CRA

FINAL REMEDIAL DESIGN REPORT
GROUNDWATER COLLECTION SYSTEM

CONGRESS STREET PLANT
SCHENECTADY INTERNATIONAL INC.
SCHENECTADY, NEW YORK

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1.0 INTRODUCTION

1.1 SITE DESCRIPTION

The Schenectady International Inc. (SII) Congress Street Plant (Site) is located at Congress Street and Tenth Avenue in Schenectady, New York. The Site is approximately 10 acres in size and located next to a railroad and Cowhorn Creek. The Site location and Site plan are presented on Figures 1.1 and 1.2, respectively. The facility has operated at this location since 1910, primarily producing industrial coatings.

1.2 SELECTED REMEDIAL ALTERNATIVE

An Order on Consent between the New York State Department of Environmental Conservation (NYSDEC) and SII was executed in December 1990 and modified in September 1993 and December 1994. The Order on Consent required SII to develop and implement a Remedial Investigation/Feasibility Study (RI/FS) at the Site.

The results of the RI were presented in the report entitled "Remedial Investigation Report" (RI Report) dated January 16, 1996. The RI Report was approved by the NYSDEC in their letter of March 5, 1996.

The information presented and evaluated in the RI Report was used as the basis for the FS. The results of the FS were presented in the report entitled "Feasibility Study Report" (FS Report) that was submitted to NYSDEC on July 5, 1996. Upon review of the FS, the NYSDEC provided comments in a letter dated September 18, 1996 and a meeting was held with NYSDEC, SII, and CRA on October 2, 1996 to discuss the comments. As a result of the October 2, 1996 meeting, SII prepared a report entitled "Addendum I, Feasibility Study Report" (Addendum I).

The outcome of the FS and Addendum I resulted in the following recommended remedial alternative (Modified Alternative 3) for the groundwater at the Site:

- Groundwater Hydraulic Containment/On-Site Treatment;
- LNAPL Collection/ Off-Site Treatment; and
- Clay Liner and Erosion Protection along the swale

The FS and Addendum 1 were approved by NYSDEC in a letter dated February 28, 1997.

Following approval of the FS and Addendum 1, a Remedial Action Work Plan (RA Work Plan) was prepared, which presented a program for the design and implementation of the selected groundwater Remedial Action.

A preliminary design consisting of a Preliminary Design Report and Preliminary Design Drawings was submitted to NYSDEC in May 1998. In a letter dated July 3, 1998, NYSDEC accepted the Preliminary Design.

This report presents the Final Design for the Remedial Action. Project support plans are presented in the following Appendices:

- Appendix I - Health and Safety Plan
- Appendix J - Construction Quality Assurance Plan
- Appendix K - Operation and Maintenance Plan

The Final Design Drawings and Project Specifications are presented under separate covers.

1.3 REMEDIAL ACTION OBJECTIVES

The overall objective of the Remedial Action is to minimize chemical migration from the Site via groundwater flow in order to control potential routes of exposure to human health and the environment. This will be achieved by intercepting and collecting potentially impacted groundwater at the downgradient property boundary. Additionally, extraction wells will be installed to collect potentially impacted groundwater which has migrated off Site.

1.4 REPORT ORGANIZATION

This Final Remedial Design Report is organized as follows:

- Section 1.0 - presents a description of the Site and states the basis, purpose, and organization of the Final Remedial Design Report.
- Section 2.0 - Describes the pre-design data collection activities.
- Section 3.0 - Presents the descriptions of the Remedial Action components.

- Section 4.0 - Presents the soil management protocols that will be implemented during construction.
- Section 5.0 - Presents erosion and sediment control features.
- Section 6.0 - Presents a listing of the permits/approvals that will be obtained prior to implementation of the RA.
- Section 7.0 - Presents the schedule for implementation.

2.0 DESIGN DATA COLLECTION ACTIVITIES

The RA Work Plan and the Preliminary Design identified the need to undertake the following design data collection activities:

- Vertical aquifer sampling;
- Grain size distribution analyses; and
- Pumping tests and effluent sampling and analyses.

These activities were undertaken to obtain additional data for the design of the RA. In addition, recovery tests were conducted on a number of the existing monitoring wells to obtain additional information regarding the hydraulic conductivity of the soils in the area of the groundwater collection system.

The following sections present the results of the design data collection activities.

2.1 VERTICAL AQUIFER SAMPLING

In order to determine the vertical distribution of contaminants in the groundwater in the area of the proposed groundwater collection drain and extraction wells PW3 and PW4, five boreholes were drilled at the locations shown on Figure 2.1. Boreholes BH32, BH33, and BH34 were advanced along the proposed collection drain alignment and the data for the samples collected from these borings were presented in the Preliminary Design Report. Borings BH44 and BH45 were advanced in the vicinity of proposed groundwater extraction wells PW3 and PW4, respectively. Sampling at these locations was recommended in the Preliminary Design Report.

At locations BH32 to BH34, the boreholes were advanced using hollow stem auger techniques. Borings BH44 and BH45 were advanced with a Geoprobe rig. Continuous split spoon soil samples were collected and screened with a photoionization detector (PID). A hydropunch sampling device was used to collect groundwater samples from depths of approximately 5, 10, and 15 feet below the water table. An additional sample was collected from BH45 at a depth of approximately 20 feet below the water table. The samples were analyzed for volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs) in accordance with the Quality Assurance Project Plan (QAPP) presented in Appendix A of the RA Work Plan. Samples collected from BH32 to BH34 also were analyzed for polychlorinated biphenyls (PCBs). At the request of NYSDEC, soil samples were also collected from borings BH32 to BH34 from the depth interval of 16 to 18 feet bgs and analyzed for PCBs. A sample key is presented on Table 2.1. All boreholes were grouted to the ground surface upon completion. Borehole logs are presented in Appendix A.

The analytical results for the groundwater samples are presented in Table 2.2. The results for the soil samples are presented in Table 2.3. The data validation report is presented in Appendix B. An evaluation of the analytical results is presented in the following paragraphs. The evaluation is presented separately for boreholes along the swale alignment (i.e., BH32 to BH34) and boreholes in the northwestern corner of the Site (i.e., BH44 and BH45).

Swale Alignment

The results presented in Table 2.2 indicate that Site-related parameters are present at deeper depths and at higher concentrations in the area of BH32, which is located at the northwestern end of the swale, than at borings BH33 and BH34 which are located approximately midway along the swale and at the upper end of the swale, respectively. At boring BH32, concentrations of ethylbenzene, xylenes, 2-methynaphthalene and naphthalene in all three samples were above the NYSDEC Class GA groundwater standards. At BH33, the concentrations of ethylbenzene, xylenes, 2,4-dimethyphenol and naphthalene in the shallow sample (4 to 8 feet bgs) were above the NYSDEC Class GA groundwater standards whereas no parameters were detected in the two deeper samples collected from this borehole. At BH34, the reported concentrations of ethylbenzene, xylenes, and naphthalene in the shallow sample (4 to 8 feet bgs) were above the NYSDEC Class GA groundwater standards. The concentrations of bis(2-ethylhexyl)phthalate and naphthalene in the sample collected from 8 to 12 feet bgs were reported at concentrations slightly above the NYSDEC Class GA groundwater standards, whereas, no parameters were detected in the deep sample (12 to 16 feet bgs) collected from this borehole.

These data are consistent with the groundwater data obtained during the Remedial Investigation. A profile showing the chemical concentrations along the swale alignment is presented on Figure 2.2. These data are used to determine the depth for installation for the groundwater collection drain (see Section 3.1).

The results for the soil samples as presented in Table 2.3 show that PCBs were not detected in the soil samples. PCBs also were not detected in the groundwater samples collected for the vertical aquifer sampling.

Northwest Corner

The analytical results for BH44 and BH45 indicate that Site-related parameters are present at higher concentrations at BH44 than at BH45. At BH44, concentrations of ethylbenzene, toluene, xylenes, 2,4-dimethylphenol, 2-methylphenol, 4-methylphenol, and phenol in all three samples were above the NYSDEC Class GA groundwater standards. The highest concentrations were reported for the two shallower samples (collected at approximately 5 and 10 feet below the water table). Concentrations in the deeper sample (collected at approximately 15 feet below the water table) were approximately one order of magnitude lower.

At BH45, concentrations of ethylbenzene, toluene, xylenes, 2,4-dimethylphenol, 2-methylphenol, 4-methylphenol, and phenol were above the Class GA groundwater standards in most of the samples collected. The concentrations of these parameters were generally lower in the deepest sample collected from BH45 over the depth interval of 23 to 28 ft bgs (i.e., approximately 20 feet below the water table).

The concentrations of Site-related parameters at BH44 and BH45 are generally higher than the concentrations detected in groundwater samples collected from well OW14-94, which is located in the area of BH44 but is screened close to the water table.

2.2 GRAIN SIZE DISTRIBUTION ANALYSES

In accordance with the RA Work Plan, soil samples were collected from boreholes BH32, BH33, and BH34 and submitted for grain size distribution analyses. Four samples were collected from BH32 and three samples were collected from each of borings BH33 and BH34. The sample key identifying the intervals sampled for each borehole is presented on Table 2.4. The grain size distribution results are presented in Appendix C. Based on these results, the primary soil components are fine to medium sand and silt. These data are used to develop specifications for the collection drain piping and drainage media as presented in Section 3.1.

2.3 PUMPING AND RECOVERY TESTS

In accordance with the RA Work Plan, a pumping test was conducted on well OW7a, located at the northwestern end of the Site next to Cowhorn Creek. The purpose of the pumping test was to obtain data for the hydraulic conductivity and groundwater quality to be used for the design of the groundwater extraction and treatment system.

Prior to the pumping test, two piezometers (P-1 and P-2) were installed utilizing 4 1/4-inch diameter hollow stem augers, with continuous split-spoon sampling. The split spoon was attached to the drill rod and driven into the soil 24-inches using a 140-pound hammer. The driving resistance was recorded for each 6-inch increment. Each split spoon was visually examined and screened with a PID and logged for geologic stratification utilizing the Unified Soil Classification System. The stratigraphic and instrumentation logs for the piezometers are presented in Appendix D.

The piezometer boreholes were advanced eight feet into the water table. Each piezometer was constructed of ten feet of #7 slot, 2-inch diameter PVC screen attached to 2-inch PVC riser. The screen was placed to straddle the high groundwater table, with 2 feet of screen above the groundwater table. A filter pack of uniformly graded sand was placed in the borehole annulus to a depth of 2 feet above the top of the screen. A 2-foot thick bentonite seal was placed on top of the sand pack. The remaining borehole annulus was filled with bentonite grout.

Following installation, each piezometer was given a minimum of 24 hours to set-up, before development activities began.

Immediately prior to development, a water level was taken and the well volume was calculated. The piezometer was then surged using a solid five-foot section of PVC. Each piezometer was surged for a minimum of ten minutes. After the piezometer was surged, a 5-foot long PVC bailer was used to remove a minimum of 10 well volumes of water from the piezometer. After each volume was removed, measurements for turbidity, pH, conductivity, and temperature were obtained to check development water stabilization. All development water was collected in drums and disposed off Site by SII. Table 2.5 presents a summary of the development data.

2.3.1 OW-7A PUMPING TEST

Prior to the pumping test, water level readings were taken from observation wells OW-13, OW-3b, OW-3, OW-12, and at surface water monitoring locations SW1 and SW3 over a three day period. In accordance with the RA Work Plan, water levels were to be measured at well OW-14, however, this well is damaged and could not be monitored. It was determined that the test could be successfully performed without the inclusion of well OW-14 and consequently the tests were undertaken. The water level measurements obtained prior to the pumping test are presented in Table 2.6.

The day before the pumping test, pressure transducers were installed in wells OW-7a and OW-7b, P-1, P-2, as well as in the creek upstream and downstream from the pumping well. This was done to aid in monitoring responses to the pumping test.

A step-drawdown test was then performed to determine yield capacity for well OW-7a. The step test was performed using a foot valve and a Waterra pump. In accordance with the RA Work Plan, the first rate in the step test was 0.1 gpm. However, such a low rate could not be maintained with the Waterra pump and the rate was increased to 0.5 gpm. After approximately 10 minutes it was apparent that 0.5 gpm was not causing significant drawdown. The rate was then increased to 1.3 gpm which produced limited drawdown.

The next day, another step test was performed utilizing a suction pump to obtain higher pumping rates. A rate of 2.4 gpm was obtained which had a greater impact on the well. The 2.4 gpm pumping rate was selected for the constant rate pumping test.

Well OW-7a was allowed to recover from the step-drawdown test prior to beginning the constant rate pumping test. The constant rate pumping test was also performed using a suction pump. The test began at 10:15 am on February 3, 1998 and was to last 48 hours. However, the pumping test was terminated after 39 hours once all of the available storage capacity in the wastewater tank was filled.

During the constant rate pumping test, an almost immediate response was observed at P-1. Other observation wells did not indicate any response during the pumping test. Appendix E provides hydrographs for OW-7a, OW-7b, P-1, P-2, OW-3a, OW-3b, and Cowhorn Creek both upstream and downstream of the culvert beneath the railroad.

The results of the pumping test are summarized as follows:

- The pumping test was conducted in monitoring well OW-7a at an average rate of 2.3 gallons per minute (gpm) for a duration of 39 hours. Approximately 5,500 gallons of groundwater were generated during the pumping test;
- Water levels were measured in monitoring wells OW-13, OW-3b, OW-3, OW-12, and OW-7b, piezometers P-1 and P-2, and upstream and downstream culvert surface water locations prior to and during the pumping test;
- The pumping test results indicate that the maximum drawdown in the pumping well (OW-7a) was approximately 3.7 feet during the test;
- A drawdown of approximately 0.5 feet was measured in piezometer P-1, located approximately 39 feet northwest of OW-7a;

- Drawdown was not measured at any of the other monitoring well, piezometer or surface water locations during the test;
- Water level recovery in OW-7a was very rapid following the termination of the pumping test;
- The hydraulic conductivity of the shallow overburden material was calculated to be on the order of 7.0×10^{-3} to 1.3×10^{-2} cm/sec using the pumping test data. This hydraulic conductivity value is approximately one to two orders of magnitude higher than the previous hydraulic conductivity values of 10^{-4} cm/sec calculated using slug test data for the shallow overburden;
- Based on the results of the pumping test, it is suspected that the higher discharge rate was caused by leakage of surface water from the culvert east of OW-7a; and
- Evidence for suspected leakage include the fact that an almost instantaneous drawdown was measured in P-1 located, northwest of OW-7a, but no drawdown was measured in P-2 located southeast of OW-7a and the culvert. The rapid recovery in the water level in OW-7a following the termination of the pumping test is also indicative of potential leakage. It should be noted that the elevation of the surface water in the Creek in this area and hence the hydraulic head in the culvert is approximately 1.5 feet higher than the water table elevation.

2.3.2 RECOVERY TESTS

Recovery tests were performed in monitoring wells OW-1, OW-3, OW-4a, and P-2 along the proposed groundwater collection drain alignment to verify the calculated hydraulic conductivity results that were based on previous investigations at the Site and presented in the RI Report.

Recovery tests consisted of the evacuation of a complete well volume at each location and measurement of water level recovery with respect to time. Two tests were performed at each location to further verify the results.

The recovery test results and graphs are provided in Appendix E. The data are summarized below and further verify the low hydraulic conductivity of the overburden material in this area:

- Monitoring well OW-1 : 1.9×10^{-4} cm/sec (average of two tests)
- Monitoring well OW-3 : 4.7×10^{-5} cm/sec (average of two tests)
- Monitoring well OW-4a : 8.6×10^{-5} cm/sec (average of two tests)

- Piezometer P-2 : 9.1×10^{-5} cm/sec (one test due to poor recovery in second test)

The geometric mean of the above hydraulic conductivity values is 7.5×10^{-5} cm/sec.

2.4 GROUNDWATER SAMPLE RESULTS

During the pumping test at well OW-7a, groundwater samples were collected from the discharge line at the beginning of the test, after 24 hours and at the end of the test. The samples were analyzed for VOCs, SVOCs, PCBs, metals and general chemistry parameters. The analytical results are presented in Table 2.7. These data indicate that concentrations of VOCs and SVOCs decreased over the duration of the pumping test. This decrease is likely due to increased infiltration of surface water from the culvert beneath the railway during the test. The data for the first sample collected are expected to be representative of the water quality during the startup of an extraction well in this area, whereas the data for the sample collected at the end of the test are expected to be representative of the long term quality of the extracted water. These data are used to estimate the quality of the collected groundwater for evaluation of treatment/discharge options as presented in Section 3.4.

3.0 SYSTEM DESIGN

The selected Remedial Action for the groundwater at the SII Congress Street Site consists of the following components:

- Groundwater collection drain;
- Groundwater extraction wells;
- Forcemain/pumping systems;
- Groundwater treatment/discharge;
- Swale liner; and
- Erosion protection.

It should be noted that the conceptual design presented in the Feasibility Study and the RA Work Plan includes a collection drain for collection of light non-aqueous phase liquid (LNAPL). LNAPL in the area of the existing monitoring well OW-10 is being addressed separately as an Interim Corrective Measure (IRM). The scope of work for the IRM is outlined in a letter to NYSDEC dated April 10, 1998.

The following sections present descriptions and the rationale for selection of the specific design elements of each of the RA components.

3.1 GROUNDWATER COLLECTION DRAIN

A groundwater collection drain consisting of a pipe and media drain will be installed along the swale alignment that parallels the southwestern property boundary. The collection drain will flow in a northwesterly direction to a wet well (WW1). Collected water will be pumped from WW1 via a forcemain for treatment and ultimate discharge to the City of Schenectady sanitary sewer, if approved by the City of Schenectady. Cleanouts will be located at each end of the drain to allow access for maintenance purposes. The specific design elements of the collection drain are the alignment, depth of installation, drainage media, and pipe specifications. The alignment and the profile for the collection drain are presented on Drawings C-01 and C-03, respectively. A typical cross section is presented on Drawing C-04.

The proposed alignment for the collection drain is presented on Drawing C-01. This alignment differs from the conceptual alignment presented in the FS and the RA Work Plan as it does not extend around the northwestern corner of the Site to monitoring well

OW-13. The deviation from the conceptual alignment was required due to concerns regarding access to this area for construction and the structural stability of the slope down to Cowhorn Creek during construction. Alternatively, extraction wells are proposed for this area as presented in Section 3.2.

The alignment for the collection drain was selected to be as close to the downgradient property boundary as possible and still provide sufficient separation from the active railway to minimize potential concerns regarding stability during and following installation. Calculations for the potential loading on the pipe and the selection of the pipe size and thickness are presented in Appendix F.

The collection pipe will be installed to drain in a northwesterly direction towards the wet well. For the first 522 feet, the collection pipe will be installed to a depth of approximately 12 feet below the existing ground elevation which is approximately 7 feet below the existing groundwater table. The vertical aquifer samples collected along this portion of the alignment as presented in Section 2.1 indicate that contaminated groundwater does not extend beyond this depth and, therefore, the collection system will intercept all contaminated groundwater in this area. For the next 128 feet, the collection pipe will be placed at a 10-percent slope to a depth of approximately 23 feet bgs (elevation 266 feet amsl). For the last 50 feet, the collection pipe will be installed at a 5-percent slope to an elevation of 263 feet amsl at the wet well. This is below the normal water elevation in Cowhorn Creek on the north side of the railway line which typically ranges from 270 to 272 feet and, therefore, will ensure hydraulic containment. The proposed pipe installation profile and the results for the vertical aquifer samples are presented on Figure 2.2

The collection pipe will be constructed of 6-inch diameter perforated high density polyethylene (HDPE). The slot width will be 1/16 inches and the drainage media will meet the following gradation specifications:

Sieve Size	*Percent Passing*
3"	100
1"	75-100
3/8"	60-85
No. 4	50-80
No. 10	40-70
No. 40	0-45
No. 100	0-15
No. 200	0-4

Some adjustments to this specification may be required depending upon local availability of material.

The size of the perforations and the drainage media specifications were determined based upon the grain size distribution analysis results for soil samples collected along the proposed alignment. The drainage media specifications are selected to provide a high permeability hydraulic connection along the entire length of the collection drain but also provide a filter to prevent fine soils in the surrounding formation from entering the collection pipe. The size of the perforations was selected to prevent the drainage media from entering the collection pipe. The calculations are presented in Appendix F.

Following installation of the collection drain, the contractor will be required to perform an initial commissioning of the drain to remove sediment in the system and develop the drainage media in the vicinity of the pipe. This will involve pumping water from the wet well for a one-week period using a contractor supplied pump. The collected water will be filtered and passed through an oil-water separator prior to discharge to the sanitary sewer. Following the initial commissioning period, the piping will be flushed to remove all foreign materials. Flushed materials will be removed at the cleanout and wet well locations.

It is estimated that the collection drain will collect approximately 4.2 gpm under steady state conditions (see calculations presented in Appendix G). Flows will be higher during the initial drawdown and commissioning period. The pump for the wet well will have a design capacity of 15 gpm to provide additional capacity during the initial drawdown period and to accommodate potentially higher flows during periods of high infiltration (i.e., after significant rainfall events).

Contractors will be allowed to propose alternative installation methods for the groundwater collection drain. Preference will be given to methods which minimize the volume of soil excavated. The selected contractor will be required to prepare a Shoring Plan and Design, certified by a professional engineer licensed in the State of New York for any excavations requiring shoring. The installation methods and the Shoring Plan and Design will be subject to approval by Conrail, SII, and NYSDEC.

3.2 GROUNDWATER EXTRACTION WELLS

A total of four 6-inch diameter extraction wells will be installed; one on each side of the culvert which passes beneath the railway line (PW1 and PW2) and two in the northwestern corner of the Site (PW3 and PW4). The proposed locations for the extraction wells are presented on Drawing C-01 and typical construction details are presented on Drawing C-04.

Wells PW1 and PW2 will be installed off Site in the vicinity of the culvert crossing beneath the railway line. These wells will be used to collect contaminated groundwater in this area that will not be collected by the groundwater collection drain. During the pumping test performed at well OW-7a, as presented in Section 2.3, a response was measured at piezometer P1 located northwest of OW-7a but no response was measured at P2 located on the other side of the culvert crossing. Well PW1 will be used to collect groundwater in the area of well OW-7a and well PW2 will be used to collect groundwater on the other side of the culvert.

Based on the pumping test results for well OW-7a, it is estimated that the steady state groundwater extraction rate for well PW1 will be 3 gpm. The estimated groundwater extraction rate for PW2 is 0.5 to 1 gpm based on the recovery test results for P-2. The calculations are presented in Appendix G. As discussed in Section 2.3, it is expected that infiltration of surface water from the culvert for Cowhorn Creek resulted in a higher flow rate during the pumping test at OW-7a. Surface water infiltration from the culvert should increase the rate of flushing of contaminants during the remediation resulting in decreased cleanup time.

Wells PW3 and PW4 will be installed along the northern property boundary in the vicinity of monitoring wells OW-13 and OW-14. As discussed in Section 3.1, the initial conceptual design included extending the groundwater collection drain through this area. Due to concerns regarding access for construction and bank stability, it is proposed to install two extraction wells to collect groundwater in this area. The proposed locations for the wells and construction details are presented on Drawings C-01 and C-04, respectively. Based on the results for the recovery tests performed on wells OW-1, OW-3, OW-4a and P-2 and the calculations presented in Appendix G, it is estimated that both wells will produce approximately 0.5 to 1.0 gpm.

Screen designs for the wells will be based on grain size analysis results for pilot soil borings installed next to the well locations.

3.3 FORCEMAIN AND PUMPING STATIONS

Electric submersible pumps will be installed in the wet well and in each of the extraction wells. The pumps will be constructed of stainless steel and be suitable for environmental applications. Based on the anticipated flow rates for the collection drain and each of the extraction wells as presented in Section 3.1 and 3.2, respectively, the design flow capacities for the system are as follows:

- Wet Well 1 — 15 gpm
- Extraction Well PW1 — 10 gpm
- Extraction Well PW2 — 10 gpm
- Extraction Well PW3 — 5 gpm
- Extraction Well PW4 — 5 gpm

The pumps will be installed within approximately 1-foot of the bottom of the well. Level controls will be installed to maintain maximum drawdown but also provide protection to the pump.

Collected water will be pumped via buried forcemains to a control building located in the northwestern corner of the Site (see Drawing C-01 for system layout). The buried forcemains will consist of a 1-inch diameter high density polyethylene (HDPE) pipe inside a 2-inch diameter HDPE secondary containment pipe. The buried forcemains will be placed a minimum of 4 feet below existing ground elevation to prevent freezing. A typical forcemain cross section is presented on Drawing C-04.

The control building will be located in the northwest corner of the Site. Separate forcemains from each extraction well and the wet well will enter the building. Flow will be monitored by separate flow meters installed on each forcemain. Flow will be conveyed from the control building to the treatment unit in Building 4 via an aboveground 2-inch diameter stainless steel forcemain. Heat tracing and insulation will be installed on sections of the aboveground forcemain located outside the buildings.

3.4 GROUNDWATER TREATMENT AND DISCHARGE

Parameter concentrations in the collected groundwater were estimated based on the chemical concentrations in the samples collected during the pumping test at OW-7a (see Section 2.4) and chemical concentrations for previous samples collected during the RI from monitoring wells located along the collection system alignment. The calculations are summarized in Table 3.1. Also presented on Table 3.1 are the City of Schenectady (City) sewer ordinance values for discharge to the sanitary sewer. The data presented in Table 3.1 indicate that the estimated parameter concentrations in the collected groundwater are well below the sanitary sewer ordinance values. Hence, it is currently anticipated that the collected groundwater will be discharged to the sanitary sewer system for treatment at the City wastewater treatment facility, subject to approval by the City. Discussions with the City have been initiated in this regard.

Although the chemical concentrations in the collected groundwater are expected to be below the City ordinance values for discharge to the sanitary sewer, an oil-water separator will be installed as a contingency measure to remove any LNAPL from the collected groundwater prior to discharge to the sanitary sewer. It is currently proposed that the oil-water separator will be located in Building 4 and will consist of a slant rib coalescing separator (Great Lakes Model SRC-50 or equivalent). Information regarding the proposed oil-water separator is presented in Appendix H.

Any collected oil will be placed in a 55-gallon drum for off-Site disposal in accordance with applicable regulations. Sludge material collected in the oil-water separator will also be disposed of off Site in accordance with applicable regulations.

A water-tight curb will be installed around the oil-water separator to provide spill containment for this unit. The curb will be 4-inches wide by 8-inches high as shown on Drawing No. C-04.

3.5 SWALE LINER

Following installation of the groundwater collection drain, the surface water drainage swale along the western side of the Site will be graded to provide a uniform 1 percent slope to maintain surface water drainage. The swale will be lined with a 60 mil high density polyethylene (HDPE) liner to prevent surface water infiltration into the groundwater collection drain. Subgrade preparation for the liner requires the surface to be smooth and free of unsuitable materials such as debris, roots, sticks, and angular rocks larger than 1 inch in diameter.

Three french drains will be installed directly beneath the HDPE liner at the downstream end of the swale as shown on Drawing C-01. Seeps have been identified in this area and the french drains will prevent the buildup of any perched water beneath the liner by providing a hydraulic connection to the groundwater collection drain. The french drains will be approximately 5 feet in width, 1 foot deep, and 10 feet in length and will consist of the same aggregate material used for the collection drain. A typical detail of the french drain construction is presented on Drawing C-04.

The HDPE liner will be overlain by a 12-inch thick layer of common fill followed by 6-inches of topsoil. The topsoil will meet the following specifications:

- Minimum 10 percent organic material;
- Soils meeting sand loam, loamy fine sand, clay loam or sandy clay loam, United States Department of Agriculture (USDA) soil classification;
- Less than 500 ppm soluble salts; and
- Maximum stone size less than 2 inches.

The topsoil, as described above, will have a soil erodibility factor between 0.1 to 0.2, which is considered erosion resistant, in accordance with the document entitled "New York, Guidelines for Urban Erosion and Sediment Control", October 1991.

The topsoil will be seeded with a seed mixture designed to produce a ground cover that is erosion resistant.

As a contingency measure, the portion of the swale downstream of Section 0+25, will be lined with 6-inch D_{50} riprap. The increased slope over this portion of the swale increases the potential for erosion. A typical rip rap installation detail is presented on Drawing C-04.

4.0 SOIL MANAGEMENT

All soils excavated for the RA will be managed in accordance with the generic Soil Management Plan dated January 1998. It is estimated that the total volume of soil to be excavated will be approximately 775 to 1,425 cubic yards, depending upon the construction method used for the installation of the groundwater collection drain. The estimated volume of soil excavated for each component is as follows:

Groundwater Collection Drain	650 to 1,300 cubic yards
Forcemains	100 cubic yards
French Drains	10 cubic yards
Riprap Placement	15 cubic yards

Soil management protocols require soils to be tested utilizing the Rapid Characterization Method (RCM). The RCM includes two components:

- Rapid Assessment Real Time Testing which consists of visual and OVA screening; and
- Rapid Field Characterization Method (RFCM) testing which involves sampling the soils for analysis by a rapid gas chromatographic technique.

All soil samples submitted for RFCM testing will be analyzed by the SII laboratory located at the Rotterdam Junction Plant. If the soils are substantially contaminated, or have parameter concentrations exceeding the RFCM criteria presented in Table 4.1, the soil cannot be used as backfill. Soils would be considered to be substantially contaminated if they contain free organic liquids and/or residual materials (construction debris; liquid man-made material; or semi-liquid man-made material) or if they register an OVA reading equal to or greater than 1,000 ppm.

SII may, at their option, submit soil samples for TCLP VOC and SVOC analyses. All TCLP soil samples would be collected in 8-ounce sample jars in accordance with the current NYSDEC approved protocol.

In order to meet the criteria for soil sampling as defined in the Order-On-Consent, Rapid Assessment Real Time Testing (i.e., visual and OVA screening) and RFCM testing will be conducted during excavation at a frequency of one per 10 cubic yards.

In accordance with Appendix F of the Order-on-Consent, SII must ship off Site any soils which meet any of the following criteria:

- contain a listed hazardous waste;
- is a characteristic hazardous waste;
- contains liquid man-made materials;
- contains semi- liquid man-made material;
- does not meet the following additional criteria if the TCLP method is used:
  - any halogenated organic found in the TCLP extract is greater than 100 mg/L per the reference library; or
  - any reference non-halogenated organic found in the TCLP extract is greater than 1,000 mg/L per the reference library.

If the soils do not meet any of the above criteria, then they may be placed on Site in the area west of the buildings and east of the top-of-slope as shown on Figure 4.1. At the completion of the project, any soils placed in this area will be covered with 6-inches of clean imported soil and be seeded.

Since chemicals present in the soils cannot be traced to a single identifiable event which resulted in their release, and the chemicals present may have resulted from the release of materials other than listed wastes, the determination regarding whether the soils are a hazardous waste will be based upon the TCLP results.

5.0 SOIL EROSION AND SEDIMENT CONTROL

5.1 CONSTRUCTION PHASE CONTROLS

Soil erosion and sediment control will be accomplished during construction by use of methods typically used for this application. The west side of the construction area will be protected by silt fencing supported by wooden posts installed at 8-foot intervals. In areas of concentrated flow such as at the end of the swale, straw or hay bales will also be installed to provide additional protection. A check dam or other suitable controls will be installed at the downstream end of the swale to provide temporary stilling for the water prior to it being discharged to Cowhorn Creek and to reduce flow velocity in the swale.

The contractor will construct berms and provide pumping equipment capable of diverting surface water runoff around the work area throughout the construction period. Any surface water which contacts potentially contaminated soils will be collected and treated on-Site prior to discharge to the City of Schenectady sanitary sewer or transported to the SII Rotterdam Junction Wastewater Treatment Facility, as appropriate, by the contractor.

All erosion control measures, including hay bales, silt fencing, control matting, and check dams will be checked daily and following each heavy rainfall.

5.2 PERMANENT CONTROLS

Once the vegetative cover is firmly established over the construction area, the silt fence, hay bales, and check dams will be removed. Riprap will be installed at the outlet of the swale as discussed in Section 3.4. The riprap will consist of 6-inch nominal diameter rock placed over a 9-foot width down the final sloped run of the swale. Typical riprap installation details are presented on Drawing C-04.

6.0 PERMITS AND APPROVALS

The following permits and/or approvals have been identified to be required for implementation of the RA.

- NYSDEC - approval of final design;
- Consolidated Rail Corporation - access agreement for construction, operation, and maintenance of extraction wells and forcemain; and
- City of Schenectady - authorization for discharge to sanitary sewer,
  - building permit.

All necessary permits and/or approvals will be obtained prior to initiating construction.

7.0 SCHEDULE

A preliminary schedule for implementation of the RA is presented on Figure 7.1. This schedule is contingent upon obtaining approvals from NYSDEC, City of Schenectady, and Conrail. The schedule will be revised, as necessary, following selection of the Contractor and receipt of the necessary approvals.

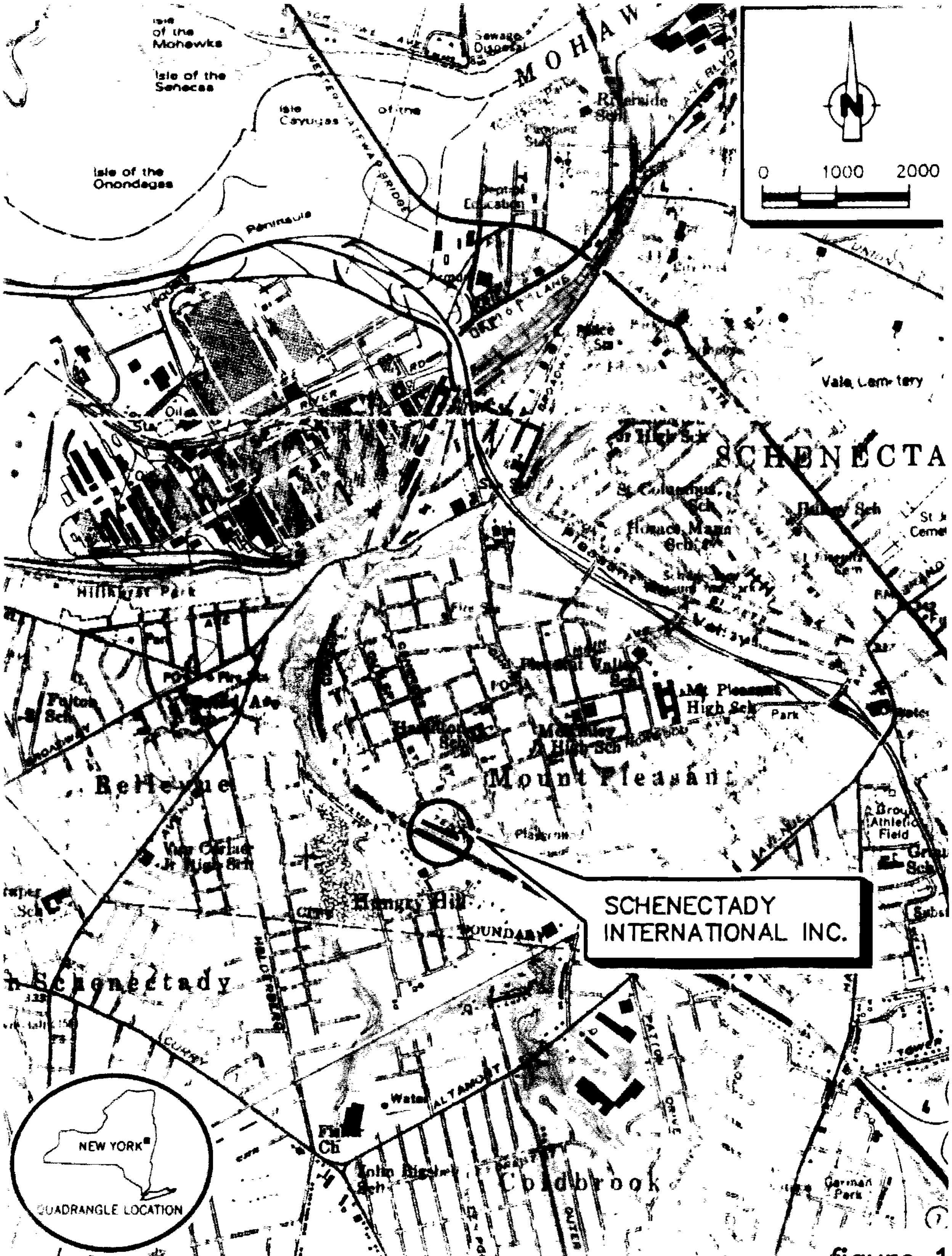


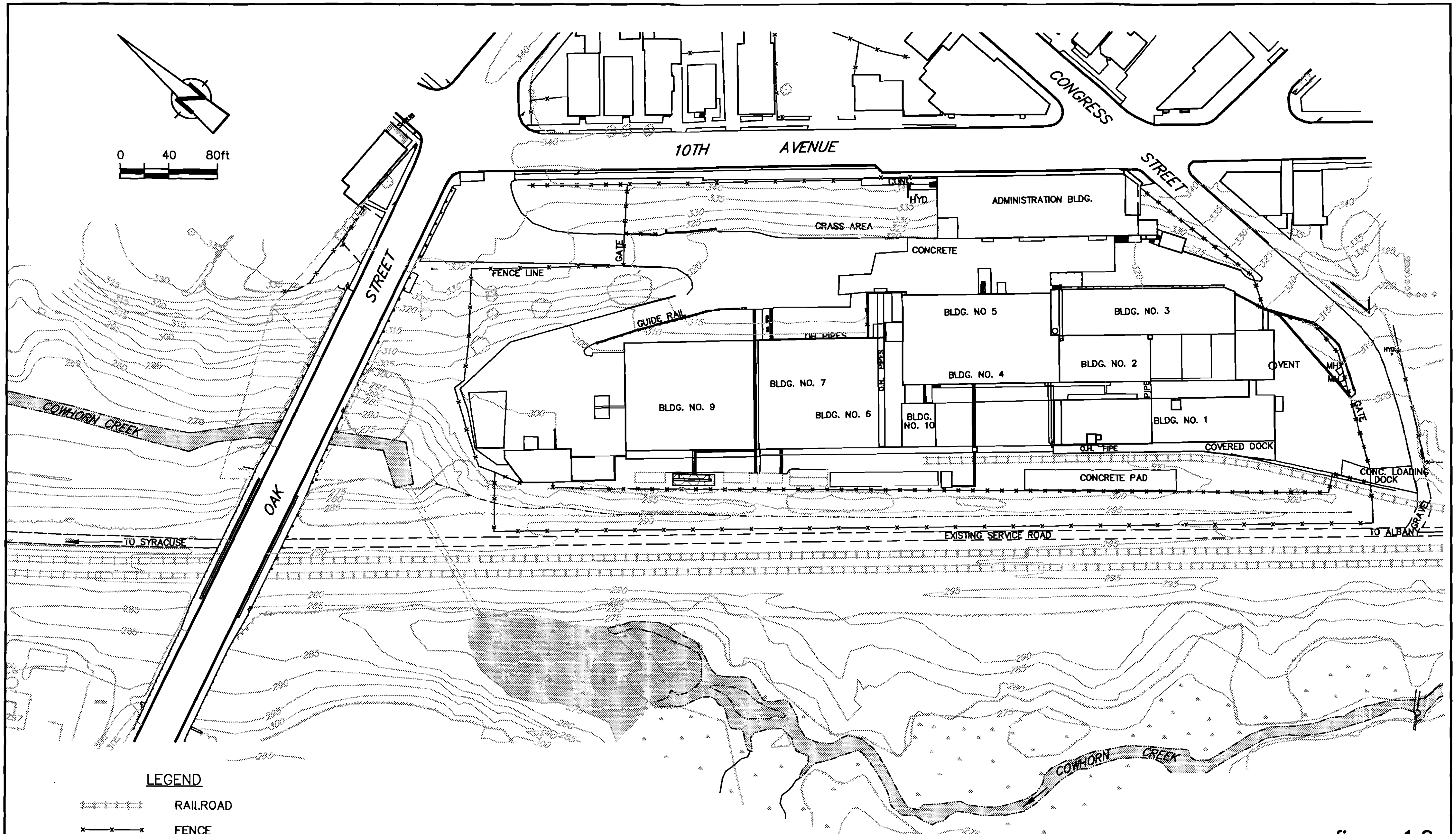
figure 1.1

SITE LOCATION
FINAL DESIGN REPORT
CONGRESS STREET PLANT
Schenectady International Inc.

SOURCE:
U.S.G.S. SCHENECTADY, N.Y.
SW/4 SCHENECTADY 15' QUADRANGLE

CRA

01312-30(036)GN-WA001 NOV 06/98



LEGEND

RAILROAD

FENCE

CULVERT

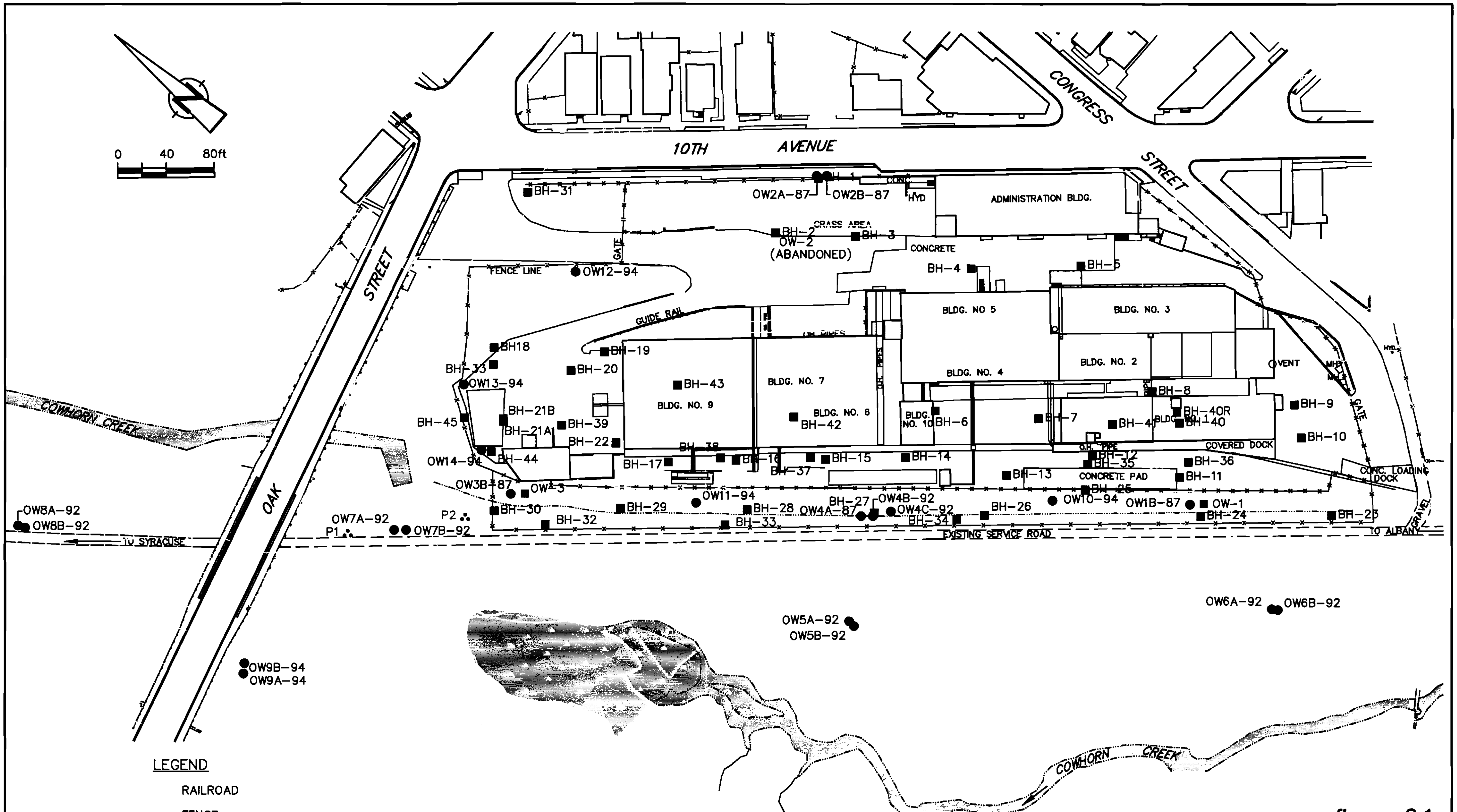
290 EXISTING CONTOUR ELEVATION (ft. AMSL)

figure 1.2

SITE PLAN
FINAL DESIGN REPORT
CONGRESS STREET PLANT
Schenectady International Inc.

CRA

01312-30(036)GN-WA002 NOV 06/98



LEGEND

RAILROAD

FENCE

CULVERT

EXISTING CONTOUR ELEVATION (ft. AMSL)

■ BH-33 VERTICAL AQUIFER SAMPLING LOCATION

∴ P2 PIEZOMETER LOCATION

CRA

figure 2.1

VERTICAL AQUIFER SAMPLING AND PIEZOMETER LOCATIONS
FINAL DESIGN REPORT
CONGRESS STREET PLANT
Schenectady International Inc.

01312-30(036)GN-WA003 NOV 06/98

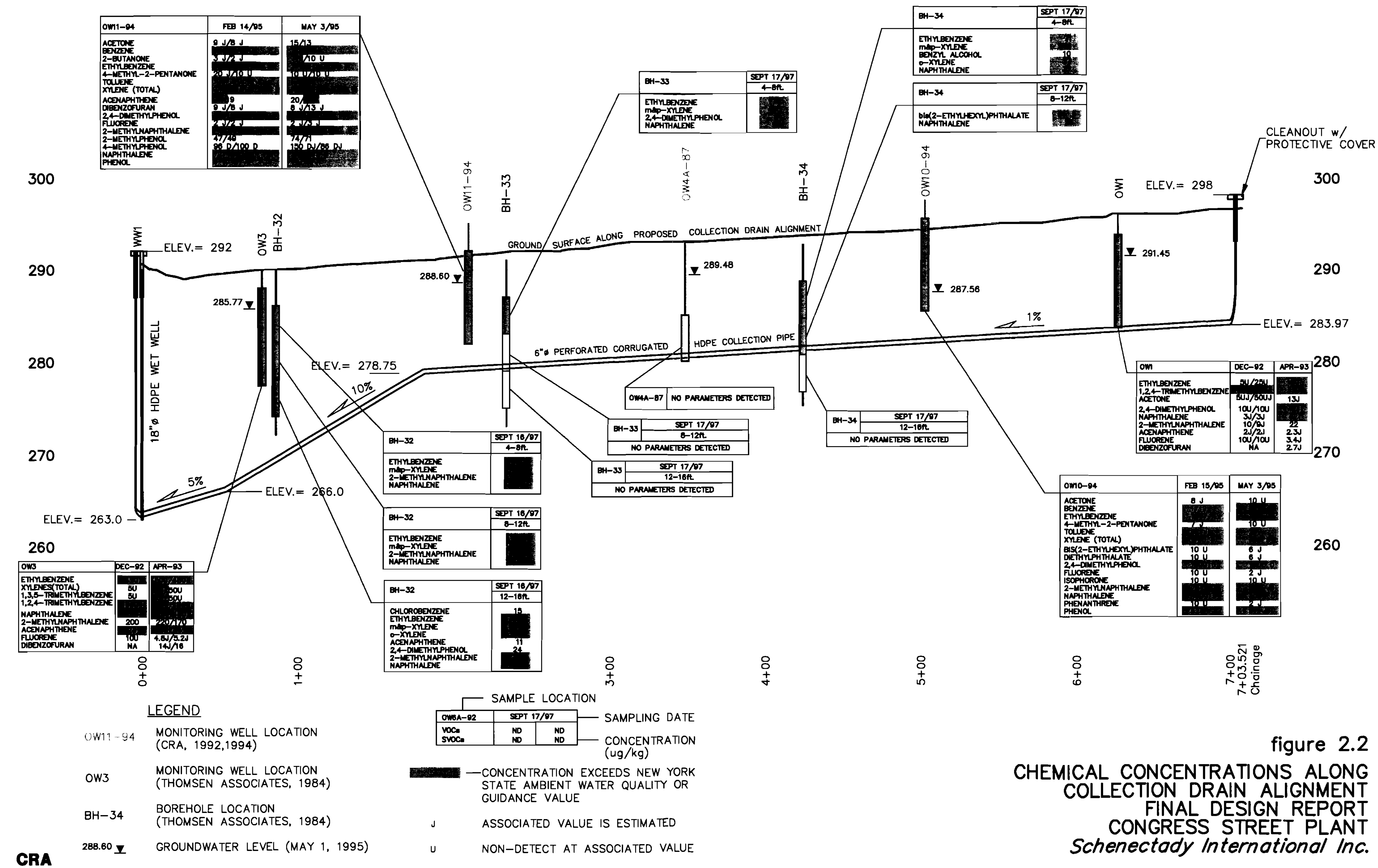


figure 2.2

CHEMICAL CONCENTRATIONS ALONG COLLECTION DRAIN ALIGNMENT
FINAL DESIGN REPORT
CONGRESS STREET PLANT
Schenectady International Inc.

01312-30(036)GN-WA004 NOV 06/98

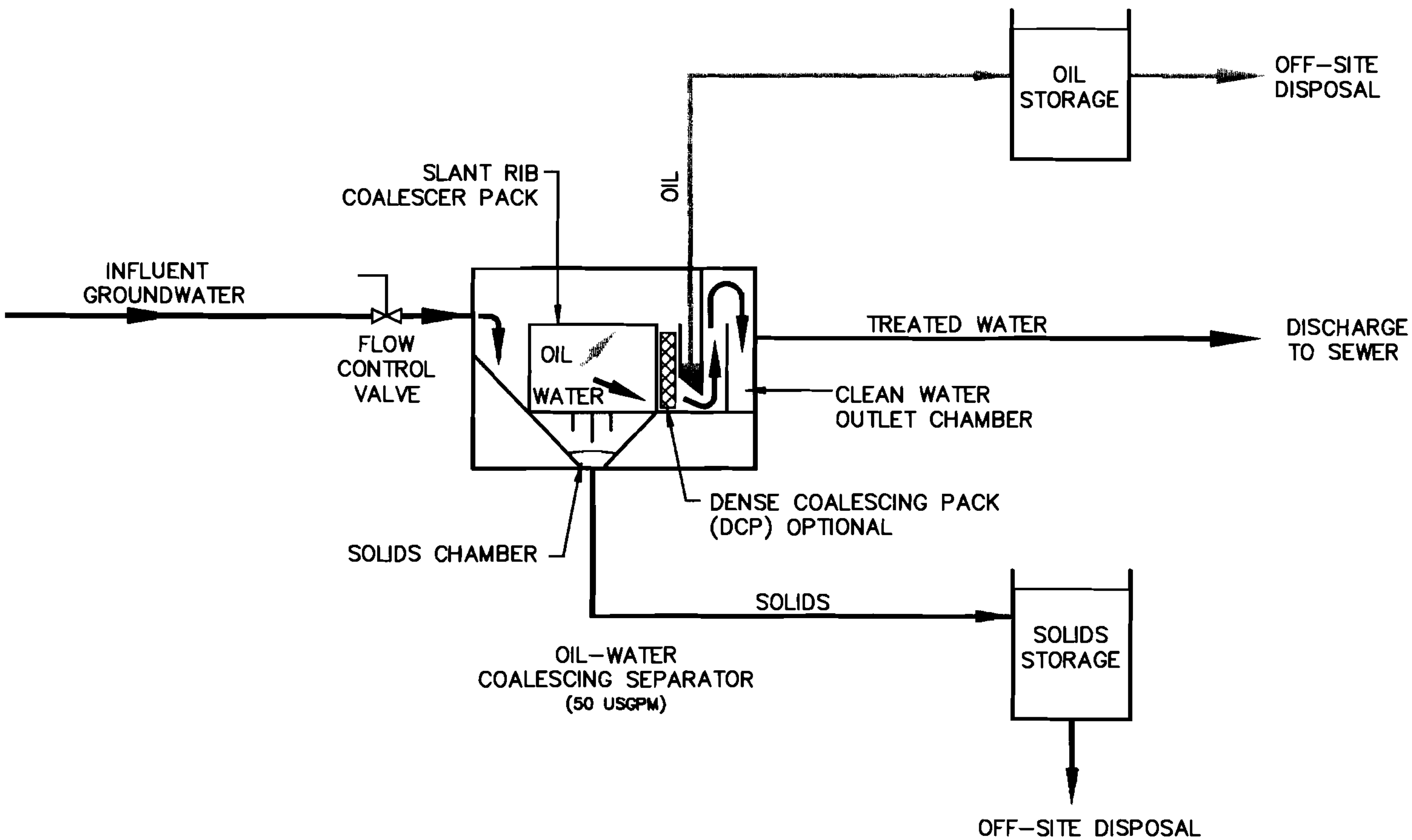
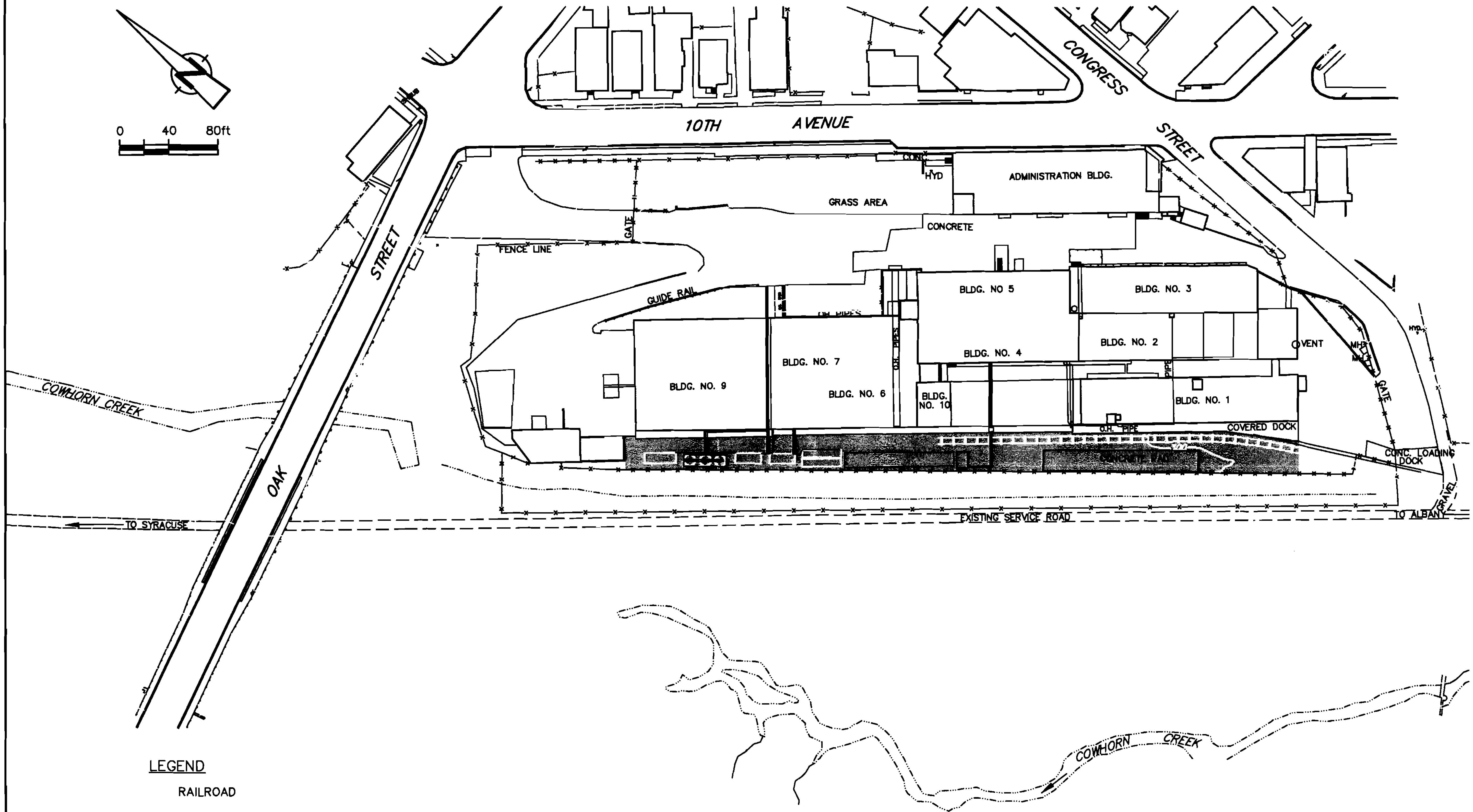


figure 3.1

GROUNDWATER TREATMENT –
PROCESS FLOW DIAGRAM
FINAL DESIGN REPORT
Schenectady International Inc.

CRA

01312-30(036)GN-WA005 NOV 06/98



LEGEND

RAILROAD

FENCE

CULVERT

EXISTING CONTOUR ELEVATION (ft. AMSL)

APPROVED PLACEMENT AREA FOR NON HAZARDOUS SOILS

figure 4.1

SOIL PLACEMENT AREA
FINAL DESIGN REPORT
CONGRESS STREET PLANT
Schenectady International Inc.

CRA

01312-30(036)GN-WA006 NOV 06/98

2001
DURATION (MONTHS)

ID	Name
1	**SHORING DESIGN (COMPLETE)**
2	PREPARE BID DOCUMENTS
3	BID AND SELECT CONSULTANT
4	DESIGN
5	SUBMIT SHORING DESIGN TO CSX
6	CSX REVIEW/ACCESS AGREEMENT
7	
8	**SETTLEMENT ANALYSIS (COMPLETE)**
9	PREPARE SETTLEMENT ANALYSIS
10	SII REVIEW
11	SUBMIT TO CSX/NYSDEC
12	SETTLEMENT MONITORING AGREEMENT WITH AMTRACK
13	
14	**RESPOND TO CSX COMMENTS (COMPLETE)**
15	PREPARE DRAFT RESPONSES
16	SII REVIEW
17	SUBMIT TO CSX
18	
19	**PROJECT DESIGN AND SPECIFICATIONS (COMPLETE)**
20	PREPARE RESPONSES TO DEC COMMENTS AND REVISE DESIGN REPORT
21	SII REVIEW OF RESPONSES
22	SUBMIT RESPONSES AND REVISED DESIGN TO DEC
23	SEPARATE SPECIFCATIONS AND PREPARE 3 BID PACKAGES
24	BID PROCESS
25	SELECT CONTRACTOR (3)
26	
27	**CONSTRUCTION**
28	SHEETING INSTALLATION
29	MOBILIZE
30	CONSTRUCTION
31	
32	**SEWER DISCHARGE PERMIT**
33	OBTAIN CITY DISCHARGE PERMIT
34	
35	**EXTRACTION WELLS (COMPLETE)**
36	SECURE ACCESS TO CSX PROPERTY
37	INSTALL PILOT BOREHOLES AND CONDUCT GRAIN SIZE ANALYSIS
38	PREPARE WELL DESIGNS
39	SUBMIT TO CSX FOR APPROVAL
40	INSTALL EXTRACTION WELLS AND CONDUCT PUMPING TESTS
41	
42	**OIL/WATER SEPARATOR**
43	PURCHASE OIL/WATER SEPARATOR (COMPLETE)
44	SELECT MECHANICAL CONTRACTOR (COMPLETE)
45	INSTALL OIL/WATER SEPARATOR AND HOOK UP TO CITY SEWER

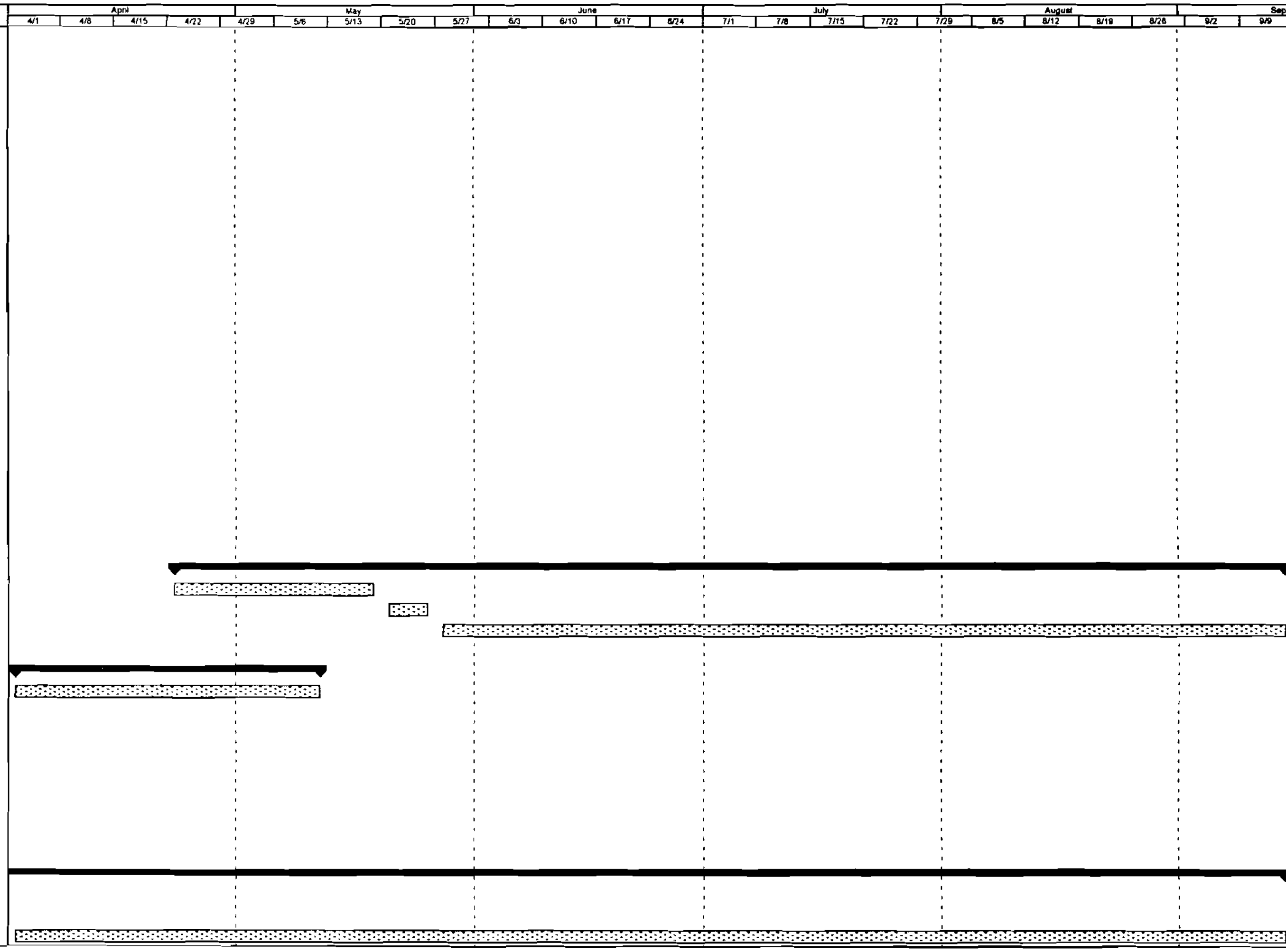


Figure 7.1
Revised

Congress St. Groundwater Protection System
Date: 4/9/2001

Task, Split, Progress, Milestone, Summary, Rolled Up Task, Rolled Up Split, Rolled Up Milestone, Rolled Up Progress, External Tasks, Project Summary

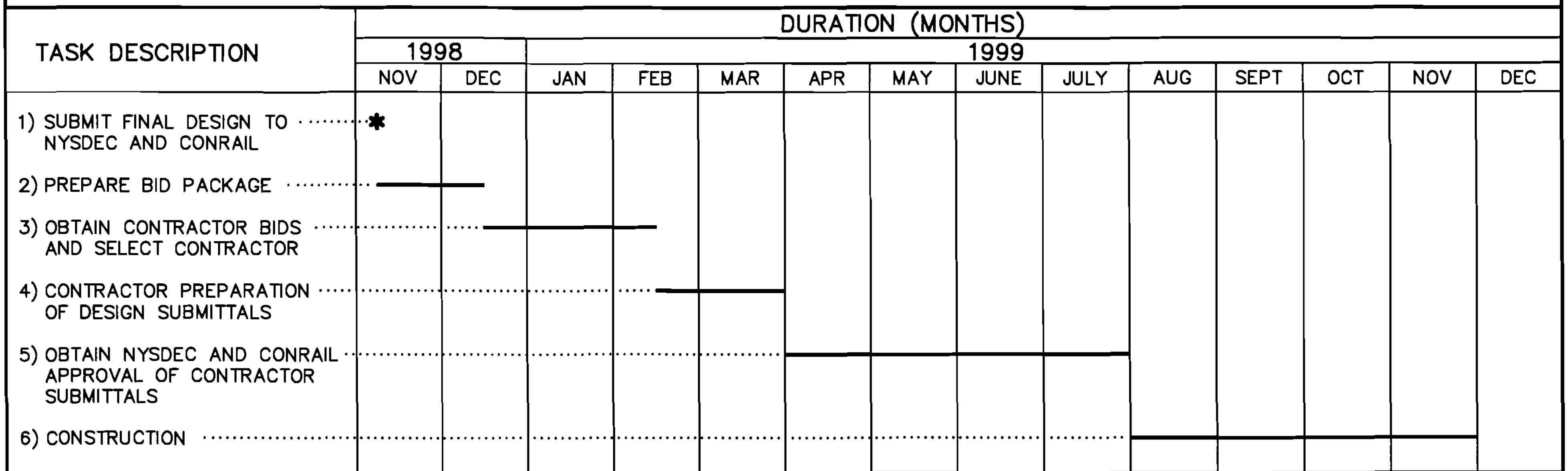


figure 7.1

PRELIMINARY SCHEDULE
CONGRESS STREET PLANT
Schenectady International Inc.

