Department of Environmental Conservation

Division of Environmental Remediation

Semiannual O&M Monitoring Report
January - June 2002

Former Gastown MGP Site,
126 East Niagara Street, Tonawanda, NY
Registry Number 915171

August 2002

New York State Department of Environmental Conservation
Region 9
270 Michigan Avenue
Buffalo, New York 14203-2999

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1.0 INTRODUCTION

In September 1998 the New York State Department of Environmental Conservation installed a groundwater/NAPL extraction and treatment system at the Former Gastown Manufactured Gas Plant (MGP) Site in response to the presence of non-aqueous phase liquids (NAPL) in the basement sumps of the nearby Gastown Sportsmen's Club. This system was installed as an Emergency Response Action to address potential adverse health impacts to members of the club by capturing NAPL and contaminated groundwater before they enter the two basement sumps of the club. The Department, through an emergency spill response contractor, conducts operation, maintenance and monitoring activities at the Site in accordance with the Operation and Maintenance Manual dated September 2001. This data summary report summarizes the operation, maintenance and monitoring activities completed at the Site from January through June 2002.

1.1 Site Description

The Former Gastown Manufactured Gas Plant, located at 126 East Niagara Street in the City of Tonawanda, Erie County, New York, occupied a total area of approximately 3.5 acres. The Site is bordered by railroad tracks to the west and south, Carney Street to the east, and East Niagara Street and Tonawanda Creek to the north (Figure 1-1). The property was formerly operated as a manufactured gas plant under various ownership, but is now rented to several local industries. Adjacent property to the east is owned by the Niagara Frontier Transportation Authority (NFTA), which leases part of their property to the Gastown Sportsmen's Club (located further east) for parking (Figure 1-2). Residential property is located west of the Site across the railroad tracks, while backyards of residential properties along Carney Street abut the Gastown Sportsmen's Club property to the east. The topography of the Site is relatively flat-lying with a gradual northerly downward slope toward Tonawanda Creek. South of the Gastown Sportsmen's Club parking lot, however, is the berm of a former railroad bed that rises approximately 8.5 feet above the general topography of the Site.

The Site is listed in the Registry of Inactive Hazardous Waste Disposal Sites in New York State (Registry) as site number 915171. The Site has been designated a Class 2 site, indicating that the Site presents a significant threat to human health and/or the environment.

1.2 Groundwater/NAPL Extraction and Treatment System

The groundwater/NAPL extraction and treatment system installed at the Former Gastown MGP Site was designed to: (1) capture NAPL and contaminated groundwater before they enter the two basement sumps of the Gastown Sportsmen's Club, and (2) extract dense non-aqueous phase liquids (DNAPL) from the

underlying plume. Figure 1-3 shows the general layout of the system, which consists of a single recovery well and a conveyance system that transports extracted fluids to a treatment system. Treated water is discharged directly to Tonawanda Creek and must meet applicable discharge limits as specified by the Department's Division of Water. Extracted NAPL is collected in 55-gallon drums that are periodically shipped off site for proper disposal. The groundwater/NAPL extraction and treatment system began operation on September 2, 1998 and has operated continuously since that time. Operation, maintenance and monitoring of this system is completed by a Department contractor from funds allocated in the Emergency Spill Response Program.

1.2.1 *Extraction System Components*

The groundwater/NAPL extraction system consists of a single, 10-inch diameter, recovery well, two submersible pumps and associated piping. The recovery well, designated PW-1, is located on the eastern portion of the NFTA property leased to the Gastown Sportsmen's Club for parking (Figure 1-3). The recovery well is equipped with two submersible pneumatic pumps, one to pump contaminated groundwater and the second one to pump DNAPL. Both pumps are air driven, with the groundwater pump designed to automatically cycle on and off in response to in-well fluid levels. The DNAPL pump is installed near the bottom of the well and pumps continuously at a low rate to maximize NAPL recovery. Each pump has a pressurized air supply line, a total fluids transfer line and a steel cable from which the pump is suspended. Discharge from the groundwater pump is routed to the treatment shed for phase separation and groundwater treatment, while discharge from the DNAPL pump is sent directly to an 85-gallon storage drum inside the treatment shed.

Water in the basement sumps of the Gastown Sportsmen's Club is contaminated; therefore, discharge from these sumps is directed to the treatment system. Water from the basement sumps is discharged directly to the secondary vault (Figure 1-3), and when reaching a pre-set height, activates a submersible pump that transfers the water through a 2-inch PVC pipe to the treatment system. During a low-level or high-level fault, electrical power to the submersible pump is automatically shut off. In such cases, water from the secondary vault gravity flows through a 4-inch PVC pipe (the overflow discharge line; Figure 1-3) and eventually discharges into Tonawanda Creek.

1.2.2 *Treatment System Components*

The groundwater treatment equipment is located inside a shed constructed during installation of the groundwater/NAPL extraction and treatment system (Figure 1-4). Fluids (groundwater and NAPL) are

pumped from the recovery well to the treatment shed, where contaminated groundwater is sent directly to an oil/water separator and DNAPL is sent directly to an 85-gallon storage drum. NAPL and sludge are collected in the chambers of the oil/water separator, which are manually drained when necessary and poured into 55-gallon drums for later disposal. DNAPL collected in the 85-gallon drum is also manually drained and poured into 55-gallon drums. Groundwater in the oil/water separator continues to flow via gravity to an equalization drum (Figure 1-4). When water in this drum reaches a preset level (as determined by a float), a transfer pump activates and pumps water from the drum through three granular activated carbon (GAC) drums (Figure 1-4) to remove organic contaminants. Treated water is discharged through a 4-inch PVC pipe to a catch basin along East Niagara Street (Figure 1-3). From this catch basin water is discharged directly into Tonawanda Creek.

1.3 Monitoring Well Network

A monitoring well network (Figure 1-5) has been installed at the Site, in part, to evaluate the effectiveness of the groundwater/NAPL extraction system. A series of micro-wells were installed in 1996 for the Spill Unit with five additional micro-wells installed in 1999 during the Remediation Unit's Site Investigation. Four 2-inch wells were installed in June 1998 as part of system installation, with five additional 2-inch wells installed in 2001 during the Remedial Investigation. Information obtained from these wells will be utilized for performance monitoring of the groundwater/NAPL extraction system. Such monitoring will consist of periodic water level measurements to determine the full extent and magnitude of the cone of depression around the recovery well, and the collection of groundwater samples for chemical analysis. The dewatering of the club's two basement sumps is also a measure of system performance and effectiveness. As a result, periodic visual observation of the sumps will be made. These data will then be evaluated to determine what adjustments, if any, should be made to either the pumping rate or depth of the groundwater pump to optimize system performance.

1.4 Report Organization

This data summary report summarizes the operation, maintenance and monitoring activities completed at the Site from January through June 2002. This report is organized into six sections, including this Introduction, with the remaining sections organized as follows:

- ***Section 2.0, Scope of Work:*** This section describes the operation, maintenance and monitoring activities completed at the Site from January through June 2002.

- ***Section 3.0, Results:*** This section presents the results of the operation, maintenance and monitoring activities completed at the Site during the reporting period.

- ***Section 4.0, Discussion:*** This section contains a detailed discussion of the results presented in Section 3.0.

- ***Section 5.0, Recommendations:*** This section discusses the Department's recommendations for future Site activities, including additional modifications to the system, if any, that would be required to improve system efficiency.

- ***Section 6.0, References:*** This section contains a list of references utilized or cited in the report.

2.0 SCOPE OF WORK

2.1 Site Inspections

The groundwater/NAPL extraction and treatment system was inspected approximately weekly from January through June 2002. More frequent inspections were conducted during some months due to system malfunctions and shutdowns. The results of these inspections are summarized in Section 3.0.

2.2 Compliance Sampling

Treated water samples were collected monthly and sent to Severn Trent Laboratories, Inc. in Amherst, New York for chemical analysis. Influent water to the primary carbon drum was also collected monthly for chemical analysis. Samples were not collected in May 2002 because the activated carbon was replaced. The analytical results from the compliance samples are presented and discussed in Section 3.0.

2.3 Groundwater Sampling

Groundwater samples were collected from selected monitoring wells during the reporting period as part of the State Funded Remedial Investigation. The analytical results from these samples are not presented in this report as they will be included and discussed in the Remedial Investigation Report.

2.4 NAPL Sampling

NAPL from the DNAPL storage drum was collected in May 2002 and sent to Severn Trent Laboratories for chemical analysis. The analytical results from this sample are presented and discussed in Section 3.0.

2.5 Sump Sampling

Water samples from the basement sumps of the Gastown Sportsmen's Club were not collected during the reporting period.

2.6 Water Level Measurements

Water levels were measured in all Site monitoring wells on April 12 and June 12, 2002. These levels were measured with an electronic water level indicator and reported as an elevation above mean sea level. The locations of the wells in close proximity to the groundwater/NAPL extraction and treatment system are shown on Figure 1-5. Hydrographs and groundwater contour plots were not constructed from these data because not all of the wells installed during the Remedial Investigation have been surveyed. These plots will be included in the next semiannual report when surveying should be complete.

3.0 RESULTS

3.1 Site Inspections

3.1.1 *January 2002*

The site was visited on six (6) occasions during the month of January 2002. A full round of compliance samples was collected and submitted to Severn Trent Laboratories, Inc. (STL) for chemical analysis on January 2 and January 31, 2002. The samples collected on January 2nd were for the December 2001 compliance event; these samples could not be collected in December due to record snowfall. An outline showing noteworthy tasks performed during the month of January 2002 is presented below. Selected system data collected during the site visits are presented in Tables 3-3 and 3-4. Complete site visit data is contained in Appendix A.

January 2, 2002

- System fully operational upon arrival.
- Recovered a total of 5.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Collected December 2001 water samples and delivered to STL for chemical analysis.
- Collected full round of system data.
- System fully operational upon departure.

January 11, 2002

- System fully operational upon arrival.
- Recovered a total of 4.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Collected full round of system data.
- System fully operational upon departure.

January 16, 2002

- System fully operational upon arrival.
- Recovered a total of 1.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Installed Culligan UV conditioner and Shelco filter unit.
- Cleaned bio-slime from the oil/water separator.
- Removed top 3" of carbon from the primary carbon drum and used a submersible pump to loosen remaining carbon.
- Collected full round of system data.
- System fully operational upon departure.

January 18, 2002

- System fully operational upon arrival.
- Completed quick system check to see if UV conditioner and filter were working properly.
- Collected partial system data.
- System fully operational upon departure.

January 25, 2002

- System fully operational upon arrival.
- Recovered a total of 1.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Adjusted DNAPL pump flow rate.
- Changed H_20 filters.
- Collected full round of system data.
- System fully operational upon departure.

January 31, 2002

- System fully operational upon arrival.
- Recovered a total of 8.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Changed H_20 filters.
- Collected water samples and delivered to STL for chemical analysis.
- Collected full round of system data.
- System fully operational upon departure; however, the transfer pump periodically shuts down due to overheating from excessive run time caused by increased flow from the secondary vault.

3.1.2 *February 2002*

The site was visited on four (4) occasions during the month of February 2002. A full round of compliance samples was collected and submitted to STL for chemical analysis on February 28, 2002. An outline showing noteworthy tasks performed during the month of February 2002 is presented below. Selected system data collected during the site visits are presented in Tables 3-3 and 3-4. Complete site visit data is contained in Appendix A.

February 8, 2002

- System fully operational upon arrival.
- Recovered a total of 14.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 6.0 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 38.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Remounted Culligan UV filters.
- Changed H_20 filters.
- Turned off sump pump in the secondary vault as requested by the NYSDEC to alleviate overheating of the transfer pump.
- Collected full round of system data.
- System not fully operational upon departure as the sump pump in the secondary vault is turned off.

February 14, 2002

- System not fully operational upon arrival due to high level fault in the DNAPL storage drum. The sump pump in the secondary vault is still turned off.
- Recovered a total of 8.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 7.0 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 65.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Collected full round of system data.
- System not fully operational upon departure as the sump pump in the secondary vault is still turned off.

February 21, 2002

- System not fully operational upon arrival as the sump pump in the secondary vault is still turned off.
- Recovered a total of 6.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 4.0 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 50.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Collected full round of system data.

- System not fully operational upon departure as the sump pump in the secondary vault is still turned off.

February 28, 2002

- System not fully operational upon arrival as the sump pump in the secondary vault is still turned off.
- Recovered a total of 4.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 6.0 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 60.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Collected water samples and delivered to STL for chemical analysis.
- Collected full round of system data.
- System not fully operational upon departure as the sump pump in the secondary vault is still turned off.

3.1.3 *March 2002*

The site was visited on four (4) occasions during the month of March 2002. A full round of compliance samples was collected and submitted to STL for chemical analysis on March 27, 2002. An outline showing noteworthy tasks performed during the month of March 2002 is presented below. Selected system data collected during the site visits are presented in Tables 3-3 and 3-4. Complete site visit data is contained in Appendix A.

March 8, 2002

- System not fully operational upon arrival as the sump pump in the secondary vault is still turned off.
- Recovered a total of 6.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 9.0 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 40.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Adjusted LNAPL pump flow rate.
- Troubleshoot LNAPL Pump and clean bubbler tube.
- Collected full round of system data.
- System not fully operational upon departure as the sump pump in the secondary vault is still

turned off.

March 15, 2002

- System not fully operational upon arrival as the sump pump in the secondary vault is still turned off.
- Recovered a total of 4.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 6.0 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 39.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Changed H_20 filters.
- Collected full round of system data.
- System not fully operational upon departure as the sump pump in the secondary vault is still turned off.

March 22, 2002

- System not fully operational upon arrival as the sump pump in the secondary vault is still turned off.
- Recovered a total of 4.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 6.0 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 65.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Collected full round of system data.
- System not fully operational upon departure as the sump pump in the secondary vault is still turned off.

March 27, 2002

- System not fully operational upon arrival as the sump pump in the secondary vault is still turned off.
- Recovered a total of 4.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 6.0 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 45.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Secondary vault is overflowing because the overflow discharge line cannot remove water

fast enough.

- Collected water samples and delivered to STL for chemical analysis.
- Collected full round of system data.
- System not fully operational upon departure as the sump pump in the secondary vault is still turned off.

3.1.4 *April 2002*

The site was visited on six (6) occasions during the month of April 2002. A full round of compliance samples was collected and submitted to STL for chemical analysis on April 30, 2002. An outline showing noteworthy tasks performed during the month of April 2002 is presented below. Selected system data collected during the site visits are presented in Tables 3-3 and 3-4. Complete site visit data is contained in Appendix A.

April 5, 2002

- System not fully operational upon arrival as the sump pump in the secondary vault is still turned off.
- Recovered a total of 4.5 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 6.0 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 65.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Secondary vault still overflowing.
- Collected full round of system data.
- System not fully operational upon departure as the sump pump in the secondary vault is still turned off.

April 11, 2002

- System not fully operational upon arrival as the sump pump in the secondary vault is still turned off.
- Recovered a total of 4.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 6.0 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 50.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Pumped approximately 1,647 gallons of water from the secondary vault through the

treatment system. Dried out electrical connections and restarted the sump pump.

- Pumped 8 drums of DNAPL/water mixture from RI well development through the treatment system. Consolidated DNAPL and sludge into 1 drum.
- Adjusted transfer pump flow rate.
- Changed H_20 filters.
- Collected full round of system data.
- System fully operational upon departure.

April 15, 2002

- System fully operational upon arrival.
- Completed quick system check to see if system was operating properly.
- Collected partial system data.
- System fully operational upon departure.

April 19, 2002

- System fully operational upon arrival.
- Recovered a total of 5.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 3.0 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 55.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Collected full round of system data.
- System fully operational upon departure.

April 26, 2002

- System fully operational upon arrival.
- Recovered a total of 1.0 gallon of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Collected full round of system data.
- System fully operational upon departure.

April 30, 2002

- System fully operational upon arrival.
- Changed H_20 filters.

- Collected water samples and delivered to STL for chemical analysis.
- Collected full round of system data.
- System fully operational upon departure.

3.1.5 *May 2002*

The site was visited on five (5) occasions during the month of May 2002. A full round of compliance samples was not collected because the activated carbon was replaced. An outline showing noteworthy tasks performed during the month of May 2002 is presented below. Selected system data collected during the site visits are presented in Tables 3-3 and 3-4. Complete site visit data is contained in Appendix A.

May 3, 2002

- System fully operational upon arrival.
- Recovered a total of 4.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 0.5 gallons of pure DNAPL product from the oil/water separator.
- Recovered a total of 4.0 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 1.0 gallon of DNAPL/water mixture from the oil/water separator.
- Recovered a total of 63.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Collected DNAPL sample and delivered to STL for chemical analysis.
- Collected full round of system data.
- System fully operational upon departure.

May 10, 2002

- System fully operational upon arrival.
- Recovered a total of 1.0 gallon of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 54.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Changed H_20 filters.
- Collected full round of system data.
- System fully operational upon departure.

May 17, 2002

- System not fully operational upon arrival due to high level fault in the equalization drum.

- Recovered a total of 3.5 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 0.5 gallons of pure DNAPL product from the oil/water separator.
- Recovered a total of 2.5 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 1.0 gallon of DNAPL/water mixture from the oil/water separator.
- Recovered a total of 65.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Cleaned all fault switches in the equalization drum.
- Changed H_20 filters.
- Took primary carbon drum offline due to excessive leaking and high pressure.
- Collected full round of system data.
- System fully operational upon departure.

May 24, 2002

- System fully operational upon arrival.
- Recovered a total of 3.5 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 0.5 gallons of pure DNAPL product from the oil/water separator.
- Recovered a total of 2.5 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 0.5 gallons of DNAPL/water mixture from the oil/water separator.
- Recovered a total of 71.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Primary carbon drum still offline.
- Collected full round of system data.
- System fully operational upon departure.

May 30, 2002

- System fully operational upon arrival.
- Recovered a total of 3.5 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 2.0 gallons of pure DNAPL product from the oil/water separator.
- Recovered a total of 3.5 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 1.5 gallons of DNAPL/water mixture from the oil/water separator.
- Recovered a total of 50.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Removed drums from site for transport to the disposal facility.

- Pressure washed the secondary vault, the oil/water separator, the equalization drum and the filter housing.
- Cleaned bubbler tube.
- Added bleach to the secondary vault, the club's basement sumps, the extraction well, the oil/water separator, and the equalization drum. Circulated bleach through the transfer pump, the equalization drum, the filter housing and the UV conditioner unit.
- Disassembled and removed LNAPL storage drum.
- Installed 3/4" pressure treated plywood to floor of XP side of treatment shed.
- Installed 3 new carbon drums with painted interiors to reduce corrosion and leaking.
- Changed H_20 filters.
- Restarted system and adjusted flow rates.
- Collected full round of system data.
- System fully operational upon departure.

