.37	Not Pumping
		07/19/96		44.68	607.66	Pumping
		09/09/96		16.01	636.33	Not Pumping
		09/06/96		44.57	607.77	Pumping
		12/01/97		16.23	636.11	Not Pumping
		11/26/97		44.72	607.62	Pumping
		09/08/98		16.81	635.53	Not Pumping
		09/11/98		16.95	635.39	Not Pumping[b]
East Well	Bedrock	05/07/96	651.09	12.46	638.63	Not Pumping
		05/16/96		12.14	638.95	Pumping
		07/22/96		14.04	637.05	Not Pumping
		07/19/96		13.98	637.11	Pumping
		09/09/96		15.27	635.82	Not Pumping
		09/06/96		16.33	634.76	Pumping
		12/01/97		17.11	633.98	Not Pumping
		11/26/97		Inaccessible	Undetermined	Pumping
		09/08/98		17.17	633.92	Not Pumping
		09/11/98		17.32	633.77	Not Pumping[b]
DEC-1	Overburden	05/07/96	645.13	4.90	640.23	Not Pumping
		05/16/96		4.40	640.73	Pumping
		07/22/96		Dry	Dry	Not Pumping
		07/19/96		6.60[c]	638.53[c]	Pumping
		09/09/96		7.00	638.13	Not Pumping
		09/06/96		Dry	Dry	Pumping
		12/01/97		Dry	Dry	Not Pumping
		11/26/97		Dry	Dry	Pumping
		09/08/98		6.10	639.03	Not Pumping
		09/11/98		6.47	638.66	Not Pumping[b]

Table 6
Groundwater Elevation Data Sets
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Monitoring Zone	Measurement Date	TOC Elevation (feet NGVD)	Groundwater (feet BTOC)	Groundwater Elevation (feet NGVD)	On-Site Production Well Status[a]
DEC-2	Overburden	05/07/96	642.93	2.33	640.60	Not Pumping
		05/16/96		1.94	640.99	Pumping
		07/22/96		—	—	Not Pumping
		07/19/96		—	—	Pumping
		09/09/96		—	—	Not Pumping
		09/06/96		—	—	Pumping
		12/01/97		—	—	Not Pumping
		11/26/97		—	—	Pumping
		09/08/98		—	—	Not Pumping
		09/11/98		—	—	Not Pumping[b]
DEC-3	Overburden	05/07/96	643.00	3.07	639.93	Not Pumping
		05/16/96		2.67	640.33	Pumping
		07/22/96		4.82	638.18	Not Pumping
		07/19/96		4.61	638.39	Pumping
		09/09/96		7.21	635.79	Not Pumping
		09/06/96		7.16	635.84	Pumping
		12/01/97		8.31	634.69	Not Pumping
		11/26/97		8.56	634.44	Pumping
		09/08/98		8.24	634.76	Not Pumping
		09/11/98		8.29	634.71	Not Pumping[b]
DEC-4	Overburden	05/07/96	645.45	5.40	640.05	Not Pumping
		05/16/96		5.00	640.45	Pumping
		07/22/96		7.13	638.32	Not Pumping
		07/19/96		6.96	638.49	Pumping
		09/09/96		9.60	635.85	Not Pumping
		09/06/96		9.52	635.93	Pumping
		12/01/97		10.69	634.76	Not Pumping
		11/26/97		10.92	634.53	Pumping
		09/08/98		Dry	Dry	Not Pumping
		09/11/98		Dry	Dry	Not Pumping[b]

Table 6
Groundwater Elevation Data Sets
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Monitoring Zone	Measurement Date	TOC Elevation (feet NGVD)	Groundwater (feet BTOC)	Groundwater Elevation (feet NGVD)	On-Site Production Well Status[a]
DEC-5	Overburden	05/07/96	657.10	16.58	640.52	Not Pumping
		05/16/96		16.18	640.92	Pumping
		07/22/96		18.46	638.64	Not Pumping
		07/19/96		18.27	638.83	Pumping
		09/09/96		21.05	636.05	Not Pumping
		09/06/96		20.96	636.14	Pumping
		12/01/97		22.27	634.83	Not Pumping
		11/26/97		22.56	634.54	Pumping
		09/08/98		22.13	634.97	Not Pumping
		09/11/98		22.22	634.88	Not Pumping[b]
DEC-6	Overburden	05/07/96	643.99	3.97	640.02	Not Pumping
		05/16/96		3.56	640.43	Pumping
		07/22/96		5.72	638.27	Not Pumping
		07/19/96		5.52	638.47	Pumping
		09/09/96		9.14	634.85	Not Pumping
		09/06/96		8.08	635.91	Pumping
		12/01/97		9.25	634.74	Not Pumping
		11/26/97		9.50	634.49	Pumping
		09/08/98		9.17	634.82	Not Pumping
		09/11/98		9.21	634.78	Not Pumping[b]
DEC-7	Overburden	05/07/96	655.45	15.00	640.45	Not Pumping
		05/16/96		14.59	640.86	Pumping
		07/22/96		16.87	638.58	Not Pumping
		07/19/96		16.69	638.76	Pumping
		09/09/96		19.00	636.45	Not Pumping
		09/06/96		18.90	636.55	Pumping
		12/01/97		Dry	Dry	Not Pumping
		11/26/97		Dry	Dry	Pumping
		09/08/98		Dry	Dry	Not Pumping
		09/11/98		Dry	Dry	Not Pumping[b]

Table 6
Groundwater Elevation Data Sets
Jones Chemicals, Inc.
Caledonia, New York

Well ID	Monitoring Zone	Measurement Date	TOC Elevation (feet NGVD)	Groundwater (feet BTOC)	Groundwater Elevation (feet NGVD)	On-Site Production Well Status[a]
DEC-8	Overburden	05/07/96	645.91	6.66	639.25	Not Pumping
		05/16/96		6.25	639.66	Pumping
		07/22/96		8.37	637.54	Not Pumping
		07/19/96		8.17	637.74	Pumping
		09/09/96		10.73	635.18	Not Pumping
		09/06/96		10.68	635.23	Pumping
		12/01/97		11.76	634.15	Not Pumping
		11/26/97		12.00	633.91	Pumping
		09/08/98		11.71	634.20	Not Pumping
		09/11/98		11.81	634.10	Not Pumping[b]
DEC-9	Overburden	05/07/96	649.25	10.72	638.53	Not Pumping
		05/16/96		10.22	639.03	Pumping
		07/22/96		12.24	637.01	Not Pumping
		07/19/96		12.06	637.19	Pumping
		09/09/96		13.50	635.75	Not Pumping
		09/06/96		12.60	636.65	Pumping
		12/01/97		Dry	Dry	Not Pumping
		11/26/97		Dry	Dry	Pumping
		09/08/98		Dry	Dry	Not Pumping
		09/11/98		Dry	Dry	Not Pumping[b]
DEC-10	Overburden	05/07/96	649.54	11.04	638.50	Not Pumping
		05/16/96		10.56	638.98	Pumping
		07/22/96		12.56	636.98	Not Pumping
		07/19/96		12.37	637.17	Pumping
		09/09/96		14.74	634.80	Not Pumping
		09/06/96		15.62	633.92	Pumping
		12/01/96		15.52	634.02	Not Pumping
		11/26/97		15.63	633.91	Pumping
		09/08/98		15.61	633.93	Not Pumping
		09/11/98		15.63	633.91	Not Pumping[b]

Notes:

[a] Refers to pumping/non-pumping status of on-site production wells (North Well and West Well).

[b] The West Well does not appear to have been pumping when water levels were measured on 9/11/98, based on the lack of drawdown recorded during the previous measuring events.

[c] estimated; casing broken

— = unable to locate well
TOC = top of casing (surveyed to third decimal place)
NGVD = National Geodetic Vertical Datum
BTOC = below top of casing

Table 7
Summary of Hydraulic Testing Analyses
Jones Chemicals, Inc.
Caledonia, New York
November 29 through December 2, 1994

Well ID	Distance from Pumping Well (feet)	Maximum Drawdown Observed (feet)	Solution	Transmissivity		Storativity (S)	Specified Yield (Sy)	Pumping Well	Comments
				(ft^2/min)	(gpd/ft)				
DECEMBER 1 AND 2, 1994									
Observation Wells:									
PZ-1	26	0.67	Theis[1]	25	269,298	0.023	---	North Well	Drawdown data analyzed.
PZ-1	26	0.67	Neuman[2]	28	301,614	0.021	0.1	North Well	Drawdown data analyzed. Neuman condition Sy/S > 10 is not satisfied.
PZ-1	26	0.67	Theis[1]	28	301,614	0.032	---	North Well	Drawdown and recovery data analyzed.
PZ-1	26	0.67	Theis[1]	29	312,386	0.230	---	North Well	Recovery data analyzed.
PZ-2	70	0.43	Theis	29	312,386	0.024	---	North Well	Drawdown and recovery data analyzed.
PZ-2	70	0.43	Neuman	41	441,649	0.010	0.1	North Well	Drawdown data analyzed. Neuman condition Sy/S > 10 is satisfied.
PZ-2	70	0.43	Theis[1]	31	333,930	0.025	---	North Well	Drawdown and recovery data analyzed.
PZ-2	70	0.43	Theis[1]	34	366,246	0.323	---	North Well	Recovery data analyzed.
NOVEMBER 29 AND 30, 1994									
Observation Wells:									
OP-4	325	0.17	Theis	5	53,859	0.0009	---	West Well	Drawdown data analyzed.
BP-4	10	2.28	Theis	0.78	8,400	0.0003	---	West Well	Drawdown data analyzed.

Notes

[1] Theis (1935) Curve Matching Solution for Confined Conditions.
[2] Neuman (1974) Curve Matching Method for Unconfined Conditions.

--- = none
ft^2/min = square feet per minute
gpd/ft = gallons per day per foot

Table 8: Site-Specific Parameter List (SSPL), Jones Chemicals, Inc., Caledonia, New York

Media	Parameter Group	EPA Method
Sediment Samples (collected from sump/dry well locations)	Purgeable halocarbons	SW-846 Method 8240
	Semivolatile organic compounds	SW-846 Method 8270
	Cadmium, chromium, iron, manganese	SW-846 Method 6010
	Lead	SW-846 Method 7421
Sludge Samples (collected from lagoon and lagoon sludge spread area)	Purgeable halocarbons	SW-846 Method 8260
	Cadmium, chromium, iron, manganese	SW-846 Method 6010
	Lead	SW-846 Method 7421
Subsurface Soil Samples	Purgeable halocarbons	SW-846 Method 8240
	Cadmium, chromium, lead, manganese	SW-846 Method 6010
	Lead	SW-846 Method 7421
Groundwater Samples	Low concentration volatile organic compounds: 1,2-Dichloroethene Chloroform 1,1,1-Trichloroethane Carbon Tetrachloride Dichlorobromethane Trichloroethene Benzene Tetrachloroethene Ethylbenzene Bromoform Xylene (ortho, para) 1,2,4-Trimethylbenzene	Method 524.2 Additional QC requirements (see Attachment II)
	Cadmium, chromium, iron, manganese	SW-846 Method 6010
	Lead	SW-846 Method 7421

Source: U.S. EPA 1995.

Table 9
Subsurface Soil Sample Analytical Results
Volatile Organic Compounds (by U.S. EPA SW-846 Method 8240)
Jones Chemicals, Inc.
Caledonia, New York
November 1995

	Sample Name (depth in feet below ground surface)																			
Parameter	BSS-1[a]	BSS-2[a]	BSS-3[a]	SB-1 (0-0.5)	SB-1 (15-17)	SB-2 (0-0.5)	SB-2 (12-14)	SB-3 (0-0.5)	DUP-1[b] (0-0.5)	SB-3 (10-12)	SB-4 (0-0.5)	SB-4 (2-4)	SB-5 (0-0.5)	SB-5 (8-10)	SB-6 (0-0.5)	SB-6 (12-14)	SB-7 (0-0.5)	SB-7 (8-10)	SB-8 (0-0.5)	SB-8 (12-14)
Chloromethane	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
Bromomethane	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
Vinyl Chloride	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
Chloroethane	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
Methylene Chloride	**1 J,B**	< 12	**1 J,B**	**520 J,D**	< 10	**4 J,B**	**6 J,B**	< 11	<11	< 10	< 12	< 10	< 10	**2 J**	< 11	< 11	< 10	< 12	< 11	< 10
Acetone	< 12	< 12	< 11	< 11	**49 B**	**170 B**	**140 B**	< 11	<11	**3200 B,D**	< 12	**510 B,D**	**3 J**	**5100 B,D**	**8 J**	**450 B,D**	**12 B**	**2000 B,D**	< 11	**460 B,D**
Carbon Disulfide	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
1,1-Dichloroethene	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
1,1-Dichloroethane	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
1,2-Dichloroethene (total)	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
Chloroform	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	**7 J**	< 11	< 11	< 11	**4 J**	**2 J**	< 11	< 10
1,2-Dichloroethane	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
2-Butanone	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
1,1,1-Trichloroethane	< 12	< 12	< 11	< 11	< 10	< 11	**6 J**	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
Carbon Tetrachloride	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
Bromodichloromethane	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
1,2-Dichloropropane	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
cis-1,3-Dichloropropene	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
Trichloroethene	< 12	< 12	< 11	**5 J**	**13**	**8 J**	**120**	**6 J**	<11	**9 J**	< 12	**2 J**	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
Benzene	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
Dibromochloromethane	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
trans-1,3-Dichloropropene	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
1,1,2-Trichloroethane	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
Bromoform	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
4-Methyl-2-Pentanone	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
2-Hexanone	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
Tetrachloroethene	< 12	< 12	< 11	**11000 D**	**2300 D**	**530 D**	**2300 D**	**65**	**75**	**91**	**23**	**41**	< 10	< 11	**20**	< 11	**11**	< 12	**4 J**	**12**
1,1,2,2-Tetrachloroethane	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
Toluene	< 12	< 12	< 11	< 11	< 10	**13**	**36**	< 11	<11	**16**	< 12	**14 J,D**	< 10	< 11	**3 J**	< 11	< 10	< 12	< 11	**3 J**
Chlorobenzene	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
Ethylbenzene	< 12	< 12	< 11	< 11	< 10	**3 J**	**4 J**	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
Styrene	< 12	< 12	< 11	< 11	< 10	< 11	< 11	< 11	<11	< 10	< 12	< 10	< 10	< 11	< 11	< 11	< 10	< 12	< 11	< 10
Xylene (total)	< 12	< 12	< 11	< 11	< 10	**19**	**80**	**3 J**	<11	< 10	< 12	**17 J,D**	< 10	< 11	**6 J**	< 11	< 10	< 12	< 11	< 10

Table 9
Subsurface Soil Sample Analytical Results
Volatile Organic Compounds (by U.S. EPA SW-846 Method 8240)
Jones Chemicals, Inc.
Caledonia, New York
November 1995

Parameter (ug/kg)	Sample Name (depth in feet below ground surface)																
	SB-9 (0-0.5)	DUP-3[c] (0-0.5)	SB-9 (14-16)	SB-10 (0-0.5)	SB-10 (12-14)	SB-11 (0-0.5)	SB-11 (12-14)	SB-12 (0-0.5)	SB-12 (12-14)	SB-13 (0-0.5)	SB-13 (10-12)	SB-14 (0-0.5)	SB-14 (10-12)	SB-15 (0-0.5)	SB-15 (6-8)	SB-16[d] (0-2)	SB-16[d] (12-14)
Chloromethane	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
Bromomethane	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
Vinyl Chloride	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
Chloroethane	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
Methylene Chloride	< 10	**4 J**	< 10	**8 J**	**2 J**	< 10	< 11	< 12	**28 J,D**	< 13	< 11	< 12	**15 J,D**	**5 J**	**24 J,D**	<11	<11
Acetone	< 10	**15**	**240 D**	< 10	**210**	**8 J**	**200**	< 12	**790 D**	< 13	**94**	< 12	**360 D**	< 13	**840 D**	**5 J,B**	**6 J,B**
Carbon Disulfide	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
1,1-Dichloroethene	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
1,1-Dichloroethane	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
1,2-Dichloroethene (total)	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
Chloroform	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
1,2-Dichloroethane	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
2-Butanone	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
1,1,1-Trichloroethane	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
Carbon Tetrachloride	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
Bromodichloromethane	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
1,2-Dichloropropane	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
cis-1,3-Dichloropropene	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
Trichloroethene	< 10	< 11	< 10	< 10	< 10	**5 J**	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	**5 J**	**1 J**
Benzene	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
Dibromochloromethane	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
trans-1,3-Dichloropropene	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
1,1,2-Trichloroethane	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
Bromoform	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
4-Methyl-2-Pentanone	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
2-Hexanone	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
Tetrachloroethene	**8 J**	**2 J**	**7 J**	**4 J**	**8 J**	**4 J**	**12**	< 12	**9 J**	< 13	**4 J**	< 12	**2 J**	< 13	< 10	**16**	**12**
1,1,2,2-Tetrachloroethane	<10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
Toluene	**11**	< 11	< 10	< 10	< 10	< 10	**2 J**	< 12	< 10	< 13	**3 J**	< 12	< 10	< 13	< 10	<11	<11
Chlorobenzene	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
Ethylbenzene	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
Styrene	< 10	< 11	< 10	< 10	< 10	< 10	< 11	< 12	< 10	< 13	< 11	< 12	< 10	< 13	< 10	<11	<11
Xylene (total)	**13**	< 11	< 10	< 10	< 10	**12**	**3 J**	< 12	< 10	< 13	**6 J**	< 12	< 10	< 13	< 10	<11	<11

Notes:

Bold indicates positive detection.
All values are presented in micrograms per kilogram.
[a] sampled in August 1994
[b] DUP-1 is a duplicate of sample SB3 (0- to 0.5-foot depth) and was also analyzed for metals.
[c] DUP-3 is a duplicate of sample SB9 (0- to 0.5-foot depth) and was also analyzed for metals.
[d] sampled in April 1996

U.S. EPA = U.S. Environmental Protection Agency
SB = soil boring
< = indicates the method detection limit
J = estimated value
D = compound identified at secondary dilution factor
B = indicates possible/probable blank contamination
μg/kg = micrograms per kilogram

Table 10
Background Soil Sample Analytical Results for Metals
Jones Chemical, Inc., Caledonia, New York
August 1994

Analyte	Units	CRDL	Sample Name		
			BSS-1	BSS-2	BSS-3
Aluminum	mg/kg	20	17,800	17,100	7,350
Antimony	mg/kg		0.52 J	0.41 J	0.25 J
Arsenic	mg/kg	1	5.9	4.2	2.3
Barium	mg/kg	20	79.7	61.3	<20
Beryllium	mg/kg	0.5	0.78	0.72	<0.5
Cadmium	mg/kg	0.5	<0.5	<0.5	<0.5
Calcium	mg/kg	500	17,700	52,600	133,000
Chromium	mg/kg	1	23.6 J	22.9 J	10.9 J
Cobalt	mg/kg	5	8.3 J	7.6 J	<5 J
Copper	mg/kg	2.5	18.1	16	13.1
Cyanide	mg/kg		< 0.58	< 0.58	< 0.53
Iron	mg/kg	10	26,200	21,500	10,600
Lead	mg/kg	0.3	38.6	20.4	6.9
Magnesium	mg/kg	500	15,000	35,400	80,100
Manganese	mg/kg	1.5	556 J	476j	286 J
Mercury	mg/kg	0.02	0.12	0.21	<0.02
Nickel	mg/kg	4	19.4 J	19.1 J	10.7 J
Potassium	mg/kg	500	3,920	5,270	4,090
Selenium	mg/kg	0.5	0.61	<0.5	<0.5
Silver	mg/kg	1	<1	<1	<1
Sodium	mg/kg	500	<500	<500	<500
Thallium	mg/kg		< 0.21	< 0.21	< 0.19
Vanadium	mg/kg	5	31	28.2	13.2
Zinc	mg/kg	2	78.3	60.4	40.8

Notes:

CRDL =

mg/l = milligrams per liter

J = estimated due to QC problems

Table 11
Sludge Sample Analytical Results
Volatile Organic Compounds (by U.S. EPA SW-84 Method 8240)
Jones Chemicals, Inc.
Caledonia, New York
November 1995

Parameter (ug/kg)	Sample Name*					
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6
Chloromethane	< 12	< 12	< 12	< 12	< 12	< 31
Bromomethane	< 12	< 12	< 12	< 12	< 12	< 31
Vinyl Chloride	< 12	< 12	< 12	< 12	< 12	**130**
Chloroethane	< 12	< 12	< 12	< 12	< 12	< 31
Methylene Chloride	< 12	**2 J**	**3 J**	< 12	**4 J**	< 31
Acetone	< 12	**3 J**	< 12	< 12	< 12	**150**
Carbon Disulfide	< 12	< 12	< 12	< 12	< 12	**27 J**
1,1-Dichloroethene	< 12	< 12	< 12	< 12	< 12	< 31
1,1-Dichloroethane	< 12	< 12	< 12	< 12	< 12	< 31
1,2-Dichloroethene (total)	< 12	< 12	< 12	< 12	**5 J**	**260**
Chloroform	< 12	< 12	< 12	< 12	< 12	< 31
1,2-Dichloroethane	< 12	< 12	< 12	< 12	< 12	< 31
2-Butanone	< 12	< 12	< 12	< 12	< 12	**44**
1,1,1-Trichloroethane	< 12	< 12	< 12	< 12	< 12	< 31
Carbon Tetrachloride	< 12	< 12	< 12	< 12	< 12	< 31
Bromodichloromethane	< 12	< 12	< 12	< 12	< 12	< 31
1,2-Dichloropropane	< 12	< 12	< 12	< 12	< 12	< 31
cis-1,3-Dichloropropene	< 12	< 12	< 12	< 12	< 12	< 31
Trichloroethene	< 12	< 12	< 12	< 12	< 12	**23 J**
Benzene	< 12	< 12	< 12	< 12	< 12	< 31
Dibromochloromethane	< 12	< 12	< 12	< 12	< 12	< 31
trans-1,3-Dichloropropene	< 12	< 12	< 12	< 12	< 12	< 31
1,1,2-Trichloroethane	< 12	< 12	< 12	< 12	< 12	< 31
Bromoform	< 12	< 12	< 12	< 12	< 12	< 31
4-Methyl-2-Pentanone	< 12	< 12	< 12	< 12	< 12	< 31
2-Hexanone	< 12	< 12	< 12	< 12	< 12	< 31
Tetrachloroethene	**24**	**51**	**3 J**	**35**	**4 J**	**310**
1,1,2,2-Tetrachloroethane	< 12	< 12	< 12	< 12	< 12	< 31
Toluene	< 12	**2 J**	< 12	< 12	**5 J**	< 31
Chlorobenzene	< 12	< 12	< 12	< 12	< 12	< 31
Ethylbenzene	< 12	< 12	< 12	< 12	< 12	< 31
Styrene	< 12	< 12	< 12	< 12	< 12	< 31
Xylene (total)	< 12	< 12	< 12	< 12	< 12	**33**

Notes

Bold indicates positive detection.
*Sludge samples were collected at a depth of 0 to 0.5 foot below ground surface.
U.S. EPA = U.S. Environmental Protection Agency
ug/kg = micrograms per kilogram
SL = sludge
< = indicates the method detection limit
J = estimated value

Table 12
Sediment Sample Analytical Results
Volatile Organic Compounds (by U.S. EPA SW-846 Method 8240)
Jones Chemicals, Inc.
Caledonia, New York
November 1995

Parameter (ug/kg)	Sample Name*					
	SD-1	SD-2	SD-3	SD-4	SD-5	SD-6
Chloromethane	< 11	< 11	< 12	< 12	< 13	< 13
Bromomethane	< 11	< 11	< 12	< 12	< 13	< 13
Vinyl Chloride	< 11	< 11	< 12	< 12	< 13	< 13
Chloroethane	< 11	< 11	< 12	< 12	< 13	< 13
Methylene Chloride	< 11	**4 J,B**	< 12	< 12	< 13	< 13
Acetone	< 11	**10 J,B**	< 12	< 12	< 13	< 13
Carbon Disulfide	< 11	< 11	< 12	< 12	< 13	< 13
1,1-Dichloroethene	< 11	< 11	< 12	< 12	< 13	< 13
1,1-Dichloroethane	< 11	< 11	< 12	< 12	< 13	< 13
1,2-Dichloroethene (total)	< 11	< 11	< 12	< 12	< 13	< 13
Chloroform	< 11	**5 J**	< 12	< 12	< 13	< 13
1,2-Dichloroethane	< 11	< 11	< 12	< 12	< 13	< 13
2-Butanone	< 11	< 11	< 12	< 12	< 13	< 13
1,1,1-Trichloroethane	< 11	< 11	< 12	< 12	< 13	< 13
Carbon Tetrachloride	< 11	< 11	< 12	< 12	< 13	< 13
Bromodichloromethane	< 11	< 11	< 12	< 12	< 13	< 13
1,2-Dichloropropane	< 11	< 11	< 12	< 12	< 13	< 13
cis-1,3-Dichloropropene	< 11	< 11	< 12	< 12	< 13	< 13
Trichloroethene	< 11	< 11	< 12	< 12	< 13	< 13
Benzene	< 11	< 11	< 12	< 12	< 13	< 13
Dibromochloromethane	< 11	< 11	< 12	< 12	< 13	< 13
trans-1,3-Dichloropropene	< 11	< 11	< 12	< 12	< 13	< 13
1,1,2-Trichloroethane	< 11	< 11	< 12	< 12	< 13	< 13
Bromoform	< 11	< 11	< 12	< 12	< 13	< 13
4-Methyl-2-Pentanone	< 11	< 11	< 12	< 12	< 13	< 13
2-Hexanone	< 11	< 11	< 12	< 12	< 13	< 13
Tetrachloroethene	**3 J**	**2 J**	< 12	**22**	< 13	< 13
1,1,2,2-Tetrachloroethane	< 11	< 11	< 12	< 12	< 13	< 13
Toluene	**4 J**	**9 J**	< 12	< 12	< 13	< 13
Chlorobenzene	< 11	< 11	< 12	< 12	< 13	< 13
Ethylbenzene	< 11	**2 J**	< 12	< 12	< 13	< 13
Styrene	< 11	< 11	< 12	< 12	< 13	< 13
Xylene (total)	**5 J**	**16**	< 12	< 12	< 13	< 13

Notes

Bold indicates positive detection.

*Sediment samples were collected at a depth of 0 to 0.5 foot below ground surface.

U.S. EPA = U.S. Environmental Protection Agency

ug/kg = micrograms per kilogram

SD = sediment

< = indicates the method detection limit

J = estimated value

B = indicates possible/probable blank contamination

Table 13
Subsurface Soil Sample Analytical Results
Metals (by U.S. EPA SW-846 Methods 6010 and 7421*)
Jones Chemicals, Inc.
Caledonia, New York
November 1995

Parameter (mg/kg)	Sample Name (depth in feet below ground surface)																	
	CRDL	SB-1 (0-0.5)	SB-1 (15-17)	SB-2 (0-0.5)	SB-2 (12-14)	SB-3 (0-0.5)	DUP-1** (0-0.5)	SB-3 (10-12)	SB-4 (0-0.5)	SB-4 (2-4)	SB-5 (0-0.5)	SB-5 (8-10)	SB-6 (0-0.5)	SB-6 (12-14)	SB-7 (0-0.5)	SB-7 (8-10)	SB-8 (0-0.5)	SB-8 (12-14)
Cadmium	1.0	0.44	0.45	0.6	0.48	1.4	1.6	0.51	0.47	0.45	0.6	0.46	0.45	0.46	1.2	0.48	1.5	0.52
Chromium	2.0	6.6	10.3	19.8	13.1	25.7	30.3	14.3	18.6	11.8	4.9	16.2	33.2	13.1	10.5	3.6	29	15.2
Iron	20.0	5520	9070	15600	10600	12200	13400	9080	14600	8980	4010	11200	7020	9210	7890	5220	11400	11600
Lead	0.6	60.5	8.7	88.2	8.1	119	85.6	5.3	59.9	13.5	25.6	19.3	216	14.5	41.1	9.8	86.4	15.1
Manganese	3.0	134	356	339	211	300	300	172	374	192	124	206	272	194	137	236	192	240

Parameter (mg/kg)	Sample Name (depth in feet below ground surface)																	
	CRDL	SB-9 (0-0.5)	DUP-3*** (0-0.5)	SB-9 (14-16)	SB-10 (0-0.5)	SB-10 (12-14)	SB-11 (0-0.5)	SB-11 (12-14)	SB-12 (0-0.5)	SB-12 (12-14)	SB-13 (0-0.5)	SB-13 (10-12)	SB-14 (0-0.5)	SB-14 (10-12)	SB-15 (0-0.5)	SB-15 (6-8)	SB-16 (0-2)	SB-16 (12-14)
Cadmium	1.0	0.22	0.22	0.64	0.97	0.29	0.47	0.51	0.58	0.36	0.66	0.37	0.64	0.31	0.55	1	<0.61	<0.58
Chromium	2.0	5.1	9.5	12.9	74.6	2.5	13	18.9	10	11.7	19	11.7	19.7	10.3	11.4	4.6	<9.9	<22.4
Iron	20.0	2680	3800	8710	51300	4180	3280	13900	13600	10700	18800	9010	16900	10200	14200	6030	7960	17000
Lead	0.6	6.4	4.5	7.1	81.9	1.4	5.9	10.7	21.4	10.1	44	8.6	35.6	6	19.3	5	<9.2	<67.6
Manganese	3.0	91	103	333	581	172	116	1310	749	310	634	230	565	267	607	236	202	263

Notes

*U.S. EPA Method 6010 was used for all parameters except lead; Method 7421 was used for lead.
**DUP-1 is a duplicate of sample SB3 (0- to 0.5-foot depth) and was also analyzed for metals.
***DUP-3 is a duplicate of sample SB9 (0- to 0.5-foot depth) and was also analyzed for metals.
U.S. EPA = U.S. Environmental Protection Agency
mg/kg = milligrams per kilogram
SB = soil boring
CRDL = Contract Required Detection Limit

Table 14
Sludge Sample Analytical Results
Metals (by U.S. EPA SW-846 Methods 6010 and 7421*)
Jones Chemicals, Inc.
Caledonia, New York
November 1995

Parameter (mg/kg)	CRDL	Sample Name**					
		SL-1	SL-2	SL-3	SL-4	SL-5	SL-6
Cadmium***	1.0	0.5	11.5	0.49	4	0.52	8.8
Chromium	2.0	29.4	20.5	24.8	23	29.9	159
Iron	20.0	25,400	19,600	19,000	19,700	31,400	171,000
Lead	0.6	42.7	31.4	19.8	68.7	17	328
Manganese	3.0	531	422	557	435	504	499

Notes

*U.S. EPA Method 6010 was used for all parameters except lead; Method 7421 was used for lead.
**Sludge samples were collected at a depth of 0 to 0.5 foot below ground surface.
***Actual quantitation limit is 29.5 mg/kg due to blank contamination; all values for cadmium are below quantitation limits.
U.S. EPA = U.S. Environmental Protection Agency
CRDL = Contract Required Detection Limit
mg/kg = milligrams per kilogram
SL = sludge

Table 15
Sediment Sample Analytical Results
Metals (by U.S. EPA SW-846 Methods 6010 and 7421*)
Jones Chemicals, Inc.
Caledonia, New York
November 1995

Parameter (mg/kg)	CRDL	Sample Name**					
		SD-1	SD-2	SD-3	SD-4	SD-5	SD-6
Cadmium***	1.0	7.4	1.4	0.49	2.5	0.52	7
Chromium	2.0	24.2	33.9	15.7	44.1	45.6	20.1
Iron	20.0	13,300	13,100	36,700	36,400	32,900	27,500
Lead	0.6	98.6	123	2.5	228	48.2	64.2
Manganese	3.0	178	209	157	678	442	176

Notes

*U.S. EPA Method 6010 was used for all parameters except lead; Method 7421 was used for lead.
**Sediment samples were collected at a depth of 0 to 0.5 foot below ground surface.
***Actual quantitation limit is 29.5 mg/kg due to blank contamination; all values for cadmium are below quantitation limits.
CRDL = Contract Required Detection Limit
U.S. EPA = U.S. Environmental Protection Agency
mg/kg = milligrams per kilogram
SD = sediment

Table 16
Sediment and Sludge Sample Analytical Results
Semivolatile Organic Compounds (by U.S. EPA SW-846 Method 8270)
Jones Chemicals, Inc.
Caledonia, New York
November 1995

Parameter (ug/kg)	Sample Name*										
	BSS-1	BSS-2	BSS-3	SL-6	SD-1	DUP-2**	SD-2	SD-3	SD-4	SD-5	SD-6
Phenol	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
bis(2-Chloroethyl)ether	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
2-Chlorophenol	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
1,3-Dichlorobenzene	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
1,4-Dichlorobenzene	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
1,2-Dichlorobenzene	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
2-Methylphenol	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
2,2'-oxybis(1-Chloropropane)	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
4-Methylphenol	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
N-Nitroso-di-n-propylamine	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
Hexachloroethane	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	**55 J**	< 410	< 430
Nitrobenzene	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
Isophorone	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
2-Nitrophenol	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
2,4-Dimethylphenol	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
bis(2-Chloroethoxy)methane	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
2,4-Dichlorophenol	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
1,2,4-Trichlorobenzene	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
Naphthalene	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	**49 J**	< 430
4-Chloroaniline	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
Hexachlorobutadiene	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
4-Chloro-3-methylphenol	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
2-Methylnaphthalene	< 380	< 390	< 350	< 1,100	**42 J**	< 370	< 560	**59 J**	**39 J**	**49 J**	< 430
Hexachlorocyclopentadiene	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
2,4,6-Trichlorophenol	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
2,4,5-Trichlorophenol	< 960	< 970	< 880	< 2,800	< 890	< 920	< 1,400	< 980	< 970	< 1000	< 1,100
2-Chloronaphthalene	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
2-Nitroaniline	< 960	< 970	< 880	< 2,800	< 890	< 920	< 1,400	< 980	< 970	< 1,000	< 1,100
Dimethylphthalate	< 380	< 390	< 350	< 1,100	**38 J**	< 370	**63 J**	< 390	< 390	< 410	< 430
Acenaphthalene	< 380	< 390	< 350	< 1,100	**43 J**	< 370	< 560	< 390	< 390	**1400**	< 430
2,6-Dinitrotoluene	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
3-Nitroaniline	< 960	< 970	< 880	< 2,800	< 890	< 920	< 1,400	< 980	< 970	< 1,000	< 1,100
Acenaphthene	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	**85 J**	< 430
2,4-Dinitrophenol	< 960	< 970	< 880	< 2,800	< 890	< 920	< 1,400	< 980	< 970	< 1000	< 1,100
4-Nitrophenol	< 380	< 390	< 880	< 2,800	< 890	< 920	< 1,400	< 980	< 970	< 1000	< 1,100
Dibenzofuran	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	**110 J**	< 430
2,4-Dinitrotoluene	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
Diethylphthalate	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
Fluorene	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	**48 J**	< 390	**390 J**	< 430
4-Chlorophenyl-phenylether	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
4-Nitroaniline	< 960	< 970	< 880	< 2,800	< 890	< 920	< 1,400	< 980	< 970	< 1,000	< 1,100
4,6-Dinitro-2-methylphenol	< 960	< 970	< 880	< 2,800	< 890	< 920	< 1,400	< 980	< 970	< 1,000	< 1,100
N-Nitrosodiphenylamine	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
4-Bromophenyl-phenylether	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
Hexachlorobenzene	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	**2,100**	< 410	< 430
Pentachlorophenol	< 960	< 970	< 880	< 2,800	< 890	< 920	< 1,400	< 980	< 970	< 1,000	< 1,100
Phenanthrene	< 380	< 390	< 350	< 1,100	**340 J**	**170 J**	**140 J**	**230 J**	**87 J**	**2,300**	< 430
Anthracene	< 380	< 390	< 350	< 1,100	**94 J**	**58 J**	< 560	< 390	< 390	**1,200**	< 430
Carbazole	< 380	< 390	< 350	< 1,100	**93 J**	**51 J**	< 560	< 390	< 390	**300 J**	< 430
Di-n-butylphthalate	< 380	< 390	< 350	< 1,100	**56 J**	< 370	65 J	< 390	< 390	< 410	< 430

Table 16
Sediment and Sludge Sample Analytical Results
Semivolatile Organic Compounds (by U.S. EPA SW-846 Method 8270)
Jones Chemicals, Inc.
Caledonia, New York
November 1995

Parameter (ug/kg)	Sample Name*										
	BSS-1	BSS-2	BSS-3	SL-6	SD-1	DUP-2**	SD-2	SD-3	SD-4	SD-5	SD-6
Fluoranthene	**120 J**	**85 J**	< 350	< 1,100	**710**	**320 J**	**230 J**	< 390	**150 J**	**6,100 D**	< 430
Pyrene	**89 J**	**89 J**	< 350	< 1,100	**660**	**510**	**190 J**	**420**	**260 J**	**8,300 D**	< 430
Butylbenzylphthalate	< 380	< 390	< 350	< 1,100	**100 J**	**48 J**	**93 J**	< 390	< 390	< 410	< 430
Benzo[a]anthracene	**39 J**	< 390	< 350	< 1,100	**260 J**	**140 J**	**58 J**	< 390	**72 J**	**4,100 D**	< 430
3,3'-Dichlorobenzidine	**49 J**	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	< 410	< 430
Chrysene	< 380	**39 J**	< 350	< 1,100	**410**	**190 J**	**130 J**	**310 J**	**100 J**	**3,700 D**	< 430
bis(2-Ethylhexyl)phthalate	**470 B,J**	**280 B,J**	**87 B,J**	**6,800**	**1,400**	**630**	**1,200**	**170 J**	**220 J**	**210 J**	**130 J**
Di-n-octylphthalate	< 380	< 390	< 350	**380 J**	< 360	< 370	**290 J**	< 390	< 390	< 410	< 430
Benzo[b]fluoranthene	< 380	**60 J**	< 350	< 1,100	**510**	**250 J**	**140 J**	< 390	< 390	**4,300 D**	< 430
Benzo[k]fluoranthene	< 380	< 390	< 350	< 1,100	**470**	**260 J**	**92 J**	< 390	< 390	**4,000 D**	< 430
Benzo[a]pyrene	< 380	< 390	< 350	< 1,100	**350 J**	**120 J**	< 560	< 390	< 390	**3,500 D**	< 430
Indeno[1,2,3-cd]pyrene	< 380	< 390	< 350	< 1,100	**140 J**	< 370	< 560	< 390	< 390	**1,100**	< 430
Dibenzo[a,h]anthracene	< 380	< 390	< 350	< 1,100	< 360	< 370	< 560	< 390	< 390	**360 J**	< 430
Benzo[g,h,i]perylene	< 380	< 390	< 350	< 1,100	**120 J**	< 370	< 560	< 390	< 390	**770**	< 430

Notes

Bold indicates positive detection.
*Sediment and sludge samples were collected at a depth of 0 to 0.5 foot below ground surface.
**DUP-2 is a duplicate of sample SD1 (0 to 0.5 foot below ground surface) and was analyzed for semivolatile organic compounds. The higher concentration between the sample and the duplicate was used in sample statistics.
U.S. EPA = U.S. Environmental Protection Agency
ug/kg = micrograms per kilogram
SL = sludge
SD = sediment
< = indicates the method detection limit
J = estimated value; below detection limit
D = compound analyzed at higher dilution factor
B = found in associated blank

Table 17
Direct Push Sample Analytical Results
Jones Chemicals, Inc.
Caledonia, New York

Sample ID	Date	Matrix	PCE	TCE	Cis-DCE	Trans-DCE	1,1-DCE	Vinyl Chloride
DP-1 (2-4)[a]	8/17/98	Soil	330,000	<130	<70	<70	<70	<130
DP-1 (14-16)	8/17/98	Soil	7,100	<1	<0.5	<0.5	<0.5	<1
DP-1 (28-30)	8/17/98	Groundwater	1,600	62	<5	<5	<5	<10
DP-1 (38-40)	8/17/98	Groundwater	3,300	<100	<50	<50	<50	<100
DP-1 (48-50)	8/17/98	Groundwater	5,800	<250	<120	<120	<120	<250
DP-2 (2-4)	8/18/98	Soil	170	320	7.9	<2.5	<2.5	<5
DP-2 (8-10)	8/18/98	Soil	120	41	<2.5	<2.5	<2.5	<5
DP-2 (18-20)	8/18/98	Groundwater	260	25	<5	<5	<5	<10
DP-2 (28-30)	8/18/98	Groundwater	74	9.4	<2.5	<2.5	<2.5	<5
DP-2 (41-43)	8/18/98	Groundwater	<5	240	<5	<5	<5	<10
DP-3 (8-10)	8/19/98	Soil	110	23	<2.5	<2.5	<2.5	<5
DP-3 (12-14)	8/19/98	Soil	180	17	<2.5	<2.5	<2.5	<5
DP-3 (18-20)	8/19/98	Groundwater	270	130	<2.5	<2.5	<2.5	<5
DP-3 (28-30)	8/19/98	Groundwater	20	6.9	<0.5	<0.5	<0.5	<1
DP-3 (35 -37)	8/19/98	Groundwater	23	8.7	<0.5	<0.5	<0.5	<1
DP-4 (28-30)	8/17/98	Groundwater	4.5	2.1	10	<0.5	<0.5	<1
DP-5 (17-19)	8/17/98	Groundwater	7.2	<1.0	<0.5	<0.5	<0.5	<1
DP-5 (28-30)	8/17/98	Groundwater	16	<2	<1	<1	<1	<2
DP- 5 (35.5-37.5)	8/17/98	Groundwater	2	<1	<0.5	<0.5	<0.5	<1
DP-6 (18-20)	8/18/98	Groundwater	8.3	3.2	<0.5	<0.5	<0.5	<1
DP-6 (28-30)	8/18/98	Groundwater	23	24	<0.5	<0.5	<0.5	<1
DP-6 (36.5-38.5)	8/18/98	Groundwater	1.8	<1	<0.5	<0.5	<0.5	<1
DP-7 (18-20)	8/19/98	Groundwater	17	11	<0.5	<0.5	<0.5	<1
DP-7 (27.5-29.5)	8/19/98	Groundwater	8.4	70	<0.5	<0.5	<0.5	<1
DP-8 (27 -29)	8/19/98	Groundwater	2.8	<1	<0.5	<0.5	<0.5	<1
DP-8 (35-37)	8/19/98	Groundwater	0.9	<1	<0.5	<0.5	<0.5	<1
DP-9 (28-30)	8/20/98	Groundwater	3.1	<1	0.6	<0.5	<0.5	<1
DP-9 (37.5-39.5)	8/20/98	Groundwater	3.6	<1	1.2	<0.5	<0.5	<1
DP-10 (18-20)	8/20/98	Groundwater	4.6	1.5	<0.5	<0.5	<0.5	<1
DP-10 (28-30)	8/20/98	Groundwater	2.8	1.5	1.1	<0.5	<0.5	<1
DP-10 (36-38)	8/20/98	Groundwater	<0.5	<1	0.6	<0.5	<0.5	<1

Notes

Samples were analyzed by SW-846 8021B.
Soil concentrations are presented in micrograms per kilogram (μg/kg).
Groundwater concentrations are presented in micrograms per liter (μg/l).
[a] Depth below ground surface in feet.

PCE = tetrachloroethene
TCE = trichloroethene
cis-DCE = cis-1,2-dichloroethene
trans-DCE = trans-1,2-dichloroethene
1,1-DCE = 1,1-dichloroethene

Table 18
Groundwater Sample Analytical Results
Volatile Organic Compounds (by U.S. EPA Method 524.1)
Jones Chemicals, Inc.
Caledonia, New York

Parameter (µg/l)	CRDL	Sample Name (depth in feet below ground surface)																	
		North Well 4/30/96	DUP-1 4/30/96	North Well 11/18/97	DUP-1 11/18/97	North Well ** 8/21/98	West Well 4/30/96	West Well 11/20/97	West Well ** 8/21/98	West Well Dup ** 8/21/98	East Well 5/1/96	East Well 11/18/97	East Well ** 8/21/98	V-1 4/29/96	V-1 11/19/97	V-2 4/29/96	V-2 11/20/97	L-2 4/30/96	L-2 11/21/97
Dichlorodifluoromethane	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Chloromethane	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Vinyl Chloride	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Bromomethane	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Chloroethane	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
1,1-Dichloroethene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Methylene Chloride	1	<1	<1	<2	<2	<30 UB	<1	<2	<10 UB	<10 UB	<1	<1	<30 UB	<1	<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	0.6	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
1,1-Dichloroethane	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
2,2-Dichloropropane	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	1	**210 DL**	**220 DL**	**6**	**6 D**	**9**	**23**	**28**	**30**	**37**	**17**	**18**	**30**	<1	<1	<1	**2**	<1	<1
Bromochloromethane	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Chloroform	1	<1	<1	<2	<2	<45 UB	<1	<2	<0.5	<0.5	**3**	**36**	<45 UB	<1	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	1	**1**	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Carbon Tetrachloride	1	**1**	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
1,1-Dichloropropene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Benzene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Trichloroethene	1	**45**	**44**	**4**	**4 D**	**16**	**18**	**16**	**18**	**22**	**3**	**2**	**3**	<1	**1**	<1	**4**	<1	<1
1,2-Dichloropropane	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Dibromomethane	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Bromodichloromethane	1	<1	<1	<2	<2	<20 UB	<1	<2	<0.5	<0.5	**2**	<1	<20 UB	<1	<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Toluene	1	<1	<1	<2	<2	**0.6**	<1	<2	<0.5	<0.5	**1**	<1	<0.5	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Tetrachloroethene	1	**570 DL**	**570 DL**	**61**	**61 D**	**140 DL**	**300 DL**	**310 DL**	**340 DL**	**340 DL**	**18**	**26**	**31**	<1	<1	<1	<1	<1	<1
1,3-Dichloropropane	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Dibromochloromethane	1	<1	<1	<2	<2	<3 UB	<1	<5 UB	<0.5	<0.5	**2**	<1	<3 UB	<1	<1	<1	<10 UB	<1	<1
1,2-Dibromoethane	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Chlorobenzene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
1,1,1,2-Tetrachloroethane	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
m/p-Xylene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
o-Xylene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Styrene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Bromoform	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<5 UB	<1	<1
Isopropylbenzene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Bromobenzene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
1,2,3-Trichloroethane	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
n-Propylbenzene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
2\4-Chlorotoluene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
4-Isopropyltoluene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
n-Butylbenzene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
Naphthalene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	1	<1	<1	<2	<2	<0.5	<1	<2	<0.5	<0.5	<1	<1	<0.5	<1	<1	<1	<1	<1	<1
# Positive Detects/# Samples	---	5/58	3/58	3/58	3/58	4/58	3/58	3/58	3/58	4/58	7/58	4/58	3/58	0/58	1/58	0/58	2/58	0/58	0/58
Arithmetric Mean	---	165	278	24	24	41	113	118	129	100	7	20.5	21.3	0	1	0	3	0	0

Table 18

Groundwater Sample Analytical Results

Volatile Organic Compounds (by U.S. EPA Method 524.1)

Jones Chemicals, Inc.