CRA

01312-30(036)GN-WA007 NOV 06/98

TABLE 2.1

SAMPLE KEY
SCHENECTADY INTERNATIONAL, INC.
SEPTEMBER 1997

Borehole	*Sample ID*	*Date*	*Depth Interval (ft-ft)*	*Matrix*	*Analyses*
BH32	S-1312-091697-DJG-006	9/16/97	16-18	Soil	PCBs
BH33	S-1312-091797-DJG-010	9/17/97	16-18	Soil	PCBs
BH34	S-1312-091797-DJG-014	9/17/97	16-18	Soil	PCBs
BH32	GW-1312-091697-DJG-001	9/16/97	4-8	Water	VOCs, SVOCs, PCBs
BH32	GW-1312-091697-DJG-002	9/16/97	8-12	Water	VOCs, SVOCs, PCBs
BH32	GW-1312-091697-DJG-003	9/16/97	12-16	Water	VOCs, SVOCs, PCBs
BH33	GW-1312-091797-DJG-004	9/17/97	4-8	Water	VOCs, SVOCs, PCBs
BH33	GW-1312-091797-DJG-005	9/17/97	8-12	Water	VOCs, SVOCs, PCBs
BH33	GW-1312-091797-DJG-006	9/17/97	12-16	Water	VOCs, SVOCs, PCBs
BH34	GW-1312-091797-DJG-007	9/17/97	4-8	Water	VOCs, SVOCs, PCBs
BH34	GW-1312-091797-DJG-008	9/17/97	8-12	Water	VOCs, SVOCs, PCBs
BH34	GW-1312-091797-DJG-009	9/17/97	12-16	Water	VOCs, SVOCs, PCBs
BH44	BH2-98 11-16	9/30/98	11-16	Water	VOCs, SVOCs
BH44	BH2-98 15-20	9/30/98	15-20	Water	VOCs, SVOCs
BH44	BH2-98 20-25	9/30/98	20-25	Water	VOCs, SVOCs
BH45	BH1-98 9-14	9/29/98	9-14	Water	VOCs, SVOCs
BH45	BH1-98 13-18	9/29/98	13-18	Water	VOCs, SVOCs
BH45	BH1-98 DUP	9/29/98	13-18 (DUP)	Water	VOCs, SVOCs
BH45	BH1-98 18-23	9/29/98	18-23	Water	VOCs, SVOCs
BH45	BH1-98 23-28	9/29/98	23-28	Water	VOCs, SVOCs

Notes:

-	Not Applicable
MS	Matrix Spike
MSD	Matrix Spike Duplicate

TABLE 2.2

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY INTERNATIONAL, INC.

	Well ID:		*BH32*	
	Well Depth:	*4-8 ft*	*8-12 ft*	*12-16 ft*
	Sample ID:	*GW-1312-091697-DJG-001*	*GW-1312-091697-DJG-002*	*GW-1312-091697-DJG-003*
	Collection Date:	*09/16/97*	*09/16/97*	*09/16/97*
	Units			
TCL Volatiles				
Acetone	µg/L	R	R	R
Benzene	µg/L	50 U	130 U	10 U
Bromodichloromethane	µg/L	50 U	130 U	10 U
Bromoform	µg/L	50 U	130 U	10 U
Bromomethane	µg/L	50 U	130 U	10 U
2-Butanone	µg/L	100 U	250 U	20 U
Carbon disulfide	µg/L	100 U	250 U	20 U
Carbon tetrachloride	µg/L	50 U	130 U	10 U
Chlorobenzene	µg/L	50 U	130 U	15
Chloroethane	µg/L	50 U	130 U	10 U
Chloroform	µg/L	50 U	130 U	10 U
Chloromethane	µg/L	50 U	130 U	10 U
Dibromochloromethane	µg/L	50 U	130 U	10 U
1,1-Dichloroethane	µg/L	50 U	130 U	10 U
1,2-Dichloroethane	µg/L	50 U	130 U	10 U
1,1-Dichloroethene	µg/L	50 U	130 U	10 U
cis-1,2-Dichloroethene	µg/L	50 U	130 U	10 U
trans-1,2-Dichloroethene	µg/L	50 U	130 U	10 U
1,2-Dichloropropane	µg/L	50 U	130 U	10 U
cis-1,3-Dichloropropene	µg/L	50 U	130 U	10 U
trans-1,3-Dichloropropene	µg/L	50 U	130 U	10 U
Ethyl benzene	µg/L	300	1600	430
2-Hexanone	µg/L	100 U	250 U	20 U
Methylene chloride	µg/L	50 U	130 U	10 U
4-Methyl-2-pentanone	µg/L	100 U	250 U	20 U
Styrene	µg/L	50 U	130 U	10 U
1,1,2,2-Tetrachloroethane	µg/L	50 U	130 U	10 U
Tetrachloroethene	µg/L	50 U	130 U	10 U
Toluene	µg/L	50 U	130 U	10 U
1,1,1-Trichloroethane	µg/L	50 U	130 U	10 U
1,1,2-Trichloroethane	µg/L	50 U	130 U	10 U
Trichloroethene	µg/L	50 U	130 U	10 U
Vinyl chloride	µg/L	50 U	130 U	10 U
m&p-Xylene	µg/L	620	6800	900
o-Xylene	µg/L	50 U	130 U	160
TCL Semi-Volatiles				
Acenaphthene	µg/L	320 U	930 U	11
Acenaphthylene	µg/L	320 UJ	930 UJ	3.0 U
Anthracene	µg/L	320 UJ	930 UJ	3.0 U
Benzo(a)anthracene	µg/L	320 U	930 U	3.0 U
Benzo(a)pyrene	µg/L	320 U	930 U	3.0 U
Benzo(b)fluoranthene	µg/L	320 U	930 U	3.0 U
Benzo(g,h,i)perylene	µg/L	320 U	930 U	3.0 U
Benzo(k)fluoranthene	µg/L	320 U	930 U	3.0 U
Benzyl alcohol	µg/L	320 U	930 U	3.0 U

TABLE 2.2

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY INTERNATIONAL, INC.

	Well ID:	*BH32*		
	Well Depth:	*4-8 ft*	*8-12 ft*	*12-16 ft*
	Sample ID:	*GW-1312-091697-DJG-001*	*GW-1312-091697-DJG-002*	*GW-1312-091697-DJG-003*
	Collection Date:	*09/16/97*	*09/16/97*	*09/16/97*
	Units			
TCL Semi-Volatiles (Cont'd.)				
Butyl benzyl phthalate	µg/L	320 UJ	930 UJ	3.0 U
Di-n-butyl phthalate	µg/L	320 U	930 U	3.0 U
Carbazole	µg/L	320 UJ	930 UJ	3.0 U
Indeno(1,2,3-cd)pyrene	µg/L	320 U	930 U	3.0 U
4-Chloroaniline	µg/L	320 U	930 U	3.0 U
bis(2-Chloroethoxy)methane	µg/L	320 U	930 U	3.0 U
bis(2-Chloroethyl) ether	µg/L	320 U	930 U	3.0 U
2-Chloronaphthalene	µg/L	320 U	930 U	3.0 U
2-Chlorophenol	µg/L	630 U	1900 U	6.0 U
2,2'-Oxybis(1-chloropropane)	µg/L	320 UJ	930 UJ	3.0 U
Chrysene	µg/L	320 UJ	930 UJ	3.0 U
Dibenzo(a,h)anthracene	µg/L	320 U	930 U	3.0 U
Dibenzofuran	µg/L	320 U	930 U	3.0 U
1,2-Dichlorobenzene	µg/L	320 U	930 U	3.0 U
1,3-Dichlorobenzene	µg/L	320 U	930 U	3.0 U
1,4-Dichlorobenzene	µg/L	320 U	930 U	3.0 U
3,3'-Dichlorobenzidine	µg/L	320 U	930 U	3.0 U
2,4-Dichlorophenol	µg/L	630 U	1900 U	6.0 U
Diethylphthalate	µg/L	320 U	930 U	3.0 U
Dimethyl phthalate	µg/L	320 U	930 U	3.0 U
2,4-Dimethylphenol	µg/L	630 U	1900 U	24
2,4-Dinitrophenol	µg/L	1300 U	3700 U	12 U
2,4-Dinitrotoluene	µg/L	320 UJ	930 UJ	3.0 U
2,6-Dinitrotoluene	µg/L	320 UJ	930 UJ	3.0 U
bis(2-Ethylhexyl)phthalate	µg/L	320 UJ	930 UJ	4.6 U
Fluoranthene	µg/L	320 U	930 U	3.0 U
Fluorene	µg/L	320 U	930 U	3.0 U
Hexachlorobenzene	µg/L	320 U	930 U	3.0 U
Hexachlorobutadiene	µg/L	320 U	930 U	3.0 U
Hexachlorocyclopentadiene	µg/L	320 U	930 U	3.0 U
Hexachloroethane	µg/L	320 U	930 U	3.0 U
Isophorone	µg/L	320 U	930 U	3.0 U
2-Methylnaphthalene	µg/L	1100	9600	59
2-Methylphenol	µg/L	630 U	1900 U	6.0 U
4,6-Dinitro-2-methylphenol	µg/L	1300 UJ	3700 UJ	12 UJ
4-Chloro-3-methylphenol	µg/L	630 U	1900 U	6.0 U
4-Methylphenol	µg/L	630 U	1900 U	6.0 U
Naphthalene	µg/L	3600	19000	430
2-Nitroaniline	µg/L	320 U	930 U	3.0 U
3-Nitroaniline	µg/L	320 UJ	930 UJ	3.0 U
4-Nitroaniline	µg/L	320 UJ	930 UJ	3.0 U
Nitrobenzene	µg/L	320 U	930 U	3.0 U
2-Nitrophenol	µg/L	630 UJ	1900 UJ	6.0 U
4-Nitrophenol	µg/L	1300 U	3700 U	12 U
n-Nitrosodimethylamine	µg/L	320 UJ	930 UJ	3.0 U
n-Nitrosodiphenylamine	µg/L	320 UJ	930 UJ	3.0 U

TABLE 2.2

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY INTERNATIONAL, INC.

	Well ID:	*BH32*		
	Well Depth:	*4-8 ft*	*8-12 ft*	*12-16 ft*
	Sample ID:	*GW-1312-091697-DJG-001*	*GW-1312-091697-DJG-002*	*GW-1312-091697-DJG-003*
	Collection Date:	*09/16/97*	*09/16/97*	*09/16/97*
	Units			
TCL Semi-Volatiles (Cont'd.)				
Di-n-octyl phthalate	µg/L	320 U	930 U	3.0 UJ
Pentachlorophenol	µg/L	1300 U	3700 U	12 U
Phenanthrene	µg/L	320 U	930 U	3.0 U
Phenol	µg/L	630 UJ	1900 UJ	6.0 U
4-Bromophenyl phenyl ether	µg/L	320 U	930 U	3.0 U
4-Chlorophenyl phenyl ether	µg/L	320 U	930 U	3.0 U
n-Nitroso-di-n-propylamine	µg/L	320 U	930 U	3.0 U
Pyrene	µg/L	320 UJ	930 UJ	3.0 U
1,2,4-Trichlorobenzene	µg/L	320 U	930 U	3.0 U
2,4,5-Trichlorophenol	µg/L	630 U	1900 U	6.0 U
2,4,6-Trichlorophenol	µg/L	630 U	1900 U	6.0 U
PCBs				
Aroclor-1016	µg/L	0.33 U	3.0 U	0.30 U
Aroclor-1221	µg/L	0.33 U	3.0 U	0.30 U
Aroclor-1232	µg/L	0.33 U	3.0 U	0.30 U
Aroclor-1242	µg/L	0.33 U	3.0 U	0.30 U
Aroclor-1248	µg/L	0.33 U	3.0 U	0.30 U
Aroclor-1254	µg/L	0.33 U	3.0 U	0.30 U
Aroclor-1260	µg/L	0.33 U	3.0 U	0.30 U

Notes:
J Associated value is estimated.
PCBs Polychlorinated Biphenyls.
R Rejected.
TCL Target Compound List
U Non-detect at associated value.

TABLE 2.2

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY INTERNATIONAL, INC.

	Well ID:	*BH33*		
	Well Depth:	*4-8 ft*	*8-12 ft*	*12-16 ft*
	Sample ID:	*GW-1312-091797-DJG-004*	*GW-1312-091797-DJG-005*	*GW-1312-019797-DJG-006*
	Collection Date:	*09/17/97*	*09/17/97*	*09/17/97*
	Units			
TCL Volatiles				
Acetone	µg/L	R	R	R
Benzene	µg/L	13 U	5.0 U	5.0 U
Bromodichloromethane	µg/L	13 U	5.0 U	5.0 U
Bromoform	µg/L	13 U	5.0 U	5.0 U
Bromomethane	µg/L	13 U	5.0 U	5.0 U
2-Butanone	µg/L	25 U	10 U	10 U
Carbon disulfide	µg/L	25 U	10 U	10 U
Carbon tetrachloride	µg/L	13 U	5.0 U	5.0 U
Chlorobenzene	µg/L	13 U	5.0 U	5.0 U
Chloroethane	µg/L	13 U	5.0 U	5.0 U
Chloroform	µg/L	13 U	5.0 U	5.0 U
Chloromethane	µg/L	13 U	5.0 U	5.0 U
Dibromochloromethane	µg/L	13 U	5.0 U	5.0 U
1,1-Dichloroethane	µg/L	13 U	5.0 U	5.0 U
1,2-Dichloroethane	µg/L	13 U	5.0 U	5.0 U
1,1-Dichloroethene	µg/L	13 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	µg/L	13 U	5.0 U	5.0 U
trans-1,2-Dichloroethene	µg/L	13 U	5.0 U	5.0 U
1,2-Dichloropropane	µg/L	13 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	µg/L	13 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	µg/L	13 U	5.0 U	5.0 U
Ethyl benzene	µg/L	170	5.0 U	5.0 U
2-Hexanone	µg/L	25 U	10 U	10 U
Methylene chloride	µg/L	13 U	5.0 U	5.0 U
4-Methyl-2-pentanone	µg/L	25 U	10 U	10 U
Styrene	µg/L	13 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	µg/L	13 U	5.0 U	5.0 U
Tetrachloroethene	µg/L	13 U	5.0 U	5.0 U
Toluene	µg/L	13 U	5.0 U	5.0 U
1,1,1-Trichloroethane	µg/L	13 U	5.0 U	5.0 U
1,1,2-Trichloroethane	µg/L	13 U	5.0 U	5.0 U
Trichloroethene	µg/L	13 U	5.0 U	5.0 U
Vinyl chloride	µg/L	13 U	5.0 U	5.0 U
m&p-Xylene	µg/L	490	5.0 U	5.0 U
o-Xylene	µg/L	13 U	5.0 U	5.0 U
TCL Semi-Volatiles				
Acenaphthene	µg/L	31 U	5.9 U	4.6 U
Acenaphthylene	µg/L	31 U	5.9 U	4.6 U
Anthracene	µg/L	31 U	5.9 U	4.6 U
Benzo(a)anthracene	µg/L	31 U	5.9 U	4.6 U
Benzo(a)pyrene	µg/L	31 U	5.9 U	4.6 U
Benzo(b)fluoranthene	µg/L	31 U	5.9 U	4.6 U
Benzo(g,h,i)perylene	µg/L	31 U	5.9 U	4.6 U
Benzo(k)fluoranthene	µg/L	31 U	5.9 U	4.6 U
Benzyl alcohol	µg/L	31 U	5.9 U	4.6 U

TABLE 2.2

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY INTERNATIONAL, INC.

	Well ID:	*BH33*		
	Well Depth:	*4-8 ft*	*8-12 ft*	*12-16 ft*
	Sample ID:	*GW-1312-091797-DJG-004*	*GW-1312-091797-DJG-005*	*GW-1312-019797-DJG-006*
	Collection Date:	*09/17/97*	*09/17/97*	*09/17/97*
	Units			
TCL Semi-Volatiles (Cont'd.)				
Butyl benzyl phthalate	µg/L	31 U	5.9 U	4.6 U
Di-n-butyl phthalate	µg/L	31 U	5.9 U	4.6 U
Carbazole	µg/L	31 U	5.9 U	4.6 U
Indeno(1,2,3-cd)pyrene	µg/L	31 U	5.9 U	4.6 U
4-Chloroaniline	µg/L	31 U	5.9 U	4.6 U
bis(2-Chloroethoxy)methane	µg/L	31 U	5.9 U	4.6 U
bis(2-Chloroethyl) ether	µg/L	31 U	5.9 U	4.6 U
2-Chloronaphthalene	µg/L	31 U	5.9 U	4.6 U
2-Chlorophenol	µg/L	61 U	12 U	9.2 U
2,2'-Oxybis(1-chloropropane)	µg/L	31 U	5.9 U	4.6 U
Chrysene	µg/L	31 U	5.9 U	4.6 U
Dibenzo(a,h)anthracene	µg/L	31 U	5.9 U	4.6 U
Dibenzofuran	µg/L	31 U	5.9 U	4.6 U
1,2-Dichlorobenzene	µg/L	31 U	5.9 U	4.6 U
1,3-Dichlorobenzene	µg/L	31 U	5.9 U	4.6 U
1,4-Dichlorobenzene	µg/L	31 U	5.9 U	4.6 U
3,3'-Dichlorobenzidine	µg/L	31 U	5.9 U	4.6 U
2,4-Dichlorophenol	µg/L	61 U	12 U	9.2 U
Diethylphthalate	µg/L	31 U	5.9 U	4.6 U
Dimethyl phthalate	µg/L	31 U	5.9 U	4.6 U
2,4-Dimethylphenol	µg/L	61	12 U	9.2 U
2,4-Dinitrophenol	µg/L	120 U	24 U	18 U
2,4-Dinitrotoluene	µg/L	31 U	5.9 U	4.6 U
2,6-Dinitrotoluene	µg/L	31 U	5.9 U	4.6 U
bis(2-Ethylhexyl)phthalate	µg/L	31 U	5.9 U	5.5 U
Fluoranthene	µg/L	31 U	5.9 U	4.6 U
Fluorene	µg/L	31 U	5.9 U	4.6 U
Hexachlorobenzene	µg/L	31 U	5.9 U	4.6 U
Hexachlorobutadiene	µg/L	31 U	5.9 U	4.6 U
Hexachlorocyclopentadiene	µg/L	31 U	5.9 U	4.6 U
Hexachloroethane	µg/L	31 U	5.9 U	4.6 U
Isophorone	µg/L	31 U	5.9 U	4.6 U
2-Methylnaphthalene	µg/L	61 U	12 U	9.2 U
2-Methylphenol	µg/L	61 U	12 U	9.2 U
4,6-Dinitro-2-methylphenol	µg/L	120 UJ	24 UJ	18 UJ
4-Chloro-3-methylphenol	µg/L	61 U	12 U	9.2 U
4-Methylphenol	µg/L	61 U	12 U	9.2 U
Naphthalene	µg/L	90	5.9 U	4.6 U
2-Nitroaniline	µg/L	31 U	5.9 U	4.6 U
3-Nitroaniline	µg/L	31 U	5.9 U	4.6 U
4-Nitroaniline	µg/L	31 U	5.9 U	4.6 U
Nitrobenzene	µg/L	31 U	5.9 U	4.6 U
2-Nitrophenol	µg/L	61 U	12 U	9.2 U
4-Nitrophenol	µg/L	120 U	24 U	18 U
n-Nitrosodimethylamine	µg/L	31 U	5.9 U	4.6 U
n-Nitrosodiphenylamine	µg/L	31 U	5.9 U	4.6 U

TABLE 2.2

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY INTERNATIONAL, INC.

	Well ID:	*BH33*		
	Well Depth:	*4-8 ft*	*8-12 ft*	*12-16 ft*
	Sample ID:	*GW-1312-091797-DJG-004*	*GW-1312-091797-DJG-005*	*GW-1312-019797-DJG-006*
	Collection Date:	*09/17/97*	*09/17/97*	*09/17/97*
	Units			
TCL Semi-Volatiles (Cont'd.)				
Di-n-octyl phthalate	µg/L	31 UJ	5.9 UJ	4.6 UJ
Pentachlorophenol	µg/L	120 U	24 U	18 U
Phenanthrene	µg/L	31 U	5.9 U	4.6 U
Phenol	µg/L	61 U	12 U	9.2 U
4-Bromophenyl phenyl ether	µg/L	31 U	5.9 U	4.6 U
4-Chlorophenyl phenyl ether	µg/L	31 U	5.9 U	4.6 U
n-Nitroso-di-n-propylamine	µg/L	31 U	5.9 U	4.6 U
Pyrene	µg/L	31 U	5.9 U	4.6 U
1,2,4-Trichlorobenzene	µg/L	31 U	5.9 U	4.6 U
2,4,5-Trichlorophenol	µg/L	61 U	12 U	9.2 U
2,4,6-Trichlorophenol	µg/L	61 U	12 U	9.2 U
PCBs				
Aroclor-1016	µg/L	0.35 U	0.5 U	0.77 U
Aroclor-1221	µg/L	0.35 U	0.5 U	0.77 U
Aroclor-1232	µg/L	0.35 U	0.5 U	0.77 U
Aroclor-1242	µg/L	0.35 U	0.5 U	0.77 U
Aroclor-1248	µg/L	0.35 U	0.5 U	0.77 U
Aroclor-1254	µg/L	0.35 U	0.5 U	0.77 U
Aroclor-1260	µg/L	0.35 U	0.5 U	0.77 U

Notes:
J Associated value is estimated.
PCBs Polychlorinated Biphenyls.
R Rejected.
TCL Target Compound List
U Non-detect at associated value.

TABLE 2.2

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY INTERNATIONAL, INC.

	Well ID:		*BH34*	
	Well Depth:	*4-8 ft*	*8-12 ft*	*12-16 ft*
	Sample ID:	*GW-1312-091797-DJG-007*	*GW-1312-091797-DJG-008*	*GW-1312-091797-DJG-009*
	Collection Date:	*09/17/97*	*09/17/97*	*09/17/97*
	Units			
TCL Volatiles				
Acetone	µg/L	R	R	R
Benzene	µg/L	5.0 U	5.0 U	5.0 U
Bromodichloromethane	µg/L	5.0 U	5.0 U	5.0 U
Bromoform	µg/L	5.0 U	5.0 U	5.0 U
Bromomethane	µg/L	5.0 U	5.0 U	5.0 U
2-Butanone	µg/L	10 U	10 U	10 U
Carbon disulfide	µg/L	10 U	10 U	10 U
Carbon tetrachloride	µg/L	5.0 U	5.0 U	5.0 U
Chlorobenzene	µg/L	5.0 U	5.0 U	5.0 U
Chloroethane	µg/L	5.0 U	5.0 U	5.0 U
Chloroform	µg/L	5.0 U	5.0 U	5.0 U
Chloromethane	µg/L	5.0 U	5.0 U	5.0 U
Dibromochloromethane	µg/L	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	µg/L	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	µg/L	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	µg/L	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	µg/L	5.0 U	5.0 U	5.0 U
trans-1,2-Dichloroethene	µg/L	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	µg/L	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	µg/L	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	µg/L	5.0 U	5.0 U	5.0 U
Ethyl benzene	µg/L	71	5.0 U	5.0 U
2-Hexanone	µg/L	10 U	10 U	10 U
Methylene chloride	µg/L	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone	µg/L	10 U	10 U	10 U
Styrene	µg/L	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	µg/L	5.0 U	5.0 U	5.0 U
Tetrachloroethene	µg/L	5.0 U	5.0 U	5.0 U
Toluene	µg/L	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane	µg/L	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	µg/L	5.0 U	5.0 U	5.0 U
Trichloroethene	µg/L	5.0 U	5.0 U	5.0 U
Vinyl chloride	µg/L	5.0 U	5.0 U	5.0 U
m&p-Xylene	µg/L	200	5.0 U	5.0 U
o-Xylene	µg/L	37	5.0 U	5.0 U
TCL Semi-Volatiles				
Acenaphthene	µg/L	4.3 U	17 U	7.6 U
Acenaphthylene	µg/L	4.3 U	17 U	7.6 U
Anthracene	µg/L	4.3 U	17 U	7.6 U
Benzo(a)anthracene	µg/L	4.3 U	17 U	7.6 U
Benzo(a)pyrene	µg/L	4.3 U	17 U	7.6 U
Benzo(b)fluoranthene	µg/L	4.3 U	17 U	7.6 U
Benzo(g,h,i)perylene	µg/L	4.3 U	17 U	7.6 U
Benzo(k)fluoranthene	µg/L	4.3 U	17 U	7.6 U
Benzyl alcohol	µg/L	10	17 U	7.6 U

TABLE 2.2

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY INTERNATIONAL, INC.

	Well ID:		*BH34*	
	Well Depth:	*4-8 ft*	*8-12 ft*	*12-16 ft*
	Sample ID:	*GW-1312-091797-DJG-007*	*GW-1312-091797-DJG-008*	*GW-1312-091797-DJG-009*
	Collection Date:	*09/17/97*	*09/17/97*	*09/17/97*
	Units			
TCL Semi-Volatiles (Cont'd.)				
Butyl benzyl phthalate	µg/L	4.3 U	17 U	7.6 U
Di-n-butyl phthalate	µg/L	4.3 U	17 U	7.6 U
Carbazole	µg/L	4.3 U	17 U	7.6 U
Indeno(1,2,3-cd)pyrene	µg/L	4.3 U	17 U	7.6 U
4-Chloroaniline	µg/L	4.3 U	17 U	7.6 U
bis(2-Chloroethoxy)methane	µg/L	4.3 U	17 U	7.6 U
bis(2-Chloroethyl) ether	µg/L	4.3 U	17 U	7.6 U
2-Chloronaphthalene	µg/L	4.3 U	17 U	7.6 U
2-Chlorophenol	µg/L	8.5 U	35 U	15 U
2,2'-Oxybis(1-chloropropane)	µg/L	4.3 U	17 U	7.6 U
Chrysene	µg/L	4.3 U	17 U	7.6 U
Dibenzo(a,h)anthracene	µg/L	4.3 U	17 U	7.6 U
Dibenzofuran	µg/L	4.3 U	17 U	7.6 U
1,2-Dichlorobenzene	µg/L	4.3 U	17 U	7.6 U
1,3-Dichlorobenzene	µg/L	4.3 U	17 U	7.6 U
1,4-Dichlorobenzene	µg/L	4.3 U	17 U	7.6 U
3,3'-Dichlorobenzidine	µg/L	4.3 U	17 U	7.6 U
2,4-Dichlorophenol	µg/L	8.5 U	35 U	15 U
Diethylphthalate	µg/L	4.3 U	17 U	7.6 U
Dimethyl phthalate	µg/L	4.3 U	17 U	7.6 U
2,4-Dimethylphenol	µg/L	8.5 U	35 U	15 U
2,4-Dinitrophenol	µg/L	17 U	69 U	30 U
2,4-Dinitrotoluene	µg/L	4.3 U	17 U	7.6 U
2,6-Dinitrotoluene	µg/L	4.3 U	17 U	7.6 U
bis(2-Ethylhexyl)phthalate	µg/L	30 U	61 J	15 U
Fluoranthene	µg/L	4.3 U	17 U	7.6 U
Fluorene	µg/L	4.3 U	17 U	7.6 U
Hexachlorobenzene	µg/L	4.3 U	17 U	7.6 U
Hexachlorobutadiene	µg/L	4.3 U	17 U	7.6 U
Hexachlorocyclopentadiene	µg/L	4.3 U	17 U	7.6 U
Hexachloroethane	µg/L	4.3 U	17 U	7.6 U
Isophorone	µg/L	4.3 U	17 U	7.6 U
2-Methylnaphthalene	µg/L	8.5 U	35 U	15 U
2-Methylphenol	µg/L	8.5 U	35 U	15 U
4,6-Dinitro-2-methylphenol	µg/L	17 UJ	69 UJ	30 UJ
4-Chloro-3-methylphenol	µg/L	8.5 U	35 U	15 U
4-Methylphenol	µg/L	8.5 U	35 U	15 U
Naphthalene	µg/L	37	28	7.6 U
2-Nitroaniline	µg/L	4.3 U	17 U	7.6 U
3-Nitroaniline	µg/L	4.3 U	17 U	7.6 U
4-Nitroaniline	µg/L	4.3 U	17 U	7.6 U
Nitrobenzene	µg/L	4.3 U	17 U	7.6 U
2-Nitrophenol	µg/L	8.5 U	35 U	15 U
4-Nitrophenol	µg/L	17 U	69 U	30 U
n-Nitrosodimethylamine	µg/L	4.3 U	17 U	7.6 U
n-Nitrosodiphenylamine	µg/L	4.3 U	17 U	7.6 U

TABLE 2.2

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY INTERNATIONAL, INC.

	Well ID:	*BH34*		
	Well Depth:	*4-8 ft*	*8-12 ft*	*12-16 ft*
	Sample ID:	*GW-1312-091797-DJG-007*	*GW-1312-091797-DJG-008*	*GW-1312-091797-DJG-009*
	Collection Date:	*09/17/97*	*09/17/97*	*09/17/97*
	Units			
TCL Semi-Volatiles (Cont'd.)				
Di-n-octyl phthalate	µg/L	4.3 UJ	17 UJ	7.6 UJ
Pentachlorophenol	µg/L	17 U	69 U	30 U
Phenanthrene	µg/L	4.3 U	17 U	7.6 U
Phenol	µg/L	8.5 U	35 U	15 U
4-Bromophenyl phenyl ether	µg/L	4.3 U	17 U	7.6 U
4-Chlorophenyl phenyl ether	µg/L	4.3 U	17 U	7.6 U
n-Nitroso-di-n-propylamine	µg/L	4.3 U	17 U	7.6 U
Pyrene	µg/L	4.3 U	17 U	7.6 U
1,2,4-Trichlorobenzene	µg/L	4.3 U	17 U	7.6 U
2,4,5-Trichlorophenol	µg/L	8.5 U	35 U	15 U
2,4,6-Trichlorophenol	µg/L	8.5 U	35 U	15 U
PCBs				
Aroclor-1016	µg/L	0.59 U	0.77 U	0.81 U
Aroclor-1221	µg/L	0.59 U	0.77 U	0.81 U
Aroclor-1232	µg/L	0.59 U	0.77 U	0.81 U
Aroclor-1242	µg/L	0.59 U	0.77 U	0.81 U
Aroclor-1248	µg/L	0.59 U	0.77 U	0.81 U
Aroclor-1254	µg/L	0.59 U	0.77 U	0.81 U
Aroclor-1260	µg/L	0.59 U	0.77 U	0.81 U

Notes:
J Associated value is estimated.
PCBs Polychlorinated Biphenyls.
R Rejected.
TCL Target Compound List
U Non-detect at associated value.

TABLE 2.2

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY INTERNATIONAL, INC.

	Well ID:	*BH44*		
	Well Depth:	*11-16 ft*	*15-20 ft*	*20-25 ft*
	Sample ID:	*BH2-98 11-16'*	*BH2-98 15-20'*	*BH2-98 20-25'*
	Collection Date:	*09/30/98*	*09/30/98*	*09/30/98*
	Units			
TCL Volatiles				
Acetone	µg/L	73 J	67 J	9.5 J
Benzene	µg/L	25 U	3.5 J	5.0 U
Bromodichloromethane	µg/L	25 U	5.0 U	5.0 U
Bromoform	µg/L	25 U	5.0 U	5.0 U
Bromomethane	µg/L	25 U	5.0 U	5.0 U
2-Butanone	µg/L	50 U	16	10 U
Carbon disulfide	µg/L	50 U	10 U	10 U
Carbon tetrachloride	µg/L	25 U	5.0 U	5.0 U
Chlorobenzene	µg/L	25 U	1.9 J	5.0 U
Chloroethane	µg/L	25 U	5.0 U	5.0 U
Chloroform	µg/L	25 U	5.0 U	5.0 U
Chloromethane	µg/L	25 U	5.0 U	5.0 U
Dibromochloromethane	µg/L	25 U	5.0 U	5.0 U
1,1-Dichloroethane	µg/L	25 U	5.0 U	5.0 U
1,2-Dichloroethane	µg/L	25 U	5.0 U	5.0 U
1,1-Dichloroethene	µg/L	25 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	µg/L	25 U	5.0 U	5.0 U
trans-1,2-Dichloroethene	µg/L	25 U	5.0 U	5.0 U
1,2-Dichloropropane	µg/L	25 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	µg/L	25 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	µg/L	25 U	5.0 U	5.0 U
Ethyl benzene	µg/L	60	95	5.6
2-Hexanone	µg/L	50 U	10 U	10 U
Methylene chloride	µg/L	25 U	5.0 U	5.0 U
4-Methyl-2-pentanone	µg/L	50 U	10 U	10 U
Styrene	µg/L	25 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	µg/L	25 U	5.0 U	5.0 U
Tetrachloroethene	µg/L	25 U	5.0 U	5.0 U
Toluene	µg/L	500	670	41
1,1,1-Trichloroethane	µg/L	25 U	5.0 U	5.0 U
1,1,2-Trichloroethane	µg/L	25 U	5.0 U	5.0 U
Trichloroethene	µg/L	25 U	5.0 U	5.0 U
Vinyl chloride	µg/L	25 U	5.0 U	5.0 U
m&p-Xylene	µg/L	97	160	8.4
o-Xylene	µg/L	440	500	29
TCL Semi-Volatiles				
Acenaphthene	µg/L	50 U	500 U	5.0 U
Acenaphthylene	µg/L	50 U	500 U	5.0 U
Anthracene	µg/L	50 U	500 U	5.0 U
Benzo(a)anthracene	µg/L	50 U	500 U	5.0 U
Benzo(a)pyrene	µg/L	50 U	500 U	5.0 U
Benzo(b)fluoranthene	µg/L	50 U	500 U	5.0 U
Benzo(g,h,i)perylene	µg/L	50 U	500 U	5.0 U
Benzo(k)fluoranthene	µg/L	50 U	500 U	5.0 U
Benzyl alcohol	µg/L	50 U	500 U	5.0 U

TABLE 2.2

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY INTERNATIONAL, INC.

	Well ID:	*BH44*		
	Well Depth:	*11-16 ft*	*15-20 ft*	*20-25 ft*
	Sample ID:	*BH2-98 11-16'*	*BH2-98 15-20'*	*BH2-98 20-25'*
	Collection Date:	*09/30/98*	*09/30/98*	*09/30/98*
	Units			
TCL Semi-Volatiles (Cont'd.)				
Butyl benzyl phthalate	µg/L	50 U	500 U	5.0 U
Di-n-butyl phthalate	µg/L	50 U	500 U	1.4 J
Carbazole	µg/L	50 U	500 U	5.0 U
Indeno(1,2,3-cd)pyrene	µg/L	50 U	500 U	5.0 U
4-Chloroaniline	µg/L	50 U	500 U	5.0 U
bis(2-Chloroethoxy)methane	µg/L	50 U	500 U	5.0 U
bis(2-Chloroethyl) ether	µg/L	50 U	500 U	5.0 U
2-Chloronaphthalene	µg/L	50 U	500 U	5.0 U
2-Chlorophenol	µg/L	100 U	1000 U	10 U
2,2'-Oxybis(1-chloropropane)	µg/L	50 U	500 U	5.0 U
Chrysene	µg/L	50 U	500 U	5.0 U
Dibenzo(a,h)anthracene	µg/L	50 U	500 U	5.0 U
Dibenzofuran	µg/L	50 U	500 U	5.0 U
1,2-Dichlorobenzene	µg/L	50 U	500 U	5.0 U
1,3-Dichlorobenzene	µg/L	50 U	500 U	5.0 U
1,4-Dichlorobenzene	µg/L	50 U	500 U	5.0 U
3,3'-Dichlorobenzidine	µg/L	50 U	500 U	5.0 U
2,4-Dichlorophenol	µg/L	100 U	1000 U	10 U
Diethylphthalate	µg/L	50 U	500 U	5.0 U
Dimethyl phthalate	µg/L	50 U	500 U	5.0 U
2,4-Dimethylphenol	µg/L	320	4100	22
2,4-Dinitrophenol	µg/L	200 U	2000 U	20 U
2,4-Dinitrotoluene	µg/L	50 U	500 U	5.0 U
2,6-Dinitrotoluene	µg/L	50 U	500 U	5.0 U
bis(2-Ethylhexyl)phthalate	µg/L	50 U	500 U	5.0 U
Fluoranthene	µg/L	50 U	500 U	5.0 U
Fluorene	µg/L	50 U	500 U	5.0 U
Hexachlorobenzene	µg/L	50 U	500 U	5.0 U
Hexachlorobutadiene	µg/L	50 U	500 U	5.0 U
Hexachlorocyclopentadiene	µg/L	50 U	500 U	5.0 U
Hexachloroethane	µg/L	50 U	500 U	5.0 U
Isophorone	µg/L	50 U	500 U	5.0 U
2-Methylnaphthalene	µg/L	100 U	1000 U	1.4 J
2-Methylphenol	µg/L	200 U	2000 U	20 U
4,6-Dinitro-2-methylphenol	µg/L	100 U	1000 U	10 U
4-Chloro-3-methylphenol	µg/L	220	3200	13
4-Methylphenol	µg/L	590	8400	37
Naphthalene	µg/L	50 U	500 U	2.3 J
2-Nitroaniline	µg/L	50 U	500 U	5.0 U
3-Nitroaniline	µg/L	50 U	500 U	5.0 U
4-Nitroaniline	µg/L	50 U	500 U	5.0 U
Nitrobenzene	µg/L	50 U	500 U	5.0 U
2-Nitrophenol	µg/L	100 U	1000 U	10 U
4-Nitrophenol	µg/L	200 U	2000 U	20 U
n-Nitrosodimethylamine	µg/L	50 U	500 U	5.0 U
n-Nitrosodiphenylamine	µg/L	50 U	500 U	5.0 U

TABLE 2.2

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY INTERNATIONAL, INC.

	Well ID:	BH44		
	Well Depth:	11-16 ft	15-20 ft	20-25 ft
	Sample ID:	BH2-98 11-16'	BH2-98 15-20'	BH2-98 20-25'
	Collection Date:	09/30/98	09/30/98	09/30/98
	Units			
TCL Semi-Volatiles (Cont'd.)				
Di-n-octyl phthalate	µg/L	50 U	500 U	5.0 U
Pentachlorophenol	µg/L	200 U	2000 U	20 U
Phenanthrene	µg/L	50 U	500 U	5.0 U
Phenol	µg/L	210	2900	9.1 J
4-Bromophenyl phenyl ether	µg/L	50 U	500 U	5.0 U
4-Chlorophenyl phenyl ether	µg/L	50 U	500 U	5.0 U
n-Nitroso-di-n-propylamine	µg/L	50 U	500 U	5.0 U
Pyrene	µg/L	50 U	500 U	5.0 U
1,2,4-Trichlorobenzene	µg/L	50 U	500 U	5.0 U
2,4,5-Trichlorophenol	µg/L	100 U	1000 U	10 U
2,4,6-Trichlorophenol	µg/L	100 U	1000 U	10 U
PCBs				
Aroclor-1016	µg/L	--	--	--
Aroclor-1221	µg/L	--	--	--
Aroclor-1232	µg/L	--	--	--
Aroclor-1242	µg/L	--	--	--
Aroclor-1248	µg/L	--	--	--
Aroclor-1254	µg/L	--	--	--
Aroclor-1260	µg/L	--	--	--

Notes:
J Associated value is estimated.
PCBs Polychlorinated Biphenyls.
R Rejected.
TCL Target Compound List
U Non-detect at associated value.

TABLE 2.2

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY INTERNATIONAL, INC.

	Well ID:	*BH45*				
	Well Depth:	*9-14 ft*	*13-18 ft*	*13-18 ft (DUP)*	*18-23 ft*	*23-28*
	Sample ID:	*BH1-98 9-14'*	*BH1-98 13-18'*	*BH1-98 13-18'*	*BH1-98 18-23'*	*BH1-98 23-28'*
	Collection Date:	*09/29/98*	*09/29/98*	*09/29/98*	*09/29/98*	*09/30/98*
	Units			*(Duplicate)*		
TCL Volatiles						
Acetone	µg/L	20 U	20 U	20 U	15 J	20 U
Benzene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone	µg/L	10 U	10 U	10 U	10 U	10 U
Carbon disulfide	µg/L	10 U	10 U	10 U	1.3 J	1.3 J
Carbon tetrachloride	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromochloromethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,2-Dichloroethene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Ethyl benzene	µg/L	1.0 J	25	25	14	14
2-Hexanone	µg/L	10 U	10 U	10 U	10 U	10 U
Methylene chloride	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone	µg/L	10 U	10 U	10 U	10 U	10 U
Styrene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	µg/L	10	12	12	6.9	4.7 J
1,1,1-Trichloroethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl chloride	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m&p-Xylene	µg/L	5.0 U	17	17	9.5	8.6
o-Xylene	µg/L	6.4	69	67	40	34
TCL Semi-Volatiles						
Acenaphthene	µg/L	50 U	50 U	50 U	52 U	5.2 U
Acenaphthylene	µg/L	50 U	50 U	50 U	52 U	5.2 U
Anthracene	µg/L	50 U	50 U	50 U	52 U	5.2 U
Benzo(a)anthracene	µg/L	50 U	50 U	50 U	52 U	5.2 U
Benzo(a)pyrene	µg/L	50 U	50 U	50 U	52 U	5.2 U
Benzo(b)fluoranthene	µg/L	50 U	50 U	50 U	52 U	5.2 U
Benzo(g,h,i)perylene	µg/L	50 U	50 U	50 U	52 U	5.2 U
Benzo(k)fluoranthene	µg/L	50 U	50 U	50 U	52 U	5.2 U
Benzyl alcohol	µg/L	50 U	50 U	50 U	52 U	5.2 U

TABLE 2.2

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY INTERNATIONAL, INC.

	Well ID:	*BH45*				
	Well Depth:	*9-14 ft*	*13-18 ft*	*13-18 ft (DUP)*	*18-23 ft*	*23-28*
	Sample ID:	*BH1-98 9-14'*	*BH1-98 13-18'*	*BH1-98 13-18'*	*BH1-98 18-23'*	*BH1-98 23-28'*
	Collection Date:	*09/29/98*	*09/29/98*	*09/29/98*	*09/29/98*	*09/30/98*
	Units			*(Duplicate)*		
TCL Semi-Volatiles (Cont'd.)						
Butyl benzyl phthalate	µg/L	50 U	50 U	50 U	52 U	5.2 U
Di-n-butyl phthalate	µg/L	50 U	17 J	21 J	16 J	2.7 J
Carbazole	µg/L	50 U	50 U	50 U	52 U	5.2 U
Indeno(1,2,3-cd)pyrene	µg/L	50 U	50 U	50 U	52 U	5.2 U
4-Chloroaniline	µg/L	50 U	50 U	50 U	52 U	5.2 U
bis(2-Chloroethoxy)methane	µg/L	50 U	50 U	50 U	52 U	5.2 U
bis(2-Chloroethyl) ether	µg/L	50 U	50 U	50 U	52 U	5.2 U
2-Chloronaphthalene	µg/L	50 U	50 U	50 U	52 U	5.2 U
2-Chlorophenol	µg/L	100 U	100 U	100 U	100 U	10 U
2,2'-Oxybis(1-chloropropane)	µg/L	50 U	50 U	50 U	52 U	5.2 U
Chrysene	µg/L	50 U	50 U	50 U	52 U	5.2 U
Dibenzo(a,h)anthracene	µg/L	50 U	50 U	50 U	52 U	5.2 U
Dibenzofuran	µg/L	50 U	50 U	50 U	52 U	5.2 U
1,2-Dichlorobenzene	µg/L	50 U	50 U	50 U	52 U	5.2 U
1,3-Dichlorobenzene	µg/L	50 U	50 U	50 U	52 U	5.2 U
1,4-Dichlorobenzene	µg/L	50 U	50 U	50 U	52 U	5.2 U
3,3'-Dichlorobenzidine	µg/L	50 U	50 U	50 U	52 U	5.2 U
2,4-Dichlorophenol	µg/L	100 U	100 U	100 U	100 U	10 U
Diethylphthalate	µg/L	50 U	50 U	50 U	52 U	5.2 U
Dimethyl phthalate	µg/L	50 U	50 U	50 U	52 U	5.2 U
2,4-Dimethylphenol	µg/L	170	52 J	51 J	150	6.5 J
2,4-Dinitrophenol	µg/L	200 U	200 U	200 U	210 U	21 U
2,4-Dinitrotoluene	µg/L	50 U	50 U	50 U	52 U	5.2 U
2,6-Dinitrotoluene	µg/L	50 U	50 U	50 U	52 U	5.2 U
bis(2-Ethylhexyl)phthalate	µg/L	50 U	50 U	50 U	52 U	5.2 U
Fluoranthene	µg/L	50 U	50 U	50 U	52 U	5.2 U
Fluorene	µg/L	50 U	50 U	50 U	52 U	5.2 U
Hexachlorobenzene	µg/L	50 U	50 U	50 U	52 U	5.2 U
Hexachlorobutadiene	µg/L	50 U	50 U	50 U	52 U	5.2 U
Hexachlorocyclopentadiene	µg/L	50 U	50 U	50 U	52 U	5.2 U
Hexachloroethane	µg/L	50 U	50 U	50 U	52 U	5.2 U
Isophorone	µg/L	50 U	50 U	50 U	52 U	5.2 U
2-Methylnaphthalene	µg/L	100 U	100 U	100 U	100 U	1.1 J
2-Methylphenol	µg/L	200 U	200 U	200 U	210 U	21 U
4,6-Dinitro-2-methylphenol	µg/L	100 U	100 U	100 U	100 U	10 U
4-Chloro-3-methylphenol	µg/L	49 J	18 J	16 J	30 J	10 U
4-Methylphenol	µg/L	300	100 U	86 J	260	8.6 J
Naphthalene	µg/L	50 U	50 U	50 U	52 U	1.5 J
2-Nitroaniline	µg/L	50 U	50 U	50 U	52 U	5.2 U
3-Nitroaniline	µg/L	50 U	50 U	50 U	52 U	5.2 U
4-Nitroaniline	µg/L	50 U	50 U	50 U	52 U	5.2 U
Nitrobenzene	µg/L	50 U	50 U	50 U	52 U	5.2 U
2-Nitrophenol	µg/L	100 U	100 U	100 U	100 U	10 U
4-Nitrophenol	µg/L	200 U	200 U	200 U	210 U	21 U
n-Nitrosodimethylamine	µg/L	50 U	50 U	50 U	52 U	5.2 U
n-Nitrosodiphenylamine	µg/L	50 U	50 U	50 U	52 U	5.2 U

TABLE 2.2

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY INTERNATIONAL, INC.

	Well ID:	*BH45*				
	Well Depth:	*9-14 ft*	*13-18 ft*	*13-18 ft (DUP)*	*18-23 ft*	*23-28*
	Sample ID:	*BH1-98 9-14'*	*BH1-98 13-18'*	*BH1-98 13-18'*	*BH1-98 18-23'*	*BH1-98 23-28'*
	Collection Date:	*09/29/98*	*09/29/98*	*09/29/98*	*09/29/98*	*09/30/98*
	Units			*(Duplicate)*		
TCL Semi-Volatiles (Cont'd.)						
Di-n-octyl phthalate	µg/L	50 U	50 U	50 U	52 U	5.2 U
Pentachlorophenol	µg/L	200 U	200 U	200 U	210 U	21 U
Phenanthrene	µg/L	50 U	50 U	50 U	52 U	5.2 U
Phenol	µg/L	790	290	260	790	22
4-Bromophenyl phenyl ether	µg/L	50 U	50 U	50 U	52 U	5.2 U
4-Chlorophenyl phenyl ether	µg/L	50 U	50 U	50 U	52 U	5.2 U
n-Nitroso-di-n-propylamine	µg/L	50 U	50 U	50 U	52 U	5.2 U
Pyrene	µg/L	50 U	50 U	50 U	52 U	5.2 U
1,2,4-Trichlorobenzene	µg/L	50 U	50 U	50 U	52 U	5.2 U
2,4,5-Trichlorophenol	µg/L	100 U	100 U	100 U	100 U	10 U
2,4,6-Trichlorophenol	µg/L	100 U	100 U	100 U	100 U	10 U
PCBs						
Aroclor-1016	µg/L	--	--	--	--	--
Aroclor-1221	µg/L	--	--	--	--	--
Aroclor-1232	µg/L	--	--	--	--	--
Aroclor-1242	µg/L	--	--	--	--	--
Aroclor-1248	µg/L	--	--	--	--	--
Aroclor-1254	µg/L	--	--	--	--	--
Aroclor-1260	µg/L	--	--	--	--	--

Notes:
J Associated value is estimated.
PCBs Polychlorinated Biphenyls.
R Rejected.
TCL Target Compound List
U Non-detect at associated value.

TABLE 2.3

ANALYTICAL RESULTS SUMMARY - SOIL
VERTICAL AQUIFER SAMPLING
SCHENECTADY INTERNATIONAL, INC.
SEPTEMBER 1997

	Sample ID:	*S-1312-091697-DJG-006*	*S-1312-091797-DJG-010*	*S-1312-091797-DJG-014*
	Collection Date:	*09/16/97*	*09/17/97*	*09/17/97*
	Units			
PCBs				
Aroclor-1016	µg/Kg	21 U	22 U	21 U
Aroclor-1221	µg/Kg	21 U	22 U	21 U
Aroclor-1232	µg/Kg	21 U	22 U	21 U
Aroclor-1242	µg/Kg	21 U	22 U	21 U
Aroclor-1248	µg/Kg	21 U	22 U	21 U
Aroclor-1254	µg/Kg	21 U	22 U	21 U
Aroclor-1260	µg/Kg	21 U	22 U	21 U

Notes:
PCBs Polychlorinated Biphenyls.
U Non-detect at associated value.

TABLE 2.4

SAMPLE KEY FOR GRAIN SIZE DISTRIBUTION ANALYSES
SCHENECTADY INTERNATIONAL, INC.
SEPTEMBER 1997

Borehole I.D.	*Sample ID*	*Depth Interval (ft-ft)*
BH32	S-1312-091697-DJG-001	2-4
BH32	S-1312-091697-DJG-002	4-6
BH32	S-1312-091697-DJG-003	10-12
BH32	S-1312-091697-DJG-004	14-14.5
BH32	S-1312-091697-DJG-005	14.5-16
BH33	S-1312-091797-DJG-007	2.5-3
BH33	S-1312-091797-DJG-008	6-6.5
BH33	S-1312-091797-DJG-009	14-16
BH34	S-1312-091797-DJG-011	0-2
BH34	S-1312-091797-DJG-012	4-6
BH34	S-1312-091797-DJG-013	10-12

TABLE 2.5

SUMMARY OF PIEZOMETER DEVELOPMENT PARAMETERS
SCHENECTADY INTERNATIONAL, INC.
SEPTEMBER 1997

Piezometer I.D.	*Date*	*Well Volume (gallons)*	*Cumulative Volume Removed (gallons)*	*Temperature (°F)*	*pH*	*Conductivity (µs/cm)*	*Turbidity (NTUs)*	*Water Quality*
P1	1/27/98	1.10	1.10	--	--	--	500+	silty, red/brown, no odor
			2.20	49.0	8.86	726.0	500+	silty, brown, no odor
			3.30	51.8	8.34	616.0	500+	silty, brown, no odor
			4.40	51.8	8.31	615.0	500+	silty, brown, no odor
			5.50	49.0	8.03	605.0	500+	silty, brown, no odor
			6.60	50.1	8.00	641.0	500+	silty, brown, no odor
			7.70	50.2	7.84	619.0	500+	silty, brown, no odor
			8.80	50.2	7.88	617.0	500+	silty, brown, no odor
			9.90	50.1	7.69	632.0	500+	silty, brown, no odor
			10.10	49.3	7.67	655.0	500+	silty, brown, no odor
P2	1/28/98	0.95	1.00	49.2	9.09	743.0	500+	tan/brown, sheen, odor
			2.00	51.2	8.16	578.0	500+	tan/brown, sheen, odor
			3.00	48.9	7.71	582.0	500+	tan/brown, sheen, odor
			4.00	44.0	7.35	520.0	175	tan/brown, sheen, odor
			5.00	43.6	7.32	579.0	500+	tan/brown, sheen, odor
			6.00	44.4	7.32	602.0	500+	tan/brown, sheen, odor
			7.00	45.9	7.22	619.0	423	tan/brown, sheen, odor
			8.00	45.9	7.25	619.0	500+	tan/brown, sheen, odor

TABLE 2.6

WATER LEVELS PRIOR TO THE OW-7a PUMP TEST
SCHENECTADY INTERNATIONAL, INC.
SEPTEMBER 1997

Monitoring Well I.D	*Date*	*Water Level (BTOR) am/pm*	*Date*	*Water Level (BTOR) am/pm*	*Date*	*Water Level (BTOR) am/pm*
OW-7a	1/28/98	20.79/20.79	1/29/98	20.82/20.82	1/30/98	20.84/20.84
OW-7b	1/28/98	18.26/18.24	1/29/98	18.25/18.24	1/30/98	18.23/18.23
OW-3	1/28/98	7.52/7.53	1/29/98	6.95/6.95	1/30/98	6.90/6.71
OW-3b	1/28/98	18.91/18.91	1/29/98	18.92/18.92	1/30/98	18.90/18.89
OW-13	1/28/98	9.62/9.61	1/29/98	9.68/9.68	1/30/98	9.67/9.66
OW-12	1/28/98	20.81/20.81	1/29/98	20.81/20.82	1/30/98	20.81/20.79
SW-3 (upstream)	1/28/98	**	1/29/98	**	1/30/98	**
SW-1 (downstream)	1/28/98	3.90	1/29/98	3.91/3.90	1/30/98	3.90/3.90
P-1	1/28/98	20.83/20.83	1/29/98	20.86/20.85	1/30/98	20.86/20.86
P-2	1/28/98	14.32/14.32	1/29/98	14.36/14.36	1/30/98	14.35/14.35

BTOR - Below top of riser.
* OW-14 was destroyed and thus not monitored.
** NOTE: SW-3 had no permanent marker to allow water levels to be taken.
A marker was installed prior to the pumping test.

TABLE 2.7

ANALYTICAL RESULTS SUMMARY - WATER

OW-7a PUMPING TEST
SCHENECTADY INTERNATIONAL, INC.
FEBRUARY 1998

	Sample Time:	*Startup*	*24 hours*	*38 hours*
	Sample ID:	*GW-1312-020398-JSV-001*	*GW-1312-020498-JSV-002*	*GW-1312-020598-JSV-003*
	Collection Date:	*02/03/98*	*02/04/98*	*02/05/98*
Parameters	*Units*			
TCL Volatiles				
Acetone	µg/L	200 U	200 U	200 U
Benzene	µg/L	50 U	50 U	50 U
Bromodichloromethane	µg/L	50 U	50 U	50 U
Bromoform	µg/L	50 U	50 U	50 U
Bromomethane	µg/L	50 U	50 U	50 U
2-Butanone	µg/L	100 U	100 U	100 U
Carbon disulfide	µg/L	100 U	100 U	100 U
Carbon tetrachloride	µg/L	50 U	50 U	50 U
Chlorobenzene	µg/L	50 U	50 U	50 U
Chloroethane	µg/L	50 U	50 U	50 U
Chloroform	µg/L	50 U	50 U	50 U
Chloromethane	µg/L	50 U	50 U	50 U
Dibromochloromethane	µg/L	50 U	50 U	50 U
1,1-Dichloroethane	µg/L	50 U	50 U	50 U
1,2-Dichloroethane	µg/L	50 U	50 U	50 U
1,1-Dichloroethene	µg/L	50 U	50 U	50 U
cis-1,2-Dichloroethene	µg/L	50 U	50 U	50 U
trans-1,2-Dichloroethene	µg/L	50 U	50 U	50 U
1,2-Dichloropropane	µg/L	50 U	50 U	50 U
cis-1,3-Dichloropropene	µg/L	50 U	50 U	50 U
trans-1,3-Dichloropropene	µg/L	50 U	50 U	50 U
Ethyl benzene	µg/L	720	350	240
2-Hexanone	µg/L	100 U	100 U	100 U
Methylene chloride	µg/L	50 U	50 U	50 U
4-Methyl-2-pentanone	µg/L	100 U	100 U	100 U
Styrene	µg/L	50 U	50 U	50 U
1,1,2,2-Tetrachloroethane	µg/L	50 U	50 U	50 U
Tetrachloroethene	µg/L	50 U	50 U	50 U
Toluene	µg/L	59	50 U	50 U
1,1,1-Trichloroethane	µg/L	50 U	50 U	50 U
1,1,2-Trichloroethane	µg/L	50 U	50 U	50 U
Trichloroethene	µg/L	50 U	50 U	50 U
Vinyl chloride	µg/L	50 U	50 U	50 U
m&p-Xylene	µg/L	1000	370	190
o-Xylene	µg/L	700	320	160
TCL Semi-Volatiles				
Acenaphthene	µg/L	60	63	20
Acenaphthylene	µg/L	5.0 U	5.0 U	5.5 U
Anthracene	µg/L	5.0 U	5.0 U	5.5 U
Benzo(a)anthracene	µg/L	5.0 U	5.0 U	5.5 U
Benzo(a)pyrene	µg/L	5.0 U	5.0 U	5.5 U
Benzo(b)fluoranthene	µg/L	5.0 U	5.0 U	5.5 U
Benzo(g,h,i)perylene	µg/L	5.0 U	5.0 U	5.5 U
Benzo(k)fluoranthene	µg/L	5.0 U	5.0 U	5.5 U
Butyl benzyl phthalate	µg/L	5.0 U	5.0 U	5.5 U
Di-n-butyl phthalate	µg/L	5.0 U	5.0 U	5.5 U
Carbazole	µg/L	5.0 U	5.0 U	5.5 U
Indeno(1,2,3-cd)pyrene	µg/L	5.0 U	5.0 U	5.5 U
4-Chloroaniline	µg/L	5.0 U	5.0 U	5.5 U

TABLE 2.7

ANALYTICAL RESULTS SUMMARY - WATER

OW-7a PUMPING TEST
SCHENECTADY INTERNATIONAL, INC.
FEBRUARY 1998

	Sample Time:	Startup	24 hours	38 hours
	Sample ID:	GW-1312-020398-JSV-001	GW-1312-020498-JSV-002	GW-1312-020598-JSV-003
	Collection Date:	02/03/98	02/04/98	02/05/98
Parameters	*Units*			
TCL Semi-Volatiles (Cont'd.)				
Bis(2-chloroethoxy)methane	µg/L	5.0 U	5.0 U	5.5 U
Bis(2-chloroethyl) ether	µg/L	5.0 U	5.0 U	5.5 U
2-Chloronaphthalene	µg/L	5.0 U	5.0 U	5.5 U
2-Chlorophenol	µg/L	10 U	10 U	11 U
2,2'-Oxybis(1-chloropropane)	µg/L	5.0 U	5.0 U	5.5 U
Chrysene	µg/L	5.0 U	5.0 U	5.5 U
Dibenzo(a,h)anthracene	µg/L	5.0 U	5.0 U	5.5 U
Dibenzofuran	µg/L	22	27	8.0
1,2-Dichlorobenzene	µg/L	5.0 U	5.0 U	5.5 U
1,3-Dichlorobenzene	µg/L	5.0 U	5.0 U	5.5 U
1,4-Dichlorobenzene	µg/L	5.0 U	5.0 U	5.5 U
3,3'-Dichlorobenzidine	µg/L	5.0 U	5.0 U	5.5 U
2,4-Dichlorophenol	µg/L	10 U	10 U	11 U
Diethylphthalate	µg/L	5.0 U	5.0 U	5.5 U
Dimethyl phthalate	µg/L	5.0 U	5.0 U	5.5 U
2,4-Dimethylphenol	µg/L	58	16	11 U
2,4-Dinitrophenol	µg/L	20 U	20 U	22 U
2,4-Dinitrotoluene	µg/L	5.0 U	5.0 U	5.5 U
2,6-Dinitrotoluene	µg/L	5.0 U	5.0 U	5.5 U
Bis(2-ethylhexyl)phthalate	µg/L	5.0 U	5.0 U	5.5 U
Fluoranthene	µg/L	5.0 U	5.0 U	5.5 U
Fluorene	µg/L	5.0 U	5.0 U	5.5 U
Hexachlorobenzene	µg/L	5.0 U	5.0 U	5.5 U
Hexachlorobutadiene	µg/L	5.0 U	5.0 U	5.5 U
Hexachlorocyclopentadiene	µg/L	5.0 U	5.0 U	5.5 U
Hexachloroethane	µg/L	5.0 U	5.0 U	5.5 U
Isophorone	µg/L	5.0 U	5.0 U	5.5 U
2-Methylnaphthalene	µg/L	270	300	84
2-Methylphenol	µg/L	10 U	10 U	11 U
4,6-Dinitro-2-methylphenol	µg/L	20 U	20 U	22 U
4-Chloro-3-methylphenol	µg/L	10 U	10 U	11 U
4-Methylphenol	µg/L	10 U	10 U	11 U
Naphthalene	µg/L	660	670	350
2-Nitroaniline	µg/L	5.0 U	5.0 U	5.5 U
3-Nitroaniline	µg/L	5.0 U	5.0 U	5.5 U
4-Nitroaniline	µg/L	5.0 U	5.0 U	5.5 U
Nitrobenzene	µg/L	5.0 U	5.0 U	5.5 U
2-Nitrophenol	µg/L	10 U	10 U	11 U
4-Nitrophenol	µg/L	20 U	20 U	22 U
n-Nitrosodimethylamine	µg/L	5.0 U	5.0 U	5.5 U
n-Nitrosodiphenylamine	µg/L	5.0 U	5.0 U	5.5 U
Di-n-octyl phthalate	µg/L	5.0 U	5.0 U	5.5 U
Pentachlorophenol	µg/L	20 U	20 U	22 U
Phenanthrene	µg/L	5.0 U	5.0 U	5.5 U
Phenol	µg/L	10 U	10 U	11 U
4-Bromophenyl phenyl ether	µg/L	5.0 U	5.0 U	5.5 U
4-Chlorophenyl phenyl ether	µg/L	5.0 U	5.0 U	5.5 U
n-Nitroso-di-n-propylamine	µg/L	5.0 U	5.0 U	5.5 U
Pyrene	µg/L	5.0 U	5.0 U	5.5 U
1,2,4-Trichlorobenzene	µg/L	5.0 U	5.0 U	5.5 U
2,4,5-Trichlorophenol	µg/L	10 U	10 U	11 U
2,4,6-Trichlorophenol	µg/L	10 U	10 U	11 U

TABLE 2.7

ANALYTICAL RESULTS SUMMARY - WATER

OW-7a PUMPING TEST
SCHENECTADY INTERNATIONAL, INC.
FEBRUARY 1998

	Sample Time:	*Startup*	*24 hours*	*38 hours*
	Sample ID:	*GW-1312-020398-JSV-001*	*GW-1312-020498-JSV-002*	*GW-1312-020598-JSV-003*
	Collection Date:	*02/03/98*	*02/04/98*	*02/05/98*
Parameters	*Units*			
Metals - Total				
Aluminum	mg/L	0.110	0.100 U	0.100 U
Antimony	mg/L	0.0600 U	0.0600 U	0.0600 U
Arsenic	mg/L	0.0173	0.0185	0.0165
Barium	mg/L	0.0359	0.0357	0.0361
Calcium	mg/L	86.0	85.2	71.8
Chromium	mg/L	0.0100 U	0.0100 U	0.0100 U
Cobalt	mg/L	0.0500 U	0.0500 U	0.0500 U
Copper	mg/L	0.104	0.0200 U	0.0200 U
Iron	mg/L	30.9	30.8	23.7
Lead	mg/L	0.0500 U	0.0500 U	0.0500 U
Magnesium	mg/L	10.7	11.0	13.6
Manganese	mg/L	4.68	4.75	3.09
Mercury	mg/L	0.000300 U	0.000300 U	0.000300 U
Nickel	mg/L	0.0400 U	0.0400 U	0.0400 U
Potassium	mg/L	3.46	3.07	2.76
Selenium	mg/L	0.00500U	0.00500U	0.00500U
Sodium	mg/L	54.3	54.4	67.8
Vanadium	mg/L	0.0500 U	0.0500 U	0.0500 U
Zinc	mg/L	0.0620	0.0118	0.0104
Metals - Soluble				
Aluminum	mg/L	0.100 U	0.100 U	0.100 U
Antimony	mg/L	0.0600 U	0.0600 U	0.0600 U
Arsenic	mg/L	0.0100 U	0.0100 U	0.0100 U
Barium	mg/L	0.0200 U	0.0200 U	0.0200 U
Calcium	mg/L	81.3	83.1	72.4
Chromium	mg/L	0.0100 U	0.0100 U	0.0100 U
Cobalt	mg/L	0.0500 U	0.0500 U	0.0500 U
Copper	mg/L	0.0200 U	0.0200 U	0.0200 U
Iron	mg/L	0.100 U	0.100 U	0.100 U
Lead	mg/L	0.0500 U	0.0500 U	0.0500 U
Magnesium	mg/L	10.5	10.8	13.8
Manganese	mg/L	4.16	4.41	3.08
Mercury	mg/L	0.000300 U	0.000300 U	0.000300 U
Nickel	mg/L	0.0400 U	0.0400 U	0.0400 U
Potassium	mg/L	3.04	2.93	2.84
Selenium	mg/L	0.00500 U	0.00500U	0.00500U
Sodium	mg/L	50.6	52.2	64.7
Vanadium	mg/L	0.0500 U	0.0500 U	0.0500 U
Zinc	mg/L	0.0100 U	0.0120	0.0100 U
General Chemistry				
Total Alkalinity	mg/L	277	284	297
Ammonia	mg/L	0.576	0.717	0.938
BOD-5	mg/L	5.87	5.06	2.20
Bromide	mg/L	1.00 U	1.00 U	1.00 U
COD (total)	mg/L	31.4	5.00 U	5.84
COD (soluble)	mg/L	27.2	18.4	13.4
Chloride	mg/L	84.4	82.8	81.9
Total Cyanide	mg/L	0.0100 U	0.0100 U	0.0100 U

TABLE 2.7

ANALYTICAL RESULTS SUMMARY - WATER

OW-7a PUMPING TEST
SCHENECTADY INTERNATIONAL, INC.
FEBRUARY 1998

	Sample Time:	*Startup*	*24 hours*	*38 hours*
	Sample ID:	*GW-1312-020398-JSV-001*	*GW-1312-020498-JSV-002*	*GW-1312-020598-JSV-003*
	Collection Date:	*02/03/98*	*02/04/98*	*02/05/98*
Parameters	*Units*			
General Chemistry (Cont'd)				
TDS	mg/L	414	423	434
Ferrous Iron (soluble)	mg/L	5.00 U	5.00 U	5.00 U
Fluoride	mg/L	0.252	0.274	0.312
Total Hardness	mg/L	274	283	257
TKN	mg/L	1.24	1.12	1.37
Nitrate (as N)	mg/L	0.0500 U	0.0500 U	0.0500 U
Nitrate/nitrite (as N)	mg/L	0.0500 U	0.0500 U	0.0500 U
Nitrite (as N)	mg/L	0.0100 U	0.0100 U	0.0100 U
Oil and grease	mg/L	5.00 U	5.00 U	5.00 U
Phosphorus (total)	mg/L	0.184	0.211	0.439
Phosphorus (soluble)	mg/L	0.149	0.122	0.188
Sulfate	mg/L	2.00 U	2.00 U	2.00 U
TSS	mg/L	53.5	60.1	47.1
TOC	mg/L	10.0	8.10	6.90
SOC	mg/L	7.20	5.90	5.00

Notes:

BOD-5	Biological Oxygen Demand - 5 day.
COD	Chemical Oxygen Demand.
NR	Results not yet received.
SOC	Soluble Organic Carbon.
TAL	Target Analyte List.
TCL	Target Compound List.
TDS	Total Dissolved Solids .
TKN	Total Kjeldahl Nitrogen.
TOC	Total Organic Carbon.
TSS	Total Suspended Solids.
U	Non-detect at associated value.