3.1.6 *June 2002*

The site was visited on four (4) occasions during the month of June 2002. A full round of compliance samples was collected and submitted to STL for chemical analysis on June 28, 2002. An outline showing noteworthy tasks performed during the month of June 2002 is presented below. Selected system data collected during the site visits are presented in Tables 3-3 and 3-4. Complete site visit data is contained in Appendix A.

June 7, 2002

- System fully operational upon arrival.
- Recovered a total of 4.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 0.5 gallons of pure DNAPL product from the oil/water separator.
- Recovered a total of 3.0 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 1.0 gallon of DNAPL/water mixture from the oil/water separator.
- Recovered a total of 55.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Collected full round of system data.
- System fully operational upon departure.

June 14, 2002

- System fully operational upon arrival.
- Recovered a total of 3.5 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 0.25 gallons of pure DNAPL product from the oil/water separator.
- Recovered a total of 3.5 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 0.75 gallon of DNAPL/water mixture from the oil/water separator.
- Recovered a total of 50.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Added bleach to the secondary vault, the club's basement sumps, the extraction well and the oil/water separator.
- Collected full round of system data.
- System fully operational upon departure.

June 21, 2002

- System fully operational upon arrival.
- Recovered a total of 3.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 0.25 gallons of pure DNAPL product from the oil/water separator.
- Recovered a total of 4.0 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 0.75 gallon of DNAPL/water mixture from the oil/water separator.
- Recovered a total of 58.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Changed H_20 filters.
- Collected full round of system data.
- System fully operational upon departure.

June 28, 2002

- System fully operational upon arrival.
- Recovered a total of 2.5 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 2.5 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 60.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Collected water samples and delivered to STL for chemical analysis.
- Collected full round of system data.

- System fully operational upon departure.

3.2 Compliance Sampling

Treated water samples were collected monthly and sent to Severn Trent Laboratories, Inc. in Amherst, New York for chemical analysis. Influent water to the primary carbon drum was also collected monthly for chemical analysis. Samples were not collected in May 2002 because the carbon drums were replaced. Analytical parameters and the dates of sample collection are summarized in Table 3-1. The discharge permit from the Department's Division of Water is included in Appendix B.

Analytical results for the influent (pre-carbon) and treated (post-carbon) water samples are summarized in Table 3-2. These data indicate that extracted groundwater is still significantly contaminated with volatiles, semivolatiles and cyanide, and that the treatment system effectively removes these contaminants from the water prior to being discharged to Tonawanda Creek. During the reporting period, however, the following discharge limits were exceeded:

- Benzene in February, March and April;
- Toluene in February;
- Iron in January, February, March and April;
- Cyanide in February; and
- Total suspended solids in February and March.

Vinyl chloride was also detected in the post-carbon samples collected in January, February, March and April 2002. The significance of these detections is unknown, however, as the Department's Division of Water did not provide a discharge limit for this compound. Due to the relatively high concentration of benzene in the April 30, 2002 post-carbon sample, all three carbon drums were replaced on May 30, 2002.

3.3 Groundwater Recovery

During most Site inspections the operator collects a full round of system data. This data includes the totalizer reading, which records the cumulative volume of water that has passed through the treatment system since operation began (or the battery was replaced). Current and historic groundwater extraction data are summarized in Table 3-3 and shown graphically on Figure 3-1. In Table 3-3, a period is defined as the time, in days, between any given date and the previous site visit date. The actual pumping rate, given in gallons per minute (gpm), is calculated by dividing the number of gallons recovered during the period by the number

of days in the period. The statistical pumping rate, given in gallons per day (gpd), is calculated by dividing the totalizer reading on any given date by the number of days the system has operated to that date.

Figure 3-1 and Table 3-3 indicate that pumping rates in January and early February 2002 were near or above 1.0 gpm. The increase in pumping rates during this time was caused by increased flow from the secondary vault to the treatment system. Thus, the calculated pumping rate is actually a sum of the pumping rates from the groundwater pump in the recovery well and the sump pumps in the basement of the Gastown Sportsmen's Club. The increased flow from the secondary vault eventually caused the transfer pump to overheat due to excessive run time. To prevent overheating of the transfer pump, the Department instructed the operator to turn off the sump pump in the secondary vault. This was done on February 8, 2002 and resulted in a significant decrease in apparent pumping rates (Table 3-3 and Figure 3-1).

On March 27, 2002 the operator observed water overflowing onto the ground surface from the secondary vault. The apparent cause was the inability of the overflow discharge line to remove water from the secondary vault fast enough. Overflowing of the vault was again observed by the operator on April 5, 2002. To alleviate this problem, it was decided to restart the sump pump in the secondary vault. This was done on April 11, 2002 after approximately 1,647 gallons of water was pumped from the secondary vault through the treatment system and the electrical connections dried out. The increased flow from the secondary vault again resulted in an apparent increase in pumping rates (Table 3-3 and Figure 3-1).

3.4 NAPL Recovery

During most Site inspections the operator drains the DNAPL storage drum (Figure 3-1) and records the recovered NAPL quantities on the Site Visit Checklist form. The quantities of DNAPL recovered from the storage drum and oil/water separator are summarized in Table 3-4 and shown graphically on Figure 3-2. Only the quantities of DNAPL and DNAPL/water mixture placed into 55-gallon drums for later disposal are tabulated. During the reporting period, the groundwater/NAPL extraction system recovered 114.5 gallons of DNAPL and 104 gallons of DNAPL/water mixture.

3.5 Groundwater Sampling

Groundwater samples were collected from selected monitoring wells during the reporting period as part of the State Funded Remedial Investigation. The analytical results from these samples were not available to the Department for inclusion in this report. Instead, these results will be included and discussed in the Remedial Investigation Report.

3.6 NAPL Sampling

NAPL from the DNAPL storage drum was collected on May 3, 2002 and sent to Severn Trent Laboratories for chemical analysis. Current and historic NAPL analytical results are summarized in Table 3-5. Due to the nature of the NAPL sample, the extractions for the pesticide and PCB analyses could not be completed. Specifically, the sample would not solubilize with the solvents required for extraction.

The May 3rd results indicate that the NAPL underlying the Former Gastown MGP Site contains significant concentrations of BTEX and PAHs, a finding that is consistent with previous NAPL analytical results. Unlike previous results, however, the recent NAPL sample contains significantly higher concentrations of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, n-butylbenzene, styrene, indene and biphenyl. The sample was also determined to have a flashpoint of 74ºF, which is well below the 140ºF regulatory limit for a characteristic hazardous waste due to ignitability.

3.7 Sump Sampling

Water samples from the basement sumps of the Gastown Sportsmen's Club were not collected during the reporting period. Historic sump water analytical results are summarized in Table 3-6.

3.8 Water Level Measurements

Water levels were measured in all Site monitoring wells on April 12 and June 12, 2002. These water levels, along with water levels from 2001, are summarized in Table 3-7. Hydrographs and groundwater contour plots were not constructed for this report because some wells installed during the Remedial Investigation have not been surveyed. These plots, however, will be included in the next semiannual report when surveying should be complete.

4.0 DISCUSSION

Between January 1 and June 30, 2002 the Department's Emergency Spill Response contractor visited the Site approximately weekly to inspect the groundwater/NAPL extraction and treatment system. More frequent inspections were conducted during some months due to system malfunctions and shutdowns. During most Site inspections the operator collected a full round of system data that included, among other items, totalizer readings and recovered NAPL quantities. Influent (pre-carbon) and treated (post-carbon) water samples were collected each month except May 2002 and sent to Severn Trent Laboratories, Inc. in Amherst, New York for chemical analysis. NAPL from the DNAPL storage drum was collected in May 2002 and also sent to Severn Trent Laboratories for chemical analysis.

Analytical results of the compliance samples (pre- and post-carbon) indicate that extracted groundwater is still significantly contaminated with volatiles, semivolatiles and cyanide, and that the treatment system effectively removes these contaminants from the water prior to being discharged to Tonawanda Creek. It is important to note that the treated (post-carbon) water sample is collected between the second and third carbon drums. This location was selected to ensure that contaminants detected in the post-carbon samples would be removed by the third drum prior to discharge. Therefore, although several exceedances of the discharge limits were documented this reporting period, the treated water flowing into Tonawanda Creek likely met the Division of Water's discharge limits.

The presence of iron in the post-carbon samples is likely attributed to rusting of the carbon drums over time. Unfortunately, influent (pre-carbon) water was not analyzed for iron this reporting period, so a direct comparison between influent and effluent iron concentrations cannot be made. Prior to October 2001, however, iron was included in the analytical parameter list for the pre-carbon samples. These data are shown graphically in Figure 4-1. This plot shows that in most cases the iron concentrations in the post-carbon samples are significantly higher than iron concentrations in the pre-carbon samples, strongly suggesting that a significant iron source must be located within the carbon drums. The most likely source is rusting of the drums.

Since startup of the groundwater/NAPL extraction and treatment system on September 2, 1998, groundwater has been recovered at an average rate of 788.7 gallons per day (gpd). The average flow rate increased during the reporting period from the 749.3 gpd calculated for December 21, 2001. This increase is most likely attributed to the increased flow from the secondary vault to the treatment system in response to snow melt and the higher than average rainfall during the spring months of the reporting period.

During the reporting period, the groundwater/NAPL extraction system recovered 114.5 gallons of DNAPL and 104 gallons of DNAPL/water mixture. NAPL recovery was highest in February (32.0 gallons) and lowest in April (13.5 gallons). NAPL recovery during the remaining months was relatively constant (19 gallons in January, 18 gallons in March, 18 gallons in May and 14 gallons in June). The quantity of NAPL collected during the reporting period is significantly lower than the quantity collected during the previous 6 months (170.0 gallons). This decrease in NAPL recovery is shown graphically on Figure 4-2. To date, the total quantities of DNAPL and DNAPL/water recovered by the extraction system are 1,627 and 692 gallons, respectively.

Groundwater samples were collected from selected monitoring wells during the reporting period as part of the State Funded Remedial Investigation. The analytical results from these samples will be included and discussed in the Remedial Investigation Report.

NAPL from the DNAPL storage drum was collected during the reporting period for chemical analysis. Consistent with previous NAPL analytical results, the recent sample contains significant concentrations of BTEX and PAHs. Unlike previous results, however, the recent sample contains significantly higher concentrations of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, n-butylbenzene, styrene, indene and biphenyl. These results appear to suggest that the NAPL composition has changed over time, perhaps because more NAPL from the source area is migrating to the recovery well in response to active NAPL extraction.

Water samples from the basement sumps of the Gastown Sportsmen's Club were not collected during the reporting period. A water sample collected from the secondary vault on June 29, 2001, however, indicated that the sump water contained significant concentrations of volatile organic compounds at that time (Table 3-6). For some contaminants (e.g., benzene, ethylbenzene and n-butylbenzene), the concentrations detected were higher than previously detected, which could be related to the apparent change in NAPL composition over time. Given the contaminant concentrations detected in groundwater (pre-carbon water) extracted this reporting period, combined with the fact that the basement sumps were not dewatered during this time, it is reasonable to conclude that water in the basement sumps also remains highly contaminated. Although the contaminants in this water have the potential to volatilize into the clubhouse airspace, the ventilation fan and containment structure around the basement sumps appear to effectively mitigate potential adverse health impacts to members of the club.

Water levels were measured in all Site monitoring wells twice during the reporting period. Hydrographs and groundwater contour plots were not constructed from these data, however, because some wells installed during the Remedial Investigation have not been surveyed. These plots will be included in the next semiannual report when surveying should be complete.

Water level data obtained prior to the Remedial Investigation have documented the effect of groundwater extraction on the groundwater flow pattern across the Former Gastown MGP Site (Figure 4-3). This figure indicates that groundwater extraction produces an elliptical cone of depression around the extraction well that extends from well MW-13 to the eastern property line of the Gastown Sportsmen's Club (wells MW-34 and MW-35). This drawdown is substantial, and was produced by groundwater extraction rates that ranged from 0.19 to 1.79 gallons per minute (gpm). Water level data from wells installed during the Remedial Investigation will be utilized to construct future groundwater contour plots. The additional water level data will further refine the groundwater flow pattern across the Site.

5.0 RECOMMENDATIONS

As required by the September 2001 Operation and Maintenance Manual, the following Site activities will be conducted during the next reporting period, which runs from July 1 to December 31, 2002:

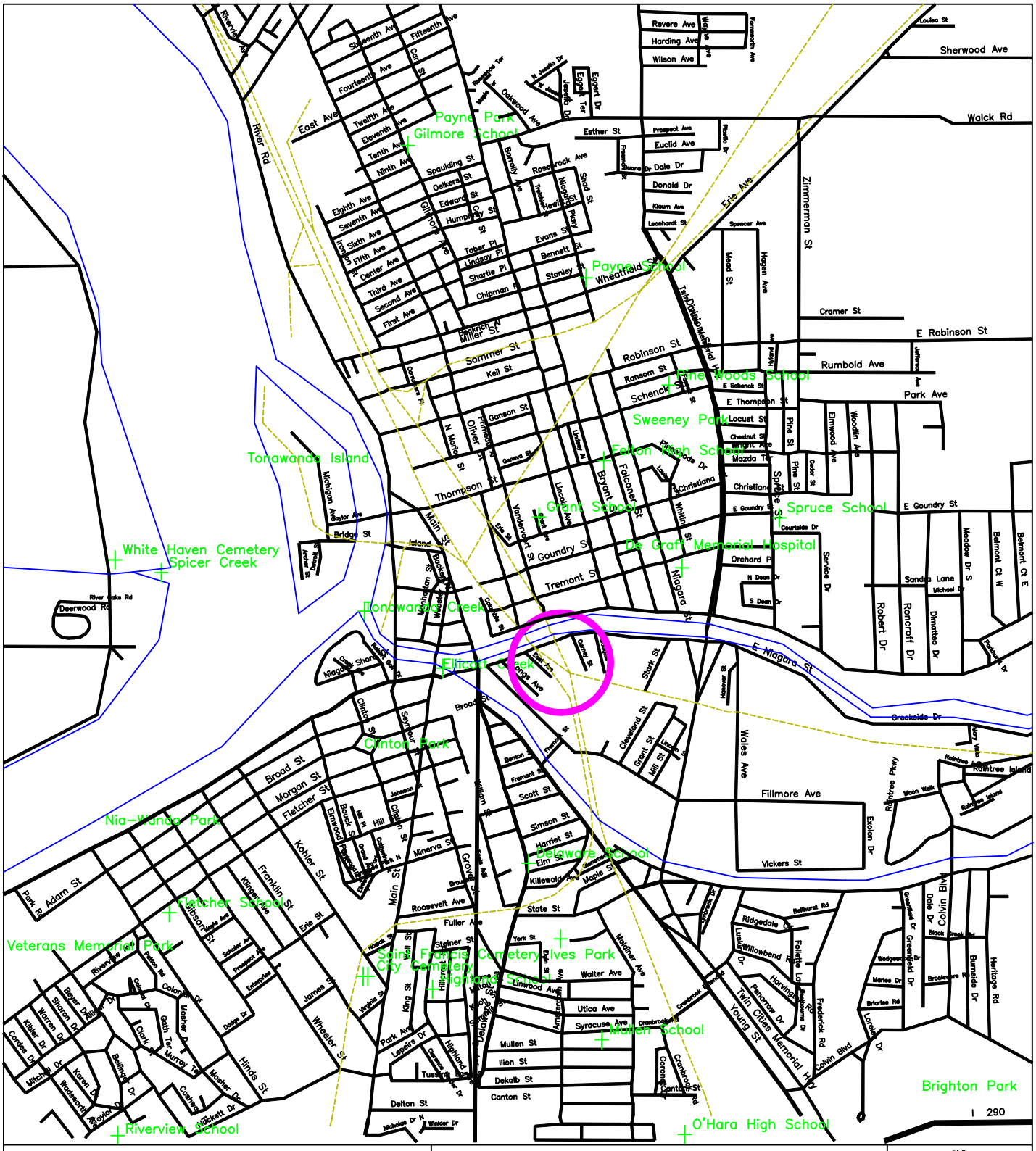
- Continue the weekly site visits to inspect and maintain the groundwater/NAPL extraction and treatment system, and to collect system data, which includes, but is not limited to, the quantity of recovered NAPL and totalizer readings. Water filters and activated carbon will be replaced as necessary;
- Collect monthly compliance samples as required by the discharge permit;
- Complete monthly water level measurements from Site monitoring wells;
- Collect a water sample from the primary basement sump of the Gastown Sportsmen's Club or the secondary vault for chemical analysis; and
- Complete periodic inspections of the basement sumps for the presence of water, NAPL and coal tar odors.

Historically, iron concentrations in post-carbon samples were significantly higher than iron concentrations in pre-carbon samples, which strongly suggested that a significant iron source was located within the carbon drums. The most likely source of this iron was rusting of the drums. To further evaluate if the presence of high iron concentrations in the post-carbon samples is related to rusting of the carbon drums, it is recommended that total iron be added to the analytical parameter list for the pre-carbon sample. A comparison of the pre- and post-carbons samples will determine if the carbon drums continue to be the source of high iron detected in the effluent samples.

6.0 REFERENCES

NYSDEC, 1998, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations: New York State Department of Environmental Conservation, Division of Water Technical and Operational Series (1.1.1), Albany, New York, 130p.

NYSDEC, 2001, Operation and Maintenance Manual for the Groundwater/NAPL Extraction and Treatment System: New York State Department of Environmental Conservation, Division of Environmental Remediation, Buffalo, New York.



