



## **SITE INVESTIGATION OF EXISTING CONDITIONS**

**FORMER GUELPH GAS WORKS  
FOUNTAIN STREET  
GUELPH, ONTARIO**

**Prepared For:  
City of Guelph**

**E**



THE CITY OF  
**Guelph**

ENVIRONMENTAL  
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DEPARTMENT  
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## **SITE INVESTIGATION OF EXISTING CONDITIONS**

**FORMER GUELPH GAS WORKS  
FOUNTAIN STREET  
GUELPH, ONTARIO**

**Prepared For:  
City of Guelph**

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## 1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) was retained by the City of Guelph to conduct an environmental investigation of existing conditions at the former Guelph Gas Works, located on Fountain Street in Guelph, Ontario (Site). A Site plan is included on Figure 1. The Site is currently used by the City of Guelph as a parking lot.

This report summarizes the environmental investigation activities conducted at the Site and presents all field and analytical data generated therefrom.

### Background

From 1871 to 1957 a small manufactured gas plant was located on the north half of the block bounded by Wyndham Street South, Surrey Street East, Gordon Street, and Fountain Street East. The plant manufactured a combustible gas from coal and coke. The gas was distributed to customers in underground pipes and was used for lighting, cooking, and heating. When natural gas became available, manufactured gas was phased out of use and the manufactured gas plant was demolished.

A by-product from gas production is coal tar. Coal tar may have leaked or spilled during the operation of the plant. Soil from excavations at the Site and from adjacent properties has been reported to have a "coal tar like" odor. Some test samples of soil have chemical constituents that could have come from coal tar.

The purpose of this environmental investigation was to assess the existing conditions at the Site and to assess the potential for off-Site receptors to exist adjacent to the Site.

## 2.0 SUMMARY OF WORK COMPLETED

The following investigative activities were completed at the Site:

1. preparation of a Health & Safety Plan (HASP);
2. development of a Communication Plan with the City of Guelph;
3. physical survey of buildings within the study area;
4. inspection and elevation survey of existing monitoring wells;
5. inspection of downgradient storm sewer outfalls;
6. groundwater, surface water and sediment sampling and analysis including analytical data assessment;
7. preparation of a scope of work and cost estimate to conduct Site characterization and delineation activities; and
8. reporting.

Results from completion of the above tasks are presented in the following sections of this report.

### 3.0 INVESTIGATION RESULTS

#### 3.1 PHYSICAL SURVEY

A physical survey of 14 downgradient buildings was conducted to investigate sub-surface features (if any) and identify potential migration and/or exposure pathways for coal tar residuals. The survey was completed with a representative of the building owner or occupant. The following items were checked during the Physical Survey:

- presence of groundwater wells;
- presence of sump pits in basements;
- conditions of basement floors and walls;
- evidence of previous water or contaminant problems;
- use of basements;
- photoionization detector (PID) readings measuring undifferentiated organic vapours in basements or other enclosed spaces; and
- relative elevations of below grade floors.

A Household Information Questionnaire was completed at each available downgradient building. The results of the physical survey are summarized in Table 1. Building locations are presented on Figure 1. A copy of the Household Information Questionnaires are included in Appendix A.

No evidence of potential off-Site impact was observed by CRA, or reported by the owner/occupant during the physical surveys, with the exception of the Schnurr Electric Co. Ltd. property, located at 64 Gordon Street. A black sediment was observed to be present at the base of two sumps located in the basement of this building. No visual evidence of impact to the water in the sumps was observed during the inspection. PID readings at these locations were 0.0 parts per million (ppm). Mr. Paul Schnurr indicated that black, oily soil exhibiting an undefined odour was encountered on his property to the north of the building during a re-paving event a few years ago.



## 3.2 GROUNDWATER

### Monitoring Well Inspection and Survey

The on-Site groundwater monitoring wells were installed by Environmental Strategies Limited, in July 1988. Monitoring wells BH1, BH3, BH5, BH6, and BH6D were located in the field, however monitoring wells BH7, BH7D, and BH8 could not be located. Monitoring wells were not installed at locations BH2 and BH4. It is assumed that the missing monitoring wells were covered over during on-Site re-paving activities. All of the located monitoring wells were found to be in good repair with the exception of the riser pipe caps at each monitoring well location. At monitoring well locations BH5, BH6D, and BH1 the aluminum and rubber well cap had deteriorated and only the rubber cap remained functional. At monitoring well locations BH3 and BH6 the riser pipe cap was missing.

The elevations of the existing groundwater monitoring wells were re-surveyed to aid in the hydrogeological characterization of the Site and surrounding properties. Depth to bottom measurements indicate that the wells are consistent with their original depth and have not filled with silt size particles. The results of the inspection and survey of the monitoring wells are included in Table 2. Monitoring well BH3 was found to be dry. The measured groundwater elevations are consistent with shallow groundwater flow to the southeast, toward Speed River.

The vertical gradient measured between BH6 and BH6D indicates a downward gradient.

### Monitoring Well Development and Sampling

All groundwater monitoring wells were developed using dedicated Waterra™ inertial pump systems by removing a minimum of three well volumes of groundwater, or purging until dry, to ensure that the groundwater samples collected were representative of local groundwater conditions. Measurements of groundwater pH, conductivity, and temperature were recorded between consecutive well volumes in order to observe the stabilization of the groundwater conditions (an indication that the groundwater in the well is representative of true groundwater conditions). Once the development of the monitoring wells was completed, groundwater samples were collected using dedicated Waterra™ inertial pump systems. No field evidence of impact (e.g., sheen or odour) was noted during the groundwater sampling activities.

A quality assurance/quality control (QA/QC) program was implemented at the time of sample collection. The following QA/QC samples were collected:

- Field Duplicate - one field duplicate was collected by filling two sample containers from the same sampling location at the same time.
- Field Blanks - one field blank was collected in the field by filling sample containers with laboratory-supplied deionized water.

Groundwater samples were placed directly into laboratory supplied containers and submitted under chain-of-custody protocol to Maxxam Analytics Inc. of Mississauga, Ontario for chemical analysis for select parameters that included volatile organic compounds (VOCs), phenolics, polycyclic aromatic hydrocarbons (PAHs), metals, arsenic, and cyanide.

#### Groundwater Quality Results

Upon receipt of the analytical data generated from samples collected during the investigation activities, CRA completed an analytical data review to assess the accuracy and the reliability of the data. A copy of the Data Quality Assessment and Validation memo is included in Appendix B.

The laboratory analytical data were assessed with respect to the Ontario Ministry of the Environment (MOE) document entitled *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, dated March 9, 2004 (MOE Standards). The data were assessed with respect to the groundwater standards contained in *Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition* (MOE Table 2), as the City of Guelph and the MOE deem groundwater in the area to be a potential source of potable water. The analytical data generated from the groundwater samples are summarized in Table 3 along with the MOE Table 2 standards for comparative reference. A copy of the laboratory analytical report for the groundwater samples is included in Appendix C.

The groundwater data is summarized as follows:

- Groundwater from monitoring well locations BH1, BH5, BH6, and BH6D was analyzed for VOCs. VOCs were not detected at these monitoring well locations, with the exception of trace detections of chloroform at monitoring well locations BH1, BH6, and BH6D and trihalomethanes at BH6D. The concentrations of chloroform at these locations were measured at concentrations below the MOE

Table 2 standards. MOE Table 2 does not contain standards for trihalomethanes. Manufactured gas plants (MGPs) are not normally a source of halogenated compounds. The presence of these compounds should not be attributed to the former MGP.

- Groundwater from monitoring wells BH5, BH6, and BH6D was analyzed for phenolics. Phenolics were not detected at these monitoring well locations.
- Groundwater from monitoring well locations BH5, BH6, and BH6D was analyzed for PAHs. PAHs were either not detected, or detected at concentrations below the applicable MOE Table 2 standards at monitoring well locations BH6 and BH6D with the exception of benzo(a)pyrene at BH6 and benzo(a)anthracene at BH6D. PAHs at monitoring well location BH5 were detected at concentrations below the applicable MOE Table 2 standards, with the exception of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene.
- Groundwater from monitoring well locations BH5, BH6, and BH6D was analyzed for metals. Metals were either not detected, or detected at concentrations below the applicable MOE Table 2 standards at these monitoring well locations, with the exception of sodium at monitoring well locations BH5, BH6, and BH6D and thallium at monitoring well locations BH5 and BH6.
- Groundwater from monitoring well locations BH5, BH6, and BH6D was analyzed for arsenic. Arsenic was not detected at monitoring well locations BH6 and BH6D. Arsenic was detected at a concentration above the MOE Table 2 standard at monitoring well location BH5.
- Groundwater from monitoring well locations BH5, BH6, and BH6D was analyzed for cyanide. Cyanide was detected at a concentration above the MOE Table 2 standard at monitoring well locations BH5, BH6, and BH6D.

### 3.3 SURFACE WATER

CRA obtained storm sewer plans from the City of Guelph to identify the storm sewer locations, flow directions, and Speed River outfall locations. Based on a review of the storm sewer plans, CRA identified two storm sewer outfalls that either historically or currently drained storm water from the Site, or may have been impacted by the Site.

### Historical Storm Water Management

An abandoned 225-millimetre diameter storm sewer is located along Surrey street and based on its configuration and sloping, it appears to have historically drained stormwater from the Site. The abandoned storm sewer continued north along Surrey Street to Wyndham Street South and extended east to Wellington Street and the Speed River. The configuration of the storm sewer between Wellington Street East and the Speed River could not be determined, but it is likely that the storm sewer outfall has been abandoned and/or removed.

A 600-millimetre diameter storm sewer currently flows along Wyndham Street South adjacent to the abandoned 225-millimetre storm sewer. The 600-millimetre diameter storm sewer discharges to the Speed River approximately 60 metres south of the Wyndham Street South bridge as a 900-millimetre outfall. According to the Environmental Strategies Limited report entitled *Guelph Gas Works Study*, dated July 1988, coal tar was found in the sewer bedding beneath the 600-millimetre storm sewer. This outfall was sampled as it represents a potential pathway for coal tar residues from the Site to the Speed River.

### Current Storm Water Management

Storm water is currently collected at the Site by overland flow draining to three on-Site catchbasins. The catchbasins are connected to a 300-millimetre diameter storm sewer that flows to the south along Surrey Street. The storm sewer connects with a 450-millimetre storm sewer at Gordon Street and flows to the east along Gordon Street as a 675-millimetre sewer to Wellington Street. The storm sewer drains into a 1,050-millimetre storm sewer flowing south under Wellington Street. The storm sewer is reduced to a 900-millimetre sewer along Wellington Street before it is discharged to the Speed River to the west of the Speed River dam.

### Storm Sewer Outfall Inspection

The downgradient storm sewer outfalls to the Speed River were inspected for sediment and visual evidence of impact. In addition, one upgradient storm sewer outfall was inspected to establish background conditions. The upgradient outfall location was located approximately 75 metres north of the Wyndham Street South bridge.

The upgradient outfall was found to be dry at the time of inspection. No sediment or debris was observed within the outfall. The sediment located beneath the outfall was

observed to be dark brown coarse sand with gravel and stones. The sediment exhibited a "swamp-like" odour. No visual or olfactory evidence of coal tar impact was observed.

The Wyndham Street outfall was found to be dry at the time of inspection. No sediment or debris was observed within the outfall. The sediment located beneath the outfall was observed to be black coarse sand with gravel and stones. The sediment exhibited a "swamp-like" odour. No visual or olfactory evidence of coal tar impact was observed.

