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COMMISSIONER OF ENVIRONMENTAL CONSERVATION

John W. Hyden
Designated Representative

Date AUGUST 30, 2001

Report

Site Investigation Report
Roblin Steel
City of North Tonawanda, NY

May 1999
Revised May 2000

Recycled Paper

SITE INVESTIGATION REPORT

ROBLIN STEEL

CITY OF NORTH TONAWANDA, NEW YORK

Prepared for

CITY OF NORTH TONAWANDA, NEW YORK

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CHAPTER 1

INTRODUCTION

1.1 GENERAL

In 1997, through tax delinquency, the City of North Tonawanda obtained the former Roblin Steel facility (Figure 1). The facility is abandoned, most fixtures of any value have been salvaged, and vandalism and miscellaneous refuse are apparent. In 1995, a preliminary site assessment (PSA) performed by Ecology and Environment Engineering, P.C. reported the presence of soil and groundwater contamination at the site.

The City of North Tonawanda has received a "Brownfields" redevelopment grant through the New York State Clean Water/Clean Air Bond Act to facilitate the rehabilitation of the site so that it may be beneficially used by a new tenant, resulting in new jobs and an enhanced property tax position for the City.

With the ultimate goal of redevelopment of the site, the City of North Tonawanda established their project goals:

1. Fully characterize the site in terms of contaminants present, media impacted, potential fate and migration of contaminants present, potential exposure and risk associated with those contaminants, and site hydrogeology. The City is seeking a complete and thorough review so that there can be a high level of confidence that all significant property conditions are known and can be dealt with appropriately.

2. Use a phased approach to complete the project so the investigation can be performed in an iterative manner. NYSDEC is receptive to investigations being completed in phases, understanding the benefits of being able to focus the investigation. In this way, the specific scope of subsequent phases can be based on results of earlier phases. This allows the investigation to be focused on the environmental media, locations, and contaminants of concern, allowing the investigation to be cost effective as well as thorough.

3. Use the information described above to identify appropriate forms of remediation for the site so that it may be returned to beneficial use without posing unacceptable risk to new occupants, neighbors or the environment in the area of the site.

Stearns & Wheler was retained to complete the necessary site investigation for fulfilling the above goals. This report presents the findings of the initial phase of that investigation, which occurred from November 1998 to January 1999.

1.2 REVIEW OF EXISTING INFORMATION

The PSA completed in 1995 provided valuable data which was used to determine the subsequent course of work at this site, including the investigation phase described in this report. The following discussion summarizes the findings of the PSA report. The summary is organized by matrix (soil and then groundwater), and then by types of contamination within each matrix (volatile organic compounds, semi-volatile organic compounds, PCBs and metals).

A. **Soils.**

1. **Volatile Organic Compounds (VOCs).** During the PSA, eight surface soil and four subsurface soil samples were collected from various locations around the site. Since the report was prepared, NYSDEC established cleanup goals for contaminants in soil. Prior to the publication of Technical and Administrative Guidance Memorandum (TAGM) HW-4046, there were no specific cleanup goals for VOCs or other contaminants in soil, making interpretation and decision making regarding cleanup difficult. The TAGM provides goals that help guide investigations such as this one.

With the exception of SS-8, collected from beneath the wood block floor at the northern end of the rolling mill building, none of the soil samples contained VOCs at levels that exceeded cleanup goals. At SS-8, three of the five VOCs present exceeded the cleanup goal concentrations.

The soil VOC results suggested that VOCs were not a significant concern in the soils at the site with the exception of the area at SS-8. However, groundwater impacts in Well GW-6 indicated that solvents containing VOCs were probably used at the site and that an investigation for the source of those VOCs would, in all likelihood, include additional soil sampling.

2. **Semi-Volatile Organic Compounds (SVOCs).**SVOCs were found in greater frequency and concentrations than the VOCs. Polynuclear aromatic hydrocarbons (PAHs), a subset of the SVOCs, were detected in 8 of the 12 samples. The various PAHs were reported as a group rather than as the individual compounds, precluding comparison to the cleanup goals for the individual compounds. However, most PAHs have cleanup goals in the vicinity of 40 to 50 ppm. Total PAH concentrations in seven of the eight samples were 20 ppm, 3.3 ppm, 5.7 ppm, 44 ppm, and .52 ppm suggesting that PAH concentrations are generally at or below cleanup goals. Only Sample SS-8 with 1,100 ppm total PAHs represents a potentially significant occurrence of PAHs in site soils. Sample SS-4, from the vicinity of the pickle liquor tanks, contained hexachlorobenzene at a level that exceeded the cleanup goal.

The PAH results suggested that PAHs might have been a concern, specifically beneath the wood block flooring in the rolling mill building. Additional sampling for PAHs was therefore proposed at the site.

3. **PCBs**. PCBs in soil were demonstrated to be a concern at the site at the former location of Transformer A, where approximately 37 tons of soil were excavated. One soil sample was collected at each of two other transformer locations. Only the sample from the southern transformer location (SS-7) indicated PCBs were present. The sample from the northern transformer area did not indicate the presence of PCBs. SS-7 contained 0.360 ppm PCBs as compared to the cleanup goal of 1 ppm.

Although the one positive indication of PCBs at the site is below the cleanup goal, the prior history of PCBs at the site and indications of PCBs in the vicinity of transformers suggested that additional PCB testing was warranted.

4. **Metals**. As with the organic compounds, cleanup goals for metals in soil were established by NYSDEC in 1994. Because the concentrations of metals occurring naturally in the environment are so variable, cleanup goals are, for the most part, based on comparison to background levels. For some metals, the cleanup goal is defined as site background or some

specific calculated value, whichever is higher. A possible indicator of the significance of the levels of metals in soil is the fact that arsenic, cadmium, chromium, nickel, and mercury do exceed the numerical cleanup goal. The actual significance can only be defined after background conditions are defined. The occurrence of lead in Sample SS-1 from the vicinity of the electrical control building definitively identifies lead in soil as a concern, at least in that area. The presence of cadmium dust at levels that failed EP toxicity testing also indicates that metals may have been a concern in soils.

To determine the potential implications of the metals in soils, additional testing was warranted in the vicinity of the electrical control building near the galvanizing facilities, east of the rolling mill, and on the south side of the site, plus off-site sampling to determine background concentrations.

B. **Groundwater.**

1. **General**. Before groundwater quality can be accurately evaluated, an understanding of the groundwater flow regime must be developed. The PSA suggested that there was a deep aquifer and a shallow aquifer. In both aquifers, the PSA report suggested that there was a flow divide at the site and that groundwater flowed to the west and east, away from the middle of the site. Although this is possible, it is not probable given the fact that the Niagara River is close to the site and, in all likelihood, results in a reasonably strong western gradient. The PSA suggests that the divide may possibly be caused by recharge from the cooling basin; however, in each case, the concept of the flow divide is supported by the water level of just one well. Before additional conclusions are drawn regarding sources of contamination and the fate and migration of contamination in groundwater, a clearer understanding of groundwater flow was necessary. For that reason alone, additional control points were proposed.

2. **VOCs**. VOCs were detected in 3 (2 deep wells and 1 shallow well) of the 10 wells installed at the site during the PSA. Deep Well GW-2 on the east side of the site and deep Well GW-6 in the southwest corner of the site contained acetone at concentrations of 630 ppb and 390 ppb, respectively. The guidance value for acetone in groundwater is 50 ppb. Although acetone is often dismissed as a laboratory contaminant, the levels present and the fact that the acetone was observed in more than one well suggest that the results are valid. There is

currently no information as to where or how acetone was used at the site or how it would have come to be released to the environment. Based on water table mapping in the PSA report, GW-6 is not downgradient from the facility, and is in fact portrayed as a groundwater high point, making it difficult to draw any conclusions regarding the source of the acetone in that well. Based on the PSA water table mapping, GW-2 is downgradient from the building, and therefore finding a source may be easier.

Shallow Well GW-3S on the east side of the site near the south end of the rolling mill building produced a sample containing a blend of several chlorinated VOCs with a total concentration of 330 ppb. Each compound detected (TCE - 86 ppb, PCE - 180 ppb and 1,2 DCE - 70 ppb) exceeded the groundwater standard of 5 ppb. These chlorinated compounds are indicative of solvents, but no information is currently available as to where or how solvents were used at the site and where or how they may have been released.

During the development of the work plan for this investigation, a preliminary round of groundwater samples was collected from 8 of the 10 wells. We were unable to locate GW-8, and GW-4S has been damaged and could not be sampled.

The results of the preliminary sampling round verified the impacts found previously in Well GW-3S. Analysis indicated elevated concentrations of TCE, PCE, and DCE. There were no indications of groundwater impacts at GW-2 or GW-6 from the preliminary sampling round.

Additional investigation was deemed necessary to better understand groundwater flow directions, determine the extent of the impacts, and gain information that may help identify source areas.

3. **SVOCs**. No concentrations of SVOCs of any significance were detected in the groundwater samples. No additional work was warranted to evaluate SVOCs.

4. **PCBs**. No PCBs were detected in groundwater. No additional work was warranted to evaluate PCBs.

5. **Metals**. Standards were exceeded in at least one groundwater sample for cadmium, chromium, iron, lead, magnesium, manganese, sodium, and zinc. However, the PSA report also concluded that groundwater samples were extremely turbid due to the fine nature of the sediments in the well screen interval. When turbid samples (even samples with turbidities under 50 NTU) are acidified, the suspended sediment load is dissolved. Because the metals detected in site groundwater samples occur naturally in soils, the analytical results can be excessively biased by the chemical makeup of the aquifer materials. To obtain analytical results that truly convey the natural or impacted groundwater chemistry, it is necessary to either take extraordinary efforts to obtain samples of low turbidity or, even better, to filter the samples. NYSDEC groundwater standards are based on unfiltered samples, but the appropriateness of filtering can generally be justified to the state, such that filtered samples can be used in conjunction with unfiltered samples to demonstrate impacts (in contrast to demonstrating compliance with standards, which must be based on unfiltered data).

To complete a valid assessment of the impacts of the site operations on metal concentrations in groundwater, additional sampling, including filtering samples, was proposed.

C. **Surface Water.** For the PSA, "surface water" samples were collected from three locations at the site: the pickling basins, a trench in the rolling mill, and the concrete cooling pond. In a regulatory sense, these are not surface water samples, but samples from process structures at the site. This being the case, they are more correctly considered potential sources of contamination as opposed to receiving bodies that must be protected. Overall, these samples were relatively unimpacted. The oils in the trench were apparent, however, and characterization before removal and disposal was proposed in the PSA.

D. **Summary and Conclusions of PSA.** The PSA provided a preliminary assessment of the Roblin site upon which to base future phases of work. PSA conclusions are summarized below.

1. PAHs were found in surface soils at several locations around the site, especially below the wood block floor in the vicinity of the pickling tanks.

2. Acetone and chlorinated VOCs were detected in groundwater at levels that exceed NYSDEC standards.

3. PCBs were previously detected and remediated in one area, and were detected in a second transformer area.

4. Lead was detected in soils at levels that exceed the TCLP standard.

5. Asbestos-containing materials were identified in buildings in a 1993 survey.

6. Stained soils are present across the site.

7. Two, possibly three, USTs exist at the site which have not been investigated.

8. Waste piles are present on site, but are all apparently nonhazardous.

The above conclusions, especially the matrix and contaminant-specific discussions, provided Stearns & Wheler with a basis for developing a work plan for further investigation. That [illegible]

CHAPTER 2

PROJECT APPROACH

The City of North Tonawanda required a complete and thorough characterization of the Roblin site so the City could be confident the site could be redeveloped in such a manner that it would not represent an unacceptable risk to human health or the environment. The City also indicated it believed a phased investigation was most appropriate. The benefit of a phased approach is that tasks within each phase are determined based on the results of the prior phase. In that way, the investigation is more focused on the areas, contaminants, and matrices of concern.

The information provided in the PSA allowed the first phase of the site investigation to focus on the areas where additional investigation was necessary. These areas were identified in the discussion of matrices and contaminants of concern presented in Section 1.2.

A detailed scope of work was developed for the first phase of the site investigation. Concepts, generalized scope items, and goals of subsequent phases were provided in the investigation work plan. The first phase was completed during November 1998 to January 1999. A preliminary draft of field results was prepared in February 1999. In March 1999, a meeting was held with NYSDEC to discuss additional phases of work. It was determined at that time that the only additional investigative effort needed was another monitoring well southeast of Well GW-3. In March 1999, Well GW-18 was installed and sampled. Results for that sampling event are included in this report.

In general, the primary objective of the first phase of the investigation was to clarify and confirm the findings of the PSA. An additional goal of the first phase was to draw conclusions regarding the sources of contaminants, an issue not addressed in the PSA.

CHAPTER 3

FIELD ACTIVITIES

Based on the City's objectives and the information gathered in the PSA, the following field activities were completed as the initial phase of this study.

3.1 SOIL SAMPLING

Surface soil samples were collected and analyzed for PCBs, metals, PAHs, and VOCs. The locations of the sampling points were determined based on the analytical results documented in the PSA. Collection of soil samples began November 11, 1998. The samples were to be collected from locations noted on the work plan site and sampling point map (Figure 2). Several soil samples were proposed for the inside of buildings. It had been proposed that these samples would be collected from soils beneath the wood block flooring, adjacent to samples collected during the PSA. During sampling, it was discovered that the wood block flooring was on a concrete slab. The historical samples were apparently dust or dirt residues accumulated under the blocks rather than soils, as reported. In this investigation this residue was resampled in several locations. In some locations, there was no material to sample. Locations from which samples were not collected are shown on Figure 2 (those locations enclosed in squares).

The soil sampling procedure was outlined in the Field Sampling Plan. Samples were collected in the following manner:

1. The sampling point was identified on the site plan and sampling point map.

2. Using decontaminated trowels and disposable gloves the samples were collected and placed in the appropriate jars.

3. The samples were then packed in a cooler, iced and shipped to the laboratory for analysis.

4. Equipment was decontaminated between locations to limit the potential for cross contamination.

5. Upon receipt of analytical results, the data was delivered to a third party for validation.

6. The information was then tabulated in summary tables based on analysis performed.

Additional soil samples were collected from two newly installed monitoring wells (MW-16S and MW-17S) which were placed adjacent to existing or suspected underground storage tanks. These samples were analyzed for STARS VOCs and SVOCs in order to determine if potential impacts may have occurred from tank leaks or spills.

3.2 MONITORING WELL INSTALLATION AND DEVELOPMENT

Twelve new monitoring wells were installed at the site in November 1998. The wells were installed to provide a more thorough understanding of the hydrogeologic characteristics of the site, particularly groundwater flow directions in the shallow and deep aquifers, and to determine the extent of impacts of contaminants in groundwater. The locations of the wells were determined based on analytical results collected from the existing wells and through gas chromatograph analysis of groundwater collected from temporary wells. Nine temporary wells were installed using geoprobe methods. The geoprobe borings were advanced to specific depths based on information collected during the PSA. Once the depth was reached, a temporary 1-inch PVC monitoring well was installed. A groundwater sample was then collected from each location and analyzed using a field gas chromatograph. If excessive concentrations of VOCs were identified in the field analysis, an additional temporary well was installed in the projected downgradient direction and the analytical process was repeated. This process continued until substantially lower concentrations of VOCs were identified on the GC. At this point, a permanent monitoring well was installed using the procedures described below. This iterative approach was used to locate Wells GW-11S, GW-12S and GW-14 due to the existing impacts identified in Wells GW-3S and GW-2.

The majority of the permanent wells were installed using 4.25-inch hollow stem augers. Soil samples were collected at 5-foot intervals until the projected screen interval was reached. At this depth, continuous soil samples were collected. The soil samples were collected using a 2-inch split-spoon sampling device driven by a 140-pound hammer. The samples were physically described in the field by a hydrogeologist. In addition, the samples were monitored using a photoionization detector (PID) to determine if any VOCs were present. In locations where subsurface soil samples were collected (MW-16S and MW-17S), the sample with the highest PID reading was collected and transported to the lab for analysis. If no elevated PID readings were noted, the sample closest to the water table was collected and sent for analysis.

Because of the apparent high concentration of VOCs in the shallow aquifer, monitoring well GW-3, proposed to evaluate the deep aquifer, was installed using a combination of hollow-stem augers and wash rotary drilling. Hollow-stem augers were used to install a 4-inch steel casing to a depth of 18 feet. The casing was used to limit the migration of impacted groundwater in the shallow aquifer into the deep aquifer. The casing was grouted into place. After a minimum of 24 hours, the well was completed using a wash rotary technique. The water for the drilling was from the City water supply. The well was then completed to its target depth.

The monitoring wells were constructed of 2-inch PVC risers and .01-inch slot PVC screens. The wells were completed using a No. 0 sand pack, a bentonite seal, and grout to the surface. Well-specific construction details and sample descriptions are provided in the well logs in Appendix A.

After installation, the monitoring wells were developed using disposable bailers. Development continued until 10 well volumes were removed.

3.3 GROUNDWATER SAMPLING

Groundwater samples were collected from all existing and newly installed wells. The methodology for the collection of the samples was described in the Field Sampling Plan. In general, the samples were collected using the following methods:

1. Before purging the well, depth to water and total depth of well measurements were recorded.

2. Using a disposable bailer, three well volumes of water were removed from each well. If the well went dry during purging, the well was allowed to recover and the samples were collected.

3. During purging, field parameters were recorded. The parameters recorded included water temperature, pH, conductivity, Eh, DO, salinity, and turbidity.

4. The samples were collected in the following order: VOCs, filtered metals, unfiltered metals and other analytes.

5. The samples were then packed in a cooler, iced and shipped to the laboratory. Appropriate QA/QC samples were also collected.

Groundwater samples were analyzed for VOCs, SVOCs, total dissolved metals, and wet chemistry parameters. Analytical results have been tabulated in summary form. Interpretation of the results is discussed in Chapter 4.

3.4 SLUG TESTS

In addition to groundwater sampling, slug tests were completed on all existing and new monitoring wells. Stearns & Wheler uses a bail-down method to complete slug tests, enabling hydraulic conductivity to be estimated by recording the change in water level as the water rises back to its static level. The slug tests were completed using the following methodology:

1. After recording the depth to groundwater measurements, a pressure transducer was installed in the water column.

2. The transducer was then linked to a datalogger which recorded the changing water levels during the test.

3. Once the datalogger and transducer were in place and set to record, a bailer was lowered into the well.

4. After completely submerging the bailer, the datalogger was started and the bailer was completely removed from the well.

5. The datalogger recorded water levels until a minimum of 90 percent recovery of the water was achieved.

6. The data were then downloaded to Aquifer Test™, a commercially available software package (Waterloo Hydrogeologic, Inc.). Data were then analyzed using the Bouwer-Rice

Method. This technique establishes an order of magnitude estimate of the hydraulic conductivity of the aquifer immediately surrounding the monitoring well.

7. These data were then used to determine the groundwater seepage velocities within the screened interval and to determine lateral variations in hydraulic conductivity.

The slug test data are found in Appendix B and will be discussed in Chapter 4.

CHAPTER 4

RESULTS

4.1 GEOLOGY

Surficial geologic maps of the site indicate that the shallow overburden at the site consists of lacustrine silts and clays. Well logs from the site confirm that this is the case. After a short interval of fill material (from 1 to 2 feet below ground surface), there is a 6- to 10-foot thick sequence of silt followed by a 5- to 25-foot thickness of clay. Below the silt and clay is an interval of silt to sandy silt. This interval has been described as a till layer in the PSA; Stearns & Wheler agrees with this description. This layer extends to bedrock that has been identified as black fissile shale. Bedrock maps of the area indicate that the Camillus Shale of the Salina Group is found in this area.

Each of the overburden units was described in the field. The upper silt layer has various percentages of fine sand with wide ranges in moisture content, from saturated to damp. The damp or moist areas were mottled, suggesting that these are zones that are saturated during periods when the water table is elevated.

The clay layer varied in color from gray (when wet) to red (when dry) and had increased moisture content with depth. Typically, it was noted that the upper reaches of the clay were dry with the lower portion of the unit saturated. This further suggests that the clay is acting as a confining unit above the underlying till.

The till is a sandy silt or silty sand matrix with notable percentages of gravel-sized particles. It was difficult to determine the orientation of the large grain-size particles, and therefore not possible to determine the genesis of the till, i.e. whether it is an ablation or lodgement till.

Using the data from the recent well logs and previous investigations, additional cross sections have been constructed. The lines of section are identified on Figure 1. The cross sections (Figures 3 and 4) indicate that the lacustrine silt and clay deposits vary in thickness. In general, the upper silt varies from 2 to just over 10 feet in thickness. This unit is absent at GW-2S, GW-4 and GW-14. At these locations, clay was encountered immediately below the fill. These wells are located adjacent to roads and parking lots, suggesting that the overlying silt may have been removed from these locations. The field description of the interval below the fill at GW-2 and GW-2S differs. The earlier information indicates that the interval is a silt layer (GW-2); the recent information indicates that the zone is silty clay. Differentiating between silt and clay can be difficult in the field. Since we are unable to view the sample from the earlier drilling, and the description at GW-14 also indicates clay directly below the fill, the cross section through these points has been drawn using the original data at GW-2 and the new data at GW-14. In either case, it does not affect the conclusions of our investigation. The thickness of the unit in both descriptions is virtually identical. The underlying clay ranges from 10 to 20 feet thick. Although portions of the clay unit are saturated, the silt unit is considered the upper aquifer. The till layer, which is considered the deep aquifer, varies in thickness from 5 to 10 feet.

4.2 HYDROGEOLOGY

A. **Groundwater Flow Patterns.** Depth-to-groundwater measurements were collected January 12, 1999 during completion of the slug tests. The water levels were converted to groundwater elevations using recent survey data. This information is summarized on Table 1. In earlier investigations, it was determined that there were two aquifers on site -- the upper silt layer and the deeper till layer. The difference in elevation between the potentiometric surfaces of the two aquifers is between 1 and 6 feet. There is a downward gradient from the upper to the lower aquifer. The potentiometric surface of the deep aquifer is above the top of the till layer, indicating that the till aquifer is confined.

Groundwater flow patterns of both aquifers are illustrated on Figures 5 and 6. The presence of the Niagara River west of the site suggests that the river would act as the regional discharge zone. This is likely the case in a regional sense. Locally, however, the patterns for each aquifer indicate that a groundwater divide, which generally trends northeast to southwest, is found at the site. Groundwater flows east-southeast and in a westerly direction from the divide.

The cause of the divide is man-made. Groundwater potentiometric surfaces in unconsolidated deposits commonly mimic local topography. There are no significant changes in relief in this area which provide for the development of a natural groundwater divide. It has been determined that construction of a local combined sewer line along Oliver Street has created a french drain which has altered the natural flow pattern at the site. The sewer line was installed at a depth of approximately 20 feet, which would allow both aquifers to drain into the excavation. The location of this sewer line is illustrated on the drawing enclosed in the pouch (1955 Plan for General Sewerage, 1974 Revision, City of North Tonawanda).

B. **Slug Tests And Seepage Velocities.** Table 2 is a summary of the slug test results and associated seepage velocities. Slug tests were completed using the methodology mentioned in Section 3.3. The Aquifer Test software package calculates the hydraulic conductivity based on the imported data (elapsed time and change in water level), the height of groundwater in the well and well configuration. Based on the hydraulic conductivity, it is possible to calculate the seepage velocity of the groundwater in the area using the following equation:

$$V = KI/n$$

where:

V is seepage velocity
K is hydraulic conductivity
I is hydraulic gradient
n is porosity

The range in hydraulic conductivity was from 1.7×10^{-2} (GW-2) to 6.74×10^{-5} cm/sec (GW-14). The hydraulic conductivity values fall within ranges for silt, sandy silts, clayey sands, silty sands and till, all of which are found at the site. Wide ranges in hydraulic conductivity values are very common, particularly in areas where there are mixed grain sizes. Smaller grain size material fills pore space between the larger grains, reducing the hydraulic conductivity of the unit. The data at this site indicate that there are reasonably consistent values for hydraulic conductivity at the wells screened in the silty clay or silt and clay (GW-2S, GW-4S, GW-11S, GW-12S, GW-16S and GW-17s). There are greater variations in the locations where either the clay or silt and the underlying till are intersected by the well screen (GW-2, GW-3, GW-5, GW-13 and GW-14). These locations have the highest (GW-2) and lowest (GW-14) calculated hydraulic conductivities. This suggests that the till has a substantial effect on the overall hydraulic conductivity values at the site.

The general hydrogeologic character of the site was discussed in the preceding paragraph. However, because there are two distinct water-bearing units at this site, it is more appropriate to discuss the hydrogeologic character of each unit individually, particularly when discussing the migration of impacted groundwater. Table 2 is a summary of the hydraulic properties of the deep and shallow aquifers. In order to simplify the discussion, the geometric mean values of hydraulic conductivity, hydraulic gradient, effective porosity, and seepage velocity will be used. In areas of impact, well-specific values will be discussed.

The deep aquifer has a range of hydraulic conductivity from 1.7 x10^{-2} to 6.74 x 10^{-5} cm/sec and a mean value of 1.35 x 10^{-3} cm/sec. As stated earlier, the controlling factors in groundwater seepage velocity are the hydraulic conductivity of the material through which it is migrating, the gradient that drives flow, and the effective porosity of the material. The range of seepage velocities in the deep aquifer ranged from 2 to 754 ft/yr. The mean value for seepage velocity is 31 ft/yr. Any impacted groundwater moving through the aquifer would require approximately 19 years to move from the groundwater divide to beyond the property line. A discussion of natural attenuation of the compounds of concern on the site will be completed in succeeding sections.

The shallow aquifer has a range of hydraulic conductivity from 1.11 x 10^{-3} cm/sec (GW-16S) to 5.47 x 10^{-4} cm/sec (GW-7S). The mean hydraulic conductivity value is 1.09 x 10^{-3} cm/sec in the shallow aquifer. The range of seepage velocities is 1.4 to 25 ft/yr. The mean value is 7.6 ft/yr. Impacted groundwater migrating from the groundwater divide would take approximately 79 years to migrate off site.

It appears that the controlling factor in groundwater seepage velocity is the hydraulic gradient. The shallow and deep aquifer's mean hydraulic conductivity values are essentially the same, the effective porosities are comparable; however, the hydraulic gradients differ by a factor of nearly three (.008 in the deep aquifer versus .003 in the shallow aquifer). This slightly steeper gradient in the deep aquifer provides a higher seepage velocity.

4.3 GROUNDWATER ANALYTICAL RESULTS

Groundwater samples were collected and analyzed for the following analytes: TCL volatiles, TAL metals (total and dissolved), semi-volatiles (MW-16S and MW-17S only), and wet chemistry parameters (alkalinity, chloride, sulfate, etc.). Following is a discussion of the groundwater analytical results.

A. **Volatile Organic Compounds.** A number of VOCs were determined to be of concern during the PSA completed in 1995. These included acetone and the chlorinated compounds 1,2-dichloroethene, trichloroethene, and tetrachloroethene. Analytical methods and sampling protocols focused specifically on these compounds and their potential daughter products.

Table 3 is a summary of groundwater analytical results for TCL volatiles. The only location that appears to be impacted by VOCs is GW-3S. At this location, cis-1,2-DCE (62 ppb), TCE (56 ppb) and PCE (40 ppb) were detected. A field GC was used to determine whether the impacts had migrated from this area. The field results were used to locate additional monitoring wells in the area (GW-11S and GW-12S). In addition, in order to determine possible impacts to the deep aquifer and to assist in determining groundwater flow directions in both aquifers, a deep well (GW-3) was installed adjacent to GW-3S. No impacts were identified in any of these additional wells. This suggests that the impact is localized. Currently, there is no information available that indicates where or how solvents were used at the site and where or how they may have been released.

B. **Metals.** During sampling, field parameter data were collected at each monitoring well. One of the parameters recorded was turbidity. Because samples for metals analysis require preservation by nitric acid, acid-soluble fractions of the suspended sediment will cause an increase in the concentrations of some of the metallic ions when the sample is analyzed. This boost in metallic ion concentrations results in false positives or concentrations of ions that may appear to be above groundwater standards, but which are actually the result of the dissolution of mechanically suspended aquifer materials rather than natural conditions. Because of this, both total and dissolved metals samples were collected at the site. Regulatory standards are based on unfiltered sample results, but the filtered results are considered when turbidity levels are high or significant exceedances of standards are indicated by the unfiltered results.

Table 4 is a summary of the results of the total metals concentrations. There are a number of metals at concentrations above the groundwater standards, including antimony, iron, magnesium, manganese, and sodium. However, a review of the dissolved metals data in Table 5 indicates that the concentrations of four out of six of these metals are significantly reduced when the samples were filtered. Sodium and antimony are apparently not affected by the acidification of the samples. The other ions -- aluminum, iron, magnesium and manganese -- are all affected by acidification. It follows then that dissolved results need to be considered when evaluating groundwater data.

Antimony and sodium are above standards at a number of wells. As stated earlier, antimony and sodium apparently are not affected by elevated turbidity. Magnesium and manganese were elevated at a number of locations. Iron concentrations were elevated at four locations.

Iron, magnesium, and manganese are some of the most common ions found naturally dissolved in groundwater. These ions can cause staining of fixtures and clogging of pipes. Rather than being of human health concerns, these ions are subject to standards that relate to their nuisance characteristics.

Antimony is similar in its chemical characteristics as arsenic, however, it appears to be only one-tenth as abundant in rocks as arsenic. Antimony is also used in lead-acid batteries and in flame retardants.

C. **Wet Chemistry**. Six wet chemistry parameters were analyzed at the site (Table 6). Standards are only provided for two of these parameters (chloride and sulfate). Exceedances of standards for sulfate were detected at 10 well locations. High concentrations of sulfate are produced either by dissolving sulfate minerals (e.g., gypsum) or by oxidation of sulfide minerals. The levels of sulfate in site groundwater indicate that there is enough oxygen available in the groundwater to sustain it. This suggests that the groundwater is under aerobic conditions at these locations.

D. **STARS Semi-Volatile Organic Compounds**. Spill Technology and Remedial Series (STARS) semi-volatile organic compound analysis was completed at two well locations (GW-16S and GW-17S). This analysis was done as part of the underground storage tank investigation at the site. Brownfields guidelines require that if there are known or suspected USTs at a site, they must be investigated. The analysis indicates that are no exceedances of standards for SVOCs at either of these locations (Table 7).

STARS VOCs analysis was not completed on samples from these wells because the wells were sampled for TCL VOCs which has a larger list of compounds. No petroleum-related VOCs were detected.

4.4 SOIL ANALYTICAL RESULTS

As noted earlier, a number of the soil sample locations within facilities on the site were not collected because the material beneath the flooring at the site was not soil, but apparently process residue. Any samples collected from these locations will be noted as such and not compared to soil standards. For ease of understanding, the analytical results will be discussed based on location.

A. **Semi-Volatile Organic Compounds.** The preliminary site assessment identified PAHs in soil across the site. Because of the unavailability of data on specific PAHs, which prevented a comparison to state cleanup objectives, and the detection of PAHs in soils at a number of locations, additional soil sampling was warranted. Samples were collected in known areas of concern, and additional samples were collected to determine if these areas are impacted by PAHs. The locations where PAH samples were collected are noted on Figure 2, indicated by an orange dot.

Whether the soil samples were collected inside or outside, there appears to be elevated concentrations of semi-volatile organic compounds in all areas of the site (Table 8). Concentrations of these compounds are well above recommended soil cleanup objectives in the samples collected inside the buildings. Table 8 is a summary of the analytical results of the soil samples. Samples SS-9 through SS-18 were collected inside the wire mill building. All of the samples except SS-15 had exceedances of a number of compounds including phenanthrene, fluoranthene, pyrene, chrysene, and benzo (a) pyrene. The highest concentrations appear to be found in the northern end of the wire mill building (Figure 2).

The next series of samples (SS-19 to SS-28) was collected east of the wire mill building. Although each of the samples has concentrations of compounds that exceed cleanup objectives, the concentrations in these samples compared to those collected within the building are lower, and fewer compounds were identified in analysis.

The area west of the wire mill building (Samples SS-37, -38, -41, -42 and –45) had a number of exceedances of cleanup objectives. Samples SS-37 and SS-42 had no exceedances of standards.

Sample SS-49 was collected in the large central building (Figure 2). This sample indicated substantial exceedances of every semi-volatile on the analyte list. This sample was collected from beneath the wood blocks that line the floor of most of the buildings on site. Similar to all samples collected within the buildings, it is predominantly a process residue and not an analysis of the soils at this site. It has value in that it identifies all potential SVOC contaminants at the site.

Sample SS-52 was collected adjacent to the western wall outside of the central building. This sample also has extremely high concentrations of SVOCs. Sample SS-54 was collected between the two long buildings on the western portion of the site. Again, this sample has very high concentrations of SVOCs.

Samples SS-55 to SS-57 were collected adjacent to monitoring well GW-10S. Each of these samples had a number of exceedances of soil cleanup objectives, including pyrene, chrysene, benzo (k) fluoranthene, and dibenzo (a,h) anthracene.

It is readily apparent that the surface soil across this site and the material within the structures on the site has been impacted by the activities at the Roblin Steel facility.

B. **PCBs**. The location of the PCB soil sampling points was determined by the data available in the PSA. This data indicated that there was a single sample that contained PCBs, but at a below-standard concentration. This sample was SS-7, slightly north of GW-3S at the southeast corner of the wire mill building. Three transformers had been located in this area.

Soil samples were collected and analyzed for PCBs at SS-20, SS-21, SS-22, SS-27, SS-29, SS-32, SS-33, SS-34, SS-40, SS-52, and SS-62 (Table 9). SS-62 is the off-site or background sample that was collected from the schoolyard located at the intersection of Humphrey and Carr Streets. PCBs were detected at four of the sample locations: SS-29 (1,000 ppb); SS-32 (4,2000 ppb); SS-33 (1,000 ppb); and SS-34 (19,000 ppb). The concentrations at these locations were at or well above soil cleanup objectives of 1,000 ppb. Sample SS-29 is adjacent to Well GW-3 at the southeast corner of the wire mill building. The other three samples are located between the wire mill building and the large central building (Figure 2). These three samples were collected in an area that has undergone a PCB cleanup. In this location, 37 tons of PCB-impacted soil has been removed and disposed of. The impacts were the result of leakage of PCB-laden oil from transformers.

C. **Metals.** Elevated concentrations of metals in soils were detected at each location (Table 10). Soil standards are based on site background samples (this sample was collected at SS-62) or an established standard, whichever is higher. There were a number of exceedances for heavy metals on site, including antimony, beryllium, cadmium, chromium, mercury, and lead.

D. **STARS VOCs and SVOCs.** As required by the Brownfields program (Item 2.2-5 of the Procedures Handbook), all underground storage tanks must be investigated. In an agreement with the NYSDEC, the UST investigation at this site is taking place in a phased format. Initially, soil samples were collected from monitoring well locations GW-16S and GW-17S. Tables 11 and 12 summarize the results of the soils analysis in these locations.

A number of STARS standards for VOCs were exceeded at Well GW-17S. None were detected at GW-16S. There was no evidence of a UST in the vicinity of GW-16S.

The tank in the vicinity of GW-17S is in place and has had apparent leaks. Before installing the monitoring well, soil from the fill port area was dug out with a shovel. There was a strong organic odor in the soils removed from the area adjacent to the top of the tank. The tank appeared to be bare steel, but the condition of the tank deeper than 2 feet below ground surface is unknown. The sample collected from GW-17S was from a depth of 4 to 7 feet. A number of VOCs, including two isomers of xylene, isopropylbenzene, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, and naphthalene were detected in the analysis. Trimethylbenzene, xylene, and naphthalene are found in petroleum products; however, the nature of the use of the tank is unknown.

A number of STARS SVOC compounds were detected above soil standards at both locations, including benzo(a)pyrene, benzo(k)fluoranthene, benzo(g,h,i)perylene, and chrysene. All of these are associated with petroleum products.

When all analytical results for soil were reviewed and considered in the context of general site conditions, three areas of concern were identified. The areas of concern for surface soils are shown on Figure 7 and include an area east of the rolling mill building, an interior area of the wire mill building, and an area on the west side of the site where the building runs are located.

CHAPTER 5

FISH AND WILDLIFE IMPACT ANALYSIS

5.1 INTRODUCTION

As specified in the approved work plan, a preliminary Fish and Wildlife Impact Analysis (FWIA) was completed on the Roblin Steel plant site. The FWIA was performed in accordance with the criteria outlined in NYSDEC Division of Fish and Wildlife's Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (1994). Step 1 of the analysis was completed, including a description of the site and fish and wildlife resources and values within a 0.5- and 2-mile radius, and identification of applicable fish and wildlife regulations. Data were compiled from reviews of published maps and reports, information obtained from state and federal regulatory agencies, and from an October 6, 1998 field investigation of the site and the surrounding area. A photographic log of items described in the following sections is included as Appendix E. The numbered photographs correspond to the numbered locations indicated on the figures referenced below.

The property is essentially rectangular in shape, bordered on three sides by public roads and the fourth side by a railway. The plant has been abandoned for many years, and some of the buildings on the site have partially or completely collapsed. The vegetated areas of the site have herbaceous and shrub plant communities typical of disturbed sites.

5.2 SITE LOCATION

The Roblin Steel plant site is located on the west side of Oliver Street, north of Eighth Avenue, and south of East Avenue, in the Town of North Tonawanda, Niagara County, NY. The site is situated on the edge of a suburban residential area, where it meets a commercial/industrial area. Lands surrounding and within 0.5 miles and 2 miles of the site are dominated by suburban residential development and commercial/industrial development. Very little undisturbed or natural land exists within the 2-mile radius, with the majority being on Grand Island across the Niagara River. Maps showing dominant development/cover types in the study area are depicted in Figures 1 through 8 (Appendix E).

5.3 TOPOGRAPHIC FEATURES

The Roblin Steel plant site is located about 1/4 mile from the Niagara River on a relatively flat, level piece of land at an approximate elevation of 570 feet. The topography within a 0.5-mile and 2-mile radius of the site is characterized by very gently sloped land without significant topographic relief.

5.4 SURFACE DRAINAGE PATTERNS

The Roblin Steel plant site drains in all directions, but all surface runoff from the site ultimately drains to the Niagara River. Much of the surface runoff within a 2-mile radius of the site is collected in streetside storm drains, which presumably discharge to the Niagara River or one of its tribuataries. From the border of the subject property, the nearest waterway is the Niagara River, which is located +1,000 feet to the west at its closest point. The Niagara River flows north into Lake Ontario, which in turn discharges into the St. Lawrence River, and ultimately into the Atlantic Ocean.

5.5 VEGETATION

The dominant plant species were identified on the property within a 0.5-mile radius and within a 2-mile radius of the landfill site. The results of this vegetation survey are outlined in tabular form below. Diversity of vegetation was fairly low due to the developed nature of the area. A list of all plant species identified within the 2-mile and 0.5-mile radius areas is outlined below:

A. **On and Around the Site.**

Queen Anne's Lace	Common Ragweed	Cottonwood
Poverty Grass	Canada Goldenrod	Heal All
Aster spp.	Staghorn Sumac	Grape sp.
Post Oak	Common Mullein	Teasel
Tree of Heaven	Tartarian Honeysuckle	Burdock
Red Osier Dogwood	Pussy Willow	Curly Dock
Orchard Grass	Choke Cherry	Evening Primrose
Bittersweet		

B. **Area Within 2 Miles of the Landfill Site.**

Silver Maple	Sugar Maple	Norway Maple
Blue Spruce	Norway Spruce	Scotch Pine
Arbor Vitae	Privet	Yew
Azalea	Crabgrass	Bluegrass
Common Reed Grass	Common Ragweed	Aster
Queen Anne's Lace	Canada Goldenrod	Cottonwood
Black Willow		

No evidence of stressed vegetation within the area of study was observed.

5.6 FISH AND WILDLIFE

The dense development of the site and surrounding area provides limited habitat for wildlife species. Wildlife typically found in urban and suburban areas is most likely to use this area. A list of wildlife species that were observed in the area, or are likely to use the area at some time of year, is outlined below:

A. **Birds.**

Mourning Dove	European Starling	American Robin
Song Sparrow	House Sparrow	Downy Woodpecker
Gray Catbird	Mockingbird	Rock Dove
American Crow	Red Winged Blackbird	Blue Jay
Black Capped Chickadee	House Wren	Dark eyed Junco
Common Grackle	House Finch	Canada Goose
Mallard	Black Duck	Canvasback
Greater Scaup	Lesser Scaup	Goldeneye
Bufflehead	Common Merganser	Hooded Merganser
Red Breasted Merganser	Gadwall	Common Loon
Double Crested Cormorant	Redhead	Ring necked Duck
Osprey	Ring Billed Gull	Herring Gull
Belted Kingfisher		

B. **Mammals.**

White-tailed Deer	Cottontail Rabbit	Gray Squirrel
House Mouse	Norway Rat	Meadow Vole
Raccoon	Muskrat	Mole

C. **Herptiles.**

Common Snapping Turtle	Eastern Garter Snake	Northern Water Snake
Eastern Box Turtle	American Toad	Green Frog
Spring Peeper		

The Niagara River, a large river, provides feeding, spawning, cover, and dispersal habitat for a wide variety of fish species. The stream varies in width, but is +1/2-mile wide near the subject site. Based on soundings provided on the Tonawanda West USGS topographic map, depth varies in the study area from 3 feet near shore to more than 30 feet in the channel.

5.7 RARE, THREATENED, ENDANGERED, AND SPECIAL CONCERN SPECIES

Requests were made to both the NYSDEC Natural Heritage Program (NHP) and Region 9 Bureau of Wildlife, as well as to the U.S. Fish & Wildlife Service for information regarding rare, threatened, endangered, or special concern species on the site or within the 2-mile radius area. The NHP's records indicate that Stiff-leaf Goldenrod (Solidago rigida), a state-threatened plant, is found along the banks of the Erie Canal south of the site, on Grand Island west of the site, and in Wheatfield, north of the site. Common Terns (Sterna hirundo), which are state-threatened birds, are known to nest on Grand Island, west of the site. In addition, the Niagara River is listed as an unprotected concentration area for waterfowl, and lower Spicer Creek on Grand Island is listed as an unprotected concentration area for warmwater fish. There is also an unprotected area of Silver Maple-Ash swamp, considered a rare community, on Grand Island. None of these resources should be impacted by the subject site, since none are directly downstream or downwind of the subject site. The request letters and responses are found in Appendix F.

5.8 VALUE OF FISH AND WILDLIFE RESOURCES

A. **Value of Resources to Fish and Wildlife.** There is little valuable terrestrial wildlife habitat within the study area except for the undeveloped woods on Grand Island, west of the site. This area is more than a mile from the subject site and is unlikely to be impacted. This area provides food, cover, and dispersal space resources to a wide variety of wildlife. Because of the heavy development of the surrounding area, this area is isolated and provides an island of habitat in an otherwise densely developed region. The most important resource for wildlife in the study area is probably the Niagara River. It provides water, food, and a travel corridor for many fish and wildlife species.

Remaining habitat is primarily suburban developed area, which favors urban wildlife species such as squirrels, raccoons, mice, rats, and cosmopolitan bird species commonly found at backyard bird feeders. Because of their close interaction with humans, some of these wildlife species may be considered nuisances.

B. **Value of Resources to Humans**. The primary value to humans of the natural resources surrounding the Roblin Steel plant lies in development and recreational opportunities. The area is already heavily developed in residential and commercial industrial corridors, and any vacant land is likely to be desired for further development. The Niagara River provides recreational boating and fishing opportunities, which draw tourists to the area, providing potential economic benefits from those people who come to the area and spend money on local businesses.

CHAPTER 6

BASELINE HUMAN HEALTH RISK ASSESSMENT

6.1 INTRODUCTION

This chapter presents the findings of the human health risk assessment for the Robin Steel site. Risk assessments are conducted as an integral part of the site investigation/remedial management decision-making process in order to characterize the potential for risk to human health posed by the presence of site-related contaminants. The analysis of risk helps determine the need for, and the extent of, potential remedial actions. During the remedial alternative selection process, then, remedial activities can be evaluated for their ability in reducing the risks to human health identified by the risk assessment.

This risk assessment was prepared in a manner consistent with methodologies presented in USEPA guidance documents (*Risk Assessment Guidance for Superfund. Volume I, Human Health Evaluation Manual [Part A] Interim Final [1989]*). Following procedures discussed in the guidance manual, a risk assessment consists of four activities. Figure 8 presents a flow chart that illustrates the role of each of the four steps in the risk assessment process.

Hazard Identification, is the first step undertaken in a risk assessment. The purpose of this activity is to define the extent to which contamination is present at the site, and then to identify the chemicals of potential concern. Samples of the various site media are collected and analyzed for quantitative information concerning concentrations of chemicals. The data obtained from the laboratories is then screened to identify chemicals of concern. As illustrated in Figure 9, the data screening includes steps such as data validation, comparison to background concentrations, and/or regulatory standards and guidance values. Chemicals that survive this screening process are termed "chemicals of concern" and are carried through the remaining steps of the risk assessment process. .

The second risk assessment activity is termed exposure assessment. This activity considers the pathways by which humans or other populations might realistically be exposed to site chemicals, both now and in the future. This is a key step in identifying risks posed by contamination at a site, because exposure can only occur when a mechanism for contaminant transport and a receptor exist simultaneously with a contaminant source. Included in this step is a calculation of the amount of chemicals to which receptors could be exposed.

The third activity is toxicity assessment. During this part of the risk assessment, toxicological databases are reviewed for relevant information about the chemicals of concern. If exposure doses have been calculated as part of the exposure assessment step, this activity also includes a comparison of the exposure doses to levels that are known to cause adverse health effects.

The final activity is called risk characterization. In this last step, the previous activities are integrated together and the potential for adverse effects on human health is characterized. Both carcinogenic (cancer-causing) and non-carcinogenic (toxic) effects on human health are examined. The result of this step is an understanding of whether a reduction in risk may be required and, if so, whether the focus should be on the source of the unacceptable risk, on stopping transport of the chemical to the receptor, or on control of the exposure.

The results of the risk assessment are based on the outcome of this four-step process. Normally, the results are presented as a quantitative estimate of the potential risk which site contaminants pose to identified human receptors. For some sites, this is not possible, as toxicological effects of some contaminants have not been determined. When this is the case, the conclusions of the risk assessment present a qualitative description of the potential risk that site contaminants pose to identified human receptors.

6.2 SITE BACKGROUND AND ENVIRONMENTAL SETTING

The environmental character and surrounding land uses of a site will, to a large degree, determine the amount of risk posed to human health by site conditions. Land use determines the extent to which potential receptors could contact impacted media (air, sediment, water, and soil). Isolated sites and those with minimal access pose less of a potential risk to human health than sites accessible to large numbers of people. The environmental setting of the site also determines the relative importance of transport of chemicals through the various media. In the risk assessment process, this environmental setting, including current and future land use combined with knowledge of site-related, contaminated media, is integrated into an evaluation of current and future pathways by which exposure to site-related chemicals may occur. The paragraphs that follow describe the environmental setting of Roblin Steel site.

The Roblin Steel site is an inactive manufacturing (steel processing) facility in the City of North Tonawanda, Niagara County, NY. The site is bounded by East Avenue on the north, by Oliver Street on the east, by Eighth Avenue on the south, and by the Conrail-Erie Lackawanna railroad tracks on the west. Industrial areas are adjacent to the site on the north and west, and residential areas are located to the east and south. A school and park are located within 1,600 feet of the facility to the east. The Niagara River is located approximately 1,000 feet west of the site. One building, located on the eastern portion of the site, has been occupied by Armstrong Pumps since 1985 and is an active facility. Most of the rest of the buildings are empty and in various states of disrepair. Confer Plastics previously occupied two buildings on the western portion of the site. Both buildings have been burned. A concrete reservoir from a former cooling pond is located in the approximate center of the site, south of a burned brick building.

The City of North Tonawanda is served by municipal water. There is no evidence of any private, wells (potable or non-potable) on the site. The adjacent residential properties are small in size, with minimal yard areas. There is no evidence of private wells installed on any of these properties.

Although the site is fenced, access can be obtained through gaps in the perimeter fence and through gates that are not secure. Evidence of trespassers was noted by field personnel during the sampling and well installation field activities.

6.3 SELECTION OF EXPOSURE PATHWAYS

Figure 10 illustrates all the potential pathways of human exposure to site-related contaminants. The exposure pathways that could actually occur are only a subset of the entire range of possibilities. The site's environmental setting and surrounding land use, coupled with the nature and extent of chemical impacts, determine the feasible exposure routes. This section presents the rationale for including, or eliminating, one or more pathway from this risk assessment. As discussed above, human exposure from site-related contamination is only possible when there is a pathway of contaminant migration and a human receptor. The environmental setting, including current and future land use, is used to frame the possible pathways of exposure to site-related contaminants.

Any contractors working on site as part of implementation of remedial actions will be trained per the requirements of OSHA regulations (29 CFR Part 1910.120). Contractors would have personal protective equipment and medical surveillance in addition to the required education and training.

Consequently, exposure to site contaminants by remedial contractors is not considered as a potential exposure pathway in this risk assessment.

Ingestion of contaminated soils is a potential exposure pathway at any impacted site. Evidence of trespassers was noted during the field activities at the Roblin Steel site. Because the site is not secure, it is likely that both adults and adolescents will continue to visit the site until some form of development occurs that would include upgrading the perimeter fence. Therefore, accidental ingestion of chemicals in soil and building residue (mill and brick buildings) is considered a complete exposure pathway under current site conditions.

If the site were developed, workers would be exposed to chemicals in the exterior soil. It is likely that any development for commercial purposes would include cleanup of the residues in the abandoned structures (mill building and brick building). However, in an effort to be conservative, site worker exposure to soil and building residue was considered a complete exposure pathway.

Ingestion of groundwater on site is not considered a complete exposure pathway for the following reasons. Currently, there are no drinking water wells installed on the site. Installation of a well on the site for potable purposes in the future is not likely, as deed restrictions can be enacted to prevent such activities in the future. Any non-potable well can be posted to make it clear that the water should not be used for drinking water purposes. However, there are residential properties located to the southeast in the flow direction of the VOC groundwater impacts. It is possible, however unlikely, that a property owner could install a well for garden irrigation purposes in this area. If that occurred, it is possible that the well could be used for drinking purposes during the growing season. Therefore, ingestion of groundwater during the period of May through September is considered a possible exposure scenario.

In summary, exposure to impacted soil (by trespassers and future site workers) and groundwater (by off-site residents) are the only identified exposure pathways for this site. Table 13 presents a summary of possible exposure pathways and the reasons for inclusion in (of rejection from) the quantitative risk assessment.

6.4 SUMMARY OF SITE CONTAMINATION AND IDENTIFICATION OF CHEMICALS OF CONCERN

The sampling plan designed to evaluate environmental conditions at the Roblin Steel site has been described in detail in Chapter 2. Groundwater, surface soil, and indoor residue/soil samples were collected during December 1998 to address the objectives of the site investigation.

Each sample was analyzed in a laboratory certified in the NYSDEC Analytical Services Protocol program. Each analytical result was subject to data validation by scientists at Analytical Assurance Associates, Inc. Included in the data validation procedures is examination of each analytical result for compliance with the criteria specified by NYSDEC and USEPA for technically defensible data. Technically acceptable data underwent additional screening before inclusion in the assessment of site-related risk. This additional screening included comparison to background concentrations and comparison to applicable standards or clean-up goals.

A. **Groundwater Screening - VOCs.** Of all the groundwater samples collected during the site investigation, VOCs were only detected in the sample collected from Monitoring Well GW-3S. Tables 14 and 15 summarize analytical results for concentrations of volatile organic compounds in samples from Monitoring Well 3S and Monitoring Wells 3S, 11S, and 12S, respectively. These three wells have been grouped together, as they are all on the eastern/southeastern portion of the site, and because groundwater in this portion of the site flows toward the adjacent residential properties.

Historically groundwater samples from Well 3S have been found to contain detectable concentrations of cis-1,2-dichloroethene (cis-1,2-DCE), trichloroethene (TCE), and tetrachloroethene (PCE) (see Table 14). Although concentrations have decreased since 1995, the compounds were still present in samples collected in December at concentrations exceeding New York State groundwater standards. The quality of the shallow groundwater flowing toward the residential area was examined to identify volatile organic compounds of concern. Results from the screening are summarized in Table 15. Four compounds were detected in samples collected from the wells in this area (acetone, 1,2-DCE, TCE, and PCE). Mean concentrations listed in Table 15 are geometric means calculated with the 1998 data only. The calculations used a replacement value of one-half the detection limit for compounds whose concentrations were not detected by the laboratory. This screening led to the identification of the three chlorinated VOCs (1,2-DCE, TCE, and PCE) as compounds of concern in the groundwater.

B. **Groundwater Screening - Metals.** The groundwater sample analytical results were also screened for identification of metal contaminants of concern using the same procedure as that used for the VOC analytical data. Table 16 presents the groundwater sample screening results. Again, only Wells 3S, 11S, and 12S were evaluated, as these wells are located in areas where the groundwater flow is toward a potential receptor. Although metals were detected in samples from other monitoring wells, the potential for a complete exposure scenario in wells located in the deeper portion of the aquifer, or located on other portions of the site, is negligible. Therefore, groundwater screening during this risk assessment concentrated on evaluation of the groundwater quality in the shallow aquifer from the portion of the site that would potentially migrate toward the off-site residential area. Only antimony, iron, and manganese were found to be present at mean concentrations greater than groundwater standards in the total metal samples; and antimony was the only compound found at mean concentrations exceeding groundwater standards for dissolved metals. Because iron and manganese are more associated with aesthetic standards, only antimony was retained as a contaminant of concern for this risk assessment.

C. **Building Residue Sample Screening - SVOCs.** Table 17 presents the results from screening indoor residue/soil analytical results for polycyclic aromatic hydrocarbon (PAH) compounds for inclusion in the risk assessment. Twelve samples were collected inside the former wire/rolling mill building, and one sample was collected inside the brick building. The samples collected in the former mill were initially evaluated by comparing the frequency of detection, the minimum detected concentrations, and the maximum detected concentrations. Mean concentrations were then calculated using replacement values equal to one-half the detection limit for compounds that were not detected. These mean concentrations were then compared to background soil concentrations (SS-62) and cleanup criteria for soil established by NYSDEC. Compounds with mean concentrations exceeding background concentrations and cleanup goals were retained for inclusion in the risk assessment as compounds of concern. For the mill samples, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and dibenzo(a,h)anthracene were found to be compounds of concern.

Because only one sample of the residue/soil was collected in the brick building, the concentrations of compounds detected in the sample were compared directly to NYSDEC cleanup criteria for soil. All PAHs detected were found at concentrations exceeding cleanup criteria. Therefore, all the PAH compounds detected were retained as compounds of concern for the residue/soil in the brick building.

D. **Outside Surface Soil Sample Screening - PAHs and PCBs.** Table 18 presents the screening surface soil sample analytical results for identification of organic chemical compounds of concern. Nineteen soil samples were collected and analyzed for PAH compounds. In addition, one sample was collected from an off-site location to serve as an indication of background soil quality. The full suite of PAH compounds was detected in all but two samples. As described previously for the other media, the screening process first included a comparison of the frequency of detection, the minimum detected concentrations, and the maximum detected concentrations. Mean concentrations were then calculated using replacement values equal to one-half the detection limit for compounds that were not detected. These mean concentrations were then compared to background soil concentrations (SS-62) and cleanup criteria established by NYSDEC for soil. Compounds retained as contaminants of concern in surface soil include benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and dibenzo(a,h)anthracene.

Eleven soil samples were collected from areas identified as being former locations of transformers. Each sample was analyzed for total PCBs. Six of the samples were found to contain detectable quantities of PCB 1260, with three of the samples containing concentrations in excess of PCB cleanup criteria, and one sample containing PCB 1260 at a concentration equal to the cleanup goal. For this screening, mean concentrations were calculated for samples SS-32, SS-33, and SS-34 only, as these samples were collected from a discrete area of the site, and all results were in exceedance of cleanup criteria. Other samples were from different areas of the site and were associated with potential PCB impacts; however, cleanup goals were not exceeded in these other areas. Therefore, it was decided that assessment of risks would focus on only that portion of the site with PCB concentrations above cleanup goals. The mean PCB concentration for this area was calculated to be 4.3 ppm, and PCBs were retained for inclusion in the risk assessment (see Table 6-6).

D. **Metals in Soil Samples.** Table 19 presents the results from screening outside soil sample analytical results for metals for inclusion in the risk assessment. The table includes the range of concentrations detected (minimum and maximum concentrations), the frequency of detection, and the mean concentration. For screening purposes, the mean and maximum concentrations were compared to NYSDEC cleanup goals for soil (TAGM HWR-94-4046), concentrations detected in the off-site/background soil sample, and concentrations reported by NYSDEC as occurring naturally in soils in the eastern United States. Those metals whose mean concentrations exceeded cleanup criteria, or background concentrations if no cleanup goal is established, were retained for inclusion in the risk assessment. Metals that were retained include antimony, arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc.

6.5 HAZARD IDENTIFICATION

The next step of a quantitative risk assessment process is to calculate representative exposure doses that could be expected to occur for each of the "complete" exposure pathways. Representative media concentrations have been estimated as described in Section 6.4. As discussed previously, only the VOCs cis-1,2-DCE, TCE, and PCE, and the metal antimony have been identified as chemicals of concern in groundwater. Soil chemicals of concern include several PAH compounds, PCBs (PCB 1260), and several metals.

In order to identify potential health hazards at the Roblin Steel site, exposure doses were then calculated for each of the potential exposure pathways identified as being associated with site contaminants of concern. After exposure doses are calculated, the doses are compared to levels known to be associated with health effects. The following paragraphs describe the exposure assessment calculations and how health effects are quantified from the exposure doses.

A. **Exposure Due to Accidental Ingestion of Contaminants in Soil.** Surficial soils on the site property exhibited elevated concentrations of PAHs, metals, and in certain areas, PCBs. In addition, soil and residue located in the former mill building and brick building were found to exhibit elevated concentrations of PAHs. As the site is not secure, incidental ingestion of contaminated soil and/or building residue is a complete exposure pathway. Should the site be developed in the future, worker exposure due to incidental ingestion of contaminated soil is also a complete exposure pathway.

Exposure to trespassers from accidental ingestion of contaminated soils was estimated using the following model:

Exposure dose (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

where:

Cs = Chemical concentration in soil (mean concentration in mg/kg)

IR = Ingestion rate (mg soil/day). In this case, 10 mg soil/day per USEPA guidance

CF = Conversion factor, (10^{-6} kg/mg)

FI = Fraction ingested from source; assume 25% (1/4 of daily exposure, with 1/8 for PCBs)

EF = Exposure factor; assume 100 times/year

ED = Exposure duration; assume 25 years for adult, not used for adolescent calculation.
BW = Body weight; assume 70 kg for adult and 45 kg for adolescent
AT = Averaging time, (days). For adults' carcinogenic effects, 70 years; non-carcinogenic effects (chronic), 25 years, 100 days; 1 year used for adolescent calculation

There are no standards or default values for estimating exposure occurrences for trespassers. Therefore, a reasonable assumption must be made for calculation of exposure doses. In this case, it was assumed that trespassers may enter the site 100 times/year (about 2 times/week), and the amount of exposure from the site would be approximately 1/4 of the total exposure experienced by the individual. Because the PCB impacts are limited to a very small part of the site, it was assumed that only 1/8 of the exposure would be to soil with PCB impacts. Results of these calculations are included in Appendix G.

Similarly, exposure to site workers from accidental ingestion of contaminated soils was estimated using the same model; however, EF, the exposure factor, was assumed to be 250 days/year (equivalent to 5 days/week for 50 weeks/year). Results of these calculations are also included in Appendix G.

B. **Exposure Due to Ingestion of Contaminants in Groundwater.** Groundwater migrating toward residential properties has been found to contain elevated concentrations of halogenated VOCs and antimony. Because there is a slight possibility that an adjacent property owner could install a private well, most likely for garden irrigation purposes, this has been retained as a potential future exposure scenario. Exposure to off-site residents from ingestion of groundwater has been estimated using the following model:

$$\text{Exposure dose (mg/kg-day)} = (C_{gw} \times IR \times CF \times FI \times EF \times ED)/(BW \times AT)$$

where:

Cgw = Chemical concentration in groundwater (mean concentration in mg/l)
IR = Amount of water consumed/day (Liters). In this case 2 L per USEPA guidance
FI = Fraction ingested from source; assume 25% (1/4 of daily exposure)
EF = Exposure factor; assume 120 times/year
ED = Exposure duration; assume 25 years for adult, not used for child calculation
BW = Body weight, assume 70 kg for adult and 15 kg for child

AT = Averaging time, (days) For adults carcinogenic effects, 70 years; non-carcinogenic effects (chronic) 25 years, 120 days; 1 year used for child calculation

The results of these calculations are included in Appendix G.

6.6 TOXICITY ASSESSMENT

Toxicity assessment determines the extent to which adverse health impacts could arise from exposure to the identified site-related compounds of concern. Data on known health impacts for each identified compound of concern was obtained from the Integrated Risk Information System (IRIS) on-line database. The database is maintained by the USEPA and includes information on known and suspected health impacts for a large number of chemicals. When data was not available in the IRIS database, the International Toxicity Estimates for Risk (ITER) database maintained by Toxicology Excellence for Risk Assessment (TERA) was consulted to see if alternative health effects information was available. The ITER database includes information from the Agency for Toxic Substances and Disease Registry (ATSDR) and Health Canada.

Two types of health impacts from exposure to chemicals are possible. Toxicity, both subchronic and chronic, is the first type of health impact. Carcinogenicity is the second. Subchronic and chronic toxic effects are health impacts that are exerted slowly over the same time period as exposure occurs. A "threshold" model is used to conceptualize these effects; that is, there is a dose below which no adverse effects will occur. Carcinogenic effects, in contrast, are molecular events that evoke changes on the cellular level that can lead to uncontrolled cellular proliferation and eventually to the disease cancer. Exposure can lead to clinical effects later in life, in comparison to the subchronic and chronic effects where the impacts occur over the same time period as exposure. Carcinogenesis is conceptualized as a "non-threshold" model, because there is no exposure that produces a zero chance of a carcinogenic response.

Toxicity assessment calculations reflect the differences between the two human health responses. The potential impacts of exposure to non-carcinogenic chemicals are evaluated by comparing the calculated exposure to the published "reference dose" (RfD in units of mg/kg/day) or "reference concentration" (RfC in units of mg/cubic meter for exposure to toxics in air) for the chemical of concern. The RfD (or RfC) is the estimated exposure at which no adverse health impacts will occur, even among sensitive subpopulations. Exposure at the reference dose may occur without deleterious effects for a lifetime. Uncertainty in the RfD (or RfC), however, may span an order of magnitude.

In contrast, carcinogenic effects are quantified by using a "slope factor" which is the unit risk per mg/kg/day exposure dose. The slope factors resulting from human and animal studies are published by the USEPA and reflect consensus judgements of the agency scientists. Each slope factor is qualified by a "weight of evidence" factor denoting the uncertainty in prediction of human carcinogenicity.

Tables 20 and 21 summarize the health effect parameters obtained from IRIS for the various chemicals of concern identified in soil and building residue at the Roblin Steel site. As indicated in Table 20, chronic non-carcinogenic effects have been associated with exposure, via ingestion, to several PAH compounds, PCBs, and metals. Several PAH compounds and metals are also identified as carcinogens. Table 22 and 23 summarize assessments of toxicity and carcinogenic health effects, respectively, for the groundwater chemicals of concern. At the present time, none of the groundwater chemicals of concern are associated with carcinogenic effects. Two of the groundwater chemicals of concern (antimony and PCE) are, however, associated with chronic toxicity effects.

The next step in toxicity assessment includes evaluating the exposure concentrations (discussed in Section 6.5, above) for their potential impact on human health. Action levels for chronic toxicity and carcinogenic effects differ. Chronic toxicity indices (or Hazard Indices, HI) are the ratio between exposure from site contamination and the RfD. As the individual and summary hazard indices approach unity, the potential for unacceptable exposure exists. Carcinogenic effects, on the other hand, are calculated by multiplying exposure amounts (mg/kg-day) times the carcinogenic slope factor (unit risk per mg/kg-day). The product is thus the unit risk of developing carcinogenic effects. The typical accepted standard in New York State is a risk of 1×10^{-6}, or one in a million. Therefore, levels of concern are greater than unity (chronic toxicity effects) and greater than 1×10^{-6} (carcinogenic effects).

6.7 RISK CHARACTERIZATION

The final step in the risk assessment process, risk characterization, integrates the previous activities and characterizes the potential for adverse effects on human health.. Both carcinogenic (cancer-causing) and non-carcinogenic (toxic) effects on human health are examined. The goal of this final step is an understanding of whether a reduction in risk is necessary.

Table 24 presents a summary of the quantitative toxicity assessment. In general, hazard indices greater than unity are associated only with ingestion of groundwater by a child. However, no calculations were possible for ingestion of soil impacted by lead, as the RfD for lead has been withdrawn from toxicity databases maintained by the USEPA and ATSDR. The reason behind this action is that experts currently believe that the toxic effects of lead can occur without a threshold. It is likely that if an RfD was published for lead, the calculated hazard index for exposure via accidental ingestion of surface soil would be greater than one.

Carcinogenic unit risks exceeding one in a million were calculated for trespassers' exposure to the residue in the buildings on the site (especially the brick building) and for future site workers' exposure to surface soil and the residue in the buildings. Similar to the issues raised by lead, several PAH compounds are currently classified as potential human carcinogens, but to date, carcinogenic slope factors have not been determined for these compounds. Although there are no human data that specifically link exposure to these compounds (pyrene, benz(a)anthracene, chrysene, and benzo(b)fluoranthene, among others), these PAHs are all components of mixtures that have been associated with human cancer, including coal tar, soot, coke oven emissions, and cigarette smoke. For these reasons, it is likely that the carcinogenic unit risk may be underestimated by the calculations in this risk assessment.

6.8 CONCLUSIONS

In conclusion, the results of this quantitative risk assessment indicate that there would likely be unacceptable risks associated with site-related contamination. However, most of the risks are due to the potential for contact with the soil and residue in the buildings. Improvements to site security could reduce the magnitude of these risks by preventing access by trespassers. Alternatively, options that prevent contact with the impacted soil, such as capping or removal, should be considered to reduce the magnitude of the potential risks to health.

Because the site is located in an area served by public water, restrictions can be placed to prevent installation of private wells for drinking water purposes. The areal extent of the impacted groundwater is small, indicating that well restrictions would not need to be placed on many properties. It is also possible that groundwater impacts are not leaving the site. A well located hydraulically downgradient from GW-3S could verify this. If this was the case and impacted groundwater is not leaving the site, then there is not a completed exposure pathway, and the risks associated with exposure to impacted groundwater are negligible.

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

Using information generated during the preliminary site assessment, Stearns & Wheler developed and executed a site investigation and remedial alternatives work plan. The work plan identified the goals of the City of North Tonawanda and the means by which those goals would be achieved. The results of the completion of the work plan were discussed in Chapter 4. Based on the results, Stearns & Wheler has reached the following conclusions.

7.1 GEOLOGY

1. Five stratigraphic units have been identified on the site: fill, a silt layer, a clay layer, a till layer and shale bedrock.

2. The silt later acts as a shallow aquifer. The clay unit acts as a confining layer for the underlying till.

3. During drilling, bedrock was encountered but no monitoring wells were installed in the bedrock.

7.2 HYDROGEOLOGY

1. Groundwater flow patterns for the aquifers indicate that a groundwater divide trends from north-northeast to south-southwest in the deep aquifer and north-south in the shallow aquifer. The divide is the result of groundwater draining to the sewer line that runs beneath Oliver Street. The sewer line excavation intersects the upper and lower aquifers, causing the water to drain away from the Niagara River in this area.

2. Potentiometric surface elevations of the deep aquifer suggest that the clay layer acts as a confining layer for the till. This may limit the potential impact of any contaminants in the shallow aquifer from migrating downward into the deep aquifer.

3. Slug test results indicate that the range of hydraulic conductivity in the deep aquifer is between 1.7×10^{-2} and 6.74×10^{-5} cm/sec. The mean hydraulic conductivity value for the till is 1.35×10^{-3} cm/sec. This indicates that there are wide variations in hydraulic conductivity in the till layer, which is not uncommon.

4. The estimated seepage velocity of the groundwater in the deep aquifer ranges from 2 to 754 ft/yr, with a mean value of 31 ft/yr. This further exemplifies the variations in hydraulic conductivity at the site.

5. Hydraulic conductivity results for the shallow aquifer range from 1.11×10^{-3} to 5.47×10^{-4} cm/sec, with a mean value of 1.09×10^{-3} cm/sec.

6. Estimated seepage velocities in the shallow aquifer range from 1.4 to 25 ft/yr with a mean value of 7.6 ft/yr.

7. Because the hydraulic conductivities for the upper silt and lower till are similar, the factor with the greatest influence over seepage velocity appears to be hydraulic gradient. The hydraulic gradients between the upper and lower aquifers vary by a factor of nearly 3, with much steeper gradients occurring in the lower till.

7.3 GROUNDWATER ANALYTICAL RESULTS

1. Well GW-3S was the only location where there were groundwater impacts of volatile organic compounds. Concentrations of cis-1,2-dichloroethene (62 ppb), trichloroethene (56 ppb), and tetrachloroethene (40 ppb) exceeded groundwater quality standards.

2. Analytical results indicated that turbidity is a factor that influences the concentration of a number of the total metallic ions.

3. Using dissolved analysis, concentrations of antimony, iron, magnesium, manganese, and sodium are above groundwater standards at a number of locations.

4. STARS semi-volatile compound analysis was completed at two well locations: GW-16S and GW-17S. These wells were placed adjacent to suspected and known underground storage tanks. Although an underground storage tank was found near GW-17S and an apparent leak

had taken place, there was no evidence of volatile organic compound or semi-volatile organic compound impacts in groundwater at this location. No tank was identified at GW-16S, and the groundwater data indicated no evidence of a leak.

7.4 SOILS ANALYTICAL RESULTS

1. Samples collected within site buildings were identified as not being native soils, but debris generated during activities at the site. These samples were not compared to NYSDEC cleanup objectives.

2. Samples collected inside and outside the buildings indicate that semi-volatile organic compound concentrations were elevated across the site. Figure 7 illustrates three areas of concern, where total semi-volatile organic compound analysis may warrant further investigation or remediation.

3. PCBs were detected at four sampling locations: SS-29, SS-32, SS-33 and SS-34. The areas that these samples were collected from were former transformer locations. Samples SS-32, SS-33, and SS-34 were located in an area where 37 tons of PCB impacted soil had been removed. Recent analytical results indicate that further investigation into this area is warranted.

4. There were a number of exceedances for heavy metals in soils on the site, including beryllium, cadmium, chromium, mercury, and lead. In addition, the element antimony was also found in samples collected on the site.

5. As part of the UST investigation, soil samples were collected at GW-16S and GW-17S. A number of compounds were identified in concentrations above the STARS VOCs standards at GW-17S. None were detected at GW-16S.

6. The tank in the vicinity of GW-17S has had either leaks or overfilling incidents. A strong organic odor was detected in the vicinity of the tank before Well GW-17S was installed. The nature of the release is unknown.

7. A number of STARS VOCs were detected at both GW-16S and GW-17S.

7.5 FISH AND WILDLIFE IMPACT ANALYSIS CONCLUSION

Step 1 of the NYSDEC Division of Fish and Wildlife's Fish and Wildlife Impact Analysis for inactive hazardous waste sites (1994) was completed on this site. The following conclusions were reached:

1. Surface runoff drains in all directions, but ultimately drains to the Niagara River.

2. Diversity of vegetation is fairly low due to the developed nature of the area.

3. The dense development of the site and surrounding areas provides limited habitat for wildlife species.

4. The Niagara River provided feeding, spawning, cover, and dispersal habitat to a wide variety of fish species.

5. The Natural Heritage Program's records indicate that Stiff-Leaf Goldenrod (*Solidago rigida)*, a state-threatened plant, is found along the banks of the Erie Canal south of the site on Grand Island west of the site, and in Wheatfield north of the site.

6. Common terns *(Sterna hirundo)*, which are state-threatened birds, are known to nest on Grand Island, west of the site.

7. The Niagara River is listed as an unprotected concentration area for water fowl, and Lower Spicer Creek on Grand Island is listed as an unprotected concentration area for warm water fish.

8. There is an unprotected area of Silver Maple-Ash swamp, considered a rare community on Grand Island.

None of the resources noted in paragraphs 5, 6, 7, and 8 should be impacted by the subject site, since none are directly downstream or downwind of the subject site.

9. There is little valuable terrestrial wildlife habitat within the study area except for the undeveloped woods on Grand Island, west of the site.

10. The primary value to humans of the natural resources surrounding the Roblin Steel plant lies in development and recreational opportunities.

7.6 RISK ASSESSMENT

1. The qualitative risk assessment indicates that there would likely be unacceptable risks associated with site-related contamination.

2. Most of the risks are due to the potential for contact with the soil and residue in the buildings. Improvements in site security could reduce the magnitude of these risks by preventing access by trespassers. Alternative measures that prevent contact, such as capping or removal, should also be considered.

3. Because the site is located in an area served by public water, restrictions can be placed to prevent installation of private wells for drinking water purposes.

4. The areal extent of groundwater impact is small, indicating well restrictions would not need to be placed on many properties.

7.7 RECOMMENDATIONS

Based on the conclusions noted above, Stearns & Wheler has the following recommendations:

1. There are very limited impacts to groundwater with respect to volatile organic compounds. The area of concern in the vicinity of GW-3S should be monitored periodically, and an analysis of the trends should be completed. Any further remediation should be considered only after several sampling rounds for the four wells in this area have been completed.

2. The underground storage tank adjacent to GW-17S should be removed and endpoint soil samples should be collected to determine if all impacted soil has been removed. Removal of the source of the impacts is essential before any decision can be made on additional remedial measures.

3. No underground storage tank was detected in the vicinity of GW-16S; however, the analysis of the soil sample collected from this location indicates that there are impacts of semi-volatile organic compounds in the area. Excavations should be completed in this area to determine if the UST is still in place. This could be completed during the same mobilization to remove the tank at GW-17S. Additionally, a third UST reportedly exists in the northwest portion of the site. No evidence of this tank has been observed yet. Exploratory test pits will be conducted in an effort to locate the tank.

4. Although the soil samples inside and outside of the buildings have notable impacts, any type of remedial effort would have to be determined after the fate of any structures on the site and the final use of the area has been determined. It should be understood that the degree of cleanup is a function of the future use of the property. The Remedial Alternatives Report (RAR) yet to be completed will evaluate alternatives for managing the impacted soil. It may be determined in the course of completing the RAR that additional soil sampling may be needed to evaluate areal extent and depth of impact.

5. Improved security and possible restrictions on the installation of potable water wells on some adjacent properties would significantly reduce potential exposure to known impacts.