Caledonia, New York

Parameter (µg/l)	CRDL	Sample Name (depth in feet below ground surface)																				
		DUP-3 11/21/97	L-2 ** 8/22/98	L-3 4/30/96	L-3 11/21/97	L-3 ** 8/22/98	OP-1 4/30/96	OP-1 11/21/97	OP-1 ** 8/21/98	OP-2 4/30/96	OP-2 11/21/97	OP-2 ** 8/20/98	OP-3 5/1/96	DUP-2 5/1/96	OP-3 11/21/97	OP-3 ** 8/20/98	OP-5 4/29/96	OP-5 11/21/97	OP-5 ** 8/20/98	OP-6 4/30/96	OP-6 11/20/97	OP-6 8/21/98
Dichlorodifluoromethane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Chloromethane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Vinyl Chloride	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Bromomethane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Chloroethane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Trichlorofluoromethane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,1-Dichloroethene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Methylene Chloride	1	<1	<10 UB	<1	<1	<10 UB	<1	<1	<30 UB	<1	<1	<30 UB	<1	<1	<1	<30 UB	<1	<1	<30 UB	<1	<1	<30 UB
trans-1,2-Dichloroethene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,1-Dichloroethane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
2,2-Dichloropropane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
cis-1,2-Dichloroethene	1	<1	7	1	1	1	<1	<1	<0.5	3	11	3	<1	<1	<1	0.7	<1	<1	<0.5	<1	4	<0.5
Bromochloromethane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Chloroform	1	<1	<0.5	<1	<1	<0.5	<45 UB	<1	<0.5	<1	<1	<45 UB	12	11	12	<45 UB	<1	<1	<45 UB	<1	2	<45 UB
1,1,1-Trichloroethane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	4	4	3	5	<1	<1	<0.5	<1	4	5
Carbon Tetrachloride	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,1-Dichloropropene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Benzene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,2-Dichloroethane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Trichloroethene	1	<1	<0.5	<1	<1	0.6	<1	<1	<0.5	<1	<1	0.6	13	13	14	18	<1	<1	0.8	9	8	9
1,2-Dichloropropane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Dibromomethane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Bromodichloromethane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<20 UB	<1	<1	<20 UB	<1	<1	<1	<20 UB	<1	<1	<20 UB	<1	<1	<20 UB
cis-1,3-Dichloropropene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Toluene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
trans-1,3-Dichloropropene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,1,2-Trichloroethane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Tetrachloroethene	1	<1	<0.5	1	1	0.8	<1	<1	<0.5	<1	<1	<0.5	10	9	9	14	<1	<1	<0.5	29	48 DL	22
1,3-Dichloropropane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<10 UB	<0.5	<1	<1	<0.5	<1	<1	<0.5
Dibromochloromethane	1	<1	<0.5	<10 UB	<1	<0.5	<1	<1	<3 UB	<1	<1	<3 UB	<1	<1	<1	<3 UB	<1	<1	<3 UB	<1	<10 UB	<3 UB
1,2-Dibromoethane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Chlorobenzene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,1,1,2-Tetrachloroethane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Ethylbenzene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
m/p-Xylene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
o-Xylene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Styrene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<5 UB	<0.5	<1	<1	<0.5	<1	<1	<0.5
Bromoform	1	<1	<0.5	<5 UB	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<5 UB	<0.5
Isopropylbenzene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Bromobenzene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,1,2,2-Tetrachloroethane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,2,3-Trichloroethane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
n-Propylbenzene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
2\4-Chlorotoluene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,3,5-Trimethylbenzene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
tert-Butylbenzene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,2,4-Trimethylbenzene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
sec-Butylbenzene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,3-Dichlorobenzene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
4-Isopropyltoluene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,4-Dichlorobenzene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,2-Dichlorobenzene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
n-Butylbenzene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,2-Dibromo-3-chloropropane	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,2,4-Trichlorobenzene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Hexachlorobutadiene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Naphthalene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,2,3-Trichlorobenzene	1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<1	< <0.5	<1	<1	<0.5	<1	<1	<0.5
# Positive Detects/# Samples	---	1/58	1/58	2/58	2/58	3/58	0/58	0/58	0/58	1/58	1/58	2/58	4/58	4/58	4/58	4/58	0/58	0/58	1/58	2/58	5/58	3/58
Arithmetic Mean	---	7	7	1	1	0.8	0	0	0	3	11	1.8	10	9	9.5	9.4	0	0	0.8	19	13.2	12

Table 18
Groundwater Sample Analytical Results
Volatile Organic Compounds (by U.S. EPA Method 524.1)
Jones Chemicals, Inc.
Caledonia, New York

Parameter (µg/l)	CRDL	Sample Name (depth in feet below ground surface)																				
		OP-7 4/29/96	OP-7 11/21/97	OP-7 8/21/98	OP-8 4/29/96	OP-8 11/21/97	OP-8 8/21/98	OP-9 5/1/96	OP-9 11/20/97	OP-9 ** 8/22/98	OP-10 5/2/96	OP-10 11/21/97	OP-10 8/21/98	OP-11 5/2/96	OP-11 11/21/97	OP-11 ** 8/22/98	OP-11 Dup** 8/22/98	OP-12 5/2/96	OP-12 11/20/97	OP-12 ** 8/22/98	OP-13 11/20/97	OP-13 ** 8/20/98
Dichlorodifluoromethane	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Chloromethane	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Vinyl Chloride	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Bromomethane	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Chloroethane	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Trichlorofluoromethane	1	<1	<1	<0.5	<1	<2	0.8	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
1,1-Dichloroethene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Methylene Chloride	1	<1	<1	<30 UB	<1	<2	<30 UB	<1	<2	<30 UB	<1	<1	<0.5	<1	<20	<10 UB	<10 UB	<1	<1	<10 UB	<1	<0.5
trans-1,2-Dichloroethene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
1,1-Dichloroethane	1	<1	<1	<0.5	2	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
2,2-Dichloropropane	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
cis-1,2-Dichloroethene	1	<1	<1	<0.5	72 DL	<2	3	2	31	1	<1	<1	<0.5	9	<20	9	6	<1	2	<0.5	<1	<0.5
Bromochloromethane	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Chloroform	1	<1	1	<45 UB	<1	<2	<45 UB	<1	<2	<45 UB	<1	<1	<0.5	<1	<20	0.6	<0.5	<1	<1	<0.5	<1	<0.5
1,1,1-Trichloroethane	1	<1	<1	<0.5	4	<2	<0.5	<1	<2	<0.5	<1	1	1	3	<20	5	3	<1	<1	<0.5	<1	<0.5
Carbon Tetrachloride	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
1,1-Dichloropropene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Benzene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
1,2-Dichloroethane	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Trichloroethene	1	1	2	1	26	20	3	110 DL	17	86 DL	1	2	2	70	24	62	44	<1	3	1	<1	<0.5
1,2-Dichloropropane	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Dibromomethane	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Bromodichloromethane	1	<1	<1	<20 UB	<1	<2	<20 UB	<1	<2	<20 UB	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
cis-1,3-Dichloropropene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Toluene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
trans-1,3-Dichloropropene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
1,1,2-Trichloroethane	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Tetrachloroethene	1	<1	<1	0.8	300 DL	40	79 DL	120 DL	64	120 DL	25	24	8	3,100 DL	1,300 DL	5,400 DL	5,500 DL	21	5	3	<1	<0.5
1,3-Dichloropropane	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Dibromochloromethane	1	<1	<10 UB	<3 UB	<1	<2	<3 UB	<1	<10 UB	<3 UB	<1	<10 UB	<0.5	<1	<20	<0.5	<0.5	<1	<10 UB	<0.5	<10 UB	<0.5
1,2-Dibromoethane	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Chlorobenzene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
1,1,1,2-Tetrachloroethane	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	2	1	<1	<1	<0.5	<1	<0.5
Ethylbenzene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
m/p-Xylene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
o-Xylene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Styrene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Bromoform	1	<1	<5 UB	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<5 UB	<0.5	<1	<20	<0.5	<0.5	<1	<5 UB	<0.5	<10 UB	<0.5
Isopropylbenzene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Bromobenzene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
1,1,2,2-Tetrachloroethane	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
1,2,3-Trichloroethane	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
n-Propylbenzene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
2\4-Chlorotoluene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
1,3,5-Trimethylbenzene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
tert-Butylbenzene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
1,2,4-Trimethylbenzene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
sec-Butylbenzene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
1,3-Dichlorobenzene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
4-Isopropyltoluene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
1,4-Dichlorobenzene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
1,2-Dichlorobenzene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
n-Butylbenzene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
1,2-Dibromo-3-chloropropane	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
1,2,4-Trichlorobenzene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Hexachlorobutadiene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
Naphthalene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
1,2,3-Trichlorobenzene	1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1	<0.5	<1	<20	<0.5	<0.5	<1	<1	<0.5	<1	<0.5
# Positive Detects/# Samples	---	1/58	2/58	2/58	5/58	2/58	4/58	3/58	3/58	3/58	2/58	3/58	3/58	4/58	2/58	5/58	5/58	1/58	3/58	2/58	0/58	0/58
Arithmetic Mean	---	1	1.5	0.9	80.8	30	21.5	77.3	37.3	69	13	9	3.7	796	662	1095	1111	21	3.3	2	0	0

Table 18
Groundwater Sample Analytical Results
Volatile Organic Compounds (by U.S. EPA Method 524.1)
Jones Chemicals, Inc.
Caledonia, New York

Parameter (µg/l)	CRDL	Sample Name (depth in feet below ground surface)																				
		OP-14 11/20/97	OP-14 ** 8/20/98	OP-15 11/20/97	OP-15 ** 8/20/98	OP-16 ** 8/20/98	PZ-1 4/30/96	PZ-1 11/21/97	DUP-2 11/21/97	PZ-1 8/22/98	BP-1 4/30/96	BP-1 11/19/97	BP-1 8/20/98	BP-2 4/29/96	BP-2 11/18/97	BP-2 8/20/98	BP-3 4/29/96	BP-3 11/21/97	BP-3 8/21/98	BP-4 4/29/96	BP-4 11/21/97	BP-4 8/21/98
Dichlorodifluoromethane	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Chloromethane	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Vinyl Chloride	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Bromomethane	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Chloroethane	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Trichlorofluoromethane	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,1-Dichloroethene	1	<1	<0.5	<1	<0.5	**2**	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Methylene Chloride	1	<1	<10 UB	<1	<10 UB	<10 UB	<1	<1	<1	<10 UB	<1	<1	<30 UB	<1	<1	<30 UB	<1	<1	<30 UB	<1	<1	<30 UB
trans-1,2-Dichloroethene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,1-Dichloroethane	1	<1	<0.5	<1	<0.5	**1**	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
2,2-Dichloropropane	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
cis-1,2-Dichloroethene	1	<1	<0.5	<1	<0.5	**2**	**40**	<1	<1	<0.5	<1	**2**	**13**	<1	**7**	**16**	**31**	<1	**11**	**21**	**29**	**21**
Bromochloromethane	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Chloroform	1	<1	<0.5	<1	<0.5	**12**	<1	<1	<1	<0.5	<1	<1	<45 UB	<1	<1	<45 UB	<1	<1	<45 UB	<1	<1	<45 UB
1,1,1-Trichloroethane	1	<1	<0.5	<1	<0.5	**7**	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Carbon Tetrachloride	1	<1	<0.5	<1	<0.5	**1**	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,1-Dichloropropene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Benzene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	**0.8**
1,2-Dichloroethane	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Trichloroethene	1	**1**	**1**	**1**	**0.8**	**100**	**16**	<1	<1	**2**	<1	<1	**8**	<1	<1	<0.5	**2**	<1	<0.5	**14**	**10**	**1**
1,2-Dichloropropane	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Dibromomethane	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Bromodichloromethane	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<20 UB	<1	<1	<20 UB	<1	<1	<20 UB	<1	<1	<20 UB
cis-1,3-Dichloropropene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Toluene	1	<1	<0.5	<1	<0.5	**2**	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
trans-1,3-Dichloropropene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,1,2-Trichloroethane	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Tetrachloroethene	1	**5**	**6**	<1	<0.5	**62,000 DL**	**120**	**2**	**1**	**16**	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	**15**	**11**	**2**
1,3-Dichloropropane	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Dibromochloromethane	1	<10 UB	<0.5	<10 UB	<0.5	<0.5	<1	<10 UB	<1	<0.5	<1	<1	<3 UB	<1	<1	<3 UB	<1	<1	<3 UB	<1	<1	<3 UB
1,2-Dibromoethane	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Chlorobenzene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,1,1,2-Tetrachloroethane	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Ethylbenzene	1	<1	<0.5	<1	<0.5	**1**	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
m/p-Xylene	1	<1	<0.5	<1	<0.5	**16**	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
o-Xylene	1	<1	<0.5	<1	<0.5	**22**	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Styrene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Bromoform	1	<10 UB	<0.5	<10 UB	<0.5	<0.5	<1	<10 UB	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Isopropylbenzene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Bromobenzene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,1,2,2-Tetrachloroethane	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,2,3-Trichloroethane	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
n-Propylbenzene	1	<1	<0.5	<1	<0.5	**0.9**	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
2\4-Chlorotoluene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,3,5-Trimethylbenzene	1	<1	<0.5	<1	<0.5	**10**	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
tert-Butylbenzene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,2,4-Trimethylbenzene	1	<1	<0.5	<1	<0.5	**20**	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
sec-Butylbenzene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,3-Dichlorobenzene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
4-Isopropyltoluene	1	<1	<0.5	<1	<0.5	**0.7**	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,4-Dichlorobenzene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,2-Dichlorobenzene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
n-Butylbenzene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,2-Dibromo-3-chloropropane	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,2,4-Trichlorobenzene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Hexachlorobutadiene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
Naphthalene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
1,2,3-Trichlorobenzene	1	<1	<0.5	<1	<0.5	<0.5	<1	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5
# Positive Detects/# Samples	---	2/58	2/58	1/58	1/58	16/58	3/58	1/58	1/58	2/58	0/58	1/58	2/58	0/58	1/58	1/58	2/58	0/58	1/58	3/58	3/58	4/58
Arithmetic Mean	---	3	3.5	1	0.8	3887	59	2	1	9	0	2	10.5	0	7	16	16.5	0	11	16.7	16.7	6.2

Table 18
Groundwater Sample Analytical Results
Volatile Organic Compounds (by U.S. EPA Method 524.1)
Jones Chemicals, Inc.
Caledonia, New York

Parameter (µg/l)	CRDL	Sample Name (depth in feet below ground surface)								
		BP-4 DUP 8/21/98	BP-5* 5/23/96	BP-5 11/21/97	BP-5 8/20/98	BP-6* 5/23/96	BP-6 11/19/97	BP-6 8/21/98	Effluent 11/20/97	VW 11/20/97
Dichlorodifluoromethane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Chloromethane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Vinyl Chloride	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Bromomethane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Chloroethane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Trichlorofluoromethane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
1,1-Dichloroethene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Methylene Chloride	1	<0.5	<5	<1	<30 UB	<5	<1	<30 UB	<1	<1
trans-1,2-Dichloroethene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
1,1-Dichloroethane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
2,2-Dichloropropane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
cis-1,2-Dichloroethene	1	**26**	<5	**1**	<0.5	<5	<1	**2**	<1	<1
Bromochloromethane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Chloroform	1	<45 UB	<5	<1	<45 UB	<5	<1	<45 UB	<1	<1
1,1,1-Trichloroethane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Carbon Tetrachloride	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
1,1-Dichloropropene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Benzene	1	**0.7**	<5	<1	<0.5	<5	<1	<0.5	<1	<1
1,2-Dichloroethane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Trichloroethene	1	**1**	<5	<1	<0.5	<5	<1	<0.5	<1	<1
1,2-Dichloropropane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Dibromomethane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Bromodichloromethane	1	<20 UB	<5	<1	<20 UB	<5	<1	<0.5	<1	**2**
cis-1,3-Dichloropropene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Toluene	1	<0.5	<5	<1	**0.8**	<5	<1	<0.5	<1	<1
trans-1,3-Dichloropropene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
1,1,2-Trichloroethane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Tetrachloroethene	1	**2**	<5	<1	<0.5	<5	<1	<0.5	<1	<1
1,3-Dichloropropane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Dibromochloromethane	1	<3 UB	<5	<1	<3 UB	<5	<1	<0.5	<1	<10 UB
1,2-Dibromoethane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Chlorobenzene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
1,1,1,2-Tetrachloroethane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Ethylbenzene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
m/p-Xylene	1	<0.5	<5	<1	**0.7**	<5	<1	<0.5	<1	<1
o-Xylene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Styrene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Bromoform	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	**3 JB**
Isopropylbenzene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Bromobenzene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
1,1,2,2-Tetrachloroethane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
1,2,3-Trichloroethane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
n-Propylbenzene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
2\4-Chlorotoluene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
1,3,5-Trimethylbenzene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
tert-Butylbenzene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
1,2,4-Trimethylbenzene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
sec-Butylbenzene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
1,3-Dichlorobenzene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
4-Isopropyltoluene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
1,4-Dichlorobenzene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
1,2-Dichlorobenzene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
n-Butylbenzene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
1,2-Dibromo-3-chloropropane	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
1,2,4-Trichlorobenzene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Hexachlorobutadiene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
Naphthalene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
1,2,3-Trichlorobenzene	1	<0.5	<5	<1	<0.5	<5	<1	<0.5	<1	<1
# Positive Detects/# Samples	---	4/58	0/58	1/58	2/58	0/58	0/58	1/58	0/58	1/58
Arithmetic Mean	---	7.4	0	1	0.7	0	0	2	0	2.5

Notes

Bold indicates positive detection.
< indicates the method detection limit.
Samples were analyzed by U.S. EPA Method 524-1.
CRDL = contract required detection limit
DUP-1 (4/30/96) = duplicate of North Well
DUP-2 (5/1/96) = duplicate of OP-3
DUP-1 (11/18/97) = duplicate of North Well
DUP-2 (11/21/97) = duplicate of PZ-1
DUP-3 (11/21/97) = duplicate of L-2
Effluent = effluent from air stripper
VW = potable water supplied to the Village of Caledonia
V-1, V-2 = Village of Caledonia production wells.
DL = samples were reanalyzed at a higher detection limit.
UB = below detection limit; detection limit elevated because of blank contamination.
JB = estimated, below detection limit; detection limit elevated because of blank contamination.
mg/l= micrograms per liter
* = nondetects; quantitation limit is estimated.
** = All positive detections qualified "J", estimated value due to hold time exceedance ranging from 24 hours to 12 days.

Non-diluted sample concentrations above diluted sample detection limits should not be used as they were above the instrument calibration limits.

Geometric means and upper 95% concentrations are not included due to minimal number of analytes with positive detections.

Table 19
Groundwater Sample Analytical Results
Metals (by U.S. EPA SW-846 Methods 6010 and 7421*)
Jones Chemicals, Inc.
Caledonia, New York
April-May 1996

Parameter (ug/l)	Sample Name														
	CRDL	North Well 4/30/96	DUP-1 4/30/96	West Well 4/30/96	East Well 5/1/96	V-1 4/29/96	V-2 4/29/96	L-2 4/30/96	L-3 4/30/96	OP-1 4/30/96	OP-2 4/30/96	OP-3 5/1/96	DUP-2 5/1/96	OP-5 4/29/96	OP-6 4/30/96
Cadmium	5.0	<0.40	<0.40	<0.40	<0.40 uj	<0.40	<0.40	<0.60	<0.40	<0.40	<0.40	<0.40	<0.40 uj	<0.40	<0.50 uj
Chromium	10.0	<1.0	<1.0	<1.0	<7.5	<1.0	<1.0	<1.0	<4.8	<1.0	<1.0	<1.0	<1.0	<3.7	20.6
Iron	100.0	16.2	16.2	424	27200	16.2	16.2	19,200	7,910	32,600	83,900	14,600	15,000	12,800	25,600
Lead	3.0	<1.0	<1.0 uj	<1.0 uj	40.8	<1.0	<1.0	<2.7 uj	<2.6 uj	<1.0 uj	<1.1 uj	<1.0 uj	<1.0 uj	<1.5 uj	49.6
Manganese	15.0	0.70	0.70	22.2	100	0.70	0.70	600	346	453	2320	175	180	164	218

Parameter (ug/l)	Sample Name												
	CRDL	OP-7 4/29/96	OP-8 4/29/96	OP-9 5/1/96	OP-10 5/2/96	OP-11 5/2/96	OP-12 5/2/96	PZ-1 4/30/96	BP-1 4/30/96	BP-2 4/29/96	BP-3 4/29/96	BP-4 4/29/96	BP-5** 5/23/96	BP-6** 5/23/96
Cadmium	5.0	<0.40	<0.40	<0.40	<0.40 uj	<0.40 uj	<0.40 uj	<0.57	<0.40	<0.9	<0.40	<0.40	<0.80	<1.50
Chromium	10.0	<1.0	<1.0	<1.2	<1.6	<3.1	<5.0	<5.8	<1.0	<1.2	<2.1	<3.6	57.6	<3.5
Iron	100.0	742	2,260	4,060	1,250	1,700	1,170	3,670	13,300	18,700	35,500	70,900	14,000	28,400
Lead	3.0	<1.0 uj	<1.5	<1.1 uj	<2.3 uj	<2.8 uj	<2.4	3.3 uj	<1.0 uj	<1.0 uj	3.9 uj	<2.3 uj	<2.3	<1.0
Manganese	15.0	59.9	39.4	58.7	35	55.0	20.3	108	1250	1390	547	440	104	375

Notes

Bold indicates positive detection.
*U.S. EPA Method 6010 was used for all parameters except lead; Method 7421 was used for lead.
**Samples received warm by laboratory.
CRDL = contract required detection limit
ug/l = micrograms per kilogram
DUP-1 = duplicate of North Well sample
DUP-2 = duplicate of OP-3 sample.
V-1, V-2 = Village of Caledonia production wells.
uj = not detected; quantitation limits estimated
NA = not applicable

Table 20
Surface Water Sample Analytical Results for Volatile Organic Compounds
Jones Chemicals, Inc.
Caledonia, New York
September 7, 1996

Parameter	CRDL	Sample Name				
		SW-1[a]	SW-2	SW-3	SW-4	SW-5
Dichlorodifluoromethane	1	< 1	< 1	< 1	< 1	< 1
Chloromethane	1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	1	< 1	< 1	< 1	< 1	< 1
Bromomethane	1	< 1	< 1	< 1	< 1	< 1
Chloroethane	1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane	1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethene	1	< 1	< 1	< 1	< 1	< 1
Methylene Chloride	1	< 1	< 1	< 1	< 1	< 1
trans-1,2-Dichloroethene	1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	1	< 1	< 1	< 1	< 1	< 1
2,2-Dichloropropane	1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	1	< 1	< 1	< 1	< 1	< 1
Bromochloromethane	1	< 1	< 1	< 1	< 1	< 1
Chloroform	1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane	1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloropropene	1	< 1	< 1	< 1	< 1	< 1
Benzene	1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethane	1	< 1	< 1	< 1	< 1	< 1
Trichloroethene	1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloropropane	1	< 1	< 1	< 1	< 1	< 1
Dibromomethane	1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	1	< 1	< 1	< 1	< 1	< 1
cis-1,3-Dichloropropene	1	< 1	< 1	< 1	< 1	< 1
Toluene	1	< 1	< 1	< 1	< 1	< 1
trans-1,3-Dichloropropene	1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene	1	< 1	< 1	< 1	< 1	< 1
1,3-Dichloropropane	1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	1	< 1	< 1	< 1	< 1	< 1
1,2-Dibromoethane	1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	1	< 1	< 1	< 1	< 1	< 1
1,1,1,2-Tetrachloroethane	1	< 1	< 1	< 1	< 1	< 1
Ethylbenzene	1	< 1	< 1	< 1	< 1	< 1
m/p-Xylene	1	< 1	< 1	< 1	< 1	< 1
o-Xylene	1	< 1	< 1	< 1	< 1	< 1
Styrene	1	< 1	< 1	< 1	< 1	< 1
Bromoform	1	< 1	< 1	< 1	< 1	< 1
Isopropylbenzene	1	< 1	< 1	< 1	< 1	< 1
Bromobenzene	1	< 1	< 1	< 1	< 1	< 1

Table 20
Surface Water Sample Analytical Results for Volatile Organic Compounds
Jones Chemicals, Inc.
Caledonia, New York
September 7, 1996

Parameter	CRDL	Sample Name				
		SW-1[a]	SW-2	SW-3	SW-4	SW-5
1,1,2,2-Tetrachloroethane	1	<1	<1	<1	<1	<1
1,2,3-Trichloroethane	1	<1	<1	<1	<1	<1
n-Propylbenzene	1	<1	<1	<1	<1	<1
2\4-Chlorotoluene	1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	1	<1	<1	<1	<1	<1
tert-Butylbenzene	1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	1	<1	<1	<1	<1	<1
sec-Butylbenzene	1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	1	<1	<1	<1	<1	<1
4-Isopropyltoluene	1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	1	<1	<1	<1	<1	<1
n-Butylbenzene	1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	1	<1	<1	<1	<1	<1
Hexachlorobutadiene	1	<1	<1	<1	<1	<1
Naphthtalene	1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	1	<1	<1	<1	<1	<1

Notes:

All values are presented in micrograms per liter.

[a] sampled on April 30, 1996

CRDL =

Table 21
Surface Water Analytical Results for Metals
Jones Chemicals, Inc.
Caledonia, New York
September 7, 1996

Parameter (Metals)	CRDL	Sample Name				
		SW-1[a]	SW-2	SW-3	SW-4	SW-5
Cadmium	5.0	<0.40	0.50	0.20	0.20	0.27
Chromium	10.0	<1.1	0.60	0.60	0.60	13.0
Iron	100.0	488	255	31.5	221	11,000
Lead	3.0	<2.1 UJ	0.90 E	9.7 E	3.8 E	34.5 E
Manganese	15.0	30.0	10.3	33.2	5.9	163

Notes:

Samples were analyzed using U.S. Environmental Protection Agency SW-846 Methods 6010 and 7421 (lead).

All values are presented in micrograms per liter.

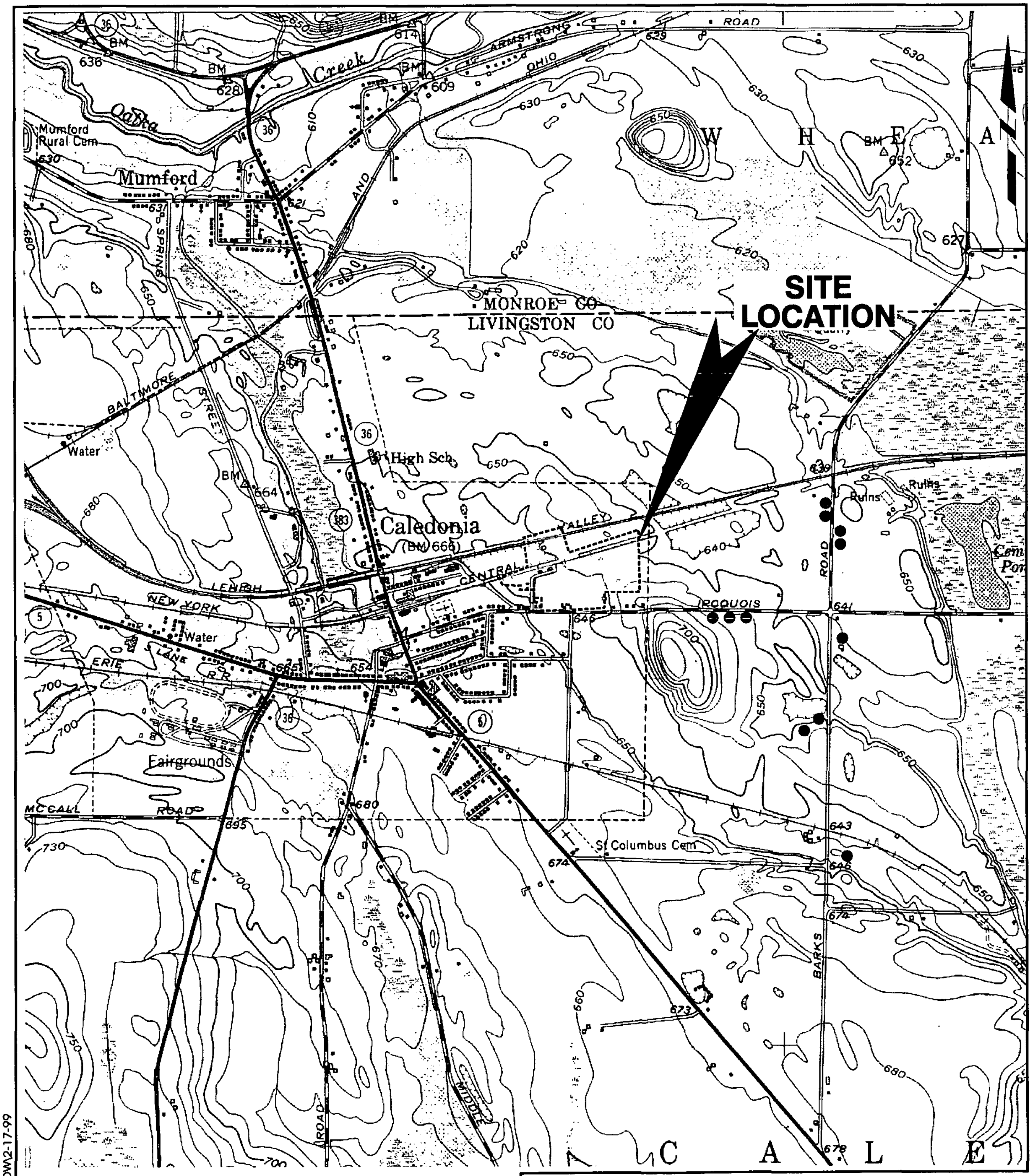
[a] Sample was collected on April 30, 1996.

E = estimated due to control limit exceedance in the serial dilution for iron

UJ = not detected; quantitation limits estimated

FIGURES

FIGURES



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

LEGEND

● Residential wells sampled NYSDOH, 1996.

0 2000 FEET

JCI/Jones Chemicals, Inc.

Site Location Map

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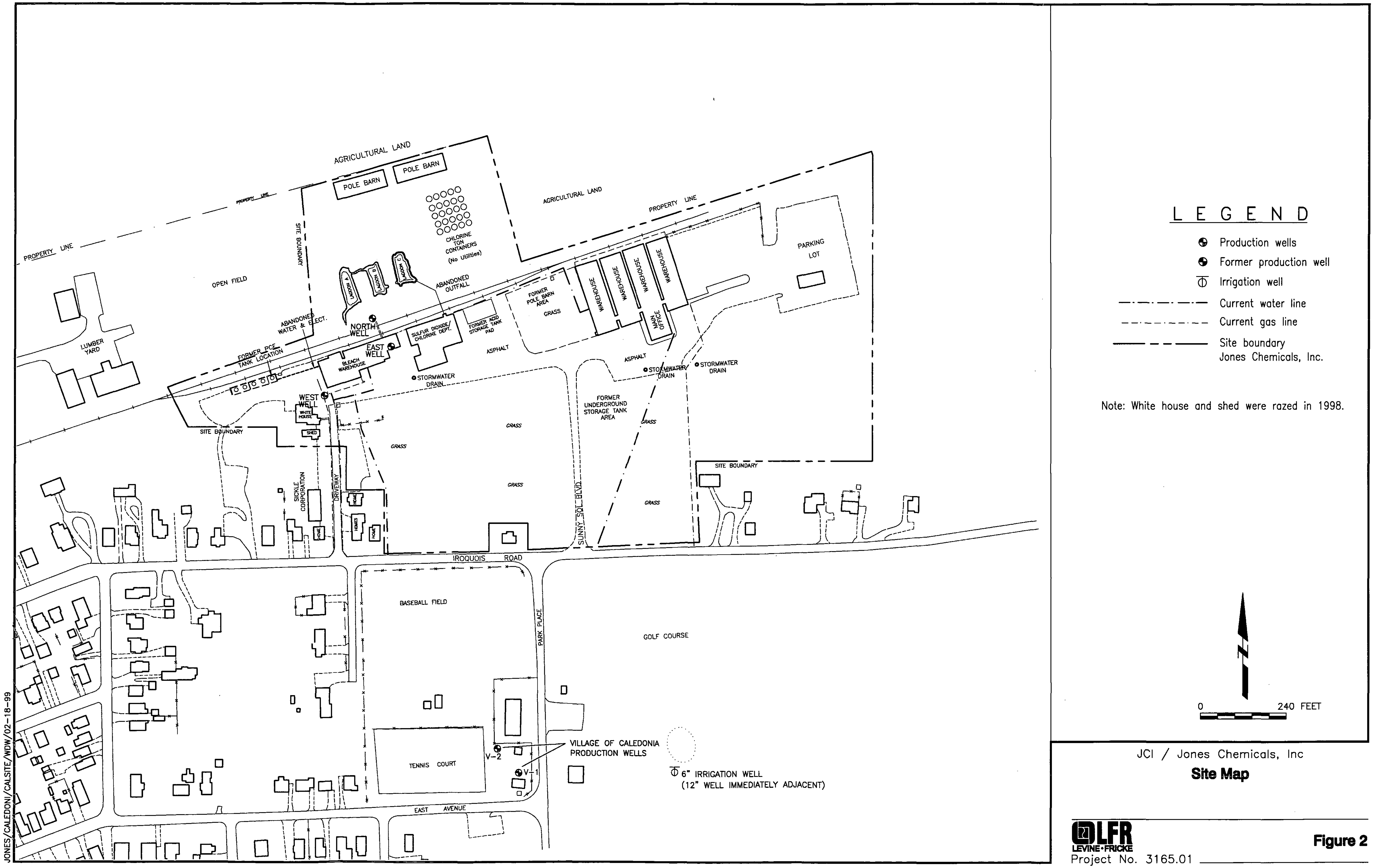
Project No. 3165.01

Figure 1

ARCHGRACH\JONES\3165SITE\WDW2-17-99



JCI / Jones Chemicals, Inc

Site Map

LFR
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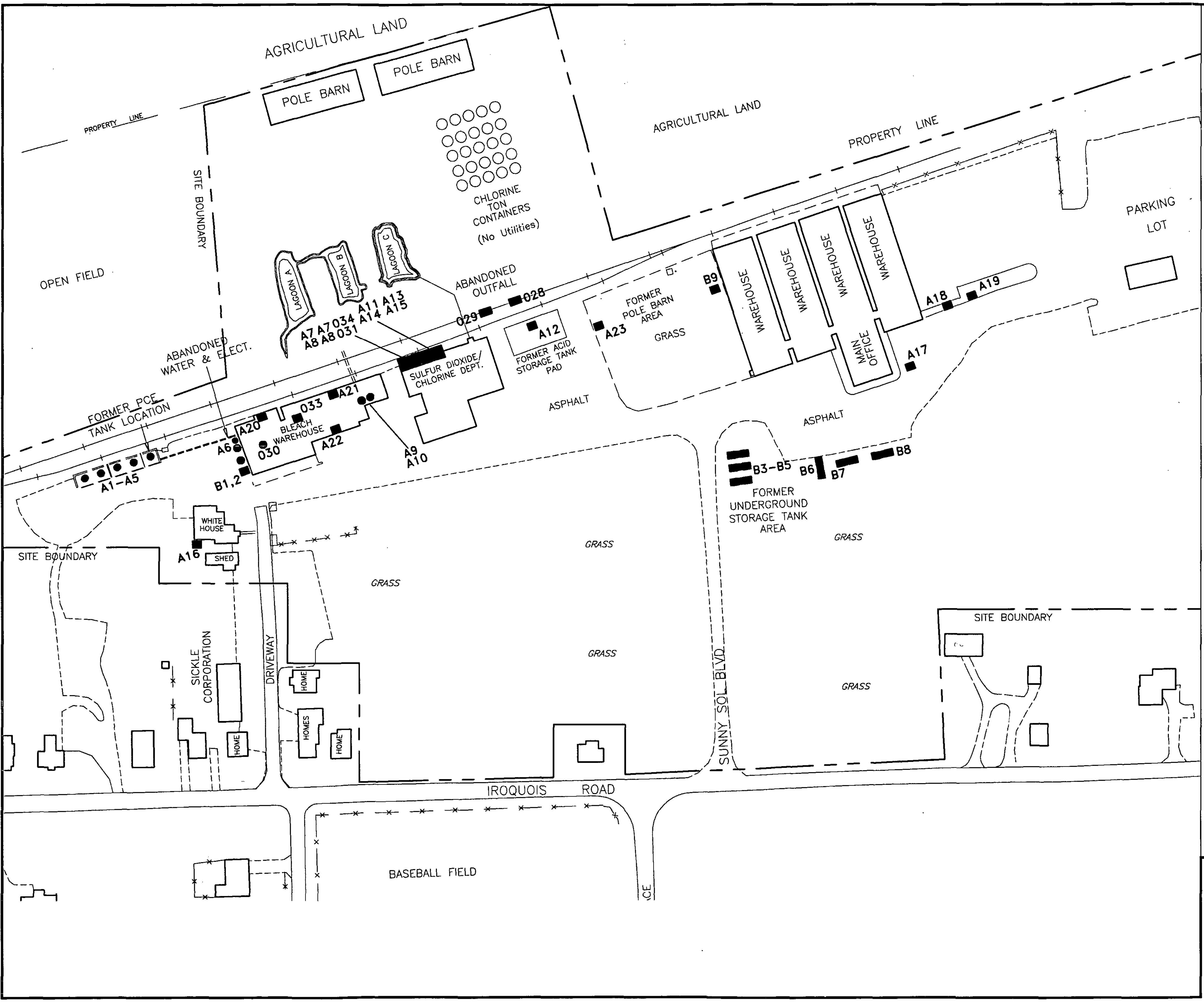
Project No. 3165.01

Figure 2



LEGEND

A. ABOVEGROUND STORAGE TANKS

- ** A1 TOLUENE 9,042 GAL. STL TANK (1)
- ** A2 TRICHLOROETHYLENE 9,042 GAL STL TANK (1)
- ** A3 NITRIC ACID 67% 8,000 GAL. STL. TANK (1)
- ** A4 SULFURIC ACID 93% 8,000 GAL. STL. TANK (1)
- ** A5 PERCHLOROETHYLENE 6,670 GAL. STL. TANK (1)
- ** A6 AMMONIUM HYDROXIDE TANKS 20,720 GAL. TOTAL (3)
- A7 BLEACH STORAGE 12,000 GAL. TANKS (2) 1 REMOVED
- A8 18% SODIUM HYDROXIDE TANKS 12,000 GAL. (2)
- A9 SODIUM BISULFITE (1) 4,500 GAL.
- A10 SOFTWATER (1) 15,000 GAL.
- A11 FERRIC CHLORIDE (1) 16,300 GAL.
- ** A12 FERRIC CHLORIDE (1) 16,300 GAL.
- A13 HYDROCHLORIC ACID 31% (1) 12,000 GAL
- A14,15 HYDROFLOUSILICIC ACID 26% (2) 12,000 GAL.
- A16 FUEL OIL #2 500 GAL. TANK (1)
- ** A17 FUEL OIL #2 500 GAL. TANK (1)
- A18 DIESEL FUEL 300 GAL. TANK (1)
- ** A19 UNLEADED GASOLINE 200 GAL. TANK (1)
- ** A20 ALGAECIDE 50% 6,000 GAL. TANK (1)
- A21 SODIUM HYDROXIDE 50% 12,000 GAL. TANK (1)
- ** A22 SODIUM HYPOCHLORITE 12.5% 1,000 GAL TANK (1)
- ** A23 HYDROCHLORIC ACID 31.45% 1,000 GAL TANK (1)
- ** 028 ANHYDROUS AMMONIA 100% 9,500 GAL RAILCAR TANK (1)
- ** 029 SULFUR DIOXIDE 100% 9,625 GAL RAILCAR TANK (1)
- ** 030 SODIUM HYPOCHLORITE 1,000 GAL
- 031 SODIUM HYDROXIDE 18% 12,000 GAL. TANK (1)
- 033 SODIUM HYPOCHLORITE 15% 1,100 GAL TANK (1)
- 034 SODIUM HYPOCHLORITE 12.5% 11,900 GAL TANK (1)

B. FORMER BURIED TANKS

- ** B1,2 DIESEL FUEL 2,000 GAL. STL. TANK
- ** B3 STODDARD SOLVENT 8,000 GAL STL. TANK
- ** B4 1,1,1–TRICHLOROETHANE 8,000 GAL. STL. TANK
- ** B5 METHYLENE CHLORIDE 8,000 GAL. STL. TANK
- ** B6 UNLEADED GASOLINE 8,000 GAL. STL. TANK
- ** B7 REGULAR GASOLINE 1,000 GAL. STL. TANK
- ** B8 DIESEL FUEL 8,000 GAL. STL. TANK
- ** B9 HEATING OIL 500 GAL. TANK

** REMOVED

— — - — Site boundary Jones Chemicals, Inc.

0 150 FEET

JCI / Jones Chemicals, Inc

Storage Tank Locations

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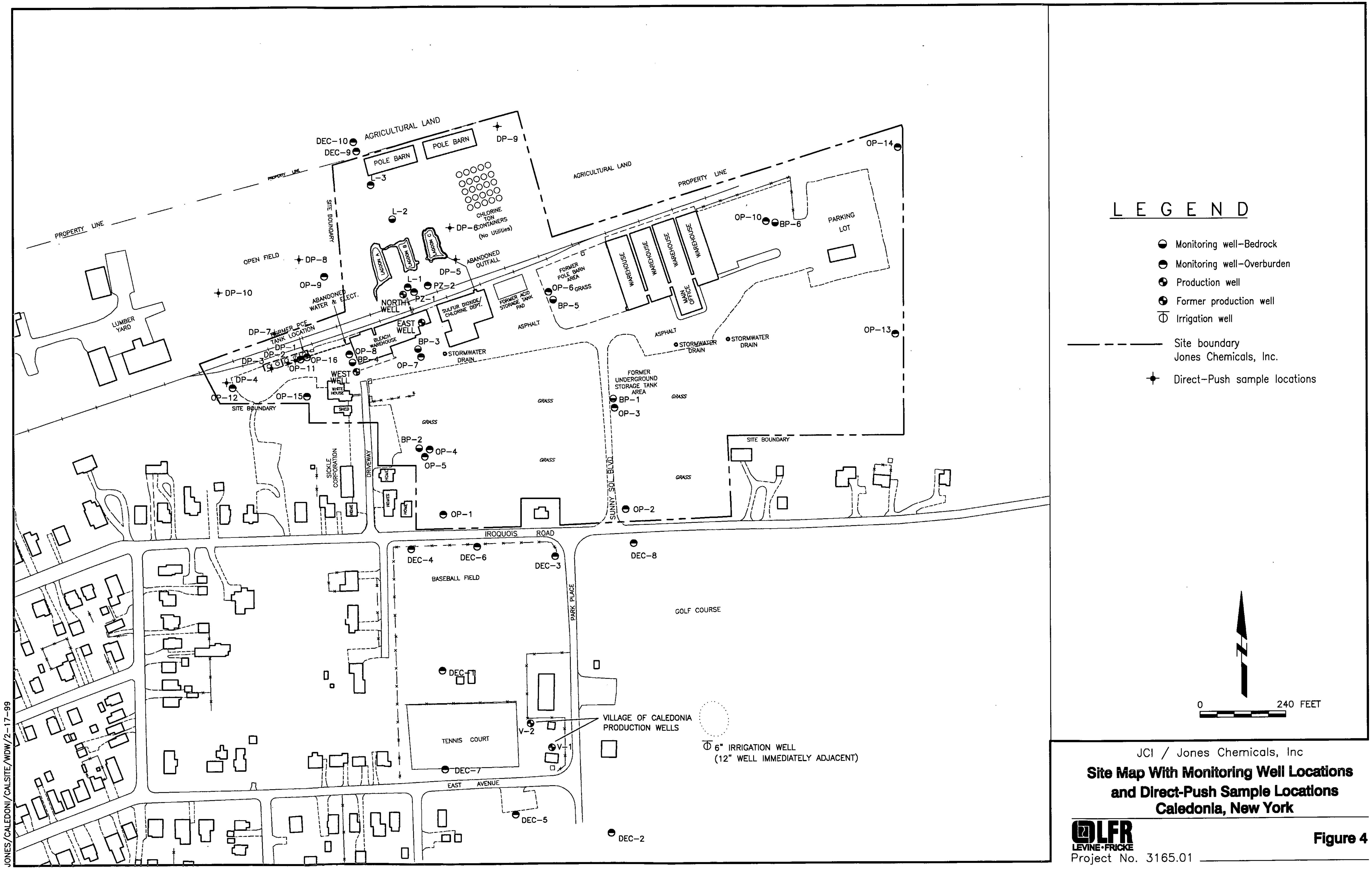
Project No. 3165.01

Figure 3

JONES/CALEDONI/CALSITE/WDW/2-17-99



JCI / Jones Chemicals, Inc

Site Map With Monitoring Well Locations and Direct-Push Sample Locations Caledonia, New York

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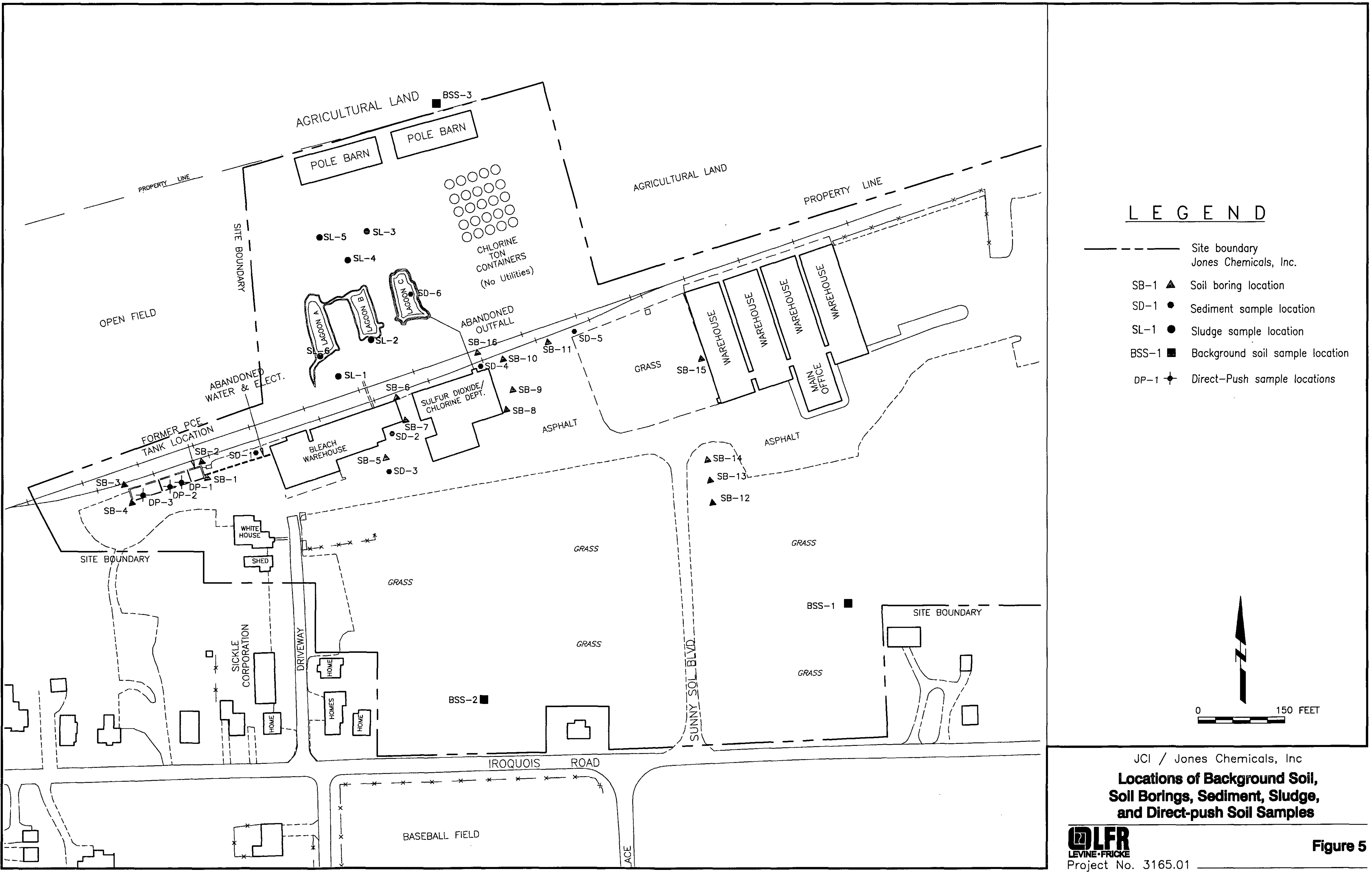
Project No. 3165.01

Figure 4



JONES/CALEDONI/CALSITE/WDW/2-17-99

JCI / Jones Chemicals, Inc

Locations of Background Soil, Soil Borings, Sediment, Sludge, and Direct-push Soil Samples

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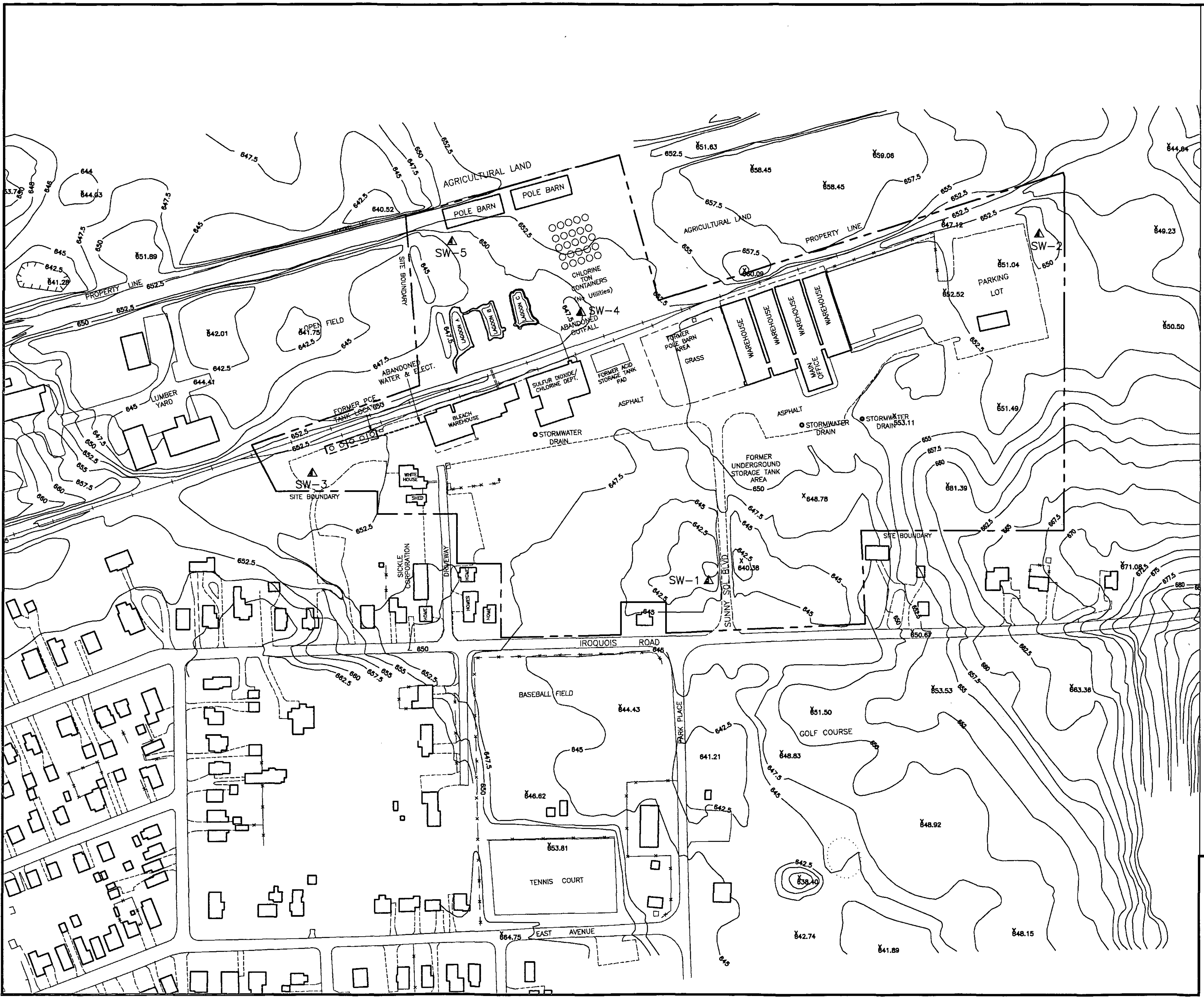
Figure 5

Project No. 3165.01



L E G E N D

Site boundary
Jones Chemicals, Inc.