The Wellington Street outfall was found to be dry at the time of inspection. The outfall contained dark brown, moist gravel and sand as well as some debris (carpet). The sediment exhibited a "swamp-like" odour. No visual or olfactory evidence of coal tar impact was observed.

Sediment and surface water samples were collected from beneath the upgradient outfall and the Wyndham Street outfall, and a sediment sample was collected from the sediment contained within the Wellington Street outfall. Sediment and surface water samples were placed directly into laboratory supplied containers and submitted under chain-of-custody protocol to Maxxam Analytics Inc. of Mississauga, Ontario for chemical analysis for VOCs, phenolics, PAHs, metals, arsenic, and cyanide.

#### Sediment Quality Results

The laboratory analytical data were assessed with respect to the MOE Table 2 sediment standards. The analytical data generated from the groundwater samples are summarized in Table 4 along with the MOE Table 2 standards for comparative reference. A copy of the laboratory analytical report for the sediment samples is included in Appendix C.

The sediment data is summarized as follows:

- VOCs were not detected in sediment at the outfall locations with the exception of toluene at the upgradient outfall. Toluene was detected at a concentration of 0.048 µg/g at this location. MOE Table 2 does not contain standards for VOCs.
- Phenolics were not detected at the outfall locations.
- PAHs were either not detected, or detected at concentrations below the applicable Table 2 standards at the upgradient outfall. PAHs in sediment collected from the Wyndham Street outfall were either not detected, or detected at concentrations below the applicable Table 2 standards, with the exception of anthracene, benzo(a)anthracene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene,

dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. PAHs in sediment collected from the Wellington Street outfall were detected at concentrations above the applicable Table 2 standards for anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluorene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. Acenaphthene, acenaphthylene, benzo(b)fluoranthene, and naphthalene were also detected at this location, however MOE Table 2 standards are not available for these parameters.

- Metals were either not detected, or detected at concentrations below the applicable Table 2 standards at the outfall locations, with the exception of cadmium, chromium (upgradient location only), copper, lead, and zinc.
- Arsenic was detected at concentrations below the MOE Table 2 standard at the upgradient and Wellington Street outfalls. Arsenic was detected above the MOE Table 2 standard at the Wyndham Street outfall.
- Cyanide was not detected at the outfall locations.

#### Surface Water Quality Results

The laboratory analytical data were assessed with respect to document entitled *Water Management Policies, Guidelines, Provincial Water Quality Objectives of the Ministry of Environment and Energy*, dated July 1994, reprinted February 1999. The data were assessed with respect to the surface water objectives contained in *Table 2: Table of PWQOs and Interm PWQOs* (PWQO Table 2). The analytical data generated from the groundwater samples are summarized in Table 5 along with the PWQO Table 2 objectives for comparative reference. A copy of the laboratory analytical report for the surface water samples is included in Appendix C.

The surface water data is summarized as follows:

- VOCs were not detected in surface water at the sampled outfall locations.
- Phenolics were not detected at the upgradient outfall location. Phenolics were detected above the PWQO Table 2 objective at the Wyndham Street outfall.
- PAHs were not detected in surface water at the sampled outfall locations.
- Metals were either not detected, or detected at concentrations below the applicable PWQO Table 2 objectives at the sampled outfall locations.
- Arsenic was not detected in surface water at the sampled outfall locations.
- Cyanide was not detected at the sampled outfall locations.

#### 4.0 CONCEPTUAL SITE MODEL

Boring logs from previous investigations indicate that coal tar residual may exist at discrete locations in the subsurface. The Site Investigation results indicate that none of the common exposure pathways are complete at this time.

Most newer buildings do not have basements, thus significantly restricting opportunities for vapor exposure from soil or shallow groundwater. Buildings with basements did not have detectable organic vapors or any other evidence of impact from the former MGP. The black oily material in shallow subsurface soil north of the Schnurr Electric building could not have been the result of subsurface migration of coal tar migration from the former MGP. Coal tar migrates vertically downward. Once in the groundwater, coal tar may be dispersed horizontally by groundwater. There is no evidence of separate phase coal tar in groundwater and there is no mechanism to raise any product into the shallow sub-surface soil behind the Schnurr Electric Building.

Surface water runoff from the Site does not contact coal tar materials. Runoff is directed off asphalt surfaces into concrete catchbasins and pipes. The storm water outfalls were inspected and sediment samples collected. Low concentrations of PAH parameters in sediment could indicate a minor accumulation affect from the former MGP but do not suggest that significant migration of coal tar constituents is occurring through the storm water system. The phenolics reported in the river water sample do not indicate an affect from the former Guelph MGP as there was no flow in the storm sewer at the time the sample was collected.

The groundwater data that was collected during this investigation indicates that low concentrations of PAHs are present in Site groundwater. Consequently, more information about groundwater is required.

Groundwater does not represent an immediate threat to human health as there are no exposure opportunities to Site groundwater. All residents of Guelph have access to city water that comes from multiple wells.

## 5.0 CONCLUSIONS

Based on the results of the environmental investigation, including field observations and analytical data, the following conclusions are provided.

1. No evidence of any affect in nearest downgradient basements.
2. No completed human exposure pathways were identified during the investigation.
3. Five of eight monitoring wells were field located.
4. Five of five located monitoring wells require new caps.
5. Shallow groundwater drains to the Speed River.
6. Low concentrations of halogenated volatile organic compounds in groundwater should not be attributed to the former MGP.
7. Several polyaromatic hydrocarbons and cyanide, typical MGP parameters are present in groundwater under the Site and require further investigation to define the vertical and horizontal extent of concentrations exceeding MOE Table 2 standards.
8. Storm water/surface water is not an ongoing release pathway but may have historically been a pathway as evidenced by low concentrations of PAH compounds in sediments at downstream sewer outfalls.



## 6.0 RECOMMENDATIONS

The following recommendations are made based on the results of this investigation and the conclusions presented in Section 5.0.

1. Repair monitoring wells BH1, BH3, BH5, BH6, and BH6D.
2. Implement the phased investigation program prescribed in Appendix D.

All of Which is Respectfully Submitted,  
CONESTOGA-ROVERS & ASSOCIATES



Trevor Beattie, B.A.Sc.



For: Alan Van Norman, P. Eng.





SPEED RIVER

WELLINGTON STREET EAST

SURREY STREET EAST

IRON STREET

PETRO-CANADA

45

45

41

SHED

53

MIXED

47

RESIDENTIAL/COMMERCIAL

45

50

KENTUCKY

FRIED

CHICKEN

36

WENDY'S

28

TIM HORTONS

TACO BELL

20

QUINZOS

78

SCHAUER

ELECTRIC

COMPANY

64

WOMEN'S

GAS

IRON

GAS HOLDER

AUTO PARTS SUPPLIER

UNION GAS

CAR SERVICE  
(FORMER SERVICE CENTER)

OWN HOUSES



TABLE 1

SUMMARY OF PHYSICAL SURVEYS RESULTS  
INVESTIGATION OF EXISTING CONDITIONS  
FORMER GUELPH GAS WORKS  
FOUNTAIN STREET, GUELPH, ONTARIO

Address	Occupant	Date of Inspection	Basement	Approximate Depth to Basement	Sumps	PID Readings (ppm)	Evidence of Impact
64 Gordon Street	Schnurr Electric Co. Ltd.	6/25/2004	Yes	0.8 m	two	0.0	Black Sediment observed in Sumps. Oily black soil discovered during re-paving activities
78 Gordon Street	Quizno's	6/25/2004	No	-	None	0.0	None
20 Wellington Street East	Taco Bell	6/25/2004	No	-	None	0.0	None
28 Wellington Street East	Tim Horton's	6/25/2004	No	-	None	0.0	None
36 Wellington Street East	Wendy's	6/10/2004	No	-	None	0.0	None
50 Wellington Street East	Kentucky Fried Chicken	6/8/2004	No	-	None	0.0	None
41 Wyndham Street South <sup>1</sup>	-	-	Yes	0.9 m	-	-	-
43 Wyndham Street South <sup>2</sup>	-	-	Yes	0.9 m	-	-	-
45 Wyndham Street South	Karen Hill	6/8/2004	Yes	0.9m	None	0.0	None
Wyndham Street South <sup>2</sup>	Petro Canada	-	No	-	-	-	-
45 Surrey Street Apartment 45	Michael Medaglia	6/8/2004	Yes	1.2m	One	0.0	None
47 Surrey Street Apartment 8	Matt Westberg	6/8/2004	Yes	1.2m	None	0.0	None
49 Surrey Street Apartment 11	Mike Galliza	6/8/2004	Yes	1.2m	None	0.0	None
49 Surrey Street Electrical Room	Not occupied	6/8/2004	Yes	1.2m	One	0.0	None

## Notes:

<sup>1</sup> - Property access refused.

<sup>2</sup> - No response from property occupant/owner.

TABLE 2

SUMMARY OF MONITORING WELL CONDITIONS AND GROUNDWATER ELEVATIONS  
 INVESTIGATION OF EXISTING CONDITIONS  
 FORMER GUELPH GAS WORKS  
 FOUNTAIN STREET, GUELPH, ONTARIO

Monitoring Well Location	Top of Kiser	Bottom of Well	Depth to	Bottom of Well	Depth to Water	Water Elevation	Groundwater Sample Analysis Completed
	Elevation 6/2/2004	Elevation Sept./Oct. 1987	Bottom 6/2/2004	Elevation 6/2/2004	Bottom 6/2/2004	6/2/2004	
BH1	316.12	2.70	2.65	313.47	2.53	313.59	VOCs <sup>1</sup>
BH3	316.13	2.60	2.56	313.57	2.48	313.65	None <sup>2</sup>
BH5	313.81	2.30	2.20	311.61	1.29	312.52	VOCs, Phenols, PAHs, Metals, Arsenic, Cyanide
BH6	315.40	2.50	2.49	312.91	1.99	313.41	VOCs, Phenols, PAHs, Metals, Arsenic, Cyanide
BH6D	315.36	6.10	6.17	309.19	2.10	313.26	VOCs, Phenols, PAHs, Metals, Arsenic, Cyanide
BH7 <sup>3</sup>	-	-	-	-	-	-	-
BH7D <sup>3</sup>	-	-	-	-	-	-	-
BH8 <sup>3</sup>	-	-	-	-	-	-	-

Notes:

- 1 - Very slow recharge. Limited groundwater sampling completed.
- 2 - No recharge. Groundwater sample not collected.
- 3 - Monitoring well could not be located.