TABLES

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

TABLE 1
GROUNDWATER ELEVATIONS
Jan-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

Well ID	Depth to Water (ft)	PVC Ele. (ft)	Groundwater Ele. (ft)
GW-1	10.1	579.32	569.22
GW-2	14.37	579.17	564.8
GW-2S	9.28	579.54	570.26
GW-3	15.1	578.22	563.12
GW-3S	NA	576.77	NA
GW-4	14.34	579.25	564.91
GW-4S	7.8	579.38	571.58
GW-5	8.39	579.45	571.06
GW-5S	5.15	577.02	571.87
GW-6	10.36	578.55	568.19
GW-7S	9.54	579.86	570.32
GW-8S	10.68	580.37	569.69
GW-9	11	579.57	568.57
GW-10S	7.38	578.38	571
GW-11S	9.14	579.23	570.09
GW-12S	9.52	579.18	569.66
GW-13*	30.17	580.04	549.87
GW-14	14.09	578.52	564.43
GW-16S	7.56	578.81	571.25
GW-17S	8.81	579.21	570.4

NA: Not Available due to heavy snow cover
* Depth to groundwater elevation unusual relative to others
S desgination indicates shallow wells

TABLE 2
HYDRAULIC CONDUCTIVITY AND SEEPAGE VELOCITY SUMMARY
DEEP AQUIFER
Jan-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

Well ID	K (cm/sec)	K (ft/min)	I	n	V (ft/year)	Overburden
GW-1	5.99E-03	1.18E-02	0.004	0.35	70.85	
GW-2	1.70E-02	3.35E-02	0.015	0.35	754.00	Clay/Till
GW-3	8.13E-03	1.60E-02	0.012	0.35	288.47	Silt/Till
GW-4	1.26E-04	2.48E-04	0.012	0.35	4.47	Till
GW-5	3.38E-04	6.66E-04	0.012	0.35	11.99	Clay/Till
GW-6	8.80E-04	1.73E-03	0.003	0.35	7.81	Clay/Till
GW-9	4.79E-03	9.43E-03	0.004	0.35	56.65	Clay/Till
GW-13	1.51E-03	2.97E-03		0.35		Silt/Till
GW-14	6.74E-05	1.33E-04	0.015	0.4	2.62	Clay/Till
Geometric Means	1.35E-03	2.66E-03	0.008	0.36	31.44	

HYDRAULIC CONDUCTIVITY AND SEEPAGE VELOCITY SUMMARY
SHALLOW AQUIFER
Jan-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

Well ID	K (cm/sec)	K (ft/min)	I	n	V (ft/year)	Overburden
GW-2S	1.87E-03	3.68E-03	0.004	0.45	17.20	Silty Clay
GW-4S	1.41E-03	2.78E-03	0.0006	0.45	1.95	Silty Clay
GW-5S	6.24E-04	1.23E-03	0.003	0.4	4.84	Silt/Clay
GW-7S	5.47E-04	1.08E-03	0.003	0.4	4.25	Silt/Clay
GW-8S	9.67E-04	1.90E-03	0.005	0.4	12.51	Silt
GW-10S	6.46E-04	1.27E-03	0.001	0.45	1.49	Silty Sand
GW-11S	1.45E-03	2.86E-03	0.003	0.45	10.00	Silt/Clay
GW-12S	1.70E-03	3.35E-03	0.003	0.4	13.20	Silt/Clay
GW-16S	1.11E-03	2.19E-03	0.009	0.4	25.85	Silt/Clay
GW-17S	1.56E-03	3.07E-03	0.004	0.4	16.14	Silt/Clay
Geometric Means	1.09E-03	2.15E-03	0.003	0.42	7.67	

K=Hydraulic Conductivity n=Porosity
I=Hydraulic Gradient V=Seepage Velocity
Unable to collect data at GW-3S due to heavy snow cover
Groundwater elevation data at GW-13 does not reflect other local data. Therefore, this information was not used in determining local hydrogeologic conditions

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS
TCL Volatiles
Dec-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

	Well ID										GW Std.
Analyte (ug/l)	**GW-1**	**GW-2**	**GW-2S**	**GW-3**	**GW-3S**	**GW-4**	**GW-4S**	**GW-5**	**GW-5S**	**GW-6**	
Chloromethane	U	U	U	U	U	U	U	U	U	U	NS
Bromomethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	5
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	2
Chloroethane	UJ	UJ	UJ	UJ	UJ	U	UJ	U	U	U	5
Methylene Chloride	U	U	U	U	U	U	U	U	U	U	5
Acetone	6UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	U	UJ	50G
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U	NS
Vinyl Acetate	U	U	U	U	U	U	U	U	U	U	NS
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	5
1,1-Dichloroethane	U	2J	2J	U	U	U	U	U	U	U	5
cis-1,2-Dichloroethene	U	U	U	U	**62**	U	U	U	U	U	5
Trans-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	5
Chloroform	U	U	U	U	U	U	U	U	U	U	7
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U	0.6
2-Butanone	U	U	U	U	U	U	U	U	U	U	50G
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U	5
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	5
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	50G
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	1
cis-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	0.4
Trichloroethene	U	U	U	U	**56**	U	U	U	U	U	5
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	5
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	1
Benzene	U	U	U	U	U	U	U	U	U	U	1
trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	0.4
Bromoform	U	U	U	U	U	U	U	U	U	U	50G
4-Methyl-2-Pentanone	U	U	U	U	U	U	U	U	U	U	NS
2-Hexanone	U	U	U	U	U	U	U	U	U	U	50G
Tetrachloroethene	U	U	4J	U	**40**	U	U	U	U	U	5
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	5
Toluene	U	U	U	U	U	U	U	U	U	U	5
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	5
Ethylbenzene	U	U	U	U	U	U	U	U	U	U	5
Styrene	U	U	U	U	U	U	U	U	U	U	5
Xylene (total)	U	U	U	U	U	U	U	U	U	U	5

Standards based on Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (NYSDEC June 1998)
Bold face indicates locations of concentrations above standards
NS: No Standard
G: Guidance Value

NOTE: Data has been validated

TABLE 3 (continued)
GROUNDWATER ANALYTICAL RESULTS
VOLATILE ORGANIC COMPOUNDS
TCL Volatiles
Dec-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

	Well ID										GW
Analyte (ug/l)	**GW-7S**	**GW-8S**	**GW-9**	**GW-10S**	**GW-11S**	**GW-12S**	**GW-13**	**GW-14**	**GW-16S**	**GW-17S**	**Std.**
Chloromethane	U	U	U	U	U	U	U	U	U	U	NS
Bromomethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	5
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	2
Chloroethane	U	U	UJ	U	UJ	UJ	U	U	UJ	U	5
Methylene Chloride	U	U	U	U	U	U	U	U	U	U	5
Acetone	UJ	UJ	UJ	15UJ	UJ	6UJ	U	UJ	UJ	U	50G
Carbon Disulfide	U	U	U	2J	1J	U	U	U	U	U	NS
Vinyl Acetate	U	U	U	U	U	U	U	U	U	U	NS
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	5
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	5
cis-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	5
Trans-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	U	5
Chloroform	U	U	U	U	U	U	U	U	U	U	7
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U	0.6
2-Butanone	U	U	U	U	U	U	U	U	U	U	NS
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U	5
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	5
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	50G
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	1
cis-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	0.4
Trichloroethene	U	U	U	U	U	U	U	U	U	U	5
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	5
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	1
Benzene	U	U	U	U	U	U	U	U	U	U	1
trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	0.4
Bromoform	U	U	U	U	U	U	U	U	U	U	50G
4-Methyl-2-Pentanone	U	U	U	U	U	U	U	U	U	U	NS
2-Hexanone	U	U	U	U	U	U	U	U	U	U	50G
Tetrachloroethene	U	U	U	U	U	U	U	U	U	U	5
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	U	5
Toluene	U	U	U	U	U	U	U	U	U	U	5
Chlorobenzene	U	U	U	U	U	U	U	U	U	U	5
Ethylbenzene	U	U	U	U	U	U	U	U	U	U	5
Styrene	U	U	U	U	U	U	U	U	U	U	5
Xylene (total)	U	U	U	U	U	U	U	U	U	U	5

Standards based on Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (NYSDEC June 1998)
Bold face indicates locations of concentrations above standards
NS: No Standard
G: Guidance Value

NOTE: Data has been validated

TABLE 4
GROUNDWATER ANALYTICAL RESULTS
TOTAL METALS
TAL Metals
Dec-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

	Well ID									**GW Std.**
Analyte (ug/l)	**GW-1**	**GW-2**	**GW-2S**	**GW-3**	**GW-3S**	**GW-4**	**GW-4S**	**GW-5**	**GW-5S**	
Aluminum	**2810**	**4470**	**1900**	**1510**	**1460**	**1520**	**928**	**3320**	**2510**	NS
Antimony	**9U**	**6.6U**	**5.1U**	**9.5U**	**7.7U**	**10.1U**	**10.7U**	**6U**	**5.4U**	3
Arsenic	3.2U	8.9U	6.8U	6.8U	23.7	5.7U	3.0U	8.2U	6.9U	25
Barium	8.9J	90.5J	68.2J	50.3J	83.1J	36.6J	64J	63.8J	92.7J	1000
Beryllium	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	3G
Cadmium	1.4	1	1.0U	1.2	1.0U	1.0U	1.0U	1.0U	1.0U	5
Calcium	130000	224000	11400	168000	137000	157000	106000	176000	193000	NS
Chromium	5.6	7.8	3.2	3.8	3.6	3.2	2.2	8.3	4.6	50
Cobalt	9.6U	10.4U	9U	8.3U	13.4U	9U	8U	10.2U	10.7U	NS
Copper	30.2	18.4	10.4U	6.8U	11.6U	8.9U	10U	15	19.2	200
Iron	**6300J**	**8980J**	**3340J**	**3090J**	**17600J**	**3050J**	**2460J**	**8080J**	**5800J**	300
Lead	10.6	14	4	2.0U	3.2	4.5	8.6	14.7	17.3	25
Magnesium	**62000**	**104000**	21100	**52800**	20000	**76300**	27800	**82300**	30900	35000G
Manganese	**397**	**502**	**314**	187	**4170**	242	138	**735**	**1200**	300
Mercury	NR	.1U	.10U	NR	.1U	0.10U	.1U	.1U	.10U	0.7
Nickel	8.5	8.4	6.0U	6.0U	6.4	6.0U	6.0U	8	9.2	100
Potassium	6000	5180	1080	2880	740	2420	2150	3600	888	NS
Selenium	7U	7.5U	8.6U	5.4U	8.1U	6.1U	6.8U	6.3U	9.5U	10
Silver	7.5U	7.5U	7.4U	7.4U	7.8U	7.7U	7.5U	7.5U	7.3U	50
Sodium	**69600J**	78600J	5130J	**68200J**	2780J	**64300J**	**46100J**	**64000J**	18100J	20000
Thallium	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	**7.3U**	5.0U	.5G
Vanadium	12.2U	13U	11U	8.1U	11.9U	8.2U	8.7U	13.6U	12.5U	NS
Zinc	33.8J	38J	19.3J	16.4J	26.1J	19.3J	4.8J	54.8J	74.4J	2000G

Standards based on Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (NYSDEC June 1998)
Bold face indicates locations of concentrations above standards
NS: No Standard
G: Guidance Value

NOTE: Data has been validated

TABLE 4 (continued)
GROUNDWATER ANALYTICAL RESULTS
TOTAL METALS
TAL Metals
Dec-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

	Well ID									**GW**
Analyte (ug/l)	**GW-6**	**GW-7S**	**GW-8S**	**GW-9**	**GW-10S**	**GW-11S**	**GW-12S**	**GW-13**	**GW-14**	**Std.**
Aluminum	**605**	**744**	**466**	**1070**	**143**	**6460J**	**564**	**1550**	280	NS
Antimony	4.0U	4.0U	4.0U	**8.8U**	4.0U	4.0U	**5.4U**	**10.6B**	4.0U	3
Arsenic	19	10.5	6.9	8.4U	20.5	15.5U	5.4U	3.5B	4.5	25
Barium	43.6	66.6	26.5	40.2J	374J	217J	62.8J	33.1B	34.8	1000
Beryllium	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	3G
Cadmium	3.4	**7.2**	2.7	1.0U	1.7	4	1.1	1.0B	2.5	5
Calcium	74300	86800	241000	67100	930000	376000J	136000	182000	106000	NS
Chromium	1.0U	2.1	1.9	1.6	1.0U	10.1	1.0U	13.3	1.0U	50
Cobalt	2.0U	2.0U	3.8	8U	20.4	23.9	7.4U	9.2B	2.0U	NS
Copper	3	6.2	10.5	6.3U	3.1U	74.8	6.8U	10.8B	3.7	200
Iron	**1960**	**9190**	**1550**	**2670J**	**2190J**	**16100J**	**1120J**	**5020E**	**454**	300
Lead	R	2.8J	R	2.0U	2.0U	36.2J	2.0U	2.0U	3.7J	25
Magnesium	**43800**	20500	**50100**	**41600**	**58000**	**72700J**	29800	**116000**	**54900**	35000G
Manganese	144	**1220**	**1610**	176	**7410**	**2400J**	261	241	54.2	300
Mercury	0.1U	0.16	0.39	0.1U	1.6	0.1U	0.1U	.1U	.1U	0.7
Nickel	7.5	9	8.5	6.0U	18.9	28.9	6.0U	6.0U	6.0U	100
Potassium	1690	661	1120	1700	6930	4290	3380	16100	4180	NS
Selenium	2.6U	1.8U	2.8U	9.5U	**29.5**	**14.9**	6.5U	4.9B	R	10
Silver	1.0U	1.0U	1.0U	7.5U	7.6U	7U	7.5U	7.6B	1.0U	50
Sodium	**41600**	18400	**33200**	**50300J**	**35400J**	**25400J**	**28700J**	**96400E**	**61700**	20000
Thallium	5.0U	UJ	UJ	5.5U	5.0U	5.0U	5.0U	5.0U	UJ	.5G
Vanadium	UJ	4.8	1.0U	8.1U	5.2U	25U	6.8U	8.4B	1.0U	NS
Zinc	7.9	12.3	15.5	9.7J	32.6J	141J	6.7J	23.5	4.3	2000G

Standards based on Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (NYSDEC June 1998)
Bold face indicates locations of concentrations above standards
NS: No Standard
G: Guidance Value

NOTE: Data has been validated

TABLE 5
GROUNDWATER ANALYTICAL RESULTS
DISSOLVED METALS
TAL Metals
Dec-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

	Well ID									GW
Analyte (ug/l)	**GW-1**	**GW-2**	**GW-2S**	**GW-3**	**GW-3S**	**GW-4**	**GW-4S**	**GW-5**	**GW-5S**	**Std.**
Aluminum	51.9B	53U	31.1U	26.9	36.5U	58.1U	49U	42.8U	40.7U	NS
Antimony	**13.6U**	**15.4U**	**10.1U**	4.0U	**11.7U**	**12.9U**	**8.8U**	**14.5U**	**9.8U**	3
Arsenic	3.0U	3.3U	5.7U	4.6	3.0U	6.9U	3.0U	3U	3.4U	25
Barium	22.9J	21.6J	39.8J	49.1	32J	19J	50.5J	16.4J	53.6J	1000
Beryllium	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	3G
Cadmium	1.0U	1.0U	1.0U	3.4	1.0U	1.0U	1.0U	1.0U	1.0U	5
Calcium	51500	74300	88600	169000	98000	131000	98400	48000	136000	NS
Chromium	1.0U	1.0U	1.0U	1.3	1.0U	1.0U	1.0U	1.0U	1.0U	50
Cobalt	11.5U	7.9U	6.6U	2.0U	7.5U	13.9U	7.2U	7.1U	7.8U	NS
Copper	2.6U	2.6U	2.6U	1.0U	2.2U	2.7U	3U	2U	3.3U	200
Iron	74.5R	62.5R	71.4R	10U	194R	73.2R	61.4R	81.5R	76.8R	300
Lead	UJ	UJ	UJ	R	UJ	UJ	UJ	UJ	UJ	25
Magnesium	**39400**	**37400**	17700	**54200**	12200	**69400**	27100	**40900**	17700	35000G
Manganese	24.2	16.2	75.2	99.5	319	62.4	42.6	12.9	808	300
Mercury	0.10U	0.1U	.1U	.1U	.1U	.1U	0.1U	0.1U	.1U	0.7
Nickel	6.0U	6.0U	6.0U	6U	6.0U	6.0U	6.0U	6.0U	6.0U	100
Potassium	5510	3280	994	3160	758	2370	1930	2140	588	NS
Selenium	3.4U	4.4U	5.3U	R	7.1U	2.6U	6.5U	2.8U	3.9U	10
Silver	7.4UJ	7.6UJ	7.6UJ	1.0U	7.5UJ	8.3UJ	7.5UJ	7.6UJ	7.6UJ	50
Sodium	**67800J**	**72400J**	5740J	**73500**	2920J	**65200J**	**43200J**	**57200J**	18200J	20000
Thallium	**6.8U**	**5.7U**	5U	5.0U	**7.7U**	5.0U	5.0U	5.0U	5.0U	.5G
Vanadium	5.8U	6U	5.7U	1.0U	5.9U	5.7J	5.7J	6.5U	6.1U	NS
Zinc	UJ	UJ	UJ	1.2	UJ	UJ	UJ	UJ	UJ	2000G

Standards based on Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (NYSDEC June 1998)
Bold face indicates locations of concentrations above standards
NS: No Standard
G: Guidance Value

NOTE: Data has been validated

TABLE 5 (continued)
GROUNDWATER ANALYTICAL RESULTS
DISSOLVED METALS
TAL Metals
Dec-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

	Well ID									**GW**
Analyte (ug/l)	**GW-6**	**GW-7S**	**GW-8S**	**GW-9**	**GW-10S**	**GW-11S**	**GW-12S**	**GW-13**	**GW-14**	**Std.**
Aluminum	15U	15U	15U	35.6U	**225**	**193**	30.9U	38U	17.2	NS
Antimony	4U	4U	4U	**14.4U**	**8.9U**	**9.1U**	**10.5U**	**11.2U**	4.0U	3
Arsenic	16.4	6.9	3.9	9.4U	5.6U	3.7U	4.6U	3.0U	5	25
Barium	34.3	58.4	21.4	29J	51.9J	49.1J	52.7J	18.1J	31.5	1000
Beryllium	1U	1U	1U	1.0U	1.0U	1.0U	1U	1.0U	1.0U	3G
Cadmium	2.3	3.9	2.4	1.0U	1.0U	1.0U	2.8	1.0U	3.1	5
Calcium	61200	79600	235000	46100	120000	85300	133000	167000	99400	NS
Chromium	1U	1U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	50
Cobalt	2U	2U	2.0U	7.4U	25.2U	14.3U	7.3U	7.9U	2.0U	NS
Copper	1.0U	1U	1.0U	2.2U	2.9U	3.6U	2.7U	2.2U	1.0U	200
Iron	24.4	**1930**	208	**367R**	**450R**	**382R**	93.5R	14.4R	10U	300
Lead	R	R	R	UJ	UJ	UJ	UJ	UJ	R	25
Magnesium	**40900**	21800	**47800**	**35600**	34100	27100	28800	**108000**	**52600**	35000G
Manganese	44.2	817	543	32.9	414	266	242	130	23	300
Mercury	.1U	.1U	.1U	.1U	0.19	0.10U	0.1U	.1U	.1U	0.7
Nickel	6U	6U	6U	6.0U	6.0U	6U	6U	6.0U	6.0U	100
Potassium	1880	882	1180	1500	2500	2520	3410	15000	4140	NS
Selenium	3.2U	4.2U	3U	1.0U	9.4U	5.7U	6.7U	4.2U	R	10
Silver	1U	1U	1U	7.6UJ	7.3UJ	7.7UJ	7.7UJ	7.3UJ	1.0U	50
Sodium	**41400**	19800	**30900**	**49500J**	**23600J**	**21400J**	**28500J**	**95800J**	6100	20000
Thallium	UJ	UJ	UJ	5.0U	5.0U	5U	5.0U	5.0U	UJ	.5G
Vanadium	1U	1U	1U	5.5U	5.8U	6.4U	5.5U	4.4U	1.0U	NS
Zinc	1U	1U	4.6B	UJ	UJ	UJ	UJ	UJ	1.0U	2000G

Standards based on Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (NYSDEC June 1998)
Bold face indicates locations of concentrations above standards
NS: No Standard
G: Guidance Value

NOTE: Data has been validated

TABLE 6
GROUNDWATER ANALYTICAL RESULTS
WET CHEMISTRY
Dec-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

	Well ID									GW Std.
Analyte (mg/l)	**GW-1**	**GW-2**	**GW-2S**	**GW-3**	**GW-3S**	**GW-4**	**GW-4S**	**GW-5**	**GW-5S**	
Alkalinity	145	230	310	311	330	94	368	254	344	
Bicarbonate	143	229	310	309	330	93.2	367	251	343	
Carbonate	2.2	2.0U	2.0U	2.2	2.0U	2.0U	2.0U	2.7	2.0U	
Chloride	9.97	4.58	8.07	15.8	4.16	5.79	19.7	9.66	31.9	250
Hardness	580	988	374	637	424	706	379	778	609	
Sulfate	**532**	**521**	48.4	**702**	19.6	**907**	131	**313**	158	250

TABLE 6 (continued)
GROUNDWATER ANALYTICAL RESULTS
WET CHEMISTRY
Dec-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

	Well ID									GW Std.
Analyte (ug/l)	**GW-6**	**GW-7S**	**GW-8S**	**GW-9**	**GW-10S**	**GW-11S**	**GW-12S**	**GW-13**	**GW-14**	
Alkalinity	225	328	296	202	262	520	377	111	40	
Bicarbonate	224	328	296	201	262	519	377	111	39.6	
Carbonate	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	
Chloride	9.99J	12.2J	15.6J	7.72	17.6	13.6	50.2	31.2	7.04J	250
Hardness	366J	301J	808J	339	2560	1240J	462	932	491J	
Sulfate	**251**	22.2	**690**	244	**260**	126	168	**1280**	**625**	250

NOTE: Data has been validated
Standards based on Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (NYSDEC June 1998)
Bold face indicates locations of concentrations above standards
NS: No Standard
G: Guidance Value

TABLE 7
GROUNDWATER ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
STARS Semivolatiles
Dec-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

	Well ID		**GW**
Analyte (ug/l)	**GW-16S**	**GW-17S**	**Std.**
Naphthalene	U	U	10G
2-Methylnaphthalene	U	U	NS
Acenapthylene	U	U	NS
Acenapthene	U	U	20G
Fluorene	U	U	50G
Phenanthrene	U	U	50G
Anthracene	U	U	50G
Fluroanthene	U	U	50G
Pyrene	.06J	U	50G
Benzo (a) anthracene	U	U	.002G
Chrysene	U	U	.002G
Benzo (b) fluoranthene	U	U	.002G
Benzo (k) fluoranthene	U	U	.002G
Benzo (a) pyrene	.06J	U	.002G
Indeno (1,2,3-cd) pyrene	U	U	.002G
Dibenzo (a,h) anthracene	U	U	50G
Benzo (g,h,I) perylene	U	U	.002G

Bold face indicates locations of concentrations above
NYSDEC STARS groundwater standards
NS: No Standard
G: Guidance Value
NOTE: Data has been validated

[redacted]

TABLE 8
SOIL ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
EPA Method 8270 TCL Semivolatiles
Nov-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

	Sample ID														Soil
Compound (ug/kg)	**SS-9**	**SS-9B**	**SS-10**	**SS-11**	**SS-12**	**SS-12B**	**SS-13**	**SS-14**	**SS-15**	**SS-16**	**SS-17**	**SS-18**	**SS-19**	**SS-20**	**Std. (ug/kg)**
Naphthalene	1,300	15,000J	16J	6,300J	5J	960J	690J	88J	3J	U	490J	39J	230J	23U	13,000
2-Methylnaphthalene	510	5,900J	20J	2,800J	U	450J	330J	66J	U	U	920J	54J	220J	31J	36,400
Acenapthylene	100	680J	20J	440J	34J	140J	1,100J	43J	U	U	2,500	94J	140J	160J	41,000
Acenapthene	1,100	13,000J	14J	7,800J	8J	1,200J	670J	81J	U	U	170J	36J	210J	32J	50,000
Fluorene	1,200	14,000J	9J	8,400J	9J	1,400J	840J	79J	U	680J	2,200	60J	190J	71J	50,000
Phenanthrene	7,700J	100000J	180J	588,000J	98J	9,700	6,600	990	40J	6,900J	6,100	510	2,000	630	50,000
Anthracene	1,800	21,000J	38J	13,000J	45J	2,600	2,700	220J	U	2,000J	2,400	160J	460	130J	50,000
Fluoranthene	2,500	110,000J	320J	64,400J	420	11,000	7,700	1,100	40J	2,800J	4,900	560	2,200	1,000	50,000
Pyrene	10,000J	97,000J	230J	50,000J	500	10,000	11,000	1,700J	19U	4,200J	4,300	1,200J	4,300J	1,100J	50,000
Benzo (a) anthracene	3,800J	49000J	170J	29000J	420	5,300	4,400	830J	14J	5,400J	2,800	330J	**1300J**	490	224 or MDL
Chrysene	3,500J	51000J	250J	30000J	460	5,500	4,400	880J	37J	6,400J	2,000	380J	**1400J**	620	400
Benzo (b) fluoranthene	3,500J	32,000J	270J	26,000J	310J	4,800	6,200J	1,100J	25J	UJ	1,800	630J	**2000J**	590	1,100
Benzo (k) fluoranthene	2,800J	55,000J	290J	24,000J	410J	6,000J	8,900J	920J	13J	UJ	2,400	340J	**1700J**	620	1,100
Benzo (a) pyrene	3,100J	38000J	190J	25,000J	280J	4,700	4,300J	790J	9J	UJ	1,700	230J	**1300J**	480	61 or MDL
Indeno (1,2,3-c,d) pyrene	1,900J	14,000J	46J	8,400J	230J	1,300J	2,700J	530J	4J	UJ	280J	210J	550J	98J	3,200
Dibenzo (a,h) anthracene	950J	7,900J	18J	4,400J	89J	700J	880J	210J	U	UJ	110J	73J	**270J**	54J	14 or MDL
Benzo (g,h,i) perylene	1,600J	10,000J	26J	5,100J	120J	780J	2,800J	460J	6J	3,100J	180J	230J	430J	82J	50,000

Standards based on Determination of Soil Cleanup Objectives and Cleanup Levels (NYSDEC, January 1994)
Boldfaced areas indicate locations of concentrations above standards
MDL: Method Detection Limit
Data has been validated

Shaded sample locations indicates samples collected within buildings
Only samples in these locations are compared to standards

TABLE 8 (continued)
SOIL ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
EPA Method 8270 TCL Semivolatiles
Nov-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

	Sample ID														Soil
Compound (ug/kg)	SS-21	SS-22	SS-23	SS-25	SS-26	SS-27	SS-28	SS-37	SS-38	SS-41	SS-42	SS-49	SS-45	SS-52	Std. (ug/kg)
Naphthalene	55J	38J	720J	160J	200J	58J	210J	6J	67J	350J	10J	100000J	400J	2,400J	13,000
2-Methylnaphthalene	100J	57J	450J	180J	160J	69J	370J	14J	110J	750J	U	96,000J	480J	1,100J	36,400
Acenapthylene	30J	70J	290J	330J	110J	100J	880	12J	100J	1,500J	3J	53,000J	540J	500J	41,000
Acenapthene	12J	27J	1,000J	540J	430	150J	130J	5J	25J	310J	U	240,000J	450J	4,200J	50,000
Fluorene	19J	44J	1,100J	500J	470	150J	150J	6J	23J	1,800	U	230,000J	640J	4,100J	50,000
Phenanthrene	220J	420	10,000	4,600	3,000	1,300	2,100	57J	410	7,100	7J	1,900,000J	7,100	39000J	50,000
Anthracene	49J	110J	2,300J	1,200J	660	320J	1,000	18J	150J	2,300	6J	350,000J	1,600J	7,800J	50,000
Fluoranthene	230J	670	14,000J	8,500	2,800	1,800	3,600J	100JB	670	8,300	10J	3,800.000J	8,700	43000J	50,000
Pyrene	330J	560	13,000J	7,700	3,700J	1,900	4,600J	110J	1,900J	8,100	22J	3,500,000J	15,000J	70000J	50,000
Benzo (a) anthracene	140J	340J	6,600J	4,300	1200J	880J	2000J	52J	340J	4,800	U	1,400,000J	7,000J	26000J	224 or MDL
Chrysene	180J	440	6,500J	4,600	1400J	1,000J	2600J	68J	470J	4,400	22J	1,600,000J	7,600J	28000J	400
Benzo (b) fluoranthene	210J	510	6,600J	5,800	1900J	1,300J	4,800J	100JB	610J	5,600J	UJ	1,200,000J	7,100J	22000J	1,100
Benzo (k) fluoranthene	180J	540	6,900J	4,800	2100J	1,200J	3,100J	60J	480J	4,800J	UJ	1,700,000J	5,500J	20000J	1,100
Benzo (a) pyrene	120J	390	6,000J	4,900	1,300J	970J	2500J	57J	330J	3,900J	UJ	1,400,000J	6,000J	23000J	61 or MDL
Indeno (1,2,3-c,d) pyrene	41J	85J	1,200J	1,000J	460J	180J	650J	15J	230J	720J	UJ	620,000J	3.900J	17000J	3,200
Dibenzo (a,h) anthracene	22J	40J	600J	480J	190J	83J	320J	5J	79J	390J	UJ	260,000J	1,400J	8,200J	14 or MDL
Benzo (g,h,i) perylene	55J	70J	910J	610J	630J	160J	680J	42J	310J	490J	UJ	550,000J	3,000J	11000J	50,000

Standards based on Determination of Soil Cleanup Objectives and Cleanup Levels (NYSDEC, January 1994)
Boldfaced areas indicate locations of concentrations above standards
MDL: Method Detection Limit
Data has been validated

Shaded sample locations indicates samples collected within buildings
Only samples in these locations are compared to standards

TABLE 8 (continued)
SOIL ANALYTICAL RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
EPA Method 8270 TCL Semivolatiles
Nov-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

	Sample ID					Soil
Compound (ug/kg)	**SS-54**	**SS-55**	**SS-56**	**SS-57**	**SS-62**	**Std. (ug/kg)**
Naphthalene	3,700	110J	23J	110J	430U	13,000
2-Methylnaphthalene	1,500J	130J	160J	160J	430U	36,400
Acenapthylene	660J	290J	960J	190J	430U	41,000
Acenapthene	4,300	54J	76J	37J	430U	50,000
Fluorene	4,500	66J	1,500J	89J	430U	50,000
Phenanthrene	41,000J	1,000	5,400J	970	16J	50,000
Anthracene	7,900	390	1,400J	260	430U	50,000
Fluoranthene	41,000J	1,700	3,400J	990	34J	50,000
Pyrene	**50,000J**	2,200	4,700J	930J	28J	50,000
Benzo (a) anthracene	**18000J**	**1,100**	**2,000J**	**540**	12J	224 or MDL
Chrysene	**18000J**	**1,500**	**1,600J**	**840**	20J	400
Benzo (b) fluoranthene	**29,000J**	**1,900J**	**1,200J**	730	17J	1,100
Benzo (k) fluoranthene	**20,000J**	**2,600J**	**1,600J**	800	19J	1,100
Benzo (a) pyrene	**17000J**	**1,500J**	**990J**	**560**	14J	61 or MDL
Indeno (1,2,3-c,d) pyrene	**9100J**	260J	370J	120J	12J	3,200
Dibenzo (a,h) anthracene	**4300J**	**120J**	**740J**	**64J**	430U	14 or MDL
Benzo (g,h,i) perylene	8,700J	220J	290J	68J	11J	50,000

Standards based on Determination of Soil Cleanup Objectives and Cleanup Levels (NYSDEC, January 1994)
Boldfaced areas indicate locations of concentrations above standards
MDL: Method Detection Limit
Data has been validated
Shaded sample locations indicates samples collected within buildings
Only samples in these locations are compared to standards

TABLE 9
SOIL ANALYTICAL RESULTS
PCBs
EPA Method 8082 PCBs
Nov-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

	Sample ID											Soil
Compound (ug/kg)	**SS-20**	**SS-21**	**SS-22**	**SS-27**	**SS-29**	**SS-32**	**SS-33**	**SS-34**	**SS-40**	**SS-52**	**SS-62**	**Std. (ug/kg)**
Aroclor 1016	78U	37U	40U	72U	210U	760U	390U	4,600U	U	U	U	1,000
Aroclor 1221	160U	75U	81U	150U	420U	1,500U	790U	9,300U	U	U	U	1,000
Aroclor 1232	78U	37U	40U	72U	210U	760U	390U	4,600U	U	U	U	1,000
Aroclor 1242	78U	37U	40U	72U	210U	760U	390U	4,600U	U	U	U	1,000
Aroclor 1248	78U	37U	40U	72U	210U	760U	390U	4,600U	U	U	U	1,000
Aroclor 1254	78U	37U	40U	72U	210U	760U	390U	4,600U	U	U	U	1,000
Aroclor 1260	78U	37U	40U	200J	**1,000J**	**4,200J**	**1,000J**	**19,000J**	U	120J	13J	1,000

Standards based on Determination of Soil Cleanup Objectives and Cleanup Levels (NYSDEC, January 1994)
Shaded areas indicate locations of concentrations above standards
Data has been validated

TABLE 10
SOIL ANALYTICAL RESULTS
METALS
Nov-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

	Sample ID							Soil
Compound (mg/kg)	**SS-19**	**SS-20**	**SS-21**	**SS-22**	**SS-24**	**SS-25**	**SS-35**	**SS-36**	**Std. (mg/kg)**
Aluminum	3,690	2,620	1,230	9,510	5,100	4,470	5,260	4,650	SB
Antimony	**116J**	**3.7J**	**4.7J**	**2.1J**	**25.4J**	**7.7J**	**4.4J**	**9.4J**	SB
Arsenic	**41.4**	**15.5**	**19.1**	**12.1**	**27.6**	**15.8**	**21.2**	**35.8**	7.5/SB
Barium	80.4	51.4	**584**	105	95.4	102	94.5	133	300/SB
Beryllium	**0.51**	0.46	0.22	**0.65**	**0.82**	**0.93**	**0.64**	**0.75**	0.16/SB
Cadmium	**12.2**	**27.5**	**60**	**1.8**	**11**	**12.4**	**40.3**	**27.5**	1/SB
Calcium	2,180	5,620	4,500	6,070	6,010	41,400	13,900	6,360	SB
Chromium	**520**	**25.6**	**66.3**	**54.5**	**187**	**122**	**40.1**	**116**	10/SB
Cobalt	**57**	7.8	10	8.9	22.9	13.3	14.3	22.2	30/SB
Copper	**698**	**192**	**133**	**69.4**	**314**	**197**	**208**	**266**	25/SB
Iron	**286,000**	**69,500**	**163,000**	**55,500**	**258,000**	**162,000**	**64,900**	**145,000**	2,000/SB
Lead	**1390J**	**365J**	**103J**	**113J**	**353J**	**164J**	**369J**	**749J**	SB****
Magnesium	807	963	245	2,310	1,100	12,900	4,050	1,670	SB
Manganese	**2,080**	**437**	**1,120**	**462**	**2,100**	**1,610**	**614**	**1,090**	SB
Mercury	**0.12J**	**0.35J**	0.063BJ	**0.18J**	**0.94J**	0.036J	**0.27J**	**0.3J**	0.1
Nickel	**176**	**42.3**	**74.9**	**38.6**	**157**	**109**	**74.7**	**175**	13/SB
Potassium	403	250	71.4	874	427	417	357	467	SB
Selenium	**15.4J**	**5.3U**	**10.3J**	**4.4U**	**13.9J**	**8.2J**	**4.9U**	**9.5J**	2/SB
Silver	**0.89**	**0.21U**	**0.28**	**0.22**	**0.86**	**0.51**	**0.24U**	**0.62**	SB
Sodium	**485**	**549**	**490**	**609**	**636**	**674**	**675**	**718**	SB
Thallium	**4.8J**	**1.2J**	**1.8J**	**1.3J**	**3.8J**	**1.1UJ**	**1.4UJ**	**1.5J**	SB
Vanadium	22.5	10.1	7.3	25.2	24.6	16.2	17.6	19.8	150/SB
Zinc	**450J**	**188J**	**1420J**	**156J**	**234J**	**185J**	**3540J**	**2490J**	20/SB
Cyanide									***

Standards based on Determination of Soil Cleanup Objectives and Cleanup Levels (NYSDEC, January 1994)
Shaded areas indicate locations of concentrations above standards
****Background levels for lead vary widely.
*Soil background
Data has been validated

TABLE 10 (continued)
SOIL ANALYTICAL RESULTS
METALS
Nov-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

	Sample ID							Soil
Compound (mg/kg)	**SS-39**	**SS-40**	**SS-43**	**SS-44**	**SS-46**	**SS-51**	**SS-62***	**Std. (mg/kg)**
Aluminum	5,060	1,630	1,260	5,680	4,010	5,760	11,000	SB
Antimony	**6.0J**	**7**	**17.2J**	**7.7J**	**6J**	**10**	UJ	SB
Arsenic	**22.1**	**25.6J**	**28.9**	**22.4**	**24.2**	**44J**	5	7.5/SB
Barium	107	50.6	53.6	160	131	180	46	300/SB
Beryllium	**0.85**	**0.36**	0.23	0.36	**0.81**	**1.2**	0.5	0.16/SB
Cadmium	**10.4**	**32**	**51.5**	**295**	**39.3**	**8**	1	1/SB
Calcium	38,800	7,090	7,100	6,230	6,120	9,050	46,100	SB
Chromium	**151**	**147J**	**551**	**54**	**116**	**223J**	14.9	10/SB
Cobalt	**50**	**20**	**37.4**	6.9	**35.7**	**168**	5	30/SB
Copper	**224**	**259J**	**446**	**668**	**230**	**296J**	17.6J	25/SB
Iron	**145,000**	**91,600**	**515,000**	**116,000**	**101,000**	**122,000**	16,500	2,000/SB
Lead	**297J**	**663**	**317J**	**266J**	**439J**	**334**	15.4J	SB****
Magnesium	13,300	1,840	2,100	481	1,900	1,460	24,900J	SB
Manganese	**1,540**	**966**	**3,810**	**697**	**795**	**1,230**	348J	SB
Mercury	**0.25J**	**0.11**	**0.15J**	**0.1J**	**1.1J**	**0.19**	0.04	0.1
Nickel	**189**	**289J**	**502**	**44**	**105**	**139J**	12.9	13/SB
Potassium	672	236	144	141	315	526	1,900J	SB
Selenium	**8.4J**	**3J**	**20J**	**8.4J**	7.4	**6J**	UJ	2/SB
Silver	**0.57**	**0.4J**	**1.6**	**0.37**	**0.99**	**0.42J**	0.21U	SB
Sodium	**753**	**211**	**528**	**661**	**700**	152	154	SB
Thallium	**1.3UJ**	**1.3**	**6.4J**	**UJ**	**UJ**		1.1U	SB
Vanadium	27.3	24.1	111	15.1	22.1	38.3	19.9	150/SB
Zinc	**542J**	**1,450J**	**955J**	**2,610J**	**882J**	**455J**	76.2	20/SB
Cyanide								***

Standards based on Determination of Soil Cleanup Objectives and Cleanup Levels (NYSDEC, January 1994)
Shaded areas indicate locations of concentrations above standards
****Background levels for lead vary widely.
*Soil background
Data has been validated

TABLE 11
SOIL ANALYTICAL RESULTS
STARS VOLATILE ORGANIC COMPOUNDS
EPA Method 8021 TCL Volatiles
Nov-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

	Sample ID		**Soil**
Compound (ug/kg)	**SS-16S**	**SS-17S**	**Std. (ug/kg)**
Benzene	1.2U	760U	14
Toluene	1.5	760U	100
Ethylbenzene	1.2U	760U	100
m,p-Xylene	1.2U	**860**	100
o-Xylene	1.2U	**830**	100
Isopropylbenzene	1.2U	**940**	100
4-Isopropyltoluene	1.2U	**690J**	100
n-Propylbenzene	1.2U	**2,000**	100
sec-Butylbenzene	1.2U	**1,500**	100
1,3,5-Trimethylbenzene	1.2U	**4,200**	100
1,2,4-Trimethylbenzene	1.2U	**6,000**	100
n-Butylbenzene	1.2U	**6,000**	100
Naphthalene	1.2U	**1,300**	200
MTBE	1.2U	760U	NS
tert-Butylbenzene	1.2U	760U	100

NS: No Standard
Standards based on STARS Memo 1 (August 1992).
Samples collected during installation of monitoring wells
Shaded areas indicate locations of concentrations above standards

TABLE 12
SOIL ANALYTICAL RESULTS
STARS SEMIVOLATILE ORGANIC COMPOUNDS
EPA Method 8270 TCL Semivolatiles
Nov-98
Roblin Steel Site Investigation
City of North Tonawanda, NY

	Sample ID		**Soil**
Compound (ug/kg)	**SS-16S**	**SS-17S**	**Std. (ug/kg)**
Naphthalene	8J	**260J**	200
Acenapthene	1,600	14J	400
Anthracene	58J	9J	1,000
Benzo (a) anthracene	**290J**	**6U**	0.04
Benzo (b) fluoranthene	**370J**	**7U**	0.04
Benzo (k) fluoranthene	**690**	**8U**	0.04
Benzo (g,h,i) perylene	**59J**	**12U**	0.04
Chrysene	**500**	**14U**	0.04
Dibenz (a,h) anthracene	46J	400U	1,000
Fluoranthene	760	9U	1,000
Fluorene	23J	26J	1,000
Indeno (1,2,3-c,d) pyrene	**100J**	**4U**	0.04
Phenanthrene	340J	75J	1,000
Benzo (a) pyrene	**360J**	**5U**	0.04
Pyrene	**2,400J**	12U	1,000

NS: No Standard
Standards based on STARS Memo 1 (August 1992).
Samples collected during installation of monitoring wells
Shaded areas indicate locations of concentrations above standards
Data has been validated

Table 13
Summary of Potential Exposure Pathways
Roblin Steel Site Investigation
City of North Tonawanda, NY

Contaminated Media	Potential Exposure Pathway	Selected Yes or No	Reason for Inclusion or Rejection
Air - VOC	Inhalation by site workers	No	No evidence of VOC emissions
	Inhalation by off site residents	No	No evidence of VOC emissions
Surface Soil	Accidental Ingestion by trespassers	Yes	Evidence of Tresspassers on site
	Accidental Ingestion by future workers	Yes	Site may be redeveloped
	Dermal Contact by trespassers	No	Potential pathway was evaluated only qualitatively
	Dermal Contact by future site workers	No	Potential pathway was evaluated only qualitatively
	Inhalation of emissions by trespassers	No	Potential pathway was evaluated only qualitatively
	Inhalation by future site workers	No	Potential pathway was evaluated only qualitatively
Groundwater	Ingestion of well water (residents)	Yes	Potential for installation of private well
	Ingestion of well water (workers)	No	Deed Restrictions could be enacted
	Inhalation of soil vapor entering homes	No	Concentrations are too low
Surface water	Aquatic bioaccumulation	No	Groundwater impacts appear to be Minimal off-site concentrations; would not impact Niagara River
	Volatile emissions	No	
	Swimming/recreational contact	No	

Table 14
Historical Analytical Results - Monitoring Well 3S
Roblin Steel Site Investigation
City of North Tonawanda, NY

Contaminant	GW Std [1] (µg/L)	Results for samples collected during: PSA (1995)	Jul-98	Dec-98
VOCs - Monitoring Wells MGW-3S - Historical Analytical Results				
Acetone	50 G	N D	N D	N D
cis-1,2-Dichloroethene	5	70	25	62
Trichloroethene	5	86	66	56
Tetrachloroethene	5	180	68	40

* Laboratory results from PSA and July 1998 sampling rounds are for both isomeric forms of 1,2-DCE.

[1] GW standard as listed in NYSDEC DOW TOGS 1.1.1, revised June 1998.

Table 15
Groundwater Screening - VOCs
Roblin Steel Site Investigation
City of North Tonawanda, NY

Contaminant	GW Std [1] (µg/L)	Frequency of Detection	Maximum Conc. (µg/L)	Mean [2] Conc. (µg/L)
VOCs - Monitoring Wells MGW-3S, GW-11S, and GW-12S				
Acetone	50 G	1 of 3	6	8
cis-1,2-Dichloroethene	5	1 of 3	62	**18**
Trichloroethene	5	1 of 3	56	**18**
Tetrachloroethene	5	1 of 3	40	**16**

[1] GW standard as listed in NYSDEC DOW TOGS 1.1.1, revised June 1998.

[2] Mean Concentration is geometric mean calculated using replacement value of 1/2 the detection limit for concentrations that were not detected.

Table 16
Groundwater Screening - Metals
Roblin Steel Site Investigation
City of North Tonawanda, NY

Contaminant	GW Std [1] (µg/L)	GW-3S, GW-11S, GW-12S Frequency of Detection	GW-3S, GW-11S, GW-12S Maximum Conc. (µg/L)	GW-3S, GW-11S, GW-12S Mean [2] Conc. (µg/L)	Selected Yes or No	GW-3S, GW-11S, GW-12S Frequency of Detection	GW-3S, GW-11S, GW-12S Maximum Conc. (µg/L)	GW-3S, GW-11S, GW-12S Mean [2] Conc. (µg/L)	Selected Yes or No
Metals (Total) - Shallow (S) Wells						Metals (Dissolved) - Shallow (S) Wells			
Aluminum	NS	3 of 3	6,460	1,746	No	3 of 3	193	60	No
Antimony	3	2 of 3	**8**	**4.4**	Yes	3 of 3	**12**	**10**	Yes
Arsenic	25	3 of 3	24	12.6	No	2 of 3	11	2.9	No
Barium	1000	3 of 3	217	104	No	3 of 3	93	44	No
Beryllium	3G	0 of 3	N D	N D	No	0 of 3	N D	N D	No
Cadmium	5	2 of 3	4	1.3	No	1 of 3	7	0.9	No
Calcium	NS	3 of 3	376,000	191,344	No	3 of 3	193,000	103,596	No
Chromium	50	2 of 3	10	2.6	No	0 of 3	N D	N D	No
Cobalt	NS	3 of 3	24	13.3	No	3 of 3	11	9.2	No
Copper	200	3 of 3	75	18.1	No	3 of 3	19	2.8	No
Iron	300	3 of 3	**17,600**	**6,821**	Yes	3 of 3	**9,190**	191	No
Lead	25	2 of 3	36	**4.9**	No	0 of 3	N D	N D	No
Magnesium	35000G	3 of 3	**72,700**	**35,123**	Yes	3 of 3	30,900	21,195	No
Manganese	300	3 of 3	**4,170**	**1377**	Yes	3 of 3	**1,220**	274	No
Mercury	0.7	0 of 3	N D	N D	No	0 of 3	N D	N D	No
Nickel	100	2 of 3	29	8.2	No	0 of 3	N D	N D	No
Potassium	NS	3 of 3	4,290	2,206	No	3 of 3	2,150	1868	No
Selenium	10	3 of 3	**15**	9.2	No	3 of 3	**10**	6.5	No
Silver	50	3 of 3	8	7.4	No	3 of 3	8	7.6	No
Sodium	20,000	3 of 3	**28,700**	12,655	No	3 of 3	**46,100**	12,121	No
Thallium	0.5 G	0 of 3	N D	N D	No	1 of 3	N D	N D	No
Vanadium	NS	3 of 3	25	12.6	No	3 of 3	13	5.9	No
Zinc	2000G	3 of 3	141	29	No	0 of 3	ND	ND	No

[1] GW standard as listed in NYSDEC DOW TOGS 1.1.1, revised June 1998.

[2] Mean concentration is the geometric mean calculated with 1/2 the detection limit for concentrations that were not detected.

Table 17
Summary of Initial Screening - Interior Residue/Soil Samples - SVOC Results
Roblin Steel Site Investigation
City of North Tonawanda, NY

Compound	NYSDEC Clean-up Goal (ug/kg)	Background Soil Conc. (ug/kg)	Wire Mill/Rolling Mill Samples (Concentration.in ug/kg)					Brick Bldg	
			Frequency of Detection	Minimum Conc.	Maximum Conc.	Mean Conc.	Selected Yes or No	SS-49 Conc. (ug/kg)	Selected Yes or No
Naphthalene	13,000	13,000	11 of 12	3	**15,000**	288	No	**100,000**	Yes
2-Methylnaphthalene	36,400	36,400	10 of 12	1	10,000	260	No	**96,000**	Yes
Acenaphthylene	41,000	41,000	10 of 12	20	10,000	240	No	**53,000**	Yes
Acenapthene	50,000	50,000	10 of 12	8	13,000	366	No	**240,000**	Yes
Fluorene	50,000	50,000	11 of 12	9	14,000	386	No	**230,000**	Yes
Phenanthrene	50,000	50,000	12 of 12	40	**588,000**	2,950	No	**1,900,000**	Yes
Anthracene	50,000	50,000	11 of 12	38	21,000	835	No	**350,000**	Yes
Fluoranthene	50,000	50,000	12 of 12	40	**110,000**	2,528	No	**3,800,000**	Yes
Pyrene	50,000	50,000	12 of 12	19	**97,000**	2,947	No	**3,500,000**	Yes
Benzo(a)anthracene	224	224	12 of 12	14	**49,000**	**1,684**	Yes	**1,400,000**	Yes
Chrysene	400	400	12 of 12	37	**51,000**	**1,910**	Yes	**1,600,000**	Yes
Benzo(b)fluoranthene	1,100	1,100	11 of 12	25	**32,000**	**1,903**	Yes	**1,200,000**	Yes
Benzo(k)fluoranthene	1,100	1,100	11 of 12	13	**55,000**	**1,905**	Yes	**1,700,000**	Yes
Benzo(a)pyrene	61	61	11 of 12	9	**38,000**	**1,452**	Yes	**1,400,000**	Yes
Indeno(1,2,3-c,d)pyrene	3,200	3,200	11 of 12	4	**14,000**	683	No	**620,000**	Yes
Dibenzo(a,h)anthracene	14	14	10 of 12	18	**10,000**	**447**	Yes	**260,000**	Yes
Benzo(g,h,i)perylene	50,000	50,000	12 of 12	6	10,000	491	No	**550,000**	Yes
Total PAHs				900	893,040	27,292	No	18,999,000	

Soil Clean-up Criteria are listed in NYSDEC TAGM HWR-94-4046, dated January 1994.
Bold entry in table indicates value exceeds clean-up criteria.

Table 18
Summary of Initial Screening - Outside Soil Samples - SVOC and PCB Results
Roblin Steel Site Investigation
City of North Tonawanda, NY

Compound	NYSDEC Clean-up Goal (ug/kg)	Off-site / Background SS-62	Outdoor Soil Sample Results - Entire site.				
			Frequency of Detection	Minimum Conc. (ug/kg)	Maximum Conc. (ug/kg)	Mean Conc. (ug/kg)	Selected Yes or No
Naphthalene	13,000	215	19 of 19	6	3,700	122	No
2-Methylnaphthalene	36,400	215	18 of 19	14	1,500	176	No
Acenaphthylene	41,000	215	19 of 19	3	1,500	169	No
Acenapthene	50,000	215	18 of 19	5	4,300	139	No
Fluorene	50,000	215	18 of 19	6	4,500	214	No
Phenanthrene	50,000	16	19 of 19	7	41,000	1,525	No
Anthracene	50,000	215	19 of 19	6	7,900	428	No
Fluoranthene	50,000	34	19 of 19	10	43,000	1,954	No
Pyrene	50,000	28	19 of 19	22	**70,000**	2,557	No
Benzo(a)anthracene	224	12	18 of 19	52	**26,000**	**1,250**	Yes
Chrysene	400	20	19 of 19	22	**28,000**	**1,314**	Yes
Benzo(b)fluoranthene	1,100	17	18 of 19	100	**29,000**	**1,670**	Yes
Benzo(k)fluoranthene	1,100	19	18 of 19	60	**20,000**	**1,534**	Yes
Benzo(a)pyrene	61	14	18 of 19	57	**23,000**	**1,221**	Yes
Indeno(1,2,3-c,d)pyrene	3,200	12	18 of 19	15	**17,000**	397	No
Dibenzo(a,h)anthracene	14	215	17 of 19	5	**8,200**	**187**	Yes
Benzo(g,h,i)perylene	50,000	11	18 of 19	42	11,000	365	No
Total PAHs		183		727	327,300	16,778	No
PCB 1260 (SS-32,33,34 only)	1000	13	3 of 3	1,000	**19,000**	**4,305**	Yes

Soil Clean-up Criteria are listed in NYSDEC TAGM HWR-94-4046, dated January 1994.
Shaded cell indicates compound was not detected. Value listed is 1/2 the detection limit.
Bold indicates concentration exceeds clean-up criteria.

Table 19

Initial Screening of Metal Analytical results - Exterior Soil Samples

Roblin Steel Site Investigation

City of North Tonawanda, NY

Compound (mg/kg)	NYSDEC Clean-up Goal (mg/kg)	Off-site / Background SS-62*	Eastern USA background conc. (mg/kg)	Frequency of Detection	Minimum Conc. (mg/kg)	Maximum Conc. (mg/kg)	Mean Conc. (mg/kg)	Selected Yes or No
Aluminum	SB	11,000	33,000	14 of 14	1,230	9,510	3,688	No
Antimony	SB	0.85UN	N/A	14 of 14	**2.10**	**116**	**8.57**	Yes
Arsenic	7.5/SB	5	3 - 12	14 of 14	**12.1**	**44.0**	**23.8**	Yes
Barium	300/SB	46	15 - 600	14 of 14	50.6	**584**	109	No
Beryllium	0.16/SB	0.5B	0 - 1.75	14 of 14	0.22	**1.20**	**0.56**	No
Cadmium	1/SB	1.0B	0.1 - 1	14 of 14	**1.80**	**295**	**22.5**	Yes
Calcium	SB	46,100E	130 - 35,000	14 of 14	2,180	41,400	8,069	No
Chromium	10/SB	14.9E	1.5 - 40	14 of 14	**25.6**	**551**	**117**	Yes
Cobalt	30/SB	5.0B	2.5 - 60	14 of 14	6.90	**168**	21.9	No
Copper	25/SB	17.6E	1 - 50	14 of 14	**69.4**	**698**	**255**	Yes
Iron	2,000/SB	16,500	2,000 - 550,000	14 of 14	**55,500**	**515,000**	**135,336**	No
Lead	SB****	15.4	****	14 of 14	**103**	**1,390**	**336**	Yes
Magnesium	SB	24,900	100 - 5,000	14 of 14	245	13,300	1,767	No
Manganese	SB	348	50 - 5,000	14 of 14	**437**	**3,810**	**1,106**	No
Mercury	0.1	0.04B	0.001 - 0.2	13 of 14	0.04	**1.10**	**0.21**	Yes
Nickel	13/SB	12.9	0.5 - 25	14 of 14	**38.6**	**502**	**116**	Yes
Potassium	SB	1,900	8,500 - 43,000	14 of 14	71.4	874	316	No
Selenium	2/SB	0.64U	0.1 - 3.9	11 of 14	**2.20**	**20**	**6.82**	Yes
Silver	SB	0.21U	N/A	12 of 14	0.11	**1.60**	**0.44**	Yes
Sodium	SB	154B	6,000 - 8,000	14 of 14	152	753	517	No
Thallium	SB	1.1U	N/A	8 of 14	0.06	**6.40**	**1.29**	Yes
Vanadium	150/SB	19.9	1 - 300	14 of 14	7.30	111	21.8	No
Zinc	20/SB	76.2	9 - 50	14 of 14	**156**	**3,540**	**691**	Yes

Standards based on Determination of Soil Cleanup Objectives and Cleanup Levels (NYSDEC, January 1994)

Bold values indicate concentrations above clean-up objectives and background concentrations.

****Background levels for lead vary widely.

U indicates compound was not detected B indicates compound was detected in blank.

Table 20
Identification of Non-carcinogenic Health Effects - Soil Contaminants
Roblin Steel Site Investigation
City of North Tonawanda, NY

Chemical of Concern SVOCs	Soil Sample Location				*RfD*[1] *(mg/kg/day)*	*Uncert. Factor*	*Mod. Factor*	*Target organ or effect*	*Confi-dence*
	Mill	Brick Bldg	Outdoor	UST					
Naphthalene	SS-9B only	X		17S	0.2	3000	1	dec. body weight	low
2-methylnaphthalene		X			Not listed in IRIS or ITER TERA Databases.				
Acenaphthylene		X			N/A				
Acenapthene		X			0.06	3000	1	blood	low
Fluorene		X			0.04	3000	1	blood	low
Phenanthrene	SS-9B, 11	X			N/A				
Anthracene		X			0.3	3000	1	kidney	low
Fluoranthene		X			0.04	3000	1	kidney, liver	low
Pyrene		X		16S	0.03	3000	1	kidney	low
Benzo[a]anthracene	X	X	X	16S	N/A				
Chrysene	X	X	X	16S	N/A				
Benzo[b]fluoranthene	X	X	X	16S	N/A				
Benzo[k]fluoranthene	X	X	X	16S	N/A				
Benzo[a]pyrene	X	X	X	16S	N/A				
Indeno[1,2,3 - cd]pyrene		X		16S	N/A				
Dibenzo[a,h]anthracene	X	X	X		N/A				
Benzo[g,h,I]perylene		X		16S	N/A				
PCB 1260			X		0.00002	300		immune system	

X indicates mean concentration exceeds clean-up goals established by NYSDEC (TAGM 1994)
N/A indicates the parameter is not available at this time.
[1] Health information obtained from EPA's Integrated Risk Information System (IRIS) database. RfD for PCB 1260 is RfD obtained from ASTDR, as listed in ITER TERA database (RfD is based on study for PCB 1254).

Table 20 (continued)

Metals	Soil Sample Location				*RfD*[1] (*mg/kg/day*)	*Uncert. Factor*	*Mod. Factor*	*Target organ or effect*	*Confi-dence*
	Mill	Brick Bldg	Outdoor	UST					
Antimony			X		0.0004	1000	1	blood chemistry	low
Arsenic (> 20 ppm)			X		0.0003	3	1	skin, vasc. System	medium
Cadmium (in food)			X		0.001	10	1	kidney	high
Cadmium (in water)			X		0.0005	10	1	proteinuria	high
Copper			X		N/A				
Chromium [2] (trivalent)			X		1.5	100	10		low
Chromium[2] (hexavalent)			X		0.003	300	3		low
Lead (> 400 ppm)			X		Effects appear to occur without threshold.				
Mercury			X		0.0003	1000	1	autoimmune sys.	high
Nickel			X		0.02	300	1	dec body/organ wt.	medium
Selenium			X		0.005	3	1	selenosis	high
Silver			X		0.005	3	1	Argyria	low
Thalllium			X		0.00008	3000	1	blood chemistry	low
Zinc			X		0.3	3	1	-	medium

VOCs - UST samples only	Soil Sample Location		*RfD*[1] (*mg/kg/day*)	*Uncert. Factor*	*Mod. Factor*	*Target organ or effect*	*Confi-dence*
	SS-16	SS-17					
Xylenes		X	2	100	1	-	medium
Isopropylbenzene		X	Not listed in IRIS or ITER TERA Databases.				
4-Isopropyltoluene		X	Not listed in IRIS or ITER TERA Databases.				
n-Propylbenzene		X	Not listed in IRIS or ITER TERA Databases.				
sec-Butylbenzene		X	Not listed in IRIS or ITER TERA Databases.				
1,3,5-Trimethylbenzene		X	Not listed in IRIS or ITER TERA Databases.				
1,2,4-Trimethylbenzene		X	Not listed in IRIS or ITER TERA Databases.				
n-Butylbenzene		X	Not listed in IRIS or ITER TERA Databases.				

X indicates mean concentration exceeds clean-up goals established by NYSDEC (TAGM 1994)

N/A indicates the parameter is not available at this time.

[1] Health information obtained from EPA's Integrated Risk Information System (IRIS) database.

[2] Sample results are for total Chromium. Analysis was not done to determine whether hexavalent or trivalent chromium are present.

Table 21

Identification of Carcinogenic Health Effects - Contaminants in Soil

Roblin Steel Site Investigation

City of North Tonawanda, NY

Chemical of Concern SVOCs	Soil Sample Location: Mill	Soil Sample Location: Brick Bldg	Soil Sample Location: Outdoor	Soil Sample Location: UST	*Slope factor 1/(mg/kg/day)*	*Class* *	*Target organ*
Naphthalene	SS-9B only	X		17S	Not derived	C[1]	
2-methylnaphthalene		X			Not listed in IRIS or ITER Database.		
Acenaphthylene		X			None	D	
Acenaphthene		X			Pulled for re-evaluation 5/93		
Fluorene		X			None	D	
Phenanthrene	SS-9B, 11	X			None	D	
Fluoranthene		X			None	D	
Anthracene		X			None	D	
Pyrene		X		16S	N/A	B2	multiple
Benz[a]anthracene	X	X	X	16S	N/A	B2	multiple
Chrysene	X	X	X	16S	N/A	B2	multiple
Benzo[b]fluoranthene	X	X	X	16S	N/A	B2	multiple
Benzo[k]fluoranthene	X	X	X	16S	N/A	B2	multiple
Benzo[a]pyrene	X	X	X	16S	7.3	B2	multiple
Indeno[1,2,3 - cd]pyrene		X		16S	N/A	B2	
Dibenz[a,h]anthracene	X	X	X		N/A	B2	
Benzo[g,h,I]perylene		X		16S	None	D	
PCB 1260			X		1.0 to 2.0	B2	liver

* Weight of Evidence Classification:

A = Known to cause cancer in humans.

B1 = Probable Human Carcinogen, limited human data.

B2 = Probable Human Carcinogen, inadequate human data.

C = Possible Human Carcinogen

D = Not classifiable as to Human Carcinogenicity.

N/A = Not available at this time.

[1] EPA reclassified Naphthalene to Class C in Sept. 1998, however human cancer potential "cannot be determined."

Table 21 (continued)

Metals	Soil Sample Location				*Slope factor 1/(mg/kg/day)*	*Class **	*Target organ*
	Mill	Brick Bldg	Outdoor	UST			
Arsenic (> 20 ppm)			X		1.5	A	multiple
Barium (> 300 ppm)			SS-21 only			D	
Cadmium			X		None	D	
Copper			X			D	
Lead (> 400 ppm)			X			B2	kidney
Mercury			X		None	C (HgCl)	
Nickel			X		None	D	
Selenium			X		None	D	
Silver			X				
Thallium			X				
Zinc			X			D	

VOCs - UST samples only	Soil Sample Location		*Slope factor 1/(mg/kg/day)*	*Class **	*Target organ*
	SS-16	SS-17			
Xylenes		X	None	D	
Isopropylbenzene		X	Not listed in IRIS or ITER Database.		
4-Isopropyltoluene		X	Not listed in IRIS or ITER Database.		
n-Propylbenzene		X	Not listed in IRIS or ITER Database.		
sec-Butylbenzene		X	Not listed in IRIS or ITER Database.		
1,3,5-Trimethylbenzene		X	Not listed in IRIS or ITER Database.		
1,2,4-Trimethylbenzene		X	Not listed in IRIS or ITER Database.		
n-Butylbenzene		X	Not listed in IRIS or ITER Database.		

* Weight of Evidence Classification:

A = Known to cause cancer in humans.
B1 = Probable Human Carcinogen, limited human data.
B2 = Probable Human Carcinogen, inadequate human data.
C = Possible Human Carcinogen
D = Not classifiable as to Human Carcinogenicity.
N/A = Not available at this time.

[1] EPA reclassified Naphthalene to Class C in Sept. 1998, however human cancer potential "cannot be determined."

Table 22
Identification of Non-carcinogenic Health Effects - Groundwater Contaminants
Roblin Steel Site Investigation
City of North Tonawanda, Ny

Chemical of Concern VOCs	*RfD[1] (mg/kg/day)*	*Uncert. Factor*	*Mod. Factor*	*Target organ or effect*	*Confi-dence*
cis-1,2-Dichloroethene	N/A				
Trichloroethene	N/A				
Tetrachloroethene	0.01	1000	1	hepatotoxicity	medium
Metals					
Antimony	0.0004	1000	1	blood glucose	low

N/A indicates the parameter is not available at this time.

Table 23
Identification of Carcinogenic Health Effects - Contaminants in Soil
Roblin Steel Site Investigation
City of North Tonawanda, NY

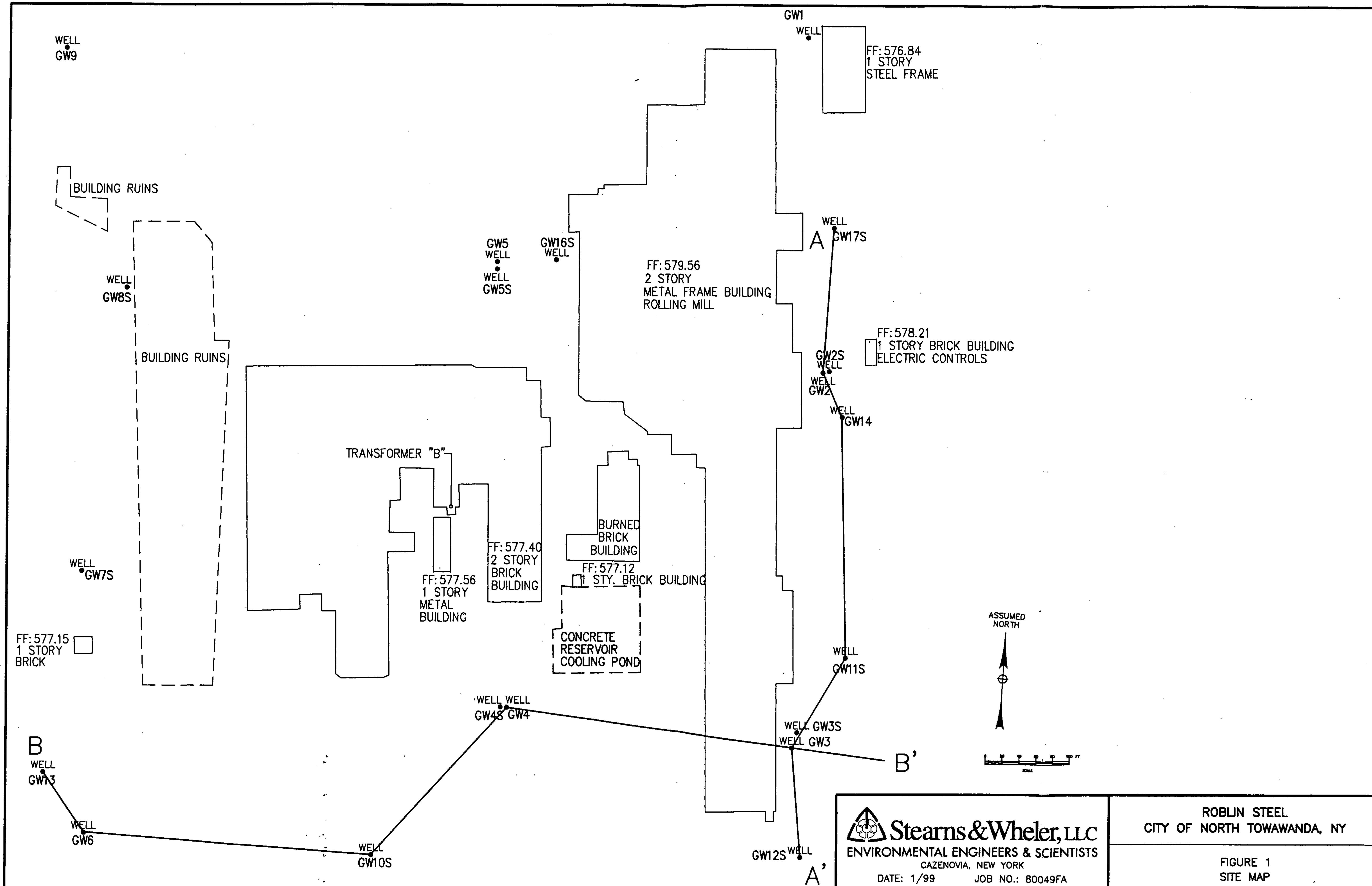
Chemical of Concern VOCs	*Slope factor 1/(mg/kg/day)*	*Class **	*Target organ*
cis-1,2-Dichloroethene	None	D	
Trichloroethene	Withdrawn following further review		
Tetrachloroethene	Not available		
Metals			
Antimony	Not evaluated		

Table 24
Summary - Calculated Risk Levels
Roblin Steel Site Investigation
City of North Tonawanda, NY

Exposure Pathway	Media	H I	Cancer Unit Risk
Adolescent Tresspassers	Outdoor Soil	0.00	N/A
	Indoor Residue - Mill	0.003	N/A
	Indoor Residue - Brick Building	0.00	N/A
	Total HI or Unit Risk	0.01	N/A
Adult Tresspassers	Outdoor Soil	3.795E-04	8.37E-08
	Indoor Residue - Mill	8.731E-05	7.41E-07
	Indoor Residue - Brick Building	0.000	**7.14E-04**
	Total HI or Unit Risk	0.001	**7.15E-04**
Adjacent Adult Resident	Groundwater	0.25	-
Adjacent Child Resident	Groundwater	**1.16**	
Future Site Workers	Outdoor Soil	0.01	4.18E-07
	Indoor Residue - Mill	0	1.85E-07
	Indoor Residue - Brick Building	0.01	**8.93E-05**
	Total HI or Unit Risk	0.01	**8.99E-05**

Action Levels:
H I > 1.0
Unit Risk > 1.00E-06

FIGURES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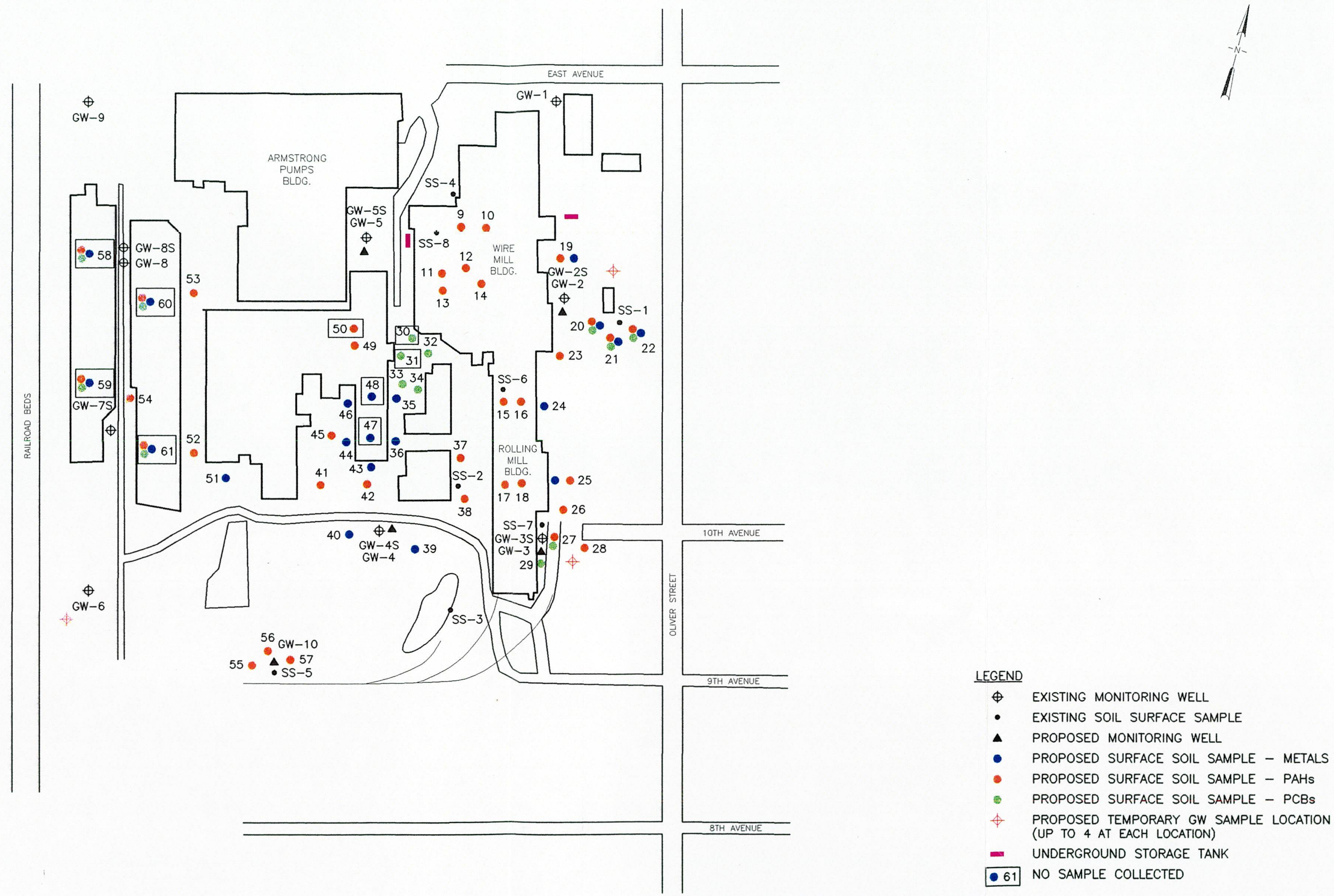
FF: 576.84
1 STORY
STEEL FRAME
WELL
GW9
BUILDING RUINS
WELL
GW8S
BUILDING RUINS
GW5
WELL
WELL
GW5S
GW16S
WELL
FF: 579.56
2 STORY
METAL FRAME BUILDING
ROLLING MILL
A
WELL
GW17S
FF: 578.21
1 STORY BRICK BUILDING
ELECTRIC CONTROLS
GW2S
WELL
WELL
GW2
WELL
GW14
TRANSFORMER "B"
FF: 577.56
1 STORY
METAL
BUILDING
FF: 577.40
2 STORY
BRICK
BUILDING
BURNED
BRICK
BUILDING
FF: 577.12
1 STY. BRICK BUILDING
CONCRETE
RESERVOIR
COOLING POND
WELL
GW7S
FF: 577.15
1 STORY
BRICK
ASSUMED
NORTH
WELL
GW11S
WELL WELL
GW4S GW4
WELL GW3S
WELL GW3
B'
B
WELL
GW13
WELL
GW6
WELL
GW10S
GW12S WELL
A'
Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK
DATE: 1/99
JOB NO.: 80049FA
ROBLIN STEEL
CITY OF NORTH TOWAWANDA, NY
FIGURE 1
SITE MAP



0 100' 200'

APPROXIMATE SCALE

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK
DATE: 1/99 JOB NO.: 80049FA

ROBLIN STEEL
CITY OF TONAWANDA, NY

FIGURE 2
SOIL SAMPLE LOCATIONS

DW REV. BY PME 4/6/00
M:\80049FA\0049_s2.DWG

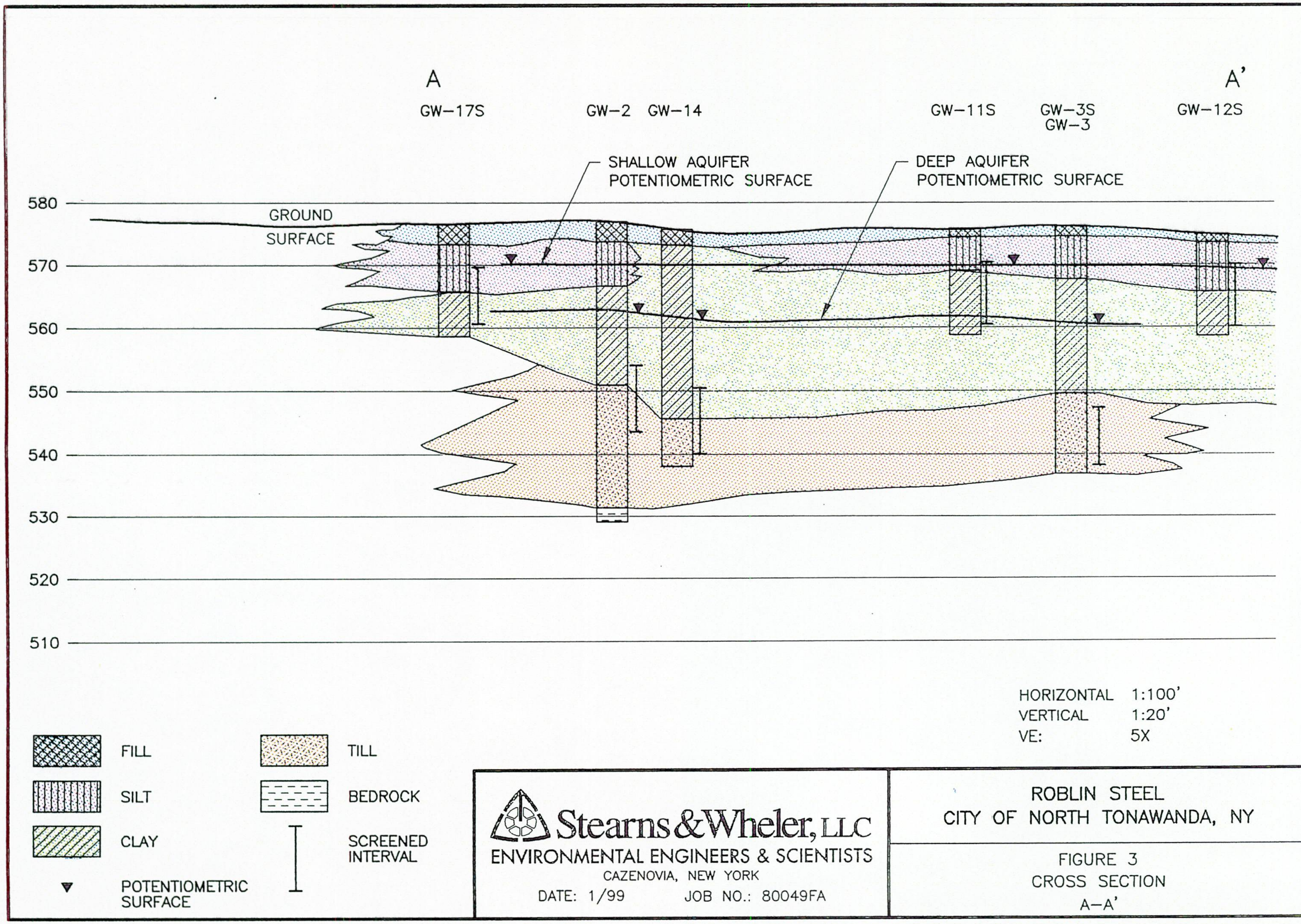
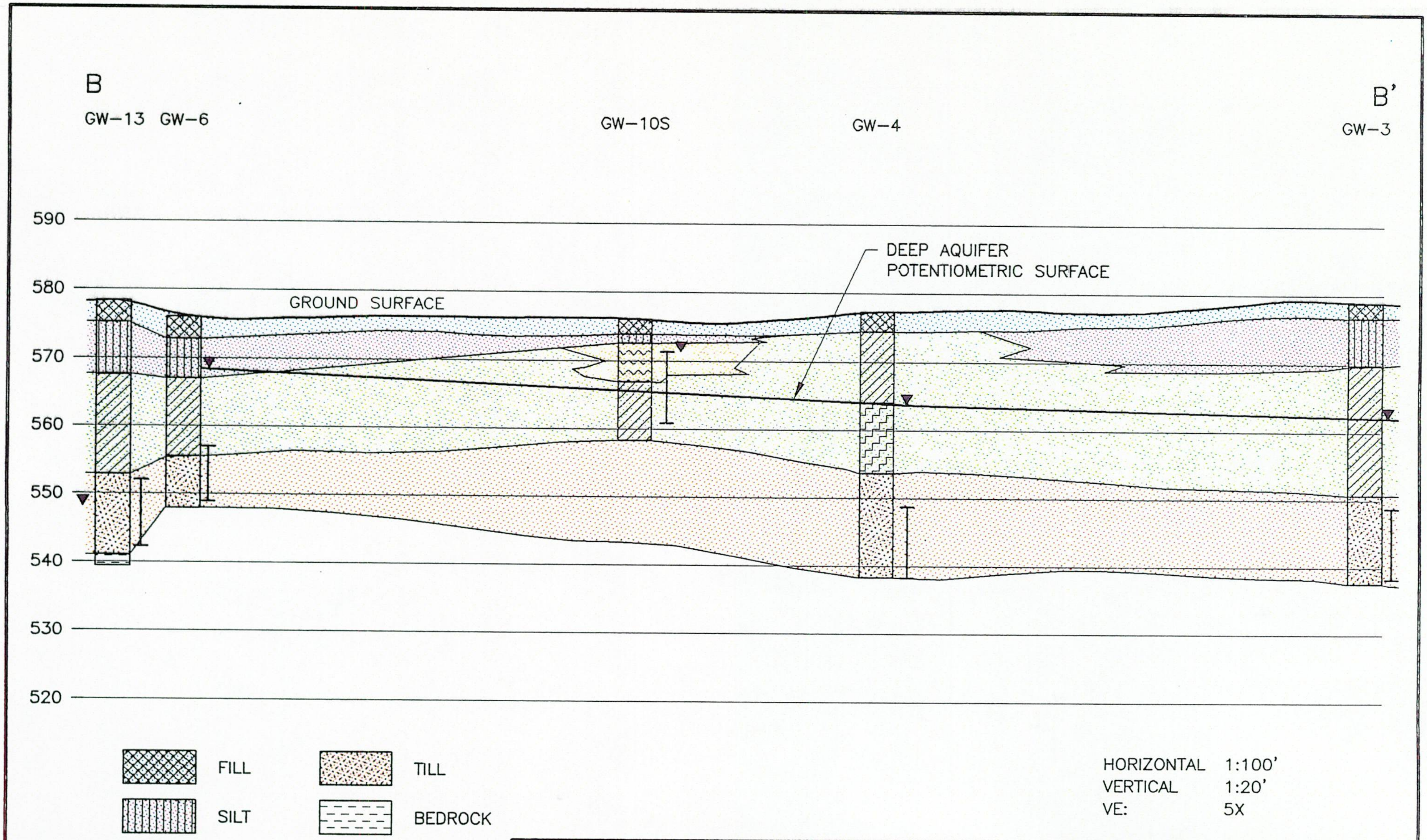


FIGURE 3
CROSS SECTION
A-A'



Stearns & Wheler, LLC
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CAZENOVIA, NEW YORK
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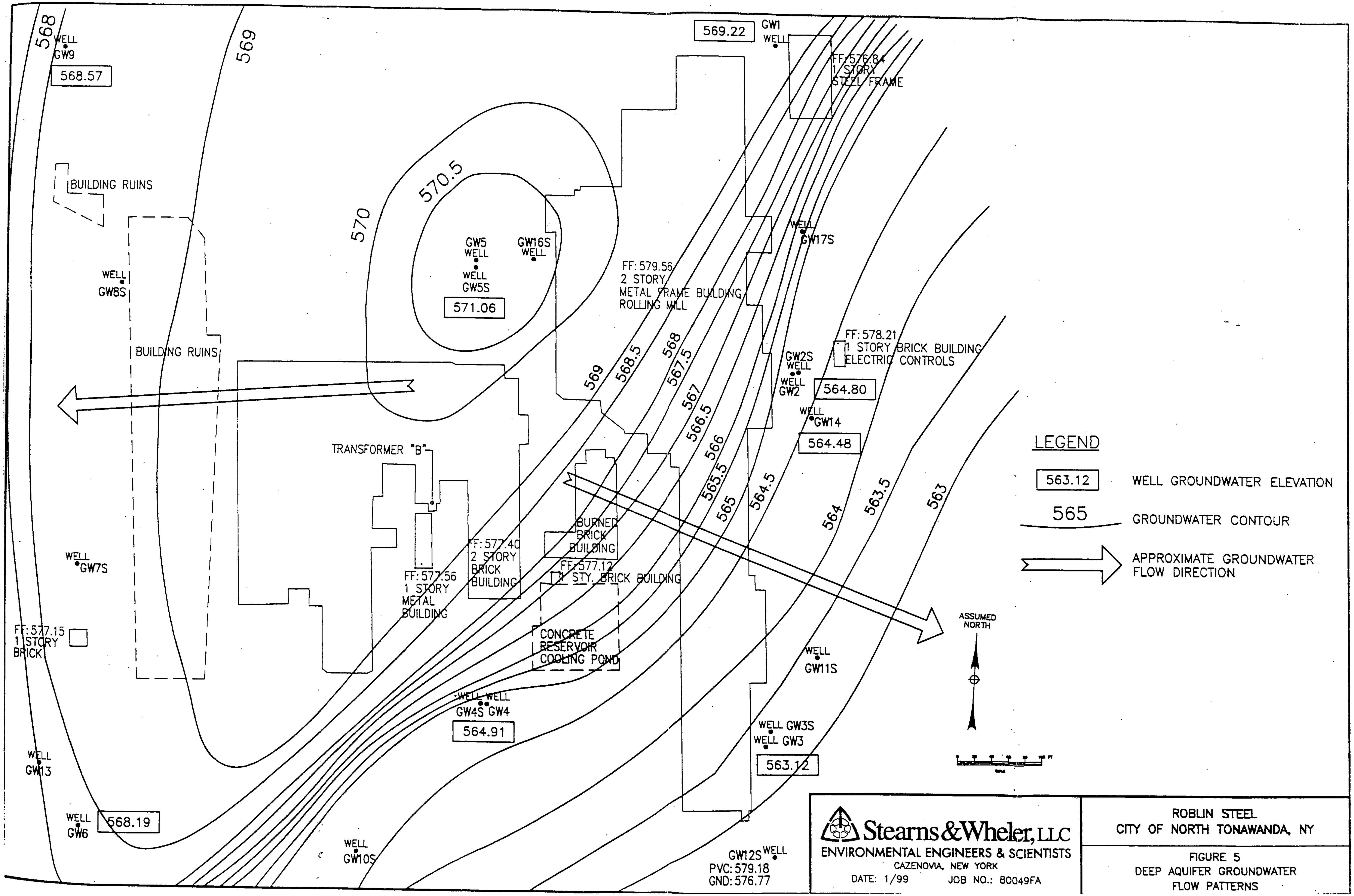
ROBLIN STEEL
CITY OF NORTH TONAWANDA, NY

FIGURE 4
CROSS SECTION
B–B'


568
569
570
570.5
WELL GW9
568.57
569.22
GW1 WELL
FF: 576.84
1 STORY
STEEL FRAME
BUILDING RUINS
WELL GW8S
BUILDING RUINS
GW5 WELL
WELL GW5S
GW16S WELL
571.06
FF: 579.56
2 STORY
METAL FRAME BUILDING
ROLLING MILL
WELL GW17S
FF: 578.21
1 STORY BRICK BUILDING
ELECTRIC CONTROLS
GW2S WELL
WELL GW2
564.80
WELL GW14
564.48
569
568.5
568
567.5
567
566.5
566
565.5
565
564.5
564
563.5
563
TRANSFORMER "B"
FF: 577.56
1 STORY
METAL
BUILDING
FF: 577.40
2 STORY
BRICK
BUILDING
BURNED
BRICK
BUILDING
FF: 577.12
1 STY. BRICK BUILDING
CONCRETE
RESERVOIR
COOLING POND
WELL GW7S
FF: 577.15
1 STORY
BRICK
WELL WELL
GW4S GW4
564.91
WELL GW11S
WELL GW3S
WELL GW3
563.12
WELL GW13
WELL GW6
568.19
WELL GW10S
GW12S WELL
PVC: 579.18
GND: 576.77
LEGEND
563.12 WELL GROUNDWATER ELEVATION
565 GROUNDWATER CONTOUR
APPROXIMATE GROUNDWATER FLOW DIRECTION
ASSUMED NORTH
Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK
DATE: 1/99 JOB NO.: 80049FA
ROBLIN STEEL
CITY OF NORTH TONAWANDA, NY
FIGURE 5
DEEP AQUIFER GROUNDWATER
FLOW PATTERNS

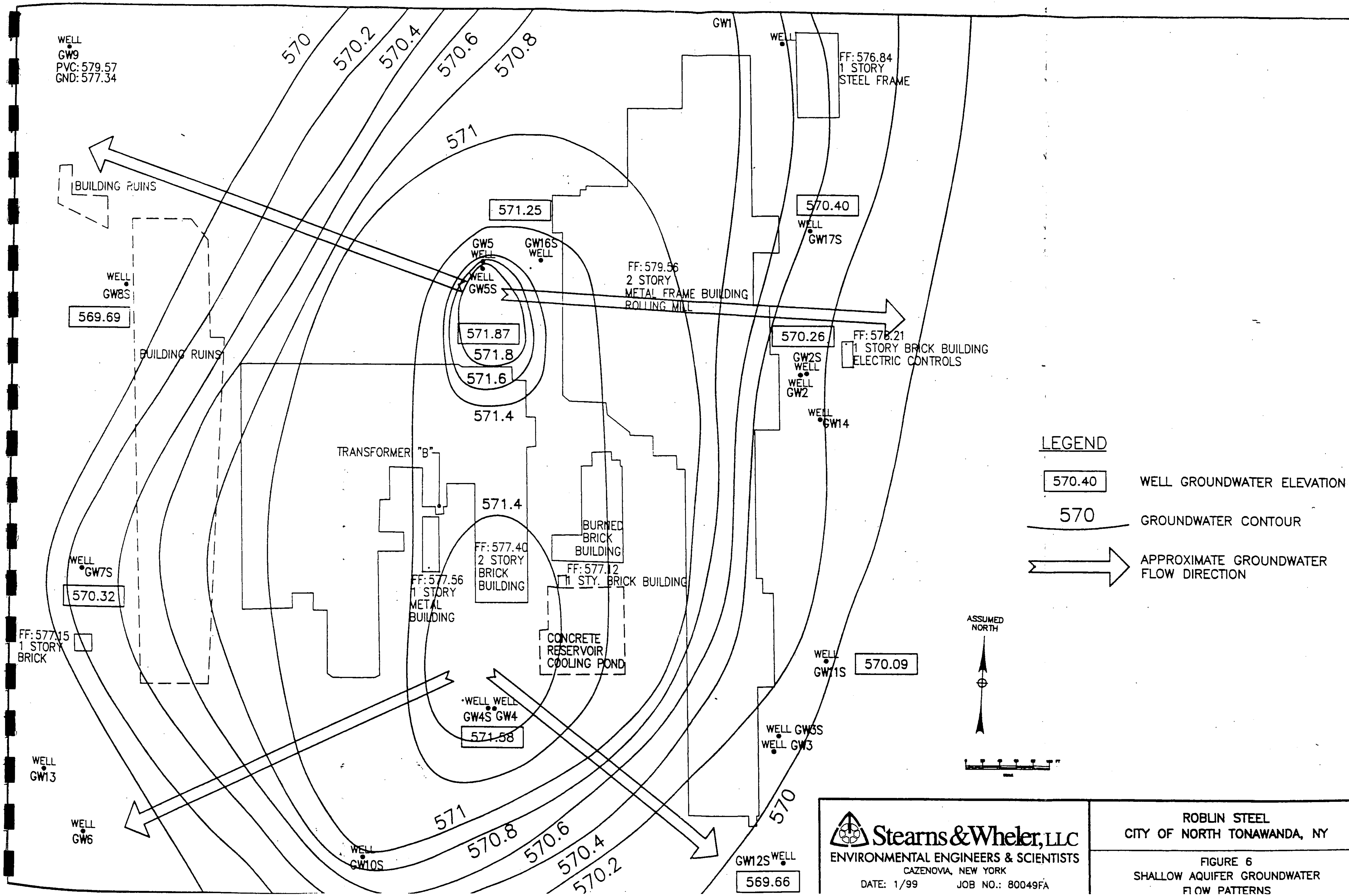
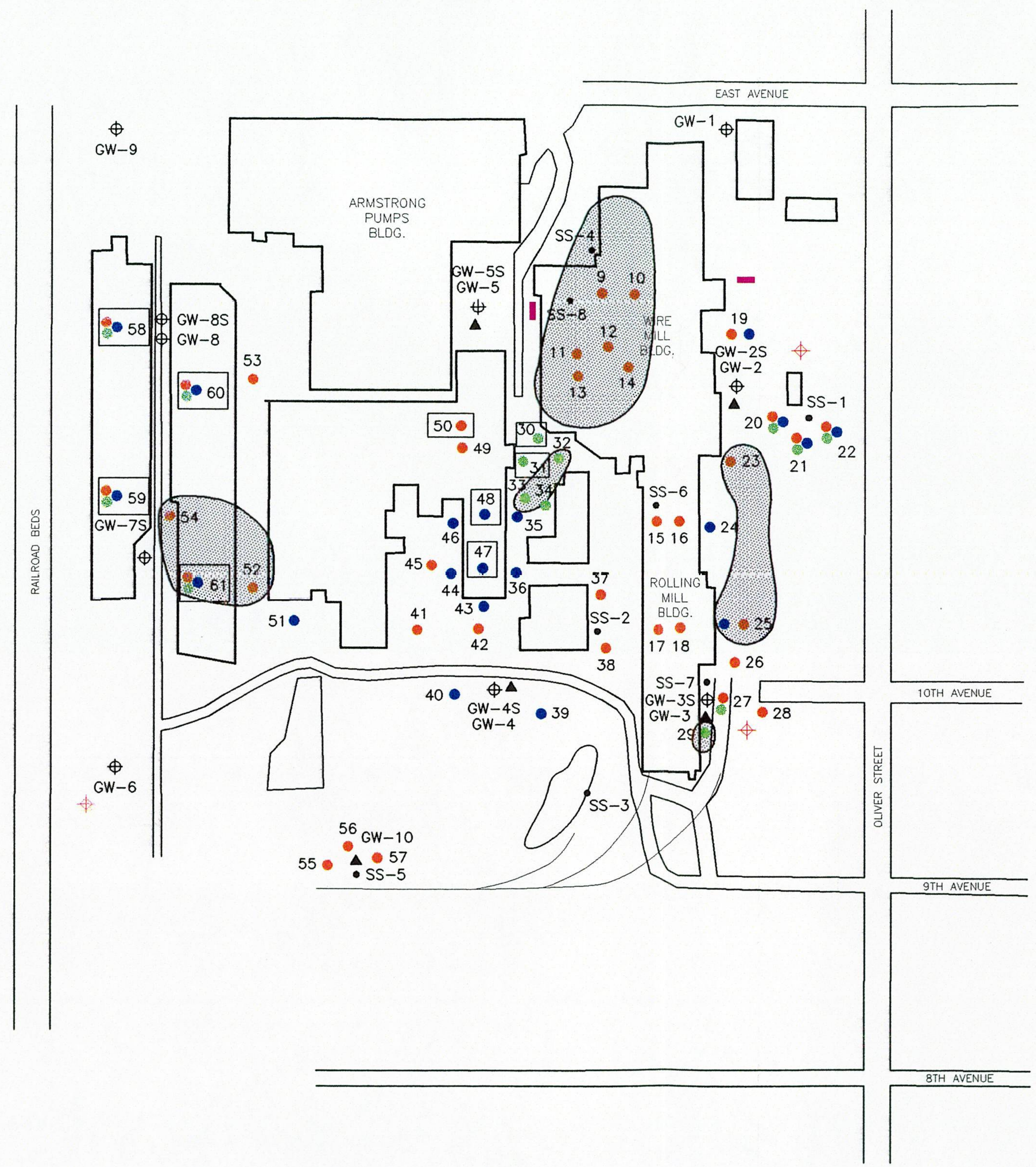


