Department of Environmental Conservation

Division of Environmental Remediation

Semiannual O&M Monitoring Report
July - December 2002

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

April 2004

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

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Prepared by:

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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 July through December 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. Information obtained from these wells will be utilized for performance monitoring to evaluate the effectiveness 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 July through December 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 during the reporting period.

- ***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 July through December 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. 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 not collected during the reporting period.

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 selected Site monitoring wells on 28 occasions during the reporting period as part of a pressure pulse test conducted during the Remedial Investigation. Water levels were measured in all Site monitoring wells on four of these occasions: July 10, August 30, September 14 and October 15, 2002. These levels were measured with an electronic water level indicator and reported as an elevation above mean sea level. The locations of these wells are shown on Figure 1-5. A discussion of the hydrographs and groundwater contour maps constructed from these data is presented in Section 4.0.

3.0 RESULTS

3.1 Site Inspections

3.1.1 *July 2002*

The site was visited on four (4) occasions during the month of July 2002. A full round of compliance samples was collected and submitted to Severn Trent Laboratories, Inc. (STL) for chemical analysis on July 26, 2002. An outline of noteworthy tasks performed during the month 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.

July 8, 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 60.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Adjusted pneumatic settings of DNAPL pump.
- Repair jammed totalizer.
- Collected full round of system data.
- System fully operational upon departure.

July 12, 2002

- System fully operational upon arrival.
- Recovered a total of 1.5 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 1.5 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.
- Changed H_20 filters.
- Collected full round of system data.
- System fully operational upon departure.

July 19, 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 0.25 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 0.75 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.
- Collected full round of system data.
- System fully operational upon departure.

July 26, 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 0.25 gallons of pure DNAPL product from the oil/water separator.
- Recovered a total of 1.0 gallon of pure DNAPL product from the purge drum utilized during the pressure pulse setup and test.
- Recovered a total of 5.0 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 0.75 gallons of DNAPL/water mixture from the oil/water separator.
- Recovered a total of 9.0 gallons of DNAPL/water mixture from the purge drum utilized during the pressure pulse setup and test.
- Recovered a total of 60.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Freed stuck high-high switch in the equalization drum.
- Collected water samples and delivered to STL for chemical analysis.
- Collected full round of system data.
- System fully operational upon departure.

3.1.2 *August 2002*

The site was visited on five (5) occasions during the month of August 2002. A full round of compliance samples was collected and submitted to STL for chemical analysis on August 30, 2002. An outline of noteworthy tasks performed during the month 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.

August 2, 2002

- System fully operational upon arrival.

- Recovered a total of 2.0 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 3.0 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 0.75 gallons 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.
- Collected full round of system data.
- System fully operational upon departure.

August 9, 2002

- System fully operational upon arrival.
- Recovered a total of 1.5 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 3.5 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 53.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Changed H_20 filters.
- Pumped four (4) drums of well development water through the treatment system.
- Collected full round of system data.
- System fully operational upon departure.

August 16, 2002

- System fully operational upon arrival.
- Recovered a total of 2.0 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 2.0 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 0.75 gallons of DNAPL/water mixture from the oil/water separator.
- Recovered a total of 53.0 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.

August 23, 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 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 0.25 gallons 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.

August 30, 2002

- System fully operational upon arrival.
- Recovered a total of 2.0 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 2.0 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 water samples and delivered to STL for chemical analysis.
- Collected full round of system data.
- System fully operational upon departure.

3.1.3 *September 2002*

The site was visited on four (4) occasions during the month of September 2002. A full round of compliance samples was collected and submitted to STL for chemical analysis on September 27, 2002. An outline of noteworthy tasks performed during the month 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.

September 6, 2002

- System fully operational upon arrival.
- Recovered a total of 1.5 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 2.0 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 fully operational upon departure.

September 13, 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 1.0 gallon of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 52.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Adjusted pneumatic settings of LNAPL pump.
- Collected full round of system data.
- System fully operational upon departure.

September 20, 2002

- System fully operational upon arrival.
- Recovered a total of 1.5 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 1.0 gallon 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.
- Troubleshoot LNAPL system and clean bubbler tube.
- Collected full round of system data.
- System fully operational upon departure.

September 27, 2002

- System fully operational upon arrival.
- Recovered a total of 1.0 gallon of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 1.5 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 56.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Cleaned LNAPL pump.
- Collected water samples and delivered to STL for chemical analysis.
- Collected full round of system data.

- System fully operational upon departure.

3.1.4 *October 2002*

The site was visited on seven (7) occasions during the month of October 2002. A full round of compliance samples was collected and submitted to STL for chemical analysis on October 18, 2002. An outline of noteworthy tasks performed during the month 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.

October 2, 2002

- Three (3) drums of NAPL and solids picked up from site for disposal.

October 4, 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 2.0 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 fully operational upon departure.

October 10, 2002

- Nine (9) drums of soil from RI drilling activities picked up from site for disposal.

October 11, 2002

- System fully operational upon arrival.
- Recovered a total of 1.5 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 1.5 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 fully operational upon departure.

October 18, 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 1.0 gallon 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 water samples and delivered to STL for chemical analysis.
- Collected full round of system data.
- System fully operational upon departure.

October 23, 2002

- System fully operational upon arrival.
- Recovered a total of 1.5 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 1.5 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 51.0 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.

October 30, 2002

- System not fully operational upon arrival due to high level fault in the DNAPL system.
- Recovered a total of 3.5 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 2.0 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 fully operational upon departure.

3.1.5 *November 2002*

The site was visited on five (5) occasions during the month of November 2002. A full round of compliance samples was collected and submitted to STL for chemical analysis on November 27, 2002. An outline of noteworthy tasks performed during the month 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.

November 1, 2002

- System fully operational upon arrival.
- Recovered a total of 1.5 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 1.0 gallon of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 20.0 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.

November 8, 2002

- System not fully operational upon arrival due to high level fault in the DNAPL system.
- Recovered a total of 3.5 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 67.0 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.

November 15, 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 1.5 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 full round of system data.
- System fully operational upon departure.

November 22, 2002

- System fully operational upon arrival.
- Recovered a total of 1.5 gallons of pure DNAPL product from the DNAPL storage drum.

- Recovered a total of 3.5 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 70.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Changed H_20 filters.
- Turned on heater.
- Freed stuck high-high switch in the equalization drum.
- Collected full round of system data.
- System fully operational upon departure.

November 27, 2002

- System fully operational upon arrival.
- Recovered a total of 1.0 gallon of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 1.0 gallon of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 47.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- 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.

3.1.6 *December 2002*

The site was visited on four (4) occasions during the month of December 2002. A full round of compliance samples was collected and submitted to STL for chemical analysis on December 27, 2002. An outline of noteworthy tasks performed during the month 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.

December 6, 2002

- System not fully operational upon arrival due to high level fault in the DNAPL system.
- Recovered a total of 1.5 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 1.5 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 0.75 gallons of DNAPL/water mixture from the oil/water separator.

- Recovered a total of 75.0 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.

December 13, 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 2.0 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.
- Changed H_20 filters.
- Collected full round of system data.
- System fully operational upon departure.

December 20, 2002

- System fully operational upon arrival.
- Recovered a total of 1.5 gallons of pure DNAPL product from the DNAPL storage drum.
- Recovered a total of 1.5 gallons of DNAPL/water mixture from the DNAPL storage drum.
- Recovered a total of 20.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Changed H_20 filters.
- Cleaned bubbler tube.
- Collected full round of system data.
- System fully operational upon departure.

December 27, 2002

- System not fully operational upon arrival due to bubbler tube malfunction in the LNAPL system.
- Recovered a total of 1.0 gallon 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 2.0 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 20.0 gallons of DNAPL/water mixture from the DNAPL storage drum that was placed in the oil/water separator.
- Changed H_20 filters.
- Blew line for bubbler tube with air compressor.
- 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. 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 volatile organic compounds, 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 August, November and December;
- Bis(2-ethylhexyl)phthalate in July, September and December;
- Iron in August; and
- Cyanide in August.

Vinyl chloride was also detected in the post-carbon samples collected in November and December 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.

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 were relatively low (<0.5 gpm) throughout the reporting period, although increased rates were observed for several periods (e.g., the November 27, December 20 and December 27, 2002 entries). These increased pumping rates were likely caused by increased flow from the secondary vault to the treatment system during precipitation events. 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.

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 61.0 gallons of DNAPL and 68.0 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.

3.6 NAPL Sampling

NAPL from the DNAPL storage drum was not collected during the reporting period. Historic NAPL analytical results are summarized in Table 3-5.

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 four times during the reporting period: July 10, August 30, September 14 and October 15, 2002, and six times during 2002. Water levels were also measured 28 additional times in select wells during the year. These water levels, along with water level data from the first reporting period of 2002, are summarized in Table 3-7.

4.0 DISCUSSION

Between July 1 and December 31, 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 and sent to Severn Trent Laboratories, Inc. in Amherst, New York for chemical analysis.

Analytical results of the compliance samples (Table 3-2) indicate that extracted groundwater is still significantly contaminated with volatile organic compounds, 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 any 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 most likely met the Division of Water's discharge limits.

Prior to August 2001, and starting again in August 2002, 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 the iron concentrations in the pre-carbon samples, strongly suggesting that a significant iron source is located between the oil water separator and the carbon drums. The most likely source is rusting of the equalization drum, carbon drums and piping over time.

Since startup of the groundwater/NAPL extraction and treatment system on September 2, 1998, groundwater has been recovered at an average rate of 752.3 gallons per day (gpd). The average flow rate decreased during the reporting period from the 788.7 gpd calculated for June 28, 2002. This decrease is most likely attributed to the lower than average precipitation during August, September and November, 2002.

During the reporting period, the groundwater/NAPL extraction system recovered 61.0 gallons of DNAPL and 68.0 gallons of DNAPL/water mixture. NAPL recovery was highest in July (15.75 gallons) and lowest in September (7.0 gallons). NAPL recovery during the remaining months fluctuated from month to

month (8.5 gallons in August, 12.0 gallons in October, 10.0 gallons in November and 7.75 gallons in December) but remained relatively low. The quantity of NAPL collected during the reporting period is significantly lower than the quantity collected during the previous 6 months (114.5 gallons), which continues the downward trend since October 2000 when 106.5 gallons of NAPL were recovered (Figure 4-2). Although gallons of NAPL are still being recovered, this downward trend suggests that in the near future the recovery rate may drop to insignificant levels. It is important to note that the secondary vault was installed in October 2000, suggesting that the discharge of the club's basement sump into the recovery well prior to this time greatly impacted the recovery of NAPL. In addition, the spike in NAPL recovery during May 2000 (98.5 gallons) occurred one month after the recovery well was rehabilitated to remove sediment and biological material that had accumulated in the well. To date, the total quantities of DNAPL and DNAPL/water recovered by the extraction system are 1,688 and 760 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 not collected during the reporting period. A NAPL sample collected on May 3, 2002 for chemical analysis was consistent with previous NAPL analytical results in that the recent sample contained significant concentrations of BTEX and PAHs (Table 3-5). Unlike previous results, however, the recent sample contained 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). Given the contaminant concentrations detected in groundwater (pre-carbon water) extracted this reporting period, 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 level data obtained prior to the Remedial Investigation appear to document the effect of groundwater extraction on the groundwater flow pattern across the Site (Figure 4-3). This figure suggests that groundwater extraction produces an elliptical cone of depression around the recovery 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).

The effect of groundwater extraction on the groundwater flow pattern across the Site was further evaluated by incorporating the water level data obtained from wells installed during the Remedial Investigation (Table 3-7). These data were utilized to construct groundwater contour maps for the six dates (April 12, June 12, July 10, August 30, September 14 and October 15, 2002) for which water levels were available for all Site monitoring wells. The groundwater contour map for April 12, 2002 is shown in Figure 4-4. Because the groundwater flow pattern is similar to that for the other five dates, only the April 12th contour map is presented in this report. The discussion of Figure 4-4, however, would be similar for the other five contour maps.

Figure 4-4 reveals that overburden groundwater flows northward toward Tonawanda Creek, and is relatively uniform across the area. Slightly steeper gradients, however, are observed near Tonawanda Creek, and the effect of the groundwater extraction system is easily observed. This figure suggests that groundwater extraction produces a circular cone of depression around the recovery well that is similar in size to that observed with pre-Remedial Investigation water level data (Figure 4-3).

To further evaluate the effect of groundwater extraction, a series of hydrographs were constructed from the water level data in Table 3-7. Representative hydrographs for select wells are shown in Figure 4-5. This figure reveals that water levels decrease throughout the year, with higher water levels observed during the wet spring and early summer months and lower water levels observed during the drier summer months. The fluctuations on June 18, July 23, July 30 and September 30, 2002 appear to be related to precipitation events on June 17 (0.32 inches), July 22 and 23 (1.77 inches), July 28 and 29 (1.23 inches) and September 27, 2002 (1.48 inches). The effect of rainfall on water levels appears to be nearly instantaneous.

Figure 4-5 also reveals that the hydrographs for wells within and outside the cone of depression (see Figure 4-4 for well locations) are essentially identical, suggesting that the groundwater extraction system has very little effect on water levels throughout the Site. The general water level decrease throughout the year,

therefore, is probably related solely to reduced precipitation and increased evapotranspiration during the relatively hot, dry summer months. Because water levels in the recovery well range from approximately 6.75 feet (dry weather) to 8.75 feet (wet weather) lower than the nearest monitoring wells (VW-2 and VW-3), the cone of depression observed in Figure 4-4 is likely the product of the contouring algorithm utilized to construct the contour (Surfer 7.04™ by Golden Software, Inc). As a result, the cone of depression observed in Figure 4-4 is probably not as extensive as shown.

To better represent the actual cone of depression, the water level data utilized to construct Figure 4-4 was re-contoured with the water level data from the recovery well removed. This groundwater contour map is shown in Figure 4-6. This figure shows that while the cone of depression is not nearly as defined as shown in Figure 4-4, groundwater extraction does influence the groundwater flow pattern in the vicinity of the recovery well. This effect, however, is caused by the combined pumping rates from the groundwater pump in the recovery well and the sump pumps in the basement of the Gastown Sportsmen's Club.

The 2002 annual cost to operate the groundwater/NAPL extraction and treatment system was $42,025. This cost includes $30,342 for system operation and maintenance, and $11,683 for chemical analysis of NAPL and groundwater samples. These costs, along with costs from previous years, are shown graphically in Figure 4-7.

5.0 RECOMMENDATIONS

As required by the September 2001 Operation and Maintenance Manual, the following Site activities are to be completed during the next reporting period, which runs from January 1 to June 30, 2003:

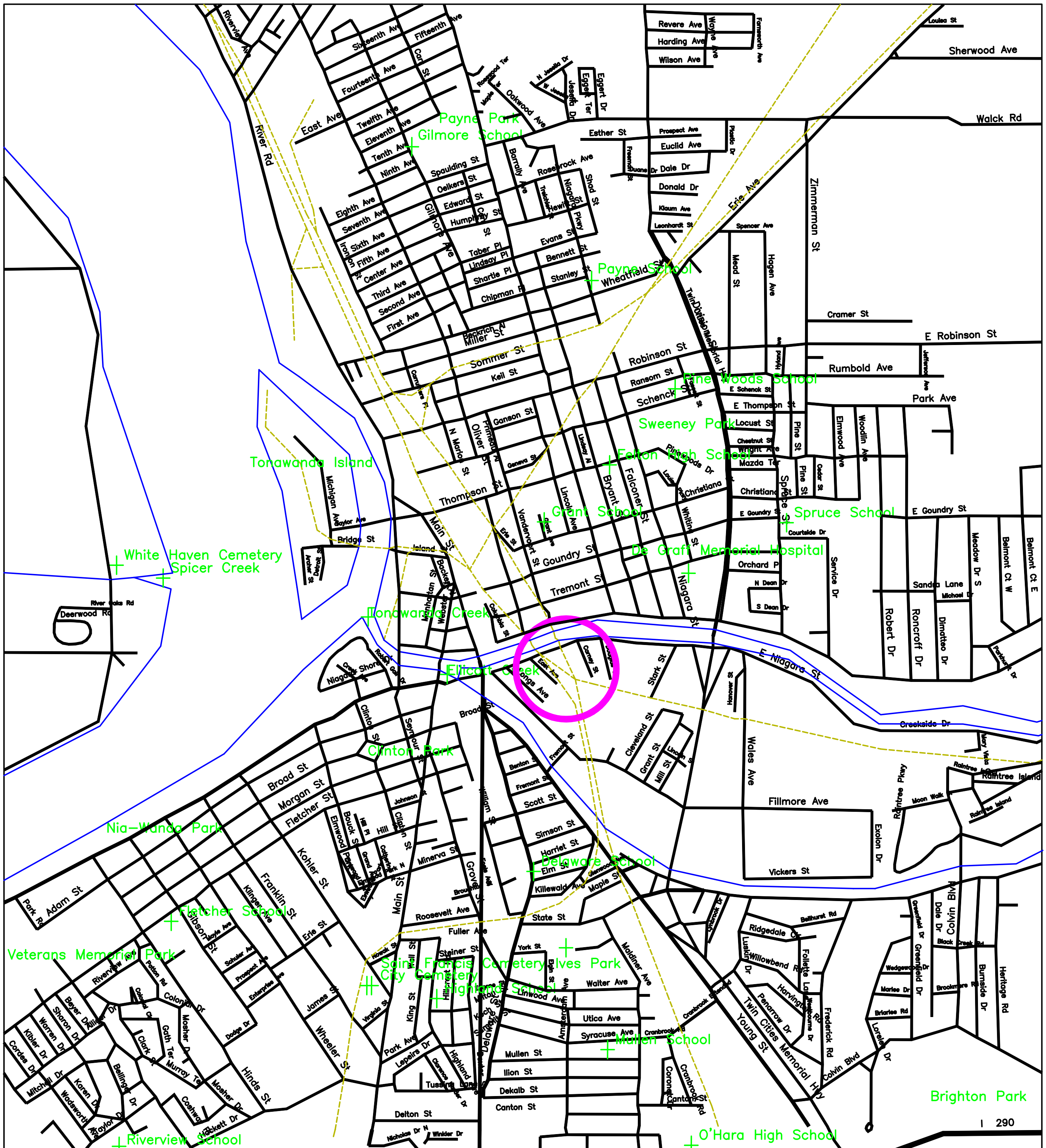
- Continue the weekly site visits to inspect and maintain the groundwater/NAPL extraction and treatment system, and to collect system data, which includes, but is not limited to, the quantity of recovered NAPL and totalizer readings. Water filters and activated carbon will be replaced as necessary;
- 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.