TABLE 3.1

ESTIMATED AVERAGE GROUNDWATER INFLUENT CONCENTRATIONS
SCHENECTADY INTERNATIONAL, INC.
SCHENECTADY, NEW YORK

Parameter	*City of Schenectady Local Sewer Ordinance Values(1)*	*Shallow Trench 1.5 gpm (OW-1, OW-10, OW-4a, OW-11)*	*Deep Trench 2 gpm (OW-3)*	*PW1 3 gpm (OW-7a pump test)*	*PW2 1 gpm (OW-7a pump test)*	*PW3 and PW4 2 gpm (OW-13, OW-14)*	*Average Influent Concentration (2)*
Volatiles (µg/L)							
Acetone	–	9.25	100U	200U	200U	10U	55
Benzene	–	8.13	50U	50U	50U	5.5	18
2-Butanone	–	4.88	100U	100U	100U	10U	33
Ethylbenzene	–	671	490	240	240	5	311
Total Xylenes	–	3337	31.5	350	350	6	683
Toluene	–	23	50U	50U	50U	3	20
1,3,5-trimethylbenzene	–	5U/12U	97.5	NA	NA	–	58
1,2,4-trimethylbenzene	–	166	1450	NA	NA	–	900
Semi-Volatiles (µg/L)							
Acenaphthene	–	8.8	33.5	20	20	10U	18
Bis(2-Ethylhexyl)phthalate	–	5.25	NA	5.5U	5.5U	10U	3.9
Dibenzofuran	–	5.8	15	8	8	10U	8.5
Diethylphthalate	–	5.25	NA	5.5U	5.5U	10U	3.9
2,4-Dimethylphenol	–	477	10U	11U	11U	10U	80
Fluorene	–	3.23	5	5.5U	5.5U	10U	3.8
2-Methylnaphthalene	–	96.9	195	84	84	4	93
2-Methylphenol	–	21.9	10U	11U	11U	10U	7.9
3-Methylphenol		NA	10U	NA	NA	NA	
4-Methylphenol	–	33	10U	11U	11U	10U	9.7
Naphthalene	–	1363	250	350	350	10U	416
Phenanthrene	–	4.25	NA	5.5U	5.5U	10U	3.7
Phenol	4,000	29	10U	11U	11U	4.5	9
PCBs (µg/L)							
Aroclor - 1016	–	0.5UJ	0.5UJ	NA	NA	NA	Not detected
Aroclor - 1221	–	0.5UJ	0.5UJ	NA	NA	NA	Not detected
Aroclor - 1232	–	0.5UJ	0.5UJ	NA	NA	NA	Not detected
Aroclor - 1242	–	0.5UJ	0.5UJ	NA	NA	NA	Not detected
Aroclor - 1248	–	0.5UJ	0.5UJ	NA	NA	NA	Not detected
Aroclor - 1254	–	1UJ	1UJ	NA	NA	NA	Not detected
Aroclor - 1260	–	1UJ	1UJ	NA	NA	NA	Not detected
Total Metals (µg/L)							
Aluminum	–	7024	200U	100U	100U	293.3	1,213
Antimony	–	7.55	NA	60U	60U	2.4U	18
Arsenic	200	41.8	10U	16.5	16.5	1.7U	15
Barium	4,000	160	1250	36	36	558	421
Calcium	–	116450	NA	71800	71800	126500	95,317
Chromium	4,000	11.85	10U	10U	10U	1.3U	5.2
Cobalt	–	10.3	NA	50U	50U	1.7U	16
Copper	500	78.3	25U	20U	20U	2.3U	20
Iron	–	44575	2650	23700	23700	14455	20,620
Lead	200	103.8	5.3U	50U	50U	6.2U	33
Magnesium	–	18515	NA	13600	13600	15700	15,143
Manganese	–	2152.5	540	3090	3090	348	1,828
Mercury	50	0.155	NA	0.3U	0.3U	0.10U	0.2
Nickel	4,000	21	NA	40U	40U	1.2	15
Cadmium	400	5U	5U	NA	NA	0.93U	Not detected
Silver	200	10U	10U	NA	NA	2.3U	Not detected
Potassium	–	5695	NA	2760	2760	4850	3,900
Sodium	–	117500	64500	67800	67800	374500	149,520
Vanadium	–	17.5	NA	50U	50U	1.8U	17
Zinc	2,000	141	34U	10.4	10.4	45.8U	35

TABLE 3.1

ESTIMATED AVERAGE GROUNDWATER INFLUENT CONCENTRATIONS
SCHENECTADY INTERNATIONAL, INC.
SCHENECTADY, NEW YORK

Parameter	*City of Schenectady Local Sewer Ordinance Values(1)*	*Shallow Trench 1.5 gpm (OW-1, OW-10, OW-4a, OW-11)*	*Deep Trench 2 gpm (OW-3)*	*PW1 3 gpm (OW-7a pump test)*	*PW2 1 gpm (OW-7a pump test)*	*PW3 and PW4 2 gpm (OW-13, OW-14)*	*Average Influent Concentration (3)*
Other Parameters (mg/L)							
Acidity	–	42	42	45	45	NA	44
BOD5	300	31	31	2.2	2.2	NA	15.6
Bromide	–	2.6	2.6	1.0U	1.0U	NA	1.48
Chloride	–	350	350	81.9	81.9	NA	207
COD (total)	500	125	125	5.84	5.84	NA	61.4
Fluoride	–	0.29	0.29	0.312	0.312	NA	0.30
Ammonia (as N)	–	0.35	0.35	0.938	0.938	NA	0.66
Sulfate	–	25.7	25.7	2.0U	2.0U	NA	12.5
Total Suspended Solids	350	604	604	47.1	47.1	NA	307
Total Alkalinity	–	240	240	297	297	NA	270
Total Dissolved Solids	–	968	968	434	434	NA	683
Total Kjeldahl Nitrogen	–	1.7	1.7	1.37	1.37	NA	1.52
Total Phosphorus (as P)	–	0.57	0.57	0.439	0.439	NA	0.50
Oil and Grease	200	5U	5U	5.0U	5.0U	NA	<5

Note:

(1) - Local sewer ordinance values per personal communication with Marilyn Buckley, City of Schenectady, March 13, 1998.

(2) - Weighted average based on analytical data for the most recent samples collected from wells located along the proposed collection system alignment. For non-detect results, the concentration was assumed to be 1/2 of the reported detection limit.

(3) - Average influent concentrations for "Other Parameters" based on average for OW-7a pumping test and composite sample from wells OW-1, OW-4a, OW-11, and OW-3)

U - not detected at noted detection limit

J - estimated value

NA - not analyzed for this parameter

TABLE 4.1

**CONSTITUENTS AND ACTION LEVELS
FOR THE RAPID FIELD CHARACTERIZATION METHOD
SCHENECTADY INTERNATIONAL, INC.**

Chemical	*Action Level (mg/kg)*
Benzene	5
Toluene	10,000
Ethylbenzene	4,000
Chlorobenzene	1,000
Total Xylenes	100,000
Phenol	25,000
Total Cresols	2,000

APPENDIX A

BOREHOLE LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

PROJECT NAME: CONGRESS STREET
PROJECT NUMBER: 1312-30
CLIENT: SCHENECTADY INTERNATIONAL
LOCATION: SOUTH OF OW-3B, EAST OF FENCE LINE

HOLE DESIGNATION: BH-32
DATE COMPLETED: SEPTEMBER 16, 1997
DRILLING METHOD: 4 ¼" HSA
CRA SUPERVISOR: D. GNAGE

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	290.14					
	SP-SAND, some gravel, fine to medium grained, black, dry			1SS	X	18	4.0
	- brick		BENTONITE GROUT				
-2.5	- moist						
	- wet, odor			2SS	X	7	150
	- moderate odor						
-5.0	- some silt, some clay, grey/black, moist			3SS	X	6	103
				4SS	X	2	-
-7.5	- some gravel, wet						
				5SS	X	3	100
-10.0	- more silt/clay, no gravel, slight odor						
				6SS	X	2	36.0
			8" Ø BOREHOLE				
-12.5				7SS	X	5	22.0
	CL/ML-CLAY and SILT, some sand, high plasticity, grey, wet, some odor	275.64					
-15.0				8SS	X	4	36.0
	SP-SAND, some silt, little clay, fine grained, brown, wet	274.14		9SS	X	6	
-17.5							
	END OF HOLE @ 18.0ft BGS	272.14					
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ⊻ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭ GRAIN SIZE ANALYSIS ▭

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

PROJECT NAME: CONGRESS STREET
PROJECT NUMBER: 1312-30
CLIENT: SCHENECTADY INTERNATIONAL
LOCATION: NORTH OF OW-4A, EAST OF FENCE LINE

HOLE DESIGNATION: BH-33
DATE COMPLETED: SEPTEMBER 17, 1997
DRILLING METHOD: 4 ¼" HSA
CRA SUPERVISOR: D. GNAGE

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	291.02					
	TOPSOIL	290.82					
	SP-SAND, some gravel, fine to medium grained, black, moist, slight odor			1SS	X	22	16.0
2.5	- wet		BENTONITE GROUT				
	- some silt, some clay, grey/black, strong odor			2SS	X	9	44.1
5.0				3SS	X	4	480
	- wet, increase in clay content						
7.5				4SS	X	11	225
	- odor						
				5SS	X	12	66.7
10.0							
				6SS	X	12	20.0
12.5			8" Ø BOREHOLE	7SS	X	13	25.9
15.0	- no gravel, increase clay			8SS	X	15	15.9
17.5				10SS	X	5	8.0
	END OF HOLE @ 18.0ft BGS	273.02					
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ⊻ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭ GRAIN SIZE ANALYSIS ▭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CONGRESS STREET
PROJECT NUMBER: 1312-30
CLIENT: SCHENECTADY INTERNATIONAL
LOCATION: SOUTH OF OW-4C, EAST OF FENCE LINE

HOLE DESIGNATION: BH-34
DATE COMPLETED: SEPTEMBER 17, 1997
DRILLING METHOD: 4 ¼" HSA
CRA SUPERVISOR: D. GNAGE

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	292.74					
	TOPSOIL	292.54					
	SP-SAND, some gravel, little silt, fine to medium grained, black, moist, strong odor			1SS	X	23	531
2.5	- some silt, some clay, tight, grey/black, odor - wet - clay, some fine sand, grey/black, odor, wet		BENTONITE GROUT	2SS	X	24	120
5.0				3SS	X	18	155
7.5				4SS	X	9	33.0
				5SS	X	14	25.0
10.0	- increase in sand content						
	- high plasticity, slight odor			6SS	X	10	22.0
12.5			8" Ø BOREHOLE	7SS	X	9	8.0
15.0				8SS	X	13	7.0
				10SS	X	6.7	6.7
17.5	END OF HOLE @ 17.5ft BGS	275.24					
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ⊻ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭ GRAIN SIZE ANALYSIS ▭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: ROTTERDAM JUNCTION
PROJECT NUMBER: 1312-30
CLIENT: SCHENECTADY INTERNATIONAL
LOCATION: ROTTERDAM JUNCTION

HOLE DESIGNATION: BH-44
DATE COMPLETED: SEPTEMBER 30, 1998
DRILLING METHOD: GEOPROBE
CRA SUPERVISOR: J. VANDERLINDEN

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. BCD	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	0.00					
	GP-SAND (FILL), and coarse gravel, dry - finer gravel	-1.4					
2.5	SP-SAND (FILL), medium to fine grained, light brown, dry	-2.5	NATIVE MATERIAL	1SS	X		0.0
5.0	GP-SAND (FILL), and gravel, some asphalt, fine grained, dry, bricks, concrete, styrofoam pieces			2SS	X		0.0
7.5		-8.9					
10.0	OL/OH-ORGANIC SOIL (FILL), some roots, other organic matter, dry	-9.1	2" Ø BOREHOLE	3SS	X		0.0
	SP-SAND (FILL), trace gravel, fine sand, brown, dry						
12.5	- fill, trace fibrous material, black staining, moist, organic odor			4SS	X		31
15.0	- motar, carboard, metal pieces, black staining, wet, slight chemical odor						
17.5				5SS	X		174
20.0	GW-SAND and GRAVEL (FILL), fine gravel, brown, trace black staining, wet - less sand	-20.0					
22.5	SM-SILT and SAND (NATIVE), trace rootlets, slightly firm, fine sand, brown, some black staining, wet	-21.8		6SS	X		10.4
25.0	SP-SAND, trace gravel, medium grained	-24.0		7SS	X		0.0
27.5	END OF HOLE @ 28.0ft BGS	-28.0					
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ⊻ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-52)
Page 1 of 1

PROJECT NAME: ROTTERDAM JUNCTION
PROJECT NUMBER: 1312-30
CLIENT: SCHENECTADY INTERNATIONAL
LOCATION: ROTTERDAM JUNCTION

HOLE DESIGNATION: BH-45
DATE COMPLETED: SEPTEMBER 30, 1998
DRILLING METHOD: GEOPROBE
CRA SUPERVISOR: J. VANDERLINDEN

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. BCD	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	0.00					
	ASPHALT	-.2					
2.5	GP-SAND and GRAVEL (FILL), trace silt, medium grained, brown, dry - more sand		NATIVE MATERIAL	1SS			0.0
5.0				2SS			0.0
7.5	SP-SAND (FILL), trace gravel, medium grained, brown, dry	-8.0					
10.0			2" Ø BOREHOLE	3SS			0.0
	SM-SAND (FILL), little silt, trace gravel, brown, moist to wet	-10.8					
12.5	ML-SILT, trace fine sand, trace organic matter, soft, dark brown, wet - trace to little fine sand, slight organic odor - trace gravel, pieces of green, gum like material	-12.4		4SS			0.0
15.0	SM-SAND (NATIVE), little silt, soft, fine grained, light brown, wet	-15.5		5SS			5.5
17.5				6SS			0.0
20.0							
22.5				7SS			0.0
	ML-SILT, trace fine sand, trace fine gravel, slightly firm, gray	-23.2					
25.0	END OF HOLE @ 24.0ft BGS	-24.0					
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

APPENDIX B

DATA VALIDATION REPORTS

ANALYTICAL DATA ASSESSMENT AND VALIDATION
VERTICAL AQUIFER SAMPLING
SCHENECTADY CHEMICALS
CONGRESS STREET
SEPTEMBER 1997

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1.0 INTRODUCTION

The following document details an assessment and validation of analytical results reported by Columbia Analytical Services, Inc. (CAS) for soil and groundwater samples collected at the Congress Street Site in Schenectady, New York (Site) on September 16 and 17, 1997. The sampling and analyses were performed in support of the Remedial Action Design. A sampling summary is presented in Table 1.

The groundwater samples were submitted for target compound list (TCL) volatile organic compounds (VOCs), TCL semi-volatile organic compounds (SVOCs), and polychlorinated biphenyls (PCBs). Soil samples were submitted for PCB analyses only. Methods of analyses were 8260 for TCL VOCs, 8270 for TCL SVOCs, and 8081 for PCBs. Methods were referenced from "Test Methods for Evaluating Solid Waste", SW-846, 3rd Edition, 1986 (with revisions).

A summary of the analytical data is presented in Tables 2A and 2B. The quality assurance/quality control (QA/QC) criteria by which these data have been assessed are outlined in the analytical methods and the document entitled "United States Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines for Organic Data Review", EPA 540/R-94-012, February 1994.

Full contract laboratory program-like (CLP) deliverables were provided by the laboratory for the analyses. The data quality assessment and validation presented in the following subsections was performed based on the sample results and supporting QA/QC provided.

2.0 SAMPLE HOLDING TIMES

Sample holding time criteria for this program were as follows:

Parameter	*Matrix*	*Holding Time*
TCL VOCs	Water	14 days from collection to analysis
TCL SVOCs	Water	7 days from collection to extraction 40 days from extraction to analysis
PCBs	Water	7 days from collection to extraction 40 days from extraction to analysis
PCBs	Soil	14 days from collection to extraction 40 days from extraction to analysis

All sample preparation and/or analyses were performed within the specified holding times.

3.0 INSTRUMENT CALIBRATION

3.1 GAS CHROMATOGRAPH/MASS SPECTROMETER (GC/MS) CALIBRATION - VOCs AND SVOCs

3.1.1 Tuning and Mass Calibration

Prior to instrument calibration each day, GC/MS instrumentation are tuned to ensure optimization over the mass range of interest.

All GC/MS tuning data were reviewed. Tuning compounds were analyzed at the required frequency throughout the VOC and SVOC analyses periods. All tuning criteria were met for these analyses.

3.1.2 Initial Calibration

To quantify compounds of interest in samples, calibration of the GC/MS over a specific concentration range must be performed in accordance with the analytical methods.

The initial calibration data for VOCs and SVOCs were reviewed. Acceptable sensitivity was demonstrated for all analytes of interest with the exception of acetone. All results for this compound were non-detect and were rejected based on unreliable sensitivity (see Table 3). The calibration curves established for some compounds did not meet the linearity requirements specified in the Functional Guidelines. In most cases the associated sample data were non-detect and the variability indicated in the curves did not impact the data. The detected results associated with the outlying calibrations were qualified as estimated, based on the indicated variability (see Table 3).

3.1.3 Continuing Calibration

To ensure that instrument calibration is acceptable throughout the sample analysis period, continuing calibration standards must be analyzed and compared to the initial calibration curve at the method-specified frequency.

Instrument sensitivity was acceptable for all compounds of concern. Some fluctuations in the instrument calibration were noted for various compounds. All associated sample results were qualified as estimated (see Table 4).

3.2 GC CALIBRATION - PCBs

3.2.1 Initial Calibration

To quantify compounds of interest, calibration of the GC/electron capture detector (ECD) over a specific concentration range must be performed. Retention time windows are also calculated from the initial calibration analyses. These windows are then used to identify all compounds of interest in subsequent analyses.

All initial calibration standards were analyzed at the required frequencies and met all method-specified linearity criteria.

3.2.2 Continuing Calibration

To ensure that the calibration of the instrument is valid throughout the sample analysis period, continuing calibration standards are analyzed and evaluated on a regular basis. To ensure that compound retention times do not vary over the analysis period, all retention times for continuing calibration compounds must fall within the established retention time windows.

All continuing calibration performed met the method-specified criteria.

4.0 SURROGATE SPIKE RECOVERIES

In accordance with the methods employed, all samples, blanks, and standards analyzed for VOCs, SVOCs, and PCBs were spiked with surrogate compounds prior to sample extraction and/or analysis.

Sample surrogate recoveries for all organic parameters were acceptable. Due to necessary sample dilutions, surrogate recoveries could not be assessed for the SVOC analysis of samples GW-1312-091697-DJG-001 and GW-1312-091697-DJG-002. Analytical accuracy for these samples was assessed based on acceptable spike recoveries (see Sections 7.0 and 8.0).

5.0 INTERNAL STANDARD RECOVERIES - VOLATILES AND SEMI-VOLATILES

To ensure that changes in GC/MS response and sensitivity do not affect sample analysis results, internal standard compounds are added to all samples, blanks, and spike samples prior to VOC and SVOC analyses. All results are calculated as a ratio of the internal standard response.

All internal standard recoveries were acceptable and all results were calculated correctly using the internal standard responses.

6.0 METHOD BLANK ANALYSES

The purpose of assessing the results of method blank analyses is to determine the existence and magnitude of sample contamination introduced during analysis. Method blanks are prepared from deionized water and analyzed as samples.

For this study, method blanks were analyzed at a minimum frequency of one per 20 investigative samples and/or one per analytical batch.

All method blank results were non-detect for the compounds of interest.

7.0 BLANK SPIKES (BSs)

BSs are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. BSs were prepared and analyzed with each batch of analytical samples.

All BS recoveries were acceptable for the compounds of interest, indicating good overall analytical accuracy.

8.0 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSES

The recoveries of MS/MSD analyses are used to assess the analytical accuracy achieved on individual sample matrices. The relative percent difference (RPD) values between the MS and MSD are used to assess analytical precision.

For this study, MS/MSD analyses were performed on sample GW-1312-091697-DJG-003.

8.1 VOLATILES

MS/MSD recoveries and RPD values were acceptable.

8.2 SEMI-VOLATILES

All MS/MSD recoveries were acceptable with the exception of a low pentachlorophenol MS recovery. Sample results for this compound were non-detect and judged to be acceptable based on acceptable MSD and blank spike recoveries (see Section 7.0).

Variability was observed for various compounds between the MS and MSD recoveries. All sample results for these compounds were non-detect and would not have been affected by the variability.

8.3 PCBs

MS/MSD recoveries and RPD values were acceptable.

9.0 FIELD QA/QC

Rinse Blanks

To investigate the possibility of contamination arising from sampling activities, a rinse blank was collected with the groundwater samples taken from this study, as specified in Table 1.

All compounds of interest were non-detect with the exception of acetone and bis(2-ethylhexyl)phthalate detected at 32 micrograms per liter (µg/L) and 4.8 µg/L, respectively. All acetone results were previously rejected and would not have been affected; all bis(2-ethylhexyl)phthalate results similar to the concentration present in the rinse blank were qualified as non-detect (see Table 5).

Trip Blanks

A trip blank was submitted and analyzed with VOC samples to evaluate the possibility of cross-contamination during sample shipment and storage.

All results were non-detect for the VOCs of interest.

10.0 CONCLUSION

Based on the assessment detailed in the foregoing, these analytical data are acceptable for their intended use with the specific exceptions and qualifications noted.

TABLES

TABLE 1

SAMPLE KEY
VERTICAL AQUIFER SAMPLING
SCHENECTADY CHEMICALS - CONGRESS STREET
SEPTEMBER 1997

Sample ID	*Date*	*Time*	*Interval*	*Matrix*	*Comments*
S-1312-091697-DJG-006	09/16/97	1700	16/18 BH-1	Soil	
S-1312-091797-DJG-010	09/17/97	1045	16/18 BH-2	Soil	
S-1312-091797-DJG-014	09/17/97	1330	16/18 BH-3	Soil	
GW-1312-091697-DJG-001	09/16/97	1445	4/8 BH-1	Water	
GW-1312-091697-DJG-002	09/16/97	1530	8/12 BH-1	Water	
GW-1312-091697-DJG-003	09/16/97	1610	12/16 BH-1	Water	MS/MSD
GW-1312-091797-DJG-004	09/17/97	0820	4/8 BH-2	Water	
GW-1312-091797-DJG-005	09/17/97	0915	8/12 BH-2	Water	
GW-1312-091797-DJG-006	09/17/97	0955	12/16 BH-2	Water	
GW-1312-091797-DJG-007	09/17/97	1145	4/8 BH-3	Water	
GW-1312-091797-DJG-008	09/17/97	1240	8/12 BH-3	Water	
GW-1312-091797-DJG-009	09/17/97	1330	12/16 BH-3	Water	
RB-1312-091797-DJG-001	09/17/97	1500	-	Water	Rinse Blank
Trip Blank	09/17/97	-	-	Water	Trip Blank

Notes:

-	Not Applicable
MS	Matrix Spike.
MSD	Matrix Spike Duplicate.

TABLE 2A

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY CHEMICALS - CONGRESS STREET
SEPTEMBER 1997

	Sample ID:	*GW-1312-091697-DJG-001*	*GW-1312-091697-DJG-002*	*GW-1312-091697-DJG-003*	*GW-1312-091797-DJG-004*	*GW-1312-091797-DJG-005*
	Collection Date:	*09/16/97*	*09/16/97*	*09/16/97*	*09/17/97*	*09/17/97*
	Units					
TCL Volatiles						
Acetone	µg/L	R	R	R	R	R
Benzene	µg/L	50 U	130 U	10 U	13 U	5.0 U
Bromodichloromethane	µg/L	50 U	130 U	10 U	13 U	5.0 U
Bromoform	µg/L	50 U	130 U	10 U	13 U	5.0 U
Bromomethane	µg/L	50 U	130 U	10 U	13 U	5.0 U
2-Butanone	µg/L	100 U	250 U	20 U	25 U	10 U
Carbon disulfide	µg/L	100 U	250 U	20 U	25 U	10 U
Carbon tetrachloride	µg/L	50 U	130 U	10 U	13 U	5.0 U
Chlorobenzene	µg/L	50 U	130 U	15	13 U	5.0 U
Chloroethane	µg/L	50 U	130 U	10 U	13 U	5.0 U
Chloroform	µg/L	50 U	130 U	10 U	13 U	5.0 U
Chloromethane	µg/L	50 U	130 U	10 U	13 U	5.0 U
Dibromochloromethane	µg/L	50 U	130 U	10 U	13 U	5.0 U
1,1-Dichloroethane	µg/L	50 U	130 U	10 U	13 U	5.0 U
1,2-Dichloroethane	µg/L	50 U	130 U	10 U	13 U	5.0 U
1,1-Dichloroethene	µg/L	50 U	130 U	10 U	13 U	5.0 U
cis-1,2-Dichloroethene	µg/L	50 U	130 U	10 U	13 U	5.0 U
trans-1,2-Dichloroethene	µg/L	50 U	130 U	10 U	13 U	5.0 U
1,2-Dichloropropane	µg/L	50 U	130 U	10 U	13 U	5.0 U
cis-1,3-Dichloropropene	µg/L	50 U	130 U	10 U	13 U	5.0 U
trans-1,3-Dichloropropene	µg/L	50 U	130 U	10 U	13 U	5.0 U
Ethyl benzene	µg/L	300	1600	430	170	5.0 U
2-Hexanone	µg/L	100 U	250 U	20 U	25 U	10 U
Methylene chloride	µg/L	50 U	130 U	10 U	13 U	5.0 U
4-Methyl-2-pentanone	µg/L	100 U	250 U	20 U	25 U	10 U
Styrene	µg/L	50 U	130 U	10 U	13 U	5.0 U
1,1,2,2-Tetrachloroethane	µg/L	50 U	130 U	10 U	13 U	5.0 U
Tetrachloroethene	µg/L	50 U	130 U	10 U	13 U	5.0 U
Toluene	µg/L	50 U	130 U	10 U	13 U	5.0 U
1,1,1-Trichloroethane	µg/L	50 U	130 U	10 U	13 U	5.0 U
1,1,2-Trichloroethane	µg/L	50 U	130 U	10 U	13 U	5.0 U
Trichloroethene	µg/L	50 U	130 U	10 U	13 U	5.0 U
Vinyl chloride	µg/L	50 U	130 U	10 U	13 U	5.0 U
m&p-Xylene	µg/L	620	6800	900	490	5.0 U
o-Xylene	µg/L	50 U	130 U	160	13 U	5.0 U

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY CHEMICALS - CONGRESS STREET
SEPTEMBER 1997

Sample ID:		*GW-1312-091697-DJG-001*	*GW-1312-091697-DJG-002*	*GW-1312-091697-DJG-003*	*GW-1312-091797-DJG-004*	*GW-1312-091797-DJG-005*
Collection Date:		*09/16/97*	*09/16/97*	*09/16/97*	*09/17/97*	*09/17/97*
	Units					
TCL Semi-Volatiles						
Acenaphthene	µg/L	320 U	930 U	11	31 U	5.9 U
Acenaphthylene	µg/L	320 UJ	930 UJ	3.0 U	31 U	5.9 U
Anthracene	µg/L	320 UJ	930 UJ	3.0 U	31 U	5.9 U
Benzo(a)anthracene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
Benzo(a)pyrene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
Benzo(b)fluoranthene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
Benzo(g,h,i)perylene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
Benzo(k)fluoranthene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
Benzyl alcohol	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
Butyl benzyl phthalate	µg/L	320 UJ	930 UJ	3.0 U	31 U	5.9 U
Di-n-butyl phthalate	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
Carbazole	µg/L	320 UJ	930 UJ	3.0 U	31 U	5.9 U
Indeno(1,2,3-cd)pyrene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
4-Chloroaniline	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
bis(2-Chloroethoxy)methane	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
bis(2-Chloroethyl) ether	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
2-Chloronaphthalene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
2-Chlorophenol	µg/L	630 U	1900 U	6.0 U	61 U	12 U
2,2'-Oxybis(1-chloropropane)	µg/L	320 UJ	930 UJ	3.0 U	31 U	5.9 U
Chrysene	µg/L	320 UJ	930 UJ	3.0 U	31 U	5.9 U
Dibenzo(a,h)anthracene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
Dibenzofuran	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
1,2-Dichlorobenzene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
1,3-Dichlorobenzene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
1,4-Dichlorobenzene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
3,3'-Dichlorobenzidine	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
2,4-Dichlorophenol	µg/L	630 U	1900 U	6.0 U	61 U	12 U
Diethylphthalate	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
Dimethyl phthalate	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
2,4-Dimethylphenol	µg/L	630 U	1900 U	24	61	12 U
2,4-Dinitrophenol	µg/L	1300 U	3700 U	12 U	120 U	24 U
2,4-Dinitrotoluene	µg/L	320 UJ	930 UJ	3.0 U	31 U	5.9 U
2,6-Dinitrotoluene	µg/L	320 UJ	930 UJ	3.0 U	31 U	5.9 U
bis(2-Ethylhexyl)phthalate	µg/L	320 UJ	930 UJ	4.6 U	31 U	5.9 U
Fluoranthene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
Fluorene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U

TABLE 2A

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY CHEMICALS - CONGRESS STREET
SEPTEMBER 1997

	Sample ID:	GW-1312-091697-DJG-001	GW-1312-091697-DJG-002	GW-1312-091697-DJG-003	GW-1312-091797-DJG-004	GW-1312-091797-DJG-005
	Collection Date:	09/16/97	09/16/97	09/16/97	09/17/97	09/17/97
	Units					
TCL Semi-Volatiles (Cont'd.)						
Hexachlorobenzene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
Hexachlorobutadiene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
Hexachlorocyclopentadiene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
Hexachloroethane	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
Isophorone	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
2-Methylnaphthalene	µg/L	1100	9600	59	61 U	12 U
2-Methylphenol	µg/L	630 U	1900 U	6.0 U	61 U	12 U
4,6-Dinitro-2-methylphenol	µg/L	1300 UJ	3700 UJ	12 UJ	120 UJ	24 UJ
4-Chloro-3-methylphenol	µg/L	630 U	1900 U	6.0 U	61 U	12 U
4-Methylphenol	µg/L	630 U	1900 U	6.0 U	61 U	12 U
Naphthalene	µg/L	3600	19000	430	90	5.9 U
2-Nitroaniline	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
3-Nitroaniline	µg/L	320 UJ	930 UJ	3.0 U	31 U	5.9 U
4-Nitroaniline	µg/L	320 UJ	930 UJ	3.0 U	31 U	5.9 U
Nitrobenzene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
2-Nitrophenol	µg/L	630 UJ	1900 UJ	6.0 U	61 U	12 U
4-Nitrophenol	µg/L	1300 U	3700 U	12 U	120 U	24 U
n-Nitrosodimethylamine	µg/L	320 UJ	930 UJ	3.0 U	31 U	5.9 U
n-Nitrosodiphenylamine	µg/L	320 UJ	930 UJ	3.0 U	31 U	5.9 U
Di-n-octyl phthalate	µg/L	320 U	930 U	3.0 UJ	31 UJ	5.9 UJ
Pentachlorophenol	µg/L	1300 U	3700 U	12 U	120 U	24 U
Phenanthrene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
Phenol	µg/L	630 UJ	1900 UJ	6.0 U	61 U	12 U
4-Bromophenyl phenyl ether	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
4-Chlorophenyl phenyl ether	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
n-Nitroso-di-n-propylamine	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
Pyrene	µg/L	320 UJ	930 UJ	3.0 U	31 U	5.9 U
1,2,4-Trichlorobenzene	µg/L	320 U	930 U	3.0 U	31 U	5.9 U
2,4,5-Trichlorophenol	µg/L	630 U	1900 U	6.0 U	61 U	12 U
2,4,6-Trichlorophenol	µg/L	630 U	1900 U	6.0 U	61 U	12 U

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY CHEMICALS - CONGRESS STREET
SEPTEMBER 1997

	Sample ID:	*GW-1312-091697-DJG-001*	*GW-1312-091697-DJG-002*	*GW-1312-091697-DJG-003*	*GW-1312-091797-DJG-004*	*GW-1312-091797-DJG-005*
	Collection Date:	*09/16/97*	*09/16/97*	*09/16/97*	*09/17/97*	*09/17/97*
	Units					
PCBs						
Aroclor-1016	µg/L	0.33 U	3.0 U	0.30 U	0.35 U	0.5 U
Aroclor-1221	µg/L	0.33 U	3.0 U	0.30 U	0.35 U	0.5 U
Aroclor-1232	µg/L	0.33 U	3.0 U	0.30 U	0.35 U	0.5 U
Aroclor-1242	µg/L	0.33 U	3.0 U	0.30 U	0.35 U	0.5 U
Aroclor-1248	µg/L	0.33 U	3.0 U	0.30 U	0.35 U	0.5 U
Aroclor-1254	µg/L	0.33 U	3.0 U	0.30 U	0.35 U	0.5 U
Aroclor-1260	µg/L	0.33 U	3.0 U	0.30 U	0.35 U	0.5 U

TABLE 2A

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY CHEMICALS - CONGRESS STREET
SEPTEMBER 1997

	Sample ID:	GW-1312-019797-DJG-006	GW-1312-091797-DJG-007	GW-1312-091797-DJG-008	GW-1312-091797-DJG-009
	Collection Date:	09/17/97	09/17/97	09/17/97	09/17/97
	Units				
TCL Volatiles					
Acetone	µg/L	R	R	R	R
Benzene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone	µg/L	10 U	10 U	10 U	10 U
Carbon disulfide	µg/L	10 U	10 U	10 U	10 U
Carbon tetrachloride	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
Chloroethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
Dibromochloromethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,2-Dichloroethene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
Ethyl benzene	µg/L	5.0 U	71	5.0 U	5.0 U
2-Hexanone	µg/L	10 U	10 U	10 U	10 U
Methylene chloride	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone	µg/L	10 U	10 U	10 U	10 U
Styrene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl chloride	µg/L	5.0 U	5.0 U	5.0 U	5.0 U
m&p-Xylene	µg/L	5.0 U	200	5.0 U	5.0 U
o-Xylene	µg/L	5.0 U	37	5.0 U	5.0 U

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY CHEMICALS - CONGRESS STREET
SEPTEMBER 1997

Sample ID:		GW-1312-019797-DJG-006	GW-1312-091797-DJG-007	GW-1312-091797-DJG-008	GW-1312-091797-DJG-009
Collection Date:		09/17/97	09/17/97	09/17/97	09/17/97
	Units				
TCL Semi-Volatiles					
Acenaphthene	µg/L	4.6 U	4.3 U	17 U	7.6 U
Acenaphthylene	µg/L	4.6 U	4.3 U	17 U	7.6 U
Anthracene	µg/L	4.6 U	4.3 U	17 U	7.6 U
Benzo(a)anthracene	µg/L	4.6 U	4.3 U	17 U	7.6 U
Benzo(a)pyrene	µg/L	4.6 U	4.3 U	17 U	7.6 U
Benzo(b)fluoranthene	µg/L	4.6 U	4.3 U	17 U	7.6 U
Benzo(g,h,i)perylene	µg/L	4.6 U	4.3 U	17 U	7.6 U
Benzo(k)fluoranthene	µg/L	4.6 U	4.3 U	17 U	7.6 U
Benzyl alcohol	µg/L	4.6 U	10	17 U	7.6 U
Butyl benzyl phthalate	µg/L	4.6 U	4.3 U	17 U	7.6 U
Di-n-butyl phthalate	µg/L	4.6 U	4.3 U	17 U	7.6 U
Carbazole	µg/L	4.6 U	4.3 U	17 U	7.6 U
Indeno(1,2,3-cd)pyrene	µg/L	4.6 U	4.3 U	17 U	7.6 U
4-Chloroaniline	µg/L	4.6 U	4.3 U	17 U	7.6 U
bis(2-Chloroethoxy)methane	µg/L	4.6 U	4.3 U	17 U	7.6 U
bis(2-Chloroethyl) ether	µg/L	4.6 U	4.3 U	17 U	7.6 U
2-Chloronaphthalene	µg/L	4.6 U	4.3 U	17 U	7.6 U
2-Chlorophenol	µg/L	9.2 U	8.5 U	35 U	15 U
2,2'-Oxybis(1-chloropropane)	µg/L	4.6 U	4.3 U	17 U	7.6 U
Chrysene	µg/L	4.6 U	4.3 U	17 U	7.6 U
Dibenzo(a,h)anthracene	µg/L	4.6 U	4.3 U	17 U	7.6 U
Dibenzofuran	µg/L	4.6 U	4.3 U	17 U	7.6 U
1,2-Dichlorobenzene	µg/L	4.6 U	4.3 U	17 U	7.6 U
1,3-Dichlorobenzene	µg/L	4.6 U	4.3 U	17 U	7.6 U
1,4-Dichlorobenzene	µg/L	4.6 U	4.3 U	17 U	7.6 U
3,3'-Dichlorobenzidine	µg/L	4.6 U	4.3 U	17 U	7.6 U
2,4-Dichlorophenol	µg/L	9.2 U	8.5 U	35 U	15 U
Diethylphthalate	µg/L	4.6 U	4.3 U	17 U	7.6 U
Dimethyl phthalate	µg/L	4.6 U	4.3 U	17 U	7.6 U
2,4-Dimethylphenol	µg/L	9.2 U	8.5 U	35 U	15 U
2,4-Dinitrophenol	µg/L	18 U	17 U	69 U	30 U
2,4-Dinitrotoluene	µg/L	4.6 U	4.3 U	17 U	7.6 U
2,6-Dinitrotoluene	µg/L	4.6 U	4.3 U	17 U	7.6 U
bis(2-Ethylhexyl)phthalate	µg/L	5.5 U	30 U	61 J	15 U
Fluoranthene	µg/L	4.6 U	4.3 U	17 U	7.6 U
Fluorene	µg/L	4.6 U	4.3 U	17 U	7.6 U

TABLE 2A

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY CHEMICALS - CONGRESS STREET
SEPTEMBER 1997

Sample ID:		GW-1312-019797-DJG-006	GW-1312-091797-DJG-007	GW-1312-091797-DJG-008	GW-1312-091797-DJG-009
Collection Date:		09/17/97	09/17/97	09/17/97	09/17/97
	Units				
TCL Semi-Volatiles (Cont'd.)					
Hexachlorobenzene	μg/L	4.6 U	4.3 U	17 U	7.6 U
Hexachlorobutadiene	μg/L	4.6 U	4.3 U	17 U	7.6 U
Hexachlorocyclopentadiene	μg/L	4.6 U	4.3 U	17 U	7.6 U
Hexachloroethane	μg/L	4.6 U	4.3 U	17 U	7.6 U
Isophorone	μg/L	4.6 U	4.3 U	17 U	7.6 U
2-Methylnaphthalene	μg/L	9.2 U	8.5 U	35 U	15 U
2-Methylphenol	μg/L	9.2 U	8.5 U	35 U	15 U
4,6-Dinitro-2-methylphenol	μg/L	18 UJ	17 UJ	69 UJ	30 UJ
4-Chloro-3-methylphenol	μg/L	9.2 U	8.5 U	35 U	15 U
4-Methylphenol	μg/L	9.2 U	8.5 U	35 U	15 U
Naphthalene	μg/L	4.6 U	37	28	7.6 U
2-Nitroaniline	μg/L	4.6 U	4.3 U	17 U	7.6 U
3-Nitroaniline	μg/L	4.6 U	4.3 U	17 U	7.6 U
4-Nitroaniline	μg/L	4.6 U	4.3 U	17 U	7.6 U
Nitrobenzene	μg/L	4.6 U	4.3 U	17 U	7.6 U
2-Nitrophenol	μg/L	9.2 U	8.5 U	35 U	15 U
4-Nitrophenol	μg/L	18 U	17 U	69 U	30 U
n-Nitrosodimethylamine	μg/L	4.6 U	4.3 U	17 U	7.6 U
n-Nitrosodiphenylamine	μg/L	4.6 U	4.3 U	17 U	7.6 U
Di-n-octyl phthalate	μg/L	4.6 UJ	4.3 UJ	17 UJ	7.6 UJ
Pentachlorophenol	μg/L	18 U	17 U	69 U	30 U
Phenanthrene	μg/L	4.6 U	4.3 U	17 U	7.6 U
Phenol	μg/L	9.2 U	8.5 U	35 U	15 U
4-Bromophenyl phenyl ether	μg/L	4.6 U	4.3 U	17 U	7.6 U
4-Chlorophenyl phenyl ether	μg/L	4.6 U	4.3 U	17 U	7.6 U
n-Nitroso-di-n-propylamine	μg/L	4.6 U	4.3 U	17 U	7.6 U
Pyrene	μg/L	4.6 U	4.3 U	17 U	7.6 U
1,2,4-Trichlorobenzene	μg/L	4.6 U	4.3 U	17 U	7.6 U
2,4,5-Trichlorophenol	μg/L	9.2 U	8.5 U	35 U	15 U
2,4,6-Trichlorophenol	μg/L	9.2 U	8.5 U	35 U	15 U

ANALYTICAL RESULTS SUMMARY - WATER
VERTICAL AQUIFER SAMPLING
SCHENECTADY CHEMICALS - CONGRESS STREET
SEPTEMBER 1997

	Sample ID:	*GW-1312-019797-DJG-006*	*GW-1312-091797-DJG-007*	*GW-1312-091797-DJG-008*	*GW-1312-091797-DJG-009*
	Collection Date:	*09/17/97*	*09/17/97*	*09/17/97*	*09/17/97*
	Units				
PCBs					
Aroclor-1016	μg/L	0.77 U	0.59 U	0.77 U	0.81 U
Aroclor-1221	μg/L	0.77 U	0.59 U	0.77 U	0.81 U
Aroclor-1232	μg/L	0.77 U	0.59 U	0.77 U	0.81 U
Aroclor-1242	μg/L	0.77 U	0.59 U	0.77 U	0.81 U
Aroclor-1248	μg/L	0.77 U	0.59 U	0.77 U	0.81 U
Aroclor-1254	μg/L	0.77 U	0.59 U	0.77 U	0.81 U
Aroclor-1260	μg/L	0.77 U	0.59 U	0.77 U	0.81 U

Notes:
J Associated value is estimated.
PCB Polychlorinated Biphenyls.
R Rejected.
TCL Target Compound List
U Non-detect at associated value.

TABLE 2B

ANALYTICAL RESULTS SUMMARY - SOIL
VERTICAL AQUIFER SAMPLING
SCHENECTADY CHEMICALS - CONGRESS STREET
SEPTEMBER 1997

	Sample ID:	*S-1312-091697-DJG-006*	*S-1312-091797-DJG-010*	*S-1312-091797-DJG-014*
	Collection Date:	*09/16/97*	*09/17/97*	*09/17/97*
	Units			
PCBs				
Aroclor-1016	µg/Kg	21 U	22 U	21 U
Aroclor-1221	µg/Kg	21 U	22 U	21 U
Aroclor-1232	µg/Kg	21 U	22 U	21 U
Aroclor-1242	µg/Kg	21 U	22 U	21 U
Aroclor-1248	µg/Kg	21 U	22 U	21 U
Aroclor-1254	µg/Kg	21 U	22 U	21 U
Aroclor-1260	µg/Kg	21 U	22 U	21 U

Notes:
PCBs Polychlorinated Biphenyls.
U Non-detect at associated value.

TABLE 3

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING INITIAL CALIBRATION DATA
VERTICAL AQUIFER SAMPLING
SCHENECTADY CHEMICALS - CONGRESS STREET
SEPTEMBER 1997

Parameter	*Compound*	*Calibration Date*	*Response Factor*	*%RSD*	*Associated Sample ID*	*Sample Results*	*Units*	*Qualifier*
VOCs	Acetone	09/18/97	0.040	5.9	GW-1312-091697-DJG-001	200 U	µg/L	R
					GW-1312-091697-DJG-002	500 U	µg/L	R
					GW-1312-091697-DJG-003	40 U	µg/L	R
					GW-1312-091797-DJG-004	50 U	µg/L	R
					GW-1312-091797-DJG-005	20 U	µg/L	R
					GW-1312-091797-DJG-006	20 U	µg/L	R
					GW-1312-091797-DJG-007	20 U	µg/L	R
					GW-1312-091797-DJG-008	20 U	µg/L	R
					GW-1312-091797-DJG-009	20 U	µg/L	R
SVOCs	bis(2-Ethylhexyl)phthalate	09/14/97	>0.05	31	GW-1312-091797-DJG-008	61	µg/L	J

Notes:
%RSD Relative Standard Deviation.
J Associated value is estimated.
R Rejected.
SVOCs Semi-Volatile Organic Compounds.
U Non-detect at associated value.
VOCs Volatile Organic Compounds.

TABLE 4

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING CONTINUING CALIBRATION DATA
VERTICAL AQUIFER SAMPLING
SCHENECTADY CHEMICALS - CONGRESS STREET
SEPTEMBER 1997

Parameter	*Compound*	*Calibration Date*	*Associated Sample ID*	*%D*	*Sample Results*	*Units*	*Qualifier*
SVOCs	4,6-Dinitro-2-methylphenol	09/19/97	GW-1312-091697-DJG-003	26	12 U	µg/L	J
			GW-1312-091797-DJG-004		120 U	µg/L	J
			GW-1312-091797-DJG-005		24 U	µg/L	J
			GW-1312-091797-DJG-006		18 U	µg/L	J
			GW-1312-091797-DJG-007		17 U	µg/L	J
			GW-1312-091797-DJG-008		69 U	µg/L	J
			GW-1312-091797-DJG-009		30 U	µg/L	J
	Di-n-octylphthalate	09/19/97	GW-1312-091697-DJG-003	28	3.0 U	µg/L	J
			GW-1312-091797-DJG-004		31 U	µg/L	J
			GW-1312-091797-DJG-005		5.9 U	µg/L	J
			GW-1312-091797-DJG-006		4.6 U	µg/L	J
			GW-1312-091797-DJG-007		4.3 U	µg/L	J
			GW-1312-091797-DJG-008		17 U	µg/L	J
			GW-1312-091797-DJG-009		7.6 U	µg/L	J
	n-Nitrosodimethylamine	09/20/97	GW-1312-091697-DJG-001	38	320 U	µg/L	J
			GW-1312-091697-DJG-002		930 U	µg/L	J
	2,2'-Oxybis(1-chloropropane)	09/20/97	GW-1312-091697-DJG-001	26	320 U	µg/L	J
			GW-1312-091697-DJG-002		930 U	µg/L	J
	2-Nitrophenol	09/20/97	GW-1312-091697-DJG-001	25	630 U	µg/L	J
			GW-1312-091697-DJG-002		1900 U	µg/L	J
	Acenaphthylene	09/20/97	GW-1312-091697-DJG-001	27	320 U	µg/L	J
			GW-1312-091697-DJG-002		930 U	µg/L	J
	2,6-Dinitrotoluene	09/20/97	GW-1312-091697-DJG-001	32	320 U	µg/L	J
			GW-1312-091697-DJG-002		930 U	µg/L	J

TABLE 4

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING CONTINUING CALIBRATION DATA
VERTICAL AQUIFER SAMPLING
SCHENECTADY CHEMICALS - CONGRESS STREET
SEPTEMBER 1997

Parameter	*Compound*	*Calibration Date*	*Associated Sample ID*	*%D*	*Sample Results*	*Units*	*Qualifier*
SVOCs	3-Nitroaniline	09/20/97	GW-1312-091697-DJG-001	36	320 U	µg/L	J
			GW-1312-091697-DJG-002		930 U	µg/L	J
	2,4-Dinitrotoluene	09/20/97	GW-1312-091697-DJG-001	27	320 U	µg/L	J
			GW-1312-091697-DJG-002		930 U	µg/L	J
	4-Nitroaniline	09/20/97	GW-1312-091697-DJG-001	30	320 U	µg/L	J
			GW-1312-091697-DJG-002		930 U	µg/L	J
	4,6-Dinitro-2-methylphenol	09/20/97	GW-1312-091697-DJG-001	31	1300 U	µg/L	J
			GW-1312-091697-DJG-002		3700 U	µg/L	J
	n-Nitrosodiphenylamine	09/20/97	GW-1312-091697-DJG-001	26	320 U	µg/L	J
			GW-1312-091697-DJG-002		930 U	µg/L	J
	Phenol	09/20/97	GW-1312-091697-DJG-001	27	630 U	µg/L	J
			GW-1312-091697-DJG-002		1900 U	µg/L	J
	Anthracene	09/20/97	GW-1312-091697-DJG-001	26	320 U	µg/L	J
			GW-1312-091697-DJG-002		930 U	µg/L	J
	Carbazole	09/20/97	GW-1312-091697-DJG-001	27	320 U	µg/L	J
			GW-1312-091697-DJG-002		930 U	µg/L	J
	Pyrene	09/20/97	GW-1312-091697-DJG-001	30	320 U	µg/L	J
			GW-1312-091697-DJG-002		930 U	µg/L	J
	Butyl benzyl phthalate	09/20/97	GW-1312-091697-DJG-001	33	320 U	µg/L	J
			GW-1312-091697-DJG-002		930 U	µg/L	J

TABLE 4

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING CONTINUING CALIBRATION DATA
VERTICAL AQUIFER SAMPLING
SCHENECTADY CHEMICALS - CONGRESS STREET
SEPTEMBER 1997

Parameter	*Compound*	*Calibration Date*	*Associated Sample ID*	*%D*	*Sample Results*	*Units*	*Qualifier*
SVOCs	Chrysene	09/20/97	GW-1312-091697-DJG-001	26	320 U	µg/L	J
			GW-1312-091697-DJG-002		930 U	µg/L	J
	bis(2-Ethylhexyl)phthalate	09/20/97	GW-1312-091697-DJG-001	32	320 U	µg/L	J
			GW-1312-091697-DJG-002		930 U	µg/L	J

Notes:
%D Percent Difference.
J Associated value is estimated.
SVOCs Semi-Volatile Organic Compounds.
U Non-detect at associated value.

TABLE 5

QUALIFIED SAMPLE RESULTS DUE TO ANALYTE CONCENTRATIONS IN THE RINSE BLANKS
VERTICAL AQUIFER SAMPLING
SCHENECTADY CHEMICALS - CONGRESS STREET
SEPTEMBER 1997

Parameter	*Rinse Blank Date*	*Analyte*	*Blank Result*	*Sample ID*	*Sample Result*	*Qualified Sample Result*	*Units*
SVOCs	09/19/97	bis(2-Ethylhexyl)phthalate	4.8	GW-1312-091697-DJG-003	4.6	4.6 U	µg/L
				GW-1312-091797-DJG-006	5.5	5.5 U	µg/L
				GW-1312-091797-DJG-007	30	30 U	µg/L
				GW-1312-091797-DJG-009	15	15 U	µg/L

Notes:
SVOCs Semi-Volatile Organic Compounds.
U Non-detect at associated value.

APPENDIX A

CHAIN OF CUSTODY FORMS

CHAIN OF CUSTODY RECORD

CRA
CONESTOGA-ROVERS & ASSOCIATES
2055 Niagara Falls Blvd. Suite Three
Niagara Falls, NY 14304 (716)297-6150

SHIPPED TO (Laboratory Name): Columbia Analytical

REFERENCE NUMBER: 1312-30 Congress St

SAMPLER'S SIGNATURE: [signature]
PRINTED NAME: Daniel J Grauel

SEQ. No.	DATE	TIME	SAMPLE No.	SAMPLE TYPE	No. OF CONTAINERS	VOC	SVOC	PCB	PCB						REMARKS
	9/16/97	1445	GW-1312-091697-076-001	H2O	4	2	1	1							48 Turn Around
	↓	1530	GW-1312-091697-076-002		4	2	1	1							↓
		1610	GW-1312-091697-076-003 MS/MSD	↓	12	6	3	3							
	↓	1700	S-1312-091697-076-006	Soil	1				1						↓
			Trip Blank	H2O	2										

TOTAL NUMBER OF CONTAINERS: 23

HEALTH/CHEMICAL HAZARDS:

RELINQUISHED BY: ① [signature]	DATE: 9/16/97 TIME: 1900	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: Fed-Ex
WAY BILL No. 52645665541

White -Fully Executed Copy
Yellow -Receiving Laboratory Copy
Pink -Shipper Copy
Goldenrod -Sampler Copy

SAMPLE TEAM: D. Grauel

RECEIVED FOR LABORATORY BY:
DATE: TIME:

№ NF- 3679

1001 (D) OCT 31/94(NF) REV.1 (F-05)

CHAIN OF CUSTODY RECORD

CRA
CONESTOGA–ROVERS & ASSOCIATES
2055 Niagara Falls Blvd. Suite Three
Niagara Falls, NY 14304 (716)297–6150

SHIPPED TO (Laboratory Name): Columbia Analytical

REFERENCE NUMBER: 1312-30 Congress Street

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: David J Grange

PARAMETERS: PCB, VOC, SVOC

SEQ. No.	DATE	TIME	SAMPLE No.	SAMPLE TYPE	No. OF CONTAINERS	PCB	VOC	SVOC	REMARKS
	9/17/97	1045	S-1312-091797-DJG-010	Soil	1	1			48 Hr TAT
	↓	1220	S-1312-091797-DJG-014	↓	1	1			↓
		0820	GW-1312-091797-DJG-004	H_2O	4	1	2	1	
		0915	GW-1312-091797-DJG-005	H_2O	4	1	2	1	
		0955	GW-1312-091797-DJG-006		4	1	2	1	
		1145	GW-1312-091797-DJG-007		4	1	2	1	
		1240	GW-1312-091797-DJG-008		4	1	2	1	
	↓	1330	GW-1312-091797-DJG-009	↓	4	1	2	1	
		1500	RB-1312-091797-DJG-001	1	4	1	2	1	

TOTAL NUMBER OF CONTAINERS | HEALTH/CHEMICAL HAZARDS

RELINQUISHED BY: ① [signature]	DATE: 9/17/97 TIME:	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: Fed-Ex WAY BILL No. 230703 1160

White –Fully Executed Copy
Yellow –Receiving Laboratory Copy
Pink –Shipper Copy
Goldenrod –Sampler Copy

SAMPLE TEAM: D. Grange

RECEIVED FOR LABORATORY BY:
DATE: TIME:

№ NF–3765

APPENDIX C

GRAIN SIZE ANALYSES RESULTS

M2M LABS, INC.

SIEVE ANALYSIS

CRA 197

DATE: 9-20-97

SAMPLE #: 9726964
5-1312-091697-DJG-001

ANALYST: Beth Gustin

CONTAINER & SAMPLE WEIGHT: 198.47 g

TARE WEIGHT: 98.47 g

TOTAL DRY SAMPLE WEIGHT: 100.00 g

SIEVE OPENING	U.S. STD. SIEVE #	DESIGNATION	WT OF CONTAINER & SAMPLE (gms)	TARE WT (gms)	SAMPLE WT (gms)	WT %	CUMULATIVE SAMPLE WEIGHT (gms)	CUMULATIVE WT %
19.0 mm		coarse gravel	553.55	553.55	0.00	0	0	0
4.75 mm	4	fine gravel	498.29	478.06	20.23	20.2	20.23	20.2
2.00 mm	10	coarse sand	464.66	449.70	14.96	15.0	35.19	35.2
0.425 mm	40	medium sand	307.52	275.06	32.46	32.5	67.65	67.7
0.075 mm	200	fine sand	357.29	333.95	23.34	23.3	90.99	91.0
<0.075 mm	PAN	silts/ clays	373.12	364.30	8.82	8.8	99.81	99.8

PRE-ANALYTICAL WT OF SAMPLE: 100.0g

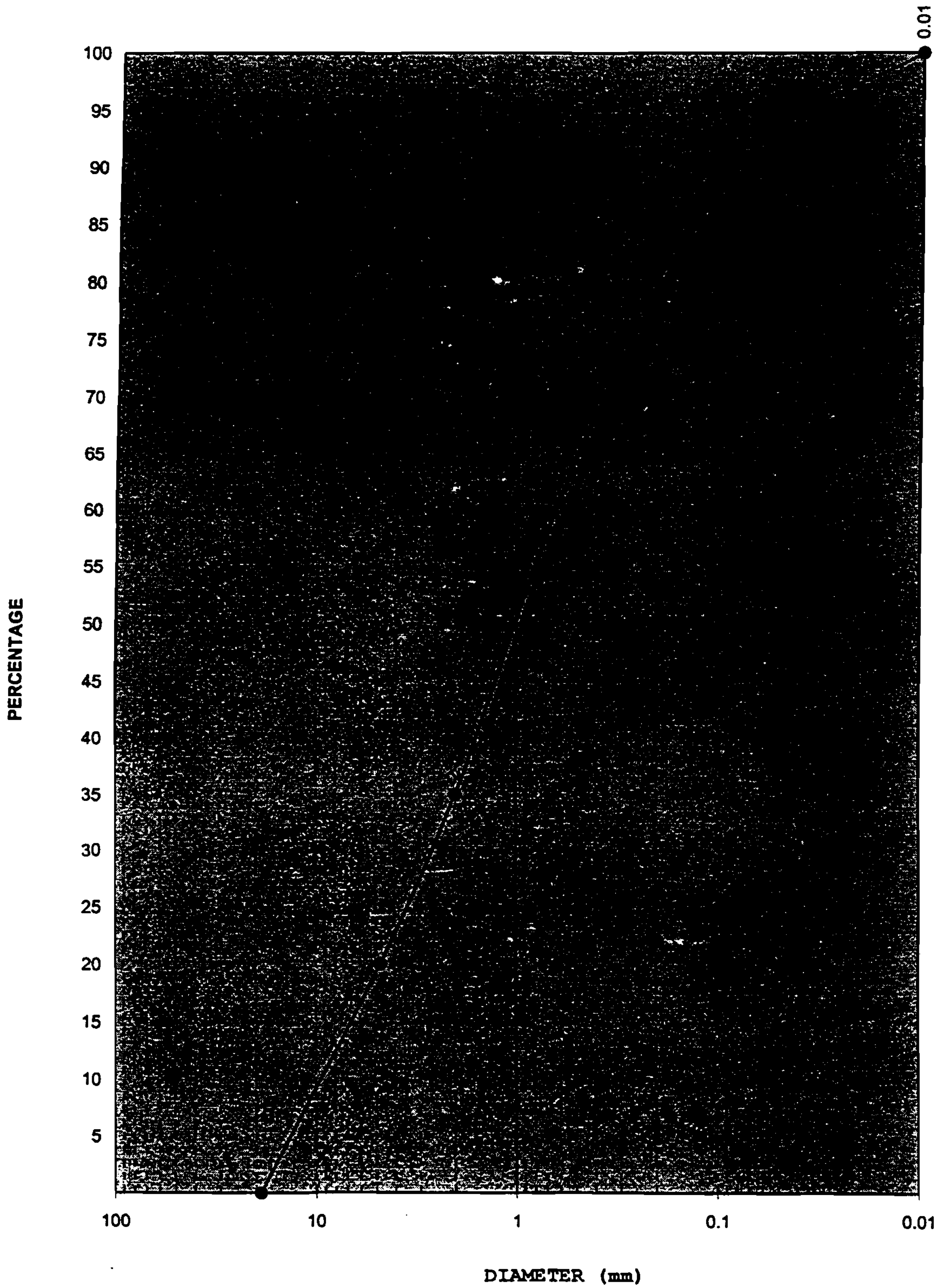
POST ANALYTICAL WT OF SAMPLE: 99.81g

SIEVE LOSS: 0.19 g

% SIEVE LOSS: 0.19%

GRAIN SIZE DISTRIBUTION

LAB #9726964
CLIENT ID: S-1312-091697-DJG-001
SDG: CRA 197



A 0025

H2M LABS, INC.

SIEVE ANALYSIS

CRA 197

DATE: 9-20-97

ANALYST: Beth Gustin

SAMPLE #: 9726965

S-1312-091697-DG-002

CONTAINER & SAMPLE WEIGHT: 198.47 g

TARE WEIGHT: 98.47 g

TOTAL DRY SAMPLE WEIGHT: 100.0 g

SIEVE OPENING	U.S. STD. SIEVE #	DESIGNATION	WT OF CONTAINER & SAMPLE (gms)	TARE WT (gms)	SAMPLE WT (gms)	WT %	CUMULATIVE SAMPLE WEIGHT (gms)	CUMULATIVE WT %
19.0 mm		coarse gravel	553.5~~0~~5 BC 9-22-97	553.55	0.0	0	0	0
4.75 mm	4	fine gravel	493.50	478.03	15.47	15.5	15.47	15.5
2.00 mm	10	coarse sand	456.12	449.73	6.39	6.4	21.86	21.9
0.425 mm	40	medium sand	290.46	275.08	15.38	15.4	37.24	37.2
0.075 mm	200	fine sand	374.80	333.96	40.84	40.8	78.08	78.1
<0.075 mm	PAN	silts/ clays	38~~5.98~~ 6.05 BC 9-20-97	364.25	21.80	21.8	99.88	99.9

PRE-ANALYTICAL WT OF SAMPLE: 100.0g

POST ANALYTICAL WT OF SAMPLE: 99.88g

SIEVE LOSS: 0.12g

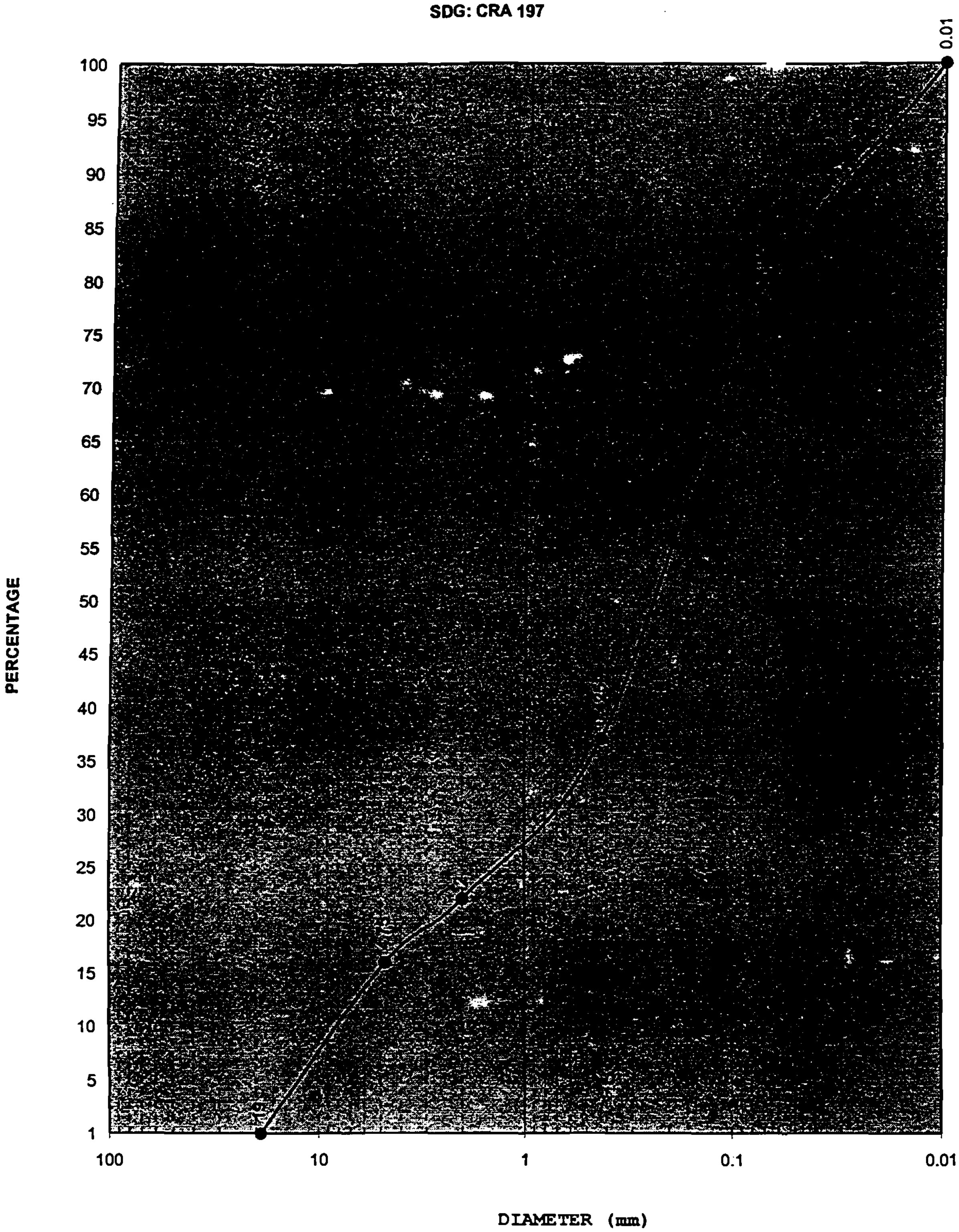
% SIEVE LOSS: 0.12%

GRAIN SIZE DISTRIBUTION

LAB #:9726965

CLIENT ID:S-1312-091697-DJG-002

SDG: CRA 197



2M LABS, INC.