Tonawanda East Quadrangle &
Tonawanda West Quadrangle

Scale Depends on Final Plotted Size

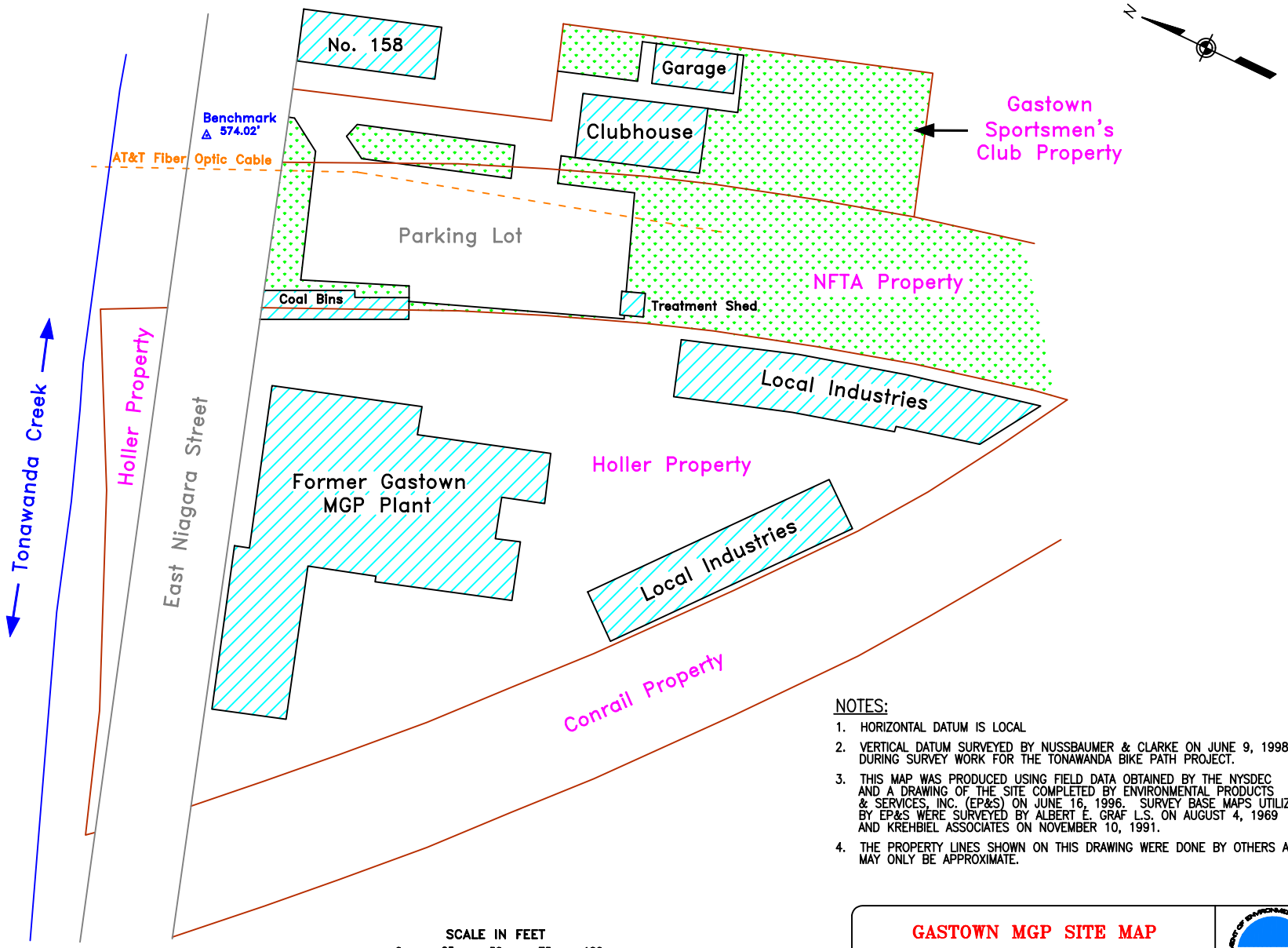
SITE LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 09/19/00	DRAWING: Location Map.dwg

SITE: FORMER GASTOWN MGP SITE

FIGURE 1-1



NOTES:

1. HORIZONTAL DATUM IS LOCAL
2. VERTICAL DATUM SURVEYED BY NUSSBAUMER & CLARKE ON JUNE 9, 1998 DURING SURVEY WORK FOR THE TONAWANDA BIKE PATH PROJECT.
3. THIS MAP WAS PRODUCED USING FIELD DATA OBTAINED BY THE NYSDEC AND A DRAWING OF THE SITE COMPLETED BY ENVIRONMENTAL PRODUCTS & SERVICES, INC. (EP&S) ON JUNE 16, 1996. SURVEY BASE MAPS UTILIZED BY EP&S WERE SURVEYED BY ALBERT E. GRAF L.S. ON AUGUST 4, 1969 AND KREHBIEL ASSOCIATES ON NOVEMBER 10, 1991.
4. THE PROPERTY LINES SHOWN ON THIS DRAWING WERE DONE BY OTHERS AND MAY ONLY BE APPROXIMATE.

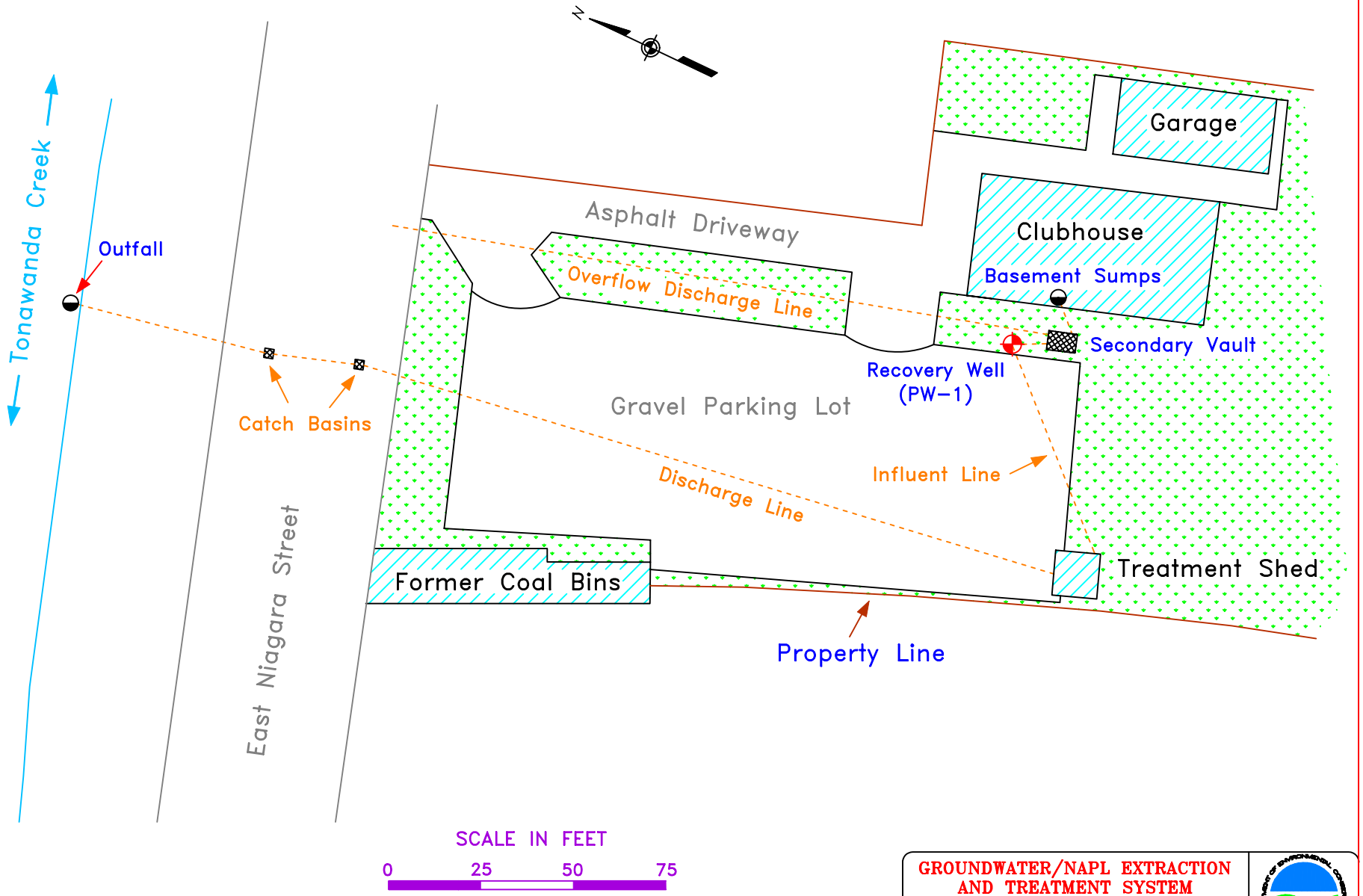
GASTOWN MGP SITE MAP

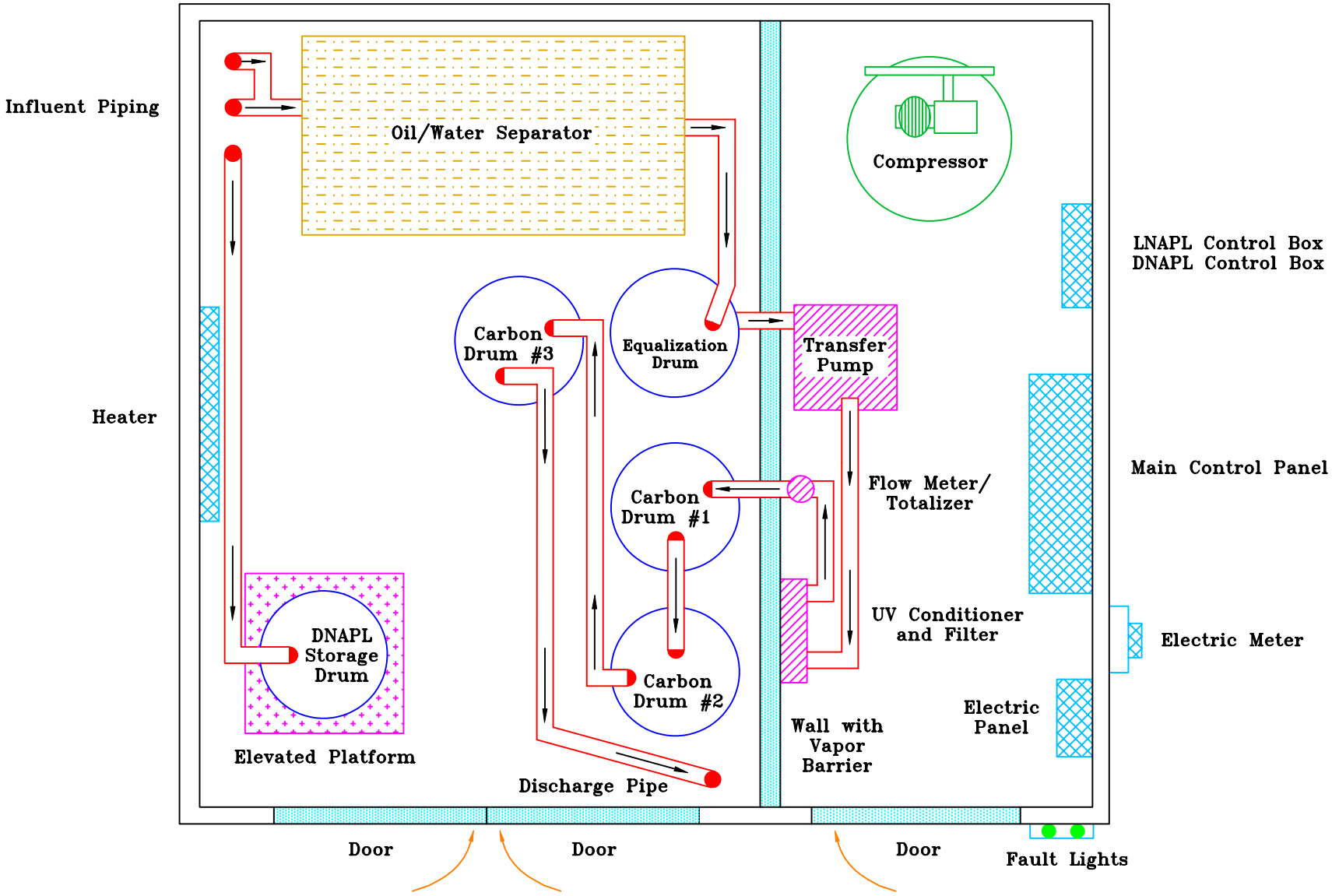
DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 06/19/02 DRAWING: Site Map.dwg

SITE: FORMER GASTOWN MGP SITE

FIGURE 1-2


N
Tonawanda Creek
Outfall
East Niagara Street
Catch Basins
Asphalt Driveway
Overflow Discharge Line
Garage
Clubhouse
Basement Sumps
Secondary Vault
Recovery Well
(PW-1)
Gravel Parking Lot
Influent Line
Discharge Line
Former Coal Bins
Treatment Shed
Property Line
SCALE IN FEET
0
25
50
75
GROUNDWATER/NAPL EXTRACTION AND TREATMENT SYSTEM
DIVISION OF ENVIRONMENTAL REMEDIATION
DATE: 01/25/01
DRAWING: System.dwg
SITE: FORMER GASTOWN MGP SITE
FIGURE 1-3

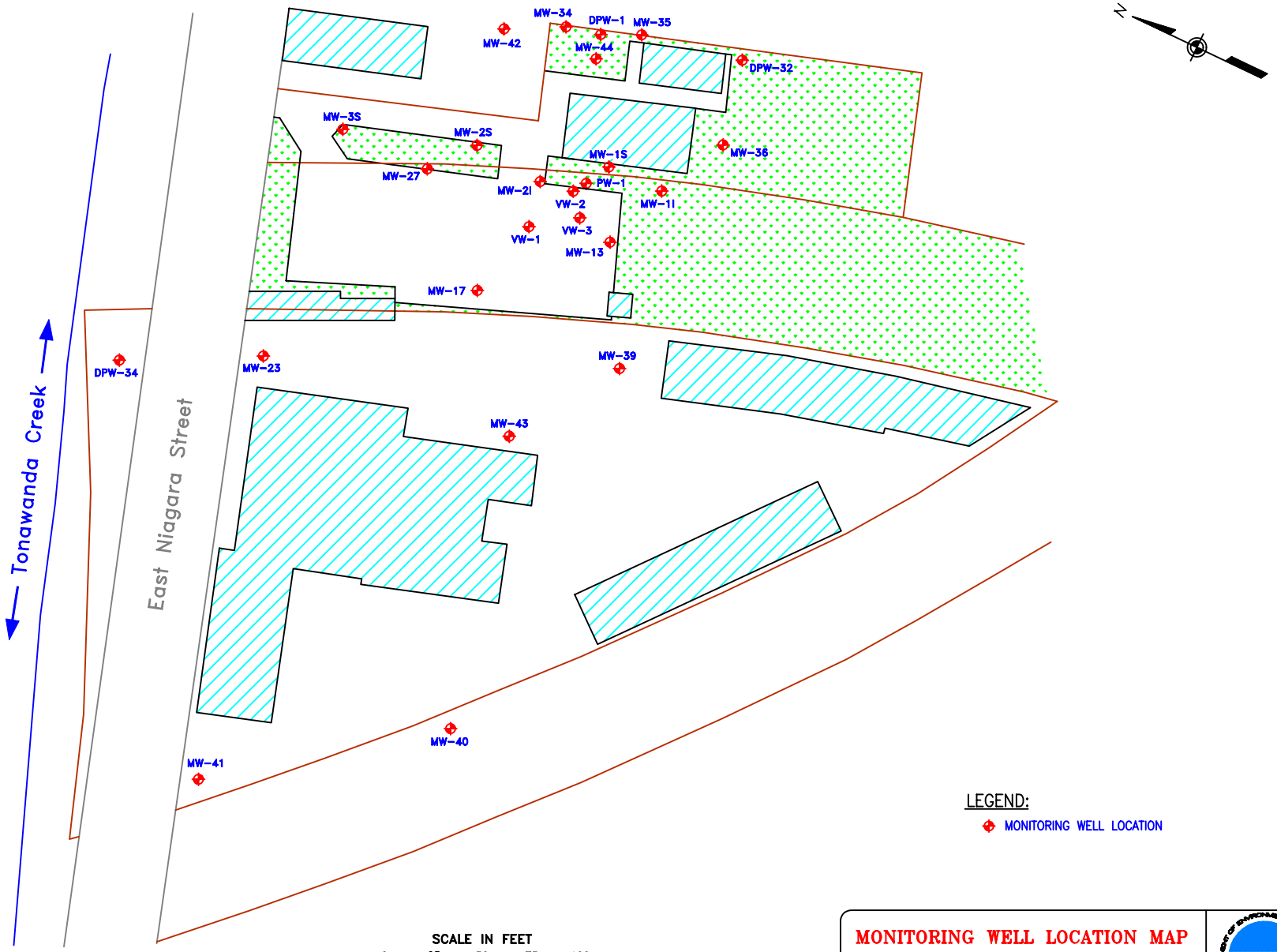


TREATMENT SYSTEM LAYOUT

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 01/25/01 DRAWING: Treatment Shed.dwg

SITE: FORMER GASTOWN MGP SITE FIGURE 1-4



MONITORING WELL LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 10/12/99 DRAWING: Sitemap.dwg

SITE: FORMER GASTOWN MGP SITE

FIGURE 1-5

Figure 3-1. Groundwater Pumping Rates Over Time
Former Gastown Manufactured Gas Plant Site

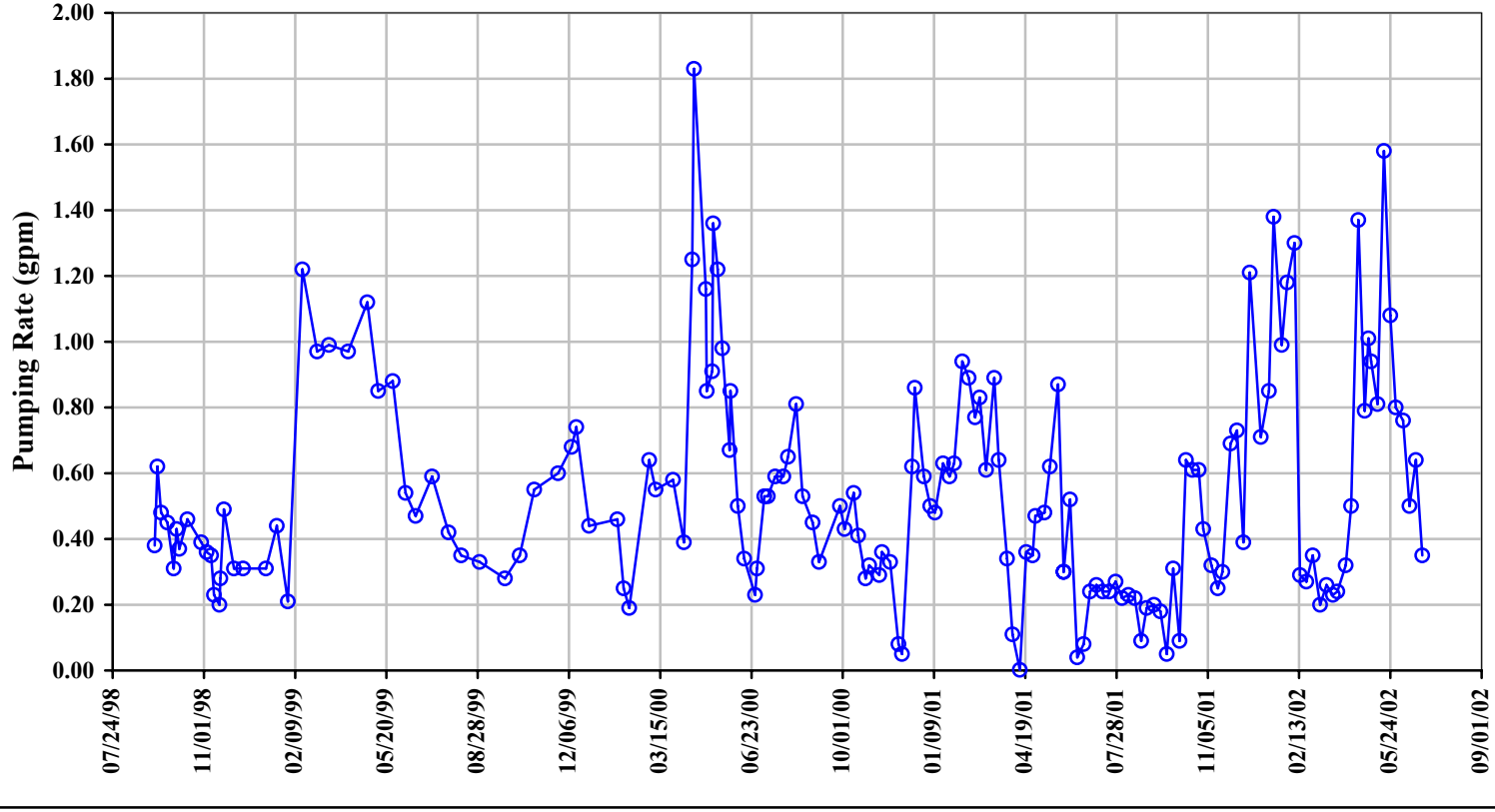


Figure 3-2. DNAPL and DNAPL/Water Recovery - Cumulative Totals
Former Gastown Manufactured Gas Plant Site