FIGURE 6
SHALLOW AQUIFER GROUNDWATER
FLOW PATTERNS



LEGEND

AREAS OF CONCERN

EXISTING MONITORING WELL

EXISTING SOIL SURFACE SAMPLE

PROPOSED MONITORING WELL

PROPOSED SURFACE SOIL SAMPLE – METALS

PROPOSED SURFACE SOIL SAMPLE – PAHs

PROPOSED SURFACE SOIL SAMPLE – PCBs

PROPOSED TEMPORARY GW SAMPLE LOCATION (UP TO 4 AT EACH LOCATION)

UNDERGROUND STORAGE TANK

61 NO SAMPLE COLLECTED

0 100' 200'

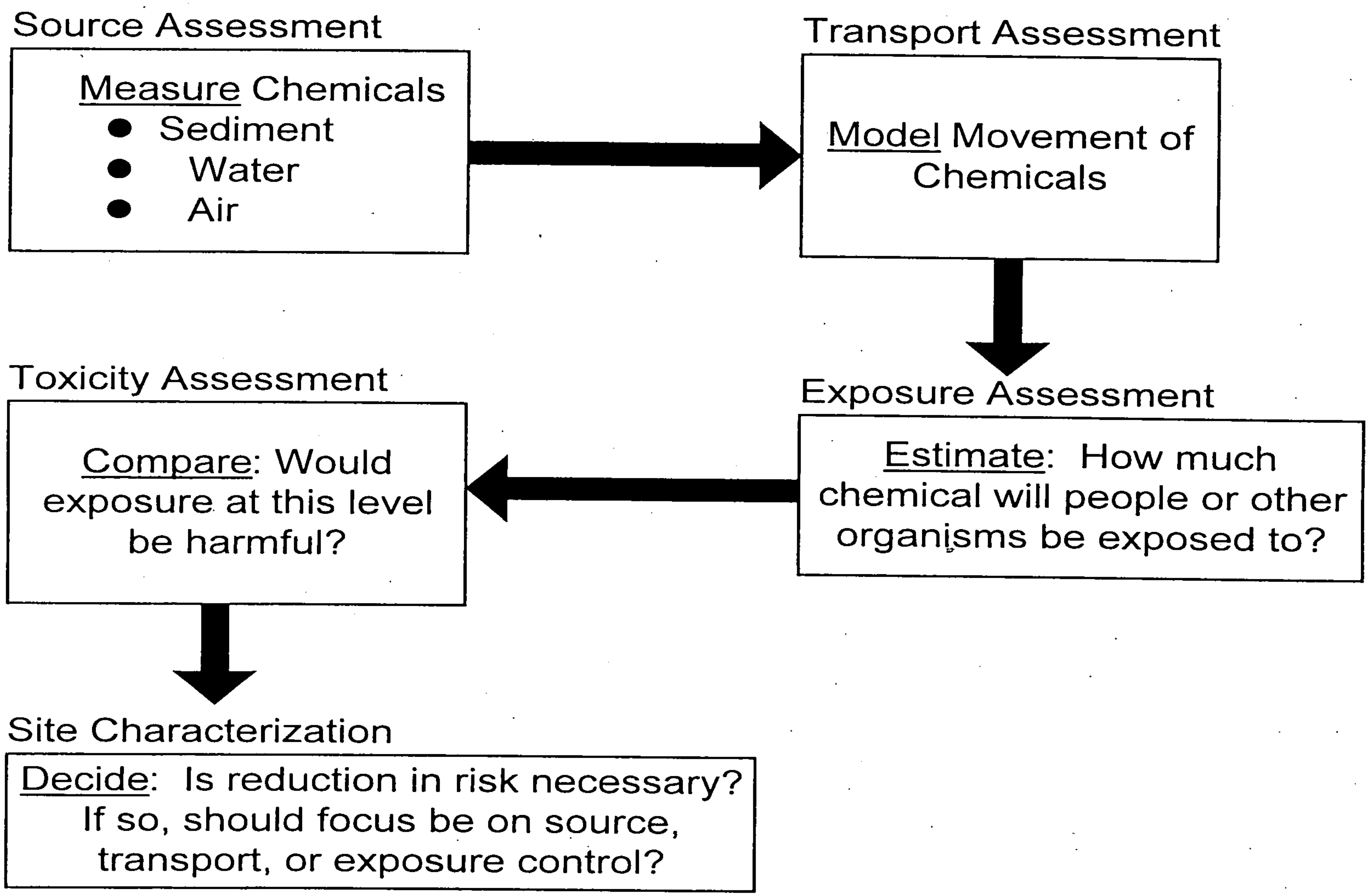
APPROXIMATE SCALE

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK
DATE: 1/99 JOB NO.: 80049FA

ROBLIN STEEL
CITY OF TONAWANDA, NY

FIGURE 7
SURFACE SOILS
AREAS OF CONCERN

99/06 DW REV. BY PME 4/6/00
FS2\DATA1\CADUSE\80049FA\80049_07.DWG

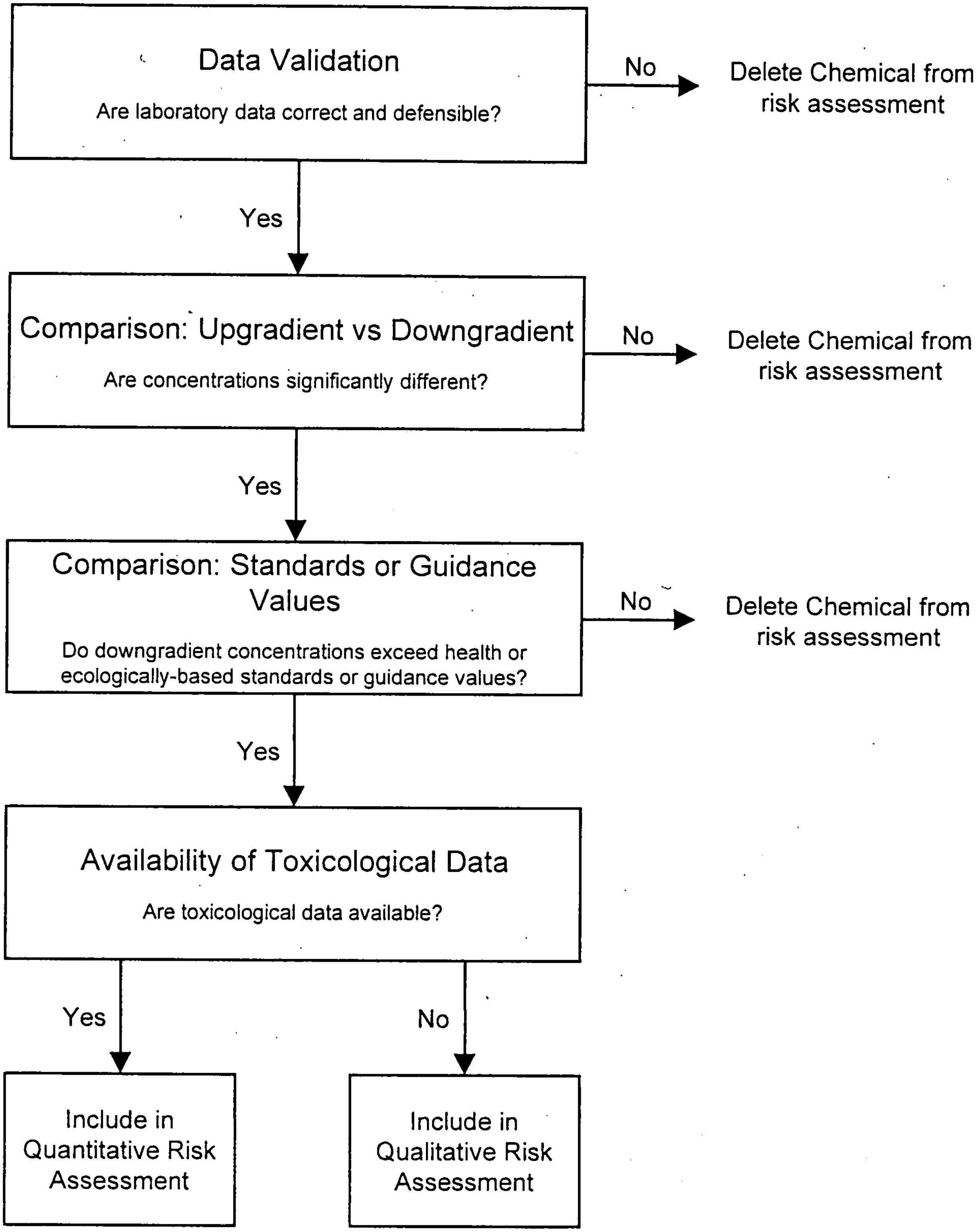


Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, NEW YORK

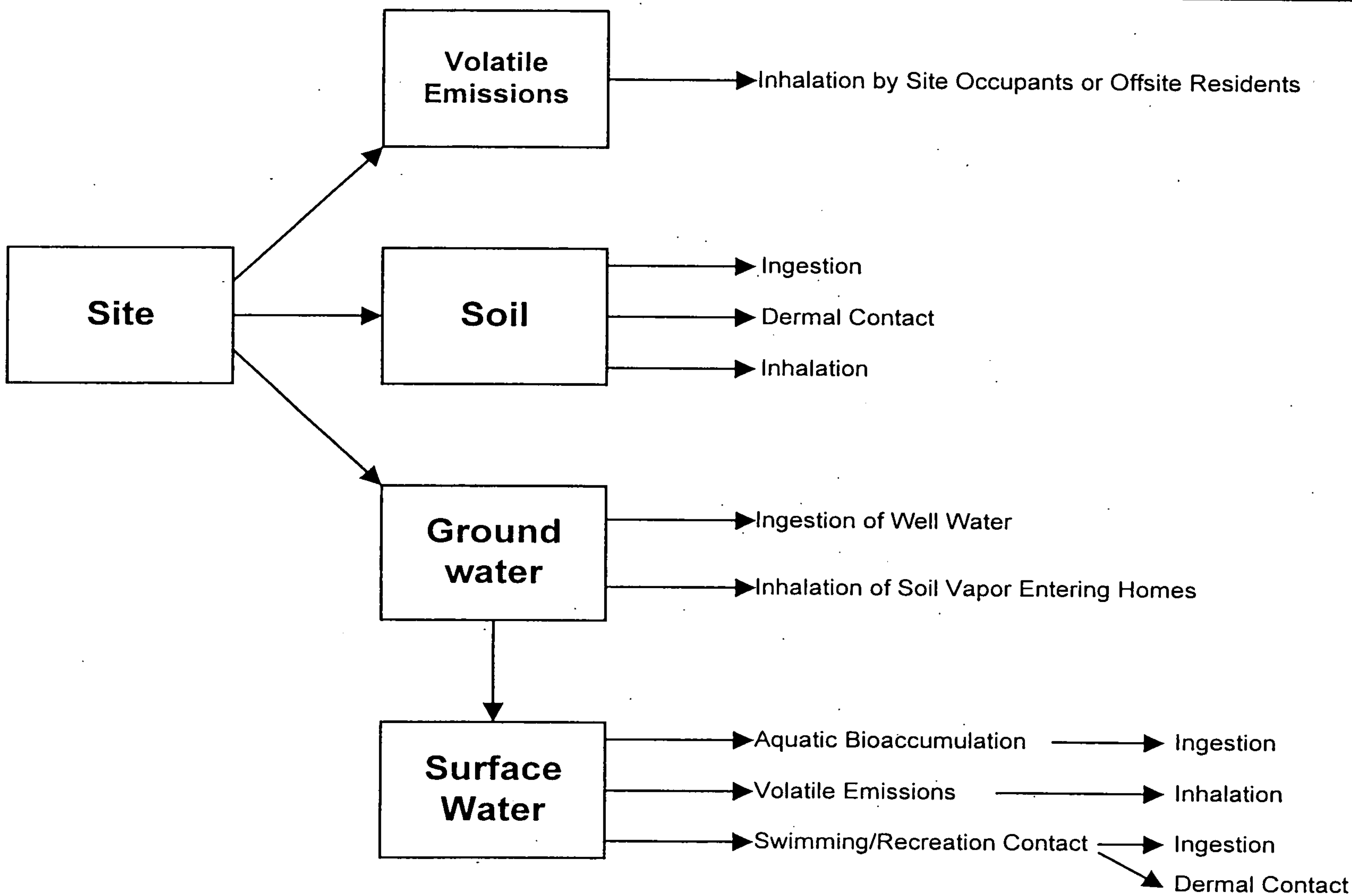
DATE: 3/99 JOB No. 80049FA

CITY OF NORTH TONAWANDA
ROBLIN STEEL SITE
SITE INVESTIGATION

FIGURE 8
RISK ASSESSMENT PROCESS



Stearns & Wheler, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, NEW YORK DATE: 3/99 JOB No. 80049FA	CITY OF NORTH TONAWANDA ROBLIN STEEL SITE SITE INVESTIGATION **FIGURE 9** **SCREENING PROCESS: GROUNDWATER DATA**



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CAZENOVIA, NEW YORK

DATE: 3/99 JOB No.80049FA

CITY OF NORTH TONAWANDA
ROBLIN STEEL SITE
SITE INVESTIGATION

FIGURE 10
SELECTION OF EXPOSURE PATHWAYS

APPENDICES

<u>APPENDIX A</u>

WELL LOGS

Boring/Well ID: GW-2S

Project Name: Roblin Steel
Job No: 80049
Start Date & Time: 11/10/98 1200
Finish Date & Time: 11/10/98 1400
Drilling Co: Parratt-Wolff
Driller: J. Percy
S&W Inspector: DSS
Drill Rig Type: Mobile B-56
Drilling Method: 4.25" HSA
Weather:

Groundwater Observations

Time:
Casing Depth:
Boring Depth: 15'
Depth to Water:
below surface ________ below meas. pt. ________
Surface Elevation:
Measuring Point Elevation:
Groundwater Elevation:

Sample Log Key: Sent for Lab Analysis
NAPL Key: NAPL Observed
Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Sample Description	Depth (ft)	Well Diagram	
1		0.4		1			Fill	1		Concrete Pad
2								2		
3								3		Bentonite
4								4		2" ID PVC
5		0.2		0.5			Moist, gray mottled, silty CLAY	5		Riser
6								6		
7								7		
8								8		#0 Sand Pack
9								9		
10		0		0.5				10		
11							Red-brown., very dense CLAY, saturated at 16.8'	11		2" ID, .01"
12								12		PVC Screen
13								13		
14								14		
15		0		2			Bottom of Boring	15		
16								16		
17								17		
18								18		
19								19		
20								20		
21								21		
22								22		
23								23		
24								24		
25								25		
26								26		
27								27		
28								28		
29								29		
30								30		

Boring/Well ID: GW-3

Project Name: Roblin Steel
Job No: 80049
Start Date & Time: 11/16/98 1300
Finish Date & Time: 11/18/98 1330
Drilling Co: Parratt-Wolff
Driller: J. Percy
S&W Inspector: SLG
Drill Rig Type: Mobile B-56
Drilling Method: 4.25" HSA
Weather:

Groundwater Observations

Time:
Casing Depth:
Boring Depth: 37'
Depth to Water:
below surface ______ below meas. pt. ______
Surface Elevation:
Measuring Point Elevation:
Groundwater Elevation:

Sample Log Key: ■ Sent for Lab Analysis
NAPL Key: ▨ NAPL Observed
▼ Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Sample Description	Depth (ft)	Well Diagram	
1							Fill	1		Concrete Pad
2								2		
3								3		
4							Dry, mottled gray SILT grading to wet rust/gray mottled SILT	4		4" steel casing
5							and f SAND	5		to 18'
6								6		
7								7		
8								8		Grout
9								9		
10								10		
11							Dry, gray, medium dense CLAY	11		
12								12		
13								13		
14								14		2" ID PVC
15								15		Riser
16							Moist, red CLAY	16		
17								17		
18								18		
19								19		
20								20		
21								21		
22								22		
23								23		
24								24		
25								25		
26								26		
27								27		Bentonite
28								28		Pellets
29							Dry, red, f sandy SILT, some m-c angular gravel (till)	29		#0 Sand Pack
30								30		

Boring/Well ID: GW-3

Sample Log Key: Sent for Lab Analysis
NAPL Key: NAPL Observed
Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Description	Depth (ft)	Well Diagram	
31								31		
32								32		
33								33		
34							Dry, red, f sandy SILT, some m-c angular gravel (till)	34		2" ID, .01"
35								35		PVC Screen
36								36		
37								37		
38								38		
39								39		
40								40		
41							Bottom of Boring	41		
42								42		
43								43		
44								44		
45								45		
46								46		
47								47		
48								48		
49								49		
50								50		
51								51		
52								52		
53								53		
54								54		
55								55		
56								56		
57								57		
58								58		
59								59		
60								60		
61								61		
62								62		
63								63		
64								64		
65								65		

Boring/Well ID: GW-4S

Project Name: Roblin Steel
Job No: 80049
Start Date & Time: 11/11/98 0900
Finish Date & Time: 11/11/98 1030
Drilling Co: Parratt-Wolff
Driller: J. Percy
S&W Inspector: DSS
Drill Rig Type: Mobile B-56
Drilling Method: 4.25" HSA
Weather:

Groundwater Observations

Time:
Casing Depth:
Boring Depth: 15'
Depth to Water:
below surface ______ below meas. pt. ______
Surface Elevation:
Measuring Point Elevation:
Groundwater Elevation:

Sample Log Key: Sent for Lab Analysis
NAPL Key: NAPL Observed
Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Sample Description	Depth (ft)	Well Diagram	
1							Fill	1		Concrete Pad
2								2		
3								3		Bentonite
4								4		2" ID PVC
5								5		Riser
6								6		
7							Moist, gray,mottled, silty CLAY	7		
8								8		
9								9		#0 Sand Pack
10								10		
11								11		
12								12		2" ID, .01"
13								13		PVC Screen
14								14		
15								15		
16								16		
17							Wet, brown, soft, CLAY	17		
18								18		
19								19		
20								20		
21								21		
22								22		
23								23		
24								24		
25								25		
26							Moist, red, dense, SILT and SAND (till)	26		
27								27		
28								28		
29								29		
30								30		

Boring/Well ID: GW-4

Project Name: Roblin Steel
Job No: 80049
Start Date & Time: 11/12/98 1300
Finish Date & Time: 11/12/98 1730
Drilling Co: Parratt-Wolff
Driller: J. Percy
S&W Inspector: SLG
Drill Rig Type: Mobile B-56
Drilling Method: 4.25" HSA
Weather:

Groundwater Observations

Time:
Casing Depth:
Boring Depth: 15'
Depth to Water:
below surface ______ below meas. pt. ______
Surface Elevation:
Measuring Point Elevation:
Groundwater Elevation:

Sample Log Key: ■ Sent for Lab Analysis
NAPL Key: ▨ NAPL Observed
▼ Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Sample Description	Depth (ft)	Well Diagram	
1							Fill	1		Concrete Pad
2								2		
3								3		
4								4		
5								5		
6								6		
7							Moist, gray,mottled, silty CLAY	7		
8								8		Grout
9								9		
10								10		
11								11		
12								12		
13								13		
14								14		2" ID PVC
15								15		Riser
16								16		
17							Wet, brown, soft, CLAY	17		
18								18		
19								19		
20								20		
21								21		
22								22		
23								23		
24								24		
25								25		Bentonite
26							Moist, red, dense, SILT and SAND (till)	26		Pellets
27								27		
28								28		
29								29		#0 Sand Pack
30								30		

Boring/Well ID: GW-4

Sample Log Key: ■ Sent for Lab Analysis
NAPL Key: ▨ NAPL Observed
▼ Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Description	Depth (ft)	Well Diagram
31								31	
32								32	
33								33	
34							Moist, red, dense, SILT and SAND (till)	34	2" ID, .01"
35								35	PVC Screen
36								36	
37								37	
38								38	
39							Bottom of Boring	39	
40								40	
41								41	
42								42	
43								43	
44								44	
45								45	
46								46	
47								47	
48								48	
49								49	
50								50	
51								51	
52								52	
53								53	
54								54	
55								55	
56								56	
57								57	
58								58	
59								59	
60								60	
61								61	
62								62	
63								63	
64								64	
65								65	

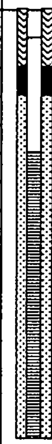
Boring/Well ID: GW-5S

Project Name: Roblin Steel
Job No: 80049
Start Date & Time: 11/11/98 1500
Finish Date & Time: 11/11/98 1530
Drilling Co: Parratt-Wolff
Driller: J. Percy
S&W Inspector: SLG
Drill Rig Type: Mobile B-56
Drilling Method: 4.25" HSA
Weather:

Groundwater Observations

Time:
Casing Depth:
Boring Depth: 15'
Depth to Water:
below surface ________ below meas. pt. ________
Surface Elevation:
Measuring Point Elevation:
Groundwater Elevation:

Sample Log Key: ■ Sent for Lab Analysis
NAPL Key: ▧ NAPL Observed
▼ Depth to Groundwater



Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Sample Description	Depth (ft)	Well Diagram	
1							Fill	1		Concrete Pad
2								2		
3								3		Bentonite
4							Strong, petroleum odor from 3 to 6 feet, evidence of impacted soil,	4		2" ID PVC
5							source unknown	5		Riser
6								6		
7								7		
8							Moist, gray,mottled, SILT	8		
9								9		#0 Sand Pack
10								10		
11								11		
12								12		2" ID, .01"
13								13		PVC Screen
14							Wet, brown, soft, CLAY	14		
15								15		
16								16		
17								17		
18							Bottom of Boring	18		
19								19		
20								20		
21								21		
22								22		
23								23		
24								24		
25								25		
26							Moist, red, dense, SILT and SAND (till)	26		
27								27		
28								28		
29								29		
30								30		

Boring/Well ID: GW-10S

Project Name: Roblin Steel
Job No: 80049
Start Date & Time: 11/13/98 1010
Finish Date & Time: 11/16/98 1110
Drilling Co: Parratt-Wolff
Driller: J. Percy
S&W Inspector: SLG
Drill Rig Type: Mobile B-56
Drilling Method: 4.25" HSA
Weather:

Groundwater Observations

Time:
Casing Depth:
Boring Depth: 15'
Depth to Water:
below surface ________ below meas. pt. ________
Surface Elevation:
Measuring Point Elevation:
Groundwater Elevation:

Sample Log Key: ■ Sent for Lab Analysis
NAPL Key: ▨ NAPL Observed
▼ Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Sample Description	Depth (ft)	Well Diagram	
1							Fill	1		Concrete Pad
2							Black grading to tan, moist sandy SILT, trace clay	2		
3								3		Bentonite
4								4		2" ID PVC
5							Brown mottled, wet, silty f SAND	5		Riser
6								6		
7								7		
8								8		
9								9		#0 Sand Pack
10								10		
11							Gray, reddish, damp, silty CLAY	11		
12								12		2" ID, .01"
13								13		PVC Screen
14								14		
15							Red, moist, soft, CLAY	15		
16								16		
17								17		
18							Bottom of Boring	18		
19								19		
20								20		
21								21		
22								22		
23								23		
24								24		
25								25		
26							Moist, red, dense, SILT and SAND (till)	26		
27								27		
28								28		
29								29		
30								30		

Boring/Well ID: GW-11S

Project Name: Roblin Steel
Job No: 80049
Start Date & Time: 11/16/98 1600
Finish Date & Time: 11/16/98 1715
Drilling Co: Parratt-Wolff
Driller: J. Percy
S&W Inspector: SLG
Drill Rig Type: Mobile B-56
Drilling Method: 4.25" HSA
Weather:

Groundwater Observations

Time:
Casing Depth:
Boring Depth: 15'
Depth to Water:
below surface ________ below meas. pt. ________
Surface Elevation:
Measuring Point Elevation:
Groundwater Elevation:

Sample Log Key: ■ Sent for Lab Analysis
NAPL Key: ▨ NAPL Observed
▼ Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Sample Description	Depth (ft)	Well Diagram	
1				2			Fill	1		Concrete Pad
2							Dry, gray mottled, SILT	2		
3								3		Bentonite
4								4		2" ID PVC
5				2				5		Riser
6							Wet, gray SILT	6		
7								7		
8								8		
9								9		#0 Sand Pack
10				2				10		
11							Dry, gray CLAY	11		
12								12		2" ID, .01"
13								13		PVC Screen
14								14		
15				2			Moist, gray, soft, CLAY	15		
16								16		
17								17		
18							Bottom of Boring	18		
19								19		
20								20		
21								21		
22								22		
23								23		
24								24		
25								25		
26							~~Moist~~, red, dense, ~~SILT and SAND (till)~~	26		
27								27		
28								28		
29								29		
30								30		

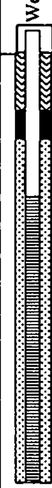
Boring/Well ID: GW-12S

Project Name: Roblin Steel
Job No: 80049
Start Date & Time: 11/19/98 0900
Finish Date & Time: 11/19/98 1015
Drilling Co: Parratt-Wolff
Driller: D. Richmond
S&W Inspector: SLG
Drill Rig Type: Mobile B-56
Drilling Method: 4.25" HSA
Weather:

Groundwater Observations

Time:
Casing Depth:
Boring Depth: 15'
Depth to Water:
below surface ________ below meas. pt. ________
Surface Elevation:
Measuring Point Elevation:
Groundwater Elevation:

Sample Log Key: ■ Sent for Lab Analysis
NAPL Key: ▨ NAPL Observed
▼ Depth to Groundwater



Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Sample Description	Depth (ft)	Well Diagram	
1		0		1.5			Fill	1		Concrete Pad
2								2		
3								3		Bentonite
4							Dry, mottled, sandy SILT	4		2" ID PVC
5		0		2				5		Riser
6								6		
7							Wet,mottled, sandy SILT	7		
8								8		#0 Sand Pack
9								9		
10		0		2				10		
11								11		2" ID, .01"
12								12		PVC Screen
13							Dry, red-gray, CLAY	13		
14								14		
15		0		2				15		
16							Dry, red-gray, CLAY	16		
17								17		
18							Bottom of Boring	18		
19								19		
20								20		
21								21		
22								22		
23								23		
24								24		
25								25		
26								26		
27								27		
28								28		
29								29		
30								30		

Boring/Well ID: GW-13

Project Name: Roblin Steel
Job No: 80049
Start Date & Time: 11/17/98 0900
Finish Date & Time: 11/17/98 1300
Drilling Co: Parratt-Wolff
Driller: J. Percy
S&W Inspector: SLG
Drill Rig Type: Mobile B-56
Drilling Method: 4.25" HSA
Weather:

Groundwater Observations

Time:
Casing Depth:
Boring Depth: 35'
Depth to Water:
below surface ________ below meas. pt. ________
Surface Elevation:
Measuring Point Elevation:
Groundwater Elevation:

Sample Log Key: ■ Sent for Lab Analysis
NAPL Key: ▨ NAPL Observed
▼ Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Sample Description	Depth (ft)	
1		0		1.5			Fill	1	Concrete Pad
2								2	
3								3	
4							Wet, mottled rust-gray SILT and f SAND	4	
5		0		2				5	
6								6	
7								7	
8								8	Grout
9								9	
10		0		2				10	
11							Dry, red, medium dense CLAY, trace silt	11	
12								12	
13								13	
14								14	2" ID PVC
15		0		2				15	Riser
16							Dry, red, medium dense CLAY, trace silt	16	
17								17	
18								18	
19								19	
20		0		2				20	
21							Wet, red, medium dense CLAY, trace silt	21	
22								22	Bentonite
23								23	Pellets
24								24	
25		0		2				25	
26							Moist-damp, red, f sandy SILT, some c subangular gravel (till)	26	
27								27	
28								28	
29								29	#0 Sand Pack
30		0		2				30	

Well Diagram

Boring/Well ID: GW-13

Sample Log Key: ■ Sent for Lab Analysis
NAPL Key: ▨ NAPL Observed
▼ Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology		Depth (ft)	Well Diagram
31								31	
32							Moist-damp, red, f sandy SILT, some c subangular gravel (till)	32	
33								33	
34								34	2" ID, .01"
35		0		2				35	PVC Screen
36							Bottom of Boring	36	
37								37	
38								38	
39								39	
40								40	
41								41	
42								42	
43								43	
44								44	
45								45	
46								46	
47								47	
48								48	
49								49	
50								50	
51								51	
52								52	
53								53	
54								54	
55								55	
56								56	
57								57	
58								58	
59								59	
60								60	
61								61	
62								62	
63								63	
64								64	
65								65	

Boring/Well ID: GW-14

Project Name: Roblin Steel	**Groundwater Observations**
Job No: 80049	Time:
Start Date & Time: 11/17/98 1330	Casing Depth:
Finish Date & Time: 11/17/98 1800	Boring Depth: 35'
Drilling Co: Parratt-Wolff	Depth to Water:
Driller: D. Richmond	below surface / below meas. pt.
S&W Inspector: SLG	Surface Elevation:
Drill Rig Type: Mobile B-56	Measuring Point Elevation:
Drilling Method: 4.25" HSA	Groundwater Elevation:
Weather:	

Sample Log Key: ■ Sent for Lab Analysis
NAPL Key: ▨ NAPL Observed
▼ Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Sample Description	Depth (ft)	Well Diagram	
1							Fill	1		Concrete Pad
2								2		
3								3		
4							Moist, gray mottled, silty CLAY	4		
5								5		
6								6		
7								7		
8								8		Grout
9								9		
10								10		
11							Red-brown, very dense CLAY, saturated at 16.8'	11		
12								12		
13								13		
14								14		2" ID PVC
15								15		Riser
16								16		
17								17		
18								18		
19								19		
20		0		2				20		
21							Wet, red-brown, CLAY	21		
22								22		Bentonite
23								23		Pellets
24								24		
25		0		2				25		
26							Wet, red-brown, CLAY	26	#	
27								27	#	
28								28		
29								29		#0 Sand Pack
30		0		2				30		

Boring/Well ID: GW-14

Sample Log Key: ▬ Sent for Lab Analysis
NAPL Key: ▨ NAPL Observed
▼ Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Description	Depth (ft)	Well Diagram
31								31	
32							Red, wet, f sandy SILT, some to little m gravel (till)	32	
33								33	
34								34	2" ID, .01"
35		0		2				35	PVC Screen
36							Red, wet, f SAND and SILT, some to little m gravel (till)	36	
37								37	
38							Bottom of Boring	38	
39								39	
40								40	
41								41	
42								42	
43								43	
44								44	
45								45	
46								46	
47								47	
48								48	
49								49	
50								50	
51								51	
52								52	
53								53	
54								54	
55								55	
56								56	
57								57	
58								58	
59								59	
60								60	
61								61	
62								62	
63								63	
64								64	
65								65	

Boring/Well ID: GW-16S

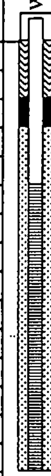
Project Name: Roblin Steel
Job No: 80049
Start Date & Time: 11/18/98 1430
Finish Date & Time: 11/18/98 1515
Drilling Co: Parratt-Wolff
Driller: D. Richmond
S&W Inspector: SLG
Drill Rig Type: Mobile B-56
Drilling Method: 4.25" HSA
Weather:

Groundwater Observations

Time:
Casing Depth:
Boring Depth: 15'
Depth to Water:
below surface ________ below meas. pt. ________
Surface Elevation:
Measuring Point Elevation:
Groundwater Elevation:

Sample Log Key: Sent for Lab Analysis
NAPL Key: NAPL Observed
Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Sample Description	Depth (ft)	Well Diagram
1		0.4		1			Fill	1	Concrete Pad
2								2	
3								3	Bentonite
4								4	2" ID PVC
5		0.2		0.5			Damp, tan, sandy SILT	5	Riser
6								6	
7								7	
8								8	#0 Sand Pack
9								9	
10		0		0.5				10	
11								11	2" ID, .01"
12								12	PVC Screen
13							Dry, gray, CLAY	13	
14							STARS sample collected here	14	
15		0		2				15	
16							Wet, gray, CLAY	16	
17								17	
18							Bottom of Boring	18	
19								19	
20								20	
21								21	
22								22	
23								23	
24								24	
25								25	
26								26	
27								27	
28								28	
29								29	
30								30	



Boring/Well ID: GW-17S

Project Name: Roblin Steel
Job No: 80049
Start Date & Time: 11/18/98 1515
Finish Date & Time: 11/18/98 1615
Drilling Co: Parratt-Wolff
Driller: D. Richmond
S&W Inspector: SLG
Drill Rig Type: Mobile B-56
Drilling Method: 4.25" HSA
Weather:

Groundwater Observations

Time:
Casing Depth:
Boring Depth: 15'
Depth to Water:
below surface ________ below meas. pt. ________
Surface Elevation:
Measuring Point Elevation:
Groundwater Elevation:

Sample Log Key: ■ Sent for Lab Analysis
NAPL Key: ▨ NAPL Observed
▼ Depth to Groundwater

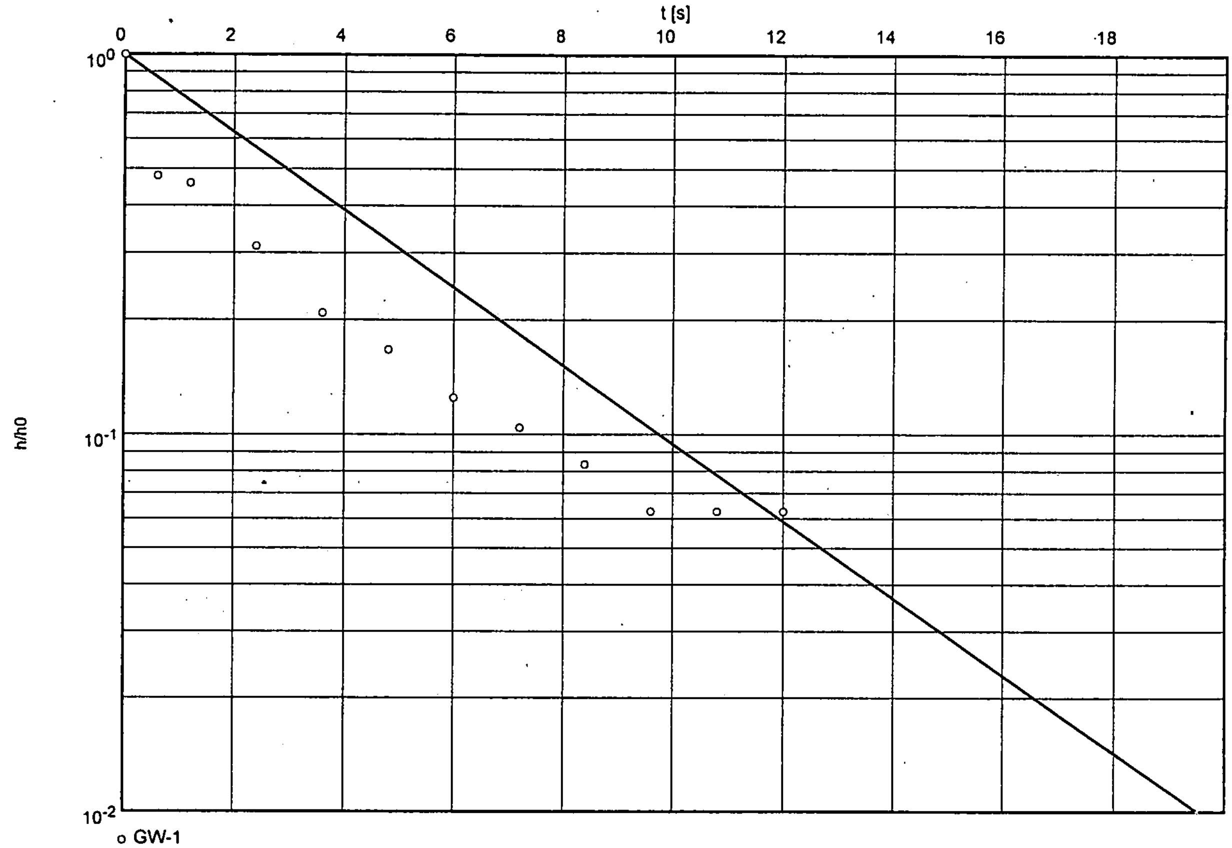
Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (ft)	NAPL	Lithology	Sample Description	Depth (ft)	Well Diagram	
1		0		1.5			Fill	1		Concrete Pad
2								2		
3								3		Bentonite
4								4		2" ID PVC
5		0	■	2			Gray-green, wet, f sandy SILT, strong petroleum odor	5		Riser
6			■				STARS sample collected here	6		
7			■					7		
8								8		#0 Sand Pack
9								9		
10		0		2				10		
11								11		2" ID, .01"
12								12		PVC Screen
13							Moist, red-brown CLAY	13		
14								14		
15		0		NR				15		
16							Wet, red-brown CLAY	16		
17								17		
18							Bottom of Boring	18		
19								19		
20								20		
21								21		
22								22		
23								23		
24								24		
25								25		
26								26		
27								27		
28								28		
29								29		
30								30		

APPENDIX B

SLUG TEST RESULTS

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 13.01.1999	Page 1
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/11/99
GW-1	



Hydraulic conductivity [cm/s]: 5.99×10^{-3}

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 13.01.1999	Page 2
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/11/99
GW-1	GW-1

Static water level: 100.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	93.58	-6.42	
2	0.01	93.83	-6.17	
3	0.02	94.28	-5.72	
4	0.03	93.99	-6.01	
5	0.04	94.21	-5.79	
6	0.05	94.02	-5.98	
7	0.06	94.16	-5.84	
8	0.07	94.05	-5.95	
9	0.08	94.14	-5.86	
10	0.09	94.06	-5.94	
11	0.10	94.12	-5.88	
12	0.11	94.07	-5.93	
13	0.12	94.11	-5.89	
14	0.13	94.08	-5.92	
15	0.14	94.10	-5.90	
16	0.15	94.08	-5.92	
17	0.16	94.09	-5.91	
18	0.17	94.08	-5.92	
19	0.18	94.09	-5.91	
20	0.19	94.08	-5.92	
21	0.20	94.09	-5.91	
22	0.21	94.08	-5.92	
23	0.22	94.08	-5.92	
24	0.23	94.08	-5.92	
25	0.24	94.08	-5.92	
26	0.25	94.08	-5.92	
27	0.26	94.08	-5.92	
28	0.27	94.08	-5.92	
29	0.28	94.08	-5.92	
30	0.29	94.08	-5.92	
31	0.30	94.08	-5.92	
32	0.31	94.08	-5.92	
33	0.32	94.08	-5.92	
34	0.33	94.08	-5.92	
35	0.35	94.08	-5.92	
36	0.37	94.08	-5.92	
37	0.38	94.08	-5.92	
38	0.40	94.08	-5.92	
39	0.42	94.07	-5.93	
40	0.43	94.07	-5.93	
41	0.45	94.07	-5.93	
42	0.47	94.07	-5.93	
43	0.48	94.07	-5.93	
44	0.50	94.07	-5.93	
45	0.52	94.07	-5.93	
46	0.53	94.07	-5.93	
47	0.55	94.07	-5.93	
48	0.57	94.07	-5.93	
49	0.58	94.07	-5.93	
50	0.60	94.07	-5.93	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 13.01.1999	Page 3
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/11/99
GW-1	GW-1

Static water level: 100.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	0.62	94.07	-5.93	
52	0.63	94.07	-5.93	
53	0.65	94.07	-5.93	
54	0.67	94.07	-5.93	
55	0.68	94.07	-5.93	
56	0.70	94.07	-5.93	
57	0.72	94.07	-5.93	
58	0.73	94.07	-5.93	
59	0.75	94.07	-5.93	
60	0.77	94.07	-5.93	
61	0.78	94.07	-5.93	
62	0.80	94.07	-5.93	
63	0.82	94.07	-5.93	
64	0.83	94.07	-5.93	
65	0.85	94.07	-5.93	
66	0.87	94.07	-5.93	
67	0.88	94.07	-5.93	
68	0.90	94.07	-5.93	
69	0.92	94.07	-5.93	
70	0.93	94.07	-5.93	
71	0.95	94.07	-5.93	
72	0.97	94.07	-5.93	
73	0.98	94.07	-5.93	
74	1.00	94.07	-5.93	
75	1.20	94.06	-5.94	
76	1.40	94.06	-5.94	
77	1.60	94.06	-5.94	
78	1.80	94.06	-5.94	
79	2.00	94.06	-5.94	
80	2.20	94.06	-5.94	
81	2.40	94.06	-5.94	
82	2.60	94.06	-5.94	
83	2.80	94.06	-5.94	
84	3.00	94.06	-5.94	
85	3.20	94.06	-5.94	
86	3.40	94.06	-5.94	
87	3.60	94.06	-5.94	
88	3.80	94.06	-5.94	
89	4.00	94.06	-5.94	
90	4.20	94.06	-5.94	
91	4.40	94.06	-5.94	
92	4.60	94.06	-5.94	
93	4.80	94.06	-5.94	
94	5.00	94.06	-5.94	
95	5.20	94.06	-5.94	
96	5.40	94.06	-5.94	
97	5.60	94.06	-5.94	
98	5.80	94.06	-5.94	
99	6.00	94.06	-5.94	
100	6.20	94.06	-5.94	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 13.01.1999	Page 4
		Project: Roblin Steel	
		Evaluated by: SLG	

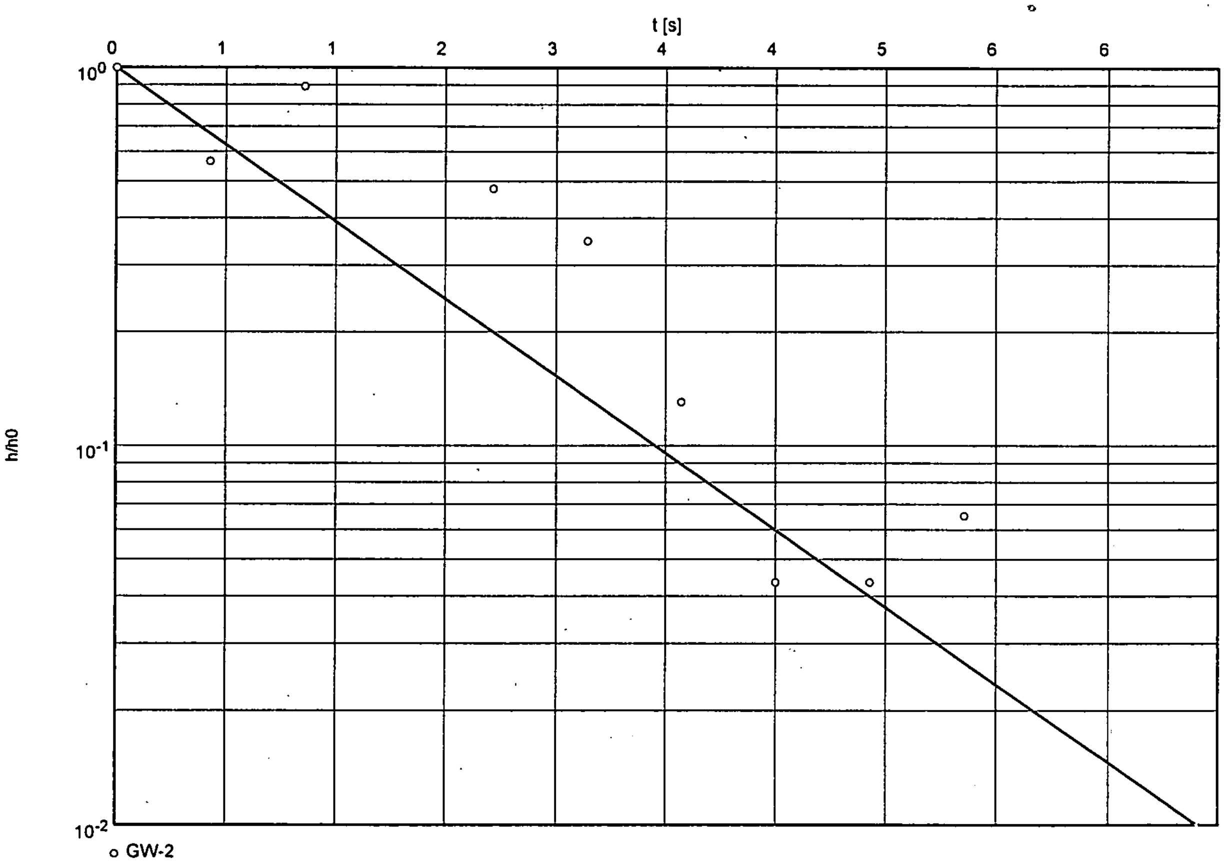
Slug Test No.	Test conducted on: 1/11/99
GW-1	GW-1

Static water level: 100.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	6.40	94.06	-5.94	
102	6.60	94.06	-5.94	
103	6.80	94.06	-5.94	
104	7.00	94.06	-5.94	
105	7.20	94.06	-5.94	
106	7.40	94.06	-5.94	
107	7.60	94.06	-5.94	
108	7.80	94.06	-5.94	
109	8.00	94.06	-5.94	
110	8.20	94.06	-5.94	
111	8.40	94.06	-5.94	
112	8.60	94.06	-5.94	
113	8.80	94.06	-5.94	
114	9.00	94.06	-5.94	
115	9.20	94.06	-5.94	
116	9.40	94.06	-5.94	
117	9.60	94.06	-5.94	
118	9.80	94.06	-5.94	
119	10.00	94.06	-5.94	
120	12.00	94.06	-5.94	
121	14.00	94.06	-5.94	
122	16.00	94.06	-5.94	
123	18.00	94.06	-5.94	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 13.01.1999 — Page 1 Project: Roblin Steel Evaluated by: SLG

Slug Test No.	Test conducted on: 1/12/99
GW-2	



Hydraulic conductivity [cm/s]: 1.70×10^{-2}

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 13.01.1999	Page 2
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-2	GW-2

Static water level: 100.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	99.54	-0.46	
2	0.01	99.74	-0.26	
3	0.02	99.59	-0.41	
4	0.03	100.06	0.06	
5	0.04	100.22	0.22	
6	0.05	100.16	0.16	
7	0.06	100.06	0.06	
8	0.07	100.02	0.02	
9	0.08	100.02	0.02	
10	0.09	100.03	0.03	
11	0.10	100.04	0.04	
12	0.11	100.04	0.04	
13	0.12	100.04	0.04	
14	0.13	100.03	0.03	
15	0.14	100.03	0.03	
16	0.15	100.03	0.03	
17	0.16	100.03	0.03	
18	0.17	100.03	0.03	
19	0.18	100.03	0.03	
20	0.19	100.03	0.03	
21	0.20	100.03	0.03	
22	0.21	100.03	0.03	
23	0.22	100.03	0.03	
24	0.23	100.03	0.03	
25	0.24	100.03	0.03	
26	0.25	100.03	0.03	
27	0.26	100.03	0.03	
28	0.27	100.03	0.03	
29	0.28	100.03	0.03	
30	0.29	100.03	0.03	
31	0.30	100.03	0.03	
32	0.31	100.03	0.03	
33	0.32	100.03	0.03	
34	0.33	100.03	0.03	
35	0.35	100.03	0.03	
36	0.37	100.03	0.03	
37	0.38	100.03	0.03	
38	0.40	100.03	0.03	
39	0.42	100.03	0.03	
40	0.43	100.03	0.03	
41	0.45	100.03	0.03	
42	0.47	100.03	0.03	
43	0.48	100.02	0.02	
44	0.50	100.02	0.02	
45	0.52	100.02	0.02	
46	0.53	100.02	0.02	
47	0.55	100.02	0.02	
48	0.57	100.02	0.02	
49	0.58	100.02	0.02	
50	0.60	100.02	0.02	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 13.01.1999	Page 3
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-2	GW-2

Static water level: 100.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	0.62	100.02	0.02	
52	0.63	100.02	0.02	
53	0.65	100.02	0.02	
54	0.67	100.02	0.02	
55	0.68	100.02	0.02	
56	0.70	100.02	0.02	
57	0.72	100.02	0.02	
58	0.73	100.02	0.02	
59	0.75	100.02	0.02	
60	0.77	100.02	0.02	
61	0.78	100.02	0.02	
62	0.80	100.02	0.02	
63	0.82	100.02	0.02	
64	0.83	100.02	0.02	
65	0.85	100.02	0.02	
66	0.87	100.02	0.02	
67	0.88	100.02	0.02	
68	0.90	100.02	0.02	
69	0.92	100.02	0.02	
70	0.93	100.02	0.02	
71	0.95	100.02	0.02	
72	0.97	100.02	0.02	
73	0.98	100.02	0.02	
74	1.00	100.02	0.02	
75	1.20	100.02	0.02	
76	1.40	100.02	0.02	
77	1.60	100.02	0.02	
78	1.80	100.02	0.02	
79	2.00	100.02	0.02	
80	2.20	100.01	0.01	
81	2.40	100.01	0.01	
82	2.60	100.01	0.01	
83	2.80	100.01	0.01	
84	3.00	100.01	0.01	
85	3.20	100.01	0.01	
86	3.40	100.01	0.01	
87	3.60	100.01	0.01	
88	3.80	100.01	0.01	
89	4.00	100.01	0.01	
90	4.20	100.01	0.01	
91	4.40	100.01	0.01	
92	4.60	100.01	0.01	
93	4.80	100.01	0.01	
94	5.00	100.01	0.01	
95	5.20	100.01	0.01	
96	5.40	100.01	0.01	
97	5.60	100.01	0.01	
98	5.80	100.01	0.01	
99	6.00	100.01	0.01	
100	6.20	100.01	0.01	

STEARNS & WHELER, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, N.Y.
(315) 655-8161

slug/bail test analysis
BOUWER-RICE's method

Date: 13.01.1999

Project: Roblin Steel
Evaluated by: SLG

Slug Test No. GW-2

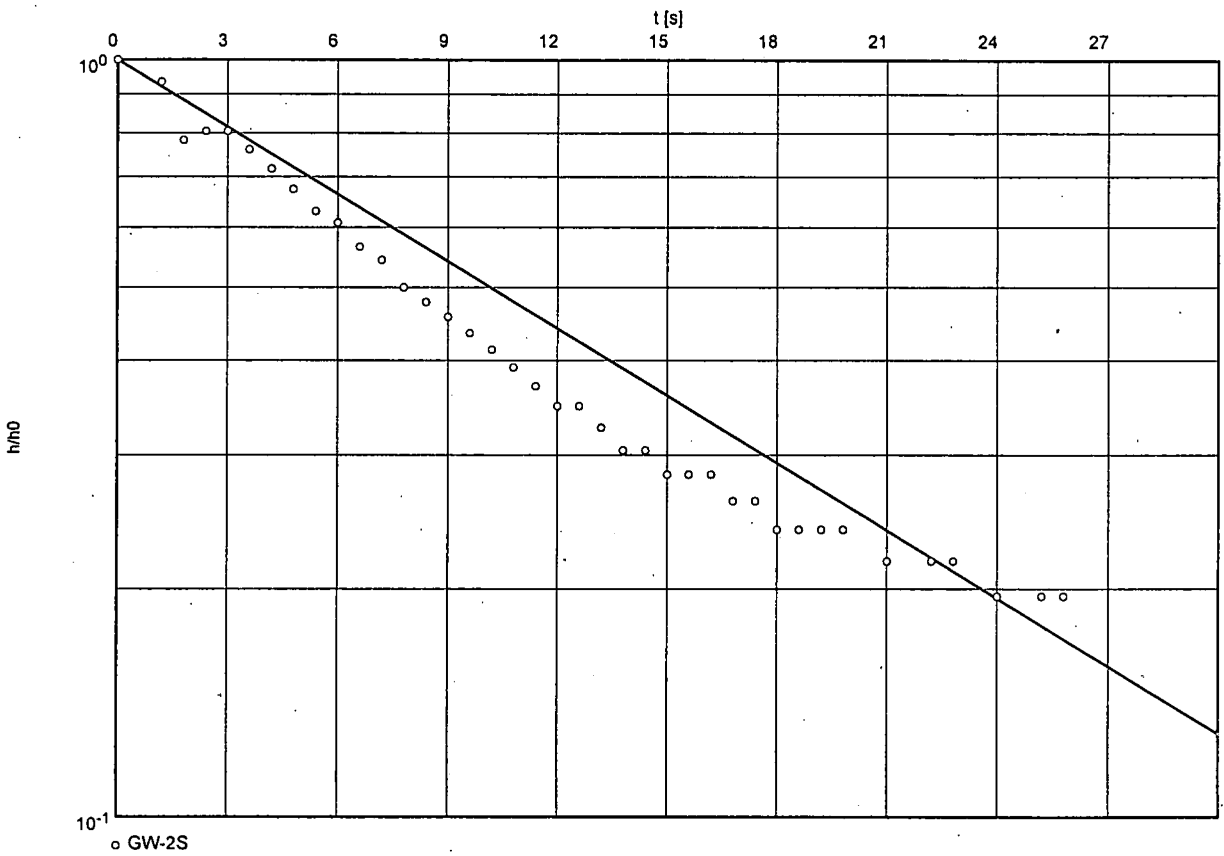
Test conducted on: 1/12/99
GW-2

Static water level: 100.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	6.40	100.01	0.01	
102	6.60	100.01	0.01	
103	6.80	100.01	0.01	
104	7.00	100.01	0.01	
105	7.20	100.01	0.01	
106	7.40	100.01	0.01	
107	7.60	100.01	0.01	
108	7.80	100.01	0.01	
109	8.00	100.01	0.01	
110	8.20	100.01	0.01	
111	8.40	100.01	0.01	
112	8.60	100.00	0.00	
113	8.80	100.00	0.00	
114	9.00	100.00	0.00	
115	9.20	100.00	0.00	
116	9.40	100.00	0.00	
117	9.60	100.00	0.00	
118	9.80	100.00	0.00	
119	10.00	100.00	0.00	
120	12.00	100.00	0.00	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 13.01.1999	Page 1
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-2S	



Hydraulic conductivity [cm/s]: 1.87×10^{-3}

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 13.01.1999	Page 2
		Project: Roblin Steel	
		Evaluated by: SLG	

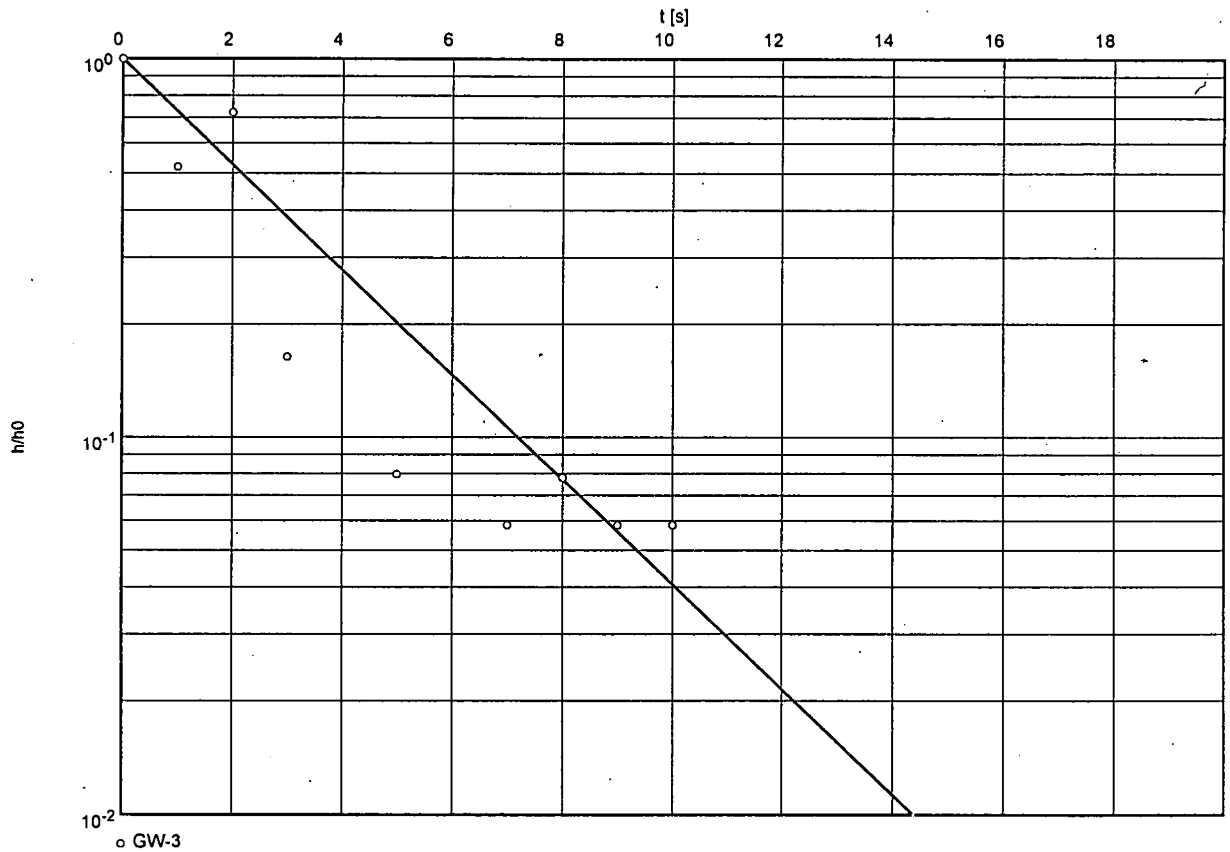
Slug Test No.	Test conducted on: 1/12/99
GW-2S	GW-2S

Static water level: 100.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	100.46	0.46	
2	0.02	100.43	0.43	
3	0.03	100.36	0.36	
4	0.04	100.37	0.37	
5	0.05	100.37	0.37	
6	0.06	100.35	0.35	
7	0.07	100.33	0.33	
8	0.08	100.31	0.31	
9	0.09	100.29	0.29	
10	0.10	100.28	0.28	
11	0.11	100.26	0.26	
12	0.12	100.25	0.25	
13	0.13	100.23	0.23	
14	0.14	100.22	0.22	
15	0.15	100.21	0.21	
16	0.16	100.20	0.20	
17	0.17	100.19	0.19	
18	0.18	100.18	0.18	
19	0.19	100.17	0.17	
20	0.20	100.16	0.16	
21	0.21	100.16	0.16	
22	0.22	100.15	0.15	
23	0.23	100.14	0.14	
24	0.24	100.14	0.14	
25	0.25	100.13	0.13	
26	0.26	100.13	0.13	
27	0.27	100.13	0.13	
28	0.28	100.12	0.12	
29	0.29	100.12	0.12	
30	0.30	100.11	0.11	
31	0.31	100.11	0.11	
32	0.32	100.11	0.11	
33	0.33	100.11	0.11	
34	0.35	100.10	0.10	
35	0.37	100.10	0.10	
36	0.38	100.10	0.10	
37	0.40	100.09	0.09	
38	0.42	100.09	0.09	
39	0.43	100.09	0.09	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 13.01.1999	Page 1
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-3	



Hydraulic conductivity [cm/s]: 8.13×10^{-3}

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 13.01.1999	Page 2
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-3	GW-3

Static water level: 98.36 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	97.86	-0.50	
2	0.00	97.91	-0.45	
3	0.01	98.10	-0.26	
4	0.01	98.10	-0.26	
5	0.01	98.49	0.13	
6	0.02	98.52	0.16	
7	0.02	98.52	0.16	
8	0.02	98.26	-0.10	
9	0.03	98.72	0.36	
10	0.03	98.72	0.36	
11	0.03	98.18	-0.18	
12	0.04	98.58	0.22	
13	0.04	98.58	0.22	
14	0.04	98.20	-0.16	
15	0.05	98.44	0.08	
16	0.05	98.44	0.08	
17	0.05	98.28	-0.08	
18	0.06	98.36	-0.00	
19	0.06	98.36	0.00	
20	0.06	98.35	-0.01	
21	0.07	98.32	-0.04	
22	0.07	98.32	-0.04	
23	0.07	98.41	0.05	
24	0.08	98.32	-0.04	
25	0.08	98.32	-0.04	
26	0.08	98.43	0.07	
27	0.09	98.34	-0.02	
28	0.09	98.34	-0.02	
29	0.09	98.43	0.07	
30	0.10	98.37	0.01	
31	0.10	98.36	0.01	
32	0.10	98.42	0.06	
33	0.11	98.39	0.03	
34	0.11	98.39	0.03	
35	0.11	98.40	0.04	
36	0.12	98.40	0.04	
37	0.12	98.40	0.04	
38	0.12	98.39	0.03	
39	0.13	98.40	0.04	
40	0.13	98.40	0.04	
41	0.13	98.38	0.02	
42	0.14	98.40	0.04	
43	0.14	98.40	0.04	
44	0.14	98.38	0.02	
45	0.15	98.39	0.03	
46	0.15	98.39	0.03	
47	0.15	98.38	0.02	
48	0.16	98.39	0.03	
49	0.16	98.39	0.03	
50	0.16	98.38	0.02	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 13.01.1999	Page 3
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-3	GW-3

Static water level: 98.36 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	0.17	98.38	0.02	
52	0.17	98.39	0.03	
53	0.17	98.38	0.02	
54	0.18	98.38	0.02	
55	0.18	98.39	0.03	
56	0.18	98.39	0.03	
57	0.19	98.38	0.02	
58	0.19	98.39	0.03	
59	0.19	98.39	0.03	
60	0.20	98.38	0.02	
61	0.20	98.38	0.02	
62	0.20	98.39	0.03	
63	0.21	98.38	0.02	
64	0.21	98.38	0.02	
65	0.21	98.39	0.03	
66	0.22	98.38	0.02	
67	0.22	98.38	0.02	
68	0.22	98.38	0.02	
69	0.23	98.38	0.02	
70	0.23	98.38	0.02	
71	0.23	98.38	0.02	
72	0.24	98.38	0.02	
73	0.24	98.38	0.02	
74	0.24	98.38	0.02	
75	0.25	98.38	0.02	
76	0.25	98.38	0.02	
77	0.25	98.38	0.02	
78	0.26	98.38	0.02	
79	0.26	98.38	0.02	
80	0.26	98.38	0.02	
81	0.27	98.38	0.02	
82	0.27	98.38	0.02	
83	0.27	98.38	0.02	
84	0.28	98.38	0.02	
85	0.28	98.38	0.02	
86	0.28	98.38	0.02	
87	0.29	98.38	0.02	
88	0.29	98.38	0.02	
89	0.29	98.38	0.02	
90	0.30	98.38	0.02	
91	0.30	98.38	0.02	
92	0.30	98.38	0.02	
93	0.31	98.38	0.02	
94	0.31	98.38	0.02	
95	0.31	98.38	0.02	
96	0.32	98.38	0.02	
97	0.32	98.38	0.02	
98	0.32	98.38	0.02	
99	0.33	98.38	0.02	
100	0.33	98.38	0.02	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 13.01.1999	Page 4
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-3	GW-3

Static water level: 98.36 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	0.33	98.38	0.02	
102	0.35	98.38	0.02	
103	0.37	98.38	0.02	
104	0.38	98.38	0.02	
105	0.40	98.38	0.02	
106	0.42	98.38	0.02	
107	0.43	98.38	0.02	
108	0.45	98.38	0.02	
109	0.47	98.38	0.02	
110	0.48	98.38	0.02	
111	0.50	98.38	0.02	
112	0.52	98.38	0.02	
113	0.53	98.38	0.02	
114	0.55	98.38	0.02	
115	0.57	98.38	0.02	
116	0.58	98.38	0.02	
117	0.60	98.38	0.02	
118	0.62	98.38	0.02	
119	0.63	98.38	0.02	
120	0.65	98.38	0.02	
121	0.67	98.38	0.02	
122	0.68	98.38	0.02	
123	0.70	98.38	0.02	
124	0.72	98.38	0.02	
125	0.73	98.38	0.02	
126	0.75	98.38	0.02	
127	0.77	98.38	0.02	
128	0.78	98.38	0.02	
129	0.80	98.38	0.02	
130	0.82	98.38	0.02	
131	0.83	98.38	0.02	
132	0.85	98.38	0.02	
133	0.87	98.38	0.02	
134	0.88	98.38	0.02	
135	0.90	98.38	0.02	
136	0.92	98.38	0.02	
137	0.93	98.38	0.02	
138	0.95	98.38	0.02	
139	0.97	98.38	0.02	
140	0.98	98.38	0.02	
141	1.00	98.38	0.02	
142	1.20	98.37	0.01	
143	1.40	98.37	0.01	
144	1.60	98.37	0.01	
145	1.80	98.37	0.01	
146	2.00	98.37	0.01	
147	2.20	98.37	0.01	
148	2.40	98.37	0.01	
149	2.60	98.37	0.01	
150	2.80	98.37	0.01	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 13.01.1999	Page 5
		Project: Roblin Steel	
		Evaluated by: SLG	

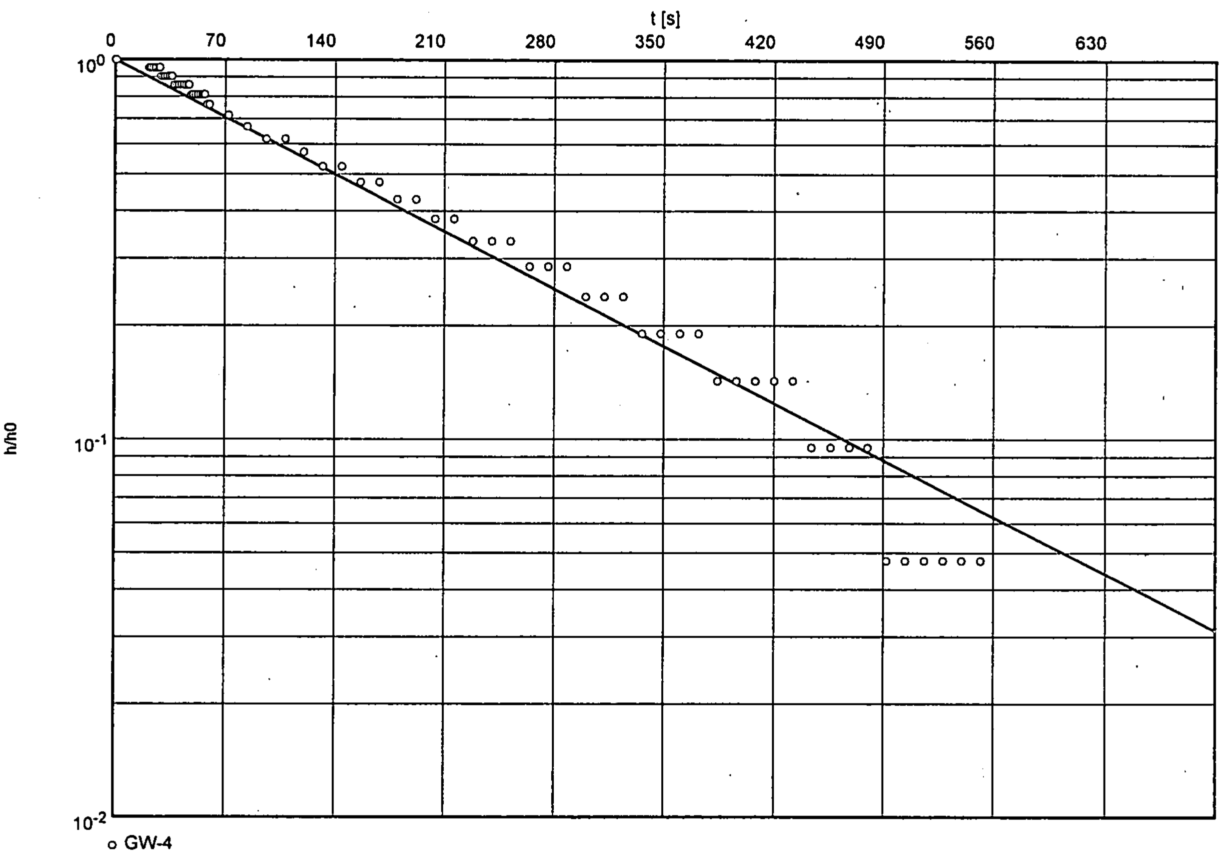
Slug Test No.	Test conducted on: 1/12/99
GW-3	GW-3

Static water level: 98.36 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
151	3.00	98.37	0.01	
152	3.20	98.37	0.01	
153	3.40	98.37	0.01	
154	3.60	98.37	0.01	
155	3.80	98.37	0.01	
156	4.00	98.37	0.01	
157	4.20	98.37	0.01	
158	4.40	98.37	0.01	
159	4.60	98.37	0.01	
160	4.80	98.37	0.01	
161	5.00	98.37	0.01	
162	5.20	98.37	0.01	
163	5.40	98.37	0.01	
164	5.60	98.37	0.01	
165	5.80	98.37	0.01	
166	6.00	98.37	0.01	
167	6.20	98.37	0.01	
168	6.40	98.37	0.01	
169	6.60	98.37	0.01	
170	6.80	98.37	0.01	
171	7.00	98.37	0.01	
172	7.20	98.37	0.01	
173	7.40	98.36	0.01	
174	7.60	98.36	0.01	
175	7.80	98.36	0.01	
176	8.00	98.36	0.01	
177	8.20	98.36	0.01	
178	8.40	98.36	0.01	
179	8.60	98.36	0.01	
180	8.80	98.36	0.01	
181	9.00	98.36	0.01	
182	9.20	98.36	0.01	
183	9.40	98.36	0.01	
184	9.60	98.36	0.01	
185	9.80	98.36	0.00	
186	10.00	98.36	0.00	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 13.01.1999	Page 1
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-4	



Hydraulic conductivity [cm/s]: 1.26×10^{-4}

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 13.01.1999	Page 2
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-4	GW-4

Static water level: 99.35 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	99.14	-0.21	
2	0.01	99.14	-0.21	
3	0.02	99.60	0.25	
4	0.03	99.68	0.33	
5	0.04	99.59	0.24	
6	0.05	99.61	0.26	
7	0.06	99.60	0.25	
8	0.07	99.59	0.24	
9	0.08	99.59	0.24	
10	0.09	99.58	0.23	
11	0.10	99.58	0.23	
12	0.11	99.58	0.23	
13	0.12	99.58	0.23	
14	0.13	99.58	0.23	
15	0.14	99.58	0.23	
16	0.15	99.57	0.22	
17	0.16	99.57	0.22	
18	0.17	99.57	0.22	
19	0.18	99.57	0.22	
20	0.19	99.57	0.22	
21	0.20	99.57	0.22	
22	0.21	99.57	0.22	
23	0.22	99.57	0.22	
24	0.23	99.56	0.21	
25	0.24	99.56	0.21	
26	0.25	99.56	0.21	
27	0.26	99.56	0.21	
28	0.27	99.56	0.21	
29	0.28	99.56	0.21	
30	0.29	99.56	0.21	
31	0.30	99.56	0.21	
32	0.31	99.56	0.21	
33	0.32	99.56	0.21	
34	0.33	99.56	0.21	
35	0.35	99.55	0.20	
36	0.37	99.55	0.20	
37	0.38	99.55	0.20	
38	0.40	99.55	0.20	
39	0.42	99.55	0.20	
40	0.43	99.55	0.20	
41	0.45	99.55	0.20	
42	0.47	99.55	0.20	
43	0.48	99.54	0.19	
44	0.50	99.54	0.19	
45	0.52	99.54	0.19	
46	0.53	99.54	0.19	
47	0.55	99.54	0.19	
48	0.57	99.54	0.19	
49	0.58	99.54	0.19	
50	0.60	99.54	0.19	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 13.01.1999	Page 3
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-4	GW-4

Static water level: 99.35 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	0.62	99.53	0.18	
52	0.63	99.53	0.18	
53	0.65	99.53	0.18	
54	0.67	99.53	0.18	
55	0.68	99.53	0.18	
56	0.70	99.53	0.18	
57	0.72	99.53	0.18	
58	0.73	99.53	0.18	
59	0.75	99.53	0.18	
60	0.77	99.53	0.18	
61	0.78	99.53	0.18	
62	0.80	99.52	0.17	
63	0.82	99.52	0.17	
64	0.83	99.52	0.17	
65	0.85	99.52	0.17	
66	0.87	99.52	0.17	
67	0.88	99.52	0.17	
68	0.90	99.52	0.17	
69	0.92	99.52	0.17	
70	0.93	99.52	0.17	
71	0.95	99.52	0.17	
72	0.97	99.51	0.16	
73	0.98	99.51	0.16	
74	1.00	99.51	0.16	
75	1.20	99.50	0.15	
76	1.40	99.49	0.14	
77	1.60	99.48	0.13	
78	1.80	99.48	0.13	
79	2.00	99.47	0.12	
80	2.20	99.46	0.11	
81	2.40	99.46	0.11	
82	2.60	99.45	0.10	
83	2.80	99.45	0.10	
84	3.00	99.44	0.09	
85	3.20	99.44	0.09	
86	3.40	99.43	0.08	
87	3.60	99.43	0.08	
88	3.80	99.42	0.07	
89	4.00	99.42	0.07	
90	4.20	99.42	0.07	
91	4.40	99.41	0.06	
92	4.60	99.41	0.06	
93	4.80	99.41	0.06	
94	5.00	99.40	0.05	
95	5.20	99.40	0.05	
96	5.40	99.40	0.05	
97	5.60	99.39	0.04	
98	5.80	99.39	0.04	
99	6.00	99.39	0.04	
100	6.20	99.39	0.04	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 13.01.1999	Page 4
		Project: Roblin Steel	
		Evaluated by: SLG	

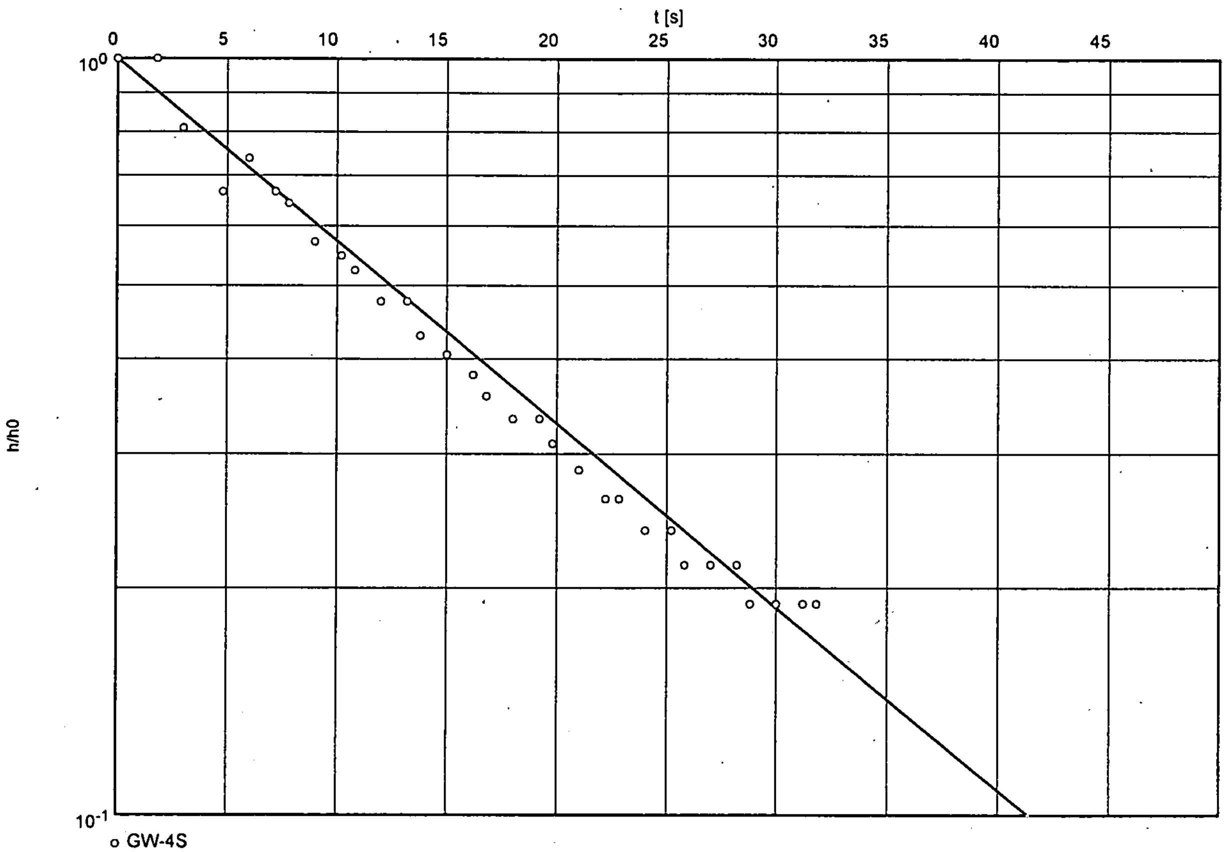
Slug Test No.	Test conducted on: 1/12/99
GW-4	GW-4

Static water level: 99.35 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	6.40	99.38	0.03	
102	6.60	99.38	0.03	
103	6.80	99.38	0.03	
104	7.00	99.38	0.03	
105	7.20	99.38	0.03	
106	7.40	99.37	0.02	
107	7.60	99.37	0.02	
108	7.80	99.37	0.02	
109	8.00	99.37	0.02	
110	8.20	99.36	0.01	
111	8.40	99.36	0.01	
112	8.60	99.36	0.01	
113	8.80	99.36	0.01	
114	9.00	99.36	0.01	
115	9.20	99.36	0.01	
116	9.40	99.35	0.00	
117	9.60	99.35	0.00	
118	9.80	99.35	0.00	
119	10.00	99.35	0.00	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 1
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-4S	



Hydraulic conductivity [cm/s]: 1.41×10^{-3}

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 2
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-4S	GW-4S

Static water level: 101.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	100.93	-0.07	
2	0.01	100.93	-0.07	
3	0.02	101.17	0.17	
4	0.03	101.42	0.42	
5	0.04	101.21	0.21	
6	0.05	101.34	0.34	
7	0.06	101.42	0.42	
8	0.07	101.33	0.33	
9	0.08	101.28	0.28	
10	0.09	101.30	0.30	
11	0.10	101.31	0.31	
12	0.11	101.28	0.28	
13	0.12	101.26	0.26	
14	0.13	101.27	0.27	
15	0.14	101.26	0.26	
16	0.15	101.24	0.24	
17	0.16	101.23	0.23	
18	0.17	101.23	0.23	
19	0.18	101.22	0.22	
20	0.19	101.21	0.21	
21	0.20	101.20	0.20	
22	0.21	101.20	0.20	
23	0.22	101.19	0.19	
24	0.23	101.18	0.18	
25	0.24	101.18	0.18	
26	0.25	101.17	0.17	
27	0.26	101.16	0.16	
28	0.27	101.16	0.16	
29	0.28	101.15	0.15	
30	0.29	101.15	0.15	
31	0.30	101.14	0.14	
32	0.31	101.14	0.14	
33	0.32	101.13	0.13	
34	0.33	101.13	0.13	
35	0.35	101.12	0.12	
36	0.37	101.11	0.11	
37	0.38	101.11	0.11	
38	0.40	101.10	0.10	
39	0.42	101.10	0.10	
40	0.43	101.09	0.09	
41	0.45	101.09	0.09	
42	0.47	101.09	0.09	
43	0.48	101.08	0.08	
44	0.50	101.08	0.08	
45	0.52	101.08	0.08	
46	0.53	101.08	0.08	
47	0.55	101.07	0.07	
48	0.57	101.07	0.07	
49	0.58	101.07	0.07	
50	0.60	101.07	0.07	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 3
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-4S	GW-4S

Static water level: 101.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	0.62	101.07	0.07	
52	0.63	101.07	0.07	
53	0.65	101.06	0.06	
54	0.67	101.06	0.06	
55	0.68	101.06	0.06	
56	0.70	101.06	0.06	
57	0.72	101.06	0.06	
58	0.73	101.06	0.06	
59	0.75	101.06	0.06	
60	0.77	101.06	0.06	
61	0.78	101.06	0.06	
62	0.80	101.06	0.06	
63	0.82	101.06	0.06	
64	0.83	101.05	0.05	
65	0.85	101.05	0.05	
66	0.87	101.05	0.05	
67	0.88	101.05	0.05	
68	0.90	101.05	0.05	
69	0.92	101.05	0.05	
70	0.93	101.05	0.05	
71	0.95	101.05	0.05	
72	0.97	101.05	0.05	
73	0.98	101.05	0.05	
74	1.00	101.05	0.05	
75	1.20	101.04	0.04	
76	1.40	101.04	0.04	
77	1.60	101.04	0.04	
78	1.80	101.03	0.03	
79	2.00	101.03	0.03	
80	2.20	101.03	0.03	
81	2.40	101.03	0.03	
82	2.60	101.03	0.03	
83	2.80	101.03	0.03	
84	3.00	101.03	0.03	
85	3.20	101.03	0.03	
86	3.40	101.03	0.03	
87	3.60	101.02	0.02	
88	3.80	101.02	0.02	
89	4.00	101.02	0.02	
90	4.20	101.02	0.02	
91	4.40	101.02	0.02	
92	4.60	101.02	0.02	
93	4.80	101.02	0.02	
94	5.00	101.02	0.02	
95	5.20	101.02	0.02	
96	5.40	101.02	0.02	
97	5.60	101.02	0.02	
98	5.80	101.02	0.02	
99	6.00	101.02	0.02	
100	6.20	101.02	0.02	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 4
		Project: Roblin Steel	
		Evaluated by: SLG	

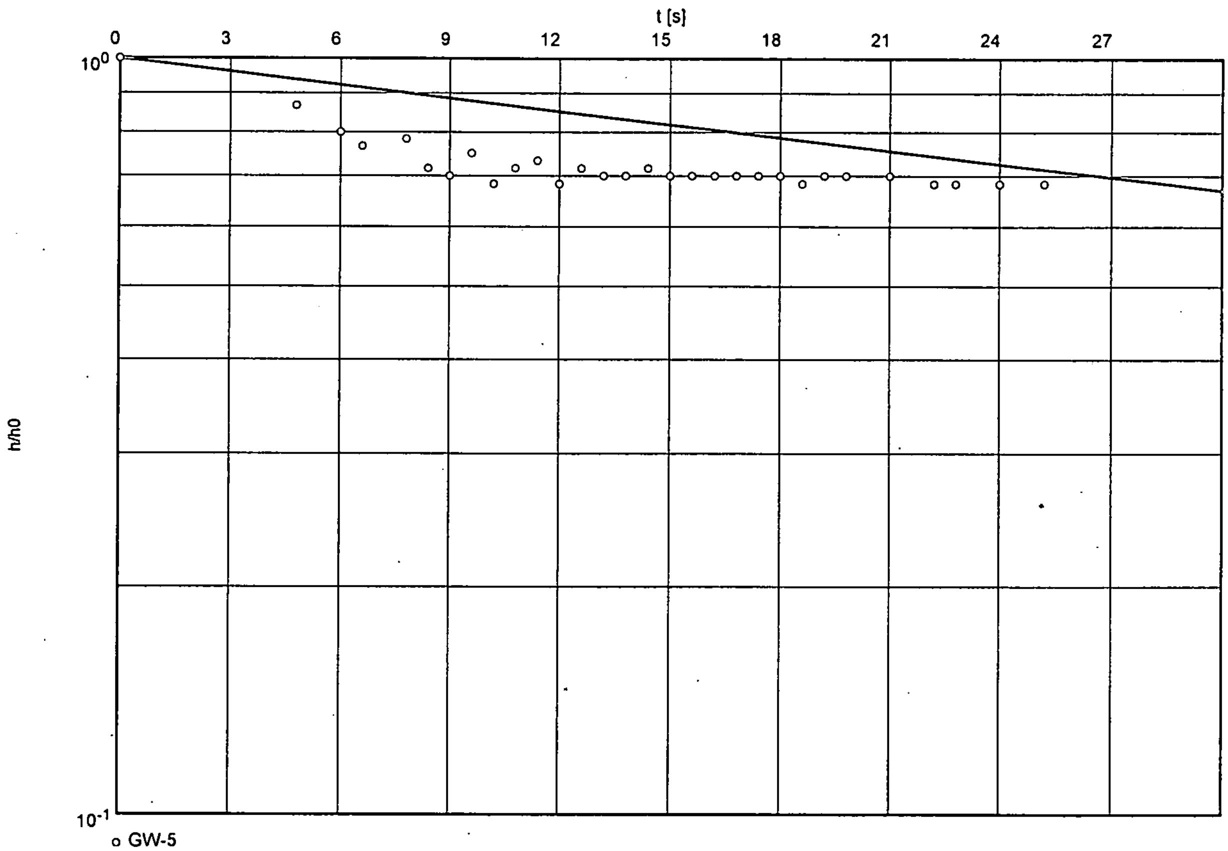
Slug Test No.	Test conducted on: 1/12/99
GW-4S	GW-4S