As discussed in Section 1.0, the groundwater extraction system was installed as an Emergency Response Action to address potential adverse health impacts to members of the Gastown Sportsmen's Club by capturing contaminated groundwater before it enters the two basement sumps of the club. The basement sumps, however, have not been dewatered since the first year of system operation. In addition, hydrographs suggest that the groundwater extraction system has very little effect on water levels throughout the Site. As a result, protection of club members is through the ventilation fan and containment structure around the basement sumps. Since club members are being adequately protected, it is recommended that the Department evaluate the need to continue operating the groundwater extraction system.

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

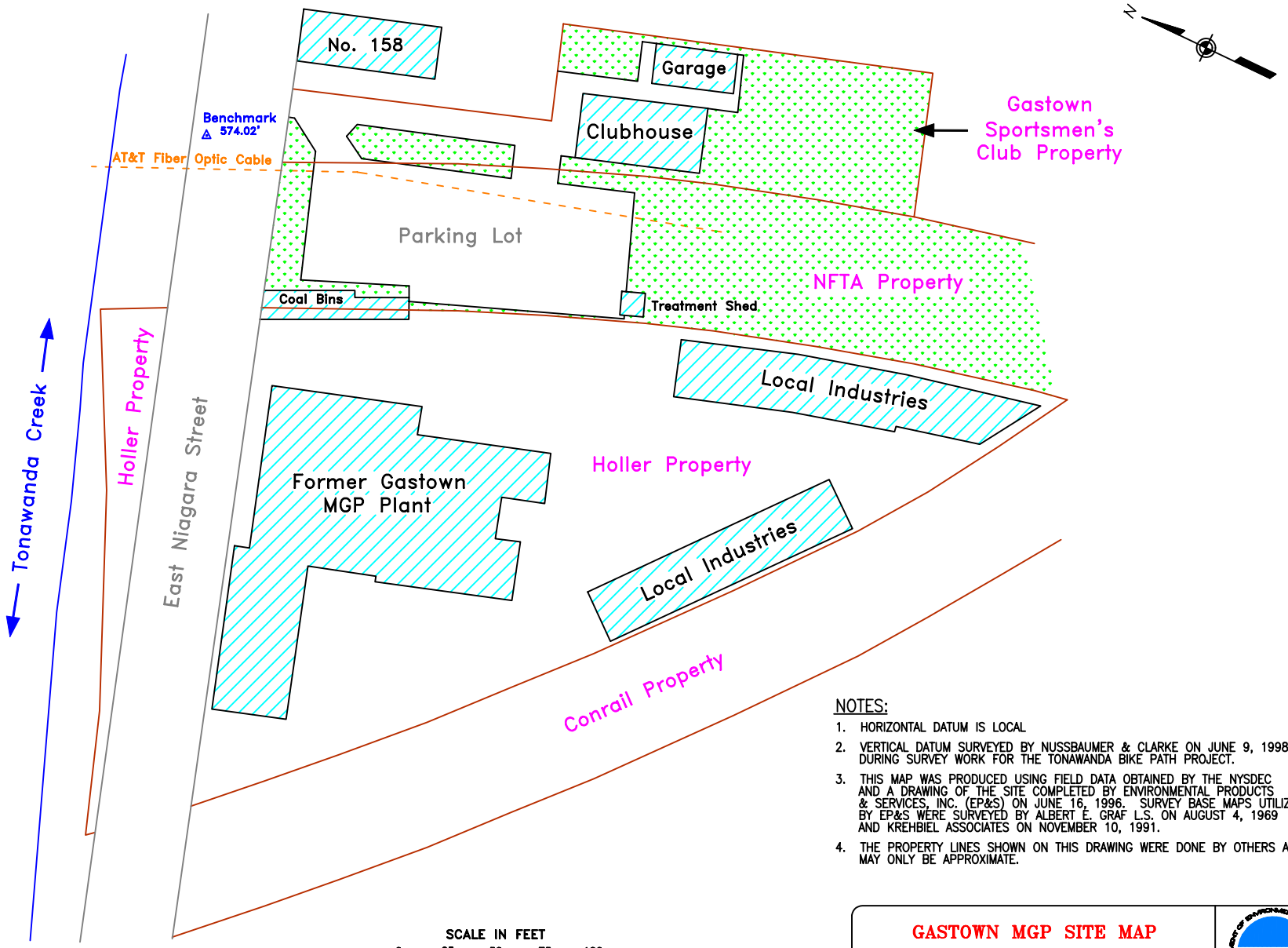
SITE LOCATION MAP

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.

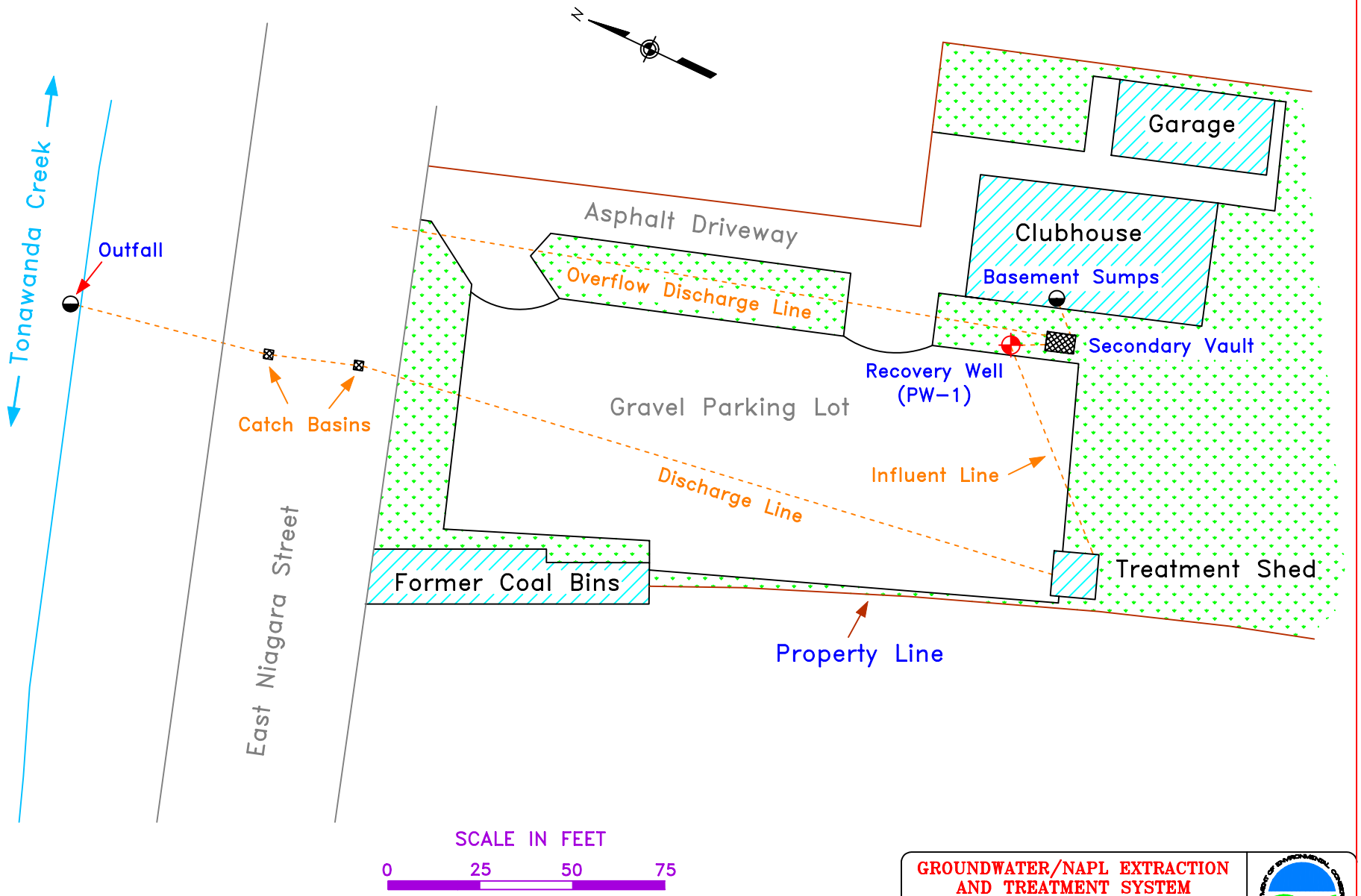
GASTOWN MGP SITE MAP

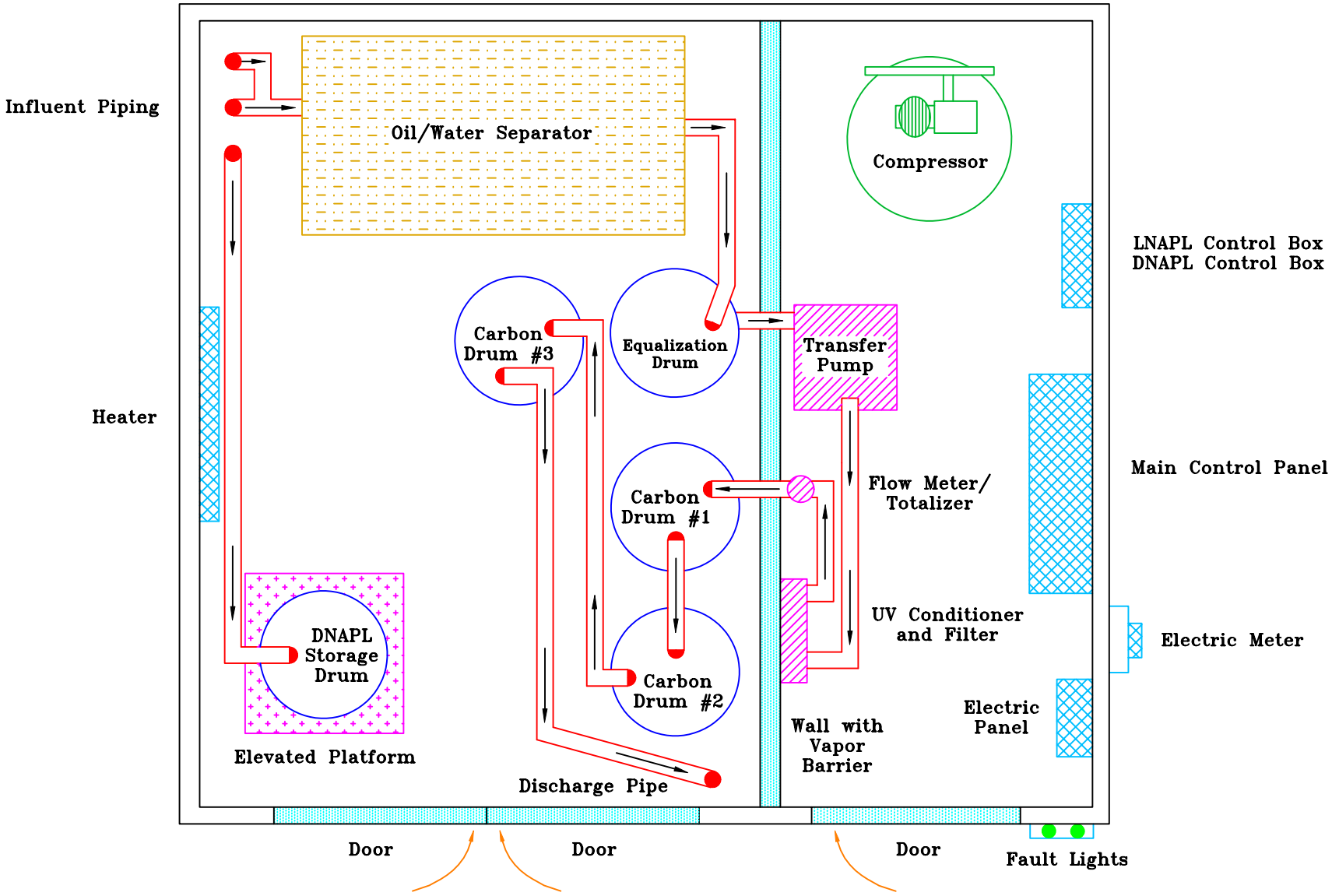
DIVISION OF ENVIRONMENTAL REMEDIATION

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

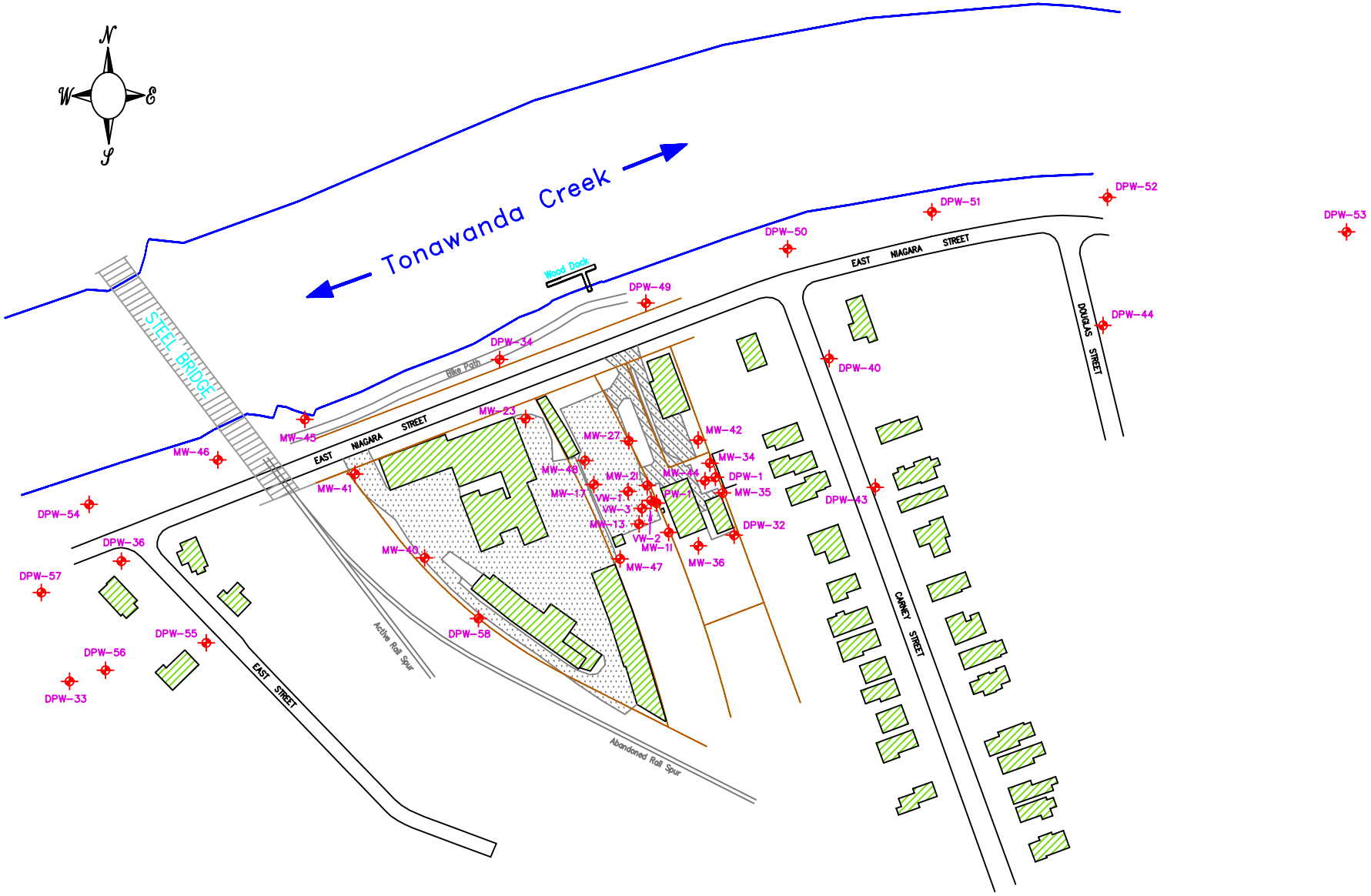


TREATMENT SYSTEM LAYOUT

DIVISION OF ENVIRONMENTAL REMEDIATION

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

SITE: FORMER GASTOWN MGP SITE FIGURE 1-4



LEGEND:

MONITORING WELL

SCALE IN FEET

0 100 200 300

MONITORING WELL LOCATION MAP

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 08/23/02 DRAWING: Monitoring Wells.dwg

SITE NAME: FORMER GASTOWN MGP SITE

FIGURE 1-5

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

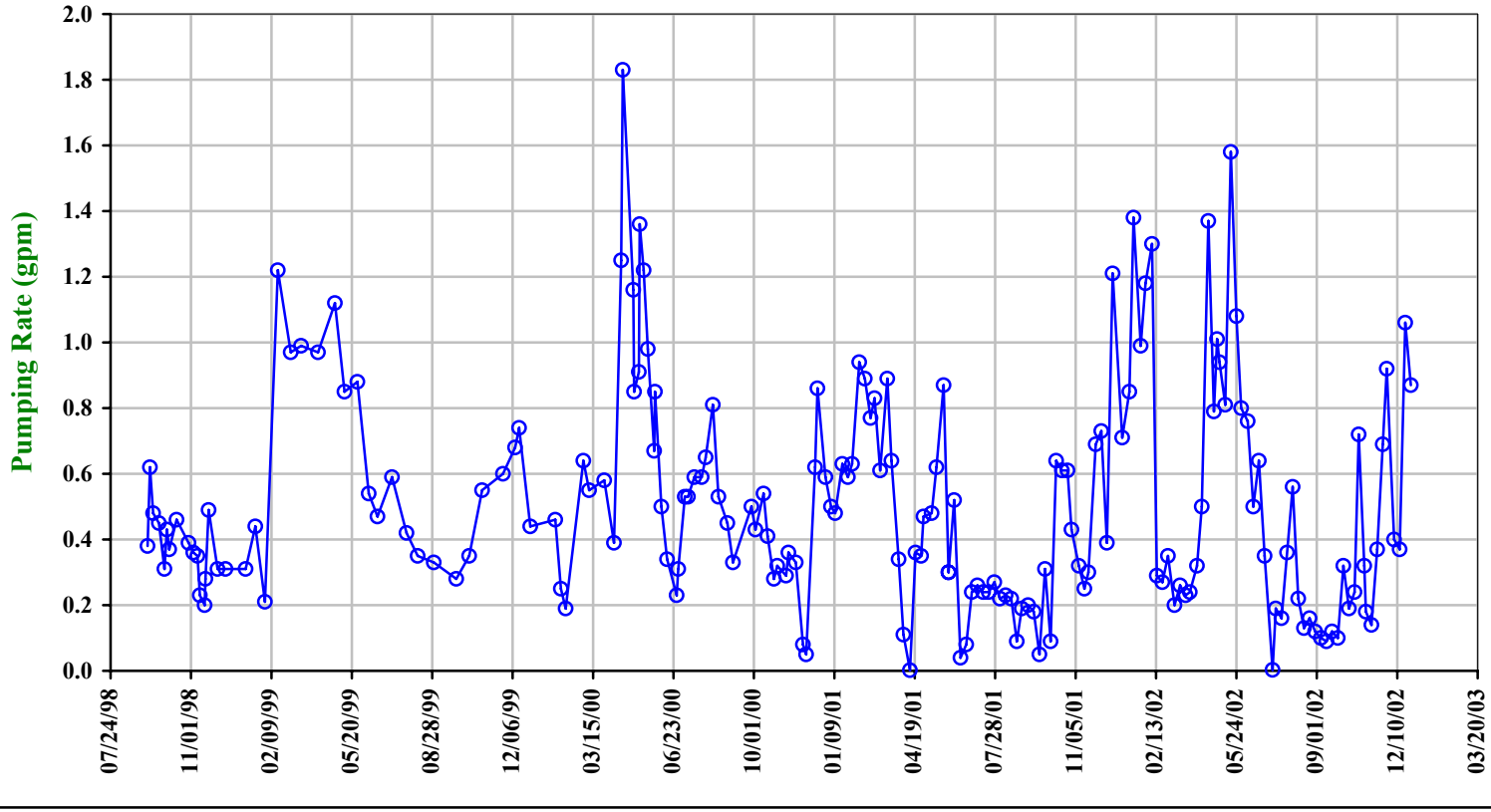


Figure 3-2. DNAPL and DNAPL/Water Recovery - Cumulative Totals
Former Gastown Manufactured Gas Plant Site

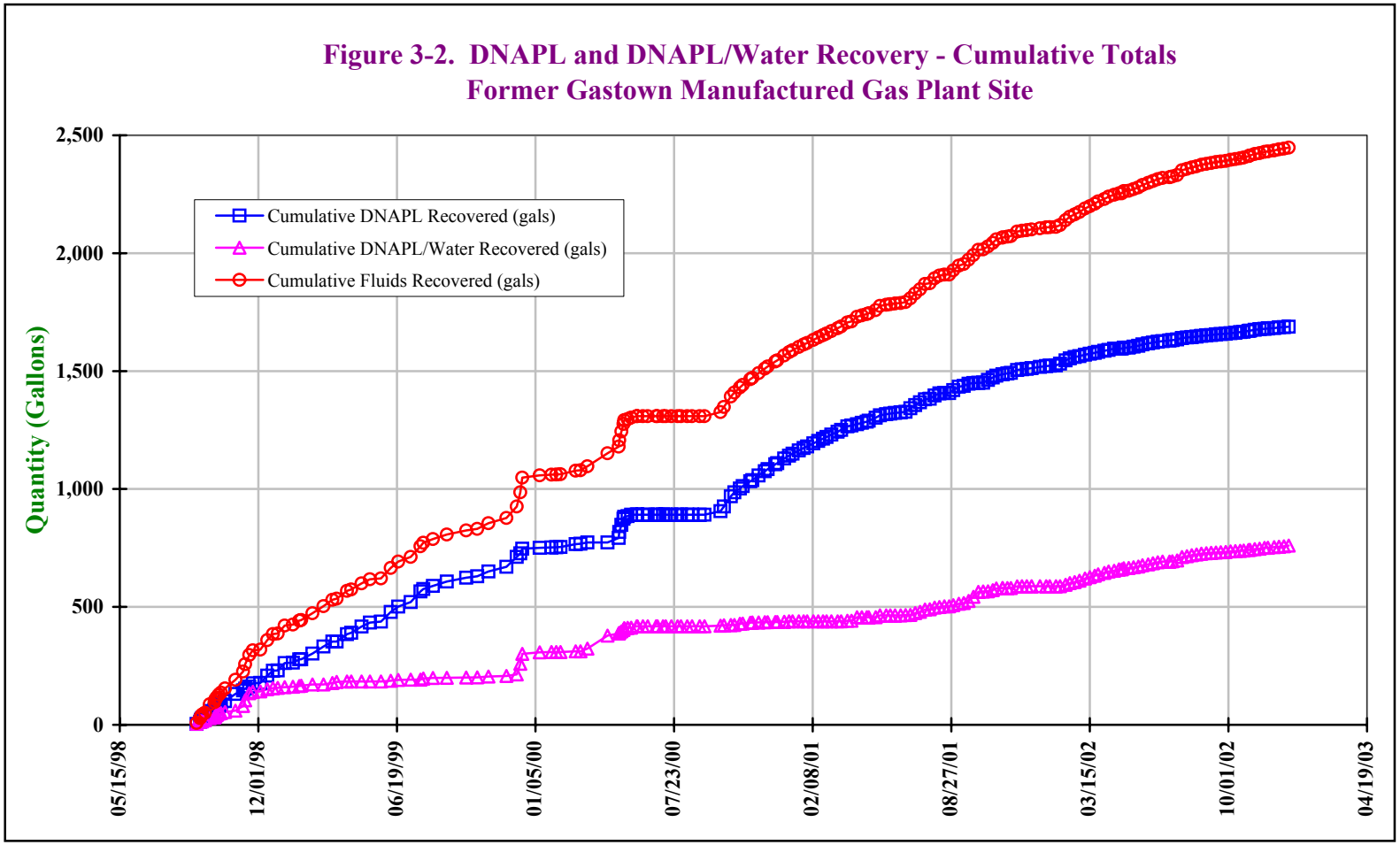


Figure 4-1. Pre- and Post-Carbon Analytical Data for Iron
Former Gastown Manufactured Gas Plant Site

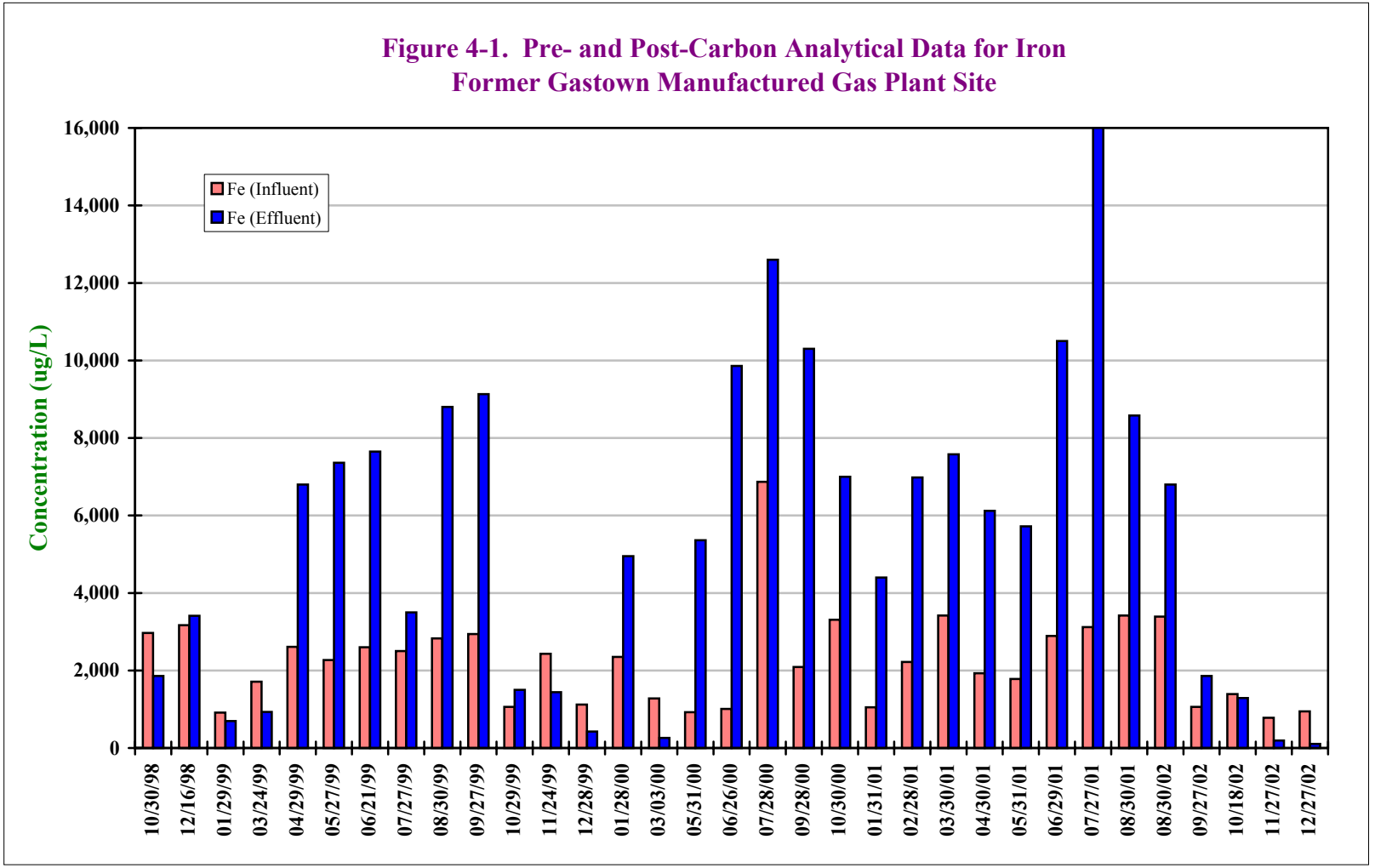
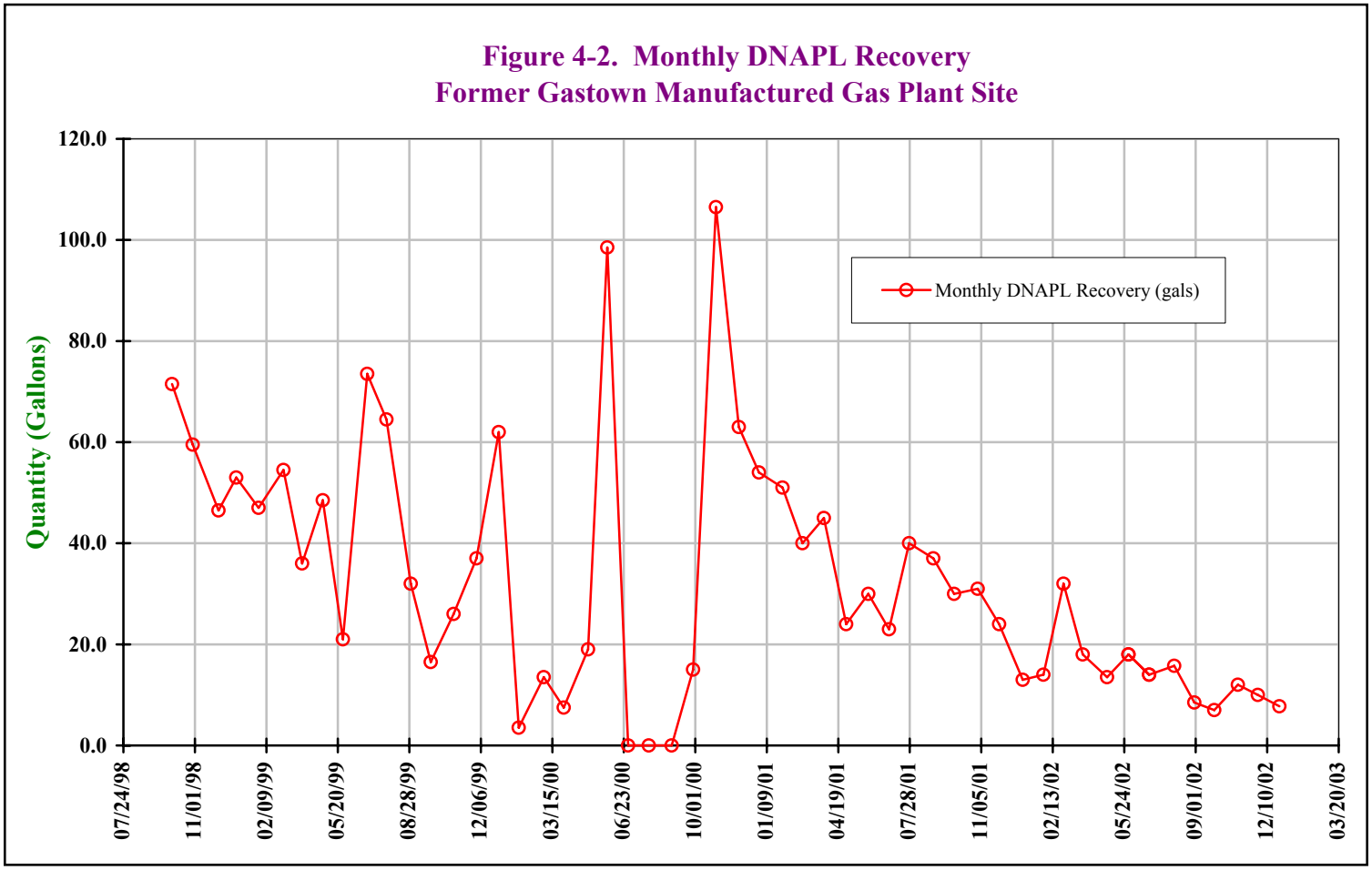
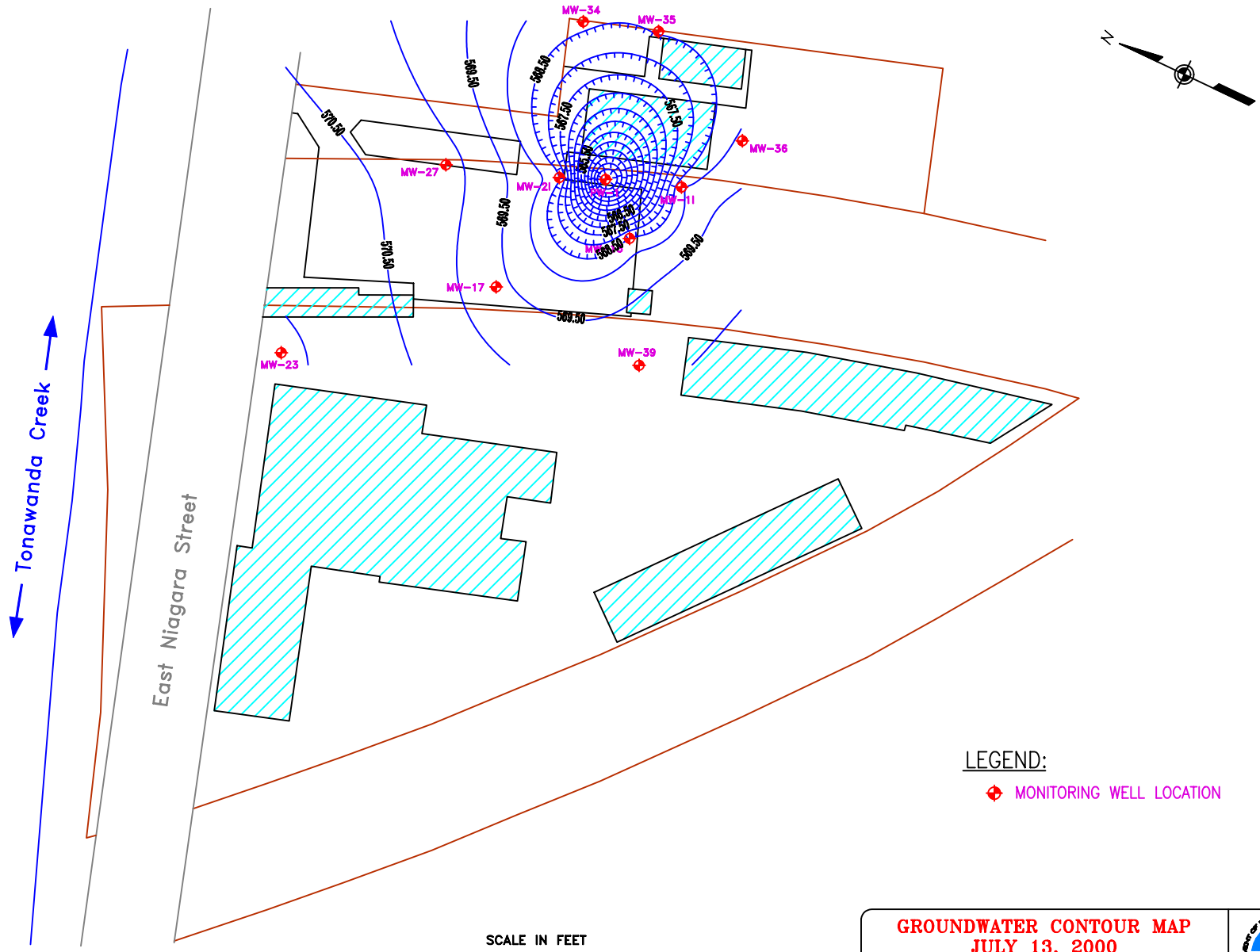