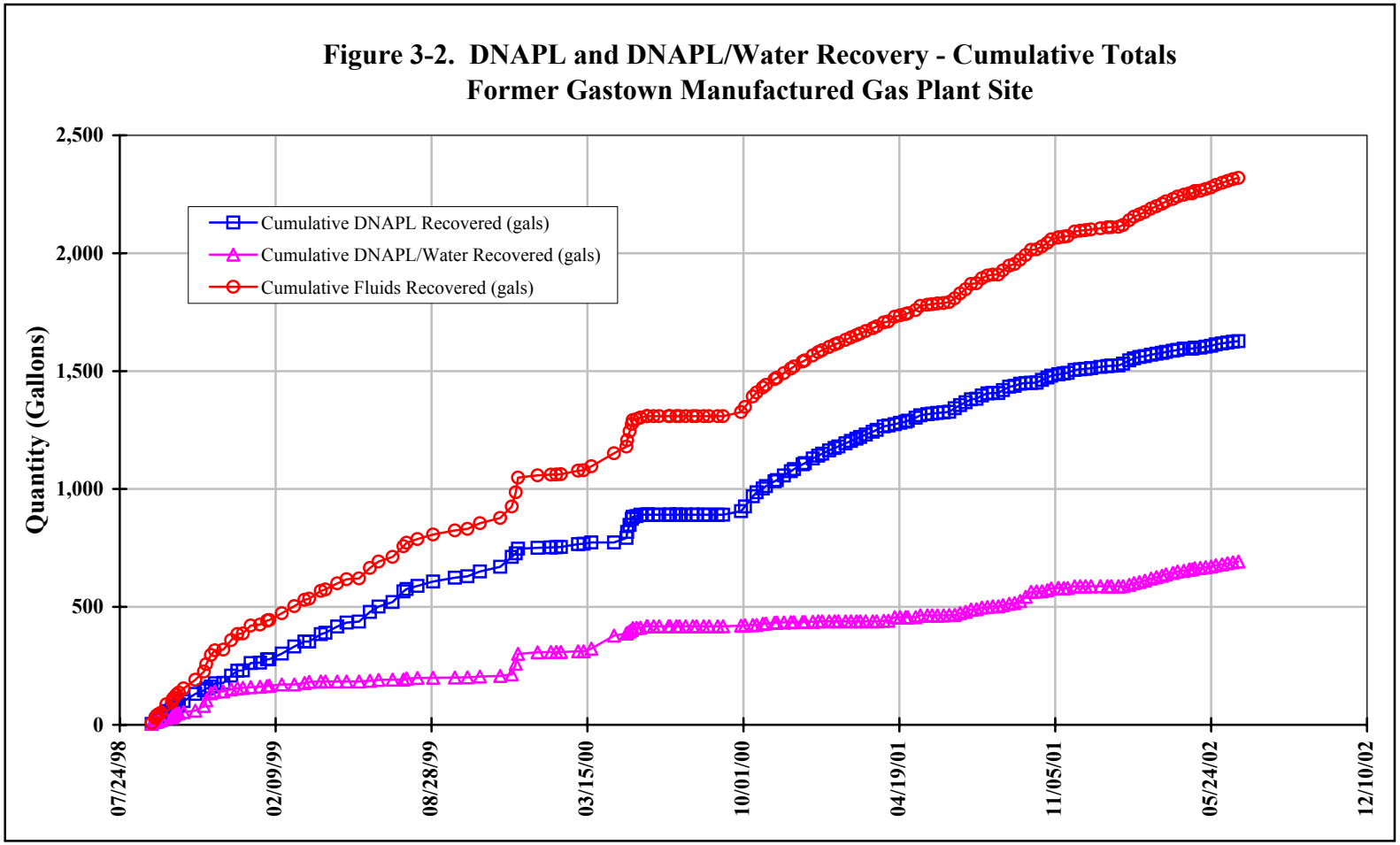


Figure 4-1. Pre- and Post-Carbon Analytical Data for Iron
Former Gastown Manufactured Gas Plant Site

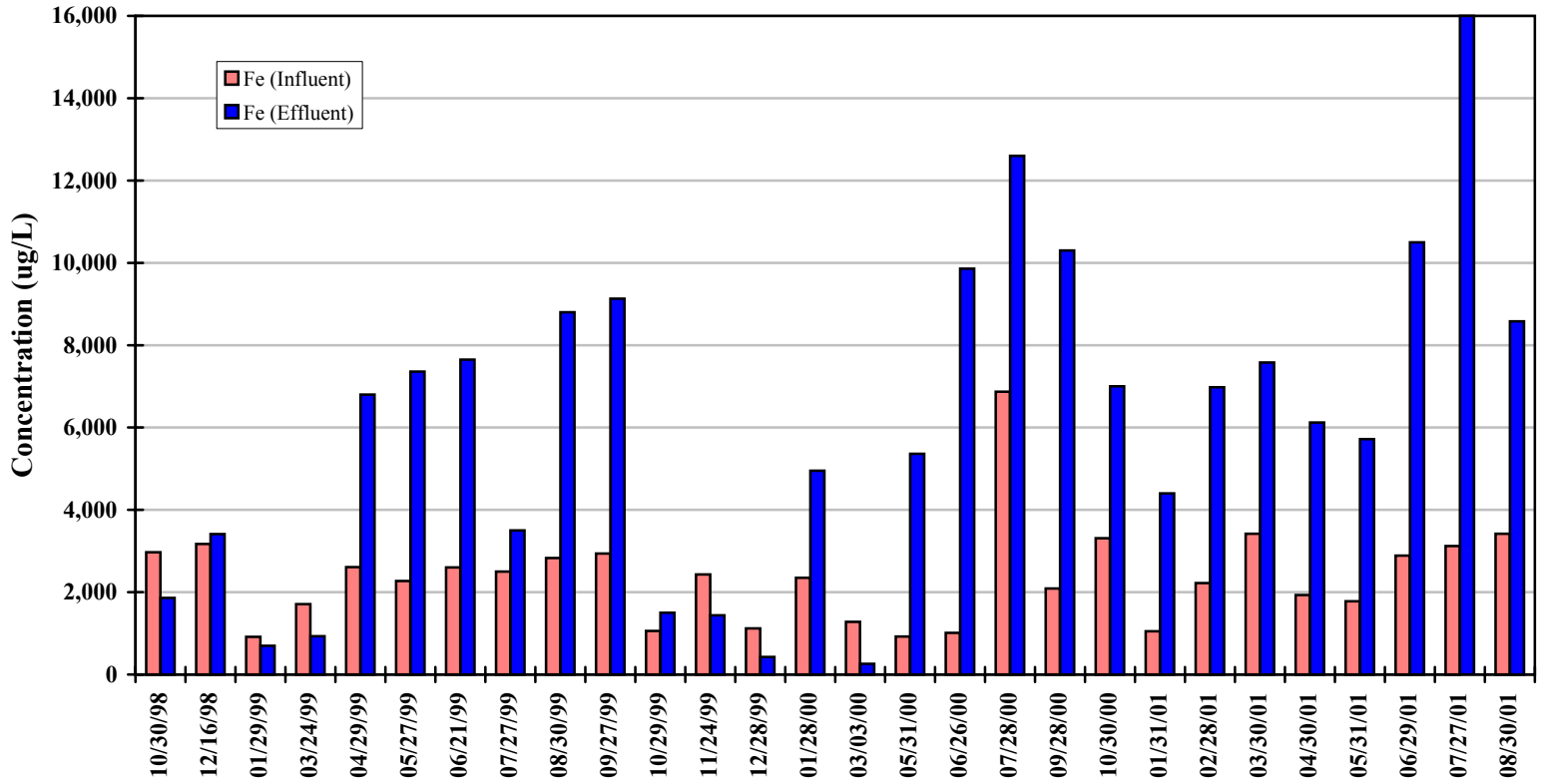
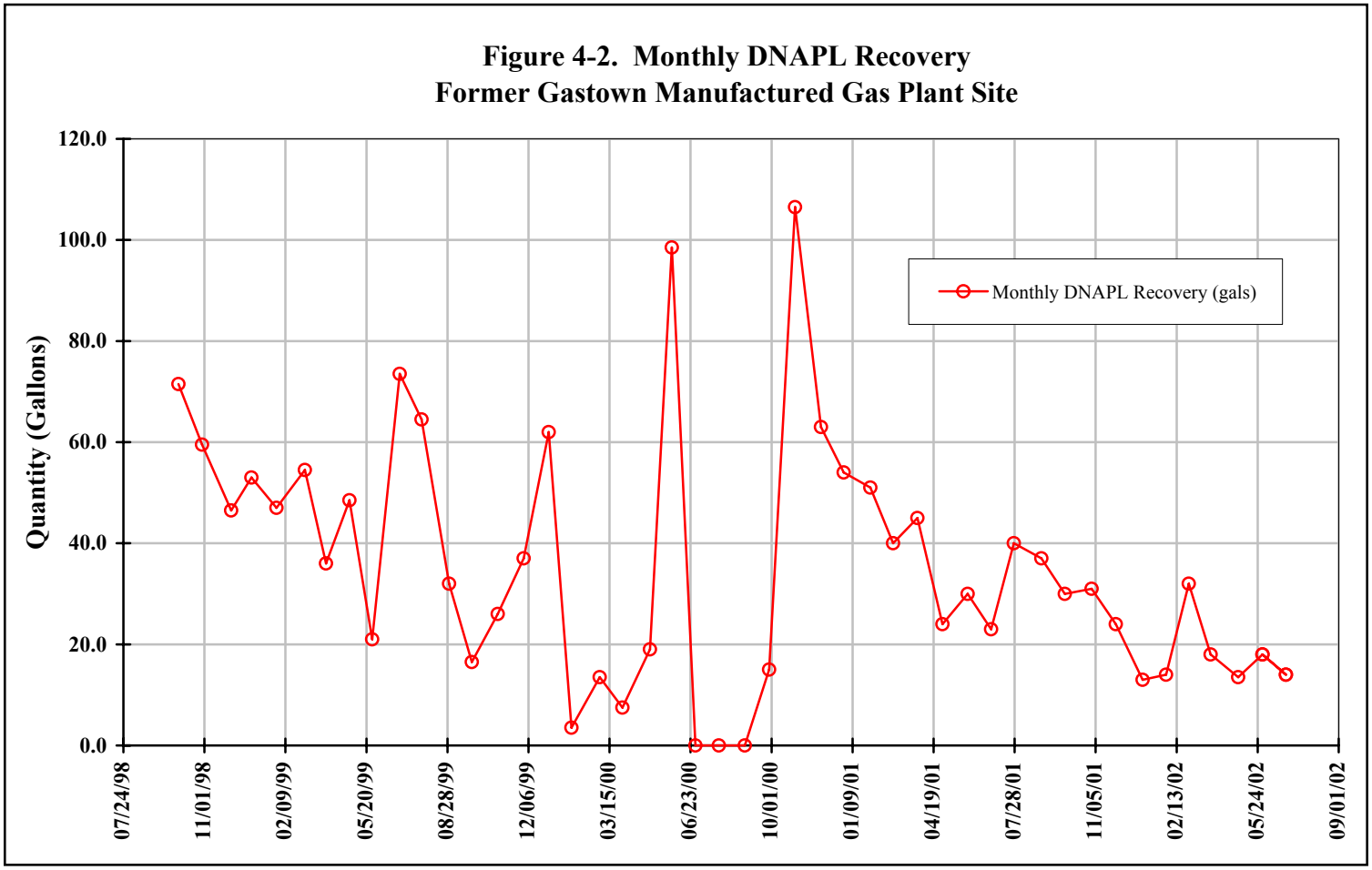
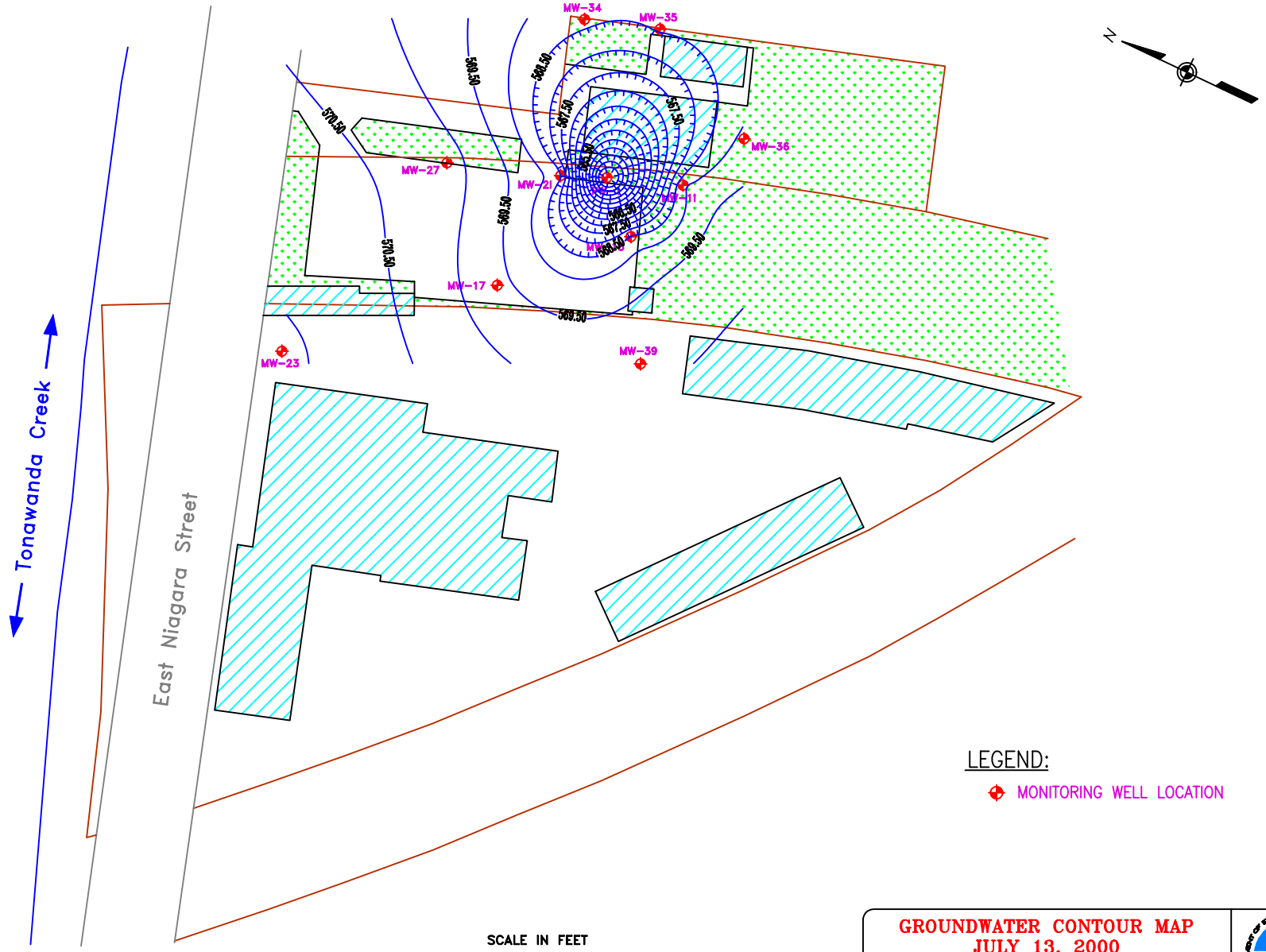


Figure 4-2. Monthly DNAPL Recovery
Former Gastown Manufactured Gas Plant Site





GROUNDWATER CONTOUR MAP
JULY 13, 2000

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 10/12/99 DRAWING: GW Contour.dwg

SITE: FORMER GASTOWN MGP SITE

FIGURE 4-3

Table 3-1.
Summary of Compliance Sampling Dates and Analytical Parameters.
Former Gastown Manufactured Gas Plant Site.

Sampling Dates	Pre-Carbon	Mid-Carbon	Post-Carbon
January 31, 2002 February 28, 2002 March 27, 2002 April 30, 2002 June 28, 2002	34 v. by EPA 8260 15 v. by EPA 8021 Calcium Magnesium Potassium Sodium Chloride Sulfate Alkalinity		34 v. by EPA 8260 15 v. by EPA 8021 24 s.v. by EPA 8270 19 p. by EPA 8081 7 pcb by EPA 8081 Arsenic Iron Manganese Zinc BOD Cyanide Oil & Grease pH TDS, TSS Total Phenols

v. = volatiles **s.v. = semivolatiles** **p. = pesticides**

Table 3-2.
Summary of Compliance Monitoring Analytical Results from the Groundwater Treatment System.
Former Gastown Manufactured Gas Plant Site.
All results in Fg/l unless otherwise noted.