SIEVE ANALYSIS

CRA 197

DATE: 9-20-97

SAMPLE #: 97269606
S-1312-091697-DJG-003

ANALYST: Beth Gustin

CONTAINER & SAMPLE WEIGHT: 198.47 g
TARE WEIGHT: 98.47 g
TOTAL DRY SAMPLE WEIGHT: 100.0 g

SIEVE OPENING	U.S. STD. SIEVE #	DESIGNATION	WT OF CONTAINER & SAMPLE (gms)	TARE WT (gms)	SAMPLE WT (gms)	WT %	CUMULATIVE SAMPLE WEIGHT (gms)	CUMULATIVE WT %
19.0 mm		coarse gravel	553.55	553.55	0.00	0	0	0
4.75 mm	4	fine gravel	478.07	478.07	0.00	0	0	0
2.00 mm	10	coarse sand	449.83	449.83	0.00	0	0	0
0.425 mm	40	medium sand	279.05	275.09	3.96	4.0	3.96	4.0
0.075 mm	200	fine sand	384.64	333.93	50.71	50.7	54.67	54.7
<0.075 mm	PAN	silts/ clays	409.41	364.25	45.16	45.2	99.83	99.8

PRE-ANALYTICAL WT OF SAMPLE: 100.0g

POST ANALYTICAL WT OF SAMPLE: 99.83g

SIEVE LOSS: 0.17g

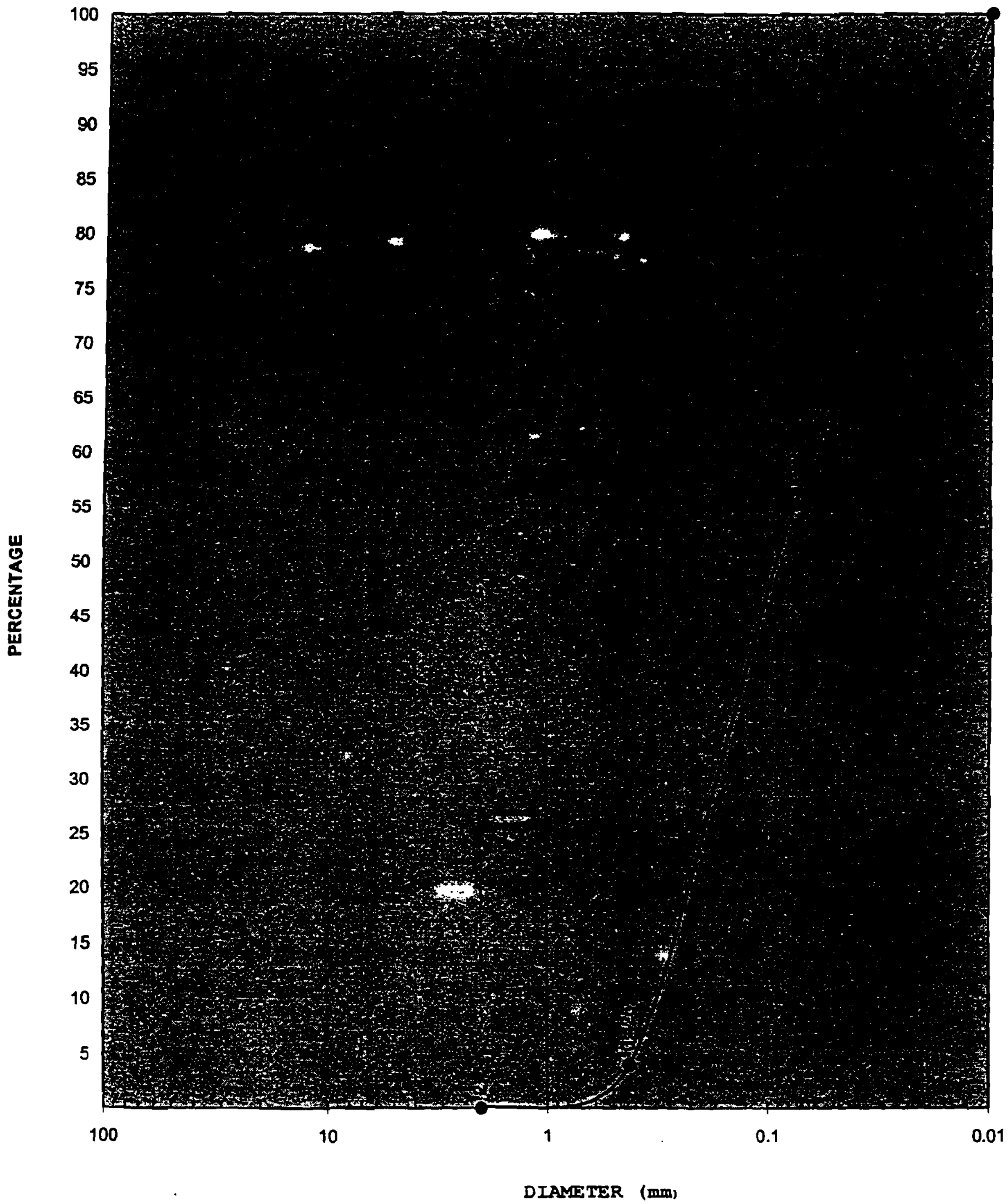
% SIEVE LOSS: 0.17%

GRAIN SIZE DISTRIBUTION

LAB #:9726966

CLIENT ID:S-1312-091697-DJG-003

SDG: CRA 197



2M LABS, INC.

SIEVE ANALYSIS

CRA 197

DATE: 9-30-97

SAMPLE #: 9726967
S-1312-091697-DJE-004

ANALYST: Beth Gustin

CONTAINER & SAMPLE WEIGHT: 198.46 g
TARE WEIGHT: 98.46 g
TOTAL DRY SAMPLE WEIGHT: 100.0 g

SIEVE OPENING	U.S. STD. SIEVE #	DESIGNATION	WT OF CONTAINER & SAMPLE (gms)	TARE WT (gms)	SAMPLE WT (gms)	WT %	CUMULATIVE SAMPLE WEIGHT (gms)	CUMULATIVE WT %
19.0 mm		coarse gravel	553.55	553.55	0.0	0	0	0
4.75 mm	4	fine gravel	487.84	478.01	9.83	9.8	9.83	9.8
2.00 mm	10	coarse sand	451.73	449.68	2.05	2.1	11.88	11.9
0.425 mm	40	medium sand	280.83	275.01	5.82	5.8	17.70	17.7
0.075 mm	200	fine sand	380.91	333.93	46.98	47.0	64.68	64.7
<0.075 mm	PAN	silts/ clays	399.80	364.25	35.55	35.6	100.23	100.2

PRE-ANALYTICAL WT OF SAMPLE: 100.0g

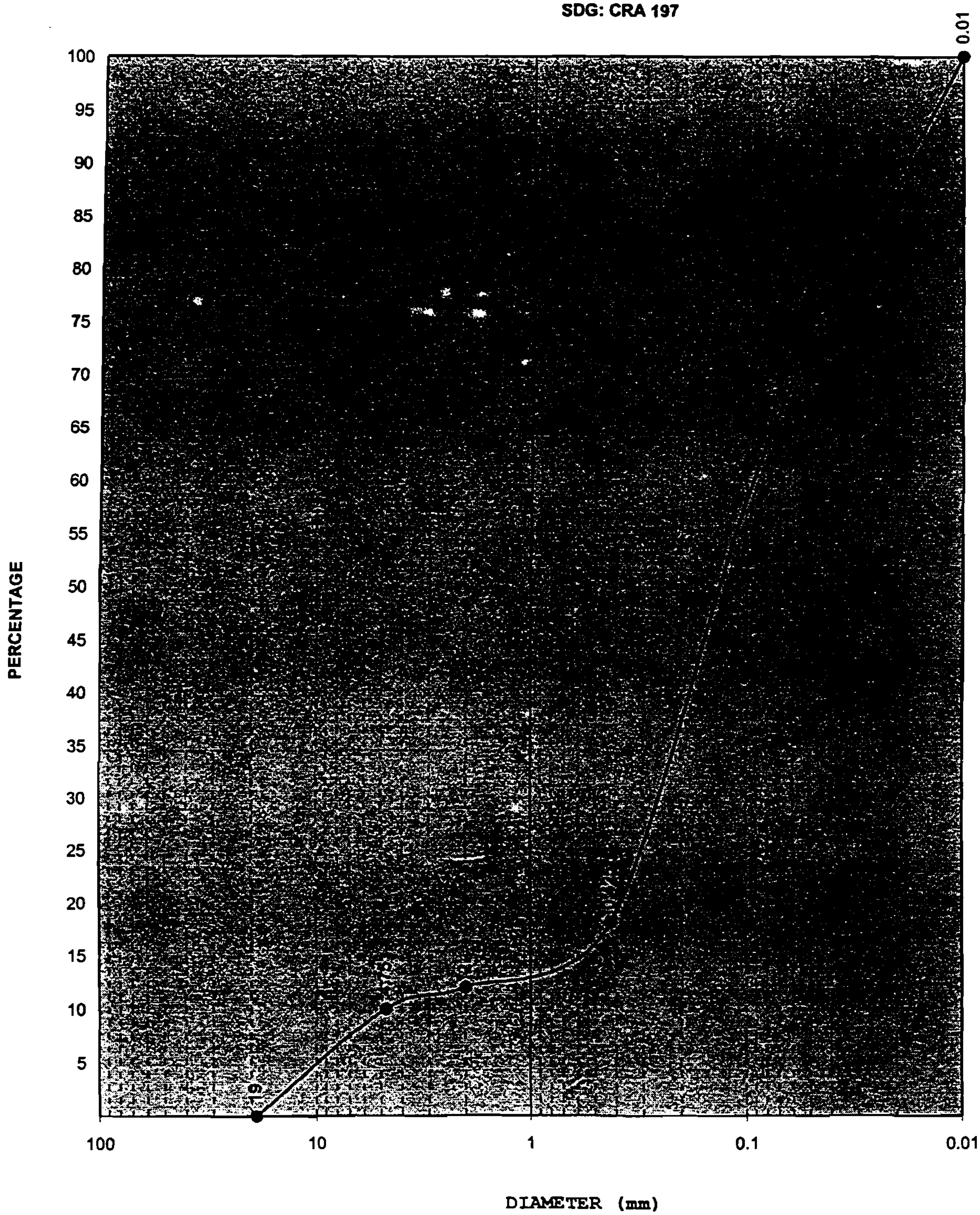
POST ANALYTICAL WT OF SAMPLE: 100.23g

SIEVE LOSS: -0.23g

% SIEVE LOSS: -0.23%

GRAIN SIZE DISTRIBUTION

LAB #:9726967
CLIENT ID:S-1312-091697-DJG-004
SDG: CRA 197



A 0031

2M LABS, INC.

SIEVE ANALYSIS

CRA 197

DATE: 9-20-97

SAMPLE #: 9726968
S-1312-091697-DJG-005

ANALYST: Beth Gustin

CONTAINER & SAMPLE WEIGHT: 198.50 g

TARE WEIGHT: 98.50 g

TOTAL DRY SAMPLE WEIGHT: 100.0g

SIEVE OPENING	U.S. STD. SIEVE #	DESIGNATION	WT OF CONTAINER & SAMPLE (gms)	TARE WT (gms)	SAMPLE WT (gms)	WT %	CUMULATIVE SAMPLE WEIGHT (gms)	CUMULATIVE WT %
19.0 mm		coarse gravel	553.55	553.55	0.0	0	0	0
4.75 mm	4	fine gravel	478.01	478.01	0.0	0	0	0
2.00 mm	10	coarse sand	449.73	449.73	0.0	0	0	0
0.425 mm	40	medium sand	275.96	275.10	0.86	0.9	0.86	0.9
0.075 mm	200	fine sand	369.33	333.93	35.40	35.4	36.26	36.3
<0.075 mm	PAN	silts/ clays	427.75	364.28	63.47	63.5	99.73	99.7

PRE-ANALYTICAL WT OF SAMPLE: 100.0g

POST ANALYTICAL WT OF SAMPLE: 99.73g

SIEVE LOSS: 0.27g

% SIEVE LOSS: 0.27%

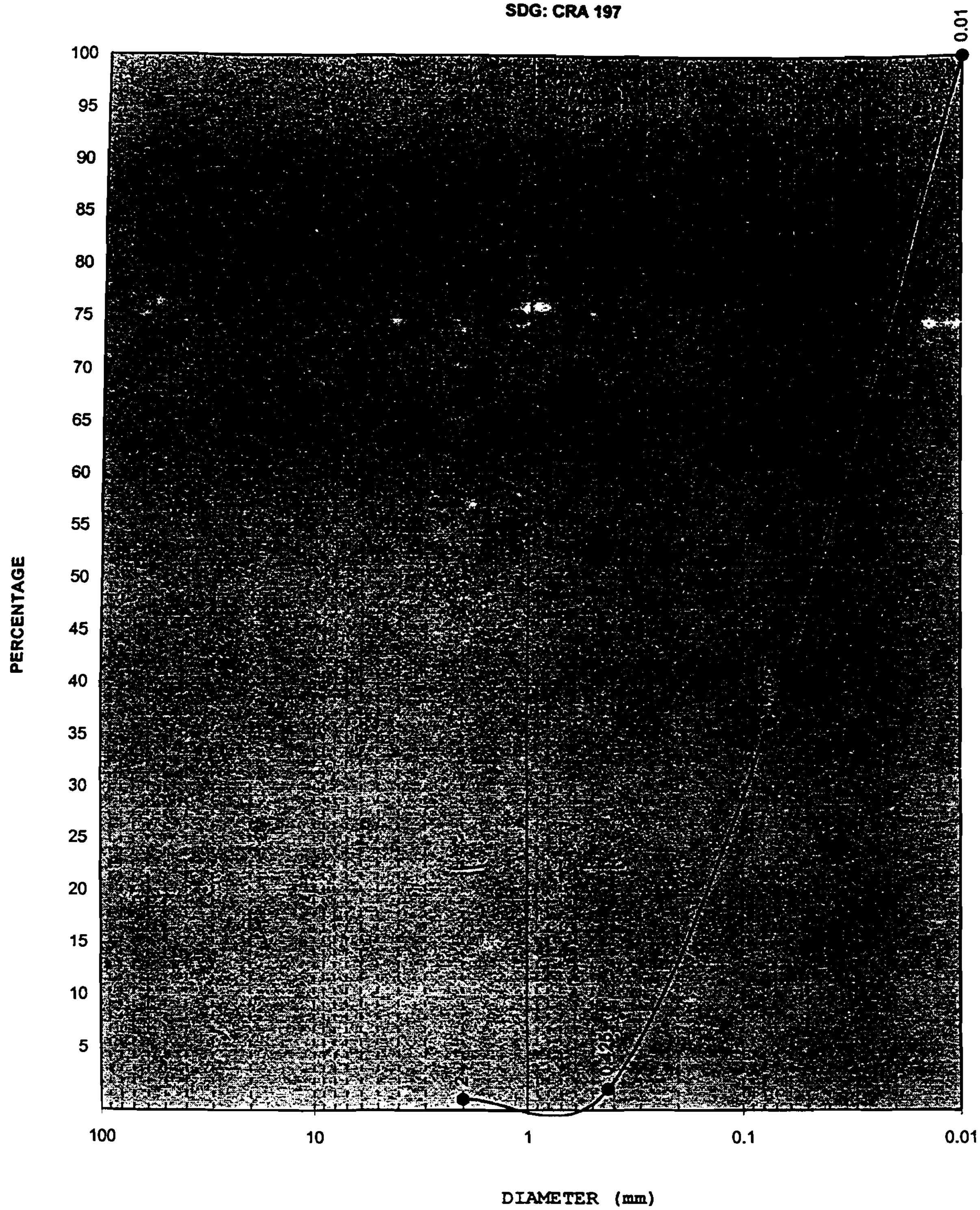
A 0032

GRAIN SIZE DISTRIBUTION

LAB #:9726968

CLIENT ID:S-1312-091697-DJG-005

SDG: CRA 197



A 0033

H2M LABS, INC.

SIEVE ANALYSIS

CRA 197

DATE: 9-30-97

SAMPLE #: 9726969
S-1312-091797-DJG-007

ANALYST: Beth Custer

CONTAINER & SAMPLE WEIGHT: 198.49 g

TARE WEIGHT: 98.49 g

TOTAL DRY SAMPLE WEIGHT: 100.0 g

SIEVE OPENING	U.S. STD. SIEVE #	DESIGNATION	WT OF CONTAINER & SAMPLE (gms)	TARE WT (gms)	SAMPLE WT (gms)	WT %	CUMULATIVE SAMPLE WEIGHT (gms)	CUMULATIVE WT %
19.0 mm		coarse gravel	553.55	553.55	0.0	0	0	0
4.75 mm	4	fine gravel	BC 9/20/97 490.72 ~~477.98~~	477.98	12.74	12.7	BC 9-22-97 ~~0~~ 12.74	12.7
2.00 mm	10	coarse sand	450.75	449.65	1.10	1.1	13.84	13.8
0.425 mm	40	medium sand	289.76	274.96	14.80	14.8	28.64	28.6
0.075 mm	200	fine sand	374.31	334.01	40.30	40.3	68.94	69.0
<0.075 mm	PAN	silts/ clays	395.41	364.28	31.13	31.1	100.07	100.1

PRE-ANALYTICAL WT OF SAMPLE: 100.0g

POST ANALYTICAL WT OF SAMPLE: 100.07g

SIEVE LOSS: -0.07g

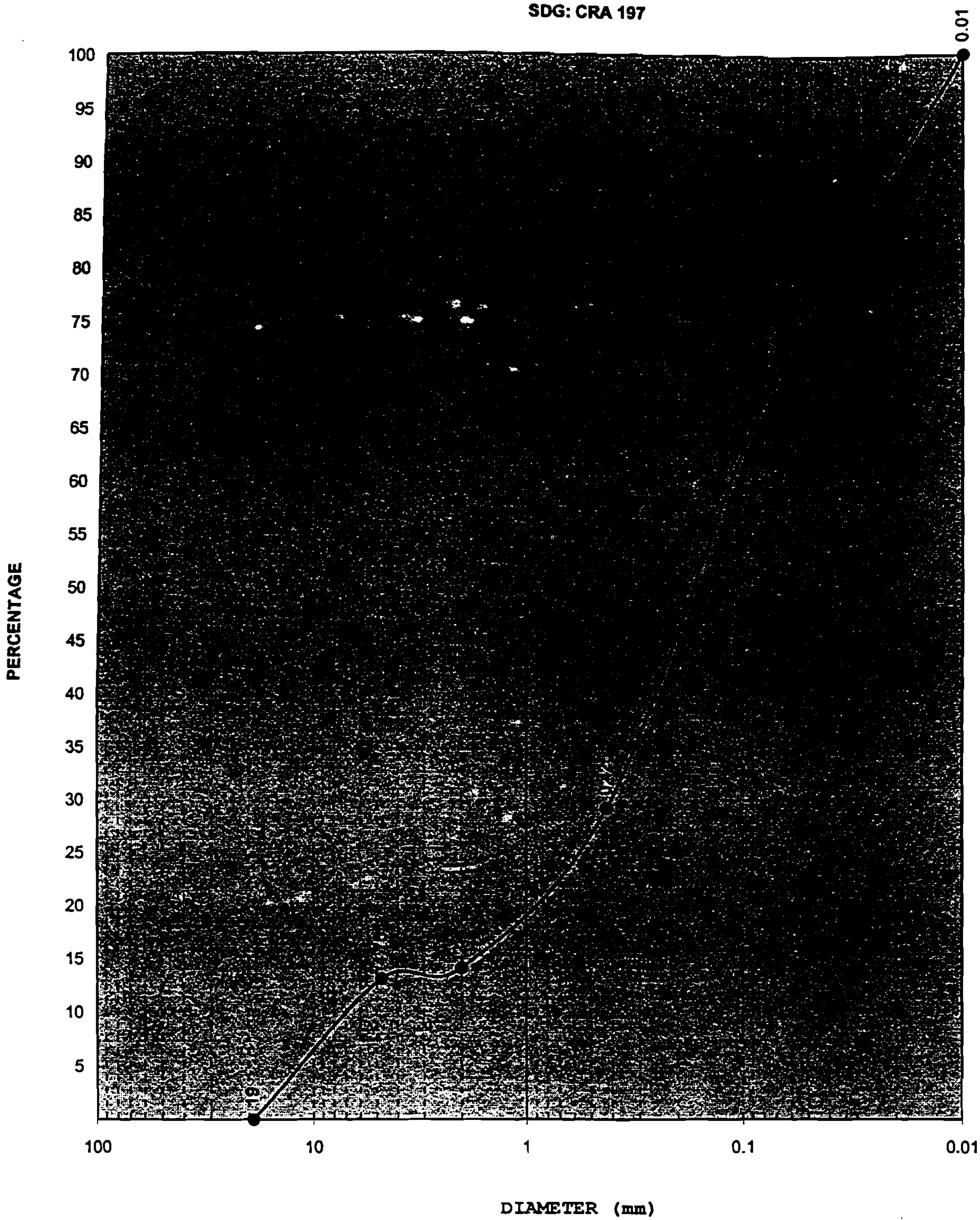
% SIEVE LOSS: -0.07 %

A 0034

P 0009

GRAIN SIZE DISTRIBUTION

LAB #:9726969
CLIENT ID:S-1312-091797-DJG-007
SDG: CRA 197



A 003

ZM LABS, INC.

SIEVE ANALYSIS

CRA 197

DATE: 9-20-97

SAMPLE #: 9726970
S-1312-091797-DJG-008

ANALYST: Beth Custer

CONTAINER & SAMPLE WEIGHT: 198.47 g

TARE WEIGHT: 98.47 g

TOTAL DRY SAMPLE WEIGHT: 100.0g

SIEVE OPENING	U.S. STD. SIEVE #	DESIGNATION	WT OF CONTAINER & SAMPLE (gms)	TARE WT (gms)	SAMPLE WT (gms)	WT %	CUMULATIVE SAMPLE WEIGHT (gms)	CUMULATIVE WT %
19.0 mm		coarse gravel	553.55	553.55	0.0	0	0	0
4.75 mm	4	fine gravel	482.98	478.04	4.94	4.9	4.94	4.9
2.00 mm	10	coarse sand	452.37	449.74	2.63	2.6	7.57	7.6
0.425 mm	40	medium sand	289.43	275.05	14.38	14.4	21.95	22.0
0.075 mm	200	fine sand	375.30	334.00	41.30	41.3	63.25	63.3
<0.075 mm	PAN	silts/ clays	400.87	364.30	36.57	36.6	99.82	99.8

PRE-ANALYTICAL WT OF SAMPLE: 100.0g

POST ANALYTICAL WT OF SAMPLE: 99.82g

SIEVE LOSS: 0.18g

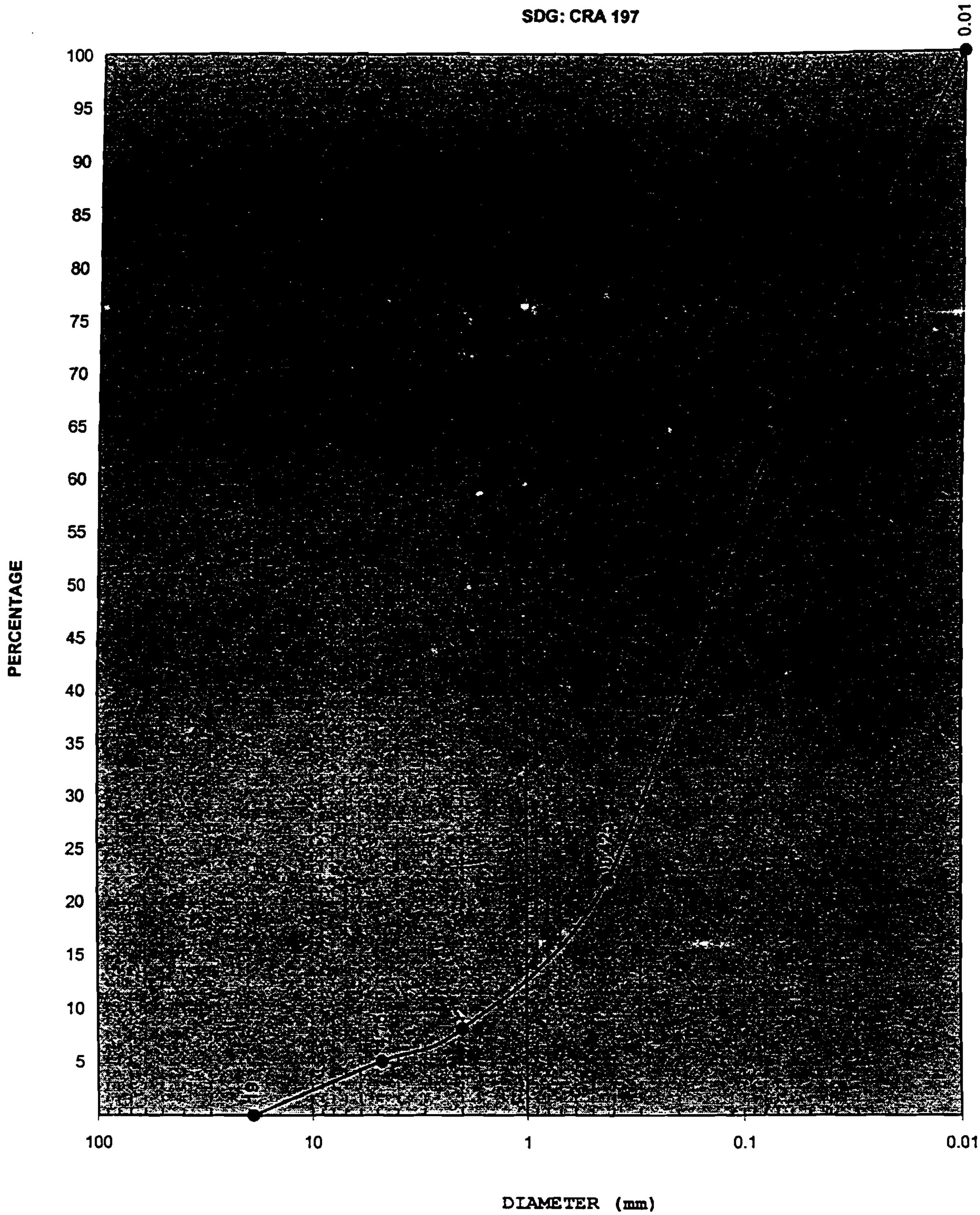
% SIEVE LOSS: 0.18%

A 0036

P 0010

GRAIN SIZE DISTRIBUTION

LAB #:9726970
CLIENT ID:S-1312-091797-DJG-008
SDG: CRA 197



H2M LABS, INC.

SIEVE ANALYSIS

CRA 197

DATE: 9-20-97

ANALYST: BethGustin

SAMPLE #: 9726971
S-1312-091797-DSG-009

CONTAINER & SAMPLE WEIGHT: 198.47

TARE WEIGHT: 98.47

TOTAL DRY SAMPLE WEIGHT: ______

SIEVE OPENING	U.S. STD. SIEVE #	DESIGNATION	WT OF CONTAINER & SAMPLE (gms)	TARE WT (gms)	SAMPLE WT (gms)	WT %	CUMULATIVE SAMPLE WEIGHT (gms)	CUMULATIVE WT %
19.0 mm		coarse gravel	553.55	553.55	0.0	0	0	0
4.75 mm	4	fine gravel	478.04	478.04	0.0	0	0	0
2.00 mm	10	coarse sand	449.71	449.71 ~~477.04~~ BG 9-20-97	0.0	0	0	0
0.425 mm	40	medium sand	275.08	275.08	0.0	0	0	0
0.075 mm	200	fine sand	386.71	334.00	52.71	52.7	52.71	52.7
<0.075 mm	PAN	silts/ clays	411.40	364.32	47.08	47.1	99.79	99.8

PRE-ANALYTICAL WT OF SAMPLE: 100.0g

POST ANALYTICAL WT OF SAMPLE: 99.79g

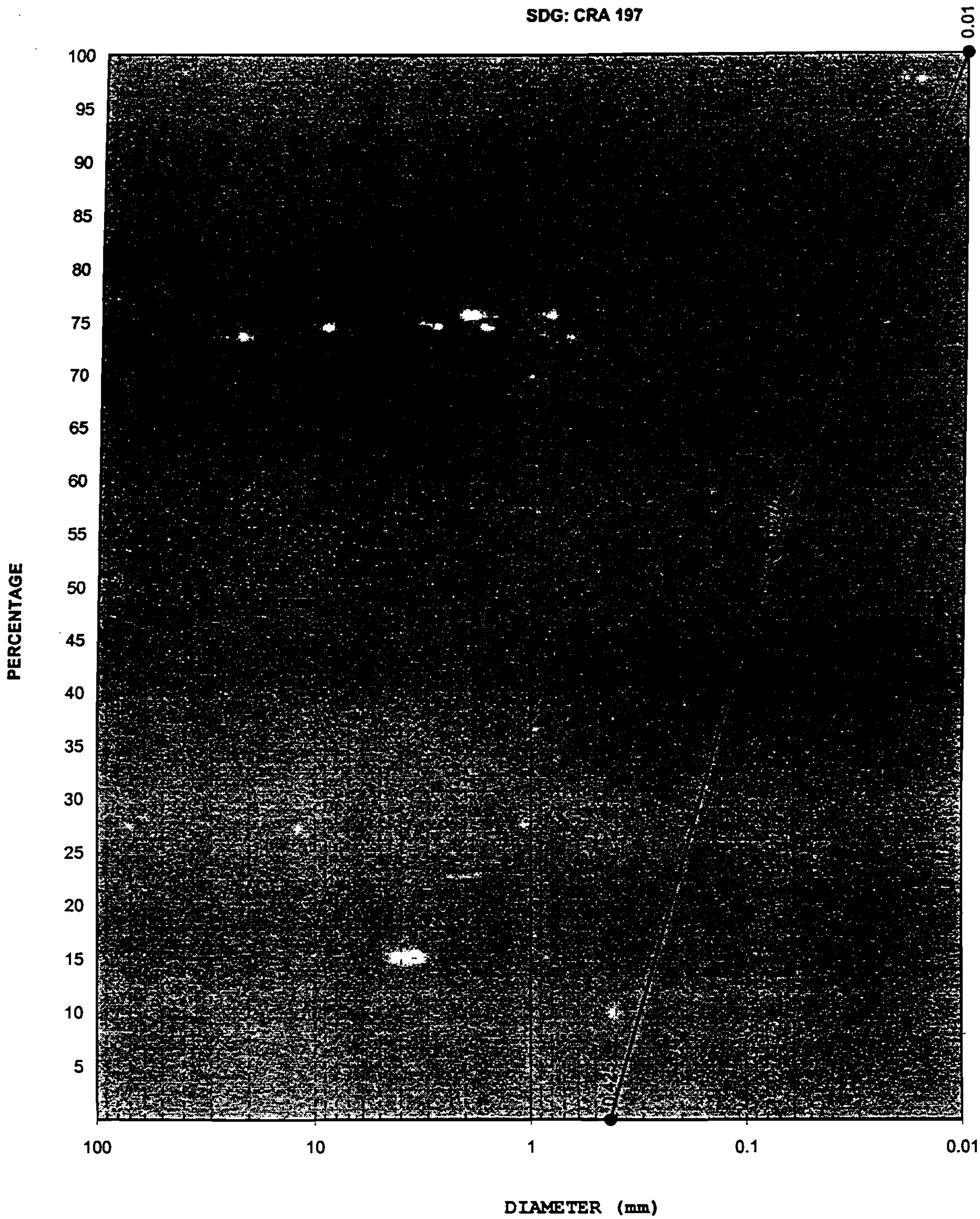
SIEVE LOSS: 0.21g

% SIEVE LOSS: 0.21%

A 0038

GRAIN SIZE DISTRIBUTION

LAB #:9726971
CLIENT ID: S-1312-091797-DJG-009
SDG: CRA 197



2M LABS, INC.

SIEVE ANALYSIS

CRA 197

DATE: 9-20-97

SAMPLE #: 9726972
S-1312-091797-DJG -011

ANALYST: Beth Custer

CONTAINER & SAMPLE WEIGHT: 198.45g

TARE WEIGHT: 98.45g

TOTAL DRY SAMPLE WEIGHT: 100.0g

SIEVE OPENING	U.S. STD. SIEVE #	DESIGNATION	WT OF CONTAINER & SAMPLE (gms)	TARE WT (gms)	SAMPLE WT (gms)	WT %	CUMULATIVE SAMPLE WEIGHT (gms)	CUMULATIVE WT %
19.0 mm		coarse gravel	568.81	553.55	15.26	15.3	15.26	15.3
4.75 mm	4	fine gravel	515.02	478.05	36.97	37.0	BC 9-22-97 ~~3~~52.23	52.2
2.00 mm	10	coarse sand	457.76	449.68 ~~275.03~~	8.08	8.1	60.31	60.3
0.425 mm	40	medium sand	290.06	275.05 ~~333.95~~	15.01	15.0	75.32	75.3
0.075 mm	200	fine sand	351.46	333.95 ~~478.03~~	17.51	17.5	92.83	92.8
<0.075 mm	PAN	silts/ clays	371.67	364.26	7.41	7.4	100.24	100.2

PRE-ANALYTICAL WT OF SAMPLE: 100.0g

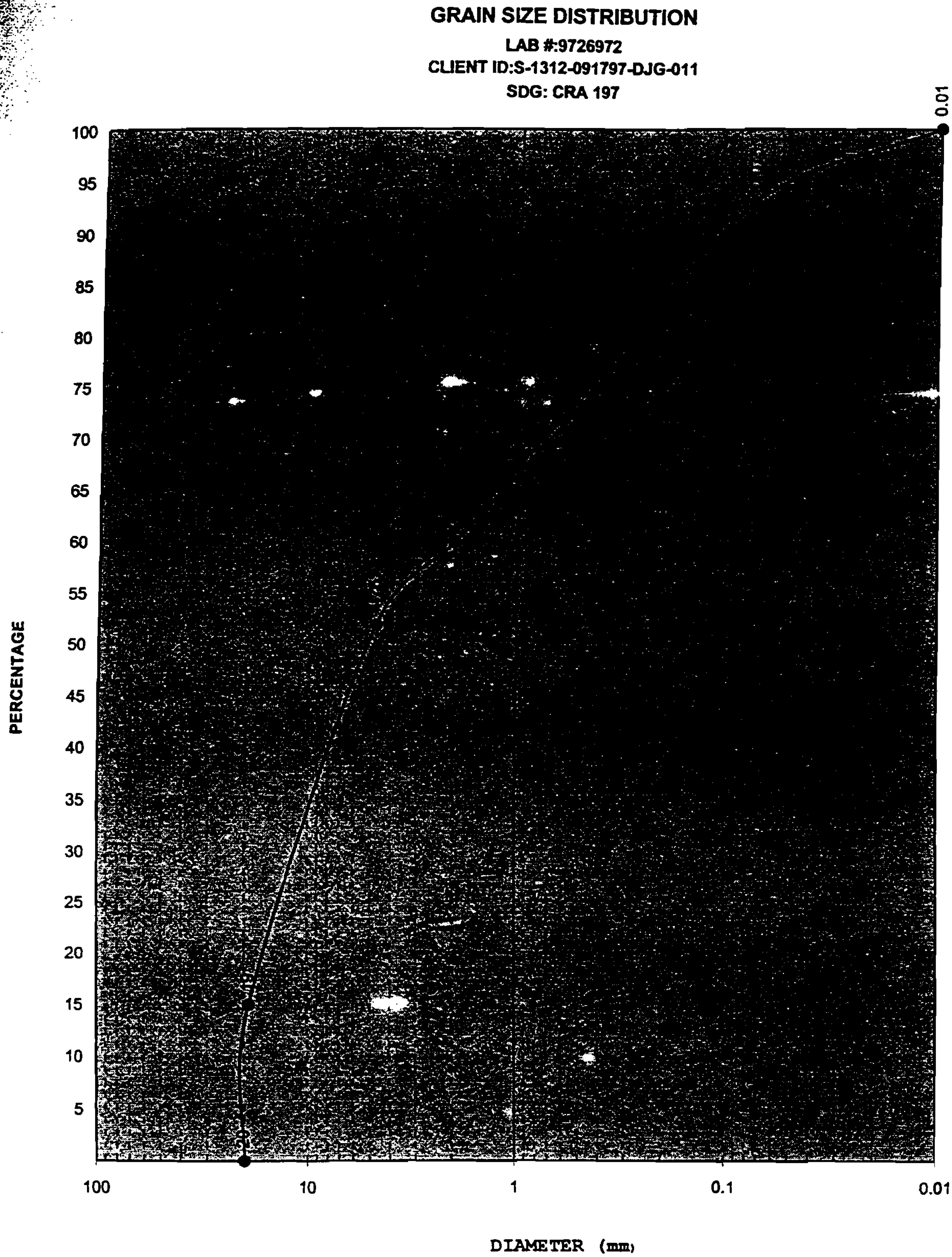
POST ANALYTICAL WT OF SAMPLE: 100.24g

SIEVE LOSS: -0.24g

% SIEVE LOSS: -0.24%

A 0040

P 0012



GRAIN SIZE DISTRIBUTION
LAB #:9726972
CLIENT ID:S-1312-091797-DJG-011
SDG: CRA 197
PERCENTAGE
DIAMETER (mm)
100
10
1
0.1
0.01

A 0041

M LABS, INC.

SIEVE ANALYSIS

CRA 197

DATE: 9-22-97

SAMPLE #: 97216973
S-1312-091797-DJG-012

ANALYST: BGusti

CONTAINER & SAMPLE WEIGHT: 198.52 g

TARE WEIGHT: 98.52 g

TOTAL DRY SAMPLE WEIGHT: 100.0g

SIEVE OPENING	U.S. STD. SIEVE #	DESIGNATION	WT OF CONTAINER & SAMPLE (gms)	TARE WT (gms)	SAMPLE WT (gms)	WT %	CUMULATIVE SAMPLE WEIGHT (gms)	CUMULATIVE WT %
19.0 mm		coarse gravel	553.72	553.72	0.0	0	0	0
4.75 mm	4	fine gravel	478.22	478.22	0.0	0	0	0
2.00 mm	10	coarse sand	449.83	449.83	0.0	0	0	0
0.425 mm	40	medium sand	275.09	275.09	0.0	0	0	0
0.075 mm	200	fine sand	340.28	334.07	6.21	6.2	6.21	6.2
<0.075 mm	PAN	silts/ clays	457.48	364.42	93.06	93.1	99.27	99.3

PRE-ANALYTICAL WT OF SAMPLE: 100.0g

POST ANALYTICAL WT OF SAMPLE: 99.27g

BG 9-22-97

SIEVE LOSS: 0.~~8~~73g

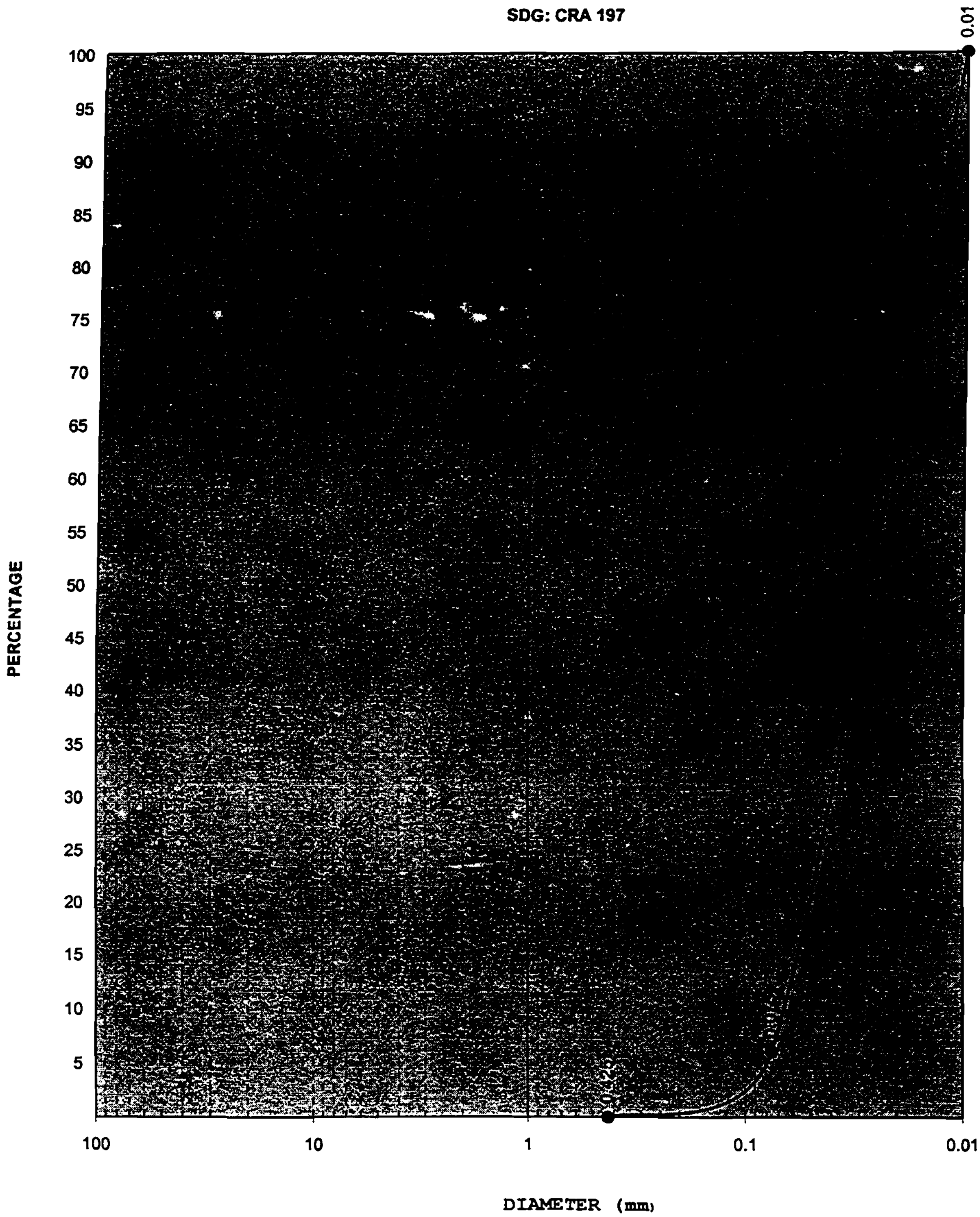
% SIEVE LOSS: 0.73%

A 0042

P 0013

GRAIN SIZE DISTRIBUTION

LAB #:9726973
CLIENT ID:S-1312-091797-DJG-012
SDG: CRA 197



ZM LABS, INC.

SIEVE ANALYSIS

CRA 197

DATE: 9-22-97

ANALYST: Beth Gustin

SAMPLE #: 9726974

S-1312-091797-DJG-013

CONTAINER & SAMPLE WEIGHT: 198.54 g

TARE WEIGHT: 98.54 g

TOTAL DRY SAMPLE WEIGHT: 100.0g

SIEVE OPENING	U.S. STD. SIEVE #	DESIGNATION	WT OF CONTAINER & SAMPLE (gms)	TARE WT (gms)	SAMPLE WT (gms)	WT %	CUMULATIVE SAMPLE WEIGHT (gms)	CUMULATIVE WT %
19.0 mm		coarse gravel	553.72	553.72	0.0	0	0	0
4.75 mm	4	fine gravel	478.22	478.22	0.0	0	0	0
2.00 mm	10	coarse sand	449.83	449.83	0.0	0	0	0
0.425 mm	40	medium sand	275.30	275.04	0.26g	0.3	0.26	0.3
0.075 mm	200	fine sand	360.57	334.05	26.52	26.5	26.78	26.8
<0.075 mm	PAN	silts/ clays	437.09	364.41	72.68	72.7	99.46	99.5

PRE-ANALYTICAL WT OF SAMPLE: 100.0g

POST ANALYTICAL WT OF SAMPLE: 99.46g

SIEVE LOSS: 0.54g

% SIEVE LOSS: 0.54 %

A 0044

H2M LABS, INC.
575 Broad Hollow Road, Melville, N.Y. 11747
(516)694-3040 FAX:(516)420-8436 NYSDOH ID: 10478

LAB NO: 9726964

CONESTOGA-ROVERS & ASSOCIATES
2055 NIAGARA FALLS BLVD.-STE 3
NIAGARA FALLS, NY 14304

TYPE...... SOIL
ROUTINE
METHOD.... GRAB

BH32 2-+
001 ✓

DATE COLLECTED. 09/16/97
DATE RECEIVED.. 09/18/97
COLLECTED BY... CL99
PROJECT NO..... 1312-30

POINT NO:
LOCATION: S-1312-091697-DJG-001

REMARKS: 1312-30 CONGRESS STREET

PARAMETER (S)	RESULTS	UNITS
COARSE GRAVEL (19.0 MM)	0	%
FINE GRAVEL (4.75 MM)	20.2	%
COARSE SAND (2.00 MM)	15.0	%
MEDIUM SAND (0.425 MM)	32.5	%
FINE SAND (0.075 MM)	23.3	%
SILTS/CLAYS (<0.075 MM)	8.8	%
TOTAL SOLIDS	79.9	%

COPIES TO:

DATE ISSUED 09/23/97

J M Slavin
LABORATORY DIRECTOR

ORIGINAL

A 0010

H2M LABS, INC.
575 Broad Hollow Road, Melville, N.Y. 11747
(516)694-3040 FAX:(516)420-8436 NYSDOH ID# 10478

LAB NO: 9726965

CONESTOGA-ROVERS & ASSOCIATES
2055 NIAGARA FALLS BLVD.-STE 3
NIAGARA FALLS, NY 14304

TYPE...... SOIL
ROUTINE
METHOD.... GRAB

BH32
4-6ft

DATE COLLECTED. 09/16/97
DATE RECEIVED.. 09/18/97
COLLECTED BY... CL99
PROJECT NO..... 1312-30

POINT NO:
LOCATION: S-1312-091697-DJG-002
REMARKS: 1312-30 CONGRESS STREET

PARAMETER (S)	RESULTS	UNITS
COARSE GRAVEL (19.0 MM)	0.0	%
FINE GRAVEL (4.75 MM)	15.5	%
COARSE SAND (2.00 MM)	6.4	%
MEDIUM SAND (0.425 MM)	15.4	%
FINE SAND (0.075 MM)	40.8	%
SILTS/CLAYS (<0.075 MM)	21.8	%
TOTAL SOLIDS	80.8	%

COPIES TO:

DATE ISSUED 09/23/97

J M [signature]
LABORATORY DIRECTOR

ORIGINAL

A 0011

H2M LABS, INC.
575 Broad Hollow Road, Melville, N.Y. 11747
(516)694-3040 FAX:(516)420-8436 NYSDOH ID# 10478

LAB NO: 9726966

CONESTOGA-ROVERS & ASSOCIATES
2055 NIAGARA FALLS BLVD.-STE 3
NIAGARA FALLS, NY 14304

TYPE...... SOIL
ROUTINE
METHOD.... GRAB

BH32
10 to 12

DATE COLLECTED. 09/16/97
DATE RECEIVED.. 09/18/97
COLLECTED BY... CL99
PROJECT NO..... 1312-30

POINT NO:
LOCATION: S-1312-091697-DJG-003

REMARKS: 1312-30 CONGRESS STREET

PARAMETER (S)	RESULTS	UNITS
COARSE GRAVEL (19.0 MM)	0	%
FINE GRAVEL (4.75 MM)	0	%
COARSE SAND (2.00 MM)	0	%
MEDIUM SAND (0.425 MM)	4.0	%
FINE SAND (0.075 MM)	50.7	%
SILTS/CLAYS (<0.075 MM)	45.2	%
TOTAL SOLIDS	77.0	%

COPIES TO:

DATE ISSUED 09/23/97

J M Slavin
LABORATORY DIRECTOR

ORIGINAL

A 0012

H2M LABS, INC.
575 Broad Hollow Road, Melville, N.Y. 11747
(516)694-3040 FAX:(516)420-8436 NYSDOH ID# 10478

LAB NO: 9726967

CONESTOGA-ROVERS & ASSOCIATES
2055 NIAGARA FALLS BLVD.-STE 3
NIAGARA FALLS, NY 14304

TYPE...... SOIL
ROUTINE
METHOD.... GRAB

BH32
14-14.5ft

DATE COLLECTED. 09/16/97
DATE RECEIVED.. 09/18/97
COLLECTED BY... CL99
PROJECT NO..... 1312-30

POINT NO:
LOCATION: S-1312-091697-DJG-004
REMARKS: 1312-30 CONGRESS STREET

PARAMETER (S)	RESULTS	UNITS
COARSE GRAVEL (19.0 MM)	0	%
FINE GRAVEL (4.75 MM)	9.8	%
COARSE SAND (2.00 MM)	2.1	%
MEDIUM SAND (0.425 MM)	5.8	%
FINE SAND (0.075 MM)	47.0	%
SILTS/CLAYS (<0.075 MM)	35.6	%
TOTAL SOLIDS	81.0	%

COPIES TO:

DATE ISSUED 09/23/97

J M [signature]
LABORATORY DIRECTOR

ORIGINAL

A 0013

H2M LABS, INC.
575 Broad Hollow Road, Melville, N.Y. 11747
(516)694-3040 FAX:(516)420-8436 NYSDOH ID# 10478

LAB NO: 9726968

CONESTOGA-ROVERS & ASSOCIATES
2055 NIAGARA FALLS BLVD.-STE 3
NIAGARA FALLS, NY 14304

TYPE...... SOIL
ROUTINE
METHOD.... GRAB

BH32
14.5-16 ft

DATE COLLECTED. 09/16/97
DATE RECEIVED.. 09/18/97
COLLECTED BY... CL99
PROJECT NO..... 1312-30

POINT NO:
LOCATION: S-1312-091697-DJG-005
REMARKS: 1312-30 CONGRESS STREET

PARAMETER (S)	RESULTS	UNITS
COARSE GRAVEL (19.0 MM)	0	%
FINE GRAVEL (4.75 MM)	0	%
COARSE SAND (2.00 MM)	0	%
MEDIUM SAND (0.425 MM)	0.9	%
FINE SAND (0.075 MM)	35.4	%
SILTS/CLAYS (<0.075 MM)	63.5	%
TOTAL SOLIDS	77.2	%

COPIES TO:

DATE ISSUED 09/23/97

J M Alaimo
LABORATORY DIRECTOR

ORIGINAL

H2M LABS, INC.
575 Broad Hollow Road, Melville, N.Y. 11747
(516)694-3040 FAX:(516)420-8436 NYSDOH ID# 10478

LAB NO: 9726969

CONESTOGA-ROVERS & ASSOCIATES
2055 NIAGARA FALLS BLVD.-STE 3
NIAGARA FALLS, NY 14304

TYPE...... SOIL
ROUTINE
METHOD.... GRAB

BH33

2.5 - 3.0

DATE COLLECTED. 09/17/97
DATE RECEIVED.. 09/18/97
COLLECTED BY... CL99
PROJECT NO..... 1312-30

POINT NO:
LOCATION: S-1312-091797-DJG-007

REMARKS: 1312-30 CONGRESS STREET

PARAMETER (S)	RESULTS	UNITS
COARSE GRAVEL (19.0 MM)	0	%
FINE GRAVEL (4.75 MM)	12.7	%
COARSE SAND (2.00 MM)	1.1	%
MEDIUM SAND (0.425 MM)	14.8	%
FINE SAND (0.075 MM)	40.3	%
SILTS/CLAYS (<0.075 MM)	31.1	%
TOTAL SOLIDS	84.3	%

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DATE ISSUED 09/23/97

J M Alavi
LABORATORY DIRECTOR

ORIGINAL

A 0015

H2M LABS, INC. 575 Broad Hollow Road, Melville, N.Y. 11747
(516)694-3040 FAX:(516)420-8436 NYSDOH ID# 10478

LAB NO: 9726970

CONESTOGA-ROVERS & ASSOCIATES
2055 NIAGARA FALLS BLVD.-STE 3
NIAGARA FALLS, NY 14304

TYPE...... SOIL
ROUTINE
METHOD.... GRAB

BH 33
6 - 6.5

DATE COLLECTED. 09/17/97
DATE RECEIVED.. 09/18/97
COLLECTED BY... CL99
PROJECT NO..... 1312-30

POINT NO:
LOCATION: S-1312-091797-DJG-008

REMARKS: 1312-30 CONGRESS STREET

PARAMETER (S)	RESULTS	UNITS
COARSE GRAVEL (19.0 MM)	0	%
FINE GRAVEL (4.75 MM)	4.9	%
COARSE SAND (2.00 MM)	2.6	%
MEDIUM SAND (0.425 MM)	14.4	%
FINE SAND (0.075 MM)	41.3	%
SILTS/CLAYS (<0.075 MM)	36.6	%
TOTAL SOLIDS	81.1	%

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LABORATORY DIRECTOR

ORIGINAL

A 0016

H2M LABS, INC.
575 Broad Hollow Road, Melville, N.Y. 11747
(516)694-3040 FAX:(516)420-8436 NYSDOH ID# 10478

LAB NO: 9726971

CONESTOGA-ROVERS & ASSOCIATES
2055 NIAGARA FALLS BLVD.-STE 3
NIAGARA FALLS, NY 14304

TYPE...... SOIL
ROUTINE
METHOD.... GRAB

DATE COLLECTED. 09/17/97
DATE RECEIVED.. 09/18/97
COLLECTED BY... CL99
PROJECT NO..... 1312-30

POINT NO:
LOCATION: S-1312-091797-DJG-009
REMARKS: 1312-30 CONGRESS STREET

BH 33
14-16

PARAMETER (S)	RESULTS	UNITS
COARSE GRAVEL (19.0 MM)	0	%
FINE GRAVEL (4.75 MM)	0	%
COARSE SAND (2.00 MM)	0	%
MEDIUM SAND (0.425 MM)	0	%
FINE SAND (0.075 MM)	52.7	%
SILTS/CLAYS (<0.075 MM)	47.1	%
TOTAL SOLIDS	76.1	%

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J M Slavin
LABORATORY DIRECTOR

ORIGINAL

A 0017

H2M LABS, INC.
575 Broad Hollow Road, Melville, N.Y. 11747
(516)694-3040 FAX:(516)420-8436 NYSDOH ID# 10478

LAB NO: 9726972

CONESTOGA-ROVERS & ASSOCIATES
2055 NIAGARA FALLS BLVD.-STE 3
NIAGARA FALLS, NY 14304

TYPE...... SOIL
ROUTINE
METHOD.... GRAB

BH34
0-2

DATE COLLECTED. 09/17/97
DATE RECEIVED.. 09/18/97
COLLECTED BY... CL99
PROJECT NO..... 1312-30

POINT NO:
LOCATION: S-1312-091797-DJG-011

REMARKS: 1312-30 CONGRESS STREET

PARAMETER (S)	RESULTS	UNITS
COARSE GRAVEL (19.0 MM)	15.3	%
FINE GRAVEL (4.75 MM)	37.0	%
COARSE SAND (2.00 MM)	8.1	%
MEDIUM SAND (0.425 MM)	15.0	%
FINE SAND (0.075 MM)	17.5	%
SILTS/CLAYS (<0.075 MM)	7.4	%
TOTAL SOLIDS	67.1	%

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J M Alavin
LABORATORY DIRECTOR

ORIGINAL

A 0018

H2M LABS, INC.
575 Broad Hollow Road, Melville, N.Y. 11747
(516)694-3040 FAX:(516)420-8436 NYSDOH ID# 10478

LAB NO: 9726973

CONESTOGA-ROVERS & ASSOCIATES
2055 NIAGARA FALLS BLVD.-STE 3
NIAGARA FALLS, NY 14304

TYPE...... SOIL
ROUTINE
METHOD.... GRAB

BH34
4-6

DATE COLLECTED. 09/17/97
DATE RECEIVED.. 09/18/97
COLLECTED BY... CL99
PROJECT NO..... 1312-30

POINT NO:
LOCATION: S-1312-091797-DJG-012
REMARKS: 1312-30 CONGRESS STREET

PARAMETER (S)	RESULTS	UNITS
COARSE GRAVEL (19.0 MM)	0	%
FINE GRAVEL (4.75 MM)	0	%
COARSE SAND (2.00 MM)	0	%
MEDIUM SAND (0.425 MM)	0	%
FINE SAND (0.075 MM)	6.2	%
SILTS/CLAYS (<0.075 MM)	93.1	%
TOTAL SOLIDS	81.1	%

COPIES TO:

DATE ISSUED 09/23/97

J M Adams
LABORATORY DIRECTOR

ORIGINAL

A 0019

H2M LABS, INC.
575 Broad Hollow Road, Melville, N.Y. 11747
(516)694-3040 FAX:(516)420-8436 NYSDOH ID# 10478

LAB NO: 9726974

CONESTOGA-ROVERS & ASSOCIATES
2055 NIAGARA FALLS BLVD.-STE 3
NIAGARA FALLS, NY 14304

TYPE...... SOIL
ROUTINE
METHOD.... GRAB

BH 34

DATE COLLECTED. 09/17/97
DATE RECEIVED.. 09/18/97
COLLECTED BY... CL99
PROJECT NO..... 1312-30

POINT NO:
LOCATION: S-1312-091797-DJG-013 10-12

REMARKS: 1312-30 CONGRESS STREET

PARAMETER (S)	RESULTS	UNITS
COARSE GRAVEL (19.0 MM)	0	%
FINE GRAVEL (4.75 MM)	0	%
COARSE SAND (2.00 MM)	0	%
MEDIUM SAND (0.425 MM)	0.3	%
FINE SAND (0.075 MM)	26.5	%
SILTS/CLAYS (<0.075 MM)	72.7	%
TOTAL SOLIDS	79.4	%

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J M Slavin
LABORATORY DIRECTOR

ORIGINAL

A 0020

APPENDIX D

PIEZOMETER INSTALLATION LOGS

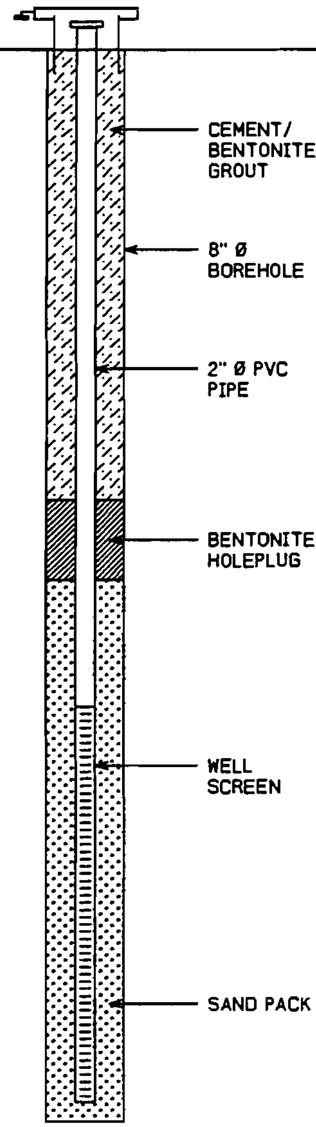
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: SII CONGRESS STREET
PROJECT NUMBER: 1312-30
CLIENT: SCHENECTADY INTERNATIONAL
LOCATION: 38.5' WEST OF OW-7A, 1.0' NORTH OF OW-7A 47.75' EAST OF WEST WALL

HOLE DESIGNATION: P1
DATE COMPLETED: JANUARY 26, 1998
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: J. RABY

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL
	REFERENCE POINT (Top of Riser)	291.90
	GROUND SURFACE	289.3
	GP-GRAVEL (FILL), trace sand and silt, dense, black and tan, dry	
-2.5	- compact	
	SP-SAND, trace gravel, loose, coarse to medium grained, black and tan, moist	285.3
-5.0		
-7.5	- fine to medium grained, yellowish orange, wet	
-10.0	SW-SAND, fine to medium grained, loose, yellowish orange, moist	280.3
-12.5		
-15.0	- very loose	
-17.5	- wet	
-20.0		
	CL-SILTY CLAY, very soft, high plasticity, light gray, wet	267.8
-22.5	SW-SAND, fine to medium grained, very loose, yellowish orange, wet	267.6
-25.0		
-27.5	END OF HOLE @ 27.0ft BGS	262.3
-30.0		
-32.5		

MONITOR INSTALLATION



SCREEN DETAILS
Screened Interval:
16.5 to 26.5ft BGS
Length: 10.0ft
Diameter: 2"
Slot Size: #7
Material: PVC
Sand Pack:
13.3 to 27.0ft BGS
Material: #00 Silica Sand

SAMPLE

NUMBER	STATE	'N' VALUE	PID (ppm)
1SS	X	33	0.7
2SS	X	13	0
3SS	X	6	0
4SS	X	7	0
5SS	X	7	16.1
6SS	X	7	0
7SS	X	8	0
8SS	X	4	0
9SS	X	5	0
10SS	X	2	0
11SS	X	WH	0
12SS	X	1	0
13SS	X	WH	0
14SS	X	WH	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ∇ STATIC WATER LEVEL ▼

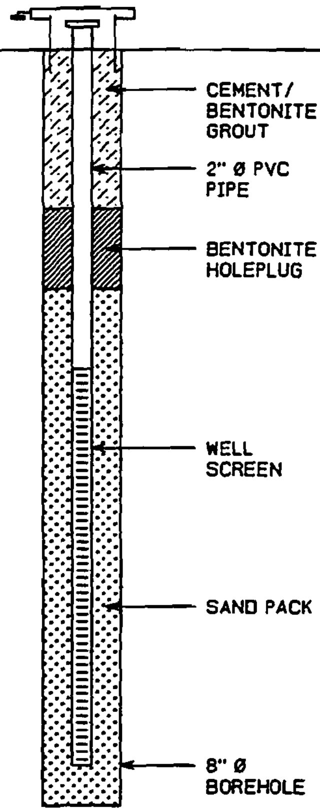
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: SII CONGRESS STREET
PROJECT NUMBER: 1312-30
CLIENT: SCHENECTADY INTERNATIONAL
LOCATION: 60' EAST OF OW-7A, 1.0' SOUTH OF FENCELINE
47.75' EAST OF WEST WALL

HOLE DESIGNATION: P2
DATE COMPLETED: JANUARY 27, 1998
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. GNAGE

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL
	REFERENCE POINT (Top of Riser)	291.73
	GROUND SURFACE	289.7
	SP-SAND, some gravel, trace silt, compact, medium to coarse grained, brown/black, dry, frozen	
-2.5	- and gravel, loose, fine to medium grained, red/brown, moist	
-5.0		
-7.5	SW-SAND, some silt, trace gravel, loose, fine grained, tan/red, moist	282.2
-10.0	- very loose, wet	
	- fine to medium grained, green/gray	
-12.5		
-15.0	ML-SILT, some fine sand, soft, low plasticity, green/gray to brown, wet	273.7
-17.5	END OF HOLE @ 19.0ft BGS	270.7
-20.0		
-22.5		
-25.0		
-27.5		
-30.0		
-32.5		

MONITOR INSTALLATION



SCREEN DETAILS
Screened Interval:
8.0 to 18.0ft BGS
Length: 10.0ft
Diameter: 2"
Slot Size: #7
Material: PVC
Sand Pack:
8.0 to 19.0ft BGS
Material: #00 Silica Sand

SAMPLE

NUMBER	STATE	'N' VALUE	PID (ppm)
1SS	X	22	0
2SS	X	6	0
3SS	X	7	0
4SS	X	8	0
5SS	X	5	0
6SS	X	3	0
7SS	X	2	18.0
8SS	X	3	280
9SS	X	4	99

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

APPENDIX E

PUMPING TEST HYDROGRAPHS/RECOVERY TEST RESULTS

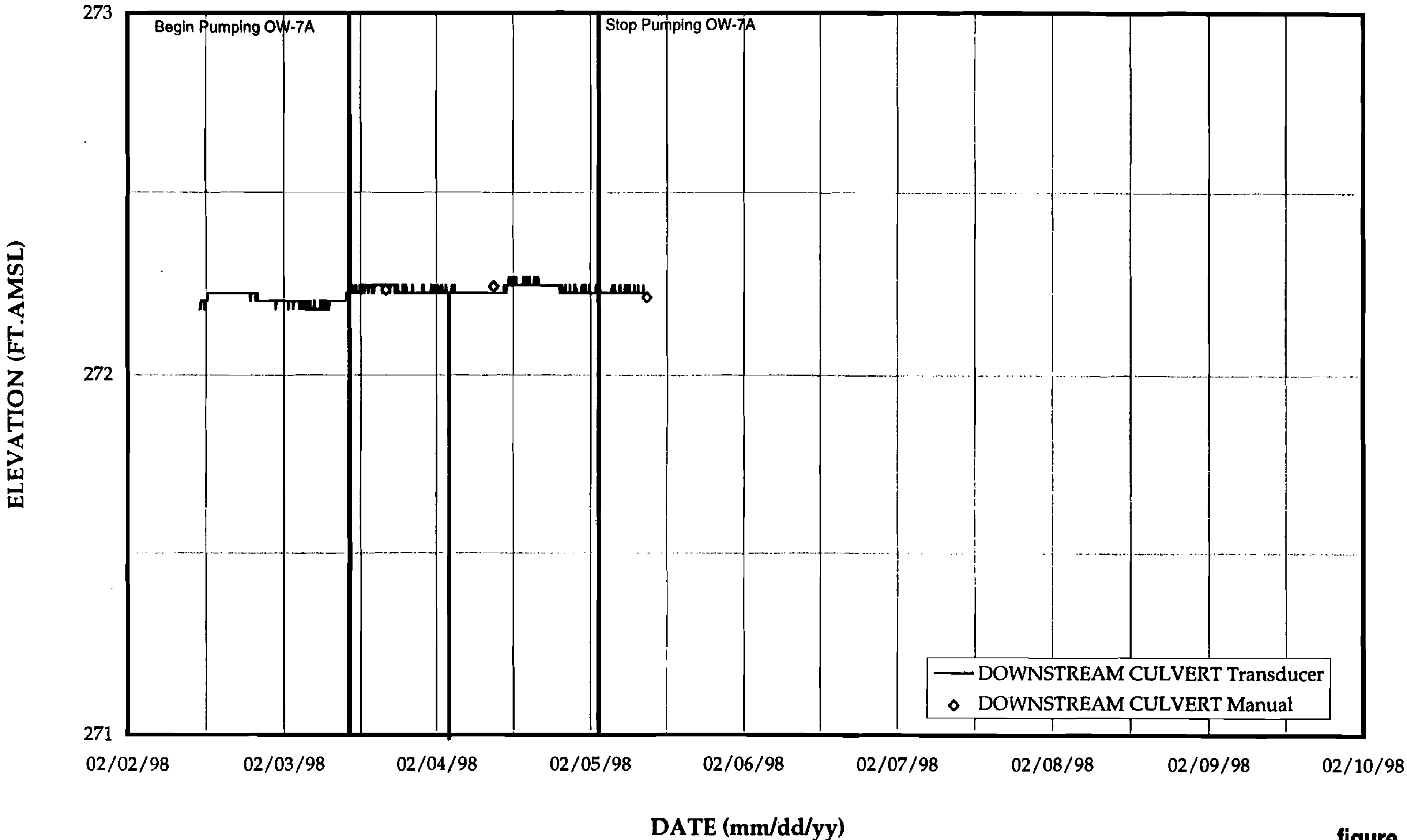
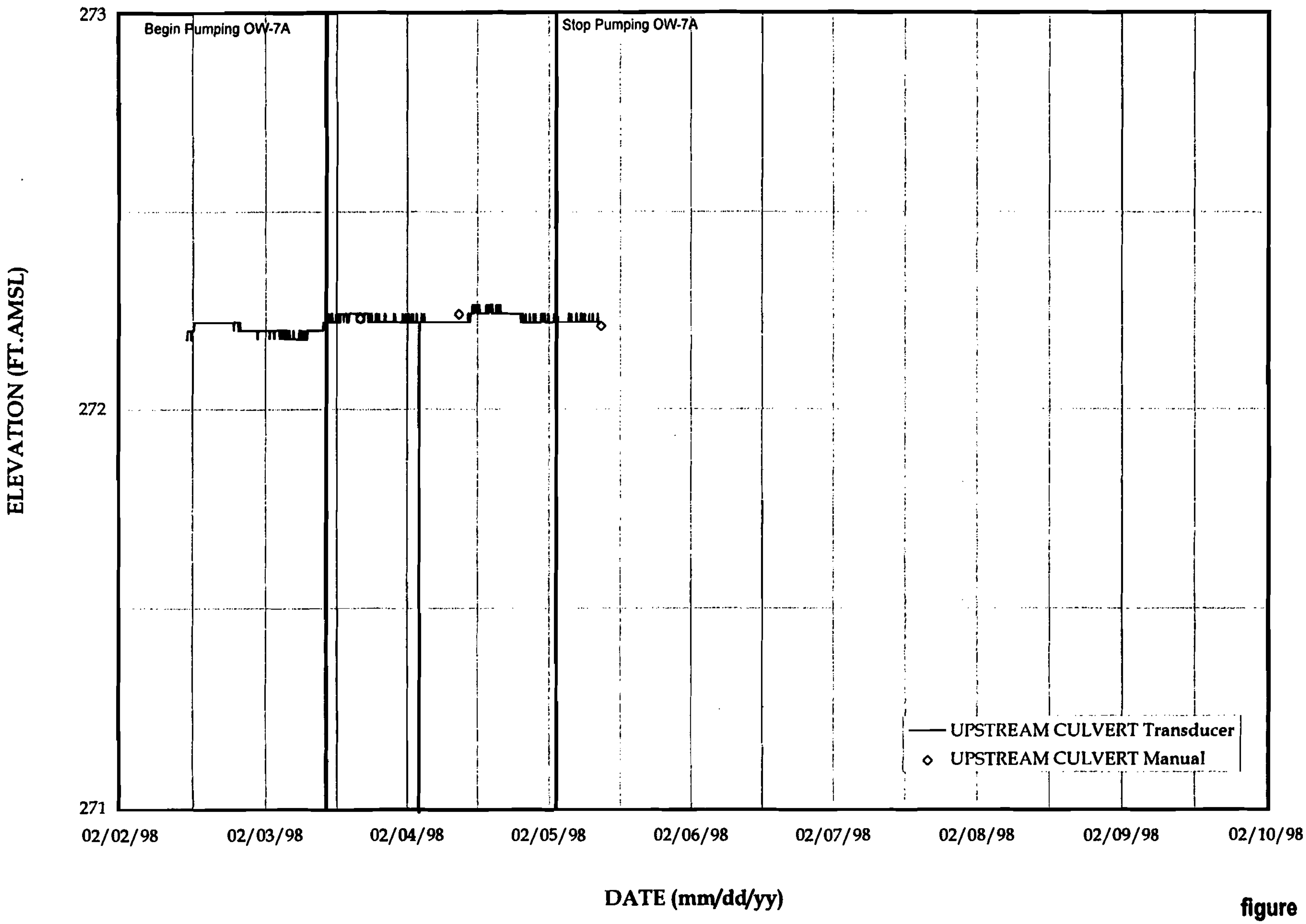


figure
DOWNSTREAM CULVERT HYDROGRAPH
OW-7A PUMPING TEST
SCHENECTADY INTERNATIONAL INC.
SCHENECTADY, NEW YORK

CRA



figure

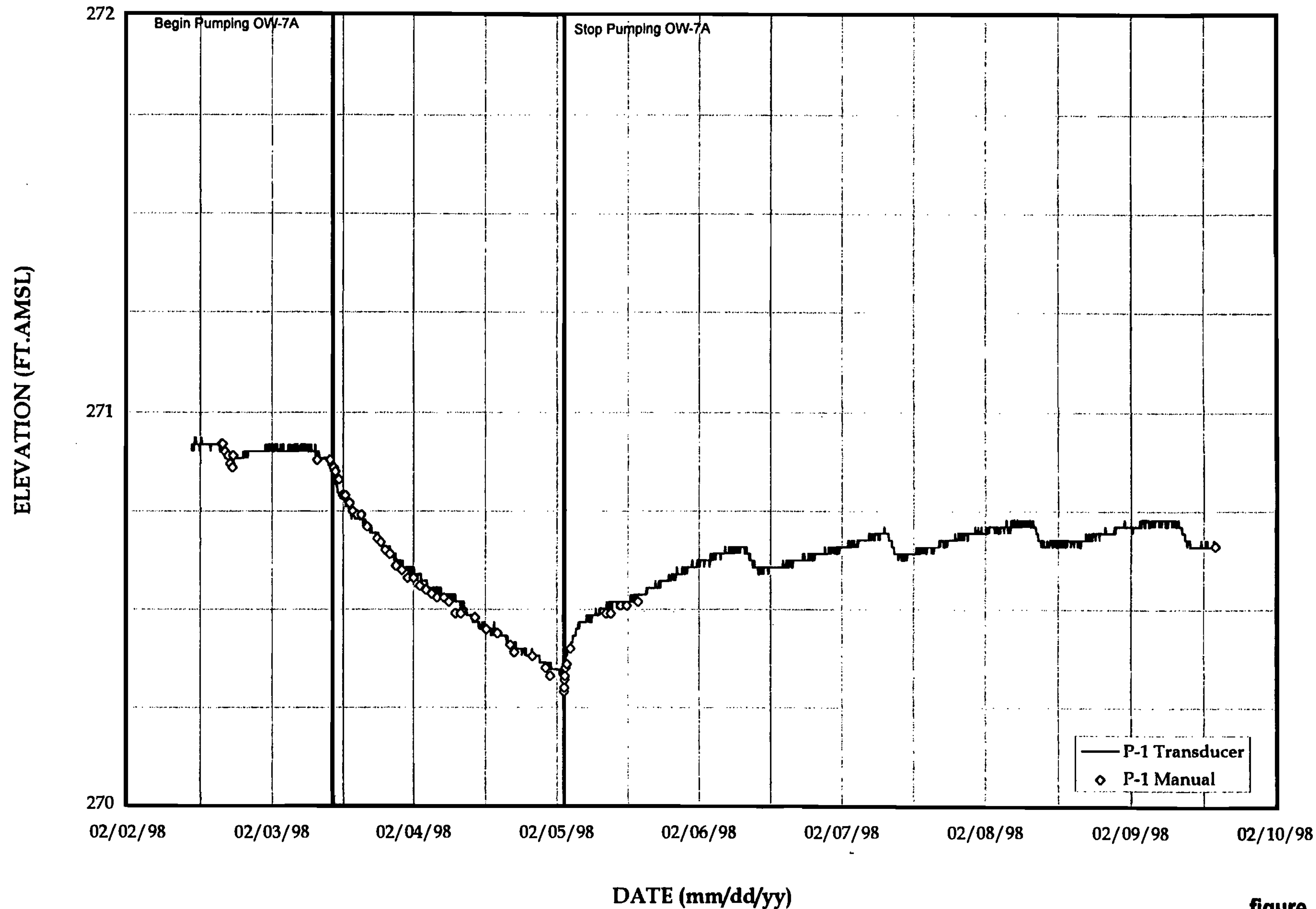
UPSTREAM CULVERT HYDROGRAPH

OW-7A PUMPING TEST

SCHENECTADY INTERNATIONAL INC.