⚠ Surface water sample location

Source:
Supplemental RI/FS Land Use Plan
Map, Drawing No. At, 12/1991
(Conestoga-Rovers & Associates 1991)

Contour interval = 2.5 Feet

0 240 FEET

JCI / Jones Chemicals, Inc

Surface Elevation Contour Plot and Surface Water Sample Locations

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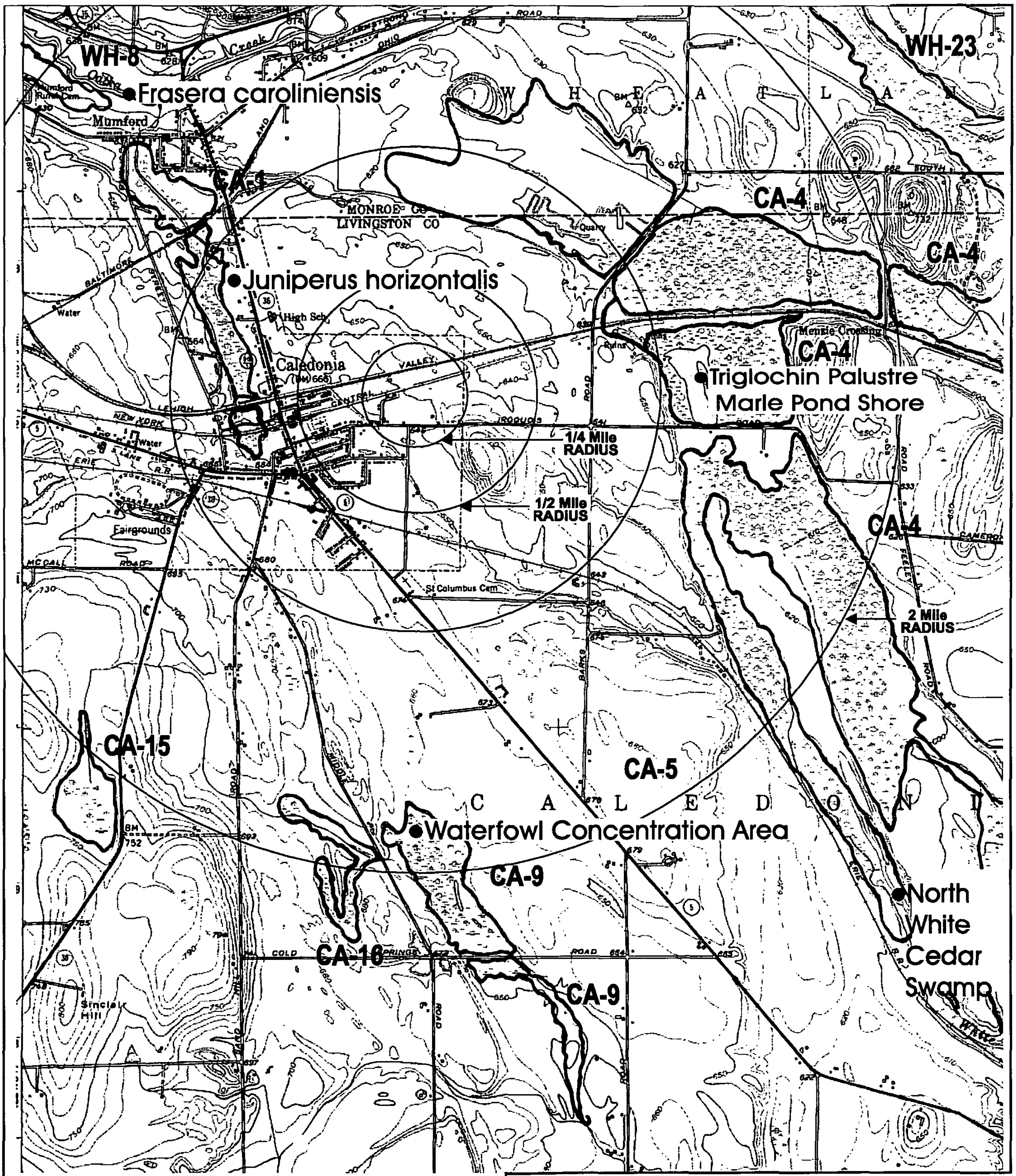
Figure 6

JONES/CALEDONI/CALSITE/WDW/2-17-99



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

LEGEND

Regulated wetlands CA-5, CA-4, CA-1, CA-9, CA-16, CA-15, WH-8, WH-23

● General area of identified habitats

NOT TO SCALE

JCI/Jones Chemicals, Inc.

Wetlands and Ecological Sensitivities Map

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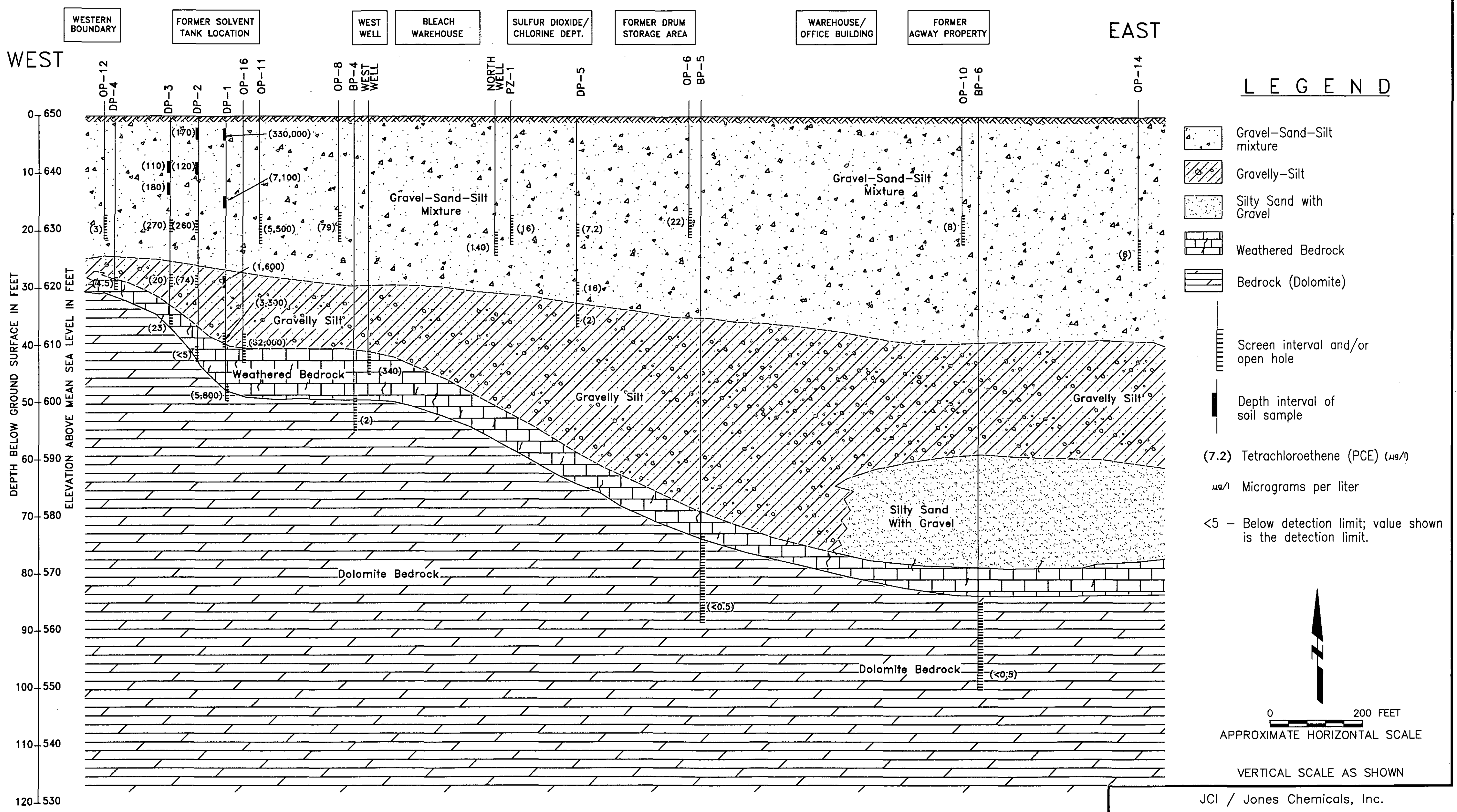
Figure 7

Project No. 3165.01

ARCHGRACHJONES\3165SITE\WDW2-17-99

JONES/CALEDONI/XSECTJ/WDW/2-17-99



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Generalized East-West Geologic Cross Section

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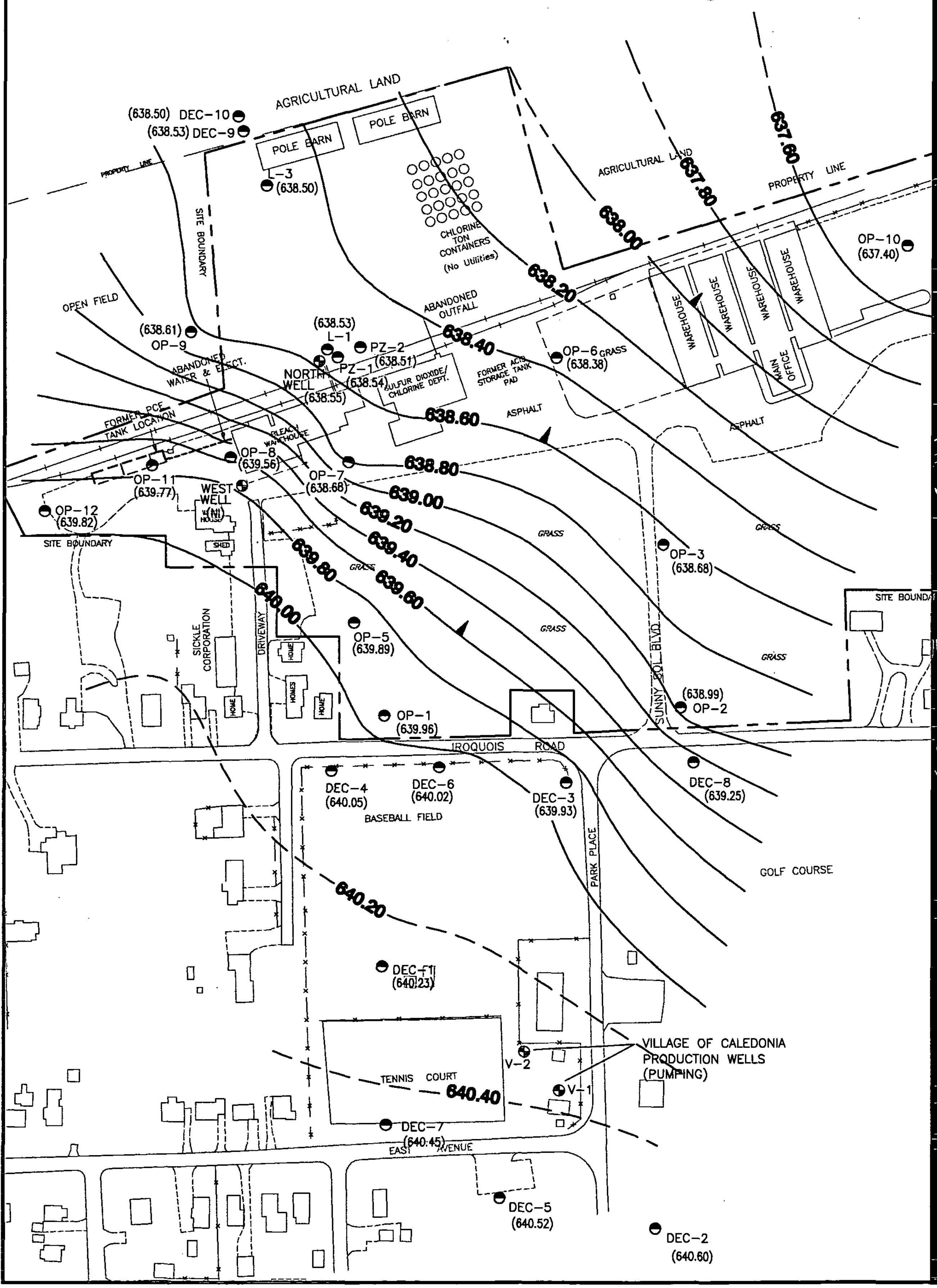
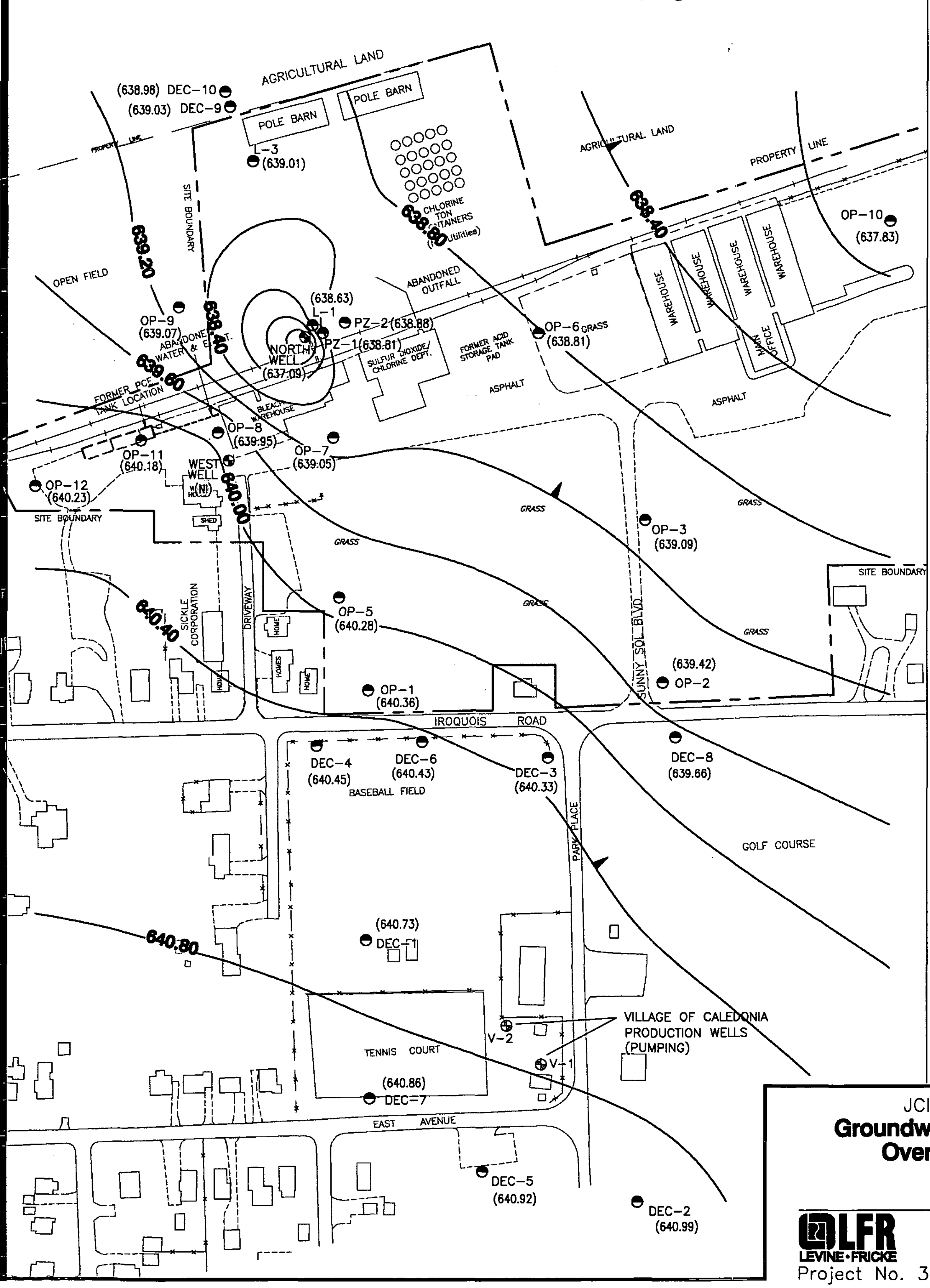
Figure 8

Groundwater Elevations-Overburden
Monitoring Wells, May 7, 1996
On-Site Production Wells: Not Pumping



Groundwater Elevations-Overburden
Monitoring Wells, May 16, 1996
On-Site Production Wells: Pumping



LEGEND

●	Monitoring well–Overburden
⊕	Production wells North Well–Overburden West Well–Bedrock
— — — —	Site boundary Jones Chemicals, Inc.
(639.42)	Groundwater elevation (FT NGVD)
640.00	Groundwater elevation contour (FT NGVD)
(NI)	Not included
NGVD	National Geodetic Vertical Datum
►	Groundwater flow direction

0 240 FEET

JCI / Jones Chemicals, Inc

Groundwater Elevation Contour Maps,
Overburden Monitoring Wells
May 7 and 16, 1996
Caledonia, New York

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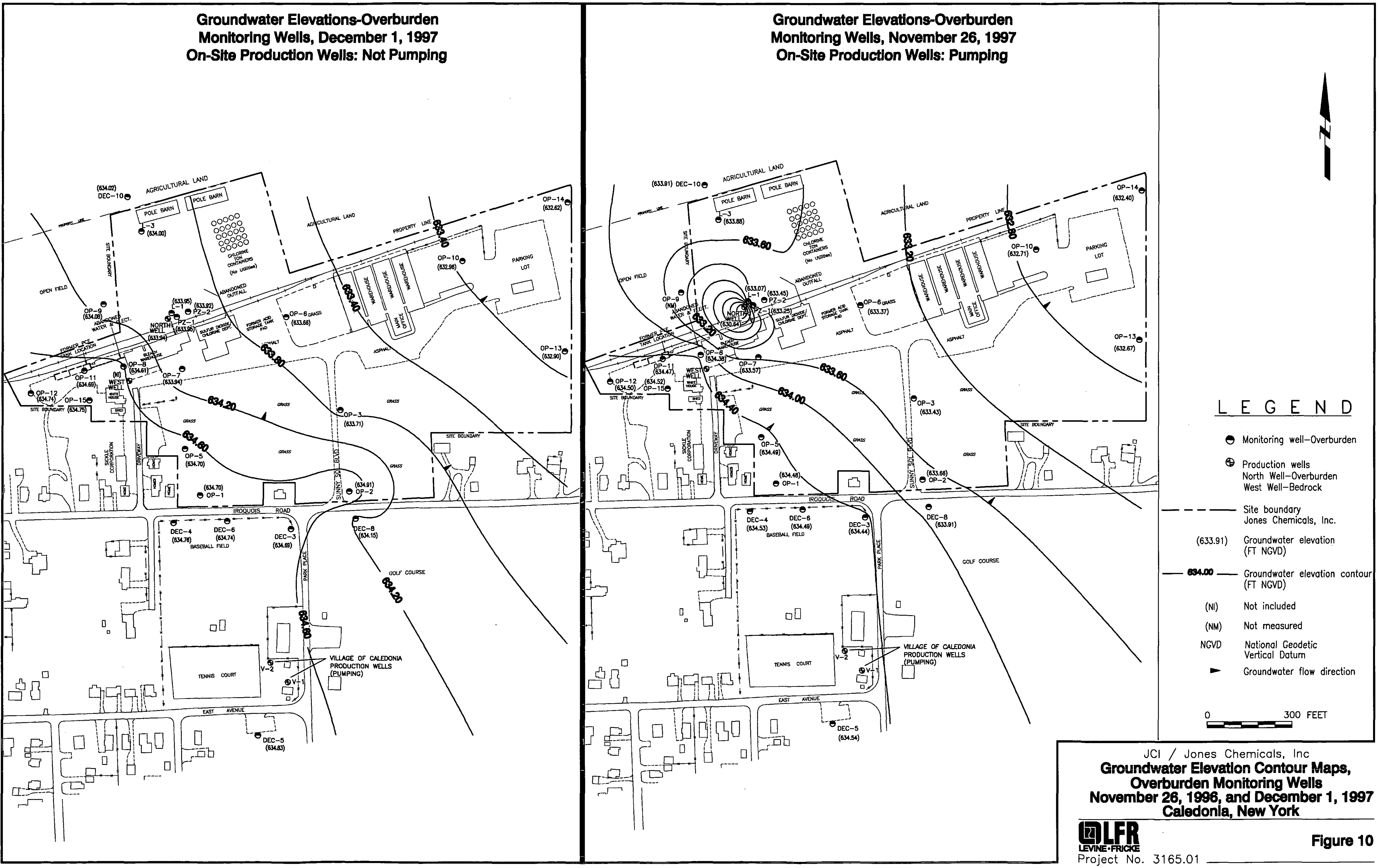
Project No. 3165.01

Figure 9

JONES/CALEDONI/CALSURF/WDW/2-17-99



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

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

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Groundwater Elevation Contour Maps, Overburden Monitoring Wells November 26, 1996, and December 1, 1997 Caledonia, New York

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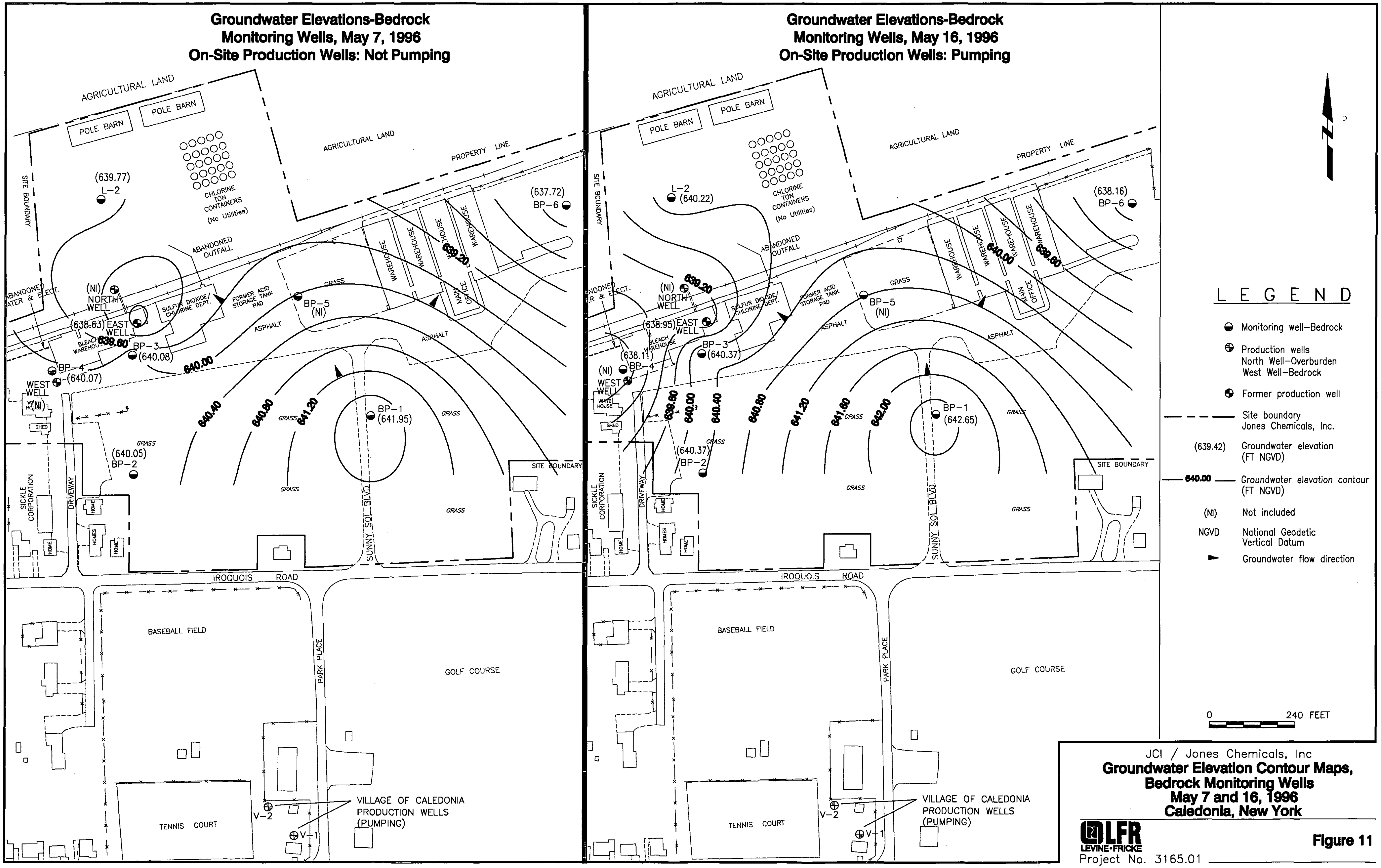
Figure 10

Project No. 3165.01

JONES/CALEDONI/CALSURF/WDW/2-17-99



JCI / Jones Chemicals, Inc

Groundwater Elevation Contour Maps,
Bedrock Monitoring Wells
May 7 and 16, 1996
Caledonia, New York

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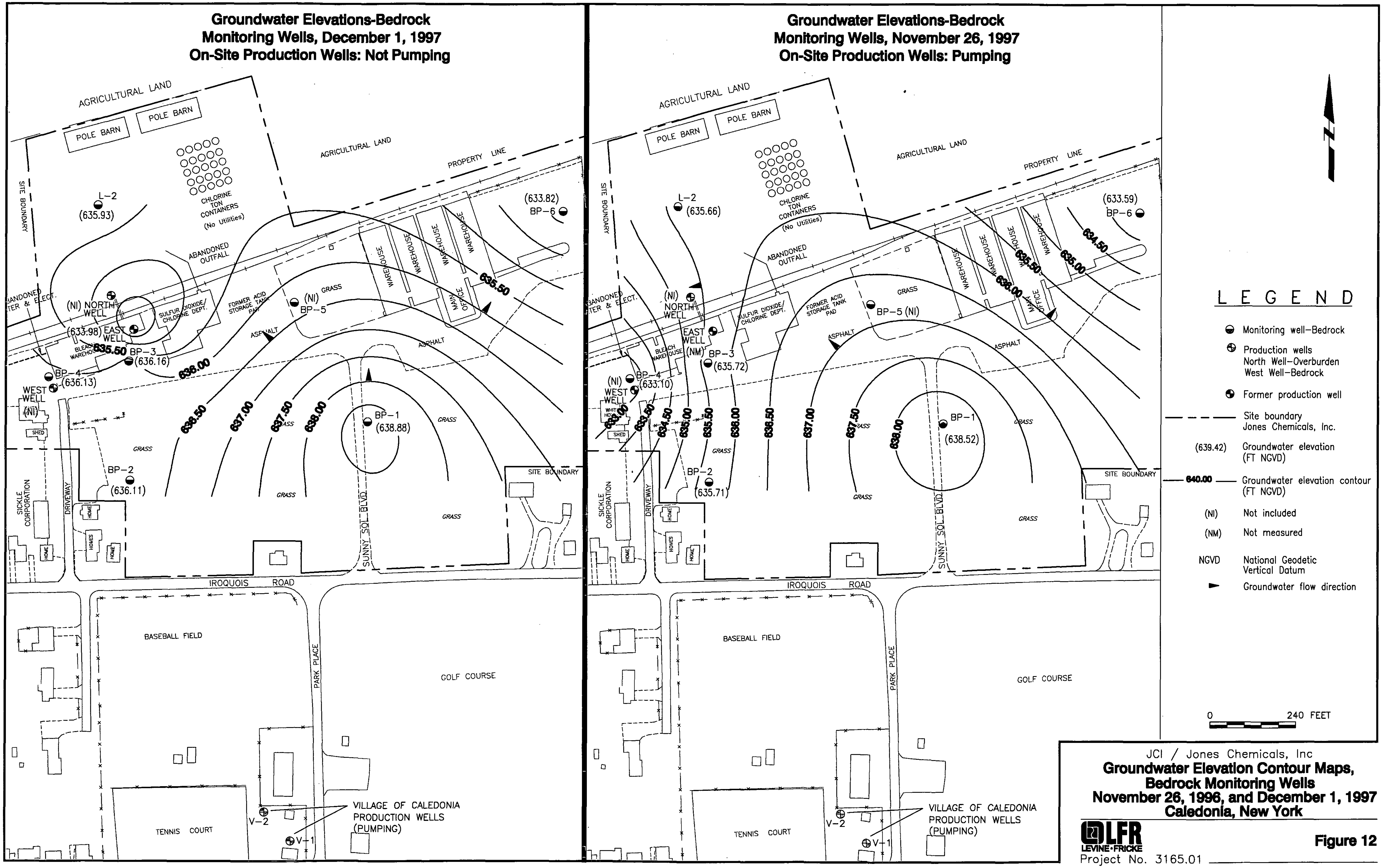
Project No. 3165.01

Figure 11

JONES/CALEDONI/CALSURF/WDW/2-17-99



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

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

JCI / Jones Chemicals, Inc

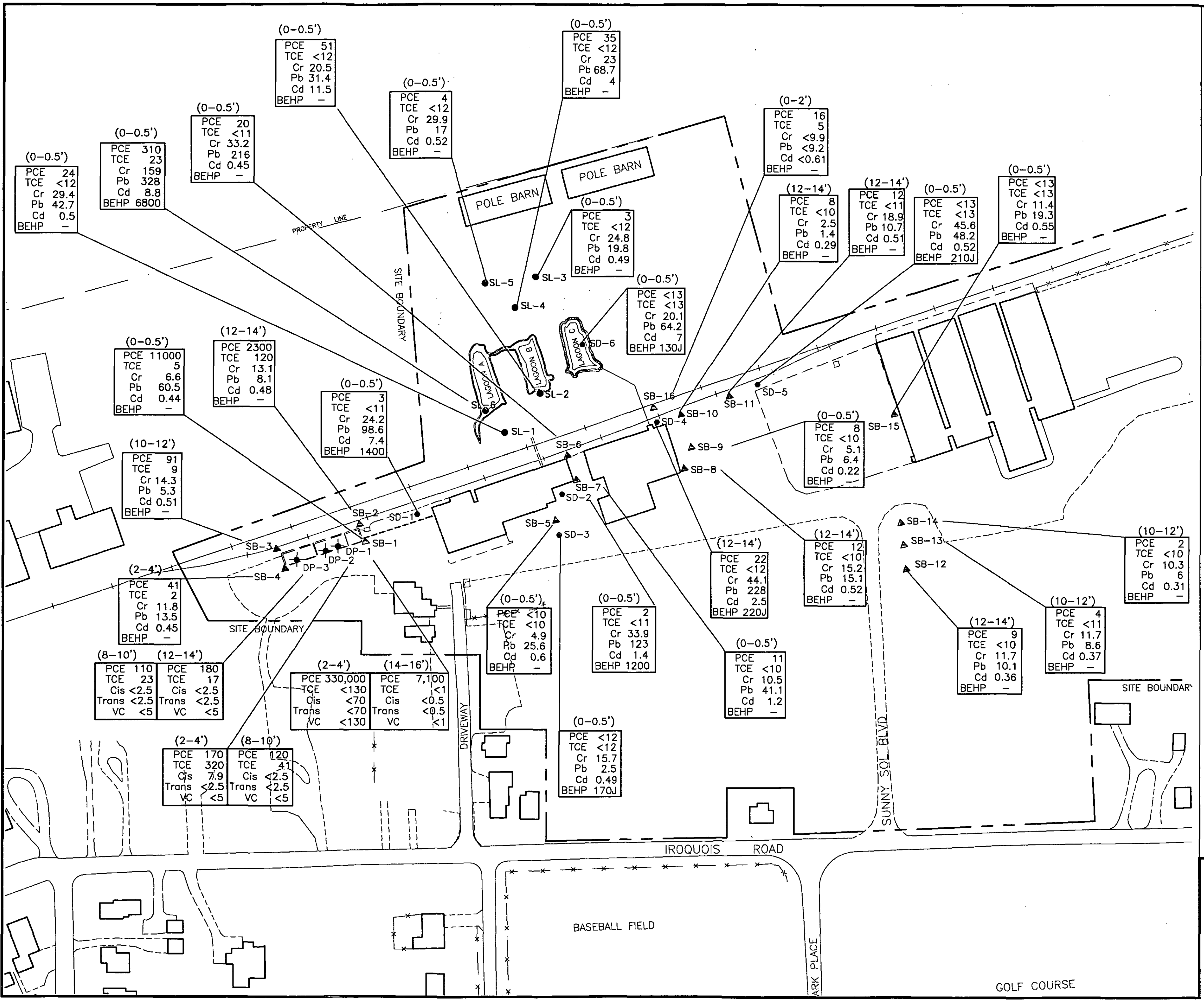
Groundwater Elevation Contour Maps, Bedrock Monitoring Wells November 26, 1996, and December 1, 1997 Caledonia, New York

LFR LEVINE·FRICKE

Project No. 3165.01

Figure 12

JONES/CALEDONI/CALSURF/WDW/2-17-99



LEGEND

— — —	Site boundary Jones Chemicals, Inc.
SB-1 ▲	Soil boring location
SD-1 ●	Sediment sample location
SL-1 ●	Sludge sample location
DP-1 ✚	Direct-Push sample locations
(0-0.5')	Sample depth in feet
PCE	Tetrachloroethene
TCE	Trichloroethene
Cr	Chromium
Pb	Lead
Cd	Cadmium
BEHP	Bis(2-Ethylhexyl) phthalate
Cis	Cis-1,2 Dichloroethene
Trans	Trans-1,2 Dichloroethene
VC	Vinyl Chloride
<11	Below detection limits; value shown is the detection limit
–	Not Analyzed

Organic compounds in micrograms per kilogram (µg/kg)

Metals in milligrams per kilogram (mg/kg)

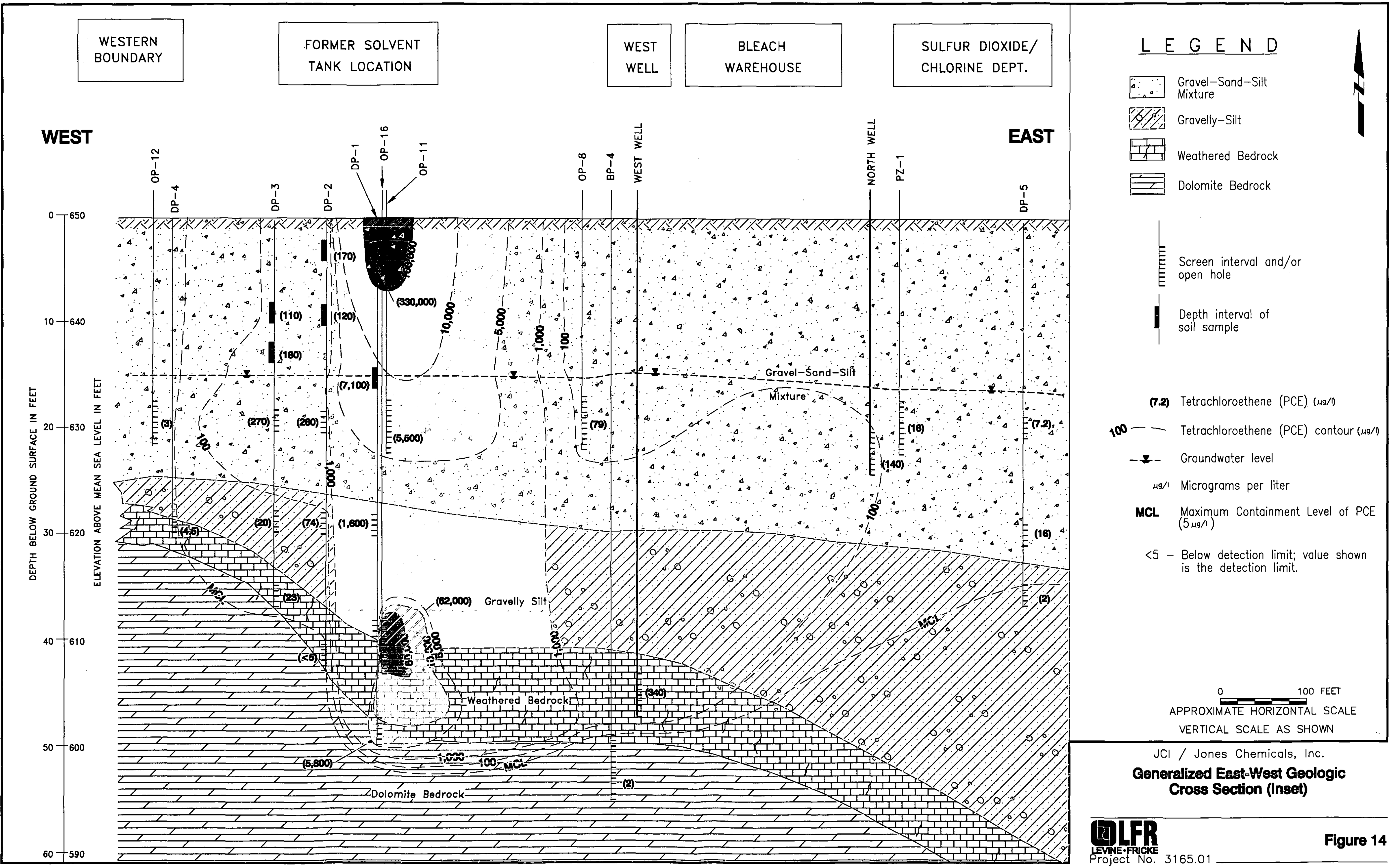
JCI / Jones Chemicals, Inc

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

LFR
LEVINE·FRICKE
Project No. 3165.01

Figure 13

JONES/CALEDONI/CALSITE/WDW/2-17-99



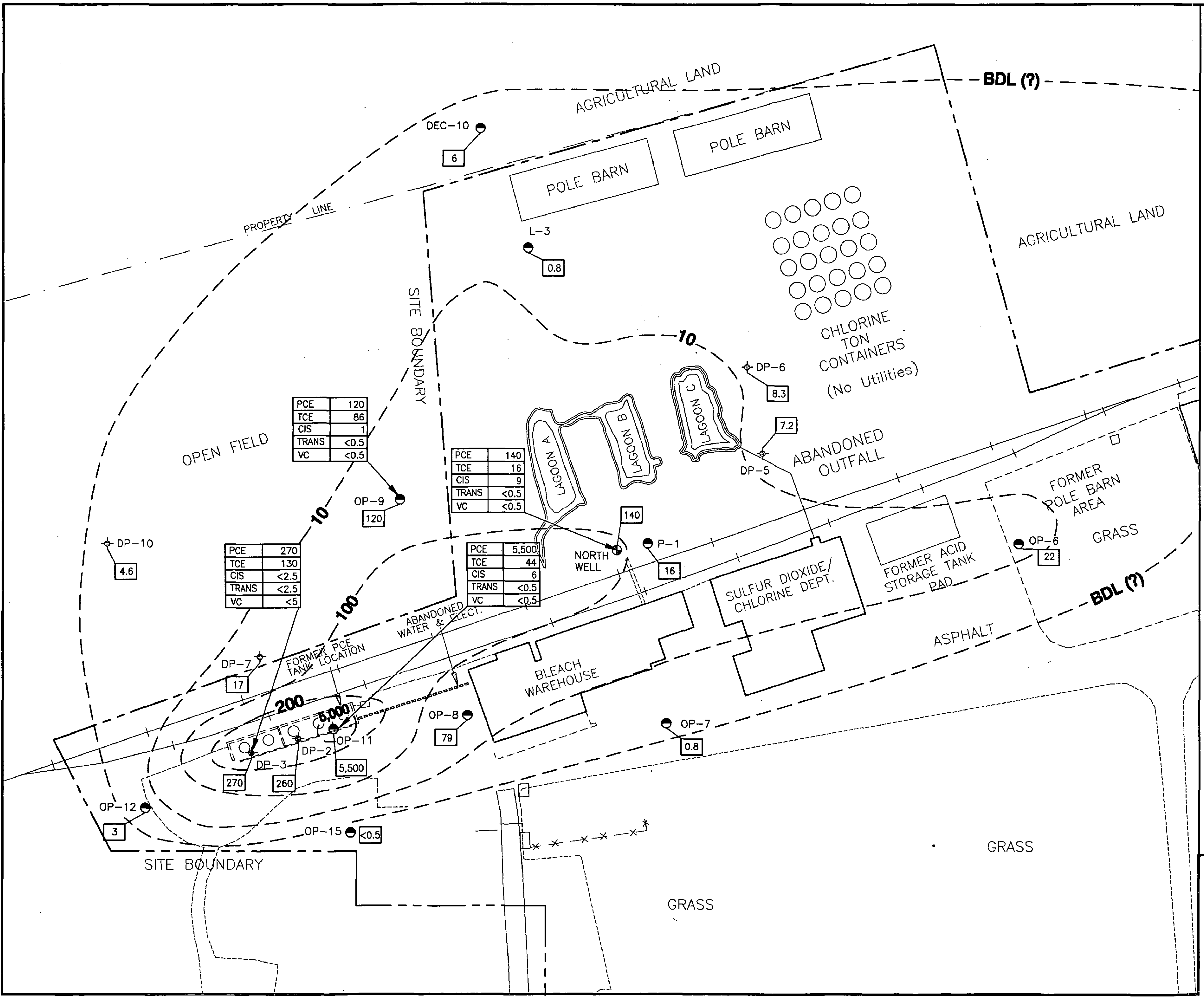
JCI / Jones Chemicals, Inc.

Generalized East-West Geologic Cross Section (Inset)

Figure 14

LFR LEVINE·FRICKE
Project No. 3165.01

JONES/CALEDONI/XSECTJ/WDW/2-17-99



N

L E G E N D

— — —	Site boundary
◒	Monitoring well-Overburden
⊕	Production well
⌖	Direct-Push sample location
PCE	Tetrachloroethene
PCE TCE CIS TRANS VC	Tetrachloroethene (µg/l) Trichloroethene (µg/l) Cis-1,2-Dichloroethene (µg/l) Trans-1,2-Dichloroethene (µg/l) Vinyl Chloride (µg/l)
22	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-Push points sampled between 17 and 20 feet bgs.