Parameter	Discharge Limits	01/31/02 (STL)			02/28/02 (STL)			03/27/02 (STL)		
		Pre Carbon	Mid Carbon	Post Carbon	Pre Carbon	Mid Carbon	Post Carbon	Pre Carbon	Mid Carbon	Post Carbon
Volatile Organic Compounds										
1,2-Dichloroethane		ND (400)		ND (5)	ND (500)		ND (5)	ND (500)		2 J
1,2-Dichloropropane		ND (400)		ND (5)	ND (500)		ND (5)	ND (500)		ND (5)
2-Butanone		ND (800)		ND (10)	ND (1000)		ND (10)	ND (1000)		ND (10)
Benzene	5	10,000		2.1	10,000		**170.0**	23,000		**55.0**
Chlorobenzene		ND (400)		ND (5)	ND (500)		ND (5)	ND (500)		ND (5)
Chloroform		ND (400)		ND (5)	ND (500)		ND (5)	ND (500)		ND (5)
Chloromethane		ND (800)		ND (10)	ND (1000)		ND (10)	ND (1000)		ND (10)
Ethylbenzene	5	450.0		ND (0.2)	ND (80)		ND (2)	590.0		ND (0.2)
Styrene	Monitor	830.0		ND (5)	160 J		1 J	2,700		ND (5)
Toluene	5	3,400		ND (0.2)	1,400		**16.0**	9,500		1.0
Vinyl Chloride		ND (400)		4 J	ND (500)		11.0	ND (500)		9.0
1,2,4-Trimethylbenzene	Monitor	260.0		ND (0.2)	ND (80)		ND (2)	ND (100)		ND (0.2)
1,3,5-Trimethylbenzene	Monitor	ND (50)		ND (1)	ND (80)		ND (2)	ND (100)		ND (1)
Isopropylbenzene	Monitor	ND (50)		ND (0.2)	ND (80)		ND (2)	ND (100)		ND (0.2)
m&p-Xylene	10	540.0		ND (0.2)	86.0		ND (2)	1,400		ND (0.2)
MTBE	50	ND (50)		ND (5)	ND (80)		ND (5)	ND (100)		ND (5)
n-Butylbenzene	Monitor	1,800		ND (0.4)	ND (80)		ND (2)	ND (100)		ND (0.4)
n-Propylbenzene	Monitor	ND (50)		ND (0.4)	ND (80)		ND (2)	ND (100)		ND (0.4)
o-Xylene	5	310.0		ND (0.2)	130.0		ND (2)	4,000		ND (0.2)
p-Isopropyltoluene	Monitor	ND (50)		ND (1)	ND (80)		ND (2)	ND (100)		ND (1)
sec-Butylbenzene	Monitor	ND (50)		ND (0.4)	ND (80)		ND (2)	ND (100)		ND (0.4)

Table 3-2 (Continued).
Summary of Compliance Monitoring Analytical Results from the Groundwater Treatment System.
Former Gastown Manufactured Gas Plant Site.
All results in Fg/l unless otherwise noted.

Parameter	Discharge Limits	01/31/02 (STL)			02/28/02 (STL)			03/27/02 (STL)		
		Pre Carbon	Mid Carbon	Post Carbon	Pre Carbon	Mid Carbon	Post Carbon	Pre Carbon	Mid Carbon	Post Carbon
Semi-Volatile Compounds										
2-Methylnaphthalene	Monitor			ND (9.3)			ND (9.4)			ND (9.3)
Acenaphthene	10			ND (9.3)			ND (9.4)			ND (9.3)
Acenaphthylene	10			ND (9.3)			ND (9.4)			ND (9.3)
Anthracene	10			ND (9.3)			ND (9.4)			ND (9.3)
Benzo(a)anthracene	10			ND (9.3)			ND (9.4)			ND (9.3)
Benzo(a)pyrene	10			ND (9.3)			ND (9.4)			ND (9.3)
Benzo(b)fluoranthene	10			ND (9.3)			ND (9.4)			ND (9.3)
Benzo(g,h,i)perylene	10			ND (9.3)			ND (9.4)			ND (9.3)
Benzo(k)fluoranthene	10			ND (9.3)			ND (9.4)			ND (9.3)
Biphenyl	Monitor			ND (9.3)			ND (9.4)			ND (9.3)
Bis(2-ethylhexyl)phthalate	10			ND (9.3)			6 J			2.2 J
Carbazole	Monitor			ND (9.3)			ND (9.4)			ND (9.3)
Chrysene	10			ND (9.3)			ND (9.4)			ND (9.3)
Dibenz(a,h)anthracene	10			ND (9.3)			ND (9.4)			ND (9.3)
Dibenzofuran	10			ND (9.3)			ND (9.4)			ND (9.3)
Fluoranthene	10			ND (9.3)			ND (9.4)			ND (9.3)
Fluorene	10			ND (9.3)			ND (9.4)			ND (9.3)
Indene	Monitor			ND (9.3)			ND			ND
Indeno(1,2,3-cd)pyrene	10			ND (9.3)			ND (9.4)			ND (9.3)
Naphthalene	10			ND (9.3)			ND (9.4)			ND (9.3)
Pentachlorophenol	10			ND (47)			ND (47)			ND (47)
Phenanthrene	10			ND (9.3)			ND (9.4)			ND (9.3)

Table 3-2 (Continued).
Summary of Compliance Monitoring Analytical Results from the Groundwater Treatment System.
Former Gastown Manufactured Gas Plant Site.
All results in Fg/l unless otherwise noted.

Parameter	Discharge Limits	01/31/02 (STL)			02/28/02 (STL)			03/27/02 (STL)		
		Pre Carbon	Mid Carbon	Post Carbon	Pre Carbon	Mid Carbon	Post Carbon	Pre Carbon	Mid Carbon	Post Carbon
Semi-Volatile Compounds (Continued)										
Phenol	50			ND (47)			2 J			1.0 J
Pyrene	10			ND (9.3)			ND (9.4)			ND (9.3)
Pesticides/PCBs										
4,4'-DDD	0.18			ND (0.05)			ND (0.05)			ND (0.05)
Chlordane	0.05			ND (0.5)			ND (0.5)			ND (0.5)
Heptachlor Epoxide	0.44			ND (0.05)			ND (0.05)			ND (0.05)
Inorganic Compounds										
Arsenic				ND (7)			ND (7)			ND (7)
Iron	2,000			**3,210**			**23,000**			**17,900**
Manganese	1,000			286.0			448.0			372.0
Zinc	Monitor			42.6			ND (26)			ND (26)
Miscellaneous Parameters										
BOD	20,000			ND (2000)			11,100			ND (2000)
Cyanide	400			240.0			**480.0**			330.0
Total Oil & Grease	15,000			ND (5000)			ND (5000)			ND (5000)
pH (Standard Unit)	6.0 to 9.0			7.3			7.4			7.4
Total Dissolved Solids	Monitor			1,140,000			1,130,000			1,180,000
Total Recoverable Phenols	500			ND (5)			8.0			ND (5)
Total Suspended Solids	20,000			7,000			**41,000**			**30,000**

ND **Indicates that the value was not detected at the method detection limit specified in parentheses.**
Shaded values equal or exceed the Division of Water's discharge limits.

Table 3-2 (Continued).
Summary of Compliance Monitoring Analytical Results from the Groundwater Treatment System.
Former Gastown Manufactured Gas Plant Site.
All results in Fg/l unless otherwise noted.

Parameter	Discharge Limits	04/30/02 (STL)			May 2002 - Not Sampled			06/28/02		
		Pre Carbon	Mid Carbon	Post Carbon	Pre Carbon	Mid Carbon	Post Carbon	Pre Carbon	Mid Carbon	Post Carbon
Volatile Organic Compounds										
1,2-Dichloroethane		ND (250)		ND (5)				ND (5)		ND (5)
1,2-Dichloropropane		ND (250)		ND (5)				ND (5)		ND (5)
2-Butanone		ND (500)		ND (10)				4 J		ND (10)
Benzene	5	9,200		**810.0**				20,000		ND (5)
Chlorobenzene		ND (250)		ND (5)				ND (5)		ND (5)
Chloroform		ND (250)		ND (5)				5.0		ND (5)
Chloromethane		ND (500)		ND (10)				ND (10)		ND (10)
Ethylbenzene	5	290.0		ND (5)				760.0		0.31
Styrene	Monitor	770.0		ND (5)				1,700		ND (5)
Toluene	5	3,200		3 J				5,300		2.8
Vinyl Chloride		ND (250)		18.0				22.0		ND (5)
1,2,4-Trimethylbenzene	Monitor	ND (100)		ND (5)				ND (100)		ND (0.2)
1,3,5-Trimethylbenzene	Monitor	ND (100)		ND (5)				ND (100)		ND (1)
Isopropylbenzene	Monitor	ND (100)		ND (5)				ND (100)		ND (0.2)
m&p-Xylene	10	610.0		ND (5)				1,000		0.55
MTBE	50	ND (100)		ND (5)				ND (100)		ND (5)
n-Butylbenzene	Monitor	ND (100)		ND (5)				ND (100)		ND (0.4)
n-Propylbenzene	Monitor	ND (100)		ND (5)				ND (100)		ND (0.4)
o-Xylene	5	1,500		ND (5)				2,600		1.6
p-Isopropyltoluene	Monitor	ND (100)		ND (5)				ND (100)		ND (1)
sec-Butylbenzene	Monitor	ND (100)		ND (5)				ND (100)		ND (0.4)

Table 3-2 (Continued).
Summary of Compliance Monitoring Analytical Results from the Groundwater Treatment System.
Former Gastown Manufactured Gas Plant Site.
All results in Fg/l unless otherwise noted.

Parameter	Discharge Limits	04/30/02 (STL)			May 2002 - Not Sampled			06/28/02		
		Pre Carbon	Mid Carbon	Post Carbon	Pre Carbon	Mid Carbon	Post Carbon	Pre Carbon	Mid Carbon	Post Carbon
Semi-Volatile Compounds										
2-Methylnaphthalene	Monitor			ND (9.4)						ND (9.9)
Acenaphthene	10			ND (9.4)						ND (9.9)
Acenaphthylene	10			ND (9.4)						ND (9.9)
Anthracene	10			ND (9.4)						ND (9.9)
Benzo(a)anthracene	10			ND (9.4)						ND (9.9)
Benzo(a)pyrene	10			ND (9.4)						ND (9.9)
Benzo(b)fluoranthene	10			ND (9.4)						ND (9.9)
Benzo(g,h,i)perylene	10			ND (9.4)						ND (9.9)
Benzo(k)fluoranthene	10			ND (9.4)						ND (9.9)
Biphenyl	Monitor			ND (9.4)						ND (9.9)
Bis(2-ethylhexyl)phthalate	10			8.1 J						12 B
Carbazole	Monitor			ND (9.4)						ND (9.9)
Chrysene	10			ND (9.4)						ND (9.9)
Dibenz(a,h)anthracene	10			ND (9.4)						ND (9.9)
Dibenzofuran	10			ND (9.4)						ND (9.9)
Fluoranthene	10			ND (9.4)						ND (9.9)
Fluorene	10			ND (9.4)						ND (9.9)
Indene	Monitor			ND (9.4)						ND (9.9)
Indeno(1,2,3-cd)pyrene	10			ND (9.4)						ND (9.9)
Naphthalene	10			ND (9.4)						1 J
Pentachlorophenol	10			ND (47)						ND (50)
Phenanthrene	10			ND (9.4)						ND (9.9)

Table 3-2 (Continued).
Summary of Compliance Monitoring Analytical Results from the Groundwater Treatment System.
Former Gastown Manufactured Gas Plant Site.
All results in Fg/l unless otherwise noted.

Parameter	Discharge Limits	04/30/02 (STL)			May 2002 - Not Sampled			06/28/02		
		Pre Carbon	Mid Carbon	Post Carbon	Pre Carbon	Mid Carbon	Post Carbon	Pre Carbon	Mid Carbon	Post Carbon
Semi-Volatile Compounds (Continued)										
Phenol	50			6.6 J						ND (50)
Pyrene	10			ND (9.4)						ND (9.9)
Pesticides/PCBs										
4,4'-DDD	0.18			ND (0.05)						ND (0.05)
Chlordane	0.05			ND (0.5)						ND (0.5)
Heptachlor Epoxide	0.44			ND (0.05)						ND (0.05)
Inorganic Compounds										
Arsenic				ND (7)						ND (7)
Iron	2,000			**2,600**						202.0
Manganese	1,000			333.0						369.0
Zinc	Monitor			166.0						42.1
Miscellaneous Parameters										
BOD	20,000			6,800						ND (2000)
Cyanide	400			180.0						92.0
Total Oil & Grease	15,000			ND (5000)						ND (5000)
pH (Standard Unit)	6.0 to 9.0			7.4						7.4
Total Dissolved Solids	Monitor			958,000						892,000
Total Recoverable Phenols	500			32.0						ND (5)
Total Suspended Solids	20,000			7,000						ND (4000)

ND **Indicates that the value was not detected at the method detection limit specified in parentheses.**
Shaded values equal or exceed the Division of Water's discharge limits.

Table 3-3.
Summary of Groundwater Recovery and Pumping Rate Data.
Former Gastown Manufactured Gas Plant Site.

Date of Initial Reading	Totalizer Reading (gals)	Gallons for Period	Days in Period	Total Days	Actual Pumping Rate (gpm)	Statistical Pumping Rate (gpd)
09/02/98	0.00	0.0	0.0	0.0	0.00	0.0
09/08/98	3,297.74	3,297.7	6.0	6.0	0.38	549.6
09/11/98	5,995.15	2,697.4	3.0	9.0	0.62	666.1
09/15/98	8,747.66	2,752.5	4.0	13.0	0.48	672.9
09/22/98	13,271.1	4,523.4	7.0	20.0	0.45	663.6
09/29/98	16,405.6	3,134.5	7.0	27.0	0.31	607.6
10/02/98	18,244.0	1,838.4	3.0	30.0	0.43	608.1
10/05/98	19,861.6	1,617.6	3.0	33.0	0.37	601.9
10/14/98	25,862.8	6,001.2	9.0	42.0	0.46	615.8
10/29/98	34,343.5	8,480.7	15.0	57.0	0.39	602.5
11/04/98	37,451.0	3,107.5	6.0	63.0	0.36	594.5
11/09/98	39,951.2	2,500.2	5.0	68.0	0.35	587.5
11/12/98	40,965.0	1,013.8	3.0	71.0	0.23	577.0
11/18/98	42,653.5	1,688.5	6.0	77.0	0.20	553.9
11/19/98	43,051.0	397.5	1.0	78.0	0.28	551.9
11/23/98	45,882.0	2,831.0	4.0	82.0	0.49	559.5
12/04/98	50,852.8	4,970.8	11.0	93.0	0.31	546.8
12/14/98	55,251.2	4,398.4	10.0	103.0	0.31	536.4
01/08/99	66,372.4	11,121.2	25.0	128.0	0.31	518.5
01/20/99	73,941.5	7,569.1	12.0	140.0	0.44	528.2
02/01/99	77,637.8	3,696.3	12.0	152.0	0.21	510.8
02/17/99	105,860	28,222.2	16.0	168.0	1.22	630.1
03/05/99	128,177	22,317	16.0	184.0	0.97	696.6
03/18/99	146,658	18,481	13.0	197.0	0.99	744.5
04/08/99	175,936	29,278	21.0	218.0	0.97	807.0
04/29/99	209,660	33,724	21.0	239.0	1.12	877.2
05/11/99	224,302	14,642	12.0	251.0	0.85	893.6
05/27/99	244,583	20,281	16.0	267.0	0.88	916.0
06/10/99	255,473	10,890	14.0	281.0	0.54	909.2
06/21/99	262,879	7,406	11.0	292.0	0.47	900.3
07/09/99	278,198	15,319	18.0	310.0	0.59	897.4
07/27/99	288,962	10,764	18.0	328.0	0.42	881.0
08/10/99	296,053	7,091	14.0	342.0	0.35	865.7
08/30/99	305,531	9,478	20.0	362.0	0.33	844.0
09/27/99	316,764	11,233	28.0	390.0	0.28	812.2
10/13/99	324,927	8,163	16.0	406.0	0.35	800.3
10/29/99	337,617	12,690	16.0	422.0	0.55	800.0
11/24/99	360,109	22,492	26.0	448.0	0.60	803.8
12/09/99	374,727	14,618	15.0	463.0	0.68	809.3
12/14/99	380,045	5,318	5.0	468.0	0.74	812.1
12/28/99	388,869	8,824	14.0	482.0	0.44	806.8
01/28/00	409,421	20,552	31.0	513.0	0.46	798.1
02/04/00	411,893	2,472	7.0	520.0	0.25	792.1
02/10/00	413,528	1,635	6.0	526.0	0.19	786.2

Table 3-3 (Continued).
Summary of Groundwater Recovery and Pumping Rate Data.
Former Gastown Manufactured Gas Plant Site.

Date of Initial Reading	Totalizer Reading (gals)	Gallons for Period	Days in Period	Total Days	Actual Pumping Rate (gpm)	Statistical Pumping Rate (gpd)
03/03/00	433,846	20,318	22.0	548.0	0.64	791.7
03/10/00	439,393	5,547	7.0	555.0	0.55	791.7
03/29/00	455,381	15,988	19.0	574.0	0.58	793.3
04/10/00	462,115	6,734	12.0	586.0	0.39	788.6
04/19/00	478,278	16,163	9.0	595.0	1.25	803.8
04/21/00	483,535	5,257	2.0	597.0	1.83	809.9
05/04/00	505,260	21,725	13.0	610.0	1.16	828.3
05/05/00	506,488	1,228	1.0	611.0	0.85	828.9
05/11/00	514,342	7,854	6.0	617.0	0.91	833.6
05/12/00	516,303	1,961	1.0	618.0	1.36	835.4
05/17/00	525,097	8,794	5.0	623.0	1.22	842.9
05/22/00	532,150	7,053	5.0	628.0	0.98	847.4
05/30/00	539,917	7,767	8.0	636.0	0.67	848.9
05/31/00	541,143	1,226	1.0	637.0	0.85	849.5
06/08/00	546,906	5,763	8.0	645.0	0.50	847.9
06/15/00	550,350	3,444	7.0	652.0	0.34	844.1
06/27/00	554,280	3,930	12.0	664.0	0.23	834.8
06/29/00	555,164	884.0	2.0	666.0	0.31	833.6
07/07/00	561,224	6,060	8.0	674.0	0.53	832.7
07/11/00	564,294	3,070	4.0	678.0	0.53	832.3
07/19/00	571,146	6,852	8.0	686.0	0.59	832.6
07/28/00	578,765	7,619	9.0	695.0	0.59	832.8
08/02/00	583,467	4,702	5.0	700.0	0.65	833.5
08/11/00	593,940	10,473	9.0	709.0	0.81	837.7
08/18/00	599,274	5,334	7.0	716.0	0.53	837.0
08/29/00	606,329	7,055	11.0	727.0	0.45	834.0
09/05/00	609,701	3,372	7.0	734.0	0.33	830.7
09/28/00	626,102	16,401	23.0	757.0	0.50	827.1
10/03/00	629,206	3,104	5.0	762.0	0.43	825.7
10/13/00	636,971	7,765	10.0	772.0	0.54	825.1
10/18/00	639,887	2,916	5.0	777.0	0.41	823.5
10/26/00	643,165	3,278	8.0	785.0	0.28	819.3
10/30/00	644,985	1,820	4.0	789.0	0.32	817.5
11/10/00	649,604	4,619	11.0	800.0	0.29	812.0
11/13/00	651,143	1,539	3.0	803.0	0.36	810.9
11/22/00	655,477	4,334	9.0	812.0	0.33	807.2
12/01/00	656,555	1,078	9.0	821.0	0.08	799.7
12/05/00	656,825	270.0	4.0	825.0	0.05	796.2
12/16/00	666,688	9,863	11.0	836.0	0.62	797.5
12/19/00	670,405	3,717	3.0	839.0	0.86	799.1
12/29/00	678,854	8,449	10.0	849.0	0.59	799.6
01/05/01	683,879	5,025	7.0	856.0	0.50	798.9
01/10/01	687,322	3,443	5.0	861.0	0.48	798.3
December 5, 2000 - final totalizer reading before changing the batteries.						