TABLE 3  
SUMMARY OF GROUNDWATER QUALITY ANALYTICAL DATA  
FORMER GUELPH GAS WORKS

Sample Location: Sample ID: Sample Date:	BH1 GW-33095-060404-TB-BH1 6/4/2004	BH5 GW-33095-060404-TB-BH5 6/4/2004	BH6 GW-33095-060404-TB-BH6 6/4/2004	BH6D GW-33095-060404-TB-BH6D 6/4/2004	Groundwater Quality Criteria in
<i>Volatile Organic Compounds (VOCs)</i>					
1,1,1,2-Tetrachloroethane	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	5.0
1,1,1-Trichloroethane	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	200
1,1,2,2-Tetrachloroethane	ND(1)	ND(1)	ND(1)	ND(1)	1.0
1,1,2-Trichloroethane	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	5.0
1,1-Dichloroethane	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	70
1,1-Dichloroethene	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	0.66
1,2-Dibromoethane (Ethylene Dibromide)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	1.0
1,2-Dichlorobenzene	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	3.0
1,2-Dichloroethane	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	5.0
1,2-Dichloropropane	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	5.0
1,3-Dichlorobenzene	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	630
1,4-Dichlorobenzene	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	1.0
2-Butanone (Methyl Ethyl Ketone)	ND(15)	ND(15)	ND(15)	ND(15)	350
2-Chloroethyl vinyl ether	ND(10)	ND(10)	ND(10)	ND(10)	—
2-Hexanone	ND(10)	ND(10)	ND(10)	ND(10)	—
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	ND(10)	ND(10)	ND(10)	ND(10)	350
Acetone	ND(15)	ND(15)	ND(15)	ND(15)	—
Acrolein	ND(10)	ND(10)	ND(10)	ND(10)	—
Acrylonitrile	ND(5)	ND(5)	ND(5)	ND(5)	—
Benzene	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	5.0
Bromodichloromethane	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	5.0
Bromoform	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	5.0
Bromomethane (Methyl Bromide)	ND(3)	ND(3)	ND(3)	ND(3)	3.7
Carbon tetrachloride	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	5.0
Chlorobenzene	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	30
Chloroethane	ND(1)	ND(1)	ND(1)	ND(1)	—
Chloroform (Trichloromethane)	0.3	ND(0.2)	0.5	0.9	5.0
Chloromethane (Methyl Chloride)	ND(2)	ND(2)	ND(2)	ND(2)	—
cis-1,2-Dichloroethene	ND(1)	ND(1)	ND(1)	ND(1)	70
cis-1,3-Dichloropropene	ND(0.14)	ND(0.14)	ND(0.14)	ND(0.14)	—
Dibromochloromethane	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	5.0
Ethylbenzene	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	2.4
m&p-Xylene	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	—
Methyl Tert Butyl Ether	ND(2)	ND(2)	ND(2)	ND(2)	700
Methylene chloride	ND(1)	ND(1)	ND(1)	ND(1)	50
o-Xylene	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	—
Xylene (Total)	ND(1)	ND(1)	ND(1)	ND(1)	300
Styrene	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	100
Tetrachloroethene	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	5.0
Toluene	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	24
trans-1,2-Dichloroethene	ND(1)	ND(1)	ND(1)	ND(1)	100
trans-1,3-Dichloropropene	ND(0.14)	ND(0.14)	ND(0.14)	ND(0.14)	—
1,3-Dichloropropene (Total)	ND(0.28)	ND(0.28)	ND(0.28)	ND(0.28)	1.4
Trichlorofluoromethane (CFC-11)	ND(2)	ND(2)	ND(2)	ND(2)	—
Trihalomethanes	ND(0.8)	ND(0.8)	ND(0.8)	0.9	—
Vinyl chloride	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	0.5



TABLE 3  
SUMMARY OF GROUNDWATER QUALITY ANALYTICAL DATA  
FORMER GUELPH GAS WORKS

Sample Location:	BH1	BH5	BH6	BH6D	Groundwater Quality Criteria <sup>(1)</sup>
Sample ID:	GW-33095-060404-TB-BH1	GW-33095-060404-TB-BH5	GW-33095-060404-TB-BH6	GW-33095-060404-TB-BH6D	
Sample Date:	6/4/2004	6/4/2004	6/4/2004	6/4/2004	
	Duplicate				
<b>Semi-Volatile Organic Compounds (SVOCs)</b>					
<b>Phenolics (Total)</b>					
Acenaphthene	ND(1)	ND(1)	ND(1)	ND(1)	4200
Acenaphthylene	0.25 J	0.76 J	ND(0.05)	ND(0.05)	20
Anthracene	0.56	1.81 J	ND(0.05)	ND(0.05)	310
Benzo(a)anthracene	1.46 J	3.67 J	0.07	ND(0.05)	12
Benzo(a)pyrene	3.05 J	8.59 J	ND(0.05)	0.30	0.2
Benzo(b)fluoranthene	4.72 J	11.8 J	0.16	ND(0.01)	0.01
Benzo(g,h,i)perylene	2.92 J	8.87 J	0.10	ND(0.05)	0.2
Benzo(k)fluoranthene	3.8 J	9.5 J	ND(0.1)	ND(0.1)	0.2
Chrysene	2.35 J	5.83 J	0.10	ND(0.05)	-
Dibenz(a,h)anthracene	2.04 J	5.28 J	0.09	ND(0.05)	0.2
Fluoranthene	2.81 J	8.26 J	0.13	0.17	0.5
Fluorene	0.8 J	2.1 J	ND(0.1)	ND(0.1)	0.2
Indeno(1,2,3-cd)pyrene	6.15 J	20.5 J	0.45	0.73	130
Naphthalene	0.40 J	1.24 J	ND(0.05)	ND(0.05)	280
Phenanthrene	3.7 J	10.2 J	ND(0.1)	ND(0.1)	0.2
Pyrene	0.63 J	1.72 J	ND(0.05)	ND(0.05)	21
	3.31 J	11.5 J	0.07	ND(0.05)	63
	5.34 J	17.2 J	0.38	1.22	40
<b>Inorganics</b>					
Antimony	ND(2)	2	ND(2)	ND(2)	6.0
Arsenic	97	102	ND(2)	ND(2)	25
Barium	98	100	51	106	1000
Beryllium	ND(1)	ND(1)	ND(1)	ND(1)	4.0
Boron (Hot Water Soluble)	77	81	77	91	5000
Cadmium	ND(3)	ND(3)	ND(3)	ND(3)	5.0
Chromium VI	ND(5)	ND(5)	ND(5)	ND(5)	50
Chromium Total	ND(5)	ND(5)	ND(5)	ND(5)	50
Cobalt	ND(5)	ND(5)	ND(5)	ND(5)	100
Copper	ND(4)	ND(4)	ND(4)	ND(4)	23
Cyanide (total)	96	99	210	1040	52
Lead	ND(25)	ND(25)	ND(25)	ND(25)	10
Mercury	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)	0.12
Molybdenum	7	11	ND(6)	ND(6)	7300
Nickel	ND(10)	ND(10)	ND(10)	ND(10)	100
Selenium	4	6	5	5	10
Silver	ND(7)	ND(7)	ND(7)	ND(7)	1.2
Sodium	1,370,000	1,400,000	983,000	1,070,000	200,000
Thallium	7 U	5 U	3	2 U	2.0
Vanadium	ND(3)	ND(3)	ND(3)	ND(3)	200
Zinc	53 J	28 J	8	5	1100

Notes:  
 All values reported in micrograms per litre (ug/L).  
 (1) "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", March 9, 2004. Table 2 groundwater criteria, potable groundwater condition.  
 ND(0.5) Not detected at the method detection limit shown in parentheses.  
 - Analysis not performed or no available criterion.  
 U Parameter detected at a concentration exceeding Table 2 criteria.  
 J The analyte was analyzed for but not detected above the reported sample quantitation limit.  
 The associated value is estimated.  
 The parameter was not detected above the sample reporting limit. The sample reporting limit is estimated.

TABLE 4

SUMMARY OF SEDIMENT QUALITY ANALYTICAL DATA  
FORMER GUELPH GAS WORKS

Sample Location:	SED1	SED2	SED3	Sediment Quality Criteria MOE Table 2 <sup>(1)</sup>
Sample ID:	SED-33095-060804-TB1	SED-33095-060804-TB2	SED-33095-092904-CS3	
Sample Date:	6/8/2004	6/8/2004	9/29/04	
<b>Volatile Organic Compounds (VOCs)</b>				
1,1,1,2-Tetrachloroethane	ND(0.01)	ND(0.01)	ND(0.01)	-
1,1,1-Trichloroethane	ND(0.01)	ND(0.01)	ND(0.01)	-
1,1,2,2-Tetrachloroethane	ND(0.01)	ND(0.01)	ND(0.01)	-
1,1,2-Trichloroethane	ND(0.02)	ND(0.02)	ND(0.02)	-
1,1-Dichloroethane	ND(0.01)	ND(0.01)	ND(0.01)	-
1,1-Dichloroethene	ND(0.0024)	ND(0.0024)	ND(0.0024)	-
1,2-Dibromoethane (Ethylene Dibromide)	ND(0.005)	ND(0.005)	ND(0.005)	-
1,2-Dichlorobenzene	ND(0.01)	ND(0.01)	ND(0.01)	-
1,2-Dichloroethane	ND(0.01)	ND(0.01)	ND(0.01)	-
1,2-Dichloropropane	ND(0.01)	ND(0.01)	ND(0.01)	-
1,3-Dichlorobenzene	ND(0.01)	ND(0.01)	ND(0.01)	-
1,4-Dichlorobenzene	ND(0.01)	ND(0.01)	ND(0.01)	-
2-Butanone (Methyl Ethyl Ketone)	ND(0.15)	ND(0.15)	ND(0.15)	-
2-Chloroethyl vinyl ether	ND(0.1)	ND(0.1)	ND(0.1)	-
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	ND(0.1)	ND(0.1)	ND(0.1)	-
Acetone	ND(0.15)	ND(0.15)	ND(0.15)	-
Benzene	ND(0.005)	ND(0.005)	ND(0.005)	-
Bromodichloromethane	ND(0.01)	ND(0.01)	ND(0.01)	-
Bromoform	ND(0.02)	ND(0.02)	ND(0.02)	-
Bromomethane (Methyl Bromide)	ND(0.02)	ND(0.02)	ND(0.02)	-
Carbon tetrachloride	ND(0.01)	ND(0.01)	ND(0.01)	-
Chlorobenzene	ND(0.005)	ND(0.005)	ND(0.005)	-
Chloroethane	ND(0.02)	ND(0.02)	ND(0.02)	-
Chloroform (Trichloromethane)	ND(0.01)	ND(0.01)	ND(0.01)	-
Chloromethane (Methyl Chloride)	ND(0.02)	ND(0.02)	ND(0.02)	-
cis-1,2-Dichloroethene	ND(0.01)	ND(0.01)	ND(0.01)	-
cis-1,3-Dichloropropene	ND(0.005)	ND(0.005)	ND(0.005)	-
trans-1,3-Dichloropropene	ND(0.005)	ND(0.005)	ND(0.005)	-
1,3-Dichloropropene (Total)	ND(0.010)	ND(0.010)	ND(0.010)	-
Dibromochloromethane	ND(0.01)	ND(0.01)	ND(0.01)	-
Ethylbenzene	ND(0.005)	ND(0.005)	ND(0.005)	-
Methyl Tert Butyl Ether	ND(0.02)	ND(0.02)	ND(0.02)	-
Methylene chloride	ND(0.01)	ND(0.01)	ND(0.01)	-
Styrene	ND(0.01)	ND(0.01)	ND(0.01)	-
Tetrachloroethene	ND(0.01)	ND(0.01)	ND(0.01)	-
Toluene	0.048	ND(0.005)	ND(0.005)	-
trans-1,2-Dichloroethene	ND(0.01)	ND(0.01)	ND(0.01)	-
Trichloroethene	ND(0.01)	ND(0.01)	ND(0.01)	-
Trichlorofluoromethane (CFC-11)	ND(0.02)	ND(0.02)	ND(0.02)	-
Vinyl chloride	ND(0.003)	ND(0.003)	ND(0.003)	-
m&p-Xylene	ND(0.005)	ND(0.005)	ND(0.005)	-
o-Xylene	ND(0.005)	ND(0.005)	ND(0.005)	-
Xylenes (Total)	ND(0.01)	ND(0.01)	ND(0.01)	-
<b>Semi-Volatile Organic Compounds (SVOCs)</b>				
Phenolics (Total)	0.04 U	2.09	0.01	-





APPENDIX A

HOUSEHOLD INFORMATION QUESTIONNAIRES

**APPENDIX A (PAGES 30-55)  
HAS BEEN REDACTED TO  
PROTECT PRIVATE INFORMATION**

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APPENDIX B

DATA VALIDATION MEMO





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## MEMORANDUM

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TO: Trevor Beattie REF. NO.: 33095  
FROM: Katherine Pritchard/ev/1 *KP* DATE: July 7, 2004  
RE: **Data Quality Assessment and Validation for Samples  
Collected in June 2004 from the Former Guelph Gas Works Site in Guelph, Ontario**

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The following details a data quality assessment and validation for surface water, groundwater, and sediment samples collected June 4<sup>th</sup> and 8<sup>th</sup>, 2004 from the Former Guelph Gas Works Site in Guelph, Ontario. All samples were collected and sent to Maxxam Analytics, Inc. (Maxxam) of Mississauga, Ontario. The samples collected are listed in Table 1. The samples were analyzed for the parameters listed in Table 2 and using the methods presented in Table 2. The quality assurance criteria used to assess the data were established by the methods of analysis.<sup>1</sup>

### Holding Time Periods

Sample holding times are determined by the sample collection date provided on the chain of custody document and sample analysis date provided by Maxxam. All analyses were performed within holding time criteria, with no exceptions. Therefore, qualifications were deemed unnecessary.