Static water level: 101.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	6.40	101.02	0.02	
102	6.60	101.01	0.01	
103	6.80	101.01	0.01	
104	7.00	101.01	0.01	
105	7.20	101.01	0.01	
106	7.40	101.01	0.01	
107	7.60	101.01	0.01	
108	7.80	101.01	0.01	
109	8.00	101.01	0.01	
110	8.20	101.01	0.01	
111	8.40	101.01	0.01	
112	8.60	101.01	0.01	
113	8.80	101.01	0.01	
114	9.00	101.01	0.01	
115	9.20	101.01	0.01	
116	9.40	101.01	0.01	
117	9.60	101.01	0.01	
118	9.80	101.01	0.01	
119	10.00	101.01	0.01	
120	12.00	101.00	0.00	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 1
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/98
GW-5	



Hydraulic conductivity [cm/s]: 3.38×10^{-4}

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 2
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/98
GW-5	GW-5

Static water level: 100.20 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	100.80	0.60	
2	0.06	100.58	0.38	
3	0.07	100.67	0.47	
4	0.08	100.72	0.52	
5	0.09	100.58	0.38	
6	0.10	100.68	0.48	
7	0.11	100.66	0.46	
8	0.12	100.60	0.40	
9	0.13	100.67	0.47	
10	0.14	100.63	0.43	
11	0.15	100.62	0.42	
12	0.16	100.65	0.45	
13	0.17	100.61	0.41	
14	0.18	100.63	0.43	
15	0.19	100.64	0.44	
16	0.20	100.61	0.41	
17	0.21	100.63	0.43	
18	0.22	100.62	0.42	
19	0.23	100.62	0.42	
20	0.24	100.63	0.43	
21	0.25	100.62	0.42	
22	0.26	100.62	0.42	
23	0.27	100.62	0.42	
24	0.28	100.62	0.42	
25	0.29	100.62	0.42	
26	0.30	100.62	0.42	
27	0.31	100.61	0.41	
28	0.32	100.62	0.42	
29	0.33	100.62	0.42	
30	0.35	100.62	0.42	
31	0.37	100.61	0.41	
32	0.38	100.61	0.41	
33	0.40	100.61	0.41	
34	0.42	100.61	0.41	
35	0.43	100.60	0.40	
36	0.45	100.60	0.40	
37	0.47	100.60	0.40	
38	0.48	100.60	0.40	
39	0.50	100.60	0.40	
40	0.52	100.60	0.40	
41	0.53	100.60	0.40	
42	0.55	100.60	0.40	
43	0.57	100.60	0.40	
44	0.58	100.60	0.40	
45	0.60	100.60	0.40	
46	0.62	100.60	0.40	
47	0.63	100.60	0.40	
48	0.65	100.60	0.40	
49	0.67	100.60	0.40	
50	0.68	100.60	0.40	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 3
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/98
GW-5	GW-5

Static water level: 100.20 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	0.70	100.60	0.40	
52	0.72	100.60	0.40	
53	0.73	100.60	0.40	
54	0.75	100.60	0.40	
55	0.77	100.60	0.40	
56	0.78	100.60	0.40	
57	0.80	100.60	0.40	
58	0.82	100.60	0.40	
59	0.83	100.60	0.40	
60	0.85	100.60	0.40	
61	0.87	100.60	0.40	
62	0.88	100.60	0.40	
63	0.90	100.60	0.40	
64	0.92	100.60	0.40	
65	0.93	100.60	0.40	
66	0.95	100.59	0.39	
67	0.97	100.59	0.39	
68	0.98	100.59	0.39	
69	1.00	100.59	0.39	
70	1.20	100.59	0.39	
71	1.40	100.59	0.39	
72	1.60	100.59	0.39	
73	1.80	100.59	0.39	
74	2.00	100.59	0.39	
75	2.20	100.58	0.38	
76	2.40	100.58	0.38	
77	2.60	100.58	0.38	
78	2.80	100.58	0.38	
79	3.00	100.58	0.38	
80	3.20	100.58	0.38	
81	3.40	100.58	0.38	
82	3.60	100.58	0.38	
83	3.80	100.58	0.38	
84	4.00	100.58	0.38	
85	4.20	100.58	0.38	
86	4.40	100.58	0.38	
87	4.60	100.58	0.38	
88	4.80	100.58	0.38	
89	5.00	100.58	0.38	
90	5.20	100.58	0.38	
91	5.40	100.58	0.38	
92	5.60	100.58	0.38	
93	5.80	100.58	0.38	
94	6.00	100.57	0.37	
95	6.20	100.57	0.37	
96	6.40	100.57	0.37	
97	6.60	100.57	0.37	
98	6.80	100.57	0.37	
99	7.00	100.57	0.37	
100	7.20	100.57	0.37	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 4
		Project: Roblin Steel	
		Evaluated by: SLG	

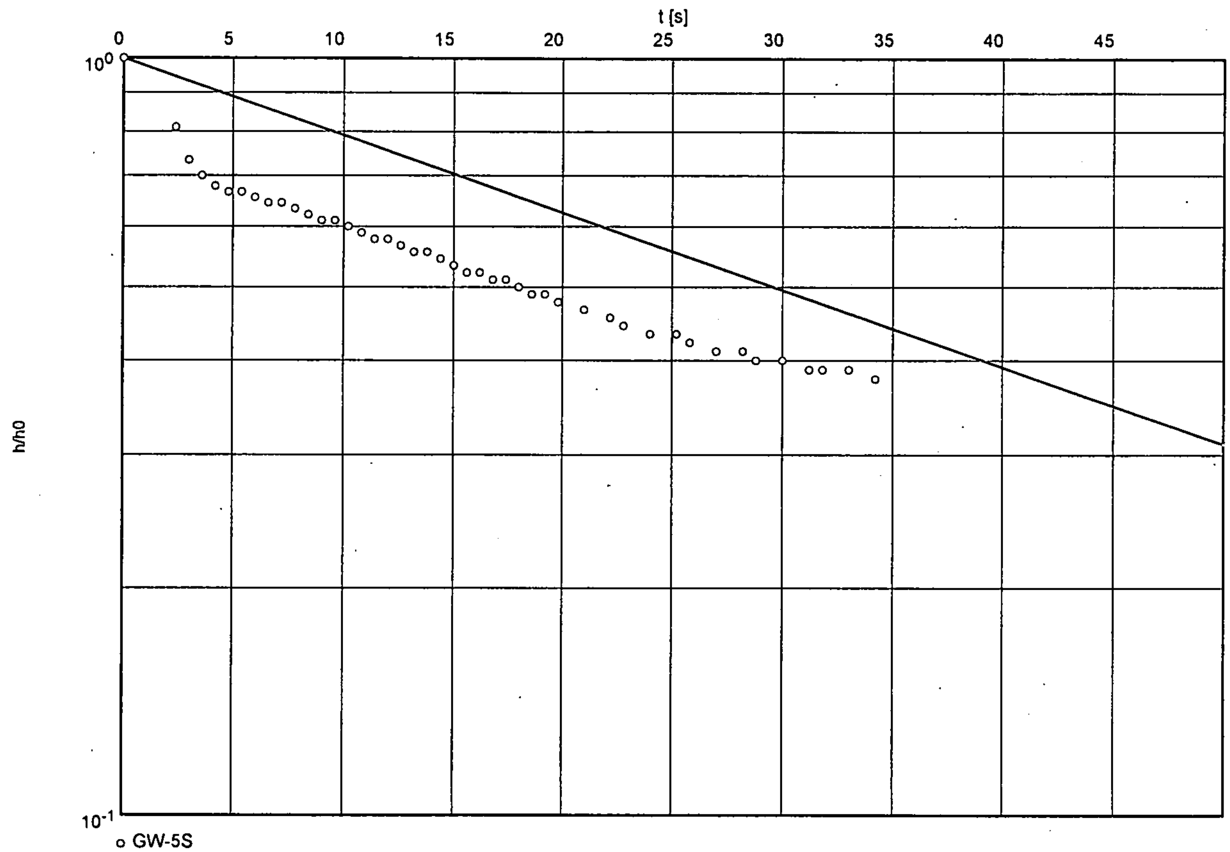
Slug Test No.	Test conducted on: 1/12/98
GW-5	GW-5

Static water level: 100.20 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	7.40	100.57	0.37	
102	7.60	100.57	0.37	
103	7.80	100.57	0.37	
104	8.00	100.57	0.37	
105	8.20	100.57	0.37	
106	8.40	100.57	0.37	
107	8.60	100.57	0.37	
108	8.80	100.57	0.37	
109	9.00	100.57	0.37	
110	9.20	100.57	0.37	
111	9.40	100.57	0.37	
112	9.60	100.57	0.37	
113	9.80	100.57	0.37	
114	10.00	100.57	0.37	
115	12.00	100.57	0.37	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 1
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-5S	



Hydraulic conductivity [cm/s]: 6.24×10^{-4}

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 2
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-5S	GW-5S

Static water level: 100.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	100.90	0.90	
2	0.00	3.29	-96.71	
3	0.00	3.30	-96.70	
4	0.00	3.31	-96.69	
5	0.00	3.31	-96.69	
6	0.00	3.31	-96.69	
7	0.00	3.29	-96.71	
8	0.00	3.31	-96.69	
9	0.00	3.31	-96.69	
10	0.00	3.29	-96.71	
11	0.00	3.31	-96.69	
12	0.00	3.30	-96.70	
13	0.00	3.30	-96.70	
14	0.00	3.30	-96.70	
15	0.00	3.30	-96.70	
16	0.00	3.30	-96.70	
17	0.00	3.30	-96.70	
18	0.00	3.30	-96.70	
19	0.00	3.30	-96.70	
20	0.00	3.30	-96.70	
21	0.00	3.30	-96.70	
22	0.00	3.30	-96.70	
23	0.00	3.30	-96.70	
24	0.00	3.30	-96.70	
25	0.00	3.30	-96.70	
26	0.00	3.30	-96.70	
27	0.00	3.30	-96.70	
28	0.00	3.30	-96.70	
29	0.00	3.30	-96.70	
30	0.00	3.30	-96.70	
31	0.00	3.30	-96.70	
32	0.00	3.30	-96.70	
33	0.00	3.30	-96.70	
34	0.00	3.30	-96.70	
35	0.00	3.30	-96.70	
36	0.00	3.30	-96.70	
37	0.00	3.30	-96.70	
38	0.00	3.30	-96.70	
39	0.00	3.30	-96.70	
40	0.00	3.30	-96.70	
41	0.00	3.30	-96.70	
42	0.00	3.30	-96.70	
43	0.00	3.30	-96.70	
44	0.00	3.30	-96.70	
45	0.00	3.30	-96.70	
46	0.00	3.30	-96.70	
47	0.00	3.30	-96.70	
48	0.00	3.30	-96.70	
49	0.00	3.30	-96.70	
50	0.00	3.30	-96.70	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 3
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-5S	GW-5S

Static water level: 100.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	0.00	3.30	-96.70	
52	0.00	3.30	-96.70	
53	0.00	3.30	-96.70	
54	0.00	3.30	-96.70	
55	0.00	3.30	-96.70	
56	0.00	3.30	-96.70	
57	0.00	3.30	-96.70	
58	0.00	3.30	-96.70	
59	0.00	3.30	-96.70	
60	0.00	3.30	-96.70	
61	0.00	3.30	-96.70	
62	0.00	3.30	-96.70	
63	0.00	3.30	-96.70	
64	0.00	3.30	-96.70	
65	0.00	3.30	-96.70	
66	0.00	3.30	-96.70	
67	0.00	3.30	-96.70	
68	0.00	3.30	-96.70	
69	0.00	3.30	-96.70	
70	0.00	3.30	-96.70	
71	0.00	3.30	-96.70	
72	0.00	3.30	-96.70	
73	0.00	3.30	-96.70	
74	0.00	3.30	-96.70	
75	0.00	3.30	-96.70	
76	0.00	3.30	-96.70	
77	0.00	3.30	-96.70	
78	0.00	3.30	-96.70	
79	0.00	3.30	-96.70	
80	0.00	3.30	-96.70	
81	0.00	3.30	-96.70	
82	0.00	3.30	-96.70	
83	0.00	3.30	-96.70	
84	0.00	3.30	-96.70	
85	0.00	3.30	-96.70	
86	0.00	3.30	-96.70	
87	0.00	3.30	-96.70	
88	0.00	3.30	-96.70	
89	0.00	3.30	-96.70	
90	0.00	3.30	-96.70	
91	0.01	3.30	-96.70	
92	0.01	3.30	-96.70	
93	0.01	3.30	-96.70	
94	0.01	3.30	-96.70	
95	0.01	3.30	-96.70	
96	0.01	3.30	-96.70	
97	0.01	3.30	-96.70	
98	0.01	3.30	-96.70	
99	0.01	3.30	-96.70	
100	0.01	3.29	-96.71	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 4
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-5S	GW-5S

Static water level: 100.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	0.01	3.29	-96.71	
102	0.01	3.29	-96.71	
103	0.01	3.29	-96.71	
104	0.01	3.29	-96.71	
105	0.01	3.29	-96.71	
106	0.01	3.29	-96.71	
107	0.01	3.29	-96.71	
108	0.01	3.29	-96.71	
109	0.01	3.29	-96.71	
110	0.01	3.29	-96.71	
111	0.01	3.29	-96.71	
112	0.01	3.29	-96.71	
113	0.01	3.29	-96.71	
114	0.01	3.29	-96.71	
115	0.01	3.29	-96.71	
116	0.01	3.29	-96.71	
117	0.01	3.29	-96.71	
118	0.01	3.29	-96.71	
119	0.01	3.29	-96.71	
120	0.01	3.29	-96.71	
121	0.01	3.29	-96.71	
122	0.01	3.29	-96.71	
123	0.01	3.29	-96.71	
124	0.01	3.29	-96.71	
125	0.01	3.29	-96.71	
126	0.01	3.29	-96.71	
127	0.01	3.29	-96.71	
128	0.01	3.29	-96.71	
129	0.01	3.29	-96.71	
130	0.01	3.29	-96.71	
131	0.01	3.29	-96.71	
132	0.01	3.29	-96.71	
133	0.01	3.29	-96.71	
134	0.01	3.29	-96.71	
135	0.02	3.29	-96.71	
136	0.02	3.29	-96.71	
137	0.02	3.29	-96.71	
138	0.02	3.29	-96.71	
139	0.02	3.29	-96.71	
140	0.02	3.29	-96.71	
141	0.02	3.29	-96.71	
142	0.02	3.29	-96.71	
143	0.02	3.29	-96.71	
144	0.03	3.29	-96.71	
145	0.03	3.29	-96.71	
146	0.03	3.29	-96.71	
147	0.04	3.29	-96.71	
148	0.04	100.73	0.73	
149	0.04	3.29	-96.71	
150	0.05	3.29	-96.71	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 5
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-5S	GW-5S

Static water level: 100.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
151	0.05	100.66	0.66	
152	0.05	3.29	-96.71	
153	0.06	3.29	-96.71	
154	0.06	100.63	0.63	
155	0.06	3.29	-96.71	
156	0.07	3.29	-96.71	
157	0.07	3.29	-96.71	
158	0.07	100.61	0.61	
159	0.07	3.29	-96.71	
160	0.08	3.29	-96.71	
161	0.08	100.60	0.60	
162	0.08	3.29	-96.71	
163	0.09	3.29	-96.71	
164	0.09	100.60	0.60	
165	0.09	3.29	-96.71	
166	0.10	3.29	-96.71	
167	0.10	100.59	0.59	
168	0.10	3.29	-96.71	
169	0.11	3.29	-96.71	
170	0.11	100.58	0.58	
171	0.11	3.29	-96.71	
172	0.12	3.29	-96.71	
173	0.12	100.58	0.58	
174	0.12	3.29	-96.71	
175	0.13	3.29	-96.71	
176	0.13	3.29	-96.71	
177	0.13	100.57	0.57	
178	0.13	3.29	-96.71	
179	0.14	3.29	-96.71	
180	0.14	3.29	-96.71	
181	0.14	100.56	0.56	
182	0.14	3.29	-96.71	
183	0.15	3.29	-96.71	
184	0.15	100.55	0.55	
185	0.15	3.29	-96.71	
186	0.16	3.29	-96.71	
187	0.16	100.55	0.55	
188	0.16	3.29	-96.71	
189	0.17	3.29	-96.71	
190	0.17	100.54	0.54	
191	0.18	100.53	0.53	
192	0.19	100.52	0.52	
193	0.20	100.52	0.52	
194	0.21	100.51	0.51	
195	0.22	100.50	0.50	
196	0.23	100.50	0.50	
197	0.23	3.29	-96.71	
198	0.24	100.49	0.49	
199	0.25	100.48	0.48	
200	0.26	100.47	0.47	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 6
		Project: Roblin Steel	
		Evaluated by: SLG	

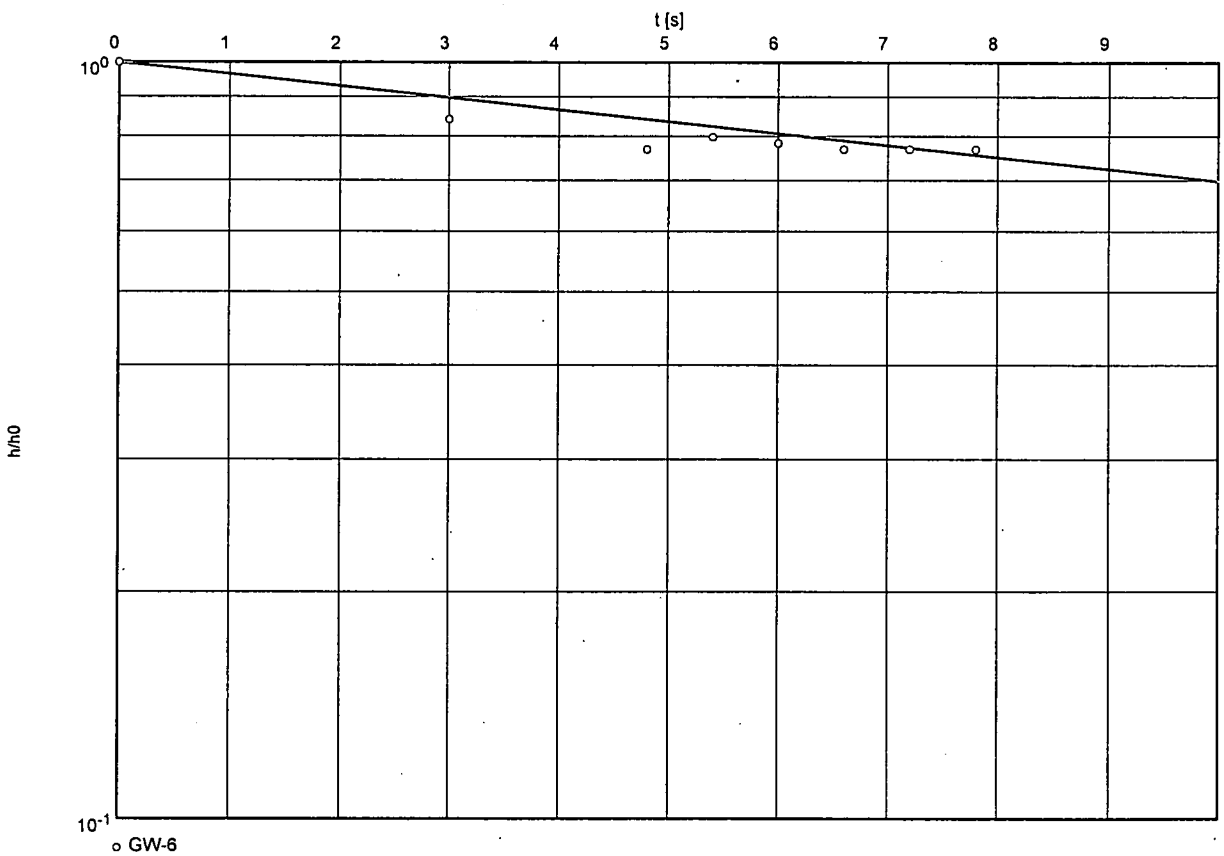
Slug Test No.	Test conducted on: 1/12/99
GW-5S	GW-5S

Static water level: 100.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
201	0.27	100.47	0.47	
202	0.28	100.46	0.46	
203	0.29	100.46	0.46	
204	0.30	100.45	0.45	
205	0.31	100.44	0.44	
206	0.32	100.44	0.44	
207	0.33	100.43	0.43	
208	0.35	100.42	0.42	
209	0.37	100.41	0.41	
210	0.38	100.40	0.40	
211	0.40	100.39	0.39	
212	0.42	100.39	0.39	
213	0.43	100.38	0.38	
214	0.45	100.37	0.37	
215	0.47	100.37	0.37	
216	0.48	100.36	0.36	
217	0.50	100.36	0.36	
218	0.52	100.35	0.35	
219	0.53	100.35	0.35	
220	0.55	100.35	0.35	
221	0.57	100.34	0.34	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 1
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/13/99
GW-6	



Hydraulic conductivity [cm/s]: 8.80×10^{-4}

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 2
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/13/99
GW-6	GW-6

Static water level: 98.41 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	99.10	0.69	
2	0.05	98.99	0.58	
3	0.06	98.90	0.49	
4	0.07	98.91	0.50	
5	0.08	98.94	0.53	
6	0.09	98.96	0.55	
7	0.10	98.95	0.54	
8	0.11	98.94	0.53	
9	0.12	98.94	0.53	
10	0.13	98.94	0.53	
11	0.14	98.94	0.53	
12	0.15	98.94	0.53	
13	0.16	98.94	0.53	
14	0.17	98.94	0.53	
15	0.18	98.94	0.53	
16	0.19	98.94	0.53	
17	0.20	98.94	0.53	
18	0.21	98.94	0.53	
19	0.22	98.94	0.53	
20	0.23	98.94	0.53	
21	0.24	98.94	0.53	
22	0.25	98.94	0.53	
23	0.26	98.94	0.53	
24	0.27	98.94	0.53	
25	0.28	98.94	0.53	
26	0.29	98.94	0.53	
27	0.30	98.94	0.53	
28	0.31	98.94	0.53	
29	0.32	98.94	0.53	
30	0.33	98.94	0.53	
31	0.35	98.93	0.52	
32	0.37	98.93	0.52	
33	0.38	98.93	0.52	
34	0.40	98.93	0.52	
35	0.42	98.93	0.52	
36	0.43	98.93	0.52	
37	0.45	98.93	0.52	
38	0.47	98.93	0.52	
39	0.48	98.93	0.52	
40	0.50	98.93	0.52	
41	0.52	98.93	0.52	
42	0.53	98.93	0.52	
43	0.55	98.93	0.52	
44	0.57	98.93	0.52	
45	0.58	98.93	0.52	
46	0.60	98.93	0.52	
47	0.62	98.93	0.52	
48	0.63	98.93	0.52	
49	0.65	98.93	0.52	
50	0.67	98.93	0.52	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 3
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/13/99
GW-6	GW-6

Static water level: 98.41 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	0.68	98.93	0.52	
52	0.70	98.93	0.52	
53	0.72	98.92	0.51	
54	0.73	98.92	0.51	
55	0.75	98.92	0.51	
56	0.77	98.92	0.51	
57	0.78	98.92	0.51	
58	0.80	98.92	0.51	
59	0.82	98.92	0.51	
60	0.83	98.92	0.51	
61	0.85	98.92	0.51	
62	0.87	98.92	0.51	
63	0.88	98.92	0.51	
64	0.90	98.92	0.51	
65	0.92	98.92	0.51	
66	0.93	98.92	0.51	
67	0.95	98.92	0.51	
68	0.97	98.92	0.51	
69	0.98	98.92	0.51	
70	1.00	98.92	0.51	
71	1.20	98.91	0.50	
72	1.40	98.91	0.50	
73	1.60	98.91	0.50	
74	1.80	98.91	0.50	
75	2.00	98.90	0.49	
76	2.20	98.90	0.49	
77	2.40	98.90	0.49	
78	2.60	98.90	0.49	
79	2.80	98.89	0.48	
80	3.00	98.89	0.48	
81	3.20	98.89	0.48	
82	3.40	98.89	0.48	
83	3.60	98.89	0.48	
84	3.80	98.88	0.47	
85	4.00	98.88	0.47	
86	4.20	98.88	0.47	
87	4.40	98.88	0.47	
88	4.60	98.88	0.47	
89	4.80	98.88	0.47	
90	5.00	98.87	0.46	
91	5.20	98.87	0.46	
92	5.40	98.87	0.46	
93	5.60	98.87	0.46	
94	5.80	98.87	0.46	
95	6.00	98.87	0.46	
96	6.20	98.86	0.45	
97	6.40	98.86	0.45	
98	6.60	98.86	0.45	
99	6.80	98.86	0.45	
100	7.00	98.86	0.45	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 4
		Project: Roblin Steel	
		Evaluated by: SLG	

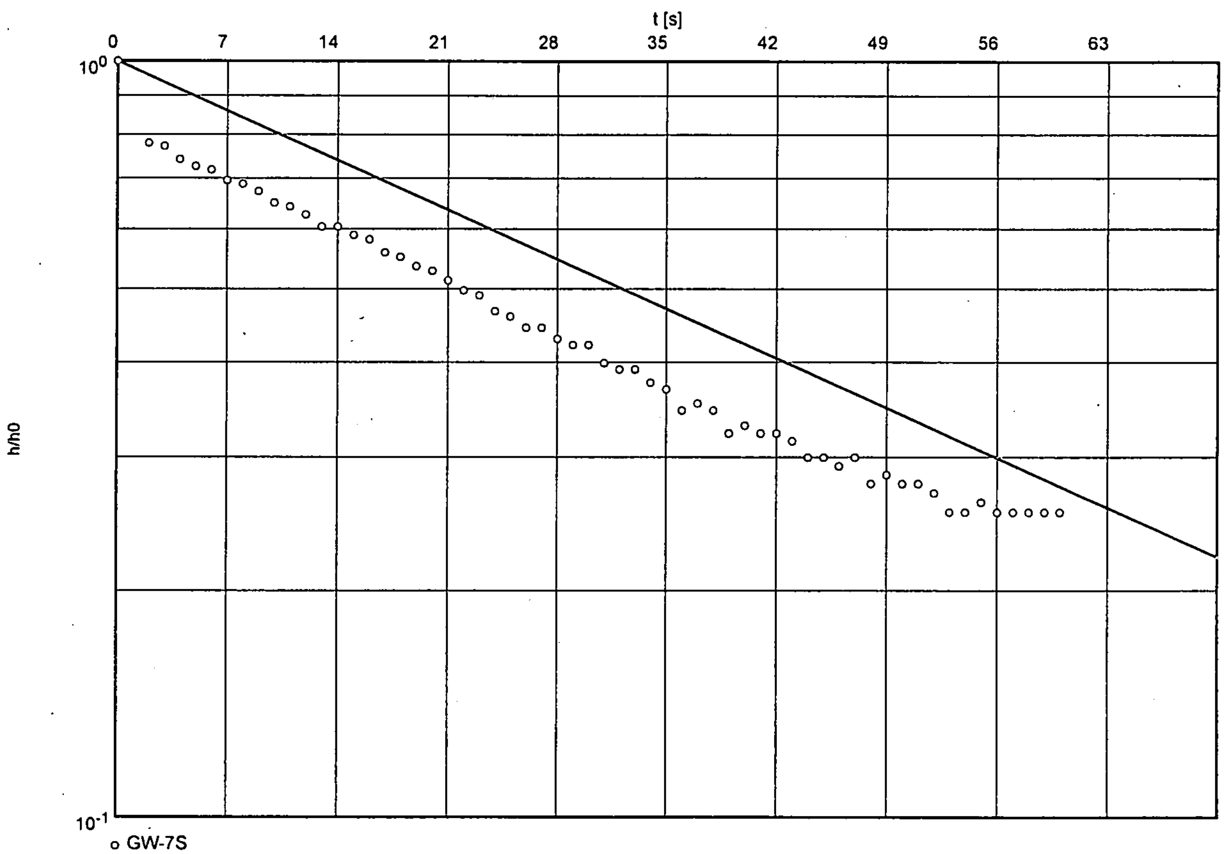
Slug Test No.	Test conducted on: 1/13/99
GW-6	GW-6

Static water level: 98.41 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	7.20	98.86	0.45	
102	7.40	98.85	0.44	
103	7.60	98.85	0.44	
104	7.80	98.85	0.44	
105	8.00	98.85	0.44	
106	8.20	98.85	0.44	
107	8.40	98.85	0.44	
108	8.60	98.85	0.44	
109	8.80	98.85	0.44	
110	9.00	98.84	0.43	
111	9.20	98.84	0.43	
112	9.40	98.84	0.43	
113	9.60	98.84	0.43	
114	9.80	98.84	0.43	
115	10.00	98.84	0.43	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 1
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/13/99
GW-7S	



Hydraulic conductivity [cm/s]: 5.47×10^{-4}

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 2
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/13/99
GW-7S	GW-7S

Static water level: 99.72 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	100.15	0.43	
2	0.00	99.73	0.01	
3	0.01	100.15	0.43	
4	0.01	99.91	0.19	
5	0.01	100.08	0.36	
6	0.02	100.07	0.35	
7	0.02	100.07	0.35	
8	0.02	100.06	0.34	
9	0.03	100.06	0.34	
10	0.03	100.06	0.34	
11	0.03	100.05	0.33	
12	0.04	100.05	0.33	
13	0.04	100.05	0.33	
14	0.04	100.05	0.33	
15	0.05	100.05	0.33	
16	0.05	100.05	0.33	
17	0.05	100.04	0.32	
18	0.06	100.04	0.32	
19	0.06	100.04	0.32	
20	0.06	100.04	0.32	
21	0.07	100.04	0.32	
22	0.07	100.04	0.32	
23	0.07	100.04	0.32	
24	0.08	100.03	0.31	
25	0.08	100.03	0.31	
26	0.08	100.03	0.31	
27	0.09	100.03	0.31	
28	0.09	100.03	0.31	
29	0.09	100.03	0.31	
30	0.10	100.03	0.31	
31	0.10	100.03	0.31	
32	0.10	100.02	0.30	
33	0.11	100.02	0.30	
34	0.11	100.02	0.30	
35	0.11	100.02	0.30	
36	0.12	100.02	0.30	
37	0.12	100.02	0.30	
38	0.12	100.02	0.30	
39	0.13	100.02	0.30	
40	0.13	100.02	0.30	
41	0.13	100.01	0.29	
42	0.14	100.01	0.29	
43	0.14	100.01	0.29	
44	0.14	100.01	0.29	
45	0.15	100.01	0.29	
46	0.15	100.01	0.29	
47	0.15	100.01	0.29	
48	0.16	100.00	0.28	
49	0.16	100.00	0.28	
50	0.16	100.00	0.28	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 3
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/13/99
GW-7S	GW-7S

Static water level: 99.72 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	0.17	100.00	0.28	
52	0.17	100.00	0.28	
53	0.17	100.00	0.28	
54	0.18	100.00	0.28	
55	0.18	100.00	0.28	
56	0.18	99.99	0.27	
57	0.19	99.99	0.27	
58	0.19	99.99	0.27	
59	0.19	99.99	0.27	
60	0.20	99.99	0.27	
61	0.20	99.99	0.27	
62	0.20	99.99	0.27	
63	0.21	99.98	0.27	
64	0.21	99.98	0.26	
65	0.21	99.98	0.26	
66	0.22	99.98	0.26	
67	0.22	99.98	0.26	
68	0.22	99.98	0.26	
69	0.23	99.98	0.26	
70	0.23	99.98	0.26	
71	0.23	99.98	0.26	
72	0.24	99.97	0.26	
73	0.24	99.97	0.25	
74	0.24	99.97	0.25	
75	0.25	99.97	0.25	
76	0.25	99.97	0.25	
77	0.25	99.97	0.25	
78	0.26	99.97	0.25	
79	0.26	99.97	0.25	
80	0.26	99.97	0.25	
81	0.27	99.96	0.24	
82	0.27	99.96	0.24	
83	0.27	99.96	0.24	
84	0.28	99.96	0.24	
85	0.28	99.96	0.24	
86	0.28	99.96	0.24	
87	0.29	99.96	0.24	
88	0.29	99.96	0.24	
89	0.29	99.96	0.24	
90	0.30	99.96	0.24	
91	0.30	99.96	0.24	
92	0.30	99.95	0.23	
93	0.31	99.95	0.23	
94	0.31	99.95	0.23	
95	0.31	99.95	0.23	
96	0.32	99.95	0.23	
97	0.32	99.95	0.23	
98	0.32	99.95	0.23	
99	0.33	99.95	0.23	
100	0.33	99.95	0.23	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 4
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/13/99
GW-7S	GW-7S

Static water level: 99.72 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	0.33	99.94	0.22	
102	0.35	99.94	0.22	
103	0.37	99.93	0.21	
104	0.37	99.93	0.21	
105	0.38	99.93	0.21	
106	0.38	99.93	0.21	
107	0.40	99.92	0.20	
108	0.42	99.92	0.20	
109	0.42	99.92	0.20	
110	0.43	99.91	0.19	
111	0.43	99.91	0.19	
112	0.45	99.91	0.19	
113	0.47	99.90	0.18	
114	0.47	99.90	0.18	
115	0.48	99.90	0.18	
116	0.48	99.90	0.18	
117	0.50	99.90	0.18	
118	0.52	99.89	0.17	
119	0.52	99.89	0.17	
120	0.53	99.89	0.17	
121	0.53	99.89	0.17	
122	0.55	99.89	0.17	
123	0.57	99.88	0.16	
124	0.57	99.88	0.16	
125	0.58	99.88	0.16	
126	0.58	99.88	0.16	
127	0.60	99.87	0.15	
128	0.62	99.87	0.15	
129	0.62	99.87	0.15	
130	0.63	99.87	0.15	
131	0.63	99.87	0.15	
132	0.65	99.86	0.14	
133	0.67	99.86	0.14	
134	0.67	99.86	0.14	
135	0.68	99.86	0.14	
136	0.68	99.86	0.14	
137	0.70	99.86	0.14	
138	0.72	99.85	0.14	
139	0.72	99.85	0.13	
140	0.73	99.85	0.13	
141	0.73	99.85	0.13	
142	0.75	99.85	0.13	
143	0.77	99.85	0.13	
144	0.77	99.85	0.13	
145	0.78	99.85	0.13	
146	0.78	99.85	0.13	
147	0.80	99.84	0.12	
148	0.82	99.84	0.12	
149	0.82	99.84	0.12	
150	0.83	99.84	0.12	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 5
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/13/99
GW-7S	GW-7S

Static water level: 99.72 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
151	0.83	99.84	0.12	
152	0.85	99.84	0.12	
153	0.87	99.84	0.12	
154	0.87	99.84	0.12	
155	0.88	99.83	0.11	
156	0.88	99.83	0.11	
157	0.90	99.83	0.11	
158	0.92	99.83	0.11	
159	0.92	99.83	0.11	
160	0.93	99.83	0.11	
161	0.93	99.83	0.11	
162	0.95	99.83	0.11	
163	0.97	99.83	0.11	
164	0.97	99.83	0.11	
165	0.98	99.83	0.11	
166	0.98	99.83	0.11	
167	1.00	99.83	0.11	
168	1.20	99.81	0.09	
169	1.40	99.81	0.09	
170	1.60	99.80	0.08	
171	1.80	99.79	0.07	
172	2.00	99.79	0.07	
173	2.20	99.78	0.06	
174	2.40	99.78	0.06	
175	2.60	99.78	0.06	
176	2.80	99.77	0.05	
177	3.00	99.77	0.05	
178	3.20	99.77	0.05	
179	3.40	99.77	0.05	
180	3.60	99.77	0.05	
181	3.80	99.76	0.04	
182	4.00	99.76	0.04	
183	4.20	99.76	0.04	
184	4.40	99.76	0.04	
185	4.60	99.76	0.04	
186	4.80	99.75	0.03	
187	5.00	99.75	0.03	
188	5.20	99.75	0.03	
189	5.40	99.75	0.03	
190	5.60	99.75	0.03	
191	5.80	99.75	0.03	
192	6.00	99.75	0.03	
193	6.20	99.74	0.02	
194	6.40	99.74	0.02	
195	6.60	99.74	0.02	
196	6.80	99.74	0.02	
197	7.00	99.74	0.02	
198	7.20	99.74	0.02	
199	7.40	99.74	0.02	
200	7.60	99.74	0.02	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 6
		Project: Roblin Steel	
		Evaluated by: SLG	

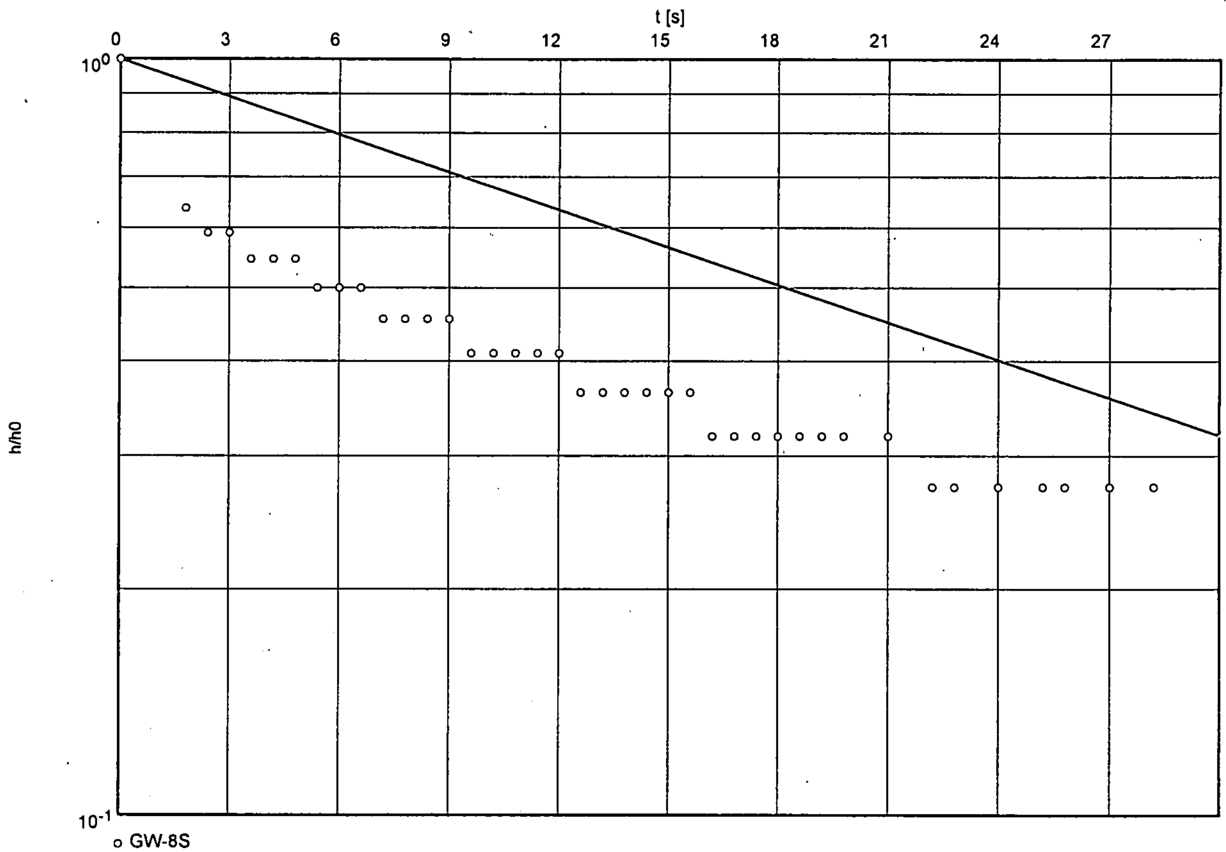
Slug Test No.	Test conducted on: 1/13/99
GW-7S	GW-7S

Static water level: 99.72 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
201	7.80	99.73	0.02	
202	8.00	99.73	0.01	
203	8.20	99.73	0.01	
204	8.40	99.73	0.01	
205	8.60	99.73	0.01	
206	8.80	99.73	0.01	
207	9.00	99.73	0.01	
208	9.20	99.73	0.01	
209	9.40	99.73	0.01	
210	9.60	99.73	0.01	
211	9.80	99.73	0.01	
212	10.00	99.72	0.01	
213	12.00	99.72	-0.00	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 1
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/13/98-9
GW-8S	



Hydraulic conductivity [cm/s]: 9.67×10^{-4}

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 2
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/13/98-9
GW-8S	GW-8S

Static water level: 102.80 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	103.02	0.22	
2	0.00	3.37	-99.43	
3	0.00	3.37	-99.43	
4	0.00	3.37	-99.43	
5	0.00	3.38	-99.42	
6	0.00	3.37	-99.43	
7	0.00	3.38	-99.42	
8	0.00	3.38	-99.42	
9	0.00	3.38	-99.42	
10	0.00	3.38	-99.42	
11	0.00	3.38	-99.42	
12	0.00	3.38	-99.42	
13	0.00	3.38	-99.42	
14	0.00	3.38	-99.42	
15	0.00	3.38	-99.42	
16	0.00	3.38	-99.42	
17	0.00	3.38	-99.42	
18	0.00	3.38	-99.42	
19	0.00	3.38	-99.42	
20	0.00	3.38	-99.42	
21	0.00	3.38	-99.42	
22	0.00	3.38	-99.42	
23	0.00	3.38	-99.42	
24	0.00	3.38	-99.42	
25	0.00	3.38	-99.42	
26	0.00	3.38	-99.42	
27	0.00	3.38	-99.42	
28	0.00	3.38	-99.42	
29	0.00	3.38	-99.42	
30	0.00	3.38	-99.42	
31	0.00	3.38	-99.42	
32	0.00	3.38	-99.42	
33	0.00	3.38	-99.42	
34	0.00	3.38	-99.42	
35	0.00	3.38	-99.42	
36	0.00	3.38	-99.42	
37	0.00	3.38	-99.42	
38	0.00	3.38	-99.42	
39	0.00	3.38	-99.42	
40	0.00	3.38	-99.42	
41	0.00	3.38	-99.42	
42	0.00	3.38	-99.42	
43	0.00	3.38	-99.42	
44	0.00	3.38	-99.42	
45	0.00	3.38	-99.42	
46	0.00	3.38	-99.42	
47	0.00	3.38	-99.42	
48	0.00	3.38	-99.42	
49	0.00	3.38	-99.42	
50	0.00	3.38	-99.42	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 3
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/13/98-9
GW-8S	GW-8S

Static water level: 102.80 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	0.00	3.38	-99.42	
52	0.00	3.38	-99.42	
53	0.00	3.38	-99.42	
54	0.00	3.38	-99.42	
55	0.00	3.38	-99.42	
56	0.00	3.38	-99.42	
57	0.00	3.38	-99.42	
58	0.00	3.38	-99.42	
59	0.00	3.38	-99.42	
60	0.00	3.38	-99.42	
61	0.00	3.38	-99.42	
62	0.00	3.38	-99.42	
63	0.00	3.38	-99.42	
64	0.00	3.38	-99.42	
65	0.00	3.38	-99.42	
66	0.00	3.38	-99.42	
67	0.00	3.38	-99.42	
68	0.00	3.38	-99.42	
69	0.00	3.38	-99.42	
70	0.00	3.38	-99.42	
71	0.00	3.38	-99.42	
72	0.00	3.38	-99.42	
73	0.00	3.38	-99.42	
74	0.00	3.38	-99.42	
75	0.00	3.38	-99.42	
76	0.00	3.38	-99.42	
77	0.00	3.38	-99.42	
78	0.00	3.38	-99.42	
79	0.00	3.38	-99.42	
80	0.00	3.38	-99.42	
81	0.00	3.38	-99.42	
82	0.00	3.38	-99.42	
83	0.00	3.38	-99.42	
84	0.00	3.38	-99.42	
85	0.00	3.38	-99.42	
86	0.00	3.38	-99.42	
87	0.00	3.38	-99.42	
88	0.00	3.38	-99.42	
89	0.00	3.38	-99.42	
90	0.00	3.38	-99.42	
91	0.01	3.38	-99.42	
92	0.01	3.38	-99.42	
93	0.01	3.37	-99.43	
94	0.01	3.37	-99.43	
95	0.01	3.37	-99.43	
96	0.01	3.37	-99.43	
97	0.01	3.37	-99.43	
98	0.01	3.37	-99.43	
99	0.01	3.37	-99.43	
100	0.01	3.37	-99.43	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 4
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/13/98-9
GW-8S	GW-8S

Static water level: 102.80 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	0.01	3.37	-99.43	
102	0.01	3.37	-99.43	
103	0.01	3.37	-99.43	
104	0.01	3.37	-99.43	
105	0.01	3.37	-99.43	
106	0.01	3.37	-99.43	
107	0.01	3.37	-99.43	
108	0.01	3.37	-99.43	
109	0.01	3.37	-99.43	
110	0.01	3.37	-99.43	
111	0.01	3.37	-99.43	
112	0.01	3.37	-99.43	
113	0.01	3.37	-99.43	
114	0.01	3.37	-99.43	
115	0.01	3.37	-99.43	
116	0.01	3.37	-99.43	
117	0.01	3.37	-99.43	
118	0.01	3.37	-99.43	
119	0.01	3.37	-99.43	
120	0.01	3.37	-99.43	
121	0.01	3.37	-99.43	
122	0.01	3.37	-99.43	
123	0.01	3.37	-99.43	
124	0.01	3.37	-99.43	
125	0.01	3.37	-99.43	
126	0.01	3.37	-99.43	
127	0.01	3.37	-99.43	
128	0.01	3.37	-99.43	
129	0.01	3.37	-99.43	
130	0.01	3.37	-99.43	
131	0.01	3.37	-99.43	
132	0.01	3.37	-99.43	
133	0.01	3.37	-99.43	
134	0.01	3.37	-99.43	
135	0.02	3.37	-99.43	
136	0.02	3.37	-99.43	
137	0.02	3.37	-99.43	
138	0.02	3.37	-99.43	
139	0.02	3.37	-99.43	
140	0.02	3.37	-99.43	
141	0.02	3.37	-99.43	
142	0.02	3.37	-99.43	
143	0.02	3.37	-99.43	
144	0.03	3.37	-99.43	
145	0.03	102.94	0.14	
146	0.03	3.37	-99.43	
147	0.04	3.37	-99.43	
148	0.04	102.93	0.13	
149	0.04	3.37	-99.43	
150	0.05	3.37	-99.43	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 5
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/13/98-9
GW-8S	GW-8S

Static water level: 102.80 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
151	0.05	102.93	0.13	
152	0.05	3.37	-99.43	
153	0.06	3.37	-99.43	
154	0.06	102.92	0.12	
155	0.06	3.37	-99.43	
156	0.07	3.37	-99.43	
157	0.07	3.37	-99.43	
158	0.07	102.92	0.12	
159	0.07	3.37	-99.43	
160	0.08	3.37	-99.43	
161	0.08	102.92	0.12	
162	0.08	3.37	-99.43	
163	0.09	3.37	-99.43	
164	0.09	102.91	0.11	
165	0.09	3.37	-99.43	
166	0.10	3.37	-99.43	
167	0.10	102.91	0.11	
168	0.10	3.37	-99.43	
169	0.11	3.37	-99.43	
170	0.11	102.91	0.11	
171	0.11	3.37	-99.43	
172	0.12	3.37	-99.43	
173	0.12	102.90	0.10	
174	0.12	3.37	-99.43	
175	0.13	3.37	-99.43	
176	0.13	3.37	-99.43	
177	0.13	102.90	0.10	
178	0.13	3.37	-99.43	
179	0.14	3.37	-99.43	
180	0.14	3.37	-99.43	
181	0.14	102.90	0.10	
182	0.14	3.37	-99.43	
183	0.15	3.37	-99.43	
184	0.15	102.90	0.10	
185	0.15	3.37	-99.43	
186	0.16	3.37	-99.43	
187	0.16	102.89	0.09	
188	0.16	3.37	-99.43	
189	0.17	3.37	-99.43	
190	0.17	102.89	0.09	
191	0.18	102.89	0.09	
192	0.19	102.89	0.09	
193	0.20	102.89	0.09	
194	0.21	102.88	0.08	
195	0.22	102.88	0.08	
196	0.23	102.88	0.08	
197	0.24	102.88	0.08	
198	0.25	102.88	0.08	
199	0.26	102.88	0.08	
200	0.27	102.87	0.07	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 6
		Project: Roblin Steel	
		Evaluated by: SLG	

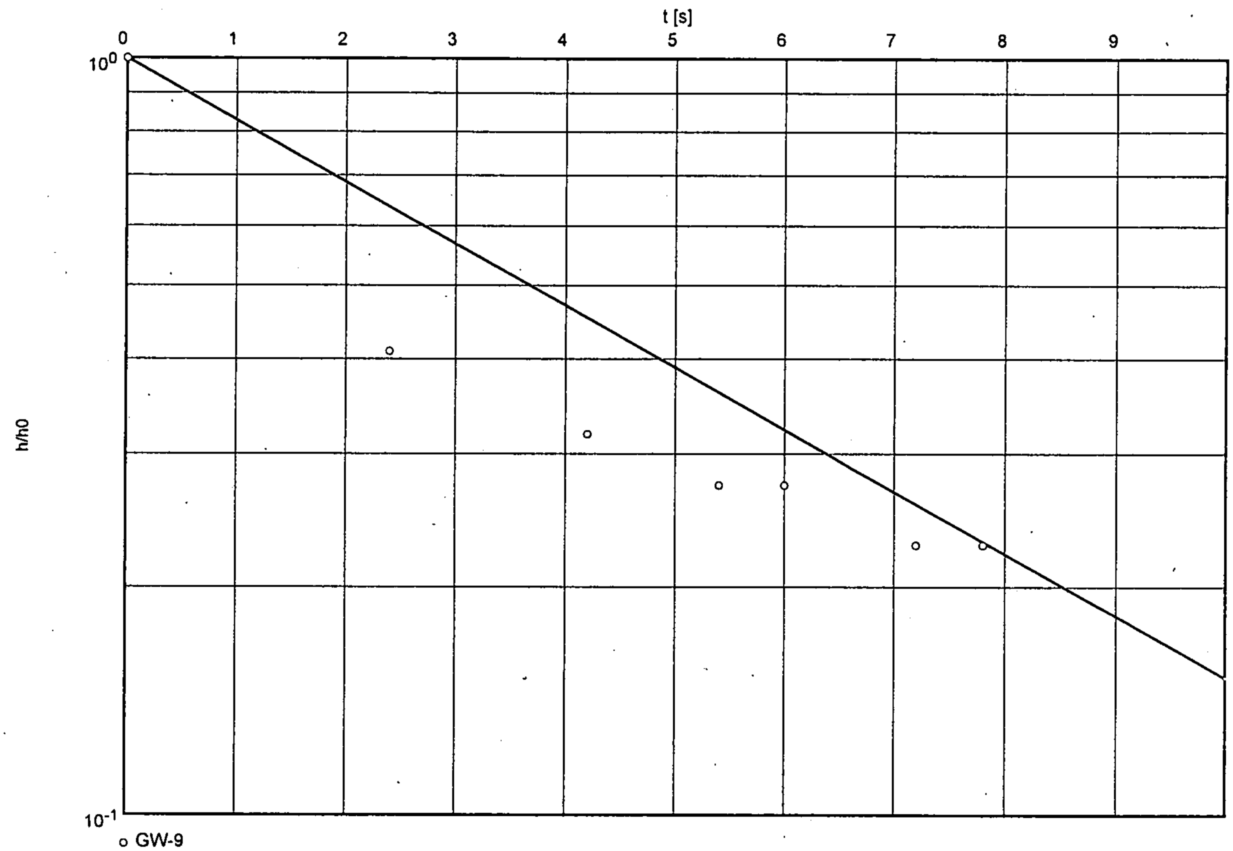
Slug Test No.	Test conducted on: 1/13/98-9
GW-8S	GW-8S

Static water level: 102.80 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
201	0.28	102.87	0.07	
202	0.29	102.87	0.07	
203	0.30	102.87	0.07	
204	0.31	102.87	0.07	
205	0.32	102.87	0.07	
206	0.33	102.87	0.07	
207	0.35	102.87	0.07	
208	0.37	102.86	0.06	
209	0.38	102.86	0.06	
210	0.40	102.86	0.06	
211	0.42	102.86	0.06	
212	0.43	102.86	0.06	
213	0.45	102.86	0.06	
214	0.47	102.86	0.06	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 1
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/13/99
GW-9	



Hydraulic conductivity [cm/s]: 4.79×10^{-3}

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 2
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/13/99
GW-9	GW-9

Static water level: 100.34 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	100.56	0.22	
2	0.04	100.43	0.09	
3	0.05	100.33	-0.01	
4	0.06	100.43	0.09	
5	0.07	100.41	0.07	
6	0.08	100.37	0.03	
7	0.09	100.40	0.06	
8	0.10	100.40	0.06	
9	0.11	100.38	0.04	
10	0.12	100.39	0.05	
11	0.13	100.39	0.05	
12	0.14	100.39	0.05	
13	0.15	100.39	0.05	
14	0.16	100.39	0.05	
15	0.17	100.39	0.05	
16	0.18	100.39	0.05	
17	0.19	100.39	0.05	
18	0.20	100.39	0.05	
19	0.21	100.39	0.05	
20	0.22	100.38	0.04	
21	0.23	100.38	0.04	
22	0.24	100.38	0.04	
23	0.25	100.38	0.04	
24	0.26	100.38	0.04	
25	0.27	100.38	0.04	
26	0.28	100.38	0.04	
27	0.29	100.38	0.04	
28	0.30	100.38	0.04	
29	0.31	100.38	0.04	
30	0.32	100.38	0.04	
31	0.33	100.38	0.04	
32	0.35	100.38	0.04	
33	0.37	100.38	0.04	
34	0.38	100.38	0.04	
35	0.40	100.38	0.04	
36	0.42	100.38	0.04	
37	0.43	100.38	0.04	
38	0.45	100.38	0.04	
39	0.47	100.38	0.04	
40	0.48	100.38	0.04	
41	0.50	100.38	0.04	
42	0.52	100.38	0.04	
43	0.53	100.38	0.04	
44	0.55	100.38	0.04	
45	0.57	100.38	0.04	
46	0.58	100.38	0.04	
47	0.60	100.38	0.04	
48	0.62	100.38	0.04	
49	0.63	100.38	0.04	
50	0.65	100.38	0.04	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 3
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/13/99
GW-9	GW-9

Static water level: 100.34 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	0.67	100.38	0.04	
52	0.68	100.38	0.04	
53	0.70	100.38	0.04	
54	0.72	100.38	0.04	
55	0.73	100.38	0.04	
56	0.75	100.38	0.04	
57	0.77	100.38	0.04	
58	0.78	100.38	0.04	
59	0.80	100.37	0.03	
60	0.82	100.37	0.03	
61	0.83	100.37	0.03	
62	0.85	100.37	0.03	
63	0.87	100.37	0.03	
64	0.88	100.37	0.03	
65	0.90	100.37	0.03	
66	0.92	100.37	0.03	
67	0.93	100.37	0.03	
68	0.95	100.37	0.03	
69	0.97	100.37	0.03	
70	0.98	100.37	0.03	
71	1.00	100.37	0.03	
72	1.20	100.37	0.03	
73	1.40	100.37	0.03	
74	1.60	100.37	0.03	
75	1.80	100.36	0.02	
76	2.00	100.36	0.02	
77	2.20	100.36	0.02	
78	2.40	100.36	0.02	
79	2.60	100.36	0.02	
80	2.80	100.36	0.02	
81	3.00	100.36	0.02	
82	3.20	100.36	0.02	
83	3.40	100.36	0.02	
84	3.60	100.35	0.01	
85	3.80	100.35	0.01	
86	4.00	100.35	0.01	
87	4.20	100.35	0.01	
88	4.40	100.35	0.01	
89	4.60	100.35	0.01	
90	4.80	100.35	0.01	
91	5.00	100.35	0.01	
92	5.20	100.35	0.01	
93	5.40	100.35	0.01	
94	5.60	100.35	0.01	
95	5.80	100.35	0.01	
96	6.00	100.35	0.01	
97	6.20	100.35	0.01	
98	6.40	100.35	0.01	
99	6.60	100.35	0.01	
100	6.80	100.35	0.01	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 4
		Project: Roblin Steel	
		Evaluated by: SLG	

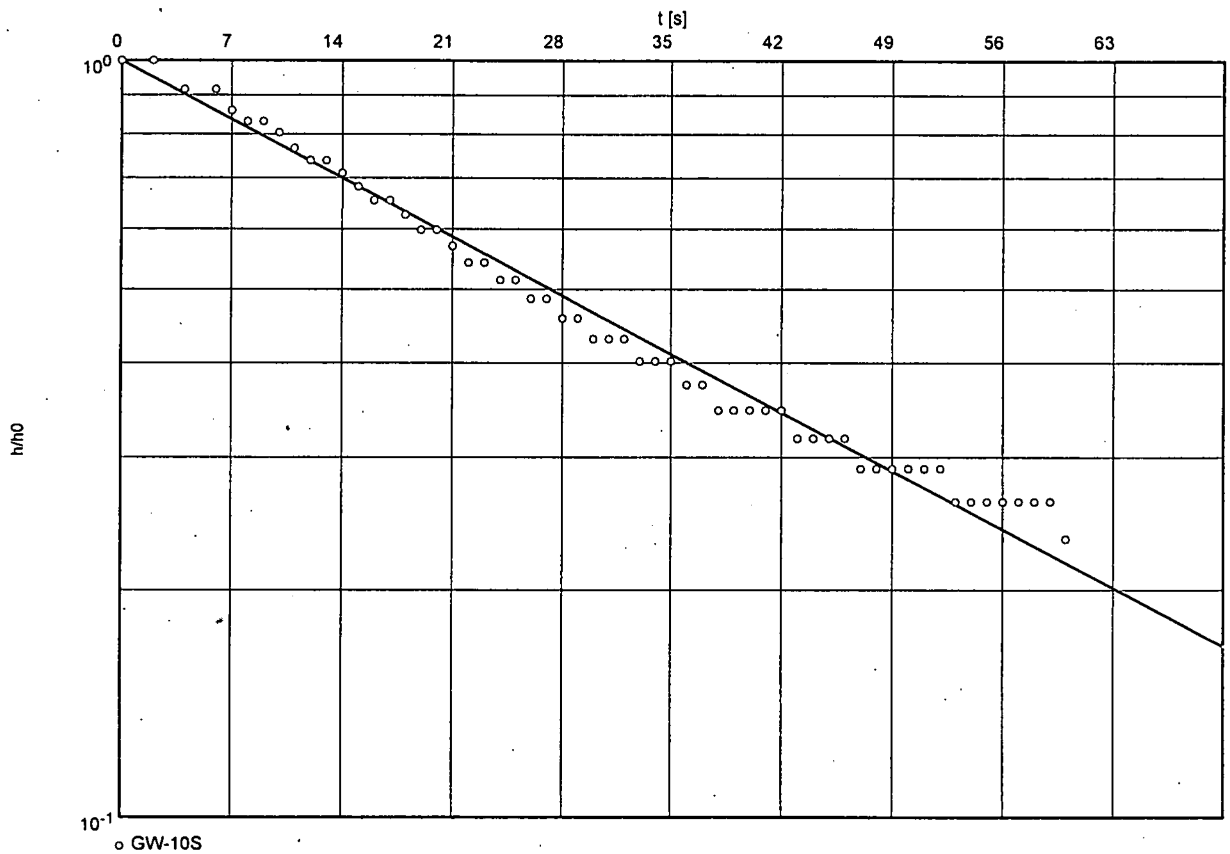
Slug Test No.	Test conducted on: 1/13/99
GW-9	GW-9

Static water level: 100.34 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	7.00	100.35	0.01	
102	7.20	100.35	0.01	
103	7.40	100.35	0.01	
104	7.60	100.35	0.01	
105	7.80	100.35	0.01	
106	8.00	100.35	0.01	
107	8.20	100.35	0.01	
108	8.40	100.34	0.00	
109	8.60	100.34	0.00	
110	8.80	100.34	0.00	
111	9.00	100.34	0.00	
112	9.20	100.34	0.00	
113	9.40	100.34	0.00	
114	9.60	100.34	0.00	
115	9.80	100.34	0.00	
116	10.00	100.34	0.00	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 1
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-10S	



Hydraulic conductivity [cm/s]: 6.25×10^{-4}

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 2
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-10	GW-10

Static water level: 99.62 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	99.51	-0.11	
2	0.02	99.90	0.28	
3	0.03	99.97	0.35	
4	0.04	99.85	0.23	
5	0.05	99.88	0.26	
6	0.06	99.94	0.32	
7	0.07	99.97	0.35	
8	0.08	99.98	0.36	
9	0.09	99.96	0.34	
10	0.10	99.94	0.32	
11	0.11	99.92	0.30	
12	0.12	99.91	0.29	
13	0.13	99.91	0.29	
14	0.14	99.91	0.29	
15	0.15	99.91	0.29	
16	0.16	99.90	0.28	
17	0.17	99.89	0.27	
18	0.18	99.89	0.27	
19	0.19	99.88	0.26	
20	0.20	99.88	0.26	
21	0.21	99.88	0.26	
22	0.22	99.87	0.25	
23	0.23	99.87	0.25	
24	0.24	99.86	0.24	
25	0.25	99.86	0.24	
26	0.26	99.85	0.23	
27	0.27	99.85	0.23	
28	0.28	99.85	0.23	
29	0.29	99.84	0.22	
30	0.30	99.84	0.22	
31	0.31	99.83	0.21	
32	0.32	99.83	0.21	
33	0.33	99.83	0.21	
34	0.35	99.82	0.20	
35	0.37	99.81	0.19	
36	0.38	99.81	0.19	
37	0.40	99.80	0.18	
38	0.42	99.80	0.18	
39	0.43	99.79	0.17	
40	0.45	99.79	0.17	
41	0.47	99.78	0.16	
42	0.48	99.78	0.16	
43	0.50	99.77	0.15	
44	0.52	99.77	0.15	
45	0.53	99.77	0.15	
46	0.55	99.76	0.14	
47	0.57	99.76	0.14	
48	0.58	99.76	0.14	
49	0.60	99.75	0.13	
50	0.62	99.75	0.13	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 3
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-10	GW-10

Static water level: 99.62 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	0.63	99.74	0.12	
52	0.65	99.74	0.12	
53	0.67	99.74	0.12	
54	0.68	99.74	0.12	
55	0.70	99.74	0.12	
56	0.72	99.73	0.11	
57	0.73	99.73	0.11	
58	0.75	99.73	0.11	
59	0.77	99.73	0.11	
60	0.78	99.72	0.10	
61	0.80	99.72	0.10	
62	0.82	99.72	0.10	
63	0.83	99.72	0.10	
64	0.85	99.72	0.10	
65	0.87	99.72	0.10	
66	0.88	99.71	0.09	
67	0.90	99.71	0.09	
68	0.92	99.71	0.09	
69	0.93	99.71	0.09	
70	0.95	99.71	0.09	
71	0.97	99.71	0.09	
72	0.98	99.71	0.09	
73	1.00	99.70	0.08	
74	1.20	99.69	0.07	
75	1.40	99.68	0.06	
76	1.60	99.68	0.06	
77	1.80	99.67	0.05	
78	2.00	99.67	0.05	
79	2.20	99.67	0.05	
80	2.40	99.66	0.04	
81	2.60	99.66	0.04	
82	2.80	99.66	0.04	
83	3.00	99.66	0.04	
84	3.20	99.65	0.03	
85	3.40	99.65	0.03	
86	3.60	99.65	0.03	
87	3.80	99.65	0.03	
88	4.00	99.65	0.03	
89	4.20	99.65	0.03	
90	4.40	99.64	0.02	
91	4.60	99.64	0.02	
92	4.80	99.64	0.02	
93	5.00	99.64	0.02	
94	5.20	99.64	0.02	
95	5.40	99.64	0.02	
96	5.60	99.64	0.02	
97	5.80	99.64	0.02	
98	6.00	99.64	0.02	
99	6.20	99.63	0.01	
100	6.40	99.63	0.01	

STEARNS & WHELER, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, N.Y.
(315) 655-8161

slug/bail test analysis
BOUWER-RICE's method

Date: 14.01.1999 |

Project: Roblin Steel

Evaluated by: SLG

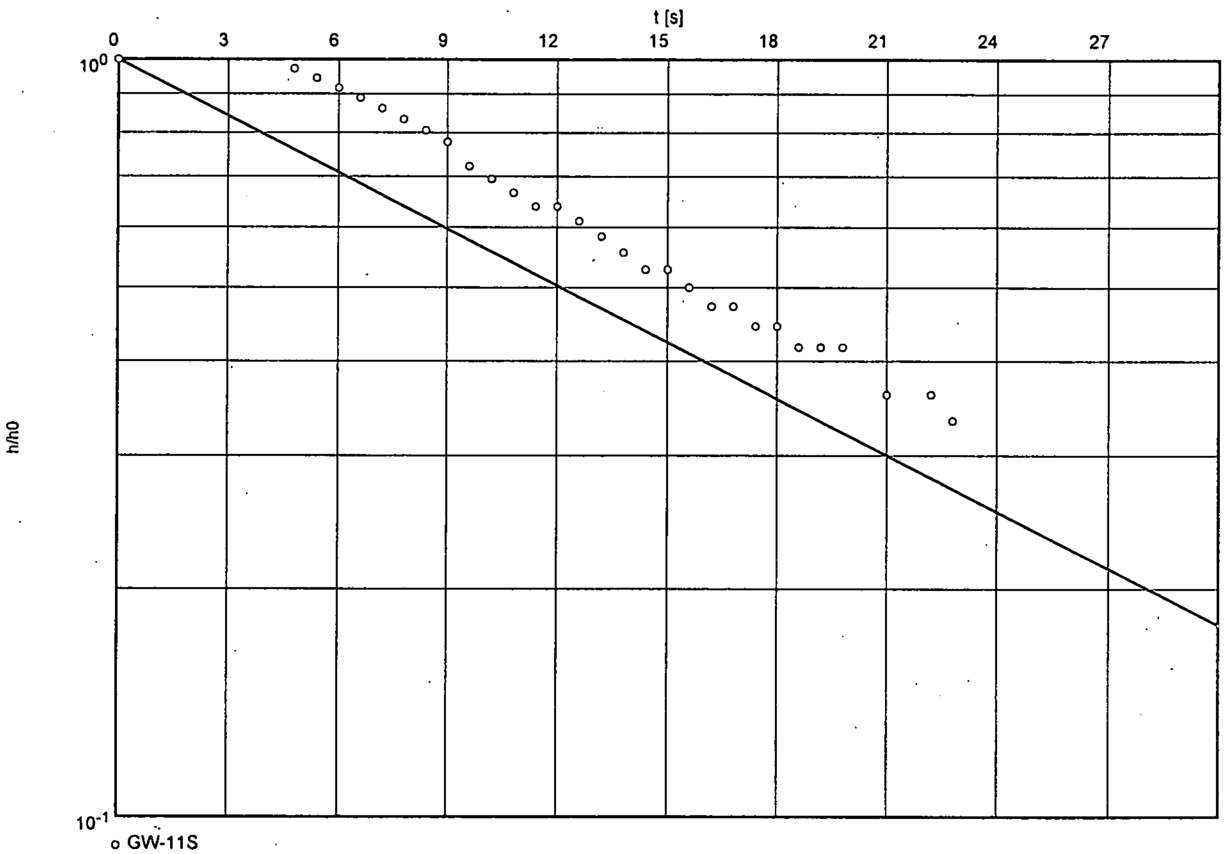
Slug Test No.	Test conducted on: 1/12/99
GW-10	GW-10

Static water level: 99.62 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	6.60	99.63	0.01	
102	6.80	99.63	0.01	
103	7.00	99.63	0.01	
104	7.20	99.63	0.01	
105	7.40	99.63	0.01	
106	7.60	99.63	0.01	
107	7.80	99.63	0.01	
108	8.00	99.63	0.01	
109	8.20	99.63	0.01	
110	8.40	99.63	0.01	
111	8.60	99.62	0.00	
112	8.80	99.62	0.00	
113	9.00	99.62	0.00	
114	9.20	99.62	0.00	
115	9.40	99.62	0.00	
116	9.60	99.62	0.00	
117	9.80	99.62	0.00	
118	10.00	99.62	0.00	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 1
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-11S	



Hydraulic conductivity [cm/s]: 1.45×10^{-3}

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 2
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-11S	GW-11S

Static water level: 101.98 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	102.34	0.36	
2	0.00	3.35	-98.64	
3	0.00	3.35	-98.63	
4	0.00	3.35	-98.63	
5	0.00	3.36	-98.62	
6	0.00	3.35	-98.63	
7	0.00	3.36	-98.62	
8	0.00	3.37	-98.61	
9	0.00	3.36	-98.63	
10	0.00	3.36	-98.62	
11	0.00	3.36	-98.62	
12	0.00	3.36	-98.62	
13	0.00	3.36	-98.62	
14	0.00	3.36	-98.62	
15	0.00	3.36	-98.62	
16	0.00	3.36	-98.62	
17	0.00	3.36	-98.62	
18	0.00	3.36	-98.62	
19	0.00	3.36	-98.62	
20	0.00	3.36	-98.62	
21	0.00	3.36	-98.62	
22	0.00	3.36	-98.62	
23	0.00	3.36	-98.62	
24	0.00	3.36	-98.62	
25	0.00	3.36	-98.62	
26	0.00	3.36	-98.62	
27	0.00	3.36	-98.62	
28	0.00	3.36	-98.62	
29	0.00	3.36	-98.62	
30	0.00	3.36	-98.62	
31	0.00	3.36	-98.63	
32	0.00	3.36	-98.63	
33	0.00	3.36	-98.63	
34	0.00	3.36	-98.63	
35	0.00	3.36	-98.63	
36	0.00	3.36	-98.63	
37	0.00	3.36	-98.63	
38	0.00	3.36	-98.63	
39	0.00	3.36	-98.63	
40	0.00	3.36	-98.63	
41	0.00	3.36	-98.63	
42	0.00	3.36	-98.63	
43	0.00	3.36	-98.63	
44	0.00	3.35	-98.63	
45	0.00	3.35	-98.63	
46	0.00	3.35	-98.63	
47	0.00	3.35	-98.63	
48	0.00	3.35	-98.63	
49	0.00	3.35	-98.63	
50	0.00	3.35	-98.63	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 3
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-11S	GW-11S

Static water level: 101.98 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	0.00	3.35	-98.63	
52	0.00	3.35	-98.63	
53	0.00	3.35	-98.63	
54	0.00	3.35	-98.63	
55	0.00	3.35	-98.63	
56	0.00	3.35	-98.63	
57	0.00	3.35	-98.63	
58	0.00	3.35	-98.63	
59	0.00	3.35	-98.63	
60	0.00	3.35	-98.63	
61	0.00	3.35	-98.63	
62	0.00	3.35	-98.63	
63	0.00	3.35	-98.63	
64	0.00	3.35	-98.63	
65	0.00	3.35	-98.63	
66	0.00	3.35	-98.63	
67	0.00	3.35	-98.63	
68	0.00	3.35	-98.63	
69	0.00	3.35	-98.63	
70	0.00	3.35	-98.63	
71	0.00	3.35	-98.63	
72	0.00	3.35	-98.63	
73	0.00	3.35	-98.63	
74	0.00	3.35	-98.63	
75	0.00	3.35	-98.63	
76	0.00	3.35	-98.63	
77	0.00	3.35	-98.63	
78	0.00	3.35	-98.63	
79	0.00	3.35	-98.63	
80	0.00	3.35	-98.63	
81	0.00	3.35	-98.63	
82	0.00	3.35	-98.63	
83	0.00	3.35	-98.63	
84	0.00	3.35	-98.63	
85	0.00	3.35	-98.63	
86	0.00	3.35	-98.63	
87	0.00	3.35	-98.63	
88	0.00	3.35	-98.63	
89	0.00	3.35	-98.63	
90	0.00	3.35	-98.63	
91	0.01	3.35	-98.63	
92	0.01	3.35	-98.63	
93	0.01	3.35	-98.63	
94	0.01	3.35	-98.63	
95	0.01	3.35	-98.63	
96	0.01	3.35	-98.63	
97	0.01	3.35	-98.63	
98	0.01	3.35	-98.63	
99	0.01	3.35	-98.63	
100	0.01	3.35	-98.63	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 4
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-11S	GW-11S

Static water level: 101.98 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	0.01	3.35	-98.63	
102	0.01	3.35	-98.63	
103	0.01	3.35	-98.63	
104	0.01	3.35	-98.63	
105	0.01	3.35	-98.63	
106	0.01	3.35	-98.63	
107	0.01	3.35	-98.63	
108	0.01	3.35	-98.63	
109	0.01	3.35	-98.63	
110	0.01	3.35	-98.63	
111	0.01	3.35	-98.63	
112	0.01	3.35	-98.63	
113	0.01	3.35	-98.63	
114	0.01	3.35	-98.63	
115	0.01	3.35	-98.63	
116	0.01	3.35	-98.63	
117	0.01	3.35	-98.63	
118	0.01	3.35	-98.63	
119	0.01	3.35	-98.63	
120	0.01	3.35	-98.63	
121	0.01	3.35	-98.63	
122	0.01	3.35	-98.63	
123	0.01	3.35	-98.63	
124	0.01	3.35	-98.63	
125	0.01	3.35	-98.63	
126	0.01	3.35	-98.63	
127	0.01	3.35	-98.63	
128	0.01	3.35	-98.63	
129	0.01	3.35	-98.63	
130	0.01	3.35	-98.63	
131	0.01	3.35	-98.63	
132	0.01	3.35	-98.63	
133	0.01	3.35	-98.63	
134	0.01	3.35	-98.63	
135	0.02	3.35	-98.63	
136	0.02	3.35	-98.63	
137	0.02	3.35	-98.63	
138	0.02	3.35	-98.63	
139	0.02	3.35	-98.63	
140	0.02	3.35	-98.63	
141	0.02	3.35	-98.63	
142	0.02	3.35	-98.63	
143	0.02	3.35	-98.63	
144	0.03	3.35	-98.63	
145	0.03	3.35	-98.63	
146	0.03	3.35	-98.63	
147	0.04	3.35	-98.63	
148	0.04	3.35	-98.63	
149	0.04	3.35	-98.63	
150	0.05	3.35	-98.63	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 5
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-11S	GW-11S

Static water level: 101.98 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
151	0.05	3.35	-98.63	
152	0.05	3.35	-98.63	
153	0.06	3.35	-98.63	
154	0.06	3.35	-98.63	
155	0.06	3.35	-98.63	
156	0.07	3.35	-98.63	
157	0.07	3.35	-98.63	
158	0.07	3.35	-98.63	
159	0.08	3.35	-98.63	
160	0.08	102.33	0.35	
161	0.08	3.35	-98.64	
162	0.09	3.35	-98.64	
163	0.09	102.32	0.34	
164	0.09	3.35	-98.64	
165	0.10	3.35	-98.64	
166	0.10	102.31	0.33	
167	0.10	3.35	-98.64	
168	0.11	3.35	-98.64	
169	0.11	102.30	0.32	
170	0.11	3.35	-98.64	
171	0.12	3.35	-98.64	
172	0.12	102.29	0.31	
173	0.12	3.35	-98.64	
174	0.13	3.35	-98.64	
175	0.13	3.35	-98.64	
176	0.13	102.28	0.30	
177	0.13	3.35	-98.64	
178	0.14	3.35	-98.64	
179	0.14	3.35	-98.64	
180	0.14	102.27	0.29	
181	0.14	3.35	-98.64	
182	0.15	3.35	-98.64	
183	0.15	102.26	0.28	
184	0.15	3.35	-98.64	
185	0.16	3.35	-98.64	
186	0.16	102.24	0.26	
187	0.16	3.35	-98.64	
188	0.17	3.35	-98.64	
189	0.17	102.23	0.25	
190	0.18	102.22	0.24	
191	0.19	102.21	0.23	
192	0.20	102.21	0.23	
193	0.21	102.20	0.22	
194	0.22	102.19	0.21	
195	0.23	102.18	0.20	
196	0.24	102.17	0.19	
197	0.25	102.17	0.19	
198	0.26	102.16	0.18	
199	0.27	102.15	0.17	
200	0.28	102.15	0.17	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 6
		Project: Roblin Steel	
		Evaluated by: SLG	

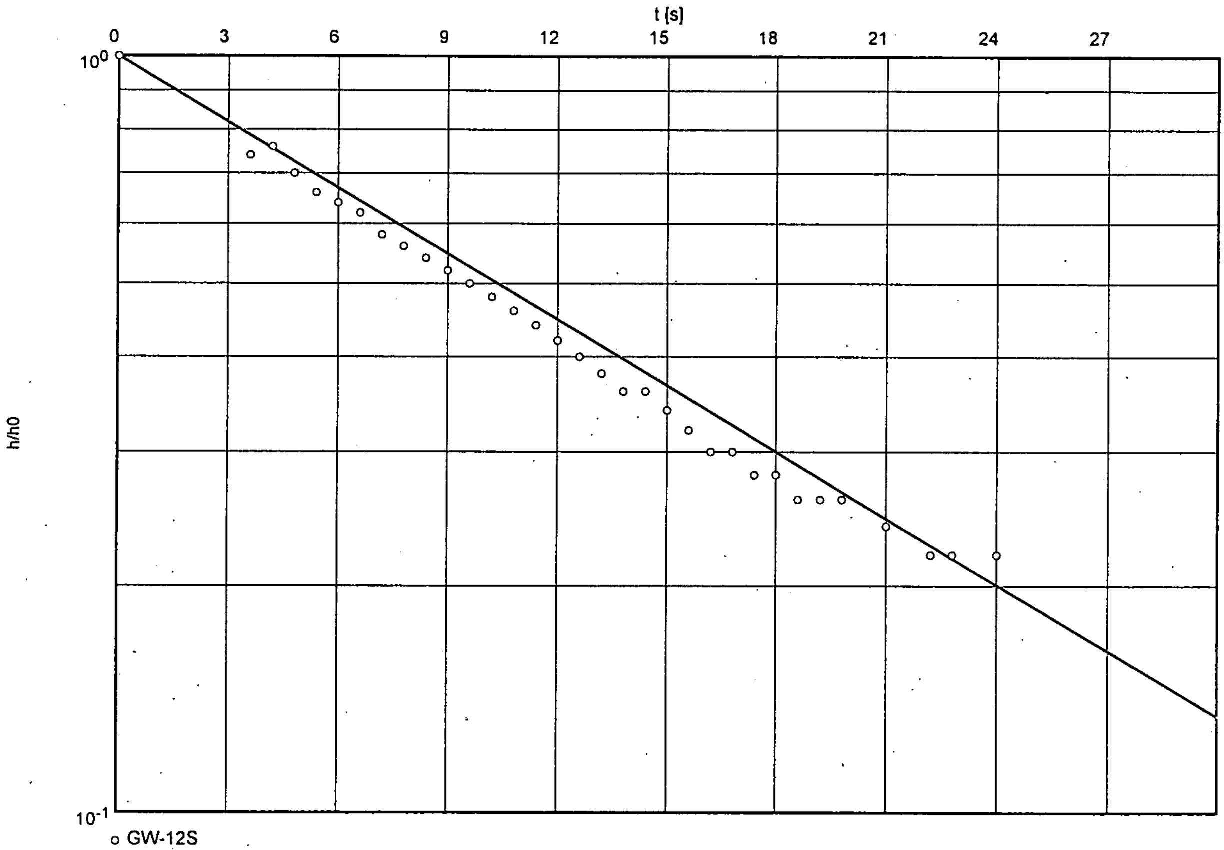
Slug Test No.	Test conducted on: 1/12/99
GW-11S	GW-11S

Static water level: 101.98 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
201	0.29	102.14	0.16	
202	0.30	102.14	0.16	
203	0.31	102.13	0.15	
204	0.32	102.13	0.15	
205	0.33	102.13	0.15	
206	0.35	102.11	0.13	
207	0.37	102.11	0.13	
208	0.38	102.10	0.12	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 1
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-12S	



Hydraulic conductivity [cm/s]: 1.70×10^{-3}

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	Pumping test analysis Time-Drawdown plot with discharge	Date: 14.01.1999	Page 2
		Project: Roblin Steel	
		Evaluated by: SLG	

Pumping Test No.	Test conducted on: 1/12/99
GW-12S	GW-12S

Static water level: 101.20 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	101.15	-0.05	
2	0.01	101.31	0.11	
3	0.02	101.50	0.30	
4	0.03	101.63	0.43	
5	0.04	101.70	0.50	
6	0.05	101.56	0.36	
7	0.06	101.57	0.37	
8	0.07	101.58	0.38	
9	0.08	101.55	0.35	
10	0.09	101.53	0.33	
11	0.10	101.52	0.32	
12	0.11	101.51	0.31	
13	0.12	101.49	0.29	
14	0.13	101.48	0.28	
15	0.14	101.47	0.27	
16	0.15	101.46	0.26	
17	0.16	101.45	0.25	
18	0.17	101.44	0.24	
19	0.18	101.43	0.23	
20	0.19	101.42	0.22	
21	0.20	101.41	0.21	
22	0.21	101.40	0.20	
23	0.22	101.39	0.19	
24	0.23	101.38	0.18	
25	0.24	101.38	0.18	
26	0.25	101.37	0.17	
27	0.26	101.36	0.16	
28	0.27	101.35	0.15	
29	0.28	101.35	0.15	
30	0.29	101.34	0.14	
31	0.30	101.34	0.14	
32	0.31	101.33	0.13	
33	0.32	101.33	0.13	
34	0.33	101.33	0.13	
35	0.35	101.32	0.12	
36	0.37	101.31	0.11	
37	0.38	101.31	0.11	
38	0.40	101.31	0.11	
39	0.42	101.30	0.10	
40	0.43	101.30	0.10	
41	0.45	101.30	0.10	
42	0.47	101.30	0.10	
43	0.48	101.30	0.10	
44	0.50	101.29	0.09	
45	0.52	101.29	0.09	
46	0.53	101.29	0.09	
47	0.55	101.29	0.09	
48	0.57	101.29	0.09	
49	0.58	101.29	0.09	
50	0.60	101.28	0.08	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	Pumping test analysis Time-Drawdown plot with discharge	Date: 14.01.1999	Page 3
		Project: Roblin Steel	
		Evaluated by: SLG	

Pumping Test No.	Test conducted on: 1/12/99
GW-12S	GW-12S

Static water level: 101.20 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	0.62	101.28	0.08	
52	0.63	101.28	0.08	
53	0.65	101.28	0.08	
54	0.67	101.28	0.08	
55	0.68	101.28	0.08	
56	0.70	101.28	0.08	
57	0.72	101.28	0.08	
58	0.73	101.28	0.08	
59	0.75	101.27	0.07	
60	0.77	101.27	0.07	
61	0.78	101.27	0.07	
62	0.80	101.27	0.07	
63	0.82	101.27	0.07	
64	0.83	101.27	0.07	
65	0.85	101.27	0.07	
66	0.87	101.27	0.07	
67	0.88	101.27	0.07	
68	0.90	101.27	0.07	
69	0.92	101.27	0.07	
70	0.93	101.27	0.07	
71	0.95	101.27	0.07	
72	0.97	101.27	0.07	
73	0.98	101.27	0.07	
74	1.00	101.26	0.06	
75	1.20	101.26	0.06	
76	1.40	101.25	0.05	
77	1.60	101.25	0.05	
78	1.80	101.25	0.05	
79	2.00	101.24	0.04	
80	2.20	101.24	0.04	
81	2.40	101.24	0.04	
82	2.60	101.24	0.04	
83	2.80	101.24	0.04	
84	3.00	101.23	0.03	
85	3.20	101.23	0.03	
86	3.40	101.23	0.03	
87	3.60	101.23	0.03	
88	3.80	101.23	0.03	
89	4.00	101.23	0.03	
90	4.20	101.22	0.02	
91	4.40	101.22	0.02	
92	4.60	101.22	0.02	
93	4.80	101.22	0.02	
94	5.00	101.22	0.02	
95	5.20	101.22	0.02	
96	5.40	101.22	0.02	
97	5.60	101.22	0.02	
98	5.80	101.21	0.01	
99	6.00	101.21	0.01	
100	6.20	101.21	0.01	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	Pumping test analysis Time-Drawdown plot with discharge	Date: 14.01.1999	Page 4
		Project: Roblin Steel	
		Evaluated by: SLG	