SCHENECTADY, NEW YORK

CRA



figure

P-1 HYDROGRAPH

OW-7A PUMPING TEST

SCHENECTADY INTERNATIONAL INC.

SCHENECTADY, NEW YORK

CRA

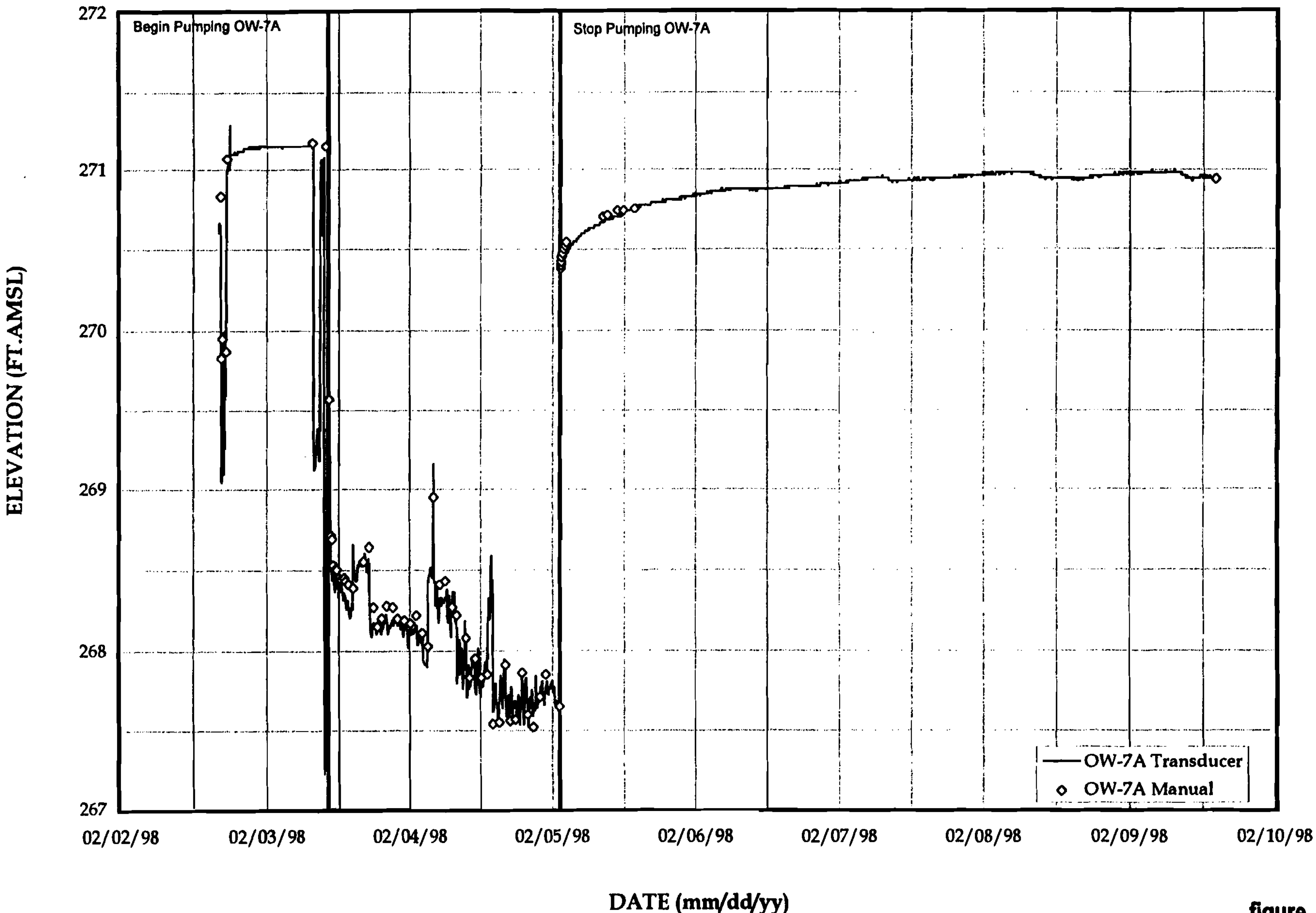


figure
OW-7A HYDROGRAPH
OW-7A PUMPING TEST
SCHENECTADY INTERNATION INC.
SCHENECTADY, NEW YORK

CRA

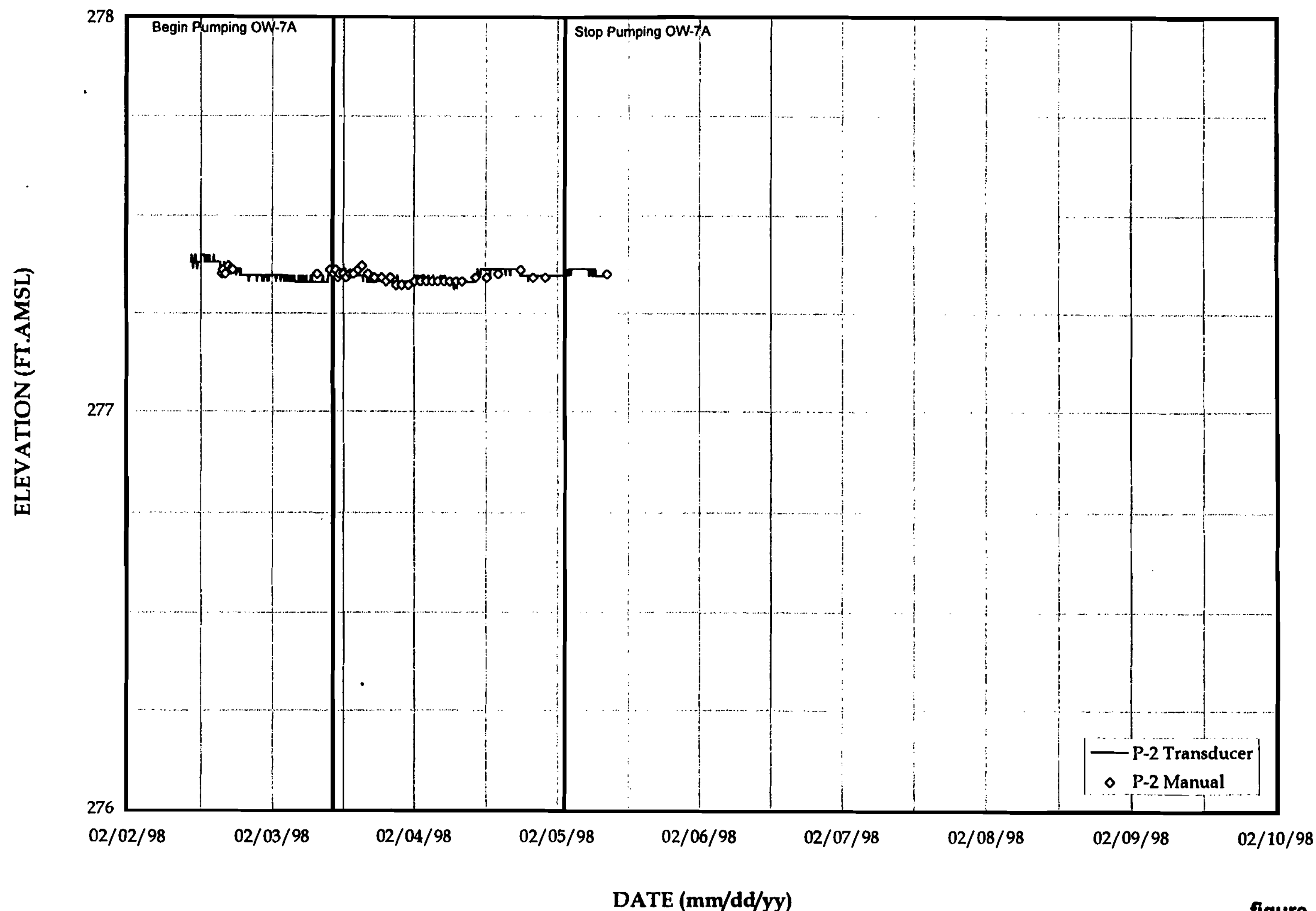


figure
P-2 HYDROGRAPH
OW-7A PUMPING TEST
SCHENECTADY INTERNATIONAL INC.
SCHENECTADY, NEW YORK

CRA

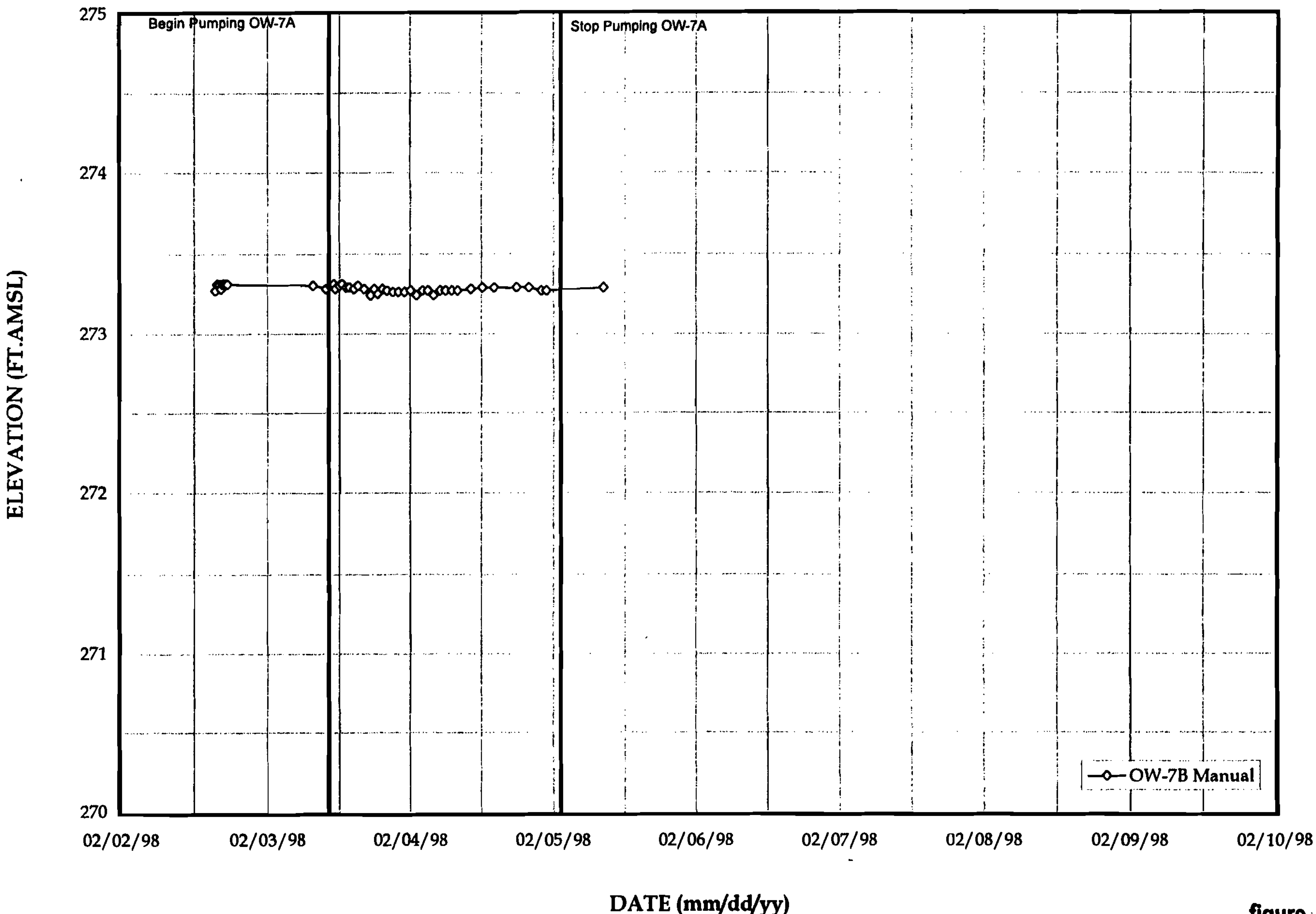
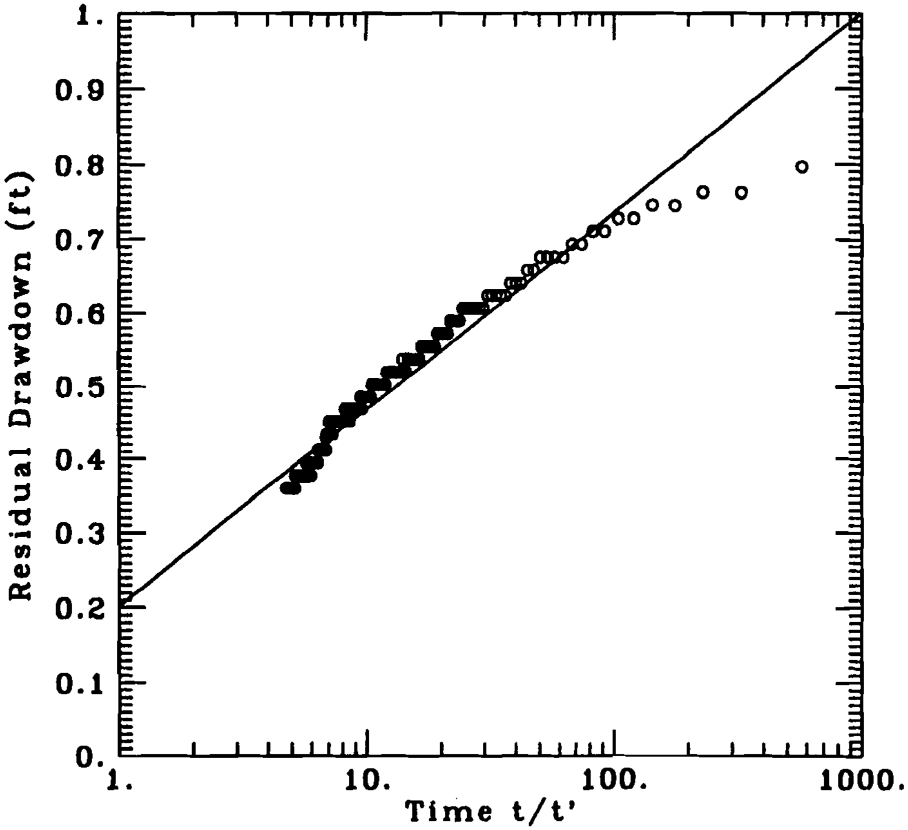


figure
OW-7B HYDROGRAPH
OW-7A PUMPING TEST
SCHENECTADY INTERNATIO[illegible] INC.
SCHENECTADY, NEW YORK

CRA

OW-7A



DATA SET:
OW7AREC.PRN
02/16/98

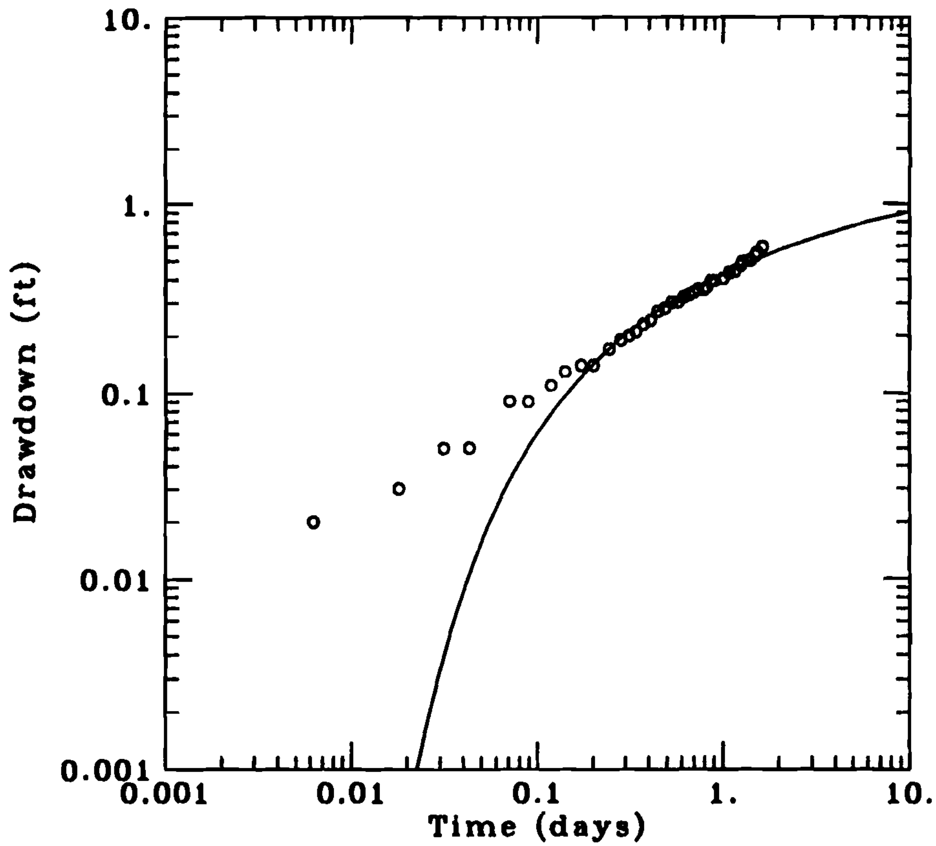
AQUIFER TYPE:
Confined

SOLUTION METHOD:
Theis Recovery

ESTIMATED PARAMETERS:
T = 303.5 ft^2/day
S' = 0.1757

TEST DATA:
Q = 441.6 ft^3/day
t pumping = 2.625 days

OW-7A PUMPING TEST



DATA SET:
ow7ap1.prn
02/16/98

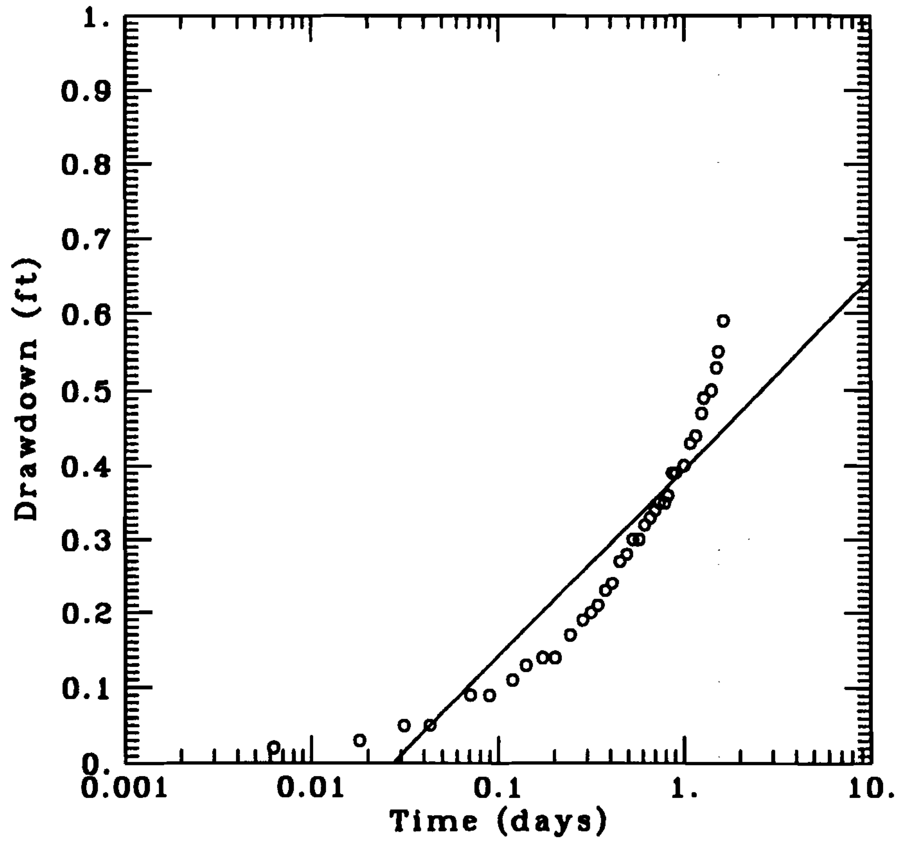
AQUIFER TYPE:
Confined

SOLUTION METHOD:
Theis

ESTIMATED PARAMETERS:
T = 161.9 ft^2/day
S = 0.0377

TEST DATA:
Q = 441.6 ft^3/day
r = 38.5 ft
rc = 0.08333 ft
rw = 0.3333 ft

OW-7A PUMPING TEST



DATA SET:
ow7ap1.prn
02/16/98

AQUIFER TYPE:
Confined

SOLUTION METHOD:
Cooper-Jacob

ESTIMATED PARAMETERS:
T = 321. ft^2/day
S = 0.01328

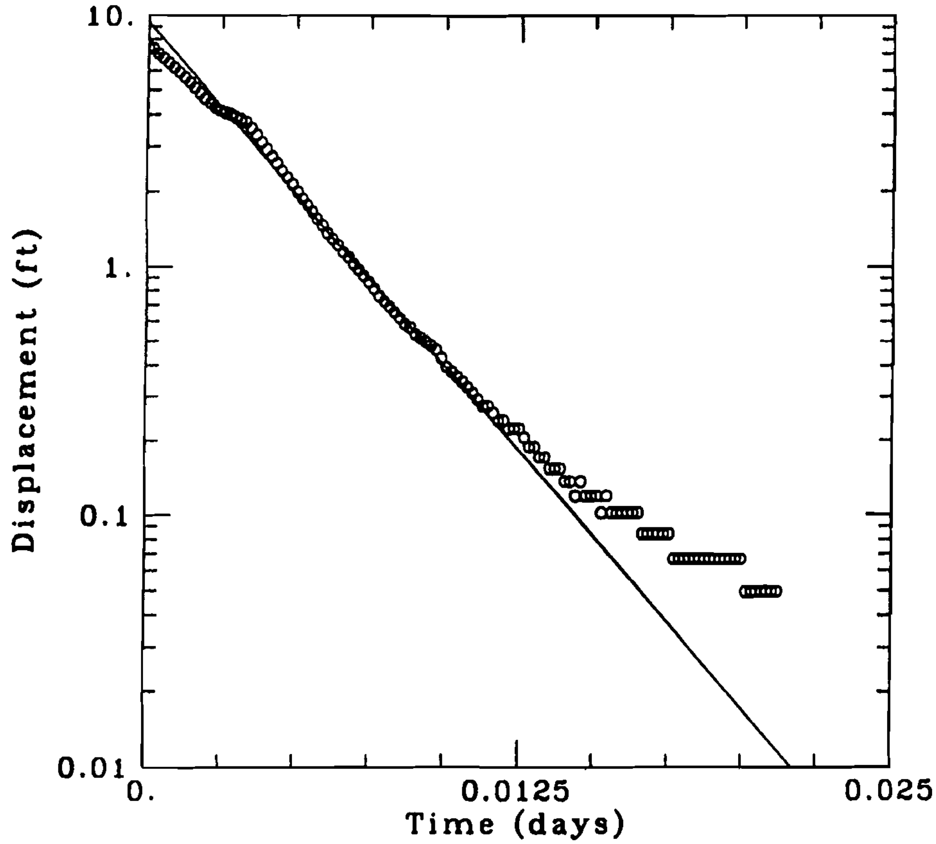
TEST DATA:
Q = 441.6 ft^3/day
r = 38.5 ft
rc = 0.08333 ft
rw = 0.3333 ft

RECOVERY TEST/SLUG TEST DATA
SCHENECTADY INTERNATIONAL INC.
CONGRESS STREET

Well ID		K (ft./day)	y^0 (ft)
OW-1	Recovery #1	0.4977	9.405
	Recovery #2	0.5553	9.495
OW-3A	Recovery #1	0.1292	27.44
	Recovery #2	0.1356	27.21
OW-4A	Recovery #1	0.2604	12.41
	Recovery #2	0.2288	9.028
P-2	Recovery #1	0.258*	6.403*
	Recovery #2	0.05496	1.572

Notes:
* Insufficient recovery for proper parameter estimation.

OW1 RECOVERY #1



DATA SET:
1r1.prn
03/01/98

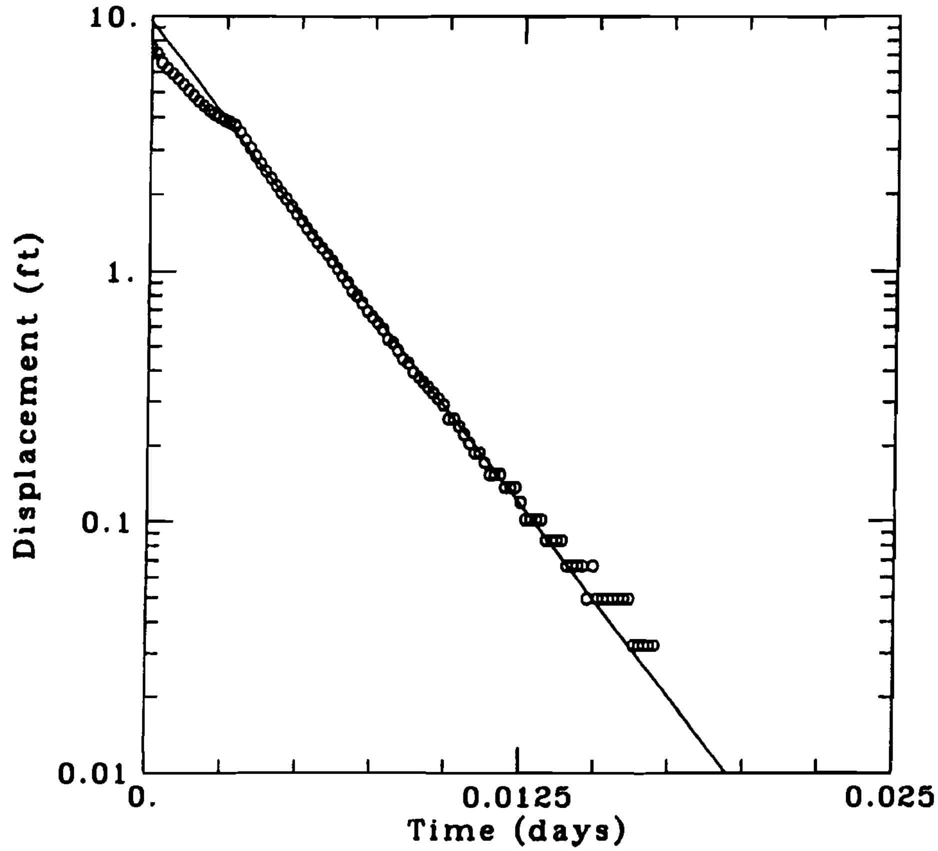
AQUIFER TYPE:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

ESTIMATED PARAMETERS:
K = 0.4977 ft/day
y0 = 9.405 ft

TEST DATA:
H0 = 7.489 ft
rc = 0.08333 ft
rw = 0.3333 ft
L = 5. ft
b = 8.44 ft
H = 8.44 ft

OW1 RECOVERY #2



DATA SET:
1r2.prn
03/01/98

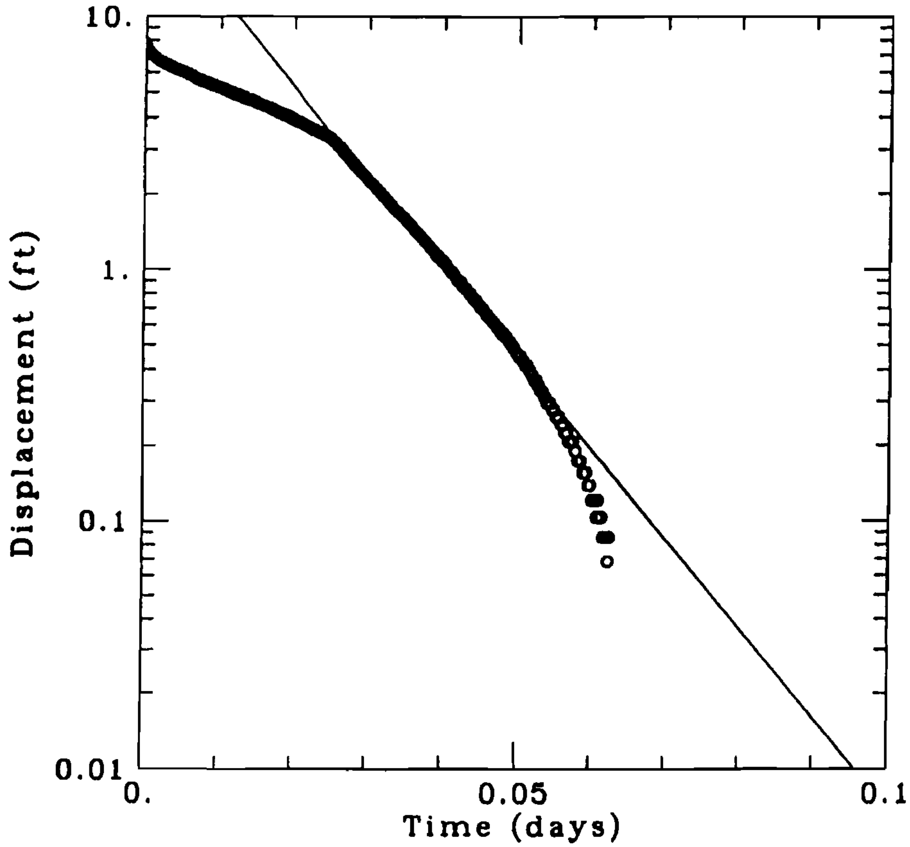
AQUIFER TYPE:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

ESTIMATED PARAMETERS:
K = 0.5553 ft/day
y0 = 9.495 ft

TEST DATA:
H0 = 7.454 ft
rc = 0.08333 ft
rw = 0.3333 ft
L = 5. ft
b = 8.44 ft
H = 8.44 ft

OW3A RECOVERY #1



DATA SET:
3ar1.prn
03/01/98

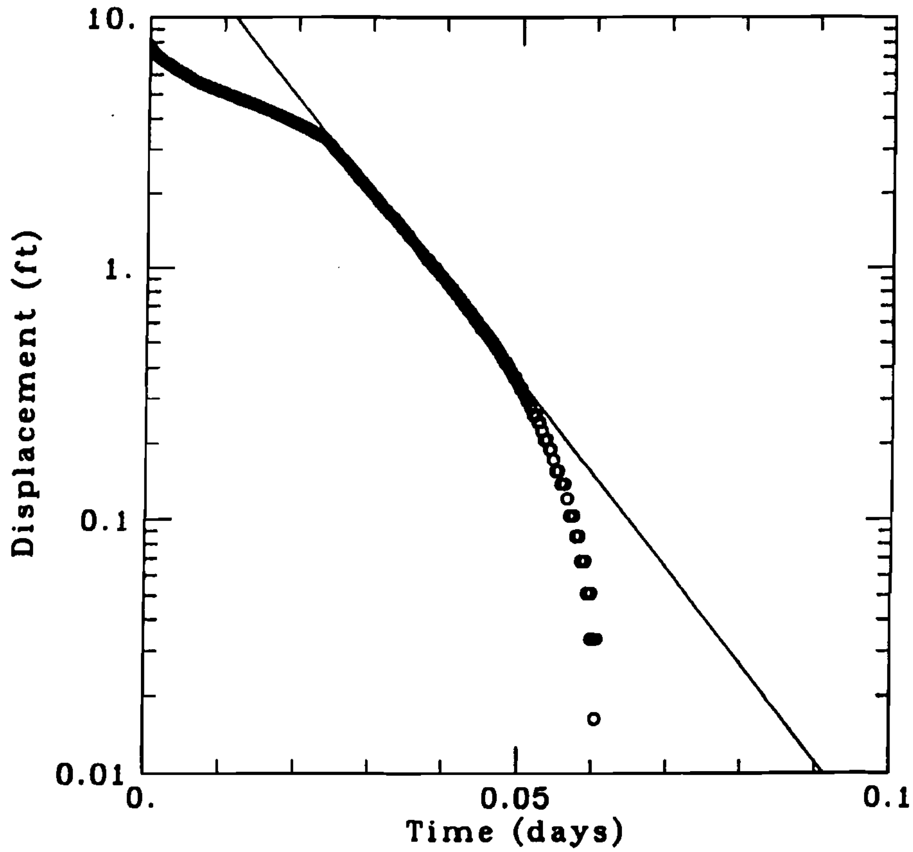
AQUIFER TYPE:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

ESTIMATED PARAMETERS:
K = 0.1292 ft/day
y0 = 27.44 ft

TEST DATA:
H0 = 7.732 ft
rc = 0.08333 ft
rw = 0.3333 ft
L = 5. ft
b = 8.13 ft
H = 8.13 ft

OW3A RECOVERY #2



DATA SET:
3ar2.prn
03/01/98

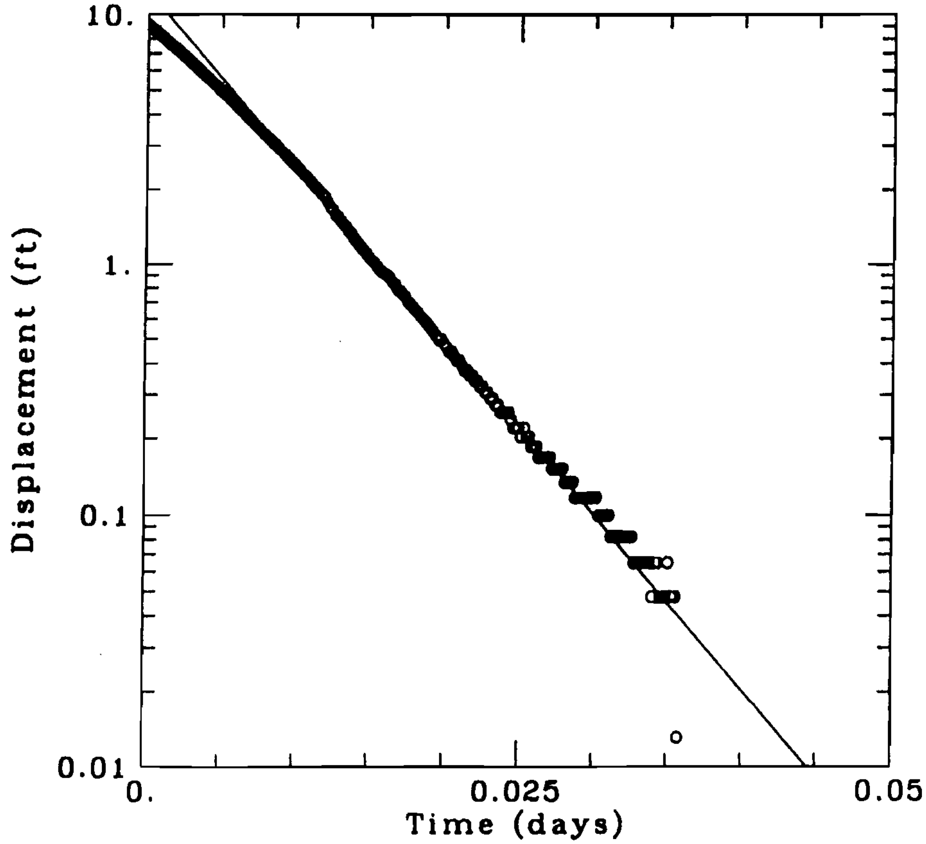
AQUIFER TYPE:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

ESTIMATED PARAMETERS:
K = 0.1356 ft/day
y0 = 27.21 ft

TEST DATA:
H0 = 7.732 ft
rc = 0.08333 ft
rw = 0.3333 ft
L = 5. ft
b = 8.13 ft
H = 8.13 ft

OW4A RECOVERY #1



DATA SET:
4ar1.prn
03/01/98

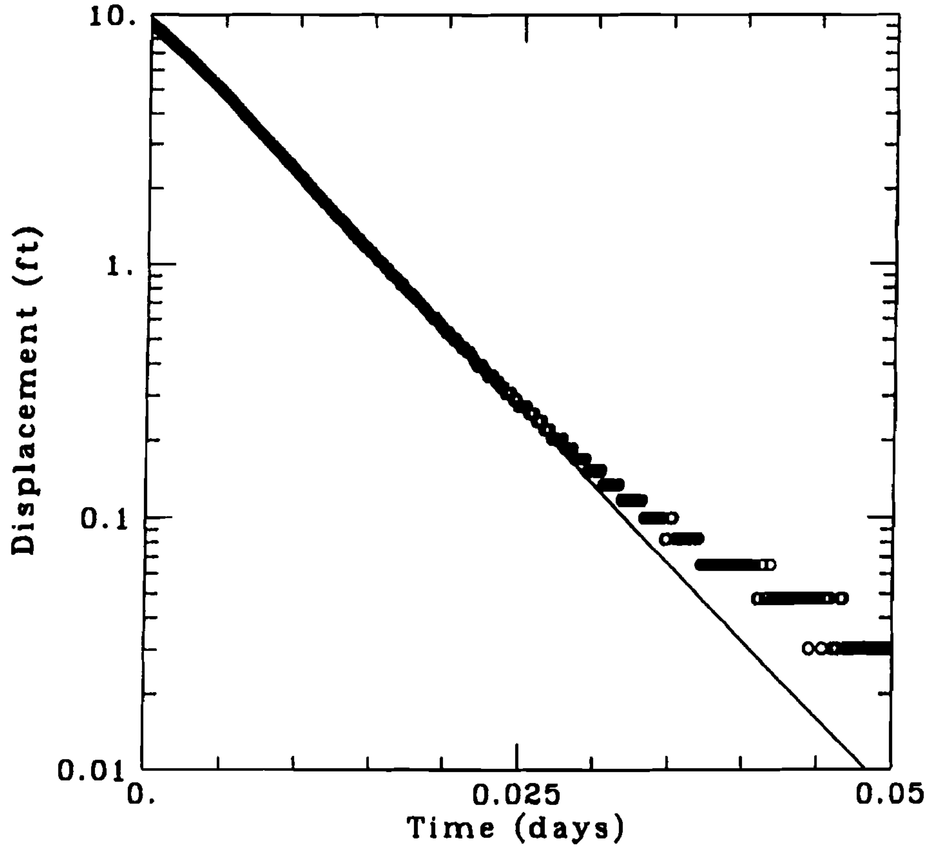
AQUIFER TYPE:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

ESTIMATED PARAMETERS:
K = 0.2604 ft/day
y0 = 12.41 ft

TEST DATA:
H0 = 9.113 ft
rc = 0.08333 ft
rw = 0.3333 ft
L = 5. ft
b = 9.58 ft
H = 9.58 ft

OW4A RECOVERY #2



DATA SET:
4ar2.prn
03/01/98

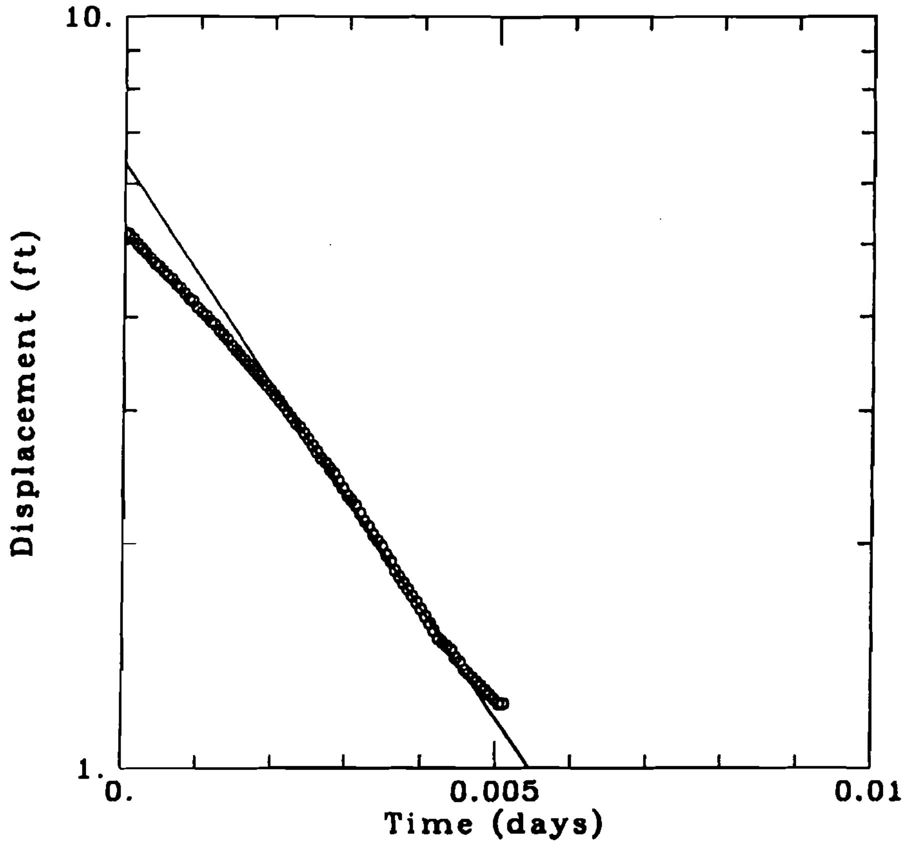
AQUIFER TYPE:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

ESTIMATED PARAMETERS:
K = 0.2288 ft/day
y0 = 9.028 ft

TEST DATA:
H0 = 9.199 ft
rc = 0.08333 ft
rw = 0.3333 ft
L = 5. ft
b = 9.58 ft
H = 9.58 ft

P2 RECOVERY #1



DATA SET:
p2r1.prn
03/01/98

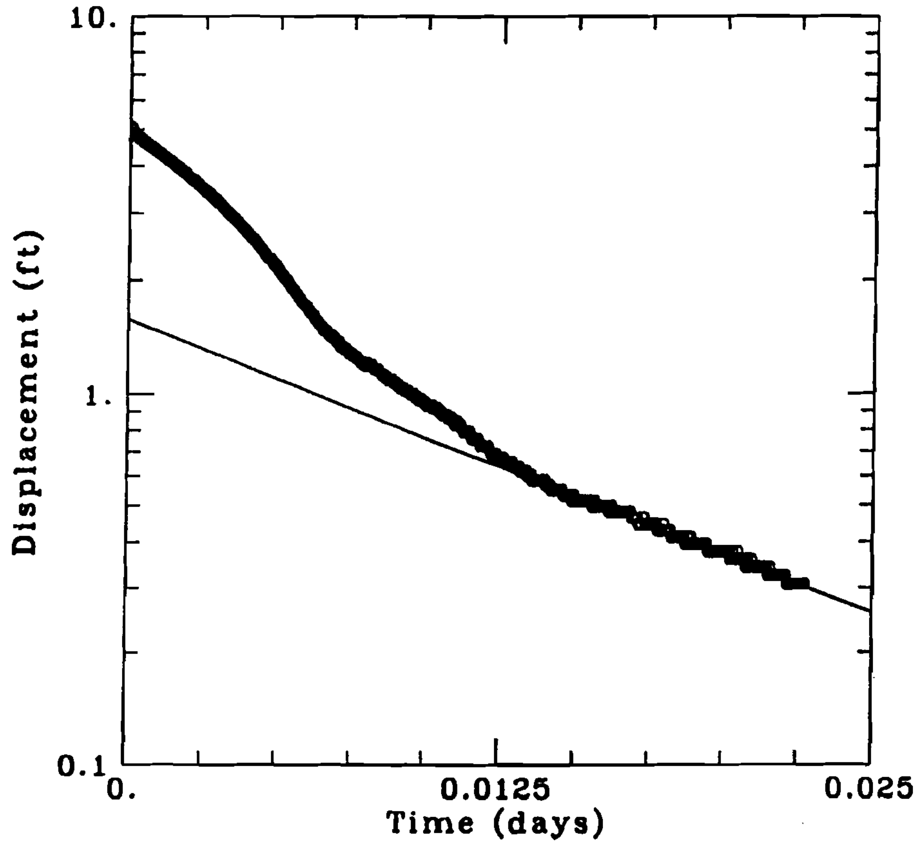
AQUIFER TYPE:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

ESTIMATED PARAMETERS:
K = 0.258 ft/day
y0 = 6.403 ft

TEST DATA:
H0 = 5.169 ft
rc = 0.08333 ft
rw = 0.3333 ft
L = 10. ft
b = 5.48 ft
H = 5.48 ft

P2 RECOVERY #2



DATA SET:
p2r2.prn
03/01/98

AQUIFER TYPE:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

ESTIMATED PARAMETERS:
K = 0.05496 ft/day
y0 = 1.572 ft

TEST DATA:
H0 = 5.099 ft
rc = 0.08333 ft
rw = 0.3333 ft
L = 10. ft
b = 5.48 ft
H = 5.48 ft

APPENDIX F

COLLECTION DRAIN CALCULATIONS

CRA CONESTOGA-ROVERS & ASSOCIATES	PROJECT No.: 1312-20 PROJECT NAME: Congress Street DATE: April 29, 98	DESIGNED BY: WJV CHECKED BY: PAGE 1 OF 4

Proposed Filter

Attached table summarizes gradation of inplace soils. Grain sizes of inplace soils drawn on attached Figure

Filter evaluated in accordance with following criteria:

$\frac{D_{15}\ \text{Filter}}{d_{85}\ \text{soil}} < 5$ piping criteria

$\frac{D_{15}\ \text{Filter}}{d_{15}\ \text{soil}} > 5$ permeability criteria

$\frac{D_{50}\ \text{Filter}}{D_{50}\ \text{Soil}} < 25$ permeability criteria

Gradation of soil 'revised' to remove fraction coarser than No. 4, which does not materially affect piping susceptibity. These percentages are shown as 'revised percents' which must be read from gradation curve to correspond to d_{85}, d_{15} & d_{50} of inplace soil. Resulting filter criteria shown in final 3 columns, and plotted on attached Figure

Filter envelope drawn on attached Figure to match majority of points. Due to variability of in place soil, some failure of criteria (2 to 4 points for each criteria) identified but should not effect performance

Recommended Gradation of Filter

Sieve Size	Percent Passing
3"	100
1"	75-100
3/8"	60-85
No. 4	50-80
No. 10	40-70
No. 40	0-45
No 100	0-15
No 200	0-4

Pipe Slot Size

Pipe slot size D_{85} Filter > slot width

Correct to remove sizes coarser than No. 4

$\Rightarrow D_{85}$ = 1.5 to 3.0 mm

$\therefore$ Slot Width = 1.5 to 3.0 mm

Spec 1/16" slot size

TABLE

TITLE

BH	Depth (ft)	Sample Name	No.4	Revised Percent			Size (mm)			Filter		
										●	Δ	□
				D15	D50	D85	D15	D50	D85	d15 less than	d15 greater than	d50 less than
32	2-4	1	0.8	12	40	68	0.2	3.5	13 d.	65	1	87.5
32	4-6	2	0.86	12.9	43	73.1	0.04	0.2	1 w	5	0.2	5
32	10-12	3	0.97	14.55	48.5	82.45	0.02	0.09	0.03 w	0.15	0.1	2.25
32	14-14.5	4	0.9	13.5	45	76.5	0.02	0.12	0.3 w	1.5	0.1	3
32	14.5-16	5	0.98	14.7	49	83.3	0.015	0.045	0.2	1	0.075	1.125
33	2.5-3	7	0.87	13.05	43.5	73.95	0.02	0.15	0.5	2.5	0.1	3.75
33	6-6.5	8	0.95	14.25	47.5	80.75	0.02	0.12	0.5	2.5	0.1	3
33	14-16	9	1	15	50	85	0.02	0.07	0.28	1.4	0.1	1.75
34	0-2	11	0.48	7.2	24	40.8	0.075	0.425	0.2	1	0.375	10.625
34	4-6	12	1	15	50	85	0.015	0.028	0.056	0.28	0.075	0.7
34	10-12	13	1	15	50	85	0.015	0.04	0.14	0.7	0.075	1

W
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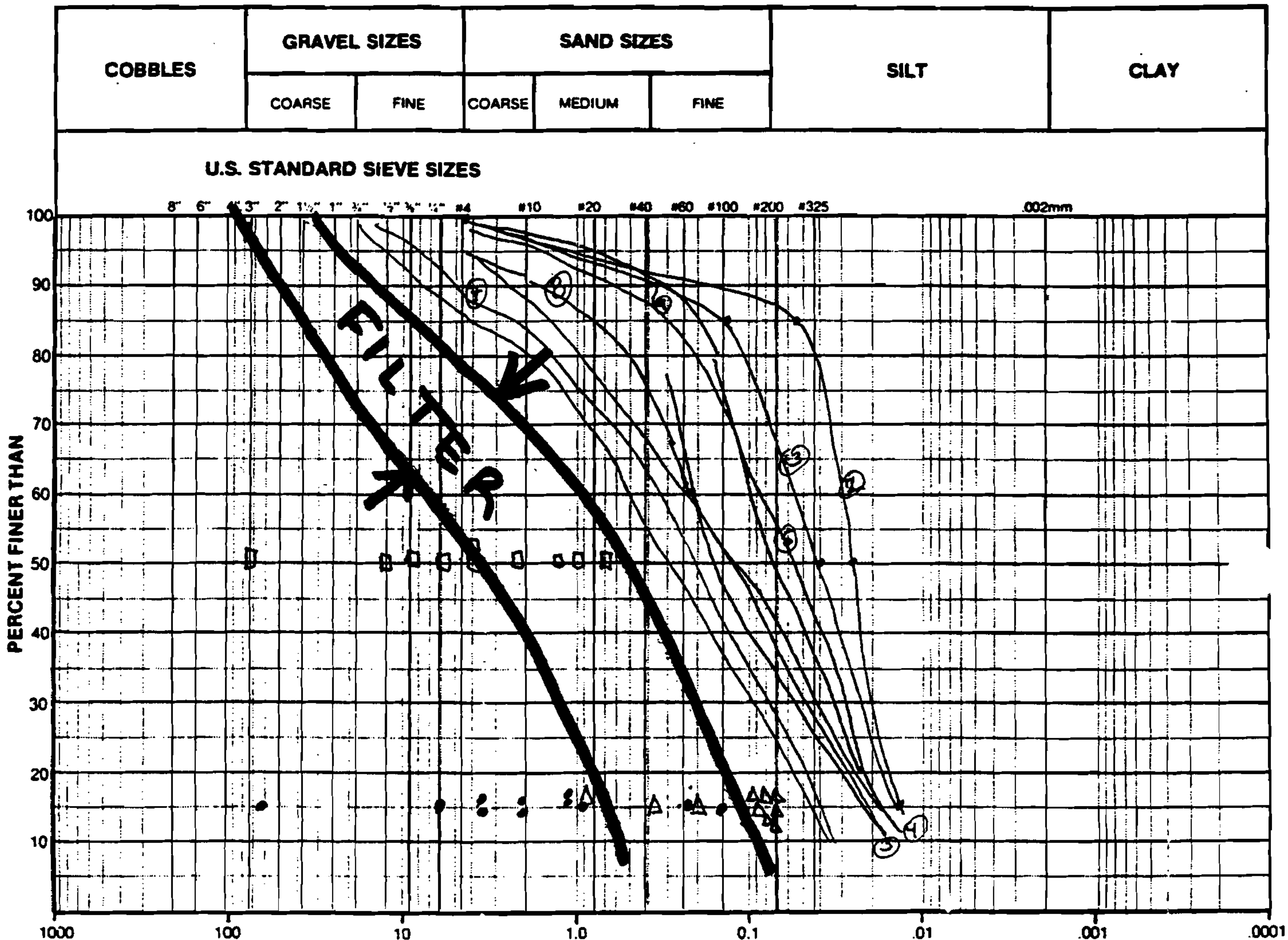
CRA Consulting Engineers
CONESTOGA-ROVERS & ASSOCIATES

GRAIN SIZE CURVE

CLIENT:	4 of 4
PROJECT NUMBER:	
LAB. NUMBER:	
LOCATION:	
HOLE:	SAMPLE:
DEPTH:	
TECHNICIAN:	DATE:



• d_{15} finer than
Δ d_{15} greater than } filter criteria
□ d_{50} less than

GRAIN SIZE IN MILLIMETERS

HAZEN PERMEABILITY ESTIMATE $(D_{10})^2$ = ______________ cm/sec

NOTE: D_{10} = GRAINSIZE IN mm AT 10% FINER THAN

REMARKS :

____

____

____

NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION DESCRIPTIVE MODIFIERS	
AND	36-50 %
SOME	21-35 %
LITTLE	11-20 %
TRACE	1-10 %

SUMMARY

GRAVEL ________ %
SAND ________ %
SILT ________ %
CLAY ________

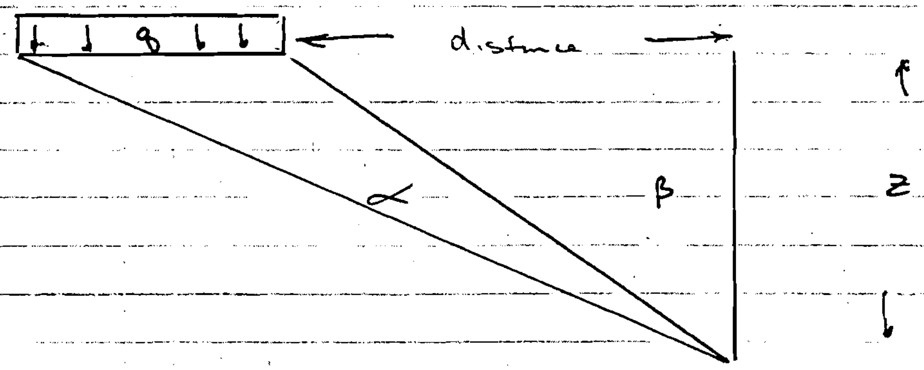
CRA **CONESTOGA-ROVERS & ASSOCIATES**	PROJECT No.: 1317-30 PROJECT NAME: Schenectady, Congress Street DATE: April 29/98	DESIGNED BY: WJV CHECKED BY: AW PAGE 1 OF 7

Pipe Loading & Design

- Pipes located as shown on attached Figure
- Loading
  - In accordance with Section 4.1.2 of Specification For Pipeline Occupancy of Consolidated Rail Corporation Property loading imposed by train is 1882 psF over a width of 8.5 Feet
- Stress
  - In accordance with Boussinesq vertical (σ_v) & horizontal (σ_h) load due to strip pressure (q) is calculated as follows

$$\sigma_v = q/\pi \left(\alpha + \sin\alpha \cos(\alpha + 2)\right)$$

$$\sigma_h = q/\pi \left(\alpha - \sin\alpha \cos(\alpha + 2\beta)\right)$$



CRA
CONESTOGA-ROVERS & ASSOCIATES

PROJECT No.:		DESIGNED BY:
PROJECT NAME:		CHECKED BY: ABC 30/4/1..
DATE:		PAGE ___ OF ___

Calculations are shown on the attached tables.

Maximum vertical of 3319 PSF & horizontal of 1792. Also train contributes only 5% additional load over & above soil load.

Pipe design based on deflection & capacity

Deflection - deflection calculation shown on loading table. Based on these 6" Ø is meeting.

Pipe Stiffness 35 psi

Capacity - capacity calculation for 1% slope shown on loading table.
Need max of 15 gpm
Get 202 gpm OK

TABLE

TITLE

Pipe Loading
Congress Street Plant
Schenectady International Inc.

Station (y)	Depth (z)	Distance (x)	Beta radians	Alpha radians	Train Vertical Pressure psf (σ_z)	Train Vertical Pressure X2 * psf	TrainHorizontal Pressure psf (σ_x)	Train Horizontal Pressure X2 psf	Vertical Soil Pressure psf	Horizontal Soil Pressure psf	Total Vertical pressure psf	Total Horizontal Pressure psf	Train Horizontal Pressure by CRC psf
1+50	15	20	0.927	0.159	55	109	136	272	1950	975	2059	1247	214
1=00	21	29	0.944	0.116	40	81	99	198	2730	1365	2811	1563	167
0+50	23	30	0.917	0.116	44	87	95	189	2990	1495	3077	1684	159
0+25	25	35	0.951	0.099	35	69	84	167	3250	1625	3319	1792	145

* Includes factor of safety of 2

use for design - equivalent to 26' of soil

Using CRC formula

Deflection (in) $= K \times \dfrac{D(W_c + W_L)}{0.149\,PS + 0.06E}$

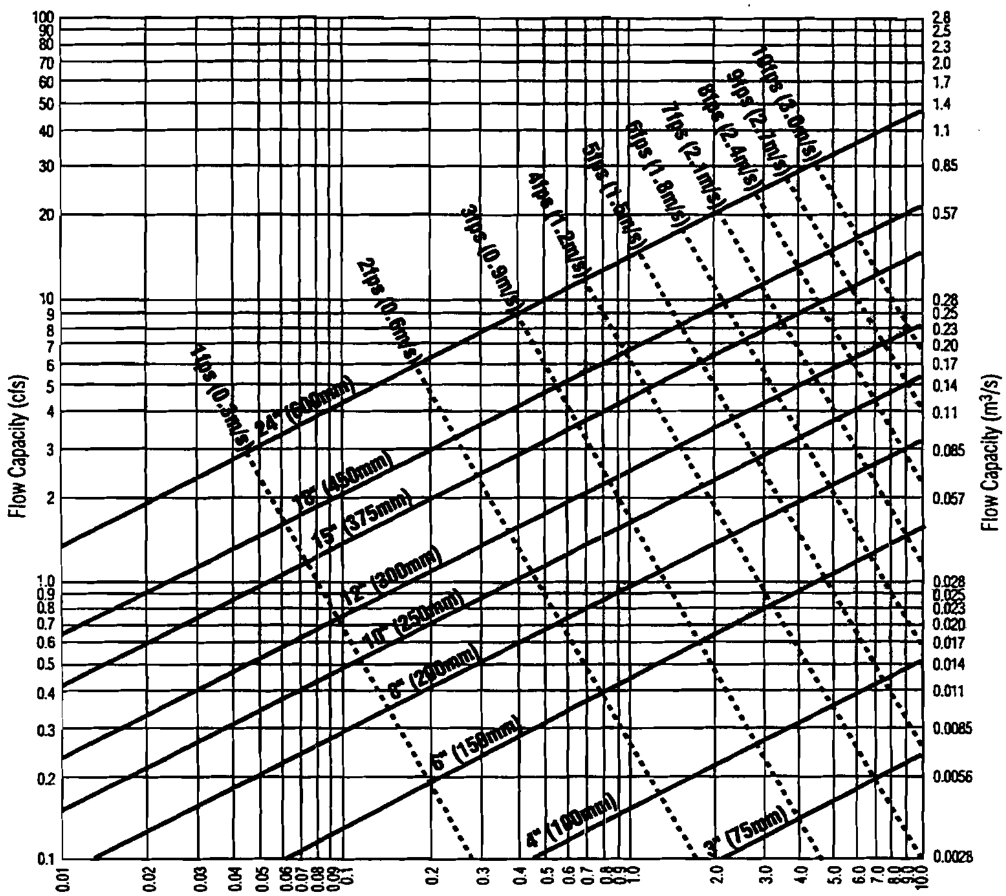
$= \dfrac{13.8}{66.2} = 0.2$ in ~ 3.4% which is less than 5% recommended

$K = 0.10$
$D_L = 1.0$
$W_c + W_L = 3319$ PSF $= 138$ lbs/in of 6"φ
$PS = 35$ psi
$E = 1000$ (Class II < 85% SPD

Flow - 6"φ at 1%
Q = 0.45 cfs
= 202 GPM > 15 gpm maximum design

Prepared by
Andy Woslowski
?/29/99

Figure 2: Discharge Rates for Corrugated Polyethylene Pipe With a Corrugated Interior



Note: The "n" value changes from diameter to diameter for corrugated interior pipe because of differences in corrugation geometry. (4" - 6": 0.015; 8": 0.016; 10: 0.017; 12" - 15": 0.018; 18" - 24": 0.020)
Solid lines indicate pipe diameter.
Dashed lines indicate approximate flow velocity.