### Method Blank Samples

Contamination of samples contributed by laboratory conditions or procedures was monitored by the data from concurrent preparation and analysis of method blank samples. Target analytes were not detected in the method blank samples, with the exception of cobalt for the groundwater method blank samples (Maxxam Job # A425898) and copper, silver, vanadium, zinc, and phenols for the surface water samples (Maxxam Job # A426406). Qualifications are necessary only if the amount of the target analyte detected in the associated sample is less than five times that detected in the method blank. Qualifications are included in Table 3.

### Surrogate Compound Percent Recoveries

Individual sample performance for organic analyses was monitored by assessing surrogate compound percent recovery data. Each groundwater and surface water sample that was analyzed for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) was spiked with the appropriate

---

<sup>1</sup> Application of quality assurance criteria was consistent with the relevant criteria in "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", EPA-540/R-99/008, October 1999, and "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review", EPA-540/R-01/008, July 2002.

surrogate compounds. All surrogate recoveries fell well within laboratory-established control limits, with the exception of those for sample SED-33095-060804-TB2 (Maxxam Job # A426406). Qualifications made on this basis are presented in Table 3.

#### Laboratory Control Samples

Laboratory control sample (LCS) analysis serves to monitor the accuracy of the laboratory preparation and analysis methods. Laboratory-established criteria are used to determine acceptable results for all parameters.

The LCS recoveries met acceptance criteria with no exceptions. Qualifications were deemed unnecessary.

#### Matrix Spike (MS) Sample – Organic Analyses

MS analyses provide insight into sample matrix effects on extraction, digestion, and/or measurement methodology. No action is normally taken on MS data, in terms of qualification, as these data alone do not give a complete indication of overall accuracy and precision. However, in conjunction with other QC data the need for qualifications can be assessed.

MS sample was analyzed as part of the VOC analyses. All MS/MSD recoveries met acceptance criteria with no exceptions. No qualifications were required.

#### Matrix Spike (MS) Sample – Inorganic Analyses

The percent recovery data from matrix spike and matrix spike duplicate samples were monitored to determine the effects of sample matrix on the accuracy of the metals sample preparation and measurement methods.

The analyses performed on select matrix spike samples fell within control limits with no exceptions. Consequently, data qualifications were deemed unnecessary.

#### Field QA/QC

The field QA/QC consisted of one field duplicate sample set and one field blank for the groundwater samples (Maxxam Job # A425598).

Overall precision for the sampling and analysis event was monitored using the results of field blank samples. The groundwater field blank (GW-33095-060404-TB-BH200) was found to contain detections of Sodium, Thallium, and Naphthalene. Qualifications are required when the sample result is found to be less than five times the amount found in the blank. The qualifications made on this basis are presented in Table 3.

Field duplicate samples are used as an indication of field and analytical reproducibility. The field duplicate sample set was GW-33095-060404-TB-BH5/BH100. The RPDs for detected compounds were calculated and all fell less than the percent maximum criteria, with the exception of Zinc, Molybdenum, Chloroform, Fluoranthene, Pyrene, and all of the PAH's. Necessary qualifications are listed in Table 3.

Overall Assessment

The data provided by Maxxam demonstrated acceptable accuracy and precision with respect to laboratory QC and may be used with the qualifications presented herein.



TABLE 1

SUMMARY OF SAMPLE IDENTIFICATIONS  
FORMER GUELPH GAS WORKS SITE  
GUELPH, ONTARIO  
JUNE 2004

<i>Maxxam Job #</i>	<i>Sample IDs</i>
A425898	GW-33095-060404-TB-BH1
A425898	GW-33095-060404-TB-BH5
A425898	GW-33095-060404-TB-BH6
A425898	GW-33095-060404-TB-BH6D
A425898	GW-33095-060404-TB-BH100
A425898	GW-33095-060404-TB-BH200
A426406	SW-33095-060804-TB1
A426406	SW-33095-060804-TB2
A426406	SED-33095-060804-TB1
A426406	SED-33095-060804-TB2

**TABLE 2**  
**SUMMARY OF ANALYTICAL METHODS AND**  
**HOLDING TIME CRITERIA**  
**FORMER GUELPH GAS WORKS**  
**GUELPH, ONTARIO**  
**JUNE 2004**

<i>Parameter</i>	<i>Analytical Method</i>	<u><i>Holding Time Criteria</i></u> <i>(Water)</i>
VOCs	SW-846 8260B (mod.)	14 days
Metals	SW-846 6000/7000 Series	60 days
Phenols	SM 5530D	30 days
Cyanide	SW-846 9010-12	14 days
SVOCs	SW-846 8270C	7/40 days

Notes:

- |        |  |
|--------|--|
| VOCs   | - Volatile Organic Compounds   |
| SVOCs  | - Semi-Volatile Organic Compounds  |
| SM     | - "Standard Methods for the Examination of Water and Wastewater",<br>19th Ed., APHA, 1995                          |
| SW-846 | - Test Method for Evaluating Solid Waste Physical/Chemical<br>Methods, EPA, November 1986 with promulgated updates |



**TABLE 3**  
**SUMMARY OF DATA QUALIFICATIONS**  
**FORMER GUELPH GAS WORKS**  
**GUELPH, ONTARIO**  
**JUNE 2004**

<i>Maxxam Job Number</i>	<i>Sample ID</i>	<i>QA/QC Analysis</i>	<i>Parameter</i>	<i>Result (mg/L)</i>	<i>Qualified Result (mg/L)</i>
A425898	GW-33095-060404-TB-BH5	Field Duplicate	Zinc	0.053	0.053 J
A425898	GW-33095-060404-TB-BH5	Field Duplicate	Naphthalene	0.63	0.63 J
A425898	GW-33095-060404-TB-BH5	Field Duplicate	Acenaphthylene	0.56	0.56 J
A425898	GW-33095-060404-TB-BH5	Field Duplicate	Acenaphthene	0.25	0.25 J
A425898	GW-33095-060404-TB-BH5	Field Duplicate	Fluorene	0.40	0.40 J
A425898	GW-33095-060404-TB-BH5	Field Duplicate	Phenanthrene	3.31	3.31 J
A425898	GW-33095-060404-TB-BH5	Field Duplicate	Anthracene	1.46	1.46 J
A425898	GW-33095-060404-TB-BH5	Field Duplicate	Fluoranthene	6.15	6.15 J
A425898	GW-33095-060404-TB-BH5	Field Duplicate	Pyrene	5.34	5.34 J
A425898	GW-33095-060404-TB-BH5	Field Duplicate	Benzo(a)anthracene	3.05	3.05 J
A425898	GW-33095-060404-TB-BH5	Field Duplicate	Chrysene	2.81	2.81 J
A425898	GW-33095-060404-TB-BH5	Field Duplicate	Benzo(b)fluoranthene	2.92	2.92 J
A425898	GW-33095-060404-TB-BH5	Field Duplicate	Benzo(j)fluoranthene	2.35	2.35 J
A425898	GW-33095-060404-TB-BH5	Field Duplicate	Benzo(k)fluoranthene	2.04	2.04 J
A425898	GW-33095-060404-TB-BH5	Field Duplicate	Benzo(a)pyrene	4.72	4.72 J
A425898	GW-33095-060404-TB-BH5	Field Duplicate	Indeno(1,2,3cd)pyrene	3.7	3.7 J
A425898	GW-33095-060404-TB-BH5	Field Duplicate	Dibenzo(a,h)anthracene	0.8	0.8 J
A425898	GW-33095-060404-TB-BH5	Field Duplicate	Benzo(ghi)perylene	3.8	3.8 J
A425898	GW-33095-060404-TB-BH5	Field Blank	Thallium	0.007	0.007 U
A425898	GW-33095-060404-TB-BH6	Field Blank	Thallium	0.003	0.003 U
A425898	GW-33095-060404-TB-BH6D	Field Blank	Thallium	0.002	0.002 U
A425898	GW-33095-060404-TB-BH100	Field Duplicate	Zinc	0.028	0.028 J
A425898	GW-33095-060404-TB-BH100	Field Duplicate	Naphthalene	1.72	1.72 J
A425898	GW-33095-060404-TB-BH100	Field Duplicate	Acenaphthylene	1.81	1.81 J
A425898	GW-33095-060404-TB-BH100	Field Duplicate	Acenaphthene	0.76	0.76 J
A425898	GW-33095-060404-TB-BH100	Field Duplicate	Fluorene	1.24	1.24 J
A425898	GW-33095-060404-TB-BH100	Field Duplicate	Phenanthrene	11.50	11.50 J
A425898	GW-33095-060404-TB-BH100	Field Duplicate	Anthracene	3.67	3.67 J
A425898	GW-33095-060404-TB-BH100	Field Duplicate	Fluoranthene	20.50	20.50 J
A425898	GW-33095-060404-TB-BH100	Field Duplicate	Pyrene	17.20	17.20 J
A425898	GW-33095-060404-TB-BH100	Field Duplicate	Benzo(a)anthracene	8.59	8.59 J
A425898	GW-33095-060404-TB-BH100	Field Duplicate	Chrysene	8.26	8.26 J
A425898	GW-33095-060404-TB-BH100	Field Duplicate	Benzo(b)fluoranthene	8.87	8.87 J
A425898	GW-33095-060404-TB-BH100	Field Duplicate	Benzo(j)fluoranthene	5.83	5.83 J
A425898	GW-33095-060404-TB-BH100	Field Duplicate	Benzo(k)fluoranthene	5.28	5.28 J
A425898	GW-33095-060404-TB-BH100	Field Duplicate	Benzo(a)pyrene	11.8	11.8 J
A425898	GW-33095-060404-TB-BH100	Field Duplicate	Indeno(1,2,3cd)pyrene	10.2	10.2 J
A425898	GW-33095-060404-TB-BH100	Field Duplicate	Dibenzo(a,h)anthracene	2.1	2.1 J
A425898	GW-33095-060404-TB-BH100	Field Duplicate	Benzo(ghi)perylene	9.5	9.5 J
A425898	GW-33095-060404-TB-BH100	Field Blank	Thallium	0.005	0.005 U
A426406	SED-33095-060804-TB1	Method Blank	Phenols	0.04	0.04 U
A426406	SED-33095-060804-TB2	Surrogate Recovery	Naphthalene	ND	50 UJ