Figure 4-2. Monthly DNAPL Recovery
Former Gastown Manufactured Gas Plant Site





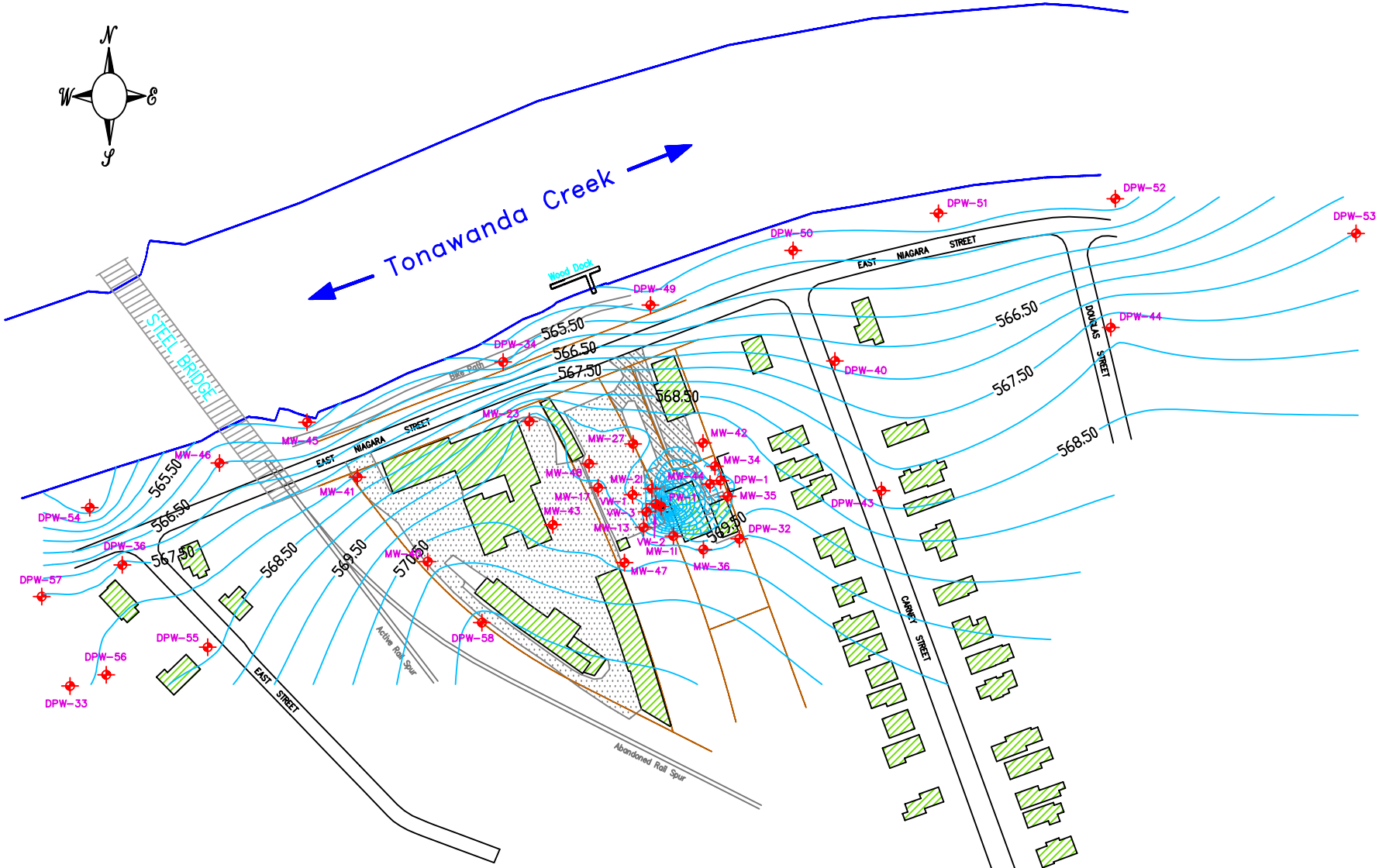
GROUNDWATER CONTOUR MAP
JULY 13, 2000

DIVISION OF ENVIRONMENTAL REMEDIATION

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

SITE: FORMER GASTOWN MGP SITE

FIGURE 4-3



SCALE IN FEET

0 100 200 300

GROUNDWATER CONTOUR MAP
APRIL 12, 2002

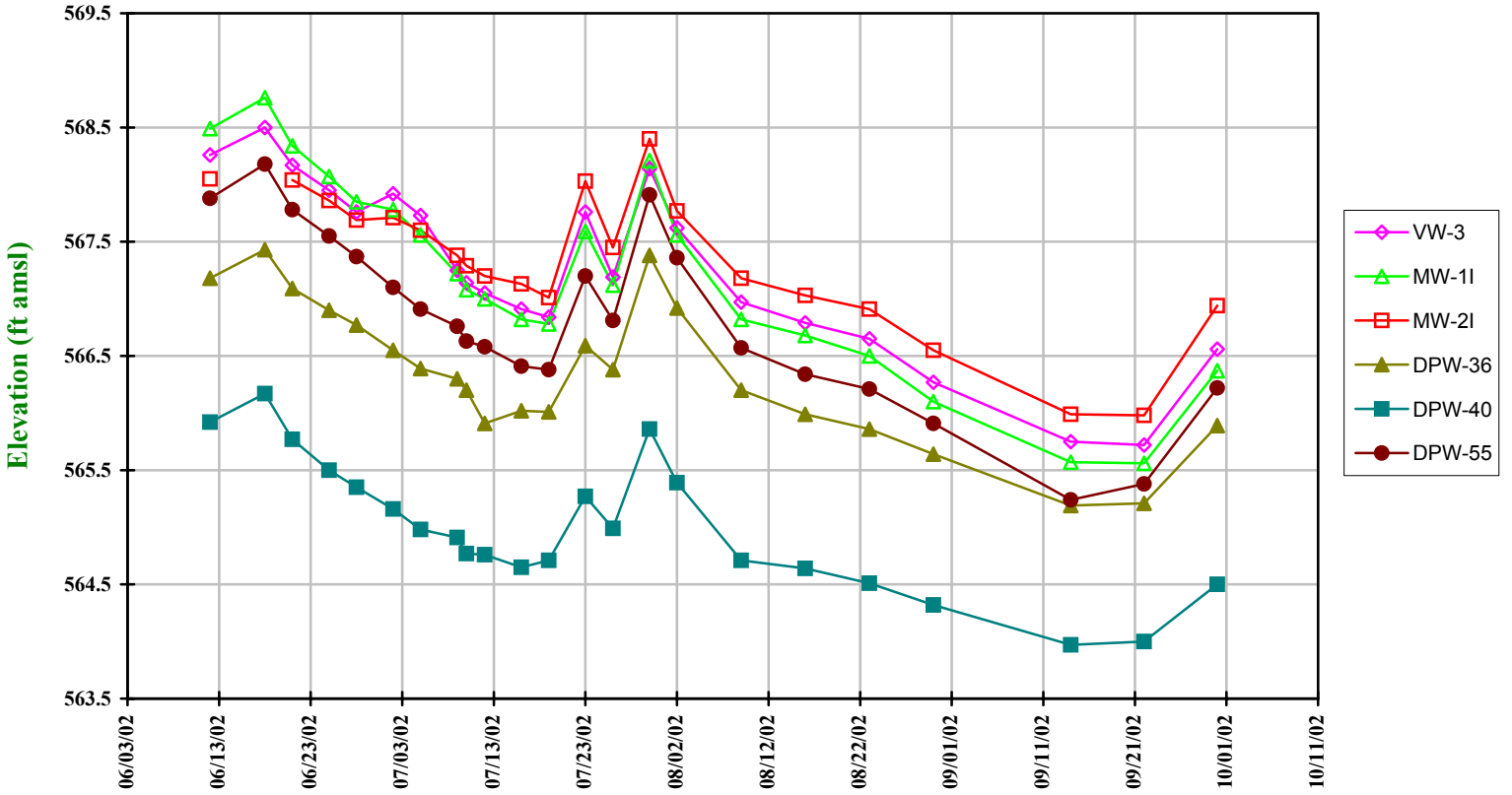
DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 08/23/02 DRAWING: Monitoring Wells.dwg

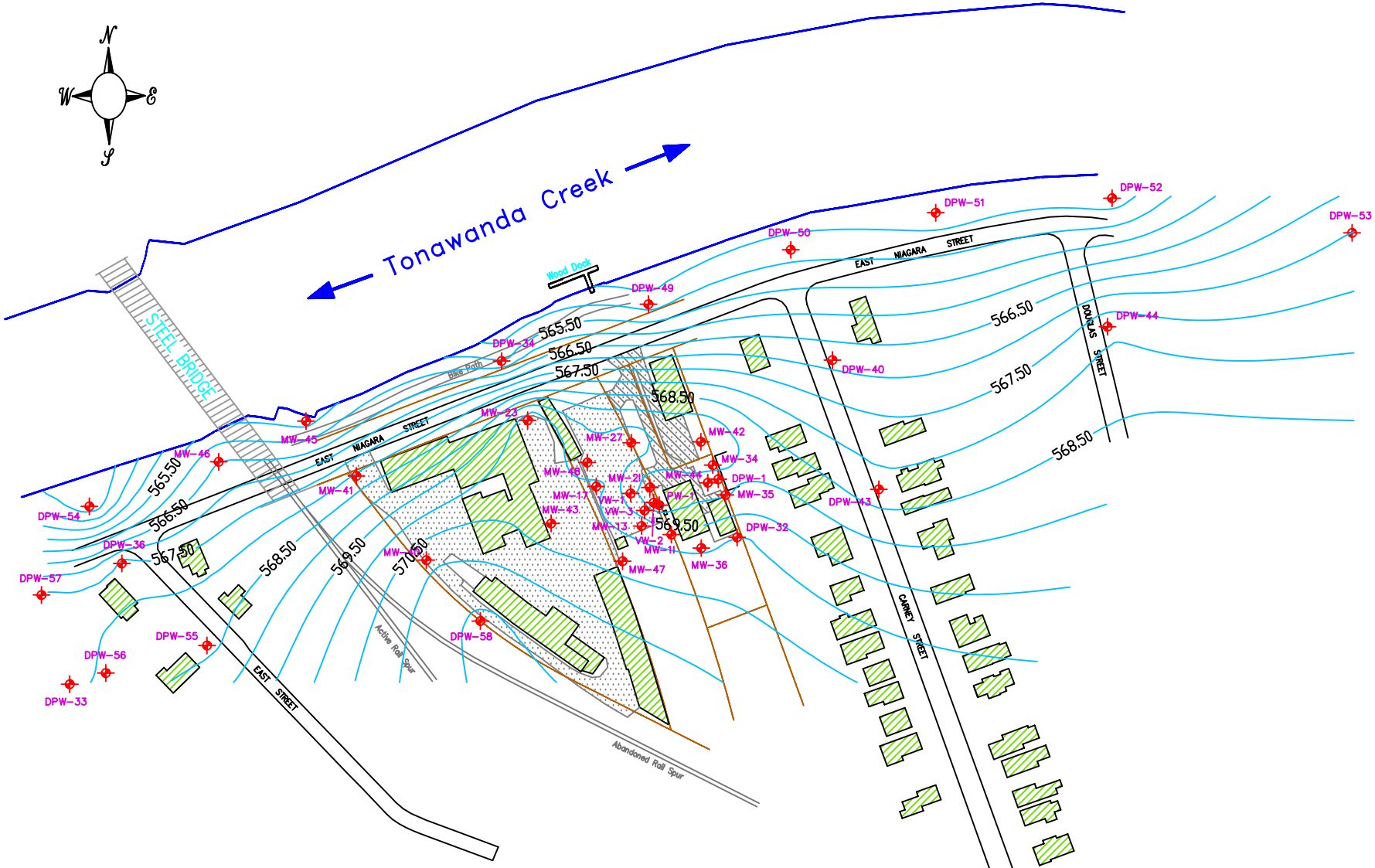
SITE NAME: FORMER GASTOWN MGP SITE

FIGURE 4-4

Figure 4-5. Hydrographs from Selected Wells
Former Gastown Manufactured Gas Plant Site



open sysmbols = wells within the cone of depression
solid sysmbols = wells outside the cone of depression



GROUNDWATER CONTOUR MAP
APRIL 12, 2002

DIVISION OF ENVIRONMENTAL REMEDIATION

DATE: 08/23/02 | DRAWING: Monitoring Wells.dwg

SITE NAME: FORMER GASTOWN MGP SITE

FIGURE 4-6

Figure 4-7. Annual Costs for Operating and Maintaining the Groundwater/NAPL Extraction and Treatment System Former Gastown Manufactured Gas Plant Site