Table 1-2
Backfill Class and Quality

Pipe Embedment Material						E', psi (kPa) For Degree of Embedment Compaction				
ASTM D2321* Class	ASTM D2321* Description	ASTM D2487 Notation	ASTM D2487 Description	AASHTO M43 Notation	Min. Std. Proctor Density (%)	Lift Placement Depth	Dumped	Slightly < 85%	Moderate 85% - 95%	High > 95%
IA	Open-graded, clean manufactured aggregates	N/A	Angular crushed stone or rock, crushed gravel, crushed slag; large voids with little or no fines	5 56	Dumped	18" (0.45m)	1000 (6,900)	3000 (20,700)	3000 (20,700)	3000 (20,700)
IB	Dense-graded, clean manufactured, processed aggregates	N/A	Angular crushed stone or other Class IA material and stone/sand mixtures; little or no fines							
II	Clean, coarse-grained soils	GW	Well-graded gravel, gravel/sand mixtures; little or no fines	57 6 67	85%	12" (0.30m)	N/R	1000 (6,900)	2000 (13,800)	3000 (20,700)
		GP	Poorly graded gravel gravel/sand mixtures; little or no fines							
		SW	Well-graded sands, gravelly sands; little or no fines							
		SP	Poorly graded sands, gravelly sands; little or no fines							
III	Coarse-grained soils with fines	GM	Silty gravels, gravel/sand/silt mixtures	Gravel and sand with <10% fines	90%	9" (0.20m)	N/R	N/R	1000 (6,900)	2000 (13,800)
		GC	Clayey gravels, gravel/sand/clay mixtures							
		SM	Silty sands, sand/silt mixtures							
		SC	Clayey sands, sand/clay mixtures							
IVA**	Inorganic fine-grained soils	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, silts with slight plasticity				N/R	N/R	N/R	1000 (6,900)
		CL	Inorganic clays of low to medium plasticity; gravelly, sandy, or silty clays; lean clays							
IVB	Inorganic fine-grained soils	MH	Inorganic silts, macaceous or diamaceous fine sandy or silty soils, elastic soils				N/R	N/R	N/R	N/R
		CH	Inorganic clays of high plasticity, fat clays							
V	Organic or highly organic soils	OL	Organic silts and organic silty clays of low plasticity				N/R	N/R	N/R	N/R
		OH	Organic clays of medium to high plasticity, organic silts							
		PT	Peat and other high organic soils							

N/R: Use not recommended by ASTM D2321 for part of the backfill envelope.
*Refer to ASTM D2321 for more complete soil descriptions.
**Use under the direction of a soils expert.

Table 1-7
Maximum Cover for
Corrugated Polyethylene Pipe, ft (m)

Inside Diameter, ID in (mm)	Backfill Condition		
	E'=1,000 psi (6,900 kPa)	E'=2,000 psi (13,800 kPa)	E'=3,000 psi (20,700 kPa)
	Class III (SM) 90% Standard Proctor Density	Class II (GW) 90% Standard Proctor Density	Class I Tamped
3 (75)	26 (7.9)	60 (18.3)	107 (32.6)
4 (100)	28 (8.5)	66 (20.1)	118 (36.0)
6 (150)	26 (7.9)	60 (18.3)	108 (32.9)
8 (200)	20 (6.1)	47 (14.3)	83 (25.3)
10 (250)	25 (7.6)	58 (17.7)	105 (32.0)
12 (300)	29 (8.8)	68 (20.7)	116 (35.4)
15 (375)	25 (7.6)	58 (17.7)	101 (30.8)
18 (450)	29 (8.8)	69 (21.0)	120 (36.6)
21 (525)	24 (7.3)	56 (17.1)	97.8 (29.8)
24 (600)	29 (8.8)	67 (20.4)	116 (35.4)
30 (750)	28 (8.5)	65 (19.8)	116 (35.4)
36 (900)	25 (7.6)	59 (18.0)	108 (32.9)
42 (1050)	25 (7.6)	58 (17.7)	105 (32.0)
48 (1200)	28 (8.5)	65 (19.8)	120 (36.6)

Product Specifications

~~CO-EXTRUDED SMOOTHWALL Environmental Solutions™ Sewer and Drain Pipe~~

Product Specification	ASTM F810
Available Diameters	3 inch (75mm), 4 inch (100mm), and 6 inch (150mm); plain or perforated co-extruded wall
Standard Lengths	10 foot (3m)
Pipe Stiffness	Meets or exceeds the requirements of ASTM F810
Jointing	Bell and spigot; belled ends shall be integrally formed with the pipe a distance of 2 inches (50mm) plus or minus 1/2 inch (13mm)

~~Turf-Flow® Tubing~~

Product Specification	
Available Diameters	2-inch (50mm); plain or perforated wall
Standard Lengths	Rolls up to 500-ft. (152m)
Pipe Stiffness	30 pii (207 kPa) min. at 5% deflection
Installation	Install according to local regulations or manufacturer's recommendations.

HEAVY DUTY Tubing and Pipe

Product Specification	ASTM F405 or F667, AASHTO M252 or M294, and SCS 606
Available Diameters	3 inch (75mm) through 18 inch (450mm); plain or perforated wall
Standard Lengths	20 foot (6m)/rolls up to 2900 feet (884m)
Pipe Stiffness 35 PSI	Pipe stiffness meets or exceeds the requirements of the applicable specification.
Installation	Install according to the standard practice of corrugated polyethylene pipe or as recommended by the manufacturer.

~~Hi-Q® & Hi-Q Sure-Lok® Pipe~~

Product Specification	AASHTO M294, Type S or SP; M252
Available Diameters	4 inch (100mm) through 48 inch (1200mm); plain or perforated wall
Standard Lengths	20 foot (6m)
Design Manning Value	0.010
Pipe Stiffness	Pipe stiffness meets or exceeds the requirements of AASHTO M294.
Installation	Install according to the standard practice of corrugated polyethylene pipe or as recommended by the manufacturer.

This product is solely intended for the conveyance of fluids. Access into this product for maintenance, inspection, or other reason should be done in strict accordance with OSHA recommendations for confined space entry.

APPENDIX G

GROUNDWATER COLLECTION CALCULATIONS

GROUNDWATER FLOW RATE CALCULATIONS

This appendix provides the calculations performed to estimate the groundwater flow rates to the groundwater collection drain and groundwater extraction wells.

In order to perform the calculations, hydraulic data collected during previous and pre-design investigations were employed. Specifically, the following historical/pre-design data were employed in the flow rate calculations:

- Stratigraphic data (lithologic, grain size, etc.);
- Hydraulic monitoring data;
- OW-7a pumping test data/results; and
- Recovery test data.

Groundwater Collection Drain

The purpose of the groundwater collection drain is to prevent off-Site migration of shallow impacted groundwater.

The flow rates to the groundwater collection drain were calculated using a dewatering equation for unconfined conditions documented on p. 741 of Groundwater and Wells (Driscoll, 1986) as follows:

$$Q = \frac{(K)\bullet(H^2 - h^2)\bullet(x)}{2Lo}$$

Where:

Q	=	flow rate (ft^3/day) from one side of the drain
K	=	hydraulic conductivity of subsurface material (ft/day)
H	=	saturated thickness of subsurface material at distance Lo (ft) or saturated thickness under static conditions
h	=	saturated thickness of subsurface material in the drain (assumed to be 0 ft) while the system is operating
Lo	=	distance from point of greatest drawdown to point where there is no drawdown (ft) or to point under static conditions
x	=	length of drain (ft)

Shallow Groundwater Collection Drain

The following data/assumptions were employed in the calculations to estimate groundwater flow to the shallow groundwater collection drain:

- Depth of groundwater collection drain is 12 feet below ground surface (bgs);
- Average depth to the water table is 2 feet (saturated thickness (H) of 10 feet along the drain);
- Length (x) of groundwater collection drain is 500 feet;
- Downgradient and upgradient distances (Lo) to points of zero drawdown are 50 feet; and
- Hydraulic conductivity (K) of subsurface material is 1 x 10^{-4} cm/sec (0.28 ft/day). This hydraulic conductivity is slightly higher than geometric mean of 7.5 x 10^{-5} cm/sec calculated from the recovery tests (see Section 2.3.2).

The flow to the shallow groundwater collection trench from the upgradient and downgradient sides are calculated as follows:

$$Q = \frac{(0.28\text{ft/day}) \bullet ((10\text{ ft})^2 - (0\text{ ft})^2) \bullet (500\text{ ft})}{(50\text{ ft})}$$

$$Q = 280\ \text{ft}^3/\text{day}$$

$$Q = 1.5\ \text{gpm (flow from both sides of collection drain)}$$

Therefore, the flow to the shallow groundwater collection drain is calculated to be on the order of 1.5 gpm.

Deeper Groundwater Collection Drain

The following data/assumptions were employed in the calculations to estimate groundwater flow to the deeper groundwater collection drain:

- Depth of groundwater collection drain is 20 feet bgs;
- Average depth to the water table is 5 feet (saturated thickness (H) of 15 feet along the drain);
- Length (x) of groundwater collection drain is 200 feet;
- Downgradient and upgradient distances (Lo) to points of zero drawdown are 50 feet; and

- Hydraulic conductivity (K) of subsurface material is 2×10^{-4} cm/sec (0.57 ft/day). This hydraulic conductivity is slightly higher than a value of 1×10^{-4} cm/sec used for shallow drain.

The flow to the deeper groundwater collection trench from the upgradient and downgradient sides are calculated as follows:

$$Q = \frac{(0.57\ \text{ft/day}) \bullet (15\ \text{ft})^2 - (0\ \text{ft})^2) \bullet (200\ \text{ft})}{(50\ \text{ft})}$$

$$Q = 513\ \text{ft}^3/\text{day}$$

$$Q = 2.7\ \text{gpm (flow from both sides of collection drain}$$

Therefore, the flow to the deeper groundwater collection drain is calculated to be on the order of 2.7 gpm.

Groundwater Extraction Wells

The purpose of the groundwater extraction wells is to prevent, in conjunction with the groundwater collection drain, off-Site migration of impacted groundwater. The specific requirement(s) for each extraction well forms the basis for the design of these wells (i.e., flow rates and depths).

The proposed groundwater extraction well locations and designations are described as follows:

- The proposed location of PW1 is approximately halfway between P1 and OW-7a, west of the Cowhorn Creek culvert;
- The proposed location of PW2 is immediately west of P2 and east of the Cowhorn Creek culvert;
- The proposed location of PW3 is immediately southwest of existing monitoring well OW14; and
- The proposed location of PW4 is approximately 10 feet southwest of existing monitoring well OW13 and approximately 40 feet north of PW3.

Groundwater Extraction Well PW1

The purpose of extraction well PW1 is to remove and prevent off-Site migration of impacted groundwater found in the vicinity of OW-7a.

Groundwater extraction well PW1 includes the following design specifications:

- Depth of 30 feet bgs which corresponds to the same depth as existing monitoring well OW-7a;
- PW1 will be installed with a 4-inch diameter stainless steel screen 10 feet in length with a No. 10 (0.01) slot size. The screen will be attached to a 5-foot steel sump and to steel riser pipe; and
- Based on a ground surface elevation of 290 ft AMSL, the screen elevation will be 270 to 260 ft AMSL. The sump elevation will be 260 to 265 ft AMSL.

The estimated flow rate in extraction well PW1 is approximately 2 to 3 gpm, based on the OW-7a pumping test results, described in Section 2.3. Monitoring well OW-7a was pumped at an average rate of 2.3 gpm for a duration of 39 hours. A drawdown of 3.7 feet was measured in OW-7a. A drawdown of 0.5 ft was measured in P1 during the test. This piezometer (P1) is located approximately 40 feet west of OW-7a. Leakage from the Cowhorn Creek culvert prevented drawdown in monitoring wells east of the culvert during the test. It is considered that the OW-7a pumping test data provided sufficient information for the design of groundwater extraction well PW1. Therefore, no further calculations were necessary to estimate the flow rate in PW1.

<u>Groundwater Extraction Well PW2</u>

The purpose of extraction well PW2 is to remove and prevent migration of impacted groundwater to the Cowhorn Creek culvert.

Groundwater extraction well PW2 includes the following design specifications:

- Depth of approximately 30 feet bgs which corresponds to the same depth and elevation as PW1;
- PW2 will be installed with a 4-inch diameter stainless steel screen 10 feet in length with a No. 10 (0.01 in.) slot size. The screen will be attached to a 5-foot steel sump and to steel riser pipe; and
- Based on a ground surface elevation of 290 ft AMSL, the screen elevation will be 270 to 260 ft AMSL. The sump elevation will be 260 to 265 ft AMSL.

It is estimated that groundwater extraction well PW2 could sustain a pumping rate of approximately 1.0 gpm, based on a hydraulic conductivity of approximately 1×10^{-4} cm/sec, for the subsurface material at this location (i.e., near P2).

Groundwater Extraction Wells PW3 and PW4

The purpose of extraction wells PW3 and PW4 is to remove and prevent migration of impacted groundwater to Cowhorn Creek.

The requirements of groundwater extraction wells PW3 and PW4 are to lower the water table to an elevation of approximately 272 ft AMSL (Cowhorn Creek water elevation), from approximately 290 ft AMSL.

Therefore, the designs of extraction wells PW3 and PW4 are based on the above-noted requirement.

In order to perform the design calculations for PW3 and PW4, the following data/assumptions were utilized:

- Ground surface elevation of 300 ft AMSL;
- Water Table elevation of 290 ft AMSL;
- Hydraulic conductivity of 1.0×10^{-4} cm/sec (0.28 ft/day);
- Saturated thickness of 20 feet (between PW3 and PW4);
- Desired drawdown of 18 feet at a distance of 20 feet (approximately halfway) between PW3 and PW4;
- Transmissivity of 5.6 ft^2/day (based on a hydraulic conductivity of 0.28 ft/day and a saturated thickness of 20 ft);
- Specific yield of 0.2;
- Time to achieve steady state in close proximity to pumping wells in approximately 180 days;
- Time to achieve steady state at a distance of approximately 20 feet from extraction wells is approximately 365 days; and
- Assume that the extraction wells are 75 percent efficient.

The drawdown in each of extraction wells PW3 and PW4 and at distances of approximately 20 feet from these wells was calculated using the following forms of the Theis (1935) equation:

$$\mu = \frac{(r^2)\bullet(Sy)}{4(T)\bullet(t)}$$

$$s = \frac{(Q) \bullet (W(u))}{(4) \bullet (\pi) \bullet (T)}$$

Where:

µ	=	exponential integral (dimensionless)
W(u)	=	well function (dimensionless)
r	=	radius of pumping well or distance to drawdown x (ft)
Sy	=	specific yield of subsurface material (dimensionless)
T	=	transmissivity of subsurface material (ft^2/day)
t	=	time to achieve steady state (days)
Q	=	discharge rate (ft^3/day)
s	=	drawdown (ft)

In order to calculate the drawdown in each extraction well, at a discharge rate of 1.0 gpm (193 ft^3/day), the following calculations are performed:

$$\mu = \frac{(0.42\ \text{ft})^2\ (0.2)}{4\,(5.6\ \text{ft}^2/\text{day}) \bullet (180\ \text{days})}$$

$$\mu = 9 \times 10^{-6}$$

$$W(u) = 11.04$$

$$\Delta = \frac{(193\ \text{ft2/day}) \bullet (11.04)}{(4) \bullet (\pi) \bullet (5.6\ \text{ft2/day})}$$

$$\Delta = 30.3\ \text{ft}$$

The drawdown in each extraction well assuming 100 percent efficiency would be approximately 30 feet. Assuming 75 percent efficiency (more typical for pumping wells), the drawdown in each well would be approximately 40 feet.

Given the calculations presented above, extraction wells PW3 and PW4 would have to be installed at a sufficient depth to allow for 40 feet of drawdown. Assuming a ground surface elevation of 300 ft AMSL and a water table elevation of 290 ft AMSL, extraction wells PW3 and PW4 would have to be installed at depths of 50 ft bgs.

In order to calculate the drawdown at a distance of approximately 20 feet from each extraction well at a discharge rate of 1.0 gpm (193 ft^3/day) per well, the following calculations are performed:

$$\mu = \frac{(20\,ft)^2\,(0.2)}{4\,(5.6\,ft^2/day) \bullet (365\,days)}$$

$$\mu = 1 \times 10^{-3}$$

$$W(u) = 6.3$$

$$\Delta = \frac{(193\,ft^2/day) \bullet (6.3)}{(4) \bullet (\pi) \bullet (5.6\,ft^2/day)}$$

$$\Delta = 17.3\,ft$$

Therefore, the drawdown at a distance of approximately 20 feet from each extraction well installed at depths of approximately 50 ft bgs and pumping at rates of approximately 1.0 gpm (193 ft^3/day) would be approximately 17.3 feet.

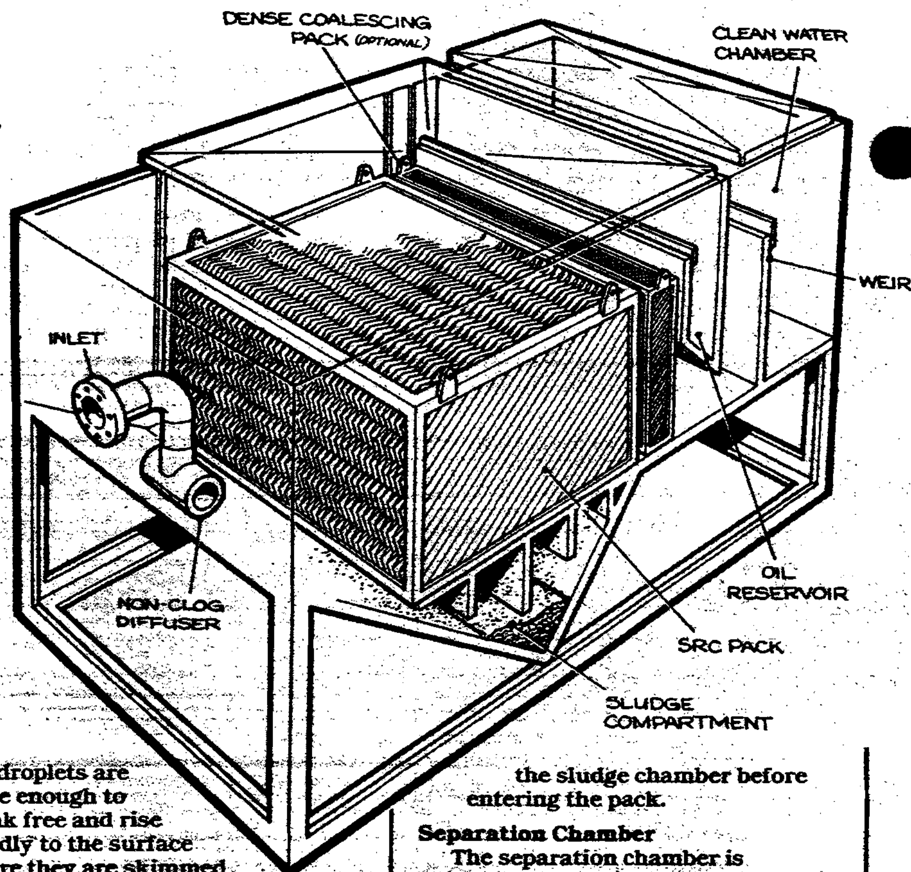
Therefore, based on the calculations provided above, the design specifications for extraction wells PW3 and PW4 are the following:

- Depth of approximately 50 feet bgs or approximately 40 feet below the water table;
- PW3 and PW4 will be installed with a 4-inch diameter stainless steel screen 20 feet in length with a No. 10 (0.01 in.) slot size. The screen will be attached to a 5-foot steel sump and to steel riser pipe; and
- Based on a ground surface elevation of 300 ft AMSL, the screen elevations will be 270 to 250 ft AMSL. The sump elevations will be 250 to 245 ft AMSL.

APPENDIX H

OIL-WATER SEPARATOR DATA

The Slant Rib Coalescing Separator is a highly effective gravity separator for the removal of dispersed oil and solids from water.



GENERAL INFORMATION

The Great Lakes Slant Rib Coalescing (SRC) Separators are capable of effectively separating oils and solids from water where the oil and solids have a specific gravity different than that of water. The SRC performance is superior to other gravity coalescing units for the separation of dispersed oil and settleable solids. Effluent concentrations of dispersed oil are less than 10 mg/L. The SRC Separators are ½ the volume and as little as ⅙ the length of straight gravity separators.

The Slant Rib Coalescers are installed in rectangular tanks containing special baffles and weirs designed to direct flow, skim oil and control the liquid levels in the separator. Pitched sludge compartments are provided below the separation chamber for easy sludge removal.

The separators are available in standard models with capacities from 5 GPM TO 5000 GPM. They can be installed above grade, flush with grade, or below grade as required. The separators can operate entirely by gravity or pumps can be supplied for product or effluent transfer when required.

DESIGN

When certain materials are placed in the waste water flow, removal efficiencies of oil increase due to impingement on their surfaces. Plastic media is particularly effective because of its oleophilic (oil attracting) characteristics. As fine oil droplets impinge upon or pass close to the plastic surface, they are attracted to it and adhere. Additional droplets continue to be attracted and coalesce or merge with previous droplets to produce much larger droplets. At a point, the droplets are large enough to break free and rise rapidly to the surface where they are skimmed or decanted. This coalescing action allows removal of smaller droplets than is possible with a straight gravity separator.

The effectiveness of any particular coalescing media is governed by several variables; density, available surface area, velocity and direction of flow and shape of the media. All of these variables influence the potential contact area, so it becomes of particular importance to form the media properly to maximize contact while minimizing blinding. The Slant Rib Coalescing (SRC) media pack was designed with consideration of all these factors. The SRC media provides greater coalescing and solids separation area than any other media currently available. The patented shape and specific spacing of the plates provides maximum protection from blinding, while providing a series of inclines that enhance solids separation and a tortuous path through which the water must pass. This continuous change of direction insures a high degree of oil droplet contact on the plate surface with resultant coalescence and oil removal. The ribs are slanted toward the surface in the direction of flow, encouraging separated oil to float to the surface along the plates before breaking free.

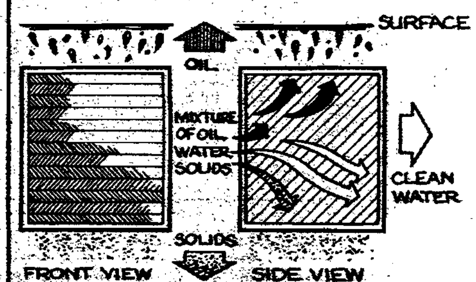
OPERATION

Inlet and Diffusion Chamber

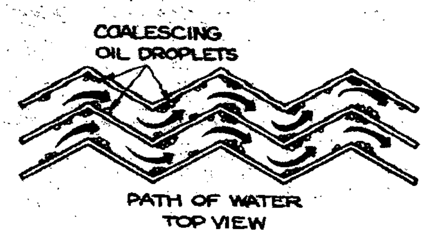
Flow enters the inlet chamber where it is dispersed through a non-clog diffuser across the width and depth of the media pack. Larger solids drop out here into the sludge chamber before entering the pack.

Separation Chamber

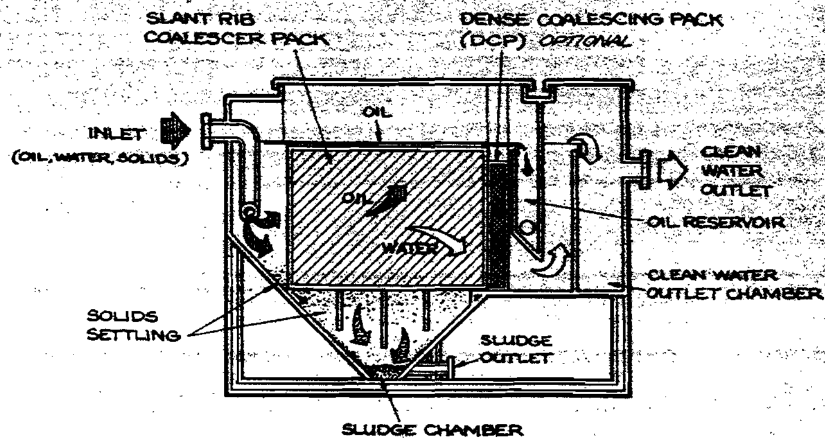
The separation chamber is filled with the SRC media pack. The ribbed plates are arranged vertically in the direction of flow,



spaced ¾" apart. When looking at the side of the media pack the ribs run from the bottom of the inlet side to the top of the outlet side on a 45° angle. The depth of the ribs is more than twice the distance of the spacing creating an overlap condition. This causes the flow to zig-zag around 90° corners throughout the pack, causing resistance to flow, collisions of the droplets 20 microns and larger with the plates and coalescence. The coalesced oil has the least restricted path to exit the waste stream, and slides to the surface on the underside of the rib.

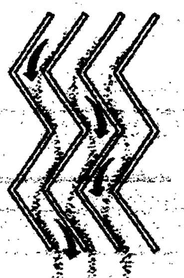


An optional Dense Coalescer Pack (DCP) is available when additional polishing is desired.



SLANT RIB COALESCING SEPARATOR

Solids entering the pack encounter a 55° angle of inclination created by the ribs which is optimum for solids settling. The solids slide down the top of the rib and fall to the next rib, gathering mass and velocity as they near the bottom of the pack and drop into the sludge chamber. The horizontal projected area of the top side of the ribs provides a conservative 0.20 GPM per square foot separation rate at design loadings.



SOLIDS SETTLING
FRONT VIEW

Sludge Chamber

The sludge chamber is located directly beneath the separation chamber and provides adequate volume for the settled sludge. The sides of the sludge chamber are sloped 45° to insure easy and complete removal of the sludge.

Oil Removal

The separated oil accumulates at the surface of the separation chamber where it displaces the water. As the oil layer increases, oil spills over a weir into an oil reservoir where it can flow by gravity or be pumped automatically to remote storage tanks.

Clean Water Chamber

The clean water leaving the SRC media pack passes under an oil retention baffle and into the effluent or clean water chamber. From there, the clean water passes over a weir which maintains the liquid level in the separator. The clean water flows by gravity through a pipe outlet or effluent pumps can be provided.

Covers

Hatches are provided for easy access into the separator. Sealed, vapor tight hatches are available. Lifting lugs are provided on the media packs and on the separator.

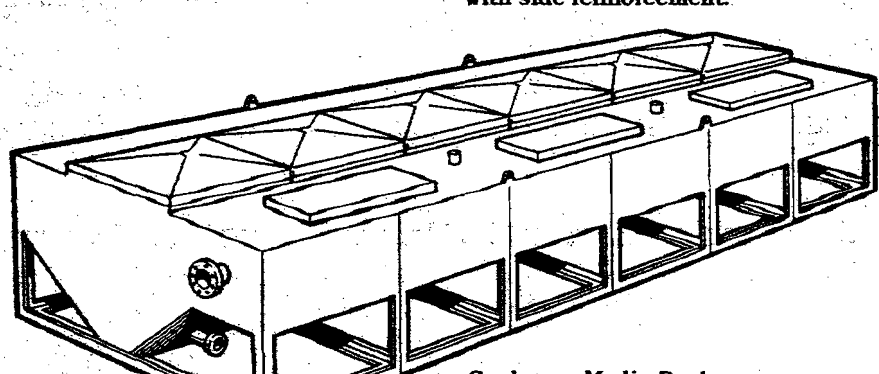
MATERIALS OF CONSTRUCTION

Materials of construction include 3/16"-1/4" thick A36 carbon steel, stainless steel and fiberglass. The standard Slant Rib Coalescing Media is polyvinylchloride (PVC) which is highly oleophilic. The media can also be supplied in:

- Polypropylene (POLP)
- Chlorinated Polyvinylchloride (CPVC)
- 304 Stainless Steel
- 316 Stainless Steel
- Carbon Steel

Plate spacings of 1/4", 1/2", 3/4", 1.2" are available for special applications.

Fiberglass separators are single piece molded construction with side reinforcement.



Coalescer Media Packs sold separately for upgrading existing gravity separators.

COATINGS

Above grade carbon steel tanks are coated on the exterior with an epoxy primer and urethane overcoat for excellent weather and chemical resistance. Interior surfaces are lined with coal tar epoxy which has resistance to a wide variety of chemical environments and pH swings. Special interior and exterior coatings are available.

AVAILABLE OPTIONS

- Inlet Feed Pumps – Coalescing media of polypropylene, CPVC, carbon steel and stainless steel
- Water Pump Out System
- Recovered Oil Pump Out System
- Heaters for freeze protection
- Dense Coalescing Pack
- Sludge Pump Out System
- External Oil Reservoir
- Design flexibility to satisfy your application

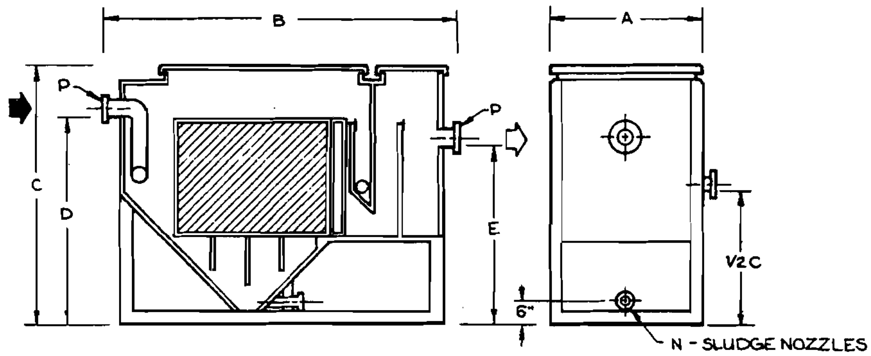
APPLICATIONS

- Automotive
- Airports
- Bus Terminals
- Bulk Plants
- Chemical Plants
- Fabricated Metal Plants
- Glass Factories
- Ground Water
- Military Bases
- Oil Fields
- Petroleum Plants/Refineries
- Pulp and Paper Mills
- Parking Lots
- Railroad Yards
- Textile Mills
- Tramp Oil
- Truck Terminals
- Utility Companies
- Wash Racks

For further information contact Great Lakes Environmental, Inc., or our local representative. We will be glad to assist you in selecting a properly sized unit for your application.

GREAT LAKES
ENVIRONMENTAL

Slant Rib Coalescing Oil/Water Separator



DIMENSIONS, WEIGHTS & CAPACITIES

MODEL	A	B	C	D	E	P	N	No. Packs	Coalescing Area Sq. Ft.	Settling Area Sq. Ft.	Empty Weight	Operating Weight
SRC-15	2.4′	7.3′	4.0′	3.3′	2.7′	3″	2	1	330	82	1260	2700
SRC-30	2.4′	7.3′	5.0′	4.4′	3.8′	3″	2	1	670	167	1720	4120
SRC-50	2.4′	8.3′	6.0′	5.4′	4.7′	4″	2	1	1000	250	1840	5190
SRC-75	3.4′	8.3′	6.0′	5.4′	4.7′	4″	2	1	1510	377	2130	7160
SRC-100	3.4′	8.3′	7.1′	6.5′	5.4′	6″	2	1	2010	502	3380	10650
SRC-150	5.4′	8.3′	7.1′	6.5′	5.4′	6″	2	1	3360	840	4800	16920
SRC-200	6.5′	8.3′	7.3′	6.5′	5.4′	6″	2	2	4030	1007	5380	19920
SRC-250	8.5′	8.3′	7.3′	6.5′	5.1′	8″	2	2	5370	1342	6540	25930
SRC-300	9.5′	8.3′	7.3′	6.5′	5.1′	8″	2	3	6040	1518	7251	29060
SRC-400	6.9′	14.0′	7.3′	5.7′	4.6′	10″	4	4	8060	2014	7700	30500
SRC-500	8.9′	14.0′	7.3′	5.7′	4.6′	10″	4	4	10740	2684	9200	39500
SRC-600	9.9′	14.0′	7.3′	5.7′	4.6′	10″	4	6	12080	3020	10000	44000
SRC-800	6.9′	16.7′	11.3′	9.5′	8.2′	14″	6	8	16120	4028	12100	66000
SRC-1000	8.9′	16.7′	11.3′	9.5′	8.2′	14″	6	8	21480	5368	14600	86000
SRC-1200	9.9′	16.7′	11.3′	9.5′	8.2′	14″	6	12	24160	6040	15900	96000
SRC-1500	9.9′	25.0′	11.5′	9.5′	8.0′	16″	2	12	30240	7560	25000	153700
SRC-2000	10.9′	28.0′	11.5′	9.5′	7.0′	18″	2	12	40320	10080	30000	192500
SRC-2500	10.9′	32.0′	11.5′	9.5′	7.0′	20″	2	12	47040	11760	35000	223500
SRC-3000	10.9′	37.5′	11.5′	9.5′	7.0′	24″	2	16	53760	13440	37300	262000
SRC-3500	11.9′	35.5′	12.3′	10.0′	8.0′	24″	3	18	58212	14553	38600	294500
SRC-4000	11.9′	37.5′	13.3′	11.0′	8.0′	(2)20/24″	3	24	73920	18480	41000	335000
SRC-4500	11.9′	41.5′	14.3′	12.0′	8.3′	(2)20/30″	3	24	81312	20330	46000	400000
SRC-5000	11.9′	43.0′	15.3′	13.0′	9.3′	(2)20/30″	3	24	88705	21175	50000	440000

Dimensions and capacities are for reference only and are not to be used for construction.
Model No. represents nominal flow rates in GPM.

GREAT LAKES ENVIRONMENTAL
463 Vista • Addison, IL 60101 • 708-543-9444
FAX 708-543-1169

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1395-20143 Lawrence Ave. W.
Toronto Ont. M6L 1A7 CANADA
Tel: (416) 245-7808 Fax: 614-0653

APPENDIX I

HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN
REMEDIAL ACTION ACTIVITIES

CONGRESS STREET PLANT
SCHENECTADY INTERNATIONAL INC.
SCHENECTADY, NEW YORK

NOVEMBER 1998
REF. NO. 1312 (35)
This report is printed on recycled paper.

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Station 2: Outer Boot, Glove, and Garment Wash and Rinse

Scrub outer boots, outer gloves, and/or splash suit with decontamination solution or detergent wash. Rinse off using water.

Station 3: Outer Boot and Glove Removal

Remove outer boots and gloves. If outer boots are disposable, deposit in a covered container. If non-disposable, store in a clean dry place.

Station 4: Outer Garment Removal

Remove outer garments and deposit in a covered container. Decontaminate or dispose of splash suits as necessary.

Station 5: Respiratory Protection Removal

Remove hard hat and facepiece, and deposit on a clean surface. Air purifying respirator cartridges will be discarded at the end of each day or upon breakthrough, whichever occurs first. Wash and rinse respirator at least daily. Wipe off and store respiratory gear in a clean, dry location.

Station 6: Inner Glove Removal

Remove inner gloves. Deposit in a covered container for disposal.

Station 7: Field Wash

Thoroughly wash hands and face with soap and water.

10.0 GENERAL SAFETY AND PERSONAL HYGIENE

1. Eating at the Site is prohibited except in specifically designated areas. Designation of eating areas will be the responsibility of the HSO. The location of these areas may change during the duration of the project to maintain adequate separation from the active work area(s).
2. Smoking at the Site is prohibited except in specifically designated areas.
3. Individuals getting wet to the skin with effluent from the washing operation must wash the affected area immediately. If clothes in contact with skin are wet, then these must be changed.
4. Hands must be washed with soap and water before eating, drinking, smoking, and before using toilets.
5. All disposable coveralls and soiled gloves will be placed in covered containers at the end of every shift or sooner, if deemed necessary by the HSO. Wastes will be stored until such time that it is properly disposed of during completion of project activities.
6. All work performed within the EZ is to be done using the "buddy system:.

informed in order to assess the need for evacuation. In the event of a spill, sanitary districts and drinking water systems may need to be alerted;

iv) ensure that appropriate decontamination, treatment, or testing for exposed or injured personnel is obtained;

v) determine the cause of the incident and make recommendations to prevent the recurrence; and

vi) ensure that all required reports have been prepared including a report for SII including the following information:

   a) name, organization, telephone number, and location of the subcontractor,
   b) name and title of the person(s) reporting the incident,
   c) date and time of accident/incident,
   d) location of accident/incident giving pertinent details,
   e) brief summary of accident/incident giving pertinent details including type of operation at time of accident,
   f) cause of accident/incident, if known,
   g) casualties (fatalities, disabling injuries),
   h) details of any existing chemical hazard of contamination,
   i) estimated property damage, if applicable,
   j) nature of damage and effect on contract schedule,
   k) action taken by subcontractor to ensure safety and security, and
   l) other damage or injuries sustained (public or private).

14.5 MEDICAL EMERGENCIES

Any person who becomes ill or injured in the EZ must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed as much as possible without causing further harm to the patient. First aid should be administered while awaiting an ambulance or paramedics. All injuries and illnesses must immediately be reported to the HSO and on-Site Engineer.

Any vehicle used to transport contaminated personnel will be cleaned or decontaminated as necessary.

14.6 FIRE OR EXPLOSION

The local fire department will be contacted and given an opportunity to attend preconstruction conference, tour the Site, and discuss necessary response actions with the Site Superintendent and HSO in case of an emergency.

In the event of a fire or explosion, the local fire department should be summoned immediately. Upon their arrival, the HSO or designated alternate will advise the fire commander of the location, nature, and identification of the hazardous materials on Site.

If it is safe to do so, Site personnel may :

i) if hazardous, report to the Agency On-Site Representative and/or Project Manager;

ii) use fire fighting equipment available on Site; or

iii) remove or isolate flammable or other hazardous materials which may contribute to the fire.

14.7 SPILLS OR CONTAINER LEAKS

In the event of a spill or leak, Site personnel will:

i) report spills and releases to the Agency On-Site Representative, Project Managers, the NRC, and State Emergency Response Commission (SERC);

ii) locate the source of the spillage and stop the flow if it can be done safely; and

iii) begin containment and recovery of the spilled materials.

15.0 RECORDKEEPING

The HSO shall establish and maintain records of all necessary and prudent monitoring activities as described below:

i) name and job classification of the employees involved on specific tasks;

ii) records of qualitative fit testing and physical examination results for Site personnel;

iii) records of all OSHA training certification for Site personnel;

iv) records of training acknowledgment forms; and

v) emergency reports describing any incidents or accidents.

APPENDIX I

HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN
REMEDIAL ACTION ACTIVITIES

CONGRESS STREET PLANT
SCHENECTADY INTERNATIONAL INC.
SCHENECTADY, NEW YORK

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LIST OF ATTACHMENTS

1.0 INTRODUCTION

The Health and Safety Plan (HASP) presented herein describes the health and safety procedures and emergency response guidelines to be implemented during the Remedial Action (RA) activities at the Schenectady International, Inc. (SII) Congress Street Plant (Site) in Schenectady, New York. Figure 1.1 and 1.2, respectively, present the Site location and Site layout.

The scope of work to be completed during the performance of the RA activities includes the following work activities:

i) mobilization and demobilization of labor, materials, and equipment to and from the Site;
ii) surveying activities;
iii) installation of the groundwater collection system including: extraction wells, collection drain, forcemain, and electrical conduit;
iv) soil handling activities including grading activities;
v) installation of the oil-water separator system (treatment system);
vi) perform operation and maintenance (O&M) activities on the treatment system including: groundwater sampling, water level measuring, flushing or cleaning of the treatment system components, collection and off-Site shipment of separated oil (LNAPL); and
vii) decontamination activities.

During completion of the above RA activities, personnel may come in contact with soils, sediments and groundwater which potentially contain hazardous constituents. This HASP has been developed to ensure the following:

i) that Site personnel are not adversely exposed to the compounds of concern;
ii) that public health and the environment are not adversely impacted by contaminated materials which may potentially migrate off-Site during work activities at the Site;
iii) compliance with applicable governmental and non-governmental (American Conference of Governmental Industrial Hygienists) regulations and guidelines. In particular, the amended rules of the Occupational Safety and Health Administration (OSHA) for Subpart H of Part 1910 (Title 29 Code of Federal Regulations [CFR] Part 1910.120) will be implemented for all Site work; and

3.0 BASIS FOR DESIGN

Regulations set forth by OSHA in Title 29, Code of Federal Regulations, Parts 1910 and 1926 (29 CFR 1910 and 1926) form the basis of this HASP. Emphasis is placed on Sections 1910.120 (Hazardous Waste Operations and Emergency Response), 1910 Subpart I (Personal Protective Equipment), 1910 Subpart Z (Toxic and Hazardous Substances), 1926 Subpart O (Motor Vehicles, Mechanized Equipment, and Marine Operations), and 1926 Subpart P (Excavations). Some of the specifications within this section are in addition to the OSHA regulations, and reflect the positions of the United States Environmental Protection Agency (USEPA), the National Institute of Occupational Safety and Health (NIOSH), and the United States Coast Guard (USCG) regarding safe operating procedures at hazardous waste sites.

The health and safety of the public and Site personnel and the protection of the environment will take precedence over cost and scheduling considerations for all project work.

4.0 RESPONSIBILITIES AND ADMINISTRATION

An on-Site Engineer will be assigned to this project and shall be responsible, along with the HSO, for all decisions regarding operations and work stoppage due to health and safety considerations. The HSO will have prior experience in working at hazardous waste sites.

The on-Site HSO responsibilities include:

i) supervision and enforcement of safety equipment usage, including the required use of extra equipment if appropriate;

ii) supervision and inspection of equipment cleaning;

iii) supervision of decontamination activities;

iv) conduct the on-Site personnel safety indoctrination session for potential hazards, personal hygiene principles, confined space entry procedures, all other SOPs, safety equipment usage, emergency procedures, and location of first aid kits and identification of personnel trained in first aid and cardiopulmonary resuscitation (CPR);

v) maintain Exclusion Zone (EZ) and Contaminant Reduction Zone (CRZ) work areas;

vi) review and modify the HASP as more information becomes available or conditions warrant;

vii) issue a confined space entry permit as required;

viii) authority to suspend work activity due to unsafe working conditions;

ix) coordination of emergency procedures;

x) be responsible for performing air monitoring;

xi) ensure that all on-Site personnel have obtained the required medical examination prior to arrival at the Site, have met the OSHA training requirements, and have been fit tested for the respiratory equipment they may use;

xii) maintain the on-Site Hazard Communication Program including copies of Material Safety Data Sheets (MSDSs); and

xiii) conduct brief daily safety meetings.

5.0 WORKER TRAINING AND EDUCATION

Prior to commencing Site activities, a Health and Safety/Site Indoctrination Session will be presented. Attendance is mandatory for all personnel who will be or are expected to be involved with RA activities at the Site.

The training program will stress the importance that each attendee understands the basic principles of personnel protection and safety, be able to perform their assigned job tasks in a safe and environmentally responsible manner, and be prepared to respond in an appropriate manner to any emergency which may arise. A brief history of the Site will be included and the various components of the project HASP will be presented followed by an opportunity to ask questions to ensure that each attendee understands the HASP. Personnel not successfully completing this training program will not be permitted to enter or work in potentially contaminated areas of the Site. Personnel successfully completing this training program shall sign an acknowledgment form, a copy of which is presented in Attachment A.

This training will be given in addition to the basic training required under OSHA and is not intended to meet the requirements of 29 CFR 1910.120. Prior to working in or entering an EZ environment (as defined in Section 6.0), all personnel will be required to provide documentation to the HSO indicating successful completion of the training requirements of 29 CFR 1910.120. This includes a certificate for the initial 40 hours of training, a current 8-hour refresher certificate, and additional 8-hour certificates for managers or supervisors.

6.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

This section of the HASP describes the requirements for PPE and the specific levels of protection required for each work task to be conducted at the Site during project activities. Basic PPE in all Site areas will consist of hard hats, safety glasses, and safety boots/shoes.

6.1 PROTECTION LEVELS

Personnel will wear protective equipment when RA activities involve potential exposure to contaminants from vapors, gases, or particulates that may be generated on Site or when direct contact with potentially hazardous substances may occur. Chemical resistant clothing protects the skin from contact with skin-destructive and absorbable contaminants. Respirators protect lungs, the gastrointestinal tract, and if a full-face respirator is worn, the eyes, against airborne toxicants. Respiratory protection levels will be based on the real-time air monitoring results and the action levels that are presented in Section 6.5.

Protection levels are selected based upon the following:

i) measured concentrations of the known Site contaminants in worker breathing zones;

ii) potential for exposure to contaminants in air, splashes of liquids, or other contact due to the nature of work tasks; and

iii) Site contaminants toxicity, route of exposure, and contaminant matrices.

The specific protection levels to be employed at the Site for each work task are listed in Table 6.1. All RA activities conducted at the Site will require the use of one of the following levels of PPE:

Level B:

i) supplied air respirator (NIOSH) approved. Respirators may be positive pressure-demand, self-contained breathing apparatus (SCBA), or positive pressure-demand airline respirator (with escape bottle for Immediate Danger to Life and Health [IDLH] or potential for IDLH atmosphere);

ii) polycoated tyvek® or saranex® coveralls;

iii) steel toe work boots and disposable boot covers or rubber boots;

iv) disposable nitrile inner gloves - chemical resistant;

v) outer nitrile work gloves - chemical resistant;

vi) hearing protection as necessary; and

vii) hard hat.

Level C:

i) tyvek® coveralls (polycoated tyvek® when handling or working with liquids [e.g., decontamination]);

ii) steel toe work boots and disposable boot covers or rubber boots;

iii) disposable nitrile inner gloves - chemical resistant;

iv) outer nitrile work gloves - chemical resistant;

v) half-face or full-face air purifying respirator (APR), equipped with combination cartridges for organic vapors and particulates;

vi) hearing protection as necessary; and

vii) hard hat.

Modified Level D:

i) tyvek® coveralls (polycoated tyvek® when handling or working with liquids);

ii) steel toe work boots;

iii) gloves as necessary;

iv) safety glasses;

v) splash shields as necessary;

vi) hearing protection as necessary; and

vii) hard hat.

Level D:

i) standard work uniform or coveralls;

ii) steel toe work boots;

iii) gloves as necessary;

iv) safety glasses;

v) splash shield as needed;

vi) hearing protection as necessary; and

vii) hard hat.

The potential exists that confined space entry work may be necessary during RA activities (see Section 13.0). If it becomes necessary to enter a confined space, this work will be completed under a permit system which requires specific air monitoring to be completed.

PPE will be maintained in a clean sanitary condition and ready for use. Disposable coveralls shall be discarded when torn and as personnel leave the contaminated work zone. Hard hats shall be thoroughly cleaned after leaving the contaminated work zone. Respirators shall be cleaned after each day's use and cartridges discarded. A sufficient quantity of potable water shall be supplied for washing, cleaning PPE, and drinking. A potable water supply for washing and cleaning PPE will be maintained adjacent to the decontamination area described in Section 9.0. Fresh potable water for drinking will be supplied on a daily basis and be maintained at a location removed from the active work area.

6.2 REASSESSMENT OF PROTECTION LEVELS

Protection levels provided by PPE selection shall be upgraded or downgraded based upon a change in Site conditions or the review of the results of monitoring.

When a significant change occurs, the hazards should be reassessed. Some indicators of the need for reassessment are as follows:

i) commencement of a new work phase;

ii) change in job tasks during a work phase;

iii) change of season/weather;

iv) when temperature extremes or individual medical considerations limit the effectiveness of PPE;

v) contaminants other than those expected to be encountered are identified;

vi) change in ambient levels of contaminants; and

vii) change in work scope which effects the degree of contact with potentially contaminated areas.

All proposed changes to protection levels and PPE requirements will be reviewed and approved prior to their implementation by the HSO and on-Site Engineer.

6.3 DURATION OF WORK TASKS

The duration of RA activities involving the usage of PPE will be established by the HSO based upon ambient temperature and weather conditions, the capacity of personnel to work in the designated level of PPE (heat stress and cold stress, see Section 12.3-Environmental Control), and limitations of the protective equipment (i.e., ensemble permeation rates, life expectancy of air-purifying respirator cartridges, etc.). As a minimum, rest breaks will be observed at the following intervals:

i) 15 minutes midway between shift startup and lunch;
ii) one-half to one hour for lunch; and
iii) 15 minutes in the afternoon, between lunch and shift end.

All rest breaks will be taken in a clean area (e.g., Support Zone) after full decontamination and PPE removal. Additional rest breaks will be observed, based upon the heat stress monitoring guidelines presented in Attachment B.

6.4 LIMITATIONS OF PROTECTIVE CLOTHING

PPE ensembles designated for use during the RA activities have been selected to provide protection against contaminants at anticipated concentrations in the soil. However, no protective garment, glove, or boot is chemical-proof, nor will it afford protection against all chemical types. Permeation of a given chemical through PPE is a complex process governed by contaminant concentrations, environmental conditions, physical condition of the protection garment, and the resistance of a garment to a specific contaminant; chemical permeation may continue even after the source of contamination has been removed from the garment.

In order to obtain optimum usage from PPE, the following procedures are to be followed by all Site personnel using PPE:

i) when using disposable coveralls, don a clean, new garment after each rest break or at the beginning of each shift;
ii) inspect all clothing, gloves, and boots both prior to and during use for:

a) imperfect seams,

b) non-uniform coatings,

c) tears, and

d) poorly functioning closures; and

iii) inspect reusable garments, boots, and gloves both prior to and during use for:

a) visible signs of chemical permeation,

b) swelling,

c) discoloration,

d) stiffness,

e) brittleness,

f) cracks,

g) any sign of puncture, and

h) any sign of abrasion.

Reusable gloves, boots, or coveralls exhibiting any of the characteristics listed above will be discarded. PPE used in areas known or suspected to exhibit elevated concentrations of contaminants will not be reused.

Additional PPE usage guidelines are as follows:

i) ankles/wrists will be secured tightly with the use of duct tape;

ii) prescription eyewear used on Site shall be safety glasses equipped with side shields when full-face respirators are not required;

iii) all EZ workers will have received training in the usage of full-face air purifying respirators and SCBAs which may be required in an emergency;

iv) steel toe leather footwear shall be covered with neoprene overboots prior to entering the EZ and immediately upon entering the CRZ; and

v) safety footwear and hard hats are to be worn by Site personnel at all times.

EZ personnel also carry certain responsibilities for their own health and safety, and are required to observe the following safe work practices:

i) familiarize themselves with this HASP;

ii) use the "buddy system" when working in a contaminated operation;

iii) use the safety equipment in accordance with training received, labeling instructions, and common sense;

iv) maintain safety equipment in good condition and proper working order;

v) refrain from activities that would create additional hazards (i.e., smoking, eating, etc. in restricted areas, leaning against dirty, contaminated surfaces);

vi) smoking and eating will be prohibited except in designated areas. These designated areas may change during the duration of the project to maintain adequate separation from the active work area(s). Designation of these areas will be the responsibility of the HSO; and

vii) soiled disposable outerwear shall be removed and placed into a covered, labeled container prior to washing hands and face, eating, using lavatory facilities, or leaving the Site.

6.5 RESPIRATORY PROTECTION PROGRAM

Prior to arriving at the Site, all on-Site personnel will have received training in the use of, and have been fit tested for either a half-face or a full-facepiece respirator. All on-Site personnel will be required to comply with their employer specific written respiratory protection program developed in accordance with OSHA 29 CFR 1910.134.

Respiratory protection may be required during some of the RA activities. This is to ensure worker protection from potentially contaminated particulates and volatile organic compounds (VOCs).

A photoionization detector (PID) equipped with a 10.2 or 10.6 eV lamp will be used to determine if organic vapors are present. A background reading will be established prior to commencing work activities at each active work area. Drager tubes or equivalent will be used to determine if benzene is present in worker breathing zones whenever sustained (15 minutes) organic vapors are present in worker breathing zones.

Action levels to determine the level of respiratory protection necessary for organic vapors during RA activities are based on the concentration of the Site contaminants measured within the breathing zone. The action levels and appropriate respiratory protection for these Site activities are as follows:

Sustained Organic Vapor Reading Above Background within Worker Breathing Zone in Parts Per Million (ppm) and Benzene is Not Present	*Action Taken*
0 or Background -5	Full-Face Respirator Available
5 - 250	Wear Full-Face Respirator
>250	Wear Supplied Air Respirator, Implement Additional Engineering Controls

Sustained Organic Vapor Reading Above Background within Worker Breathing Zone in ppm and Benzene is Present	*Action Taken*
0 - 50	Wear Full-Face Respirator
>50	Wear Supplied Air Respirator, Implement Additional Engineering Controls

However, if the ambient concentrations of organic vapors are due to identifiable substances, the level of respiratory protection may be altered by the HSO.

The appropriate air purifying respirator cartridge to be used at the Site is a combination organic vapor/P-100 particulate cartridge. The cartridge used must be of the same manufacturer as the respiratory face piece.

6.6 SITE CONTROL

Designated work areas will be set up as appropriate during the Site field activities, as required. The purpose of these procedures is to limit access to potentially contaminated areas, and prevent the migration of potentially hazardous materials into adjacent non-contaminated areas. These areas are described in the following.

i) The Exclusion Zone (EZ) is the area immediately surrounding the active work area. Sufficient area will be provided for efficient movement of personnel and equipment as well as contaminant control. Boundaries are modifiable depending on operational requirements. The HSO will be responsible for maintaining the boundaries of this area. Personnel entering this area are required to wear the PPE as defined previously. A wind direction indication device (i.e., flagging, windsock, etc.) will be mounted in the area of any EZ during Site activities.

   All personnel (including visitors) entering the EZ or CRZ using respiratory protection must have successfully passed a qualitative respirator fit test in accordance with OSHA 29 CFR 1910.134. Documentation of fit testing is the responsibility of each employer.

In the event that unauthorized personnel enter the EZ, work will stop. Work will not resume until the unauthorized personnel have been removed from the EZ or have been moved to an acceptable on-Site area. A log of all visitors to the Site, including those entering the EZ, will be maintained.

ii) The Contaminant Reduction Zone (CRZ) will provide a location for removal of contaminated PPE and final removal and decontamination of personnel and equipment. Supplemental safety equipment, such as fire extinguishers, portable eyewash, and extra quantities of PPE may be stored in this area. The order in which safety equipment is to be donned is as follows:

a) tyvek® suit;
b) rubber boot;
c) gloves;
d) respirator (if required); and
e) hard hat.

The following order applies when removing safety equipment:

a) wash off boots and outer gloves prior to removal;
b) tyvek® suit;
c) hard hat;
d) respirator; and
e) inner gloves.

iii) The Support Zone (SZ) is situated in clean areas where there is a minimal risk of encountering hazardous materials or conditions. PPE beyond standard construction safety equipment is therefore not required.

7.0 ACTIVITY HAZARD/RISK ANALYSIS

This section identifies the general hazards associated with specific project activities and presents the documented or potential health and safety hazards that exist at the Site. Every effort will be made to reduce or eliminate these hazards. Those which cannot be eliminated must be guarded against by use of engineering controls and/or PPE. Table 7.1 presents the anticipated hazards/risks and hazard controls.

In addition to the chemical hazards presented in Section 2.0 of this HASP, physical and biological hazards including uneven terrain, steep slopes, slippery surfaces, potential confined spaces, the use of heavy equipment, potential entanglement in drill rigs, potential injuries or death caused by being struck or run over by heavy equipment, the use of decontamination equipment, poisonous vegetation, bites and/or stings from ticks, bees, wasps, and potential heat and cold stress exist at the Site. It will be the responsibility of all Site personnel to identify the physical hazards posed by the various RA activities and implement preventative and corrective action.

7.1 CHEMICAL EXPOSURE

Preventing exposure to toxic chemicals is a primary concern. Chemical substances can enter the unprotected body by inhalation, skin absorption, ingestion, or through a puncture wound (injection). A contaminant can cause damage at the point of contact or can act systematically, causing a toxic effect at a part of the body distant from the point of initial contact.

Chemical exposures are generally divided into two categories: acute and chronic. Symptoms resulting from acute exposures usually occur during or shortly after exposure to a sufficiently high concentration of a contaminant. The concentration required to produce such effects varies widely from chemical to chemical. The term "chronic exposure" generally refers to exposures to "low" concentrations of a contaminant over a long period of time. The "low" concentrations required to produce symptoms of chronic exposure depend upon the chemical, the duration of each exposure, and the number of exposures. For a given contaminant, the symptoms of an acute exposure may be completely different from those resulting from chronic exposure.

For either chronic or acute exposure, the toxic effect may be temporary and reversible, or may be permanent (disability or death). Some chemicals may cause obvious symptoms such as burning, coughing, nausea, tearing eyes, or rashes. Other chemicals may cause health damage without any such warning signs (this is a particular concern for chronic exposures to low concentrations). Health effects such as cancer or respiratory disease may not become manifest for several years or decades after exposure. In addition, some toxic chemicals may be colorless and/or odorless, may dull the sense of smell, or may not produce any immediate or obvious physiological sensations. Thus, a worker's senses or feelings cannot be relied upon in all cases to warn of potential toxic exposure.

The effects of exposure not only depend on the chemical, its concentration, route of entry, and duration of exposure, but may also be influenced by personal factors such as the individual's smoking habits, alcohol consumption, medication use, nutrition, age, and sex.

An important exposure route of concern at the Site is inhalation. The lungs are extremely vulnerable to chemical agents. Even substances that do not directly affect the lungs may pass through lung tissue into the bloodstream, where they are transported to other vulnerable areas of the body. Some toxic chemicals present in the atmosphere may not be detected by human senses (i.e., they may be colorless, odorless, and their toxic effects may not produce any immediate symptoms). Respiratory protection is therefore extremely important if there is a possibility that the work site atmosphere may contain such hazardous substances. Chemicals also can enter the respiratory tract through punctured eardrums. Where this is a hazard, individuals with punctured eardrums should be medically evaluated specifically to determine if such a condition would place them at an unacceptable risk and preclude their working at the task in question.

Direct contact of the skin and eyes by hazardous substances is another important route of exposure. Some chemicals directly injure the skin. Some pass through the skin into the bloodstream where they are transported to vulnerable organs. Skin absorption is enhanced by abrasions, cuts, heat, and moisture. The eye is particularly vulnerable because airborne chemicals can dissolve in its moist surface and be carried to the rest of the body through the bloodstream (capillaries are very close to the surface of the eye). Wearing protective equipment, not using contact lenses in contaminated atmospheres (since they may trap chemicals against the eye surface), keeping hands away from the face, and minimizing contact with liquid and solid chemicals can help protect against skin and eye contact.

Although ingestion should be the least significant route of exposure at the Site, it is important to be aware of how this type of exposure can occur. Deliberate ingestion of chemicals is unlikely, however, personal habits such as chewing gum or tobacco, drinking, eating, smoking cigarettes, and applying cosmetics at the Site may provide a route of entry for chemicals.

The last primary route of chemical exposure is injection, whereby chemicals are introduced into the body through puncture wounds (i.e., by stepping or tripping and falling onto contaminated sharp objects). Wearing safety shoes, avoiding physical hazards, and taking common sense precautions are important protective measures against injection.

8.0 AIR MONITORING

During the progress of RA activities, monitoring of particulate levels and organic vapors will be taken by the HSO.

The following air monitoring instrumentation will be used for this purpose:

i) a PID equipped with either a 10.2 or 10.6 eV lamp;

ii) a realtime digital particulate monitor (Mini Ram PDM 3 or equivalent); and

iii) a Drager hand pump and Drager tubes or equivalent capable of detecting benzene.

All monitoring equipment will be calibrated on a daily basis in accordance with the manufacturer's guidelines, and such calibrations will be recorded in the Site daily log book. Results of all daily air monitoring also will be recorded in the Site daily log book.

Air monitoring will be conducted hourly in the breathing zone of workers in the EZ or as deemed necessary by the HSO based on Site-specific conditions. Background measurements immediately upwind of the EZ will be taken before activities commence. When organic vapors are present in worker breathing zones, Drager tubes will be used to determine if benzene is present. Respiratory action levels for organic vapors are discussed in Section 6.5.

Immediately upon identifying sustained elevated levels of organic vapors (greater than 50 ppm where benzene is present or 250 ppm in the absence of benzene) within the Work Zone, the air monitoring results will be reported to the HSO and work activities will be shut down. The HSO will determine the cause of the sustained elevated levels of organic vapors and alternate work methods or engineering controls will be implemented to rectify the release of elevated concentrations of organic vapors, or upgrade levels of PPE as required.

The contractor may implement a personnel air monitoring program for workers having the highest potential for exposure to chemicals present on Site. Samples would be collected during the startup of activities where personnel would face potential exposure to verify the adequacy of personal protection and to document the actual exposure level to the selected chemicals of concern. Samples may be collected and analyzed for the presence of benzene if detected by the Drager tubes and any additional compounds of concern as determined by the Project Management Team. Appropriate NIOSH procedures and methods will be followed and all samples are to be sent to an American

Industrial Hygiene Association (AIHA) accredited laboratory. Results of the air sampling program will be posted for personnel to review.

8.1 COMMUNITY AIR MONITORING

Air monitoring will be performed during performance of the RA activities to ensure that the community will not be adversely impacted during Site activities. The community air monitoring plan is described below.

8.1.1 COMMUNITY AIR MONITORING PLAN

This Community Air Monitoring Plan will be implemented during all ground intrusive activities at the Site. Realtime air monitoring for VOCs and respirable dust levels will be performed at the perimeter of the EZ. Monitoring will be conducted during ground invasive activities and any other activity which may potentially create an airborne hazard.

Community air monitoring will be conducted in accordance with the following:

i) VOCs will be monitored continuously at the downwind perimeter of the EZ. Readings will be recorded at 15-minute intervals or sooner if an action level has been exceeded. If total organic vapor levels exceed 5 ppm above background, work activities will be halted and monitoring continued under the provisions of the Vapor Emission Response Plan (see Section 8.1.2). All monitoring readings will be recorded and available for review; and

ii) a fugitive dust suppression and particulate monitoring program will be conducted in accordance with the procedures presented in Section 8.1.5.

8.1.2 STEP 1 VAPOR EMISSION MONITORING

If the ambient air concentrations of organic vapors exceeds 5 ppm above background at the downwind perimeter of the EZ then a check of the downwind Site perimeter will be made to verify that the level is less than 5 ppm. Activities will be halted and monitoring at the downwind perimeter of the Site will be continued if levels at the downwind perimeter are greater than 5 ppm. If the organic vapor level decreases below 5 ppm above background at the downwind perimeter of the Site, work activities can resume.

If the organic vapor level is above 25 ppm at the downwind perimeter of the EZ, air monitoring at 200 feet downwind of the Site perimeter or half the distance to the nearest residential or commercial structure, whichever is less, will be performed to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Step 2 Vapor Emission Monitoring section (Section 8.1.3).

8.1.3 STEP 2 VAPOR EMISSION MONITORING

If any organic vapor levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, then the air quality will be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If effort to abate the emission source are unsuccessful and if any of the organic vapor levels persist at 5 ppm above background or greater for more than 30 minutes in the 20 Foot Zone, then the Vapor Emission Response Plan (see Section 8.1.4) will automatically be placed into effect.

However, the Vapor Emission Response Plan will be immediately placed into effect if organic vapor levels are greater than 10 ppm above background at the 20 Foot Zone for any one time.

8.1.4 VAPOR EMISSION RESPONSE PLAN

Upon activation, the following activities will be undertaken:

i) all emergency response contacts, as listed in Section 14.1 of this HASP, will be notified so that evacuation procedures may begin and/or the Emergency Response Plan, will go into effect; and

ii) frequent air monitoring will be conducted at 30 minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the HSO.

8.1.5 FUGITIVE DUST SUPPRESSION AND PARTICULATE MONITORING PROGRAM

The following fugitive dust suppression and particulate monitoring program will be employed at the Site during ground invasive activities or during other activities which may potentially create an airborne hazard:

i) reasonable fugitive dust suppression techniques will be employed during all Site activities which may generate fugitive dust;

ii) particulate monitoring will be employed during ground invasive activities or activities which may generate fugitive dust;

iii) particulate monitoring will be performed using a realtime particulate monitor that is capable of monitoring particulate matter less than 10 microns in size. Particulate levels will be monitored at the downwind side of the EZ. Readings will be based on the 15 minute average concentrations;

iv) the particulate monitoring will be performed by a trained technician who fully understands the operation of the monitoring equipment and necessary calibration procedure. The technician will be responsible for keeping the air monitoring log book which will contain records of equipment calibration and all air monitoring readings;

v) the action level will be set at 150 micrograms per cubic meter ($\mu g/m^3$) based on a 15 minute average. If particulate levels are detected in excess of 150 $\mu g/m^3$ the upwind background level will be measured immediately using the same portable monitor. If the working site particulate measurement is greater than 100 $\mu g/m^3$ above the background level, additional dust suppression techniques will be implemented to reduce the generation of fugitive dust and corrective actions will be taken to protect Site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection and implementing additional dust suppression techniques. These may include:

   a) applying water on haul roads,

   b) wetting equipment and excavation faces,

   c) spraying water on buckets during excavation and dumping,

   d) hauling materials in tarped containers,

   e) restricting vehicle speed,

   f) immediately covering excavation areas or materials upon completion, and

g) reducing the size and/or number of excavations;

vi) if dust is observed leaving the working site, additional dust suppression techniques will be employed; and

vii) if the dust suppression techniques being utilized at the Site do not lower particulates to an acceptable level (below 150 $\mu g/m^3$) work will be suspended until appropriate corrective measures are approved to remedy the situation.

9.0 DECONTAMINATION PROCEDURES

In general, everything that enters the EZ at the Site must either be decontaminated or properly discarded upon exit from the EZ. All personnel, including any Federal, State, and local officials, must enter and exit the EZ through the CRZ. Prior to demobilization, potentially contaminated equipment will be decontaminated and inspected by the HSO before it is moved into the clean zone. Any material that is generated by decontamination procedures will be stored in a designated area in the EZ until disposal arrangements are made.

The type of decontamination solution to be used is dependent on the type of chemical hazards. The decontamination solution for heavy equipment and for any reusable PPE is Liquinox soap. The MSDSs for Liquinox and for all other Site chemical products will be maintained by the HSO in a separate binder kept on Site.

9.1 EQUIPMENT DECONTAMINATION PROCEDURES

All equipment must be decontaminated within the CRZ or on the decontamination pad by a pressure water cleaner upon exit from the EZ. Decontamination procedures should include: knocking soil/mud from machines; water rinsing using a solution of water and Liquinox; and a final water rinse. Personnel shall wear as a minimum Level C protection when decontaminating equipment . Runoff will be collected and stored until the wash waters are disposed of in an environmentally safe manner. Following decontamination and prior to exit from the EZ, the HSO shall be responsible for ensuring that the item has been sufficiently decontaminated. This inspection shall be included in the Site log.

9.2 PERSONNEL DECONTAMINATION PROCEDURES

The following describes the procedures to be followed by all personnel when leaving the EZ.

Station 1: Equipment Drop

Deposit equipment used on Site (tools, sampling devices, monitoring instruments, radios, etc.) on plastic drop cloths. These items must be decontaminated or discarded as waste prior to removal from the EZ.

Station 2: Outer Boot, Glove, and Garment Wash and Rinse

Scrub outer boots, outer gloves, and/or splash suit with decontamination solution or detergent wash. Rinse off using water.

Station 3: Outer Boot and Glove Removal

Remove outer boots and gloves. If outer boots are disposable, deposit in a covered container. If non-disposable, store in a clean dry place.

Station 4: Outer Garment Removal

Remove outer garments and deposit in a covered container. Decontaminate or dispose of splash suits as necessary.

Station 5: Respiratory Protection Removal

Remove hard hat and facepiece, and deposit on a clean surface. Air purifying respirator cartridges will be discarded at the end of each day or upon breakthrough, whichever occurs first. Wash and rinse respirator at least daily. Wipe off and store respiratory gear in a clean, dry location.