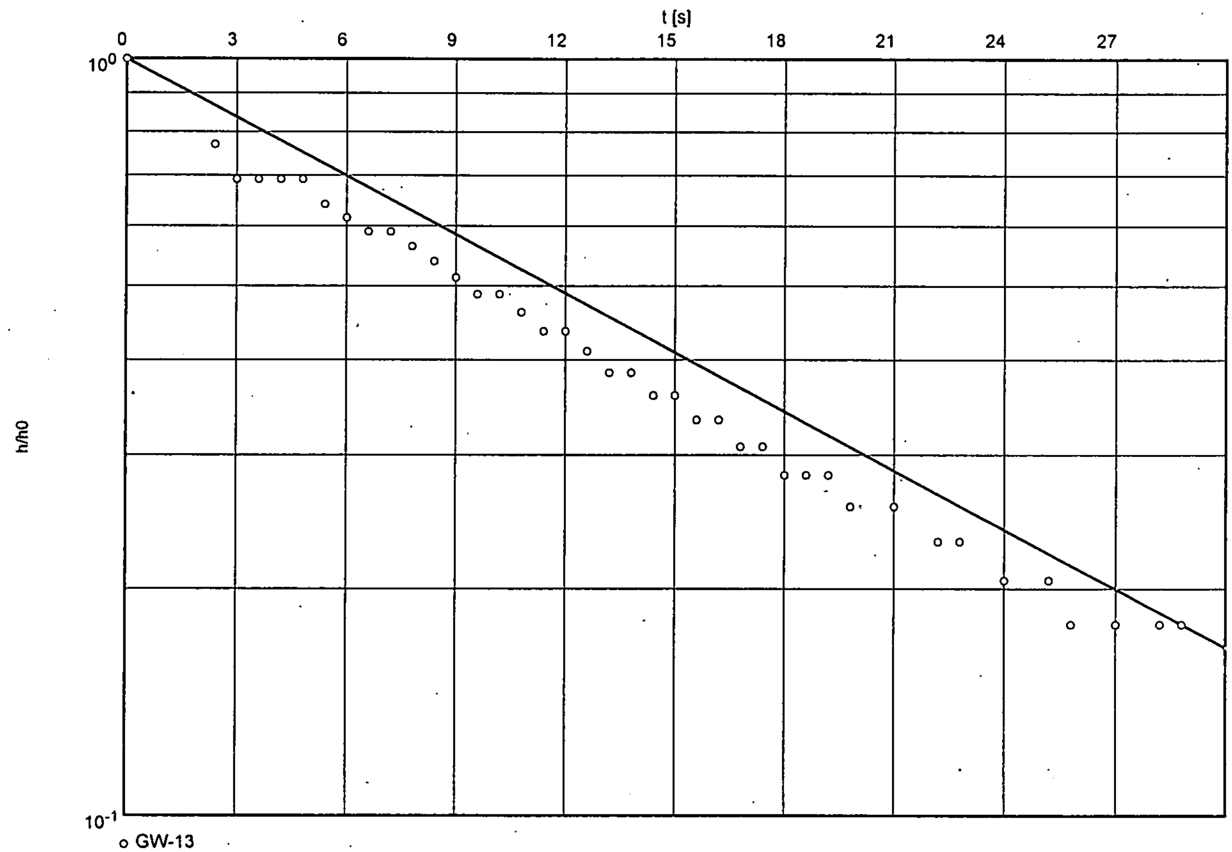
Pumping Test No.	Test conducted on: 1/12/99
GW-12S	GW-12S

Static water level: 101.20 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	6.40	101.21	0.01	
102	6.60	101.21	0.01	
103	6.80	101.21	0.01	
104	7.00	101.21	0.01	
105	7.20	101.21	0.01	
106	7.40	101.21	0.01	
107	7.60	101.21	0.01	
108	7.80	101.21	0.01	
109	8.00	101.21	0.01	
110	8.20	101.21	0.01	
111	8.40	101.20	0.00	
112	8.60	101.20	0.00	
113	8.80	101.20	0.00	
114	9.00	101.20	0.00	
115	9.20	101.20	0.00	
116	9.40	101.20	0.00	
117	9.60	101.20	0.00	
118	9.80	101.20	0.00	
119	10.00	101.20	0.00	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 1
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-13	



Hydraulic conductivity [cm/s]: 1.51×10^{-3}

STEARNS & WHELER, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, N.Y.
(315) 655-8161

slug/bail test analysis
BOUWER-RICE's method

Date: 14.01.1999 | Page 2

Project: Roblin Steel

Evaluated by: SLG

Slug Test No. | Test conducted on: 1/12/99

GW-13 | GW-13

Static water level: 98.80 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	99.19	0.39	
2	0.00	3.24	-95.56	
3	0.00	3.24	-95.56	
4	0.00	3.24	-95.56	
5	0.00	3.25	-95.55	
6	0.00	3.24	-95.55	
7	0.00	3.25	-95.55	
8	0.00	3.25	-95.55	
9	0.00	3.25	-95.55	
10	0.00	3.25	-95.55	
11	0.00	3.25	-95.55	
12	0.00	3.25	-95.55	
13	0.00	3.25	-95.55	
14	0.00	3.25	-95.55	
15	0.00	3.25	-95.55	
16	0.00	3.25	-95.55	
17	0.00	3.25	-95.55	
18	0.00	3.25	-95.55	
19	0.00	3.25	-95.55	
20	0.00	3.25	-95.55	
21	0.00	3.25	-95.55	
22	0.00	3.25	-95.55	
23	0.00	3.25	-95.55	
24	0.00	3.25	-95.55	
25	0.00	3.25	-95.55	
26	0.00	3.25	-95.55	
27	0.00	3.25	-95.55	
28	0.00	3.25	-95.55	
29	0.00	3.25	-95.55	
30	0.00	3.25	-95.55	
31	0.00	3.25	-95.55	
32	0.00	3.25	-95.55	
33	0.00	3.25	-95.55	
34	0.00	3.25	-95.55	
35	0.00	3.25	-95.55	
36	0.00	3.25	-95.55	
37	0.00	3.25	-95.55	
38	0.00	3.25	-95.55	
39	0.00	3.25	-95.55	
40	0.00	3.25	-95.55	
41	0.00	3.25	-95.55	
42	0.00	3.25	-95.55	
43	0.00	3.25	-95.55	
44	0.00	3.25	-95.55	
45	0.00	3.25	-95.55	
46	0.00	3.25	-95.55	
47	0.00	3.25	-95.55	
48	0.00	3.25	-95.55	
49	0.00	3.25	-95.55	
50	0.00	3.25	-95.55	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 3
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-13	GW-13

Static water level: 98.80 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	0.00	3.25	-95.55	
52	0.00	3.25	-95.55	
53	0.00	3.25	-95.55	
54	0.00	3.25	-95.55	
55	0.00	3.25	-95.55	
56	0.00	3.25	-95.55	
57	0.00	3.25	-95.55	
58	0.00	3.25	-95.55	
59	0.00	3.25	-95.55	
60	0.00	3.25	-95.55	
61	0.00	3.25	-95.55	
62	0.00	3.25	-95.55	
63	0.00	3.25	-95.55	
64	0.00	3.25	-95.55	
65	0.00	3.25	-95.55	
66	0.00	3.25	-95.55	
67	0.00	3.25	-95.55	
68	0.00	3.25	-95.55	
69	0.00	3.25	-95.55	
70	0.00	3.25	-95.55	
71	0.00	3.25	-95.55	
72	0.00	3.25	-95.55	
73	0.00	3.25	-95.55	
74	0.00	3.25	-95.55	
75	0.00	3.25	-95.55	
76	0.00	3.25	-95.55	
77	0.00	3.25	-95.55	
78	0.00	3.25	-95.55	
79	0.00	3.25	-95.55	
80	0.00	3.25	-95.55	
81	0.00	3.25	-95.55	
82	0.00	3.25	-95.55	
83	0.00	3.25	-95.55	
84	0.00	3.25	-95.55	
85	0.00	3.25	-95.55	
86	0.00	3.25	-95.55	
87	0.00	3.25	-95.55	
88	0.00	3.25	-95.55	
89	0.00	3.25	-95.55	
90	0.00	3.25	-95.55	
91	0.01	3.25	-95.55	
92	0.01	3.25	-95.55	
93	0.01	3.25	-95.55	
94	0.01	3.24	-95.55	
95	0.01	3.24	-95.55	
96	0.01	3.24	-95.55	
97	0.01	3.24	-95.55	
98	0.01	3.24	-95.55	
99	0.01	3.24	-95.55	
100	0.01	3.24	-95.55	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 4
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-13	GW-13

Static water level: 98.80 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	0.01	3.24	-95.55	
102	0.01	3.24	-95.55	
103	0.01	3.24	-95.55	
104	0.01	3.24	-95.55	
105	0.01	3.24	-95.56	
106	0.01	3.24	-95.56	
107	0.01	3.24	-95.56	
108	0.01	3.24	-95.56	
109	0.01	3.24	-95.56	
110	0.01	3.24	-95.56	
111	0.01	3.24	-95.56	
112	0.01	3.24	-95.56	
113	0.01	3.24	-95.56	
114	0.01	3.24	-95.56	
115	0.01	3.24	-95.56	
116	0.01	3.24	-95.56	
117	0.01	3.24	-95.56	
118	0.01	3.24	-95.56	
119	0.01	3.24	-95.56	
120	0.01	3.24	-95.56	
121	0.01	3.24	-95.56	
122	0.01	3.24	-95.56	
123	0.01	3.24	-95.56	
124	0.01	3.24	-95.56	
125	0.01	3.24	-95.56	
126	0.01	3.24	-95.56	
127	0.01	3.24	-95.56	
128	0.01	3.24	-95.56	
129	0.01	3.24	-95.56	
130	0.01	3.24	-95.56	
131	0.01	3.24	-95.56	
132	0.01	3.24	-95.56	
133	0.01	3.24	-95.56	
134	0.01	3.24	-95.56	
135	0.02	3.24	-95.56	
136	0.02	3.24	-95.56	
137	0.02	3.24	-95.56	
138	0.02	3.24	-95.56	
139	0.02	3.24	-95.56	
140	0.02	3.24	-95.56	
141	0.02	3.24	-95.56	
142	0.02	3.24	-95.56	
143	0.02	3.24	-95.56	
144	0.03	3.24	-95.56	
145	0.03	3.24	-95.56	
146	0.03	3.24	-95.56	
147	0.04	3.24	-95.56	
148	0.04	99.10	0.30	
149	0.04	3.24	-95.56	
150	0.05	3.24	-95.56	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 5
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-13	GW-13

Static water level: 98.80 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
151	0.05	99.07	0.27	
152	0.05	3.24	-95.56	
153	0.06	3.24	-95.56	
154	0.06	99.07	0.27	
155	0.06	3.24	-95.56	
156	0.07	3.24	-95.56	
157	0.07	3.24	-95.56	
158	0.07	99.07	0.27	
159	0.07	3.24	-95.56	
160	0.08	3.24	-95.56	
161	0.08	99.07	0.27	
162	0.08	3.24	-95.56	
163	0.09	3.24	-95.56	
164	0.09	99.05	0.25	
165	0.09	3.24	-95.56	
166	0.10	3.24	-95.56	
167	0.10	99.04	0.24	
168	0.10	3.24	-95.56	
169	0.11	3.24	-95.56	
170	0.11	99.03	0.23	
171	0.11	3.24	-95.56	
172	0.12	3.24	-95.56	
173	0.12	99.03	0.23	
174	0.12	3.24	-95.56	
175	0.13	3.24	-95.56	
176	0.13	3.24	-95.56	
177	0.13	99.02	0.22	
178	0.13	3.24	-95.56	
179	0.14	3.24	-95.56	
180	0.14	3.24	-95.56	
181	0.14	99.01	0.21	
182	0.14	3.24	-95.56	
183	0.15	3.24	-95.56	
184	0.15	99.00	0.20	
185	0.15	3.24	-95.56	
186	0.16	3.24	-95.56	
187	0.16	98.99	0.19	
188	0.16	3.24	-95.56	
189	0.17	3.24	-95.56	
190	0.17	98.99	0.19	
191	0.18	98.98	0.18	
192	0.19	98.97	0.17	
193	0.20	98.97	0.17	
194	0.21	98.96	0.16	
195	0.22	98.95	0.15	
196	0.23	98.95	0.15	
197	0.24	98.94	0.14	
198	0.25	98.94	0.14	
199	0.26	98.93	0.13	
200	0.27	98.93	0.13	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 6
		Project: Roblin Steel	
		Evaluated by: SLG	

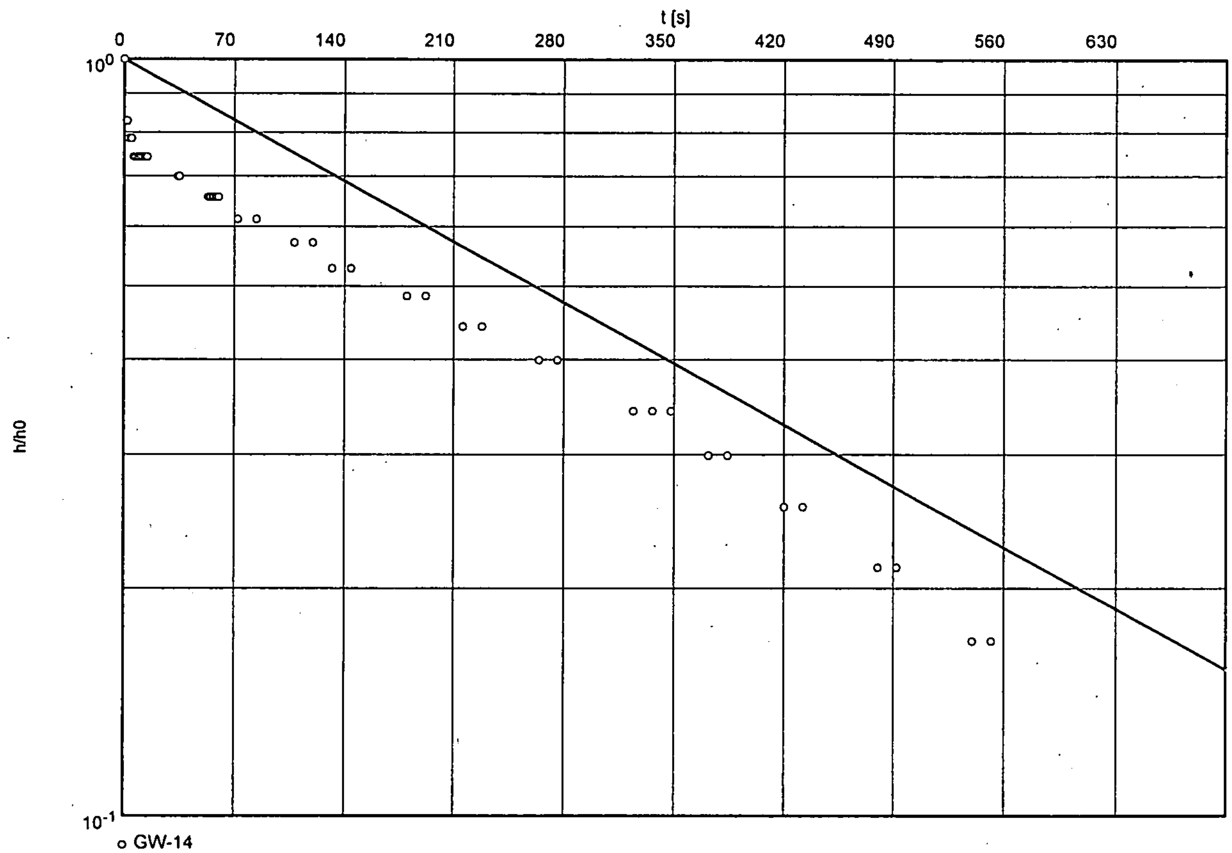
Slug Test No.	Test conducted on: 1/12/99
GW-13	GW-13

Static water level: 98.80 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
201	0.28	98.92	0.12	
202	0.29	98.92	0.12	
203	0.30	98.91	0.11	
204	0.31	98.91	0.11	
205	0.32	98.91	0.11	
206	0.33	98.90	0.10	
207	0.35	98.90	0.10	
208	0.37	98.89	0.09	
209	0.38	98.89	0.09	
210	0.40	98.88	0.08	
211	0.42	98.88	0.08	
212	0.43	98.87	0.07	
213	0.45	98.87	0.07	
214	0.47	98.87	0.07	
215	0.48	98.87	0.07	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 1
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-14	



Hydraulic conductivity [cm/s]: 6.74×10^{-5}

STEARNS & WHELER, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS
CAZENOVIA, N.Y.
(315) 655-8161

Pumping test analysis
Time-Drawdown plot
with discharge

Date: 14.01.1999 | Page 2
Project: Roblin Steel
Evaluated by: SLG

Pumping Test No.	Test conducted on: 1/12/99
GW-14	GW-14

Static water level: 100.23 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	99.91	-0.32	
2	0.01	100.09	-0.14	
3	0.02	100.46	0.23	
4	0.03	100.42	0.19	
5	0.04	100.42	0.19	
6	0.05	100.41	0.18	
7	0.06	100.41	0.18	
8	0.07	100.40	0.17	
9	0.08	100.41	0.18	
10	0.09	100.40	0.17	
11	0.10	100.40	0.17	
12	0.11	100.40	0.17	
13	0.12	100.40	0.17	
14	0.13	100.40	0.17	
15	0.14	100.40	0.17	
16	0.15	100.40	0.17	
17	0.16	100.40	0.17	
18	0.17	100.40	0.17	
19	0.18	100.40	0.17	
20	0.19	100.40	0.17	
21	0.20	100.40	0.17	
22	0.21	100.40	0.17	
23	0.22	100.40	0.17	
24	0.23	100.40	0.17	
25	0.24	100.40	0.17	
26	0.25	100.40	0.17	
27	0.26	100.39	0.16	
28	0.27	100.39	0.16	
29	0.28	100.39	0.16	
30	0.29	100.39	0.16	
31	0.30	100.39	0.16	
32	0.31	100.39	0.16	
33	0.32	100.39	0.16	
34	0.33	100.39	0.16	
35	0.35	100.39	0.16	
36	0.37	100.39	0.16	
37	0.38	100.39	0.16	
38	0.40	100.39	0.16	
39	0.42	100.39	0.16	
40	0.43	100.39	0.16	
41	0.45	100.39	0.16	
42	0.47	100.39	0.16	
43	0.48	100.39	0.16	
44	0.50	100.39	0.16	
45	0.52	100.39	0.16	
46	0.53	100.39	0.16	
47	0.55	100.39	0.16	
48	0.57	100.39	0.16	
49	0.58	100.39	0.16	
50	0.60	100.38	0.15	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	Pumping test analysis Time-Drawdown plot with discharge	Date: 14.01.1999	Page 3
		Project: Roblin Steel	
		Evaluated by: SLG	

Pumping Test No.	Test conducted on: 1/12/99
GW-14	GW-14

Static water level: 100.23 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	0.62	100.38	0.15	
52	0.63	100.38	0.15	
53	0.65	100.38	0.15	
54	0.67	100.38	0.15	
55	0.68	100.38	0.15	
56	0.70	100.38	0.15	
57	0.72	100.38	0.15	
58	0.73	100.38	0.15	
59	0.75	100.38	0.15	
60	0.77	100.38	0.15	
61	0.78	100.38	0.15	
62	0.80	100.38	0.15	
63	0.82	100.38	0.15	
64	0.83	100.38	0.15	
65	0.85	100.38	0.15	
66	0.87	100.38	0.15	
67	0.88	100.38	0.15	
68	0.90	100.38	0.15	
69	0.92	100.38	0.15	
70	0.93	100.38	0.15	
71	0.95	100.38	0.15	
72	0.97	100.38	0.15	
73	0.98	100.38	0.15	
74	1.00	100.38	0.15	
75	1.20	100.37	0.14	
76	1.40	100.37	0.14	
77	1.60	100.36	0.13	
78	1.80	100.36	0.13	
79	2.00	100.36	0.13	
80	2.20	100.35	0.12	
81	2.40	100.35	0.12	
82	2.60	100.35	0.12	
83	2.80	100.34	0.11	
84	3.00	100.34	0.11	
85	3.20	100.34	0.11	
86	3.40	100.33	0.10	
87	3.60	100.33	0.10	
88	3.80	100.33	0.10	
89	4.00	100.33	0.10	
90	4.20	100.32	0.09	
91	4.40	100.32	0.09	
92	4.60	100.32	0.09	
93	4.80	100.32	0.09	
94	5.00	100.31	0.08	
95	5.20	100.31	0.08	
96	5.40	100.31	0.08	
97	5.60	100.31	0.08	
98	5.80	100.31	0.08	
99	6.00	100.30	0.07	
100	6.20	100.30	0.07	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	Pumping test analysis Time-Drawdown plot with discharge	Date: 14.01.1999	Page 4
		Project: Roblin Steel	
		Evaluated by: SLG	

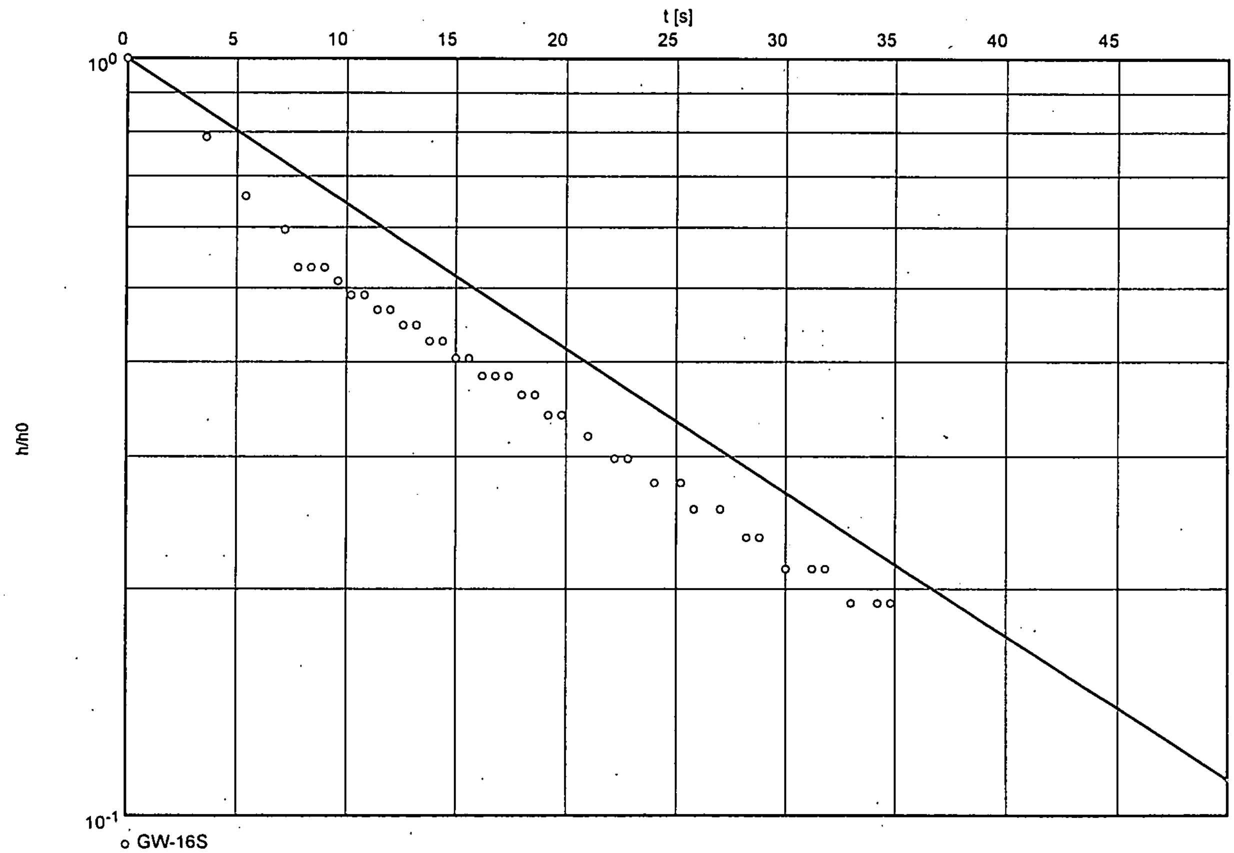
Pumping Test No.	Test conducted on: 1/12/99
GW-14	GW-14

Static water level: 100.23 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	6.40	100.30	0.07	
102	6.60	100.30	0.07	
103	6.80	100.29	0.06	
104	7.00	100.29	0.06	
105	7.20	100.29	0.06	
106	7.40	100.29	0.06	
107	7.60	100.29	0.06	
108	7.80	100.28	0.05	
109	8.00	100.28	0.05	
110	8.20	100.28	0.05	
111	8.40	100.28	0.05	
112	8.60	100.27	0.04	
113	8.80	100.27	0.04	
114	9.00	100.27	0.04	
115	9.20	100.27	0.04	
116	9.40	100.27	0.04	
117	9.60	100.27	0.04	
118	9.80	100.26	0.03	
119	10.00	100.26	0.03	
120	12.00	100.24	0.01	
121	14.00	100.23	0.00	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 1
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-16S	



Hydraulic conductivity [cm/s]: 1.11×10^{-3}

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 2
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-16S	GW-16S

Static water level: 100.78 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	101.25	0.47	
2	0.04	101.05	0.27	
3	0.05	101.05	0.27	
4	0.06	101.15	0.37	
5	0.07	101.06	0.28	
6	0.08	101.05	0.27	
7	0.09	101.09	0.31	
8	0.10	101.05	0.27	
9	0.11	101.04	0.26	
10	0.12	101.06	0.28	
11	0.13	101.03	0.25	
12	0.14	101.03	0.25	
13	0.15	101.03	0.25	
14	0.16	101.02	0.24	
15	0.17	101.01	0.23	
16	0.18	101.01	0.23	
17	0.19	101.00	0.22	
18	0.20	101.00	0.22	
19	0.21	100.99	0.21	
20	0.22	100.99	0.21	
21	0.23	100.98	0.20	
22	0.24	100.98	0.20	
23	0.25	100.97	0.19	
24	0.26	100.97	0.19	
25	0.27	100.96	0.18	
26	0.28	100.96	0.18	
27	0.29	100.96	0.18	
28	0.30	100.95	0.17	
29	0.31	100.95	0.17	
30	0.32	100.94	0.16	
31	0.33	100.94	0.16	
32	0.35	100.93	0.15	
33	0.37	100.92	0.14	
34	0.38	100.92	0.14	
35	0.40	100.91	0.13	
36	0.42	100.91	0.13	
37	0.43	100.90	0.12	
38	0.45	100.90	0.12	
39	0.47	100.89	0.11	
40	0.48	100.89	0.11	
41	0.50	100.88	0.10	
42	0.52	100.88	0.10	
43	0.53	100.88	0.10	
44	0.55	100.87	0.09	
45	0.57	100.87	0.09	
46	0.58	100.87	0.09	
47	0.60	100.86	0.08	
48	0.62	100.86	0.08	
49	0.63	100.86	0.08	
50	0.65	100.86	0.08	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 3
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-16S	GW-16S

Static water level: 100.78 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	0.67	100.85	0.07	
52	0.68	100.85	0.07	
53	0.70	100.85	0.07	
54	0.72	100.85	0.07	
55	0.73	100.85	0.07	
56	0.75	100.85	0.07	
57	0.77	100.84	0.06	
58	0.78	100.84	0.06	
59	0.80	100.84	0.06	
60	0.82	100.84	0.06	
61	0.83	100.84	0.06	
62	0.85	100.84	0.06	
63	0.87	100.84	0.06	
64	0.88	100.84	0.06	
65	0.90	100.84	0.06	
66	0.92	100.84	0.06	
67	0.93	100.83	0.05	
68	0.95	100.83	0.05	
69	0.97	100.83	0.05	
70	0.98	100.83	0.05	
71	1.00	100.83	0.05	
72	1.20	100.82	0.04	
73	1.40	100.82	0.04	
74	1.60	100.81	0.03	
75	1.80	100.81	0.03	
76	2.00	100.81	0.03	
77	2.20	100.81	0.03	
78	2.40	100.80	0.02	
79	2.60	100.80	0.02	
80	2.80	100.80	0.02	
81	3.00	100.80	0.02	
82	3.20	100.80	0.02	
83	3.40	100.80	0.02	
84	3.60	100.80	0.02	
85	3.80	100.79	0.01	
86	4.00	100.79	0.01	
87	4.20	100.79	0.01	
88	4.40	100.79	0.01	
89	4.60	100.79	0.01	
90	4.80	100.79	0.01	
91	5.00	100.79	0.01	
92	5.20	100.79	0.01	
93	5.40	100.79	0.01	
94	5.60	100.79	0.01	
95	5.80	100.79	0.01	
96	6.00	100.79	0.01	
97	6.20	100.79	0.01	
98	6.40	100.79	0.01	
99	6.60	100.79	0.01	
100	6.80	100.79	0.01	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 4
		Project: Roblin Steel	
		Evaluated by: SLG	

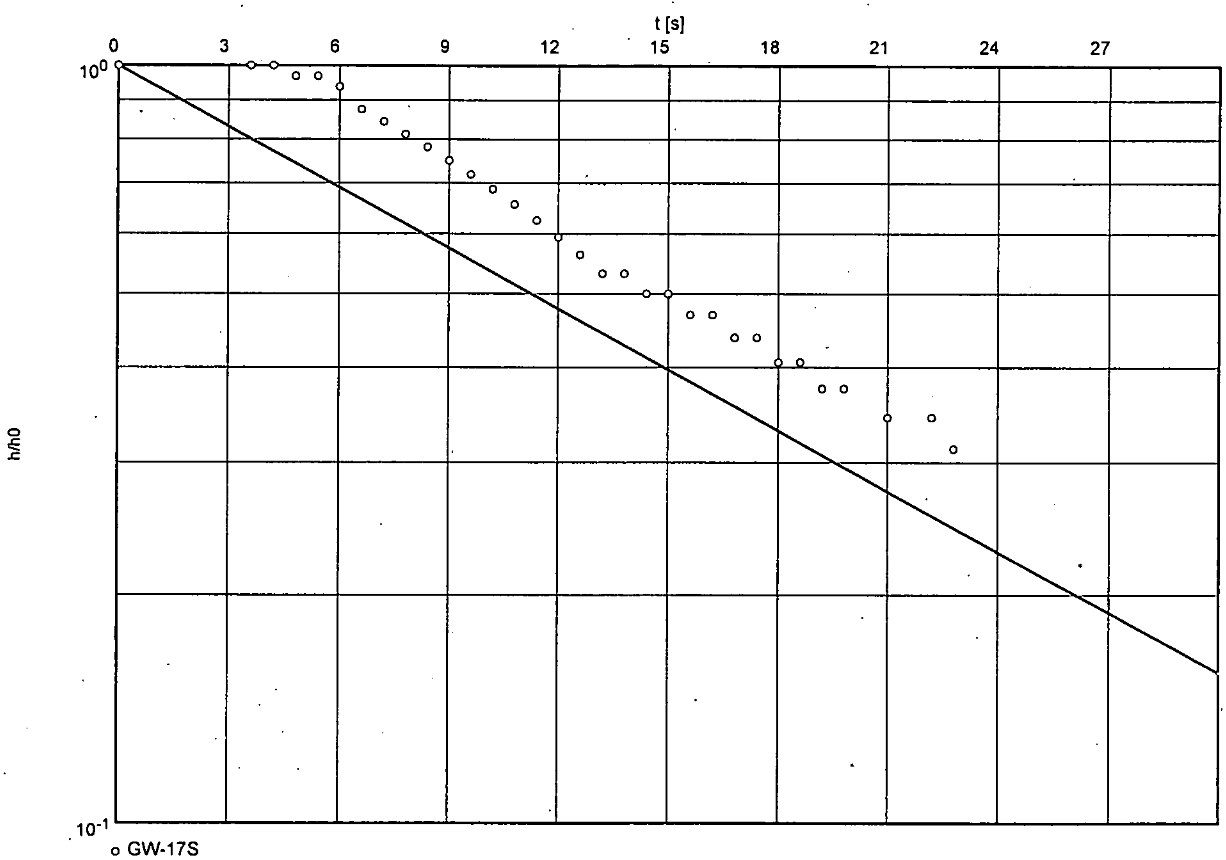
Slug Test No.	Test conducted on: 1/12/99
GW-16S	GW-16S

Static water level: 100.78 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	7.00	100.79	0.01	
102	7.20	100.79	0.01	
103	7.40	100.79	0.01	
104	7.60	100.79	0.01	
105	7.80	100.78	0.00	
106	8.00	100.78	0.00	
107	8.20	100.78	0.00	
108	8.40	100.78	0.00	
109	8.60	100.78	0.00	
110	8.80	100.78	0.00	
111	9.00	100.78	0.00	
112	9.20	100.78	0.00	
113	9.40	100.78	0.00	
114	9.60	100.78	0.00	
115	9.80	100.78	0.00	
116	10.00	100.78	0.00	
117	12.00	100.78	0.00	
118	14.00	100.78	0.00	
119	16.00	100.78	0.00	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 1
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-17S	



Hydraulic conductivity [cm/s]: 1.56×10^{-3}

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 2
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-17S	GW-17S

Static water level: 100.03 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
1	0.00	100.35	0.32	
2	0.03	100.33	0.30	
3	0.04	100.32	0.29	
4	0.05	100.34	0.31	
5	0.06	100.35	0.32	
6	0.07	100.35	0.32	
7	0.08	100.34	0.31	
8	0.09	100.34	0.31	
9	0.10	100.33	0.30	
10	0.11	100.31	0.28	
11	0.12	100.30	0.27	
12	0.13	100.29	0.26	
13	0.14	100.28	0.25	
14	0.15	100.27	0.24	
15	0.16	100.26	0.23	
16	0.17	100.25	0.22	
17	0.18	100.24	0.21	
18	0.19	100.23	0.20	
19	0.20	100.22	0.19	
20	0.21	100.21	0.18	
21	0.22	100.20	0.17	
22	0.23	100.20	0.17	
23	0.24	100.19	0.16	
24	0.25	100.19	0.16	
25	0.26	100.18	0.15	
26	0.27	100.18	0.15	
27	0.28	100.17	0.14	
28	0.29	100.17	0.14	
29	0.30	100.16	0.13	
30	0.31	100.16	0.13	
31	0.32	100.15	0.12	
32	0.33	100.15	0.12	
33	0.35	100.14	0.11	
34	0.37	100.14	0.11	
35	0.38	100.13	0.10	
36	0.40	100.13	0.10	
37	0.42	100.13	0.10	
38	0.43	100.12	0.09	
39	0.45	100.12	0.09	
40	0.47	100.12	0.09	
41	0.48	100.12	0.09	
42	0.50	100.11	0.08	
43	0.52	100.11	0.08	
44	0.53	100.11	0.08	
45	0.55	100.11	0.08	
46	0.57	100.11	0.08	
47	0.58	100.10	0.07	
48	0.60	100.10	0.07	
49	0.62	100.10	0.07	
50	0.63	100.10	0.07	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 3
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-17S	GW-17S

Static water level: 100.03 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
51	0.65	100.10	0.07	
52	0.67	100.10	0.07	
53	0.68	100.10	0.07	
54	0.70	100.10	0.07	
55	0.72	100.09	0.06	
56	0.73	100.09	0.06	
57	0.75	100.09	0.06	
58	0.77	100.09	0.06	
59	0.78	100.09	0.06	
60	0.80	100.09	0.06	
61	0.82	100.09	0.06	
62	0.83	100.09	0.06	
63	0.85	100.09	0.06	
64	0.87	100.09	0.06	
65	0.88	100.09	0.06	
66	0.90	100.09	0.06	
67	0.92	100.09	0.06	
68	0.93	100.09	0.06	
69	0.95	100.08	0.05	
70	0.97	100.08	0.05	
71	0.98	100.08	0.05	
72	1.00	100.08	0.05	
73	1.20	100.08	0.05	
74	1.40	100.07	0.04	
75	1.60	100.07	0.04	
76	1.80	100.06	0.03	
77	2.00	100.06	0.03	
78	2.20	100.06	0.03	
79	2.40	100.06	0.03	
80	2.60	100.05	0.02	
81	2.80	100.05	0.02	
82	3.00	100.05	0.02	
83	3.20	100.05	0.02	
84	3.40	100.05	0.02	
85	3.60	100.05	0.02	
86	3.80	100.05	0.02	
87	4.00	100.05	0.02	
88	4.20	100.04	0.01	
89	4.40	100.04	0.01	
90	4.60	100.04	0.01	
91	4.80	100.04	0.01	
92	5.00	100.04	0.01	
93	5.20	100.04	0.01	
94	5.40	100.04	0.01	
95	5.60	100.04	0.01	
96	5.80	100.04	0.01	
97	6.00	100.04	0.01	
98	6.20	100.04	0.01	
99	6.40	100.04	0.01	
100	6.60	100.03	0.00	

STEARNS & WHELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS CAZENOVIA, N.Y. (315) 655-8161	slug/bail test analysis BOUWER-RICE's method	Date: 14.01.1999	Page 4
		Project: Roblin Steel	
		Evaluated by: SLG	

Slug Test No.	Test conducted on: 1/12/99
GW-17S	GW-17S

Static water level: 100.03 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	
101	6.80	100.03	0.00	
102	7.00	100.03	0.00	
103	7.20	100.03	0.00	
104	7.40	100.03	0.00	
105	7.60	100.03	0.00	
106	7.80	100.03	0.00	
107	8.00	100.03	0.00	
108	8.20	100.03	0.00	
109	8.40	100.03	0.00	
110	8.60	100.03	0.00	
111	8.80	100.03	0.00	
112	9.00	100.03	0.00	
113	9.20	100.03	0.00	
114	9.40	100.03	0.00	
115	9.60	100.03	0.00	
116	9.80	100.03	0.00	
117	10.00	100.03	0.00	
118	12.00	100.03	0.00	

APPENDIX C

FIELD PARAMETERS

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SITE INVESTIGATION & REMEDIATION FIELD PARAMETERS

Well ID	GW-1
Date	12/15/98
DTW(ft)	33.13
Well Depth (ft)	40
3 Volumes (gals)	4

SITE NAME: ROBLIN STEEL

Observations
Bailed dry after two gallons; water milky brown

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	11	1.03	8.30	140	999	7.53	0.04

Sample Time	12:15
Total Volume Purged	
Final Turbidity	999
Duplicate	
MS/MSD	

Purging method:

Disp. Bailer	■
Peristaltic Pump	☐

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SITE INVESTIGATION & REMEDIATION
FIELD PARAMETERS

Well ID	**GW-2**
Date	12/13/98
DTW(ft)	12/15/98
Well Depth (ft)	30
3 Volumes (gals)	8

SITE NAME: ROBLIN STEEL

Observations
Bailed dry after 3 gallons

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	10.7	1.18	7.90	75	406	3.63	0.05

Sample Time	14:15
Total Volume Purged	
Final Turbidity	406
Duplicate	
MS/MSD	

Purging method:

- **Disp. Bailer** ■
- **Peristaltic Pump** □

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

**SITE INVESTIGATION & REMEDIATION
FIELD PARAMETERS**

Well ID	GW-2S
Date	12/15/98
DTW(ft)	9.37
Well Depth (ft)	15
3 Volumes (gals)	3

SITE NAME: ROBLIN STEEL

Observations
Water light brown, to rust

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	12	0.607	7.20	150	999	6.55	0.02

Sample Time	13:00
Total Volume Purged	
Final Turbidity	999
Duplicate	
MS/MSD	*****

Purging method:

Disp. Bailer ■

Peristaltic Pump □

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SITE INVESTIGATION & REMEDIATION
FIELD PARAMETERS

Well ID	GW-3
Date	12/15/98
DTW(ft)	28.03
Well Depth (ft)	40
3 Volumes (gals)	6

SITE NAME: ROBLIN STEEL

Observations
Very low volume of water took samples only not enough water for parameters

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	10.7	1.18	7.90	75	406	3.63	0.05

Sample Time	14:15
Total Volume Purged	
Final Turbidity	406
Duplicate	
MS/MSD	

Purging method:

Disp. Bailer ■

Peristaltic Pump □

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SITE INVESTIGATION & REMEDIATION
FIELD PARAMETERS

Well ID	GW-3S
Date	12/15/98
DTW(ft)	7.26
Well Depth (ft)	10
3 Volumes (gals)	1.5

SITE NAME: ROBLIN STEEL

Observations
Water rusty brown and turbid

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	10.9	0.588	7.30	160	753	4.34	0.02

Sample Time	16:30
Total Volume Purged	
Final Turbidity	753
Duplicate	
MS/MSD	

Purging method:

Disp. Bailer ■

Peristaltic Pump □

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SITE INVESTIGATION & REMEDIATION
FIELD PARAMETERS

Well ID	GW-4
Date	12/16/98
DTW(ft)	14.72
Well Depth (ft)	40
3 Volumes (gals)	12

SITE NAME: ROBLIN STEEL

Observations
Water pinkish, cloudy
Dup-2

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	10.2	1.51	8.00	145	999	3.22	0.06

Sample Time	14:00
Total Volume Purged	
Final Turbidity	999
Duplicate	******
MS/MSD	

Purging method:

Disp. Bailer	■
Peristaltic Pump	□

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SITE INVESTIGATION & REMEDIATION
FIELD PARAMETERS

Well ID	GW-4S
Date	12/16/98
DTW(ft)	8.34
Well Depth (ft)	15
3 Volumes (gals)	3.5

SITE NAME: ROBLIN STEEL

Observations
Water brown, recovering well

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	11.6	0.91	7.30	140	362	5.20	0.03

Sample Time	13:30
Total Volume Purged	
Final Turbidity	362
Duplicate	
MS/MSD	*****

Purging method:

Disp. Bailer ■

Peristaltic Pump □

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SITE INVESTIGATION & REMEDIATION
FIELD PARAMETERS

Well ID	GW-5
Date	12/16/98
DTW(ft)	7.79
Well Depth (ft)	34.5
3 Volumes (gals)	12

SITE NAME: ROBLIN STEEL

Observations
Bailed dry after 9.5 gals

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	11.4	1	8.00	135	999	4.37	0.04

Sample Time	11:45
Total Volume Purged	
Final Turbidity	999
Duplicate	
MS/MSD	

Purging method:

Disp. Bailer ■

Peristaltic Pump □

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SITE INVESTIGATION & REMEDIATION
FIELD PARAMETERS

Well ID	GW-5S
Date	12/16/98
DTW(ft)	5.21
Well Depth (ft)	14
3 Volumes (gals)	4.5

SITE NAME: ROBLIN STEEL

Observations
Sheen and strong odor, purged 1.5 gals and sampled

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	12	0.837	7.40	150	999	5.02	0.03

Sample Time	11:30
Total Volume Purged	
Final Turbidity	999
Duplicate	
MS/MSD	

Purging method:

Disp. Bailer ■

Peristaltic Pump □

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

**SITE INVESTIGATION & REMEDIATION
FIELD PARAMETERS**

Well ID	**GW-6**
Date	12/17/98
DTW(ft)	10.41
Well Depth (ft)	30
3 Volumes (gals)	12

SITE NAME: ROBLIN STEEL

Observations
Bailed dry at 6 gals

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	9.9	0.809	8.00	175	116	3.80	0.03

Sample Time	8:00
Total Volume Purged	
Final Turbidity	116
Duplicate	
MS/MSD	

Purging method:

Disp. Bailer	■
Peristaltic Pump	☐

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SITE INVESTIGATION & REMEDIATION
FIELD PARAMETERS

Well ID	GW-7S
Date	12/16/98
DTW(ft)	9.72
Well Depth (ft)	12.32
3 Volumes (gals)	1.5

SITE NAME: ROBLIN STEEL

Observations
Bailed dry, water is turbid despite turbidity reading

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	10	0.637	6.60	165	2	8.13	0.02

Sample Time	8:30
Total Volume Purged	
Final Turbidity	2
Duplicate	
MS/MSD	

Purging method:

Disp. Bailer ■

Peristaltic Pump □

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

**SITE INVESTIGATION & REMEDIATION
FIELD PARAMETERS**

Well ID	GW-8S
Date	12/16/98
DTW(ft)	10.68
Well Depth (ft)	12.27
3 Volumes (gals)	1

SITE NAME: ROBLIN STEEL

Observations

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	10.1	1.58	6.70	105	0	8.78	0.07

Sample Time	9:30
Total Volume Purged	
Final Turbidity	0
Duplicate	
MS/MSD	

Purging method:

Disp. Bailer ■

Peristaltic Pump □

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SITE INVESTIGATION & REMEDIATION
FIELD PARAMETERS

Well ID	GW-9
Date	12/15/98
DTW(ft)	10.99
Well Depth (ft)	32.85
3 Volumes (gals)	10

SITE NAME: ROBLIN STEEL

Observations
Water slightly turbid, red/brown

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	10.1	0.96	8.00	80	999+	3.94	0.04

Sample Time	9:15
Total Volume Purged	
Final Turbidity	999
Duplicate	
MS/MSD	

Purging method:

Disp. Bailer ■

Peristaltic Pump □

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SITE INVESTIGATION & REMEDIATION FIELD PARAMETERS

Well ID	**GW-10**
Date	12/15/98
DTW(ft)	7.76
Well Depth (ft)	15
3 Volumes (gals)	4

SITE NAME: ROBLIN STEEL

Observations
Water extremely turbid, with dark brown color, well dry after sampling

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	10.4	0.816	7.30	105	730	3.99	0.03

Sample Time	10:45
Total Volume Purged	
Final Turbidity	730
Duplicate	
MS/MSD	

Purging method:

Disp. Bailer ■

Peristaltic Pump □

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SITE INVESTIGATION & REMEDIATION
FIELD PARAMETERS

Well ID	**GW-11S**
Date	12/15/98
DTW(ft)	9.87
Well Depth (ft)	15
3 Volumes (gals)	3

SITE NAME: ROBLIN STEEL

Observations
Water extremely turbid
Dup-1

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	10.6	0.712	7.50	110	680	3.95	0.03

Sample Time	10:00
Total Volume Purged	
Final Turbidity	680
Duplicate	*******
MS/MSD	

Purging method:

Disp. Bailer ■

Peristaltic Pump □

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SITE INVESTIGATION & REMEDIATION
FIELD PARAMETERS

Well ID	**GW-12S**
Date	12/16/98
DTW(ft)	9.86
Well Depth (ft)	15
3 Volumes (gals)	3

SITE NAME: ROBLIN STEEL

Observations
Water clear

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	12.1	1.07	7.10	125	304	4.43	0.04

Sample Time	10:00
Total Volume Purged	
Final Turbidity	304
Duplicate	
MS/MSD	

Purging method:

Disp. Bailer ■

Peristaltic Pump □

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SITE INVESTIGATION & REMEDIATION
FIELD PARAMETERS

Well ID	GW-13
Date	12/16/98
DTW(ft)	35.13
Well Depth (ft)	37.5
3 Volumes (gals)	

SITE NAME: ROBLIN STEEL

Observations
Did not purge due to low volume of water

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	10.2	0.897	7.30	170	347	3.80	0.02

Sample Time	15:00
Total Volume Purged	
Final Turbidity	347
Duplicate	
MS/MSD	

Purging method:

Disp. Bailer ■

Peristaltic Pump □

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SITE INVESTIGATION & REMEDIATION
FIELD PARAMETERS

Well ID	GW-14
Date	12/17/98
DTW(ft)	14.37
Well Depth (ft)	40
3 Volumes (gals)	12.5

SITE NAME: ROBLIN STEEL

Observations

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	10.1	1.27	7.40	70	45	4.27	0.05

Sample Time	10:30
Total Volume Purged	
Final Turbidity	45
Duplicate	
MS/MSD	

Purging method:

Disp. Bailer ■

Peristaltic Pump □

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SITE INVESTIGATION & REMEDIATION
FIELD PARAMETERS

Well ID	GW-16S
Date	12/16/98
DTW(ft)	7.05
Well Depth (ft)	15
3 Volumes (gals)	4

SITE NAME: ROBLIN STEEL

Observations
Water cloudy brown

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	10.2	1.67	7.10	140	413	7.58	0.07

Sample Time	11:00
Total Volume Purged	
Final Turbidity	413
Duplicate	
MS/MSD	

Purging method:

Disp. Bailer	■
Peristaltic Pump	☐

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SITE INVESTIGATION & REMEDIATION
FIELD PARAMETERS

Well ID	GW-17S
Date	12/16/98
DTW(ft)	8.98
Well Depth (ft)	15
3 Volumes (gals)	3

SITE NAME: ROBLIN STEEL

Observations
Water brown with slight sheen, strong organic odor

Time	Purge Rate (L/min)	Temp. (C)	Cond. (ms/cm)	pH	Eh (mV)	Turbidity (NTU)	DO (ppm)	Salinity %
	Bailed	11.5	0.547	7.30	160	999	2.96	0.02

Sample Time	9:00
Total Volume Purged	
Final Turbidity	999
Duplicate	
MS/MSD	

Purging method:

Disp. Bailer	■
Peristaltic Pump	☐

Well Capacities

Diameter (in)	Capacity (gal/ft)
1	0.042
2	0.164
4	0.651

APPENDIX D

VALIDATED ANALYTICAL RESULTS

Analytical Assurance Associates, Inc.
600 Rock Raymond Road
Downingtown, PA 19335
Phone: 610 - 269 - 9989
Fax: 610 - 269 - 9989

ORGAINC & INORGANIC
QUALITY ASSURANCE DATA REVIEW

STEARNS & WHELER, LLC

SITE: ROBLIN STEEL
CASE NO.: 7098-2469C/ SDG NO.: C2469

REPORTED BY:
ANALYTICAL ASSURANCE ASSOCIATES (A^3)
600 ROCK RAYMOND ROAD
DOWNINGTOWN, PA 19335

REVIEWED BY:
ZOHREH HAMID, Ph.D.
JANUARY 12, 1999

ORGANIC ANALYSES

STEARNS & WHELER
SITE NAME: ROBLIN STEEL
CASE NO.:7098-2469C/SDG NO.: C2469

INTRODUCTION

This quality assurance report is provided based upon a review of all data generated from two (2) soil samples for specific aromatic Volatile compounds, eight (8) soil samples for Poly Aromatic Hydrocarbons (PAH), and two (2) soil samples for Poly Chlorinated Biphenyl (PCB) compounds. The samples were collected on 11-12,13,17,18-98 and were analyzed by Severn Trent Laboratories according to criteria set forth in USEPA CLP OLM3.1 for PAH and PCB target compound. However, the volatile samples were subbed to the IEA laboratory and were analyzed according SW 846, Method 8021.
The following samples are contained within this report:

SS-54	SS-57	SS-40*	GW-16S**
SS-45	SS-52+	SS-56	GW-17S**
SS-55	SS-16S	SS-17	

* Sample was solely analyzed for PCB fraction.
** Sample was analyzed for volatile fraction only.
+ sample analyzed for PAH and PCB fractions

The QC (MS/MSD) sample was not performed on sample SS-52 for PAH and PCB. Also sample SS-40 was anlyzed as a QC sample in PCB analysis. The MS/MSD analysis was performed on an alternate sample for volatile analysis.

All data have been validated with regard to usability according to the quality assurance set forth in NYSDEC ASP for Evaluating Organic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations
- Blanks
- Surrogate Recoveries
- Internal Standards Recovery
- Matrix Spike/Spike Duplicate/Blank Spike Analyses
- Instrument Performance
- Field Duplicate Results
- Sample Results

DATA COMPLETENESS

The data package completeness was satisfactory.

HOLDING TIME

Volatile
Both samples were analyzed within 7-days from collections.

PAH & PCB
All samples were extracted within 7-days from collection, and analyzed within 40-days from extraction as cited in the Methods for both fractions

CALIBRATION

Volatile
The %RSDs and %Ds for the corresponding target compounds were within the control limits.

PAH
All RSDs, %Ds and response factors were within the control limits in both initial and continuing calibrations for the PAH compounds with the exception of the following %Ds.

Compound Name	CC 12-03-98	CC 12-08-98
Benzo (k) fluoranthene Benzo(B)fluoranthene	32	 29.4
Associated Samples:	SS-17S SS-55	SS-54DL SS-56DL SS-57 SS-52 SS-52MS SS-52MSD SS-16S SS-45 SS-55Re

The reported sample results were qualified estimated in the associated samples.

PCBs
The %RSD for alpha BHC (21.4%) and DDT (25.7%) exceeded the 20% QC limits. Also, %Ds for DDT and methoxychlor were above 20% in the continuing calibrations. The data were not qualified since the initial calibration criteria met the requirements and these compounds were not PCB compounds.

BLANKS

Volatile
The low level and medium level blanks were free of target compounds.

PAH
The method blank SBLKVR contained fluoranthene (2 ug/kg), pyrene (2 ug/kg), benzo (b & K) fluoranthene (2 ug/kg) and benzo (g,h,i) perylene (4 ug/kg) at levels below the CRQLs. Also, blank SBLKCR contained 10 PAH compounds at levels below 4 ug/kg. These compounds were detected in the samples at relatively high levels, (above the action levels) with the exception of sample SS-17S. The reported result up to action levels were qualified "U" in this sample.

Tentatively Identified Compounds were not searched/reported for this analysis.

PCBs
The preparation blanks and instrument blanks were free of target compounds.

SURROGATE RECOVERIES

Volatile
The surrogate recoveries for both samples were within the control limits.

PAH
All samples and the corresponding QC samples were spiked with eight surrogate compounds as required by the applied methods. The recoveries were within the control limits with the exception of terphenyl-d14 in samples SS-54 (187%) and SS-56DL (141%). The data were not qualified based on these outliers since the surrogate recovery criteria, (i.e., one outlier per fraction and no recoveries below 10%) has been met.

PCBs
The DCB surrogate recoveries diluted out for both samples and the corresponding QC samples. Also, the recovery for DCB in the first column (170%) was above the control limit of 150% in SS-52MBS. The reported sample data were qualified estimated due to the dilutions. Additional qualifier codes were not applied.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

Volatile
The recoveries and RPDs in low level spike analysis were within the control limits. The medium level analysis was not provided.

PAH
The matrix spike recoveries for 4-nitrophenol (117%), 2,4-dinitrotoluene (90%), and pyrene (195%) were above the upper control limits. Also, the RPD for pyrene (40%) was above 34% control limit. The reported results for pyrene were qualified estimated.

PCBs
The spike recovery for aroclor-1260 (39%) and aroclor 1242 (32%) in MS & MSD samples respectively were below the lower control limits. The sample data were not qualified based on these outliers since the recoveries were above 10%.

LABORATORY CONTROL SAMPLE

Volatile
The recoveries for the specific spike compounds were within the control limits.

PAH & PCBs
The LCS sample was analyzed in PAH fraction. Also, two BS sample analyses were performed for PCB fraction. The recoveries were within the control limits with the exception of 4-nitrophenol (100%) in PAH fraction. This compound is not a target compounds. Therefore, the data were not impacted.

INTERNAL STANDARD

PAH
All internal standard recoveries and retention times were within the control limits established by the laboratory with the exception of the following:

Sample ID	Internal Standard
SS-54	CRY &PRY
SS-54DL	PRY
SS-55	PRY
SS-55Re	PRY
SS-56DL	PRY
SS-52	PRY
SS-52MS/MSD	PRY
SS-45	PRY
SS-56	PHN/CRY/PRY
SS-45Re	PRY

PHN = Phenantherene-d10
CRY = Chrysene-d12
PRY = Perylene-d12

The comparison of the initial sample results and the reanalysis gave the satisfactory reproducibility. Therefore, the reanalysis sample results were reported on the data summary. The sample data were qualified based on the aforementioned outliers.

DUPLICATE ANALYSIS

VOA, PAH & PCBs
Duplicate analysis was performed under batch # 2496B for PAH fraction. This QC sample was not analyzed for volatile and PCB samples.

SAMPLE RESULTS

Volatile
Sample GW-17S was analyzed according to the medium level analysis. The confirmation analysis (secondary column and/or GC/MS) was not provided. Therefore, the sample results were qualified estimated.

PAH
Four samples were initially analyzed at 2-fold dilutions. Sample SS-54 was also reanalyzed at five fold dilution due to the high concentration of the target compounds. The results for these compounds were transferred from the 5-fold-dilution and listed in the initial sample data. These compounds were identified with an asterisk on the data validation summary.

Sample SS-52 was also analyzed under SDG # 2469B with the different results. The chain-of-custody in batch 2469B indicated that this sample was not received. This issue must be clarified by the laboratory.

All target compounds were detected in the samples. The base line for all sample chromatograms with the exception of samples SS-16S and SS-17S were elevated from the retention time approximately "RT= 19 minutes". The GC/MS spectra for the detected compounds showed an interference with petroleum hydrocarbons (TPHC) which may cause the elevated base lines and the internal standard outlier.

PCBs
Both samples were analyzed at 10-fold dilutions due to the sample background contamination. Therefore the results were biased low and the possibility of false negative exists. The reported results and non-detected values for these two samples were qualified estimated.

The %D for the results detected/reported from two different columns exceeded 25% control limits. All positive results were qualified estimated.

SUMMARY

The cooler temperature was not listed on the chain-of-custody. The sample results below the CRQLs were qualified estimated, due to the uncertainty near the detection limits in the both fractions.

Overall, major analysis problems were not encountered during the sample analyses. The most important issue was sample background contamination and internal standard outliers. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

1. Appendix A- Glossary of Data Qualifier
2. Appendix B- Data Summary Forms
3. Appendix C- Laboratory Results (Form I)
4. Appendix D - Support Documentation /Resubmission (if applicable)

Appendix A
Glossary of Data Qualifier

Appendix B
Data Summary Forms

ANALYTICAL ASSURANCE ASSOCIATES (A3)
PESTICIDE SOIL ANALYSIS
ug/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL
STL ID: 7098-2469C
SDG NO.: 2469C

CLIENT SAMPLE ID:		SS-40	SS-52
LAB SAMPLE ID:		982469C-07	982469C-09
% MOISTURE:		15	24
DILUTION FACTOR:		10.0	10.0

TARGET COMPOUNDS:

	CRQL		
Aroclor-1016	33	UJ	UJ
Aroclor-1221	67	UJ	UJ
Aroclor-1232	33	UJ	UJ
Aroclor-1242	33	UJ	150 J
Aroclor-1248	33	UJ	UJ
Aroclor-1254	33	UJ	UJ
Aroclor-1260	33	UJ	120 J

ANALYTICAL ASSURANCE ASSOCIATES (A3)
SEMIVOLATILE SOIL ANALYSIS
ug/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL
STL ID: 7098-2469C
SDG NO.: 2469C

CLIENT SAMPLE ID:	SS-17S
LAB SAMPLE ID:	982469C-11
% MOISTURE:	18
DILUTION FACTOR:	1.0

TARGET COMPOUNDS:

	CRQL	
Naphthalene	330	260 J
2-Methylnaphthalene	330	NA
Acenaphthylene	330	NA
Acenaphthene	330	14 J
Fluorene	330	26 J
Phenanthrene	330	75 J
Anthracene	330	9 J
Fluoranthene	330	9 U
Pyrene	330	12 U
Benzo(a)anthracene	330	6 U
Chrysene	330	14 U
Benzo(b)fluoranthene	330	7 U
Benzo(k)fluoranthene	330	8 U
Benzo(a)pyrene	330	5 U
Indeno(1,2,3-cd)pyrene	330	4 U
Dibenzo(a,h)anthracene	330	
Benzo(g,h,i)perylene	330	12 U

ANALYTICAL ASSURANCE ASSOCIATES (A3)
SEMIVOLATILE SOIL ANALYSIS
ug/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL
STL ID: 7098-2469C
SDG NO.: 2469C

CLIENT SAMPLE ID:		SS-54	SS-45RE	SS-55RE	SS-56	SS-57	SS-52	SS-16S
LAB SAMPLE ID:		982469C-02	982469C-03RE	982469C-04RE	982469C-05	982469C-06	982469C-09	982469C-10
% MOISTURE:		20	26	14	11	14	15	22
DILUTION FACTOR:		2.0/5.0*	5.0	1.0	2.0	1.0	2.0	1.0
TARGET COMPOUNDS:	CRQL							
Naphthalene	330	3700	400 J	110 J	23 J	110 J	87 J	8 J
2-Methylnaphthalene	330	1500 J	480 J	130 J	160 J	160 J	120 J	NA
Acenaphthylene	330	660 J	540 J	290 J	960 J	190 J	130 J	NA
Acenaphthene	330	4300	450 J	54 J	76 J	37 J	160 J	1600
Fluorene	330	4500	640 J	66 J	1500 J	89 J	160 J	23 J
Phenanthrene	330	41000 J*	7100	1000	5400 J	970	2000	340 J
Anthracene	330	7900	1600 J	390	1400 J	260 J	470 J	58 J
Fluoranthene	330	41000 J*	8700	1700	3400 J	990	3400	760
Pyrene	330	50000 J*	15000 J	2200	4700 J	930 J	4100 J	2400 J
Benzo(a)anthracene	330	18000 J	7000 J	1100	2000 J	540	1800	290 J
Chrysene	330	18000 J	7600 J	1500	1600 J	840	2100	500
Benzo(b)fluoranthene	330	29000 J*	7100 J	1900 J	1200 J	730 J	2300 J	370 J
Benzo(k)fluoranthene	330	20000 J	5500 J	2600 J	1600 J	800	2300 J	690
Benzo(a)pyrene	330	17000 J	6000 J	1500 J	990 J	560	1900 J	360 J
Indeno(1,2,3-cd)pyrene	330	9100 J	3900 J	260 J	370 J	120 J	350 J	100 J
Dibenzo(a,h)anthracene	330	4300 J	1400 J	120 J	UJ	64 J	160 J	46 J
Benzo(g,h,i)perylene	330	8700 J	3000 J	220 J	290 J	68 J	310 J	59 J

ANALYTICAL ASSURANCE ASSOCIATES (A3)
VOLATILE SOIL ANALYSIS
ug/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL
STL ID: 7098-2469C
SDG NO.: 2469C

CLIENT SAMPLE ID:		GW-16S	GW-17S
LAB SAMPLE ID:		195659-01	195659-02
% SOLID:		80.4	82.2
DILUTION FACTOR:		1.0	1.0*
TARGET COMPOUNDS:	CRQL		
Benzene	1.0		
Toluene	1.0	1.5	
Ethylbenzene	1.0		
m,p-Xylene	1.0		860 J
o-Xylene	1.0		830 J
Isopropylbenzene	1.0		940 J
4-Isopropyltoluene	1.0		690 J
n-Propylbenzene	1.0		2000 J
sec-Butylbenzene	1.0		1500 J
1,3,5-Trimethylbenzene	1.0		4200 J
1,2,4-Trimethylbenzene	1.0		6000 J
n-Butylbenzene	1.0		6000 J
Naphthalene	1.0		1300 J
MTBE	1.0		
tert-Butylbenzene	1.0		

Appendix C
Laboratory Reported Results

Volatile Organics Analysis Data Sheet
Form I VOA
8021-STAR

Client ID:	GW-16S	Date Collected:	18-NOV-98
STL Sample Number:	195659-01	Date Received:	24-NOV-98
Client Name:	SEVERN TRENT CT.	Date Extracted:	
Project Name:	CT 7609	Date Analyzed:	24-NOV-98
% Solid:	80.4	Report Date:	09-DEC-98
Matrix:	3 Soil/Sldg	Column:	RTX-502.2
Sample Wt/Vol:	5g	Lab File Id:	A9523.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
71-43-2	Benzene	1.2		U
108-88-3	Toluene	1.2	1.5	
100-41-4	Ethylbenzene	1.2		U
108-38-3/106-42-3	m,p-Xylene	1.2		U
95-47-6	o-Xylene	1.2		U
98-82-8	Isopropylbenzene	1.2		U
99-87-6	4-Isopropyltoluene	1.2		U
103-65-1	n-Propylbenzene	1.2		U
135-98-8	sec-Butylbenzene	1.2		U
108-67-8	1,3,5-Trimethylbenzene	1.2		U
95-63-6	1,2,4-Trimethylbenzene	1.2		U
104-51-8	n-Butylbenzene	1.2		U
91-20-3	Naphthalene	1.2		U
1634-04-4	MTBE	1.2		U
98-06-6	tert-Butylbenzene	1.2		U

315 Fullerton Avenue
Newburgh, NY 12550
Tel: (914) 562-0890

Volatile Organics Analysis Data Sheet
Form I VOA
8021-STAR

Client ID:	GW-17S	Date Collected:	18-NOV-98
STL Sample Number:	195659-02	Date Received:	24-NOV-98
Client Name:	SEVERN TRENT CT.	Date Extracted:	
Project Name:	CT 7609	Date Analyzed:	24-NOV-98
% Solid:	82.2	Report Date:	16-DEC-98
Matrix:	3 Soil/Sldg	Column:	RTX-502.2
Sample Wt/Vol:	10000ul	Lab File Id:	A9523.D
Level:	MED	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
71-43-2	Benzene	760		U
108-88-3	Toluene	760		U
100-41-4	Ethylbenzene	760		U
108-38-3/106-42-3	m,p-Xylene	760	860	
95-47-6	o-Xylene	760	830	
98-82-8	Isopropylbenzene	760	940	
99-87-6	4-Isopropyltoluene	760	690	J
103-65-1	n-Propylbenzene	760	2000	
135-98-8	sec-Butylbenzene	760	1500	
108-67-8	1,3,5-Trimethylbenzene	760	4200	
95-63-6	1,2,4-Trimethylbenzene	760	6000	
104-51-8	n-Butylbenzene	760	6000	
91-20-3	Naphthalene	760	1300	
1634-04-4	MTBE	760		U
98-06-6	tert-Butylbenzene	760		U

TABLE SV-1.0
7098-2469C
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	Method Blank	SS-54	SS-54 DL	
Lab Sample I.D.	SBLKVR	982469C-02	982469C-02DL	Quant. Limits with no Dilution
Method Blank I.D.	SBLKVR	SBLKVR	SBLKVR	
Quant. Factor	1.00	10.0	25.0	
Naphthalene	U	3700	3700JD	330
2-Methylnaphthalene	U	1500J	1500JD	330
Acenaphthylene	U	660J	690JD	330
Acenaphthene	U	4300	4400JD	330
Fluorene	U	4500	4600JD	330
Phenanthrene	U	36000E	41000D	330
Anthracene	U	7900	7800JD	330
Fluoranthene	2J	30000EB	41000DB	330
Pyrene	2J	73000EB	50000DB	330
Benzo(a)anthracene	U	18000	19000D	330
Chrysene	U	18000	20000D	330
Benzo(b)fluoranthene	2J	28000EB	29000DB	330
Benzo(k)fluoranthene	2J	20000B	26000DB	330
Benzo(a)pyrene	U	17000	16000D	330
Indeno(1,2,3-cd)pyrene	U	9100	3600JD	330
Dibenzo(a,h)anthracene	U	4300	1600JD	330
Benzo(g,h,i)perylene	4J	8700B	3000JDB	330
Date Received		11/13/98	11/13/98	
Date Extracted	11/18/98	11/18/98	11/18/98	
Date Analyzed	12/02/98	12/02/98	12/04/98	

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.1
7098-2469C
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	Method Blank	SS-45	SS-45 RE	
Lab Sample I.D.	SBLKCR	982469C-03	982469C-03RE	Quant. Limits with no Dilution
Method Blank I.D.	SBLKCR	SBLKCR	SBLKCR	
Quant. Factor	1.00	6.76	6.76	
Naphthalene	U	420J	400JD	330
2-Methylnaphthalene	U	510J	480JD	330
Acenaphthylene	U	1100J	540JD	330
Acenaphthene	U	470J	450JD	330
Fluorene	U	780J	640JD	330
Phenanthrene	2J	7200B	7100DB	330
Anthracene	U	2200	1600JD	330
Fluoranthene	3J	11000B	8700DB	330
Pyrene	3J	12000B	15000DB	330
Benzo(a)anthracene	2J	7000B	7000DB	330
Chrysene	2J	7800B	7600DB	330
Benzo(b)fluoranthene	2J	9000B	7100DB	330
Benzo(k)fluoranthene	3J	10000B	5500DB	330
Benzo(a)pyrene	2J	6400B	6000DB	330
Indeno(1,2,3-cd)pyrene	2J	1300JB	3900DB	330
Dibenzo(a,h)anthracene	U	650J	1400JD	330
Benzo(g,h,i)perylene	3J	900JB	3000DB	330
Date Received		11/17/98	11/17/98	
Date Extracted	11/21/98	11/21/98	11/21/98	
Date Analyzed	12/03/98	12/04/98	12/07/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor

Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

Soil

TABLE SV-1.2
7098-2469C
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

All values are ug/Kg dry weight basis.

Client Sample I.D.	SS-55	SS-55 RE	SS-56	
Lab Sample I.D.	982469C-04	982469C-04RE	982469C-05	Quant. Limits with no Dilution
Method Blank I.D.	SBLKCR	SBLKCR	SBLKCR	
Quant. Factor	1.16	1.16	2.25	
Naphthalene	100J	110J	23JD	330
2-Methylnaphthalene	120J	130J	160JD	330
Acenaphthylene	280J	290J	960D	330
Acenaphthene	53J	54J	76JD	330
Fluorene	64J	66J	1500D	330
Phenanthrene	1000B	1000B	5400DB	330
Anthracene	400	390	1400D	330
Fluoranthene	1700B	1700B	3400DB	330
Pyrene	2200B	2200B	4700DB	330
Benzo(a)anthracene	1000B	1100B	2000DB	330
Chrysene	1600B	1500B	1600DB	330
Benzo(b)fluoranthene	2100B	1900B	1200DB	330
Benzo(k)fluoranthene	2500B	2600B	1600DB	330
Benzo(a)pyrene	1400B	1500B	990DB	330
Indeno(1,2,3-cd)pyrene	280JB	260JB	370JDB	330
Dibenzo(a,h)anthracene	130J	120J	U	330
Benzo(g,h,i)perylene	270JB	220JB	290JDB	330
Date Received	11/17/98	11/17/98	11/17/98	
Date Extracted	11/21/98	11/21/98	11/21/98	
Date Analyzed	12/03/98	12/04/98	12/07/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

Soil

TABLE SV-1.3
7098-2469C
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

All values are ug/Kg dry weight basis.

Client Sample I.D.	SS-56 DL	SS-57	SS-52	Quant. Limits with no Dilution
Lab Sample I.D.	982469C-05DL	982469C-06	982469C-09	
Method Blank I.D.	SBLKCR	SBLKCR	SBLKCR	
Quant. Factor	5.62	1.16	2.35	
Naphthalene	24J	110J	87J	330
2-Methylnaphthalene	160J	160J	120J	330
Acenaphthylene	1300J	190J	130J	330
Acenaphthene	75J	37J	160J	330
Fluorene	1600J	89J	160J	330
Phenanthrene	5200B	970B	2000B	330
Anthracene	1700J	260J	470J	330
Fluoranthene	4500B	990B	3400B	330
Pyrene	4700B	930B	4100B	330
Benzo(a)anthracene	2000B	540B	1800B	330
Chrysene	1600JB	840B	2100B	330
Benzo(b)fluoranthene	1300JB	730B	2300B	330
Benzo(k)fluoranthene	2700B	800B	2300B	330
Benzo(a)pyrene	1000JB	560B	1900B	330
Indeno(1,2,3-cd)pyrene	200JB	120JB	350JB	330
Dibenzo(a,h)anthracene	U	64J	160J	330
Benzo(g,h,i)perylene	150JB	68JB	310JB	330
Date Received	11/17/98	11/17/98	11/20/98	
Date Extracted	11/21/98	11/21/98	11/21/98	
Date Analyzed	12/04/98	12/04/98	12/04/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

Soil

TABLE SV-1.4
7098-2469C
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

All values are ug/Kg dry weight basis.

Client Sample I.D. Lab Sample I.D. Method Blank I.D. Quant. Factor	SS-52 MS 982469C-09MS SBLKCR 2.35	SS-52 MSD 982469C-09 MSD SBLKCR 2.35		Quant. Limits with no Dilution
Naphthalene	85J	95J		330
2-Methylnaphthalene	110J	120J		330
Acenaphthylene	180J	160J		330
Acenaphthene	2000X	2200X		330
Fluorene	180J	250J		330
Phenanthrene	2400B	3400B		330
Anthracene	580J	730J		330
Fluoranthene	4100B	5200B		330
Pyrene	6700EBX	8000EBX		330
Benzo(a)anthracene	2200B	2700B		330
Chrysene	2500B	3000B		330
Benzo(b)fluoranthene	3000B	3400B		330
Benzo(k)fluoranthene	2700B	2800B		330
Benzo(a)pyrene	2400B	2600B		330
Indeno(1,2,3-cd)pyrene	430JB	460JB		330
Dibenzo(a,h)anthracene	200J	210J		330
Benzo(g,h,i)perylene	350JB	380JB		330
Date Received Date Extracted Date Analyzed	11/20/98 11/21/98 12/04/98	11/20/98 11/21/98 12/04/98		

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-2.0 Soil
7098-2469C
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

All values are ug/Kg dry weight basis.

Client Sample I.D.	Method Blank	SS-16S	SS-17S	
Lab Sample I.D.	SBLKCR	982469C-10	982469C-11	Quant. Limits with no Dilution
Method Blank I.D.	SBLKCR	SBLKCR	SBLKCR	
Quant. Factor	1.00	1.28	1.22	
Naphthalene	U	8J	260J	330
Acenaphthene	U	1600	14J	330
Fluorene	U	23J	26J	330
Phenanthrene	2J	340JB	75JB	330
Anthracene	U	58J	9J	330
Fluoranthene	3J	760B	9JB	330
Pyrene	3J	2400B	12JB	330
Benzo(a)anthracene	2J	290JB	6JB	330
Chrysene	2J	500B	14JB	330
Benzo(b)fluoranthene	2J	370JB	7JB	330
Benzo(k)fluoranthene	3J	690B	8JB	330
Benzo(a)pyrene	2J	360JB	5JB	330
Indeno(1,2,3-cd)pyrene	2J	100JB	4JB	330
Dibenzo(a,h)anthracene	U	46J	U	330
Benzo(g,h,i)perylene	3J	59JB	12JB	330
Date Received		11/20/98	11/20/98	
Date Extracted	11/21/98	11/21/98	11/21/98	
Date Analyzed	12/03/98	12/04/98	12/03/98	

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE GC-1.0
7098-2469C
STEARNS & WHELER
POLYCHLORINATED BIPHENYLS (PCB"s)

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	Method Blank	SS-40	SS-40 MS	
Lab Sample I.D.	112598-B02	982469C-07	982469C-07MS	Quant. Limits with no Dilution
Method Blank I.D.	PBLK63	PBLK63	PBLK63	
Quant. Factor	1.00	11.8	11.8	
Aroclor-1016	U	U	U	33.
Aroclor-1221	U	U	U	67.
Aroclor-1232	U	U	U	33.
Aroclor-1242	U	U	210JX	33.
Aroclor-1248	U	U	U	33.
Aroclor-1254	U	U	U	33.
Aroclor-1260	U	U	260JPX	33.
Date Received		11/20/98	11/20/98	
Date Extracted	11/25/98	11/25/98	11/25/98	
Date Analyzed	12/04/98	12/08/98	12/08/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE GC-1.1
7098-2469C
STEARNS & WHELER
POLYCHLORINATED BIPHENYLS (PCB"s)

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D. Lab Sample I.D. Method Blank I.D. Quant. Factor	SS-40 MSD 982469C-07 MSD PBLK63 11.8	SS-52 982469C-09 PBLK63 13.2	SS-52 MS 982469C-09MS PBLK63 13.2	Quant. Limits with no Dilution
Aroclor-1016	U	U	U	33.
Aroclor-1221	U	U	U	67.
Aroclor-1232	U	U	U	33.
Aroclor-1242	290JPX	150J	340JX	33.
Aroclor-1248	U	U	U	33.
Aroclor-1254	U	U	U	33.
Aroclor-1260	270JPX	120JP	290JX	33.
Date Received	11/20/98	11/20/98	11/20/98	
Date Extracted	11/25/98	11/25/98	11/25/98	
Date Analyzed	12/08/98	12/04/98	12/04/98	

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

Soil

TABLE GC-1.2
7098-2469C
STEARNS & WHELER
POLYCHLORINATED BIPHENYLS (PCB"s)

All values are ug/Kg dry weight basis.

Client Sample I.D. Lab Sample I.D. Method Blank I.D. Quant. Factor	SS-52 MSD 982469C-09 MSD PBLK63 13.2			Quant. Limits with no Dilution
Aroclor-1016	U			33.
Aroclor-1221	U			67.
Aroclor-1232	U			33.
Aroclor-1242	290JX			33.
Aroclor-1248	U			33.
Aroclor-1254	U			33.
Aroclor-1260	300JPX			33.
Date Received	11/20/98			
Date Extracted	11/25/98			
Date Analyzed	12/04/98			

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor

Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

Appendix D
Support Documentation/Resubmission

INORGANIC ANALYSIS DATA REVIEW

STEARNS & WHELER
SITE: ROBLIN STEEL
CASE NO.:7098-2469C/ SDG NO.: C2469

INTRODUCTION

This quality assurance review is based upon a review of all data generated from two (2) soil samples collected on 11-11-98. The samples were received by Severn Trent Laboratories on 11-13-98 and analyzed according to criteria set forth in SOW3,90 (ILM03.0) for TAL metals.

The following samples are contained within this report:

SS-40
SS-51

The QC samples (MS & MD) was analyzed on sample SS-40.

All data have been validated with regard to usability according to the quality assurance set forth in National Functional Guidelines for Evaluating Inorganic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations & CRDL Analyses
- Blanks
- ICP Interference Check Sample
- Matrix Spike Analysis
- Matrix Duplicate Analysis
- Laboratory Control Sample Analysis
- ICP Serial Dilution Analysis
- Instrument Detection Limits
- Field Duplicate Results
- Sample Results

DATA COMPLETENESS

The data for spike outliers in the matrix spike sample were not qualified with an "N" on form V and forms I as required by the Method. Also, the post digestion spike sample analysis was not performed. Therefore, the possibility of matrix interference could not be evaluated. The laboratory has been contacted. The Forms I and V were corrected and resubmitted.

HOLDING TIME

All samples were digested/analyzed within the requirements established in the method.

CALIBRATIONS & CRDL Analyses

The recoveries for all analytes in the initial and continuing calibrations were within the control limits of 90-110%.

The CRDL sample analysis was performed prior and after all samples analysis. The %recoveries were within the control limits with the exception of As (70.2 & 77.2%) in initial and final CRDL analyses. The results were above the 3 times the corresponding CRDLs. Therefore, the data were not qualified based on these outliers.

BLANKS

The laboratory preparation blank had Al (5.8 mg/kg), Mg (1.36 mg/kg), Hg (0.01 mg/kg) and Zn (5.5 mg/kg) contamination at levels below the CRDL. The reported sample results were above the action limits (5 x the blank concentrations). Therefore, the sample data were not impacted.

ICP INTERFERENCE CHECK SAMPLE

The recoveries were within the control limit of 80-120%.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

Matrix spike analysis was performed on sample SS-40. The spike recoveries for the following analytes were outside the control limits of 75-125%.

Analyte	% Recovery
As	41.9
Cr	-10.2
Cu	33.3
Ni	40.6
Se	70.7
Ag	20.1

The reported sample data for chromium and silver were considered biased low and the possibility of false negative exist. However, the data for other outliers were considered estimated.

The analytical spike post digestion sample was not analyzed as required for this method. Therefore, the matrix interference could not be evaluated.

The review of the data indicated that the SW 846 Method was utilized to analyze the spike sample. All these analytes were detected in both samples. The reported positive results were qualified "J".

The recoveries of Cd (-106%), Pb (656%), Mn (-45.5%) and Zn (62.7%) were also outside the control limits. However, the data were not impacted since the initial sample results were above 4 times the amount of spike added to the sample.

MATRIX DUPLICATE ANALYSIS

The matrix duplicate analysis was also performed on sample SS-40. The RPDs for all analytes were within the analysis and validation control limits with the exception of Cr (38.2%) and Fe (22.8%). The data for iron was not qualified since the RPD was within the data validation control limit of 35%. The reported positive sample results for chromium were qualified estimated.

LABORATORY CONTROL SAMPLE

The recoveries for all analyses were within the control limits.

ICP SERIAL DILUTION

The %Ds for Zn (16.1%) was above the 10% requirement. The reported positive results were qualified estimated.

INSTRUMENT DETECTION LIMITS

All analytes with the exception of mercury were analyzed with ICP. The reported IDLs were below the CRDL.

DUPLICATE ANALYSIS

Duplicate analysis was analyzed on sample SS-39/Dup-2 from the other batch. The RPDs were within the control limits.

SAMPLE RESULTS

All analytes were analyzed at one-fold dilutions. The reported sample results were within the calibration range.

The calculation of the sample results with the provided factors did not match the reported sample data. The examination of the raw data indicated that the % solids were incorrectly listed on the Forms I. The corrected %solid was listed on the data validation summary.

SUMMARY

The cooler temperature was not reported on the chain-of-custody. Overall, major problems with the exception of the lack of analytical spike sample were not encountered during the sample analyses. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

1. Appendix A- Glossary of Data Qualifier
2. Appendix B- Data Summary Forms
3. Appendix C- Laboratory Results (Form I)
4. Appendix D - Support Documentation /Resubmission (if applicable)

Appendix A
Glossary of Data Qualifier

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

Appendix B
Data Summary Forms

ANALYTICAL ASSURANCE ASSOCIATES (A3)
METAL SOIL ANALYSIS
mg/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL
STL ID: 7098-2469C
SDG NO.: 2469C

CLIENT SAMPLE ID:			SS-40	SS-51
LAB SAMPLE ID:			982469C-07	982469C-08
% SOLID:			79.2	77.5
TARGET COMPOUNDS:				
	IDL			
Aluminum	6	P	1630	5760
Antimony	5	P	7	10
Arsenic	3	P	25.6 J	44 J
Barium	1	P	50.6	180
Beryllium	1	P	0.36	1.2
Cadmium	1	P	32	8
Calcium	4	P	7090	9050
Chromium	1	P	147 J	223 J
Cobalt	1	P	20	168
Copper	2	P	259 J	296 J
Iron	7	P	91600	122000
Lead	2	P	663	334
Magnesium	5	P	1840	1460
Manganese	1	P	966	1230
Mercury	0.1	CV	0.11	0.19
Nickel	5	P	289 J	139 J
Potassium	29	P	236	526
Selenium	2	P	3 J	6 J
Silver	1	P	0.4 J	0.42 J
Sodium	15	P	211	152
Thallium	6	P	1.3	
Vanadium	1	P	24.1	38.3
Zinc	1	P	1450 J	455 J

Appendix C
Laboratory Reported Results

TABLE AS-1.0
7098-2469C
STEARNS & WHELER
TAL METALS

Soil

All values are mg/Kg dry weight basis.