**TABLE 3**  
**SUMMARY OF DATA QUALIFICATIONS**  
**FORMER GUELPH GAS WORKS**  
**GUELPH, ONTARIO**  
**JUNE 2004**

<i>Maxxam Job Number</i>	<i>Sample ID</i>	<i>QA/QC Analysis</i>	<i>Parameter</i>	<i>Result (mg/L)</i>	<i>Qualified Result (mg/L)</i>
A426406	SED-33095-060804-TB2	Surrogate Recovery	Acenaphthylene	ND	50 UJ
A426406	SED-33095-060804-TB2	Surrogate Recovery	Acenaphthene	ND	100 UJ
A426406	SED-33095-060804-TB2	Surrogate Recovery	Fluorene	ND	50 UJ
A426406	SED-33095-060804-TB2	Surrogate Recovery	Phenanthrene	1340	1340 J
A426406	SED-33095-060804-TB2	Surrogate Recovery	Anthracene	309	309 J
A426406	SED-33095-060804-TB2	Surrogate Recovery	Fluoranthene	2080	2080 J
A426406	SED-33095-060804-TB2	Surrogate Recovery	Pyrene	1640	1640 J
A426406	SED-33095-060804-TB2	Surrogate Recovery	Benzo(a)anthracene	916	916 J
A426406	SED-33095-060804-TB2	Surrogate Recovery	Chrysene	885	885 J
A426406	SED-33095-060804-TB2	Surrogate Recovery	Benzo(b)fluoranthene	445	445 J
A426406	SED-33095-060804-TB2	Surrogate Recovery	Benzo(k)fluoranthene	545	545 J
A426406	SED-33095-060804-TB2	Surrogate Recovery	Benzo(a)pyrene	602	602 J
A426406	SED-33095-060804-TB2	Surrogate Recovery	Indeno(1,2,3cd)pyrene	330	330 J
A426406	SED-33095-060804-TB2	Surrogate Recovery	Dibenzo(a,h)anthracene	ND	200 UJ
A426406	SED-33095-060804-TB2	Surrogate Recovery	Benzo(ghi)perylene	377	377 J

Notes:

- U - The analyte was analyzed for but not detected above the reported sample quantitation limit.  
 J - The associated value is estimated  
 UJ - The parameter was not detected above the sample reporting limit. The sample reporting limit is estimated.



APPENDIX C

LABORATORY ANALYTICAL REPORTS



**Attention: Melissa Ford**

**Report Date: 2004/06/16**

Your P.O. #: 20-004178  
Your Project #: 33095

**ANALYTICAL REPORT**

33095  
MONITORING DATA

**MAXXAM JOB #: A426406**  
**Received: 2004/06/08, 5:49**

Sample Matrix: LIQUID  
# Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Chromium (VI)	2	N/A	2004/06/14	Ont SOP 0104	EPA 7196
Total Cyanide	2	2004/06/10	2004/06/10		EPA 9012 Modified
Mercury	2	2004/06/10	2004/06/10	Ont SOP 0112	EPA 7470
Dissolved Metals in Water by ICPMS	2	2004/06/14	2004/06/14	Ont SOP 0624	EPA 6020
Polycyclic Aromatic Hydrocarbons (PAH)	2	2004/06/11	2004/06/14	EPA 8270	GC/MS
Phenol (4AAP)	2	N/A	2004/06/14	Ont SOP 0113	EPA 9066
Volatile Organic Compounds	2	N/A	2004/06/10	Ont SOP 0126	EPA 8260

Sample Matrix: SOLID  
# Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Hot Water Extractable Boron	2	2004/06/11	2004/06/11	Ont SOP 0102	EPA 3050B
Chromium (VI)	2	2004/06/14	2004/06/14	Ont SOP 0104	EPA 7196
Acid Extractable Metals in Soil by GF	2	2004/06/14	2004/06/14	Ont SOP 0095	EPA 7010
Mercury	2	2004/06/14	2004/06/14	Ont SOP 0112	EPA 7470
Acid Extractable Metals by ICP	2	2004/06/14	2004/06/14	Ont SOP 0072	EPA 6010
MOISTURE	2	N/A	2004/06/14		MOE HANDBOOK(19)
Polycyclic Aromatic Hydrocarbons (PAH)	2	2004/06/10	2004/06/11	EPA 8270	GC/MS
Phenol (4AAP)	2	N/A	2004/06/15	Ont SOP 0113	EPA 9066
Total Cyanide on Solids	2	2004/06/16	2004/06/16		Colourimetric

**Attention: Melissa Ford**

**Report Date: 2004/06/16**

Your P.O. #: 20-004178  
Your Project #: 33095

**ANALYTICAL REPORT**

-2-

Sample Matrix: SOLID  
# Samples Received: 2


<u>Analyses</u>	<u>Quantity</u>	<u>Date Extracted</u>	<u>Date Analyzed</u>	<u>Laboratory Method</u>	<u>Method Reference</u>
Volatle Organic Compounds	2	N/A	2004/06/10	Ont SOP 0126	EPA 8260

(1) This test was performed by Maxxam Analytics Montreal

**MAXXAM ANALYTICS INC.**



SAMI JAMOKHA, M.Sc., C.Chem.



TROY CARRIERE, B.Sc.  
Inorganics Supervisor, Environmental Division

SJA/lt  
encl.

Total cover pages: 2



Maxxam Job #: A426406  
 Report Date: 2004/06/16

Conestoga-Rovers & Associates  
 Client Project #: 33095  
 Project name:  
 Your P.O. #: 20-004178  
 Sampler Initials:

**RESULTS OF ANALYSIS OF LIQUID**

Maxxam ID		C90808	C90814		
Sampling Date		2004/06/08	2004/06/08		
	Units	SW-33095-060804-TB1	SW-33095-060804-TB2	DL	QA Batch

<b>CONVENTIONALS</b>					
Phenol-4AAP	mg/L	ND	0.004	0.001	604261
Total Cyanide (CN)	mg/L	ND	ND	0.005	603247

ND = Not detected  
 QC Batch = Quality Control Batch  
 Please check for attached comments





Maxxam Job #: A426406  
 Report Date: 2004/06/16

Conestoga-Rovers & Associates  
 Client Project #: 33095  
 Project name:  
 Your P.O. #: 20-004178  
 Sampler Initials:

**ELEMENTS BY ATOMIC SPECTROSCOPY (LIQUID)**

Maxxam ID		C90808	C90814		
Sampling Date		2004/06/08	2004/06/08		
	Units	SW-33095-060804-TB1	SW-33095-060804-TB2	DL	QA Batch

CONVENTIONALS					
Chromium (VI)	mg/L	ND	ND	0.005	604226
METALS					
Dissolved Antimony (Sb)	mg/L	ND	ND	0.0002	604290
Dissolved Arsenic (As)	mg/L	ND	ND	0.0002	604290
Dissolved Barium (Ba)	mg/L	0.0239	0.0443	0.0002	604290
Dissolved Beryllium (Be)	mg/L	ND	ND	0.0002	604290
Dissolved Boron (B)	mg/L	0.0180	0.0169	0.0012	604290
Dissolved Cadmium (Cd)	mg/L	ND	ND	0.0002	604290
Dissolved Chromium (Cr)	mg/L	ND	ND	0.0004	604290
Dissolved Cobalt (Co)	mg/L	ND	ND	0.0002	604290
Dissolved Copper (Cu)	mg/L	0.0014	0.0023	0.0006	604290
Dissolved Lead (Pb)	mg/L	0.0015	0.0016	0.0004	604290
Total Mercury (Hg)	mg/L	ND	ND	0.0001	603250
Dissolved Molybdenum (Mo)	mg/L	ND	ND	0.0002	604290
Dissolved Nickel (Ni)	mg/L	ND	ND	0.0002	604290
Dissolved Selenium (Se)	mg/L	ND	ND	0.0004	604290
Dissolved Silver (Ag)	mg/L	ND	ND	0.0002	604290
Dissolved Sodium (Na)	mg/L	22.5	31.6	0.06	604290
Dissolved Thallium (Tl)	mg/L	ND	ND	0.0002	604290
Dissolved Vanadium (V)	mg/L	0.0003	ND	0.0002	604290
Dissolved Zinc (Zn)	mg/L	0.023	0.021	0.001	604290

ND = Not detected  
 QC Batch = Quality Control Batch  
 Please check for attached comments



Maxxam Job #: A426406  
 Report Date: 2004/06/16

Conestoga-Rovers & Associates  
 Client Project #: 33095  
 Project name:  
 Your P.O. #: 20-004178  
 Sampler Initials:

**VOLATILE ORGANICS BY GC-MS (LIQUID)**

Maxxam ID		C90808	C90814		
Sampling Date		2004/06/08	2004/06/08		
	Units	SW-33095-060874-TB1	SW-33095-060804-TB2	DL	QA Batch

VOLATILES					
1,1-Dichloroethane	ug/L	ND	ND	0.4	603153
1,1-Dichloroethylene	ug/L	ND	ND	0.5	603153
1,1,1-Trichloroethane	ug/L	ND	ND	0.5	603153
1,1,1,2-Tetrachloroethane	ug/L	ND	ND	0.5	603153
1,1,2-Trichloroethane	ug/L	ND	ND	0.5	603153
1,1,2,2-Tetrachloroethane	ug/L	ND	ND	1	603153
1,2-Dibromoethane (EDB)	ug/L	ND	ND	0.5	603153
1,2-Dichlorobenzene	ug/L	ND	ND	0.5	603153
1,2-Dichloroethane	ug/L	ND	ND	0.5	603153
cis-1,2-Dichloroethylene	ug/L	ND	ND	1	603153
trans-1,2-Dichloroethylene	ug/L	ND	ND	1	603153
1,2-Dichloropropane	ug/L	ND	ND	0.5	603153
1,3-Dichlorobenzene	ug/L	ND	ND	0.5	603153
cis-1,3-Dichloropropene	ug/L	ND	ND	0.14	603153
trans-1,3-Dichloropropene	ug/L	ND	ND	0.14	603153
1,4-Dichlorobenzene	ug/L	ND	ND	0.5	603153
2-Chloroethylvinyl ether	ug/L	ND	ND	10	603153
2-Hexanone	ug/L	ND	ND	10	603153
Acetone	ug/L	ND	ND	15	603153
Acrolein	ug/L	ND	ND	10	603153
Acrylonitrile	ug/L	ND	ND	5	603153
Benzene	ug/L	ND	ND	0.5	603153
Bromodichloromethane	ug/L	ND	ND	0.2	603153
Bromoform	ug/L	ND	ND	0.2	603153
Bromomethane	ug/L	ND	ND	3	603153
Carbon Tetrachloride	ug/L	ND	ND	0.5	603153
Chlorobenzene	ug/L	ND	ND	0.5	603153
Chloroethane	ug/L	ND	ND	1	603153
Chloroform	ug/L	ND	ND	0.2	603153
Chloromethane	ug/L	ND	ND	2	603153
Dibromochloromethane	ug/L	ND	ND	0.2	603153
Dichloromethane(Methylene Chloride)	ug/L	ND	ND	1	603153
Ethylbenzene	ug/L	ND	ND	0.5	603153

ND = Not detected  
 QC Batch = Quality Control Batch  
 Please check for attached comments