0 100 FEET

JCI / Jones Chemicals, Inc

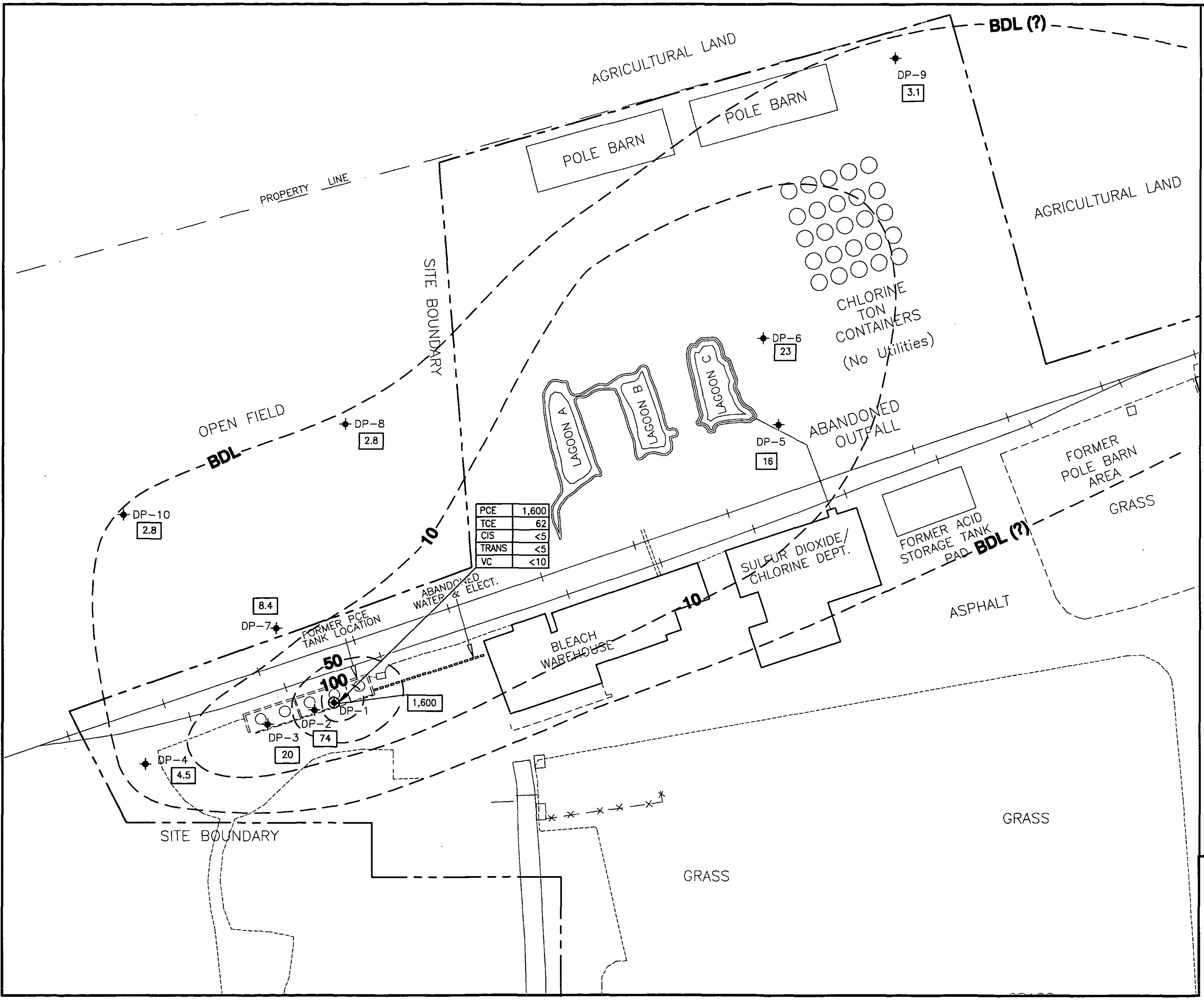
Isoconcentration Map of PCE in Groundwater, 17 - 25 Feet bgs, August 17 - 22, 1998 Caledonia, New York

LFR LEVINE·FRICKE

Project No. 3165.01

Figure 15

JONES/CALEDONI/3165-PCE/WDW/06-03-99



LEGEND

— — —	Site boundary Jones Chemicals, Inc.
⌖	Direct-Push sample location
PCE	Tetrachloroethene
PCE TCE CIS TRANS VC	Tetrachloroethene (µg/l) Trichloroethene (µg/l) Cis-1,2-Dichloroethene (µg/l) Trans-1,2-Dichloroethene (µg/l) Vinyl Chloride (µg/l)
22	PCE Concentration (µg/l)
10 — —	PCE inferred isoconcentration contour (µg/l)
µg/l	Micrograms per liter
bgs	Below ground surface
BDL	Below detection limit

Note: Direct-Push points sampled between 27 and 30 feet bgs.

0 100 FEET

JCI / Jones Chemicals, Inc

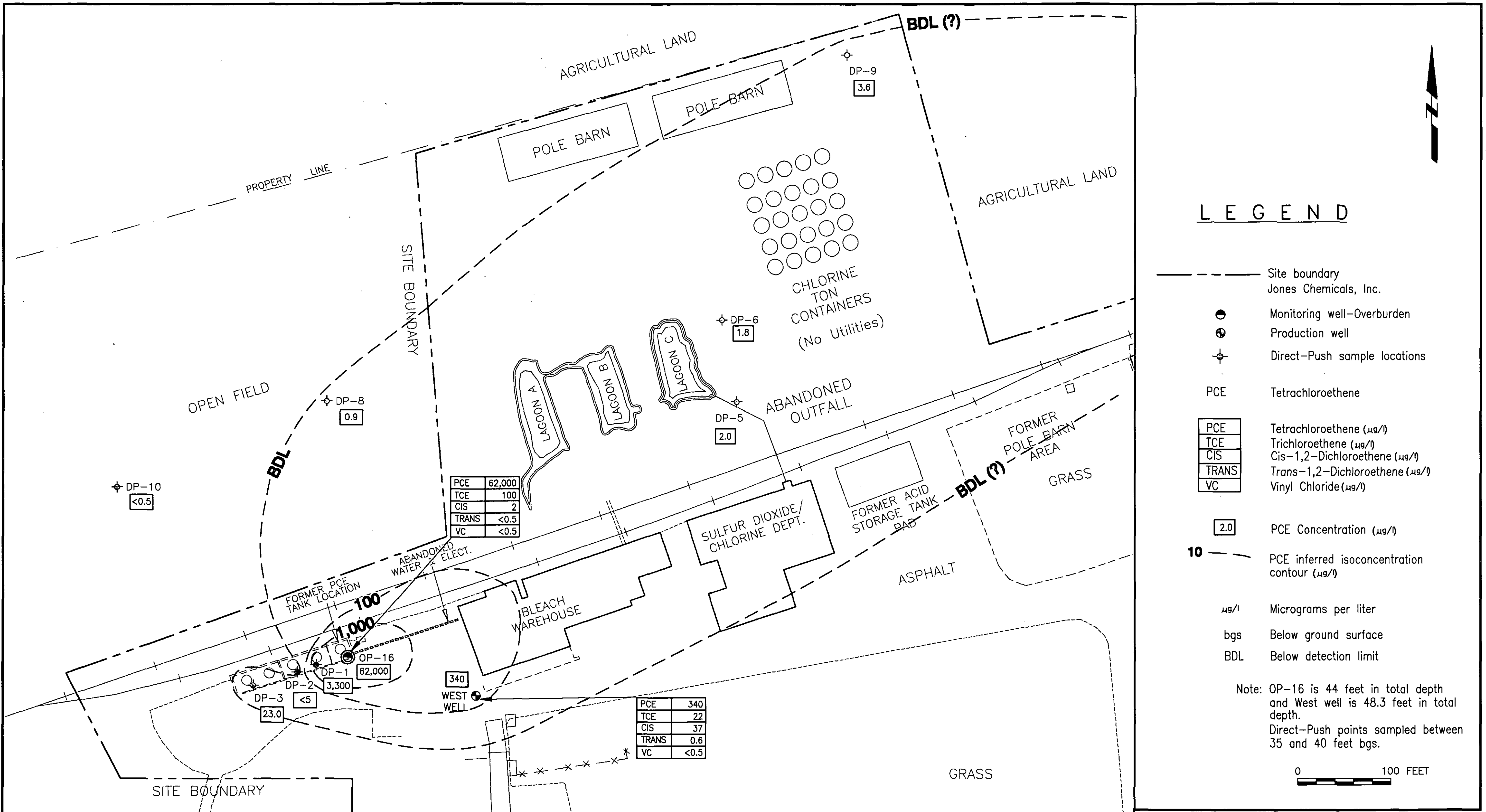
Isoconcentration Map of PCE in Groundwater, 27 - 30 Feet bgs, August 17 - 20, 1998 Caledonia, New York

LFR LEVINE·FRICKE

Figure 16

Project No. 3165.01

JONES/CALEDONI/3165-PCE/WDW/06-03-99



PCE	62,000
TCE	100
CIS	2
TRANS	<0.5
VC	<0.5

PCE	340
TCE	22
CIS	37
TRANS	0.6
VC	<0.5

JCI / Jones Chemicals, Inc

Isoconcentration Map of PCE in Groundwater, 35 - 48 Feet bgs, August 17 - 21, 1998 Caledonia, New York

LFR LEVINE·FRICKE

Figure 17

Project No. 3165.01

JONES/CALEDONI/3165-PCE/WDW/06-03-99

APPENDICES

Appendix A

Selected Aerial Photographs
(Source: U.S. EPA 1999)

PHOTOGRAPHIC ANALYSIS

The Jones Chemical, Inc., site is located east of State Route 5 and on the northern side of Iroquois Road (Figure 2). The site has an areal extent of approximately 19 hectares (47 acres) and is relatively flat. The general surface runoff flows eastward. An unnamed tributary, probably Spring Creek, is approximately 1 kilometer (0.6 mile) west of the site and flows north toward Oatka Creek. The National Priorities Listing (NPL) for this site makes reference to this creek (NPL 1990). To aid in comprehensive understanding of the analysis of the site, features referenced in the background material are sometimes cited in the text that accompanies each photograph. When they first appear in the text these features are denoted with an asterisk (*). They are also denoted with an asterisk each time they appear on the photographs. The locations of structures and features are annotated on the photographs throughout the analysis to serve as reference points within the site. These features are not discussed unless they are environmentally significant.

JUNE 20, 1938

The site lies on the northern side of Iroquois Road and is accessible via Harwood Avenue. An east-west railway comprising the northern boundary of the site is identified as the Northern Railway* and a second east-west railway within the site is identified as the Main Service Railway*. The extension of the Main Service Railway beyond the eastern site boundary is noted. The site contains no discernible industrial development or waste disposal facilities. The site includes an orchard, agricultural fields, and pasture land. An access road (A1) in the northwestern corner of the site extends through an orchard to a building (B1), a revegetating area, and a cleared area (CA). A building (B2) and a probable building foundation are adjacent to the south side of the second railway. A probable farmstead is identified in the southwestern portion of the site.

Fig. A-1 Jones Chemical, Inc., site, June 20, 1938. Approximate scale 1:3,820.

INTERPRETATION CODE

BOUNDARIES AND LIMITS

x—x—x— FENCED SITE BOUNDARY
—— UNFENCED SITE BOUNDARY
x x x x x x FENCE
— — — STUDY AREA

DRAINAGE

←- - - - DRAINAGE
← FLOW DIRECTION
- - -←- - - INDETERMINATE DRAINAGE

TRANSPORTATION/UTILITY

= = = = = VEHICLE ACCESS
+—+—+—+ RAILWAY

SITE FEATURES

BERM/DIKE
STANDING LIQUID
SL STANDING LIQUID
EXCAVATION, PIT (EXTENSIVE)
MOUNDED MATERIAL (EXTENSIVE)
MM MOUNDED MATERIAL (SMALL)

CR	CRATES/BOXES
DR	DRUMS
HT	HORIZONTAL TANK
PT	PRESSURE TANK
VT	VERTICAL TANK
CA	CLEARED AREA
DG	DISTURBED GROUND
FL	FILL
IM	IMPOUNDMENT
LG	LAGOON
OF	OUTFALL
SD	SLUDGE
ST	STAIN
SW	SOLID WASTE
TR	TRENCH
VS	VEGETATION STRESS
WD	WASTE DISPOSAL AREA
WV	WETLAND VEGETATION

Figure A-1

AUGUST 27, 1954

A chemical facility* is operational on the site. Two waste disposal areas (WD-1 and WD-2) are in the western portion of the site. To the northwest, waste disposal area WD-1 is bounded north and south by the two associated railways. The contents of waste disposal area WD-1 include: three empty, unlined lagoons (LG-A, LG-B, and LG-C) at the former location of an orchard (1938); trenches (TR) partially obscured by vegetation connecting to the southern ends of the lagoons; and a light-toned mound of material (LTMM) adjacent to the north side of lagoon LG-C.

In the southwestern portion of the site, facility development is evident by the addition of an asphalt yard (Yard-1) containing an industrial building (B3), an open storage area (OS-1), a waste disposal area (WD-2), support buildings (SB), and vehicles (not annotated). Yard-1 extends from the main service railway to the southern boundary of waste disposal area WD-2. The easternmost end of the Main Service Railway now ends within the eastern boundary of the site. A new rail spur extending from the Main Service Railway and lying adjacent to the northern side of buildings B2 and B3 is identified as a Parallel Service Railway*. Six rail tank cars adjacent to the northern side of buildings B2 and B3 are probably associated with rail transshipment operations. West of building B3 there are two horizontal tanks and ground stains (GS). Adjacent to building B2, open storage area OS-1 contains crates and boxes (CR). Waste disposal area WD-2 is located in the southeast quadrant of Yard-1, and contains probable debris and stacked accumulations of probable lumber, three horizontal tanks, and a probable roofless shed.

In the eastern portion of the site, the facility is comprised of three warehouses* (W1, W2, and W3), open storage area OS-2 that contains probable crates and boxes, a dirt yard (Yard-2) that contains two probable vertical tanks (VT) and ground stains, a partially vegetated area probably pertaining to an underground storage tank* (UST), and a Main Office*. A rail tank car is adjacent to the northern side of the warehouses.

Fig. A-2 Jones Chemical, Inc., site, August 27, 1954. Approximate scale 1:3,570.

INTERPRETATION CODE

BOUNDARIES AND LIMITS

- x—x—x— FENCED SITE BOUNDARY
- —— UNFENCED SITE BOUNDARY
- xxxxxx FENCE
- — — — STUDY AREA

DRAINAGE

- ←- - - DRAINAGE
- ← FLOW DIRECTION
- - -←- - INDETERMINATE DRAINAGE

TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- +++++ RAILWAY

SITE FEATURES

- BERM/DIKE
- STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure A-2

OCTOBER 24, 1974

At waste disposal area WD-1 an increased level of activity is indicated by disturbed ground, a medium-toned mound of material (MTMM) east of building B1, and vehicles. The lagoons (LG-A, LG-B, and LG-C) contain probable liquid.

In Yard-1 there are 15 rail tank cars adjacent to the northern side of buildings B2 and B3. West of building B3 there is one horizontal tank, eight vertical tanks, and ground stains. There is a new expansion of building B2 at the former location of open storage area OS-1 (1963). The area east of building B2 now contains six vertical tanks, crates and boxes, and disturbed ground. At waste disposal area WD-2 the areal extent has expanded west to the support buildings. This area now contains crates and boxes, disturbed ground, ground stains, tanker trailers, and vehicles.

In the eastern portion of the site, four rail tank cars adjacent to the northern side of the warehouses are probably associated with rail transshipment operations. There is a new expansion of the main office at the former location of open storage area OS-2 (1963). The contents of Yard-2 have increased in volume and are comprised primarily of vehicles with possible ground stains. Due to revegetation, the locations of the previously observed underground storage tank (UST) area (1963) and the former cleared area (1963) are obscured. These locations are annotated as being approximate.

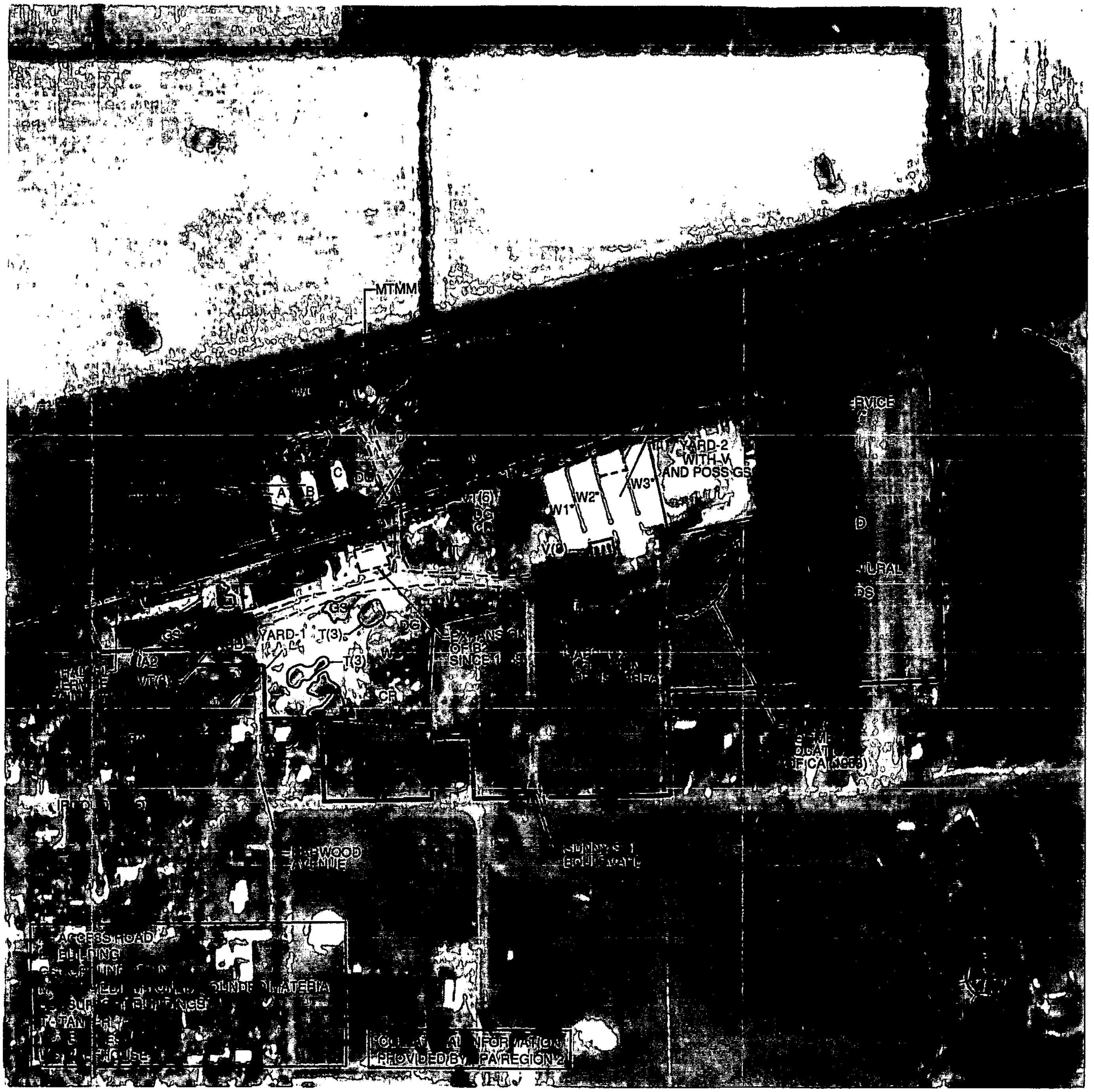


Fig. A-3 Jones Chemical, Inc., site, October 24, 1974. Approximate scale 1:3,590.

INTERPRETATION CODE

BOUNDARIES AND LIMITS

- x—x—x— FENCED SITE BOUNDARY
- ——— UNFENCED SITE BOUNDARY
- x x x x x x FENCE
- — — — STUDY AREA

DRAINAGE

- ←- - - DRAINAGE
- ← FLOW DIRECTION
- - -←- - INDETERMINATE DRAINAGE

TRANSPORTATION/UTILITY

- ===== VEHICLE ACCESS
- +++++ RAILWAY

SITE FEATURES

- BERM/DIKE
- STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)

CR	CRATES/BOXES
DR	DRUMS
HT	HORIZONTAL TANK
PT	PRESSURE TANK
VT	VERTICAL TANK
CA	CLEARED AREA
DG	DISTURBED GROUND
FL	FILL
IM	IMPOUNDMENT
LG	LAGOON
OF	OUTFALL
SD	SLUDGE
ST	STAIN
SW	SOLID WASTE
TR	TRENCH
VS	VEGETATION STRESS
WD	WASTE DISPOSAL AREA
WV	WETLAND VEGETATIO

Figure A-3

MAY 5, 1991

At waste disposal area WD-1, four accumulations of crates and boxes are visible. A new, rectangular cleared area and a new accumulation of dark-toned (DT), probable solid waste (SW) are visible. Lagoon LG-A has dark-toned stains that indicate the presence of liquid. The two remaining lagoons (LG-B and LG-C) appear relatively dry.

In Yard-1 there are twelve rail tank cars adjacent to the northern side of buildings B2 and B3. West and south of building B3 there are crates and boxes, eight vertical tanks, and one horizontal tank. The number of crates and boxes in open storage area OS-4 has increased since August 1990. At waste disposal area WD-2 medium-toned ground stains are visible near the crates and boxes stacked along the southern and southeastern periphery of Yard-1.

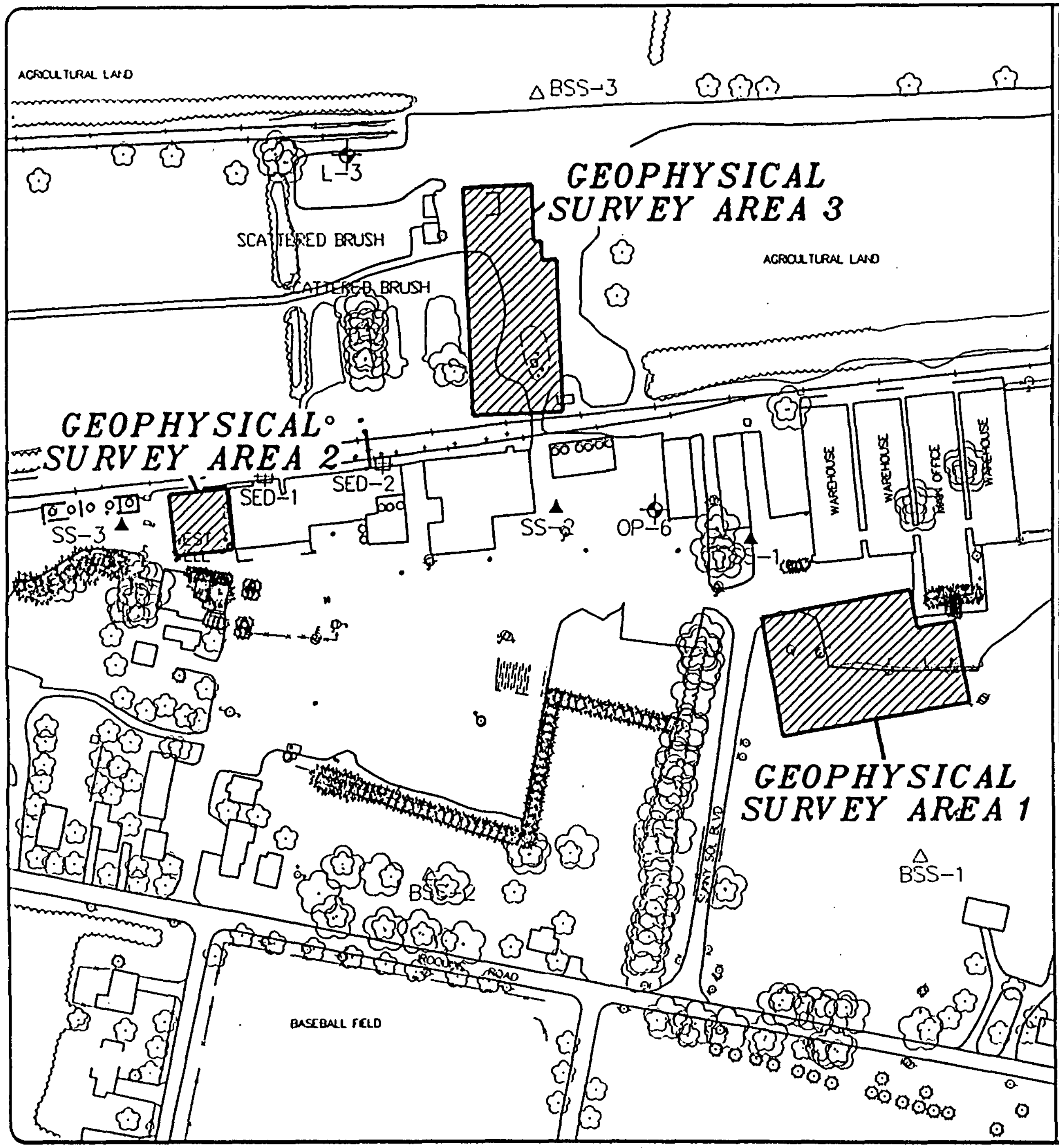
The previously observed medium-toned ground stains (1990) at Yard-2 in the eastern portion of the site have decreased in areal extent and an accumulation of crates and boxes lies adjacent to building B5.

Fig. A-4 Jones Chemical, Inc., site, May 5, 1991. Approximate scale 1:3,680.

Figure A-4

Appendix B

Geophysical (Electromagnetic) Survey Study Areas and Results



LEGEND

SED-1	⊞	SEDIMENT SAMPLE
BSS-1	△	BACKGROUND SOIL SAMPLE
SS-2	▲	SOIL SAMPLE
OP-6	⌖	OVERBURDEN MONITORING WELL
NORTH WELL	○	PRODUCTION WELL

NOTES

BASE MAP MODIFIED FROM AUTOCAD DRAWING "CALEDON1.DWG" PROVIDED BY LEVINE-FRICKE

SCALE

100 0 50 100 200 300

(FEET)

SITE MAP

JONES CHEMICALS, INC., CALEDONIA, NY

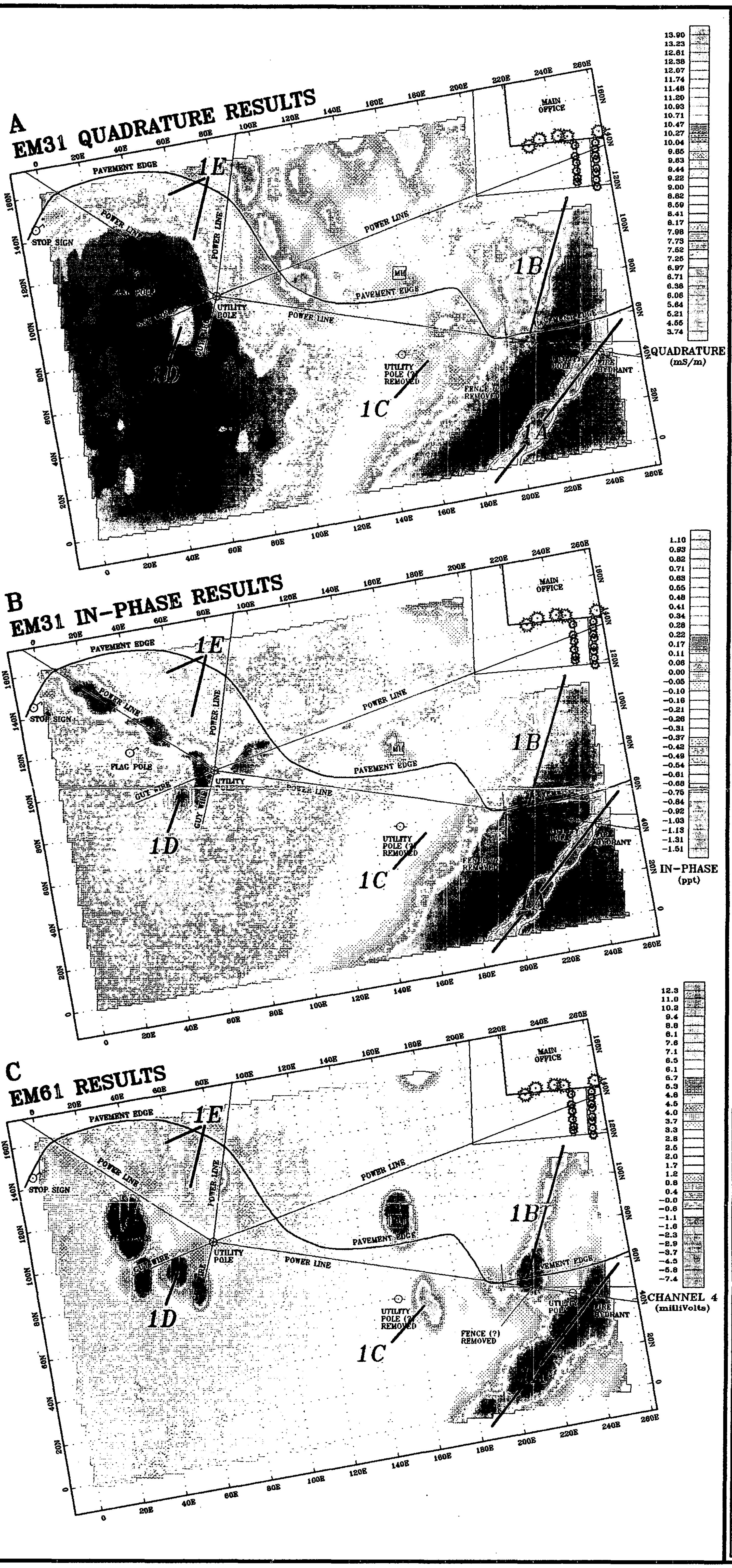
LEVINE-FRICKE

SITE MAP SHOWING LOCATIONS OF GEOPHYSICAL SURVEY AREAS OVERLAID ON BASE MAP

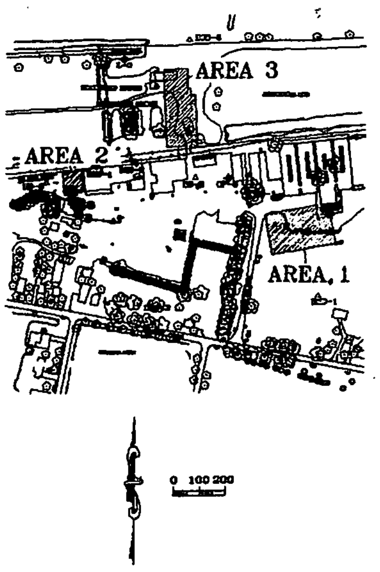
PROJECT No: 94-848 DATE: NOVEMBER 1994 FILENAME: FIG1.DWG

Gartner Lee
Niagara Falls, NY

FIGURE 1



LOCATION MAP



NOTES

BASE MAP MODIFIED FROM DRAWING "CALEDON1.DWG" PROVIDED BY LEVINE-FRICKE

SCALE
25 0 25 50
(FEET)

GEOPHYSICAL SURVEY RESULTS

JONES CHEMICALS, INC.
CALEDONIA, NY

LEVINE-FRICKE

AREA 1

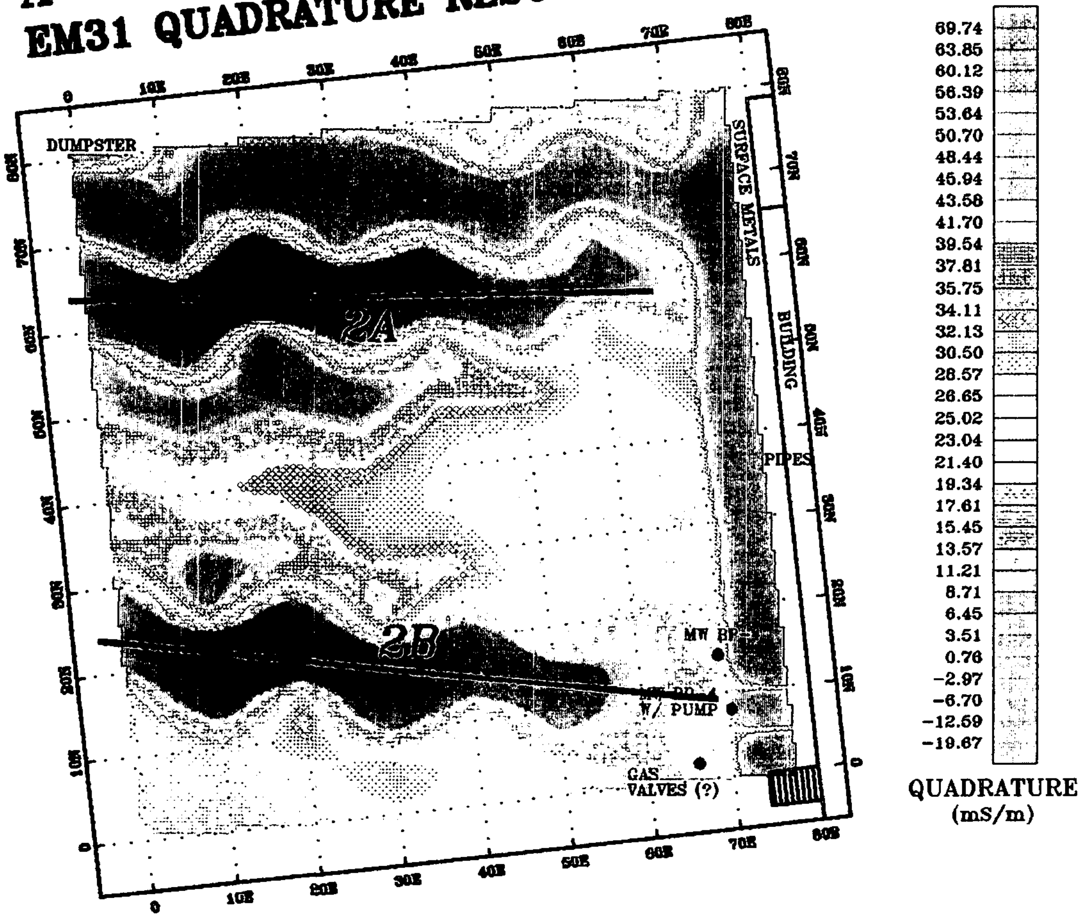
EM31 QUADRATURE AND IN-PHASE
AND EM61 SURVEY RESULTS

PROJECT No.94-646 DATE: NOVEMBER 1994 FILENAME: AREA1.GCD

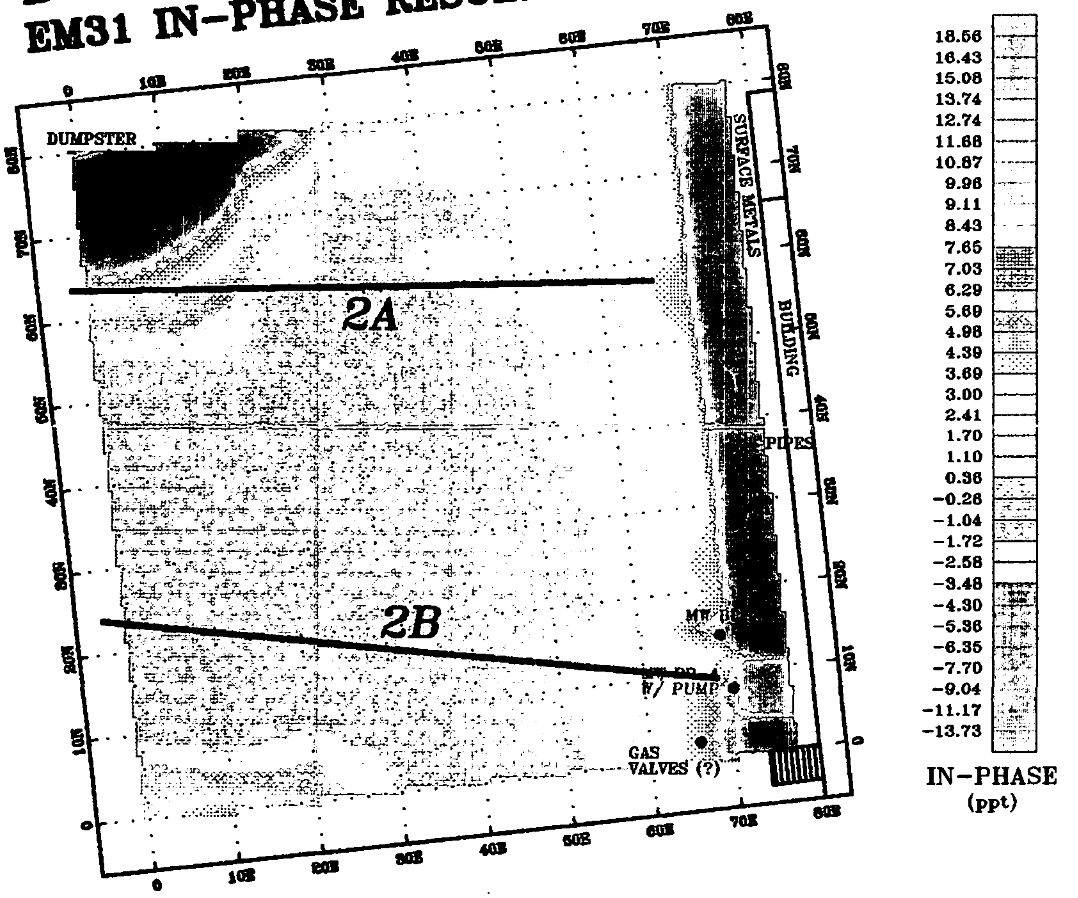
Gartner
Lee

FIGURE
2

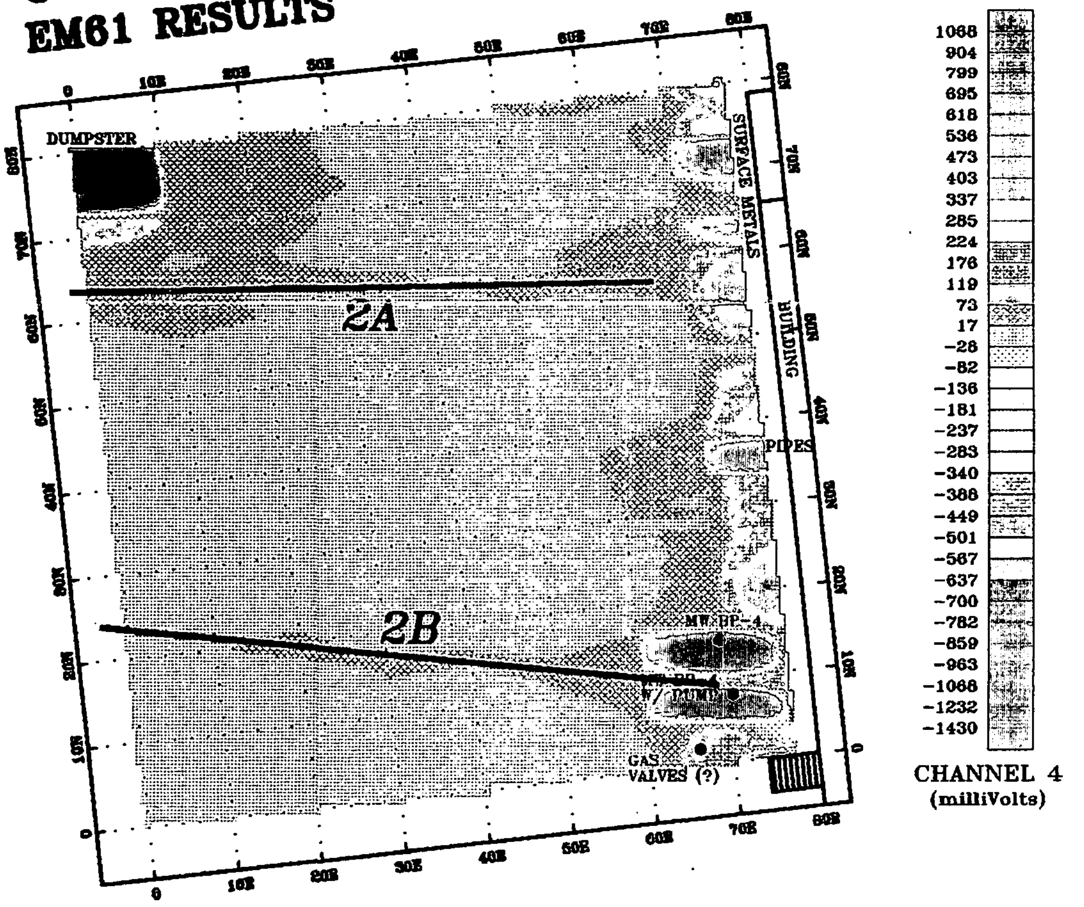
A
EM31 QUADRATURE RESULTS



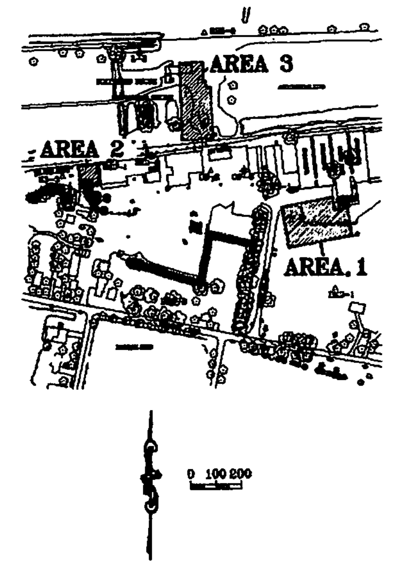
B
EM31 IN-PHASE RESULTS



C
EM61 RESULTS



LOCATION MAP



NOTES

BASE MAP MODIFIED FROM DRAWING
"CALEDON1.DWG" PROVIDED BY
LEVINE–FRICKE

SCALE

25 0 25 50 75

(FEET)

GEOPHYSICAL SURVEY RESULTS

JONES CHEMICALS, INC.
CALEDONIA, NY

LEVINE–FRICKE

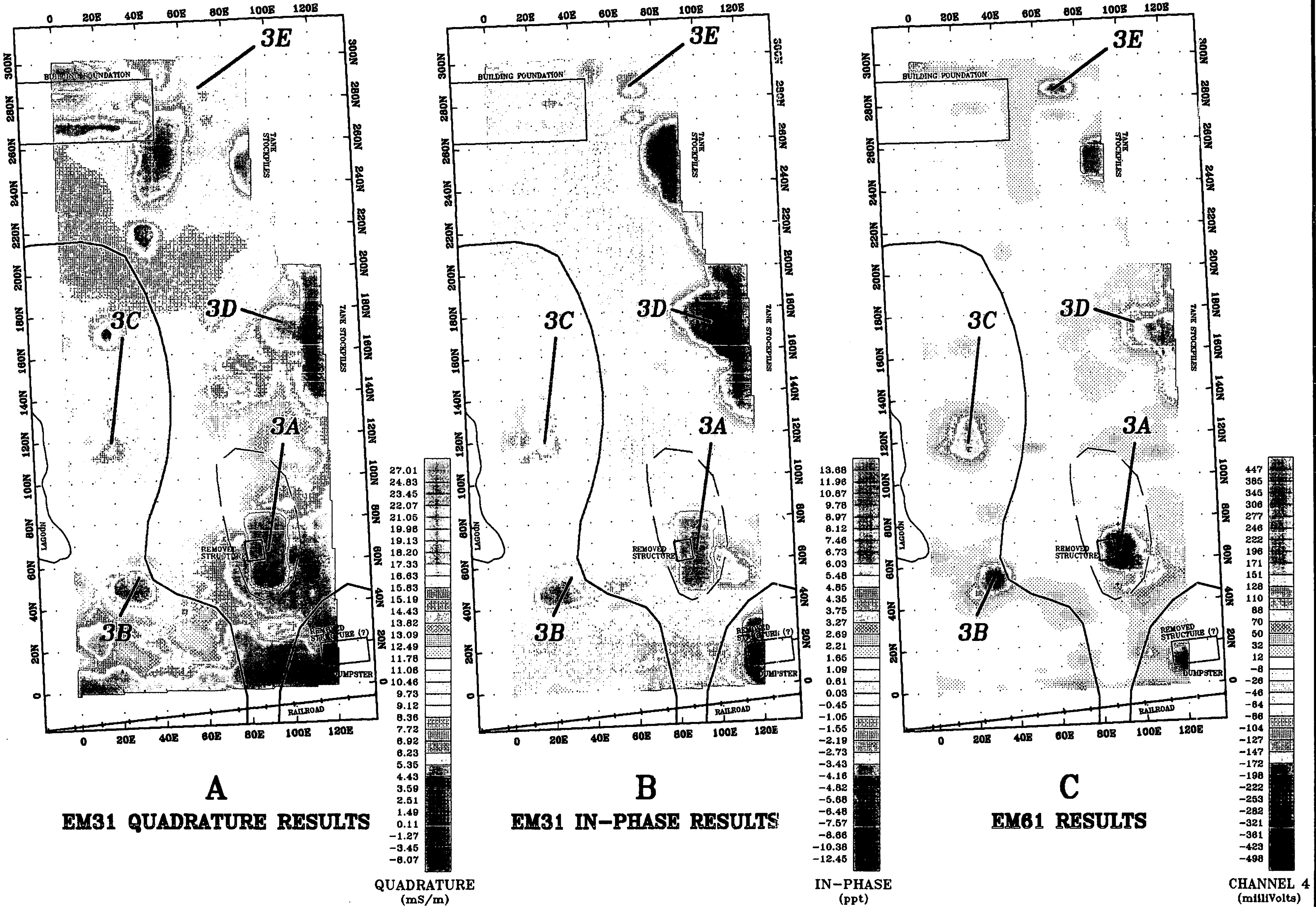
AREA 2

EM31 QUADRATURE AND IN–PHASE
AND EM61 SURVEY RESULTS

PROJECT No.94–846 DATE: NOVEMBER 1994 FILENAME: AREA2.GCD

Gartner
Lee

FIGURE
3

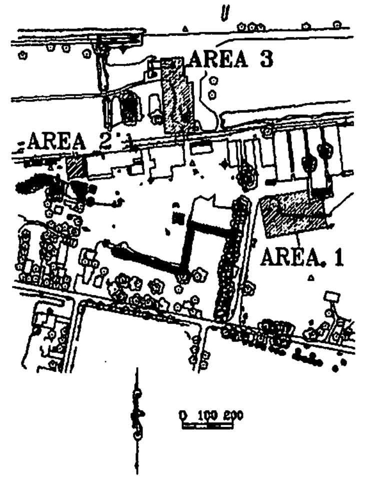


A
EM31 QUADRATURE RESULTS

B
EM31 IN−PHASE RESULTS

C
EM61 RESULTS

LOCATION MAP



NOTES

BASE MAP MODIFIED FROM DRAWING "CALEDON1.DWG" PROVIDED BY LEVINE−FRICKE

SCALE
25 0 25 50
(FEET)