Table 3-3 (Continued).
Summary of Groundwater Recovery and Pumping Rate Data.
Former Gastown Manufactured Gas Plant Site.

Date of Initial Reading	Totalizer Reading (gals)	Gallons for Period	Days in Period	Total Days	Actual Pumping Rate (gpm)	Statistical Pumping Rate (gpd)
01/19/01	695,445	8,123	9.0	870.0	0.63	799.4
01/26/01	701,382	5,937	7.0	877.0	0.59	799.8
01/31/01	705,946	4,564	5.0	882.0	0.63	800.4
02/09/01	718,088	12,142	9.0	891.0	0.94	805.9
02/16/01	727,038	8,950	7.0	898.0	0.89	809.6
02/23/01	734,810	7,772	7.0	905.0	0.77	811.9
02/28/01	740,780	5,970	5.0	910.0	0.83	814.0
03/07/01	746,908	6,128	7.0	917.0	0.61	814.5
03/16/01	758,470	11,562	9.0	926.0	0.89	819.1
03/21/01	763,103	4,633	5.0	931.0	0.64	819.7
03/30/01	767,509	4,406	9.0	940.0	0.34	816.5
04/05/01	768,491	982.0	6.0	946.0	0.11	812.4
04/13/01	768,514	23.0	8.0	954.0	0.002	805.6
04/20/01	772,113	3,599	7.0	961.0	0.36	803.4
04/27/01	775,674	3,561	7.0	968.0	0.35	801.3
04/30/01	777,705	2,031	3.0	971.0	0.47	800.9
05/10/01	784,617	6,912	10.0	981.0	0.48	799.8
05/16/01	790,005	5,388	6.0	987.0	0.62	800.4
05/25/01	801,236	11,231	9.0	996.0	0.87	804.5
05/31/01	803,832	2,596	6.0	1,002	0.30	802.2
06/07/01	809,072	5,240	7.0	1,009	0.52	801.9
06/15/01	809,503	431.0	8.0	1,017	0.04	796.0
06/22/01	810,316	813.0	7.0	1,024	0.08	791.3
06/29/01	812,775	2,459	7.0	1,031	0.24	788.3
07/06/01	815,384	2,609	7.0	1,038	0.26	785.5
07/13/01	817,847	2,463	7.0	1,045	0.24	782.6
07/20/01	820,248	2,401	7.0	1,052	0.24	779.7
07/27/01	822,944	2,696	7.0	1,059	0.27	777.1
08/03/01	825,163	2,219	7.0	1,066	0.22	774.1
08/10/01	827,507	2,344	7.0	1,073	0.23	771.2
08/17/01	829,681	2,174	7.0	1,080	0.22	768.2
08/24/01	830,546	865.0	7.0	1,087	0.09	764.1
08/30/01	832,182	1,636	6.0	1,093	0.19	761.4
09/07/01	834,458	2,276	8.0	1,101	0.20	757.9
09/14/01	836,231	1,773	7.0	1,108	0.18	754.7
09/21/01	836,695	464.0	7.0	1,115	0.05	750.4
09/28/01	839,850	3,155	7.0	1,122	0.31	748.5
10/05/01	840,723	873.0	7.0	1,129	0.09	744.7
10/12/01	847,206	6,483	7.0	1,136	0.64	745.8
10/19/01	853,340	6,134	7.0	1,143	0.61	746.6
10/26/01	859,454	6,114	7.0	1,150	0.61	747.4
10/31/01	862,520	3,066	5.0	1,155	0.43	746.8
11/09/01	866,632	4,112	9.0	1,164	0.32	744.5
11/16/01	869,147	2,515	7.0	1,171	0.25	742.2
11/21/01	871,279	2,132	5.0	1,176	0.30	740.9

Table 3-3 (Continued).
Summary of Groundwater Recovery and Pumping Rate Data.
Former Gastown Manufactured Gas Plant Site.

Date of Initial Reading	Totalizer Reading (gals)	Gallons for Period	Days in Period	Total Days	Actual Pumping Rate (gpm)	Statistical Pumping Rate (gpd)
11/30/01	880,207	8,928	9.0	1,185	0.69	742.8
12/07/01	887,552	7,345	7.0	1,192	0.73	744.6
12/14/01	891,511	3,959	7.0	1,199	0.39	743.5
12/21/01	903,667	12,156	7.0	1,206	1.21	749.3
01/02/02	915,881	12,214	12.0	1,218	0.71	752.0
01/11/02	926,941	11,060	9.0	1,227	0.85	755.5
01/16/02	936,858	9,917	5.0	1,232	1.38	760.4
01/25/02	949,728	12,870	9.0	1,241	0.99	765.3
01/31/02	959,933	10,205	6.0	1,247	1.18	769.8
02/08/02	974,935	15,002	8.0	1,255	1.30	776.8
02/14/02	977,469	2,534	6.0	1,261	0.29	775.2
02/21/02	980,217	2,748	7.0	1,268	0.27	773.0
02/28/02	983,742	3,525	7.0	1,275	0.35	771.6
03/08/02	986,102	2,360	8.0	1,283	0.20	768.6
03/15/02	988,721	2,619	7.0	1,290	0.26	766.5
03/22/02	991,018	2,297	7.0	1,297	0.23	764.1
03/27/02	992,753	1,735	5.0	1,302	0.24	762.5
04/05/02	996,838	4,085	9.0	1,311	0.32	760.4
04/11/02	1,001,179	4,341	6.0	1,317	0.50	760.2
04/19/02	1,016,906	15,727	8.0	1,325	1.37	767.5
04/26/02	1,024,853	7,947	7.0	1,332	0.79	769.4
04/30/02	1,030,642	5,789	4.0	1,336	1.01	771.4
05/03/02	1,034,702	4,060	3.0	1,339	0.94	772.7
05/10/02	1,042,836	8,134	7.0	1,346	0.81	774.8
05/17/02	1,058,722	15,886	7.0	1,353	1.58	782.5
05/24/02	1,069,618	10,896	7.0	1,360	1.08	786.5
05/30/02	1,076,536	6,918	6.0	1,366	0.80	788.1
06/07/02	1,085,264	8,728	8.0	1,374	0.76	789.9
06/14/02	1,090,318	5,054	7.0	1,381	0.50	789.5
06/21/02	1,096,719	6,401	7.0	1,388	0.64	790.1
06/28/02	1,100,237	3,518	7.0	1,395	0.35	788.7

Table 3-4.
Summary of NAPL Recovery Data.
Former Gastown Manufactured Gas Plant Site.

Date	Product from DNAPL Drum (gals)	DNAPL from O/W Separator (gals)	Total DNAPL Recovered (gals)	DNAPL/Water Recovered (gals)	Total Fluid Recovered (gals)	Cumulative DNAPL Recovered (gals)	Cumulative DNAPL/Water Recovered (gals)	Cumulative Fluids Recovered (gals)
09/03/98	3.5	0.0	3.5	4.5	8.0	3.5	4.5	8.0
09/08/98	10.0	0.0	10.0	10.0	20.0	13.5	14.5	28.0
09/09/98	7.5	0.0	7.5	0.0	7.5	21.0	14.5	35.5
09/11/98	7.5	0.0	7.5	0.0	7.5	28.5	14.5	43.0
09/15/98	3.0	0.0	3.0	5.0	8.0	31.5	19.5	51.0
09/22/98	12.0	15.0	27.0	9.0	36.0	58.5	28.5	87.0
09/29/98	0.5	6.0	6.5	2.5	9.0	65.0	31.0	96.0
09/30/98	6.5	0.0	6.5	5.5	12.0	71.5	36.5	108.0
10/02/98	3.0	0.0	3.0	5.0	8.0	74.5	41.5	116.0
10/05/98	6.0	0.0	6.0	6.0	12.0	80.5	47.5	128.0
10/08/98	6.0	0.0	6.0	2.0	8.0	86.5	49.5	136.0
10/14/98	13.0	0.5	13.5	4.5	18.0	100.0	54.0	154.0
10/29/98	31.0	0.0	31.0	6.0	37.0	131.0	60.0	191.0
11/09/98	15.0	0.0	15.0	20.0	35.0	146.0	80.0	226.0
11/12/98	6.5	0.5	7.0	24.0	31.0	153.0	104.0	257.0
11/18/98	7.0	2.0	9.0	30.0	39.0	162.0	134.0	296.0
11/23/98	14.0	0.0	14.0	6.0	20.0	176.0	140.0	316.0
12/04/98	1.0	0.5	1.5	1.5	3.0	177.5	141.5	319.0
12/14/98	30.0	1.0	31.0	9.0	40.0	208.5	150.5	359.0
12/22/98	20.0	1.0	21.0	5.0	26.0	229.5	155.5	385.0
12/29/98	1.0	0.0	1.0	1.0	2.0	230.5	156.5	387.0
01/08/99	30.0	1.0	31.0	3.0	34.0	261.5	159.5	421.0
01/20/99	1.0	1.0	2.0	2.0	4.0	263.5	161.5	425.0
01/29/99	12.0	2.0	14.0	3.0	17.0	277.5	164.5	442.0
02/01/99	0.0	0.5	0.5	1.5	2.0	278.0	166.0	444.0
02/17/99	23.0	1.0	24.0	5.0	29.0	302.0	171.0	473.0
03/05/99	30.0	0.0	30.0	0.0	30.0	332.0	171.0	503.0
03/18/99	20.0	1.0	21.0	6.0	27.0	353.0	177.0	530.0
03/24/99	0.0	0.0	0.0	5.0	5.0	353.0	182.0	535.0
04/08/99	31.0	0.5	31.5	1.5	33.0	384.5	183.5	568.0

Table 3-4 (Continued).
Summary of NAPL Recovery Data.
Former Gastown Manufactured Gas Plant Site.

Date	Product from DNAPL Drum (gals)	DNAPL from O/W Separator (gals)	Total DNAPL Recovered (gals)	DNAPL/Water Recovered (gals)	Total Fluid Recovered (gals)	Cumulative DNAPL Recovered (gals)	Cumulative DNAPL/Water Recovered (gals)	Cumulative Fluids Recovered (gals)
04/14/99	6.0	0.0	6.0	0.0	6.0	390.5	183.5	574.0
04/29/99	16.0	10.0	26.0	0.0	26.0	416.5	183.5	600.0
05/11/99	17.0	0.0	17.0	0.0	17.0	433.5	183.5	617.0
05/27/99	4.0	0.0	4.0	0.0	4.0	437.5	183.5	621.0
06/10/99	27.0	14.0	41.0	3.0	44.0	478.5	186.5	665.0
06/21/99	21.0	2.0	23.0	4.0	27.0	501.5	190.5	692.0
07/09/99	16.0	3.0	19.0	1.0	20.0	520.5	191.5	712.0
07/23/99	35.0	10.0	45.0	0.0	45.0	565.5	191.5	757.0
07/27/99	9.0	1.0	10.0	5.0	15.0	575.5	196.5	772.0
08/10/99	13.0	0.5	13.5	2.0	15.5	589.0	198.5	787.5
08/30/99	18.0	0.5	18.5	1.0	19.5	607.5	199.5	807.0
09/27/99	16.0	0.5	16.5	1.0	17.5	624.0	200.5	824.5
10/13/99	5.0	1.0	6.0	0.5	6.5	630.0	201.0	831.0
10/29/99	4.0	16.0	20.0	4.0	24.0	650.0	205.0	855.0
11/24/99	2.0	18.0	20.0	2.0	22.0	670.0	207.0	877.0
12/09/99	30.0	12.0	42.0	7.0	49.0	712.0	214.0	926.0
12/14/99	0.0	15.0	15.0	45.0	60.0	727.0	259.0	986.0
12/17/99	20.0	0.0	20.0	42.0	62.0	747.0	301.0	1048.0
01/11/00	3.0	0.5	3.5	6.5	10.0	750.5	307.5	1058.0
01/28/00	0.0	2.0	2.0	1.0	3.0	752.5	308.5	1061.0
02/04/00	0.5	0.0	0.5	0.0	0.5	753.0	308.5	1061.5
02/10/00	1.0	0.0	1.0	0.0	1.0	754.0	308.5	1062.5
03/03/00	12.0	0.0	12.0	3.0	15.0	766.0	311.5	1077.5
03/10/00	2.0	0.0	2.0	0.0	2.0	768.0	311.5	1079.5
03/20/00	5.0	0.5	5.5	11.5	17.0	773.5	323.0	1096.5
04/18/00	0.0	0.0	0.0	55.0	55.0	773.5	378.0	1151.5
05/04/00	4.0	15.0	19.0	9.0	28.0	792.5	387.0	1179.5
05/05/00	25.0	0.0	25.0	2.5	27.5	817.5	389.5	1207.0
05/08/00	30.0	0.0	30.0	7.0	37.0	847.5	396.5	1244.0
05/11/00	25.0	1.0	26.0	6.0	32.0	873.5	402.5	1276.0

Table 3-4 (Continued).
Summary of NAPL Recovery Data.
Former Gastown Manufactured Gas Plant Site.

Date	Product from DNAPL Drum (gals)	DNAPL from O/W Separator (gals)	Total DNAPL Recovered (gals)	DNAPL/Water Recovered (gals)	Total Fluid Recovered (gals)	Cumulative DNAPL Recovered (gals)	Cumulative DNAPL/Water Recovered (gals)	Cumulative Fluids Recovered (gals)
05/12/00	8.0	0.5	8.5	7.5	16.0	882.0	410.0	1292.0
05/17/00	3.0	0.0	3.0	1.0	4.0	885.0	411.0	1296.0
05/22/00	6.0	0.0	6.0	1.0	7.0	891.0	412.0	1303.0
05/30/00	0.0	0.0	0.0	6.0	6.0	891.0	418.0	1309.0
05/31/00	0.0	0.0	0.0	0.0	0.0	891.0	418.0	1309.0
06/08/00	0.0	0.0	0.0	0.0	0.0	891.0	418.0	1309.0
06/15/00	0.0	0.0	0.0	0.0	0.0	891.0	418.0	1309.0
06/27/00	0.0	0.0	0.0	0.0	0.0	891.0	418.0	1309.0
06/29/00	0.0	0.0	0.0	0.0	0.0	891.0	418.0	1309.0
07/07/00	0.0	0.0	0.0	0.0	0.0	891.0	418.0	1309.0
07/11/00	0.0	0.0	0.0	0.0	0.0	891.0	418.0	1309.0
07/19/00	0.0	0.0	0.0	0.0	0.0	891.0	418.0	1309.0
07/28/00	0.0	0.0	0.0	0.0	0.0	891.0	418.0	1309.0
08/02/00	0.0	0.0	0.0	0.0	0.0	891.0	418.0	1309.0
08/11/00	0.0	0.0	0.0	0.0	0.0	891.0	418.0	1309.0
08/18/00	0.0	0.0	0.0	0.0	0.0	891.0	418.0	1309.0
08/29/00	0.0	0.0	0.0	0.0	0.0	891.0	418.0	1309.0
09/05/00	0.0	0.0	0.0	0.0	0.0	891.0	418.0	1309.0
09/28/00	10.0	5.0	15.0	2.0	17.0	906.0	420.0	1326.0
10/03/00	20.0	0.0	20.0	2.0	22.0	926.0	422.0	1348.0
10/13/00	43.0	0.0	43.0	1.0	44.0	969.0	423.0	1392.0
10/18/00	17.0	0.0	17.0	0.0	17.0	986.0	423.0	1409.0
10/26/00	15.0	1.0	16.0	5.5	21.5	1002.0	428.5	1430.5
10/30/00	10.0	0.5	10.5	0.5	11.0	1012.5	429.0	1441.5
11/10/00	20.0	0.0	20.0	4.0	24.0	1032.5	433.0	1465.5
11/13/00	5.0	0.0	5.0	1.0	6.0	1037.5	434.0	1471.5
11/22/00	20.0	0.0	20.0	0.0	20.0	1057.5	434.0	1491.5
12/01/00	18.0	0.0	18.0	1.0	19.0	1075.5	435.0	1510.5
12/05/00	9.0	0.0	9.0	0.0	9.0	1084.5	435.0	1519.5
12/16/00	20.0	0.0	20.0	1.0	21.0	1104.5	436.0	1540.5

Table 3-4 (Continued).
Summary of NAPL Recovery Data.
Former Gastown Manufactured Gas Plant Site.

Date	Product from DNAPL Drum (gals)	DNAPL from O/W Separator (gals)	Total DNAPL Recovered (gals)	DNAPL/Water Recovered (gals)	Total Fluid Recovered (gals)	Cumulative DNAPL Recovered (gals)	Cumulative DNAPL/Water Recovered (gals)	Cumulative Fluids Recovered (gals)
12/19/00	5.0	0.0	5.0	0.0	5.0	1109.5	436.0	1545.5
12/29/00	20.0	0.0	20.0	1.0	21.0	1129.5	437.0	1566.5
01/05/01	12.0	0.0	12.0	2.0	14.0	1141.5	439.0	1580.5
01/10/01	8.0	0.0	8.0	0.0	8.0	1149.5	439.0	1588.5
01/19/01	14.0	0.0	14.0	0.0	14.0	1163.5	439.0	1602.5
01/26/01	10.0	0.0	10.0	0.0	10.0	1173.5	439.0	1612.5
01/31/01	7.0	0.0	7.0	0.0	7.0	1180.5	439.0	1619.5
02/09/01	13.0	0.0	13.0	0.0	13.0	1193.5	439.0	1632.5
02/16/01	10.0	0.0	10.0	0.0	10.0	1203.5	439.0	1642.5
02/23/01	10.0	0.0	10.0	0.0	10.0	1213.5	439.0	1652.5
02/28/01	7.0	0.0	7.0	0.0	7.0	1220.5	439.0	1659.5
03/07/01	10.0	0.0	10.0	0.0	10.0	1230.5	439.0	1669.5
03/16/01	12.0	0.0	12.0	0.0	12.0	1242.5	439.0	1681.5
03/21/01	8.0	0.0	8.0	0.0	8.0	1250.5	439.0	1689.5
03/30/01	15.0	0.0	15.0	2.0	17.0	1265.5	441.0	1706.5
04/05/01	4.0	0.0	4.0	0.0	4.0	1269.5	441.0	1710.5
04/13/01	5.0	0.0	5.0	15.0	20.0	1274.5	456.0	1730.5
04/20/01	6.0	0.0	6.0	0.0	6.0	1280.5	456.0	1736.5
04/27/01	5.0	0.0	5.0	0.0	5.0	1285.5	456.0	1741.5
04/30/01	4.0	0.0	4.0	0.0	4.0	1289.5	456.0	1745.5
05/10/01	13.0	0.0	13.0	0.0	13.0	1302.5	456.0	1758.5
05/16/01	10.0	0.0	10.0	8.0	18.0	1312.5	464.0	1776.5
05/25/01	5.0	0.0	5.0	0.0	5.0	1317.5	464.0	1781.5
05/31/01	2.0	0.0	2.0	0.0	2.0	1319.5	464.0	1783.5
06/07/01	3.0	0.0	3.0	0.0	3.0	1322.5	464.0	1786.5
06/15/01	2.0	0.0	2.0	0.0	2.0	1324.5	464.0	1788.5
06/22/01	3.0	0.0	3.0	1.0	4.0	1327.5	465.0	1792.5
06/29/01	15.0	0.0	15.0	1.0	16.0	1342.5	466.0	1808.5
07/06/01	13.0	0.0	13.0	8.0	21.0	1355.5	474.0	1829.5
07/13/01	12.0	0.0	12.0	5.0	17.0	1367.5	479.0	1846.5

Table 3-4 (Continued).
Summary of NAPL Recovery Data.
Former Gastown Manufactured Gas Plant Site.