**VOLATILE ORGANICS BY GC-MS (LIQUID)**

Maxxam ID		C90808	C90814		
Sampling Date		2004/06/08	2004/06/08		
	Units	SW-33095-060804-TB1	SW-33095-060804-TB2	DL	QA Batch

2-Butanone (Methyl Ethyl Ketone)	ug/L	ND	ND	15	603153
Methyl t-butyl ether (MTBE)	ug/L	ND	ND	2	603153
4-Methyl-2-Pentanone (MIBK)	ug/L	ND	ND	10	603153
Styrene	ug/L	ND	ND	0.5	603153
Tetrachloroethylene	ug/L	ND	ND	0.5	603153
Toluene	ug/L	ND	ND	0.5	603153
Trichloroethylene	ug/L	ND	ND	0.5	603153
Trichlorofluoromethane (FREON 11)	ug/L	ND	ND	2	603153
Vinyl Chloride	ug/L	ND	ND	0.2	603153
o-Xylene	ug/L	ND	ND	0.5	603153
p+m-Xylene	ug/L	ND	ND	0.5	603153
Xylene (Total)	ug/L	ND	ND	1	603153
Total Trihalomethanes	ug/L	ND	ND	0.8	603153
<b>Surrogate Recovery (%)</b>					
4-Bromofluorobenzene	%	94	89		603153
D4-1,2-Dichloroethane	%	102	101		603153
D8-Toluene	%	104	100		603153

ND = Not detected  
 QC Batch = Quality Control Batch  
 Please check for attached comments

**SEMI-VOLATILE ORGANICS BY GC-MS (LIQUID)**

Maxxam ID		C90808	C90814		
Sampling Date		2004/06/08	2004/06/08		
	Units	SW-33095-060804-TB1	SW-33095-060804-TB2	DL	QA Batch

PAH'S					
Naphthalene	ug/L	ND	ND	0.05	603771
Acenaphthylene	ug/L	ND	ND	0.05	603771
Acenaphthene	ug/L	ND	ND	0.05	603771
Fluorene	ug/L	ND	ND	0.05	603771
Phenanthrene	ug/L	ND	ND	0.05	603771
Anthracene	ug/L	ND	ND	0.05	603771
Fluoranthene	ug/L	ND	ND	0.05	603771
Pyrene	ug/L	ND	ND	0.05	603771
Benzo(a)anthracene	ug/L	ND	ND	0.05	603771
Chrysene	ug/L	ND	ND	0.05	603771
Benzo(b)fluoranthene	ug/L	ND	ND	0.05	603771
Benzo(j)fluoranthene	ug/L	ND	ND	0.05	603771
Benzo(k)fluoranthene	ug/L	ND	ND	0.05	603771
Benzo(a)pyrene	ug/L	ND	ND	0.01	603771
Indeno(1,2,3-cd)pyrene	ug/L	ND	ND	0.1	603771
Dibenzo(a,h)anthracene	ug/L	ND	ND	0.1	603771
Benzo(ghi)perylene	ug/L	ND	ND	0.1	603771
<b>Surrogate Recovery (%)</b>					
2-Fluorobiphenyl	%	73	63		603771
D14-Terphenyl	%	93	78		603771
D5-Nitrobenzene	%	74	63		603771

ND = Not detected  
QC Batch = Quality Control Batch  
Please check for attached comments



Maxxam Job #: A426406  
 Report Date: 2004/06/16

Conestoga-Rovers & Associates  
 Client Project #: 33095  
 Project name:  
 Your P.O. #: 20-004178  
 Sampler Initials:

**RESULTS OF ANALYSES OF SOLID**

Maxxam ID		C90815	C90834		
Sampling Date		2004/06/08	2004/06/08		
	Units	SED-33095-060804-TB1	SED-33095-060804-TB2	DL	QA Batch

<b>CONVENTIONALS</b>					
Moisture	%	20	28	0.2	604127
<b>CONVENTIONALS</b>					
Phenol-4AAP	ug/g	0.04	2.09	0.01	604802

QC Batch = Quality Control Batch  
 Please check for attached comments

**ELEMENTS BY ATOMIC SPECTROSCOPY (SOLID)**

Maxxam ID		C90815	C90834		
Sampling Date		2004/06/08	2004/06/08		
	Units	SED-33095-060804-TB1	SED-33095-060804-TB2	DL	QA Batch

CONVENTIONALS					
Chromium (VI)	ug/g	ND	ND	0.05	604227
METALS					
Acid Extractable Antimony (Sb)	ug/g	ND	1	1	604370
Acid Extractable Arsenic (As)	ug/g	2	14.0	1	604370
Acid Extractable Barium (Ba)	ug/g	26.2	20.6	0.1	604327
Acid Extractable Beryllium (Be)	ug/g	0.1	0.1	0.1	604327
Acid Extractable Cadmium (Cd)	ug/g	1.1	1.4	0.3	604327
Acid Extractable Chromium (Cr)	ug/g	28.1	23.9	0.5	604327
Acid Extractable Cobalt (Co)	ug/g	1.7	2.3	0.5	604327
Acid Extractable Copper (Cu)	ug/g	27.1	49.7	0.4	604327
Acid Extractable Lead (Pb)	ug/g	40.3	139	2.5	604327
Acid Extractable Mercury (Hg)	ug/g	ND	0.06	0.05	604213
Acid Extractable Molybdenum (Mo)	ug/g	ND	ND	0.6	604327
Acid Extractable Nickel (Ni)	ug/g	6	7	1	604327
Acid Extractable Selenium (Se)	ug/g	ND	ND	1	604370
Acid Extractable Silver (Ag)	ug/g	ND	ND	0.7	604327
Acid Extractable Thallium (Tl)	ug/g	ND	ND	1	604370
Acid Extractable Vanadium (V)	ug/g	7.5	8.5	0.3	604327
Acid Extractable Zinc (Zn)	ug/g	188	306	0.3	604327
METALS					
Hot Water Ext. Boron (B)	ug/g	0.11	0.17	0.01	603949

ND = Not detected  
 QC Batch = Quality Control Batch  
 Please check for attached comments

**SUBCONTRACTED ANALYSIS (SOLID)**

Maxxam ID		C90815	C90834		
Sampling Date		2004/06/08	2004/06/08		
	Units	SED-33095-060804-TB1	SED-33095-060804-TB2	DL	QA Batch

<b>CONVENTIONALS</b>					
Total Cyanide (CN)	ug/g	ND	ND	0.025	605289

ND = Not detected  
QC Batch = Quality Control Batch  
Please check for attached comments

**VOLATILE ORGANICS BY GC-MS (SOLID)**

Maxxam ID		C90815	C90834		
Sampling Date		2004/06/08	2004/06/08		
	Units	SED-33095-060804-TB1	SED-33095-060804-TB2	DL	QA Batch

VOLATILES					
1,1-Dichloroethane	ug/g	ND	ND	0.01	603154
1,1-Dichloroethylene	ug/g	ND	ND	0.0024	603154
1,1,1-Trichloroethane	ug/g	ND	ND	0.01	603154
1,1,1,2-Tetrachloroethane	ug/g	ND	ND	0.01	603154
1,1,2-Trichloroethane	ug/g	ND	ND	0.02	603154
1,1,2,2-Tetrachloroethane	ug/g	ND	ND	0.01	603154
1,2-Dibromoethane (EDB)	ug/g	ND	ND	0.005	603154
1,2-Dichlorobenzene	ug/g	ND	ND	0.01	603154
1,2-Dichloroethane	ug/g	ND	ND	0.01	603154
cis-1,2-Dichloroethylene	ug/g	ND	ND	0.01	603154
trans-1,2-Dichloroethylene	ug/g	ND	ND	0.01	603154
1,2-Dichloropropane	ug/g	ND	ND	0.01	603154
1,3-Dichlorobenzene	ug/g	ND	ND	0.01	603154
cis-1,3-Dichloropropene	ug/g	ND	ND	0.005	603154
trans-1,3-Dichloropropene	ug/g	ND	ND	0.005	603154
1,4-Dichlorobenzene	ug/g	ND	ND	0.01	603154
Acetone	ug/g	ND	ND	0.15	603154
Benzene	ug/g	ND	ND	0.005	603154
Bromodichloromethane	ug/g	ND	ND	0.01	603154
Bromoform	ug/g	ND	ND	0.02	603154
Bromomethane	ug/g	ND	ND	0.02	603154
Carbon Tetrachloride	ug/g	ND	ND	0.01	603154
Chlorobenzene	ug/g	ND	ND	0.005	603154
Chloroform	ug/g	ND	ND	0.01	603154
Dibromochloromethane	ug/g	ND	ND	0.01	603154
Dichloromethane(Methylene Chloride)	ug/g	ND	ND	0.01	603154
Ethylbenzene	ug/g	ND	ND	0.005	603154
2-Butanone (Methyl Ethyl Ketone)	ug/g	ND	ND	0.15	603154
Methyl t-butyl ether (MTBE)	ug/g	ND	ND	0.02	603154
4-Methyl-2-Pentanone (MIBK)	ug/g	ND	ND	0.1	603154
Styrene	ug/g	ND	ND	0.01	603154
Tetrachloroethylene	ug/g	ND	ND	0.01	603154
Toluene	ug/g	0.048	ND	0.005	603154

ND = Not detected  
QC Batch = Quality Control Batch  
Please check for attached comments



**VOLATILE ORGANICS BY GC-MS (SOLID)**

Maxxam ID		C90815	C90834		
Sampling Date		2004/06/08	2004/06/08		
	Units	SED-33095-060804-TB1	SED-33095-060804-TB2	DL	QA Batch
Trichloroethylene	ug/g	ND	ND	0.01	603154
Vinyl Chloride	ug/g	ND	ND	0.003	603154
o-Xylene	ug/g	ND	ND	0.005	603154
p+m-Xylene	ug/g	ND	ND	0.005	603154
2-Chloroethylvinyl ether	ug/g	ND	ND	0.1	603154
Chloroethane	ug/g	ND	ND	0.02	603154
Chloromethane	ug/g	ND	ND	0.02	603154
Trichlorofluoromethane (FREON 11)	ug/g	ND	ND	0.02	603154
Xylene (Total)	ug/g	ND	ND	0.01	603154
<b>Surrogate Recovery (%)</b>					
4-Bromofluorobenzene	%	96	106		603154
D4-1,2-Dichloroethane	%	100	99		603154
D8-Toluene	%	100	102		603154
ND = Not detected QC Batch = Quality Control Batch Please check for attached comments					

**SEMI-VOLATILE ORGANICS BY GC-MS (SOLID)**

Maxxam ID		C90815	C90834		
Sampling Date		2004/06/08	2004/06/08		
	Units	SED-33095-060804-TB1	SED-33095-060804-TB2	DL	QA Batch

PAH'S					
Naphthalene	ug/Kg	ND	ND	50	603142
Acenaphthylene	ug/Kg	ND	ND	50	603142
Acenaphthene	ug/Kg	ND	ND	100	603142
Fluorene	ug/Kg	ND	ND	50	603142
Phenanthrene	ug/Kg	161	1340	50	603142
Anthracene	ug/Kg	ND	309	50	603142
Fluoranthene	ug/Kg	265	2080	50	603142
Pyrene	ug/Kg	242	1640	50	603142
Benzo(a)anthracene	ug/Kg	ND	916	100	603142
Chrysene	ug/Kg	ND	885	100	603142
Benzo(b)fluoranthene	ug/Kg	ND	445	100	603142
Benzo(k)fluoranthene	ug/Kg	ND	545	100	603142
Benzo(a)pyrene	ug/Kg	81	602	50	603142
Indeno(1,2,3-cd)pyrene	ug/Kg	ND	330	200	603142
Dibenzo(a,h)anthracene	ug/Kg	ND	ND	200	603142
Benzo(ghi)perylene	ug/Kg	ND	377	200	603142
<b>Surrogate Recovery (%)</b>					
2-Fluorobiphenyl	%	78	!! 30		603142
D14-Terphenyl	%	67	!! 38		603142
D5-Nitrobenzene	%	67	***		603142

ND = Not detected  
QC Batch = Quality Control Batch  
Please check for attached comments

**GENERAL COMMENTS**

Sample C90815-01: PAH-SIM-S Analysis:

The sample was diluted due to matrix interference. MDLs were adjusted accordingly.