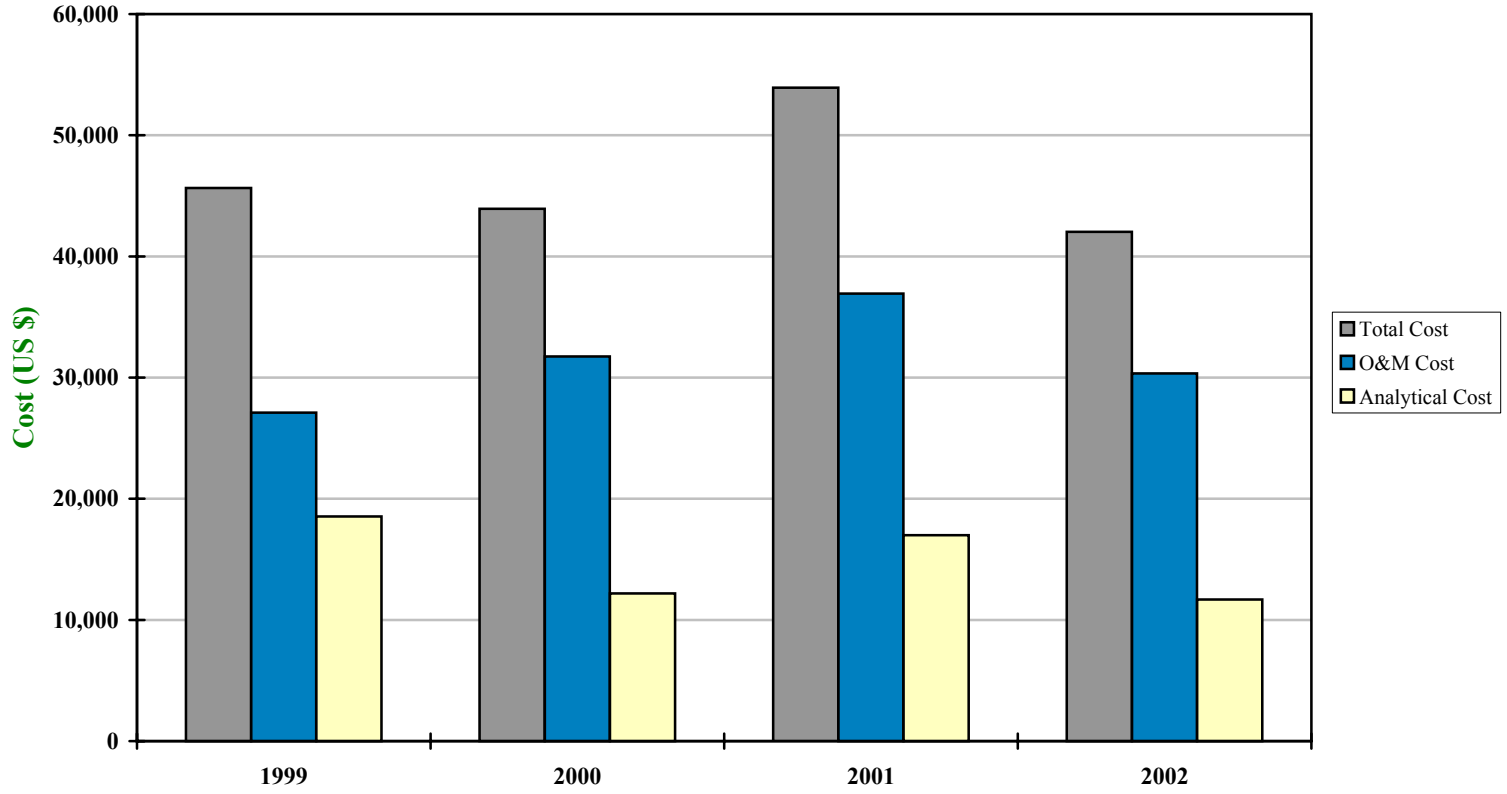


Table 3-1.
Summary of Compliance Sampling Dates and Analytical Parameters.
Former Gastown Manufactured Gas Plant Site.

Sampling Dates	Pre-Carbon	Mid-Carbon	Post-Carbon
July 26, 2002 August 30, 2002 September 27, 2002 October 18, 2002 November 27, 2002 December 27, 2002	34 v. by EPA 8260 15 v. by EPA 8021 Calcium Iron 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	07/26/02 (STL)			08/30/02 (STL)			09/27/02 (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 (500)		ND (5)	ND (500)		ND (5)	ND (100)		ND (1)
1,2-Dichloropropane		ND (500)		ND (5)	ND (500)		ND (5)	ND (100)		ND (1)
2-Butanone		ND (1000)		ND (10)	ND (1000)		ND (10)	ND (200)		ND (2)
Benzene	5	18,000		1.5	27,000		**5.1**	11,000		1.8
Chlorobenzene		ND (500)		ND (5)	ND (500)		ND (5)	ND (100)		ND (1)
Chloroform		ND (500)		ND (5)	ND (500)		ND (5)	ND (100)		ND (1)
Chloromethane		ND (1000)		ND (10)	ND (1000)		ND (10)	ND (200)		ND (2)
Ethylbenzene	5	610.0		ND (0.2)	1,400		ND (0.2)	410.0		ND (0.2)
Styrene	Monitor	ND (500)		ND (5)	3,600		ND (5)	1,500		0.4 J
Toluene	5	4,800		0.67	9,300		2.3	4,400		0.8 J
Vinyl Chloride		ND (500)		ND (5)	ND (500)		ND (5)	ND (100)		ND (1)
1,2,4-Trimethylbenzene	Monitor	110.0		ND (0.2)	180.0		ND (0.2)	ND (80)		ND (0.2)
1,3,5-Trimethylbenzene	Monitor	ND (100)		ND (1)	ND (100)		ND (1)	ND (80)		ND (1)
Isopropylbenzene	Monitor	ND (100)		ND (0.2)	ND (100)		ND (0.2)	ND (80)		ND (0.2)
m&p-Xylene	10	990.0		ND (0.2)	1,800		ND (0.2)	690.0		ND (0.2)
MTBE	50	ND (100)		ND (5)	ND (100)		ND (5)	ND (80)		ND (5)
n-Butylbenzene	Monitor	ND (100)		ND (0.4)	ND (100)		ND (0.4)	ND (80)		ND (0.4)
n-Propylbenzene	Monitor	ND (100)		ND (0.4)	ND (100)		ND (0.4)	ND (80)		ND (0.4)
o-Xylene	5	2,400		0.55	5,100		1.4	2,000		0.3
p-Isopropyltoluene	Monitor	ND (100)		ND (1)	ND (100)		ND (1)	ND (80)		ND (1)
sec-Butylbenzene	Monitor	ND (100)		ND (0.4)	ND (100)		ND (0.4)	ND (80)		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	07/26/02 (STL)			08/30/02 (STL)			09/27/02 (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 (9.9)			ND (10)			ND (9.5)
Acenaphthene	10			ND (9.9)			ND (10)			ND (9.5)
Acenaphthylene	10			ND (9.9)			ND (10)			ND (9.5)
Anthracene	10			ND (9.9)			ND (10)			ND (9.5)
Benzo(a)anthracene	10			ND (9.9)			ND (10)			ND (9.5)
Benzo(a)pyrene	10			ND (9.9)			ND (10)			ND (9.5)
Benzo(b)fluoranthene	10			ND (9.9)			ND (10)			ND (9.5)
Benzo(g,h,i)perylene	10			ND (9.9)			ND (10)			ND (9.5)
Benzo(k)fluoranthene	10			ND (9.9)			ND (10)			ND (9.5)
Biphenyl	Monitor			ND (9.9)			ND (10)			ND (9.5)
Bis(2-ethylhexyl)phthalate	10			**20.0**			9.4 J			**22.0**
Carbazole	Monitor			ND (9.9)			ND (10)			ND (9.5)
Chrysene	10			ND (9.9)			ND (10)			ND (9.5)
Dibenz(a,h)anthracene	10			ND (9.9)			ND (10)			ND (9.5)
Dibenzofuran	10			ND (9.9)			ND (10)			ND (9.5)
Fluoranthene	10			ND (9.9)			ND (10)			ND (9.5)
Fluorene	10			ND (9.9)			ND (10)			ND (9.5)
Indene	Monitor			ND (9.9)			ND (10)			ND (9.5)
Indeno(1,2,3-cd)pyrene	10			ND (9.9)			ND (10)			ND (9.5)
Naphthalene	10			ND (9.9)			ND (10)			ND (9.5)
Pentachlorophenol	10			ND (50)			ND (52)			ND (48)
Phenanthrene	10			ND (9.9)			ND (10)			ND (9.5)

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	07/26/02 (STL)			08/30/02 (STL)			09/27/02 (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 (50)			ND (52)			ND (48)
Pyrene	10			ND (9.9)			ND (10)			ND (9.5)
Pesticides/PCBs										
4,4'-DDD	0.18			ND (0.06)			ND (0.05)			ND (0.05)
Chlordane	0.05			ND (0.6)			ND (0.5)			ND (0.5)
Heptachlor Epoxide	0.44			ND (0.06)			ND (0.05)			ND (0.05)
Inorganic Compounds										
Arsenic				ND (7)			ND (7)			ND (7)
Iron	2,000			335.0	3,390		**6,800**	1,060		1,860
Manganese	1,000			292.0			432.0			190.0
Zinc	Monitor			ND (26)			52.0			ND (26)
Miscellaneous Parameters										
BOD	20,000			5,600			2,000			ND (2000)
Cyanide	400			340.0			**530.0**			190.0
Total Oil & Grease	15,000			ND (5000)			ND (5000)			ND (5000)
pH (Standard Unit)	6.0 to 9.0			7.4			7.2			7.1
Total Dissolved Solids	Monitor			996,000			1,140,000			598,000
Total Recoverable Phenols	500			ND (5)			10.0			28.0
Total Suspended Solids	20,000			ND (4000)			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 3-2 (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	10/18/02 (STL)			11/27/02 (STL)			12/27/02 (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 (1000)		ND (5)	ND (250)		ND (5)	ND (250)		ND (5)
1,2-Dichloropropane		ND (1000)		ND (5)	ND (250)		ND (5)	ND (250)		ND (5)
2-Butanone		ND (2000)		ND (10)	ND (500)		ND (10)	ND (500)		ND (10)
Benzene	5	32,000		2 J	8,800		**10.0**	7,200		**110.0**
Chlorobenzene		ND (1000)		ND (5)	ND (250)		ND (5)	ND (250)		ND (5)
Chloroform		ND (1000)		ND (5)	ND (250)		ND (5)	ND (250)		3 J
Chloromethane		ND (2000)		ND (10)	ND (500)		ND (10)	ND (500)		ND (10)
Ethylbenzene	5	750 J		ND (1)	390.0		ND (1)	310.0		ND (1)
Styrene	Monitor	3,100		ND (5)	600.0		ND (5)	750.0		ND (5)
Toluene	5	11,000		0.31	2,300		1 J	2,400		ND (0.8)
Vinyl Chloride		ND (1000)		ND (5)	ND (250)		3 J	ND (250)		10.0
1,2,4-Trimethylbenzene	Monitor	910.0		ND (0.2)	70.0		ND (0.2)	320.0		ND (0.8)
1,3,5-Trimethylbenzene	Monitor	ND (100)		ND (0.2)	ND (40)		ND (0.2)	ND (40)		ND (0.8)
Isopropylbenzene	Monitor	ND (100)		ND (0.2)	ND (40)		ND (0.2)	ND (40)		ND (0.8)
m&p-Xylene	10	1,600		ND (0.2)	370.0		ND (0.2)	420.0		ND (0.8)
MTBE	50	ND (100)		ND (0.2)	ND (40)		1.7	ND (40)		3.9
n-Butylbenzene	Monitor	5,400		0.41	2,100		ND (0.2)	1,900		ND (0.8)
n-Propylbenzene	Monitor	ND (100)		ND (0.2)	ND (40)		ND (0.2)	ND (40)		ND (0.8)
o-Xylene	5	920.0		ND (0.2)	930.0		ND (0.2)	230.0		ND (0.8)
p-Isopropyltoluene	Monitor	ND (100)		ND (0.2)	ND (40)		ND (0.2)	ND (40)		ND (0.8)
sec-Butylbenzene	Monitor	ND (100)		ND (0.4)	ND (40)		ND (0.4)	ND (40)		ND (0.8)

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	10/18/02 (STL)			11/27/02 (STL)			12/27/02 (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 (9.4)			ND (10)			ND (9.5)
Acenaphthene	10			ND (9.4)			ND (10)			ND (9.5)
Acenaphthylene	10			ND (9.4)			ND (10)			ND (9.5)
Anthracene	10			ND (9.4)			ND (10)			ND (9.5)
Benzo(a)anthracene	10			ND (9.4)			ND (10)			ND (9.5)
Benzo(a)pyrene	10			ND (9.4)			ND (10)			ND (9.5)
Benzo(b)fluoranthene	10			ND (9.4)			ND (10)			ND (9.5)
Benzo(g,h,i)perylene	10			ND (9.4)			ND (10)			ND (9.5)
Benzo(k)fluoranthene	10			ND (9.4)			ND (10)			ND (9.5)
Biphenyl	Monitor			ND (9.4)			ND (10)			ND (9.5)
Bis(2-ethylhexyl)phthalate	10			4.3 J			ND (10)			**13.0**
Carbazole	Monitor			ND (9.4)			ND (10)			ND (9.5)
Chrysene	10			ND (9.4)			ND (10)			ND (9.5)
Dibenz(a,h)anthracene	10			ND (9.4)			ND (10)			ND (9.5)
Dibenzofuran	10			ND (9.4)			ND (10)			ND (9.5)
Fluoranthene	10			ND (9.4)			ND (10)			ND (9.5)
Fluorene	10			ND (9.4)			ND (10)			ND (9.5)
Indene	Monitor			ND (9.4)			ND (10)			ND (9.5)
Indeno(1,2,3-cd)pyrene	10			ND (9.4)			ND (10)			ND (9.5)
Naphthalene	10			ND (9.4)			ND (10)			ND (9.5)
Pentachlorophenol	10			ND (47)			ND (50)			ND (48)
Phenanthrene	10			ND (9.4)			ND (10)			ND (9.5)

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	10/18/02 (STL)			11/27/02 (STL)			12/27/02 (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)			ND (49)			ND (48)
Pyrene	10			ND (9.4)			ND (10)			ND (9.5)
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	1,390		1,290	780.0		193.0			104.0
Manganese	1,000			300.0			188.0			197.0
Zinc	Monitor			ND (26)			ND (26)			ND (26)
Miscellaneous Parameters										
BOD	20,000			4,200			ND (2000)			ND (2000)
Cyanide	400			220.0			200.0			120.0
Total Oil & Grease	15,000			ND (5000)			ND (5000)			ND (5000)
pH (Standard Unit)	6.0 to 9.0			7.4			7.0			7.4
Total Dissolved Solids	Monitor			867,000			964,000			919,000
Total Recoverable Phenols	500			5.7			9.5			ND (5)
Total Suspended Solids	20,000			ND (4000)			ND (4000)			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
07/08/02	1,100,277	40.0	10.0	1,405	0.003	783.1
07/12/02	1,101,395	1,118	4.0	1,409	0.19	781.7
07/19/02	1,103,014	1,619	7.0	1,416	0.16	779.0
07/26/02	1,106,606	3,592	7.0	1,423	0.36	777.7
08/02/02	1,112,289	5,683	7.0	1,430	0.56	777.8
08/09/02	1,114,504	2,215	7.0	1,437	0.22	775.6
08/16/02	1,115,830	1,326	7.0	1,444	0.13	772.7
08/23/02	1,117,425	1,595	7.0	1,451	0.16	770.1
08/30/02	1,118,649	1,224	7.0	1,458	0.12	767.2
09/06/02	1,119,628	979.0	7.0	1,465	0.10	764.3
09/13/02	1,120,533	905.0	7.0	1,472	0.09	761.2
09/20/02	1,121,710	1,177	7.0	1,479	0.12	758.4
July 8, 2002 - totalizer was found jammed during the site inspection.						