Client Sample I.D.	SS-40	SS-40 D	SS-40 S	SS-51
Lab Sample I.D.	982469C-07	982469C-07D	982469C-07S	982469C-08
Aluminum	1630	1930	1960	5760
Antimony	7.0B	7.5B	172.	10.0B
Arsenic	25.6	26.9	32.0	44.0
Barium	50.6	53.9	746.	180.
Beryllium	0.36B	0.32B	18.0	1.2B
Cadmium	32.0	27.8	29.9	8.0
Calcium	7090	10700	NR	9050
Chromium	147.*	99.9*	139.	223.*
Cobalt	20.0	13.2	176.	168.
Copper	259.	262.	290.	296.
Iron	91600*	72900*	60700	122000*
Lead	663.	790.	712.	334.
Magnesium	1840	3120	NR	1460
Manganese	966.	829.	879.	1230
Mercury	0.11	0.12	0.54	0.19
Nickel	289.	294.	366.	139.
Potassium	236.B	289.B	NR	526.B
Selenium	3.0	2.6	5.7	6.0
Silver	0.40B	0.25U	4.2	0.42B
Sodium	211.B	244.B	NR	152.B
Thallium	1.3B	1.3U	18.7	1.3U
Vanadium	24.1	21.2	182.	38.3
Zinc	1450E	1470	1570	455.E

See Appendix for qualifier definitions

77.5

780 | id = 79.2

Appendix D
Support Documentation/Resubmission

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

SS-40S

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 2469C SAS No.: ______ SDG No.: C2469

Matrix: SOIL Level (low/med): LOW

% Solids for Sample: 77

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum	75-125	1960.9910		1631.5738		757.48	43.5		P
Antimony	75-125	172.5175		6.9940	B	189.37	87.4		P
Arsenic	75-125	31.9646		25.6169		15.15	41.9	N	P
Barium	75-125	746.3552		50.5969		757.48	91.8		P
Beryllium	75-125	17.9529		0.3651	B	18.94	92.9		P
Cadmium		29.9416		31.9504		1.89	-106.1		P
Calcium				7092.4782		0.00	0.0		P
Chromium	75-125	139.4380		147.1526		75.75	-10.2	N	P
Cobalt	75-125	175.9544		20.0307		189.37	82.3		P
Copper	75-125	290.3717		258.8256		94.68	33.3	N	P
Iron		60669.4104		91656.0283		378.74	-8181.5		P
Lead		712.5365		662.7961		7.57	656.6		P
Magnesium				1840.7602		0.00	0.0		P
Manganese		879.4607		965.5581		189.37	-45.5		P
Mercury	75-125	0.5367		0.1082		0.48	89.5		CV
Nickel	75-125	366.0674		289.0983		189.37	40.6	N	P
Potassium				235.6621	B	0.00	0.0		P
Selenium	75-125	5.6906		3.0138		3.79	70.7	N	P
Silver	75-125	4.2108		0.4008	B	18.94	20.1	N	P
Sodium				210.7021	B	0.00	0.0		P
Thallium	75-125	18.7318		1.3093	B	18.94	92.0		P
Vanadium	75-125	182.1233		24.0737		189.37	83.5		P
Zinc		1568.0154		1449.2728		189.37	62.7		P
Cyanide									NR

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SS-40

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 2469C SAS No.: ______ SDG No.: C2469

Matrix (soil/water): SOIL Lab Sample ID: 982469C-07

Level (low/med): LOW Date Received: 11/20/98

% Solids: ~~77~~ 79.2

Concentration Units (ug/L or mg/kg dry weight): Mg/Kg

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1630			P
7440-36-0	Antimony	7.0	B		P
7440-38-2	Arsenic	25.6		N	P
7440-39-3	Barium	50.6			P
7440-41-7	Beryllium	0.36	B		P
7440-43-9	Cadmium	32.0			P
7440-70-2	Calcium	7090			P
7440-47-3	Chromium	147.		*N	P
7440-48-4	Cobalt	20.0			P
7440-50-8	Copper	259.		N	P
7439-89-6	Iron	91600		*	P
7439-92-1	Lead	663.			P
7439-95-4	Magnesium	1840			P
7439-96-5	Manganese	966.			P
7439-97-6	Mercury	0.11			CV
7440-02-0	Nickel	289.		N	P
7440-09-7	Potassium	236.	B		P
7782-49-2	Selenium	3.0		N	P
7440-22-4	Silver	0.40	B	N	P
7440-23-5	Sodium	211.	B		P
7440-28-0	Thallium	1.3	B		P
7440-62-2	Vanadium	24.1			P
7440-66-6	Zinc	1450		E	P
57-12-5	Cyanide				NR

Color Before: BROWN Clarity Before: OPAQUE Texture: MED

Color After: YELLOW Clarity After: CLEAR Artifacts: ______

Comments:

FORM I - IN ILM03.0

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SS-51

Lab Name: STL Contract:

Lab Code: STL Case No.: 2469C SAS No.: SDG No.: C2469

Matrix (soil/water): SOIL Lab Sample ID: 982469C-08

Level (low/med): LOW Date Received: 11/20/98

% Solids: ~~84.7~~

77.5 #

Concentration Units (ug/L or mg/kg dry weight): Mg/Kg

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5760			P
7440-36-0	Antimony	10.0	B		P
7440-38-2	Arsenic	44.0		N	P
7440-39-3	Barium	180.			P
7440-41-7	Beryllium	1.2	B		P
7440-43-9	Cadmium	8.0			P
7440-70-2	Calcium	9050			P
7440-47-3	Chromium	223.		*N	P
7440-48-4	Cobalt	168.			P
7440-50-8	Copper	296.		N	P
7439-89-6	Iron	122000		*	P
7439-92-1	Lead	334.			P
7439-95-4	Magnesium	1460			P
7439-96-5	Manganese	1230			P
7439-97-6	Mercury	0.19			CV
7440-02-0	Nickel	139.		N	P
7440-09-7	Potassium	526.	B		P
7782-49-2	Selenium	6.0		N	P
7440-22-4	Silver	0.42	B	N	P
7440-23-5	Sodium	152.	B		P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	38.3			P
7440-66-6	Zinc	455.		E	P
57-12-5	Cyanide				NR

Color Before: BROWN Clarity Before: OPAQUE Texture: MED

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

END OF DATA PACKAGE

Analytical Assurance Associates, Inc.
600 Rock Raymond Road
Downingtown, PA 19335
Phone: 610 - 269 - 9989
Fax: 610 - 269 - 9989

ORGAINC & INORGANIC QUALITY ASSURANCE DATA REVIEW

STEARNS & WHELER, LLC

SITE: ROBLIN STEEL
CASE NO.: 7098-2469A/ SDG NO.: A2469

REPORTED BY:
ANALYTICAL ASSURANCE ASSOCIATES (A^3)
600 ROCK RAYMOND ROAD
DOWNINGTOWN, PA 19335

REVIEWED BY:
ZOHREH HAMID, Ph.D.
JANUARY 14, 1999

ORGANIC ANALYSES

STEARNS & WHELER
SITE NAME: ROBLIN STEEL
CASE NO.:7098-2469A/SDG NO.: A2469

INTRODUCTION

This quality assurance report is provided based upon a review of all data generated from twelve (12) soil samples for Poly Aromatic Hydrocarbons (PAH), and eight (8) soil samples for Poly Chlorinated Biphenyl (PCB) compounds. The samples were collected on 11-11-98 and were analyzed by Severn Trent Laboratories according to criteria set forth in USEPA CLP OLM3.1.

The following samples are contained within this report:

SS-37	**SS-21***	**SS-26**	**SS-29****
SS-38	**SS-22***	**SS-27***	**SS-32****
SS-19	**SS-23**	**SS-28**	**SS-33****
SS-20*	**SS-25**	**SS-9**	**SS-34****

* The sample was analyzed for PAH and PCB fractions.
**The sample was solely analyzed for PCB fraction.

The QC (MS/MSD) sample was not performed on the samples from this batch.

All data have been validated with regard to usability according to the quality assurance set forth in NYSDEC ASP for Evaluating Organic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations
- Blanks
- Surrogate Recoveries
- Internal Standards Recovery
- Matrix Spike/Spike Duplicate/Blank Spike Analyses
- Instrument Performance
- Field Duplicate Results
- Sample Results

PCBs
The DCB surrogate recoveries for samples SS21 (500/182%) in both columns and SS-22 (153%) in second column exceeded 150% requirements. The target compounds were not detected in these two samples. Therefore, the data were not qualified. Also, the recoveries were diluted out in sample SS-34 due to the high level of dilution (100-fold). The sample result was qualified.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

PAH & PCBs
Matrix spike/spike duplicate sample analyses were not performed for these fractions.

LABORATORY CONTROL SAMPLE

PAH & PCBs
Two LCS samples were analyzed in PAH fraction. Also, one BS/BSD sample analyses was performed for PCB fraction. The recoveries and RPDs were within the control limits

INTERNAL STANDARD

PAH
All internal standard recoveries and retention times were within the control limits established by the laboratory with the exception of the following:

Sample ID	Internal Standard
SS-38/SS-38Re	CRY &PRY
SS-19/SS-19DL	PRY
SS-21/SS-21Re	PRY
SS-26/SS-26DL	PRY
SS-27/SS-27Re	PRY
SS-28/SS-28DL	PRY
SS-37/SS-37Re	PRY
SS-9/SS-9DL	CRY &PRY

CRY = Chrysene-d12
PRY = Perylene-d12

The comparison of the initial sample results and the reanalysis gave the satisfactory reproducibility. Therefore, the reanalysis sample results were reported on the data summary. The sample data were qualified based on the aforementioned outliers.

DATA COMPLETENESS

The data package completeness was satisfactory.

HOLDING TIME

PAH & PCB
All samples were extracted within 7-days from collection, and analyzed within 40-days from extraction as cited in the Methods for both fractions

CALIBRATION

PAH
All RSDs, %Ds and response factors were within the control limits in both initial and continuing calibrations for the PAH compounds. The %D for 2-fluorophenol (38.2%) was above 25% control limits in calibration standard analyzed on 11-24-98. The sample data were not impacted since this compound is a surrogate compound.

PCBs
The %RSD for alpha BHC (20.8%) exceeded the 20% QC limits. The data were not qualified since the initial calibration criteria met the requirements.

BLANKS

PAH
The method blanks contained naphthalene (4 ug/kg), fluoranthene (2 ug/kg), pyrene (2 ug/kg), benzo (b & k) fluoranthene (2 ug/kg) and benzo (a) pyrene (2 ug/kg) at levels below the CRQLs. These compounds were detected in the samples at relatively high levels, (above the action levels) with the exception of naphthalene in sample SS-20. The reported result was qualified "U". Tentatively Identified Compounds were not searched/reported for this analysis.

PCBs
The preparation blanks and instrument blanks were free of target compounds.

SURROGATE RECOVERIES

PAH
All samples and the corresponding QC samples were spiked with eight surrogate compounds as required by the applied methods. The recoveries were within the control limits with the exception of terphenyl-d14 in samples SS-38/SS-38 Re (184/199%), SS-19 (171%) and SS-9 (149%). The data were not qualified based on these outliers since the surrogate recovery criteria, (i.e., one outlier per fraction and no recoveries below 10%) has been met.

DUPLICATE ANALYSIS

PAH & PCBs
Duplicate analysis was not performed with this batch. This QC sample was analyzed with batch number 2469B.

SAMPLE RESULTS

PAH
Six samples were analyzed at higher dilutions. Samples SS-19, SS-26, SS-28 and SS-9 were reanalyzed at 2 and 4-fold dilutions due to the high concentration of the target compounds in the corresponding samples. The results for these compounds were transferred from the higher dilution sample and listed in the initial sample data. These compounds were identified with an asterisk on the data validation summary.

The reported data for sample SS-23 was qualified estimated since the sample was analyzed at above 5-fold dilution. TICs were not searched/reported for this fraction.

All target compounds were detected in the samples. The base line chromatogram was elevated in all samples from the retention time approximately "RT= 17 minutes". The GC/MS spectra for the detected compounds showed an interference with petroleum hydrocarbons (TPHC) which may cause the elevated base lines and the internal standard outlier.

PCBs
All samples with the exception of samples SS-21 and SS-22 were analyzed at higher dilutions due to the sample background contamination. Therefore the results were biased low and the possibility of false negative exists. The reported results and non-detected values for all samples analyzed at above 5-fold dilutions were qualified estimated.

The %Ds for the results detected/reported from two different columns exceeded 25% control limits. All positive results were qualified estimated.

The laboratory case narrative indicated that samples SS-29 & SS-27 appeared to contain a late eluting PCBs, possibly either Aroclor-1262 or Aroclor-1268. This lab does not quantify for either of these PCBs.

SUMMARY

The cooler temperature was not listed on the chain-of-custody. The sample results below the CRQLs were qualified estimated, due to the uncertainty near the detection limits in the both fractions.

Aroclors were not analyzed as continuing calibration during the analyses. It is the validator's opinion that either a more suitable method utilized to characterize these specific compounds or aroclors must be analyzed as the calibration points during the entire sample analysis runs.

Overall, major analysis problems were not encountered during the sample analyses. The most important issue was sample background contamination. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

1. Appendix A- Glossary of Data Qualifier
2. Appendix B- Data Summary Forms
3. Appendix C- Laboratory Results (Form I)
4. Appendix D - Support Documentation /Resubmission (if applicable)

Appendix A
Glossary of Data Qualifier

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U	=	NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]
R	=	UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.
N	=	NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J	=	ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.
UJ	=	ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q	=	NO ANALYTICAL RESULT.

Appendix B
Data Summary Forms

ANALYTICAL ASSURANCE ASSOCIATES (A3)
PESTICIDE SOIL ANALYSIS
ug/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL
STL ID: 7098-2469A
SDG NO.: 2469A

CLIENT SAMPLE ID:	SS-27
LAB SAMPLE ID:	982469A-18
% MOISTURE:	9
DILUTION FACTOR:	2.0

TARGET COMPOUNDS:

	CRQL	
Aroclor-1016	33	
Aroclor-1221	67	
Aroclor-1232	33	
Aroclor-1242	33	
Aroclor-1248	33	
Aroclor-1254	33	
Aroclor-1260	33	200 J

ANALYTICAL ASSURANCE ASSOCIATES (A3)
PESTICIDE SOIL ANALYSIS
ug/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL
STL ID: 7098-2469A
SDG NO.: 2469A

CLIENT SAMPLE ID:		SS-29	SS-32	SS-33	SS-34	SS-20	SS-21	SS-22
LAB SAMPLE ID:		982469A-01	982469A-02	982469A-03	982469A-04	982469A-11	982469A-12	982469A-13
% MOISTURE:		20	13	15	28	15	11	17
DILUTION FACTOR:		5.0	20.0	10.0	100.0	2.0	1.0	1.0
TARGET COMPOUNDS:	CRQL							
Aroclor-1016	33		UJ	UJ	UJ			
Aroclor-1221	67		UJ	UJ	UJ			
Aroclor-1232	33		UJ	UJ	UJ			
Aroclor-1242	33		UJ	UJ	UJ			
Aroclor-1248	33		UJ	UJ	UJ			
Aroclor-1254	33		UJ	UJ	UJ			
Aroclor-1260	33	1000 J	4200 J	1000 J	19000 J			

ANALYTICAL ASSURANCE ASSOCIATES (A3)
SEMIVOLATILE SOIL ANALYSIS
ug/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL
STL ID: 7098-2469A
SDG NO.: 2469A

CLIENT SAMPLE ID:		SS-25	SS-26	SS-27RE	SS-28	SS-9
LAB SAMPLE ID:		982469A-16	982469A-17	982469A-18RE	982469A-19	982469A-20
% MOISTURE:		19.00	12.00	14.00	14.00	32.00
DILUTION FACTOR:		4.0	1.0/2.0*	1.0	1.0/2.0*	1.0/4.0*
TARGET COMPOUNDS:	CRQL					
Naphthalene	330	160 J	200 J	58 J	210 J	1300
2-Methylnaphthalene	330	180 J	160 J	69 J	370 J	510
Acenaphthylene	330	330 J	110 J	100 J	880	100
Acenaphthene	330	540 J	430	150 J	130 J	1100
Fluorene	330	500 J	470	150 J	150 J	1200
Phenanthrene	330	4600	3000	1300	2100	7700 J*
Anthracene	330	1200 J	660	320 J	1000	1800
Fluoranthene	330	8500	2800	1800	3600 J*	2500
Pyrene	330	7700	3700 J*	1900	4600 J*	10000 J*
Benzo(a)anthracene	330	4300	1200 J	880 J	2000 J	3800 J
Chrysene	330	4600	1400 J	1000 J	2600 J	3500 J
Benzo(b)fluoranthene	330	5800	1900 J	1300 J	4800 J*	3500 J
Benzo(k)fluoranthene	330	4800	2100 J	1200 J	3100 J*	3500 J
Benzo(a)pyrene	330	4900	1300 J	970 J	2500 J	2800 J
Indeno(1,2,3-cd)pyrene	330	1000 J	460 J	180 J	650 J	3100 J
Dibenzo(a,h)anthracene	330	480 J	190 J	83 J	320 J	1900 J
Benzo(g,h,i)perylene	330	610 J	630 J	160 J	680 J	950 J
						1600 J

ANALYTICAL ASSURANCE ASSOCIATES (A3)
SEMIVOLATILE SOIL ANALYSIS
ug/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL
STL ID: 7098-2469A
SDG NO.: 2469A

CLIENT SAMPLE ID:		SS-37RE	SS-38RE	SS-19	SS-20	SS-21RE	SS-22	SS-23
LAB SAMPLE ID:		2469A-07RE	982469A-08RE	982469A-10	982469A-11	982469A-12RE	982469A-13	982469A-14
% MOISTURE:		7.00	20.00	20.00	14.00	11.00	16.00	15.00
DILUTION FACTOR:		1.0	1.0	1.0/2.0*	1.0	1.0	1.0	10.0
TARGET COMPOUNDS:	CRQL							
Naphthalene	330	6 J	67 J	230 J	23 U	55 J	38 J	720 J
2-Methylnaphthalene	330	14 J	110 J	220 J	31 J	100 J	57 J	450 J
Acenaphthylene	330	12 J	100 J	140 J	160 J	30 J	70 J	290 J
Acenaphthene	330	5 J	25 J	210 J	32 J	12 J	27 J	1000 J
Fluorene	330	6 J	23 J	190 J	71 J	19 J	44 J	1100 J
Phenanthrene	330	57 J	410	2000	630	220 J	420	10000 J
Anthracene	330	18 J	150 J	460	130 J	49 J	110 J	2300 J
Fluoranthene	330	100 J	670	2200	1000	230 J	670	14000 J
Pyrene	330	110 J	1900 J	4300 J*	1100	330 J	560	13000 J
Benzo(a)anthracene	330	52 J	340 J	1300 J	490	140 J	340 J	6600 J
Chrysene	330	68 J	470 J	1400 J	620	180 J	440	6500 J
Benzo(b)fluoranthene	330	100 J	610 J	2000 J	590	210 J	510	6600 J
Benzo(k)fluoranthene	330	60 J	480 J	1700 J	620	180 J	540	6900 J
Benzo(a)pyrene	330	57 J	330 J	1300 J	480	120 J	390	6000 J
Indeno(1,2,3-cd)pyrene	330	15 J	230 J	550 J	98 J	41 J	85 J	1200 J
Dibenzo(a,h)anthracene	330	5 J	79 J	270 J	54 J	22 J	40 J	600 J
Benzo(g,h,i)perylene	330	42 J	310 J	430 J	82 J	55 J	70 J	910 J

Appendix C
Laboratory Reported Results

TABLE SV-1.0
7098-2469A
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	Method Blank	SS-38	SS-38 RE	Quant. Limits with no Dilution
Lab Sample I.D.	SBLKQR	982469A-08	982469A-08RE	
Method Blank I.D.	SBLKQR	SBLKQR	SBLKQR	
Quant. Factor	1.00	1.25	1.25	
Naphthalene	4J	69JB	67JB	330
2-Methylnaphthalene	U	110J	110J	330
Acenaphthylene	U	99J	100J	330
Acenaphthene	U	24J	25J	330
Fluorene	U	22J	23J	330
Phenanthrene	U	400J	410	330
Anthracene	U	150J	150J	330
Fluoranthene	U	710	670	330
Pyrene	U	1700	1900	330
Benzo(a)anthracene	U	340J	340J	330
Chrysene	U	490	470	330
Benzo(b)fluoranthene	U	760	610	330
Benzo(k)fluoranthene	U	380J	480	330
Benzo(a)pyrene	U	340J	330J	330
Indeno(1,2,3-cd)pyrene	U	230J	230J	330
Dibenzo(a,h)anthracene	U	66J	79J	330
Benzo(g,h,i)perylene	U	310J	310J	330
Date Received		11/13/98	11/13/98	
Date Extracted	11/16/98	11/16/98	11/16/98	
Date Analyzed	11/23/98	11/23/98	11/24/98	

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.1
7098-2469A
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	SS-19	SS-19 DL	SS-20	Quant. Limits with no Dilution
Lab Sample I.D.	982469A-10	982469A-10DL	982469A-11	
Method Blank I.D.	SBLKQR	SBLKQR	SBLKQR	
Quant. Factor	1.25	2.50	1.16	
Naphthalene	230JB	250JDB	23JB	330
2-Methylnaphthalene	220J	250JD	31J	330
Acenaphthylene	140J	150JD	160J	330
Acenaphthene	210J	240JD	32J	330
Fluorene	190J	210JD	71J	330
Phenanthrene	2000	2200D	630	330
Anthracene	460	500JD	130J	330
Fluoranthene	2200	2600D	1000	330
Pyrene	4300E	4300D	1100	330
Benzo(a)anthracene	1300	1500D	490	330
Chrysene	1400	1500D	620	330
Benzo(b)fluoranthene	2000	2400D	590	330
Benzo(k)fluoranthene	1700	1500D	620	330
Benzo(a)pyrene	1300	1300D	480	330
Indeno(1,2,3-cd)pyrene	550	490JD	98J	330
Dibenzo(a,h)anthracene	270J	220JD	54J	330
Benzo(g,h,i)perylene	430	360JD	82J	330
Date Received	11/13/98	11/13/98	11/13/98	
Date Extracted	11/16/98	11/16/98	11/16/98	
Date Analyzed	11/23/98	12/02/98	11/23/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.2 Soil
7098-2469A
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

All values are ug/Kg dry weight basis.

Client Sample I.D.	SS-21	SS-21 RE	SS-22	
Lab Sample I.D.	982469A-12	982469A-12RE	982469A-13	Quant. Limits with no Dilution
Method Blank I.D.	SBLKQR	SBLKQR	SBLKQR	
Quant. Factor	1.12	1.12	1.19	
Naphthalene	56JB	55JB	38JB	330
2-Methylnaphthalene	96J	100J	57J	330
Acenaphthylene	30J	30J	70J	330
Acenaphthene	11J	12J	27J	330
Fluorene	17J	19J	44J	330
Phenanthrene	210J	220J	420	330
Anthracene	46J	49J	110J	330
Fluoranthene	240J	230J	670	330
Pyrene	280J	330J	560	330
Benzo(a)anthracene	130J	140J	340J	330
Chrysene	170J	180J	440	330
Benzo(b)fluoranthene	200J	210J	510	330
Benzo(k)fluoranthene	190J	180J	540	330
Benzo(a)pyrene	120J	120J	390	330
Indeno(1,2,3-cd)pyrene	32J	41J	85J	330
Dibenzo(a,h)anthracene	10J	22J	40J	330
Benzo(g,h,i)perylene	40J	55J	70J	330
Date Received	11/13/98	11/13/98	11/13/98	
Date Extracted	11/16/98	11/16/98	11/16/98	
Date Analyzed	11/24/98	12/02/98	11/24/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.3
7098-2469A
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	SS-23	SS-25	SS-26	Quant. Limits with no Dilution
Lab Sample I.D.	982469A-14	982469A-16	982469A-17	
Method Blank I.D.	SBLKQR	SBLKQR	SBLKQR	
Quant. Factor	11.8	4.94	1.14	
Naphthalene	720JB	160JB	200JB	330
2-Methylnaphthalene	450J	180J	160J	330
Acenaphthylene	290J	330J	110J	330
Acenaphthene	1000J	540J	430	330
Fluorene	1100J	500J	470	330
Phenanthrene	10000	4600	3000	330
Anthracene	2300J	1200J	660	330
Fluoranthene	14000	8500	2800	330
Pyrene	13000	7700	3800E	330
Benzo(a)anthracene	6600	4300	1200	330
Chrysene	6500	4600	1400	330
Benzo(b)fluoranthene	6600	5800	1900	330
Benzo(k)fluoranthene	6900	4800	2100	330
Benzo(a)pyrene	6000	4900	1300	330
Indeno(1,2,3-cd)pyrene	1200J	1000J	460	330
Dibenzo(a,h)anthracene	600J	480J	190J	330
Benzo(g,h,i)perylene	910J	610J	630	330
Date Received	11/13/98	11/13/98	11/13/98	
Date Extracted	11/16/98	11/16/98	11/16/98	
Date Analyzed	12/02/98	12/02/98	11/24/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.4
7098-2469A
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	SS-26 DL	SS-27	SS-27 RE	
Lab Sample I.D.	982469A-17DL	982469A-18	982469A-18RE	Quant. Limits with no Dilution
Method Blank I.D.	SBLKQR	SBLKQR	SBLKQR	
Quant. Factor	2.27	1.16	1.16	
Naphthalene	200JDB	61JB	58JB	330
2-Methylnaphthalene	160JD	70J	69J	330
Acenaphthylene	100JD	110J	100J	330
Acenaphthene	440JD	150J	150J	330
Fluorene	480JD	160J	150J	330
Phenanthrene	2900D	1400	1300	330
Anthracene	700JD	310J	320J	330
Fluoranthene	2900D	1900	1800	330
Pyrene	3700D	1800	1900	330
Benzo(a)anthracene	1300D	830	880	330
Chrysene	1400D	1000	1000	330
Benzo(b)fluoranthene	1900D	1200	1300	330
Benzo(k)fluoranthene	1800D	1300	1200	330
Benzo(a)pyrene	1300D	1000	970	330
Indeno(1,2,3-cd)pyrene	390JD	180J	180J	330
Dibenzo(a,h)anthracene	160JD	81J	83J	330
Benzo(g,h,i)perylene	510JD	150J	160J	330
Date Received	11/13/98	11/13/98	11/13/98	
Date Extracted	11/16/98	11/16/98	11/16/98	
Date Analyzed	12/02/98	11/24/98	12/02/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.5
7098-2469A
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	SS-28	SS-28 DL	SS-9	Quant. Limits with no Dilution
Lab Sample I.D.	982469A-19	982469A-19DL	982469A-20	
Method Blank I.D.	SBLKQR	SBLKQR	SBLKQR	
Quant. Factor	1.16	2.32	1.47	
Naphthalene	210JB	200JDB	1300B	330
2-Methylnaphthalene	370J	360JD	510	330
Acenaphthylene	880	750JD	100J	330
Acenaphthene	130J	130JD	1100	330
Fluorene	150J	150JD	1200	330
Phenanthrene	2100	2000D	7000E	330
Anthracene	1000	890D	1800	330
Fluoranthene	3400E	3600D	2500	330
Pyrene	4700E	4600D	13000E	330
Benzo(a)anthracene	2000	2100D	3800	330
Chrysene	2600	2800D	3500	330
Benzo(b)fluoranthene	4800E	4800D	3500	330
Benzo(k)fluoranthene	3400E	3100D	2800	330
Benzo(a)pyrene	2500	2600D	3100	330
Indeno(1,2,3-cd)pyrene	650	530JD	1900	330
Dibenzo(a,h)anthracene	320J	260JD	950	330
Benzo(g,h,i)perylene	680	500JD	1600	330
Date Received	11/13/98	11/13/98	11/13/98	
Date Extracted	11/16/98	11/16/98	11/16/98	
Date Analyzed	11/24/98	12/02/98	12/02/98	

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.6
7098-2469A
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	SS-9 DL			
Lab Sample I.D.	982469A-20DL			Quant. Limits with no Dilution
Method Blank I.D.	SBLKQR			
Quant. Factor	5.88			
Naphthalene	1300JDB			330
2-Methylnaphthalene	500JD			330
Acenaphthylene	91JD			330
Acenaphthene	1000JD			330
Fluorene	1200JD			330
Phenanthrene	7700D			330
Anthracene	2100D			330
Fluoranthene	6400D			330
Pyrene	10000D			330
Benzo(a)anthracene	3700D			330
Chrysene	3700D			330
Benzo(b)fluoranthene	4200D			330
Benzo(k)fluoranthene	4300D			330
Benzo(a)pyrene	3000D			330
Indeno(1,2,3-cd)pyrene	1000JD			330
Dibenzo(a,h)anthracene	520JD			330
Benzo(g,h,i)perylene	810JD			330
Date Received	11/13/98			
Date Extracted	11/16/98			
Date Analyzed	12/02/98			

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor

Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.7
7098-2469A
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	Method Blank	SS-37	SS-37 RE	Quant. Limits with no Dilution
Lab Sample I.D.	SBLKUR	982469A-07	982469A-07RE	
Method Blank I.D.	SBLKUR	SBLKUR	SBLKUR	
Quant. Factor	1.00	1.08	1.08	
Naphthalene	U	7J	6J	330
2-Methylnaphthalene	U	14J	14J	330
Acenaphthylene	U	12J	12J	330
Acenaphthene	U	5J	5J	330
Fluorene	U	4J	6J	330
Phenanthrene	U	57J	57J	330
Anthracene	U	18J	18J	330
Fluoranthene	2J	100JB	100JB	330
Pyrene	2J	100JB	110JB	330
Benzo(a)anthracene	U	51J	52J	330
Chrysene	U	68J	68J	330
Benzo(b)fluoranthene	2J	92JB	100JB	330
Benzo(k)fluoranthene	2J	77JB	60JB	330
Benzo(a)pyrene	2J	55JB	57JB	330
Indeno(1,2,3-cd)pyrene	U	16J	15J	330
Dibenzo(a,h)anthracene	U	6J	5J	330
Benzo(g,h,i)perylene	3J	40JB	42JB	330
Date Received		11/13/98	11/13/98	
Date Extracted	11/17/98	11/17/98	11/17/98	
Date Analyzed	12/02/98	12/02/98	12/02/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE GC-1.0
7098-2469A
STEARNS & WHELER
POLYCHLORINATED BIPHENYLS (PCB"s)

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	Method Blank	PBLK42 MS	PBLK42 MSD	
Lab Sample I.D.	111698-B06	111698-B06MS	111698-B06 MSD	Quant. Limits with no Dilution
Method Blank I.D.	PBLK42	PBLK42	PBLK42	
Quant. Factor	1.00	1.00	1.00	
Aroclor-1016	U	U	U	33.
Aroclor-1221	U	U	U	67.
Aroclor-1232	U	U	U	33.
Aroclor-1242	U	U	U	33.
Aroclor-1248	U	U	U	33.
Aroclor-1254	U	U	U	33.
Aroclor-1260	U	U	U	33.
Date Received				
Date Extracted	11/16/98	11/16/98	11/16/98	
Date Analyzed	12/01/98	12/01/98	12/01/98	

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

Soil

TABLE GC-1.1
7098-2469A
STEARNS & WHELER
POLYCHLORINATED BIPHENYLS (PCB"s)

All values are ug/Kg dry weight basis.

Client Sample I.D. Lab Sample I.D. Method Blank I.D. Quant. Factor	SS-29 982469A-01 PBLK42 6.25	SS-32 982469A-02 PBLK42 23.0	SS-33 982469A-03 PBLK42 11.8	Quant. Limits with no Dilution
Aroclor-1016	U	U	U	33.
Aroclor-1221	U	U	U	67.
Aroclor-1232	U	U	U	33.
Aroclor-1242	U	U	U	33.
Aroclor-1248	U	U	U	33.
Aroclor-1254	U	U	U	33.
Aroclor-1260	1000P	4200P	1000P	33.
Date Received	11/13/98	11/13/98	11/13/98	
Date Extracted	11/16/98	11/16/98	11/16/98	
Date Analyzed	12/02/98	12/02/98	12/02/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE GC-1.2
7098-2469A
STEARNS & WHELER
POLYCHLORINATED BIPHENYLS (PCB"s)

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D. Lab Sample I.D. Method Blank I.D. Quant. Factor	SS-34 982469A-04 PBLK42 139.	SS-20 982469A-11 PBLK42 2.35	SS-21 982469A-12 PBLK42 1.12	Quant. Limits with no Dilution
Aroclor-1016	U	U	U	33.
Aroclor-1221	U	U	U	67.
Aroclor-1232	U	U	U	33.
Aroclor-1242	U	U	U	33.
Aroclor-1248	U	U	U	33.
Aroclor-1254	U	U	U	33.
Aroclor-1260	19000P	U	U	33.
Date Received	11/13/98	11/13/98	11/13/98	
Date Extracted	11/16/98	11/16/98	11/16/98	
Date Analyzed	12/02/98	12/02/98	12/02/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE GC-1.3
7098-2469A
STEARNS & WHELER
POLYCHLORINATED BIPHENYLS (PCB"s)

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	SS-22	SS-27		Quant. Limits with no Dilution
Lab Sample I.D.	982469A-13	982469A-18		
Method Blank I.D.	PBLK42	PBLK42		
Quant. Factor	1.20	2.20		
Aroclor-1016	U	U		33.
Aroclor-1221	U	U		67.
Aroclor-1232	U	U		33.
Aroclor-1242	U	U		33.
Aroclor-1248	U	U		33.
Aroclor-1254	U	U		33.
Aroclor-1260	U	200P		33.
Date Received	11/13/98	11/13/98		
Date Extracted	11/16/98	11/16/98		
Date Analyzed	12/02/98	12/02/98		

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

Appendix D
Support Documentation/Resubmission

INORGANIC ANALYSIS DATA REVIEW

STEARNS & WHELER
SITE: ROBLIN STEEL
CASE NO.:7098-2469A/ SDG NO. A2469

INTRODUCTION

This quality assurance review is based upon a review of all data generated from nine (9) soil samples collected on 11-11-98. The samples were received by Severn Trent Laboratories on 11-13-98 and analyzed according to criteria set forth in SOW3,90 (ILM03.0) for TAL metals.

The following samples are contained within this report:

SS-35	SS-39	SS-20	SS-22	SS-25
SS-36	SS-19	SS-21	SS-24	

The QC samples (MS & MD) was assigned to the alternate samples with sample IDs SP1-F2 and DAF95E for the ICP metals and mercury respectively.

All data have been validated with regard to usability according to the quality assurance set forth in National Functional Guidelines for Evaluating Inorganic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations & CRDL Analyses
- Blanks
- ICP Interference Check Sample
- Matrix Spike Analysis
- Matrix Duplicate Analysis
- Laboratory Control Sample Analysis
- ICP Serial Dilution Analysis
- Instrument Detection Limits
- Field Duplicate Results
- Sample Results

DATA COMPLETENESS

The 8-hour analysis holding time for CRDL and ICS samples exceeded in the analysis run log "Form XIV", however; the review of the raw data indicated that these QC samples were analyzed within the 8-hour requirements. The laboratory has been contacted. The corrected Forms II (part 2), Forms IV and forms XIV were resubmitted.

HOLDING TIME

All samples were digested/analyzed within the requirements established in the method.

CALIBRATIONS & CRDL Analyses

The recoveries for all analytes in the initial and continuing calibrations were within the control limits of 90-110%.

The CRDL sample analysis was performed prior and after all samples analysis. The %recoveries were within the control limits with the exception of Pb (72.9%), Se (124.8%) and Zn (201%) in initial CRDL and Tl (68.5% & 72.8%) in final CRDL analysis runs. The results for lead and zinc were above 3x the CRDLs. Therefore, the data were not qualified based on these outliers. The positive results for selenium and the results and non-detected values foe thallium were qualified estimated.

BLANKS

The laboratory preparation blank had Se (0.914 mg/kg) contamination at a level below the CRDL. The reported sample results up to 5 times the blank level were qualified "U" and considered as the laboratory artifact. Affected samples: SS-35, SS-20, SS-22.

ICP INTERFERENCE CHECK SAMPLE

The recoveries for Cd (78.9%) in initial ICS sample was below the lower control limit of 80%. The data were not impacted since the deviation was marginal and also, the final ICS recoveries were within the control limit.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

Matrix spike analysis was performed on the alternate samples. The spike recoveries were within the control limits with the exception of Sb (32%) and Hg (-9.1%). The post digestion spike sample was analyzed for antimony as required by the method. The recovery (96%) was within the control limit. The results and non-detected values for antimony were qualified estimated "J & UJ". However, the results for mercury were considered biased low and the possibility of false negative exist. Therefore, the positive results were qualified estimated and non-detected values were rejected for this analyte.

MATRIX DUPLICATE ANALYSIS

The matrix duplicate analysis was also performed on samples SP1-F2 and DAF95E for ICP metals and mercury respectively. The RPDs for all analytes were within the analysis and validation control limits with the exception of Cr (21.2%) and Pb (77.1%). The data for chromium was not qualified since the RPD was within the data validation control limit of 35%. The reported positive sample results for lead were qualified estimated.

LABORATORY CONTROL SAMPLE

The recoveries for all analyses were within the control limits.

ICP SERIAL DILUTION

The %Ds for Zn (44.42%) was above the 10% requirement. The reported positive results were qualified estimated.

INSTRUMENT DETECTION LIMITS

All analytes with the exception of mercury were analyzed with ICP. The reported IDLs were below the CRDL.

DUPLICATE ANALYSIS

Duplicate analysis was analyzed on sample SS-39/Dup-2. The RPDs were within the control limits. Sample Dup-2 was analyzed with batch # 2469B.

SAMPLE RESULTS

All analytes were analyzed at one-fold dilutions. The reported sample results were within the calibration range.

SUMMARY

The cooler temperature was not reported on the chain-of-custody. Overall, major problems were not encountered during the sample analyses. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

1. Appendix A- Glossary of Data Qualifier
2. Appendix B- Data Summary Forms
3. Appendix C- Laboratory Results (Form I)
4. Appendix D - Support Documentation /Resubmission (if applicable)

Appendix A
Glossary of Data Qualifier

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

Appendix B
Data Summary Forms

ANALYTICAL ASSURANCE ASSOCIATES (A3)
METAL SOIL ANALYSIS
mg/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL
STL ID: 7098-2469A
SDG NO.: 2469A

CLIENT SAMPLE ID:			SS-24	SS-25
LAB SAMPLE ID:			982469A-15	982469A-16
% SOLID:			85	85.2

TARGET COMPOUNDS:

	IDL			
Aluminum	6	P	5100	4470
Antimony	5	P	25.4 J	7.7 J
Arsenic	3	P	27.6	15.8
Barium	1	P	95.4	102
Beryllium	1	P	0.82	0.93
Cadmium	1	P	11	12.4
Calcium	4	P	6010	41400
Chromium	1	P	187	122
Cobalt	1	P	22.9	13.3
Copper	2	P	314	197
Iron	7	P	258000	162000
Lead	2	P	353 J	164 J
Magnesium	5	P	1100	12900
Manganese	1	P	2100	1610
Mercury	0.1	CV	0.94 J	0.036 J
Nickel	5	P	157	109
Potassium	29	P	427	417
Selenium	2	P	13.9 J	8.2 J
Silver	1	P	0.86	0.51
Sodium	15	P	636	674
Thallium	6	P	3.8 J	UJ
Vanadium	1	P	24.6	16.2
Zinc	1	P	234 J	185 J

ANALYTICAL ASSURANCE ASSOCIATES (A3)
METAL SOIL ANALYSIS
mg/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL
STL ID: 7098-2469A
SDG NO.: 2469A

CLIENT SAMPLE ID:			SS-35	SS-36	SS-39	SS-19	SS-20	SS-21	SS-22
LAB SAMPLE ID:			982469A-05	982469A-06	982469A-09	982469A-10	982469A-11	982469A-12	982469A-13
% SOLID:			82.5	78.9	78.2	78.9	84.7	89.1	84.3
TARGET COMPOUNDS:	IDL								
Aluminum	6	P	5260	4650	5060	3690	2620	1230	9510
Antimony	5	P	4.4 J	9.4 J	6 J	116 J	3.7 J	4.7 J	2.1 J
Arsenic	3	P	21.2	35.8	22.1	41.4	15.5	19.1	12.1
Barium	1	P	94.5	133	107	80.4	51.4	584	105
Beryllium	1	P	0.64	0.75	0.85	0.51	0.46	0.22	0.65
Cadmium	1	P	40.3	27.5	10.4	12.2	27.5	60	1.8
Calcium	4	P	13900	6360	38800	2180	5620	4500	6070
Chromium	1	P	40.1	116	151	520	25.6	66.3	54.5
Cobalt	1	P	14.3	22.2	20	57	7.8	10	8.9
Copper	2	P	208	266	224	698	192	133	69.4
Iron	7	P	64900	145000	145000	286000	69500	163000	55500
Lead	2	P	369 J	749 J	297 J	1390 J	365 J	103 J	113 J
Magnesium	5	P	4050	1670	13300	807	963	245	2310
Manganese	1	P	614	1090	1540	2080	437	1120	462
Mercury	0.1	CV	0.27 J	0.3 J	0.25 J	0.12 J	0.35 J	0.063 J	0.18 J
Nickel	5	P	74.7	175	189	176	42.3	74.9	38.6
Potassium	29	P	357	467	672	403	250	71.4	874
Selenium	2	P	4.9 U	9.5 J	8.4 J	15.4 J	5.3 U	10.3 J	4.4 U
Silver	1	P		0.62	0.57	0.89		0.28	0.22
Sodium	15	P	675	718	753	485	549	490	609
Thallium	6	P	UJ	1.5 J	UJ	4.8 J	1.2 J	1.8 J	1.3 J
Vanadium	1	P	17.6	19.8	27.3	22.5	10.1	7.3	25.2
Zinc	1	P	3540 J	2490 J	542 J	450 J	188 J	1420 J	156 J

Appendix C
Laboratory Reported Results

TABLE AS-1.0
7098-2469A
STEARNS & WHELER
TAL METALS

Soil

All values are mg/Kg dry weight basis.

Client Sample I.D.	SS-35	SS-36	SS-39	SS-19
Lab Sample I.D.	982469A-05	982469A-06	982469A-09	982469A-10
Aluminum	5260	4650	5060	3690
Antimony	4.4BN	9.4BN	6.0BN	116.N
Arsenic	21.2	35.8	22.1	41.4
Barium	94.5	133.	107.	80.4
Beryllium	0.64B	0.75B	0.85B	0.51B
Cadmium	40.3	27.5	10.4	12.2
Calcium	13900	6360	38800	2180
Chromium	40.1*	116.*	151.*	520.*
Cobalt	14.3	22.2	20.0	57.0
Copper	208.	266.	224.	698.
Iron	64900	145000	145000	286000
Lead	369.*	749.*	297.*	1390*
Magnesium	4050	1670	13300	807.B
Manganese	614.	1090	1540	2080
Mercury	0.27N	0.30N	0.25N	0.12N
Nickel	74.7	175.	189.	176.
Potassium	357.B	467.B	672.B	403.B
Selenium	4.9	9.5	8.4	15.4
Silver	0.24U	0.62B	0.57B	0.89B
Sodium	675.B	718.B	753.B	485.B
Thallium	1.4U	1.5B	1.3U	4.8
Vanadium	17.6	19.8	27.3	22.5
Zinc	3540E	2490E	542.E	450.E

See Appendix for qualifier definitions

TABLE AS-1.1
7098-2469A
STEARNS & WHELER
TAL METALS

Soil

All values are mg/Kg dry weight basis.

Client Sample I.D.	SS-20	SS-21	SS-22	SS-24
Lab Sample I.D.	982469A-11	982469A-12	982469A-13	982469A-15
Aluminum	2620	1230	9510	5100
Antimony	3.7BN	4.7BN	2.1BN	25.4N
Arsenic	15.5	19.1	12.1	27.6
Barium	51.4	584.	105.	95.4
Beryllium	0.46B	0.22B	0.65B	0.82B
Cadmium	27.5	60.0	1.8	11.0
Calcium	5620	4500	6070	6010
Chromium	25.6*	66.3*	54.5*	187.*
Cobalt	7.8B	10.0B	8.9B	22.9
Copper	192.	133.	69.4	314.
Iron	69500	163000	55500	258000
Lead	365.*	103.*	113.*	353.*
Magnesium	963.B	245.B	2310	1100
Manganese	437.	1120	462.	2100
Mercury	0.35N	0.063BN	0.18N	0.94N
Nickel	42.3	74.9	38.6	157.
Potassium	250.B	71.4B	874.B	427.B
Selenium	5.3	10.3	4.4	13.9
Silver	0.21U	0.28B	0.22U	0.86B
Sodium	549.B	490.B	609.B	636.B
Thallium	1.2U	1.8B	1.3U	3.8
Vanadium	10.1B	7.3B	25.2	24.6
Zinc	188.E	1420E	156.E	234.E

See Appendix for qualifier definitions

Soil

TABLE AS-1.2
7098-2469A
STEARNS & WHELER
TAL METALS

All values are mg/Kg dry weight basis.

Client Sample I.D. Lab Sample I.D.	SS-25 982469A-16			
Aluminum	4470			
Antimony	7.7BN			
Arsenic	15.8			
Barium	102.			
Beryllium	0.93			
Cadmium	12.4			
Calcium	41400			
Chromium	122.*			
Cobalt	13.3			
Copper	197.			
Iron	162000			
Lead	164.*			
Magnesium	12900			
Manganese	1610			
Mercury	0.036BN			
Nickel	109.			
Potassium	417.B			
Selenium	8.2			
Silver	0.51B			
Sodium	674.B			
Thallium	1.1U			
Vanadium	16.2			
Zinc	185.E			

See Appendix for qualifier definitions

Appendix D
Support Documentation/Resubmission

STL

Committed To *Your* Success

Severn Trent Laboratories
200 Monroe Turnpike
Monroe CT 06468
Tel: (203) 261-4458
Fax: (203) 268-5346

FACSIMILE COVER SHEET

DATE: 1/14/99

NUMBER OF PAGES (INCLUDING COVER SHEET) 18

TO: Zohreh Hamid

LOCATION: Sterns + Wheler

TELEPHONE NO. **FAX NO.** 610-269-9989

FROM: PAUL HOBART

LOCATION: SEVERN TRENT LABORATORIES-CT

TELEPHONE NO: (203) 261-4458 **FAX NO.** (203) 268-5346

MESSAGE

Roblin Steel Project. STL Report # 7098.2469A,B,C

Attached are the corrected metals forms you requested for the project listed above. If you require any additional information please call our laboratory director, Jeff Curran, or your project manager, Stephanie Plunkett. Thank you.

Paul Hobart

a part of
Severn Trent Services Inc

Other Laboratory Locations:

- 149 Rangeway Road, North Billerica MA 01862
- 16203 Park Row, Suite 110, Houston TX 77084
- 120 Southcenter Court, Suite 300, Morrisville NC 27560
- 315 Fullerton Avenue, Newburgh NY 12550
- 11 East Olive Road, Pensacola FL 32514
- Westfield Executive Park, 53 Southampton Road, Westfield MA 01085
- 628 Route 10, Whippany NJ 07981

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2B
CRDL STANDARD FOR AA AND ICP

Lab Name: STL Contract: ____

Lab Code: STL Case No.: ____ SAS No.: ____ SDG No.: A2469

AA CRDL Standard Source: INORG. VENT.

ICP CRDL Standard Source: INORG. VENT.

Concentration Units: ug/L

Analyte	CRDL Standard for AA True	Found	%R(1)	CRDL Standard for ICP True	Initial Found	%R(1)	Final Found	%R(1)
Aluminum				400.0	11.48	2.9		
Antimony				120.0	122.15	101.8	118.13	98.4
Arsenic				20.0	18.17	90.8	17.64	88.2
Barium				400.0				
Beryllium				10.0	10.09	100.9	9.52	95.2
Cadmium				10.0	9.93	99.3	10.69	106.9
Calcium				10000.0	4.28			
Chromium				20.0	19.43	97.2	19.13	95.6
Cobalt				100.0	100.80	100.8	96.02	96.0
Copper				50.0	50.67	101.4	48.05	96.1
Iron				200.0	-2.82	-1.4		
Lead				6.0	4.37	72.9	5.16	86.0
Magnesium				10000.0	5.21			
Manganese				30.0	29.91	99.7	29.31	97.7
Mercury								
Nickel				80.0	78.81	98.5	80.43	100.5
Potassium				10000.0	6.44	0.1		
Selenium				10.0	12.47	124.8	11.90	119.0
Silver				20.0	19.99	100.0	19.58	97.9
Sodium				10000.0	-12.84	-0.1		
Thallium				20.0	16.82	84.1	14.56	72.8
Vanadium				100.0	99.79	99.8	95.64	95.6
Zinc				40.0	80.38	201.0	51.41	128.5
Cyanide								

U.S. EPA - CLP

4
ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL Contract: ____

Lab Code: STL Case No.: ____ SAS No.: ____ SDG No.: A2469

ID Number: JA61E ICS Source: EPA-LV87

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum	500000	500000	469142	461845.5	92.3	455257	452610.9	90.5
Antimony		500	0	578.7	115.7	5	568.5	113.7
Arsenic		100	3	100.5	100.5	2	97.2	97.2
Barium		500	2	459.1	91.8	2	464.8	92.9
Beryllium		500	1	433.6	86.7	0	427.5	85.5
Cadmium		1000	-2	789.4	78.9	-6	845.2	84.5
Calcium	500000	500000	425258	417349.0	83.4	415455	413994.9	82.7
Chromium		500	3	433.7	86.7	3	432.3	86.4
Cobalt		500	0	440.9	88.1	0	424.4	84.8
Copper		500	2	511.7	102.3	0	502.6	100.5
Iron	200000	200000	183525	181111.0	90.5	184805	184076.4	92.0
Lead		50	-2	45.5	91.0	-3	44.5	89.0
Magnesium	500000	500000	473123	466653.5	93.3	465929	463718.7	92.7
Manganese		500	-1	425.4	85.0	-1	433.6	86.7
Mercury								
Nickel		1000	3	804.9	80.4	2	851.5	85.1
Potassium			-14	-20.3		-12	-19.8	
Selenium		50	6	53.7	107.4	5	53.6	107.2
Silver		200	0	203.4	101.7	0	202.8	101.4
Sodium			-171	-167.3		-173	-155.1	
Thallium		100	6	96.3	96.3	5	98.0	98.0
Vanadium		500	-2	447.2	89.4	-2	436.8	87.3
Zinc		1000	-11	903.6	90.3	-3	920.3	92.0
Cyanide								

U.S. EPA - CLP

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL Contract: ________

Lab Code: STL Case No.: ______ SAS No.: ______ SDG No.: A2469

ID Number: JA61E ICS Source: EPA-LV87

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum	500000	500000	464775	451976.0	90.3		451976.0	90.3
Antimony		500	1	571.4	114.2		571.4	114.2
Arsenic		100	0	94.2	94.2		94.2	94.2
Barium		500	2	467.9	93.5		467.9	93.5
Beryllium		500	0	423.8	84.7		423.8	84.7
Cadmium		1000	-5	853.9	85.3		853.9	85.3
Calcium	500000	500000	424152	410761.1	82.1		410761.1	82.1
Chromium		500	3	431.7	86.3		431.7	86.3
Cobalt		500	0	419.1	83.8		419.1	83.8
Copper		500	0	503.2	100.6		503.2	100.6
Iron	200000	200000	186744	181281.1	90.6		181281.1	90.6
Lead		50	-2	46.8	93.6		46.8	93.6
Magnesium	500000	500000	476454	462451.9	92.4		462451.9	92.4
Manganese		500	-1	435.7	87.1		435.7	87.1
Mercury								
Nickel		1000	3	861.0	86.1		861.0	86.1
Potassium			-14	-14.6			-14.6	
Selenium		50	7	54.7	109.4		54.7	109.4
Silver		200	0	203.2	101.6		203.2	101.6
Sodium			-169	-169.4			-169.4	
Thallium		100	-4	98.4	98.4		98.4	98.4
Vanadium		500	-1	433.7	86.7		433.7	86.7
Zinc		1000	-13	894.8	89.4		894.8	89.4
Cyanide								

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14
ANALYSIS RUN LOG

Lab Name: STL Contract: ______

Lab Code: STL Case No.: ______ SAS No.: ______ SDG No.: A2469

Instrument ID Number: JA61E Method: P

Start Date: 11/19/98 End Date: 11/19/98

EPA Sample No.	D/F	Time	% R	AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S1	1.00	1204		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
S7	1.00	1210			X	X	X	X	X		X	X	X				X		X		X	X		X	X	X	
S8	1.00	1216			X	X	X	X	X		X	X	X				X		X		X	X		X	X	X	
S4	1.00	1222		X		X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
S9	1.00	1228		X						X				X		X				X			X				
S6	1.00	1233		X						X				X		X				X			X				
S5	1.00	1237			X																						
S3	1.00	1243								X				X		X				X			X				
ICV1	1.00	1243		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ICB1	1.00	1250		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CRI1	1.00	1257			X	X		X	X		X	X	X		X		X		X		X	X		X	X	X	
ICSAI	1.00	1303		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ICSABI	1.00	1310		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCV1	1.00	1317		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCB1	1.00	1324		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
PBS1	1.00	1331		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ZZZZZZ	1.00	1338																									
ZZZZZZ	1.00	1344																									
ZZZZZZ	1.00	1351																									
ZZZZZZ	1.00	1358																									
982489A-09	1.00	1405		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
982489A-09D	1.00	1412		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
982489A-09S	1.00	1419			X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
ZZZZZZ	1.00	1425																									
LCSS1	1.00	1432		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCV2	1.00	1439		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCB2	1.00	1446		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ZZZZZZ	1.00	1453																									
ZZZZZZ	1.00	1500																									
982469A-05	1.00	1506		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
982469A-06	1.00	1513		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
982469A-09	1.00	1520		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
982469A-10	1.00	1527		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	

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14
ANALYSIS RUN LOG

Lab Name: STL Contract: ________

Lab Code: STL Case No.: ______ SAS No.: ______ SDG No.: A2469

Instrument ID Number: JA61E Method: P

Start Date: 11/19/98 End Date: 11/19/98

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
982469A-11	1.00	1534		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
982469A-12	1.00	1540		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
982469A-13	1.00	1547		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
982469A-15	1.00	1554		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ZZZZZZ	1.00	1601																									
CCV3	1.00	1610		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCB3	1.00	1616		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
982469A-16	1.00	1623		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
982469B-12	1.00	1630																									
982469B-13	1.00	1637																									
982469B-14	1.00	1644																									
982469B-17	1.00	1651																									
ZZZZZZ	5.00	1657																									
982469A-C5L	5.00	1706		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
982469B-12L	5.00	1713																									
CCV4	1.00	1720		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCB4	1.00	1727		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CRI2	1.00	1734		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ICSAF	1.00	1740		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ICSABF	1.00	1747		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCV5	1.00	1754		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCB5	1.00	1801		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ZZZZZZ	1.00	1808																									
ZZZZZZ	1.00	1815																									
ZZZZZZ	1.00	1821																									
ZZZZZZ	1.00	1828																									
ZZZZZZ	1.00	1835																									
ZZZZZZ	1.00	1842																									
ZZZZZZ	1.00	1849																									
ZZZZZZ	1.00	1856																									
ZZZZZZ	1.00	1902																									
ZZZZZZ	1.00	1909																									
CCV6	1.00	1916		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	

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14
ANALYSIS RUN LOG

Lab Name: STL Contract: ______

Lab Code: STL Case No.: ______ SAS No.: ______ SDG No.: A2469

Instrument ID Number: JA61E Method: P

Start Date: 11/19/98 End Date: 11/19/98

EPA Sample No.	D/F	Time	% R	AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB6	1.00	1923		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ZZZZZZ	1.00	1930																									
ZZZZZZ	1.00	1937																									
ZZZZZZ	1.00	1943																									
ZZZZZZ	1.00	1950																									
ZZZZZZ	1.00	1957																									
ZZZZZZ	1.00	2004																									
ZZZZZZ	1.00	2011																									
ZZZZZZ	1.00	2018																									
ZZZZZZ	1.00	2024																									
ZZZZZZ	1.00	2031																									
CCV7	1.00	2038		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCB7	1.00	2045		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ZZZZZZ	5.00	2052																									
ZZZZZZ	1.00	2059																									
ZZZZZZ	1.00	2106																									
ZZZZZZ	1.00	2112																									
ZZZZZZ	1.00	2119																									
ZZZZZZ	1.00	2126																									
982489A-09A	1.00	2133	-11.6		X																						
CRI2	1.00	2140			X	X		X	X		X	X	X		X		X		X		X	X		X	X	X	
CRI3	1.00	2140			X	X		X	X		X	X	X		X		X		X		X	X		X	X	X	
ICSAF	1.00	2147		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ICSABF	1.00	2153		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCV8	1.00	2200		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCB8	1.00	2207		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	

END OF DATA PACKAGE

Analytical Assurance Associates, Inc.
600 Rock Raymond Road
Downingtown, PA 19335
Phone: 610 - 269 - 9989
Fax: 610 - 269 - 9989

ORGAINC & INORGANIC QUALITY ASSURANCE DATA REVIEW

STEARNS & WHELER, LLC

SITE: ROBLIN STEEL
CASE NO.: 7098-2469B/ SDG NO.: B2469

REPORTED BY:
ANALYTICAL ASSURANCE ASSOCIATES (A^3)
600 ROCK RAYMOND ROAD
DOWNINGTOWN, PA 19335

REVIEWED BY:
ZOHREH HAMID, Ph.D.
JANUARY 10, 1999

ORGANIC ANALYSES

STEARNS & WHELER
SITE NAME: ROBLIN STEEL
CASE NO.:7098-2469B/SDG NO.: B2469

INTRODUCTION

This quality assurance report is provided based upon a review of all data generated from sixteen (16) soil samples collected on 11-11,12-98 and were received by Severn Trent Laboratories on 11-13-98. The samples were analyzed for Poly Aromatic Hydrocarbons (PAH) compounds according to criteria set forth in USEPA CLP OLM3.1.

The following samples are contained within this report:

SS-10	SS-14	SS-18	SS-9B
SS-11	SS-15	SS-41	SS-52
SS-12	SS-16	SS-42	SS-12B
SS-13	SS-17	DUP-1	SS-49

Two sets of QC (MS/MSD) sample analyses were performed on samples SS-9B and SS-52 from this batch.

All data have been validated with regard to usability according to the quality assurance set forth in NYSDEC ASP for Evaluating Organic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations
- Blanks
- Surrogate Recoveries
- Internal Standards Recovery
- Matrix Spike/Spike Duplicate/Blank Spike Analyses
- Instrument Performance
- Field Duplicate Results
- Sample Results

DATA COMPLETENESS

The data package completeness was satisfactory.

HOLDING TIME

All samples were extracted within 7-days from collection, and analyzed within 40-days from extraction as cited in the Method for this fraction.

CALIBRATION

All RSDs, %Ds and response factors for the PAH compounds were within the control limits in both initial and continuing calibrations for the PAH compounds with the exception of the following %Ds:

Compound Name	CC 12-02-98	CC 12-08-98
Indino(1,2,3-cd)Pyrene	35	
Dibenzo(a,h)anthracene	34	
Benzo(g,h,i)perylene	34	
Benzo(k)fluoranthene		27
Associated Samples:	SS-10 SS-12	SS-11 SS-16Re SS-42 SS-13Re SS-18 SS-41 DUP-1 SS-9B SS-12B SS-49

CC= Continuing Calibration

The reported sample data for the above %d outliers were qualified estimated in the corresponding samples.

BLANKS

The method blanks contained naphthalene (4 ug/kg), fluoranthene (2&3 ug/kg), pyrene (2&3 ug/kg), benzo (b & K) fluoranthene (2 ug/kg) and benzo (g,h,i) pyrene (2 ug/kg) at levels below the CRQLs. These compounds were detected in the samples at relatively high levels, (above the action levels) with the exception of pyrene in sample SS-15. The reported result was qualified "U". Tentatively Identified Compounds were not searched/reported for this analysis.

SURROGATE RECOVERIES

All samples and the corresponding QC samples were spiked with eight surrogate compounds as required by the applied methods. The recoveries were within the control limits with the exception of terphenyl-d14 in sample SS-18 (207%) and the corresponding reanalysis SS-18Re (172%). The data were not qualified based on these outliers since the surrogate recovery criteria, (i.e., one outlier per fraction and no recoveries below 10%) has been met.

All surrogate recoveries were diluted out in sample SS-49 due to the high level of the dilution. The reported sample data were qualified estimated.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

Two sets of matrix spike/spike duplicate analyses were performed for these fractions. The recoveries of 17 out of 22 in sample SS-9B and 6 out of 22 in sample SS-52 were outside the QC limits. The recoveries were above 10% for all compounds with the exception of pentachlorophenol (0%) and pyrene (0%) in both QC samples. The data were not qualified since the concentration of pyrene in the original sample was above 4 times the amount of spike added. Also, pentachlorophenol was not listed as a target compound.

INTERNAL STANDARD

All internal standard recoveries and retention times were within the control limits established by the laboratory with the exception of the following:

Sample ID	Internal Standard
SS-14	PHN
SS-52MSB	CRY/PRY
SS-13	CRY/PRY
SS-13Re	PRY
SS-14Re	CRY/PRY
SS-16	CRY/PRY
SS-52	CRY/PRY
SS-52 MS/MSD	CRY/PRY
SS-16Re	PRY
SS-42/SS-42Re	PRY
SS-18/SS-18Re	CRY/PRY
SS-41/SS-41Re	PRY

PHN= Phenanthrene
CRY = Chrysene-d12
PRY = Perylene-d12
The analysis of MS/MSD samples fulfilled the reanalysis requirements for sample SS-52.

The comparison of the initial sample results and the reanalysis gave the satisfactory reproducibility. Therefore, the reanalysis sample results were reported on the data summary. The sample data were qualified based on the aforementioned outliers.

LABORATORY CONTROL SAMPLE

Two LCS samples were analyzed for this fraction. The recoveries were within the control limits with the exception of 4-nitrophenol (88%) which exceeded the upper control limit of 80% in one LCS sample. This compound is not a target compound. Therefore, the data were not qualified.

DUPLICATE ANALYSIS

One set of field duplicate samples "SS-12B/DUP-1" analysis was performed. The RPDs for all compounds were below 100% which is considered satisfactory for the corresponding matrix/analysis.

SAMPLE RESULTS

The laboratory case narrative stated that sample SS-16 completely dissolved in the extract solvent. Therefore; the waste dilution technique was used for the preparation. This sample was analyzed according to the medium level.

Nine samples were analyzed at higher dilutions. Samples SS-11, SS-9B, SS-49 and SS-52 were initially analyzed at above 5-fold dilutions. The sample data were considered biased and the reported sample result and non-detected values were qualified estimated.

All target compounds were detected in the samples. The base line for all chromatograms were elevated from the retention time approximately "RT= 19 minutes". The GC/MS spectra for the detected compounds showed an interference with petroleum hydrocarbons (TPHC) which may cause the elevated base lines and the internal standard outlier.

SUMMARY

The cooler temperature was not listed on the chain-of-custody. The sample results below the CRQLs were qualified estimated, due to the uncertainty near the detection limits in the both fractions.

Overall, major analysis problems were not encountered during the sample analyses. The most important issue was sample background contamination. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

1. **Appendix A- Glossary of Data Qualifier**
2. **Appendix B- Data Summary Forms**
3. **Appendix C- Laboratory Results (Form I)**
4. **Appendix D - Support Documentation /Resubmission (if applicable)**

Appendix A
Glossary of Data Qualifier

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

Appendix B
Data Summary Forms

ANALYTICAL ASSURANCE ASSOCIATES (A3)
SEMIVOLATILE SOIL ANALYSIS
ug/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL
STL ID: 7098-2469B
SDG NO.: 2469B

CLIENT SAMPLE ID:		SS-10	SS-11	SS-12	SS-13RE	SS-14RE	SS-15	SS-16RE
LAB SAMPLE ID:		982469B-01	982469B-02	982469B-03	982469B-04RE	982469B-05RE	982469B-06	982469B-07
% MOISTURE:		21	21	21	21	15	1	NA*
DILUTION FACTOR:		1.0	25.0	1.0	2.0	1.0	1.0	1.0
TARGET COMPOUNDS:								
	CRQL							
Naphthalene	330	16 J	6300 J	5 J	690 J	88 J	3 J	
2-Methylnaphthalene	330	20 J	2800 J		330 J	66 J		
Acenaphthylene	330	20 J	440 J	34 J	1100 J	43 J		
Acenaphthene	330	14 J	7800 J	8 J	670 J	81 J		
Fluorene	330	9 J	8400 J	9 J	840 J	79 J		680 J
Phenanthrene	330	180 J	58000 J	98 J	6600	990	40 J	6900 J
Anthracene	330	38 J	13000 J	45 J	2700	220 J		
Fluoranthene	330	320 J	64000 J	420	7700	1100	40 J	2800 J
Pyrene	330	230 J	50000 J	500	11000	1700 J	19 U	4200 J
Benzo(a)anthracene	330	170 J	29000 J	420	4400	830 J	14 J	
Chrysene	330	250 J	30000 J	460	4400	880 J	37 J	6400 J
Benzo(b)fluoranthene	330	270 J	26000 J	310 J	6200 J	1100 J	25 J	UJ
Benzo(k)fluoranthene	330	290 J	24000 J	410 J	8900 J	920 J	13 J	UJ
Benzo(a)pyrene	330	190 J	25000 J	280 J	4300 J	790 J	9 J	UJ
Indeno(1,2,3-cd)pyrene	330	46 J	8400 J	230 J	2700 J	530 J	4 J	UJ
Dibenzo(a,h)anthracene	330	18 J	4400 J	89 J	880 J	210 J		UJ
Benzo(g,h,i)perylene	330	26 J	5100 J	120 J	2800 J	460 J	6 J	3100 J

ANALYTICAL ASSURANCE ASSOCIATES (A3)
SEMIVOLATILE SOIL ANALYSIS
ug/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL
STL ID: 7098-2469B
SDG NO.: 2469B

CLIENT SAMPLE ID:		SS-17	SS-18RE	SS-41RE	SS-42RE	DUP-1	SS-9B	SS-52
LAB SAMPLE ID:		982469B-08	982469B-09RE	982469B-10RE	982469B-11RE	982469B-15	982469B-16	982469B-18
% MOISTURE:		7	5	21	7	6	30	25
DILUTION FACTOR:		4.0	1.0	4.0	1.0	4.0	50.0	25.0
TARGET COMPOUNDS:	CRQL							
Naphthalene	330	490 J	39 J	350 J	10 J	2800	15000 J	2400 J
2-Methylnaphthalene	330	920 J	54 J	750 J		1000 J	5900 J	1100 J
Acenaphthylene	330	2500	94 J	1500 J	3 J	190 J	680 J	500 J
Acenaphthene	330	170 J	36 J	310 J		2000 J	13000 J	4200 J
Fluorene	330	2200	60 J	1800		2500 J	14000 J	4100 J
Phenanthrene	330	6100	510	7100	7 J	15000	100000 J	39000 J
Anthracene	330	2400	160 J	2300	6 J	3600	21000 J	7800 J
Fluoranthene	330	4900	560	8300	10 J	16000	110000 J	43000 J
Pyrene	330	4300	1200 J	8100	22 J	15000	97000 J	70000 J
Benzo(a)anthracene	330	2800	330 J	4800		7700	49000 J	26000 J
Chrysene	330	2000	380 J	4400	22 J	7900	51000 J	28000 J
Benzo(b)fluoranthene	330	1800	630 J	5600 J	UJ	6900	32000 J	22000 J
Benzo(k)fluoranthene	330	2400	340 J	4800 J	UJ	8600 J	55000 J	20000 J
Benzo(a)pyrene	330	1700	230 J	3900 J	UJ	6400	38000 J	23000 J
Indeno(1,2,3-cd)pyrene	330	280 J	210 J	720 J	UJ	1500 J	14000 J	17000 J
Dibenzo(a,h)anthracene	330	110 J	73 J	390 J	UJ	760 J	7900 J	8200 J
Benzo(g,h,i)perylene	330	180 J	230 J	490 J	UJ	1100 J	10000 J	11000 J

ANALYTICAL ASSURANCE ASSOCIATES (A3)
SEMIVOLATILE SOIL ANALYSIS
ug/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL
STL ID: 7098-2469B
SDG NO.: 2469B

CLIENT SAMPLE ID:		SS-12B	SS-49
LAB SAMPLE ID:		982469B-19	982469B-20
% MOISTURE:		7	9
DILUTION FACTOR:		5.0	250.0

TARGET COMPOUNDS:

	CRQL		
Naphthalene	330	960 J	100000 J
2-Methylnaphthalene	330	450 J	96000 J
Acenaphthylene	330	140 J	53000 J
Acenaphthene	330	1200 J	240000 J
Fluorene	330	1400 J	230000 J
Phenanthrene	330	9700	1900000 J
Anthracene	330	2600	350000 J
Fluoranthene	330	11000	3800000 J
Pyrene	330	10000	3500000 J
Benzo(a)anthracene	330	5300	1400000 J
Chrysene	330	5500	1600000 J
Benzo(b)fluoranthene	330	4800	1200000 J
Benzo(k)fluoranthene	330	6000 J	1700000 J
Benzo(a)pyrene	330	4700	1400000 J
Indeno(1,2,3-cd)pyrene	330	1300 J	620000 J
Dibenzo(a,h)anthracene	330	700 J	260000 J
Benzo(g,h,i)perylene	330	780 J	550000 J

Appendix C
Laboratory Reported Results

TABLE SV-1.0
7098-2469B
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	Method Blank	SS-10	SS-12	
Lab Sample I.D.	SBLKUP	982469B-01	982469B-03	Quant. Limits with no Dilution
Method Blank I.D.	SBLKUP	SBLKUP	SBLKUP	
Quant. Factor	1.00	1.26	1.26	
Naphthalene	U	16J	5J	330
2-Methylnaphthalene	U	20J	U	330
Acenaphthylene	U	20J	34J	330
Acenaphthene	U	14J	8J	330
Fluorene	U	9J	9J	330
Phenanthrene	U	180J	98J	330
Anthracene	U	38J	45J	330
Fluoranthene	3J	320JB	420B	330
Pyrene	3J	230JB	500B	330
Benzo(a)anthracene	U	170J	420	330
Chrysene	U	250J	460	330
Benzo(b)fluoranthene	U	270J	310J	330
Benzo(k)fluoranthene	U	290J	410J	330
Benzo(a)pyrene	U	190J	280J	330
Indeno(1,2,3-cd)pyrene	U	46J	230J	330
Dibenzo(a,h)anthracene	U	18J	89J	330
Benzo(g,h,i)perylene	U	26J	120J	330
Date Received		11/13/98	11/13/98	
Date Extracted	11/17/98	11/17/98	11/17/98	
Date Analyzed	12/0[illegible]/98	12/02/9[illegible]	12/03/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.1
7098-2469B
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	SS-14	SS-15		Quant. Limits with no Dilution
Lab Sample I.D.	982469B-05	982469B-06		
Method Blank I.D.	SBLKUP	SBLKUP		
Quant. Factor	1.18	1.01		
Naphthalene	100J	3J		330
2-Methylnaphthalene	82J	U		330
Acenaphthylene	110J	U		330
Acenaphthene	98J	U		330
Fluorene	86J	U		330
Phenanthrene	1100	40J		330
Anthracene	340J	U		330
Fluoranthene	1800B	40JB		330
Pyrene	880B	19JB		330
Benzo(a)anthracene	820	14J		330
Chrysene	970	37J		330
Benzo(b)fluoranthene	1400	25J		330
Benzo(k)fluoranthene	1300	13J		330
Benzo(a)pyrene	850	9J		330
Indeno(1,2,3-cd)pyrene	100J	4J		330
Dibenzo(a,h)anthracene	25J	U		330
Benzo(g,h,i)perylene	61J	6J		330
Date Received	11/13/98	11/13/98		
Date Extracted	11/17/98	11/17/98		
Date Analyzed	12/03/98	12/03/98		

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

Soil

TABLE SV-1.2
7098-2469B
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

All values are ug/Kg dry weight basis.

Client Sample I.D.	Method Blank	SS-52	SS-52 MS	
Lab Sample I.D.	SBLKQR	982469B-18	982469B-18MS	Quant. Limits with no Dilution
Method Blank I.D.	SBLKQR	SBLKQR	SBLKQR	
Quant. Factor	1.00	33.3	33.3	
Naphthalene	4J	2400JB	3900JB	330
2-Methylnaphthalene	U	1100J	1700J	330
Acenaphthylene	U	500J	710J	330
Acenaphthene	U	4200J	10000JX	330
Fluorene	U	4100J	7500J	330
Phenanthrene	U	39000	70000	330
Anthracene	U	7800J	14000	330
Fluoranthene	U	43000	71000	330
Pyrene	U	70000	120000EX	330
Benzo(a)anthracene	U	26000	47000	330
Chrysene	U	28000	50000	330
Benzo(b)fluoranthene	U	22000	34000	330
Benzo(k)fluoranthene	U	20000	41000	330
Benzo(a)pyrene	U	23000	43000	330
Indeno(1,2,3-cd)pyrene	U	17000	32000	330
Dibenzo(a,h)anthracene	U	8200J	14000	330
Benzo(g,h,i)perylene	U	11000	30000	330
Date Received		11/13/98	11/13/98	
Date Extracted	11/16/98	11/16/98	11/16/98	
Date Analyzed	11/23/98	12/07/98	12/07/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.3
7098-2469B
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D. Lab Sample I.D. Method Blank I.D. Quant. Factor	SS-52 MSD 982469B-18 MSD SBLKQR 33.3			Quant. Limits with no Dilution
Naphthalene	6100JB			330
2-Methylnaphthalene	2200J			330
Acenaphthylene	680J			330
Acenaphthene	9500JX			330
Fluorene	7600J			330
Phenanthrene	66000			330
Anthracene	14000			330
Fluoranthene	62000			330
Pyrene	110000EX			330
Benzo(a)anthracene	41000			330
Chrysene	44000			330
Benzo(b)fluoranthene	31000			330
Benzo(k)fluoranthene	32000			330
Benzo(a)pyrene	35000			330
Indeno(1,2,3-cd)pyrene	25000			330
Dibenzo(a,h)anthracene	12000			330
Benzo(g,h,i)perylene	18000			330
Date Received	11/13/98			
Date Extracted	11/16/98			
Date Analyzed	12/07/98			

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor

Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.4
7098-2469B
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	Method Blank	SS-11	SS-13	Quant. Limits with no Dilution
Lab Sample I.D.	SBLKUR	982469B-02	982469B-04	
Method Blank I.D.	SBLKUR	SBLKUR	SBLKUR	
Quant. Factor	1.00	31.6	5.06	
Naphthalene	U	6300J	640J	330
2-Methylnaphthalene	U	2800J	300J	330
Acenaphthylene	U	440J	340J	330
Acenaphthene	U	7800J	650J	330
Fluorene	U	8400J	720J	330
Phenanthrene	U	58000	6600	330
Anthracene	U	13000	1700	330
Fluoranthene	2J	64000B	6000B	330
Pyrene	2J	50000B	8300B	330
Benzo(a)anthracene	U	29000	4400	330
Chrysene	U	30000	4400	330
Benzo(b)fluoranthene	2J	26000B	4500B	330
Benzo(k)fluoranthene	2J	24000B	3900B	330
Benzo(a)pyrene	2J	25000B	3700B	330
Indeno(1,2,3-cd)pyrene	U	8400J	3100	330
Dibenzo(a,h)anthracene	U	4400J	1000J	330
Benzo(g,h,i)perylene	3J	5100JB	3100B	330
Date Received		11/13/98	11/13/98	
Date Extracted	11/17/98	11/17/98	11/17/98	
Date Analyzed	12/02/98	12/03/98	12/07/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.5
7098-2469B
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	SS-13 RE	SS-14 RE		
Lab Sample I.D.	982469B-04RE	982469B-05RE		Quant. Limits with no Dilution
Method Blank I.D.	SBLKUR	SBLKUR		
Quant. Factor	5.06	1.18		
Naphthalene	690J	88J		330
2-Methylnaphthalene	330J	66J		330
Acenaphthylene	1100J	43J		330
Acenaphthene	670J	81J		330
Fluorene	840J	79J		330
Phenanthrene	6600	990		330
Anthracene	2700	220J		330
Fluoranthene	7700B	1100B		330
Pyrene	11000B	1700B		330
Benzo(a)anthracene	4400	830		330
Chrysene	4400	880		330
Benzo(b)fluoranthene	6200B	1100B		330
Benzo(k)fluoranthene	8900B	920B		330
Benzo(a)pyrene	4300B	790B		330
Indeno(1,2,3-cd)pyrene	2700	530		330
Dibenzo(a,h)anthracene	880J	210J		330
Benzo(g,h,i)perylene	2800B	460B		330
Date Received	11/13/98	11/13/98		
Date Extracted	11/17/98	11/17/98		
Date Analyzed	12/08/98	12/07/98		

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.6
7098-2469B
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	Method Blank	SS-17	SS-18	Quant. Limits with no Dilution
Lab Sample I.D.	SBLKVR	982469B-08	982469B-09	
Method Blank I.D.	SBLKVR	SBLKVR	SBLKVR	
Quant. Factor	1.00	4.30	1.05	
Naphthalene	U	490J	40J	330
2-Methylnaphthalene	U	920J	56J	330
Acenaphthylene	U	2500	96J	330
Acenaphthene	U	170J	36J	330
Fluorene	U	2200	62J	330
Phenanthrene	U	6100	510	330
Anthracene	U	2400	160J	330
Fluoranthene	2J	4900B	570B	330
Pyrene	2J	4300B	1500B	330
Benzo(a)anthracene	U	2800	310J	330
Chrysene	U	2000	410	330
Benzo(b)fluoranthene	2J	1800B	490B	330
Benzo(k)fluoranthene	2J	2400B	600B	330
Benzo(a)pyrene	U	1700	250J	330
Indeno(1,2,3-cd)pyrene	U	280J	160J	330
Dibenzo(a,h)anthracene	U	110J	50J	330
Benzo(g,h,i)perylene	4J	180JB	170JB	330
Date Received		11/13/98	11/13/98	
Date Extracted	11/18/98	11/18/98	11/18/98	
Date Analyzed	12/02/98	12/09/98	12/08/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor

Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.7
7098-2469B
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	SS-18 RE	SS-41	SS-41 RE	Quant. Limits with no Dilution
Lab Sample I.D.	982469B-09RE	982469B-10	982469B-10RE	
Method Blank I.D.	SBLKVR	SBLKVR	SBLKVR	
Quant. Factor	1.05	5.06	5.06	
Naphthalene	39J	370J	350J	330
2-Methylnaphthalene	54J	780J	750J	330
Acenaphthylene	94J	1500J	1500J	330
Acenaphthene	36J	320J	310J	330
Fluorene	60J	1800	1800	330
Phenanthrene	510	7200	7100	330
Anthracene	160J	2400	2300	330
Fluoranthene	560B	8500B	8300B	330
Pyrene	1200B	8200B	8100B	330
Benzo(a)anthracene	330J	4600	4800	330
Chrysene	380	4800	4400	330
Benzo(b)fluoranthene	630B	5400B	5600B	330
Benzo(k)fluoranthene	340JB	6100B	4800B	330
Benzo(a)pyrene	230J	4100	3900	330
Indeno(1,2,3-cd)pyrene	210J	690J	720J	330
Dibenzo(a,h)anthracene	73J	340J	390J	330
Benzo(g,h,i)perylene	230JB	490JB	490JB	330
Date Received	11/13/98	11/13/98	11/13/98	
Date Extracted	11/18/98	11/18/98	11/18/98	
Date Analyzed	12/09/98	12/08/98	12/09/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.8 Soil
7098-2469B
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

All values are ug/Kg dry weight basis.

Client Sample I.D.	SS-42	SS-42 RE	DUP-1	Quant. Limits with no Dilution
Lab Sample I.D.	982469B-11	982469B-11RE	982469B-15	
Method Blank I.D.	SBLKVR	SBLKVR	SBLKVR	
Quant. Factor	1.08	1.08	8.51	
Naphthalene	9J	10J	2800	330
2-Methylnaphthalene	U	U	1000J	330
Acenaphthylene	3J	3J	190J	330
Acenaphthene	U	U	2000J	330
Fluorene	U	U	2500J	330
Phenanthrene	12J	7J	15000	330
Anthracene	5J	6J	3600	330
Fluoranthene	14JB	10JB	16000B	330
Pyrene	25JB	22JB	15000B	330
Benzo(a)anthracene	U	U	7700	330
Chrysene	27J	22J	7900	330
Benzo(b)fluoranthene	U	U	6900B	330
Benzo(k)fluoranthene	U	U	8600B	330
Benzo(a)pyrene	U	U	6400	330
Indeno(1,2,3-cd)pyrene	U	U	1500J	330
Dibenzo(a,h)anthracene	U	U	760J	330
Benzo(g,h,i)perylene	U	U	1100JB	330
Date Received	11/13/98	11/13/98	11/13/98	
Date Extracted	11/18/98	11/18/98	11/18/98	
Date Analyzed	12/0ε/98	12/09/9ε	12/08/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.9
7098-2469B
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	SS-9B	SS-9B MS	SS-9B MSD	
Lab Sample I.D.	982469B-16	982469B-16MS	982469B-16 MSD	Quant. Limits with no Dilution
Method Blank I.D.	SBLKVR	SBLKVR	SBLKVR	
Quant. Factor	71.4	71.4	71.4	
Naphthalene	15000J	11000J	9200J	330
2-Methylnaphthalene	5900J	4300J	3500J	330
Acenaphthylene	680J	510J	520J	330
Acenaphthene	13000J	11000JX	9300JX	330
Fluorene	14000J	11000J	9600J	330
Phenanthrene	100000	80000	69000	330
Anthracene	21000J	18000J	15000J	330
Fluoranthene	110000B	86000B	76000B	330
Pyrene	97000B	75000BX	65000BX	330
Benzo(a)anthracene	49000	37000	32000	330
Chrysene	51000	40000	34000	330
Benzo(b)fluoranthene	32000B	22000JB	21000JB	330
Benzo(k)fluoranthene	55000B	50000B	40000B	330
Benzo(a)pyrene	38000	31000	27000	330
Indeno(1,2,3-cd)pyrene	14000J	12000J	11000J	330
Dibenzo(a,h)anthracene	7900J	6600J	6000J	330
Benzo(g,h,i)perylene	10000JB	9600JB	8900JB	330
Date Received	11/13/98	11/13/98	11/13/98	
Date Extracted	11/18/98	11/18/98	11/18/98	
Date Analyzed	12/08/98	12/08/98	12/08/98	

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.10
7098-2469B
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil

All values are ug/Kg dry weight basis.

Client Sample I.D.	SS-12B	SS-49		Quant. Limits with no Dilution
Lab Sample I.D.	982469B-19	982469B-20		
Method Blank I.D.	SBLKVR	SBLKVR		
Quant. Factor	5.38	2200		
Naphthalene	960J	100000J		330
2-Methylnaphthalene	450J	96000J		330
Acenaphthylene	140J	53000J		330
Acenaphthene	1200J	240000J		330
Fluorene	1400J	230000J		330
Phenanthrene	9700	1900000		330
Anthracene	2600	350000J		330
Fluoranthene	11000B	3800000B		330
Pyrene	10000B	3500000B		330
Benzo(a)anthracene	5300	1400000		330
Chrysene	5500	1600000		330
Benzo(b)fluoranthene	4800B	1200000B		330
Benzo(k)fluoranthene	6000B	1700000B		330
Benzo(a)pyrene	4700	1400000		330
Indeno(1,2,3-cd)pyrene	1300J	620000J		330
Dibenzo(a,h)anthracene	700J	260000J		330
Benzo(g,h,i)perylene	780JB	550000JB		330
Date Received	11/13/98	11/13/98		
Date Extracted	11/18/98	11/18/98		
Date Analyzed	12/08/98	12/Cd/98		

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.11
7098-2469B
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Soil
Medium

All values are ug/Kg dry weight basis.

Client Sample I.D.	Method Blank	SS-16	SS-16 RE	
Lab Sample I.D.	SBLKXR	982469B-07	982469B-07RE	Quant. Limits with no Dilution
Method Blank I.D.	SBLKXR	SBLKXR	SBLKXR	
Quant. Factor	10.0	10.0	10.0	
Naphthalene	U	3000J	U	20000
2-Methylnaphthalene	U	U	U	20000
Acenaphthylene	U	U	U	20000
Acenaphthene	U	U	U	20000
Fluorene	U	U	680J	20000
Phenanthrene	U	7100J	6900J	20000
Anthracene	U	U	U	20000
Fluoranthene	U	2000J	2800J	20000
Pyrene	U	3700J	4200J	20000
Benzo(a)anthracene	U	U	U	20000
Chrysene	U	5400J	6400J	20000
Benzo(b)fluoranthene	U	U	U	20000
Benzo(k)fluoranthene	U	U	U	20000
Benzo(a)pyrene	U	U	U	20000
Indeno(1,2,3-cd)pyrene	U	U	U	20000
Dibenzo(a,h)anthracene	U	U	U	20000
Benzo(g,h,i)perylene	U	7900J	3100J	20000
Date Received		11/13/98	11/13/98	
Date Extracted	11/18/98	11/18/98	11/18/98	
Date Analyzed	12/07/98	12/07/98	12/08/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

Appendix D
Support Documentation/Resubmission

INORGANIC ANALYSES

STEARNS & WHELER
SITE: ROBLIN STEEL
CASE NO.:7098-2469B/ SDG NO.: B2469

INTRODUCTION

This quality assurance review is based upon a review of all data generated from four (4) soil samples collected on 11-11,12-98. The samples were received by Severn Trent Laboratories on 11-13-98 and analyzed according to criteria set forth in SOW3,90 (ILM03.0) for TAL metals.

The following samples are contained within this report:

SS-43	SS-46
SS-44	DUP-2

The QC samples (MS & MD) was assigned to the alternate samples with sample IDs "SP1-F2" and "DAF95E" for the ICP metals and mercury respectively.

All data have been validated with regard to usability according to the quality assurance set forth in National Functional Guidelines for Evaluating Inorganic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations & CRDL Analyses
- Blanks
- ICP Interference Check Sample
- Matrix Spike Analysis
- Matrix Duplicate Analysis
- Laboratory Control Sample Analysis
- ICP Serial Dilution Analysis
- Instrument Detection Limits
- Field Duplicate Results
- Sample Results

DATA COMPLETENESS

The 8-hour analysis holding time for CRDL and ICS samples exceeded in the analysis run log "Form XIV", however; the review of the raw data indicated that these QC samples were analyzed within the 8-hour requirements. The laboratory has been contacted. The corrected Forms II (part 2), Forms IV and forms XIV were resubmitted.

HOLDING TIME

All samples were digested/analyzed within the requirements established in the method.

CALIBRATIONS & CRDL Analyses

The recoveries for all analytes in the initial and continuing calibrations were within the control limits of 90-110%.

The CRDL sample analysis was performed prior and after all samples analysis. The %recoveries were within the control limits with the exception of Pb (72.9%), Se (124.8%) and Zn (201%) in initial CRDL and Tl (68.5% & 72.8%) in final CRDL analysis run. The results for lead and zinc were above the corresponding CRDLs. Therefore, the data were not qualified based on these outliers. The positive results for selenium and the results and non-detected values foe thallium were qualified estimated.

BLANKS

The laboratory preparation blank had Se(0.914 mg/kg) contamination at a level below the CRDL. The reported sample results were above the action limit (5 x the blank concentration). Therefore, the sample data were not impacted.