Sample C90834-01: PAH-SIM-S Analysis:

The sample was diluted due to matrix interference. MDLs were adjusted accordingly.

!!: recoveries are below control limits due to matrix interference.

\*\*\*: not detected due to matrix interference.

**Results relate only to the items tested.**

Quality Assurance Report  
 Maxxam Job Number: MA426406

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits	
603142 CD	Spiked Blank	2-Fluorobiphenyl	2004/06/11		86	%	40 - 130	
		D14-Terphenyl	2004/06/11		79	%	40 - 130	
		D5-Nitrobenzene	2004/06/11		83	%	40 - 130	
		Naphthalene	2004/06/11		85	%	40 - 140	
		Acenaphthylene	2004/06/11		92	%	40 - 140	
		Acenaphthene	2004/06/11		93	%	40 - 140	
		Fluorene	2004/06/11		91	%	40 - 140	
		Phenanthrene	2004/06/11		95	%	40 - 140	
		Anthracene	2004/06/11		98	%	40 - 140	
		Fluoranthene	2004/06/11		99	%	40 - 140	
		Pyrene	2004/06/11		100	%	40 - 140	
		Benzo(a)anthracene	2004/06/11		101	%	40 - 140	
		Chrysene	2004/06/11		102	%	40 - 140	
		Benzo(b)fluoranthene	2004/06/11		69	%	40 - 140	
		Benzo(k)fluoranthene	2004/06/11		123	%	40 - 140	
		Benzo(a)pyrene	2004/06/11		100	%	40 - 140	
		Indeno(1,2,3-cd)pyrene	2004/06/11		97	%	40 - 140	
		Dibenzo(a,h)anthracene	2004/06/11		83	%	40 - 140	
		Benzo(ghi)perylene	2004/06/11		101	%	40 - 140	
		Method Blank	2-Fluorobiphenyl	2004/06/11		55	%	40 - 130
			D14-Terphenyl	2004/06/11		75	%	40 - 130
	D5-Nitrobenzene		2004/06/11		53	%	40 - 130	
	Naphthalene		2004/06/11	ND			ug/Kg	
	Acenaphthylene		2004/06/11	ND			ug/Kg	
	Acenaphthene		2004/06/11	ND			ug/Kg	
	Fluorene		2004/06/11	ND			ug/Kg	
	Phenanthrene		2004/06/11	ND			ug/Kg	
	Anthracene		2004/06/11	ND			ug/Kg	
	Fluoranthene		2004/06/11	ND			ug/Kg	
	Pyrene		2004/06/11	ND			ug/Kg	
	Benzo(a)anthracene		2004/06/11	ND			ug/Kg	
	Chrysene	2004/06/11	ND			ug/Kg		
	Benzo(b)fluoranthene	2004/06/11	ND			ug/Kg		
Benzo(k)fluoranthene	2004/06/11	ND			ug/Kg			
Benzo(a)pyrene	2004/06/11	ND			ug/Kg			
Indeno(1,2,3-cd)pyrene	2004/06/11	ND			ug/Kg			
Dibenzo(a,h)anthracene	2004/06/11	ND			ug/Kg			
Benzo(ghi)perylene	2004/06/11	ND			ug/Kg			
603153 SSS	Spiked Blank	4-Bromofluorobenzene	2004/06/10		105	%	75 - 115	
		D4-1,2-Dichloroethane	2004/06/10		92	%	85 - 120	
		D8-Toluene	2004/06/10		101	%	75 - 115	
		1,1-Dichloroethane	2004/06/10		88	%	79 - 120	
		1,1-Dichloroethylene	2004/06/10		86	%	80 - 120	
		1,1,1-Trichloroethane	2004/06/10		87	%	70 - 132	
		1,1,1,2-Tetrachloroethane	2004/06/10		87	%	40 - 130	
		1,1,2-Trichloroethane	2004/06/10		96	%	81 - 120	
		1,1,2,2-Tetrachloroethane	2004/06/10		88	%	74 - 123	
		1,2-Dibromoethane (EDB)	2004/06/10		88	%	40 - 130	
		1,2-Dichlorobenzene	2004/06/10		94	%	76 - 120	
		1,2-Dichloroethane	2004/06/10		92	%	85 - 117	
		cis-1,2-Dichloroethylene	2004/06/10		88	%	52 - 163	
		trans-1,2-Dichloroethylene	2004/06/10		83	%	79 - 120	
		1,2-Dichloropropane	2004/06/10		96	%	83 - 120	
		1,3-Dichlorobenzene	2004/06/10		93	%	79 - 116	
		cis-1,3-Dichloropropene	2004/06/10		87	%	61 - 118	
		trans-1,3-Dichloropropene	2004/06/10		89	%	65 - 121	



Conestoga-Rovers & Associates  
 Attention: Melissa Ford  
 Client Project #: 33095  
 P.O. #: 20-004178  
 Project name:

Quality Assurance Report (Continued)

Maxxam Job Number: MA426406

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits		
603153 SSS	Spiked Blank	1,4-Dichlorobenzene	2004/06/10		94	%	77 - 7		
		2-Chloroethylvinyl ether	2004/06/10		87	%	70 - 0		
		2-Hexanone	2004/06/10		85	%	40 - 130		
		Acetone	2004/06/10		92	%	40 - 130		
		Acrolein	2004/06/10		76	%	40 - 0		
		Acrylonitrile	2004/06/10		82	%	40 - 0		
		Benzene	2004/06/10		92	%	84 - 119		
		Bromodichloromethane	2004/06/10		94	%	70 - 131		
		Bromoform	2004/06/10		84	%	55 - 83		
		Bromomethane	2004/06/10		92	%	80 - 115		
		Carbon Tetrachloride	2004/06/10		85	%	74 - 119		
		Chlorobenzene	2004/06/10		92	%	80 - 116		
		Chloroethane	2004/06/10		92	%	81 - 121		
		Chloroform	2004/06/10		87	%	76 - 1		
		Chloromethane	2004/06/10		89	%	64 - 111		
		Dibromochloromethane	2004/06/10		89	%	60 - 136		
		Dichloromethane(Methylene Chloride)	2004/06/10		89	%	82 - 119		
		Ethylbenzene	2004/06/10		91	%	82 - 1		
		2-Butanone (Methyl Ethyl Ketone)	2004/06/10		101	%	40 - 1		
		Methyl t-butyl ether (MTBE)	2004/06/10		79	%	40 - 130		
		4-Methyl-2-Pentanone (MIBK)	2004/06/10		93	%	40 - 130		
		Styrene	2004/06/10		95	%	40 - 1		
		Tetrachloroethylene	2004/06/10		84	%	77 - 1		
		Toluene	2004/06/10		90	%	82 - 118		
		Trichloroethylene	2004/06/10		88	%	82 - 122		
		Trichlorofluoromethane (FREON 11)	2004/06/10		88	%	79 - 1		
		Vinyl Chloride	2004/06/10		90	%	79 - 1		
		o-Xylene	2004/06/10		95	%	83 - 117		
		p+m-Xylene	2004/06/10		93	%	84 - 115		
		Xylene (Total)	2004/06/10		188	%	N/A		
		Method Blank		4-Bromofluorobenzene	2004/06/10		100	%	75 - 11
				D4-1,2-Dichloroethane	2004/06/10		95	%	85 - 12
				D8-Toluene	2004/06/10		100	%	75 - 115
				1,1-Dichloroethane	2004/06/10	ND			ug/L
				1,1-Dichloroethylene	2004/06/10	ND			ug/L
				1,1,1-Trichloroethane	2004/06/10	ND			ug/L
				1,1,1,2-Tetrachloroethane	2004/06/10	ND			ug/L
				1,1,2-Trichloroethane	2004/06/10	ND			ug/L
				1,1,2,2-Tetrachloroethane	2004/06/10	ND			ug/L
				1,2-Dibromoethane (EDB)	2004/06/10	ND			ug/L
				1,2-Dichlorobenzene	2004/06/10	ND			ug/L
				1,2-Dichloroethane	2004/06/10	ND			ug/L
				cis-1,2-Dichloroethylene	2004/06/10	ND			ug/L
				trans-1,2-Dichloroethylene	2004/06/10	ND			ug/L
				1,2-Dichloropropane	2004/06/10	ND			ug/L
				1,3-Dichlorobenzene	2004/06/10	ND			ug/L
				cis-1,3-Dichloropropene	2004/06/10	ND			ug/L
				trans-1,3-Dichloropropene	2004/06/10	ND			ug/L
				1,4-Dichlorobenzene	2004/06/10	ND			ug/L
				2-Chloroethylvinyl ether	2004/06/10	ND			ug/L
2-Hexanone	2004/06/10			ND			ug/L		
Acetone	2004/06/10			ND			ug/L		
Acrolein	2004/06/10			ND			ug/L		
Acrylonitrile	2004/06/10			ND			ug/L		
Benzene	2004/06/10			ND			ug/L		
Bromodichloromethane	2004/06/10			ND			ug/L		

Quality Assurance Report (Continued)