GEOPHYSICAL SURVEY RESULTS

JONES CHEMICALS, INC.
CALEDONIA, NY

LEVINE−FRICKE

AREA 3

EM31 QUADRATURE AND IN−PHASE AND EM61 SURVEY RESULTS

PROJECT No.94−846 DATE: NOVEMBER 1994 FILENAME: AREA3.GCD

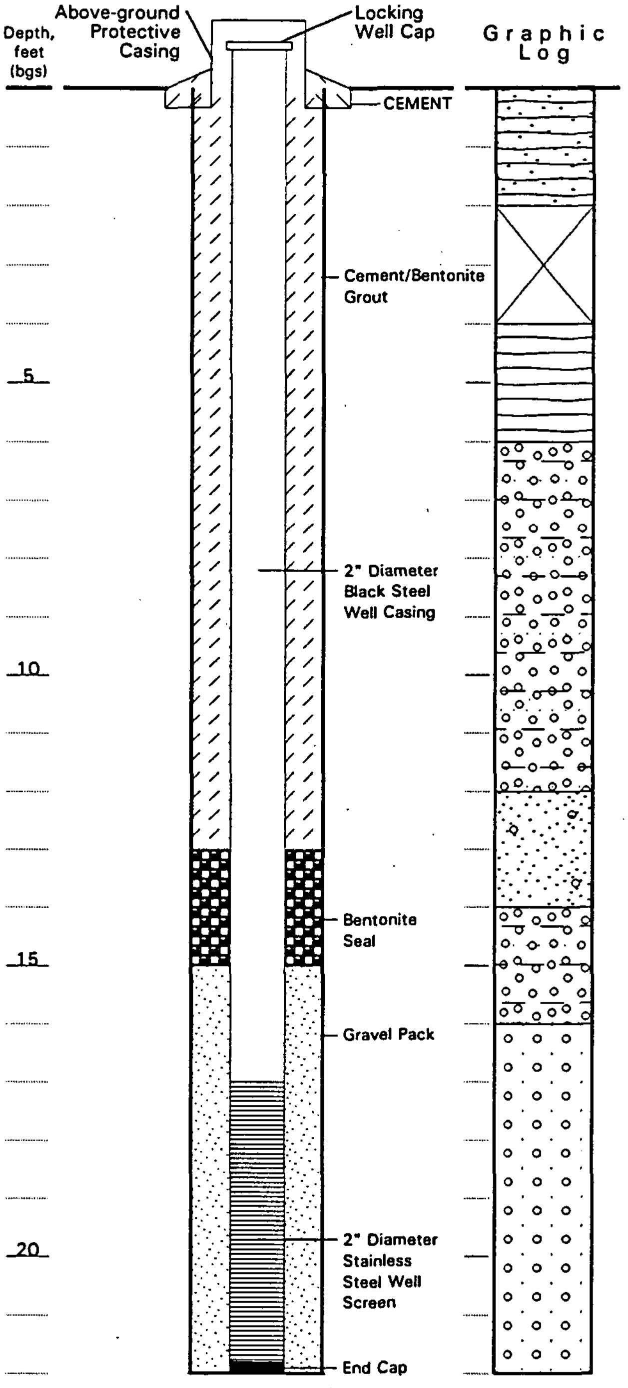
Gartner Lee

FIGURE
4

Appendix C

Lithology Logs

WELL CONSTRUCTION **LITHOLOGY** **SAMPLING DATA**



Visual Description	Penetration Rate (blows/ft.)	PID/FID Values (ppm)
Sandy Clay (CL), very dark grayish brown (10YR 3/2), moist, medium to high plasticity, medium stiff, minor gravels present -- appears like fill material	4 4 3 2/17	NR/NRC
No recovery	3 6 9 7/15	
Same as 0-2' interval, also appears like fill material	5 8 17 9/25	NR/NRC
Silty Gravel with Sand (GM), dark gray (10YR 4/1), dry, fine to medium grained, subangular sand, medium loose, poorly graded, minor clay content	Not recorded	2/NRC
As above, color change to brownish gray (10YR 6/2), slightly moist, very dense	14 29 28 13/57	13/NRC
As above, medium loose	7 14 15 9/29	14/NRC
Poorly-Graded Sand (SP), dark gray (10YR 4/1), gravel <15%, slightly moist, medium grained and angular sand, poorly graded	10 15 40 29/55	13/NRC
Silty Gravel with Sand (GM), grayish brown (10YR 5/2), slightly moist, medium grained and angular sand, dense, well graded, clay <10%	8 12 23 18/35	22/NRC
Well-Graded Gravel with Sand (GW), dark gray (10YR 4/1), moist, medium to coarse grained angular sand, loose, well graded, clay <5%	9 5 6 5/11	28/NRC
As above, medium loose sand	12 13 16 18/29	56/NRC
As above, dense sand	10 10 23 58/33	70/NRC
Total depth 22' bgs		

Date well drilled: 04/24/96

L•F Geologist/Engineer: SRM

Approved by: JLA

EXPLANATION

▤	Clay
▤	Silt
▨	Sand
○	Gravel

▨ Interval Sampled
■ Sample Retained

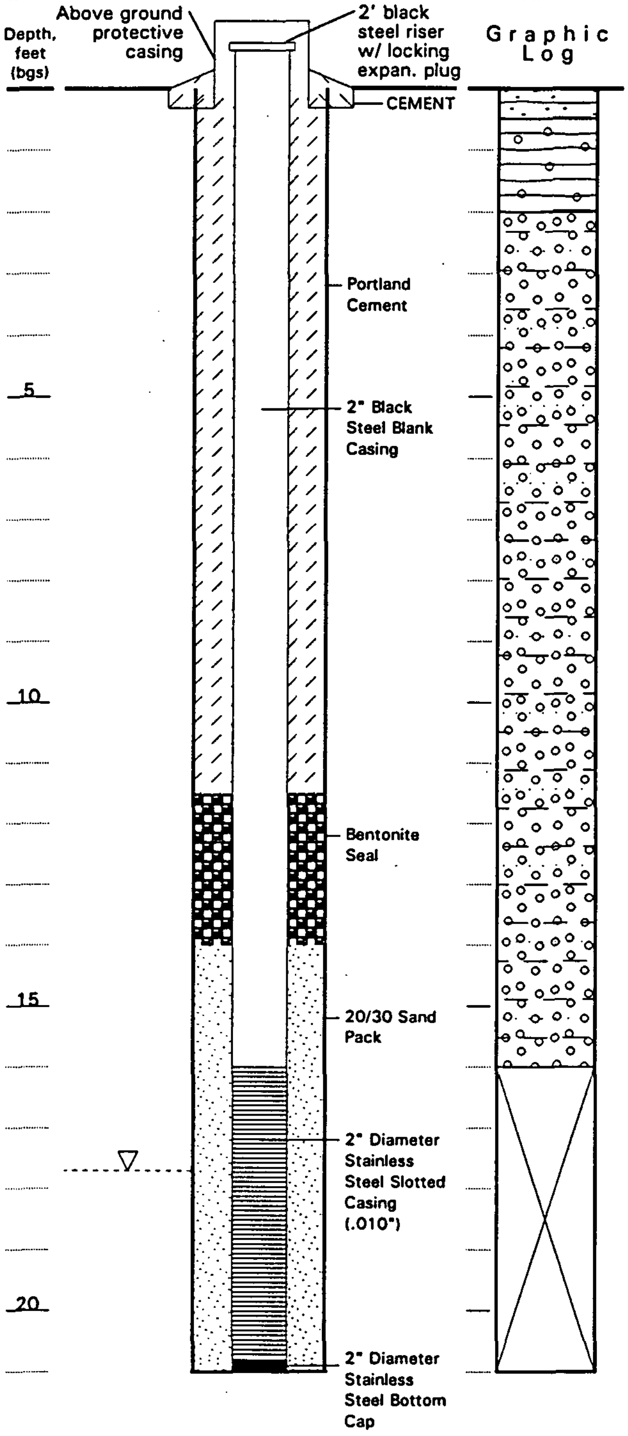
FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

WELL CONSTRUCTION AND LITHOLOGY FOR WELL OP-5

Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

WELL CONSTRUCTION | LITHOLOGY | SAMPLING DATA



Visual Description	Penetration Rate (blows/ft.)	PID/FID Values (ppm)
Sandy Clay (CL), very dark grayish brown (10YR 3/2), moist, medium to high plasticity, medium stiff, some gravel and sand	6 10 13 13/23	NR/NRC
Gravelly Clay (CL), pale brown to light brownish gray, increase in sand and gravel content with depth		
Silty Gravel with Sand (GM), light gray (10YR 4/1), fine to coarse grain sand and gravel, 30-40% gravel	9 6 6 8/12	NR/NRC
As above	7 9 7 7/16	NR/NRC
As above	8 12 14 13/26	NR/NRC
As above	8 13 9 11/22	1.6/NRC
As above, increase in silt content(20-30%)	12 15 11 11/26	NR/NRC
As above, varying amount of silt content(10-30%)	6 13 11 8/24	NR/NRC
As above	13 38 15 22/53	NR/NRC
As above		
No recovery		

EXPLANATION

▭	Clay
▤	Silt
⁘	Sand
○	Gravel
▨	Interval Sampled
■	Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

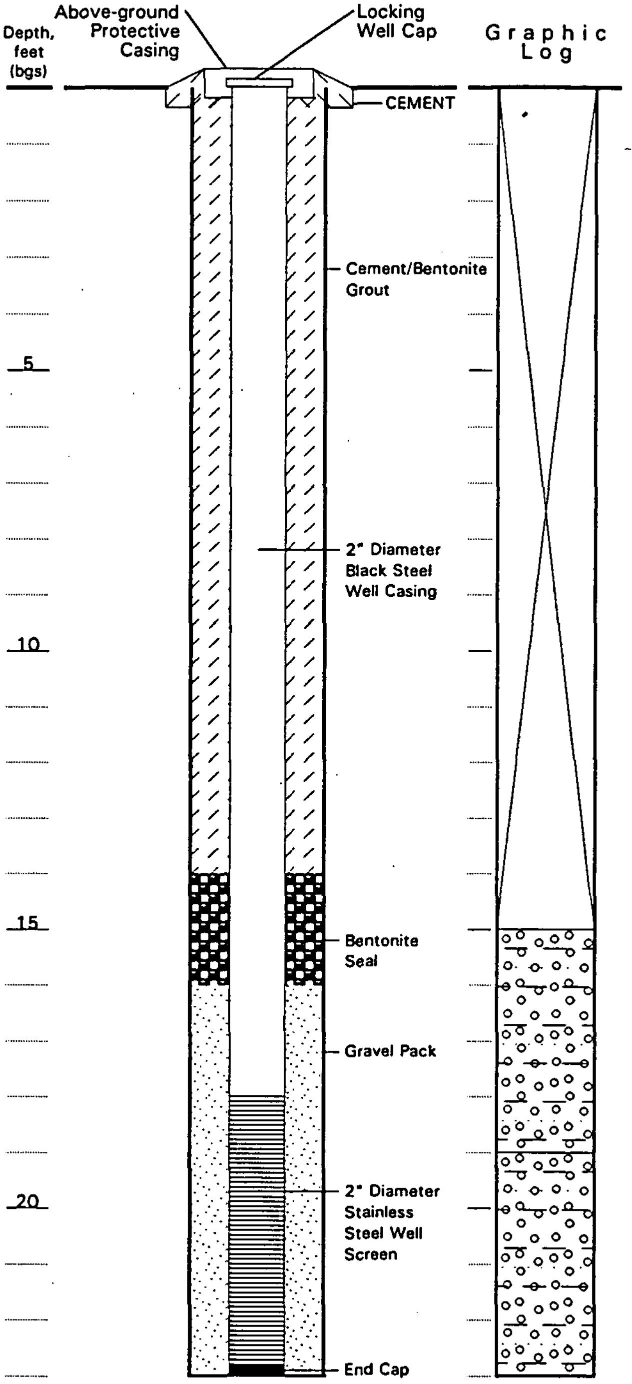
Date well drilled: 08/23/94
L•F Geologist/Engineer: JLA
Approved by: JLA

WELL CONSTRUCTION AND LITHOLOGY FOR WELL OP-6

Project No. 3165.01
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

WELL CONSTRUCTION	LITHOLOGY	SAMPLING DATA	



Visual Description	Penetration Rate (blows/ft.)	PID/FID Values (ppm)
Note: See lithologic log of SB-5 for lithologic description. Split spoon samples not collected due to close proximity of SB-5		
Well-Graded Gravel with Sand (GW), grayish brown (10YR 5/2), slightly moist, medium to coarse grained sand, subangular, medium loose density, well graded	4 10 13 13/23	20/NRC
As above	7 9 11 1/20	33/NRC
As above, clay <5%	12 14 14 16/28	28/NRC
As above	7 8 42 30/50	16/NRC
Total depth 23' bgs		

Depth scale: 5, 10, 15, 20

EXPLANATION

- ☰ Clay
- ▤ Silt
- ⁘ Sand
- ○ Gravel

▨ Interval Sampled
■ Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date well drilled: 04/23/96

L•F Geologist/Engineer: SRM

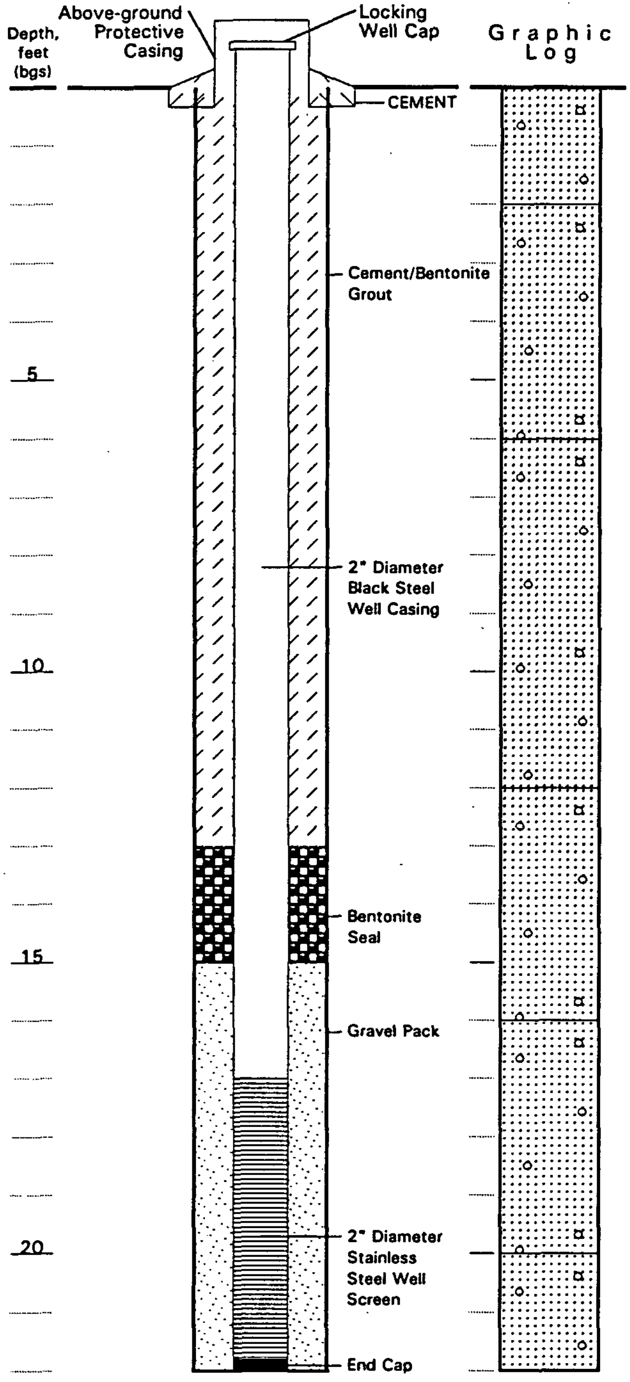
Approved by: JLA

WELL CONSTRUCTION AND LITHOLOGY FOR WELL OP-7

Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

WELL CONSTRUCTION / LITHOLOGY / SAMPLING DATA



Visual Description	Penetration Rate (blows/ft.)	PID/FID Values (ppm)
Well-Graded Sand with Gravel (SW), grayish brown (10YR 5/2), gravel <20%, gravel is predominantly carbonates, medium dense sand, dry, coarse grained and angular, well graded, clay 10-15%, organic material <2%	0 7 4 4/11	<1/NRC
As above, increase in gravel content to approx. 20%	9 7 9 7/16	1/NRC
Well-Graded Sand with Gravel (SW), light grayish brown (10YR 6/2), gravel <10% (carbonates), dry, fine grained, subangular to angular, very loose sand, well graded, clay <10%, organic material not visible	1 1 1 1/2	4/NRC
As above	12 21 33 17/54	9/NRC
As above	Not counted	12/NRC
As above, sand is slightly moist, very dense clay increases to 10-15%	33 23 43 23/66	28/NRC
Well-Graded Sand with Gravel (SW), dark gray (10YR 4/1), gravel <15% (carbonates), slightly moist, medium grained and angular sand, dense, poorly graded, clay approx. 10%	30 20 29 35/49	36/NRC
As above, with decreasing amount of gravel <5%, very dense sand, sharp contact between medium grained sand and gravel	7 40 31 44/71	100/NRC
Well-Graded Sand with Gravel (SW), very dark gray (10YR 3/1), gravel 20-25%, moist, medium grained and angular sand, loose sand, well graded	3 3 8 14/11	10/NRC
As above, but medium loose sand with slight amount of clay (<10%)	7 7 8 9/15	65/NRC
Well-Graded Sand with Gravel (SW), gray (10YR 5/1), gravel 10-15%, moist, medium grained and angular sand, dense sand, well graded, clay <5%	12 12 19 24/31	8/NRC
Total depth 22' bgs		

EXPLANATION

Clay
Silt
Sand
Gravel

▨ Interval Sampled
■ Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

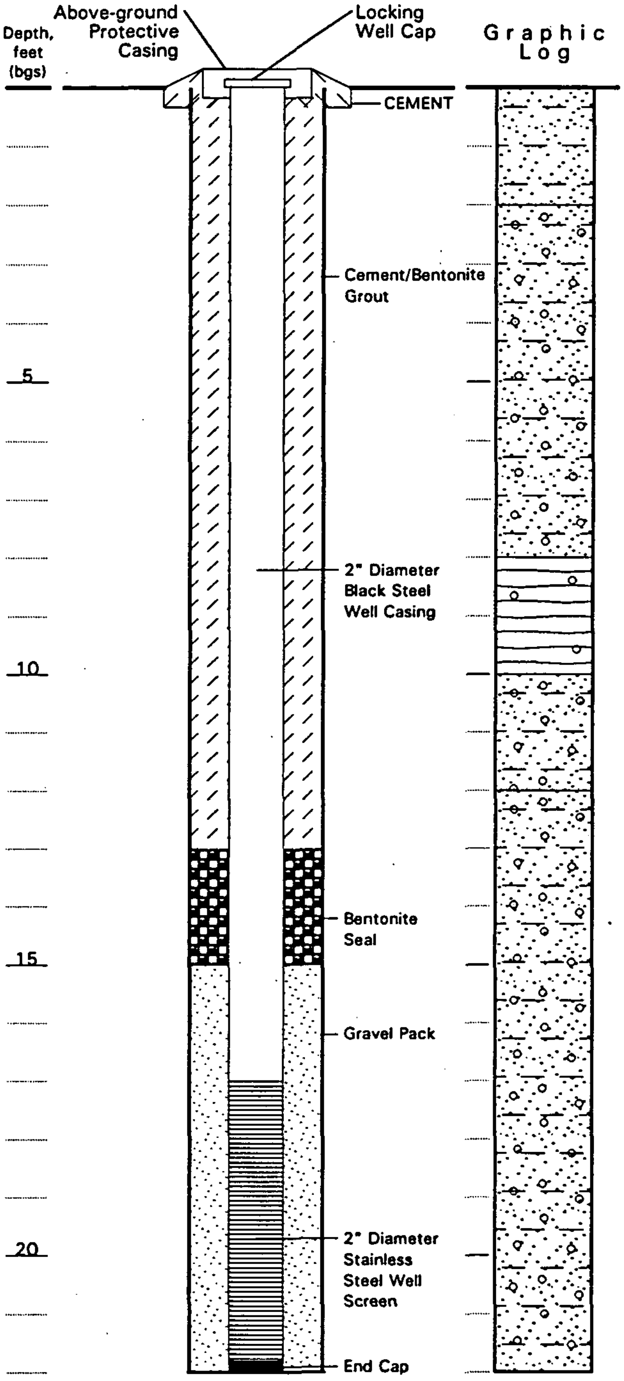
Date well drilled: 04/23/96

L•F Geologist/Engineer: SRM

Approved by: JLA

WELL CONSTRUCTION AND LITHOLOGY FOR WELL OP-8

WELL CONSTRUCTION | **LITHOLOGY** | **SAMPLING DATA**



Visual Description	Penetration Rate (blows/ft.)	PID/FID Values (ppm)
Silty Sand (SM), dark gray (10YR 4/1), slightly moist, medium to coarse grained and subangular, loose, well graded, clay 5-15%, gravel <10%	1 2 8 7/10	NR/NRC
Silty Sand with Gravel (SM), dark gray (10YR 4/1), dry, medium coarse grained and angular sand, medium loose, well graded, clay <10%, gravel 15-20%	7 8 11 11/19	4/NRC
As above, color change to light brownish gray (10YR 6/2), clay <5%	16 - 10 0/10	10/NRC
As above	20 14 19 27/33	16/NRC
Gravelly Clay (CL), brown (10YR 5/3), weak spongy thread, soft to medium stiff plasticity, very stiff, gravel 10-15%	20 13 9 10/22	3/NRC
Silty Sand with Gravel (SM), same as described in 0-2' interval, color change to grayish brown (10YR 5/2)	5 9 10 10/19	12/NRC
Silty Sand with Gravel (SM), grayish brown (10YR 5/2), moist, coarse grained sand, angular, medium loose density, well graded, clay 5-10%	6 11 14 14/25	16/NRC
As above, color change to dark gray (10YR 4/1), dense	23 27 19 21/46	34/NRC
As above, very dense	17 30 40 31/70	12/NRC
As above, medium density	12 12 12 29/24	42/NRC
As above	6 12 12 9/24	16/NRC

Total depth 22' bgs

EXPLANATION

- ▭ Clay
- ▭ Silt
- ⁙ Sand
- ○ Gravel

▨ Interval Sampled
■ Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date well drilled: 04/26/96

L•F Geologist/Engineer: SRM

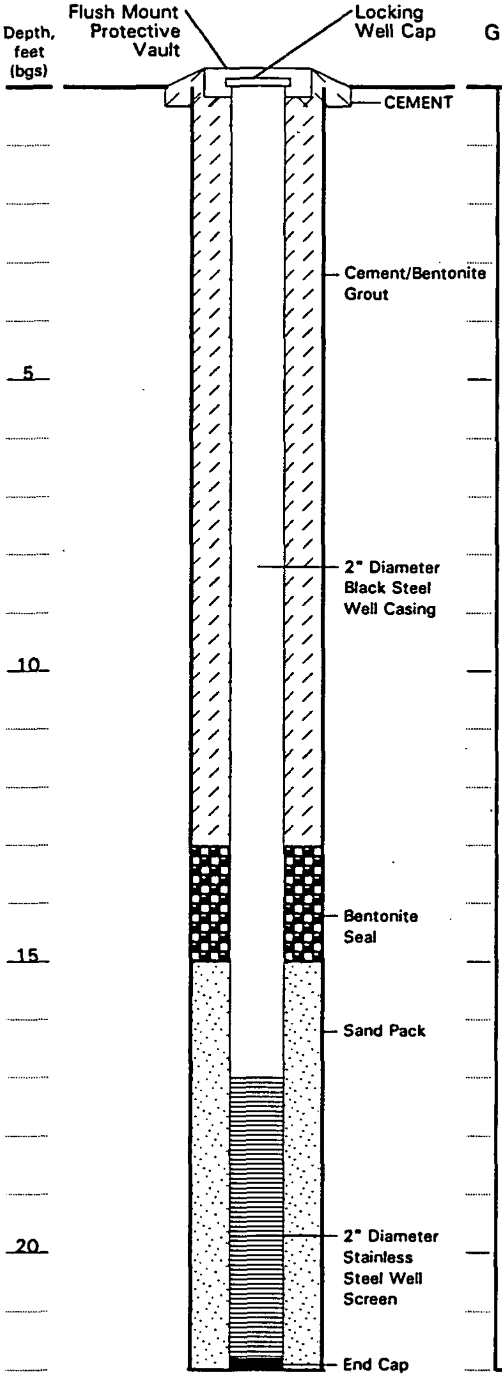
Approved by: JLA

WELL CONSTRUCTION AND LITHOLOGY FOR WELL OP-9

Project No. 3165.01
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

WELL CONSTRUCTION	LITHOLOGY		SAMPLING DATA	
	Graphic Log	Visual Description	Penetration Rate (blows/ft.)	PID/FID Values (ppm)
		Note: See lithologic log of BP-6 for lithologic description.		



EXPLANATION

▭	Clay
▤	Silt
▨	Sand
○	Gravel

▨ Interval Sampled
■ Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date well drilled: 04/25/96

L•F Geologist/Engineer: SRM

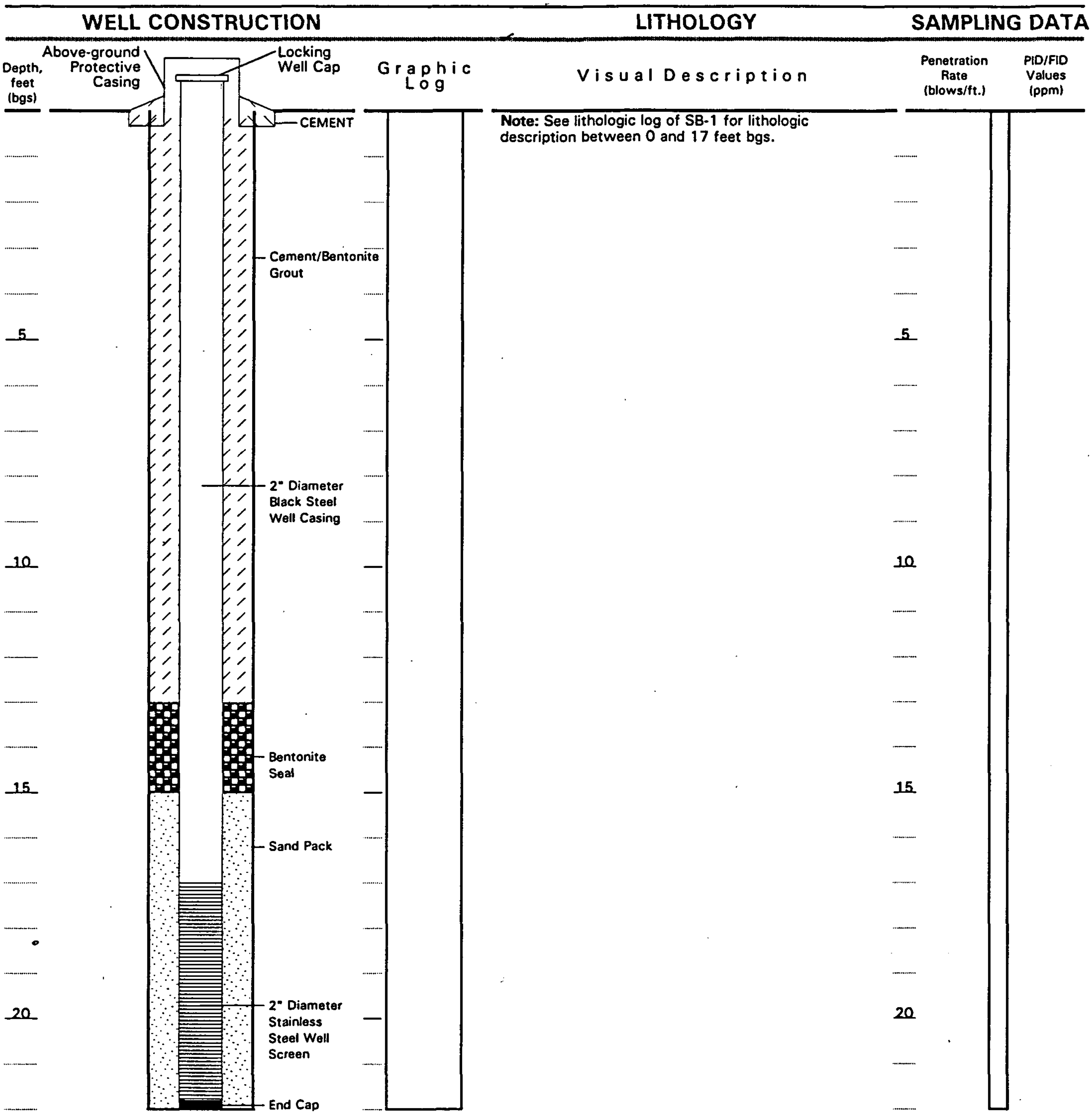
Approved by: JLA

WELL CONSTRUCTION AND LITHOLOGY FOR WELL OP-10

Project No. 3165.01
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

By/WDW



Note: See lithologic log of SB-1 for lithologic description between 0 and 17 feet bgs.

Date well drilled: 04/25/96

L•F Geologist/Engineer: SRM

Approved by: JLA

EXPLANATION

- ▭ Clay
- ▭ Silt
- ▒ Sand
- ○ Gravel

▒ Interval Sampled
■ Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

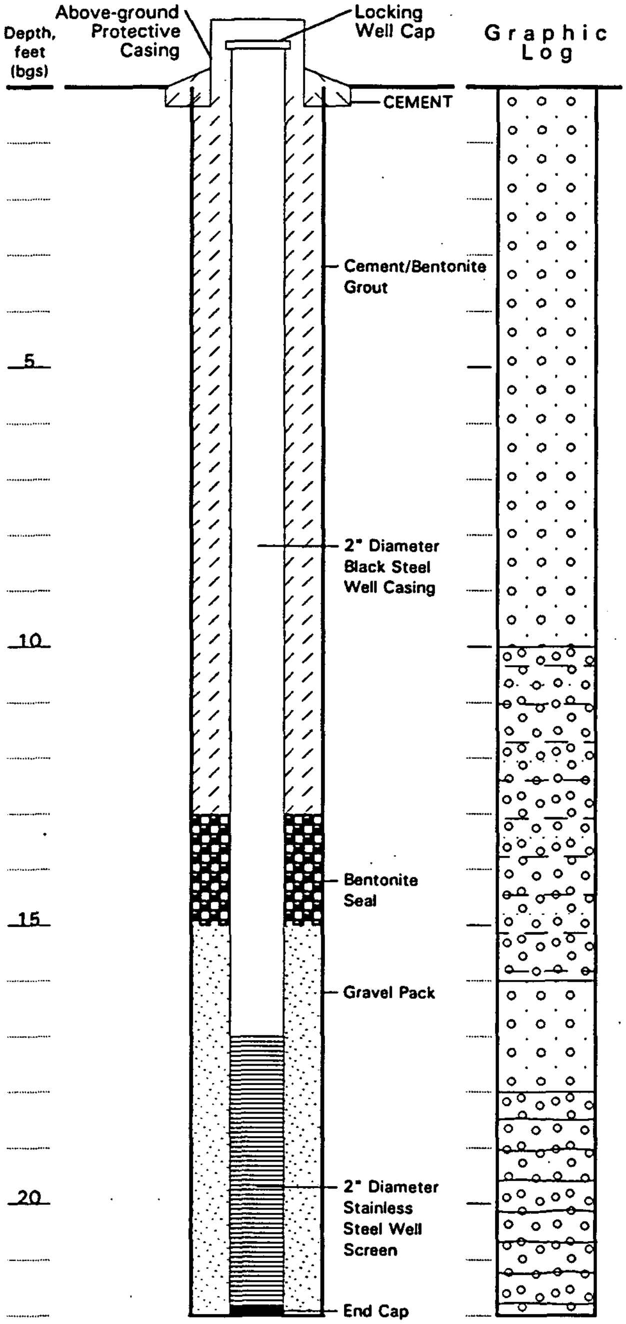
WELL CONSTRUCTION AND LITHOLOGY FOR WELL OP-11

Project No. 3165.01
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

By/WDW

WELL CONSTRUCTION | **LITHOLOGY** | **SAMPLING DATA**



Visual Description	Penetration Rate (blows/ft.)	PID/FID Values (ppm)
Gravel - Sand Mixture (GW), dark gray (10YR 4/1), dry, fine to coarse sand, subangular, medium loose, well graded, clay <5%, gravel 20-25%	7 9 5 8/14	1/NRC
As above, gravel content decreases to <10%	16 16 11 11/27	2/NRC
As above (i.e.) 0-2'	6 9 9 12/18	NRC
As above	7 8 9 9/17	5/NRC
As above	5 9 9 9/18	1/NRC
Gravel-Sand-Silt Mixture (GM), dark gray (10YR 4/1), dry, medium coarse sand, subangular, medium loose density, well graded, clay 0-15%	9 11 13 9/24	4/NRC
As above, clay content decreases to <5%	7 13 15 7/28	18/NRC
As above, decreasing clay content	10 15 15 19/30	5/NRC
Gravel (GW), dark gray (10YR 4/1), slightly moist, minor sand content, sand is coarse grained, subangular, well graded, medium loose	10 13 13 17/26	8/NRC
Gravel-Sand-Silt Mixture (GM), as described in 10-12' interval, clay <5%	3 5 7 7/12	34/NRC
As above	7 9 9 3/18	44/NRC

Total depth 22' bgs

EXPLANATION

Clay
Silt
Sand
Gravel

▨ Interval Sampled
■ Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date well drilled: 04/29/96

L•F Geologist/Engineer: SRM

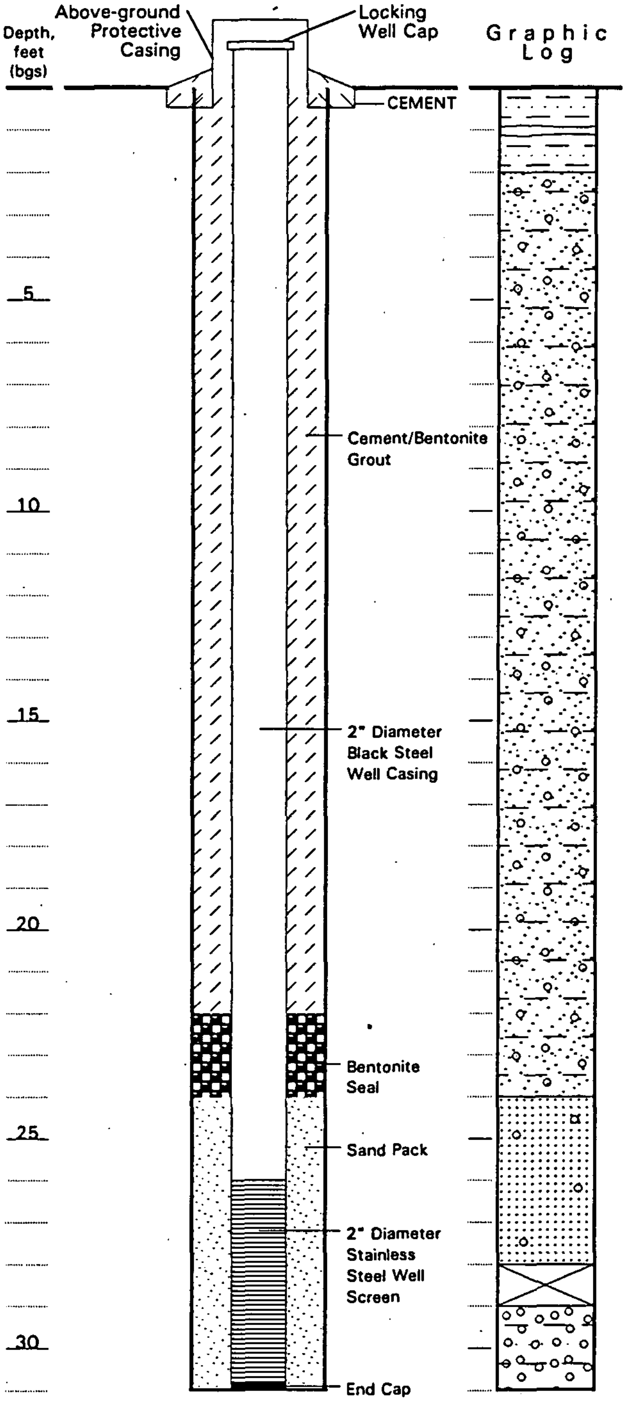
Approved by: JLA

WELL CONSTRUCTION AND LITHOLOGY FOR WELL OP-12

Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

WELL CONSTRUCTION | LITHOLOGY | SAMPLING DATA



Visual Description	Penetration Rate (blows/ft.)	PID/FID Values (ppm)
Silty Clay (CL), dark brown (7.5YR 3/2), slightly moist, medium plasticity, medium stiff, minor amounts of gravel, 10% recovery	1 2 2 3/4	0
Silty Sand with Gravel (SM), brown (7.5YR 5/2), dry, coarse gravel, subangular, medium dense, well graded, 20% gravel, 10% recovery	6 8 10 9/18	0
As above, 25% recovery	9 11 11 10/22	0
As above, gravel size ranges up to 0.5"	10 8 7 10/15	0
As above, 50% recovery, gravel size decreases, approx. 10% gravels	10 11 10 11/21	0
As above, gravel size up to 1.0"	14 15 11 15/26	0
As above	10 11 12 15/23	0
As above	8 9 10 10/19	0
As above, 50% recovery	21 15 15 17/30	0
As above, 40% recovery	8 9 11 9/20	0
As above but dense mixture	20 25 19 20/44	0
As above	15 12 30 130/42	0
Well-Graded Sand with Gravel (SW), dark gray (10YR 4/1), wet, subangular, medium dense, moderately graded, 20% gravels, 60% recovery	9 12 10 7/22	0
As above, poorly graded, 80% recovery	5 6 6 5/12	0
Silty Gravel with Sand (GM), brown (7.5YR 5/2), dry, coarse gravel, subangular, medium dense, well graded, 20% gravel, 10% recovery	7 10 8 8/18	0
End of boring at 31' bgs		

EXPLANATION

- Clay
- Silt
- Sand
- Gravel

▨ Interval Sampled
■ Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date well drilled: 11/18/97

L•F Geologist/Engineer: SRM

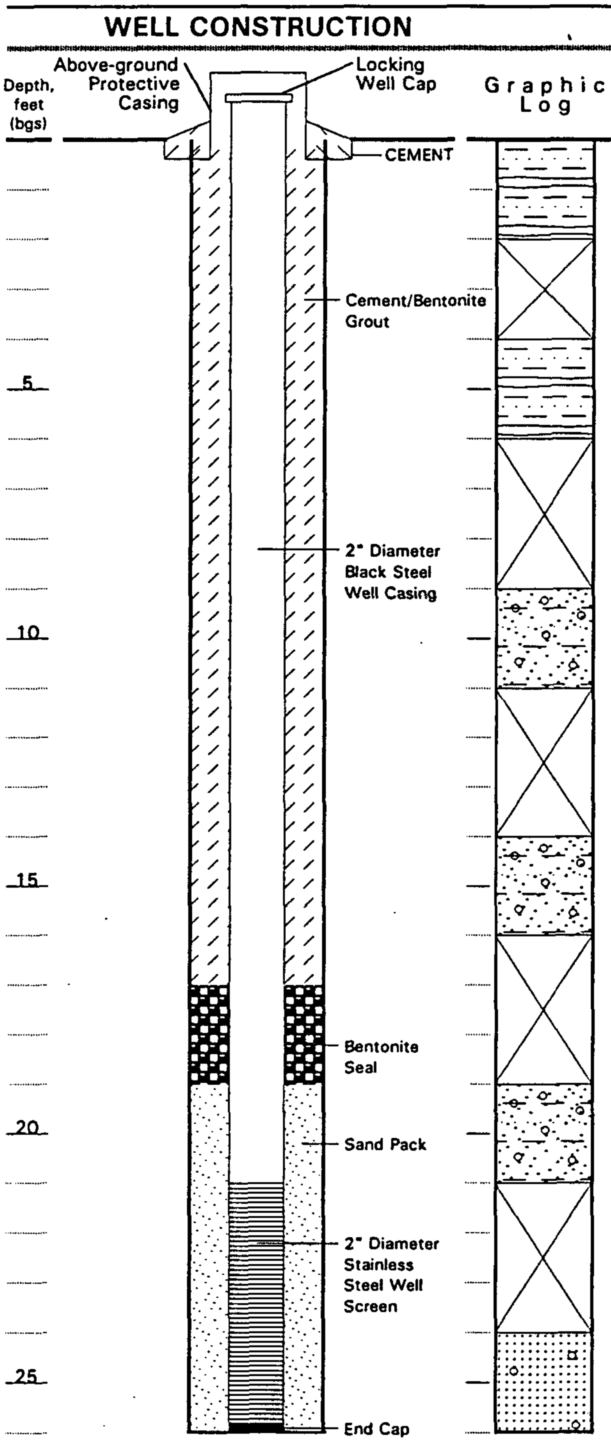
Approved by: JLA

WELL CONSTRUCTION AND LITHOLOGY FOR WELL OP-13

Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

By/ABC



LITHOLOGY Visual Description	SAMPLING DATA Penetration Rate (blows/ft.)	PID/FID Values (ppm)
Silty Clay (CL), dark brown (7.5YR 3/2), slightly moist, medium plasticity, medium stiff, 10% gravels, 25% recovery	3 3 1 3/4	0
As above, wet, very stiff, 40% recovery	14 14 17 20/31	0
Silty Sand with Gravel (SM), brown (7.5YR 5/2), dry, coarse gravel, subrounded, medium dense, well graded 10-15% gravels (up to 0.5"), 40% recovery	10 12 17 20/29	0
As above, 40% recovery	8 14 12 12/26	0.6
As above but wet, 50% recovery	7 10 10 11/20	0.9
Well-Graded Sand with Gravel (SW), dark gray (10YR 4/1), wet, coarse gravel, subrounded, medium dense, moderately graded, 25% gravels, 50% recovery	13 11 10 11/21	0.2

End of boring at 26' bgs

EXPLANATION

▭ Clay

▭ Silt

▨ Sand

○ Gravel

▨ Interval Sampled

■ Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date well drilled: 11/19/97

L•F Geologist/Engineer: SRM

Approved by: JLA

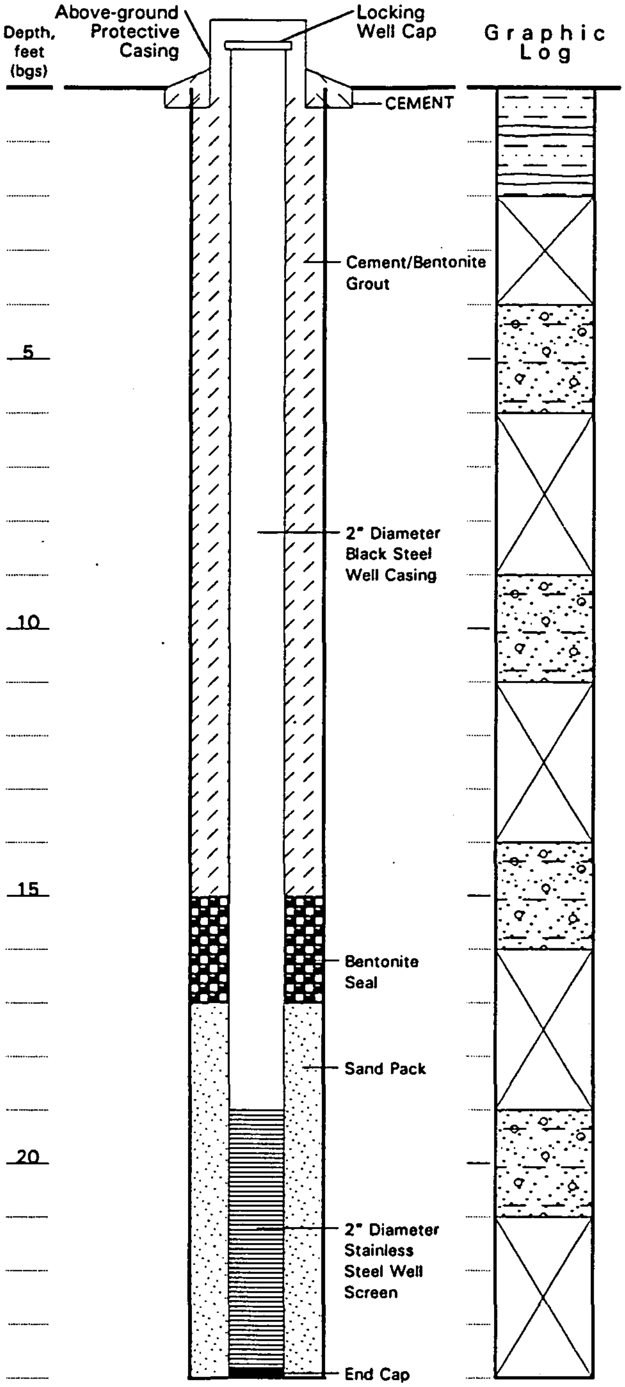
WELL CONSTRUCTION AND LITHOLOGY FOR WELL OP-14

Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

By/ABC

WELL CONSTRUCTION	LITHOLOGY	SAMPLING DATA	



Visual Description	Penetration Rate (blows/ft.)	PID/FID Values (ppm)
Silty Clay (CL), dark brown (7.5YR 3/2), moist, medium plasticity, soft, minor gravel content, 15% recovery	3 3 1 3/4	0
Silty Sand with Gravel (SM), brown (7.5YR 5/2), dry, coarse sand, coarse gravel, loose density, well graded, 10-15% gravels, 40% recovery	7 5 4 3/9	0
As above but dense, 5% recovery	16 16 16 17/32	0
As above but slightly moist, very dense, 50% recovery	15 25 27 30/52	
As above but saturated, dense, 50% recovery	14 15 19 15/34	
End of boring at 24' bgs		

EXPLANATION

▭	Clay
▭	Silt
▨	Sand
○	Gravel
▨	Interval Sampled
■	Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date well drilled: 11/19/97

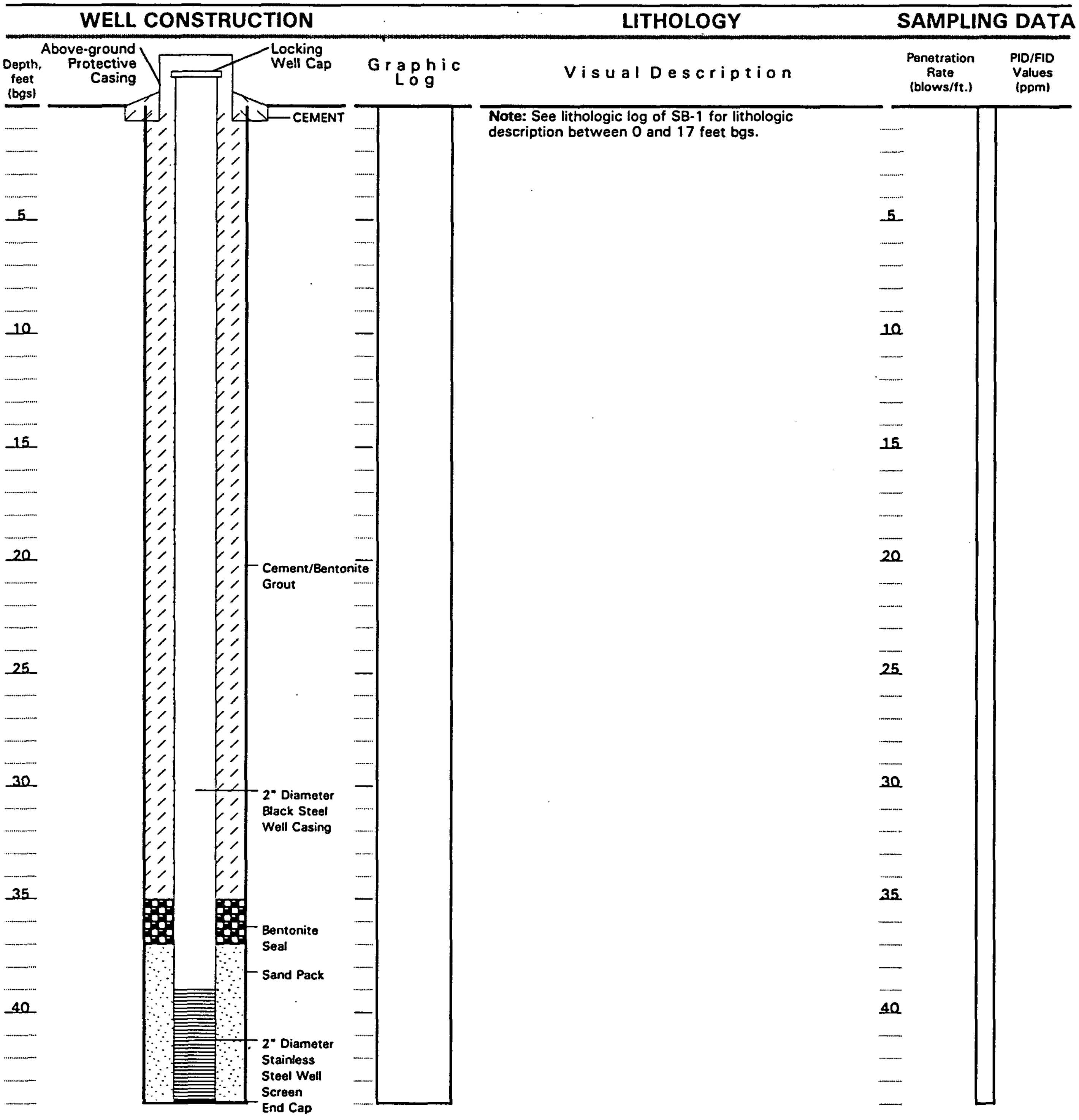
L•F Geologist/Engineer: SRM

Approved by: JLA

WELL CONSTRUCTION AND LITHOLOGY FOR WELL OP-15

Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke



Note: See lithologic log of SB-1 for lithologic description between 0 and 17 feet bgs.