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)
09/27/02	1,122,766	1,056	7.0	1,486	0.10	755.6
10/04/02	1,125,959	3,193	7.0	1,493	0.32	754.2
10/11/02	1,127,906	1,947	7.0	1,500	0.19	751.9
10/18/02	1,130,330	2,424	7.0	1,507	0.24	750.1
10/23/02	1,135,480	5,150	5.0	1,512	0.72	751.0
10/30/02	1,138,693	3,213	7.0	1,519	0.32	749.6
11/01/02	1,139,207	514.0	2.0	1,521	0.18	749.0
11/08/02	1,140,649	1,442	7.0	1,528	0.14	746.5
11/15/02	1,144,404	3,755	7.0	1,535	0.37	745.5
11/22/02	1,151,360	6,956	7.0	1,542	0.69	746.7
11/27/02	1,157,969	6,609	5.0	1,547	0.92	748.5
12/06/02	1,163,098	5,129	9.0	1,556	0.40	747.5
12/13/02	1,166,868	3,770	7.0	1,563	0.37	746.6
12/20/02	1,177,549	10,681	7.0	1,570	1.06	750.0
12/27/02	1,186,353	8,804	7.0	1,577	0.87	752.3

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
07/08/02	3.0	0.0	3.0	0.0	3.0	1630.0	692.0	2322.0
07/12/02	1.5	0.0	1.5	1.5	3.0	1631.5	693.5	2325.0
07/19/02	2.5	0.25	2.75	3.25	6.0	1634.25	696.75	2331.0
07/26/02	6.0	0.25	6.25	14.75	21.0	1640.50	711.50	2352.0
08/02/02	2.0	0.25	2.25	3.75	6.0	1642.75	715.25	2358.0
08/09/02	1.5	0.0	1.5	4.0	5.5	1644.25	719.25	2363.5
08/16/02	2.0	0.25	2.25	2.75	5.0	1646.50	722.00	2368.5
08/23/02	2.5	0.25	2.75	3.75	6.5	1649.25	725.75	2375.0
08/30/02	2.0	0.0	2.0	2.0	4.0	1651.25	727.75	2379.0
09/06/02	1.5	0.0	1.5	2.0	3.5	1652.75	729.75	2382.5

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)
09/13/02	3.0	0.0	3.0	1.0	4.0	1655.75	730.75	2386.5
09/20/02	1.5	0.0	1.5	1.0	2.5	1657.25	731.75	2389.0
09/27/02	1.0	0.0	1.0	1.5	2.5	1658.25	733.25	2391.5
10/04/02	2.5	0.0	2.5	2.0	4.5	1660.75	735.25	2396.0
10/11/02	1.5	0.0	1.5	1.5	3.0	1662.25	736.75	2399.0
10/18/02	3.0	0.0	3.0	1.0	4.0	1665.25	737.75	2403.0
10/23/02	1.5	0.0	1.5	1.5	3.0	1666.75	739.25	2406.0
10/30/02	3.5	0.0	3.5	2.0	5.5	1670.25	741.25	2411.5
11/01/02	1.5	0.0	1.5	1.0	2.5	1671.75	742.25	2414.0
11/08/02	3.5	0.0	3.5	3.0	6.5	1675.25	745.25	2420.5
11/15/02	2.5	0.0	2.5	1.5	4.0	1677.75	746.75	2424.5
11/22/02	1.5	0.0	1.5	3.5	5.0	1679.25	750.25	2429.5
11/27/02	1.0	0.0	1.0	1.0	2.0	1680.25	751.25	2431.5
12/06/02	1.5	0.25	1.75	2.25	4.0	1682.0	753.5	2435.5
12/13/02	3.0	0.0	3.0	2.0	5.0	1685.0	755.5	2440.5
12/20/02	1.5	0.0	1.5	1.5	3.0	1686.5	757.0	2443.5
12/27/02	1.0	0.5	1.5	3.0	4.5	1688.0	760.0	2448.0

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-Trimethylbenzene				ND (0.4)	1,220	48,000
1,2,4-Trimethylbenzene				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 (^{o}F)						73.7

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 Elevations from Shallow and Intermediate Zone Wells
Former Gastown Manufactured Gas Plant Site.

Date	MW-13	MW-17	MW-1S	MW-2S	MW-3S	DPW-1	MW-23	MW-1I	MW-2I	PW-1	Creek
04/12/02	569.72	570.13	566.61	570.19	570.45	568.80	570.52	569.70	568.65	560.57	564.00
06/12/02	568.31	568.90				567.95	570.01	568.49	568.05		564.19
06/18/02		569.17				568.46	570.94	568.76			
06/21/02		568.80				567.93	570.42	568.34	568.04		
06/25/02		568.58				567.66	569.13	568.07	567.86		
06/28/02		568.33				567.48	568.67	567.85	567.69		
07/02/02		568.25				567.38	568.47	567.78	567.71		
07/05/02		568.07				567.25	568.19	567.56	567.60		
07/09/02		567.89				567.05	568.04	567.22	567.38		
07/10/02	567.25	567.78		568.71	569.65	566.95	567.88	567.08	567.29		563.64
07/12/02		567.69				566.88	567.80	567.00	567.20		
07/16/02		567.56				566.72	567.56	566.82	567.13		
07/19/02		567.42				566.68	567.37	566.78	567.01		
07/23/02		568.18				567.63	571.35	567.59	568.03		
07/26/02		567.90				567.34	570.29	567.12	567.45		
07/30/02		568.98				568.45	571.34	568.21	568.40		
08/02/02		568.37				567.61	570.55	567.56	567.77		
08/09/02		567.70				566.87	568.35	566.82	567.18		
08/16/02		567.44				566.71	567.76	566.68	567.03		
08/23/02		567.28				566.59	567.36	566.50	566.91		
08/30/02	566.39	566.94		568.76	568.58	566.23	567.09	566.10	566.55		
09/14/02	565.86	566.34		568.41	566.76	565.70	566.27	565.57	565.99		
09/22/02		566.31				565.68	566.38	565.56	565.98		
09/30/02		567.17				566.67		566.37	566.94		
10/04/02		567.70				567.02	570.34	567.09	567.41		
10/08/02								566.87	567.23		
10/11/02								566.68	567.11		
10/15/02	567.80	567.44		568.82	568.73	566.73	568.10	566.86	567.20		
10/18/02								567.18	568.41		
10/22/02		568.35				567.52	570.86	567.48	567.92		
10/25/02		568.45						567.13	567.67		
10/29/02		568.39				567.45	570.59	567.53	567.77		
11/05/02		567.57				567.08	570.32	566.86	567.17		
11/12/02		568.18				567.88	570.52	567.63	567.75		

Table 3-7 (Continued).
Groundwater Elevations from Shallow and Intermediate Zone Wells
Former Gastown Manufactured Gas Plant Site.

Date	MW-27	MW-34	MW-35	MW-36	MW-40	MW-41	MW-42	MW-43	MW-44	MW-45	MW-46
04/12/02	569.87	569.21	568.95	569.89	570.89	568.10	569.70	570.08	568.73	565.22	566.53
06/12/02	568.84	568.14	567.94	568.56	569.72	567.81	568.36	569.71	567.97	565.51	566.44
06/18/02	569.62				569.47	567.76	569.46	569.70	568.38	565.45	566.48
06/21/02	568.93				569.39	567.61	568.53	569.59	567.95	565.31	566.27
06/25/02	568.52				569.15	567.50	567.94	569.43	567.70	565.31	566.14
06/28/02	568.24				568.86	567.32	567.64	569.28	567.50	565.26	566.05
07/02/02	568.06				568.50	567.20	567.41	569.19	567.52	565.21	565.88
07/05/02	567.88				568.16	566.98	567.20	569.03	567.36	565.05	565.70
07/09/02	567.73				567.95	566.92	567.03	568.86	567.07	565.21	565.75
07/10/02	567.62	566.97	566.85	567.05	567.81	566.71	566.90	568.74	566.97	564.91	565.53
07/12/02	567.51				567.68	566.70	566.82	568.69	566.90	564.98	565.55
07/16/02	567.34				567.43	566.57	566.62	568.54	566.75	565.02	565.49
07/19/02	567.21				567.31	566.51	566.55	568.45	566.71	565.05	565.51
07/23/02	569.50				567.38	566.77	568.15	568.63	567.64	565.12	565.82
07/26/02	568.29				567.58	566.82	567.56	568.62	567.25	565.52	565.75
07/30/02	569.95				567.98	567.24	569.97	568.52	568.30	565.43	566.31
08/02/02	568.79				568.35	567.22	568.33	568.91	567.52	565.42	566.06
08/09/02	567.68				567.53	566.71	566.94	568.45	566.85	565.16	565.62
08/16/02	567.56				567.14	566.59	566.84	568.26	566.73	565.28	565.57
08/23/02	567.53				566.87	566.34	566.76	568.11	566.59	564.92	565.32
08/30/02	567.04	566.28	566.14	566.05	566.59	566.16	566.29	567.86	566.20	565.00	565.22
09/14/02	566.26	565.70	565.61	565.53	565.98	565.73	565.57	567.46	565.68	564.82	564.91
09/22/02	566.48				565.91	565.72	565.70	567.37	565.67	564.89	564.94
09/30/02						565.23		567.71	566.64		565.32
10/04/02	567.94				566.67	566.37	567.19	568.03	567.13	565.08	
10/08/02							566.85	567.90	566.91		
10/11/02								567.82			
10/15/02	567.03	566.70	567.65	566.58	566.43	566.10	566.49	567.85	566.87	564.88	565.02
10/18/02							567.61	568.01	567.22		
10/22/02	568.83				567.32	566.69	568.36	568.34	567.49		
10/25/02	568.54						567.96	568.07	567.27		
10/29/02	568.48				567.30	566.61	567.83	568.27	567.48		
11/05/02	567.73				566.96	566.23	567.22	567.76	566.92		
11/12/02	569.73				567.37	566.69	568.85	567.92	567.70		

Table 3-7 (Continued).
Groundwater Elevations from Shallow and Intermediate Zone Wells
Former Gastown Manufactured Gas Plant Site.

Date	MW-47	MW-48	VW-1	VW-2	VW-3	DPW-32	DPW-33	DPW-34	DPW-36	DPW-40	DPW-43
04/12/02	570.30	569.55	569.12	568.43	569.18	570.05	567.85	565.35	567.61	566.80	568.15
06/12/02	569.06	568.85	568.23	567.79	568.26	568.77	567.31	565.45	567.18	565.92	567.27
06/18/02	569.30	568.96	568.53		568.50	569.23		565.44	567.43	566.17	567.71
06/21/02	568.91	568.72	568.18		568.17	568.58		565.25	567.09	565.77	567.15
06/25/02	568.62	568.52	567.97		567.95	568.14		565.19	566.90	565.50	566.89
06/28/02	568.31	568.29	567.82	567.47	567.76	567.87		565.12	566.77	565.35	566.69
07/02/02	568.16	568.21		567.69	567.92			565.05	566.55	565.16	566.51
07/05/02	567.87	567.99	567.70	567.57	567.73	567.24		564.93	566.39	564.98	566.32
07/09/02	567.55	567.77	567.43	567.11	567.25	566.92		565.07	566.30	564.91	566.15
07/10/02	567.43	567.65	567.33	567.03	567.14	566.79	566.23	564.76	566.20	564.77	566.09
07/12/02	567.33	567.56	567.25	566.98	567.05	566.72		564.86	565.91	564.76	566.01
07/16/02	567.12	567.42	567.19	566.90	566.91	566.47		564.83	566.02	564.65	565.90
07/19/02	567.02	567.31	567.04	566.80	566.84	566.40		564.87	566.01	564.71	565.88
07/23/02	567.65	567.87	568.01	567.80	567.76	567.18		564.99	566.59	565.27	565.79
07/26/02	567.41	568.76	567.44	567.13	567.19	566.74		565.00	566.38	564.99	566.19
07/30/02	568.34	568.49	568.42	568.06	568.14	568.20		565.27	567.38	565.86	567.52
08/02/02	567.91	568.24	567.81	567.46	567.62	567.32		565.17	566.92	565.39	566.54
08/09/02	567.11	567.57	567.24	566.94	566.97	566.32		564.89	566.20	564.71	565.89
08/16/02	566.86	567.34	567.03	566.78	566.79	566.20		564.97	565.99	564.64	565.77
08/23/02	566.66	567.15	566.91	566.67	566.65	566.00		564.67	565.86	564.51	565.67
08/30/02	566.32	566.84	566.56	566.31	566.27	565.74	565.60	564.68	565.64	564.32	565.91
09/14/02	565.78	566.27	566.00	565.80	565.75	565.25	565.15	564.49	565.19	563.97	565.01
09/22/02	565.73	566.25	565.99	565.77	565.72	565.22		564.53	565.21	564.00	565.04
09/30/02			566.88	566.64	566.56	565.93		564.72	565.89	564.50	565.71
10/04/02	567.29	567.61	567.57	567.40	567.92	566.17		564.74			
10/08/02	567.04	567.37	567.37	567.20	567.57						
10/11/02	566.91	567.28	567.22	567.05	567.38						
10/15/02	567.08	567.35	567.36	567.23	567.72	565.94	565.42	564.53	565.20	564.30	565.61
10/18/02	568.23	567.67	568.53	568.38	568.94						
10/22/02	567.76	568.09	568.13	567.85	568.46	566.85		564.80			
10/25/02	567.35	567.82	567.75	567.29	567.33						
10/29/02	567.75	568.12	567.02	567.73	568.14	566.82		564.62			
11/05/02	567.00	567.35	567.15	566.67	567.09	566.56		564.33			
11/12/02	567.20	567.82	567.71	567.43	567.55	567.56		564.58			

Table 3-7 (Continued).
Groundwater Elevations from Shallow and Intermediate Zone Wells
Former Gastown Manufactured Gas Plant Site.

Date	DPW-44	DPW-49	DPW-50	DPW-51	DPW-52	DPW-53	DPW-54	DPW-55	DPW-56	DPW-57	DPW-58
04/12/02	567.88	564.68	564.76	564.14	564.15	567.01	563.47	568.34	568.07	567.62	571.60
06/12/02	566.93	564.79	564.92	564.51	564.53	566.68	565.05	567.88	567.45	567.21	570.38
06/18/02		564.72	564.84					568.18			570.39
06/21/02		564.50	564.63					567.78			570.10
06/25/02		564.49	564.54					567.55			569.70
06/28/02		564.43	564.50					567.37			569.38
07/02/02		564.41	564.45					567.10			568.91
07/05/02		564.22	564.28					566.91			568.48
07/09/02		564.44	564.51					566.76			568.18
07/10/02	565.42	564.08	564.18	563.86	563.85	565.24	564.53	566.63	566.35	566.23	567.98
07/12/02		564.18	564.23					566.58			567.88
07/16/02		564.24	564.31					566.41			568.49
07/19/02		564.27	564.36					566.38			567.36
07/23/02		564.38	564.45					567.20			567.90
07/26/02		564.43	564.49					566.81			567.80
07/30/02		564.71	564.82					567.91			568.74
08/02/02		564.57	564.68					567.36			568.77
08/09/02		564.30	564.45					566.57			567.50
08/16/02		564.49	564.65					566.34			567.03
08/23/02		564.06	564.15					566.21			566.68
08/30/02	564.70	564.18	564.33	564.23	564.20	564.73	564.49	565.91	565.72	565.67	566.39
09/14/02	564.33	564.06	564.18	564.11	564.08	564.35	564.42	565.24	565.27	565.23	565.76
09/22/02		564.14	563.32					565.38			565.70
09/30/02		564.20						566.22			565.95
10/04/02											566.55
10/08/02											
10/11/02											
10/15/02	564.54	564.02	564.11	564.12	563.86	564.43	564.31	565.75	565.53	565.46	566.28
10/18/02											
10/22/02											567.65
10/25/02											
10/29/02											567.52
11/05/02											567.45
11/12/02											567.52

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.

APPENDIX C

RECOVERY AND TREATMENT SYSTEM DATA SUMMARY

Table C-1.
Summary of Recovery and Treatment System Data.
Former Gastown Manufactured Gas Plant Site.

Date	DNAPL Pump			LNAPL Pump			Bubbler Tube	Water Filters	Compressor
	Pressure (psi)	Adjusted (y/n)	Cleaned	Pressure (psi)	Adjusted (y/n)	Cleaned	Pressure (psi)	Changed (y/n)	Hours
09/03/98	---	No	No	---	No	No	---	NI	6.7
09/08/98	---	"	"	---	"	"	---	"	32.4
09/09/98	---	Yes	"	---	"	"	---	"	---
09/11/98	20	No	"	30	"	"	7.3	"	48.4
09/15/98	18	"	"	30	"	"	5.5	"	62.5
09/22/98	28	Yes	"	30	"	"	6	"	100.0
09/29/98	40	"	"	30	"	"	6	"	126.9
09/30/98	---	No	"	---	"	"	---	"	---
10/02/98	---	"	"	---	"	"	---	"	---
10/05/98	43	Yes - to 35 psi	"	32	"	"	5.8 - adjusted to 7 psi	"	152.8
10/14/98	38	No	"	33	"	"	6.8	"	193.7
10/29/98	38	"	"	35	"	"	6.8	"	251.0
11/09/98	38	"	"	38	"	"	6.8	"	281.6
11/12/98	40	Yes	"	22	Yes	"	7	"	283.5
11/18/98	33	Yes - to 40 psi	Yes	22	"	Yes	7	"	287.1
11/19/98	---	No	No	38	"	No	6	"	---
11/23/98	38	Yes	"	22	"	"	8.2	"	295.4
12/04/98	36	"	"	42	No	"	8.4	"	326.0
12/14/98	36	"	"	42	"	"	7	"	339.3
12/22/98	---	"	"	---	"	"	---	"	---
12/29/98	---	"	"	---	"	"	---	"	---
01/08/99	42	Yes - to 20 psi	"	42	"	"	7	"	379.5
01/20/99	20	Yes - to 30 psi	"	50	"	"	7	"	398.6
01/29/99	---	No	"	---	"	Yes	---	"	---
02/01/99	28	"	"	52	"	No	7	"	423.9

Table C-1 (Continued).
Summary of Recovery and Treatment System Data.
Former Gastown Manufactured Gas Plant Site.