Station 6: Inner Glove Removal

Remove inner gloves. Deposit in a covered container for disposal.

Station 7: Field Wash

Thoroughly wash hands and face with soap and water.

10.0 GENERAL SAFETY AND PERSONAL HYGIENE

1. Eating at the Site is prohibited except in specifically designated areas. Designation of eating areas will be the responsibility of the HSO. The location of these areas may change during the duration of the project to maintain adequate separation from the active work area(s).
2. Smoking at the Site is prohibited except in specifically designated areas.
3. Individuals getting wet to the skin with effluent from the washing operation must wash the affected area immediately. If clothes in contact with skin are wet, then these must be changed.
4. Hands must be washed with soap and water before eating, drinking, smoking, and before using toilets.
5. All disposable coveralls and soiled gloves will be placed in covered containers at the end of every shift or sooner, if deemed necessary by the HSO. Wastes will be stored until such time that it is properly disposed of during completion of project activities.
6. All work performed within the EZ is to be done using the "buddy system:.

11.0 MEDICAL SURVEILLANCE

In accordance with the requirements detailed in 29 CFR 1910.120 and 29 CFR 1910.134, all Site personnel who will come in contact with potentially contaminated materials will have received, within one year prior to starting field activities, medical surveillance by a licensed physician or physician's group.

Medical records for all on-Site personnel will be maintained by their respective employers. The medical records will detail the tests that were taken and will include a copy of the consulting physician's statement regarding the tests and the employee's suitability for work.

The medical records will be available to the employee or his/her designated representative upon written request, as outlined in 29 CFR 1910.1020.

Each employer will provide certifications to the HSO that its personnel involved in Site activities will have all necessary medical examinations prior to commencing work which requires respiratory protection or potential exposure to hazardous materials. Personnel not obtaining medical certification will not perform work within contaminated areas.

Interim medical surveillance will be completed if an individual exhibits poor health or high stress responses due to any Site activity or when accidental exposure to elevated concentrations of contaminants occur.

12.0 ENVIRONMENTAL CONTROL PROGRAM

This section of the HASP outlines measures to be implemented at the Site to prevent hazards associated with environmental conditions.

12.1 WEATHER MONITORING

The HSO or on-Site Engineer will be responsible for checking weather forecasts for the next day and week of work to provide advance notification of any severe weather conditions. Severe weather conditions (e.g., heavy rains) may cause unsafe conditions at the site and in some situations work may have to be stopped.

12.2 RAIN AND SNOW

Excessive amounts of precipitation may cause potential safety hazards for all work tasks. The hazards would be most commonly associated with slipping, tripping, or falling due to slippery surfaces and further hazards are detailed by work task (Table 7.1).

Severe weather conditions will result in work stoppage and the implementation of further emergency measures, as described in Attachment C of this HASP.

12.3 TEMPERATURE

The RA activities are expected to be conducted year round. Low and high temperatures may be experienced which require measures to be implemented to prevent health and safety hazards from occurring. Potential hazards arising from temperature extremes are heat stress and cold exposure.

The potential hazard due to worker heat stress is particularly important if high protection levels of PPE are in use (e.g., respirators). A detailed monitoring program and prevention measures to implement to reduce heat stress are detailed in Attachment B. It is the responsibility of the HSO to determine which measures are appropriate to implement to prevent heat stress; these will depend largely on daily Site conditions.

Exposure to cold is similar to heat stress in that the HSO must determine the appropriate preventative measures to implement. Some of the measures which may be implemented include: more frequent breaks, additional clothing, and partial enclosure of work areas. Detailed cold exposure prevention measures are also included in Attachment B.

12.4 WIND

High winds may be encountered at the Site and these can cause hazards that may affect Site personnel health and safety. Preventative measures that will be implemented if necessary are as follows:

i) restricted Site activity;

ii) battening down light equipment or building materials;

iii) partially enclosing work areas; and

iv) reduction or stoppage of work activities.

13.0 CONFINED SPACE ENTRY PROCEDURE

A confined space provides the potential for unusually high concentrations of contaminants, explosive atmospheres, oxygen deficient atmospheres, limited visibility, and restricted movement. This section establishes requirements for safe entry into, continued work in, and safe exit from confined spaces. Additional information regarding confined space entry can be found in 29 CFR 1926.21, 29 CFR 1910.146, and NIOSH-106. At this Site, confined spaces may be encountered during excavation activities. Entry into a confined space will only be undertaken after remote methods have been tried and found not to be successful. If confined space entry is required, such work will only be undertaken following the guidelines presented in this section.

13.1 DEFINITIONS

Confined Space is a space or work area not designed or intended for normal human occupancy, having limited means of egress and poor natural ventilation; and/or any structure, including buildings or rooms, which have limited means of egress.

Confined Space Entry Permit (CSEP) is a document to be initiated by the supervisor or personnel who are to enter into or work in a confined space. The CSEP will be completed by the personnel involved in the entry and approved by the HSO before personnel will be permitted to enter the confined space. The CSEP shall be valid only for the performance of the work identified on the permit and for the location and time specified on the permit. The beginning of a new shift with change of personnel will require the issuance of a new CSEP. A copy of the CSEP is provided in Attachment D.

Confined Space Observer is an individual assigned to monitor the activities of personnel working within a confined space. The confined space observer monitors and provides external assistance to those inside the confined space. The confined space observer summons rescue personnel in the event of emergency and assists the rescue team.

13.2 GENERAL PROVISIONS

The following general provisions will apply to confined space entry:

i) when possible, confined spaces should be identified with a posted sign which reads: Caution - Confined Space;

ii) only personnel trained and knowledgeable of the requirements of these confined space entry procedures will be authorized to enter a confined space or be a confined space observer;

iii) a CSEP must be issued prior to the performance of any work within a confined space. The CSEP will become a part of the permanent and official health and safety record for the Site;

iv) natural ventilation shall be provided for the confined space prior to initial entry and for the duration of the CSEP. Positive/forced mechanical ventilation may be required. However, care should be taken to not spread contamination outside of the enclosed area;

v) if flammable liquids are anticipated to be within the confined space, explosion proof equipment should be used. All equipment shall be positively grounded;

vi) the contents of any confined space shall, where necessary and where possible, be removed prior to entry. All sources of ignition must be disconnected and/or removed prior to entry; lockout/tagout procedures shall be followed to safeguard against hazardous energy;

vii) hand tools used in confined spaces shall be in good repair, explosion proof and spark proof, and selected according to intended use. Where possible, pneumatic power tools are to be used;

viii) hand-held lights and other illumination utilized in confined spaces shall be equipped with guards to prevent contact with the bulb and must be explosion proof;

ix) compressed gas cylinders, except cylinders used for SCBA, shall not be taken into confined spaces. Gas hoses shall be removed from the space and the supply turned off at the cylinder valve when personnel exit from the confined space;

x) if a confined space requires respiratory equipment or where rescue may be difficult, safety belts, body harnesses, extraction equipment, and lifelines will be used. The outside observer shall be provided with the same PPE equipment as those working within the confined space;

xi) a ladder or extraction device is required in all confined spaces deeper than the employee's shoulders. The ladder shall be secured and not removed until all personnel have exited the confined space;

xii) only SCBA or NIOSH-approved airline respirators equipped with a 5-minute emergency air supply (egress bottle) shall be used in untested spaces or in any confined space with conditions determined immediately dangerous to life and health;

xiii) where air-moving equipment is used to provide ventilation, chemicals shall be removed from the vicinity to prevent their introduction into the confined space;

xiv) vehicles shall not be left running near confined space work or near air-moving equipment being used for confined space ventilation;

xv) smoking in confined spaces will be prohibited at all times; and

xvi) any deviation from these confined space entry procedures requires the prior permission of the HSO.

13.3 PROCEDURE FOR CONFINED SPACE ENTRY

The HSO and confined space entry personnel shall adhere to the following confined space entry procedures:

i) evaluate the job to be done and identify the potential hazards before a job in a confined space is scheduled;

ii) initiate a CSEP in concurrence with the HSO or designated alternative;

iii) ensure that the confined space is ventilated before starting work in the confined space and for the duration of the time that the work is to be performed in the confined space;

iv) ensure that the personnel who enter the confined space and the confined space observer helper are familiar with the contents and requirements of this instruction and the CSEP; and

v) ensure remote atmospheric testing of the confined space prior to and during employee entry and before validation/revalidation of a CSEP to ensure the following requirements:

    a) oxygen content between 19.5 percent and 23.0 percent,

    b) no concentration of combustible gas in the space. Sampling will be done throughout the confined space and specifically at the lowest point in the space,

    c) the absence of other atmospheric contaminants if the space has previously contained toxic, corrosive, or irritant material, and

    d) if remote testing is not possible, Level B PPE is required for confined space entry.

The CSEP shall be considered void if work in the confined space does not start within one hour after the tests in Item v) are performed or if significant changes within the confined space atmosphere or job scope occurs.

The CSEP posted at the work Site shall be removed at the completion of the job or the end of the shift, whichever is first.

13.4 CONFINED SPACE OBSERVER

The duties of the confined space observer are as follows:

i) while personnel are inside the confined space, a confined space observer will monitor the activities and provide external assistance to those in the confined space. The observer will not have other duties which may take his attention away from the work or require him to leave the vicinity of the confined space at any time while personnel are in the confined space;

ii) the confined space observer shall maintain at least voice contact with all personnel in the confined space. Visual contact is preferred, if possible;

iii) the confined space observer shall be instructed by his supervisor or the HSO in the method for contacting rescue personnel in the event of an emergency;

iv) if irregularities within the confined space are detected by the observer, personnel within the confined space will be ordered to exit;

v) in the event of an emergency, the confined space observer must not enter the confined space prior to contacting and receiving assistance from a helper. Prior to this time, he should attempt to remove personnel with the lifeline and to perform all other rescue functions from outside the space; and

vi) a helper shall be designated to provide assistance to the confined space observer in case the observer must enter the confined space to retrieve personnel.

14.0 EMERGENCY RESPONSE

It is essential that Site personnel be prepared in the event of an emergency. Emergencies can take many forms; illnesses or injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather. The following sections outline the general procedures for emergencies. Emergency information should be posted as appropriate.

14.1 EMERGENCY CONTACTS

Ambulance (Schenectady Fire Department): 374-3111
Fire Department (Schenectady Fire Department): 374-3111
Police Department (Schenectady Police Department): 374-7744
Hospital:
St. Clare's Hospital 382-2222

Directions to Hospital: (See Figure 14.1). From the Site exit, turn right onto Tenth Avenue, turn right onto Crane Street, turn left onto Lakeview Road, turn right onto Chrisler Avenue, turn left onto Michigan Avenue, turn right onto State Street, turn left onto McClellan Street to the hospital.

14.2 ADDITIONAL EMERGENCY NUMBERS

Poison Control Centers:
Ellis Hospital, Schenectady, New York 382-4121
St. Mary's Hospital Center, Troy, New York .... 272-5000 Ext. 5792
NY City Poison Control Center 212-304-4494

Hazardous Material Spill or Release:
Schenectady Fire Department (if required) 374-3111
NYSDEC .... 474-7362 (24-Hr. Hotline)
National Response Center .... 800-424-8802 (24-Hr. Hotline)
New England Pollution Control Co., Inc. 203-853-1990
716-343-6444
New York State Emergency Response Commission 513-457-9996

Natural Emergencies:

New York State Waterways Maintenance - Lock #8	346-3382
New York State Section Superintendent - Mr. Al Ferris	237-0613 (Office)
	237-0269 (Home)
New York State - Region Waterways Engineer - Mr. John Hulchanski	474-6715 (Office)
	785-5748 (Home)
Schenectady County Sheriff's Office	382-3300
New York State Police (24 Hours) Albany, New York	457-6811
American Red Cross, Schenectady, New York	393-3606

Others:

Underground Utilities Protection Organization (One Call)	800-962-7962
CRA Project Manager (Jamie Puskas)	519-884-0510
CRA Project Industrial Hygienist (Craig Gebhardt)	716-297-6150
SII Project Manager (Richard Dahlgren)	518-370-4200
NYSDEC (Dan Verrillo)	518-357-2045

Communication between work areas and the SZ, will be via verbal communication, auto horn, or walkie-talkie. The HSO will use the nearest telephone on Site to communicate with outside emergency and medical facilities.

The following signals shall be established for use with auto or compressed air-type horns:

i) 1 Long Blast (2 Second Duration): evacuate exclusion area, meet at CRZ or designated area;

ii) 1 Long Blast (2 Short Blasts): prepare for removal of injured personnel, evacuate work area; and

iii) 3 Short Blasts: all clear.

The following hand signals will be used by downrange field teams in conjunction with the "buddy" system. These signals are very important when working with heavy equipment. They shall be known by the entire field team before operations commence.

Signal	*Meaning*
• Hand Gripping Throat	Out of Air; Can't Breathe
• Grip Partner's Wrist	Leave Area Immediately
• Hands on Top of Head	Need Assistance
• Thumbs Up	Ok, I'm All Right, I Understand
• Thumbs Down	No, Negative

14.3 EMERGENCY AND FIRST AID EQUIPMENT

Emergency safety equipment will be available for use by Site personnel and will be located and maintained on Site. The safety equipment will include, but is not limited to, the following:

i) portable emergency eyewash;

ii) two 20-pound ABC type dry chemical fire extinguishers and one on each piece of heavy equipment;

iii) approved first aid kit for a minimum of ten personnel;

iv) one SCBA unit;

v) portable air horn; and

vi) adequate supply of spill response equipment and material.

14.4 PROJECT PERSONNEL RESPONSIBILITIES DURING EMERGENCIES

HEALTH AND SAFETY OFFICER (HSO)

The HSO has overall responsibility for the project health and safety. He must ensure that adequate staff and resources are available to conduct an effective emergency response program. As the administrator of the project, the HSO has primary responsibility for responding to and correcting emergency situations. The HSO will:

i) take appropriate measures to protect personnel including: determining and communicating evacuation routes and places of safe refuge, withdrawal from the EZ, total evacuation and securing of the Site, or upgrading or downgrading the level of protective clothing and respiratory protection;

ii) take appropriate measures to protect the public and the environment including isolating and securing the Site, preventing runoff to surface waters, and ending or controlling the emergency to the extent possible;

iii) ensure that appropriate Federal, State, local agencies, and Project Management Team are informed, and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. In the event of an air release of toxic materials, the local authorities should be informed in order to assess the need for evacuation. In the event of a spill, sanitary districts and drinking water systems may need to be alerted;

iv) ensure that appropriate decontamination, treatment, or testing for exposed or injured personnel is obtained;

v) determine the cause of the incident and make recommendations to prevent the recurrence; and

vi) ensure that all required reports have been prepared including a report for SII including the following information:

a) name, organization, telephone number, and location of the subcontractor,

b) name and title of the person(s) reporting the incident,

c) date and time of accident/incident,

d) location of accident/incident giving pertinent details,

e) brief summary of accident/incident giving pertinent details including type of operation at time of accident,

f) cause of accident/incident, if known,

g) casualties (fatalities, disabling injuries),

h) details of any existing chemical hazard of contamination,

i) estimated property damage, if applicable,

j) nature of damage and effect on contract schedule,

k) action taken by subcontractor to ensure safety and security, and

l) other damage or injuries sustained (public or private).

14.5 MEDICAL EMERGENCIES

Any person who becomes ill or injured in the EZ must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed as much as possible without causing further harm to the patient. First aid should be administered while awaiting an ambulance or paramedics. All injuries and illnesses must immediately be reported to the HSO and on-Site Engineer.

Any person transporting an injured/exposed person to a clinic or hospital for treatment should take with them directions to the hospital and a listing of the contaminants of concern to which they may have been exposed.

Any vehicle used to transport contaminated personnel will be cleaned or decontaminated as necessary.

14.6 FIRE OR EXPLOSION

The local fire department will be contacted and given an opportunity to attend preconstruction conference, tour the Site, and discuss necessary response actions with the Site Superintendent and HSO in case of an emergency.

In the event of a fire or explosion, the local fire department should be summoned immediately. Upon their arrival, the HSO or designated alternate will advise the fire commander of the location, nature, and identification of the hazardous materials on Site.

If it is safe to do so, Site personnel may :

i) if hazardous, report to the Agency On-Site Representative and/or Project Manager;

ii) use fire fighting equipment available on Site; or

iii) remove or isolate flammable or other hazardous materials which may contribute to the fire.

14.7 SPILLS OR CONTAINER LEAKS

In the event of a spill or leak, Site personnel will:

i) report spills and releases to the Agency On-Site Representative, Project Managers, the NRC, and State Emergency Response Commission (SERC);

ii) locate the source of the spillage and stop the flow if it can be done safely; and

iii) begin containment and recovery of the spilled materials.

15.0 RECORDKEEPING

The HSO shall establish and maintain records of all necessary and prudent monitoring activities as described below:

i) name and job classification of the employees involved on specific tasks;

ii) records of qualitative fit testing and physical examination results for Site personnel;

iii) records of all OSHA training certification for Site personnel;

iv) records of training acknowledgment forms; and

v) emergency reports describing any incidents or accidents.

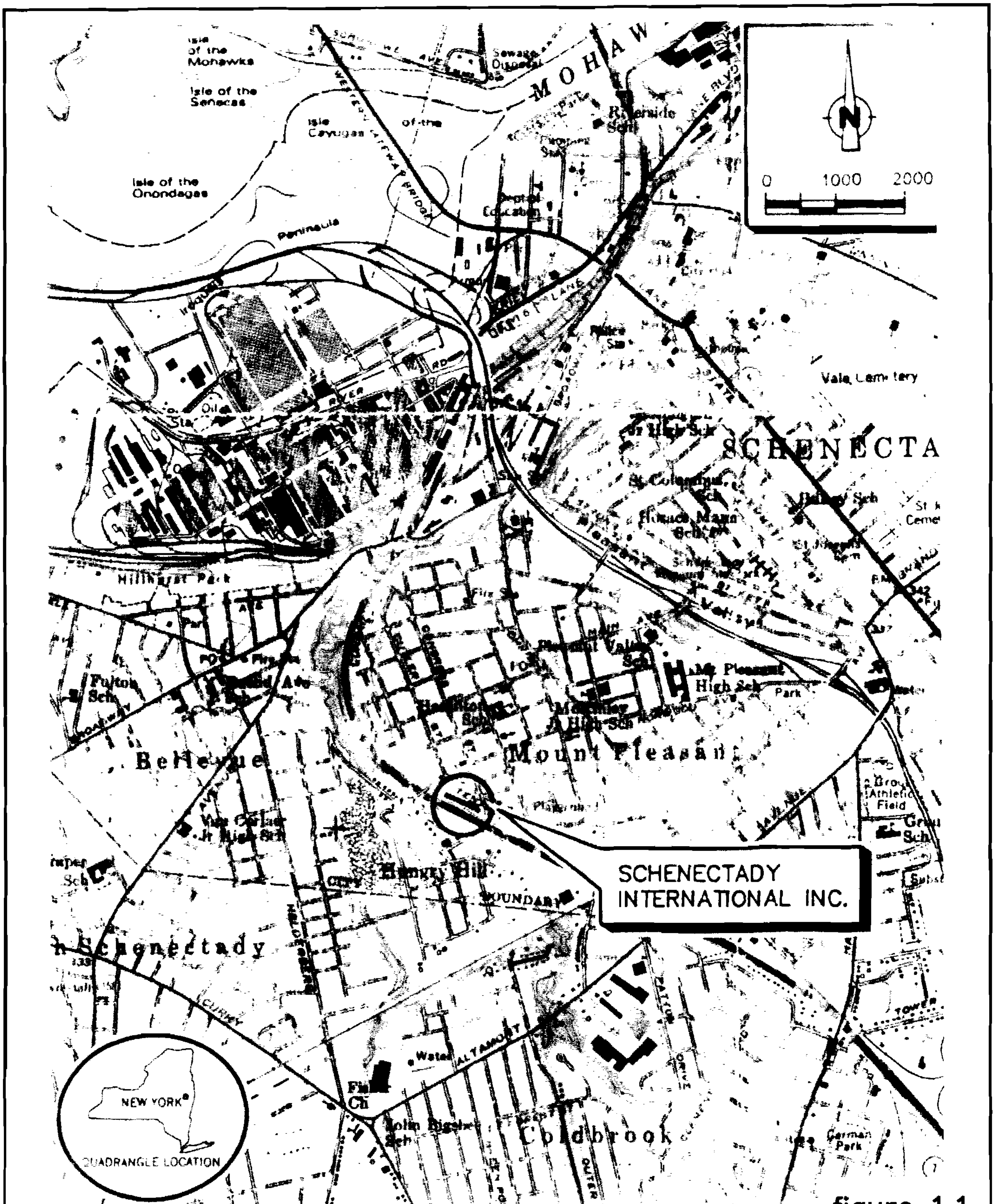

figure 1.1

SITE LOCATION
HEALTH AND SAFETY PLAN
CONGRESS STREET PLANT
Schenectady International Inc.

SOURCE:
U.S.G.S. SCHENECTADY, N.Y.
SW/4 SCHENECTADY 15' QUADRANGLE

CRA

01312-30(035)GN-WA001 NOV 06/98

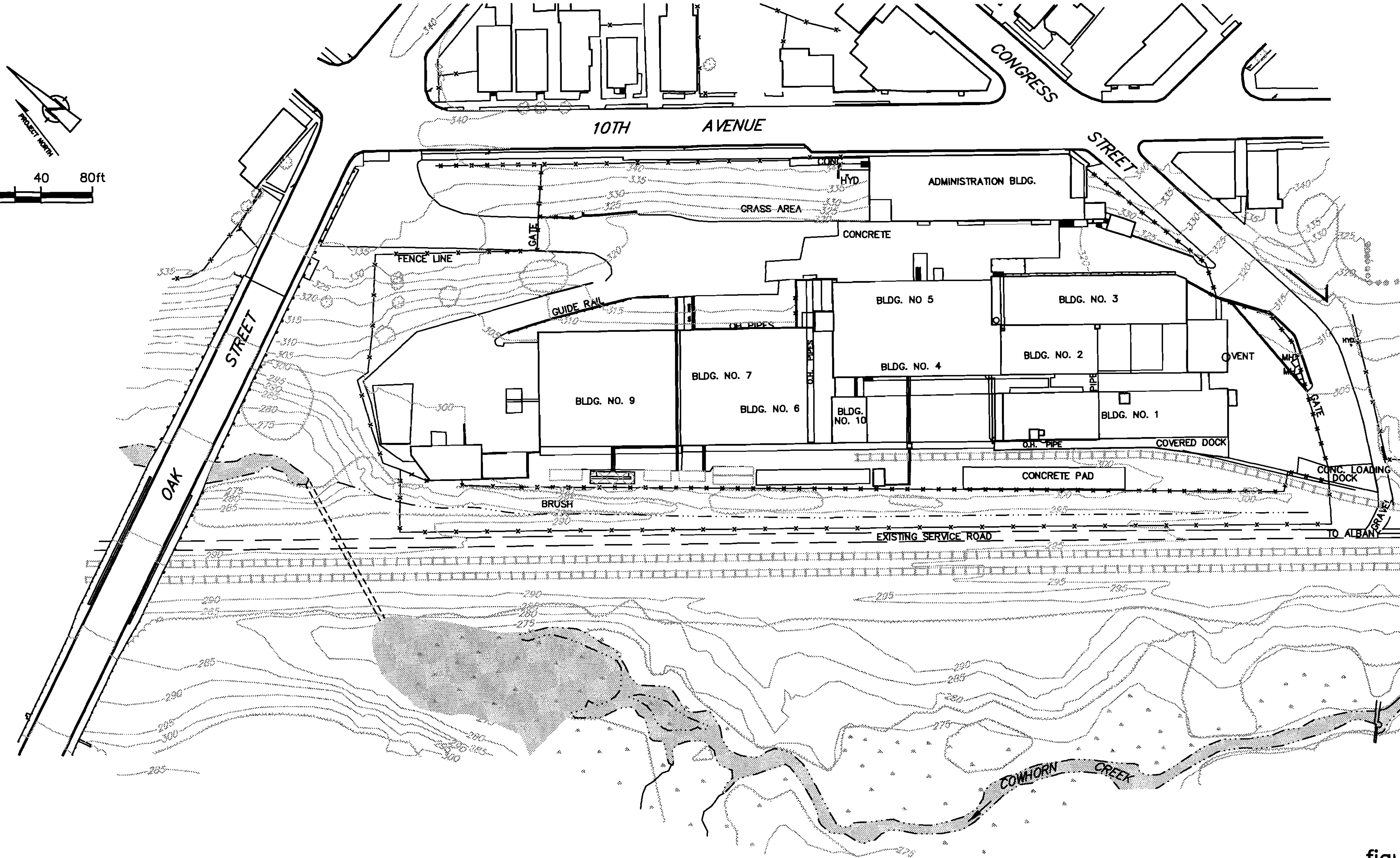

figure 1.2

SITE LAYOUT
HEALTH AND SAFETY PLAN
CONGRESS STREET PLANT
Schenectady International Inc.

CRA

01312-30(035)GN-WA003 NOV 06/98

SOURCE:
NEW YORK STATE DEPARTMENT OF TRANSPORTATION (1974)

figure 14.1

EMERGENCY HOSPITAL ROUTE
HEALTH AND SAFETY PLAN
CONGRESS STREET PLANT
Schenectady International Inc.

CRA

01312-30(035)GN-WA002 NOV 06/98

TABLE 2.1

CONTAMINANTS OF CONCERN AT THE SITE
SCHENECTADY INTERNATIONAL, INC.
CONGRESS STREET PLANT
SCHENECTADY, NEW YORK

Volatile Organics

Benzene
Chlorobenzene
Ethylbenzene
Styrene
Toluene
Xylene

Semi-Volatile Organics

Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthrene
Benzo(g,h,i)perylene
Benzo(k)fluoranthene
bis(2-Ethylhexyl)phthalate
Butylbenzylphthalate
Carbazole
Dibenz(a,h)anthracene
Dibenzofuran
1,2-Dichlorobenzene
2,4-Dimethylphenol
di-n-Butylphthalate
Fluoranthene
Fluorene
Indeno(1,2,3-cd)pyrene
2-Methylnaphthalene
2-Methylphenol
4-Methylphenol
Naphthalene
Phenanthrene
Phenol
Pyrene
2,4,5-Trichlorophenol

TABLE 2.2

EXPOSURE ROUTES AND EXPOSURE LEVELS FOR THE CONTAMINANTS OF CONCERN
SCHENECTADY INTERNATIONAL, INC.
CONGRESS STREET PLANT
SCHENECTADY, NEW YORK

Contaminant	*Ionization Potential*	*Exposure Routes*	*Acceptable Exposure Levels in Air*
Benzene	9.2	Inhalation, Ingestion, Skin Absorption, Human Carcinogen	0.5 ppm (1) 1 ppm (2) 500 ppm (3)
Chlorobenzene	9.1	Inhalation, Ingestion, Animal Carcinogen	10 ppm (1) 75 ppm (2) 1000 ppm (3)
Ethylbenzene	8.8	Inhalation, Ingestion	100 ppm (1) 100 ppm (2) 800 ppm (3)
Styrene	8.5	Inhalation, Ingestion	20 ppm (1) 100 ppm (2) 500 ppm (3)
Toluene	8.8	Inhalation, Ingestion, Skin Absorption	50 ppm (1) 200 ppm (2) 500 ppm (3)
Xylene	8.5	Inhalation, Ingestion	100 ppm (1) 100 ppm (2) 900 ppm (3)
Acenaphthene	-	Inhalation, Ingestion	Not Established
Acenaphthylene	-	Inhalation, Ingestion	Not Established
Anthracene	-	Inhalation, Ingestion	Not Established
Benzo(a)anthracene	-	Inhalation, Ingestion	Not Established
Benzo(a)pyrene	-	Inhalation, Ingestion, Suspected Human Carcinogen	0.2 mg/m^3 (2)
Benzo(b)fluoranthene	-	Inhalation, Ingestion	Not Established
Benzo(g,h,i)perylene	-	Inhalation, Ingestion	Not Established
Benzo(k)fluoranthene	-	Inhalation, Ingestion	Not Established
bis(2-Ethylhexyl)phthalate	-	Inhalation, Ingestion	Not Established
Carbazole	-	Inhalation, Ingestion	Not Established

TABLE 2.2

**EXPOSURE ROUTES AND EXPOSURE LEVELS FOR THE CONTAMINANTS OF CONCERN
SCHENECTADY INTERNATIONAL, INC.
CONGRESS STREET PLANT
SCHENECTADY, NEW YORK**

Contaminant	*Ionization Potential*	*Exposure Routes*	*Acceptable Exposure Levels in Air*
Dibenz(a,h)anthracene	-	Inhalation, Ingestion	Not Established
Dibenzofuran	-	Inhalation, Ingestion	Not Established
1,2-Dichlorobenzene	9.1	Inhalation, Ingestion	25 ppm (1) 200 ppm (3)
2,4-Dimethylphenol	-	Inhalation, Ingestion	Not Established
di-n-Butylphthalate	-	Inhalation, Ingestion	Not Established
Fluoranthene	-	Inhalation, Ingestion	Not Established
Fluorene	-	Inhalation, Ingestion	Not Established
Indeno(1,2,3-cd)pyrene	-	Inhalation, Ingestion	Not Established
2-Methylnaphthalene	-	Inhalation, Ingestion	Not Established
2-Methylphenol	-	Inhalation, Ingestion	Not Established
4-Methylphenol	-	Inhalation, Ingestion	Not Established
Naphthalene	8.1	Inhalation, Ingestion	10 ppm (1) 10 ppm (2) 250 ppm (3)
Phenanthrene	-	Inhalation, Ingestion	Not Established
Phenol	8.7	Inhalation, Ingestion, Skin Absorption	5 ppm (1) 5 ppm (2) 250 ppm (3)
Pyrene	-	Inhalation, Ingestion	Not Established
2,4,5-Trichlorophenol	-	Inhalation, Ingestion	Not Established

Notes:
(1) 1997-1998 Values, American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs).
(2) Federal Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL).
(3) Immediately Dangerous to Life and Health (IDLH).
mg/m^3 Milligrams per Meter Cubed.
ppm Parts Per Million.

TABLE 6.1

**SPECIFIC PERSONAL PROTECTION LEVELS
SCHENECTADY INTERNATIONAL, INC.
CONGRESS STREET PLANT
SCHENECTADY, NEW YORK**

Work Tasks	*Maximum Protection Level (1)*	*Alternate Protection Level (2)*
Mobilization and Demobilization of Labor, Materials, and Equipment to and from the Site	Modified D	D
Surveying Activities	Modified D	D
Installation of the Groundwater Collection System Including Extraction Wells, Collection Drains, Forcemain, and Electrical Conduit		
• Activities with Potential Contact to Contaminants of Concern	Level C/B (3)	Modified D
• Activities with no Potential Contact to Contaminants of Concern	Modified D (3)	D
Soil Handling Activities, Including Grading Activities	Level C	Modified D
Installation of the Oil, Water Separator System (Treatment System)	D	
Operation and Maintenance (O&M) Activities on the Treatment System, Including: Groundwater Sampling; Water Level Measuring; Flushing or Cleaning of the Treatment System Components; and Collection of Off-Site Shipment of the Separated Oil (LNAPL)		
• Activities with Potential Contact to Contaminants of Concern	Level C	Modified D
• Activities with no Potential Contact to Contaminants of Concern	Modified D	D
Decontamination Activities	Level C	Modified D

Notes:
Specific requirements of protection levels are detailed in Section 6.1.

(1) Level C: To be worn when the criterion for using air-purifying respirators (APRs) are met and a lesser level of skin protection is needed.
Modified Level D: To be worn when dermal protection is required, however, no respiratory hazards are present. It provides minimal protection against chemical hazards.

(2) Alternate protection levels will be used if monitoring indicates that conditions are appropriate or the HSO and on-Site Engineer agree that there is a reduced potential of exposure.

(3) May require additional personal protective equipment. See Confined Space Entry Permit.

TABLE 7.1

ANTICIPATED HAZARDS/RISKS AND HAZARD CONTROLS
SCHENECTADY INTERNATIONAL, INC.
CONGRESS STREET PLANT
SCHENECTADY, NEW YORK

Activity	*Anticipated Hazards*	*Appropriate Precautions*
1. Mobilization and Demobilization Activities, and Surveying Activities	• slip/trip/fall hazards • potential back injuries from lifting heavy objects • potential heat or cold stress • severe weather • electrical hazards from power sources • moving or backing vehicles • potential contact with poison ivy • bites and/or stings from ticks, bees, wasps	• Modified D or Level D personal protection • practice safe lifting techniques • participate in on-Site training programs • practice good personal hygiene principles • use a spotter around moving or backing equipment • work activities will be reduced or suspended during severe weather conditions • ground fault circuit interrupters (GFCIs) should be used to reduce the hazard of electrical shock. Electrical equipment will be approved • keep first aid supplies readily available, including antidote kit for those allergic to bees or wasp:
2. Installation of the Groundwater Collection System Including Extraction Wells, Collection Drain, Forcemain and Electrical Conduit, Soil Handling Activities, Including Grading Activities, Installation of the Oil Water Separator System (Treatment System), Including Groundwater Sampling, Water Level Measuring, Flushing or Cleaning of the Treatment System Components and Collection and off-Site Shipment of the Separated Oil (LNAPL) and Decontamination Activities	• slip/trip/fall hazards • potential back injuries from lifting heavy objects • potential heat or cold stress • severe weather • electrical hazards from power sources • moving or backing vehicles and equipment • personnel injuries from sharp objects, falling debris or pinch points, and entanglement in drill rig • direct contact with potentially contaminated soils, sediment, and groundwater • hazards presented by the use of heavy equipment overhead and underground utility hazards (e.g., electrical lines) • hazards presented by entry into a confined space (i.e., oxygen deficient, falling overhead objects) • potential contact with poison ivy • bites and/or stings from ticks, bees, wasps	• Level C and Modified Level D, based on realtime air monitoring or established protection levels (see Table 6.1) • practice safe lifting techniques • participate in all on-Site training programs • be trained with all appropriate equipment standard operating procedures • practice good personal hygiene principles • take proper precautions in unsafe areas • use the "buddy" system • perform an underground utilities search • only essential personnel allowed in work area • if performing confined space entry work, make sure permit system is in place and workers have participated in a training program • use a spotter around moving or backing equipment • identify all high temperature objects or equipment • work activities will be reduced or suspended during severe weather conditions • GCFIs should be used to reduce the hazard of electrical shock. Do not stand in water when handling equipment. Electrical equipment will be approved • keep first aid supplies readily available including antidote kit for those allergic to bees or wasps

ATTACHMENT A

TRAINING ACKNOWLEDGEMENT FORM

TRAINING ACKNOWLEDGEMENT FORM

Please Print:

NAME: ______________________________

ADDRESS: ______________________________

SOCIAL SECURITY NUMBER: ______________________________

EMPLOYER: ______________________________

JOB SITE: Schenectady International, Inc. Schenectady, New York

I have attended and understood the mandatory Site-specific initiation session for the above referenced job site. This program referenced the following topics:

i) known potential hazards on-Site;

ii) level of personal protection equipment required;

iii) emergency procedures for the Site; and

iv) the basics of the Site-specific Health and Safety Plan.

I further confirm that I have the required 40 hours of training to comply with 29 CFR 1910.120, have a respirator for which I have been fit tested and have been thoroughly trained on the standard operating procedures of equipment I will be operating or procedures (e.g., confined space) which I will be participating in.

______________________________ (Date)

______________________________ (Signature)

ATTACHMENT B

TEMPERATURE STRESS PREVENTION AND MONITORING

HEAT STRESS PREVENTION AND MONITORING[1]

Heat stress may occur at any time work is being performed at elevated temperatures. Wearing of chemical protective clothing, which may result in decreasing natural body ventilation, increases the risk of heat stress.

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur, ranging from mild (such as fatigue, irritability, anxiety, and decreased concentration, dexterity movement) to fatal. Because heat stress is one of the most common and potentially serious illnesses at hazardous waste sites, regular monitoring and other preventative measures are vital.

Site workers must learn to recognize and treat the various forms of heat stress. The best approach is preventative heat stress management. In general, if possible:

1. have workers drink 16 ounces of water before beginning work, such as in the morning or after lunch. Provide disposable 4-ounce cups, and water that is maintained at 50 to 60°F. Urge workers to drink one to two of these cups of water every 20 minutes for a total of one to two gallons per day. Provide a cool area for rest breaks. Discourage the intake of coffee during working hours. Monitor for signs of heat stress;

2. acclimate workers to Site work conditions by slowly increasing workloads (e.g., do not begin Site work activities with extremely demanding activities);

3. provide cooling devices to aid natural body ventilation. These devices, however, add weight and their use should be balanced against worker efficiency. An example of a cooling aid is long cotton underwear which acts as a wick to absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing;

4. in extremely hot weather, conduct field activities in the early morning and evening;

5. ensure that adequate shelter is available to protect personnel against heat as well as cold, rain, snow, etc., which can decrease physical efficiency and increase the

(1) Sources: (USEPA, 1985) 29 United States Code of Federal Regulations, 1910.29.

probability of both heat and cold stress. If possible, set up the command post in the shade;

6. in hot weather, rotate shifts of workers wearing impervious clothing; and

7. good hygienic standards must be maintained by frequent changes of clothing and showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should immediately consult medical personnel.

The following is a discussion of specific results of heat stress.

Heat Stroke

Heat stroke is an acute and dangerous reaction to heat stress caused by failure of heat regulating mechanisms of the body; the individual's temperature control system that causes sweating stops working correctly. Body temperature rises so high that brain damage and death will result if the person is not cooled quickly.

- Symptoms - Red, hot, dry skin, although person may have been sweating earlier; nausea; dizziness; confusion; extremely high body temperature; rapid respiratory and pulse rate; unconsciousness or coma.

- Treatment - Cool the victim quickly. If the body temperature is not brought down fast, permanent brain damage or death will result. Soak the victim in cool, but not cold water; sponge the body with cool water or pour water on the body to reduce the temperature to a safe level (102°F). Observe the victim and obtain medical help. Do not give coffee, tea or alcoholic beverages.

Heat Exhaustion

Heat exhaustion is a state of every definite weakness or exhaustion caused by the loss of fluids from the body. The condition is much less dangerous than heat stroke, but it nonetheless must be treated.

- Symptoms - Pale, clammy, moist skin; profuse perspiration and extreme weakness. Body temperature is normal, pulse is weak and rapid, breathing is shallow. The person may have a headache, may vomit and may be dizzy.

- Treatment - Remove the person to a cool, air conditioned place, loosen clothing, place in a head-low position and provide bed rest. Consult physician, especially in severe cases. The normal thirst mechanism is not sensitive enough to ensure body fluid replacement. Have patient drink one to two cups of water immediately, and every 20 minutes thereafter until symptoms subside. Total water consumption should be about one to two gallons per day.

Heat Cramps

Heat cramps are caused by perspiration that is not balanced by adequate fluid intake. Heat cramps are often the first sign of a condition that can lead to heat stroke.

- Symptoms - Acute painful spasms of voluntary muscles (e.g., abdomen and extremities).

- Treatment - Remove victim to cool area and loosen clothing. Have patient drink one to two cups of water immediately and every 20 minutes thereafter until symptoms subside. Total water consumption should be one to two gallons per day.

Heat Rash

Heat rash is caused by continuous exposure to heat and humid air and is aggravated by chafing clothes. The condition decreases ability to tolerate heat.

- Symptoms - Mild red rash, especially in areas of the body that come into contact with protective gear.

- Treatment - Decrease amount of time in protective gear and provide powder to help absorb moisture and decrease chafing.

Heat Stress Monitoring and Work Cycle Management

For strenuous field activities that are part of on-going Site work activities in hot weather, the following procedures shall be used to monitor the body's physiological response to heat, and to manage the work cycle, even if workers are not wearing impervious clothing. These procedures are to be instituted when the temperature exceeds 70°F. If possible these measures will be supplemented by the use of automatic monitoring equipment which can be worn by the workers under their PPE.

- Measure Heart Rate - Heart rate (HR) should be measured by the radial pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats/minute. If the HR is higher, the next work period should be shortened by 33 percent, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats/minute at the beginning of the next rest period, the following work cycle should be further shortened by 33 percent. The procedure is continued until the rate is maintained below 110 beats/minute.

- Measure Body Temperature - When ambient temperature is over 90°F, body temperatures should be measured with a clinical thermometer as early as possible in the resting period. If oral temperature (OT) at the beginning of the rest period exceeds 99.6°F, the next work period should be shortened by 33 percent, while the length of the rest period stays the same. If the OT exceeds 99.6°F at the beginning of the next rest period, the following work cycle should be further shortened by 33 percent. The procedure is continued until the body temperature is maintained below 99.6°F.

- Physiological Monitoring Schedule - The following Suggested Frequency of Physiological Monitoring Schedule for Fit and Acclimated Workers shall be used as a guideline.

Temperature (Adjusted)	*(Level D)*	*(Level C)*
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°F (30.8• -32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5°-87.5°F (28.1°-32.2°C)	After each 90 minutes of work	After each 60 minutes of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5°-77.5°F (22.5°-25.3°C)	After each 150 minutes of work	After each 120 minutes of work

Measure the air temperature with a standard thermometer. Estimate the fraction of sunshine by judging what percent of the sun is out.

100% sunshine = no cloud cover = 1.0

50% sunshine = 50% cloud cover = 0.5

0% sunshine = full cloud cover = 0.0

Adjusted temp. = actual temp. + 13 x (% sunshine factor).

The length of work period is governed by Frequency of Physiological Monitoring. The length of the rest period is governed by physiological parameters (heart rate and oral temperature). For example, if an individual's heart rate exceeds 110 beats/minute at the beginning of the rest period, that individual will remain on rest-time until his/her heart rate drops well below 110 beats/minute and their next work period (= duration of time before suggested physiological monitoring) is decreased by 33 percent.

COLD STRESS PREVENTION AND MONITORING

Persons working outdoors in low temperatures, especially at or below freezing are subject to cold stress. Exposure to extreme cold for a short time causes severe injury to the surface of the body, or results in profound generalized cooling, causing death. Areas of the body which have a high surface area-to-volume ratio such as fingers, toes, and ears, are the most susceptible.

Chemical protective clothing generally does not afford protection against cold stress. In many instances, it increases susceptibility. Hazardous waste Site workers must learn to dress carefully to provide chemical protection and thermal insulation while not dressing so warmly that exercise or strenuous activity will result in heat stress.

Provisions must also be made for the fact that after physical activity and accumulation of body heat, sudden chilling during decontamination and rest breaks may increase susceptibility to colds, etc.

Two factors influence the development of a cold injury: ambient temperature and the velocity of the wind. Wind Chill Indices describe the chilling effect of moving air in combination with low temperature.

As a general rule, the greatest incremental increase in wind chill occurs with a wind of 5 miles per hour (mph). Additionally, water conducts heat 240 times faster than air; thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration-soaked.

Frostbite

Local injury resulting from cold is included in the generic term frostbite. Frostbite of the extremities can be categorized into:

1. frost nip or incipient frostbite is characterized by sudden blanching or whitening of skin;
2. superficial frostbite is characterized by skin with a waxy or white appearance and is firm to the touch, but tissue beneath is resilient; and
3. deep frostbite is characterized by tissues that are cold, pale and solid.

To administer first aid for frostbite:

1. take the victim indoors and rewarm the areas quickly in water that is between 39°C and 41°C (102°F to 105°F);
2. give a warm drink - water or juices, no coffee, tea or alcohol. The victim must not smoke;
3. keep the frozen parts in warm water or covered with warm clothes for 30 minutes even though the tissue will be very painful as it thaws;
4. then elevate the injured area and protect it from injury;
5. do not allow blisters to be broken;
6. use sterile, soft, dry material to cover the injured areas; and
7. keep victim warm and get immediate medical care.

After thawing, the victim should try to move the injured areas a little, but no more than can be done alone, without help. Seek medical attention as soon as possible.

Note:

1. Do not rub the frostbitten part (this may cause gangrene).
2. Do not use ice, snow, gasoline or anything cold on the frostbitten area.
3. Do not use heat lamps or hot water bottles to rewarm the part.
4. Do not place the part near a hot stove.

Hypothermia

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms are usually exhibited in five stages:

1. shivering;
2. apathy, listlessness, sleepiness;
3. (sometimes) rapid cooling of the body to less than 95°F;
4. unconsciousness, glassy stare, slow pulse, slow respiration; and
5. death.

If hypothermia is suspected in any field personnel, move person to a warmer location until symptoms recede.

ATTACHMENT C

SEVERE WEATHER PROCEDURES

SEVERE WEATHER

When projects are conducted outside, the potential for severe weather must be considered. Thunderstorms, tornadoes and winter storms can develop quickly, jeopardizing Site safety. The following emergency procedures are to be followed in the event of severe weather.

Thunderstorms and Lightning

1. Monitor weather conditions at all times while working. At a sign of an impending storm - increased cloudiness, darkened skies, increased wind listen to a radio for the latest weather information.

2. When a thunderstorm accompanied by lightning is in the project area, reduce activities or cease work immediately.

3. Perform decontamination as quickly and orderly as possible, if work stoppage is necessary.

4. Seek shelter inside nearest building or Site trailer.

5. If you are caught in an open area and you feel your hair stand on end, lightning may be about to strike you. Drop to your knees and bend forward, putting your hands on your knees. DO NOT LIE FLAT ON THE GROUND.

6. If someone has been struck by lightning, monitor life signs and begin administering mouth-to-mouth resuscitation or cardiopulmonary resuscitation as needed. Send for help.

7. Check conscious victims for burns, especially at the fingers and toes and next to buckles and jewelry. Administer first aid for shock. Do not let the victim walk around.

Tornadoes

1. Tornadoes usually develop from thunderstorms and normally occur at the trailing edge of the storm. Most tornadoes occur in the months of April, May, June and July in the late afternoon and early evening hours.

2. When storms are predicted for the project area, monitor weather conditions on a radio. A tornado watch is issued when favorable conditions exist for the development of a tornado. A tornado warning is issued by the local weather service office whenever a tornado has actually been sighted or is strongly indicated by radar.

3. If a tornado warning is issued, seek shelter immediately.

4. If a tornado warning is issued and you are in a vehicle or a Site trailer, leave and go to the nearest building.

5. Once a tornado has passed the Site, Site personnel are to assemble at the designated SZ area to determine if anyone is missing. Administer first aid and seek medical attention as needed.

Winter Storms

1. When snow or ice storms are predicted for the project area, Site personnel should monitor weather conditions on a radio. A winter storm watch is issued when a storm has formed and is approaching the area. A winter storm warning is issued when a storm is imminent and immediate action is to be taken.

2. When a storm watch is issued, monitor weather conditions and be prepared to halt Site activities. Seek shelter in Site buildings or the Site trailer.

ATTACHMENT D

CONFINED SPACE ENTRY PERMIT

CONFINED SPACE ENTRY PERMIT

SITE NAME/LOCATION/REF. NO.: Schenectady International, Inc.
Schenectady
New York
Reference No. 1312-30

WORK ACTIVITY: ______________________

Duration: Issue Date: ______________ Time: ________ Filled Out by: ______________________

POTENTIAL HAZARDS:
(System Generated)

(Work Generated)

CONFINED SPACE ENTRY PERMIT

AIR MONITORING: PRE-ENTRY__________ PERIODIC_________CONTINUOUS________

DATE/TIME	*BY (INIT)*	*% O_2*	*ppm CO*	*% LEL*	*OTHER TEST TYPE*	*RESULT*

ISOLATION:

Purging Required: YES ☐ NO ☐ PURGING CONFIRMED:

Safety Tags Required: YES ☐ NO ☐

VENTILATION REQUIRED: YES ☐ NO ☐

CONTINUOUS ______________ OTHER __________

EMERGENCY RESCUE EQUIPMENT REQUIRED:

_________________Communications Device
_________________First Aid Kit
_________________Stretcher/Backboard
_________________Fire Extinguisher
_________________SCBA
_________________Other ________________________________

_________________Winch/Hoist
_________________Harness with Lifeline (type)
_________________PPE (type)
_________________Lighting (type)

CONFINED SPACE ENTRY PERMIT

PERSONAL PROTECTIVE EQUIPMENT REQUIRED:

____ Hardhat	____ Respiratory Protection (type)
____ Safety Glasses	____ Coveralls
____ Face Shield	Chemical Suits
____ Ear Plugs/Muff	____ Rain Suits
____ Emergency Escape Pack	____ Lifelines
____ Lanyards	

____ Gloves (type) ____

____ Harnesses (type) ____

____ Other ____

ADDITIONAL WORK INSTRUCTIONS:

____

EMERGENCY CONTACT PHONE NO.____

PERSONS ENTERING CONFINED SPACE (PRINT NAME)

____ ____

____ ____

____ ____

____ ____

STANDBY PERSON REQUIRED: YES ☐ NO ☐ (PRINT NAMES)

____ ____

CONFINED SPACE ENTRY PERMIT

I have reviewed and met the requirements of this permit and expect that this work shall be done safely. Entrants have been instructed on the proper confined space entry procedures, requirements and conditions.

ENTRY AUTHORIZED BY: ______________________________ DATE: __________________

All work under this permit has been completed and all materials and entrants have been withdrawn from the confined space.

______________________________ ______________________________

Attendant or Entrant Date

APPENDIX J

CONSTRUCTION QUALITY ASSURANCE PLAN

CONSTRUCTION QUALITY ASSURANCE PROJECT PLAN (CQAPP)

CONGRESS STREET PLANT
SCHENECTADY INTERNATIONAL INC.
SCHENECTADY, NEW YORK

NOVEMBER 1998
REF. NO. 1312 (38)
This report is printed on recycled paper.

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(Following Report)

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GLOSSARY

Conrail	Consolidated Rail Corporation
CQA	Construction Quality Assurance
CQAPP	Construction Quality Assurance Project Plan
CQC	Construction Quality Control
FDR	Final Design Report
HS	Health and Safety
HASP	Health and Safety Plan
HDPE	High Density Polyethylene
NYSDEC	New York State Department of Environmental Conservation
O&M	Operation and Maintenance
OSHA	Occupational Safety and Health Administration
POTW	Publicly Owned Treatment Works
QA	Quality Assurance
QC	Quality Control
RA	Remedial Action
RD	Remedial Design
SII	Schenectady International Inc.
Site	SII Congress Street Site
SMDD	Standard Modified Dry Density
SOW	Scope of Work

1.0 INTRODUCTION

The Construction Quality Assurance Project Plan (CQAPP) presented herein forms part of the Remedial Design (RD) for the Schenectady International Inc. (SII) Congress Street Plant located at Congress Street and Tenth Avenue in Schenectady, New York.

1.1 PURPOSE AND ORGANIZATION OF REPORT

This CQAPP presents the quality assurance program to be used during implementation of the Remedial Action (RA) at the Site. The purpose of the CQAPP is to ensure that the remedial construction activities meet or exceed all design criteria, plans, and specifications and that the contractor's Quality Control (QC) program is performing as required by the project specifications. Long-term operation, maintenance, and monitoring requirements for the Site are identified in the Operation and Maintenance (O&M) Plan, which is presented as Appendix K to the Final Design Report.

This CQAPP is organized as follows:

i) Section 1.0 presents the background information, purpose and organization of the report;
ii) Section 2.0 provides a description of the project;
iii) Section 3.0 outlines the project organization and responsibilities;
iv) Section 4.0 presents the personnel qualification requirements;
v) Section 5.0 presents the project meeting requirements;
vi) Section 6.0 describes the inspection and testing activities required to ensure that construction and materials comply with all design specifications and plans; and
vii) Section 7.0 describes the documentation requirements of the Construction Quality Assurance (CQA) activities.

2.0 PROJECT DESCRIPTION

The major components of the RA for the Site include the following:

i) a pipe and media groundwater collection drain with a wet well located at the downgradient end;

ii) four groundwater extraction wells complete with pumps and level controls;

iii) a forcemain system to convey collected groundwater to an oil/water separator prior to discharge to the City of Schenectady (City) Publicly Owned Treatment Works (POTW) for treatment;

iv) construction of a high density polyethylene (HDPE) liner along the western side of the Site to prevent surface water runoff from entering the groundwater collection drain; and

v) an O&M Plan to ensure safe and effective implementation, operation, and maintenance of the RA.

This CQAPP applies to all RA activities.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

Figure 3.1 shows the Project Organizational Chart including Quality Assurance (QA) and Quality Control (QC). Duties and responsibilities including QA and QC are listed below.

3.1 SII PROJECT MANAGER

- Is the "Owner" for purposes of this project.
- Implements scope of work (SOW) for the project.
- Signs appropriate contracts.
- Pays invoices.
- Provides overall project direction.
- Communicates with and keeps Performing Parties (PPs) and others apprised of pertinent activities.
- Is main contact with New York State Department of Environmental Conservation (NYSDEC).
- Provides administration, coordination, communication roles, and technical support.
- Establishes budget and reports costs and projections.
- Reviews, tracks, and processes change orders from Engineer.
- Prepares reports to NYSDEC.
- Coordinates among City, Conrail, and Contractors.
- Coordinates preparation of bid packages and selection of Contractor(s).
- Assists in resolution of contract issues.
- Assists Engineer in preparation and coordination of Draft and Final RA Reports.
- Assigns work to staff and to Engineer.

3.2 ENGINEER

- Serves as the Owner's Representative.
- Reports directly to SII Project Manager.
- Provides day-to-day construction management/liaison with RA Contractor.
- Provides engineering and other technical support during construction.

- Updates and revises plans and specifications changed during construction.
- Establishes Occupational Safety and Health Administration (OSHA) awareness on-Site.
- Assures adherence to contracts and schedules.
- Prepares cost estimates for changes as necessary.
- Coordinates QA and construction work.
- Represents Owner at meetings.
- Initiates, negotiates, and processes change orders.
- Maintains job record, reviews submittal schedules, and logs shop drawings and samples.
- Reviews work performed, disapproves defective work, and verifies that test and startup procedures are done.
- Prepares cost and progress reports and tracks costs.
- Conducts pre-final and final inspections of completed work.
- Prepares O&M Manual.
- Prepares record drawings.
- Prepares RA Report.
- Conducts meetings as required.
- Provides initial interpretation of construction document requirements and resolves contract disputes.
- Deals with NYSDEC oversight personnel.
- Reviews RA Contractor's, and other invoices and makes recommendations to Owner regarding payment.
- Verifies quantities of materials used.

3.3 CQA OFFICER

- Reports to the Engineer.
- Executes the approved CQAPP.
- Provides field management of CQA activities.
- Examines and tests materials, procedures, and equipment.
- Manages QA Team.

- Verifies that the Construction Quality Control (CQC) Plan (to be provided by the RA Contractor) is implemented.
- Performs independent on-Site inspections of the work to assess compliance with project standards, as necessary.
- Verifies that equipment and test procedures meet the test requirements.
- Reviews, records, and maintains all test data.
- Reports the results of all inspections to the Engineer.
- Identifies work that should be accepted, rejected, or uncovered for observation or that may require special testing, inspection, or approval.
- Verifies that corrective measures are implemented.
- Prepares final documents at the request of the Engineer for inclusion in the Final RA Report (supported by QA technicians and testing laboratories).

3.4 CQA SUPPORT PERSONNEL

- Report to the CQA Officer.
- Conduct CQA tests and inspections as indicated in the CQAPP.
- Record test results and inspections daily.
- Calibrate test equipment as required.
- Maintain test equipment in good order.
- Notify CQA Officer whether or not test results comply with design specifications.

3.5 RA CONTRACTOR

- Provides required plans, e.g., health and safety, construction work plans.
- Constructs the works according to the plans and specifications.
- Ensures compliance with all specifications, drawings, and certifications.
- Obtains all necessary construction permits and approvals.
- Provides project schedules and other required submittals.
- Maintains "record drawings" at the Site properly noting all changes made during construction.
- Is responsible for health and safety of Site personnel, including health and safety orientation and training.

- Cooperates with inspection authorities.
- Manages own subcontractors.
- Implements the CQC Plan.
- Retains qualified testing firms (e.g., laboratory, geotechnical) for testing of materials and workmanship to ensure that materials meet specified requirements.
- Submits samples and/or materials for testing to determine if samples and/or materials meet specified requirements, and submits results directly to the CQA Officer.
- Records daily CQC activities in the Contractor's Site log book and submits a "Daily Construction Quality Control Report" (see Section 7.2) to the CQA Officer.
- Carries out construction activities according to design specifications, work plans, drawings, and contract with SII.
- Provides Site security.

4.0 PERSONNEL QUALIFICATIONS

4.1 ENGINEER

- Consulting engineering firm experienced in design and construction of hazardous waste remedies including groundwater containment systems.
- Experience in the various engineering/technical disciplines needed to support construction activities at the Site (civil engineering, surface water management, geotechnical engineering, environmental engineering, and cost estimating).

4.2 CQA OFFICER

- Graduate of a recognized college in a technically related field.
- Minimum of three years experience in the oversight and implementation of hazardous waste remediation and construction QA activities.
- Working knowledge of relevant codes and regulations concerning material and equipment installation, observation and testing procedures, equipment, documentation procedures, and site safety.
- Good management and communication skills.

4.3 CQA SUPPORT PERSONNEL

- Degree from a recognized college in engineering technology or equivalent; or a minimum of two years experience in hazardous waste remedial construction and construction QA inspection procedures.
- Working knowledge of relevant codes and regulations concerning material and equipment installation, observation and testing procedures, equipment, documentation procedures, and site safety.

4.4 RA CONTRACTOR

- Experience in hazardous waste site remediation (minimum 5 years of corporate experience) and groundwater collection system construction (minimum 5 similar projects).

- Thorough knowledge of testing procedures, equipment, and documentation procedures required for implementation of the remedial activities and for conduct of the CQC Plan.
- Senior level point of contact (minimum 10 years experience in hazardous waste remediation or equivalent).
- An on-Site Construction Superintendent (minimum 5 years experience in hazardous waste remediation or equivalent) empowered to act on behalf of the Contractor in all field related matters pertaining to the remedial activities.

5.0 PROJECT MEETINGS

Project meetings will be held during the performance of the RA to ensure that all tasks are accomplished according to schedule and that they are completed in accordance with the design specifications and drawings. It is anticipated that these progress meetings will be attended by the SII Project Manager, Construction Superintendent, RA Contractor Representative(s), Engineer, CQA Officer, and NYSDEC Representatives as detailed below.

5.1 PRECONSTRUCTION MEETING

Purpose: To resolve any uncertainties in the design specifications and drawings, and to review levels of responsibility, reporting requirements, and health and safety requirements.

Participants: SII Project Manager, Construction Superintendent, CQA Officer, CQA Support Personnel, RA Contractor Representative(s), Health and Safety (HS) Officer, Engineer, and NYSDEC Representatives.

Topics:

- Discuss RA Work Plan, CQAPP, site-specific Health and Safety Plan (HASP), project schedule, and other relevant documents.
- Review the activities to be conducted during the RA.
- Review roles of each organization relative to the overall project, design criteria, plans and specifications, and the CQAPP.
- Review lines of authority and communication.
- Discuss the established procedures or protocol for initiating, negotiating, approving, implementing, and processing change orders (refer to contract documents).
- Discuss the established procedures or protocol for observations and tests including sampling strategies.
- Discuss the established procedures or protocols for invoicing and payment.
- Discuss the established procedures or protocols for handling construction deficiencies, repairs, and retesting.
- Review methods for documenting and reporting inspection data.
- Review methods for distributing and storing documents and reports.
- Review work area delineation, security, and safety protocol.

- Discuss the location for storing equipment and materials, and the protection of these items during inclement weather.
- Discuss the protection of uncompleted remedial work during off hours and during inclement weather.
- Conduct a Site tour to review remediation areas, safety areas, and equipment and stockpile storage locations.
- Confirm that each party understands and accepts its responsibility to ensure that the RA is performed to meet or exceed the specified design criteria.

5.2 DAILY PROGRESS MEETING

Purpose: To review daily work schedule progress and health and safety issues. This meeting is intended to be an informal meeting held at the start or end of each work day.

Participants: Engineer, Construction Superintendent, RA Contractor Representative(s), CQA Officer, and HS Officer.

Topics:
- Review previous day's activities and progress.
- Review work location and activities for upcoming or next day.
- Review any health and safety deficiencies from the previous work day and review health and safety requirements and potential problems for the next day's activities.
- Review RA Contractor's personnel, subcontractor personnel, and equipment assignments for the upcoming day.
- Discuss any potential construction problems.

5.3 WEEKLY PROGRESS MEETINGS

Purpose: To review update of work schedule progress and plans on a weekly basis, and identify schedule slippage and efforts required to get back onto schedule, if required.

Participants: Construction Superintendent, CQA Officer, CQA Support Personnel (optional), Engineer, HS Officer (optional), and NYSDEC Representatives.

Topics:

- Health and Safety report for previous week's activities and progress for the coming weeks activities.
- Review work activities from the previous week.
- Comparison of actual progress to scheduled work activities, noting schedule slippage and actions to be implemented to rectify schedule slippage.
- Review work activities for the next week.
- Review potential remedial problems and proposed solutions.

5.4 STATUS MEETING WITH NYSDEC

Purpose: To provide an update of work progress, and to discuss any significant problems or changes in the work. Meetings will be held as needed and/or as requested by NYSDEC.

Participants: SII Project Manager, Engineer and NYSDEC.

Topics:

- Status report on progress.
- Identify any past problems and corrective measures taken to address them.
- Identify and discuss any required field changes.
- Identify and discuss any anticipated problems.

5.5 PROBLEM OR WORK DEFICIENCY MEETINGS

Purpose: To identify problems or deficiencies which have occurred or are likely to occur. The meeting provides a forum for review of potential solutions and is held as needed.

Participants: Construction Superintendent, CQA Officer, CQA Support Personnel, Engineer, SII Project Manager, and RA Contractor Representative.

Topics:

- Define and discuss problem or deficiency.
- Review alternative solutions.

- Develop and implement a plan and schedule to resolve the identified problem or deficiency.

6.0 QA INSPECTION AND TESTING ACTIVITIES

6.1 SCOPE

Throughout the implementation of the RA, there will be continuous field inspections and testing requirements for specific work tasks. The field inspection and testing activities will ensure compliance with the RD as presented in the design specifications and drawings, as well as ensure completion of the work according to the designated QA/QC requirements.

Field inspections and testing will provide a qualitative and quantitative means of monitoring the quality and progress of work performed.

The Contractor is responsible for implementing and maintaining the Construction Quality Control (CQC) program to assure the quality standards specified by the design and accepted trade practices are met. The QA team is responsible for conducting the QA program and for verifying that the CQC program is implemented.

The components of each work task that will require field inspection or testing are as follows:

i) Construction Facilities and Temporary Controls

- Site support area
- Equipment decontamination facilities
- New or upgraded access roads
- Dewatering facilities (if necessary)
- Temporary wastewater storage tanks

ii) Excavation/Grading Activities

- Clearing and grubbing
- Excavation
- Dewatering
- Backfilling/restoration
- Site grading/filling
- Sediment and erosion control

iii) Groundwater Collection System

- Excavation
- Collection pipe and drainage media installation
- Wet well and cleanout installation
- Forcemain pipe installation
- Shoring (if necessary)
- Elevations and grades
- Backfilling

iv) Swale Liner Construction

- Minimal Pregrading
- Surface water and erosion control
- Soil density, gradation, and composition
- Geotextile and HDPE liner material specifications and installation
- Elevations and grades
- Sediment and erosion control
- Vegetation

6.2 FIELD INSPECTIONS

Field inspections will be completed throughout the construction by the Engineer, CQA Officer and/or CQA support personnel. Inspections will be conducted by NYSDEC at its own discretion.

The CQA Officer has the primary responsibility for conducting and documenting all QA inspection activities. The CQA Officer may delegate certain tasks to support personnel, if prior approval from the Engineer is obtained.

The inspections will examine the following:

- Quality of workmanship;
- Conformance of materials with Contract specifications;
- Conformance with specified lines, grades, and elevations;
- Conformance with specified material quantities and thicknesses;

- Conformance with relevant permit requirements; and
- Conformance with required handling procedures.

Documentation of all QA inspection activities will be included in the CQA Officer's log book. Specific observations and results will be documented and attached to the Daily Construction QA Reports.

Any inspection failures, conformance problems, or other concerns will be reported immediately to the Engineer.

The specific inspection activities, frequencies, conformance standards, and documentation requirements are summarized in Table 6.1.

6.3 TESTING

In addition to the above mentioned inspections, field and laboratory testing will be conducted to ensure compliance with material specifications, performance standards, and design criteria.

The CQA Officer has the primary responsibility for conducting and documenting all QA testing activities. The CQA Officer may delegate certain tasks to support personnel, if prior approval from the Engineer is obtained.

Documentation of all QA testing activities will be included in the CQA Officer's log book. Testing results will be documented and attached to the Daily Construction QA reports.

Any test failures, performance problems, or other concerns will be reported immediately to the Engineer.

The specific testing activities, methods, frequencies, performance standards, and documentation requirements are summarized in Table 6.2.

7.0 CQA DOCUMENTATION

7.1 GENERAL

This section describes the documentation requirements for the CQA activities. The proper, thorough, and accurate documentation of all CQA activities is important to verify that the RA was completed according to the plans and specifications.

CQA documentation shall consist of daily records, construction problem identification and resolution reports, photographic records, design and specification revisions, weekly progress reports, and a final report. All records shall be maintained at the Site by the CQA Officer, and copies submitted to the Engineer.

7.2 DAILY RECORDS

At a minimum, daily records shall consist of field notes, summaries of daily meeting with the RA Contractor, observation and data sheets, and construction problem and resolution reports.

The CQA Officer will record daily QA activities on observation and data sheets. The observation and data sheets shall include the following information:

- Date, time, and weather conditions.
- Description of ongoing construction and inspection activities.
- A reduced scale Site plan showing work area, including test locations for each work day.
- A summary of test results identified as passing or failing; or in the event of a failed test, retest results.
- Test equipment calibrations, if applicable.
- Off-Site materials received and approvals given.
- A summary of decisions regarding acceptance of the work and/or corrective actions taken.
- Submittals made by RA Contractor verifying material quality.
- Quality control test and inspection results.
- Construction delays/causes and areas affected.
- QA personnel on Site.

- QA equipment on Site.
- Record of instructions given by the Engineer.
- Record of changed conditions/conflicts encountered.
- Contractor's crew size, equipment, and hours worked.
- Signature of CQA Officer.

7.3 CONSTRUCTION PROBLEM/CORRECTIVE ACTION REPORTS

This report shall identify and document construction problems and corrective actions taken. The purpose is to document problems involving rework required to meet the limits and criteria defined in the specifications or by the judgment of the CQA Officer, or the Engineer. At a minimum, this report shall include the following information:

- Detailed description of the problem.
- Location and likely cause of the problem.
- How and when the problem was identified.
- Estimation of how long the problem has existed.
- Plan for corrective action.
- Description of the implementation of the corrective action.
- Verification and effectiveness of the corrective action.
- Suggested methods to prevent similar problems.
- Signature of CQA Officer.