ICP INTERFERENCE CHECK SAMPLE

The recoveries for Cd (78.9%) in initial ICS sample was below the lower control limit of 80%. The data were not impacted since the deviation was marginal and also, the final ICS recoveries were within the control limit.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

Matrix spike analysis was performed on the alternate samples. The spike recoveries were within the control limits with the exception of Sb (32%) and Hg (-9.1%). The post digestion spike sample was analyzed for antimony as required by the method. The recovery (96%) was within the control limit. The results and non-detected values for antimony were qualified estimated "J & UJ". However, the results for mercury were considered biased low and the possibility of false negative exist. Therefore, the positive results were qualified estimated and non-detected values were rejected for this analyte.

MATRIX DUPLICATE ANALYSIS

The matrix duplicate analysis was also performed on samples SP1-F2 and DAF95E for ICP metals and mercury respectively. The RPDs for all analytes were within the analysis and validation control limits with the exception of Cr (21.2%) and Pb (77.1%). The data for chromium was not qualified since the RPD was within the data validation control limit of 35%. The reported positive sample results for lead were qualified estimated.

LABORATORY CONTROL SAMPLE

The recoveries for all analyses were within the control limits.

ICP SERIAL DILUTION

The %Ds for Zn (44.42%) was above the 10% requirement. The reported positive results were qualified estimated.

INSTRUMENT DETECTION LIMITS

All analytes with the exception of mercury were analyzed with ICP. The reported IDLs were below the CRDL.

DUPLICATE ANALYSIS

Duplicate analysis was analyzed on sample SS-39/Dup-2. The RPDs were within the control limits. Sample SS-39 was analyzed in batch # 2469A.

SAMPLE RESULTS

The samples from this batch were digested/analyzed with SDG No.A2469. Therefore, the QC sample results and outliers were identical.

All analytes were analyzed at one-fold dilutions. The reported sample results were within the calibration range.

SUMMARY

The cooler temperature was not reported on the chain-of-custody. Overall, major problems were not encountered during the sample analyses. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

1. **Appendix A- Glossary of Data Qualifier**
2. **Appendix B- Data Summary Forms**
3. **Appendix C- Laboratory Results (Form I)**
4. **Appendix D - Support Documentation /Resubmission (if applicable)**

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

Appendix A
Glossary of Data Qualifier

ANALYTICAL ASSURANCE ASSOCIATES (A3)
METAL SOIL ANALYSIS
mg/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL
STL ID: 7098-2469B
SDG NO.: 2469B

CLIENT SAMPLE ID:			SS-43	SS-44	SS-46	DUP-2
LAB SAMPLE ID:			982469B-12	982469B-13	982469B-14	982469B-17
% SOLID:			87.4	82.7	70.2	78.8

TARGET COMPOUNDS:

	IDL					
Aluminum	6	P	1260	5680	4010	5480
Antimony	5	P	17.2 J	7.7 J	6 J	5.4 J
Arsenic	3	P	28.9	22.4	24.2	22.2
Barium	1	P	53.6	160	131	107
Beryllium	1	P	0.23	0.36	0.81	0.95
Cadmium	1	P	51.5	295	39.3	8.5
Calcium	4	P	7100	6230	6120	28800
Chromium	1	P	551	54	116	141
Cobalt	1	P	37.4	6.9	35.7	22.5
Copper	2	P	446	668	230	209
Iron	7	P	515000	116000	101000	144000
Lead	2	P	317 J	266 J	439 J	269 J
Magnesium	5	P	2100	481	1900	9500
Manganese	1	P	3810	697	795	1420
Mercury	0.1	CV	0.15 J	0.1 J	1.1 J	0.19 J
Nickel	5	P	502	44	105	198
Potassium	29	P	144	141	315	767
Selenium	2	P	20 J	8.4 J	7.4 J	9.2 J
Silver	1	P	1.6	0.37	0.99	0.52
Sodium	15	P	528	661	700	706
Thallium	6	P	6.4 J	UJ	UJ	UJ
Vanadium	1	P	111	15.1	22.1	29.1
Zinc	1	P	955 J	2610 J	882 J	482 J

Appendix C
Laboratory Reported Results

Soil

TABLE AS-1.0
7098-2469B
STEARNS & WHELER
TAL METALS

All values are mg/Kg dry weight basis.

Client Sample I.D.	SS-43	SS-44	SS-46	DUP-2
Lab Sample I.D.	982469B-12	982469B-13	982469B-14	982469B-17
Aluminum	1260	5680	4010	5480
Antimony	17.2N	7.7BN	6.0BN	5.4BN
Arsenic	28.9	22.4	24.2	22.2
Barium	53.6	160.	131.	107.
Beryllium	0.23B	0.36B	0.81B	0.95B
Cadmium	51.5	295.	39.3	8.5
Calcium	7100	6230	6120	28800
Chromium	551.*	54.0*	116.*	141.*
Cobalt	37.4	6.9B	35.7	22.5
Copper	446.	668.	230.	209.
Iron	515000	116000	101000	144000
Lead	317.*	266.*	439.*	269.*
Magnesium	2100	481.B	1900	9500
Manganese	3810	697.	795.	1420
Mercury	0.15N	0.10N	1.1N	0.19N
Nickel	502.	44.0	105.	198.
Potassium	144.B	141.B	315.B	767.B
Selenium	20.0	8.4	7.4	9.2
Silver	1.6B	0.37B	0.99B	0.52B
Sodium	528.B	661.B	700.B	706.B
Thallium	6.4	1.3U	1.6U	1.2U
Vanadium	111.	15.1	22.1	29.1
Zinc	955.E	2610E	882.E	482.E

See Appendix for qualifier definitions

Appendix D
Support Documentation/Resubmission

U.S. EPA - CLP

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: STL Contract: ______

Lab Code: STL Case No.: ______ SAS No.: ______ SDG No.: B2469

AA CRDL Standard Source: INORG. VENT.

ICP CRDL Standard Source: INORG. VENT.

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R(1)	True	Initial Found	%R(1)	Final Found	%R(1)
Aluminum								
Antimony				120.0	122.48	102.1		
Arsenic				20.0	17.47	87.4		
Barium								
Beryllium				10.0	10.05	100.6		
Cadmium				10.0	11.02	110.2		
Calcium								
Chromium				20.0	19.80	99.0		
Cobalt				100.0	97.79	97.8		
Copper				50.0	47.94	95.9		
Iron								
Lead				6.0	7.14	119.1		
Magnesium								
Manganese				30.0	30.63	102.1		
Mercury								
Nickel				80.0	84.25	105.3		
Potassium								
Selenium				10.0	11.89	118.9		
Silver				20.0	20.01	100.1		
Sodium								
Thallium				20.0	13.70	68.5		
Vanadium				100.0	97.43	97.4		
Zinc				40.0	42.91	107.3		
Cyanide								

U.S. EPA - CLP

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: STL Contract: ____

Lab Code: STL Case No.: ____ SAS No.: ____ SDG No.: B2469

AA CRDL Standard Source: INORG. VENT.

ICP CRDL Standard Source: INORG. VENT.

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R(1)	True	Initial Found	%R(1)	Final Found	%R(1)
Aluminum				400.0	11.48	2.9		
Antimony				120.0	122.15	101.8	118.13	98.4
Arsenic				20.0	18.17	90.8	17.64	88.2
Barium				400.0				
Beryllium				10.0	10.09	100.9	9.52	95.2
Cadmium				10.0	9.93	99.3	10.69	106.9
Calcium				10000.0	4.28			
Chromium				20.0	19.43	97.2	19.13	95.6
Cobalt				100.0	100.80	100.8	96.02	96.0
Copper				50.0	50.67	101.4	48.05	96.1
Iron				200.0	-2.82	-1.4		
Lead				6.0	4.37	72.9	5.16	86.0
Magnesium				10000.0	5.21			
Manganese				30.0	29.91	99.7	29.31	97.7
Mercury								
Nickel				80.0	78.81	98.5	80.43	100.5
Potassium				10000.0	6.44	0.1		
Selenium				10.0	12.47	124.8	11.90	119.0
Silver				20.0	19.99	100.0	19.58	97.9
Sodium				10000.0	-12.84	-0.1		
Thallium				20.0	16.82	84.1	14.56	72.8
Vanadium				100.0	99.79	99.8	95.64	95.6
Zinc				40.0	80.38	201.0	51.41	128.5
Cyanide								

U.S. EPA - CLP

2B

CRDL STANDARD FOR AA AND ICP

Lab Name: STL Contract: ______

Lab Code: STL Case No.: ______ SAS No.: ______ SDG No.: A2469

AA CRDL Standard Source: INORG. VENT.

ICP CRDL Standard Source: INORG. VENT.

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R(1)	True	Initial Found	%R(1)	Final Found	%R(1)
Aluminum								
Antimony				120.0	122.48	102.1		
Arsenic				20.0	17.47	87.4		
Barium								
Beryllium				10.0	10.05	100.6		
Cadmium				10.0	11.02	110.2		
Calcium								
Chromium				20.0	19.80	99.0		
Cobalt				100.0	97.79	97.8		
Copper				50.0	47.94	95.9		
Iron								
Lead				6.0	7.14	119.1		
Magnesium								
Manganese				30.0	30.63	102.1		
Mercury								
Nickel				80.0	84.25	105.3		
Potassium								
Selenium				10.0	11.89	118.9		
Silver				20.0	20.01	100.1		
Sodium								
Thallium				20.0	13.70	68.5		
Vanadium				100.0	97.43	97.4		
Zinc				40.0	42.91	107.3		
Cyanide								

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4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL Contract: ____

Lab Code: STL Case No.: ____ SAS No.: ____ SDG No.: A2469

ID Number: JA61E ICS Source: EPA-LV87

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum	500000	500000	464775	451976.0	90.3		451976.0	90.3
Antimony		500	1	571.4	114.2		571.4	114.2
Arsenic		100	0	94.2	94.2		94.2	94.2
Barium		500	2	467.9	93.5		467.9	93.5
Beryllium		500	0	423.8	84.7		423.8	84.7
Cadmium		1000	-5	853.9	85.3		853.9	85.3
Calcium	500000	500000	424152	410761.1	82.1		410761.1	82.1
Chromium		500	3	431.7	86.3		431.7	86.3
Cobalt		500	0	419.1	83.8		419.1	83.8
Copper		500	0	503.2	100.6		503.2	100.6
Iron	200000	200000	186744	181281.1	90.6		181281.1	90.6
Lead		50	-2	46.8	93.6		46.8	93.6
Magnesium	500000	500000	476454	462451.9	92.4		462451.9	92.4
Manganese		500	-1	435.7	87.1		435.7	87.1
Mercury								
Nickel		1000	3	861.0	86.1		861.0	86.1
Potassium			-14	-14.6			-14.6	
Selenium		50	7	54.7	109.4		54.7	109.4
Silver		200	0	203.2	101.6		203.2	101.6
Sodium			-169	-169.4			-169.4	
Thallium		100	-4	98.4	98.4		98.4	98.4
Vanadium		500	-1	433.7	86.7		433.7	86.7
Zinc		1000	-13	894.8	89.4		894.8	89.4
Cyanide								

FORM IV - IN ILM03.0

U.S. EPA - CLP

4
ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL Contract: ____

Lab Code: STL Case No.: ____ SAS No.: ____ SDG No.: B2469

ID Number: JA61E ICS Source: EPA-LV87

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum	500000	500000	469142	461845.5	92.3	455257	452610.9	90.5
Antimony		500	0	578.7	115.7	5	568.5	113.7
Arsenic		100	3	100.5	100.5	2	97.2	97.2
Barium		500	2	459.1	91.8	2	464.8	92.9
Beryllium		500	1	433.6	86.7	0	427.5	85.5
Cadmium		1000	-2	789.4	78.9	-6	845.2	84.5
Calcium	500000	500000	425258	417349.0	83.4	415455	413994.9	82.7
Chromium		500	3	433.7	86.7	3	432.3	86.4
Cobalt		500	0	440.9	88.1	0	424.4	84.8
Copper		500	2	511.7	102.3	0	502.6	100.5
Iron	200000	200000	183525	181111.0	90.5	184805	184076.4	92.0
Lead		50	-2	45.5	91.0	-3	44.5	89.0
Magnesium	500000	500000	473123	466653.5	93.3	465929	463718.7	92.7
Manganese		500	-1	425.4	85.0	-1	433.6	86.7
Mercury								
Nickel		1000	3	804.9	80.4	2	851.5	85.1
Potassium			-14	-20.3		-12	-19.8	
Selenium		50	6	53.7	107.4	5	53.6	107.2
Silver		200	0	203.4	101.7	0	202.8	101.4
Sodium			-171	-167.3		-173	-165.1	
Thallium		100	6	96.3	96.3	5	98.0	98.0
Vanadium		500	-2	447.2	89.4	-2	436.8	87.3
Zinc		1000	-11	903.6	90.3	-3	920.3	92.0
Cyanide								

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14
ANALYSIS RUN LOG

Lab Name: STL Contract:

Lab Code: STL Case No.: SAS No.: SDG No.: B2469

Instrument ID Number: JA61E Method: P

Start Date: 11/19/98 End Date: 11/19/98

EPA Sample No.	D/F	Time	% R	AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S1	1.00	1204		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
S7	1.00	1210			X	X	X	X	X		X	X	X				X		X		X	X		X	X	X	
S8	1.00	1216			X	X	X	X	X		X	X	X				X		X		X	X		X	X	X	
S4	1.00	1222		X		X	X	X	X		X	X	X		X		X		X		X	X		X	X	X	
S9	1.00	1228		X						X				X		X				X			X				
S6	1.00	1233		X						X				X		X				X			X				
S5	1.00	1237			X																						
S3	1.00	1243								X				X		X				X			X				
ICV1	1.00	1243		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ICB1	1.00	1250		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CRI1	1.00	1257			X	X		X	X		X	X	X		X		X		X		X	X		X	X	X	
ICSA1	1.00	1303		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ICSAB1	1.00	1310		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCV1	1.00	1317		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCB1	1.00	1324		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
PBS1	1.00	1331		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ZZZZZZ	1.00	1338																									
ZZZZZZ	1.00	1344																									
ZZZZZZ	1.00	1351																									
ZZZZZZ	1.00	1358																									
982489A-09	1.00	1405		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
982489A-09D	1.00	1412		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
982489A-09S	1.00	1419		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ZZZZZZ	1.00	1425																									
LCSS1	1.00	1432		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCV2	1.00	1439		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCB2	1.00	1446		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ZZZZZZ	1.00	1453																									
ZZZZZZ	1.00	1500																									
982469A-05	1.00	1506																									
982469A-06	1.00	1513																									
982469A-09	1.00	1520																									
982469A-10	1.00	1527																									

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ANALYSIS RUN LOG

Lab Name: STL Contract: ____________

Lab Code: STL Case No.: ______ SAS No.: ______ SDG No.: B2469

Instrument ID Number: JA61E Method: P

Start Date: 11/19/98 End Date: 11/19/98

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
982469A-11	1.00	1534																									
982469A-12	1.00	1540																									
982469A-13	1.00	1547																									
982469A-15	1.00	1554																									
ZZZZZZ	1.00	1601																									
CCV3	1.00	1610		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCB3	1.00	1616		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
982469A-16	1.00	1623																									
982469B-12	1.00	1630		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
982469B-13	1.00	1637		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
982469B-14	1.00	1644		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
982469B-17	1.00	1651		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ZZZZZZ	5.00	1657																									
982469A-05L	5.00	1706		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
982469B-12L	5.00	1713																									
CCV4	1.00	1720		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCB4	1.00	1727		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CRI2	1.00	1734		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ICSAF	1.00	1740		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ICSABF	1.00	1747		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCV5	1.00	1754		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCB5	1.00	1801		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ZZZZZZ	1.00	1808																									
ZZZZZZ	1.00	1815																									
ZZZZZZ	1.00	1821																									
ZZZZZZ	1.00	1828																									
ZZZZZZ	1.00	1835																									
ZZZZZZ	1.00	1842																									
ZZZZZZ	1.00	1849																									
ZZZZZZ	1.00	1856																									
ZZZZZZ	1.00	1902																									
ZZZZZZ	1.00	1909																									
CCV6	1.00	1916		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	

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ANALYSIS RUN LOG

Lab Name: STL Contract: ____________

Lab Code: STL Case No.: ______ SAS No.: ______ SDG No.: B2469

Instrument ID Number: JA61E Method: P

Start Date: 11/19/98 End Date: 11/19/98

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB6	1.00	1923		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ZZZZZZ	1.00	1930																									
ZZZZZZ	1.00	1937																									
ZZZZZZ	1.00	1943																									
ZZZZZZ	1.00	1950																									
ZZZZZZ	1.00	1957																									
ZZZZZZ	1.00	2004																									
ZZZZZZ	1.00	2011																									
ZZZZZZ	1.00	2018																									
ZZZZZZ	1.00	2024																									
ZZZZZZ	1.00	2031																									
CCV7	1.00	2038		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCB7	1.00	2045		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ZZZZZZ	5.00	2052																									
ZZZZZZ	1.00	2059																									
ZZZZZZ	1.00	2106																									
ZZZZZZ	1.00	2112																									
ZZZZZZ	1.00	2119																									
ZZZZZZ	1.00	2126																									
982489A-09A	1.00	2133	-11.6		X																						
CRI2	1.00	2140			X	X		X	X		X	X	X		X		X		X		X	X		X	X	X	
CRI3	1.00	2140			X	X		X	X		X	X	X		X		X		X		X	X		X	X	X	
ICSAF	1.00	2147		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ICSABF	1.00	2153		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCV8	1.00	2200		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCB8	1.00	2207		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	

END OF DATA PACKAGE

Analytical Assurance Associates, Inc.
600 Rock Raymond Road
Downingtown, PA 19335
Phone: 610 - 269 - 9989
Fax: 610 - 269 - 9989

METAL ANALYSIS
TOTAL & DISSOLVED
QUALITY ASSURANCE DATA REVIEW

STEARNS & WHELER, LLC

SITE: ROBLIN STEEL
CASE NO.: 7098-2557A/ SDG NO.: A2557

REPORTED BY:
ANALYTICAL ASSURANCE ASSOCIATES (A^3)
600 ROCK RAYMOND ROAD
DOWNINGTOWN, PA 19335

REVIEWED BY:
ZOHREH HAMID, Ph.D.
FEBRUARY18, 1999

STEARNS & WHELER
SITE: ROBLIN STEEL
CASE NO.:7098-2557A/ SDG NO. A2557

INTRODUCTION

This quality assurance review is based upon a review of all data generated from sixteen (16) water samples collected on 12-15,16-98. The samples were received by Severn Trent Laboratories on 12-16,17-98 and analyzed according to criteria set forth in SOW3,90 (ILM03.0) for total and dissolved metals.

The following samples are contained within this report:

GW-1	GW-11S	GW-12S	GW-4S
GW-2	GW-9	GW-3 *	GW-5
GW-2S	GW-3S	DUP-2	GW-5S
GW-10S	DUP-1	GW-4	GW-13

* Sample was not analyzed for dissolved metal.

The QC samples (MS & MD) were assigned to sample GW-2S in filtered and total analyses.

All data have been validated with regard to usability according to the quality assurance set forth in National Functional Guidelines for Evaluating Inorganic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations & CRDL Analyses
- Blanks
- ICP Interference Check Sample
- Matrix Spike Analysis
- Matrix Duplicate Analysis
- Laboratory Control Sample Analysis
- ICP Serial Dilution Analysis
- Instrument Detection Limits
- Field Duplicate Results
- Sample Results

DATA COMPLETENESS

The matrix spike recoveries for silver and iron were outside the control limits in dissolved and total sample analyses respectively. The corresponding sample data were not qualified with an "N" as required by the method.

The RPD for Se(34%) was above 20% requirement in dissolved sample. The sample data were not qualified with an asterisk, however, the data for total samples were inadvertently flagged with an (*)

Mercury was not analyzed in total samples GW-1 and GW-3, also, the results for matrix spike sample GW-4S were reported in the raw mercury analysis, however; the corresponding QC forms were not included in the data package. Sample GW-3 was not analyzed for filtered metals. These issues were not listed on the case narrative.

The laboratory case narrative stated that samples GW-17S, GW-5S and GW-13 were cancelled due to samples being frozen.

The copy of the raw data for mercury analysis was illegible. The results for samples 2557A-13 and 18 in filtered and total analyses were not copied properly

HOLDING TIME

All samples were digested/analyzed within the requirements established in the method.

CALIBRATIONS & CRDL Analyses

The recoveries for all analytes in the initial and continuing calibrations were within the control limits of 90-110% with the exception of Ag (89.6%). The data were not qualified based on this outlier since the deviation is marginal.

The CRDL sample analysis was performed prior and after all samples analysis. The %recoveries were within the control limits with the exception of Ba (75.4/74.1%), Pb (72.4%), Se (137%), Ag (121.9%) Tl (138.7/127.2%) and Zn in two different runs (138.8/128.1%) & (79.3/72.5%). The positive results for silver, selenium, thallium were qualified "U" due to the blank contamination. Therefore, the data were not impacted by these outliers. The positive results and non-detected values for barium, lead and zinc were qualified estimated.

BLANKS

The laboratory preparation blank,. ICB and CCBs had iron at levels above the CRDL. The results in total sample analysis were above 10X the CRDL. Therefore, the data were not impacted. However, the results for dissolved samples up to 5X the CRDL (500 ug/l) were rejected.

The laboratory blanks had the following contamination at levels below the CRDLs. The maximum results were tabulated. The reported sample results up to 5 times the blank levels (action level) were qualified "U" and considered as the laboratory artifact.

Analyte Name	Blank Result ug/l	Action Level ug/l
Al	27	135
Sb	15	75
As	3.1	15.5
Ba	1.2	6
Co	6.4	32
Cu	2.7	13.5
Mg	58	290
K	28	140
Se	3	15
Ag	7.6	38
Tl	5.3	26.5
V	6	30
Zn	16	80

ICP INTERFERENCE CHECK SAMPLE

The recoveries for all metals were within the control limits.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

Matrix spike analysis was performed on sample GW-2S. The spike recoveries were within the control limits with the exception of Ag (72.5%) and Fe (129.9%) in filtered and total sample analyses respectively. The post digestion analysis was performed for iron. The recovery was within the control limit. The sample data were not flagged "N" by laboratory as required by the method. The positive results for iron in total sample analyses were qualified estimated "J". However, the results for silver have been qualified "U" due to the blank contamination. The reported data were also qualified "J" based on the low matrix spike recovery.

MATRIX DUPLICATE ANALYSIS

The matrix duplicate analysis was also performed on samples GW-2S for ICP metals and mercury respectively. The RPDs for all analytes were within the analysis and validation control limits with the exception of Se (34%) in filtered analysis. The data for selenium was not qualified since the RPD was within the data validation control limit of 35%.

LABORATORY CONTROL SAMPLE

The recoveries for all analyses were within the control limits of 80-120% with the exception of Be (120.6%) in total and Na (120.4%) in both total and filtered analyses. The data were not impacted since the deviations were marginal.

ICP SERIAL DILUTION

The %Ds for Na (19.6%) was above the 10% requirement in both analyses. The reported positive results were qualified estimated. Also, the %D for Fe (10.7%) was outside the control limits. The data were not qualified based on this outlier since the deviation was marginal.

INSTRUMENT DETECTION LIMITS

All analytes with the exception of mercury were analyzed with ICP. The reported IDLs were below the CRDL.

DUPLICATE ANALYSIS

Duplicate analysis was analyzed on sample GW-11S/Dup-1 and GW-4/DUP-2. The RPDs were within the 100% with the exception of Al, Ca, Fe, Pb, Mg, Mn, and Zn in samples GW-11S/DUP-1 in total sample analysis. The reported sample data were qualified estimated in these two samples for the RPD outliers.

SAMPLE RESULTS

All analytes were analyzed at one-fold dilutions. The reported sample results were within the calibration range.

SUMMARY

The cooler temperature was not reported on the chain-of-custody. Overall, major problems were not encountered during the sample analyses. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

1. **Appendix A- Glossary of Data Qualifier**
2. **Appendix B- Data Summary Forms**
3. **Appendix C- Laboratory Results (Form I)**
4. **Appendix D - Support Documentation /Resubmission (if applicable)**

Appendix A
Glossary of Data Qualifier

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

Appendix B
Data Summary Forms

ANALYTICAL ASSURANCE ASSOCIATES (A3)
TOTAL METAL WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-A2557
SDG NO.: A2557

CLIENT SAMPLE ID:			GW-5S	GW-13
LAB SAMPLE ID:			T982557A-19	T982557A-20

TARGET COMPOUNDS:

	IDL			
Aluminum	15	P	2510	1550
Antimony	4	P	5.4 U	10.6 U
Arsenic	3	P	6.9 U	3.5 U
Barium	1	P	92.7 J	33.1 J
Beryllium	1	P		
Cadmium	1	P		1
Calcium	31	P	193000	182000
Chromium	1	P	4.6	13.3
Cobalt	2	P	10.7 U	9.2 U
Copper	1	P	19.2	10.8 U
Iron	10	P	5800 J	5020 J
Lead	2	P	17.3	
Magnesium	5	P	30900	116000
Manganese	1	P	1200	241
Mercury	0.1	CV		
Nickel	6	P	9.2	
Potassium	25	P	888	16100
Selenium	1	P	9.5 U	4.9 U
Silver	1	P	7.3 U	7.6 U
Sodium	49	P	18100 J	96400 J
Thallium	5	P		
Vanadium	1	P	12.5 U	8.4 U
Zinc	1	P	74.4 J	23.5 J

ANALYTICAL ASSURANCE ASSOCIATES (A3)
TOTAL METAL WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-A2557
SDG NO.: A2557

CLIENT SAMPLE ID:			DUP-1	GW-12S	GW-3	DUP 2	GW-4	GW-4S	GW-5
LAB SAMPLE ID:			T982557A-09	T982557A-13	T982557A-14	T982557A-15	T982557A-16	T982557A-17	T982557A-18
TARGET COMPOUNDS:	IDL								
Aluminum	15	P	408 J	564	1510	2710	1520	928	3320
Antimony	4	P	8.6 U	5.4 U	9.5 U	12.8 U	10.1 U	10.7 U	6 U
Arsenic	3	P	3.1 U	5.4 U	6.8 U	5.7 U	5.7 U		8.2 U
Barium	1	P	42.6 J	62.8 J	50.3 J	53.5 J	36.6 J	64 J	63.8 J
Beryllium	1	P							
Cadmium	1	P		1.1	1.2				
Calcium	31	P	96300 J	136000	168000	180000	157000	106000	176000
Chromium	1	P			3.8	5.9	3.2	2.2	8.3
Cobalt	2	P	8.1 U	7.4 U	8.3 U	9.4 U	9 U	8 U	10.2 U
Copper	1	P	5.3 U	6.8 U	6.8 U	14.5	8.9 U	10 U	15
Iron	10	P	965 J	1120 J	3090 J	5400 J	3050 J	2460 J	8080 J
Lead	2	P	UJ			9.8	4.5	8.6	14.7
Magnesium	5	P	22900 J	29800	52800	83000	76300	27800	82300
Manganese	1	P	619 J	261	187	381	242	138	735
Mercury	0.1	CV			NR				
Nickel	6	P				6.8			8
Potassium	25	P	764	3380	2880	2980	2420	2150	3600
Selenium	1	P	10 U	6.5 U	5.4 U	7.9 U	6.1 U	6.8 U	6.3 U
Silver	1	P	7.6 U	7.5 U	7.4 U	7.6 U	7.7 U	7.5 U	7.5 U
Sodium	49	P	15200 J	28700 J	68200 J	65800 J	64300 J	46100 J	64000 J
Thallium	5	P							7.3 U
Vanadium	1	P	6.8 U	6.8 U	8.1 U	10.6 U	8.2 U	8.7 U	13.6 U
Zinc	1	P	7.7 J	6.7 J	16.4 J	34.6 J	19.3 J	24.8 J	54.8 J

ANALYTICAL ASSURANCE ASSOCIATES (A3)
TOTAL METAL WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-A2557
SDG NO.: A2557

CLIENT SAMPLE ID:			GW-1	GW-2	GW-2S	GW-10S	GW-11S	GW-9	GW-3S
LAB SAMPLE ID:			T982557A-01	T982557A-02	T982557A-03	T982557A-04	T982557A-05	T982557A-06	T982557A-08
TARGET COMPOUNDS:	IDL								
Aluminum	15	P	2810	4470	1900	143	6460 J	1070	1460
Antimony	4	P	9 U	6.6 U	5.1 U			8.8 U	7.7 U
Arsenic	3	P	3.2 U	8.9 U	6.8 U	20.5	15.5 U	8.4 U	23.7
Barium	1	P	78.9 J	90.5 J	68.2 J	374 J	217 J	40.2 J	83.1 J
Beryllium	1	P							
Cadmium	1	P	1.4	1		1.7	4		
Calcium	31	P	130000	224000	114000	930000	376000 J	67100	137000
Chromium	1	P	5.6	7.8	3.2		10.1	1.6	3.6
Cobalt	2	P	9.6 U	10.4 U	9 U	20.4	23.9	8 U	13.4 U
Copper	1	P	30.2	18.4	10.4 U	3.1 U	74.8	6.3 U	11.6 U
Iron	10	P	6300 J	8980 J	3340 J	2190 J	16100 J	2670 J	17600 J
Lead	2	P	10.6	14	4		36.2 J		3.2
Magnesium	5	P	62000	104000	21100	58000	72700 J	41600	20000
Manganese	1	P	397	502	314	7410	2400 J	176	4170
Mercury	0.1	CV	NR			1.6			
Nickel	6	P	8.5	8.4		18.9	28.9		6.4
Potassium	25	P	6000	5180	1080	6930	4290	1700	740
Selenium	1	P	7 U	7.5 U	8.6 U	29.5	14.9	9.5 U	8.1 U
Silver	1	P	7.5 U	7.5 U	7.4 U	7.6 U	7 U	7.5 U	7.8 U
Sodium	49	P	69600 J	78600 J	5130 J	35400 J	25400 J	50300 J	2780 J
Thallium	5	P						5.5 U	
Vanadium	1	P	12.2 U	13 U	11 U	5.2 U	25 U	8.1 U	11.9 U
Zinc	1	P	33.8 J	38 J	19.3 J	32.6 J	141 J	9.7 J	26.1 J

ANALYTICAL ASSURANCE ASSOCIATES (A3)
FILTERED METAL WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-A2557
SDG NO.: A2557

CLIENT SAMPLE ID: GW-13
LAB SAMPLE ID: /982557A-20

TARGET COMPOUNDS:

	IDL		
Aluminum	15	P	38 U
Antimony	4	P	11.2 U
Arsenic	3	P	
Barium	1	P	18.1 J
Beryllium	1	P	
Cadmium	1	P	
Calcium	31	P	167000
Chromium	1	P	
Cobalt	2	P	7.9 U
Copper	1	P	2.2 U
Iron	10	P	14.4 R
Lead	2	P	UJ
Magnesium	5	P	108000
Manganese	1	P	130
Mercury	0.1	CV	
Nickel	6	P	
Potassium	25	P	15000
Selenium	1	P	4.2 U
Silver	1	P	7.3 UJ
Sodium	49	P	95800 J
Thallium	5	P	
Vanadium	1	P	4.4 U
Zinc	1	P	UJ

ANALYTICAL ASSURANCE ASSOCIATES (A3)
FILTERED METAL WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-A2557
SDG NO.: A2557

CLIENT SAMPLE ID:			DUP-1	GW-12S	DUP 2	GW-4	GW-4S	GW-5	GW-5S
LAB SAMPLE ID:			F982557A-09	F982557A-13	F982557A-15	F982557A-16	F982557A-17	F982557A-18	F982557A-19
TARGET COMPOUNDS:									
	IDL								
Aluminum	15	P	36 U	30.9 U	43.9 U	58.1 U	49 U	42.8 U	40.7 U
Antimony	4	P	9.8 U	10.5 U	11.5 U	12.9 U	8.8 U	14.5 U	9.8 U
Arsenic	3	P	4.1 U	4.6 U	4.1 U	6.9 U			3.4 U
Barium	1	P	37.5 J	52.7 J	18.5 J	19 J	50.5 J	16.4 J	53.6 J
Beryllium	1	P							
Cadmium	1	P		2.8					
Calcium	31	P	89800	133000	128000	131000	98400	48000	13600
Chromium	1	P							
Cobalt	2	P	13 U	7.3 U	7.5 U	13.9 U	7.2 U	7.1 U	7.8 U
Copper	1	P	3.6 U	2.7 U	2.4 U	2.7 U	3 U	2 U	3.3 U
Iron	10	P	81.3 R	93.5 R	36.1 R	73.2 R	61.4 R	81.5 R	76.8 R
Lead	2	P	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Magnesium	5	P	20700	28800	68200	69400	27100	40900	17700
Manganese	1	P	579	242	44.5	62.4	42.6	12.9	808
Mercury	0.1	CV							
Nickel	6	P							
Potassium	25	P	795	3410	2280	2370	1930	2140	588
Selenium	1	P	7.4 U	6.7 U	5 U	2.6 U	6.5 U	2.8 U	3.9 U
Silver	1	P	7.5 UJ	7.7 UJ	7.3 UJ	8.3 UJ	7.5 UJ	7.6 UJ	7.6 UJ
Sodium	49	P	14700 J	28500 J	64000 J	65200 J	43200 J	57200 J	18200 J
Thallium	5	P			6.4 U				
Vanadium	1	P	5.8 U	5.5 U	5 U	5.7 U	5.7 U	6.5 U	6.1 U
Zinc	1	P	UJ	UJ	UJ	UJ	UJ	UJ	UJ

ANALYTICAL ASSURANCE ASSOCIATES (A3)
FILTERED METAL WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-A2557
SDG NO.: A2557

CLIENT SAMPLE ID:			GW-1	GW-2	GW-2S	GW-10S	GW-11S	GW-9	GW-3S
LAB SAMPLE ID:			F982557A-01	F982557A-02	F982557A-03	F982557A-04	F982557A-05	F982557A-06	F982557A-08
TARGET COMPOUNDS:	IDL								
Aluminum	15	P	51.9 U	53 U	31.1 U	225	193	35.6 U	36.5 U
Antimony	4	P	13.6 U	15.4 U	10.1 U	8.9 U	9.1 U	14.4 U	11.7 U
Arsenic	3	P		3.3 U	5.7 U	5.6 U	3.7 U	9.4 U	
Barium	1	P	22.9 J	21.6 J	39.8 J	51.9 J	49.1 J	29 J	32 J
Beryllium	1	P							
Cadmium	1	P							
Calcium	31	P	51500	74300	88600	120000	85300	46100	98000
Chromium	1	P							
Cobalt	2	P	11.5 U	7.9 U	6.6 U	25.2 U	14.3 U	7.4 U	7.5 U
Copper	1	P	2.6 U	2.6 U	2.6 U	2.9 U	3.6 U	2.2 U	2.2 U
Iron	10	P	74.5 R	62.5 R	71.4 R	450 R	382 R	367 R	194 R
Lead	2	P	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Magnesium	5	P	39400	37400	17700	34100	27100	35600	12200
Manganese	1	P	24.2	16.2	75.2	414	266	32.9	319
Mercury	0.1	CV				0.19			
Nickel	6	P							
Potassium	25	P	5510	3280	994	2500	2520	1500	758
Selenium	1	P	3.4 U	4.4 U	5.3 U	9.4 U	5.7 U		7.1 U
Silver	1	P	7.4 UJ	7.6 UJ	7.6 UJ	7.3 UJ	7.7 UJ	7.6 UJ	7.5 UJ
Sodium	49	P	67800 J	72400 J	5740 J	23600 J	21400 J	49500 J	2920 J
Thallium	5	P	6.8 U	5.7 U					7.7 U
Vanadium	1	P	5.8 U	6 U	5.7 U	5.8 U	6.4 U	5.5 U	5.9 U
Zinc	1	P	UJ	UJ	UJ	UJ	UJ	UJ	UJ

Appendix C
Laboratory Reported Results

Aqueous

TABLE AS-1.9
7098-2557A
STEARNS & WHELER
TAL METALS (Total)

All values are ug/L.

Client Sample I.D.	GW-5S	GW-13		
Lab Sample I.D.	982557A-19	982557A-20		
Aluminum	2510	1550		
Antimony	5.4B	10.6B		
Arsenic	6.9B	3.5B		
Barium	92.7B	33.1B		
Beryllium	1.0U	1.0U		
Cadmium	1.0U	1.0B		
Calcium	193000	182000		
Chromium	4.6B	13.3		
Cobalt	10.7B	9.2B		
Copper	19.2B	10.8B		
Iron	5800E	5020E		
Lead	17.3	2.0U		
Magnesium	30900	116000		
Manganese	1200	241.		
Mercury	0.10U	0.10U		
Nickel	9.2B	6.0U		
Potassium	888.B	16100		
Selenium	9.5*	4.9B*		
Silver	7.3B	7.6B		
Sodium	18100E	96400E		
Thallium	5.0U	5.0U		
Vanadium	12.5B	8.4B		
Zinc	74.4	23.5		

See Appendix for qualifier definitions

TABLE AS-1.8
7098-2557A
STEARNS & WHELER
TAL METALS (Total)

Aqueous

All values are ug/L.

Client Sample I.D.	DUP 2	GW-4	GW-4S	GW-5
Lab Sample I.D.	982557A-15	982557A-16	982557A-17	982557A-18
Aluminum	2710	1520	928.	3320
Antimony	12.8B	10.1B	10.7B	6.0B
Arsenic	5.7B	5.7B	3.0U	8.2B
Barium	53.5B	36.6B	64.0B	63.8B
Beryllium	1.0U	1.0U	1.0U	1.0U
Cadmium	1.0U	1.0U	1.0U	1.0U
Calcium	180000	157000	106000	176000
Chromium	5.9B	3.2B	2.2B	8.3B
Cobalt	9.4B	9.0B	8.0B	10.2B
Copper	14.5B	8.9B	10.0B	15.0B
Iron	5400E	3050E	2460E	8080E
Lead	9.8	4.5	8.6	14.7
Magnesium	83000	76300	27800	82300
Manganese	381.	242.	138.	735.
Mercury	0.10U	0.10U	0.10U	0.10U
Nickel	6.8B	6.0U	6.0U	8.0B
Potassium	2980B	2420B	2150B	3600B
Selenium	7.9*	6.1*	6.8*	6.3*
Silver	7.6B	7.7B	7.5B	7.5B
Sodium	65800E	64300E	46100E	64000E
Thallium	5.0U	5.0U	5.0U	7.3B
Vanadium	10.6B	8.2B	8.7B	13.6B
Zinc	34.6	19.3B	24.8	54.8

See Appendix for qualifier definitions

TABLE AS-1.7
7098-2557A
STEARNS & WHELER
TAL METALS (Total)

Aqueous

All values are ug/L.

Client Sample I.D.	GW-3S	DUP-1	GW-12S	GW-3
Lab Sample I.D.	982557A-08	982557A-09	982557A-13	982557A-14
Aluminum	1460	408.	564.	1510
Antimony	7.7B	8.6B	5.4B	9.5B
Arsenic	23.7	3.1B	5.4B	6.8B
Barium	83.1B	42.6B	62.8B	50.3B
Beryllium	1.0U	1.0U	1.0U	1.0U
Cadmium	1.0U	1.0U	1.1B	1.2B
Calcium	137000	96300	136000	168000
Chromium	3.6B	1.0U	1.0U	3.8B
Cobalt	13.4B	8.1B	7.4B	8.3B
Copper	11.6B	5.3B	6.8B	6.8B
Iron	17600E	965.E	1120E	3090E
Lead	3.2	2.0U	2.0U	2.0U
Magnesium	20000	22900	29800	52800
Manganese	4170	619.	261.	187.
Mercury	0.10U	0.10U	0.10U	NR
Nickel	6.4B	6.0U	6.0U	6.0U
Potassium	740.B	764.B	3380B	2880B
Selenium	8.1*	10.0*	6.5*	5.4*
Silver	7.8B	7.6B	7.5B	7.4B
Sodium	2780BE	15200E	28700E	68200E
Thallium	5.0U	5.0U	5.0U	5.0U
Vanadium	11.9B	6.8B	6.8B	8.1B
Zinc	26.1	7.7B	6.7B	16.4B

See Appendix for qualifier definitions

TABLE AS-1.6
7098-2557A
STEARNS & WHELER
TAL METALS (Total)

Aqueous

All values are ug/L.

Client Sample I.D.	GW-2S S	GW-10S	GW-11S	GW-9
Lab Sample I.D.	982557A-03S	982557A-04	982557A-05	982557A-06
Aluminum	4160	143.B	6460	1070
Antimony	428.	4.0U	4.0U	8.8B
Arsenic	44.4	20.5	15.5	8.4B
Barium	1800	374.	217.	40.2B
Beryllium	46.9	1.0U	1.0U	1.0U
Cadmium	5.0B	1.7B	4.0B	1.0U
Calcium	NR	930000	376000	67100
Chromium	178.	1.0U	10.1	1.6B
Cobalt	437.	20.4B	23.9B	8.0B
Copper	234.	3.1B	74.8	6.3B
Iron	4640N	2190E	16100E	2670E
Lead	23.3	2.0U	36.2	2.0U
Magnesium	NR	58000	72700	41600
Manganese	753.	7410	2400	176.
Mercury	0.99	1.6	0.10U	0.10U
Nickel	434.	18.9B	28.9B	6.0U
Potassium	NR	6930	4290B	1700B
Selenium	18.1	29.5*	14.9*	9.5*
Silver	46.1	7.6B	7.0B	7.5B
Sodium	NR	35400E	25400E	50300E
Thallium	49.6	5.0U	5.0U	5.5B
Vanadium	444.	5.2B	25.0B	8.1B
Zinc	448.	32.6	141.	9.7B

See Appendix for qualifier definitions

TABLE AS-1.5
7098-2557A
STEARNS & WHELER
TAL METALS (Total)

Aqueous

All values are ug/L.

Client Sample I.D.	GW-1	GW-2	GW-2S	GW-2S D
Lab Sample I.D.	982557A-01	982557A-02	982557A-03	982557A-03D
Aluminum	2810	4470	1900	1910
Antimony	9.0B	6.6B	5.1B	6.2B
Arsenic	3.2B	8.9B	6.8B	6.8B
Barium	78.9B	90.5B	68.2B	68.9B
Beryllium	1.0U	1.0U	1.0U	1.0U
Cadmium	1.4B	1.0B	1.0U	1.0U
Calcium	130000	224000	114000	115000
Chromium	5.6B	7.8B	3.2B	3.3B
Cobalt	9.6B	10.4B	9.0B	9.1B
Copper	30.2	18.4B	10.4B	10.2B
Iron	6300E	8980E	3340E	3350
Lead	10.6	14.0	4.0	2.4B
Magnesium	62000	104000	21100	21200
Manganese	397.	502.	314.	316.
Mercury	NR	0.10U	0.10U	0.10U
Nickel	8.5B	8.4B	6.0U	6.0U
Potassium	6000	5180	1080B	1090B
Selenium	7.0*	7.5*	8.6*	7.6*
Silver	7.5B	7.5B	7.4B	7.5B
Sodium	69600E	78600E	5130E	5150
Thallium	5.0U	5.0U	5.0U	5.0U
Vanadium	12.2B	13.0B	11.0B	11.4B
Zinc	33.8	38.0	19.3B	18.2B

See Appendix for qualifier definitions

Aqueous

TABLE AS-1.4
7098-2557A
STEARNS & WHELER
TAL METALS (Dissolved)

All values are ug/L.

Client Sample I.D. / Lab Sample I.D.	GW-13 / 982557A-20			
Aluminum	38.0B			
Antimony	11.2B			
Arsenic	3.0U			
Barium	18.1B			
Beryllium	1.0U			
Cadmium	1.0U			
Calcium	167000			
Chromium	1.0U			
Cobalt	7.9B			
Copper	2.2B			
Iron	14.4BE			
Lead	2.0U			
Magnesium	108000			
Manganese	130.			
Mercury	0.10U			
Nickel	6.0U			
Potassium	15000			
Selenium	4.2B			
Silver	7.3B			
Sodium	95800E			
Thallium	5.0U			
Vanadium	4.4B			
Zinc	1.0U			

See Appendix for qualifier definitions

TABLE AS-1.3
7098-2557A
STEARNS & WHELER
TAL METALS (Dissolved)

Aqueous

All values are ug/L.

Client Sample I.D.	GW-4	GW-4S	GW-5	GW-5S
Lab Sample I.D.	982557A-16	982557A-17	982557A-18	982557A-19
Aluminum	58.1B	49.0B	42.8B	40.7B
Antimony	12.9B	8.8B	14.5B	9.8B
Arsenic	6.9B	3.0U	3.0U	3.4B
Barium	19.0B	50.5B	16.4B	53.6B
Beryllium	1.0U	1.0U	1.0U	1.0U
Cadmium	1.0U	1.0U	1.0U	1.0U
Calcium	131000	98400	48000	136000
Chromium	1.0U	1.0U	1.0U	1.0U
Cobalt	13.9B	7.2B	7.1B	7.8B
Copper	2.7B	3.0B	2.0B	3.3B
Iron	73.2BE	61.4BE	81.5BE	76.8BE
Lead	2.0U	2.0U	2.0U	2.0U
Magnesium	69400	27100	40900	17700
Manganese	62.4	42.6	12.9B	808.
Mercury	0.10U	0.10U	0.10U	0.10U
Nickel	6.0U	6.0U	6.0U	6.0U
Potassium	2370B	1930B	2140B	588.B
Selenium	2.6B	6.5	2.8B	3.9B
Silver	8.3B	7.5B	7.6B	7.6B
Sodium	65200E	43200E	57200E	18200E
Thallium	5.0U	5.0U	5.0U	5.0U
Vanadium	5.7B	5.7B	6.5B	6.1B
Zinc	1.0U	1.0U	1.0U	1.0U

See Appendix for qualifier definitions

Aqueous

TABLE AS-1.2
7098-2557A
STEARNS & WHELER
TAL METALS (Dissolved)

All values are ug/L.

Client Sample I.D. Lab Sample I.D.	GW-3S 982557A-08	DUP-1 982557A-09	GW-12S 982557A-13	DUP 2 982557A-15
Aluminum	36.5B	36.0B	30.9B	43.9B
Antimony	11.7B	9.8B	10.5B	11.5B
Arsenic	3.0U	4.1B	4.6B	4.1B
Barium	32.0B	37.5B	52.7B	18.5B
Beryllium	1.0U	1.0U	1.0U	1.0U
Cadmium	1.0U	1.0U	2.8B	1.0U
Calcium	98000	89800	133000	128000
Chromium	1.0U	1.0U	1.0U	1.0U
Cobalt	7.5B	13.0B	7.3B	7.5B
Copper	2.2B	3.6B	2.7B	2.4B
Iron	194.E	81.3BE	93.5BE	36.1BE
Lead	2.0U	2.0U	2.0U	2.0U
Magnesium	12200	20700	28800	68200
Manganese	319.	579.	242.	44.5
Mercury	0.10U	0.10U	0.10U	0.10U
Nickel	6.0U	6.0U	6.0U	6.0U
Potassium	758.B	795.B	3410B	2280B
Selenium	7.1	7.4	6.7	5.0
Silver	7.5B	7.5B	7.7B	7.3B
Sodium	2920BE	14700E	28500E	64000E
Thallium	7.7B	5.0U	5.0U	6.4B
Vanadium	5.9B	5.8B	5.5B	5.0B
Zinc	1.0U	1.0U	1.0U	1.0U

See Appendix for qualifier definitions

TABLE AS-1.1
7098-2557A
STEARNS & WHELER
TAL METALS (Dissolved)

Aqueous

All values are ug/L.

Client Sample I.D.	GW-2S S	GW-10S	GW-11S	GW-9
Lab Sample I.D.	982557A-03S	982557A-04	982557A-05	982557A-06
Aluminum	1690	225.	193.B	35.6B
Antimony	385.	8.9B	9.1B	14.4B
Arsenic	26.6	5.6B	3.7B	9.4B
Barium	1640	51.9B	49.1B	29.0B
Beryllium	43.3	1.0U	1.0U	1.0U
Cadmium	3.0B	1.0U	1.0U	1.0U
Calcium	NR	120000	85300	46100
Chromium	165.	1.0U	1.0U	1.0U
Cobalt	410.	25.2B	14.3B	7.4B
Copper	209.	2.9B	3.6B	2.2B
Iron	915.	450.E	382.E	367.E
Lead	9.8	2.0U	2.0U	2.0U
Magnesium	NR	34100	27100	35600
Manganese	489.	414.	266.	32.9
Mercury	0.96	0.19B	0.10U	0.10U
Nickel	406.	6.0U	6.0U	6.0U
Potassium	NR	2500B	2520B	1500B
Selenium	10.6	9.4	5.7	1.0U
Silver	43.8	7.3B	7.7B	7.6B
Sodium	NR	23600E	21400E	49500E
Thallium	30.2	5.0U	5.0U	5.0U
Vanadium	411.	5.8B	6.4B	5.5B
Zinc	407.	1.0U	1.0U	1.0U

See Appendix for qualifier definitions

TABLE AS-1.0
7098-2557A
STEARNS & WHELER
TAL METALS (Dissolved)

Aqueous

All values are ug/L.

Client Sample I.D.	GW-1	GW-2	GW-2S	GW-2S D
Lab Sample I.D.	982557A-01	982557A-02	982557A-03	982557A-03D
Aluminum	51.9B	53.0B	31.1B	33.6B
Antimony	13.6B	15.4B	10.1B	9.4B
Arsenic	3.0U	3.3B	5.7B	3.0U
Barium	22.9B	21.6B	39.8B	39.7B
Beryllium	1.0U	1.0U	1.0U	1.0U
Cadmium	1.0U	1.0U	1.0U	1.0U
Calcium	51500	74300	88600	88700
Chromium	1.0U	1.0U	1.0U	1.0U
Cobalt	11.5B	7.9B	6.6B	7.0B
Copper	2.6B	2.6B	2.6B	2.6B
Iron	74.5BE	62.5BE	71.4BE	70.1B
Lead	2.0U	2.0U	2.0U	2.0U
Magnesium	39400	37400	17700	17700
Manganese	24.2	16.2	75.2	75.1
Mercury	0.10U	0.10U	0.10U	0.10U
Nickel	6.0U	6.0U	6.0U	6.0U
Potassium	5510	3280B	994.B	1000B
Selenium	3.4B	4.4B	5.3	3.8B*
Silver	7.4B	7.6B	7.6B	7.7B
Sodium	67800E	72400E	5740E	5730
Thallium	6.8B	5.7B	5.0U	6.0B
Vanadium	5.8B	6.0B	5.7B	5.8B
Zinc	1.0U	1.0U	1.0U	1.0U

See Appendix for qualifier definitions

Appendix D
Support Documentation/Resubmission

END OF DATA PACKAGE

Analytical Assurance Associates, Inc.
600 Rock Raymond Road
Downingtown, PA 19335
Phone: 610 - 269 - 9989
Fax: 610 - 269 - 9989

METAL ANALYSIS
TOTAL & DISSOLVED
QUALITY ASSURANCE DATA REVIEW

STEARNS & WHELER, LLC

SITE: ROBLIN STEEL
CASE NO.: 7098-2557B/ SDG NO.: B2557

REPORTED BY:
ANALYTICAL ASSURANCE ASSOCIATES (A^3)
600 ROCK RAYMOND ROAD
DOWNINGTOWN, PA 19335

REVIEWED BY:
ZOHREH HAMID, Ph.D.
FEBRUARY16, 1999

STEARNS & WHELER
SITE: ROBLIN STEEL
CASE NO.:7098-2557B/ SDG NO.: B2557

INTRODUCTION

This quality assurance review is based upon a review of all data generated from five (5) water samples collected on 12-17-98. The samples were received by Severn Trent Laboratories on 12-18-98 and analyzed according to criteria set forth in SOW3,90 (ILM03.0) for total and dissolved metals.

The following samples are contained within this report:

GW-7S	GW-14
GW-8S	GW-3*
GW-6	

* The total sample analysis was performed with SDG number 2557A.

The QC samples (MS & MD) for ICP metals was assigned to an alternate sample with sample ID: LP-01. However, the QC samples for mercury was analyzed on sample GW-6.

All data have been validated with regard to usability according to the quality assurance set forth in National Functional Guidelines for Evaluating Inorganic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations & CRDL Analyses
- Blanks
- ICP Interference Check Sample
- Matrix Spike Analysis
- Matrix Duplicate Analysis
- Laboratory Control Sample Analysis
- ICP Serial Dilution Analysis
- Instrument Detection Limits
- Field Duplicate Results
- Sample Results

DATA COMPLETENESS

The 8-hour analysis holding time for CRDL and ICS samples exceeded on Form XIV in the analysis run performed on 01-17-99 for the alternate QC samples. The review of the raw data showed that these samples were analyzed with in the analysis requirement. The form XIV must be corrected and resubmitted.

The laboratory case narrative stated that the analysis for sample GW-17S was cancelled due to sample being frozen.

The matrix spike recovery for Ag exceeded the upper control limit. However, the sample data were not qualified "N" for this outlier.

HOLDING TIME

All samples were digested/analyzed within the requirements established in the method.

CALIBRATIONS & CRDL Analyses

The recoveries for all analytes in the initial and continuing calibrations were within the control limits of 90-110%.

The CRDL sample analysis was performed prior and after all samples analysis. The %recoveries were within the control limits with the exception of Cd (121%) and Tl (73.6%) in initial CRDL The results for cadmium was accepted unqualified since the deviation was marginal. The positive results and non-detected values for thallium were qualified estimated.

Two other analysis runs were provided for QC samples and analytical spike sample. Several recoveries were outside the control limits. However, the sample data were not impacted.

BLANKS

The laboratory preparation blank had Mg (5.4 ug/l) and Se (2.4 ug/l) contamination at a level below the CRDL. Magnesium was detected at levels above the action limits. The reported sample results up to 5 times the blank level for selenium were qualified "U" and considered as the laboratory artifact.

The concentration of Tl and Se were below the negative CRDLs in analysis run performed for the QC samples. The sample data were not impacted by these outliers since the samples from this site were not analyzed under this analysis sequence.

ICP INTERFERENCE CHECK SAMPLE

The recoveries for Sb (120.5%), Pb (72.4/74.6%) and Se (129.4/120.6%) were outside the control limits of 80-120% in the ICS sample analyzed for the total and dissolved samples. The data for antimony was not qualified since the deviation was marginal. The reported sample results for lead and selenium and non-detected values for lead were considered estimated.

The recoveries of a few analytes were outside the QC limits in the other analysis runs performed for the QC samples. The sample data were not impacted by these outliers.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

Matrix spike analysis was performed on an alternate sample. The spike recoveries were within the control limits with the exception of Pb (13.8%), Se (0.0%) and Ag (133.7%). The post digestion spike sample was analyzed for lead and selenium as required by the method. The recoveries 12.6% and 101.5% were obtained. The data for Ag was not impacted since this analyte was not detected in the samples. The positive results were qualified estimated "J" and "U' for lead and selenium respectively. However, the non-detected values for these analytes were rejected since the possibility of false negative exist.

MATRIX DUPLICATE ANALYSIS

The matrix duplicate analysis was also performed on samples LP-01 and GW-6 for ICP metals and mercury respectively. The RPDs for were within the analysis and validation control limits.

LABORATORY CONTROL SAMPLE

The recoveries for all analyses were within the control limits.

ICP SERIAL DILUTION

The %Ds for all ICP analytes were within the control limits.

INSTRUMENT DETECTION LIMITS

All analytes with the exception of mercury were analyzed with ICP. The reported IDLs were below the CRDL.

DUPLICATE ANALYSIS

Duplicate analysis was analyzed under SDG number 2557A.

SAMPLE RESULTS

All analytes were analyzed at one-fold dilutions. The reported sample results were within the calibration range.

SUMMARY

The cooler temperature was not reported on the chain-of-custody. The matrix spike recoveries for Pb and Se were extremely low. The matrix spike sample was not assigned to this site. Therefore, the matrix interference could not be evaluated. . The major and minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

1. Appendix A- Glossary of Data Qualifier
2. Appendix B- Data Summary Forms
3. Appendix C- Laboratory Results (Form I)
4. Appendix D - Support Documentation /Resubmission (if applicable)

Appendix A
Glossary of Data Qualifier

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U	=	NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]
R	=	UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.
N	=	NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J	=	ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.
UJ	=	ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q	=	NO ANALYTICAL RESULT.

Appendix B
Data Summary Forms

ANALYTICAL ASSURANCE ASSOCIATES (A3)
TOTAL METAL WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-B2557
SDG NO.: B2557

CLIENT SAMPLE ID:			GW-7S	GW-8S	GW-6	GW-14
LAB SAMPLE ID:			982557B-02	T982557B-03	T982557B-04	T982557B-05
TARGET COMPOUNDS:						
	IDL					
Aluminum	15	P	744	466	605	280
Antimony	4	P				
Arsenic	3	P	10.5	6.9	19	4.5
Barium	1	P	66.6	26.5	43.6	34.8
Beryllium	1	P				
Cadmium	1	P	7.2	2.7	3.4	2.5
Calcium	31	P	86800	241000	74300	106000
Chromium	1	P	2.1	1.9		
Cobalt	2	P		3.8		
Copper	1	P	6.2	10.5	3	3.7
Iron	10	P	9190	1550	1960	454
Lead	2	P	2.8 J	R	R	3.7 J
Magnesium	5	P	20500	50100	43800	54900
Manganese	1	P	1220	1610	144	54.2
Mercury	0.1	CV	0.16	0.39		
Nickel	6	P	9	8.5	7.5	
Potassium	25	P	661	1120	1690	4180
Selenium	1	P	1.8 U	2.8 U	2.6 U	R
Silver	1	P				
Sodium	49	P	18400	33200	41600	61700
Thallium	5	P	UJ	UJ	UJ	UJ
Vanadium	1	P	4.8			
Zinc	1	P	12.3	15.5	7.9	4.3

ANALYTICAL ASSURANCE ASSOCIATES (A3)
FILTERED METAL WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-B2557
SDG NO.: B2557

CLIENT SAMPLE ID:			GW-7S		GW-8S		GW-6		GW-14		GW-3	
LAB SAMPLE ID:			·982557B-02		F982557B-03		F982557B-04		F982557B-05		F982557B-07	
TARGET COMPOUNDS:	IDL											
Aluminum	15	P							17.2		26.9	
Antimony	4	P										
Arsenic	3	P	6.9		3.9		16.4		5		4.6	
Barium	1	P	58.4		21.4		34.3		31.5		49.1	
Beryllium	1	P										
Cadmium	1	P	3.9		2.4		2.3		3.1		3.4	
Calcium	31	P	79600		235000		61200		99400		169000	
Chromium	1	P									1.3	
Cobalt	2	P										
Copper	1	P										
Iron	10	P	1930		208		24.4					
Lead	2	P		R		R		R		R		R
Magnesium	5	P	21800		47800		40900		52600		54200	
Manganese	1	P	817		543		44.2		23		99.5	
Mercury	0.1	CV										
Nickel	6	P										
Potassium	25	P	882		1180		1880		4140		3160	
Selenium	1	P	4.2	U	3	U	3.2	U		R		R
Silver	1	P										
Sodium	49	P	19800		30900		41400		6100		73500	
Thallium	5	P		UJ		UJ		UJ		UJ		UJ
Vanadium	1	P										
Zinc	1	P			4.6						1.2	

Appendix C
Laboratory Reported Results

Aqueous

TABLE AS-1.0
7098-2557B
STEARNS & WHELER
TAL METALS (Dissolved)

All values are ug/L.

Client Sample I.D.	GW-7S	GW-8S	GW-6	GW-14
Lab Sample I.D.	982557B-02	982557B-03	982557B-04	982557B-05
Aluminum	15.0U	15.0U	15.0U	17.2B
Antimony	4.0U	4.0U	4.0U	4.0U
Arsenic	6.9B	3.9B	16.4	5.0B
Barium	58.4B	21.4B	34.3B	31.5B
Beryllium	1.0U	1.0U	1.0U	1.0U
Cadmium	3.9B	2.4B	2.3B	3.1B
Calcium	79600	235000	61200	99400
Chromium	1.0U	1.0U	1.0U	1.0U
Cobalt	2.0U	2.0U	2.0U	2.0U
Copper	1.0U	1.0U	1.0U	1.0U
Iron	1930	208.	24.4B	10.0U
Lead	2.0UN	2.0UN	2.0UN	2.0UN
Magnesium	21800	47800	40900	52600
Manganese	817.	543.	44.2	23.0
Mercury	0.10U	0.10U	0.10U	0.10U
Nickel	6.0U	6.0U	6.0U	6.0U
Potassium	882.B	1180B	1880B	4140B
Selenium	4.2BN	3.0BN	3.2BN	1.0UN
Silver	1.0U	1.0U	1.0U	1.0U
Sodium	19800	30900	41400	61000
Thallium	5.0U	5.0U	5.0U	5.0U
Vanadium	1.0U	1.0U	1.0U	1.0U
Zinc	1.0U	4.6B	1.0U	1.0U

See Appendix for qualifier definitions

Aqueous

TABLE AS-1.1
7098-2557B
STEARNS & WHELER
TAL METALS (Dissolved)

All values are ug/L.

Client Sample I.D. / Lab Sample I.D.	GW-3 / 982557B-07			
Aluminum	26.9B			
Antimony	4.0U			
Arsenic	4.6B			
Barium	49.1B			
Beryllium	1.0U			
Cadmium	3.4B			
Calcium	169000			
Chromium	1.3B			
Cobalt	2.0U			
Copper	1.0U			
Iron	10.0U			
Lead	2.0UN			
Magnesium	54200			
Manganese	99.5			
Mercury	0.10U			
Nickel	6.0U			
Potassium	3160B			
Selenium	1.0UN			
Silver	1.0U			
Sodium	73500			
Thallium	5.0U			
Vanadium	1.0U			
Zinc	1.2B			

See Appendix for qualifier definitions

TABLE AS-1.2
7098-2557B
STEARNS & WHELER
TAL METALS (Total)

Aqueous

All values are ug/L.

Client Sample I.D.	GW-7S	GW-8S	GW-6	GW-14
Lab Sample I.D.	982557B-02	982557B-03	982557B-04	982557B-05
Aluminum	744.	466.	605.	280.
Antimony	4.0U	4.0U	4.0U	4.0U
Arsenic	10.5	6.9B	19.0	4.5B
Barium	66.6B	26.5B	43.6B	34.8B
Beryllium	1.0U	1.0U	1.0U	1.0U
Cadmium	7.2	2.7B	3.4B	2.5B
Calcium	86800	241000	74300	106000
Chromium	2.1B	1.9B	1.0U	1.0U
Cobalt	2.0U	3.8B	2.0U	2.0U
Copper	6.2B	10.5B	3.0B	3.7B
Iron	9190	1550	1960	454.
Lead	2.8BN	2.0UN	2.0UN	3.7N
Magnesium	20500	50100	43800	54900
Manganese	1220	1610	144.	54.2
Mercury	0.16B	0.39	0.10U	0.10U
Nickel	9.0B	8.5B	7.5B	6.0U
Potassium	661.B	1120B	1690B	4180B
Selenium	1.8BN	2.8BN	2.6BN	1.0UN
Silver	1.0U	1.0U	1.0U	1.0U
Sodium	18400	33200	41600	61700
Thallium	5.0U	5.0U	5.0U	5.0U
Vanadium	4.8B	1.0U	1.0U	1.0U
Zinc	12.3B	15.5B	7.9B	4.3B

See Appendix for qualifier definitions

Appendix D
Tentatively Identified compounds

END OF DATA PACKAGE

Analytical Assurance Associates, Inc.
600 Rock Raymond Road
Downingtown, PA 19335
Phone: 610 - 269 - 9989
Fax: 610 - 269 - 9989

INORGAINC
QUALITY ASSURANCE DATA REVIEW

STEARNS & WHELER, LLC

SITE: ROBLIN STEEL
CASE NO.: 7098-2557A/ SDG NO.: A2557

REPORTED BY:
ANALYTICAL ASSURANCE ASSOCIATES (A^3)
600 ROCK RAYMOND ROAD
DOWNINGTOWN, PA 19335

REVIEWED BY:
ZOHREH HAMID, Ph.D.
FEBRUARY17, 1999

STEARNS & WHELER
SITE: ROBLIN STEEL
CASE NO.:7098-2557A/ SDG NO. A2557

INTRODUCTION

This quality assurance review is based upon a review of all data generated from sixteen (16) water samples collected on 12-15,16-98. The samples were received by Severn Trent Laboratories on 12-16,17-98 and analyzed according to criteria set forth in EPA 600, Methods 310.1 (alkalinity), 325.2 (chloride), 150.1 (pH), and 375.2 (sulfate) plus Standard Methods for examination water and wastewater, 18th edition,1992 Methods 2340B (hardness) and 2320B (carbonate/bicarbonate)..

The following samples are contained within this report:

GW-1	GW-11S	GW-12S	GW-4S
GW-2	GW-9	GW-3	GW-5
GW-2S	GW-3S	DUP-2	GW-5S
GW-10S	DUP-1	GW-4	GW-13

The QC samples (MS & MD) were assigned to sample GW-2S.

All data have been validated with regard to usability according to the quality assurance set forth in National Functional Guidelines for Evaluating Inorganic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations
- Blanks
- Matrix Spike Analysis
- Matrix Duplicate Analysis
- Laboratory Control Sample Analysis
- Instrument Detection Limits
- Field Duplicate Results
- Sample Results

DATA COMPLETENESS

The laboratory case narrative stated that the analysis for samples GW-17S, GW-5S and GW-13 were cancelled due to samples being frozen.

The raw data for carbonate and bicarbonate were not included in the data package. The results for alkalinity was reported based on "mg of carbonate/L" unit, and the results for carbonate/bicarbonate were calculated in accordance with the alkalinity result in the corresponding samples. Therefore, the alkalinity results were solely reported on the data validation summary.

HOLDING TIME

All samples were prepared/analyzed within the holding time requirements established in the methods.

CALIBRATIONS & CRDL Analyses

The recoveries for chloride and sulfate in the initial and continuing calibrations were within the control limits of 90-110%.

BLANKS

The laboratory blanks, ICBs and CCBs were below the CRDLs for chloride and sulfate analyses.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

Matrix spike analysis was performed for chloride, sulfate and hardness. The recoveries were within the control limits of 80-120%.

MATRIX DUPLICATE ANALYSIS

The matrix duplicate analysis was performed on samples GW-2S for all analyses. The RPDs were below 20%, which indicated a satisfactory reproducibility.

LABORATORY CONTROL SAMPLE

This sample analysis was performed for chloride, sulfate, alkalinity and hardness. The recoveries for all analyses were within the control limits of 80-120%.

DUPLICATE ANALYSIS

Duplicate analysis was performed on samples GW-11S/Dup-1 and GW-4/DUP-2. The RPDs were within the 100% with the exception of hardness in samples GW-11S/DUP-1. The reported sample data were qualified estimated in these two samples.

SAMPLE RESULTS

All analytes were analyzed at one-fold dilutions with the exception of sulfate in samples 982557-(02,07, 15, 16, 18 and 20). These samples were analyzed at five-fold dilutions. The reported sample results were within the calibration range and considered acceptable.

SUMMARY

The cooler temperature was not reported on the chain-of-custody. Overall, major problems were not encountered during the sample analyses. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

1. **Appendix A- Glossary of Data Qualifier**
2. **Appendix B- Data Summary Forms**
3. **Appendix C- Laboratory Results (Form I)**
4. **Appendix D - Support Documentation /Resubmission (if applicable)**

Appendix A
Glossary of Data Qualifier

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

Appendix B
Data Summary Forms

ANALYTICAL ASSURANCE ASSOCIATES (A3)
INORGANIC WATER ANALYSIS

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-A2557
SDG NO.: A2557

CLIENT SAMPLE ID:		GW-1	GW-2	GW-2S	GW-10S	GW-11S	GW-9	GW-3
LAB SAMPLE ID:		982557A-01	982557A-02	982557A-03	982557A-04	982557A-05	982557A-06	982557A-07
TARGET COMPOUNDS:	UNITS							
Alkalinity	mg/L*	145	230	310	262	520	202	311
Chloride	mg/L	9.97	4.58	8.07	17.6	13.6	7.72	15.8
Hardness	mg/L	580	988	374	2560	1240 J	339	637
pH	S.U.	8.22	7.68	7.2	7.26	7.32	7.55	7.87
Sulfate	mg/L	532	521	48.4	260	126	244	702

* The unit is base on mg CaCO3/L

ANALYTICAL ASSURANCE ASSOCIATES (A3)
INORGANIC WATER ANALYSIS

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-A2557
SDG NO.: A2557

CLIENT SAMPLE ID:		GW-3S	DUP-1	GW-12S	DUP 2	GW-4	GW-4S	GW-5
LAB SAMPLE ID:		982557A-08	982557A-09	982557A-13	982557A-15	982557A-16	982557A-17	982557A-18
TARGET COMPOUNDS:	UNITS							
Alkalinity	mg/L*	330	317	377	80	94	368	254
Chloride	mg/L	4.16	12.6	50.2	5.57	5.79	19.7	9.66
Hardness	mg/L	424	335 J	462	791	706	379	778
pH	S.U.	7.06	7.15	7.05	7.84	7.95	7.44	8.06
Sulfate	mg/L	19.6	59.1	168	715	907	131	313

* The unit is base on mg CaCO3/L

ANALYTICAL ASSURANCE ASSOCIATES (A3)
INORGANIC WATER ANALYSIS

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-A2557
SDG NO.: A2557

CLIENT SAMPLE ID:		GW-5S	GW-13
LAB SAMPLE ID:		982557A-19	982557A-20
TARGET COMPOUNDS:			
	UNITS		
Alkalinity	mg/L*	344	111
Chloride	mg/L	31.9	31.2
Hardness	mg/L	609	932
pH	S.U.	7.3	7.65
Sulfate	mg/L	158	1280

* The unit is base on mg $CaCO_3$/L

Appendix C
Laboratory Reported Results

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

GW-1

Lab Name: STL Contract:

Lab Code: STL Case No.: 2557A SAS No.: SDG No.: A2557

Matrix (soil/water): WATER Lab Sample ID: 982557A-01

% Solids: 0 Date Received: 12/16/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	145.		mg/L		T
71-52-3	Bicarbonate	143.		mg/L		T
471-34-1	Carbonate	2.2		mg/L		T
16887-00-6	Chloride	9.97		mg/L		L
	Hardness	580.		mg/L		D
12408-02-5	pH	8.22		S.U.		D
	Sulfate	532.		mg/L		L

Comments:

FORM I - WC

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

GW-2

Lab Name: STL Contract:

Lab Code: STL Case No.: 2557A SAS No.: SDG No.: A2557

Matrix (soil/water): WATER Lab Sample ID: 982557A-02

% Solids: 0 Date Received: 12/16/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	230.		mg/L		T
71-52-3	Bicarbonate	229.		mg/L		T
471-34-1	Carbonate	2.0	U	mg/L		T
16887-00-6	Chloride	4.58		mg/L		L
	Hardness	988.		mg/L		D
12408-02-5	pH	7.68		S.U.		D
	Sulfate	521.		mg/L		L

Comments:

FORM I - WC

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

GW-2S

Lab Name: STL Contract:

Lab Code: STL Case No.: 2557A SAS No.: SDG No.: A2557

Matrix (soil/water): WATER Lab Sample ID: 982557A-03

% Solids: 0 Date Received: 12/16/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	310.		mg/L		T
71-52-3	Bicarbonate	310.		mg/L		T
471-34-1	Carbonate	2.0	U	mg/L		T
16887-00-6	Chloride	8.07		mg/L		L
	Hardness	374.		mg/L		D
12408-02-5	pH	7.20		S.U.		D
	Sulfate	48.4		mg/L		L

Comments:

FORM I - WC

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

GW-10S

Lab Name: STL

Contract:

Lab Code: STL   Case No.: 2557A   SAS No.:   SDG No.: A2557

Matrix (soil/water): WATER   Lab Sample ID: 982557A-04

% Solids: 0   Date Received: 12/16/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	262.		mg/L		T
71-52-3	Bicarbonate	262.		mg/L		T
471-34-1	Carbonate	2.0	U	mg/L		T
16887-00-6	Chloride	17.6		mg/L		L
	Hardness	2560		mg/L		D
12408-02-5	pH	7.26		S.U.		D
	Sulfate	260.		mg/L		L

Comments:

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

GW-11S

Lab Name: STL Contract: ____

Lab Code: STL Case No.: 2557A SAS No.: ____ SDG No.: A2557

Matrix (soil/water): WATER Lab Sample ID: 982557A-05

% Solids: 0 Date Received: 12/16/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	520.		mg/L		T
71-52-3	Bicarbonate	519.		mg/L		T
471-34-1	Carbonate	2.0	U	mg/L		T
16887-00-6	Chloride	13.6		mg/L		L
	Hardness	1240		mg/L		D
12408-02-5	pH	7.32		S.U.		D
	Sulfate	126.		mg/L		L

Comments:

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

GW-9

Lab Name: STL   Contract:

Lab Code: STL   Case No.: 2557A   SAS No.:   SDG No.: A2557

Matrix (soil/water): WATER   Lab Sample ID: 982557A-06

% Solids: 0   Date Received: 12/16/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	202.		mg/L		T
71-52-3	Bicarbonate	201.		mg/L		T
471-34-1	Carbonate	2.0	U	mg/L		T
16887-00-6	Chloride	7.72		mg/L		L
	Hardness	339.		mg/L		D
12408-02-5	pH	7.55		S.U.		D
	Sulfate	244.		mg/L		L

Comments:

FORM I - WC

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

GW-3

Lab Name: STL Contract:

Lab Code: STL Case No.: 2557A SAS No.: SDG No.: A2557

Matrix (soil/water): WATER Lab Sample ID: 982557A-07

% Solids: 0 Date Received: 12/16/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	311.		mg/L		T
71-52-3	Bicarbonate	309.		mg/L		T
471-34-1	Carbonate	2.2		mg/L		T
16887-00-6	Chloride	15.8		mg/L		L
12408-02-5	pH	7.87		S.U.		D
	Sulfate	702.		mg/L		L

Comments:

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

GW-3S

Lab Name: STL Contract:

Lab Code: STL Case No.: 2557A SAS No.: SDG No.: A2557

Matrix (soil/water): WATER Lab Sample ID: 982557A-08

% Solids: 0 Date Received: 12/16/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	330.		mg/L		T
71-52-3	Bicarbonate	330.		mg/L		T
471-34-1	Carbonate	2.0	U	mg/L		T
16887-00-6	Chloride	4.16		mg/L		L
	Hardness	424.		mg/L		D
12408-02-5	pH	7.06		S.U.		D
	Sulfate	19.6		mg/L		L

Comments:

FORM I - WC

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

DUP-1

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 2557A SAS No.: ______ SDG No.: A2557

Matrix (soil/water): WATER Lab Sample ID: 982557A-09

% Solids: 0 Date Received: 12/16/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	317.		mg/L		T
71-52-3	Bicarbonate	317.		mg/L		T
471-34-1	Carbonate	2.0	U	mg/L		T
16887-00-6	Chloride	12.6		mg/L		L
	Hardness	335.		mg/L		D
12408-02-5	pH	7.15		S.U.		D
	Sulfate	59.1		mg/L		L

Comments:

FORM I - WC

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

GW-12S

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 2557A SAS No.: ______ SDG No.: A2557

Matrix (soil/water): WATER Lab Sample ID: 982557A-13

% Solids: 0 Date Received: 12/17/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	377.		mg/L		T
71-52-3	Bicarbonate	377.		mg/L		T
471-34-1	Carbonate	2.0	U	mg/L		T
16887-00-6	Chloride	50.2		mg/L		L
	Hardness	462.		mg/L		D
12408-02-5	pH	7.05		S.U.		D
	Sulfate	168.		mg/L		L

Comments:

FORM I - WC

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

GW-3

Lab Name: STL   Contract: ____

Lab Code: STL   Case No.: 2557A   SAS No.: ____   SDG No.: A2557

Matrix (soil/water): WATER   Lab Sample ID: 982557A-14

% Solids: 0   Date Received: 12/17/98

CAS No.	Analyte	Concentration	C	Units	Q	M
	Hardness	637.		mg/L		D

Comments:

FORM I - WC

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

DUP 2

Lab Name: STL Contract:

Lab Code: STL Case No.: 2557A SAS No.: SDG No.: A2557

Matrix (soil/water): WATER Lab Sample ID: 982557A-15

% Solids: 0 Date Received: 12/17/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	80.0		mg/L		T
71-52-3	Bicarbonate	79.4		mg/L		T
471-34-1	Carbonate	2.0	U	mg/L		T
16887-00-6	Chloride	5.57		mg/L		L
	Hardness	791.		mg/L		D
12408-02-5	pH	7.84		S.U.		D
	Sulfate	715.		mg/L		L

Comments:

FORM I - WC

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

GW-4

Lab Name: STL Contract:

Lab Code: STL Case No.: 2557A SAS No.: SDG No.: A2557

Matrix (soil/water): WATER Lab Sample ID: 982557A-16

% Solids: 0 Date Received: 12/17/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	94.0		mg/L		T
71-52-3	Bicarbonate	93.2		mg/L		T
471-34-1	Carbonate	2.0	U	mg/L		T
16887-00-6	Chloride	5.79		mg/L		L
	Hardness	706.		mg/L		D
12408-02-5	pH	7.95		S.U.		D
	Sulfate	907.		mg/L		L

Comments:

FORM I - WC

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

GW-4S

Lab Name: STL

Contract:

Lab Code: STL Case No.: 2557A SAS No.: SDG No.: A2557

Matrix (soil/water): WATER

Lab Sample ID: 982557A-17

% Solids: 0

Date Received: 12/17/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	368.		mg/L		T
71-52-3	Bicarbonate	367.		mg/L		T
471-34-1	Carbonate	2.0	U	mg/L		T
16887-00-6	Chloride	19.7		mg/L		L
	Hardness	379.		mg/L		D
12408-02-5	pH	7.44		S.U.		D
	Sulfate	131.		mg/L		L

Comments:

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

GW-5

Lab Name: STL Contract:

Lab Code: STL Case No.: 2557A SAS No.: SDG No.: A2557

Matrix (soil/water): WATER Lab Sample ID: 982557A-18

% Solids: 0 Date Received: 12/17/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	254.		mg/L		T
71-52-3	Bicarbonate	251.		mg/L		T
471-34-1	Carbonate	2.7		mg/L		T
16887-00-6	Chloride	9.66		mg/L		L
	Hardness	778.		mg/L		D
12408-02-5	pH	8.06		S.U.		D
	Sulfate	313.		mg/L		L

Comments:

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

GW-5S

Lab Name: STL Contract:

Lab Code: STL Case No.: 2557A SAS No.: SDG No.: A2557

Matrix (soil/water): WATER Lab Sample ID: 982557A-19

% Solids: 0 Date Received: 12/17/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	344.		mg/L		T
71-52-3	Bicarbonate	343.		mg/L		T
471-34-1	Carbonate	2.0	U	mg/L		T
16887-00-6	Chloride	31.9		mg/L		L
	Hardness	609.		mg/L		D
12408-02-5	pH	7.30		S.U.		D
	Sulfate	158.		mg/L		L

Comments:

FORM I - WC

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO.

GW-13

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 2557A SAS No.: ______ SDG No.: A2557

Matrix (soil/water): WATER Lab Sample ID: 982557A-20

% Solids: 0 Date Received: 12/17/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	111.		mg/L		T
71-52-3	Bicarbonate	111.		mg/L		T
471-34-1	Carbonate	2.0	U	mg/L		T
16887-00-6	Chloride	31.2		mg/L		L
	Hardness	932.		mg/L		D
12408-02-5	pH	7.65		S.U.		D
	Sulfate	1280		mg/L		L

Comments:

FORM I - WC

Appendix D
Support Documentation/Resubmission

END OF DATA PACKAGE

Analytical Assurance Associates, Inc.
600 Rock Raymond Road
Downingtown, PA 19335
Phone: 610 - 269 - 9989
Fax: 610 - 269 - 9989

INORGANIC ANALYSIS
QUALITY ASSURANCE DATA REVIEW

STEARNS & WHELER, LLC

SITE: ROBLIN STEEL
CASE NO.: 7098-2557B/ SDG NO.: B2557

REPORTED BY:
ANALYTICAL ASSURANCE ASSOCIATES (A^3)
600 ROCK RAYMOND ROAD
DOWNINGTOWN, PA 19335

REVIEWED BY:
ZOHREH HAMID, Ph.D.
FEBRUARY 20, 1999

STEARNS & WHELER
SITE: ROBLIN STEEL
CASE NO.:7098-2557B/ SDG NO.: B2557

INTRODUCTION

This quality assurance review is based upon a review of all data generated from four (4) water samples collected on 12-17-98. The samples were received by Severn Trent Laboratories on 12-18-98 and analyzed according to criteria set forth in EPA 600, Methods 310.1 (alkalinity), 325.2 (chloride), 150.1 (pH), and 375.2 (sulfate) plus Standard Methods for examination water and wastewater, 18^{th} edition,1992 Methods 2340B (hardness) and 2320B (carbonate/bicarbonate).

The following samples are contained within this report:

GW-7S	GW-8S	GW-6	GW-14

The QC samples (MS) were assigned to sample GW-2S from SDG A2557 for sulfate and IW-1 & LP-01 from alternate batches for chloride and hardness respectively.

All data have been validated with regard to usability according to the quality assurance set forth in National Functional Guidelines for Evaluating Inorganic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations
- Blanks
- Matrix Spike Analysis
- Matrix Duplicate Analysis
- Laboratory Control Sample Analysis
- Instrument Detection Limits
- Field Duplicate Results
- Sample Results

DATA COMPLETENESS

The laboratory case narrative stated that the analysis for samples GW-17S was cancelled due to samples being frozen.

HOLDING TIME

All samples were prepared/analyzed within the holding time requirements established in the methods.

CALIBRATIONS & CRDL Analyses

The recoveries for chloride and sulfate in the initial and continuing calibrations were within the control limits of 90-110%.

BLANKS

The laboratory blanks, ICBs and CCBs were below the CRDLs for chloride and sulfate analyses.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

Matrix spike analysis was performed for chloride, sulfate and hardness. The recoveries were within the control limits of 80-120% with the exception of hardness (132%). The reported positive sample results were considered biased high and qualified estimated.

MATRIX DUPLICATE ANALYSIS

The matrix duplicate analysis was performed on samples GW-2S, LPP DET-07, GW-14, IW-1 and LP-01 for sulfate, alkalinity, pH, chloride and hardness respectively. The RPDs were below 20% with the exception of chloride (27.8%). The positive results for this analyte was qualified estimated.

LABORATORY CONTROL SAMPLE

This sample analysis was performed for chloride, sulfate, alkalinity and hardness. The recoveries for all analyses were within the control limits of 80-120%.

DUPLICATE ANALYSIS

Duplicate analysis was performed on samples GW-11S/Dup-1 and GW-4/DUP-2 in SDG number 2557A. The RPDs were within the 100% with the exception of hardness in samples GW-11S/DUP-1. The reported sample data were qualified estimated in these two samples.

SAMPLE RESULTS

All analytes were analyzed at one-fold dilutions with the exception of sulfate in samples GW-8S and GW-14. These samples were analyzed at five-fold dilutions. The reported sample results were within the calibration range and considered acceptable.