Date	Product from DNAPL Drum (gals)	DNAPL from O/W Separator (gals)	Total DNAPL Recovered (gals)	DNAPL/Water Recovered (gals)	Total Fluid Recovered (gals)	Cumulative DNAPL Recovered (gals)	Cumulative DNAPL/Water Recovered (gals)	Cumulative Fluids Recovered (gals)
07/20/01	13.0	0.0	13.0	10.0	23.0	1380.5	489.0	1869.5
07/27/01	2.0	0.0	2.0	1.0	3.0	1382.5	490.0	1872.5
08/03/01	14.0	0.0	14.0	7.0	21.0	1396.5	497.0	1893.5
08/10/01	8.0	1.0	9.0	2.5	11.5	1405.5	499.5	1905.0
08/17/01	0.5	0.5	1.0	3.0	4.0	1406.5	502.5	1909.0
08/24/01	0.0	0.0	0.0	0.0	0.0	1406.5	502.5	1909.0
08/30/01	13.0	0.0	13.0	5.0	18.0	1419.5	507.5	1927.0
09/07/01	14.0	0.0	14.0	6.0	20.0	1433.5	513.5	1947.0
09/14/01	4.0	0.0	4.0	3.0	7.0	1437.5	516.5	1954.0
09/21/01	9.0	0.0	9.0	9.0	18.0	1446.5	525.5	1972.0
09/28/01	3.0	0.0	3.0	17.0	20.0	1449.5	542.5	1992.0
10/05/01	1.0	0.0	1.0	21.0	22.0	1450.5	563.5	2014.0
10/12/01	0.0	0.0	0.0	2.0	2.0	1450.5	565.5	2016.0
10/19/01	12.0	0.0	12.0	0.5	12.5	1462.5	566.0	2028.5
10/26/01	10.0	0.0	10.0	5.0	15.0	1472.5	571.0	2043.5
10/31/01	8.0	0.0	8.0	7.0	15.0	1480.5	578.0	2058.5
11/09/01	6.0	0.0	6.0	2.0	8.0	1486.5	580.0	2066.5
11/16/01	3.5	0.0	3.5	0.0	3.5	1490.0	580.0	2070.0
11/21/01	2.5	0.0	2.5	0.0	2.5	1492.5	580.0	2072.5
11/30/01	12.0	0.0	12.0	7.0	19.0	1504.5	587.0	2091.5
12/07/01	3.0	0.0	3.0	1.0	4.0	1507.5	588.0	2095.5
12/14/01	2.0	0.0	2.0	0.0	2.0	1509.5	588.0	2097.5
12/21/01	3.0	0.0	3.0	0.0	3.0	1512.5	588.0	2100.5
01/02/02	5.0	0.0	5.0	0.0	5.0	1517.5	588.0	2105.5
01/11/02	4.0	0.0	4.0	0.0	4.0	1521.5	588.0	2109.5
01/16/02	1.0	0.0	1.0	0.0	1.0	1522.5	588.0	2110.5
01/25/02	1.0	0.0	1.0	0.0	1.0	1523.5	588.0	2111.5
01/31/02	8.0	0.0	8.0	0.0	8.0	1531.5	588.0	2119.5
02/08/02	14.0	0.0	14.0	6.0	20.0	1545.5	594.0	2139.5
02/14/02	8.0	0.0	8.0	7.0	15.0	1553.5	601.0	2154.5

Table 3-4 (Continued).
Summary of NAPL Recovery Data.
Former Gastown Manufactured Gas Plant Site.

Date	Product from DNAPL Drum (gals)	DNAPL from O/W Separator (gals)	Total DNAPL Recovered (gals)	DNAPL/Water Recovered (gals)	Total Fluid Recovered (gals)	Cumulative DNAPL Recovered (gals)	Cumulative DNAPL/Water Recovered (gals)	Cumulative Fluids Recovered (gals)
02/21/02	6.0	0.0	6.0	4.0	10.0	1559.5	605.0	2164.5
02/28/02	4.0	0.0	4.0	6.0	10.0	1563.5	611.0	2174.5
03/08/02	6.0	0.0	6.0	9.0	15.0	1569.5	620.0	2189.5
03/15/02	4.0	0.0	4.0	6.0	10.0	1573.5	626.0	2199.5
03/22/02	4.0	0.0	4.0	6.0	10.0	1577.5	632.0	2209.5
03/27/02	4.0	0.0	4.0	6.0	10.0	1581.5	638.0	2219.5
04/05/02	4.5	0.0	4.5	6.0	10.5	1586.0	644.0	2230.0
04/11/02	4.0	0.0	4.0	6.0	10.0	1590.0	650.0	2240.0
04/19/02	5.0	0.0	5.0	3.0	8.0	1595.0	653.0	2248.0
04/26/02	0.0	0.0	0.0	6.0	6.0	1595.0	659.0	2254.0
04/30/02	0.0	0.0	0.0	0.0	0.0	1595.0	659.0	2254.0
05/03/02	4.0	0.5	4.5	5.0	9.5	1599.5	664.0	2263.5
05/10/02	0.0	0.0	0.0	1.0	1.0	1599.5	665.0	2264.5
05/17/02	3.5	0.5	4.0	3.5	7.5	1603.5	668.5	2272.0
05/24/02	3.5	0.5	4.0	3.0	7.0	1607.5	671.5	2279.0
05/30/02	3.5	2.0	5.5	5.0	10.5	1613.0	676.5	2289.5
06/07/02	4.0	0.5	4.5	4.0	8.5	1617.5	680.5	2298.0
06/14/02	3.5	0.25	3.75	4.25	8.0	1621.25	684.75	2306.0
06/21/02	3.0	0.25	3.25	4.75	8.0	1624.50	689.50	2314.0
06/28/02	2.5	0.0	2.5	2.5	5.0	1627.0	692.0	2319.0

Table 3-5.
Summary of Analytical Results of DNAPL Collected by the Extraction System.
Former Gastown Manufactured Gas Plant Site.
All results in mg/l unless otherwise specified.

Parameter	Date of Sample Collection					
	9/11/98	9/22/98	11/18/98	12/16/98	5/31/00	5/3/02
Volatile Organic Compounds						
Benzene		6.577	5.700	260.0 (14,000)	30,610	38,000
Toluene		1.700	1.975	180.0 (14,000)	27,830	55,000
Ethylbenzene		6.735	4.567	ND (0.4) (1,400)	2,830	8,600
Xylene-O		2.434	1.500	160.0 (7,800)	4,000	38,000
Xylene-M&P		3.490	3.225		11,470	
Isopropylbenzene				ND (0.4)	ND (222)	ND (10,000)
n-Propylbenzene				ND (0.4)	ND (222)	ND (10,000)
1,3,5-				ND (0.4)	1,220	48,000
1,2,4-				ND (0.4)	3,360	600,000
p-Isopropyltoluene				ND (0.4)	ND (222)	ND (10,000)
n-Butylbenzene				ND (0.4)	ND (222)	1,800,000
sec-Butylbenzene				ND (0.4)	ND (222)	ND (10,000)
MTBE				ND (0.4)	ND (444)	ND (50,000)
Styrene		ND (0.1)	ND (0.1)	10,000	18,920	500,000
Chloromethane		0.283	0.125	ND (800)	445.0	ND (4,800)
Vinyl Chloride		0.209	0.027	ND (200)		ND (4,800)
Chloroethane		0.839	0.089	ND (800)		ND (4,800)
Chloroform		0.595	0.510	ND (4,000)	ND (222)	ND (2,400)
1,2-Dichloroethane		0.977	0.235	ND (500)	ND (222)	ND (2,400)
2-Butanone		0.750	0.125	ND (100,000)	445.0	ND (12,000)
1,2-Dichloropropane		2.149	1.575	ND (800)	ND (222)	ND (2,400)
Chlorobenzene		2.350	1.563	ND (50,000)	ND (222)	ND (2,400)
Semi-Volatile Compounds						
Phenol		ND (0.01)		ND (1,800)	ND	
Naphthalene	38.60	20.70		120,000 E	3.1	110,000
2-Methylnaphthalene	21.65	16.90		24,000 E	0.336	27,000
Acenaphthylene	13.30	13.90		18,000 E	0.323	26,000
Acenaphthene	1.95	1.42		1,100 J	0.02	1,900 J
Dibenzofuran		1.50		1,200 J	0.024	2,000 J
Fluorene	10.90	8.40		8,800	0.195	
Phenanthrene	28.30	7.20		39,000 E		42,000
Anthracene	15.05	7.50		9,400		12,000

Table 3-5 (Continued).
Summary of Analytical Results of DNAPL Collected by the Extraction System.
Former Gastown Manufactured Gas Plant Site.
All results in mg/l unless otherwise specified.

Parameter	Date of Sample Collection					
	9/11/98	9/22/98	11/18/98	12/16/98	5/31/00	5/3/02
Semi-Volatile Compounds (continued)						
Carbazole					ND (0.05)	440 J
Fluoranthene	10.45	9.30		15,000 E		19,000
Pyrene	9.80	12.00		28,000 E	0.381	24,000
Benzo(a)anthracene	3.95	3.30		7,700	0.074	7,800
Chrysene	9.85	3.40		5,200	0.063	7,000
Benzo(b)fluoranthene	6.40	4.20		4,400	0.036	2,900 J
Benzo(k)fluoranthene	2.05	1.40		920 J	0.052	5,400
Benzo(a)pyrene	5.20	2.50		5,800	0.042	7,800
Indeno(1,2,3-cd)pyrene	2.45	1.80		2,000	0.028	2,300 J
Dibenz(a,h)anthracene	0.38	0.07		430 J	ND (0.01)	680 J
Benzo(g,h,i)perylene	2.35	0.19		2,300	0.035	3,000 J
Indene		Present	Present		0.541	28,000
Biphenyl					0.035	4,800
PCB/Pesticides						
Heptachlor Epoxide		ND (0.01)	ND (0.01)	ND (5.1)	ND (0.05)*	
4,4'-DDT					0.869*	
4,4'-DDE					0.213*	
4,4'-DDD		ND (0.01)	ND (0.01)	ND (10)	ND (0.05)*	
Chlordane		0.185	0.167	ND (5.1)	ND (1)*	
PCBs (all arochlors)		ND (0.002)		ND (100)	ND (1)*	
Inorganics						
Arsenic		5.90		3.87		9.5
Iron		1.70		7.63 B	59.0	ND (14.8)
Manganese		ND (0.1)		0.57 B	0.86	ND (0.99)
Zinc		0.20		12.10	0.455	ND (0.99)
Miscellaneous Parameters						
BTUs (BTU/lb)		15,329				
Viscosity (centistokes)		22.2				
Density (g/cc)		1.05				
Flashpoint (°F)						74

Table 3-5 (Continued).
Summary of Analytical Results of DNAPL Collected by the Extraction System.
Former Gastown Manufactured Gas Plant Site.
All results in mg/l unless otherwise specified.

ND	**Indicates that the compound was not detected at the method detection limit specified in parentheses.**
J	**Estimated concentration that is less than the sample quantitation limit but greater than zero.**
E	**Estimated concentration that exceeds the calibration range of the GC/MS instrument.**
P	**There is a >25% difference between the analytical results on two GC columns. The lower value is reported.**
B	**Analyte detected in the associated blank as well as in the sample (Organic Data); Value greater than or equal to the instrument detection limit, but less than the contract required detection limit (Inorganic Data).**
(2.8)	**Results of duplicate analysis.**
*****	**Results reported in Fg/l.**
Note:	**When multiple duplicate analyses were completed, the values shown represent the minimum and maximum values reported.**

Table 3-6.
Summary of Water Analytical Results from the Primary Sump in the Basement of the Gastown Sportsman's Club.
Former Gastown Manufactured Gas Plant Site.
All results in Fg/l unless otherwise noted.

Parameter	Ground- + Water Standards	Date Sampled							
		3/8/93	6/8/95	11/6/95	4/13/98	4/23/98 *	4/24/98 ●	12/16/99	6/29/01■
Volatile Organic Compounds									
Benzene	1		**10,500**	**6,200**	**4,535**	**3,964**	**12,000**	**350.0**	**23,000**
Toluene	5		**1,390**	**1,200**	**1,767**	**1,117**	**5,200**	**580.0**	**4,600**
Ethylbenzene	5		**120.0**	**250.0**	ND (100)	ND (5)	**460.0**	**94.0**	**1,200**
Xylene-O	5		**493.0**	**330.0**	**298.9**	ND (5)	**1,800**	**58.0**	**400.0**
Xylene-M&P	5		**97.6 J**	**560.0**	**613.1**	ND (10)		**95.0**	**660.0**
Isopropylbenzene	5		ND (240)	ND (200)	ND (100)	**1,552**		0.54	ND (20)
n-Propylbenzene	5		ND (280)	ND (200)	ND (100)	**1,507**		0.43	ND (20)
1,3,5-Trimethylbenzene	5		ND (160)	ND (200)	**126.2**	**24.2**		4.3	**22.0**
1,2,4-Trimethylbenzene	5		ND (210)	**240.0**	**267.6**	**89.5**		**45.0**	**280.0**
p-Isopropyltoluene	5		ND (190)	ND (200)	**222.9**	**209.0**		3.7	ND (20)
n-Butylbenzene	5		ND (320)	ND (200)	**499.1**	**1,120**		**320.0**	**2,200**
sec-Butylbenzene	5		ND (650)	ND (200)	**306.4**	**168.0**		ND (0.4)	ND (20)
Naphthalene	10G		**6,070**	ND (200)	**672.1**	**156.0**			
MTBE	10G		ND (1000)	ND (200)	ND (1000)	**202.0**		ND (5)	ND (20)
Vinyl Chloride	2						ND (100)	1 J	ND (5)
Styrene	5						**2,000**	**130.0**	**420 J**
Chloromethane	NS						ND (100)	ND (10)	ND (10)
1,2-Dichloroethene	5						ND (100)	1 J	ND (5)
Chloroform	7						ND (100)	ND (10)	1 J
1,2-Dichloroethane	0.6						ND (100)	ND (10)	ND (5)
2-Butanone	50G						ND (100)	ND (10)	ND (10)
1,2-Dichloropropane	1						ND (100)	ND (10)	ND (5)
Chlorobenzene	5						ND (100)	ND (10)	ND (5)

Table 3-6 (Continued).
Summary of Water Analytical Results from the Primary Sump in the Basement of the Gastown Sportsman's Club.
Former Gastown Manufactured Gas Plant Site.
All results in Fg/l unless otherwise noted.

Parameter	Ground- + Water Standards	Date Sampled							
		3/8/93	6/8/95	11/6/95	4/13/98	4/23/98 *	4/24/98 ●	12/16/99	6/29/01■
Semi-Volatile Compounds - Phenols									
Phenol	1	**11.0**					ND (50)	**9 J**	
2-Methylphenol	NS	ND (10)					13 J	9 J	
4-Methylphenol	NS	15.0					20 J	4 J	
2-Nitrophenol	1	ND (10)					ND (50)	ND (10)	
4-Nitrophenol	1	ND (10)					ND (120)	ND (24)	
2,4-Dimethylphenol	50G	33.0					33 J	9 J	
Pentachlorophenol	1	**16.0**					**19 J**	ND (24)	
4-Chloro-3-Methylphenol	NS	ND (10)					ND (50)	ND (10)	
Semi-Volatile Compounds - PAHs									
Naphthalene	10G	**190.0**			**34.0**		**9,300**	9 J	
2-Methylnaphthalene	NS	98.0				546.0	2,200 BJ	5 J	
Acenaphthylene	NS	130.0			214.0	570.0	3,800 J	15.0	
Acenaphthene	20G	**25.0**			**37.0**	ND (10)	**330.0**	1 J	
Dibenzofuran	NS	21.0					290.0	ND (10)	
Fluorene	50G	**98.0**			**56.0**	**168.0**	**1,600 J**	3 J	
Phenanthrene	50G	**120.0**			**73.0**	**619.0**	**5,700.0**	2 J	
Anthracene	50G	**52.0**			16.0	**614.0**	**1,500 J**	ND (10)	
Carbazole	NS						88.0		
Fluoranthene	50G	**61.0**			10 J	**162.0**	**2,500 J**	ND (10)	
Pyrene	50G	**70.0**			8 J	**271.0**	**3,800 J**	1 J	
Benzo(a)anthracene	0.002G	**26.0**			ND (10)	ND (10)	**940 J**	ND (10)	
Chrysene	0.002G	**22.0**			ND (10)	ND (10)	**720 J**	ND (10)	

Table 3-6 (Continued).
Summary of Water Analytical Results from the Primary Sump in the Basement of the Gastown Sportsman's Club.
Former Gastown Manufactured Gas Plant Site.
All results in Fg/l unless otherwise noted.