EXPLANATION

Clay

Silt

Sand

Gravel

▨ Interval Sampled
■ Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date well drilled: 08/19/98

L•F Geologist/Engineer: SRM

Approved by: JLA

WELL CONSTRUCTION AND LITHOLOGY FOR WELL OP-16

Project No. 3165.01
Jones Chemical: Caledonia, NY

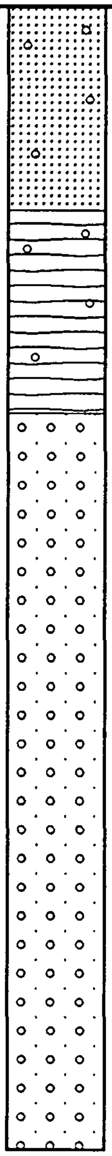
LFR Levine-Fricke

By/WDW

Page 1 of 1

LITHOLOGY

SAMPLING DATA



Depth, feet (bgs)	Visual Description	Sample No. and Interval	Penetration Rate (Blows/ft.)	PID/FID Values (ppm)
	Well-Graded Sand with Gravel (SW), very dark gray (10YR 3/1), gravel <10%, gravel is predominantly carbonates; sand is angular, well graded, very coarse grained; clay <10%, 4" recovery		11 5 6 9/11	2/NRC
	Gravelly Clay (CL), grayish brown (6YR 5/2), medium plasticity, stiff, minor gravel <5%, 6" recovery		2 4 4 6/8	0.8/NRC
5	As above to 6' **Well-Graded Gravel with Sand (GW)**, predominantly carbonates, 2mm-30mm size; sand is angular, very coarse to medium grained, well graded, clay 10% As above from 6'-7'		12 13 15 15/28	1.2/NRC
			11 15 15 15/30	1/NRC
10	As above but gravel increase to 50-70%, medium dense		8 8 18 18/26	0.6/NRC
	As above, dense		13 14 25 45/39	2.6/NR
	As above, very dense		13 22 29 20/51	3/NR
15	As above, very dense		68 32 28 38/60	84/NR

Date boring drilled: 11/14/95 - 11/14/95

L•F Geologist/Engineer: SRM

Approved by: JLA

EXPLANATION

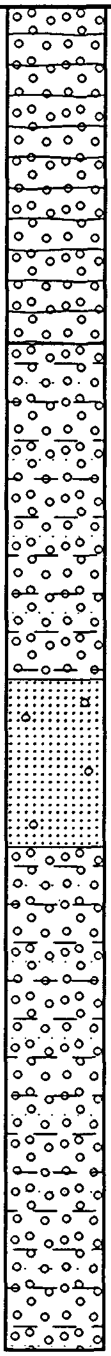
▭	Clay
▭	Silt
▨	Sand
○	Gravel
▨	Interval Sampled
■	Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

LITHOLOGY AND SAMPLE DATA FOR SOIL BORING SB-1

Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

LITHOLOGY			SAMPLING DATA		
Depth, feet (bgs)	Graphic Log	Visual Description	Sample No. and Interval	Penetration Rate (Blows/ft.)	PID/FID Values (ppm)
		**Clayey Gravel (GC)**, dark grayish brown (10YR 4/2), gravelly approx. 25%, gravel ranges 2mm-10mm, angular, predominantly carbonates present; clay of medium plasticity	▨	2 3 2 5/5	0.2/NRC
		As above, gravel decreases to 10-15%	▨	NA	0.4/NRC
5		**Silty Gravel with Sand (GM)**, brown (10YR 5/3), gravelly 5-10%, sand is angular, well graded, medium dense, clay 10-20%	▨	5 8 17 17/25	NR/NRC
		As above, dense	▨	11 16 27 16/43	1.4/NRC
		Well-Graded Sand with Gravel (SW), gravel 20%, sand is angular, well graded, dense, clay 20-25%	▨	13 20 27 25/47	1/NRC
10		**Silty Gravel with Sand (GM)**, as described in 4'-6' interval but dense	▨	25 30 21 21/51	1.8/NRC
		As above	▨	22 54 39 21/93	3.8/NRC
15		As above	▨	NA	1.8/NRC

EXPLANATION

▭ Clay	▨ Interval Sampled ■ Sample Retained
▤ Silt	
⛆ Sand	
⚬ Gravel	

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date boring drilled: 11/14/95 - 11/14/95

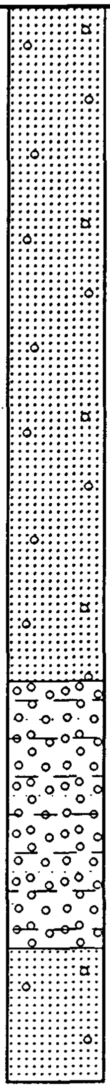
L•F Geologist/Engineer: SRM

Approved by: JLA

LITHOLOGY AND SAMPLE DATA FOR SOIL BORING SB-2

Project No. 3165.01
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

LITHOLOGY			SAMPLING DATA		
Depth, feet (bgs)	Graphic Log	Visual Description	Sample No. and Interval	Penetration Rate (Blows/ft.)	PID/FID Values (ppm)
		**Well-Graded Sand with Gravel (SW)**, gray (10YR 5/1), dry, angular, well graded, dense, minor gravel < 10%, gravel is predominantly carbonates, clay 10-15%		20 20 30 17/50	0.8/NRC
		As above, gravel content increases to 15-20%		13 15 15 17/30	NR/NRC
5		As above		NA	0.2/NRC
		As above		6 5 5 9/10	0.2/NRC
		As above		5 9 18 42/17	2.4/NR
10		**Silty Gravel with Sand (GM)**, minor sand, gravel 2mm-40mm, predominantly carbonates		9 50 20 16/70	3.2/NR
		As above		12 11 17 21/28	1.8/NRC
15		**Well-Graded Sand with Gravel (SW)**, as described in 2'-4' interval		20 22 26 28/48	0.4/NRC

EXPLANATION

- ▭ Clay
- ▭ Silt
- ▨ Sand
- ○ Gravel

- ▨ Interval Sampled
- ■ Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date boring drilled: 11/14/95 - 11/14/95
L•F Geologist/Engineer: SRM
Approved by: JLA

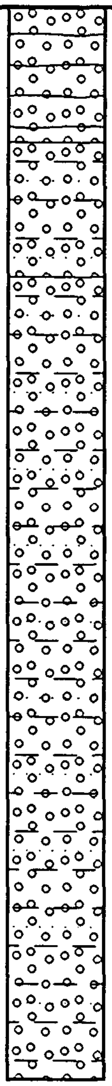
LITHOLOGY AND SAMPLE DATA FOR SOIL BORING SB-3

Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

By/ABC

	LITHOLOGY		SAMPLING DATA		
Depth, feet (bgs)	Graphic Log	Visual Description	Sample No. and Interval	Penetration Rate (Blows/ft.)	PID/FID Values (ppm)
		Clayey Gravel (GC), dark grayish brown (10YR 4/2), slightly moist, medium plasticity, stiff; gravel approx. 20%, 2mm-10mm in size, predominantly carbonates		3 5 7 9/15	1.0/NRC
		Silty Gravel with Sand (GM), dark grayish brown (10YR 4/2), gravel 2mm-30mm, predominantly carbonates (dolomite), sand/clay present in minor amounts		13 14 15 14/29	4.8/NRC
5		**Silty Gravel with Sand (GM)**, dark grayish brown (10YR 4/2), sand is angular, well graded, medium dense, clay approx. 10%, gravel 10-20%	5	10 18 18 11/36	NR/NRC
		As above		12 15 11 12/26	NR/NRC
		As above		13 20 10 10/30	1.6/NRC
10		As above	10	14 12 12 14/24	0.8/NRC
		As above		9 23 30 12/53	1.2/NRC
15		As above	15	15 22 20 21/42	1.8/NRC



EXPLANATION

▭ Clay	▨ Interval Sampled
▭ Silt	■ Sample Retained
▭ Sand	
▭ Gravel	

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date boring drilled: 11/14/95 - 11/14/95

L•F Geologist/Engineer: SRM

Approved by: JLA

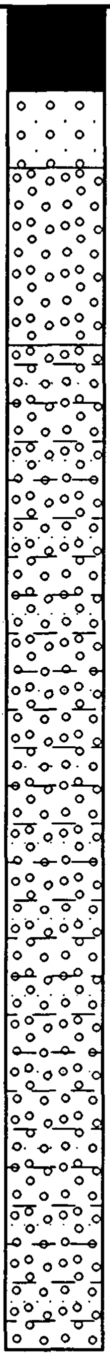
LITHOLOGY AND SAMPLE DATA FOR SOIL BORING SB-4

Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

By/ABC

LITHOLOGY | SAMPLING DATA



Depth, feet (bgs)	Visual Description	Sample No. and Interval	Penetration Rate (Blows/ft.)	PID/FID Values (ppm)
	Fill material and asphalt		8 18 17/35	1.8/NRC
	Well-Graded Gravel with Sand (GW), dark gray (10YR 4/1), glacial till, gravel is aphanitic dolomite, angular, ranges in size from 2mm-20m; sand 10-20%, well graded, angular, dense			
	Gravel (GP), as above, decreasing sand content, medium dense		10 6 7 8/13	0.4/NRC
5	**Silty Gravel with Sand (GM)**, dark grayish brown (10YR 4/2), gravel is angular, ranges in size from 2mm-20mm, gravel is primarily dolomite with limestone chunks, sand is well graded, coarse grained, angular, medium dense, sand 10-15%, clay 25%		5 7 8 10/15	1.2/NRC
	As above, sand 35%, clay 30%		12 8 13 13/21	1/NRC
	As above, dense		11 18 16 12/34	66/NRC
10	As above		34 24 19 21/43	2/NRC
	As above, gravel size increases up to 30mm		14 16 16 16/32	1.6/NRC
15	As above, sand and clay increases to 50%		35 28 21 19/49	1.2/NRC

EXPLANATION

- Clay
- Silt
- Sand
- Gravel

Interval Sampled
Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

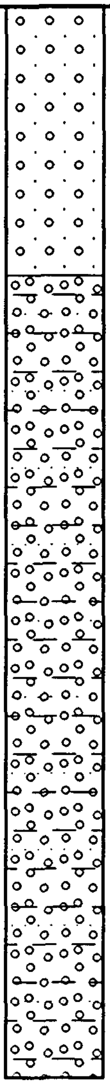
Date boring drilled: 11/15/95 - 11/15/95
L•F Geologist/Engineer: SRM
Approved by: JLA

LITHOLOGY AND SAMPLE DATA FOR SOIL BORING SB-5

Project No. 3165.01
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

LITHOLOGY | SAMPLING DATA



Depth, feet (bgs)	Visual Description	Sample No. and Interval	Penetration Rate (Blows/ft.)	PID/FID Values (ppm)
	Well-Graded Gravel with Sand (GW), gray (10YR 5/1), gravel approx. 50%, predominantly carbonates, sand is very coarse grained, angular, well graded, loose, clay 25%	▨	5 9/5	2.4/NRC
	As above, increasing clay content up to 15%	▨	5 6 7 9/13	1.2/NRC
5	**Silty Gravel with Sand (GM)**, brown (10YR 5/2), gravel and sand as above, clay is medium plasticity, soft, varies between 10-20%	▨	6 5 4 4/9	0.6/NRC
	As above, color change to gray (10YR 5/1), decreasing clay content to <10%	▨	9 5 10 10/15	1.2/NRC
	As above	▨	13 14 11 15/25	1.8/NRC
10	As above	▨	13 13 15 9/28	1/NRC
	As above	▨	18 17 20 22/37	46/NRC
15	As above	▨	17 32 17 17/49	1/NRC

EXPLANATION

☰	Clay
⋯	Silt
∴	Sand
○	Gravel
▨	Interval Sampled
■	Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date boring drilled: 11/15/95 - 11/15/95

L•F Geologist/Engineer: SRM

Approved by: JLA

LITHOLOGY AND SAMPLE DATA FOR SOIL BORING SB-6

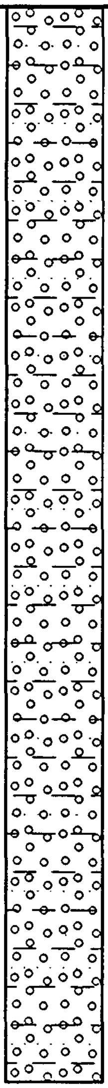
Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

By/ABC

LITHOLOGY

SAMPLING DATA



Depth, feet (bgs)	Visual Description	Sample No. and Interval	Penetration Rate (Blows/ft.)	PID/FID Values (ppm)
	Silty Gravel with Sand (GM), gray (10YR 5/1), gravel 10-40%, predominantly carbonates (dolomite), sand is very coarse grained, angular, well graded, clay <20%	▨	5 5 5 5/20	2.6/NRC
	As above with varying amounts of sand and clay with dolomitic, angular large sized (20mm-25mm) gravel	▨	10 5 3 3/8	NR/NRC
5		▨	2 5 10 16/15	NR/NRC
		▨	10 15 41 15/66	0.4/NRC
		▨	18 21 17 17/38	2.8/NRC
10		▨	22 11 19 18/30	0.8/NRC
		▨	5 6 6 33/12	2.2/NRC
15		▨	37 21 38 54/59	0.6/NRC

EXPLANATION

▭	Clay
▭	Silt
▨	Sand
○	Gravel
▨	Interval Sampled
■	Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date boring drilled: 11/15/95 - 11/15/95
L•F Geologist/Engineer: SRM
Approved by: JLA

LITHOLOGY AND SAMPLE DATA FOR SOIL BORING SB-7

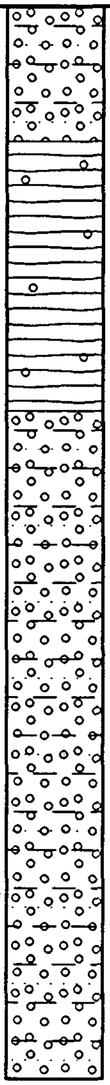
Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

By/ABC

Depth, feet (bgs)	LITHOLOGY Visual Description	SAMPLING DATA Sample No. and Interval	Penetration Rate (Blows/ft.)	PID/FID Values (ppm)
	Silty Gravel with Sand (GM), brown (10YR 5/2), glacial till, gravel approx. 50%, 2mm-10mm in size, primarily carbonates; very coarse grained sand, angular, well graded; clay <15%, soft		4 5 10/9	NR/NRC
	Gravelly Clay (CL), dark brown (10YR 4/3), clay is medium plasticity, medium stiff, minor gravel content <15%		10 8 8 10/16	NR/NRC
5	**Gravelly Clay (CL)**, dark gray (10YR 4/1), clay as above, soft, gravel content increases to 30-50%		7 10 9 9/19	1/NRC
	Silty Gravel with Sand (GM), gray (10YR 5/1), gravel approx. 50%, 2mm-30mm in size; very coarse grained sand, angular, well graded; clay <15%		15 9 8 8/17	1/NRC
	As above		6 7 11 18/18	0.6/NRC
10	As above		8 18 15 10/33	0.4/NRC
	As above		14 15 12 8/27	2.8/NRC
15	No retrieval		No Retrieval	

Graphic Log



EXPLANATION

- Clay
- Silt
- Sand
- Gravel

▨ Interval Sampled
■ Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date boring drilled: 11/15/95 - 11/15/95
L•F Geologist/Engineer: SRM
Approved by: JLA

LITHOLOGY AND SAMPLE DATA FOR SOIL BORING SB-8

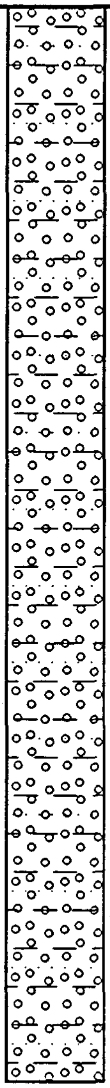
Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

LITHOLOGY

SAMPLING DATA

Graphic Log



Depth, feet (bgs)	Visual Description	Sample No. and Interval	Penetration Rate (Blows/ft.)	PID/FID Values (ppm)
	Silty Gravel with Sand (GM), gray (10YR 5/1) to dark grayish brown (10YR 4/2), gravel 10-50%, primarily carbonates, sand is very coarse grained, angular, well graded, clay 10-20%	▨	8 10 15/18	0.6/NRC
	As above with varying amounts of sand and clay	▨	15 11 18 26/29	0.6/NRC
5		▨	6 12 18 26/30	1.4/NRC
		▨	18 42 53 45/95	0.6/NRC
		▨	16 20 20 22/40	0.8/NRC
10		▨	31 20 24 26/44	0.8/NRC
		▨	11 18 19 21/37	1.8/NRC
15		▨	10 11 12 22/23	44/NRC

EXPLANATION

▭	Clay
▭	Silt
▨	Sand
○	Gravel
▨	Interval Sampled
■	Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date boring drilled: 11/16/95 - 11/16/95

L•F Geologist/Engineer: SRM

Approved by: JLA

LITHOLOGY AND SAMPLE DATA FOR SOIL BORING SB-9

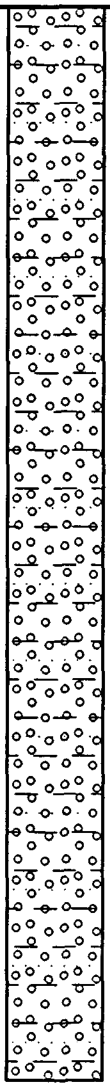
Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

By/ABC

LITHOLOGY		SAMPLING DATA		
Depth, feet (bgs)	Visual Description	Sample No. and Interval	Penetration Rate (Blows/ft.)	PID/FID Values (ppm)
	Silty Gravel with Sand (GM), gray (10YR 5/1) to dark grayish brown (10YR 4/2), gravel 10-40%, mostly carbonates (dolomite), sand is very coarse grained, angular, well graded, clay 10-30%	▨	1 1 2/2	1/NRC
	As above with varying amounts of sand and clay	▨	No Sample	
5		▨	3 3 9 14/12	NR/NRC
		▨	12 11 21 13/32	1/NRC
		▨	12 20 18 23/38	0.6/NRC
10		▨	12 16 22 23/38	NR/NRC
		▨	18 22 19 18/41	2.2/NRC
15		▨	28 20 15 12/35	0.6/NRC

Graphic Log



Date boring drilled: 11/16/95 - 11/16/95

L•F Geologist/Engineer: SRM

Approved by: JLA

EXPLANATION

- Clay
- Silt
- Sand
- Gravel

▨ Interval Sampled
■ Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

LITHOLOGY AND SAMPLE DATA FOR SOIL BORING SB-10

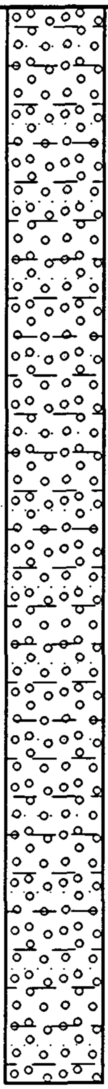
Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

By/ABC

LITHOLOGY

SAMPLING DATA



Depth, feet (bgs)	Visual Description	Sample No. and Interval	Penetration Rate (Blows/ft.)	PID/FID Values (ppm)
	Silty Sand with Gravel (GM), grayish brown (10YR 5/2) to gray (10YR 5/1), gravel varies from 10-50%, predominantly carbonates, sand is very coarse grained, angular, well graded, clay ranges from 10-40%	▨	1 2 3/3	NR/NRC
	As above with varying amounts of sand and clay	▨	1 2 1 2/3	NR/NRC
5		▨	3 6 6 5/12	NR/NRC
		▨	6 9 10 8/19	NR/NRC
		▨	4 15 22 14/47	0.8/NRC
10		▨	15 15 16 16/31	0.4/NRC
		▨	25 31 29 26/60	1.4/NRC
15		▨	19 46 100 13	0.4/NRC

Date boring drilled: 11/16/95 - 11/16/95

L•F Geologist/Engineer: SRM

Approved by: JLA

EXPLANATION

▭	Clay
▭	Silt
▨	Sand
○	Gravel

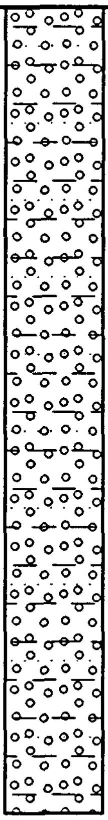
▨ - Interval Sampled
■ - Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

LITHOLOGY AND SAMPLE DATA FOR SOIL BORING SB-11

Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

LITHOLOGY			SAMPLING DATA		
Depth, feet (bgs)	Graphic Log	Visual Description	Sample No. and Interval	Penetration Rate (Blows/ft.)	PID/FID Values (ppm)
		**Silty Gravel with Sand (GM)**, gray (10YR 4/1) to dark grayish brown (10YR 4/2), gravel 10-15%, predominantly carbonates (dolomite), sand is very coarse to coarse grained, angular, well graded, clay <20%	▨	5 7 7/12	NR/NRC
		As above but very little gravel <10% between 2'-8'; gravel, clay, sand varies; gravel increases between 8'-12'	▨	5 4 2 2/6	NR/NRC
5			▨	1 2 2 3/4	NR/NRC
			▨	1 1 2 2/3	NR/NRC
			▨	NA	1.8/NRC
10			▨	5 12 12 12/24	1/NRC

Date boring drilled: 11/16/95 - 11/16/95

L•F Geologist/Engineer: SRM

Approved by: JLA

EXPLANATION

▭ Clay	▨ Interval Sampled
▭ Silt	■ Sample Retained
▭ Sand	
▭ Gravel	

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

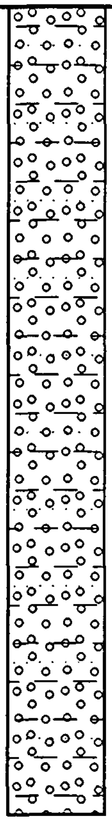
LITHOLOGY AND SAMPLE DATA FOR SOIL BORING SB-12

Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

By/ABC

LITHOLOGY | SAMPLING DATA



Depth, feet (bgs)	Visual Description	Sample No. and Interval	Penetration Rate (Blows/ft.)	PID/FID Values (ppm)
	Silty Gravel with Sand (GM), gray (10YR 5/1) to grayish brown (10YR 5/2), gravel 10-20%, predominantly carbonates, sand is very coarse grained, angular, well graded, clay 10-20%	▨	2 4 7/6	0.6/NRC
	As above but varying percentages of gravel, sand, and clay	▨	5 10 11 13/21	NR/NRC
5		▨	7 8 7 12/15	0.4/NRC
		▨	15 11 11 13/22	1/NRC
		▨	18 15 13 13/28	0.6/NRC
10		▨	11 11 10 18/21	1/NRC

EXPLANATION

▭	Clay
▭	Silt
⋰	Sand
○	Gravel

▨ - Interval Sampled
■ - Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date boring drilled: 11/16/95 - 11/16/95

L•F Geologist/Engineer: SRM

Approved by: JLA

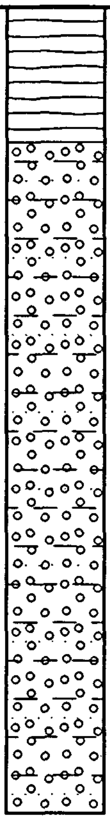
LITHOLOGY AND SAMPLE DATA FOR SOIL BORING SB-13

Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

By/ABC

LITHOLOGY | SAMPLING DATA



Depth, feet (bgs)	Visual Description	Sample No. and Interval	Penetration Rate (Blows/ft.)	PID/FID Values (ppm)
	Clay (CL), very dark grayish brown (10YR 3/2), medium plasticity, medium stiff		2 4 7/6	NR/NRC
	Silty Gravel with Sand (GM), gravel 10-20%, sand is very coarse grained, angular, well graded, clay 25-30%		12 12 10 12/22	0.4/NRC
5	As above but sand, gravel, and clay percentages vary		6 7 7 12/14	0.8/NRC
			8 8 12 10/20	1.8/NRC
			12 7 6 9/13	0.6/NRC
10			22 15 11 16/26	1.8/NRC

Date boring drilled: 11/16/95 - 11/16/95

L• F Geologist/Engineer: SRM

Approved by: JLA

EXPLANATION

- ▤ Clay
- ▭ Silt
- ░ Sand
- ○ Gravel

▨ Interval Sampled
■ Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

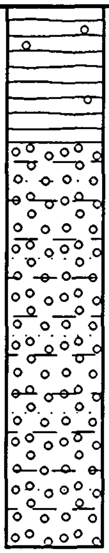
LITHOLOGY AND SAMPLE DATA FOR SOIL BORING SB-14

Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

By/ABC

LITHOLOGY | SAMPLING DATA



Depth, feet (bgs)	Visual Description	Sample No. and Interval	Penetration Rate (Blows/ft.)	PID/FID Values (ppm)
	Gravelly Clay (CL), very dark grayish brown (10YR 3/2), medium plasticity, medium stiff, gravel <10%, 2mm-10mm		2 8 6 5/14	NR/NRC
	Silty Gravel with Sand (GM), dark grayish brown (10YR 4/2), sand is very coarse grained, angular, well graded, clay 20-25%		8 8 6 4/14	0.6/NRC
5	As above but varying percentages of gravel, sand, and clay	5	20 22 27 45/47	NR/NRC
			60 50 30 29/80	NR/NRC

EXPLANATION

Clay
Silt
Sand
Gravel

▨ Interval Sampled
■ Sample Retained

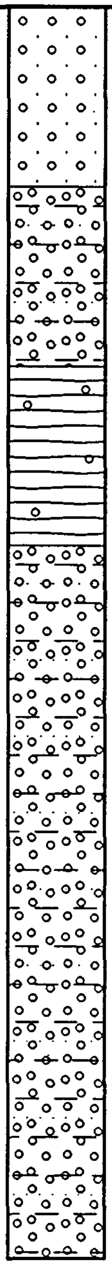
FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date boring drilled: 11/17/95 - 11/17/95
L•F Geologist/Engineer: SRM
Approved by: JLA

LITHOLOGY AND SAMPLE DATA FOR SOIL BORING SB-15

Project No. 3165.00
Jones Chemical: Caledonia, NY

LFR Levine-Fricke



Depth, feet (bgs)	LITHOLOGY Visual Description	SAMPLING DATA Sample No. and Interval	Penetration Rate (Blows/ft.)	PID/FID Values (ppm)
	Well-Graded Gravel with Sand (GW), gray (10YR 5/1), dry, coarse grained sand, subangular to angular, loose density		2 2 3 9/5	2/NRC
	Silty Gravel with Sand (GM), dark gray (10YR 4/1), dry, medium to coarse grained sand, subangular to angular, loose density, clay <5%		2 3 3 4/6	NR/NRC
5	**Gravelly Clay (CL)**, dark brown (10YR 3/3), dry, low plasticity, stiff consistency, gravel present in minor amounts		2 4 6 9/10	2/NRC
	Silty Gravel with Sand (GM),same as 2-4' interval		2 5 8 10/13	3/NRC
	As above, color change to dark brown (10YR 3/3)		6 12 12 13/24	1/NRC
10	As above		13 10 10 12/20	1/NRC
	As above		Not counted	8/NRC
	Total depth 14' bgs			

EXPLANATION

▤	Clay
▭	Silt
⁘	Sand
∘	Gravel

▨ - Interval Sampled
■ - Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date boring drilled: 05/02/96 - 05/02/96

L•F Geologist/Engineer: SRM

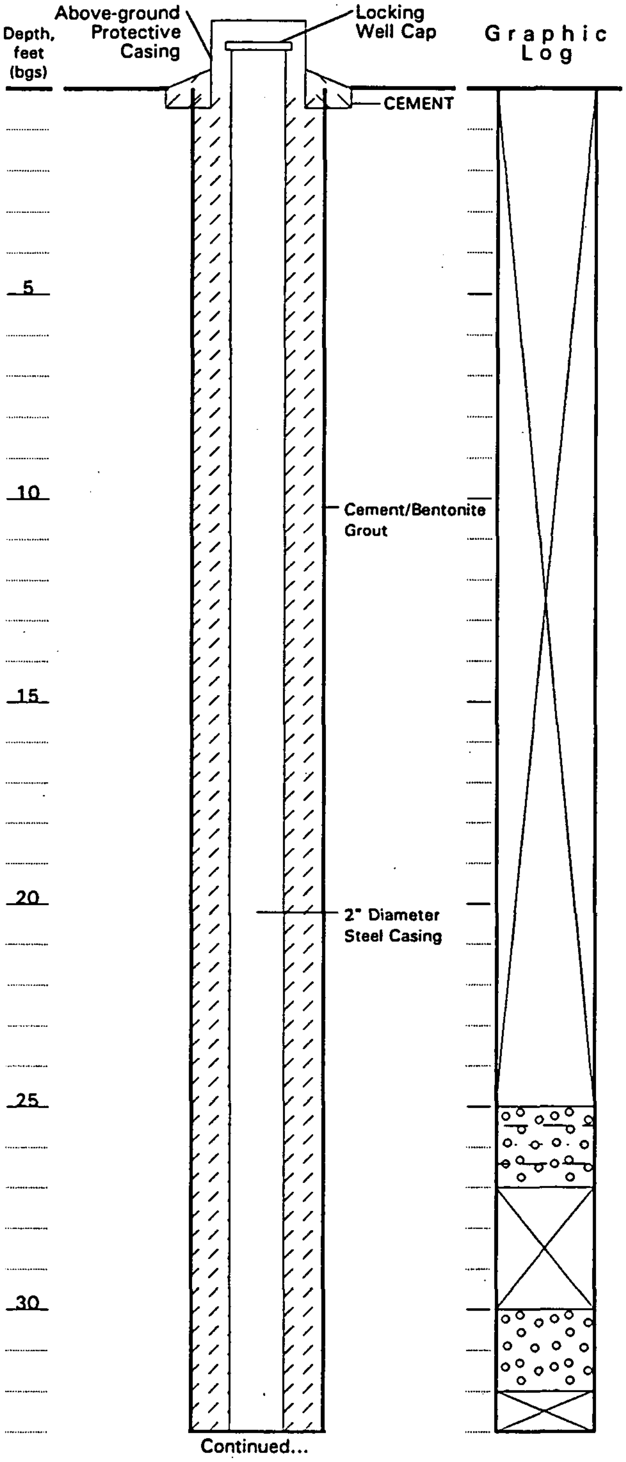
Approved by: JLA

LITHOLOGY AND SAMPLE DATA FOR SOIL BORING SB-16

Project No. 3165.01
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

WELL CONSTRUCTION — LITHOLOGY — SAMPLING DATA



Depth, feet (bgs)	Visual Description	Penetration Rate (blows/ft.)	PID/FID Values (ppm)
0	**Note:** See lithologic log of OP-6 for lithologic description.		
25	**Silty Gravel with Sand (GM)**, grayish brown (10YR 5/2), wet, coarse sand, subangular, medium loose, well graded	17 1 19 19/20	11/NRC
30	**Well-Graded Gravel (GW)**, dark gray (10YR 4/1), wet, predominantly carbonates, well graded, minor amounts of sand and clay	11 20 35 24/55	14/NRC

EXPLANATION

☰	Clay
⋯	Silt
⁘	Sand
○	Gravel
▨	Interval Sampled
■	Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date well drilled: 05/02/96

L• F Geologist/Engineer: SRM

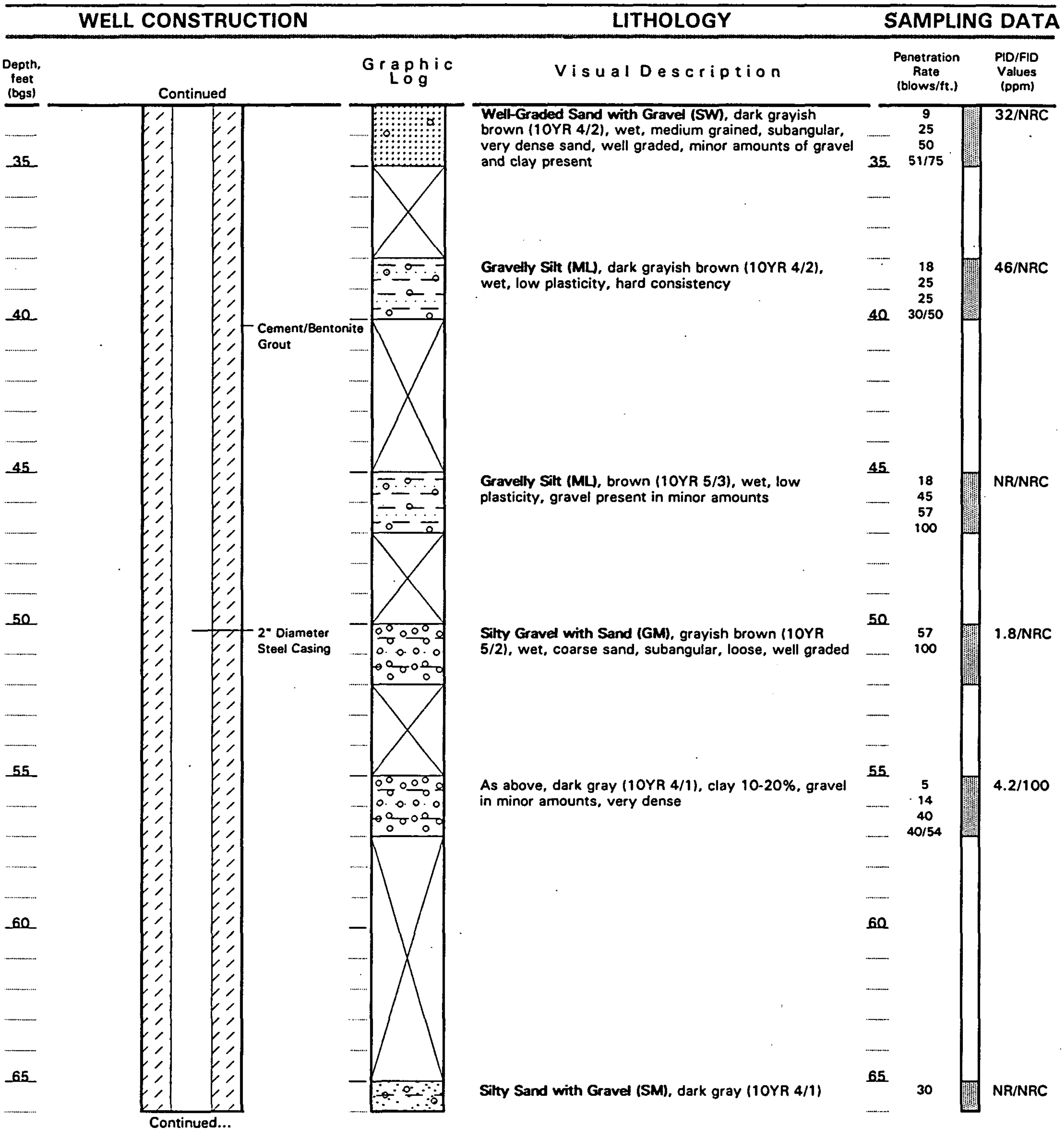
Approved by: JLA

WELL CONSTRUCTION AND LITHOLOGY FOR WELL BP-5

Project No. 3165.01
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

WELL CONSTRUCTION | LITHOLOGY | SAMPLING DATA



Visual Description	Penetration Rate (blows/ft.)	PID/FID Values (ppm)
Well-Graded Sand with Gravel (SW), dark grayish brown (10YR 4/2), wet, medium grained, subangular, very dense sand, well graded, minor amounts of gravel and clay present	9 25 50 51/75	32/NRC
Gravelly Silt (ML), dark grayish brown (10YR 4/2), wet, low plasticity, hard consistency	18 25 25 30/50	46/NRC
Gravelly Silt (ML), brown (10YR 5/3), wet, low plasticity, gravel present in minor amounts	18 45 57 100	NR/NRC
Silty Gravel with Sand (GM), grayish brown (10YR 5/2), wet, coarse sand, subangular, loose, well graded	57 100	1.8/NRC
As above, dark gray (10YR 4/1), clay 10-20%, gravel in minor amounts, very dense	5 14 40 40/54	4.2/100
Silty Sand with Gravel (SM), dark gray (10YR 4/1)	30	NR/NRC

EXPLANATION

▭	Clay
▭	Silt
⁘	Sand
°	Gravel

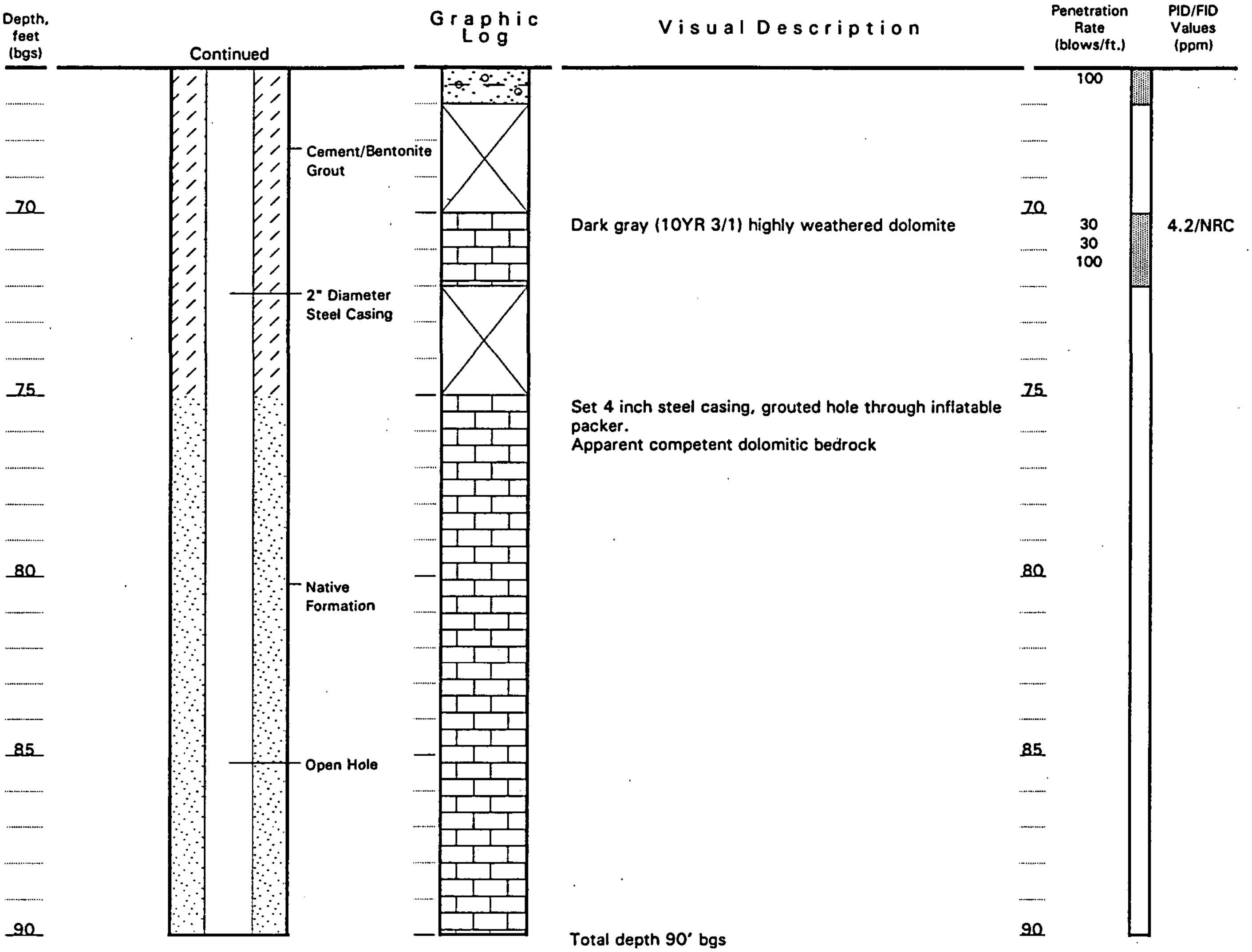
▨ Interval Sampled
■ Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date well drilled: 05/02/96
L•F Geologist/Engineer: SRM
Approved by: JLA

WELL CONSTRUCTION AND LITHOLOGY FOR WELL BP-5 (CONTINUED)

WELL CONSTRUCTION	LITHOLOGY	SAMPLING DATA



Depth, feet (bgs)	Visual Description	Penetration Rate (blows/ft.)	PID/FID Values (ppm)
		100	
70	Dark gray (10YR 3/1) highly weathered dolomite	30 30 100	4.2/NRC
75	Set 4 inch steel casing, grouted hole through inflatable packer. Apparent competent dolomitic bedrock		
90	Total depth 90' bgs		

Date well drilled: 05/02/96

L•F Geologist/Engineer: SRM

Approved by: JLA

EXPLANATION

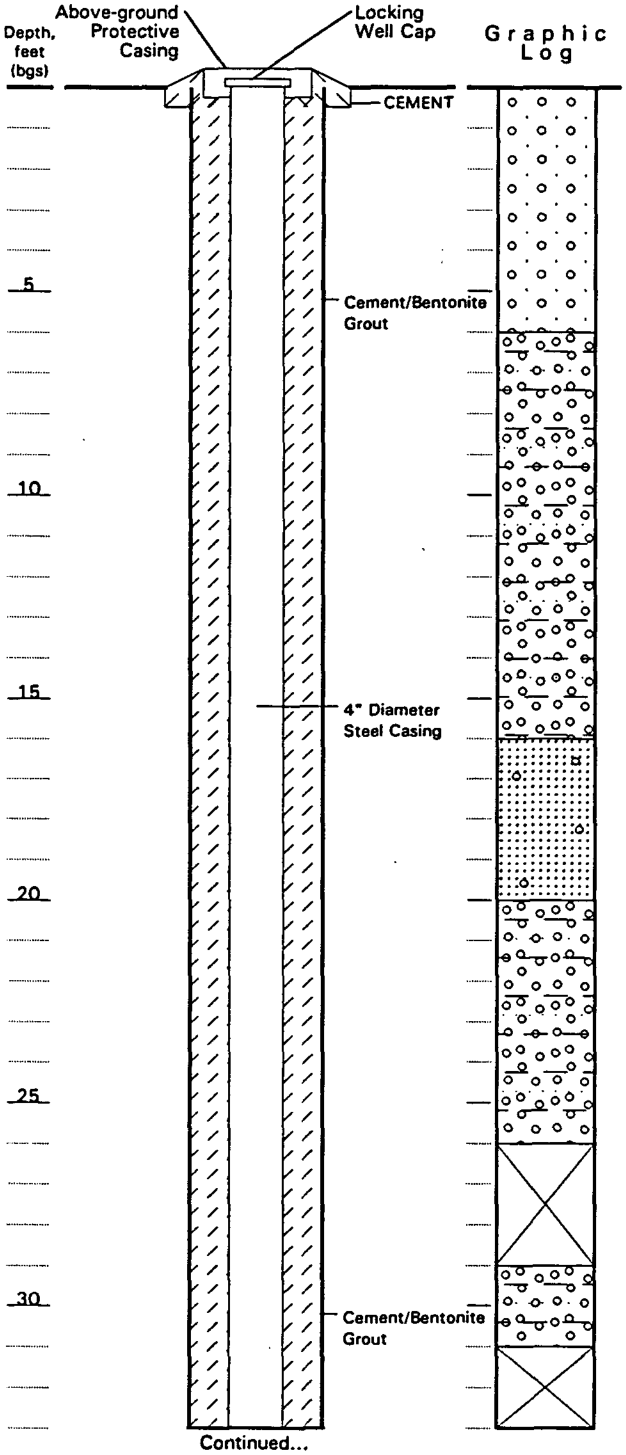
- ▭ Clay
- ▭ Silt
- ⁙ Sand
- ° Gravel

▨ Interval Sampled
■ Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

WELL CONSTRUCTION AND LITHOLOGY FOR WELL BP-5 (CONTINUED)

WELL CONSTRUCTION | **LITHOLOGY** | **SAMPLING DATA**



Depth, feet (bgs)	Penetration Rate (blows/ft.)	PID/FID Values (ppm)	Visual Description
	0	5/NRC	**Well-Graded Gravel with Sand (GW)**, light brownish gray (10YR 6/2), dry, medium to coarse grained, subangular sand, medium loose density, well graded
	13		
	13		
	18/26		
	15	5/NRC	As above
	15		
	8		
	8/23		
	5	4/NRC	As above
5	8		
	7		
	12/15		
	10	3/NRC	**Silty Gravel with Sand (GM)**, light brownish gray (10YR 6/2), dry, medium grained, subangular, medium loose sand, clay 5-10%
	9		
	8		
	5/17		
	7	18/NRC	As above, clay <5%
	9		
	12		
10	7/21	2/NRC	As above
	11		
	12		
	13		
	16/25	5/NRC	As above
	7		
	7		
	8		
	9/15	12/NRC	As above
15	9		
	14		
	11		
	9/25	20/NRC	**Well-Graded Sand with Gravel(SW)**, dark gray (10YR 4/1), slightly moist, medium to coarse grained, subangular to angular, medium loose density, well graded
	11		
	9		
	10		
	15/19	23/NRC	As above, loose density sand, minor clay content
	5		
	4		
20	5		
	12	1/NRC	**Silty Gravel with Sand (GM)**, dark gray (10YR 4/1), wet, coarse grained, subangular, medium loose density, well graded sand, clay 5-10%
	9		
	12		
	12		
	9	22/NRC	As above, color change to brown (10YR 5/2), dense sand
	6/21		
	14		
	14		
	17	12/NRC	As above
25	34/31		
	11		
	11		**Note:** Heaving sands begin, stopped continuous sampling and switched to larger sample intervals (5' and 10'), no samples collected from 26'-29'
	20		
	19/31		
	20	38/NRC	**Silty Gravel with Sand (GM)**, grayish brown (10YR 5/2), medium to coarse grained sand, subangular, dense sand, well graded, clay 10-15%
30	19		
	12		
	12/31		