SUMMARY

The cooler temperature was not reported on the chain-of-custody. The spike analysis for chloride and hardness were analyzed on the samples from different site. Therefore, the matrix interference could not be evaluated. Overall, major problems were not encountered during the sample analyses. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

1. Appendix A- Glossary of Data Qualifier
2. Appendix B- Data Summary Forms
3. Appendix C- Laboratory Results (Form I)
4. Appendix D - Support Documentation /Resubmission (if applicable)

Appendix A
Glossary of Data Qualifier

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

Appendix B
Data Summary Forms

ANALYTICAL ASSURANCE ASSOCIATES (A3)
INORGANIC WATER ANALYSIS

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-B2557
SDG NO.: B2557

CLIENT SAMPLE ID:		GW-7S	GW-8S	GW-6	GW-14
LAB SAMPLE ID:		982557B-02	982557B-03	982557B-04	982557B-05
TARGET COMPOUNDS:	UNITS				
Alkalinity	mg/L	328	296	225	40
Bicarbonate	mg/L	328	296	225	39.6
Carbonate	mg/L				
Chloride	mg/L	12.2 J	15.6 J	9.99 J	7.04 J
Hardness	mg/L	301 J	808 J	366 J	491 J
pH	S.U.	7.33	7.3	7.75	8.03
Sulfate	mg/L	22.2	690	251	625

Appendix C
Laboratory Reported Results

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO. 0507

GW-7S

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 2557B SAS No.: ______ SDG No.: B2557

Matrix (soil/water): WATER Lab Sample ID: 982557B-02

% Solids: 0 Date Received: 12/18/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	328.		mg/L		T
71-52-3	Bicarbonate	328.		mg/L		T
471-34-1	Carbonate	2.0	U	mg/L		T
16887-00-6	Chloride	12.2		mg/L		L
	Hardness	301.		mg/L		D
12408-02-5	pH	7.33		S.U.		D
	Sulfate	22.2		mg/L		L

Comments:

FORM I - WC

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO. - 0508

GW-8S

Lab Name: STL Contract:

Lab Code: STL Case No.: 2557B SAS No.: SDG No.: B2557

Matrix (soil/water): WATER Lab Sample ID: 982557B-03

% Solids: 0 Date Received: 12/18/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	296.		mg/L		T
71-52-3	Bicarbonate	296.		mg/L		T
471-34-1	Carbonate	2.0	U	mg/L		T
16887-00-6	Chloride	15.6		mg/L		L
	Hardness	808.		mg/L		D
12408-02-5	pH	7.30		S.U.		D
	Sulfate	690.		mg/L		L

Comments:

FORM I - WC

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO. - 0509

GW-6

Lab Name: STL Contract:

Lab Code: STL Case No.: 2557B SAS No.: SDG No.: B2557

Matrix (soil/water): WATER Lab Sample ID: 982557B-04

% Solids: 0 Date Received: 12/18/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	225.		mg/L		T
71-52-3	Bicarbonate	224.		mg/L		T
471-34-1	Carbonate	2.0	U	mg/L		T
16887-00-6	Chloride	9.99		mg/L		L
	Hardness	366.		mg/L		D
12408-02-5	pH	7.75		S.U.		D
	Sulfate	251.		mg/L		L

Comments:

FORM I - WC

1

WET CHEM ANALYSIS DATA SHEET

SAMPLE NO. 0510

GW-14

Lab Name: STL Contract:

Lab Code: STL Case No.: 2557B SAS No.: SDG No.: B2557

Matrix (soil/water): WATER Lab Sample ID: 982557B-05

% Solids: 0 Date Received: 12/18/98

CAS No.	Analyte	Concentration	C	Units	Q	M
471-34-1	Alkalinity	40.0		mg/L		T
71-52-3	Bicarbonate	39.6		mg/L		T
471-34-1	Carbonate	2.0	U	mg/L		T
16887-00-6	Chloride	7.04		mg/L		L
	Hardness	491.		mg/L		D
12408-02-5	pH	8.03		S.U.		D
	Sulfate	625.		mg/L		L

Comments:

FORM I - WC

Appendix D
Support Documentation/Resubmission

END OF DATA PACKAGE

Analytical Assurance Associates, Inc.
600 Rock Raymond Road
Downingtown, PA 19335
Phone: 610 - 269 - 9989
Fax: 610 - 269 - 9989

ORGAINC
QUALITY ASSURANCE DATA REVIEW

STEARNS & WHELER, LLC

SITE: ROBLIN STEEL
CASE NO.: 7098-2557A/ SDG NO.: A2557

REPORTED BY:
ANALYTICAL ASSURANCE ASSOCIATES (A^3)
600 ROCK RAYMOND ROAD
DOWNINGTOWN, PA 19335

REVIEWED BY:
ZOHREH HAMID, Ph.D.
FEBRUARY19, 1999

STEARNS & WHELER
SITE NAME: ROBLIN STEEL
CASE NO.:7098-2557A/SDG NO.: A2557

INTRODUCTION

This quality assurance report is provided based upon a review of all data generated from seventeen (17) water samples collected on 12-15,16-98 and received by Severn Trent Laboratories on 12-16,17-98. Samples were analyzed for volatile target compounds according to criteria set forth in USEPA CLP OLM3.1. In addition, one sample was analyzed for Poly Aromatic Hydrocarbons (PAH) based on NYSDEC' 95 protocol

The following samples are contained within this report:

GW-1	**GW-9**	**TB 121598**	**GW-12S**	**GW-4**
GW-2	**GW-3**	**GW-10S**	**DUP-2**	
GW-2S	**GW-3S**	**GW-16S***	**GW-4S**	
GW-11S	**DUP-1**	**TB 2-4**	**GW-5**	

* Sample was analyzed for PAH fraction.

The QC (MS/MSD) analyses was performed on samples GW-2S & GW-4S for volatile fraction.

All data have been validated with regard to usability according to the quality assurance set forth in NYSDEC ASP for Evaluating Organic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations
- Blanks
- Surrogate Recoveries
- Internal Standards Recovery
- Matrix Spike/Spike Duplicate/Blank Spike Analyses
- Instrument Performance
- Field Duplicate Results
- Sample Results

DATA COMPLETENESS

Three samples (GW 17S, GW-5S and GW-13) were listed on the chain-of-custody, however; the analysis was not included in the data package. The laboratory case narrative stated that these samples were not analyzed due to the samples begin frozen.

HOLDING TIME

All volatile samples were analyzed within 5-days from VTSR based on the NYSDEC requirements. Also, the PAH sample was extracted within 5-days and analyzed within 40-days from VTSR.

CALIBRATION

Volatile

The response factors were within the data validation requirement limit of 0.05 in all calibrations. The following %RSDs ana %Ds were above 30% and 25% in the initial and continuing calibrations respectively.

Compound Name	IC 12-14-98	CC 12-19-98 @ 8:55	CC 12-20-98 @ 10:53
Bromomethane	38.9		40
Acetone	36.2		
Chloroethane		29.4	36
Associated Samples:	All samples	TB 121598 GW-1 GW-2 GW-2S GW-11S GW-9 GW-3 GW-3S DUP-1	GW-4 GW-4MS GW-4MSD GW-2MS GW-2MSD

IC= Initial Calibration
CC= Continuing Calibration

The reported sample results and not detected values were qualified "J" & "UJ" in the corresponding samples.

PAH

All RSDs, %Ds and response factors were within the control limits in both initial and continuing calibrations for the PAH compounds.

BLANKS

Volatile

The method blanks contained acetone and 2-butanone at levels below 2 times the CRQLs. The reported sample results up to 10 times the CRQLs were qualified "U" and considered as the laboratory artifact. Two trip blanks were analyzed. The trip blanks were free of target and non-target compounds.

PAH

The laboratory method blank was free of target compounds. The TICs were not reported.

SURROGATE RECOVERIES

Volatile

All samples and the corresponding QC samples were spiked with three surrogate compounds as required by the applied methods. The recoveries were within the control limits.

PAH

Sample and the corresponding QC samples were spiked with eight surrogate compounds as recommended by the method. The recoveries were within the control limis.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

Volatile

Two sets of matrix spike/spike duplicate sample analyses were performed for volatile fraction. The recoveries and RPDs were within the control limits with the exception of RPD for benzene (20%) in GW-4S MS/MSD. The data were not impacted since this compound was not detected in the samples.

PAH

Matrix spike analysis was not provided.

LABORATORY CONTROL SAMPLE

Volatile

Two LCS samples were analyzed in volatile fraction. The recoveries were within the control limits.

PAH

One blank spike sample was analyzed. The recoveries were within the control limits.

INTERNAL STANDARD

All internal standard recoveries and retention times were within the control limits established by the laboratory in both volatile and PAH analyses.

DUPLICATE ANALYSIS

Two sets of duplicate analysis (GW-11S/DUP-1 & GW-4/DUP-2) were analyzed for volatile fraction. Target compounds were not detected at levels above the CRQLs in these samples.

SAMPLE RESULTS

All samples were analyzed at one-fold dilutions. The Tentatively Identified Compound (TICs) were not detected in the samples with the exception of one TIC in sample GW-3S.

Sample for PAH was also analyzed at 1-fold dilution. The target compounds were not detected at levels above CRQLs. The TICs were not searched for this fraction.

SUMMARY

The cooler temperature was not listed on the chain-of-custody. This information must be provided by the laboratory. The sample results below the CRQLs were qualified estimated, due to the uncertainty near the detection limits in the both fractions.

Overall, major analysis problems were not encountered during the sample analyses. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

1. **Appendix A- Glossary of Data Qualifier**
2. **Appendix B- Data Summary Forms**
3. **Appendix C- Laboratory Results (Form I)**
4. **Appendix D - Support Documentation /Resubmission (if applicable)**

Appendix A
Glossary of Data Qualifier

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

Appendix B
Data Summary Forms

ANALYTICAL ASSURANCE ASSOCIATES (A3)
VOLATILE WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-2557A
SDG NO.: A2557

CLIENT SAMPLE ID:		GW-1	GW-2	GW-2S	GW-10S	GW-11S	GW-9	GW-3
LAB SAMPLE ID:		982557A-01	982557A-02	982557A-03	982557A-04	982557A-05	982557A-06	982557A-07
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0	1.0	1.0
TARGET COMPOUNDS:	CRQL							
Chloromethane	10							
Bromomethane	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Vinyl Chloride	10							
Chloroethane	10	UJ	UJ	UJ		UJ	UJ	UJ
Methylene Chloride	10							
Acetone	10	6 UJ	UJ	UJ	15 UJ	UJ	UJ	UJ
Carbon Disulfide	10				2 J	1 J		
1,1-Dichloroethene	10							
1,1-Dichloroethane	10			2 J				
1,2-Dichloroethene (total)	10							
Chloroform	10							
1,2-Dichloroethane	10							
2-Butanone	10							
1,1,1-Trichloroethane	10							
Carbon Tetrachloride	10							
Bromodichloromethane	10							
1,2-Dichloropropane	10							
cis-1,3-Dichloropropene	10							
Trichloroethene	10							
Dibromochloromethane	10							
1,1,2-Trichloroethane	10							
Benzene	10							
Trans-1,3-Dichloropropene	10							
Bromoform	10							
4-Methyl-2-pentanone	10							
2-Hexanone	10							
Tetrachloroethene	10			4 J				
1,1,2,2-Tetrachloroethane	10							
Toluene	10							
Chlorobenzene	10							
Ethylbenzene	10							
Styrene	10							
Xylene (total)	10							

ANALYTICAL ASSURANCE ASSOCIATES (A3)
VOLATILE WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-2557A
SDG NO.: A2557

CLIENT SAMPLE ID:		GW-3S	DUP-1	TB 121598	GW-16S	TB 2-4	GW-12S	DUP 2
LAB SAMPLE ID:		982557A-08	982557A-09	982557A-10	982557A-11	982557A-12	982557A-13	982557A-15
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0	1.0	1.0
TARGET COMPOUNDS:	CRQL							
Chloromethane	10							
Bromomethane	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Vinyl Chloride	10							
Chloroethane	10	UJ	UJ	UJ				
Methylene Chloride	10							
Acetone	10	UJ	UJ	UJ	UJ	UJ	6 UJ	UJ
Carbon Disulfide	10							
1,1-Dichloroethene	10							
1,1-Dichloroethane	10							
1,2-Dichloroethene (total)	10	62						
Chloroform	10							
1,2-Dichloroethane	10							
2-Butanone	10							
1,1,1-Trichloroethane	10							
Carbon Tetrachloride	10							
Bromodichloromethane	10							
1,2-Dichloropropane	10							
cis-1,3-Dichloropropene	10							
Trichloroethene	10	56						
Dibromochloromethane	10							
1,1,2-Trichloroethane	10							
Benzene	10							
Trans-1,3-Dichloropropene	10							
Bromoform	10							
4-Methyl-2-pentanone	10							
2-Hexanone	10							
Tetrachloroethene	10	40						
1,1,2,2-Tetrachloroethane	10							
Toluene	10							
Chlorobenzene	10							
Ethylbenzene	10							
Styrene	10							
Xylene (total)	10							

ANALYTICAL ASSURANCE ASSOCIATES (A3)
VOLATILE WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-2557A
SDG NO: A2557

CLIENT SAMPLE ID:		GW-4	GW-4S	GW-5
LAB SAMPLE ID:		982557A-16	982557A-17	982557A-18
DILUTION FACTOR:		1.0	1.0	1.0

TARGET COMPOUNDS:

	CRQL			
Chloromethane	10			
Bromomethane	10	UJ	UJ	UJ
Vinyl Chloride	10			
Chloroethane	10	UJ		
Methylene Chloride	10			
Acetone	10	UJ	UJ	UJ
Carbon Disulfide	10			
1,1-Dichloroethene	10			
1,1-Dichloroethane	10			
1,2-Dichloroethene (total)	10			
Chloroform	10			
1,2-Dichloroethane	10			
2-Butanone	10			
1,1,1-Trichloroethane	10			
Carbon Tetrachloride	10			
Bromodichloromethane	10			
1,2-Dichloropropane	10			
cis-1,3-Dichloropropene	10			
Trichloroethene	10			
Dibromochloromethane	10			
1,1,2-Trichloroethane	10			
Benzene	10			
Trans-1,3-Dichloropropene	10			
Bromoform	10			
4-Methyl-2-pentanone	10			
2-Hexanone	10			
Tetrachloroethene	10			
1,1,2,2-Tetrachloroethane	10			
Toluene	10			
Chlorobenzene	10			
Ethylbenzene	10			
Styrene	10			
Xylene (total)	10			

ANALYTICAL ASSURANCE ASSOCIATES (A3)
SEMIVOLATILE WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-2557A
SDG NO.: A2557

CLIENT SAMPLE ID:	GW-16S
LAB SAMPLE ID:	982557A-11
DILUTION FACTOR:	1.0

TARGET COMPOUNDS:

	CRQL	
Naphthalene	10	
2-Methylnaphthalene	10	
Acenaphthylene	10	
Acenaphthene	10	
Fluorene	10	
Phenanthrene	10	
Anthracene	10	
Fluoranthene	10	
Pyrene	10	0.06 J
Benzo(a)anthracene	10	
Chrysene	10	
Benzo(b)fluoranthene	10	
Benzo(k)fluoranthene	10	
Benzo(a)pyrene	10	0.06 J
Indeno(1,2,3-cd)pyrene	10	
Dibenzo(a,h)anthracene	10	
Benzo(g,h,i)perylene	10	

Appendix C
Laboratory Reported Results

TABLE VO-1.0
7098-2557A
STEARNS & WHELER
TCL VOLATILE ORGANICS + TIC'S

Aqueous

All values are ug/L.

Client Sample I.D.	Method Blank	GW-1	GW-2	Quant. Limits with no Dilution
Lab Sample I.D.	VBLKO5	982557A-01	982557A-02	
Method Blank I.D.	VBLKO5	VBLKO5	VBLKO5	
Quant. Factor	1.00	1.00	1.00	
Chloromethane	U	U	U	10
Bromomethane	U	U	U	10
Vinyl Chloride	U	U	U	10
Chloroethane	U	U	U	10
Methylene Chloride	U	U	U	10
Acetone	9J	6JB	U	10
Carbon Disulfide	U	U	U	10
1,1-Dichloroethene	U	U	U	10
1,1-Dichloroethane	U	U	U	10
1,2-Dichloroethene (total)	U	U	U	10
Chloroform	U	U	U	10
1,2-Dichloroethane	U	U	U	10
2-Butanone	4J	U	U	10
1,1,1-Trichloroethane	U	U	U	10
Carbon Tetrachloride	U	U	U	10
Bromodichloromethane	U	U	U	10
1,2-Dichloropropane	U	U	U	10
cis-1,3-Dichloropropene	U	U	U	10
Trichloroethene	U	U	U	10
Dibromochloromethane	U	U	U	10
1,1,2-Trichloroethane	U	U	U	10
Benzene	U	U	U	10
trans-1,3-Dichloropropene	U	U	U	10
Bromoform	U	U	U	10
4-Methyl-2-Pentanone	U	U	U	10
2-Hexanone	U	U	U	10
Tetrachloroethene	U	U	U	10
1,1,2,2-Tetrachloroethane	U	U	U	10
Toluene	U	U	U	10
Chlorobenzene	U	U	U	10
Ethylbenzene	U	U	U	10
Styrene	U	U	U	10
Xylene (total)	U	U	U	10
Date Received		12/16/98	12/16/98	
Date Extracted	N/A	N/A	N/A	
Date Analyzed	12/19/98	12/19/98	12/19/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE VO-1.1
7098-2557A
STEARNS & WHELER
TCL VOLATILE ORGANICS + TIC'S

Aqueous

All values are ug/L.

Client Sample I.D.	GW-2S	GW-11S	GW-9	
Lab Sample I.D.	982557A-03	982557A-05	982557A-06	Quant. Limits with no Dilution
Method Blank I.D.	VBLKO5	VBLKO5	VBLKO5	
Quant. Factor	1.00	1.00	1.00	
Chloromethane	U	U	U	10
Bromomethane	U	U	U	10
Vinyl Chloride	U	U	U	10
Chloroethane	U	U	U	10
Methylene Chloride	U	U	U	10
Acetone	U	U	U	10
Carbon Disulfide	U	1J	U	10
1,1-Dichloroethene	U	U	U	10
1,1-Dichloroethane	2J	U	U	10
1,2-Dichloroethene (total)	U	U	U	10
Chloroform	U	U	U	10
1,2-Dichloroethane	U	U	U	10
2-Butanone	U	U	U	10
1,1,1-Trichloroethane	U	U	U	10
Carbon Tetrachloride	U	U	U	10
Bromodichloromethane	U	U	U	10
1,2-Dichloropropane	U	U	U	10
cis-1,3-Dichloropropene	U	U	U	10
Trichloroethene	U	U	U	10
Dibromochloromethane	U	U	U	10
1,1,2-Trichloroethane	U	U	U	10
Benzene	U	U	U	10
trans-1,3-Dichloropropene	U	U	U	10
Bromoform	U	U	U	10
4-Methyl-2-Pentanone	U	U	U	10
2-Hexanone	U	U	U	10
Tetrachloroethene	4J	U	U	10
1,1,2,2-Tetrachloroethane	U	U	U	10
Toluene	U	U	U	10
Chlorobenzene	U	U	U	10
Ethylbenzene	U	U	U	10
Styrene	U	U	U	10
Xylene (total)	U	U	U	10
Date Received	12/16/98	12/16/98	12/16/98	
Date Extracted	N/A	N/A	N/A	
Date Analyzed	12/19/98	12/19/98	12/19/98	

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE VO-1.2
7098-2557A
STEARNS & WHELER
TCL VOLATILE ORGANICS + TIC'S

Aqueous

All values are ug/L.

Client Sample I.D.	GW-3	GW-3S	DUP-1	Quant. Limits with no Dilution
Lab Sample I.D.	982557A-07	982557A-08	982557A-09	
Method Blank I.D.	VBLKO5	VBLKO5	VBLKO5	
Quant. Factor	1.00	1.00	1.00	
Chloromethane	U	U	U	10
Bromomethane	U	U	U	10
Vinyl Chloride	U	U	U	10
Chloroethane	U	U	U	10
Methylene Chloride	U	U	U	10
Acetone	U	U	U	10
Carbon Disulfide	U	U	U	10
1,1-Dichloroethene	U	U	U	10
1,1-Dichloroethane	U	U	U	10
1,2-Dichloroethene (total)	U	62	U	10
Chloroform	U	U	U	10
1,2-Dichloroethane	U	U	U	10
2-Butanone	U	U	U	10
1,1,1-Trichloroethane	U	U	U	10
Carbon Tetrachloride	U	U	U	10
Bromodichloromethane	U	U	U	10
1,2-Dichloropropane	U	U	U	10
cis-1,3-Dichloropropene	U	U	U	10
Trichloroethene	U	56	U	10
Dibromochloromethane	U	U	U	10
1,1,2-Trichloroethane	U	U	U	10
Benzene	U	U	U	10
trans-1,3-Dichloropropene	U	U	U	10
Bromoform	U	U	U	10
4-Methyl-2-Pentanone	U	U	U	10
2-Hexanone	U	U	U	10
Tetrachloroethene	U	40	U	10
1,1,2,2-Tetrachloroethane	U	U	U	10
Toluene	U	U	U	10
Chlorobenzene	U	U	U	10
Ethylbenzene	U	U	U	10
Styrene	U	U	U	10
Xylene (total)	U	U	U	10
Date Received	12/16/98	12/16/98	12/16/98	
Date Extracted	N/A	N/A	N/A	
Date Analyzed	12/19/98	12/19/98	12/19/98	

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE VO-1.3
7098-2557A
STEARNS & WHELER
TCL VOLATILE ORGANICS + TIC'S

Aqueous

All values are ug/L.

Client Sample I.D. Lab Sample I.D. Method Blank I.D. Quant. Factor	TB 121598 982557A-10 VBLK05 1.00			Quant. Limits with no Dilution
Chloromethane	U			10
Bromomethane	U			10
Vinyl Chloride	U			10
Chloroethane	U			10
Methylene Chloride	U			10
Acetone	U			10
Carbon Disulfide	U			10
1,1-Dichloroethene	U			10
1,1-Dichloroethane	U			10
1,2-Dichloroethene (total)	U			10
Chloroform	U			10
1,2-Dichloroethane	U			10
2-Butanone	U			10
1,1,1-Trichloroethane	U			10
Carbon Tetrachloride	U			10
Bromodichloromethane	U			10
1,2-Dichloropropane	U			10
cis-1,3-Dichloropropene	U			10
Trichloroethene	U			10
Dibromochloromethane	U			10
1,1,2-Trichloroethane	U			10
Benzene	U			10
trans-1,3-Dichloropropene	U			10
Bromoform	U			10
4-Methyl-2-Pentanone	U			10
2-Hexanone	U			10
Tetrachloroethene	U			10
1,1,2,2-Tetrachloroethane	U			10
Toluene	U			10
Chlorobenzene	U			10
Ethylbenzene	U			10
Styrene	U			10
Xylene (total)	U			10
Date Received Date Extracted Date Analyzed	12/16/98 N/A 12/19/98			

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

Aqueous

TABLE VO-1.4
7098-2557A
STEARNS & WHELER
TCL VOLATILE ORGANICS + TIC'S

All values are ug/L.

Client Sample I.D.	Method Blank	GW-10S	GW-16S	
Lab Sample I.D.	VBLKO6	982557A-04	982557A-11	Quant. Limits with no Dilution
Method Blank I.D.	VBLKO6	VBLKO6	VBLKO6	
Quant. Factor	1.00	1.00	1.00	
Chloromethane	U	U	U	10
Bromomethane	U	U	U	10
Vinyl Chloride	U	U	U	10
Chloroethane	U	U	U	10
Methylene Chloride	U	U	U	10
Acetone	6J	15B	U	10
Carbon Disulfide	U	2J	U	10
1,1-Dichloroethene	U	U	U	10
1,1-Dichloroethane	U	U	U	10
1,2-Dichloroethene (total)	U	U	U	10
Chloroform	U	U	U	10
1,2-Dichloroethane	U	U	U	10
2-Butanone	U	U	U	10
1,1,1-Trichloroethane	U	U	U	10
Carbon Tetrachloride	U	U	U	10
Bromodichloromethane	U	U	U	10
1,2-Dichloropropane	U	U	U	10
cis-1,3-Dichloropropene	U	U	U	10
Trichloroethene	U	U	U	10
Dibromochloromethane	U	U	U	10
1,1,2-Trichloroethane	U	U	U	10
Benzene	U	U	U	10
trans-1,3-Dichloropropene	U	U	U	10
Bromoform	U	U	U	10
4-Methyl-2-Pentanone	U	U	U	10
2-Hexanone	U	U	U	10
Tetrachloroethene	U	U	U	10
1,1,2,2-Tetrachloroethane	U	U	U	10
Toluene	U	U	U	10
Chlorobenzene	U	U	U	10
Ethylbenzene	U	U	U	10
Styrene	U	U	U	10
Xylene (total)	U	U	U	10
Date Received		12/16/98	12/17/98	
Date Extracted	N/A	N/A	N/A	
Date Analyzed	12/19/98	12/19/98	12/20/98	

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE VO-1.5
7098-2557A
STEARNS & WHELER
TCL VOLATILE ORGANICS + TIC'S

Aqueous

All values are ug/L.

Client Sample I.D.	TB 2-4	GW-12S	DUP 2	
Lab Sample I.D.	982557A-12	982557A-13	982557A-15	Quant. Limits with no Dilution
Method Blank I.D.	VBLKO6	VBLKO6	VBLKO6	
Quant. Factor	1.00	1.00	1.00	
Chloromethane	U	U	U	10
Bromomethane	U	U	U	10
Vinyl Chloride	U	U	U	10
Chloroethane	U	U	U	10
Methylene Chloride	U	U	U	10
Acetone	U	6JB	U	10
Carbon Disulfide	U	U	U	10
1,1-Dichloroethene	U	U	U	10
1,1-Dichloroethane	U	U	U	10
1,2-Dichloroethene (total)	U	U	U	10
Chloroform	U	U	U	10
1,2-Dichloroethane	U	U	U	10
2-Butanone	U	U	U	10
1,1,1-Trichloroethane	U	U	U	10
Carbon Tetrachloride	U	U	U	10
Bromodichloromethane	U	U	U	10
1,2-Dichloropropane	U	U	U	10
cis-1,3-Dichloropropene	U	U	U	10
Trichloroethene	U	U	U	10
Dibromochloromethane	U	U	U	10
1,1,2-Trichloroethane	U	U	U	10
Benzene	U	U	U	10
trans-1,3-Dichloropropene	U	U	U	10
Bromoform	U	U	U	10
4-Methyl-2-Pentanone	U	U	U	10
2-Hexanone	U	U	U	10
Tetrachloroethene	U	U	U	10
1,1,2,2-Tetrachloroethane	U	U	U	10
Toluene	U	U	U	10
Chlorobenzene	U	U	U	10
Ethylbenzene	U	U	U	10
Styrene	U	U	U	10
Xylene (total)	U	U	U	10
Date Received	12/17/98	12/17/98	12/17/98	
Date Extracted	N/A	N/A	N/A	
Date Analyzed	12/20/98	12/20/98	12/20/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE VO-1.6
7098-2557A
STEARNS & WHELER
TCL VOLATILE ORGANICS + TIC'S

Aqueous

All values are ug/L.

Client Sample I.D.	GW-4S	GW-5		Quant. Limits with no Dilution
Lab Sample I.D.	982557A-17	982557A-18		
Method Blank I.D.	VBLK06	VBLK06		
Quant. Factor	1.00	1.00		
Chloromethane	U	U		10
Bromomethane	U	U		10
Vinyl Chloride	U	U		10
Chloroethane	U	U		10
Methylene Chloride	U	U		10
Acetone	U	U		10
Carbon Disulfide	U	U		10
1,1-Dichloroethene	U	U		10
1,1-Dichloroethane	U	U		10
1,2-Dichloroethene (total)	U	U		10
Chloroform	U	U		10
1,2-Dichloroethane	U	U		10
2-Butanone	U	U		10
1,1,1-Trichloroethane	U	U		10
Carbon Tetrachloride	U	U		10
Bromodichloromethane	U	U		10
1,2-Dichloropropane	U	U		10
cis-1,3-Dichloropropene	U	U		10
Trichloroethene	U	U		10
Dibromochloromethane	U	U		10
1,1,2-Trichloroethane	U	U		10
Benzene	U	U		10
trans-1,3-Dichloropropene	U	U		10
Bromoform	U	U		10
4-Methyl-2-Pentanone	U	U		10
2-Hexanone	U	U		10
Tetrachloroethene	U	U		10
1,1,2,2-Tetrachloroethane	U	U		10
Toluene	U	U		10
Chlorobenzene	U	U		10
Ethylbenzene	U	U		10
Styrene	U	U		10
Xylene (total)	U	U		10
Date Received	12/17/98	12/17/98		
Date Extracted	N/A	N/A		
Date Analyzed	12/20/98	12/20/98		

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE VO-1.7
7098-2557A
STEARNS & WHELER
TCL VOLATILE ORGANICS + TIC'S

Aqueous

All values are ug/L.

Client Sample I.D. Lab Sample I.D. Method Blank I.D. Quant. Factor	Method Blank VBLKO7 VBLKO7 1.00	GW-2S MS 982557A-03MS VBLKO7 1.00	GW-2S MSD 982557A-03 MSD VBLKO7 1.00	Quant. Limits with no Dilution
Chloromethane	U	U	U	10
Bromomethane	U	U	U	10
Vinyl Chloride	U	U	U	10
Chloroethane	U	U	U	10
Methylene Chloride	U	U	U	10
Acetone	11	U	U	10
Carbon Disulfide	U	U	U	10
1,1-Dichloroethene	U	53X	49X	10
1,1-Dichloroethane	U	2J	2J	10
1,2-Dichloroethene (total)	U	U	U	10
Chloroform	U	U	U	10
1,2-Dichloroethane	U	U	U	10
2-Butanone	5J	U	U	10
1,1,1-Trichloroethane	U	U	U	10
Carbon Tetrachloride	U	U	U	10
Bromodichloromethane	U	U	U	10
1,2-Dichloropropane	U	U	U	10
cis-1,3-Dichloropropene	U	U	U	10
Trichloroethene	U	44X	44X	10
Dibromochloromethane	U	U	U	10
1,1,2-Trichloroethane	U	U	U	10
Benzene	U	55X	54X	10
trans-1,3-Dichloropropene	U	U	U	10
Bromoform	U	U	U	10
4-Methyl-2-Pentanone	U	U	U	10
2-Hexanone	U	U	U	10
Tetrachloroethene	U	3J	3J	10
1,1,2,2-Tetrachloroethane	U	U	U	10
Toluene	U	49X	47X	10
Chlorobenzene	U	48X	46X	10
Ethylbenzene	U	U	U	10
Styrene	U	U	U	10
Xylene (total)	U	U	U	10
Date Received Date Extracted Date Analyzed	 N/A 12/20/98	12/16/98 N/A 12/20/98	12/16/98 N/A 12/20/98	

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

Aqueous

TABLE VO-1.8
7098-2557A
STEARNS & WHELER
TCL VOLATILE ORGANICS + TIC'S

All values are ug/L.

Client Sample I.D.	GW-4	GW-4S MS	GW-4S MSD	Quant. Limits with no Dilution
Lab Sample I.D.	982557A-16	982557A-17MS	982557A-17 MSD	
Method Blank I.D.	VBLKO7	VBLKO7	VBLKO7	
Quant. Factor	1.00	1.00	1.00	
Chloromethane	U	U	U	10
Bromomethane	U	U	U	10
Vinyl Chloride	U	U	U	10
Chloroethane	U	U	U	10
Methylene Chloride	U	U	U	10
Acetone	U	U	U	10
Carbon Disulfide	U	U	U	10
1,1-Dichloroethene	U	50X	51X	10
1,1-Dichloroethane	U	U	U	10
1,2-Dichloroethene (total)	U	U	U	10
Chloroform	U	U	U	10
1,2-Dichloroethane	U	U	U	10
2-Butanone	U	U	U	10
1,1,1-Trichloroethane	U	U	U	10
Carbon Tetrachloride	U	U	U	10
Bromodichloromethane	U	U	U	10
1,2-Dichloropropane	U	U	U	10
cis-1,3-Dichloropropene	U	U	U	10
Trichloroethene	U	44X	44X	10
Dibromochloromethane	U	U	U	10
1,1,2-Trichloroethane	U	U	U	10
Benzene	U	46X	56X	10
trans-1,3-Dichloropropene	U	U	U	10
Bromoform	U	U	U	10
4-Methyl-2-Pentanone	U	U	U	10
2-Hexanone	U	U	U	10
Tetrachloroethene	U	U	U	10
1,1,2,2-Tetrachloroethane	U	U	U	10
Toluene	U	45X	48X	10
Chlorobenzene	U	44X	47X	10
Ethylbenzene	U	U	U	10
Styrene	U	U	U	10
Xylene (total)	U	U	U	10
Date Received	12/17/98	12/17/98	12/17/98	
Date Extracted	N/A	N/A	N/A	
Date Analyzed	12/20/98	12/20/98	12/20/98	

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE SV-1.0
7098-2557A
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

Aqueous

All values are ug/L.

Client Sample I.D. Lab Sample I.D. Method Blank I.D. Quant. Factor	Method Blank SBLKLR SBLKLR 1.00	GW-16S 982557A-11 SBLKLR 1.05		Quant. Limits with no Dilution
Naphthalene	U	U		10
2-Methylnaphthalene	U	U		10
Acenaphthylene	U	U		10
Acenaphthene	U	U		10
Fluorene	U	U		10
Phenanthrene	U	U		10
Anthracene	U	U		10
Fluoranthene	U	U		10
Pyrene	U	.06J		10
Benzo(a)anthracene	U	U		10
Chrysene	U	U		10
Benzo(b)fluoranthene	U	U		10
Benzo(k)fluoranthene	U	U		10
Benzo(a)pyrene	U	.06J		10
Indeno(1,2,3-cd)pyrene	U	U		10
Dibenzo(a,h)anthracene	U	U		10
Benzo(g,h,i)perylene	U	U		10
Date Received Date Extracted Date Analyzed	 12/20/98 12/23/98	12/17/98 12/20/98 12/23/98		

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

Aqueous

TABLE VO-2.0
7098-2557A
STEARNS & WHELER
VOLATILE TENTATIVELY IDENTIFIED COMPOUNDS

Related Method Blank: VBLK05

Lab Sample Id: VBLK05 Client Sample Id: Method Blank

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557A-01 Client Sample Id: GW-1

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557A-02 Client Sample Id: GW-2

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557A-03 Client Sample Id: GW-2S

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557A-05 Client Sample Id: GW-11S

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

See Appendix for qualifier definitions

Aqueous

TABLE VO-2.1
7098-2557A
STEARNS & WHELER
VOLATILE TENTATIVELY IDENTIFIED COMPOUNDS

Related Method Blank: VBLK05

Lab Sample Id: 982557A-06 Client Sample Id: GW-9

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557A-07 Client Sample Id: GW-3

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557A-08 Client Sample Id: GW-3S

CAS#	Compound	RT	Estimated Conc., ug/L
1634-04-4	PROPANE, 2-METHOXY-2-METHYL-	10.54	20JN

Lab Sample Id: 982557A-09 Client Sample Id: DUP-1

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557A-10 Client Sample Id: TB 121598

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

See Appendix for qualifier definitions

Aqueous

TABLE VO-2.2
7098-2557A
STEARNS & WHELER
VOLATILE TENTATIVELY IDENTIFIED COMPOUNDS

Related Method Blank: VBLK06

Lab Sample Id: VBLK06 Client Sample Id: Method Blank

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557A-04 Client Sample Id: GW-10S

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557A-11 Client Sample Id: GW-16S

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557A-12 Client Sample Id: TB 2-4

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557A-13 Client Sample Id: GW-12S

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

See Appendix for qualifier definitions

Aqueous

TABLE VO-2.3
7098-2557A
STEARNS & WHELER
VOLATILE TENTATIVELY IDENTIFIED COMPOUNDS

Related Method Blank: VBLK06

Lab Sample Id: 982557A-15 Client Sample Id: DUP 2

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557A-17 Client Sample Id: GW-4S

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557A-18 Client Sample Id: GW-5

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

See Appendix for qualifier definitions

TABLE VO-2.4
7098-2557A
STEARNS & WHELER
VOLATILE TENTATIVELY IDENTIFIED COMPOUNDS

Aqueous

Related Method Blank: VBLK07

Lab Sample Id: VBLK07   Client Sample Id: Method Blank

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557A-16   Client Sample Id: GW-4

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

See Appendix for qualifier definitions

Appendix D
Support Documentation/Resubmission

END OF DATA PACKAGE

Analytical Assurance Associates, Inc.
600 Rock Raymond Road
Downingtown, PA 19335
Phone: 610 - 269 - 9989
Fax: 610 - 269 - 9989

ORGANIC ANALYSIS
QUALITY ASSURANCE DATA REVIEW

STEARNS & WHELER, LLC

SITE: ROBLIN STEEL
CASE NO.: 7098-2557B/ SDG NO.: B2557

REPORTED BY:
ANALYTICAL ASSURANCE ASSOCIATES (A^3)
600 ROCK RAYMOND ROAD
DOWNINGTOWN, PA 19335

REVIEWED BY:
ZOHREH HAMID, Ph.D.
FEBRUARY 20, 1999

STEARNS & WHELER
SITE NAME: ROBLIN STEEL
CASE NO.:7098-2557B/SDG NO.: B2557

INTRODUCTION

This quality assurance report is provided based upon a review of all data generated from five (5) water samples and one trip blank collected on 12-17-98. Samples were received by Severn Trent Laboratories on 12-18-98 and were analyzed for volatile target compounds according to criteria set forth in USEPA CLP OLM3.1. In addition, one sample was analyzed for Poly Aromatic Hydrocarbons (PAH) based on NYSDEC' 95 protocol

The following samples are contained within this report:

GW-17S*	**GW-6**
GW-7S	**GW-14**
GW-8S	**TB-5**

* Sample was analyzed for PAH fraction only.

The QC (MS/MSD) analyses was performed on samples GW-4S and GW17S for volatile and PAH analyses.

All data have been validated with regard to usability according to the quality assurance set forth in NYSDEC ASP for Evaluating Organic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations
- Blanks
- Surrogate Recoveries
- Internal Standards Recovery
- Matrix Spike/Spike Duplicate/Blank Spike Analyses
- Instrument Performance
- Field Duplicate Results
- Sample Results

DATA COMPLETENESS

The laboratory case narrative stated that sample 982557B-01 (GW-17S) was not analyzed for the volatile fraction due to sample being frozen.

HOLDING TIME

All volatile samples were analyzed within 5-days from VTSR based on the NYSDEC requirements. Also, the PAH sample was extracted within 5-days and analyzed within 40-days from VTSR.

CALIBRATION

Volatile
The response factors were within the data validation requirement limit of 0.05 in all calibrations. The following %RSDs and %Ds were above 30% and 25% in the initial and continuing calibrations respectively.

Compound Name	IC 12-14-98	CC 12-20-98 @ 10:53
Bromomethane	38.9	40
Acetone	36.2	
Chloroethane		36
Associated Samples:	All samples	TB-5 GW-14

IC= Initial Calibration
CC= Continuing Calibration

The reported sample results and not detected values were qualified "J" & "UJ" in the corresponding samples.

PAH
All RSDs, %Ds and response factors were within the control limits in both initial and continuing calibrations for the PAH compounds.

BLANKS

Volatile
The method blanks contained acetone and 2-butanone at levels below the 2x the CRQLs. The reported sample data were not impacted since these compounds were not detected in the samples. The trip blank was free of target and non-target compounds.

PAH
The laboratory method blank was free of target compounds. The TICs were not reported.

SURROGATE RECOVERIES

Volatile
All samples and the corresponding QC samples were spiked with three surrogate compounds as required by the applied methods. The recoveries were within the control limits.

PAH
Sample and the corresponding QC samples were spiked with eight surrogate compounds as recommended by the method. The recoveries were within the control limits.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

Volatile
The matrix spike/spike duplicate sample analyses were performed on SDG number 2557A. The recoveries and RPDs were within the control limits with the exception of RPD for benzene (20%) in GW-4S MS/MSD. The data were not impacted since this compound was not detected in the samples.

PAH
Matrix spike analysis was performed on sample GW-17S. The recoveries and RPDs were within the control limits with the exception of 4-nitrophenol (90/84%) and pentachlorophenol (126/125%) which exceeded the upper control limits of 80% & 103% respectively. The data were not impacted since these compounds were not considered as the PAH target compounds.

LABORATORY CONTROL SAMPLE

Volatile
One LCS sample was analyzed in volatile fraction. The recoveries were within the control limits.

PAH
One blank spike sample was analyzed. The recoveries were within the control limits with the exception of 4-nitrophenol (83%) and pentachlorophenol (107%). The sample data were not impacted by these outliers.

INTERNAL STANDARD

All internal standard recoveries and retention times were within the control limits established by the laboratory in both volatile and PAH analyses.

DUPLICATE ANALYSIS

Duplicate analysis (GW-11S/DUP-1 & GW-4/DUP-2) was analyzed for volatile fraction under SDG number 2557A. Target compounds were not detected at levels above the CRQLs in these samples.

SAMPLE RESULTS

All samples were analyzed at one-fold dilutions. The Tentatively Identified Compound (TICs) were not detected in the samples.

Sample for PAH was also analyzed at 1-fold dilution. The target compounds were not detected and the TICs were not searched for this fraction.

SUMMARY

The cooler temperature was not listed on the chain-of-custody. This information must be provided by the laboratory. The sample results below the CRQLs were qualified estimated, due to the uncertainty near the detection limits in the both fractions.

Overall, major analysis problems were not encountered during the sample analyses. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

1. **Appendix A- Glossary of Data Qualifier**
2. **Appendix B- Data Summary Forms**
3. **Appendix C- Laboratory Results (Form I)**
4. **Appendix D - Support Documentation /Resubmission (if applicable)**

Appendix A
Glossary of Data Qualifier

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

Appendix B
Data Summary Forms

ANALYTICAL ASSURANCE ASSOCIATES (A3)
VOLATILE WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-2557B
SDG NO.: B2557

CLIENT SAMPLE ID:		GW-7S	GW-8S	GW-6	GW-14	TB-5
LAB SAMPLE ID:		982557B-02	982557B-03	982557B-04	982557B-05	982557B-06
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0
TARGET COMPOUNDS:	CRQL					
Chloromethane	10					
Bromomethane	10	UJ	UJ	UJ	UJ	UJ
Vinyl Chloride	10					
Chloroethane	10				UJ	UJ
Methylene Chloride	10					
Acetone	10	UJ	UJ	UJ	UJ	UJ
Carbon Disulfide	10					
1,1-Dichloroethene	10					
1,1-Dichloroethane	10					
1,2-Dichloroethene (total)	10					
Chloroform	10					
1,2-Dichloroethane	10					
2-Butanone	10					
1,1,1-Trichloroethane	10					
Carbon Tetrachloride	10					
Bromodichloromethane	10					
1,2-Dichloropropane	10					
cis-1,3-Dichloropropene	10					
Trichloroethene	10					
Dibromochloromethane	10					
1,1,2-Trichloroethane	10					
Benzene	10					
Trans-1,3-Dichloropropene	10					
Bromoform	10					
4-Methyl-2-pentanone	10					
2-Hexanone	10					
Tetrachloroethene	10					
1,1,2,2-Tetrachloroethane	10					
Toluene	10					
Chlorobenzene	10					
Ethylbenzene	10					
Styrene	10					
Xylene (total)	10					

ANALYTICAL ASSURANCE ASSOCIATES (A3)
SEMIVOLATILE WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-2557B
SDG NO.: B2557

CLIENT SAMPLE ID:	GW-17S
LAB SAMPLE ID:	982557B-01
DILUTION FACTOR:	1.0

TARGET COMPOUNDS:

	CRQL
Naphthalene	10
2-Methylnaphthalene	10
Acenaphthylene	10
Acenaphthene	10
Fluorene	10
Phenanthrene	10
Anthracene	10
Fluoranthene	10
Pyrene	10
Benzo(a)anthracene	10
Chrysene	10
Benzo(b)fluoranthene	10
Benzo(k)fluoranthene	10
Benzo(a)pyrene	10
Indeno(1,2,3-cd)pyrene	10
Dibenzo(a,h)anthracene	10
Benzo(g,h,i)perylene	10

Appendix C
Laboratory Reported Results

TABLE VO-1.0
7098-2557B
STEARNS & WHELER
TCL VOLATILE ORGANICS + TIC'S

Aqueous

All values are ug/L.

Client Sample I.D.	Method Blank	GW-7S	GW-8S	
Lab Sample I.D.	VBLKO6	982557B-02	982557B-03	Quant. Limits with no Dilution
Method Blank I.D.	VBLKO6	VBLKO6	VBLKO6	
Quant. Factor	1.00	1.00	1.00	
Chloromethane	U	U	U	10
Bromomethane	U	U	U	10
Vinyl Chloride	U	U	U	10
Chloroethane	U	U	U	10
Methylene Chloride	U	U	U	10
Acetone	6J	U	U	10
Carbon Disulfide	U	U	U	10
1,1-Dichloroethene	U	U	U	10
1,1-Dichloroethane	U	U	U	10
1,2-Dichloroethene (total)	U	U	U	10
Chloroform	U	U	U	10
1,2-Dichloroethane	U	U	U	10
2-Butanone	U	U	U	10
1,1,1-Trichloroethane	U	U	U	10
Carbon Tetrachloride	U	U	U	10
Bromodichloromethane	U	U	U	10
1,2-Dichloropropane	U	U	U	10
cis-1,3-Dichloropropene	U	U	U	10
Trichloroethene	U	U	U	10
Dibromochloromethane	U	U	U	10
1,1,2-Trichloroethane	U	U	U	10
Benzene	U	U	U	10
trans-1,3-Dichloropropene	U	U	U	10
Bromoform	U	U	U	10
4-Methyl-2-Pentanone	U	U	U	10
2-Hexanone	U	U	U	10
Tetrachloroethene	U	U	U	10
1,1,2,2-Tetrachloroethane	U	U	U	10
Toluene	U	U	U	10
Chlorobenzene	U	U	U	10
Ethylbenzene	U	U	U	10
Styrene	U	U	U	10
Xylene (total)	U	U	U	10
Date Received		12/18/98	12/18/98	
Date Extracted	N/A	N/A	N/A	
Date Analyzed	12/19/98	12/20/98	12/20/98	

See Appendix for qualifier definitions

Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE VO-1.1
7098-2557B
STEARNS & WHELER
TCL VOLATILE ORGANICS + TIC'S

Aqueous

All values are ug/L.

Client Sample I.D.	GW-6			
Lab Sample I.D. Method Blank I.D. Quant. Factor	982557B-04 VBLK06 1.00			Quant. Limits with no Dilution
Chloromethane	U			10
Bromomethane	U			10
Vinyl Chloride	U			10
Chloroethane	U			10
Methylene Chloride	U			10
Acetone	U			10
Carbon Disulfide	U			10
1,1-Dichloroethene	U			10
1,1-Dichloroethane	U			10
1,2-Dichloroethene (total)	U			10
Chloroform	U			10
1,2-Dichloroethane	U			10
2-Butanone	U			10
1,1,1-Trichloroethane	U			10
Carbon Tetrachloride	U			10
Bromodichloromethane	U			10
1,2-Dichloropropane	U			10
cis-1,3-Dichloropropene	U			10
Trichloroethene	U			10
Dibromochloromethane	U			10
1,1,2-Trichloroethane	U			10
Benzene	U			10
trans-1,3-Dichloropropene	U			10
Bromoform	U			10
4-Methyl-2-Pentanone	U			10
2-Hexanone	U			10
Tetrachloroethene	U			10
1,1,2,2-Tetrachloroethane	U			10
Toluene	U			10
Chlorobenzene	U			10
Ethylbenzene	U			10
Styrene	U			10
Xylene (total)	U			10
Date Received Date Extracted Date Analyzed	12/18/98 N/A 12/20/98			

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

TABLE VO-1.2
7098-2557B
STEARNS & WHELER
TCL VOLATILE ORGANICS + TIC'S

Aqueous

All values are ug/L.

Client Sample I.D.	Method Blank	GW-14	TB-5	Quant. Limits with no Dilution
Lab Sample I.D.	VBLKO7	982557B-05	982557B-06	
Method Blank I.D.	VBLKO7	VBLKO7	VBLKO7	
Quant. Factor	1.00	1.00	1.00	
Chloromethane	U	U	U	10
Bromomethane	U	U	U	10
Vinyl Chloride	U	U	U	10
Chloroethane	U	U	U	10
Methylene Chloride	U	U	U	10
Acetone	11	U	U	10
Carbon Disulfide	U	U	U	10
1,1-Dichloroethene	U	U	U	10
1,1-Dichloroethane	U	U	U	10
1,2-Dichloroethene (total)	U	U	U	10
Chloroform	U	U	U	10
1,2-Dichloroethane	U	U	U	10
2-Butanone	5J	U	U	10
1,1,1-Trichloroethane	U	U	U	10
Carbon Tetrachloride	U	U	U	10
Bromodichloromethane	U	U	U	10
1,2-Dichloropropane	U	U	U	10
cis-1,3-Dichloropropene	U	U	U	10
Trichloroethene	U	U	U	10
Dibromochloromethane	U	U	U	10
1,1,2-Trichloroethane	U	U	U	10
Benzene	U	U	U	10
trans-1,3-Dichloropropene	U	U	U	10
Bromoform	U	U	U	10
4-Methyl-2-Pentanone	U	U	U	10
2-Hexanone	U	U	U	10
Tetrachloroethene	U	U	U	10
1,1,2,2-Tetrachloroethane	U	U	U	10
Toluene	U	U	U	10
Chlorobenzene	U	U	U	10
Ethylbenzene	U	U	U	10
Styrene	U	U	U	10
Xylene (total)	U	U	U	10
Date Received		12/18/98	12/18/98	
Date Extracted	N/A	N/A	N/A	
Date Analyzed	12/20/98	12/20/98	12/20/98	

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

Aqueous

TABLE VO-2.0
7098-2557B
STEARNS & WHELER
VOLATILE TENTATIVELY IDENTIFIED COMPOUNDS

Related Method Blank: VBLK06

Lab Sample Id: VBLK06 Client Sample Id: Method Blank

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557B-02 Client Sample Id: GW-7S

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557B-03 Client Sample Id: GW-8S

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557B-04 Client Sample Id: GW-6

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

See Appendix for qualifier definitions

Aqueous

TABLE VO-2.1
7098-2557B
STEARNS & WHELER
VOLATILE TENTATIVELY IDENTIFIED COMPOUNDS

Related Method Blank: VBLK07

Lab Sample Id: VBLK07   Client Sample Id: Method Blank

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557B-05   Client Sample Id: GW-14

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

Lab Sample Id: 982557B-06   Client Sample Id: TB-5

CAS#	Compound	RT	Estimated Conc., ug/L
	NONE DETECTED		

See Appendix for qualifier definitions

Aqueous

TABLE SV-1.0
7098-2557B
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

All values are ug/L.

Client Sample I.D.	Method Blank	GW-17S	GW-17S MS	
Lab Sample I.D.	SBLKLP	982557B-01	982557B-01MS	Quant. Limits with no Dilution
Method Blank I.D.	SBLKLP	SBLKLP	SBLKLP	
Quant. Factor	1.00	1.05	1.05	
Naphthalene	U	U	U	10
2-Methylnaphthalene	U	U	U	10
Acenaphthylene	U	U	U	10
Acenaphthene	U	U	48X	10
Fluorene	U	U	U	10
Phenanthrene	U	U	U	10
Anthracene	U	U	U	10
Fluoranthene	U	U	U	10
Pyrene	U	U	44X	10
Benzo(a)anthracene	U	U	U	10
Chrysene	U	U	U	10
Benzo(b)fluoranthene	U	U	U	10
Benzo(k)fluoranthene	U	U	U	10
Benzo(a)pyrene	U	U	U	10
Indeno(1,2,3-cd)pyrene	U	U	U	10
Dibenzo(a,h)anthracene	U	U	U	10
Benzo(g,h,i)perylene	U	U	U	10
Date Received		12/17/98	12/17/98	
Date Extracted	12/20/98	12/20/98	12/20/98	
Date Analyzed	12/31/98	12/31/98	12/31/98	

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a nu~erical value which takes into account any var[illegible]ion in sample weight/volume, % moisture and sam[illegible] dilution.

Aqueous

TABLE SV-1.1
7098-2557B
STEARNS & WHELER
MISCELLANEOUS BASE-NEUTRALS

All values are ug/L.

Client Sample I.D. Lab Sample I.D. Method Blank I.D. Quant. Factor	GW-17S MSD 982557B-01 MSD SBLKLP 1.05			Quant. Limits with no Dilution
Naphthalene	U			10
2-Methylnaphthalene	U			10
Acenaphthylene	U			10
Acenaphthene	46X			10
Fluorene	U			10
Phenanthrene	U			10
Anthracene	U			10
Fluoranthene	U			10
Pyrene	42X			10
Benzo(a)anthracene	U			10
Chrysene	U			10
Benzo(b)fluoranthene	U			10
Benzo(k)fluoranthene	U			10
Benzo(a)pyrene	U			10
Indeno(1,2,3-cd)pyrene	U			10
Dibenzo(a,h)anthracene	U			10
Benzo(g,h,i)perylene	U			10
Date Received Date Extracted Date Analyzed	12/17/98 12/20/98 12/31/98			

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

Appendix D
Support Documentation/Resubmission

END OF DATA PACKAGE

Analytical Assurance Associates, Inc.
600 Rock Raymond Road
Downingtown, PA 19335
Phone: 610 - 269 - 9989
Fax: 610 - 269 - 9989

METAL ANALYSIS
QUALITY ASSURANCE DATA REVIEW

STEARNS & WHELER, LLC

SITE: ROBLIN STEEL
CASE NO.: 7099-0012A/ SDG NO.: A0012

REPORTED BY:
ANALYTICAL ASSURANCE ASSOCIATES (A^3)
600 ROCK RAYMOND ROAD
DOWNINGTOWN, PA 19335

REVIEWED BY:
ZOHREH HAMID, Ph.D.
FEBRUARY 24, 1999

STEARNS & WHELER
SITE: ROBLIN STEEL
CASE NO.:7099-0012A/ SDG NO.: A0012

INTRODUCTION

This quality assurance review is based upon a review of all data generated from two (2) soil samples collected on 01-05-99. The samples were received by Severn Trent Laboratories on 01-06-99 and analyzed according to criteria set forth in SOW3,90 (ILM03.0) for TAL metals.

The following samples are contained within this report:

SS-62
DUP

The QC samples (MS & MD) were assigned to sample SS-62.

All data have been validated with regard to usability according to the quality assurance set forth in National Functional Guidelines for Evaluating Inorganic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations & CRDL Analyses
- Blanks
- ICP Interference Check Sample
- Matrix Spike Analysis
- Matrix Duplicate Analysis
- Laboratory Control Sample Analysis
- ICP Serial Dilution Analysis
- Instrument Detection Limits
- Field Duplicate Results
- Sample Results

DATA COMPLETENESS

Matrix spike recoveries for lead and manganese were outside the control limits. The reported sample data were not qualified "N" by the laboratory. The corresponding form Is and form V should be corrected and resubmitted.

The copy of the raw data for ICP analysis was illegible.

HOLDING TIME

All samples were digested/analyzed within the requirements established in the method.

CALIBRATIONS & CRDL Analyses

The recoveries for all analytes in the initial and continuing calibrations were within the control limits of 90-110%.

The CRDL sample analysis was performed prior and after all samples analysis. The %recoveries were within the control limits with the exception of Se(71.4%) in final CRDL and Zn (76.2//74.7). The positive results and non-detected values were qualified estimated.

BLANKS

The laboratory preparation blank, ICB and CCBs were free of target analyte at levels above the CRDLs.

ICP INTERFERENCE CHECK SAMPLE

The recoveries for all metals were within the control limits with the exception of Sb (120.2/120.5%), and final ICS recoveries for Se (121%) & Tl (128.3%). The reported data for Sb and Se were not impacted since the deviations were marginal. Also, thallium were not detected in the samples. Therefore, the data were not impacted by these outliers.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

Matrix spike analysis was performed on sample SS-62. The spike recoveries were within the control limits with the exception of Sb(47%), Pb (67.7%) and Mn (131.6%). The reported sample data were not flagged with "N" qualifier codes for lead and manganese as required by the method. Consequently, the analytical post digest spike sample analyses were not performed. Therefore, the matrix interference could not be evaluated. The reported sample results and non-detected values were qualified estimated.

The recoveries for Al and Fe were outside the control limits. However, the data were not impacted since the sample results were above 4x the amount of spike added to the sample.

MATRIX DUPLICATE ANALYSIS

The matrix duplicate analysis was also performed on sample SS-62 for ICP metals and mercury. The RPDs for all analytes were within the analysis control limits with the exception of Al (26.6%), Ca (28.9%) and Mg (38.2%). The data for aluminum and calcium were not qualified since the RPDs were within the data validation control limit of 35%. The positive results for magnesium were qualified estimated.

LABORATORY CONTROL SAMPLE

The recoveries for all analyses were within the control limits established in the soil matrix sample analysis.

ICP SERIAL DILUTION

The %Ds for Ca (10.5%), Cr (10.2%), Cu (15%) and K (17.6%) were above the 10% requirement limit. The reported positive results were qualified estimated for copper and potassium. The data for calcium and chromium were not qualified based on these outliers since the deviations were marginal.

INSTRUMENT DETECTION LIMITS

All analytes with the exception of mercury were analyzed with ICP. The reported IDLs were below the CRDL.

DUPLICATE ANALYSIS

Duplicate analysis was analyzed on sample SS-62/DUP. The RPDs were less than 50%, which indicated satisfactory reproducibility.

SAMPLE RESULTS

All analytes were analyzed at one-fold dilutions. The reported sample results were within the calibration range.

SUMMARY

The cooler temperature was not reported on the chain-of-custody. Overall, major problems were not encountered during the sample analyses. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

1. Appendix A- Glossary of Data Qualifier
2. Appendix B- Data Summary Forms
3. Appendix C- Laboratory Results (Form I)
4. Appendix D - Support Documentation /Resubmission (if applicable)

Appendix A
Glossary of Data Qualifier

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U	=	NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]
R	=	UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.
N	=	NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J	=	ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.
UJ	=	ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q	=	NO ANALYTICAL RESULT.

Appendix B
Data Summary Forms

ANALYTICAL ASSURANCE ASSOCIATES (A3)
METAL SOIL ANALYSIS
mg/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-0012A
SDG NO.: A0012

CLIENT SAMPLE ID:			SS-62	DUP
LAB SAMPLE ID:			990012A-06	990012A-07
% SOLID:			76.6	77

TARGET COMPOUNDS:

	IDL			
Aluminum	15	P	11000	10200
Antimony	4	P	UJ	UJ
Arsenic	3	P	5	6.4
Barium	1	P	46	49.3
Beryllium	1	P	0.5	0.49
Cadmium	1	P	1	1.4
Calcium	31	P	46100	53100
Chromium	1	P	14.9	12.9
Cobalt	2	P	5	5
Copper	1	P	17.6 J	17.7 J
Iron	10	P	16500	18800
Lead	2	P	15.4 J	15.9 J
Magnesium	5	P	24900 J	30600 J
Manganese	1	P	348 J	361 J
Mercury	0.1	CV	0.04	
Nickel	6	P	12.9	13
Potassium	25	P	1900 J	1320 J
Selenium	1	P	UJ	0.8 J
Silver	1	P		
Sodium	49	P	154	148
Thallium	5	P		
Vanadium	1	P	19.9	20.3
Zinc	1	P	76.2 J	70.8 J

Appendix C
Laboratory Reported Results

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

DUP

Lab Name: STL Contract: ______

Lab Code: STL Case No.: 0012A SAS No.: ______ SDG No.: A0012

Matrix (soil/water): SOIL Lab Sample ID: 990012A-07

Level (low/med): LOW Date Received: 01/06/99

% Solids: 77

Concentration Units (ug/L or mg/kg dry weight): Mg/Kg

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	10200		*	P	
7440-36-0	Antimony	0.73	U	N	P	
7440-38-2	Arsenic	6.4			P	
7440-39-3	Barium	49.3			P	
7440-41-7	Beryllium	0.49	B		P	
7440-43-9	Cadmium	1.4			P	
7440-70-2	Calcium	53100		*E	P	
7440-47-3	Chromium	12.9		E	P	
7440-48-4	Cobalt	5.0	B		P	
7440-50-8	Copper	17.7		E	P	
7439-89-6	Iron	18800			P	
7439-92-1	Lead	15.9		N	P	Z-H
7439-95-4	Magnesium	30600		*	P	
7439-96-5	Manganese	361.		N	P	ZM
7439-97-6	Mercury	0.052	U		CV	
7440-02-0	Nickel	13.0			P	
7440-09-7	Potassium	1320		E	P	
7782-49-2	Selenium	0.80	B		P	
7440-22-4	Silver	0.18	U		P	
7440-23-5	Sodium	148.	B		P	
7440-28-0	Thallium	0.91	U		P	
7440-62-2	Vanadium	20.3			P	
7440-66-6	Zinc	70.8			P	
57-12-5	Cyanide				NR	

Color Before: BROWN Clarity Before: OPAQUE Texture: ______

Color After: YELLOW Clarity After: CLEAR Artifacts: ______

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SS-62

Lab Name: STL Contract:

Lab Code: STL Case No.: 0012A SAS No.: SDG No.: A0012

Matrix (soil/water): SOIL Lab Sample ID: 990012A-06

Level (low/med): LOW Date Received: 01/06/99

% Solids: 76.6

Concentration Units (ug/L or mg/kg dry weight): Mg/Kg

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11000		*	P
7440-36-0	Antimony	0.85	U	N	P
7440-38-2	Arsenic	5.0			P
7440-39-3	Barium	46.0			P
7440-41-7	Beryllium	0.50	B		P
7440-43-9	Cadmium	1.0	B		P
7440-70-2	Calcium	46100		*E	P
7440-47-3	Chromium	14.9		E	P
7440-48-4	Cobalt	5.0	B		P
7440-50-8	Copper	17.6		E	P
7439-89-6	Iron	16500			P
7439-92-1	Lead	15.4		N	P ZH
7439-95-4	Magnesium	24900		*	P
7439-96-5	Manganese	348.		N	P ZH
7439-97-6	Mercury	0.040	B		CV
7440-02-0	Nickel	12.9			P
7440-09-7	Potassium	1900		E	P
7782-49-2	Selenium	0.64	U		P
7440-22-4	Silver	0.21	U		P
7440-23-5	Sodium	154.	B		P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	19.9			P
7440-66-6	Zinc	76.2			P
57-12-5	Cyanide				NR

Color Before: BROWN Clarity Before: OPAQUE Texture:

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

Appendix D
Support Documentation/Resubmission

END OF DATA PACKAGE

Analytical Assurance Associates, Inc.
600 Rock Raymond Road
Downingtown, PA 19335
Phone: 610 - 269 - 9989
Fax: 610 - 269 - 9989

ORGANIC ANALYSIS
QUALITY ASSURANCE DATA REVIEW

STEARNS & WHELER, LLC

SITE: ROBLIN STEEL
CASE NO.: 7099-0012A/ SDG NO.: A0012

REPORTED BY:
ANALYTICAL ASSURANCE ASSOCIATES (A^3)
600 ROCK RAYMOND ROAD
DOWNINGTOWN, PA 19335

REVIEWED BY:
ZOHREH HAMID, Ph.D.
FEBRUARY 22, 1999

STEARNS & WHELER
SITE NAME: ROBLIN STEEL
CASE NO.:7099-00012A/SDG NO.: A0012

INTRODUCTION

This quality assurance report is provided based upon a review of all data generated from five (5) water samples and two soil samples collected on 01-05-99 and received by Severn Trent Laboratories on 01-06-99. Samples were analyzed for volatile target compounds according to criteria set forth in USEPA CLP OLM3.1. In addition, two soil samples were analyzed for Poly Aromatic Hydrocarbons (PAH) and PCB fractions based on NYSDEC' 95 and USEPA OLM03.1 protocols respectively.

The following samples are contained within this report:

GW-13	GW-17S	SS-62	TB
GW-5S	DUP-3	DUP	

The QC (MS/MSD) analyses was performed on samples GW-17S and SS-62 for water and soil samples respectively.

All data have been validated with regard to usability according to the quality assurance set forth in NYSDEC ASP for Evaluating Organic analyses. If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 269-9989.

QUALITY ASSURANCE REVIEW

The finding offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Times
- Calibrations
- Blanks
- Surrogate Recoveries
- Internal Standards Recovery
- Matrix Spike/Spike Duplicate/Blank Spike Analyses
- Instrument Performance
- Field Duplicate Results
- Sample Results

DATA COMPLETENESS

The data package completeness was satisfactory.

HOLDING TIME

All volatile samples were analyzed within 5-days from VTSR based on the NYSDEC requirements. Also, the PAH and PCB sample were extracted within 5-days and analyzed within 40-days from VTSR.

CALIBRATION

Volatile
The response factors were within the data validation requirement limit of 0.05 in all calibrations. The following %RSDs and %Ds were above 30% and 25% in the initial and continuing calibrations respectively.

Compound Name	IC 12-14-98	CC 12-20-98 @ 10:53
Acetone	38.2	
2-Hexanone		26.7
Associated Samples:	Soil Samples	Soil Samples

IC= Initial Calibration
CC= Continuing Calibration

The reported sample results and not detected values were qualified "J" & "UJ" in the corresponding samples. The results for acetone were qualified "U" due to the laboratory blank. The results were also qualified estimated based on the RSD outlier.

PAH
All RSDs, %Ds and response factors were within the control limits in both initial and continuing calibrations for the PAH compounds with the exception of %Ds for indeno(1,2,3-cd) pyrene (27.3%) and benzo(g,h,I)perylene (30.8%). The reported sample results and non-detected values were qualified estimated.

BLANKS

Volatile
The water laboratory blank and trip blank were free of target and non-target compounds. The laboratory soil blank contained methylene chloride, acetone and 2-butanone at levels below the CRQLs. The reported sample results up to 10 times the CRQLs were qualified "U" and considered as the laboratory artifact.

PAH
The laboratory method blank was free of target compounds. The TICs were not reported for this fraction.

PCB
The laboratory blank was free of target compounds.

SURROGATE RECOVERIES

Volatile
All samples and the corresponding QC samples were spiked with three surrogate compounds as required by the applied methods. The recoveries were within the control limits.

PAH
Sample and the corresponding QC samples were spiked with eight surrogate compounds as recommended by the method. The recoveries were within the control limits.

PCB
Samples and the corresponding QC samples were spiked with two surrogate compounds as recommended by the method. The recoveries within the control limits.

MATRIX SPIKE/SPIKE DUPLICATE ANALYSIS

Volatile
One set of matrix spike/spike duplicate sample analysis was performed for each matrix. The recoveries and RPDs were within the control limits in both matrices.

PAH
Matrix spike analysis was performed on sample SS-62. The recoveries and RPDs were within the control limits.

PCB
Sample SS-62 was analyzed as a QC sample. The recoveries and RPD for the spiking compound (aroclor-1260) were within the control limits.

LABORATORY CONTROL SAMPLE

Volatile
Two LCS samples (soil & water) were analyzed in volatile fraction. The recoveries were within the control limits.

PAH
One blank spike sample was analyzed for this fraction. The recoveries were within the control limits with the exception of 4-nitrophenol (88%) which exceeded the upper control limit of 80%. The reported sample data were not impacted since this compound is not a target compound.

PCB
The laboratory control sample was not analyzed for this fraction.

INTERNAL STANDARD

All internal standard recoveries and retention times were within the control limits established by the laboratory in both volatile and PAH analyses.

DUPLICATE ANALYSIS

Volatile
One set of duplicate analysis was performed for each matrix. Target compounds were not detected at levels above the CRQLs in these samples with the exception of acetone in soil field duplicate analysis (SS-62/DUP). The results for acetone have been qualified "UJ" and considered as non-detected values.

PAH & PCB
Duplicate analysis was performed on samples (SS-62/DUP). Target compounds were not detected at levels above the CRQLs in these samples.

SAMPLE RESULTS

Volatile
All samples were analyzed at one-fold dilutions. The Tentatively Identified Compound (TICs) were not detected in the samples with the exception of one TICs in sample GW-5S and both soil samples.

PAH
Sample for PAH was also analyzed at 1-fold dilution. The target compounds were not detected at levels above CRQLs. The TICs were not searched for this fraction.

PCB
The result for arocolor-1260 was qualified estimated since the %D for the results between two column was above 25%.

SUMMARY

The cooler temperature was not listed on the chain-of-custody. This information must be provided by the laboratory. The sample results below the CRQLs were qualified estimated, due to the uncertainty near the detection limits in the both fractions.

Overall, major analysis problems were not encountered during the sample analyses. The minor issues have been discussed. The reported data were summarized on the data summary with the applied qualifier codes.

1. Appendix A- Glossary of Data Qualifier
2. Appendix B- Data Summary Forms
3. Appendix C- Laboratory Results (Form I)
4. Appendix D - Support Documentation /Resubmission (if applicable)

Appendix A
Glossary of Data Qualifier

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2- butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICCATION.

CODES RELATING TO QUATITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED. THE REPORTED QUATITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

Appendix B
Data Summary Forms

ANALYTICAL ASSURANCE ASSOCIATES (A3)
VOLATILE WATER ANALYSIS
ug/L

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-0012A
SDG NO.: A0012

CLIENT SAMPLE ID:		TB	GW-13	GW-5S	GW-17S	DUP-3
LAB SAMPLE ID:		990012A-01	990012A-02	990012A-03	990012A-04	990012A-05
DILUTION FACTOR:		1.0	1.0	1.0	1.0	1.0
TARGET COMPOUNDS:	CRQL					
Chloromethane	10					
Bromomethane	10					
Vinyl Chloride	10					
Chloroethane	10					
Methylene Chloride	10					
Acetone	10					
Carbon Disulfide	10					1 J
1,1-Dichloroethene	10					
1,1-Dichloroethane	10					
1,2-Dichloroethene (total)	10					
Chloroform	10					
1,2-Dichloroethane	10					
2-Butanone	10					
1,1,1-Trichloroethane	10					
Carbon Tetrachloride	10					
Bromodichloromethane	10					
1,2-Dichloropropane	10					
cis-1,3-Dichloropropene	10					
Trichloroethene	10					
Dibromochloromethane	10					
1,1,2-Trichloroethane	10					
Benzene	10					
Trans-1,3-Dichloropropene	10					
Bromoform	10					
4-Methyl-2-pentanone	10					
2-Hexanone	10					
Tetrachloroethene	10					
1,1,2,2-Tetrachloroethane	10					
Toluene	10					
Chlorobenzene	10					
Ethylbenzene	10					
Styrene	10					
Xylene (total)	10					

ANALYTICAL ASSURANCE ASSOCIATES (A3)
VOLATILE SOIL ANALYSIS
ug/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-0012A
SDG NO.: A0012

CLIENT SAMPLE ID:		SS-62	DUP
LAB SAMPLE ID:		990012A-06	990012A-07
% MOISTURE:		15	17
DILUTION FACTOR:		1.0	1.0

TARGET COMPOUNDS:

	CRQL		
Chloromethane	10		
Bromomethane	10		
Vinyl Chloride	10		
Chloroethane	10		
Methylene Chloride	10	1 U	2 U
Acetone	10	31 U	24 U
Carbon Disulfide	10		
1,1-Dichloroethene	10		
1,1-Dichloroethane	10		
1,2-Dichloroethene (total)	10		
Chloroform	10		
1,2-Dichloroethane	10		
2-Butanone	10	4 U	3 U
1,1,1-Trichloroethane	10		
Carbon Tetrachloride	10		
Bromodichloromethane	10		
1,2-Dichloropropane	10		
cis-1,3-Dichloropropene	10		
Trichloroethene	10		
Dibromochloromethane	10		
1,1,2-Trichloroethane	10		
Benzene	10		
Trans-1,3-Dichloropropene	10		
Bromoform	10		
4-Methyl-2-pentanone	10		
2-Hexanone	10	UJ	UJ
Tetrachloroethene	10		
1,1,2,2-Tetrachloroethane	10		
Toluene	10		
Chlorobenzene	10		
Ethylbenzene	10		
Styrene	10		
Xylene (total)	10		

ANALYTICAL ASSURANCE ASSOCIATES (A3)
SEMIVOLATILE SOIL ANALYSIS
ug/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-0012A
SDG NO.: A0012

CLIENT SAMPLE ID:		SS-62	DUP
LAB SAMPLE ID:		990012A-06	990012A-07
% MOISTURE:		23	23
DILUTION FACTOR:		1.0	1.0

TARGET COMPOUNDS:

	CRQL		
Naphthalene	330		
2-Methylnaphthalene	330		
Acenaphthylene	330		5 J
Acenaphthene	330		
Fluorene	330		
Phenanthrene	330	16 J	22 J
Anthracene	330		4 J
Fluoranthene	330	34 J	53 J
Pyrene	330	28 J	42 J
Benzo(a)anthracene	330	12 J	23 J
Chrysene	330	20 J	32 J
Benzo(b)fluoranthene	330	17 J	26 J
Benzo(k)fluoranthene	330	19 J	29 J
Benzo(a)pyrene	330	14 J	24 J
Indeno(1,2,3-cd)pyrene	330	12 J	15 J
Dibenzo(a,h)anthracene	330		6 J
Benzo(g,h,i)perylene	330	11 J	19 J

ANALYTICAL ASSURANCE ASSOCIATES (A3)
PESTICIDE SOIL ANALYSIS
ug/Kg

CLIENT: STEARNS & WHELER
LABORATORY NAME: STL/CT
STL ID: 7099-0012A
SDG NO.: A0012

CLIENT SAMPLE ID:		SS-62	DUP
LAB SAMPLE ID:		990012A-06	990012A-07
% MOISTURE:		21	24
DILUTION FACTOR:		1.0	1.0

TARGET COMPOUNDS:

	CRQL		
Aroclor-1016	33		
Aroclor-1221	67		
Aroclor-1232	33		
Aroclor-1242	33		
Aroclor-1248	33		
Aroclor-1254	33		
Aroclor-1260	33	13 J	8.5 J

Appendix C
Laboratory Reported Results

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

TB

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 0012A SAS No.: ______ SDG No.: A0012

Matrix: (soil/water) WATER Lab Sample ID: 990012A-01

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L2545

Level: (low/med) LOW Date Received: 01/06/99

% Moisture: not dec. _______ Date Analyzed: 01/08/99

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ________(uL) Soil Aliquot Volume: ____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

GW-13

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 0012A SAS No.: ______ SDG No.: A0012

Matrix: (soil/water) WATER Lab Sample ID: 990012A-02

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L2546

Level: (low/med) LOW Date Received: 01/06/99

% Moisture: not dec. ______ Date Analyzed: 01/08/99

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ________(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

GW-5S

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 0012A SAS No.: ______ SDG No.: A0012

Matrix: (soil/water) WATER Lab Sample ID: 990012A-03

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L2547

Level: (low/med) LOW Date Received: 01/06/99

% Moisture: not dec. _______ Date Analyzed: 01/08/99

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ________(uL) Soil Aliquot Volume: _____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

GW-17S

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 0012A SAS No.: ______ SDG No.: A0012

Matrix: (soil/water) WATER Lab Sample ID: 990012A-04

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L2548

Level: (low/med) LOW Date Received: 01/06/99

% Moisture: not dec. ______ Date Analyzed: 01/08/99

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ________(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochlorometha e	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

DUP-3

Lab Name: STL/CT Contract: ______

Lab Code: IEACT Case No.: 0012A SAS No.: ______ SDG No.: A0012

Matrix: (soil/water) WATER Lab Sample ID: 990012A-05

Sample wt/vol: 5 (g/mL) ML Lab File ID: >L2549

Level: (low/med) LOW Date Received: 01/06/99

% Moisture: not dec. ______ Date Analyzed: 01/08/99

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ______ (uL) Soil Aliquot Volume: ______ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	1	J
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene (total)	10	U

1A
NYSDEC SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

SS-62

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 0012A SAS No.: ______ SDG No.: A0012

Matrix: (soil/water) SOIL Lab Sample ID: 990012A-06

Sample wt/vol: 5 (g/mL) G Lab File ID: >K2316

Level: (low/med) LOW Date Received: 01/06/99

% Moisture: not dec. 15 Date Analyzed: 01/12/99

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ________ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	1	JB
67-64-1	Acetone	31	B
75-15-0	Carbon Disulfide	12	U
75-35-4	1,1-Dichloroethene	12	U
75-34-3	1,1-Dichloroethane	12	U
540-59-0	1,2-Dichloroethene (total)	12	U
67-66-3	Chloroform	12	U
107-06-2	1,2-Dichloroethane	12	U
78-93-3	2-Butanone	4	JB
71-55-6	1,1,1-Trichloroethane	12	U
56-23-5	Carbon Tetrachloride	12	U
75-27-4	Bromodichloromethane	12	U
78-87-5	1,2-Dichloropropane	12	U
10061-01-5	cis-1,3-Dichloropropene	12	U
79-01-6	Trichloroethene	12	U
124-48-1	Dibromochloromethane	12	U
79-00-5	1,1,2-Trichloroethane	12	U
71-43-2	Benzene	12	U
10061-02-6	trans-1,3-Dichloropropene	12	U
75-25-2	Bromoform	12	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	12	U
79-34-5	1,1,2,2-Tetrachloroethane	12	U
108-88-3	Toluene	12	U
108-90-7	Chlorobenzene	12	U
100-41-4	Ethylbenzene	12	U
100-42-5	Styrene	12	U
1330-20-7	Xylene (total)	12	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

DUP

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 0012A SAS No.: ______ SDG No.: A0012

Matrix: (soil/water) SOIL Lab Sample ID: 990012A-07

Sample wt/vol: 5 (g/mL) G Lab File ID: >K2317

Level: (low/med) LOW Date Received: 01/06/99

% Moisture: not dec. 17 Date Analyzed: 01/12/99

GC Column: 007-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: ________ (uL) Soil Aliquot Volume: ____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	2	JB
67-64-1	Acetone	24	B
75-15-0	Carbon Disulfide	12	U
75-35-4	1,1-Dichloroethene	12	U
75-34-3	1,1-Dichloroethane	12	U
540-59-0	1,2-Dichloroethene (total)	12	U
67-66-3	Chloroform	12	U
107-06-2	1,2-Dichloroethane	12	U
78-93-3	2-Butanone	3	JB
71-55-6	1,1,1-Trichloroethane	12	U
56-23-5	Carbon Tetrachloride	12	U
75-27-4	Bromodichloromethane	12	U
78-87-5	1,2-Dichloropropane	12	U
10061-01-5	cis-1,3-Dichloropropene	12	U
79-01-6	Trichloroethene	12	U
124-48-1	Dibromochloromethane	12	U
79-00-5	1,1,2-Trichloroethane	12	U
71-43-2	Benzene	12	U
10061-02-6	trans-1,3-Dichloropropene	12	U
75-25-2	Bromoform	12	U
108-10-1	4-Methyl-2-Pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	12	U
79-34-5	1,1,2,2-Tetrachloroethane	12	U
108-88-3	Toluene	12	U
108-90-7	Chlorobenzene	12	U
100-41-4	Ethylbenzene	12	U
100-42-5	Styrene	12	U
1330-20-7	Xylene (total)	12	U

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS-62

Lab Name: STL/CT Contract: ____________

Lab Code: IEACT Case No.: 0012A SAS No.: _____ SDG No.: A0012

Matrix: (soil/water) SOIL Lab Sample ID: 990012A-06

Sample wt/vol: 30 (g/mL) G Lab File ID: >R1884

Level: (low/med) LOW Date Received: 01/06/99

% Moisture: 23 decanted: (Y/N) N Date Extracted: 01/15/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 01/25/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.4

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
91-20-3	Naphthalene	430	U
91-57-6	2-Methylnaphthalene	430	U
208-96-8	Acenaphthylene	430	U
83-32-9	Acenaphthene	430	U
86-73-7	Fluorene	430	U
85-01-8	Phenanthrene	16	J
120-12-7	Anthracene	430	U
206-44-0	Fluoranthene	34	J
129-00-0	Pyrene	28	J
56-55-3	Benzo(a)anthracene	12	J
218-01-9	Chrysene	20	J
205-99-2	Benzo(b)fluoranthene	17	J
207-08-9	Benzo(k)fluoranthene	19	J
50-32-8	Benzo(a)pyrene	14	J
193-39-5	Indeno(1,2,3-cd)pyrene	12	J
53-70-3	Dibenzo(a,h)anthracene	430	U
191-24-2	Benzo(g,h,i)perylene	11	J

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DUP

Lab Name: STL/CT   Contract: ______

Lab Code: IEACT   Case No.: 0012A   SAS No.: ______   SDG No.: A0012

Matrix: (soil/water) SOIL   Lab Sample ID: 990012A-07

Sample wt/vol: 30 (g/mL) G   Lab File ID: >R1888

Level: (low/med) LOW   Date Received: 01/06/99

% Moisture: 23   decanted: (Y/N) N   Date Extracted: 01/15/99

Concentrated Extract Volume: 500 (uL)   Date Analyzed: 01/25/99

Injection Volume: 2.0 (uL)   Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y   pH: 7.6

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
91-20-3	Naphthalene	430	U
91-57-6	2-Methylnaphthalene	430	U
208-96-8	Acenaphthylene	5	J
83-32-9	Acenaphthene	430	U
86-73-7	Fluorene	430	U
85-01-8	Phenanthrene	22	J
120-12-7	Anthracene	4	J
206-44-0	Fluoranthene	53	J
129-00-0	Pyrene	42	J
56-55-3	Benzo(a)anthracene	23	J
218-01-9	Chrysene	32	J
205-99-2	Benzo(b)fluoranthene	26	J
207-08-9	Benzo(k)fluoranthene	29	J
50-32-8	Benzo(a)pyrene	24	J
193-39-5	Indeno(1,2,3-cd)pyrene	15	J
53-70-3	Dibenzo(a,h)[illegible]hracene	6	J
191-24-2	Benzo(g,h,i)[illegible]ylene	19	J

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS-62

Lab Name: STL-CT Contract: ____

Lab Code: IEACT Case No.: 0012A SAS No.: ____ SDG No.: A0012

Matrix: (soil/water): SOIL Lab Sample ID: 990012A-06

Sample wt/vol: 30 (g/ml) G Lab File ID: C1013CLP390

% Moisture: 21 decanted: (Y/N) N Date Received: 01/06/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 01/06/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 01/25/99

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.8 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
12674-11-2	Aroclor-1016	42.	U
11104-28-2	Aroclor-1221	85.	U
11141-16-5	Aroclor-1232	42.	U
53469-21-9	Aroclor-1242	42.	U
12672-29-6	Aroclor-1248	42.	U
11097-69-1	Aroclor-1254	42.	U
11096-82-5	Aroclor-1260	13.	JP

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DUP

Lab Name: STL-CT Contract: ______

Lab Code: IEACT Case No.: 0012A SAS No.: ______ SDG No.: A0012

Matrix: (soil/water): SOIL Lab Sample ID: 990012A-07

Sample wt/vol: 30 (g/ml) G Lab File ID: C1013CLP393

% Moisture: 24 decanted: (Y/N) N Date Received: 01/06/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 01/06/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 01/26/99

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.5 Sulfur Cleanup: (Y/N) N

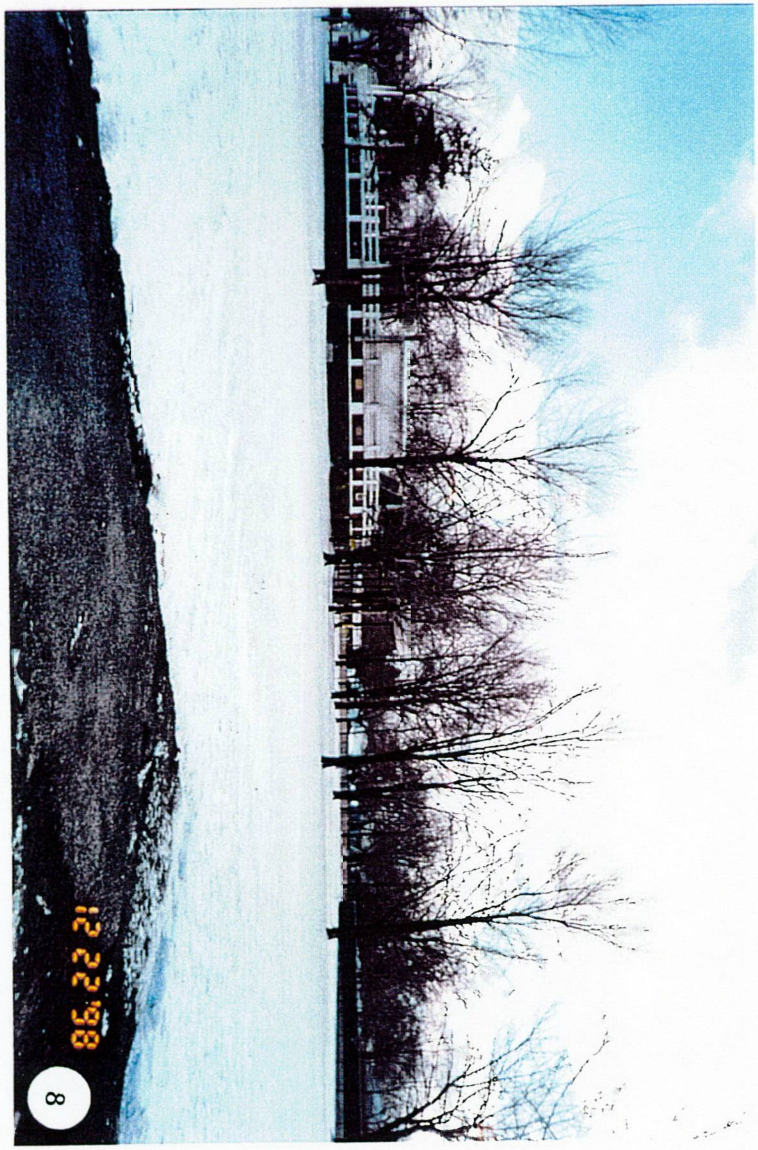
CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
12674-11-2	Aroclor-1016	43.	U
11104-28-2	Aroclor-1221	88.	U
11141-16-5	Aroclor-1232	43.	U
53469-21-9	Aroclor-1242	43.	U
12672-29-6	Aroclor-1248	43.	U
11097-69-1	Aroclor-1254	43.	U
11096-82-5	Aroclor-1260	8.5	J

Appendix D
Support Documentation/Resubmission

END OF DATA PACKAGE

APPENDIX E

FISH AND WILDLIFE IMPACT FIGURES



ROBLIN STEEL SITE FISH & WILDLIFE IMPACT ANALYSIS

SITE PHOTOGRAPHS

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