Parameter	Ground- + Water Standards	Date Sampled							
		3/8/93	6/8/95	11/6/95	4/13/98	4/23/98 *	4/24/98 ●	12/16/99	6/29/01■
Semi-Volatile Compounds - PAHs (continued)									
Benzo(b)fluoranthene	0.002G	**17.0**			ND (10)	ND (10)	**1,100 E**	ND (10)	
Benzo(k)fluoranthene	0.002G	ND (10)			ND (10)	**127.0**	**510 E**	ND (10)	
Benzo(a)pyrene	ND	**24.0**			ND (10)	ND (10)	**800 J**	ND (10)	
Indeno(1,2,3-cd)pyrene	0.002G	**10.0**			ND (10)	ND (10)	**280.0**	ND (10)	
Dibenz(a,h)anthracene	NS	ND (10)			ND (10)	ND (10)	55.0	ND (10)	
Benzo(g,h,i)perylene	NS	12.0			ND (10)	ND (10)	250.0	ND (10)	
Semi-Volatile Compounds - Miscellaneous Compounds									
1,2,4-Trichlorobenzene	5	ND (10)					ND (50)	ND (10)	
Hexachlorobutadiene	0.5	ND (10)					ND (50)	ND (10)	
Dimethylphthalate	50G	ND (10)					ND (50)	ND (10)	
2,6-Dinotrotoluene	5	ND (10)					ND (50)	ND (10)	
2,4-Dinitrotoluene	5	ND (10)					ND (50)	ND (10)	
Di-n-butylphthalate	NS	ND (10)					ND (50)	ND (10)	
Bis(2-ethylhexyl)phthalate	5	**19.0**					ND (50)	ND (10)	
Pesticides									
Heptachlor Epoxide	0.03						0.023 J	ND (0.05)	
Dieldrin	0.004						ND (0.5)	ND (0.09)	
Endrin	ND						ND (0.5)	ND (0.09)	
Endosulfan II	NS						ND (0.5)	ND (0.09)	
4,4'-DDD	0.3						**0.099 JP**	ND (0.09)	
Methoxychlor	35						ND (2.5)	ND (0.5)	
Chlordane	0.05						0.017 JP	ND (0.05)	

Table 3-6 (Continued).
Summary of Water Analytical Results from the Primary Sump in the Basement of the Gastown Sportsman's Club.
Former Gastown Manufactured Gas Plant Site.
All results in Fg/l unless otherwise noted.

Parameter	Ground- + Water Standards	Date Sampled							
		3/8/93	6/8/95	11/6/95	4/13/98	4/23/98 *	4/24/98 ●	12/16/99	6/29/01■
Inorganic Compounds									
Arsenic	25						3.4 B	ND (3.5)	
Iron	300						**1,690**	**455.0**	
Lead	25						ND (2.6)	ND (3)	
Manganese	300						**863.0**	108 E	
Zinc	2000G						29.0	15.9 BE	
Miscellaneous Detected Parameters									
Cyanide	200						**200.0**	50.0	
Indene	NS						4,000 J	120 J	
Biphenyl	5						**580 J**		
Benzyl Alcohol	NS							7 J	

+ **NYSDEC Ambient Water Quality Standards and Guidance Values, June 1998; April 2000 amendment.**
G **Guidance value.**
NS **No standard.**
ND **Indicates that the compound was not detected at the method detection limit specified in parentheses.**
J **Estimated concentration that is less than the sample quantitation limit but greater than zero.**
E **Estimated concentration that exceeds the calibration range of the GC/MS instrument.**
B **Compound detected in both the sample and blank (organics) or Concentration greater than or equal to the instrument detection limit, but less than the contract required detection limit (inorganics).**
(2.8) **Results of duplicate analysis.**
P **There is a >25% difference between the analytical results between the two GC columns. The lower value is reported.**
***** **Kanti Technologies, Inc.**
● **Recra Labnet.**
■ **Sample collected from the secondary vault.**

Shaded values equal or exceed groundwater and/or surface water standards or guidance values (ARARs).

Table 3-7.
Groundwater Elevation Data for Shallow and Intermediate Zone Wells from 2001 thru 2002.
Former Gastown Manufactured Gas Plant Site.
All water levels and elevations are given in feet.

Well Designation	Top of Riser Elevation	03/22/01 ●		06/19/01		06/26/01	
		Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.
Shallow Zone Wells							
MW-13	576.09	3.17	572.92	7.47	568.62	7.71	568.38
MW-17	576.86	5.20	571.66	7.49	569.37	7.77	569.09
MW-1S	576.84	8.98	567.86	9.00	567.84	9.17	567.67
MW-2S	574.77	2.56	572.21	4.47	570.30	4.23	570.54
MW-3S	574.55	2.77	571.78	3.77	570.78	3.91	570.64
MW-39	576.85	2.88	573.97	7.08	569.77	7.45	569.40
Intermediate Zone Wells							
MW-23	576.61	3.91	572.70	6.85	569.76	7.23	569.38
MW-1I	575.43	3.72	571.71	6.66	568.77	6.95	568.48
MW-2I	575.08	4.79	570.29	6.36	568.72	6.52	568.56
PW-1	574.58	3.32 **	571.26	12.87	561.71	11.15	563.43
MW-27	575.17	3.27	571.90	5.72	569.45	5.84	569.33
MW-34	574.56	3.04	571.52	5.96	568.60	6.14	568.42
MW-35	574.31	2.71	571.60	5.89	568.42	6.07	568.24
MW-36	574.13	1.37	572.76	5.29	568.84	5.58	568.55
MW-40	575.56			5.53 +	570.03	5.87	569.69
MW-41	574.07			5.39 +	568.68	5.62	568.45
MW-42	574.25			5.60 +	568.65	5.68	568.57
MW-43	577.23			6.95 +	570.28	7.13	570.10
MW-44	574.19			5.85 +	568.34	5.99	568.20
Tonawanda Creek							
East End Dock	568.31	3.71	564.60	2.99 *	565.32	3.40	564.91
West End Dock	568.24	3.66	564.58	2.96 *	565.28	3.36	564.88

***** **Creek very wavy due to wind - difficult to measure.**
+ **Water level measured on June 22, 2001.**
****** **LNAPL in well.**
● **System was shut down for approximately 24 hours at the time of water level measurements.**

Table 3-7 (Continued).
Groundwater Elevation Data for Shallow and Intermediate Zone Wells from 2001 thru 2002.
Former Gastown Manufactured Gas Plant Site.
All water levels and elevations are given in feet.

Well Designation	Top of Riser Elevation	08/01/01		09/21/01		10/02/01	
		Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.
Shallow Zone Wells							
MW-13	576.09	8.70	567.39	9.45	566.64	8.18	567.91
MW-17	576.86	8.74	568.12	10.01	566.85	8.56	568.30
MW-1S	576.84	9.47	567.37	Dry	N/A	9.24	567.60
MW-2S	574.77	4.54	570.23	7.72	567.05	4.38	570.39
MW-3S	574.55	3.92	570.63	7.06	567.49	3.68	570.87
MW-39	576.85	8.77	568.08	Dry	N/A	8.77	568.08
DPW-1	574.33			7.91	566.42	6.58	567.75
Intermediate Zone Wells							
MW-23	576.61	8.11	568.50	9.83	566.78	5.12	571.49
MW-1I	575.43	8.14	567.29	9.05	566.38	7.89	567.54
MW-2I	575.08	7.38	567.70	8.39	566.69	6.98	568.10
PW-1	574.58	12.20	562.38	8.92 *	565.66	7.61 *	566.97
MW-27	575.17	6.68	568.49	8.37	566.80	6.21	568.96
MW-34	574.56	7.04	567.52	8.13	566.43	6.60	567.96
MW-35	574.31	7.05	567.26	7.96	566.35	6.65	567.66
MW-36	574.13	6.85	567.28	7.84	566.29	6.68	567.45
MW-40	575.56	7.24	568.32	8.71	566.85	7.64	567.92
MW-41	574.07	6.50	567.57	7.55	566.52	6.60	567.47
MW-42	574.25	6.57	567.68	8.09	566.16	6.03	568.22
MW-43	577.23	7.99	569.24	NM	N/A	8.68	568.55
MW-44	574.19	6.96	567.23	8.78	565.41	6.53	567.66
VW-1	575.86			9.15	566.71	7.85	568.01
VW-2	575.38			8.83	566.55	7.68	567.70
VW-3	575.60			9.09	566.51	8.06	567.54
DPW-32	573.71			7.63	566.08	6.63	567.08
DPW-33	575.29			NM	N/A	8.21	567.08
DPW-34	574.10			8.00	566.10	8.28	565.82
DPW-36	575.83			9.74	566.09	8.65	567.18
DPW-40	573.32			NM	N/A	7.74	565.58

Table 3-7 (Continued).
Groundwater Elevation Data for Shallow and Intermediate Zone Wells from 2001 thru 2002.
Former Gastown Manufactured Gas Plant Site.
All water levels and elevations are given in feet.

Well Designation	Top of Riser Elevation	08/01/01		09/21/01		10/02/01	
		Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.
Intermediate Zone Wells (continued)							
DPW-43	573.52			NM	N/A	6.73	566.79
DPW-44	573.19			NM	N/A	7.15	566.04
Tonawanda Creek							
East End Dock	568.31	3.32	564.99	3.47	564.84	3.43	564.88
West End Dock	568.24	3.27	564.97	3.42	564.82	3.37	564.87

NA Not Applicable.
NM Not Measured.
***** Bubbler and regulatory sent for repairs; pump rate lowered so it won't pump dry.

Note: The basement sumps of the Gastown Sportsmen's Club were dry on September 21, 2001.

Table 3-7 (Continued).
Groundwater Elevation Data for Shallow and Intermediate Zone Wells from 2001 thru 2002.
Former Gastown Manufactured Gas Plant Site.
All water levels and elevations are given in feet.

Well Designation	Top of Riser Elevation	04/12/02		06/12/02			
		Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.
Shallow Zone Wells							
MW-13	574.88	5.16	569.72	6.57	568.31		574.88
MW-17	575.77	5.64	570.13	6.87	568.90		575.77
MW-1S	575.61	9.00	566.61	NM	N/A		575.61
MW-2S	573.54	3.35	570.19	NM	N/A		573.54
MW-3S	573.30	2.85	570.45	NM	N/A		573.30
MW-39	575.62	Well Destroyed		Well Destroyed		Well Destroyed	
DPW-1	573.10	4.30	568.80	5.15	567.95		573.10
Intermediate Zone Wells							
MW-23	575.50	4.98	570.52	5.49	570.01		575.50
MW-1I	574.18	4.48	569.70	5.69	568.49		574.18
MW-2I	573.85	5.20	568.65	5.80	568.05		573.85
PW-1	573.35	12.78	560.57	NM	N/A		573.35
MW-27	573.93	4.06	569.87	5.09	568.84		573.93
MW-34	573.33	4.12	569.21	5.19	568.14		573.33
MW-35	573.08	4.13	568.95	5.14	567.94		573.08
MW-36	572.91	3.02	569.89	4.35	568.56		572.91
MW-40	574.40	3.51	570.89	4.68	569.72		574.40
MW-41	572.81	4.71	568.10	5.00	567.81		572.81
MW-42	573.05	3.35	569.70	4.69	568.36		573.05
MW-43	575.97	5.89	570.08	6.26	569.71		575.97
MW-44	573.00	4.27	568.73	5.03	567.97		573.00
MW-45	571.13	5.91	565.22	5.62	565.51		571.13
MW-46	571.26	4.73	566.53	4.82	566.44		571.26
MW-47	575.95	5.65	570.30	6.89	569.06		575.95
MW-48	575.17	5.62	569.55	6.32	568.85		575.17
VW-1	574.63	5.51	569.12	6.40	568.23		574.63
VW-2	574.15	5.72	568.43	6.36	567.79		574.15
VW-3	574.37	5.19	569.18	6.11	568.26		574.37
DPW-32	572.48	2.43	570.05	3.71	568.77		572.48

Table 3-7 (Continued).
Groundwater Elevation Data for Shallow and Intermediate Zone Wells from 2001 thru 2002.
Former Gastown Manufactured Gas Plant Site.
All water levels and elevations are given in feet.

Well Designation	Top of Riser Elevation	04/12/02		06/12/02			
		Depth to Water	Elev.	Depth to Water	Elev.	Depth to Water	Elev.
Intermediate Zone Wells (continued)							
DPW-33	574.06	6.21	567.85	6.75	567.31		574.06
DPW-34	572.87	7.52	565.35	7.42	565.45		572.87
DPW-36	574.60	6.99	567.61	7.42	567.18		574.60
DPW-40	572.09	5.29	566.80	6.17	565.92		572.09
DPW-43	572.29	4.14	568.15	5.02	567.27		572.29
DPW-44	571.96	4.08	567.88	5.03	566.93		571.96
DPW-49	571.82	7.14	564.68	7.03	564.79		571.82
DPW-50	571.15	6.39	564.76	6.23	564.92		571.15
DPW-51	570.82	6.68	564.14	6.31	564.51		570.82
DPW-52	571.07	6.92	564.15	6.54	564.53		571.07
DPW-53	570.84	3.83	567.01	4.16	566.68		570.84
DPW-54	571.56	8.09	563.47	6.51	565.05		571.56
DPW-55	573.72	5.38	568.34	5.84	567.88		573.72
DPW-56	574.40	6.33	568.07	6.95	567.45		574.40
DPW-57	574.63	7.01	567.62	7.42	567.21		574.63
DPW-58	575.23	3.63	571.60	4.85	570.38		575.23
Tonawanda Creek							
East End Dock	567.08	3.04	564.04	NM	N/A		567.08
West End Dock	567.01	3.01	564.00	NM	N/A		567.01
SG-1	570.96	NM	N/A	6.77	564.19		570.96

NA Not Applicable.
NM Not Measured.

APPENDIX A

SITE VISIT DATA

APPENDIX B

DISCHARGE PERMIT

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning August 1998

and lasting until August 2003

the discharges from the treatment facility to Tonawanda Creek,water index number 0-158-12 , Class C , RECEIVING WATER shall be limited and monitored by the operator as specified below:

Outfall Number and Parameter	Discharge Limitations		Units	Minimum Monitoring Requirements	
	Daily Avg.	Daily Max		Measurement Frequency	Sample Type
Outfall 001 - Treated Groundwater Remediation Discharge:					
Flow	Monitor	22000	GPD	Continuous	Meter
pH (range)	6.0 to 9.0		SU	Monthly	Grab
OIL & GREASE	Monitor	15000	µg/l	Monthly	Grab
BOD	Monitor	20000	µg/l	Monthly	Grab
TOTAL SUSPENDED SOLIDS	Monitor	20000	µg/l	Monthly	Grab
TOTAL DISSOLVED SOLIDS	Monitor	Monitor	µg/l	Monthly	Grab
IRON	Monitor	2000	µg/l	Monthly	Grab
MANGANESE	Monitor	1000	µg/l	Monthly	Grab
ZINC	Monitor	Monitor	µg/l	Monthly	Grab
CYANIDE	Monitor	400	µg/l	Monthly	Grab
BENZENE	Monitor	5	µg/l	Monthly	Grab
TOLUENE	Monitor	5	µg/l	Monthly	Grab
ETHYLBENZENE	Monitor	5	µg/l	Monthly	Grab
XYLENE-O	Monitor	5	µg/l	Monthly	Grab
XYLENE-M & P	Monitor	10	µg/l	Monthly	Grab
MTBE	Monitor	50	µg/l	Monthly	Grab
NAPHTHALENE	Monitor	10	µg/l	Monthly	Grab
ACENAPHTHYLENE	Monitor	10	µg/l	Monthly	Grab
ACENAPHTHENE	Monitor	10	µg/l	Monthly	Grab
FLUORENE	Monitor	10	µg/l	Monthly	Grab
PHENANTHRENE	Monitor	10	µg/l	Monthly	Grab
ANTHRACENE	Monitor	10	µg/l	Monthly	Grab
FLUORANTHENE	Monitor	10	µg/l	Monthly	Grab

PYRENE	Monitor	10	ug/l	Monthly	Grab
BENZO(a)ANTHRACENE	Monitor	10	ug/l	Monthly	Grab
CHRYSENE	Monitor	10	ug/l	Monthly	Grab
BIS(2-ETHYLHEXYL)PHTHALATE	Monitor	10	ug/l	Monthly	Grab
BENZO(b)FLUORANTHENE	Monitor	10	ug/l	Monthly	Grab
BENZO(k)FLUORANTHENE	Monitor	10	ug/l	Monthly	Grab
BENZO(a)PYRENE	Monitor	10	ug/l	Monthly	Grab
INDENO(1,2,3-cd)PYRENE	Monitor	10	ug/l	Monthly	Grab
DIBENZ(a,h)ANTHRACENE	Monitor	10	ug/l	Monthly	Grab
BENZO(g,h,i)PERYLENE	Monitor	10	ug/l	Monthly	Grab
PENTACHLOROPHENOL	Monitor	10	ug/l	Monthly	Grab
PHENOL	Monitor	50	ug/l	Monthly	Grab
PHENOLS, T(4AAP)	Monitor	500	ug/l	Monthly	Grab
HEPTACHLOR EPOXIDE	Monitor	0.44	ug/l	Monthly	Grab
4, 4' DDD	Monitor	0.18	ug/l	Monthly	Grab
CHLORDANE	Monitor	0.05	ug/l	Monthly	Grab
DIBENZOFURAN	Monitor	10	ug/l	Monthly	Grab
STYRENE		Monitor	ug/l	Quarterly	Grab
ISOPROPYLBENZENE		Monitor	ug/l	Quarterly	Grab
n-PROPYLBENZENE		Monitor	ug/l	Quarterly	Grab
1,2,4- TRIMETHYLBENZENE		Monitor	ug/l	Quarterly	Grab
1,3,5-TRIMETHYLBENZENE		Monitor	ug/l	Quarterly	Grab
sec-BUTYLBENZENE		Monitor	ug/l	Quarterly	Grab
p-ISOPROPYLTOLUENE		Monitor	ug/l	Quarterly	Grab
n-BUTYLBENZENE		Monitor	ug/l	Quarterly	Grab
INDENE		Monitor	ug/l	Quarterly	Grab
2-METHYLNAPHTHALENE		Monitor	ug/l	Quarterly	Grab
CARBAZOLE		Monitor	ug/l	Quarterly	Grab
BIPHENYL		Monitor	ug/l	Quarterly	Grab

Additional Conditions:

(1) Discharge is not authorized until such time as an engineering submission showing the method of treatment is approved by the Department. The discharge rate may not exceed the effective or design treatment system capacity. All monitoring data, engineering submissions and modification requests must be submitted to:

Chief - Operation Maintenance and Support Section
Bureau of Hazardous Site Control
Division of Environmental Remediation
NYSDEC
50 Wolf Road
Albany, N.Y. 12233-7010

With a copy sent to:

John McMahon,RWE, R-9
NYS Dept. Of En. Con.
270 Michigan Ave
Buffalo, NY 14202-2999
Ph: 716-851-7070

(2) Only site generated wastewater is authorized for treatment and discharge.

(3) Authorization to discharge is valid only for the period noted above but may be renewed if appropriate. A request for renewal must be received 6 months prior to the expiration date to allow for a review of monitoring data and reassessment of monitoring requirements.

(4) Both concentration (mg/l or ug/l) and mass loadings (lbs/day) must be reported to the Department for all parameters except flow and pH.

(5) Any use of corrosion/scale inhibitors or biocidal-type compounds used in the treatment process must be approved by the department prior to use.

(6) This discharge and adminstration of this discharge must comply with the attached General Conditions.