Date well drilled: 05/02/96

L•F Geologist/Engineer: SRM

Approved by: JLA

EXPLANATION

▭	Clay	▨ Interval Sampled
▭	Silt	■ Sample Retained
⁙	Sand	
○	Gravel	

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

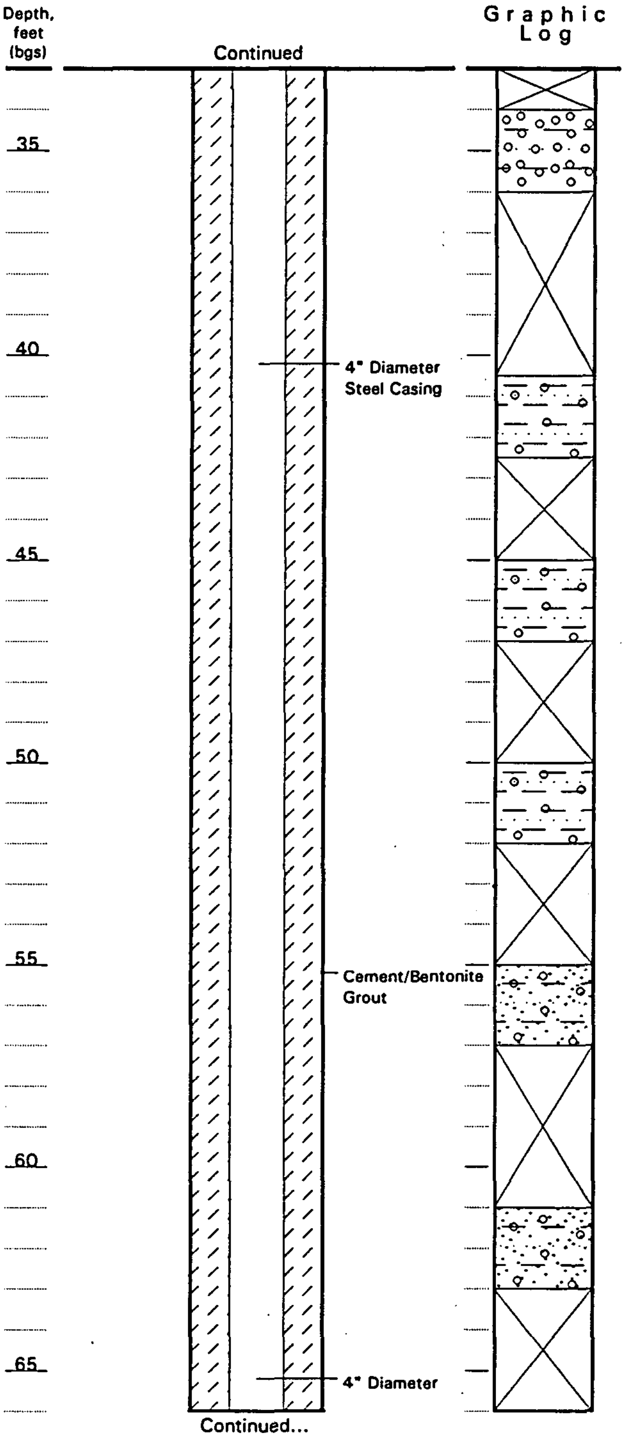
WELL CONSTRUCTION AND LITHOLOGY FOR WELL BP-6

Project No. 3165.01
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

By/ABC

WELL CONSTRUCTION	LITHOLOGY	SAMPLING DATA



Visual Description	Penetration Rate (blows/ft.)	PID/FID Values (ppm)
As above	18 21 16 19/37	30/NRC
Gravelly Silt (ML), light brownish gray (10YR 6/2), wet, medium to coarse grained sand, subangular, medium loose, well graded, clay 20-25%, gravel <10%	13 13 15 10/28	1/NRC
As above, silty gravelly sands and clay are interlayered, carbonate gravels with chert observed, clay appears oxidized, very dense sands	18 15 50 54/65	1/NRc
As above, clay content decreases to 10-15%	31 34 43 41/77	60/NRC
Silty Sand with Gravel (SM), dark gray (10YR 4/1), wet, medium grained, subangular to angular, dense sand, well sorted, clay 20%, gravel <10%	43 36 17 15/53	1/NRC
As above	10 26 17 38/43	12/NRC

Date well drilled: 05/02/96

L•F Geologist/Engineer: SRM

Approved by: JLA

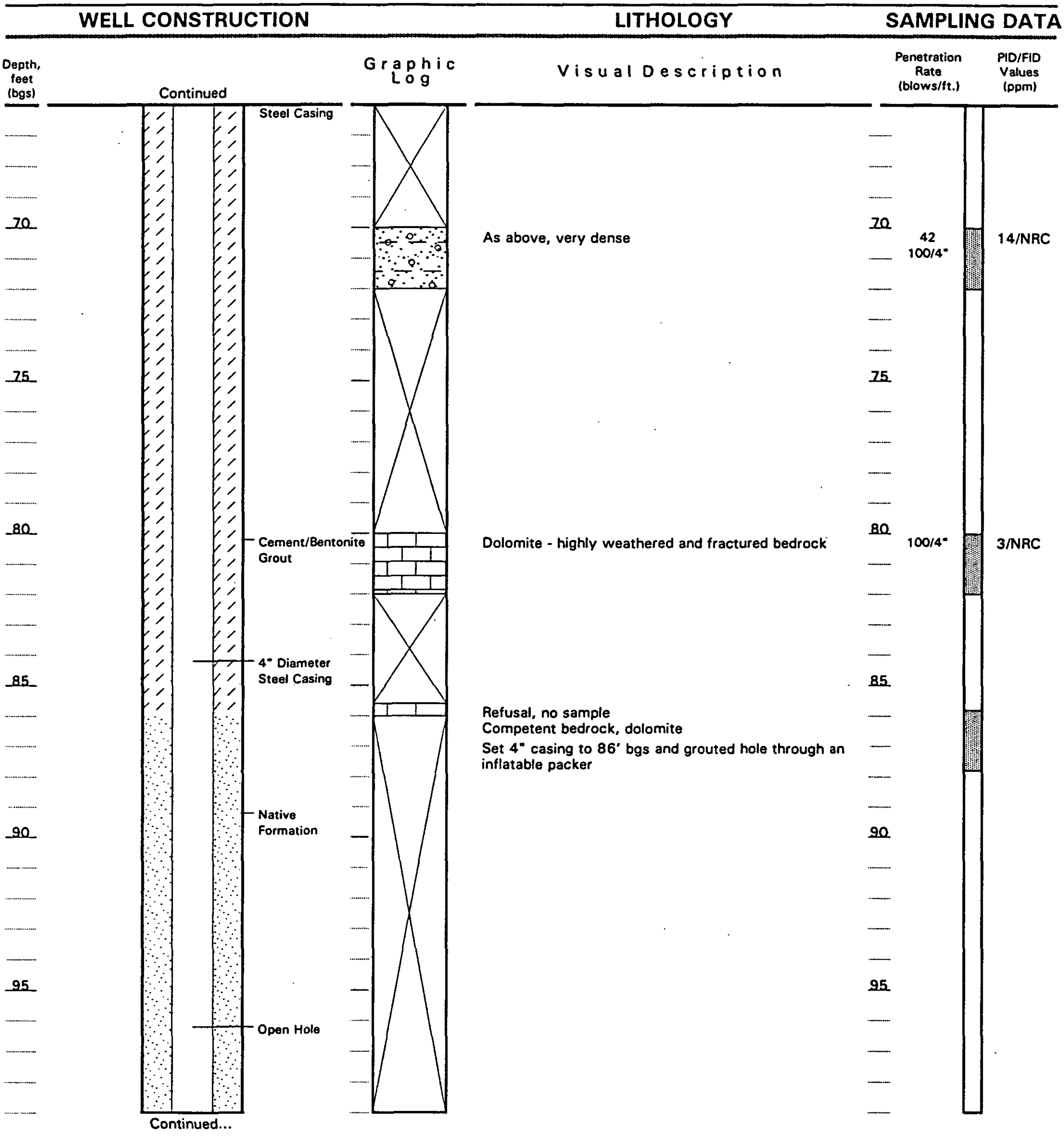
EXPLANATION

- ▭ Clay
- ▭ Silt
- ▨ Sand
- ○ Gravel

▨ Interval Sampled
■ Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

WELL CONSTRUCTION AND LITHOLOGY FOR WELL BP-6 (CONTINUED)



Depth, feet (bgs)	Visual Description	Penetration Rate (blows/ft.)	PID/FID Values (ppm)
70	As above, very dense	42 100/4"	14/NRC
80	Dolomite - highly weathered and fractured bedrock	100/4"	3/NRC
	Refusal, no sample Competent bedrock, dolomite Set 4" casing to 86' bgs and grouted hole through an inflatable packer		

EXPLANATION

- Clay
- Silt
- Sand
- Gravel

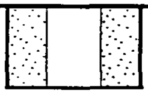
▨ - Interval Sampled
■ - Sample Retained

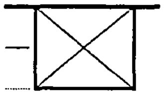
FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date well drilled: 05/02/96
L•F Geologist/Engineer: SRM
Approved by: JLA

WELL CONSTRUCTION AND LITHOLOGY FOR WELL BP-6 (CONTINUED)

WELL CONSTRUCTION		LITHOLOGY		SAMPLING DATA	
Depth, feet (bgs)	Continued	Graphic Log	Visual Description	Penetration Rate (blows/ft.)	PID/FID Values (ppm)
100				100	
			Total depth 101' bgs		





Date well drilled: 05/02/96

L•F Geologist/Engineer: SRM

Approved by: JLA

EXPLANATION

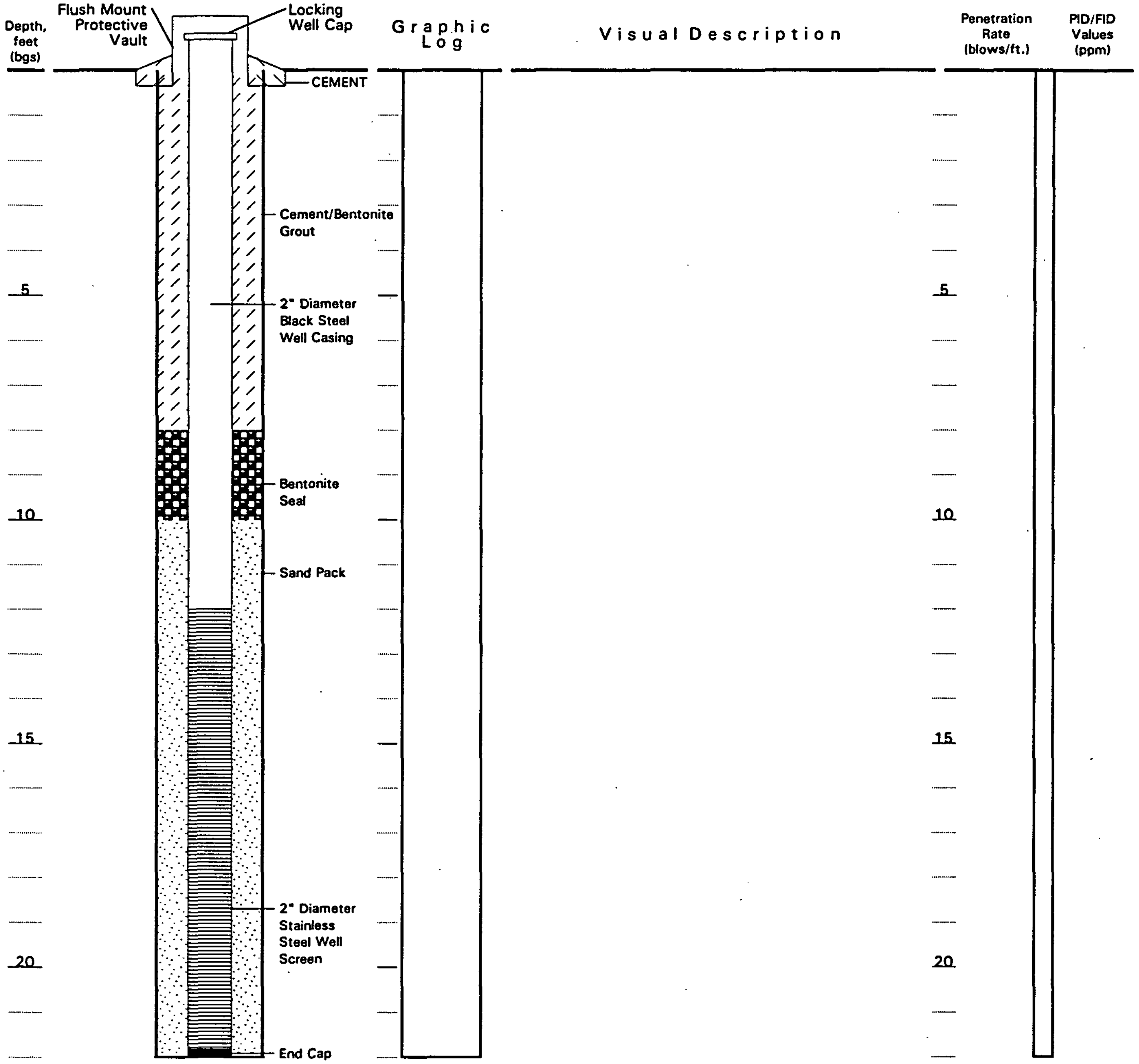
▭	Clay
▤	Silt
▒	Sand
○	Gravel

▒ Interval Sampled
■ Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

WELL CONSTRUCTION AND LITHOLOGY FOR WELL BP-6 (CONTINUED)

WELL CONSTRUCTION | **LITHOLOGY** | **SAMPLING DATA**



EXPLANATION

▭	Clay	▨ Interval Sampled ■ Sample Retained
▭	Silt	
⁘	Sand	
○	Gravel	

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date well drilled: 11/29/94

L•F Geologist/Engineer: CAA/TXZ

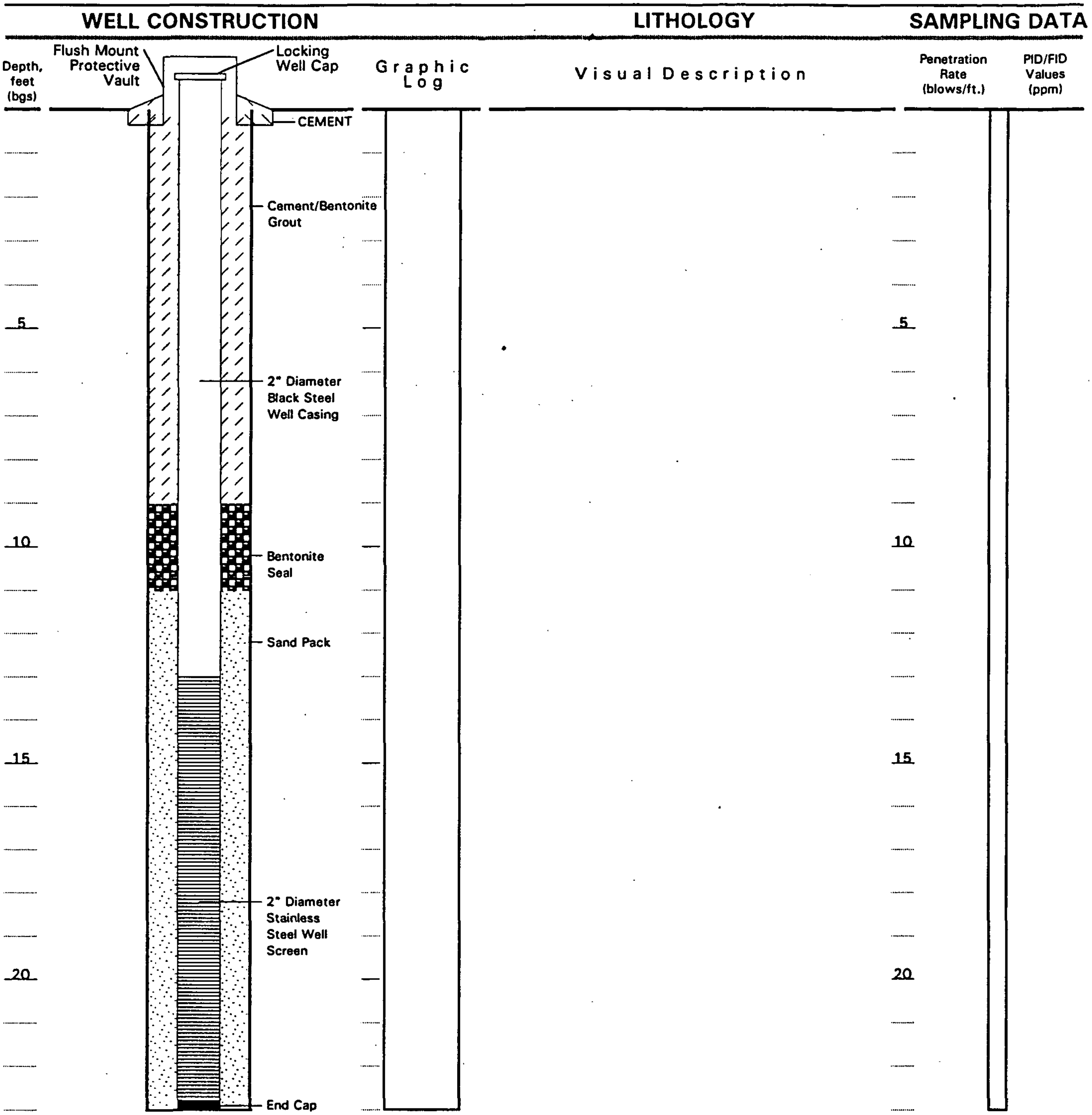
Approved by: JLA

WELL CONSTRUCTION AND LITHOLOGY FOR WELL PZ-1

Project No. 3165.01
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

By/WDW



EXPLANATION

- ▭ Clay
- ▭ Silt
- ░ Sand
- ○ Gravel

▒ Interval Sampled
■ Sample Retained

FID - Flame Ionization Detector
PID - Photoionization Detector
NR - No Response (Unfiltered)
NRC - Not Recorded (Charcoal Filtered)
bgs - below ground surface
ppm - parts per million

Date well drilled: 11/29/94

L•F Geologist/Engineer: CAA/TXZ

Approved by: JLA

WELL CONSTRUCTION AND LITHOLOGY FOR WELL PZ-2

Project No. 3165.01
Jones Chemical: Caledonia, NY

LFR Levine-Fricke

By/WDW

Appendix D

Hydraulic Testing Analysis

Table D-1
Pumping Test Data
November – December 1994
Jones Chemicals, Inc.
Caledonia, New York

Drawdown Data[1]							
L-1		North Well		PZ-1		PZ-2	
dT	dS	dT	dS	dT	dS	dT	dS
0.05	0.02	0.05	0.09	0.05	0.02	0.16	0.01
0.11	0.00	0.11	0.23	0.11	0.02	0.22	0.01
0.16	0.02	0.16	0.37	0.16	0.02	0.27	0.01
0.22	0.00	0.22	0.46	0.22	0.05	0.32	0.01
0.27	0.02	0.27	0.60	0.27	0.05	0.38	0.01
0.32	0.00	0.32	0.69	0.32	0.05	0.43	0.01
0.38	0.02	0.38	0.83	0.38	0.05	0.49	0.01
0.43	0.00	0.43	0.92	0.43	0.07	0.54	0.02
0.49	0.00	0.49	1.02	0.49	0.07	0.58	0.02
0.54	0.02	0.54	1.11	0.54	0.07	0.65	0.02
0.58	0.02	0.58	1.20	0.58	0.07	0.70	0.02
0.65	0.02	0.65	1.29	0.65	0.09	0.75	0.02
0.70	0.00	0.70	1.34	0.70	0.09	0.80	0.02
0.75	0.02	0.75	1.43	0.75	0.09	0.86	0.02
0.80	0.02	0.80	1.52	0.80	0.09	0.91	0.03
0.86	0.02	0.86	1.62	0.86	0.12	0.96	0.03
0.91	0.00	0.91	1.71	0.91	0.12	1.02	0.03
0.96	0.02	0.96	1.76	0.96	0.12	1.50	0.05
1.02	0.02	1.02	1.85	1.02	0.12	2.01	0.06
1.50	0.02	1.50	2.40	1.50	0.16	2.51	0.07
2.01	0.02	2.01	2.91	2.01	0.18	3.01	0.07
2.51	0.02	2.51	3.33	2.51	0.21	3.51	0.08
3.01	0.02	3.01	3.70	3.01	0.21	4.01	0.09
3.51	0.00	3.51	4.02	3.51	0.23	4.51	0.10
4.01	0.02	4.01	4.30	4.01	0.25	5.01	0.10
4.51	0.02	4.51	4.53	4.51	0.25	6.01	0.13
5.01	0.02	5.01	4.76	5.01	0.28	7.01	0.14
6.01	0.02	6.01	5.17	6.01	0.32	8.01	0.15
7.01	0.02	7.01	5.36	7.01	0.32	9.01	0.16
8.01	0.02	8.01	5.36	8.01	0.35	10.31	0.17
9.01	0.02	9.01	5.41	9.01	0.37	15.31	0.21
10.31	0.02	10.31	5.36	10.31	0.39	20.31	0.24
15.31	0.02	15.31	5.36	15.31	0.44	25.31	0.28
20.31	0.05	20.31	5.41	20.31	0.49	30.31	0.29
25.31	0.05	25.31	5.36	25.31	0.51	35.31	0.31
30.31	0.05	30.31	5.41	30.31	0.53	40.31	0.33
35.31	0.07	35.31	5.41	35.31	0.55	45.31	0.35
40.31	0.07	40.31	5.36	40.31	0.58	50.31	0.36
45.31	0.09	45.31	5.41	45.31	0.60	59.31	0.38

Table D-1
Pumping Test Data
November – December 1994
Jones Chemicals, Inc.
Caledonia, New York

Drawdown Data (cont.)[1]							
L-1		North Well		PZ-1		PZ-2	
dT	dS	dT	dS	dT	dS	dT	dS
50.31	0.09	50.31	5.41	50.31	0.60	64.31	0.39
59.31	0.12	59.31	5.41	59.31	0.65	74.31	0.40
64.31	0.14	64.31	5.41	64.31	0.65	84.31	0.42
74.31	0.14	74.31	5.45	74.31	0.65	94.31	0.43
84.31	0.16	84.31	5.41	84.31	0.69	104.31	0.43
94.31	0.18	94.31	5.41	94.31	0.69	154.31	0.45
104.31	0.21	104.31	5.41	104.31	0.69	204.31	0.46
154.31	0.30	154.31	5.45	154.31	0.74	254.31	0.46
204.31	0.39	204.31	5.50	204.31	0.74	304.31	0.46
254.31	0.42	254.31	5.50	254.31	0.74	352.21	0.47
304.31	0.49	304.31	5.45	304.31	0.74	402.21	0.46
352.21	0.53	352.21	5.50	352.21	0.74	—	—
402.21	0.55	402.21	5.45	402.21	0.74	—	—
Recovery Data[1]							
0.16	0.55	0.06	5.41	0.06	0.74	0.06	0.47
0.22	0.55	0.11	5.31	0.11	0.72	0.11	0.45
0.27	0.58	0.16	5.22	0.16	0.72	0.16	0.45
0.32	0.55	0.22	5.08	0.22	0.72	0.22	0.45
0.37	0.55	0.27	4.94	0.27	0.72	0.27	0.45
0.42	0.55	0.32	4.85	0.32	0.72	0.32	0.45
0.48	0.55	0.37	4.76	0.37	0.72	0.37	0.45
0.53	0.55	0.42	4.62	0.42	0.72	0.42	0.45
0.59	0.55	0.48	4.53	0.48	0.69	0.48	0.45
0.64	0.55	0.53	4.44	0.53	0.69	0.53	0.45
0.69	0.55	0.59	4.30	0.59	0.69	0.59	0.45
0.75	0.55	0.64	4.20	0.64	0.69	0.64	0.45
0.80	0.55	0.69	4.11	0.69	0.72	0.69	0.45
0.85	0.55	0.75	4.02	0.75	0.69	0.75	0.45
0.90	0.55	0.80	3.88	0.80	0.69	0.80	0.45
0.95	0.55	0.85	3.79	0.85	0.69	0.85	0.45
1.01	0.55	0.90	3.70	0.90	0.69	0.90	0.45
1.57	0.55	0.95	3.60	0.95	0.69	0.95	0.45
2.07	0.55	1.01	3.51	1.01	0.69	1.01	0.45
2.57	0.55	1.57	2.63	1.57	0.65	1.57	0.44
3.07	0.55	2.07	1.99	2.07	0.62	2.07	0.43
3.57	0.55	2.57	1.48	2.57	0.60	2.57	0.43
4.07	0.55	3.07	1.11	3.07	0.55	3.07	0.42
4.57	0.55	3.57	0.88	3.57	0.55	3.57	0.40
5.07	0.55	4.07	0.69	4.07	0.53	4.07	0.39

Table D-1
Pumping Test Data
November – December 1994
Jones Chemicals, Inc.
Caledonia, New York

Recovery Data (cont.)[1]							
L-1		North Well[1]		PZ-1		PZ-2	
dT	dS	dT	dS	dT	dS	dT	dS
6.07	0.55	4.57	0.60	4.57	0.51	4.57	0.38
7.07	0.55	5.07	0.55	5.07	0.46	5.07	0.38
8.07	0.55	6.07	0.51	6.07	0.44	6.07	0.36
9.07	0.55	7.07	0.46	7.07	0.44	7.07	0.35
10.27	0.55	8.07	0.46	8.07	0.39	8.07	0.33
15.27	0.55	9.07	0.42	9.07	0.39	9.07	0.32
20.27	0.53	10.27	0.37	10.27	0.37	10.27	0.31
25.27	0.53	15.27	0.32	15.27	0.32	15.27	0.27
30.27	0.53	20.27	0.28	20.27	0.28	20.27	0.23
35.27	0.53	25.27	0.23	25.27	0.23	25.27	0.21
40.27	0.51	30.27	0.23	30.27	0.21	30.27	0.18
45.27	0.51	35.27	0.18	35.27	0.18	35.27	0.16
50.27	0.51	40.27	0.18	40.27	0.18	40.27	0.15
64.27	0.49	45.27	0.14	45.27	0.16	45.27	0.14
74.27	0.49	50.27	0.14	50.27	0.14	50.27	0.13
84.27	0.49	64.27	0.09	64.27	0.12	64.27	0.10
94.27	0.46	74.27	0.09	74.27	0.12	74.27	0.09
104.27	0.46	84.27	0.09	84.27	0.09	84.27	0.08
154.27	0.39	94.27	0.09	94.27	0.09	94.27	0.07
204.27	0.37	104.27	0.09	104.27	0.07	104.27	0.07
254.27	0.35	154.27	0.05	154.27	0.05	154.27	0.05
304.27	0.30	204.27	0.00	204.27	0.05	204.27	0.03
354.27	0.28	254.27	0.05	254.27	0.05	254.27	0.03
404.27	0.25	304.27	0.05	304.27	0.05	304.27	0.03
454.27	0.23	354.27	0.05	354.27	0.05	354.27	0.03
504.27	0.23	404.27	0.05	404.27	0.05	404.27	0.03
604.27	0.21	454.27	0.05	---	---	---	---
704.27	0.16	504.27	0.09	---	---	---	---
---	---	604.27	0.09	---	---	---	---
---	---	704.27	0.05	---	---	---	---

Drawdown Data[2]							
OP-4		BP-4		BP-4 (cont'd)		BP-4 (cont'd)	
dT	dS	dT	dS	dT	dS	dT	dS
3.10	0.01	0.10	0.01	25.60	1.99	192.60	2.03
4.10	0.02	0.20	0.04	26.10	1.99	197.60	2.03
5.10	0.03	0.30	0.09	26.60	1.99	202.60	2.03
6.10	0.04	0.40	0.13	27.10	1.99	207.60	2.03

Table D-1
Pumping Test Data
November – December 1994
Jones Chemicals, Inc.
Caledonia, New York

Drawdown Data (cont.)[2]							
OP-4		BP-4 (cont.)		BP-4 (cont'd)		BP-4 (cont'd)	
dT	dS	dT	dS	dT	dS	dT	dS
7.60	0.05	0.50	0.19	27.60	2.00	212.60	2.03
8.60	0.06	0.60	0.24	12.10	1.96	36.60	2.00
10.60	0.07	0.70	0.30	12.60	1.96	37.60	2.00
12.10	0.08	0.80	0.36	13.10	1.96	38.60	2.00
15.10	0.09	0.90	0.42	13.60	1.97	39.60	2.00
18.60	0.10	1.00	0.47	14.10	1.97	40.60	2.00
22.10	0.11	1.10	0.52	14.60	1.97	41.60	2.00
28.60	0.12	1.20	0.58	15.10	1.97	42.60	2.01
34.60	0.13	1.30	0.62	15.60	1.98	43.60	2.01
49.60	0.14	1.40	0.67	16.60	1.98	44.60	2.01
112.60	0.15	1.50	0.72	17.10	1.98	45.60	2.00
162.60	0.15	1.60	0.77	17.60	1.98	46.60	2.00
167.60	0.15	1.70	0.82	18.10	1.98	47.60	2.00
172.60	0.15	1.80	0.86	18.60	1.98	48.60	2.01
177.60	0.15	1.90	0.90	19.10	1.98	49.60	2.02
182.60	0.15	2.00	0.94	19.60	1.98	50.60	2.01
187.60	0.15	2.10	0.98	20.10	1.98	51.60	2.01
192.60	0.15	2.20	1.02	20.60	1.98	52.60	2.01
197.60	0.15	2.30	1.07	21.10	1.98	53.60	2.01
202.60	0.15	2.40	1.10	21.60	1.98	54.60	2.00
207.60	0.15	2.50	1.14	22.10	1.99	55.60	2.01
217.60	0.15	2.60	1.18	22.60	1.99	56.60	2.01
227.60	0.15	3.10	1.35	23.10	1.99	57.60	2.01
232.60	0.15	3.60	1.50	23.60	1.99	58.60	2.02
237.60	0.15	4.10	1.65	24.10	1.99	59.60	2.02
242.60	0.15	4.60	1.75	24.60	2.00	60.60	2.02
247.60	0.15	5.10	1.80	25.10	1.99	61.60	2.02
252.60	0.15	5.60	1.85	28.10	2.00	62.60	2.02
257.60	0.15	6.10	1.88	28.60	2.00	67.60	2.02
262.60	0.15	6.60	1.88	29.10	2.00	72.60	2.02
267.60	0.15	7.10	1.92	29.60	2.00	77.60	2.02
272.60	0.15	7.60	1.92	30.10	2.00	82.60	2.02
277.60	0.15	8.10	1.93	30.60	2.00	87.60	2.02
282.60	0.15	8.60	1.94	31.10	2.00	92.60	2.02
287.60	0.15	9.10	1.94	31.60	2.00	97.60	2.02
292.60	0.15	9.60	1.95	32.10	2.00	102.60	2.03
297.60	0.15	10.10	1.95	32.60	2.00	107.60	2.02
302.60	0.15	10.60	1.95	33.60	2.00	112.60	2.03
307.60	0.15	11.10	1.95	34.60	2.00	117.60	2.03

Table D-1
Pumping Test Data
November – December 1994
Jones Chemicals, Inc.
Caledonia, New York

Drawdown Data (cont.)[2]							
OP-4		BP-4 (cont.)		BP-4 (cont'd)		BP-4 (cont'd)	
dT	dS	dT	dS	dT	dS	dT	dS
312.60	0.15	11.60	1.96	35.60	2.00	122.60	2.03
317.60	0.15	127.60	2.03	222.60	2.03	292.60	2.03
322.60	0.15	132.60	2.03	227.60	2.03	297.60	2.03
332.60	0.15	137.60	2.03	232.60	2.03	302.60	2.03
337.60	0.15	142.60	2.03	237.60	2.03	307.60	2.03
342.60	0.15	147.60	2.03	242.60	2.03	312.60	2.03
347.60	0.15	152.60	2.03	247.60	2.03	317.60	2.03
352.60	0.15	157.60	2.03	252.60	2.03	322.60	2.03
357.60	0.16	162.60	2.03	257.60	2.03	327.60	2.03
		167.60	2.03	262.60	2.03	332.60	2.03
		172.60	2.03	267.60	2.03	337.60	2.03
		177.60	2.02	272.60	2.03	342.60	2.06
		182.60	2.03	277.60	2.03	347.60	2.00
		187.60	2.03	282.60	2.03	352.60	2.02
		217.60	2.03	287.60	2.03	357.60	2.04

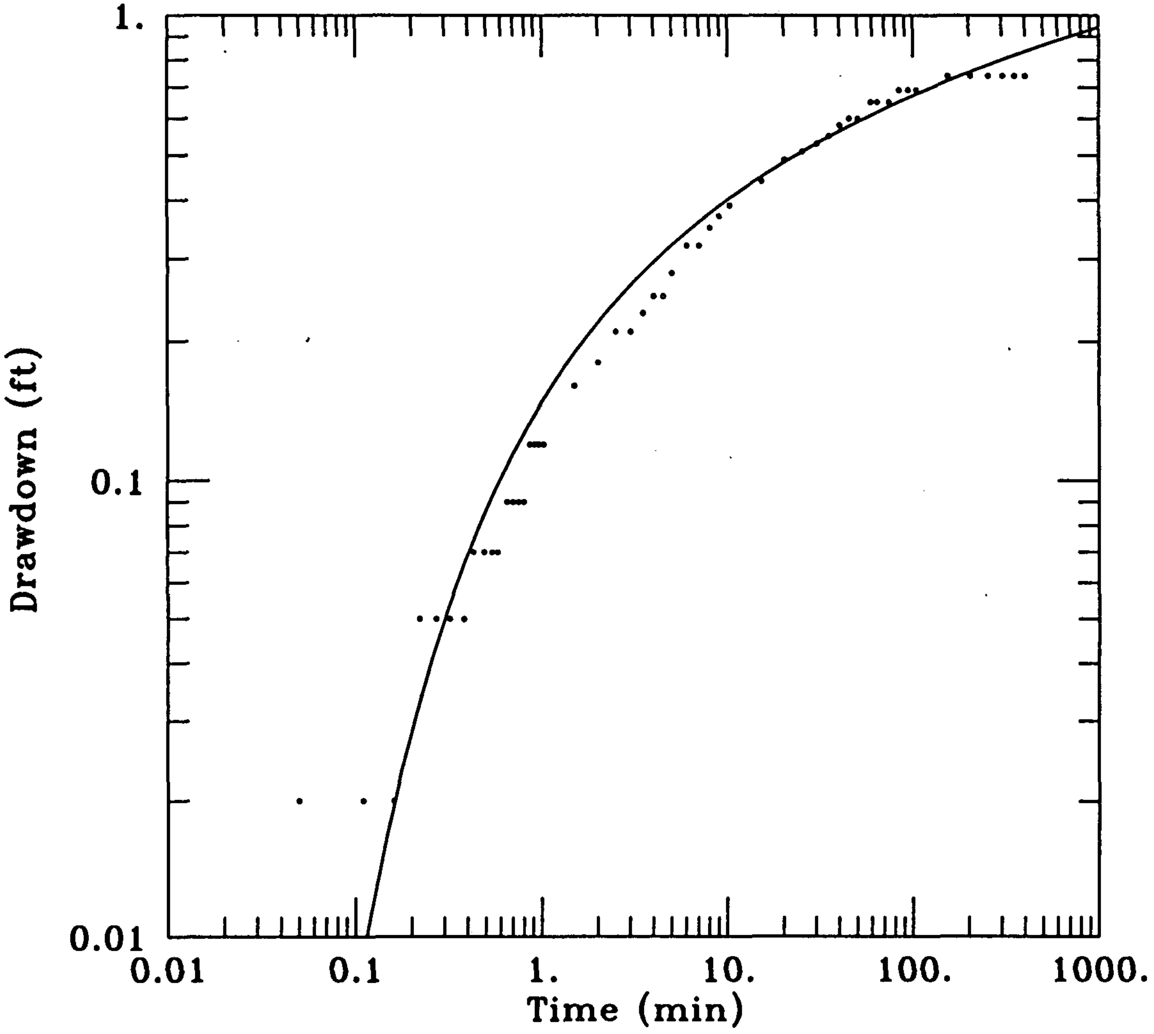
Notes

[1] Pumping Test Conducted: December 1 & 2, 1994
Pumping Well = North Well
Pumping Rate = 280 gallons per minute
Pumping Time = 402 minutes
Observation Wells = PZ-1, PZ-2, and L-1

[2] Pumping Test Conducted: November 29 & 30, 1994
Pumping Well = West Well
Pumping Rate = 15 gallons per minute
Pumping Time = 358 minutes
Observation Wells = OP-4 and BP-4

Client: **JCI/Jones Chemicals, Inc.**	Company: **LFR Levine.Fricke**
Location: **Caledonia, New York**	Project: **3165.01**

Pumping Test (Drawdown) Analysis



DATA SET:
DPZ1.AQT
02/16/99

AQUIFER MODEL:
Confined

SOLUTION METHOD:
Theis

PROJECT DATA:
test date: December 1 & 2, 1994
test well: North Well
obs. well: PZ-1

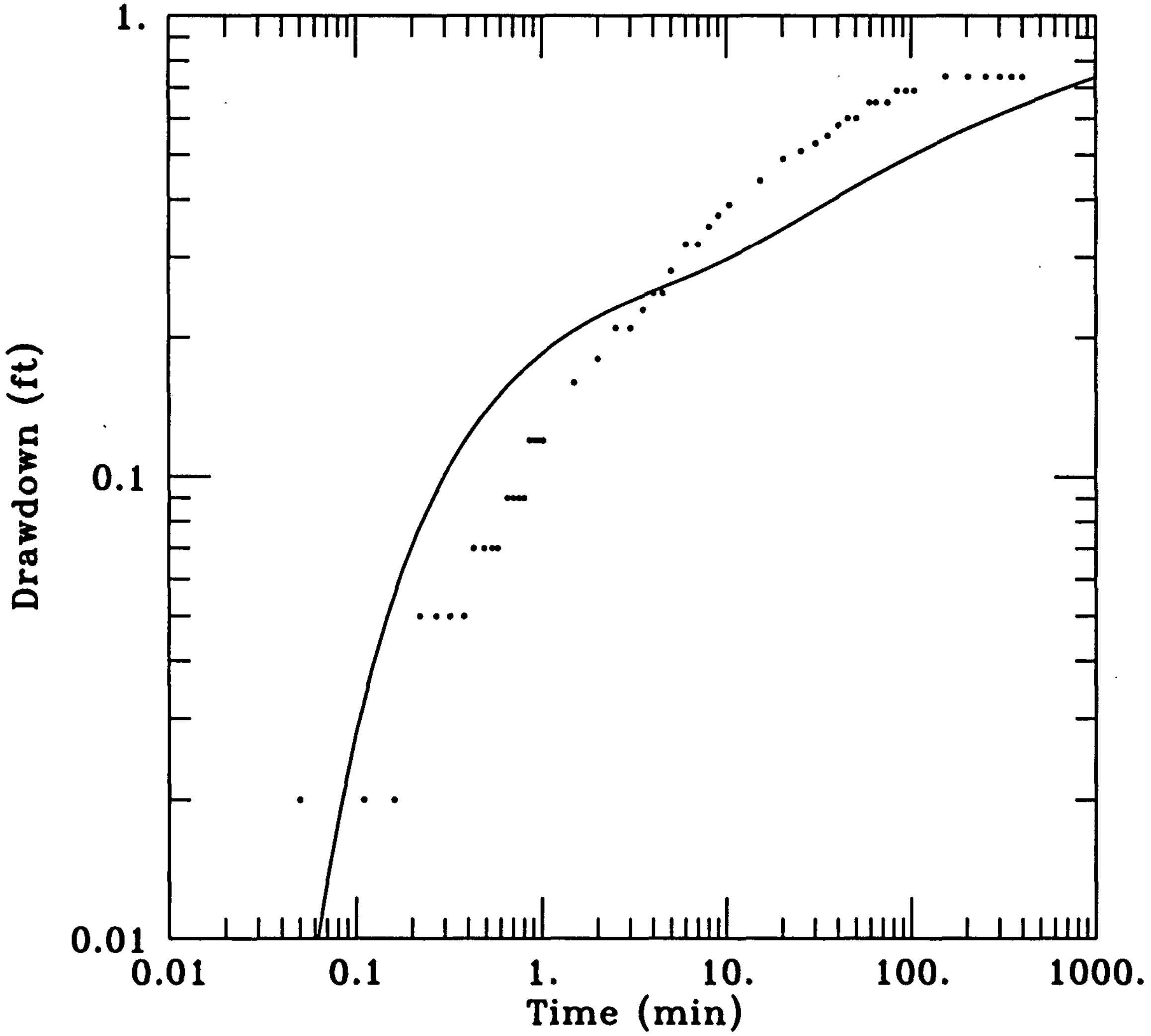
TEST DATA:
Q = 280. gal/min
r = 26. ft
r_c = 2. ft
r_w = 2. ft
b = 35. ft
Pumping Well Screen Depth:
top = 12. ft
bot. = 24. ft
Obs. Well Screen Depth:
top = 12. ft
bot. = 22. ft

PARAMETER ESTIMATES:
T = 25.17 ft^2/min
S = 0.02929

AQTESOLV

Client: **JCI/Jones Chemicals, Inc.**	Company: **LFR Levine.Fricke**
Location: **Caledonia, New York**	Project: **3165.01**

Pumping Test (Drawdown) Analysis



DATA SET:
DPZ1.AQT
02/16/99

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Neuman

PROJECT DATA:
test date: December 1 & 2, 1994
test well: North Well
obs. well: PZ-1

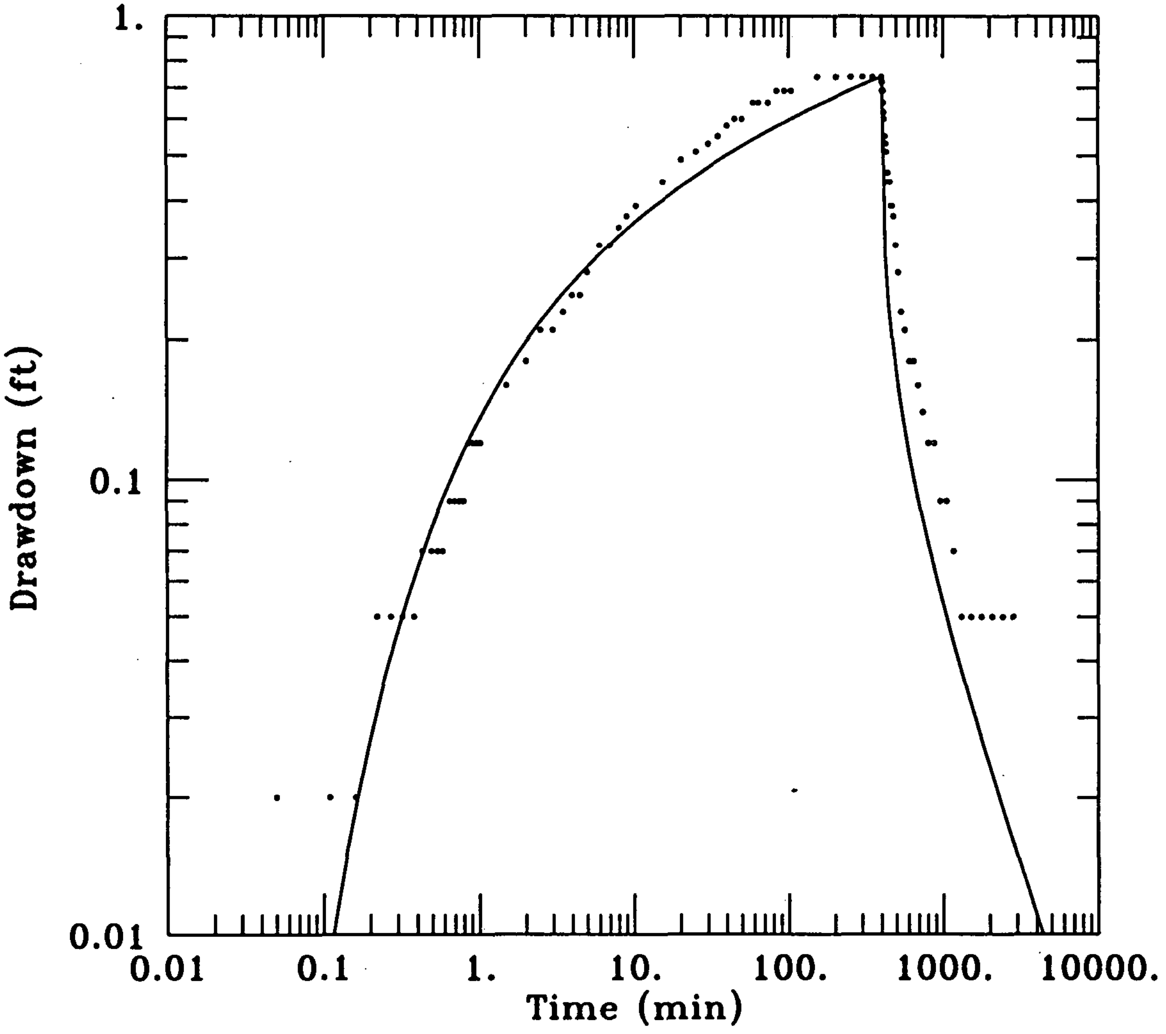
TEST DATA:
Q = 280. gal/min
r = 26. ft
r_c= 2. ft
r_w= 2. ft
b = 35. ft
Pumping Well Screen Depth:
  top = 12. ft
  bot.= 24. ft
Obs. Well Screen Depth:
  top = 12. ft
  bot.= 22. ft

PARAMETER ESTIMATES:
T = 28.19 ft^2/min
S = 0.0213
Sy = 0.1
β = 0.1

AQTESOLV

Client: **JCI/Jones Chemicals, Inc.**	Company: **LFR Levine.Fricke**
Location: **Caledonia, New York**	Project: **3165.01**

Drawdown & Recovery Data Analysis



DATA SET:
PZ1.AQT
02/16/99

AQUIFER MODEL:
Confined

SOLUTION METHOD:
Theis

PROJECT DATA:
test date: December 1 & 2, 1994
test well: North Well
obs. well: PZ-1