Date	Transfer Pump Flow rate (gpm)	Primary Carbon Drum Pressure (PSI)	Carbon Changed or Rotated (y/n)	Oil/Water Separator Cleaned (y/n)	Comments
09/03/98	---	---	No	No	reset regulator to 100 psi; installed check valve on transfer pump
09/08/98	---	4.0	"	"	DNAPL drum full - fault light on
09/09/98	---	---	"	"	
09/11/98	4.6	1.5	"	"	regulator gauge broken
09/15/98	4.4	---	"	"	installed liquid filled gauge on regulator
09/22/98	4.3	---	"	"	DNAPL not being pumped - possibly due to low air pressure
09/29/98	4.95	3.0	Yes	"	installed 3rd carbon drum
09/30/98	---	---	No	"	DNAPL drum full - fault light on
10/02/98	---	---	"	"	DNAPL drum full - fault light on
10/05/98	---	3.0	"	"	Turned heater on for winter
10/14/98	4.68	---	"	"	
10/29/98	4.5	4.0	"	"	
11/09/98	4.43	4.0	"	"	DNAPL drum full - fault light on
11/12/98	4.43	4.0	"	"	DNAPL drum full - fault light on; bubbler problem
11/18/98	4.43	4.0	"	"	DNAPL drum full - fault light on; replaced ball valve in OWS
11/19/98	---	---	"	"	
11/23/98	4.43	5.0	"	"	replaced LNAPL pump and bubbler controller
12/04/98	4.13	5.0	"	"	changed regulator valve on bubbler
12/14/98	4.3	5.0	"	"	DNAPL drum full - fault light on
12/22/98	---	---	"	"	DNAPL drum full - fault light on
12/29/98	---	---	"	"	
01/08/99	3.93	5.0	"	"	DNAPL drum full - fault light on
01/20/99	3.93	7.0	"	"	replaced leaking lid on primary drum; compressor oil changed
01/29/99	---	---	"	"	no liquid being pumped to OWS due to plugged check valves
02/01/99	4.08	7.0	"	"	primary vault flooded; check valve of LNAPL pump stuck in up position

Table C-1 (Continued).
Summary of Recovery and Treatment System Data.
Former Gastown Manufactured Gas Plant Site.

Date	DNAPL Pump			LNAPL Pump			Bubbler Tube	Water Filters	Compressor
	Pressure (psi)	Adjusted (y/n)	Cleaned	Pressure (psi)	Adjusted (y/n)	Cleaned	Pressure (psi)	Changed (y/n)	Hours
02/17/99	28	No	No	45	No	No	7	NI	460.2
03/05/99	32	"	"	52	"	"	7	"	494.1
03/18/99	30	"	"	52	"	"	7	Installed	523.1
03/24/99	---	Yes	"	---	"	"	---	No	---
04/08/99	29	No	Yes	52	"	Yes	7	"	569.0
04/14/99	---	"	No	---	"	No	---	Yes	---
04/29/99	---	"	"	---	"	"	---	No	---
05/11/99	26	"	"	50	"	"	7	"	635.0
05/27/99	26	Yes - to 35 psi	"	52	"	"	6.8	Yes	660.8
06/10/99	36	No	"	52	"	"	7.0	No	677.8
06/21/99	36	Yes - to 32 psi	"	50	"	"	6.4	"	687.7
07/09/99	32	Yes - to 27 psi	"	50	"	"	7	"	710.7
07/23/99	---	No	"	---	"	"	---	"	---
07/27/99	28	Yes	Yes	48	"	Yes	7	Yes	732.2
08/03/99	---	No	No	---	"	No	---	No	---
08/10/99	28	"	"	46	"	"	7	"	749.2
08/30/99	28	"	"	46	"	"	7	Yes	768.7
09/01/99	---	"	"	---	"	"	---	Yes	---
09/27/99	---	"	"	---	"	"	---	No	794.4
10/13/99	28	Yes	"	44	"	"	7	"	811.4
10/29/99	26	Yes - to 34 psi	"	44	"	"	7	Yes	857.3
11/24/99	34	Yes - to 38 psi	"	42	Yes	"	7	No	907.5
12/09/99	38	No	"	---	"	"	7	"	946.0
12/14/99	38	Yes - to 32 psi	Yes	42	"	Yes	7	Yes	957.4
12/17/99	40	Yes	No	---	"	No	---	No	---
12/19/99	---	No	"	---	"	"	---	Yes	---

Table C-1 (Continued).
Summary of Recovery and Treatment System Data.
Former Gastown Manufactured Gas Plant Site.

Date	Transfer Pump Flow rate (gpm)	Primary Carbon Drum Pressure (PSI)	Carbon Changed or Rotated (y/n)	Oil/Water Separator Cleaned (y/n)	Comments
02/17/99	4.03	1.5 - after changeout	Yes	No	primary carbon drum burst under pressure
03/05/99	4.07	1.0	No	"	primary carbon drum lid burst - drum bypassed
03/18/99	4.42	1.0	Yes	"	installed new primary drum, DNAPL storage drum and 5 micron water filter
03/24/99	---	3.0	No	"	
04/08/99	4.13	3.0	"	"	Biological buildup observed on LNAPL pump
04/14/99	---	---	Yes	"	Changed all 3 carbon drums
04/29/99	---	---	No	Yes	Installed stainless steel coalescing media in OWS
05/11/99	4.30	3.0	"	No	
05/27/99	4.05	3.0	"	"	
06/10/99	4.08	3.0	"	"	DNAPL drum full - fault light on
06/21/99	4.13	3.0	"	"	DNAPL drum full - fault light on
07/09/99	4.20	4.0	"	"	DNAPL drum full - fault light on
07/23/99	---	---	"	"	DNAPL drum full - fault light on
07/27/99	4.13	6.0	"	"	
08/03/99	---	---	"	"	Air bubbling into OWS
08/10/99	4.56	1.5 - after changeout	Yes	"	Changed all 3 carbon drums; replaced all 1-inch braided poly-hose
08/30/99	5.26	2.0	No	"	Water filter cartridge plugged - fault light on
09/01/99	---	---	"	"	Water filter cartridge plugged - fault light on; cleaned switches
09/27/99	---	---	"	"	
10/13/99	3.16	3.0	"	"	Turned heater on for winter
10/29/99	5.61	5.0	"	"	All equipment need cleaning
11/24/99	5.62	5.0	"	"	All equipment need cleaning
12/09/99	5.78	5.0	"	"	
12/14/99	4.58	10.0	Yes	Yes	Changed primary & secondary drums - rotated polishing drum to primary position. Also cleaned equalization drum, transfer pump and water lines
12/17/99	4.38	5.0	No	No	DNAPL drum full - fault light on
12/19/99	---	---	"	"	Water flowing from primary vault; LNAPL pump pulled and inspected

Table C-1 (Continued).
Summary of Recovery and Treatment System Data.
Former Gastown Manufactured Gas Plant Site.

Date	DNAPL Pump			LNAPL Pump			Bubbler Tube	Water Filters	Compressor
	Pressure (psi)	Adjusted (y/n)	Cleaned	Pressure (psi)	Adjusted (y/n)	Cleaned	Pressure (psi)	Changed (y/n)	Hours
12/21/99	---	Yes	Yes	---	Yes	No	---	No	---
12/28/99	---	"	No	---	No	"	---	"	---
01/11/00	---	No	Yes	---	"	Yes	---	"	---
01/12/00	---	"	No	---	Yes	No	---	"	---
01/28/00	30	"	"	50	No	"	7	"	1029.0
02/04/00	30	"	"	50	"	"	7	"	1039.3
03/03/00	---	"	"	45	"	"	7	"	1105.0
03/10/00	34	"	"	47	"	"	7	Yes	1118.0
03/20/00	---	Yes	Yes	---	Yes - to 60 psi	Yes	7	No	---
03/21/00	---	No	No	---	Yes	No	---	"	---
04/10/00	---	"	"	---	Yes	"	---	"	1172.5
04/17/00	---	"	Yes	---	No	Yes	---	"	---
04/18/00	---	"	No	---	"	No	---	"	---
04/19/00	---	Yes	"	55	"	"	7	"	1248.7
04/21/00	---	No	"	---	"	"	---	"	1255.4
05/04/00	32	Yes	"	55	"	"	6.4	Yes	1285.8
05/05/00	---	No	"	---	"	"	---	No	---
05/08/00	---	Yes - lowered	"	---	"	"	---	"	---
05/11/00	32	Yes	"	52	Yes - to 40 psi	"	7	"	1300.0
05/12/00	32	Yes - to 28 psi	"	38	No	"	7	"	1302.6
05/17/00	28	Yes	"	40	"	"	7	"	1313.2
05/22/00	---	"	"	---	"	"	---	"	1323.4
05/30/00	32	"	"	40	"	"	7	"	1336.8
05/31/00	30	Yes	"	38	"	"	6.8	"	1339.0
06/08/00	0	Yes - to 28 psi	"	35	"	"	7	"	1355.1
06/15/00	30	Yes	"	38	"	"	7	Yes	1368.9

Table C-1 (Continued).
Summary of Recovery and Treatment System Data.
Former Gastown Manufactured Gas Plant Site.

Date	Transfer Pump Flow rate (gpm)	Primary Carbon Drum Pressure (PSI)	Carbon Changed or Rotated (y/n)	Oil/Water Separator Cleaned (y/n)	Comments
12/21/99	---	---	No	No	Water flowing from primary vault; installed new check valve in LNAPL pump
12/28/99	4.58	2.5	"	"	
01/11/00	3.54	6.0	"	"	Water flowing from primary vault; installed new Viton Seal check valve in LNAPL pump
01/12/00	---	---	"	"	Water flowing from primary vault
01/28/00	3.52	8.0	"	"	
02/04/00	3.24	8.0	"	"	
03/03/00	2.90	12.0	"	"	
03/10/00	3.31	10.0	Yes	"	Rotated secondary & polishing drums - added new polishing drum
03/20/00	3.84	2.0	No	"	Water flowing from primary vault
03/21/00	---	---	"	"	
04/10/00	4.43	4.5	"	"	
04/17/00	---	---	"	Yes	Well rehabilitation completed; also cleaned equalization drum
04/18/00	---	---	Yes	No	Changed all 3 carbon drums and replumbed with 2-inch piping
04/19/00	7.34	1.0	No	"	
04/21/00	7.21	3.0	"	"	
05/04/00	4.81	5.0	"	"	Installed new auto drain kit, air filter and sample ports
05/05/00	---	5.0	"	"	
05/08/00	---	6.0	"	"	DNAPL drum full - fault light on
05/11/00	---	7 - 8	"	"	
05/12/00	4.56	9.0	"	"	
05/17/00	3.54	14.0	"	"	
05/22/00	---	14.0	Yes	"	Changed primary carbon drum
05/30/00	3.93	2.0	No	"	DNAPL drum full - fault light on
05/31/00	3.80	3.0	"	"	
06/08/00	3.67	3.5	"	"	DNAPL drum full - fault light on
06/15/00	---	3.0	"	"	Totalizer not working due to biological buildup; added bleach to recovery well

Table C-1 (Continued).
Summary of Recovery and Treatment System Data.
Former Gastown Manufactured Gas Plant Site.

Date	DNAPL Pump			LNAPL Pump			Bubbler Tube	Water Filters	Compressor
	Pressure (psi)	Adjusted (y/n)	Cleaned	Pressure (psi)	Adjusted (y/n)	Cleaned	Pressure (psi)	Changed (y/n)	Hours
06/27/00	30	No	No	46	No	Yes	7	No	1397.7
06/29/00	30	"	"	46	Yes - to 58 psi	Yes	7	"	1401.0
07/07/00	30	"	"	58	No	No	7	"	1419.5
07/11/00	30	"	"	56	"	"	7	"	1428.7
07/19/00	32	"	"	56	"	"	7	"	1446.6
07/28/00	30	"	"	60	"	"	7	"	1466.3
08/02/00	30	"	"	60	"	"	7	"	1477.7
08/11/00	30	"	"	60	"	"	7	"	1500.0
08/18/00	34	"	"	56	Yes - to 38 psi	"	7	"	1514.7
08/29/00	30	"	"	---	No	"	7	"	1529.1
09/05/00	32	"	"	50	"	"	7	"	1537.0
09/28/00	33	"	"	55	"	"	7	"	1566.9
10/03/00	32	Yes	"	52	"	"	7	"	1572.1
10/13/00	32	No	"	52	"	"	7	"	1583.7
10/18/00	32	"	"	52	"	"	7	"	1588.8
10/26/00	32	Yes - to 26 psi	"	53	"	"	7	"	1594.4
10/30/00	26	No	"	53	"	"	7	"	1597.9
11/10/00	26	"	"	52	"	"	7	"	1607.3
11/13/00	26	"	"	52	"	"	7	"	1609.8
11/22/00	26	"	"	52	"	"	7	"	1618.1
12/01/00	26	"	"	52	"	"	7	"	1627.0
12/05/00	26	"	"	52	"	"	7	"	1631.0
12/16/00	26	"	"	52	"	"	7	"	1642.1
12/19/00	26	"	"	52	"	"	7	"	1645.6
12/29/00	27	"	"	52	"	"	7	"	1656.3
01/05/01	26	"	"	52	"	"	7	"	1663.0
01/10/01	26	"	"	52	"	"	7	"	1668.7
01/19/01	26	"	"	52	"	"	7	"	1672.2
01/26/01	26	"	"	52	"	"	7	"	1684.0

Table C-1 (Continued).
Summary of Recovery and Treatment System Data.
Former Gastown Manufactured Gas Plant Site.

Date	Transfer Pump Flow rate (gpm)	Primary Carbon Drum Pressure (PSI)	Carbon Changed or Rotated (y/n)	Oil/Water Separator Cleaned (y/n)	Comments
06/27/00	3.80	3.0	No	No	Water flowing from primary vault; cleaned pipe from OWS to equalization drum
06/29/00	3.08	3.0	"	"	Added bleach to recovery well
07/07/00	3.15	3.0	"	"	
07/11/00	3.14	4.0	"	"	
07/19/00	3.16	6.0	"	"	
07/28/00	3.29	5.0	"	"	
08/02/00	3.25	5.5	"	"	
08/11/00	3.29	6.5	"	"	Raised DNAPL pump approximately 18 inches
08/18/00	3.29	6.5	"	"	
08/29/00	3.80	8.0	Yes	"	Changed primary & secondary drums - rotated polishing drum to primary position
09/05/00	3.67	0.5	No	"	
09/28/00	3.67	2.0	"	"	
10/03/00	3.80	2.0	"	"	
10/13/00	3.81	2.0	"	"	Installed secondary vault
10/18/00	3.61	2.0	"	"	Completed secondary vault and sump installation
10/26/00	3.80	1.5	"	"	DNAPL drum full - fault light on
10/30/00	3.80	1.5	"	"	
11/10/00	3.82	1.5	"	"	
11/13/00	3.80	1.5	"	"	
11/22/00	3.80	1.5	"	"	
12/01/00	3.82	1.5	"	"	
12/05/00	3.29	1.5	Yes	"	Changed all 3 carbon drums; changed totalizer batteries - reset to 0.0 gallons
12/16/00	3.29	3.0	No	"	
12/19/00	3.16	5.0	"	"	
12/29/00	3.10	3.0	"	"	
01/05/01	3.10	3.0	"	"	
01/10/01	3.10	3.0	"	"	
01/19/01	3.04	3.5	"	"	
01/26/01	3.04	3.0	"	"	

Table C-1 (Continued).
Summary of Recovery and Treatment System Data.
Former Gastown Manufactured Gas Plant Site.

Date	DNAPL Pump			LNAPL Pump			Bubbler Tube	Water Filters	Compressor
	Pressure (psi)	Adjusted (y/n)	Cleaned	Pressure (psi)	Adjusted (y/n)	Cleaned	Pressure (psi)	Changed (y/n)	Hours
01/31/01	26	No	No	52	No	No	7	No	1688.5
02/09/01	26	"	"	52	"	"	10 - adjusted to 7 psi	"	1698.4
02/16/01	26	"	"	52	"	"	7	"	1706.3
02/23/01	26	"	"	52	"	"	7	"	1713.7
02/28/01	26	"	"	52	"	"	7	"	1718.8
03/07/01	26	"	"	52	"	"	7	"	1726.0
03/16/01	26	"	"	52	"	"	7	"	1735.1
03/21/01	26	"	Yes	52	"	Yes	7	"	1740.2
03/30/01	26	"	No	56	Yes - to 40 psi	No	7	Yes	1749.6
04/05/01	26	"	"	40	No	"	7	No	1755.4
04/13/01	26	"	"	40	"	"	7	"	1763.1
04/20/01	26	"	"	40	"	"	7	"	1769.7
04/27/01	26	"	"	40	"	"	7	"	1776.5
04/30/01	24	"	"	40	"	"	7	Yes	1779.1
05/10/01	26	"	"	---	"	"	---	No	1788.6
05/16/01	24	Yes - to 22 psi	"	40	"	"	7	"	1794.1
05/23/01	---	No	"	---	"	"	---	"	---
05/25/01	22	"	"	40	"	"	6.6	"	1801.5
05/31/01	22	"	"	40	"	"	7	"	1807.7
06/03/01	---	"	"	---	"	"	---	"	---
06/07/01	26	"	"	40	"	"	7	Yes	1814.3
06/15/01	20	"	"	35	"	"	6	No	1821.0
06/22/01	22	Yes - to 24 psi	"	38	"	"	7	Yes	1827.4
06/29/01	24	No	"	---	"	"	7	No	1833.4

Table C-1 (Continued).
Summary of Recovery and Treatment System Data.
Former Gastown Manufactured Gas Plant Site.