7.4 PHOTOGRAPHS

A photographic record of construction activities, including any significant problems and corrective actions shall be maintained by the CQA Officer. Photographs shall be identified by location, time, date, and individual photographer. One copy of the photographs and the negatives shall be given to the Engineer weekly, or more frequently if necessary. The CQA Officer shall also keep a complete set of photographs at the Site.

7.5 WEEKLY PROGRESS REPORTS

The CQA Officer shall prepare weekly progress reports summarizing construction and QA/QC activities. The report shall be submitted to the Engineer and will be included in progress meeting minutes for distribution. At a minimum, weekly progress reports shall include the following information:

- Date, project name, and location.
- Summary of work activities for the week.
- Summary of deficiencies and/or defects and corrective actions.
- Signature of CQA Officer.

7.6 FINAL REPORT

Upon completion of the RA construction, the CQA Officer shall submit a report to the Engineer that summarizes the CQA activities performed during the construction. The report shall contain, at a minimum, the following information:

- Summary of all quality assurance activities.
- Complete set of observation and data sheets and field notes.
- Complete set of construction problem/corrective action reports.
- Complete set of construction photographs.
- Sampling, inspection, and testing location plans and results.

7.7 STORAGE OF RECORDS

During construction, the Engineer shall maintain on-Site copies of the plans and specifications and any construction reports submitted by the RA Contractor. The CQA Officer shall maintain on-Site copies of the above-mentioned CQA documentation.

Following construction, the SII Project Manager shall maintain the plans and specifications, as-built drawings, construction reports, CQA reports, and any other submittals.

SII CONGRESS ST. SITE

PROJECT ORGANIZATION CHART FOR CONSTRUCTION (INCLUDING QA/QC)

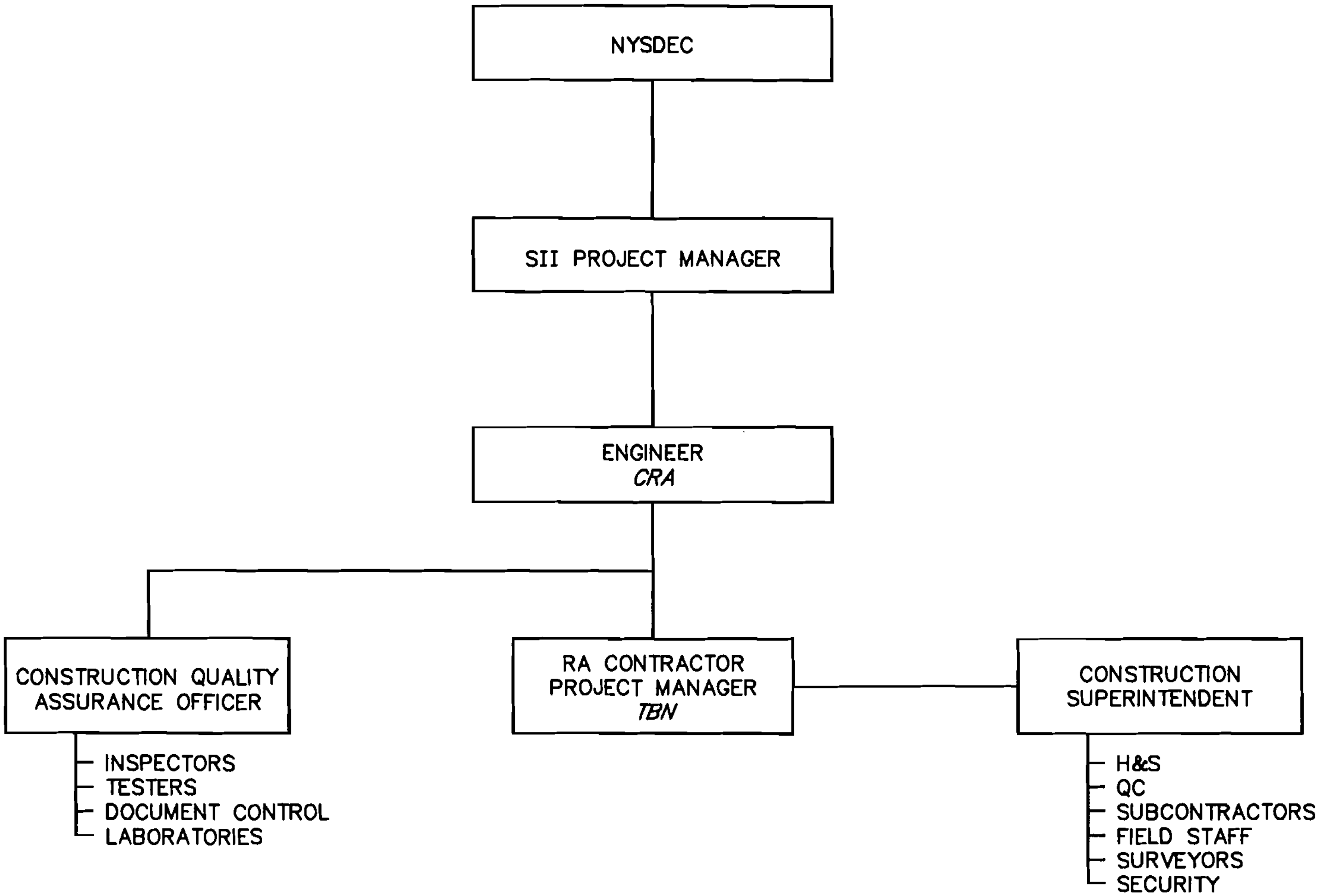

figure 3.1

PROJECT ORGANIZATION
CONSTRUCTION QUALITY ASSURANCE PROJECT PLAN
CONGRESS STREET PLANT
Schenectady International Inc.

CRA

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SUMMARY OF CONSTRUCTION QUALITY ASSURANCE INSPECTIONS
REMEDIAL ACTION
SII CONGRESS STREET SITE
SCHENECTADY, NEW YORK

TABLE TO BE REVISED AS PROJECT SPECS ARE DEVELOPED

Work Task Component to be Inspected	*Items to be Checked During Inspection*	*Type of Inspection*	*Frequency of Inspection*	*Submittals to On-Site Engineer*	*Rejection Criteria*
A. Construction Facilities and Temporary Controls					
• Site Operations	• are barriers in place to prevent unauthorized Site entry and to protect adjacent properties and facilities	• visual	• daily as required	• none	• barriers not in place
	• is fencing in place to delineate work areas and do workers observe and respect limits marked with fencing	• visual	• daily as required	• none	• fencing not in place
	• is surface water runoff prevented from leaving work areas	• visual	• daily as required	• none	• surface water controls not in place
	• is surface water runoff from non-contaminated areas prevented from contacting potentially contaminated areas	• visual	• daily as required	• none	• surface water controls not in place
	• are appropriate erosion control measures in place around cuts, fills, stockpiles, staging areas and other work areas	• visual	• daily as required	• none	• erosion controls not in place
	• are appropriate dust control measures being followed to prevent dust release from the Site exceeding specified levels	• instrument reading	• per specifications	• per specifications	• specified levels exceeded • dust control measures not being followed
	• are appropriate Site access roads and parking areas being maintained	• visual	• daily as required	• none	• access roads and parking areas not maintained
	• are appropriate equipment decontamination procedures followed	• visual	• as required	• none	• equipment decontamination procedures not followed
• Excess Excavated Site Materials	• have excess excavated materials been properly stockpiled	• visual	• continuous	• none	• material not properly stockpiled
	• are stockpiled materials covered with an impermeable liner during periods of work stoppage, including at the end of each working day	• visual	• daily as required	• none	• stockpile not covered correctly
• Clearing and/or Grubbing	• are above ground portions of trees, shrubs, and other cleared vegetation handled separately from below ground portions	• visual	• daily as required	• none	• not handled separately

TABLE 6.1

SUMMARY OF CONSTRUCTION QUALITY ASSURANCE INSPECTIONS
REMEDIAL ACTION
SII CONGRESS STREET SITE
SCHENECTADY, NEW YORK

TABLE TO BE REVISED AS PROJECT SPECS ARE DEVELOPED

Work Task Component to be Inspected	*Items to be Checked During Inspection*	*Type of Inspection*	*Frequency of Inspection*	*Submittals to On-Site Engineer*	*Rejection Criteria*
B. Swale Liner Construction					
• Pregrade	• has swale been graded to pregrade elevation	• perform survey	• on completion of pregrading	• survey information	• pregrade elevation does not meet tolerance of 3± inches
	• has the surface been cleared of any loose earth, exposed rocks larger than 3 inches in diameter, or other foreign matter	• visual	• on completion of pregrading	• normal	• does not meet specification
• 12-inch Common Soil Layer Installation	• is material approved for application	• visual • chemical analyses (for imported materials) • geotechnical	• prior to placement for each source of material • for imported materials, prior to delivery to Site (see Table 6.2)	• chemical results • gradation	• specifications not met
	• does soil contain unsuitable material	• visual • check against specifications	• upon delivery to the Site	• none	• unsuitable material present
	• has material been placed to design thickness and in proper lifts	• perform survey	• continuous	• survey information	• material placement does not meet tolerance 2± inches
	• has soil been compacted to specification	• geotechnical	• see Table 6.2	• density results	• does not meet specifications
• HDPE Liner	• does HDPE liner comply with specifications	• check manufacturers and supplier certificates	• see Table 6.2	• suppliers and manufacturer's certification	• material does not meet specifications
	• has material arrived at Site undamaged	• visual	• upon delivery to Site	• none	• damaged materials
	• is material properly stored to prevent accidental damage and UV exposure	• visual	• upon delivery to Site	• none	• improperly stored materials
	• has Contractor submitted required submittals	• check against Specifications	• prior to commencing material placement	• Contractor's submittals	• required submittals not submitted or deficient
	• are there any visible defects, holes, blisters, undispersed raw materials or any sign of contamination by foreign matter	• visual	• before installation	• none	• visual defects
	• have materials been installed as specified	• visual	• continuous	• supplier-installer approval letter	• material not installed as specified
	• has material been properly anchored in the confining unit key	• visual/physical	• before placement of drainage media	• RA Contractors certification	• not properly anchored

SUMMARY OF CONSTRUCTION QUALITY ASSURANCE INSPECTIONS
REMEDIAL ACTION
SII CONGRESS STREET SITE
SCHENECTADY, NEW YORK

TABLE TO BE REVISED AS PROJECT SPECS ARE DEVELOPED

Work Task Component to be Inspected	*Items to be Checked During Inspection*	*Type of Inspection*	*Frequency of Inspection*	*Submittals to On-Site Engineer*	*Rejection Criteria*
B. Cap Construction (continued)					
• Topsoil	• is material approved for application	• visual • chemical analyses (for imported materials) • geotechnical	• prior to placement • for each source of topsoil and seeding material • for imported materials, prior to delivery to Site (see Table 6.2)	• analytical results • gradation curves	• material does not meet specification
	• does material contain unsuitable material	• visual • check against Specifications	• upon delivery to the Site and during installation	• none	• material does not meet specification
	• has material been placed to design thickness	• perform survey	• continuous	• none	• material placement does not meet tolerance of 1± inches
	• horizontal and vertical control	• survey	• during and on completion of topsoil placement	• survey information	• grading does not meet tolerance of 2± inches
• Vegetation	• does seed meet Specifications	• check supplier's Specifications	• prior to delivery	• supplier's certification	• material does not meet Specifications
	• does fertilizer meet Specifications	• check supplier's Specifications	• prior to delivery	• supplier's certification	• material does not meet Specifications
	• do plants meet Specifications	• check supplier's Specifications	• prior to delivery	• supplier's certification	• material does not meet Specifications
	• have seeds and plants been stored, packaged and shipped according to Specifications	• check supplier's Specifications	• upon delivery	• supplier's certification	• material not shipped according to Specifications
	• have seeds and plants been planted according to Specifications	• visual	• continuous	• none	• seeds and plants not planted according to Specifications
	• has maintenance of plantings been performed according to Specifications	• visual	• weekly (see Specifications for duration)	• none	• maintenance not performed according to Specifications

SUMMARY OF CONSTRUCTION QUALITY ASSURANCE INSPECTIONS
REMEDIAL ACTION
SII CONGRESS STREET SITE
SCHENECTADY, NEW YORK

TABLE TO BE REVISED AS PROJECT SPECS ARE DEVELOPED

Work Task Component to be Inspected	*Items to be Checked During Inspection*	*Type of Inspection*	*Frequency of Inspection*	*Submittals to On-Site Engineer*	*Rejection Criteria*
B. Cap Construction (continued)					
• Stockpiling	• are stockpiles of different materials adequately separated to prevent intermingling	• visual	• each stockpile daily	• none	• material not adequately separated
	• are stockpiles identified	• visual	• each stockpile daily	• none	• stockpiles not identified
	• are adequate sediment and erosion controls in place	• visual	• during stockpile area preparation and following rainfall events	• none	• sediment and erosion controls inadequate
C. Groundwater Collection System					
• Collection Drain	• does drainage media meet specifications	• check against specifications	• prior to delivery to Site	• gradation curves	• material does not meet specifications
	• horizontal and vertical control	• survey	• during installation	• survey information	• material placement does not meet specifications and drawings
	• does collection pipe meet specification	• check against specifications	• prior to delivery to Site	• manufacturer's certification	• material does not meet specifications and drawings
	• is pipe continuity unbroken	• visual/physical	• after installation before cap installation	• RA Contractor's certification	• pipe continuity broken
• Wet Wells and Cleanouts	• check structures for physical damage	• visual	• upon delivery to Site and during installation	• none	• physical damage
	• confirm fit and sealing of joints, covers, and accessories	• visual	• during installation	• none	• inadequate fit and sealing of joints, covers, and accessories
	• horizontal and vertical control	• survey	• during installation	• survey information	• installation not performed to required lines and grades
D. Forcemain and Electrical Conduits					
• Material	• does pipe meet specifications	• check supplier's/ manufacturer's certification	• upon delivery to Site	• supplier's/manufacturer's certification	• material does not meet specification
	• does bedding material meet specifications	• check against specification	• prior to delivery to Site	• gradation curves	• material does not meet specification

SUMMARY OF CONSTRUCTION QUALITY ASSURANCE INSPECTIONS
REMEDIAL ACTION
SII CONGRESS STREET SITE
SCHENECTADY, NEW YORK

TABLE TO BE REVISED AS PROJECT SPECS ARE DEVELOPED

Work Task Component to be Inspected	*Items to be Checked During Inspection*	*Type of Inspection*	*Frequency of Inspection*	*Submittals to On-Site Engineer*	*Rejection Criteria*
D. *Forcemain and Electrical Conduits (Cont'd)*					
• Installation	• has buried pipe been laid to design depth	• survey	• continuous	• none	• buried forcemain installed to incorrect depth (tolerance of 3± inches)
	• has pipe been damaged during installation	• visual	• continuous	• none	• damaged pipe
	• has trench been properly backfilled	• visual	• continuous	• none	• trench not properly backfilled
• Piping	• does piping material meet specifications	• check supplier's certification	• prior to delivery	• supplier's certification	• material does not meet specifications
	• does installation follow proper alignment	• survey and visual	• continuous	• none	• material not installed in accordance with specifications
	• bedding and backfill material meets specifications	• check supplier's gradation	• upon delivery to Site	• material certificates and gradations	• material does not meet specifications
E. *Miscellaneous*					
• Riprap	• does material meet Specifications	• check supplier's Specifications	• prior to delivery	• supplier's certification	• material does not meet Specifications
	• proper location and depth	• survey	• continuous during work	• none	• material not installed in accordance with design. Tolerance of ±2 inches
• Pre-Engineered Buildings	• does material meet Specifications	• check supplier's Specifications	• upon delivery to Site	• supplier's certification	• material does not meet Specifications
	• is alignment correct	• survey and visual	• continuous during installation	• none	• alignment incorrect. Tolerance of ±2 inches
	• does installation conform to Specifications	• as per Specifications	• continuous during installation	• none	• installation does not conform to Specifications

TABLE 6.1

SUMMARY OF CONSTRUCTION QUALITY ASSURANCE INSPECTIONS
REMEDIAL ACTION
SII CONGRESS STREET SITE
SCHENECTADY, NEW YORK

TABLE TO BE REVISED AS PROJECT SPECS ARE DEVELOPED

Work Task Component to be Inspected	*Items to be Checked During Inspection*	*Type of Inspection*	*Frequency of Inspection*	*Submittals to On-Site Engineer*	*Rejection Criteria*
E. Miscellaneous (Cont'd)					
• Concrete Foundations	• does material meet Specifications	• check supplier's Specifications	• upon delivery to Site	• supplier's certification	• material does not meet Specifications
	• is alignment correct	• survey and visual	• continuous during installation	• none	• alignment incorrect. Tolerance of ±2 inches
	• does installation conform to Specifications	• as per Specifications	• continuous during installation	• none	• installation does not conform to Specifications and Drawings
	• has reinforcement been properly installed	• as per Specifications	• continuous during installation	• none	• installation does not conform to Specifications
	• has bedding been properly prepared	• as per Specifications	• continuous during installation	• none	• installation does not conform to Specifications
• Oil-Water Separator	• does unit conform to specifications	• as per Specifications	• prior to installation	• Manufacturer's/Supplier's Certification	• tank does not conform to specifications
	• has unit been properly installed	• as per Specifications	• after installation	• none	• installation does not conform to Specifications
• Temporary Fencing and Gates	• does material meet specifications	• check supplier's specifications	• upon delivery to Site	• supplier's certification	• material does not meet specifications
	• is alignment correct	• survey and visual	• continuous during installation	• none	• alignment incorrect
	• does installation conform to specifications	• as per specifications	• continuous during installation	• none	• installation does not conform to specifications

TABLE 6.2

SUMMARY OF QUALITY CONTROL TESTING PROCEDURES AND ASSOCIATED QUALITY ASSURANCE ACTIVITIES
REMEDIAL ACTION
SII CONGRESS STREET SITE
SCHENECTADY, NEW YORK

Work Task to be Inspected	*Quality Control Activities*			
	Type of Testing	*Method of Testing*	*Frequency*	*Acceptance/Rejection Criteria*
Soil Source				
• Soil Types S1 and S2	pH	ASTM D4972	1 per source	5 to 8
	grain size	ASTM D422	2 per source	see specifications
	organic matter	ASTM D2974	2 per source	3 to 10% for topsoil
	chemical analyses	SW846	1 per source	free of toxic or hazardous constituents at toxic or hazardous concentrations
	maximum dry density	ASTM D698	2 per source	--
Aggregate Source				
• Type A1	grain size	ASTM C117 and C136	2 per source	see specifications
	maximum dry density	ASTM D698	2 per source	--
	chemical analyses	SW846	1 per source	free of toxic or hazardous constituents at toxic or hazardous concentrations
• Type A2	grain size	ASTM C117 and C136	1 per 50 ft of collection drain	see specifications
	maximum dry density	ASTM D698	2 per source	--
	chemical analyses	SW846	1 per source	free of toxic or hazardous constituents at toxic or hazardous concentrations
Buried Forcemain and Containment Piping				
• pipe placement	hydrostatic testing	see specifications	minimum 1 per forcemain	see specifications
• compaction of bedding and backfill	in place density	ASTM D2922	1 per 100 linear feet per lift	95% SMDD
	in place moisture content	ASTM D3017	1 per 100 linear feet per lift	95% SMDD

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SUMMARY OF QUALITY CONTROL TESTING PROCEDURES AND ASSOCIATED QUALITY ASSURANCE ACTIVITIES
REMEDIAL ACTION
SII CONGRESS STREET SITE
SCHENECTADY, NEW YORK

Work Task to be Inspected	*Quality Control Activities*			
	Type of Testing	*Method of Testing*	*Frequency*	*Acceptance/Rejection Criteria*
Pipe and Media Drain				
• placement of drainage media	in place density	ASTM D2922/D2167	1 per 100 lineal ft around pipe. 1 per 100 cubic yards placed thereafter	95% SMDD
	in place moisture content	ASTM D3017/D2216	1 per 100 lineal ft around pipe. 1 per 100 cubic yards placed thereafter	95% SMDD
• discharge of water from dewatering and initial commissioning	chemical analyses	per City of Schenectady discharge permit	per City of Schenectady discharge permit	per City of Schenectady discharge permit
Cast in Place Concrete				
• concrete testing	compression strength	ASTM C39	3 cylinders per 75 cu. yd. or less	3500 psi
	slump test	ASTM C143	1 per set of strength test	4 inches ± 1 inch
	total air content	ASTM C231/C173	1 per set of strength test	6 percent ± 1 percent
Oil/Water Separator				
• oil/water separator unit	leakage test	per specifications	following installation	no leakage

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APPENDIX K

OPERATION AND MAINTENANCE PLAN

OPERATION AND MAINTENANCE PLAN
GROUNDWATER COLLECTION SYSTEM

CONGRESS STREET PLANT
SCHENECTADY INTERNATIONAL INC.
SCHENECTADY, NEW YORK

NOVEMBER 1998
REF. NO. 1312 (37)
This report is printed on recycled paper.

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GLOSSARY

ASTM	American Society for Testing and Materials
City	City of Schenectady
Conrail	Consolidated Rail Company
FDR	Final Design Report
GCS	Groundwater Collection System
HASP	Health and Safety Plan
HDPE	High Density Polyethylene
NTU	Nephelometric Turbidity Unit
NYSDEC	New York State Department of Environmental Conservation
NYSDOT	New York State Department of Transportation
O&M	Operation and Maintenance
POTW	Publicly Owned Treatment Works
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RA	Remedial Action
RDWP	Remedial Design Work Plan
RI	Remedial Investigation
TCL	Target Compound List

1.0 INTRODUCTION

This report outlines the Operation and Maintenance (O&M) Plan for the Groundwater Collection System at Schenectady International Inc. (SII) Congress Street Plant (Site) located in Schenectady, New York. The purpose of this O&M Plan is to provide the detailed operation, maintenance, and monitoring requirements for the various components of the Remedial Action (RA) that will be implemented at the Site.

1.1 SCOPE OF THE O&M PLAN

The purpose of this O&M Plan is to detail the operation, maintenance, and monitoring requirements for the RA. This report is organized as follows:

- Section 1.0 Introduction;
- Section 2.0 Site Description;
- Section 3.0 Selected Remedial Action;
- Section 4.0 Monitoring, Testing, and Records;
- Section 5.0 Operation of Site Systems;
- Section 6.0 Site Maintenance; and
- Section 7.0 Reports.

1.2 REVISIONS TO THE O&M PLAN

This O&M Plan presents the details of the operation, maintenance, and monitoring requirements of the RA components. The O&M Plan will likely require revisions after the construction of the various remedial components is complete; thereafter, becoming the O&M Manual. Revisions will be made, as necessary, to reflect the conditions of the constructed remedy and to provide additional operation and maintenance information and requirements. The O&M Manual will be further amended, as necessary, to reflect experience gained during the operation of the Site systems.

2.0 SITE DESCRIPTION

The Site is located at Congress Street and Tenth Avenue in Schenectady, New York, and comprises an area of approximately 8 acres.

Adjacent land uses include light industrial areas to the south and west; commercial facilities to the east and northwest; and residential areas to the north and northeast. The Site is situated on the side of a valley which slopes down to Cowhorn Creek. An active rail line is located between the Site and Cowhorn Creek.

The Site location is shown on Figure 2.1 and the Site layout and existing topographic conditions are shown on Figure 2.2.

3.0 SELECTED REMEDIAL ACTION

The RA selected for the Site consists of the following components:

- pipe and media groundwater collection drain along the western side of the Site;
- four groundwater extraction wells;
- forcemains for conveying collected groundwater to oil-water separator unit;
- oil-water separator for removing any oils from collected groundwater prior to discharge to the City of Schenectady Publicly Owned Treatment Works (POTW);
- high density polyethylene (HDPE) liner along the swale to prevent surface water runoff from entering the groundwater collection drain; and
- riprap at the end of the swale to prevent erosion.

4.0 MONITORING, TESTING, AND RECORDS

4.1 SYSTEM PERFORMANCE MONITORING

The objective of the RA is to minimize chemical migration from the Site via groundwater flow by intercepting and collecting potentially impacted groundwater at the downgradient property boundary.

The overall performance goal will be to maintain continuous operation of the groundwater extraction system. Recognizing that there is likely to be some downtime for system maintenance and repairs, the performance objective for operation of the groundwater extraction system will be 85 percent.

The system performance will be evaluated on an annual basis for each of the extraction wells and the groundwater collection based on flow monitoring data.

4.2 GROUNDWATER MONITORING

A groundwater monitoring program has been established to monitor the effectiveness of groundwater collection system (GCS).

The groundwater monitoring program consists of hydraulic monitoring and groundwater quality monitoring. The data will be used to determine at what time operation of the GCS may cease (subject to NYSDEC approval).

4.2.1 MONITORING WELL NETWORK

Several observation wells were installed at the Site during the Remedial Investigation. Some of these wells have been incorporated into a hydraulic and groundwater quality monitoring program described in the following subsections. The wells that comprise the groundwater monitoring network are presented on Figure 4.1.

4.2.2 HYDRAULIC MONITORING

Hydraulic monitoring consists of the collection of water levels in monitoring wells, extraction wells, and surface water bodies to determine groundwater elevations and subsequently groundwater flow directions. Water levels will be measured at the following locations:

i) WW1, PW1, PW2, PW3, and PW4;

ii) OW5A-92, OW5B-92, OW6A-92, OW6B-92; OW7A-92, OW7B-92, OW8A-92, OW8B-92, OW11-94, OW13-94 and EW-1; and

iii) SW1.

Hydraulic monitoring locations are presented on Figure 4.1 and are listed in Table 4.1. Water elevations will be determined at the following frequency:

i) weekly following startup for two months;

ii) monthly for the remainder of the 1-year period following GCS startup; and

iii) quarterly thereafter.

The monitoring frequency will be reviewed after the initial first year period. Any modifications to the monitoring frequency will be subject to NYSDEC approval.

4.2.3 GROUNDWATER QUALITY MONITORING

Groundwater quality monitoring consists of the collection of groundwater samples from selected groundwater monitoring wells and the analysis of these samples to determine the concentrations of chemicals in the groundwater.

Proposed groundwater quality monitoring locations include OW5A-92, OW5B-92, OW6A-92, OW6B-92, OW7A-92 and OW7B-92. The well locations are presented on Figure 4.1 and are listed in Table 4.2. Samples will also be collected groundwater extraction locations WW1, PW1, PW2, PW3 and PW4. Groundwater samples will be collected and analyzed at the following frequency:

i) quarterly for the first year after GCS startup.

The sampling frequency after the initial first year period will be based on an evaluation of initial first year results. Any modifications to the monitoring frequency will be subject to NYSDEC approval.

Groundwater quality monitoring will include field information (pH, conductivity, temperature, and turbidity) and laboratory analysis of samples. During the initial first year period, laboratory analysis will include Target Compound List (TCL) Volatile Organic Compounds (VOCs), and Semi-Volatile Organic Compounds (SVOCs). The monitoring parameters will be reviewed after the initial first year period to develop a Site-Specific Parameter List (SSPL) for subsequent monitoring events.

Groundwater sampling activities will be conducted in accordance with the Quality Assurance Project Plan (QAPP) presented in the Remedial Design Work Plan. Groundwater samples from the extraction wells PW1, PW2, PW3 and WW1 will be collected from sampling ports on the discharge lines.

Groundwater quality also will be monitored at the GCS effluent sampling location. Effluent samples collected as described in Section 4.3 will be analyzed and evaluated to determine the quality of the groundwater being discharged from the GCS to the City's POTW.

4.3 EFFLUENT MONITORING PROGRAM

Groundwater from the GCS will be discharged to the POTW following pretreatment by an oil-water separator to remove any LNAPL that may be present.

Effluent sampling will be performed in accordance with the discharge permit issued by the City of Schenectady. The discharge permit will be attached to this O&M Plan upon receipt from the City.

4.4 SURFACE WATER MONITORING PROGRAM

Surface water samples will be collected upstream of, adjacent to and downstream of the Site at locations SW1, SW4, and SW9, shown on Figure 4.1 and listed on Table 4.2. Laboratory analysis will include TCL VOCs and SVOCs for the initial first year period.

Surface water samples will be collected and analyzed at the following frequency:

i) quarterly for the first year after GCS startup (concurrent with groundwater samples).

The sampling frequency and the monitoring parameters after the initial first year period will be based on an evaluation of the initial first year results. Any modifications to the monitoring frequency will be subject to NYSDEC approval.

4.5 SAMPLING PLAN

The following subsections detail the required procedures for sampling groundwater and surface water. Procedures and protocols outlined in this Sampling Plan will be performed in conjunction with those presented in the Health and Safety Plan (HASP) presented as Appendix I to the Final Design Report and the QAPP.

4.5.1 GENERAL SAMPLING PROTOCOLS

Employ the following protocols during all sampling throughout this program:

1. Clean all sampling instruments and equipment in accordance with the protocols presented in Section 4.5.8 prior to sampling at each location.
2. Use a new pair of disposable nitrile gloves at each sampling location. Undertake additional glove changes as conditions warrant.
3. Handle all sampling-generated wastes such as gloves, Tyveks, etc., in accordance with Section 4.5.7.
4. Ice all samples collected for off-Site chemical analysis in laboratory supplied coolers after collection and labeling. Fill any remaining space within the coolers with packing material to cushion the sample containers. Seal each cooler with a transportation security seal containing the sampler's initials, then seal the cooler with packing tape. Preserve and label samples in accordance with Section 4.5.5 and pack and ship sample coolers in accordance with Section 4.5.6.
5. All samples must be delivered to the off-Site laboratory by commercial courier or sampling personnel, within 24 to 48 hours from day of collection.
6. Samples will remain under the control of the sampling personnel until relinquished to the laboratory or commercial courier under chain-of-custody protocols (see QAPP).
7. Always return undelivered samples to locked storage at the end of each day. Samples must not be stored overnight in areas other than a secured storage area. Sampling containers must not be stored in enclosures containing equipment which use any form of fuel or volatile petroleum based product.

Complete the following tasks before conducting any sampling activities:

1. Review the HASP, the QAPP, and the procedures for the sampling that will be performed.
2. Make proper arrangements with the laboratory with regard to sample containers and the sampling date. Review Quality Assurance (QA)/Quality Control (QC) requirements.

Additional protocols specific to each sampling method are presented in the following subsections.

4.5.2 MONITORING WELL PURGING

Use the following procedures to purge monitoring wells prior to sampling.

1. All personnel involved in purging or sampling must wear appropriate PPE as specified in the HASP.
2. Inspect the well. Determine if the cap and lock are secure or if they have been tampered with. If the well is unlocked, replace the lock. Note any cracks in the protective casing and/or surface seal as well as any subsidence in the vicinity of the well. Note the results of the inspection even if the well is in perfect condition.
3. Measure the water level in the well to ±0.01 feet prior to purging. Compare these results to previous water level measurements to ensure that the correct well is being purged for sampling. Record the water level.
4. The objective of purging is to extract a sufficient volume of water prior to sampling to ensure that the sample is representative of the actual groundwater conditions.

   Remove a minimum of three well volumes of water when possible. (A 2-inch diameter well contains 0.16 gallons of water per foot of casing below the water level and a 4-inch diameter well contains 0.65 gallons of water per foot of casing below the water level). After each well volume is removed, collect and field analyze a purge water sample for temperature, pH, conductivity, and turbidity. Record all readings. Continue purging until a maximum of five well volumes have been removed or until three consecutive, consistent readings of conductivity, temperature, and pH are obtained and the turbidity is less than 50 Nephelometric Turbidity Units (NTU). Conductivity, temperature, and pH readings are consistent if conductivity and temperature readings are within 10 percent of the average value or pH readings are within ±1 pH unit of the average value. If the above criteria have not been met after the maximum five well volumes have been removed, a decision will be made by the NYSDEC representative and the sampling personnel regarding sampling of the well. Record the number of well volumes that were required to purge the well.

5. If recharge is insufficient to conduct the purging protocols described in Step 5 above, the well will be pumped/bailed to dryness and samples will be collected when the well has sufficiently recovered.
6. Acceptable equipment for water extraction during purging includes bailers, peristaltic pumps, bladder pumps, Waterra™ pumps, centrifugal, and submersible pumps.
7. Clean all water extraction equipment and field instruments (including the water level measuring device) prior to use at each new location in accordance with the protocols presented in Section 4.5.8.
8. Collect and store all purge waters for later disposal as described in Section 4.5.7.

4.5.3 MONITORING WELL SAMPLING

Following well purging, carry out sampling of the monitoring well according to the following protocols:

1. Collect samples as soon after purging as possible.
2. Use a new pair of disposable nitrile gloves for sampling each well. Undertake additional glove changes as conditions warrant.
3. Collect samples from the monitoring well using either a bottom filling bailer with a stainless steel leader attached to a nylon or polypropylene rope or using a suitable sample pump. Use sampling bailers constructed of either Teflon or stainless steel and use a new length of rope at each well. Suitable sampling pumps include peristaltic pumps (for the semi-volatiles) and bladder pumps. If peristaltic pumps are used, collect the volatile portion using a bottom loading bailer prior to collection of the sample portion for the remaining parameters.
4. Prior to use at each new sampling location, clean the bailer or pump as specified in Section 4.5.8.
5. Collect a sufficient volume of groundwater for chemical analysis. Collect all required QA/QC samples as discussed in the QAPP.

6. Label sample containers in accordance with Section 4.5.5. Maintain a hard-cover, bound field book to record all groundwater samples and sampling events.
7. Clean all field equipment and instruments at the conclusion of sampling in accordance with the protocols presented in Section 4.5.8.

4.5.4 SURFACE WATER SAMPLING

Perform surface water sampling according to the following protocols:

1. Collect all surface water samples within as short a time period as possible.
2. Use a new pair of disposable nitrile gloves for sampling each location. Undertake additional glove changes as conditions warrant.
3. Collect surface water samples using the grab sampling technique which involves submersing the laboratory supplied sample bottles directly into the surface water course.
4. Surface water samples should be as representative and undisturbed as possible. Take care to avoid disturbing sediment and debris during the collection of samples.
5. Collect a sufficient volume of groundwater for chemical analysis. Collect all required QA/QC samples in accordance with the QAPP.
6. Label sample containers in accordance with Section 4.5.5. Maintain a hard-cover, bound field book to record all surface water samples and sampling events.
7. Clean all field equipment and instruments at the conclusion of sampling in accordance with the protocols presented in Section 4.5.8.

4.5.5 SAMPLE CONTAINERS, PRESERVATION, AND LABELS

Required sample containers, sample preservation methods, and maximum sample holding times are summarized in the QAPP.

Sample containers must be prepared using washing procedures that meet or exceed the requirements specified in the QAPP. Sample containers must be shipped to the Site in sealed containers from a single lot of prepared bottles.

Label sample containers with a unique sample identification, the date and time, the parameters to be analyzed, and the sampler's initials.

4.5.6 PACKING AND SHIPPING

Prepare sample containers for shipment as follows:

1. Wipe containers to remove all debris/water using paper towels. Dispose paper towels with other contaminated materials.
2. Place clear, wide packing tape over sample labels for protection.

Adhere to the following guidelines when packing the samples for shipment:

1. Plan time to pack the samples. Proper packing and manifesting takes time.
2. Always opt for more coolers and padding rather than crowd samples.
3. Do not bulk pack. Each sample must be individually padded.
4. Large glass containers (1 liter and up) require much more space between containers.
5. Do not rely on ice for padding because it reduces in volume when it melts.
6. When using ice as a cooling media, always double bag the ice in Zip-Lock™ or equivalent bags and remove as much air as possible from the bags prior to sealing.
7. Double-check to ensure all trip blanks have been included as specified in the QAPP.
8. Enclose the Chain-of-Custody form in a sealed Zip-Lock™ or equivalent bag.
9. Ensure custody seals (two, minimum) are placed on each cooler. For coolers with hinged lids, place both seals on the opening edge of the lid. For coolers with "free" lids, place seals on opposite corners of the lid. Place clear tape over the custody seals. Wrap clear tape around the cooler to ensure the lid will not come off during shipping.
10. Ensure that all "Hazardous Material" stickers/markings have been removed from the coolers before being used.

Samples must be shipped by overnight courier. A great many shipping problems can be avoided by adhering to the following protocols:

1. Prior to the start of the field sampling, contact the carrier to determine if pick-ups can be made at the field site location. If pick-ups at the field site can be made, determine the "no-later-than" time for having the shipment ready.
2. If no pick-up is available at the Site, determine the nearest pick-up or drop-off location. Again, determine the "no-later-than" time for each location.
3. Allow sufficient time not only for packaging but also for delivery of samples, if this becomes necessary. Driving at high rates of speed in order to make the drop time is not recommended.
4. Sample shipments must not be left at unsecured or questionable drop locations (i.e., if the cooler will not fit in a remote drop box, do not leave the cooler unattended next to the drop box).
5. Some overnight carriers do not provide "overnight" shipment to/from some locations. Do not assume, call the carrier in advance before the start of the field work.
6. Maintain copies of all shipment manifests in the field file.

4.5.7 HANDLING OF MATERIALS GENERATED DURING SAMPLING ACTIVITIES

Containerize Personal Protective Equipment (PPE) and sampling refuse (i.e., paper towels, used tin foil) generated during the sampling activities in clear plastic bags and dispose at a sanitary landfill.

To the extent practical, collect all groundwater and collection system effluent extracted during monitoring activities and discharge it to the Groundwater Collection System at a suitable location (e.g., WW1).

4.5.8 EQUIPMENT CLEANING PROTOCOLS

Clean all equipment used for the collection of samples for chemical analysis including bailers and pumps according to the following protocol:

- wash and scrub with low-phosphate detergent;
- rinse with tap water;
- rinse with 10 percent nitric acid (HNO_3 - ultrapure);
- rinse with tap water;

- rinse with methanol (solvents must be pesticide grade or better);
- rinse thoroughly with deionized demonstrated-analyte-free water supplied by the lab. The volume of water used must at least be five times the volume of solvent used in the above step;
- air dry; and
- wrap in aluminum foil.

Dedicated sampling equipment which is left in the well will either be precleaned by the manufacturer or cleaned prior to its first use. Dedicated equipment will not require cleaning between sampling rounds unless the equipment becomes unsafe to handle. The use of dedicated equipment will result in the generation of only minimal volumes of spent solvent and thus is preferred.

Tap water may be used from any municipal water treatment system. The use of an untreated potable water supply is not an acceptable substitute. If metals samples are not being collected, the 10 percent HNO_3 rinse may be omitted; and if organics samples are not being taken, the solvent rinse may be omitted.

Place all cleaned equipment on clean polyethylene sheeting or aluminum foil in order to avoid contacting a contaminated surface before use.

Before use and between each well, clean the water level measuring device, pH meter, conductivity meter, thermometer, and turbidity meter (nephlometer) by rinsing with detergent solution followed by a deionized water rinse. Solvent rinses must not be used because of their potential to damage the instruments.

Treat/dispose the water washes and spent cleaning solvents using the procedures presented in Section 4.5.7.

4.6 ANALYTICAL PROGRAM

The Analytical Program is detailed in the QAPP and includes analytical schedules and methods, laboratory QC samples, reporting and deliverables, special analytical protocols, laboratory audits, and data audits.

4.7 HYDRAULIC MONITORING PROCEDURES

The following subsection details the required procedures for measuring water levels for hydraulic monitoring. Procedures and protocols outlined in this subsection will be performed in conjunction with those presented in the HASP.

Complete the following tasks before conducting any water level measurement activities:

1. Review the HASP.
2. Assemble equipment and supplies.
3. All personnel involved in water level monitoring activities must wear appropriate PPE as specified in the HASP.
4. Collect water levels over as short a period of time as possible. Note observations of significant weather changes during the period of water level measurements. Note recent rainfall events.

Use the following procedures to measure water levels at all wells and piezometers:

1. Inspect the well. Determine if the cap and lock are secure or if they have been tampered with. If the well is unlocked, replace the lock. Note any cracks in the protective casing and/or surface seal as well as any subsidence in the vicinity of the well. Note the results of the inspection even if the well is in perfect condition.
2. Ensure that the well to be measured has been correctly identified and located. Determine the reference point for the well (i.e., top of casing).
3. Use a new pair of disposable nitrile gloves for each monitoring location. Undertake additional glove changes as conditions warrant.
4. Measure the water level in the well to ±0.01 feet. Compare these results to previous water level measurements to ensure the correct well is being monitored. Record the water level. Note the presence of any immiscible liquids in the well and any unusual odors.
5. Clean the water level measuring device prior to use at each new location and at the end of all water level measurements in accordance with the protocols presented in Section 4.5.8.

4.8 EVALUATION OF MONITORING RESULTS

Upon receipt of groundwater and effluent quality data, analytical results will be evaluated to determine if the data are acceptable for use in the respective monitoring programs. Raw data packages resulting from groundwater monitoring will be sent to the NYSDEC upon request following QA review.

Raw data packages resulting from effluent monitoring will be sent to the City upon request following QA review.

The procedures for evaluating analytical data resulting from Site monitoring activities are detailed in the QAPP.

The data will be used to determine the presence of Site-related chemicals in off-Site surface water and groundwater. Hydraulic data will be converted to elevations and listed in tabular form for each round of data collected.

The evaluation of the hydraulic and water quality data will be used to determine if system is meeting the RA objectives (i.e., minimizing chemical migration from the Site via groundwater flow in order to control potential routes of exposure to human health and the environment).

4.9 RECORDS AND REPORTS

Data Summary Reports will be submitted to NYSDEC at the same frequency as sampling events, after QA review. The Data Summary Reports will include analytical results, appropriate QA/QC data, and hydraulic monitoring data. Complete monitoring reports will be submitted to the NYSDEC annually as detailed in Section 7.0.

5.0 OPERATION OF SITE SYSTEMS

[This section will be provided in the O&M Manual.]

6.0 SITE MAINTENANCE

Site maintenance requirements will include routine Site inspections, scheduled preventative maintenance, unscheduled maintenance in response to inspection reports or component failures, and record keeping for maintenance activities. Perform all system inspection and maintenance activities in strict accordance with the HASP.

6.1 SITE INSPECTIONS

6.1.1 INSPECTION SCHEDULE

Table 6.1 presents an outline of the inspection and preventative maintenance schedule for the groundwater collection system and swale liner. This schedule will be revised, as appropriate, as more experience with the particular maintenance requirements of the Site systems is gained.

Perform required maintenance as identified by the monthly inspections as soon as possible following identification.

6.1.2 MONTHLY INSPECTIONS

Inspect the Site on a monthly basis following completion of the RA construction. These inspections will ensure that the remedial components are functioning effectively as designed following construction. Give particular attention to the following system components:

Swale Liner

- vegetated soil cover; and
- general surface conditions.

Groundwater Collection System

- cleanouts;
- pumping location(s);
- pumps; and
- flow monitoring devices.

Oil-Water Separator

- general condition;
- piping connections; and
- secondary containment.

The monthly inspection of the GCS will include visual observation of all pumping locations and cleanouts to ensure that they are secure. Inspect the surface of the swale to ensure that the integrity of the liner is being maintained, including signs of damage due to loss of vegetation, settlement, erosion, and burrowing by animals.

Record the monthly inspections on the Monthly Inspection Log. Keep all original logs on file at the Site.

6.2 MAINTENANCE

Maintenance is required when inspections reveal a problem with one of the systems or when system components malfunction. Should inspections reveal that non-emergency maintenance or response is required, complete the work as soon as practicable in order to eliminate further damage and the need for emergency repairs. If a situation requires immediate action, initiate emergency remedial actions immediately. Notify NYSDEC of all emergency actions. All replacement equipment must be of equal or better quality than the original components and when possible should be the same make and model as the original. All replacement materials must meet or exceed the RA construction specifications. A summary of potential problems that will require maintenance and the appropriate corrective actions is summarized in Table 6.2.

The need for maintenance of the various components of the remedy will be determined after the construction is completed based on Site conditions and the initial inspection. Maintenance items include, but are not limited to, the following remedy components:

Swale Liner

1. fertilizing and restoring the Site vegetative cover, and removing/cutting weeds or bushes;
2. repairing damage caused by burrowing wildlife, presence of deep-rooted weeds, or other vegetation; and
3. repairing damage caused by erosion.

GCS

1. cleaning extraction wells and the collection pipe (as required);
2. cleaning of pumps, level control probes, and flow meters; and
3. repairing and maintaining the control building.

Oil-Water Separator

1. cleaning of oil-water separator (as required).

6.2.1 SWALE LINER

The purpose of the swale liner is to prevent infiltration of surface water runoff into the groundwater collection drain. When a problem is detected with the swale liner, correct it as soon as feasible.

6.2.1.1 VEGETATIVE COVER

Visible indications of problems which may occur with the vegetative cover include bare areas, dead or dying vegetation, and growth of weeds. When inspection reveals bare areas or dead or dying vegetation, perform the following actions as soon as feasible to correct the problem:

1. till the topsoil; and
2. re-seed and mulch.

Remove all tall weeds at least annually.

6.2.1.2 TOPSOIL AND COMMON SOIL LAYERS

Visible indications of problems which may occur with the common soil and topsoil layers include washout and erosion, settlement, standing water, and animal holes or burrows.

If the liner has been damaged by erosion or a washout has occurred, perform the following actions to correct the problem:

1. recover the washed out soil;
2. backfill with recovered soil and additional soil to the original grade;
3. place a 6-inch thick layer of topsoil over the common soil layer;
4. check the final elevation to ensure adequate drainage; and
5. seed/mulch.

Correct settlement and standing water, if necessary, by either regrading or by placing additional topsoil in the low areas.

Correct animal holes or burrows by performing the following actions:

1. capture and remove the rodents;
2. replace the compacted fill and topsoil layers to the original design thickness; and
3. seed/mulch.

6.2.2 GROUNDWATER COLLECTION SYSTEM (GCS)

The purpose of the GCS is to minimize contaminant migration via groundwater flow from the Site. All of the GCS components work together to achieve these goals; therefore, each component is necessary for the system to function effectively. When a problem is detected with the GCS, correct it as soon as possible.

6.2.2.1 GROUNDWATER COLLECTION DRAIN

A visible indication of problems which may occur with the collection drain is an increase in groundwater levels in the area of the drain and a decrease in discharge flow. This indicates that the collection pipe may be blocked and groundwater flow is restricted. Take the following actions as soon as possible:

1. inspect pipe to determine reason for restricted flow;
2. pressure flush the pipe sections that are plugged or excavate and replace section of pipe that may have collapsed or separated; and
3. vacuum sediments and debris from wet well.

Use pressures in the range of 500 to 1,000 psi to avoid damaging the collection pipe and/or bedding.

6.2.2.2 GROUNDWATER EXTRACTION WELLS

Visible indications of problems which may occur with the groundwater extraction wells is an increase in water level or a decrease in discharge flow.

These indicate that the well may be blocked or the pump may be malfunctioning.

Take the following actions as soon as possible:

1. remove and inspect level controls and pump;
2. clean and/or replace level controls and pumps, as necessary; and
3. pressure flush the well and remove any sediments or debris from well.

6.2.2.3 FORCEMAIN

A visible indication of problems which may occur with the forcemain is a decrease in discharge flow. This indicates that the forcemain may be blocked or leaking.

If the forcemain is blocked, take the following actions as soon as possible:

1. shut down the GCS;
2. drain the section of forcemain that is blocked;
3. pressure wash the forcemain section;
4. check continuity of forcemains; and
5. restart the GCS.

If the forcemain is leaking, take the following actions as soon as possible:

1. shut down the GCS;
2. drain the section of forcemain that is leaking;
3. excavate the forcemain, if buried; and
4. reconstruct the forcemain to the original construction specifications.

6.2.2.4 ELECTRICAL AND CONTROL SYSTEMS

[This section will be completed after the electrical and control systems are installed and will include maintenance recommended by the manufacturer.]

6.2.2.5 PUMPS

[This section will be completed after the electrical and control systems are installed and will include maintenance recommended by the manufacturer.]

6.2.2.6 OIL-WATER SEPARATOR

[This section will be completed after the oil-water separator has been installed and will include maintenance recommended by the manufacturer.]

6.3 MAINTENANCE RECORDS

A record of all maintenance performed at the Site will be kept on Site. The record will include a description of the work performed, who it was performed by, and comments which may arise.

6.4 REMEDIAL WORKS

Should inspections reveal that non-emergency maintenance or response is required, it will be completed as soon as practical in order to preclude further damage and the need for emergency repairs. Should a situation exist requiring immediate action, SII personnel must initiate emergency or remedial response actions. Notify NYSDEC of any emergency actions.

7.0 REPORTS

Data Summary Reports, Monitoring Reports, and Inspection and Maintenance Reports will be maintained on Site. Data Summary Reports will be submitted at the same frequency as sampling events, after QA review, as detailed in Section 4.6.

Monitoring Reports will be submitted to NYSDEC annually and will include the results of all environmental monitoring performed at the Site during the previous year. The Monitoring Reports will include:

- analytical results and appropriate QA/QC data;
- hydraulic monitoring data;
- an evaluation of the performance of the GCS; and
- recommendations for system modifications, if appropriate.

Inspection and Maintenance Reports will be submitted annually and will include a description of all inspection and maintenance activities performed at the Site during the previous year, including recommendations for system improvements which would reduce the need for future unscheduled maintenance activities.

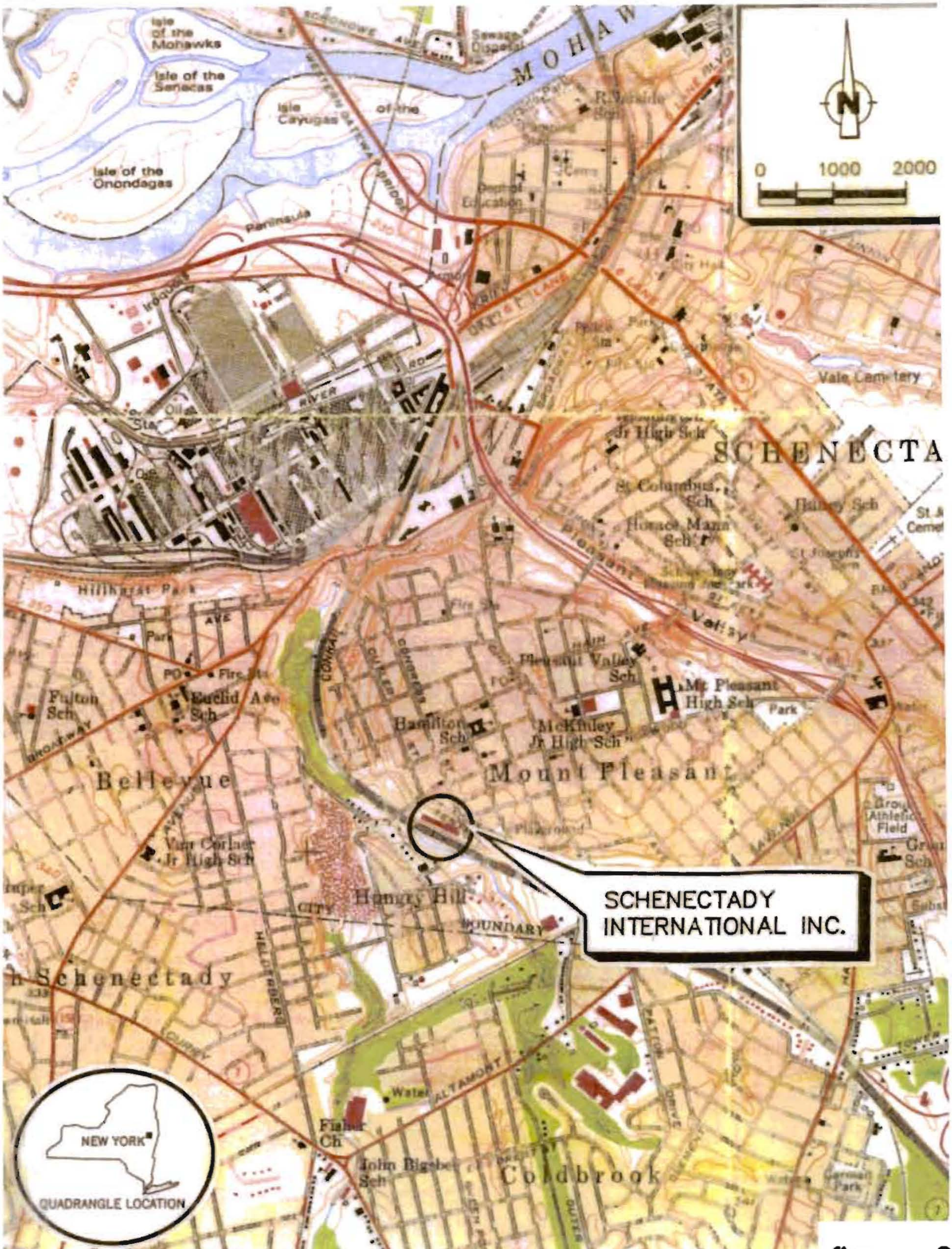


figure 2.1

SOURCE:
U.S.G.S. SCHENECTADY, N.Y.
SW/4 SCHENECTADY 15' QUADRANGLE

SITE LOCATION
OPERATION AND MAINTENANCE PLAN
CONGRESS STREET PLANT
Schenectady International Inc.

CRA

01312-30(037)GN-WA002 NOV 06/98

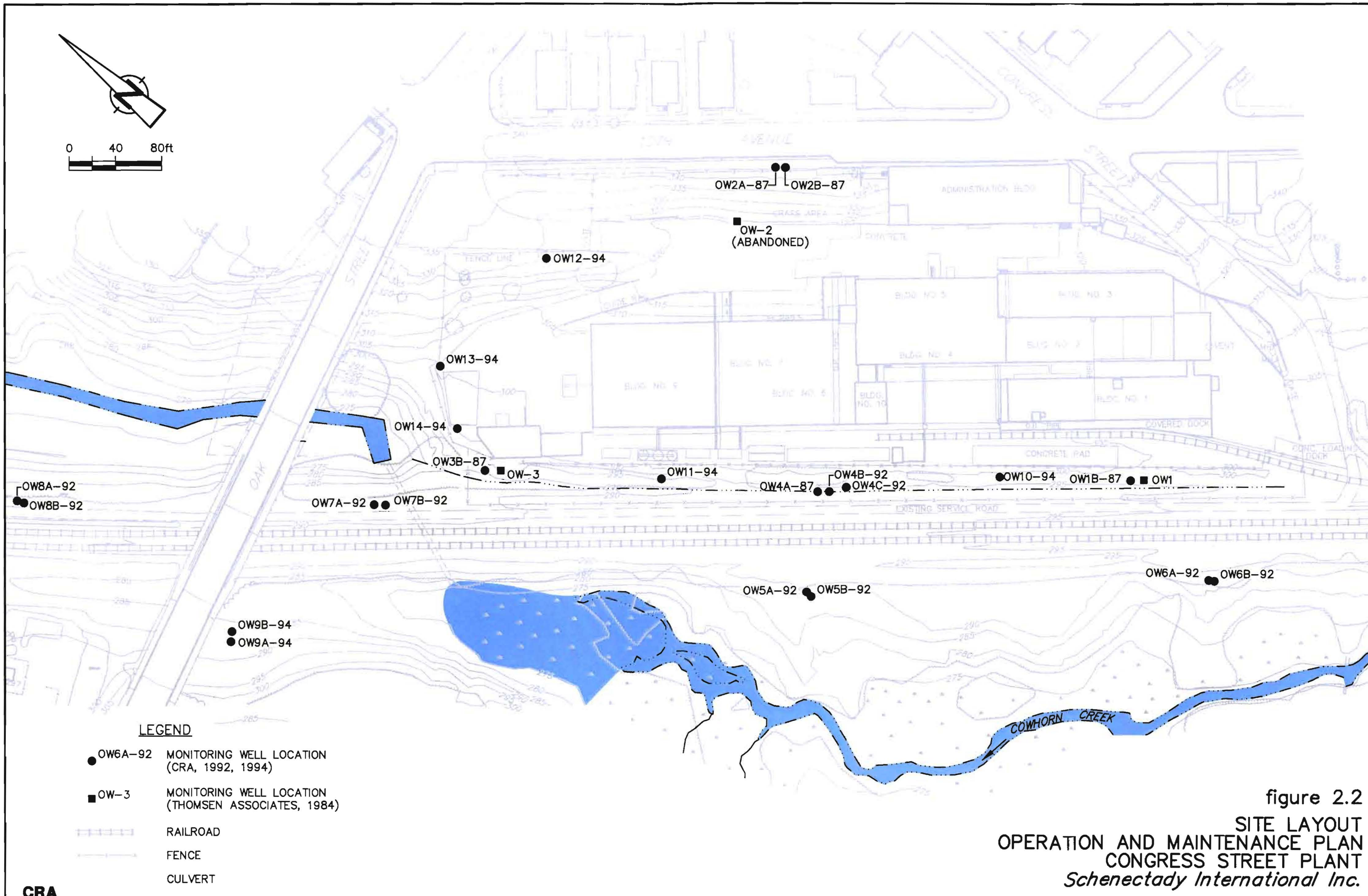
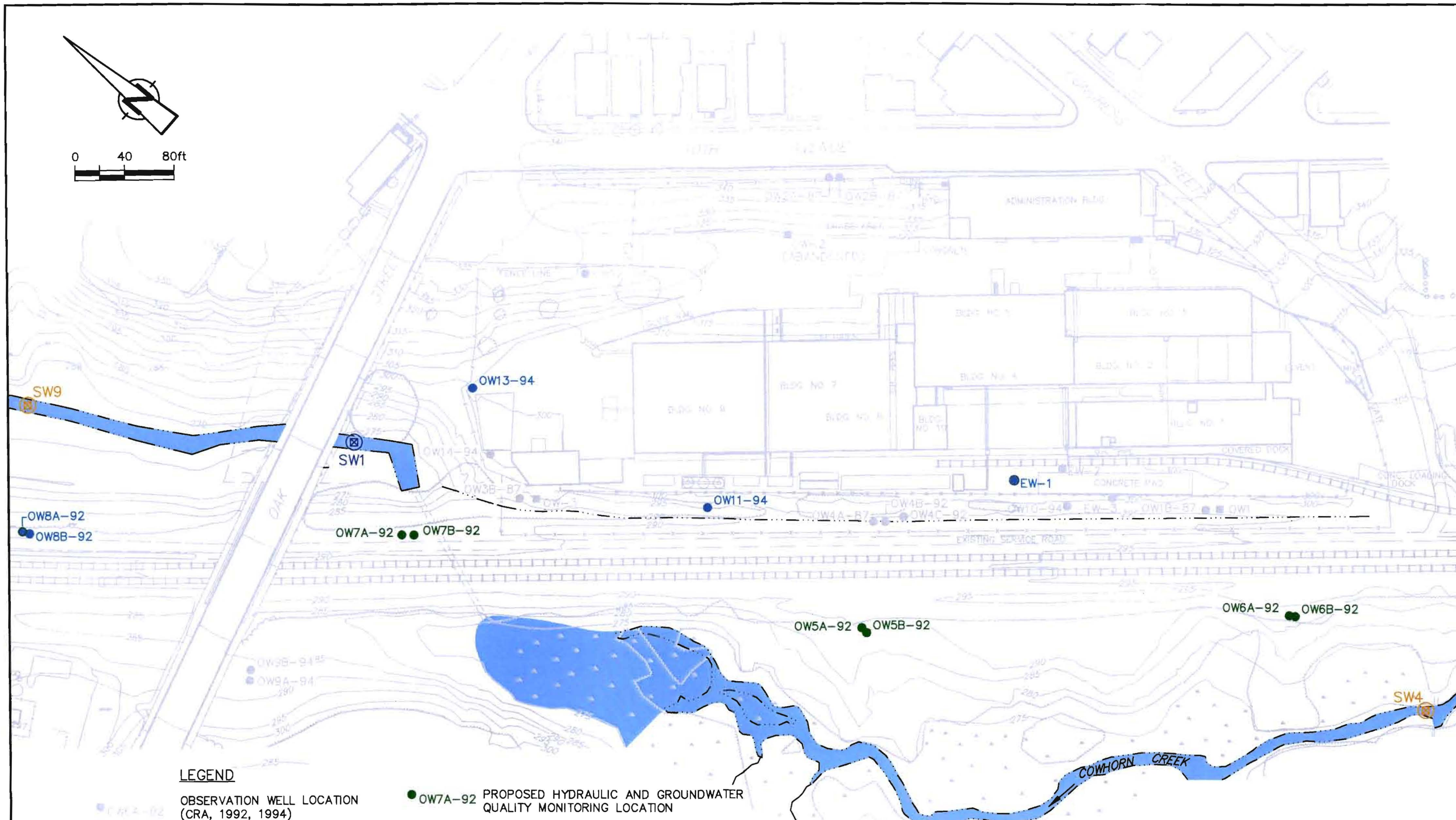


figure 2.2

SITE LAYOUT
OPERATION AND MAINTENANCE PLAN
CONGRESS STREET PLANT
Schenectady International Inc.

CRA

01312-30(037)GN-WA003 NOV 06/98



LEGEND

OBSERVATION WELL LOCATION (CRA, 1992, 1994)

OBSERVATION WELL LOCATION (THOMSEN ASSOCIATES, 1984)

RAILROAD

FENCE

CULVERT

OW7A-92 PROPOSED HYDRAULIC AND GROUNDWATER QUALITY MONITORING LOCATION

SW1 PROPOSED HYDRAULIC AND SURFACE WATER QUALITY MONITORING LOCATION

SW9 PROPOSED SURFACE WATER QUALITY MONITORING LOCATION

OW11-94 PROPOSED HYDRAULIC MONITORING LOCATION

figure 4.1

PROPOSED MONITORING LOCATIONS
OPERATION AND MAINTENANCE PLAN
CONGRESS STREET PLANT
Schenectady International Inc.

CRA

01312-30(037)GN-WA001 NOV 06/98

TABLE 4.1

HYDRAULIC MONITORING LOCATIONS
OPERATION AND MAINTENANCE PLAN
SII CONGRESS STREET SITE
SCHENECTADY, NEW YORK

GROUNDWATER MONITORING WELLS

OW5A-92	OW7B-92
OW5B-92	OW8A-92
OW6A-92	OW8B-92
OW6B-92	OW11-94
OW7A-92	OW13-95
	EW-1

GROUNDWATER EXTRACTION LOCATIONS

WW1	PW3
PW1	PW4
PW2	

SURFACE WATER LOCATIONS

SW1

FREQUENCY

- Weekly following GWS startup for two months;
- Monthly thereafter for the remainder of the initial 1-year period; and
- Quarterly thereafter.

TABLE 4.2

GROUNDWATER AND SURFACE WATER SAMPLING SUMMARY
OPERATION AND MAINTENANCE PLAN
SII CONGRESS STREET SITE
SCHENECTADY, NEW YORK

LOCATIONS

OW5A-92	OW7B-92	SW1
OW5B-92	PW1	SW4
OW6A-92	PW2	SW9
OW6B-92	PW3	WW1
OW7A-92	PW4	

FREQUENCY

- quarterly for first year following GWS startup (review after 1 year).

PARAMETERS

- TCL VOCs AND SVOCs (review after 1 year to develop SSPL).

TABLE 4.3

EFFLUENT SAMPLING SUMMARY
OPERATION AND MAINTENANCE PLAN
SII CONGRESS STREET SITE
SCHENECTADY, NEW YORK

LOCATIONS

effluent monitoring station at Site discharge point

FREQUENCY

As dictated by the City of Schenectady Industrial Wastewater Discharge Permit

PARAMETERS

As dictated by the City of Schenectady Industrial Wastewater Discharge Permit

TABLE 6.1

MONTHLY INSPECTION AND PREVENTATIVE MAINTENANCE
OPERATION AND MAINTENANCE PLAN
SII CONGRESS STREET SITE
SCHENECTADY, NEW YORK

	Item	*Inspect For*
1.	**Groundwater Collection System**	
	Wet Wells and Extraction Wells	- cover on securely - condition of cover - condition of casing - flow unrestricted
	Flow Meters	- operating properly, check manufacturer's inspection requirements
	Pumps	- operating properly, check manufacturer's inspection requirements
2.	**Swale Liner**	
	Vegetated Soil Cover	- erosion, bare areas, washouts, leachate seeps, length of vegetation, dead/dying vegetation
	General Surface Conditions	- integrity of liner, erosion, washouts, burrowing by animals, sediment buildup
3.	**Oil-Water Separator**	
	General Surface Condition	- leaks, corrosion
	Secondary Containment	- cracks, staining

TABLE 6.2

POTENTIAL PROBLEMS AND APPROPRIATE CORRECTIVE ACTIONS
OPERATION AND MAINTENANCE PLAN
SII CONGRESS STREET SITE
SCHENECTADY, NEW YORK

Areas of Concern	*Potential Problem*	*Action*
Groundwater Collection System		
Groundwater Extraction Wells	Blockage of well, biofouling. Will restrict groundwater flow.	Remove pumps and level control probes and clean/replace as appropriate. Flush well. Vacuum sediments and debris from well.
Groundwater Withdrawal Pipe/Forcemain	Blockage in pipe. Will restrict groundwater flow. Water level may not be maintained at desired elevations.	Pressure flush pipe sections that are plugged. Vacuum sediments and debris from wet wells.
Swale Liner		
Vegetated Soil Cover	Washout and erosion of vegetation, topsoil, or compacted fill. Typically on steep slopes.	Take immediate action to prevent further erosion and to protect exposed refuse. Recover washed out soil. This material may be used to restore the eroded area. Backfill with additional soil to original cover design thickness. Re-seed. If seeding slopes, erosion control mat is recommended.
	Bare areas.	Loosen and till topsoil. Re-seed and mulch as necessary. Perform restoration as soon as feasible.
	Settlement of original cover. Standing water. Dry bare areas.	Assess size of settlement and potential impact to drainage. Till topsoil and grade. Add additional topsoil if necessary. Check final elevation to ensure adequate drainage. Re-seed and mulch. Regrading of topsoil should be sufficient to correct minor ponding. Additional soil may be required for significant ponding.
	Dead/dying vegetation (potential for erosion).	Till topsoil and re-seed and mulch.
	Weeds. Deterioration of desired vegetation. Potential penetration through cover if left unattended.	Remove all tall weeds. Re-seed as required. Perform annually as a minimum.
	Animal holes/burrows. Safety hazard. Potential for soil cover erosion.	Capture and remove rodents. Replace cap layers as required in specifications. Seed and mulch.
Rip Rap	Erosion of rip rap.	Take immediate action to prevent further erosion. Recover washed out rip rap to the extent possible. Restore eroded area with recovered rip rap. Use additional stone as necessary to match design grades.
Other Unforeseen Problems		Record problem on Inspection Log. Notify Project Manager for appropriate action.

ATTACHMENT A

WASTEWATER DISCHARGE PERMIT

(Will be Inserted for Final O&M Manual)