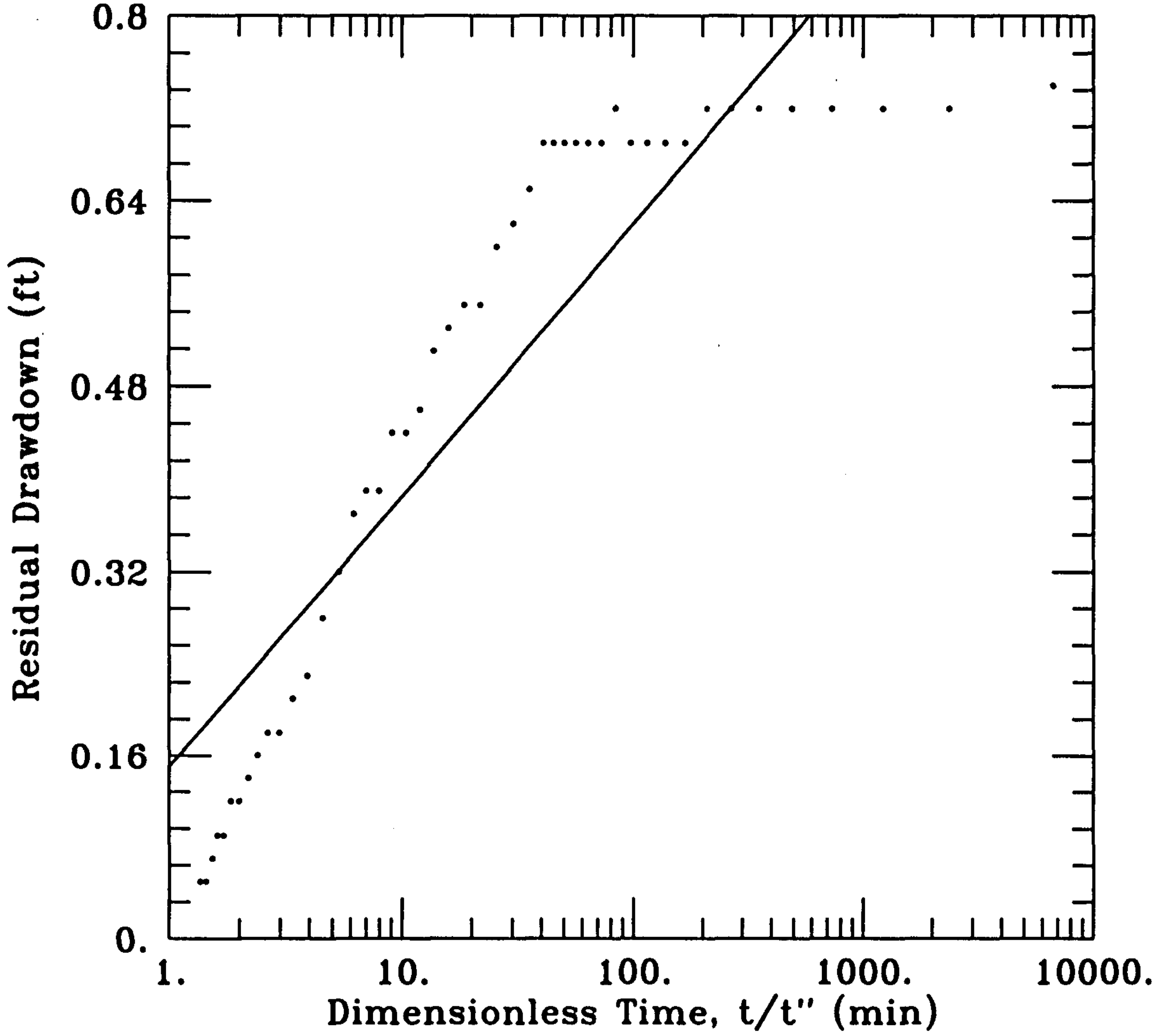
TEST DATA:
Q = 280. gal/min
r = 26. ft
r_c = 2. ft
r_w = 2. ft
b = 35. ft
Pumping Well Screen Depth:
top = 12. ft
bot. = 24. ft
Obs. Well Screen Depth:
top = 12. ft
bot. = 22. ft

PARAMETER ESTIMATES:
T = 28.61 ft^2/min
S = 0.03162

AQTESOLV

Client: **JCI/Jones Chemicals, Inc.**	Company: **LFR Levine.Fricke**
Location: **Caledonia, New York**	Project: **3165.01**

Pumping Test (Recovery Data) Analysis



DATA SET:
RPZ1.AQT
02/16/99

AQUIFER MODEL:
Confined

SOLUTION METHOD:
Theis Recovery

PROJECT DATA:
test date: December 1 & 2, 1994
test well: North Well
obs. well: PZ-1

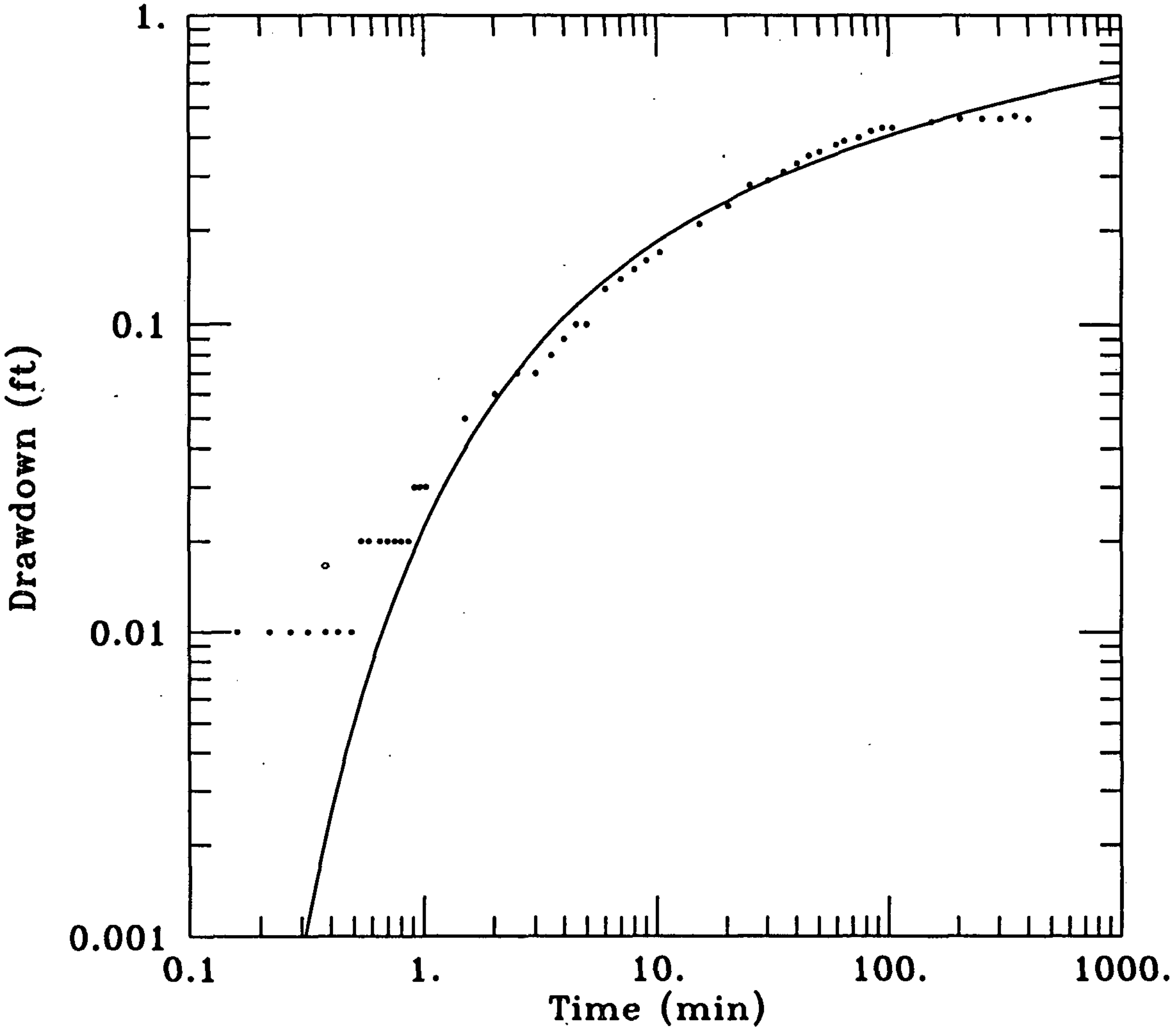
TEST DATA:
Q = 280. gal/min
r = 26. ft
r_c = 2. ft
r_w = 2. ft
b = 35. ft

PARAMETER ESTIMATES:
T = 29.21 ft^2/min
S' = 0.2295

AQTESOLV

Client: **Jones/Chemicals, Inc.**	Company: **LFR Levine.Fricke**
Location: **Caledonia, New York**	Project: **3165.01**

Pumping Test (Drawdown) Analysis



DATA SET:
DPZ2.AQT
02/16/99

AQUIFER MODEL:
Confined

SOLUTION METHOD:
Theis

PROJECT DATA:
test date: December 1 & 2, 1994
test well: North Well
obs. well: PZ-2

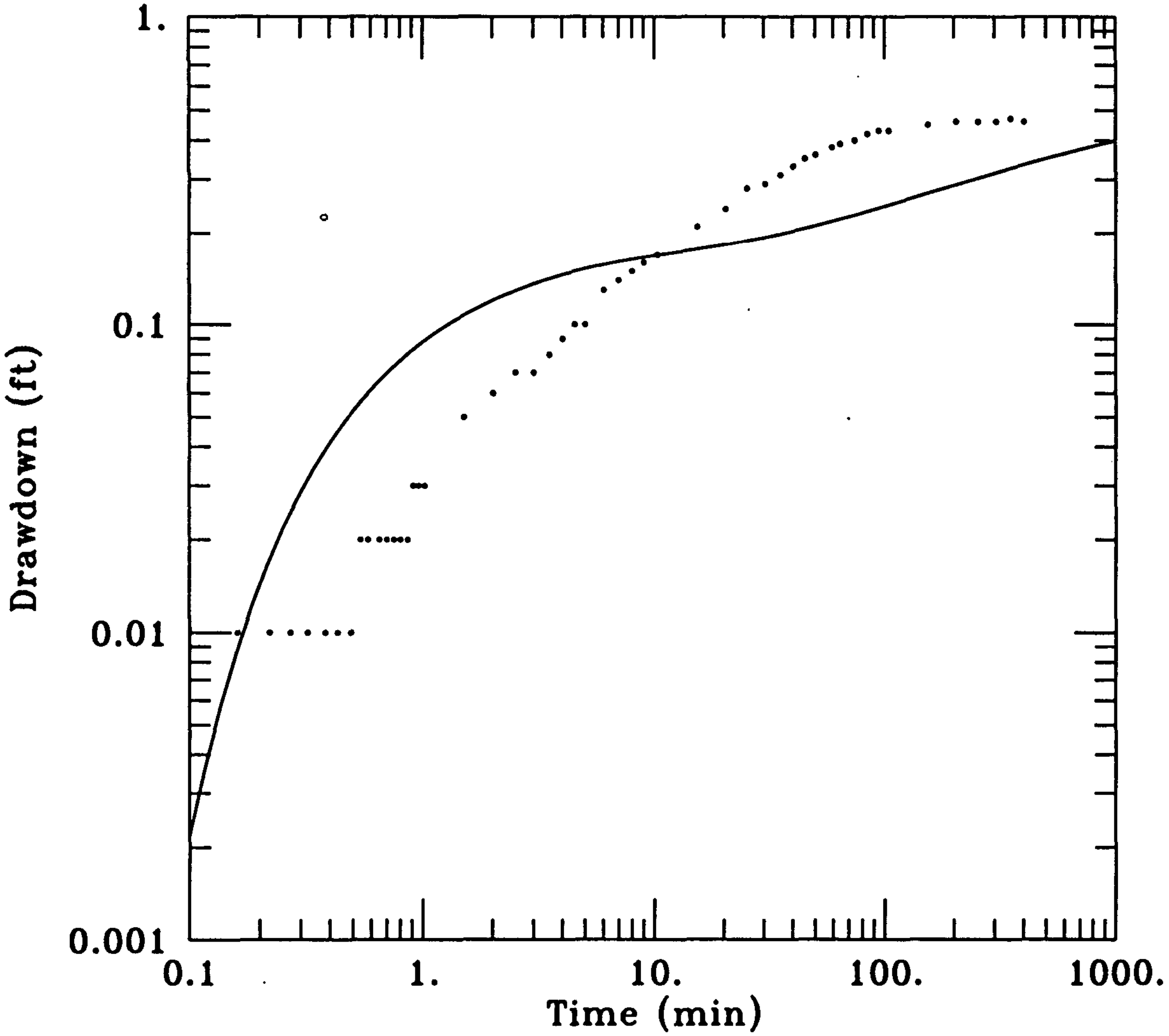
TEST DATA:
Q = 280. gal/min
r = 70. ft
r_c = 2. ft
r_w = 2. ft
b = 35. ft
Pumping Well Screen Depth:
top = 12. ft
bot.= 24. ft
Obs. Well Screen Depth:
top = 12. ft
bot.= 22. ft

PARAMETER ESTIMATES:
T = 29.68 ft^2/min
S = 0.02415

AQTESOLV

Client: **Jones/Chemicals, Inc.**	Company: **LFR Levine.Fricke**
Location: **Caledonia, New York**	Project: **3165.01**

Pumping Test (Drawdown) Analysis



DATA SET:
DPZ2.AQT
02/16/99

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Neuman

PROJECT DATA:
test date: December 1 & 2, 1994
test well: North Well
obs. well: PZ-2

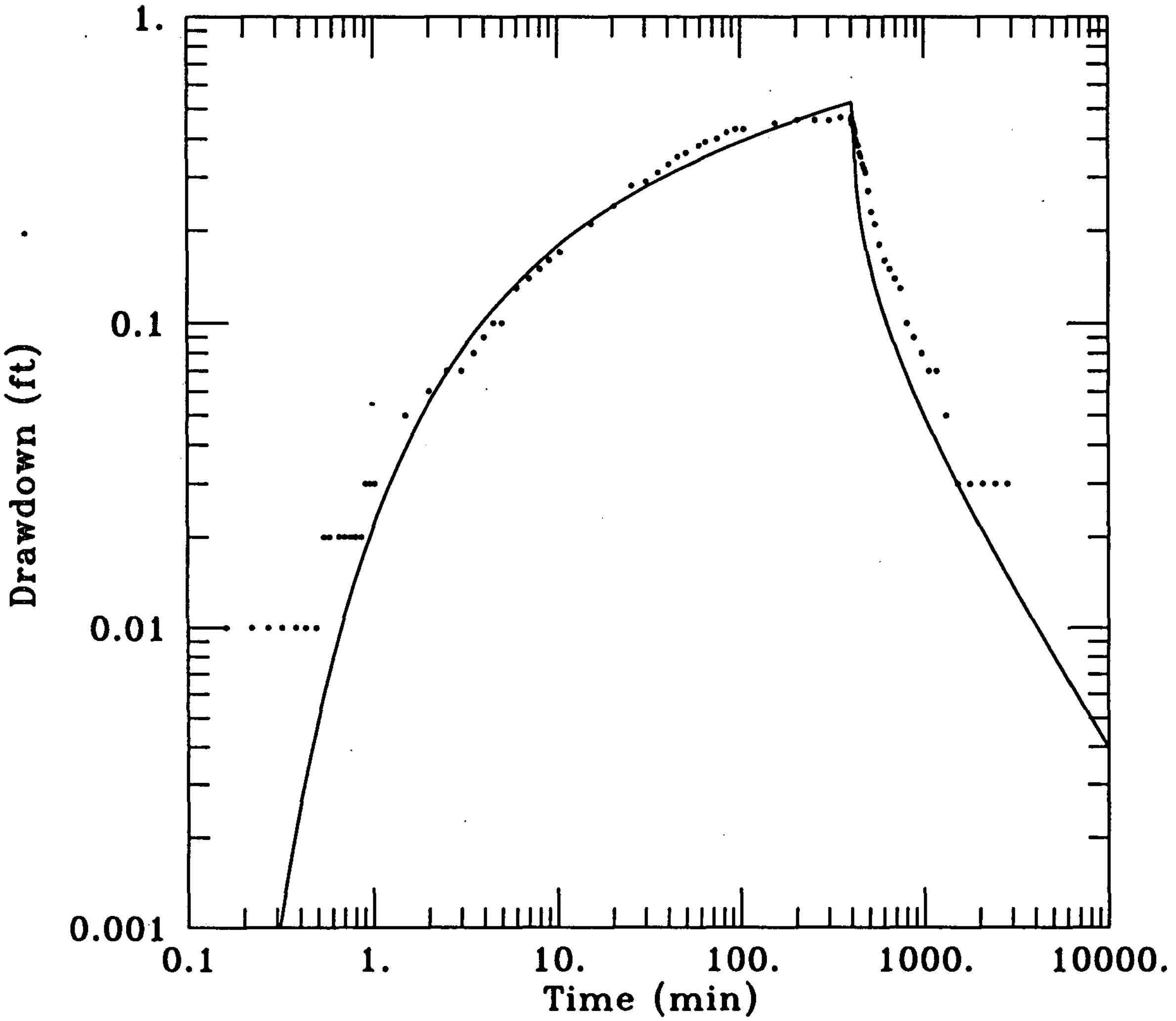
TEST DATA:
Q = 280. gal/min
r = 70. ft
r_c = 2. ft
r_w = 2. ft
b = 35. ft
Pumping Well Screen Depth:
top = 12. ft
bot.= 24. ft
Obs. Well Screen Depth:
top = 12. ft
bot.= 22. ft

PARAMETER ESTIMATES:
T = 40.92 ft^2/min
S = 0.009941
Sy = 0.1
β = 0.1

AQTESOLV

Client: **Jones/Chemicals, Inc.**	Company: **LFR Levine.Fricke**
Location: **Caledonia, New York**	Project: **3165.01**

Drawdown & Recovery Data Analysis



DATA SET:
PZ2.AQT
02/16/99

AQUIFER MODEL:
Confined

SOLUTION METHOD:
Theis

PROJECT DATA:
test date: December 1 & 2, 1994
test well: North Well
obs. well: PZ-2

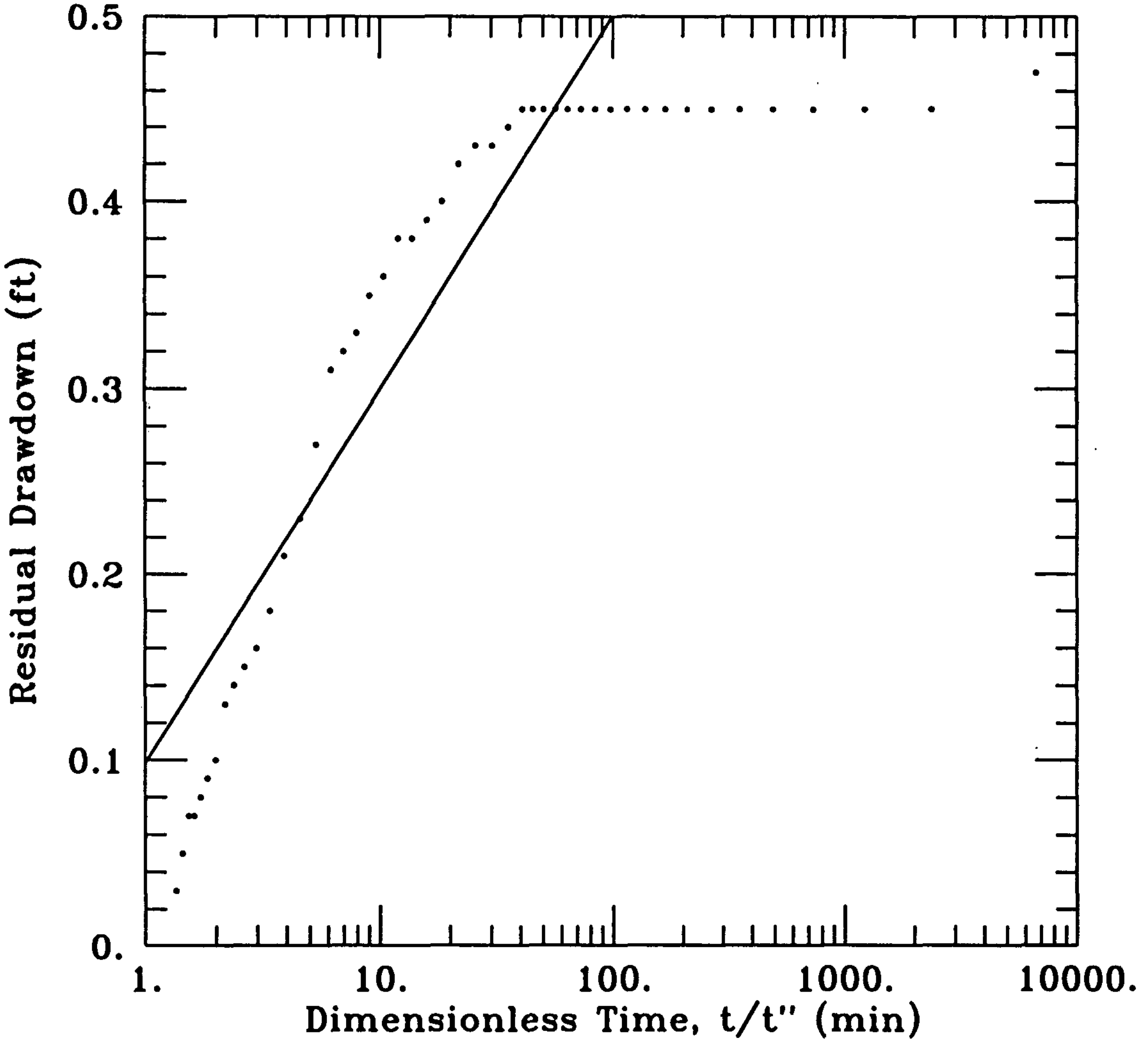
TEST DATA:
Q = 280. gal/min
r = 70. ft
r_c = 2. ft
r_w = 2. ft
b = 35. ft
Pumping Well Screen Depth:
top = 12. ft
bot.= 24. ft
Obs. Well Screen Depth:
top = 12. ft
bot.= 22. ft

PARAMETER ESTIMATES:
T = 30.81 ft^2/min
S = 0.02484

AQTESOLV

Client: **JCI/Jones Chemicals, Inc.**	Company: **LFR Levine.Fricke**
Location: **Caledonia, New York**	Project: **3165.01**

Pumping Test (Recovery Data) Analysis



DATA SET:
RPZ2.AQT
02/16/99

AQUIFER MODEL:
Confined

SOLUTION METHOD:
Theis Recovery

PROJECT DATA:
test date: December 1 & 2, 1994
test well: North Well
obs. well: PZ-2

TEST DATA:
Q = 280. gal/min
r = 70. ft
r_c = 2. ft
r_w = 2. ft
b = 35. ft

PARAMETER ESTIMATES:
T = 34.13 ft^2/min
S' = 0.3237

AQTESOLV

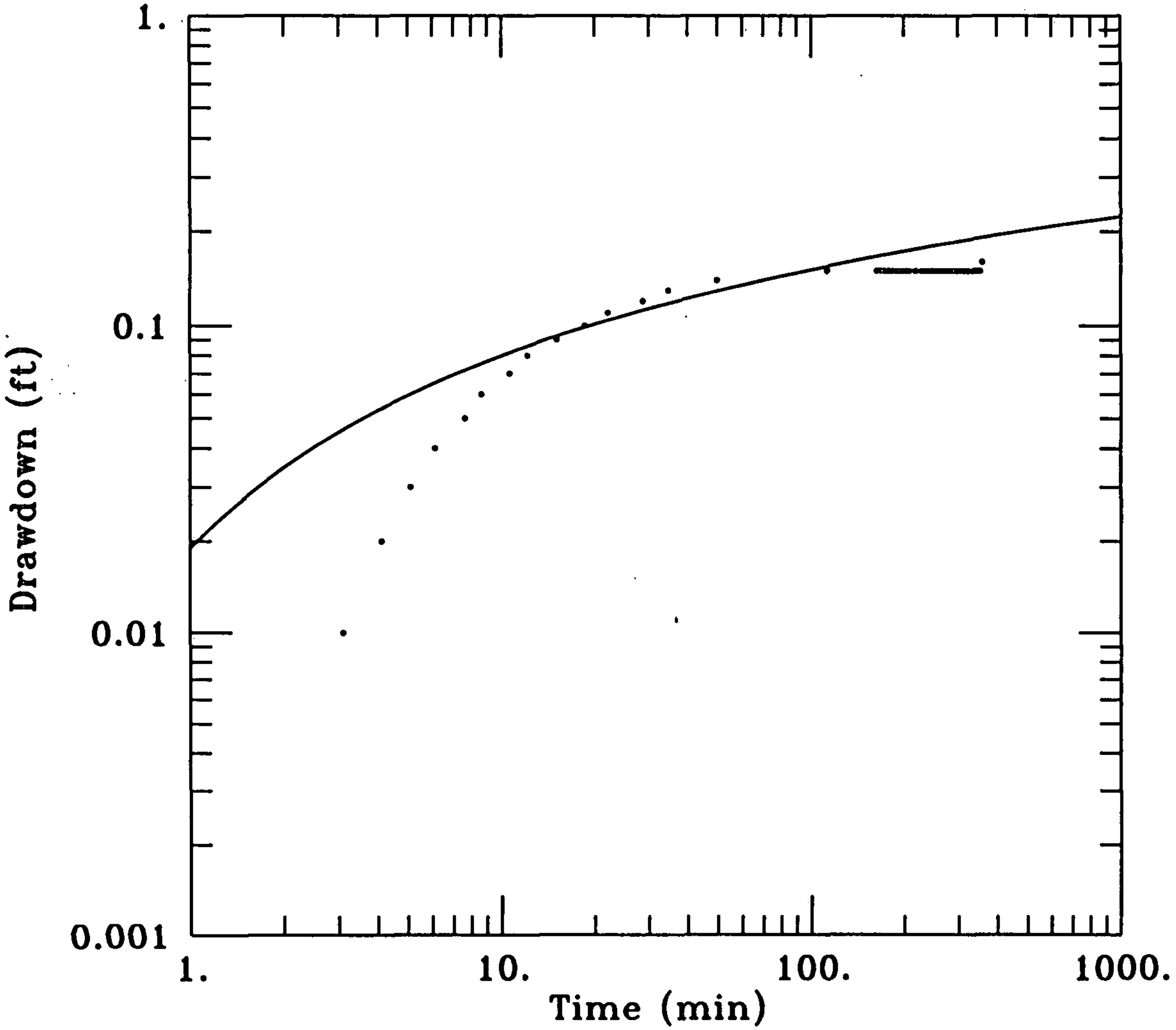
Client: **JCI/Jones Chemicals, Inc.**

Company: **LFR Levine.Fricke**

Location: **Caledonia, New York**

Project: **3165.01**

Pumping Test (Drawdown) Analysis



DATA SET:
DOP4.AQT
02/16/99

AQUIFER MODEL:
Confined

SOLUTION METHOD:
Theis

PROJECT DATA:
test date: December 1 & 2, 1994
test well: West Well
obs. well: OP-4

TEST DATA:
Q = 15. gal/min
r = 325. ft
r_c = 2. ft
r_w = 2. ft
b = 55. ft
Pumping Well Screen Depth:
top = 40. ft
bot.= 45. ft
Obs. Well Screen Depth:
top = 40. ft
bot.= 45. ft

PARAMETER ESTIMATES:
T = 5.062 ft^2/min
S = 8.936E-05

AQTESOLV

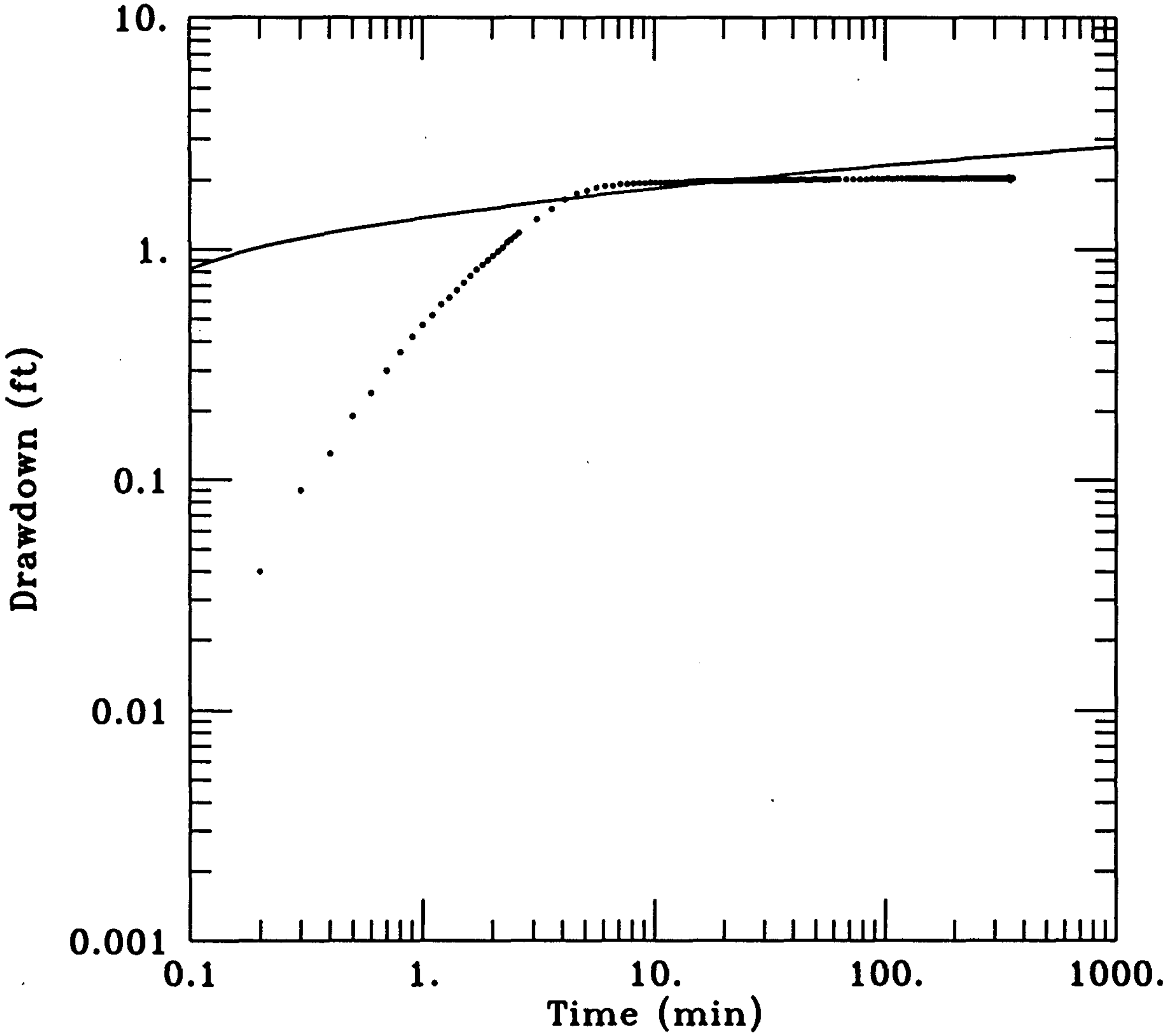
Client: **JCI/Jones Chemicals, Inc.**

Company: **LFR Levine.Fricke**

Location: **Caledonia, New York**

Project: **3165.01**

Pumping Test (Drawdown) Analysis



DATA SET:
DBP4.AQT
02/16/99

AQUIFER MODEL:
Confined

SOLUTION METHOD:
Theis

PROJECT DATA:
test date: December 1 & 2, 1994
test well: West Well
obs. well: BP-4

TEST DATA:
Q = 15. gal/min
r = 8. ft
r_c= 2. ft
r_w= 2. ft
b = 55. ft
Pumping Well Screen Depth:
top = 40. ft
bot.= 45. ft
Obs. Well Screen Depth:
top = 50. ft
bot.= 55. ft

PARAMETER ESTIMATES:
T = 0.7794 ft^2/min
S = 0.0003004

AQTESOLV

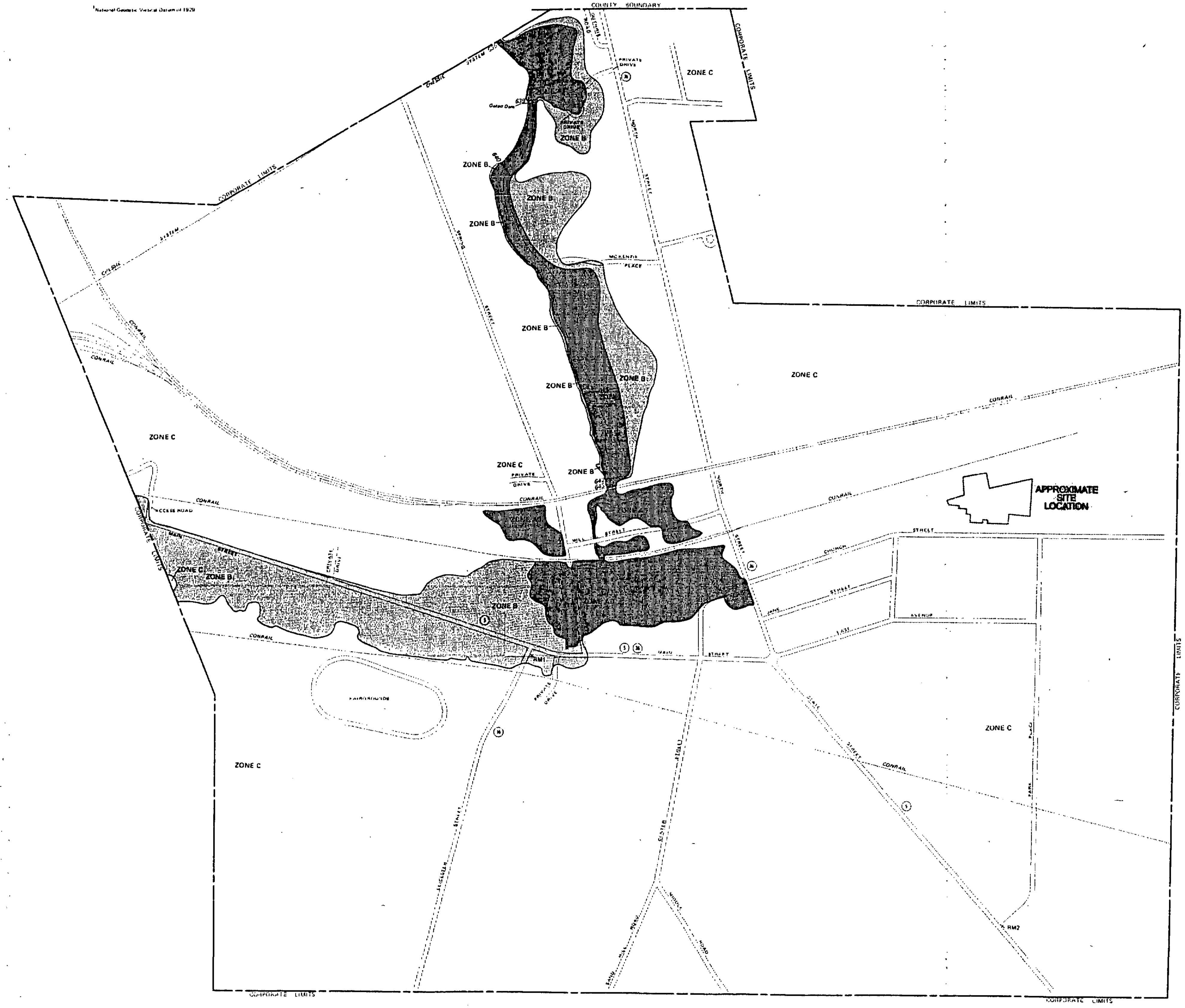
Appendix E

Flood Insurance Zone Map

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (IN FT. (NGVD)[1]	DESCRIPTION OF LOCATION
RM 1	667.1	Train spike in pole RM 1 on southeast corner of State Route 5 and Leicester Street, 1.5 feet above ground.
RM 2	674.8	Train spike set in pavement on east side of State Route 5 and centerline of Park Place.

[1] National Geodetic Vertical Datum of 1929



KEY TO MAP

500-Year Flood Boundary	ZONE B
100-Year Flood Boundary	
Zone Designations* With Date of Identification e.g., 12/2/74	▨
100-Year Flood Boundary	
500-Year Flood Boundary	ZONE B
Base Flood Elevation Line With Elevation In Feet**	513
Base Flood Elevation in Feet Where Uniform Within Zone**	(EL 987)
Elevation Reference Mark	RM7 x
River Mile	• M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

INITIAL IDENTIFICATION:
FEBRUARY 7, 1975

FLOOD HAZARD BOUNDARY MAP REVISIONS:

FLOOD INSURANCE RATE MAP EFFECTIVE:
JUNE 1, 1981

FLOOD INSURANCE RATE MAP REVISIONS:

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program at (800) 638-6620, or (800) 424-8872.

APPROXIMATE SCALE
400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

VILLAGE OF
CALEDONIA, NEW YORK
LIVINGSTON COUNTY

ONLY PANEL PRINTED

COMMUNITY-PANEL NUMBER
360381 0001 A

EFFECTIVE DATE:
JUNE 1, 1981

federal emergency management agency
federal insurance administration

Appendix F

Ecological Habitats and Sensitive Species (Letter from NYSDEC)

New York State Department of Environmental Conservation
Region 8 Bureau of Wildlife
6274 East Avon-Lima Road, Avon, New York 14414-9519
Telephone: (716) 226-2466, Wildlife Fax: (716) 226-3009
e-mail: jceckler@gw.dec.state.ny.us

John P. Cahill
Commissioner

John T. Hicks
Regional Director

June 15, 1998

Amy Goldberg Day
Levine-Fricke-Recon
1900 Powell Street, 12th floor
Emeryville, California 94608-1827

Re: Jones Chemical at 100 Sunny Bol Blvd., Caledonia

DEAR MS. GOLDBERG DAY:

This is in response to your recent inquiry regarding environmental information in connection with the above-referenced project. An examination of our file materials reveals no records of the following sensitive environmental areas in the vicinity of the project site:

- ☒ Exemplary Natural Communities
- ☒ Significant Wildlife Habitats
- ☒ Threatened, Endangered, or Rare Species

Please be advised that our data represents only currently documented information. Our files are continually being updated as data becomes available. The absence of data for a particular site does not necessarily mean that sensitive environmental areas do not exist on or adjacent to a site, but rather that our files do not contain any information which indicates the presence or absence of these areas. This data does not substitute for an on-site survey by qualified researchers.

If your project is still active one year from now, you may wish to contact us again to determine if the status of this information has changed. Due to the sensitivity of some of this information, we request that any data provided to you be treated in a sensitive manner. Precise locations of rare species, for example, should not be incorporated into an Environmental Impact Statement or other public documents without prior written approval.

Please feel free to contact me for any further information or clarification.

JIM ECKLER, FISH AND WILDLIFE TECHNICIAN I

je

[C:\WINDOWS\DESKTOP\NHP.LTR]

Appendix G

Cultural Resource Evaluation (Letter from New York State Office of Parks, Recreation, and Historic Places)

OFFICE OF PARKS · RECREATION · HISTORIC PRESERVATION
NEW YORK STATE

Bernadette Castro
Commissioner

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189 518-237-8643

July 8, 1996

Nick Contos
Levine-Fricke
3382 Capital Circle, N.E.
Tallahassee, Florida 32308-1568

Dear Mr. Contos:

RE: EPA
Jones Chemical Site Remediation
Caledonia, Livingston County
96PR1376

Thank you for requesting the comments of the State Historic Preservation Office (SHPO). We have reviewed the project in accordance with Section 106 of the National Historic Preservation Act of 1966.

Based upon this review, it is the SHPO's opinion that your project will have No Effect upon cultural resources eligible for inclusion in the National Register of Historic Places.

If further correspondence is required regarding this project, please be sure to refer to the OPRHP Project Review (PR) number noted above.

Sincerely,

Ruth L. Pierpont

Ruth L. Pierpont
Director, Historic Preservation
Field Services Bureau

RLP:cm

Appendix H

Evaluation/Validation of Laboratory Data for Soil and Groundwater Sample

Evaluation/Validation of Laboratory Data for Soil and Groundwater Samples

A data evaluation/validation review was conducted of the laboratory data reported for:

- soil samples collected inn November 1995
- groundwater samples collected in April/May 1996
- groundwater samples collected in November 1997
- groundwater samples collected in August 1998

The review was conducted in accordance with the procedures outlined in the Field Operations Plan Supplemental RI/FS: Volume II; QAPP (CRA 1992b); U.S. EPA (1998b and 1988c), and in LFR's Comprehensive Quality Assurance Plan (LFR 1991). The samples were containerized in the appropriate sample containers provided by the laboratory and were stored at 4 degrees Celsius (°C) until delivery to the analytical laboratory. The samples were delivered under chain-of-custody by common shipping carrier. The samples were analyzed by a U.S. EPA- and NYSDEC-certified laboratory (H2M Laboratories, Inc., Melville, New York).

Soil Samples - November 1995 and May 1996

Soil samples were collected between November 14 and 17, 1995; one soil sample, SB-16, was collected May 1, 1996. The samples were analyzed for VOCs, SVOCs, and selected metals as indicated on the SSPL (LFR 1994). The samples were analyzed for VOCs using EPA SW-846 Method 8240. All samples were analyzed within their holding times. Surrogate sample recoveries were within control limits. The method blanks were below the quantitation limits with acceptable percent accuracy and relative percent differences (RPDs). A majority of the matrix spikes were within acceptable percent recoveries and RPDs, with the exception of recoveries for 2 of 15 spikes; 2 of 5 RPDs were out of control limits for sample SB-11 (0 to 0.5 foot bgs). All trip blanks were below the quantitation limits. Selected analytes in soil samples SB-1 (0 to 0.5 foot bgs), SB-9 (0 to 0.5 foot bgs), SB-9 (14 to 16 feet bgs), SB-11 (0 to 0.5 foot bgs) and SD-1 are qualified "J" for detected estimated values. The RPDs for the duplicate samples were within the control limits. No qualification of these data is recommended, except as noted for SB-1, SB-9, SB-9, SB-11, and SD-1.

Soil samples were analyzed for SVOCs using EPA SW-846 Method 8270. All samples were analyzed within their holding times. The method blanks were below quantitation limits with acceptable percent accuracy and RPD. A majority of the surrogate sample recoveries were within control limits, with the exception of 16 (mostly for d14-terphenyl) of 126 samples. A majority of the matrix spike percent recoveries were within control limits, with the exception of seven (for sample SD-1) of 48 spike recoveries. All RPDs were within control limits. Twenty-two of 108 internal standards areas were out of control limits for perylene-d12 and chrysene-d12. Sample SD-5 was diluted and re-analyzed because it contained high concentrations of targeted analytes. Sample results have been qualified as "J" (estimated value) because of problems with surrogate spikes, matrix spikes, and internal standards, and because of the RPDs associated with the duplicate sample of SD-1.

Soil samples for selected metals (i.e., cadmium, chromium, iron, and manganese) were analyzed using EPA SW-846 Method 6010. Lead was analyzed using EPA SW-846 Method 7421. All samples were analyzed within their holding times. The method blanks were within acceptable percent accuracy and RPDs. Control limits for matrix spike and duplicate sample analyses were exceeded for several samples. According to U.S. EPA guidelines, the data are useable; however, the data are qualified "J" (estimated value), where appropriate. Cadmium was detected in the field equipment blank. In accordance with the "Five Times Rule," the cadmium quantitation limit was raised to 29.5 mg/kg for samples SD-1 through SD-6 and SL-1 through SL-6.

Groundwater Samples - April/May 1996

The groundwater samples were collected between April 29 through May 2, 1996, and on May 23, 1996. The samples were analyzed by a U.S. EPA- and NYSDEC-certified laboratory (H2M Laboratories, Inc., Melville, New York). The groundwater samples were analyzed for VOCs and selected metals as indicated on the SSPL (LFR 1994).

Groundwater samples were analyzed using EPA Method 524.1 for VOCs. All samples were analyzed within holding times. All surrogate sample recoveries, with the exception of one, were within control limits. The method blanks were below quantitation limits with acceptable accuracy and RPDs. Matrix spikes were within acceptable percent recoveries and RPDs with the exception of two recoveries for chlorobenzene; and 15 of 58 recoveries for samples BP-5 and BP-6. All samples, with the exception of BP-5, BP-6, and Trip Blank 4, were received in the laboratory at 15 °C. Trip blanks were below quantitation limits, with the exception of Trip Blank 4 which was reported to have toluene at 5 μg/l. The quantitation limit for samples BP-5 and BP-6 was raised to 5 μg/l using the "5 times rule" for blank contaminants. Duplicate sample RPDs were within control limits. Eight of 32 samples had elevated detection limits; both sets of data are presented in Table 16. No qualification of these data is recommended, except as noted for samples BP-5 and BP-6.

Analyses for selected metals (cadmium, chromium, iron and manganese) in groundwater samples were conducted using EPA Method 6010; analyses for lead were conducted using EPA Method 72421. All samples were analyzed within holding times. The method blanks were below quantitation limits with acceptable accuracy and RPDs. Matrix spikes were within acceptable recoveries and RPDs for all metals except lead. Laboratory duplicate recoveries were within control limits for all metals except cadmium (14.3 vs. 10%). The continuing calibration verification recoveries were within control limits except for iron; because there were no non-detects reported for iron, qualifications are not suggested. Duplicate sample RPDs were within control limits. There were no elevated detection limits.

Groundwater Samples - November 1997

The groundwater samples were analyzed for VOCs using EPA Method 524.2. All samples were analyzed within holding times. All surrogate sample recoveries were within control limits. The method blanks were below quantitation limits with acceptable accuracy and RPDs. Matrix spikes were within acceptable percent recoveries and RPDs with the exception of two recoveries for trichloroethene. Trip blanks were below quantitation limits. The field blank sample was reported with concentrations of 1 μg/l for bromoform and 2 μg/l for dibromochloromethane. The quantitation limit for samples West Well, Village Water (VW), V-2, L-3, TB, PZ-1, OP-6, OP-7, OP-9, and OP-10 through OP-15 was raised to 5 μg/l for bromoform and 10 μg/l for dibromochloromethane using the "5 times rule" for blank contaminants. Duplicate sample RPDs were within control limits. Six of 33 samples had elevated detection limits. No qualification of these data is recommended, except as noted for samples affected by field blank contamination.

Groundwater Samples - August 1998

Groundwater samples were analyzed for VOCs using EPA Method 524.2. The following samples were analyzed within holding times: BP-1 through BP-6, the North Well, and OP-6 through OP-10. All other samples including all dilutions exceeded the holding times by one to 12 days. All samples affected by hold time exceedances are qualified "J," estimated for positive detections. The laboratory reported that the hold time exceedances were due to an excess of work at the time. All but two surrogate sample recoveries were within control limits. Matrix spikes were within acceptable percent recoveries and RPDs (relative percent difference) with the exception of two recoveries for trichloroethene. Trip blanks were below quantitation limits except for methylene chloride, which was found in one trip blank at 0.7 μg/l. Nine μg/l of chloroform, 4 μg/l of bromodichloromethane, and 0.9 μg/l of dibromochloromethane in the field equipment blank sample. The laboratory method blanks were below quantitation limits with acceptable accuracy and RPDs, except for methylene chloride, which was found in most method blanks in concentrations up to 3 μg/l. Because of the presence of these contaminants in the various blanks, the quantitation limit for affected samples was raised to 20 μg/l for bromodichloromethane and 3 μg/l for dibromochloromethane and 45 μg/l using the "5 times rule" for blank contaminants. Samples affected by the contaminants in the blanks are qualified "UB" for below detection limit, detection limit was raised due to blank contamination. RPDs of duplicate samples were within control limits. Six of 33 samples had elevated detection limits. These data are qualified as recommended above, except as noted for samples affected by blank contamination.