Date	Transfer Pump Flow rate (gpm)	Primary Carbon Drum Pressure (PSI)	Carbon Changed or Rotated (y/n)	Oil/Water Separator Cleaned (y/n)	Comments
01/31/01	3.16	3.5	No	No	
02/09/01	3.16	4.5	"	"	
02/16/01	2.66	4.5	"	"	
02/23/01	2.41	4.5	"	"	
02/28/01	2.52	5.5	"	"	
03/07/01	2.39	4.5	"	"	OWS contains biological buildup - needs cleaning
03/16/01	2.52	6.0	"	"	Secondary vault pump is not working
03/21/01	2.52	7.0	Yes	Yes	Removed pump for repairs; changed primary drum - rotated secondary & polishing drums. Also cleaned secondary vault, equalization drum and transfer pump; bleached recovery well, seconday vault, OWS and equalization drum.
03/30/01	3.54	1.0	No	No	
04/05/01	3.54	1.5	"	"	
04/13/01	4.05	2.5	"	"	Cleaned secondary vault; removed totalizer obstruction
04/20/01	3.64	1.5	"	"	
04/27/01	3.16	2.5	"	"	Replumbed secondary vault with 2-inch pipe & hose
04/30/01	3.54	3.0	"	"	Water filter cartridge plugged - fault light on; added bleach to recovery well
05/10/01	3.29	1.0	"	"	Added bleach to club's sumps
05/16/01	3.16	3.0	"	"	
05/23/01	---	---	Yes	"	Changed primary drum - rotated secondary & polishing drums
05/25/01	5.32	2.0	No	"	
05/31/01	3.80	7.0	"	"	Repaired leaking carbon drum & obstructed totalizer
06/03/01	2.82	---	"	"	LNAPL fault light cycling on & off due to large amount of water from the club's sumps
06/07/01	3.54	2.0	"	"	Cleaned equalization drum; bleached entire system
06/15/01	2.80	2.5	"	"	
06/22/01	3.80	3.5	"	"	
06/29/01	3.94	2.5	"	"	

Table C-1 (Continued).
Summary of Recovery and Treatment System Data.
Former Gastown Manufactured Gas Plant Site.

Date	DNAPL Pump			LNAPL Pump			Bubbler Tube	Water Filters	Compressor
	Pressure (psi)	Adjusted (y/n)	Cleaned	Pressure (psi)	Adjusted (y/n)	Cleaned	Pressure (psi)	Changed (y/n)	Hours
07/06/01	24	Yes	No	40	No	No	7	No	1839.7
07/13/01	24	Yes - to 22 psi	"	39	"	"	7	"	1845.7
07/20/01	20	Yes	"	38	"	"	7	"	---
07/27/01	22	"	"	40	"	"	7	"	1857.4
08/01/01	---	No	"	---	"	"	---	"	---
08/03/01	22	"	"	40	"	"	7	"	1905.0
08/10/01	22	Yes	"	38	"	"	7	"	1911.3
08/17/01	22	No	"	48	"	"	7	"	1978.2
08/21/01	---	"	"	---	"	"	---	Yes	---
08/24/01	20	Yes - to 22 psi	"	40	"	"	7	No	1980.9
08/30/01	22	No	"	40	"	"	7	"	1986.1
09/07/01	20	Yes	"	---	"	"	7	"	1993.5
09/14/01	22	No	"	40	Yes - to 30 psi	"	7	"	2002.6
09/21/01	24	"	"	30	No	"	7	"	2006.0
09/28/01	22	"	Yes	30	"	Yes	7	"	2009.5
10/05/01	20	"	No	30	Yes - to 40 psi	No	7	"	2013.0
10/12/01	18	Yes - to 24 psi	"	40	Yes	"	7	"	2041.7
10/19/01	26	No	"	42	No	"	7	"	2051.4
10/26/01	25	Yes	"	45	"	"	7	"	2060.6
10/31/01	25	No	"	42	"	"	7	"	2067.1
11/09/01	24	"	"	44	"	"	7	"	2078.6
11/16/01	23	"	"	42	"	"	7	"	2087.1

Table C-1 (Continued).
Summary of Recovery and Treatment System Data.
Former Gastown Manufactured Gas Plant Site.

Date	Transfer Pump Flow rate (gpm)	Primary Carbon Drum Pressure (PSI)	Carbon Changed or Rotated (y/n)	Oil/Water Separator Cleaned (y/n)	Comments
07/06/01	4.05	2.0	No	No	
07/13/01	4.05	1.0	"	"	
07/20/01	4.05	1.5	"	"	Secondary vault pump is not working - removed for repairs
07/27/01	4.30	1.5	"	"	
08/01/01	---	---	"	"	Installed new regulator; disassembled and cleaned compressor auto drain; replaced leaking air hose to DNAPL pump controller
08/03/01	4.16	1.0	"	"	
08/10/01	4.05	1.5	"	"	
08/17/01	4.18	1.5	"	"	Disassembled and cleaned compressor auto drain & air filter unit
08/21/01	---	---	"	"	Installed auto drain rebuild kit, filter/moisture separator and inlet air filter on compressor; changed compressor oil; greased compressor electric motor bearings
08/24/01	4.47	1.5	"	"	
08/30/01	4.68	1.0	"	"	
09/07/01	4.18	2.0	"	"	Cleaned secondary vault and installed new pump
09/14/01	5.06	2.0	"	"	Installed check valve on secondary vault pump; removed defective bubbler tube control valve; cleaned jammed totalizer
09/21/01	5.13	3.0	"	"	
09/28/01	5.44	0.0	Yes	Yes	Changed all 3 carbon drums. Also cleaned equalization drum and transfer pump
10/05/01	5.06	1.0	No	No	Reinstalled bubbler tube control valve
10/12/01	5.06	1.5	"	"	Cleaned moisture knock-out for LNAPL & DNAPL pump controllers
10/19/01	4.93	2.0	"	"	
10/26/01	5.44	2.0	"	"	Turned heater on for winter
10/31/01	4.98	4.5	"	"	
11/09/01	5.06	3.5	"	"	
11/16/01	5.19	3.0	"	"	

Table C-1 (Continued).
Summary of Recovery and Treatment System Data.
Former Gastown Manufactured Gas Plant Site.

Date	DNAPL Pump			LNAPL Pump			Bubbler Tube	Water Filters	Compressor
	Pressure (psi)	Adjusted (y/n)	Cleaned	Pressure (psi)	Adjusted (y/n)	Cleaned	Pressure (psi)	Changed (y/n)	Hours
11/24/01	24	Yes - to 26 psi	No	43	No	No	7	No	2093.3
11/30/01	24	Yes - to 22 psi	"	42	"	"	7	"	2104.7
12/07/01	22	No	"	42	"	"	7	"	2113.2
12/14/01	22	Yes - to 24 psi	"	42	"	"	7	"	2121.6
12/19/01	---	No	"	---	"	"	---	"	---
12/21/01	27	"	"	45	"	"	7	"	2129.4
01/02/02	26	"	"	42	"	"	7	"	2142.7
01/11/02	24	"	"	42	"	"	7	"	2152.0
01/16/02	24	"	"	42	"	"	7	Installed	2159.4
01/18/02	---	"	"	---	"	"	---	No	---
01/25/02	24	Yes - to 26 psi	"	42	"	"	7	Yes	2174.5
01/31/02	---	No	"	42	"	"	7	"	2184.9
02/08/02	26	"	"	42	"	"	7	"	2194.2
02/14/02	28	Yes - to 25 psi	"	42	"	"	7	No	2200.6
02/21/02	24	No	"	42	"	"	7	"	2208.8
02/28/02	24	"	"	42	"	"	7	"	2216.2
03/08/02	23	"	"	42	Yes	"	7	"	2227.5
03/15/02	22	"	"	39	No	"	7	Yes	2234.6
03/22/02	24	"	"	40	"	"	7	No	2241.3
03/27/02	24	"	"	40	"	"	7	"	2246.0
04/05/02	24	"	"	40	"	"	7	"	2255.0
04/11/02	22	"	"	38	"	"	7	Yes	2261.5

Table C-1 (Continued).
Summary of Recovery and Treatment System Data.
Former Gastown Manufactured Gas Plant Site.

Date	Transfer Pump Flow rate (gpm)	Primary Carbon Drum Pressure (PSI)	Carbon Changed or Rotated (y/n)	Oil/Water Separator Cleaned (y/n)	Comments
11/24/01	5.06	2.0	No	No	
11/30/01	4.93	10.0	"	"	Removed calcified carbon from primary drum; cleaned equalization drum, fault switches & water filter housing; added bleach to secondary vault
12/07/01	5.06	2.0	"	"	
12/14/01	5.06	3.0	"	"	Club's sump pump is not working - needs replacing
12/19/01	---	7.5	"	"	
12/21/01	4.43	10.0	Yes	"	Changed primary drum - rotated secondary & polishing drums; installed new sump pump in club
01/02/02	4.84	3.5	No	"	
01/11/02	5.06	6.0	"	"	
01/16/02	5.06	10.0 - 1.5 after removing and loosening carbon	"	"	Installed Culligan UV conditioner & Shelco Filter unit; removed bioslime from OWS; removed top 3" of carbon in primary drum - loosened remaining carbon with submersible pump
01/18/02	4.81	---	"	"	
01/25/02	4.81	3.5	"	"	
01/31/02	4.68	4.0	"	"	Transfer pump cycles on & off due to overheating from excessive run time - cause is increased flow from secondary vault
02/08/02	4.68	5.0	"	"	Turned off pump in secondary vault to alleviate overheating of transfer pump
02/14/02	4.81	4.0	"	"	DNAPL drum full - fault light on
02/21/02	5.06	3.0	"	"	
02/28/02	5.06	3.0	"	"	
03/08/02	5.32	2.5	"	"	Cleaned bubbler tube
03/15/02	5.32	2.5	"	"	
03/22/02	5.19	2.5	"	"	
03/27/02	5.16	2.0	"	"	Water flowing from secondary vault
04/05/02	5.44	2.0	"	"	Water flowing from secondary vault
04/11/02	5.32 - adjusted to 10.86 psi	2.0	"	"	Pumped water from secondary vault through treatment system - restarted pump

Table C-1 (Continued).
Summary of Recovery and Treatment System Data.
Former Gastown Manufactured Gas Plant Site.

Date	DNAPL Pump			LNAPL Pump			Bubbler Tube	Water Filters	Compressor
	Pressure (psi)	Adjusted (y/n)	Cleaned	Pressure (psi)	Adjusted (y/n)	Cleaned	Pressure (psi)	Changed (y/n)	Hours
04/15/02	---	No	No	---	No	No	---	No	---
04/19/02	22	"	"	38	"	"	7	"	2271.3
04/26/02	24	"	"	40	"	"	7	"	2278.5
04/30/02	22	"	"	40	"	"	7	Yes	2283.8
05/03/02	22	"	"	40	"	"	7	No	2287.7
05/10/02	23	"	"	40	"	"	7	Yes	2294.8
05/17/02	22	"	"	40	"	"	7	"	2301.7
05/24/02	20	"	"	42	"	"	7	No	2309.1
05/30/02	20	"	"	42	"	"	7	Yes	2315.2
06/07/02	22	"	"	38	"	"	7	No	2323.6
06/14/02	22	"	"	38	"	"	7	"	2331.0
06/21/02	22	"	"	42	"	"	7	Yes	2338.4
06/28/02	22	"	"	38	"	"	7	No	2345.3
07/08/02	22	Yes	"	38	"	"	7	"	2345.4
07/12/02	22	No	"	38	"	"	7	Yes	2349.8
07/19/02	22	"	"	38	"	"	7	No	2357.2
07/26/02	22	"	"	38	"	"	7	"	2364.4
08/02/02	22	"	"	38	"	"	7	"	2371.7
08/09/02	22	"	"	38	"	"	7	Yes	2378.6
08/16/02	22	"	"	38	"	"	7	No	2385.1
08/23/02	22	"	"	38	"	"	7	"	2398.1
08/30/02	20	"	"	38	"	"	7	"	2398.1

Table C-1 (Continued).
Summary of Recovery and Treatment System Data.
Former Gastown Manufactured Gas Plant Site.

Date	Transfer Pump Flow rate (gpm)	Primary Carbon Drum Pressure (PSI)	Carbon Changed or Rotated (y/n)	Oil/Water Separator Cleaned (y/n)	Comments
04/15/02	10.25	5.0	No	No	
04/19/02	10.25 - adjusted to 8.86 psi	5.0	"	"	
04/26/02	8.23	5.0	"	"	
04/30/02	6.20 - 8.48 after filter change	4.0	"	"	
05/03/02	8.43	6.0	"	"	
05/10/02	4.30 - 7.21 after filter change	8.0	"	"	
05/17/02	8.43	8.0	"	"	LNAPL fault light on; cleaned all switches in equalization drum; took primary carbon drum off-line due to excessive leaking & high pressure
05/24/02	6.96	---	"	"	Primary carbon drum still off-line
05/30/02	8.48	1.5	Yes	Yes	Changed all 3 carbon drums. Also cleaned secondary vault, equalization drum, bubbler tube and filter housing; bleached entire system including club sumps; removed LNAPL drum from the system.
06/07/02	8.61	0.5	No	No	
06/14/02	8.61	0.5	"	"	Bleached club sumps, recovery well, seconday vault and OWS.
06/21/02	8.48	1.0	"	"	
06/28/02	8.48	1.0	"	"	
07/08/02	8.48	1.0	"	"	Repaired jammed totalizer
07/12/02	8.12 - 8.48 after filter change	1.0	"	"	
07/19/02	8.78	1.0	"	"	
07/26/02	8.78	1.0	"	"	Freed stuck high-high switch in equalization drum
08/02/02	8.48	1.0	"	"	
08/09/02	8.61	1.0	"	"	
08/16/02	8.61	1.0	"	"	
08/23/02	8.34	1.0	"	"	
08/30/02	8.48	1.0	"	"	

Table C-1 (Continued).
Summary of Recovery and Treatment System Data.
Former Gastown Manufactured Gas Plant Site.

Date	DNAPL Pump			LNAPL Pump			Bubbler Tube	Water Filters	Compressor
	Pressure (psi)	Adjusted (y/n)	Cleaned	Pressure (psi)	Adjusted (y/n)	Cleaned	Pressure (psi)	Changed (y/n)	Hours
09/06/02	22	No	No	38	No	No	7	No	2404.2
09/13/02	20	"	"	38	Yes	"	7	"	2410.1
09/20/02	20	"	"	38	"	"	7	"	2416.1
09/27/02	21	"	"	39	"	Yes	7	"	2421.8
10/04/02	21	"	"	38	No	No	6.8	"	2427.6
10/11/02	22.5	"	"	40	"	"	7	"	2433.4
10/18/02	22	"	"	40	"	"	7	"	2440.1
10/23/02	24	"	"	40	"	"	7	"	2444.3
10/30/02	25	"	"	40	"	"	7	"	2450.7
11/01/02	24	"	"	40	"	"	7	Yes	2452.5
11/08/02	24	"	"	40	"	"	7	No	2458.5
11/15/02	24	"	---	40	"	"	7	"	2463.0
11/22/02	22	"	No	42	"	"	7	Yes	2469.9
11/27/02	24	"	"	40	"	"	7	Yes	2473.8
12/06/02	26	Yes - to 23 psi	"	42	"	"	7	No	2480.8
12/13/02	20	No	"	---	"	"	7	Yes	2485.8
12/20/02	21	Yes - to 23 psi	"	42	"	"	7	Yes	2496.2
12/27/02	23	No	"	42	"	"	7	Yes	2510.2
--- Information not given.									
NI Not installed.									

Table C-1 (Continued).
Summary of Recovery and Treatment System Data.
Former Gastown Manufactured Gas Plant Site.

Date	Transfer Pump Flow rate (gpm)	Primary Carbon Drum Pressure (PSI)	Carbon Changed or Rotated (y/n)	Oil/Water Separator Cleaned (y/n)	Comments
09/06/02	8.53	1.5	No	No	
09/13/02	8.73	1.5	"	"	
09/20/02	8.73	1.5	"	"	Cleaned probe in well
09/27/02	8.61	1.5	"	"	
10/04/02	8.61	1.5	"	"	
10/11/02	8.48	1.5	"	"	
10/18/02	8.35	---	"	"	
10/23/02	8.23	1.5	"	"	
10/30/02	8.10	2.0	"	---	DNAPL drum full - fault light on
11/01/02	7.98	2.0	"	No	
11/08/02	8.48	2.0	"	"	DNAPL drum full - fault light on
11/15/02	8.35	2.0	"	"	
11/22/02	8.35	1.5	"	"	Freed stuck high-high switch in equalization drum; light bulbs needed in shed; turned heater on
11/27/02	6.96	2.5	"	"	
12/06/02	7.85	3.0	"	"	DNAPL drum full - fault light on
12/13/02	7.34	3.0	"	"	
12/20/02	6.07 - 8.23 after filter change	1.5	"	"	Transfer pump overheating; cleaned bubbler tube
12/27/02	6.18 - 8.73 after filter change	4.0	"	"	Belt slipping on air compressor; blew compressed air through bubbler tube supply line