Maxxam Job Number: MA426406

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
603153 SSS	Method Blank	Bromoform	2004/06/10	ND		ug/L	
		Bromomethane	2004/06/10	ND		ug/L	
		Carbon Tetrachloride	2004/06/10	ND		ug/L	
		Chlorobenzene	2004/06/10	ND		ug/L	
		Chloroethane	2004/06/10	ND		ug/L	
		Chloroform	2004/06/10	ND		ug/L	
		Chloromethane	2004/06/10	ND		ug/L	
		Dibromochloromethane	2004/06/10	ND		ug/L	
		Dichloromethane(Methylene Chloride)	2004/06/10	ND		ug/L	
		Ethylbenzene	2004/06/10	ND		ug/L	
		2-Butanone (Methyl Ethyl Ketone)	2004/06/10	ND		ug/L	
		Methyl t-butyl ether (MTBE)	2004/06/10	ND		ug/L	
		4-Methyl-2-Pentanone (MIBK)	2004/06/10	ND		ug/L	
		Styrene	2004/06/10	ND		ug/L	
		Tetrachloroethylene	2004/06/10	ND		ug/L	
		Toluene	2004/06/10	ND		ug/L	
		Trichloroethylene	2004/06/10	ND		ug/L	
		Trichlorofluoromethane (FREON 11)	2004/06/10	ND		ug/L	
		Vinyl Chloride	2004/06/10	ND		ug/L	
		o-Xylene	2004/06/10	ND		ug/L	
		p+m-Xylene	2004/06/10	ND		ug/L	
		Xylene (Total)	2004/06/10	ND		ug/L	
		603154 RM	Spiked Blank	Total Trihalomethanes	2004/06/10	ND	
4-Bromofluorobenzene	2004/06/10				105	%	60 - 120
D4-1,2-Dichloroethane	2004/06/10				92	%	84 - 120
D8-Toluene	2004/06/10				101	%	74 - 120
1,1-Dichloroethane	2004/06/10				88	%	79 - 120
1,1-Dichloroethylene	2004/06/10				86	%	80 - 120
1,1,1-Trichloroethane	2004/06/10				87	%	70 - 132
1,1,1,2-Tetrachloroethane	2004/06/10				89	%	40 - 130
1,1,2-Trichloroethane	2004/06/10				96	%	81 - 120
1,1,2,2-Tetrachloroethane	2004/06/10				88	%	74 - 123
1,2-Dibromoethane (EDB)	2004/06/10				88	%	40 - 130
1,2-Dichlorobenzene	2004/06/10				94	%	76 - 120
1,2-Dichloroethane	2004/06/10				92	%	85 - 117
cis-1,2-Dichloroethylene	2004/06/10				88	%	52 - 163
trans-1,2-Dichloroethylene	2004/06/10				83	%	79 - 120
1,2-Dichloropropane	2004/06/10				96	%	83 - 120
1,3-Dichlorobenzene	2004/06/10				93	%	79 - 116
cis-1,3-Dichloropropene	2004/06/10				87	%	61 - 118
trans-1,3-Dichloropropene	2004/06/10				89	%	65 - 121
1,4-Dichlorobenzene	2004/06/10				94	%	77 - 117
Acetone	2004/06/10				92	%	40 - 130
Benzene	2004/06/10				92	%	84 - 119
Bromodichloromethane	2004/06/10				94	%	70 - 131
Bromoform	2004/06/10				84	%	55 - 138
Bromomethane	2004/06/10				92	%	80 - 125
Carbon Tetrachloride	2004/06/10				85	%	74 - 129
Chlorobenzene	2004/06/10				92	%	80 - 116
Chloroform	2004/06/10				87	%	76 - 120
Dibromochloromethane	2004/06/10				89	%	60 - 136
Dichloromethane(Methylene Chloride)	2004/06/10				89	%	82 - 119
Ethylbenzene	2004/06/10				91	%	82 - 115
2-Butanone (Methyl Ethyl Ketone)	2004/06/10				101	%	40 - 130
Methyl t-butyl ether (MTBE)	2004/06/10				79	%	40 - 130
4-Methyl-2-Pentanone (MIBK)	2004/06/10		93	%	40 - 130		



Conestoga-Rovers & Associates  
 Attention: Melissa Ford  
 Client Project #: 33095  
 P.O. #: 20-004178  
 Project name:

Quality Assurance Report (Continued)

Maxxam Job Number: MA426406

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits		
603154 RM	Spiked Blank	Styrene	2004/06/10		95	%	40 - 100		
		Tetrachloroethylene	2004/06/10		84	%	77 - 100		
		Toluene	2004/06/10		90	%	82 - 118		
		Trichloroethylene	2004/06/10		88	%	82 - 122		
		Vinyl Chloride	2004/06/10		90	%	79 - 109		
		o-Xylene	2004/06/10		95	%	83 - 117		
		p+m-Xylene	2004/06/10		93	%	84 - 115		
		2-Chloroethylvinyl ether	2004/06/10		87	%	70 - 130		
		Chloroethane	2004/06/10		92	%	81 - 101		
		Chloromethane	2004/06/10		89	%	64 - 100		
		Trichlorofluoromethane (FREON 11)	2004/06/10		88	%	79 - 100		
		Xylene (Total)	2004/06/10		78	%	N/A		
		Method Blank	4-Bromofluorobenzene	2004/06/10			100	%	60 - 120
			D4-1,2-Dichloroethane	2004/06/10			95	%	84 - 100
	D8-Toluene		2004/06/10			100	%	74 - 100	
	1,1-Dichloroethane		2004/06/10	ND			ug/g		
	1,1-Dichloroethylene		2004/06/10	ND			ug/g		
	1,1,1-Trichloroethane		2004/06/10	ND			ug/g		
	1,1,1,2-Tetrachloroethane		2004/06/10	ND			ug/g		
	1,1,2-Trichloroethane		2004/06/10	ND			ug/g		
	1,1,2,2-Tetrachloroethane		2004/06/10	ND			ug/g		
	1,2-Dibromoethane (EDB)		2004/06/10	ND			ug/g		
	1,2-Dichlorobenzene		2004/06/10	ND			ug/g		
	1,2-Dichloroethane		2004/06/10	ND			ug/g		
	cis-1,2-Dichloroethylene		2004/06/10	ND			ug/g		
	trans-1,2-Dichloroethylene	2004/06/10	ND			ug/g			
	1,2-Dichloropropane	2004/06/10	ND			ug/g			
1,3-Dichlorobenzene	2004/06/10	ND			ug/g				
cis-1,3-Dichloropropene	2004/06/10	ND			ug/g				
trans-1,3-Dichloropropene	2004/06/10	ND			ug/g				
1,4-Dichlorobenzene	2004/06/10	ND			ug/g				
Acetone	2004/06/10	ND			ug/g				
Benzene	2004/06/10	ND			ug/g				
Bromodichloromethane	2004/06/10	ND			ug/g				
Bromoform	2004/06/10	ND			ug/g				
Bromomethane	2004/06/10	ND			ug/g				
Carbon Tetrachloride	2004/06/10	ND			ug/g				
Chlorobenzene	2004/06/10	ND			ug/g				
Chloroform	2004/06/10	ND			ug/g				
Dibromochloromethane	2004/06/10	ND			ug/g				
Dichloromethane(Methylene Chloride)	2004/06/10	ND			ug/g				
Ethylbenzene	2004/06/10	ND			ug/g				
2-Butanone (Methyl Ethyl Ketone)	2004/06/10	ND			ug/g				
Methyl t-butyl ether (MTBE)	2004/06/10	ND			ug/g				
4-Methyl-2-Pentanone (MIBK)	2004/06/10	ND			ug/g				
Styrene	2004/06/10	ND			ug/g				
Tetrachloroethylene	2004/06/10	ND			ug/g				
Toluene	2004/06/10	ND			ug/g				
Trichloroethylene	2004/06/10	ND			ug/g				
Vinyl Chloride	2004/06/10	ND			ug/g				
o-Xylene	2004/06/10	ND			ug/g				
p+m-Xylene	2004/06/10	ND			ug/g				
2-Chloroethylvinyl ether	2004/06/10	ND			ug/g				
Chloroethane	2004/06/10	ND			ug/g				
Chloromethane	2004/06/10	ND			ug/g				
Trichlorofluoromethane (FREON 11)	2004/06/10	ND			ug/g				



Conestoga-Rovers & Associates  
 Attention: Melissa Ford  
 Client Project #: 33095  
 P.O. #: 20-004178  
 Project name:

Quality Assurance Report (Continued)  
 Maxxam Job Number: MA426406

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
603154 RM	Method Blank	Xylene (Total)	2004/06/10	ND		ug/g	
603247 TJO	MATRIX SPIKE	Total Cyanide (CN)	2004/06/10		89	%	75 - 125
	QC STANDARD	Total Cyanide (CN)	2004/06/10		113	%	85 - 115
	Spiked Blank	Total Cyanide (CN)	2004/06/10		96	%	75 - 125
	Method Blank	Total Cyanide (CN)	2004/06/10	ND		mg/L	
	RPD	Total Cyanide (CN)	2004/06/10	NC		%	20
603250 MC	MATRIX SPIKE	Total Mercury (Hg)	2004/06/10		92	%	75 - 125
	QC STANDARD	Total Mercury (Hg)	2004/06/10		93	%	88 - 115
	Spiked Blank	Total Mercury (Hg)	2004/06/10		97	%	88 - 115
	Method Blank	Total Mercury (Hg)	2004/06/10	ND		mg/L	
	RPD	Total Mercury (Hg)	2004/06/10	NC		%	20
603771 NMO	Spiked Blank	2-Fluorobiphenyl	2004/06/14		81	%	40 - 130
		D14-Terphenyl	2004/06/14		82	%	40 - 130
		D5-Nitrobenzene	2004/06/14		67	%	40 - 130
		Naphthalene	2004/06/14		84	%	40 - 140
		Acenaphthylene	2004/06/14		89	%	40 - 140
		Acenaphthene	2004/06/14		89	%	40 - 140
		Fluorene	2004/06/14		92	%	40 - 140
		Phenanthrene	2004/06/14		93	%	40 - 140
		Anthracene	2004/06/14		104	%	40 - 140
		Fluoranthene	2004/06/14		93	%	40 - 140
		Pyrene	2004/06/14		94	%	40 - 140
		Benzo(a)anthracene	2004/06/14		92	%	40 - 140
		Chrysene	2004/06/14		90	%	40 - 140
		Benzo(b)fluoranthene	2004/06/14		96	%	40 - 140
		Benzo(j)fluoranthene	2004/06/14		84	%	40 - 140
		Benzo(k)fluoranthene	2004/06/14		87	%	40 - 140
		Benzo(a)pyrene	2004/06/14		89	%	40 - 140
		Indeno(1,2,3-cd)pyrene	2004/06/14		89	%	40 - 140
		Dibenzo(a,h)anthracene	2004/06/14		104	%	40 - 140
		Benzo(ghi)perylene	2004/06/14		90	%	40 - 140
	Method Blank	2-Fluorobiphenyl	2004/06/14		76	%	40 - 130
		D14-Terphenyl	2004/06/14		83	%	40 - 130
		D5-Nitrobenzene	2004/06/14		80	%	40 - 130
		Naphthalene	2004/06/14	ND		ug/L	
		Acenaphthylene	2004/06/14	ND		ug/L	
		Acenaphthene	2004/06/14	ND		ug/L	
		Fluorene	2004/06/14	ND		ug/L	
		Phenanthrene	2004/06/14	ND		ug/L	
		Anthracene	2004/06/14	ND		ug/L	
		Fluoranthene	2004/06/14	ND		ug/L	
		Pyrene	2004/06/14	ND		ug/L	
		Benzo(a)anthracene	2004/06/14	ND		ug/L	
		Chrysene	2004/06/14	ND		ug/L	
		Benzo(b)fluoranthene	2004/06/14	ND		ug/L	
		Benzo(j)fluoranthene	2004/06/14	ND		ug/L	
		Benzo(k)fluoranthene	2004/06/14	ND		ug/L	
		Benzo(a)pyrene	2004/06/14	ND		ug/L	
		Indeno(1,2,3-cd)pyrene	2004/06/14	ND		ug/L	
		Dibenzo(a,h)anthracene	2004/06/14	ND		ug/L	
		Benzo(ghi)perylene	2004/06/14	ND		ug/L	
603949 ISI	QC STANDARD	Hot Water Ext. Boron (B)	2004/06/11		98	%	77 - 121
	Method Blank	Hot Water Ext. Boron (B)	2004/06/11	ND		ug/g	
604213 MC	MATRIX SPIKE	Acid Extractable Mercury (Hg)	2004/06/14		88	%	75 - 125
	QC STANDARD	Acid Extractable Mercury (Hg)	2004/06/14		105	%	N/A
	Spiked Blank	Acid Extractable Mercury (Hg)	2004/06/14		98	%	75 - 125

Mississauga: 5540 McAdam Road L4Z 1P1 Telephone(905) 890-2555 FAX(905) 890-0370



Quality Assurance Report (Continued)  
 Maxxam Job Number: MA426406

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
604213 MC	Method Blank	Acid Extractable Mercury (Hg)	2004/06/14	ND		ug/g	
	RPD	Acid Extractable Mercury (Hg)	2004/06/14	NC		%	0
604226 TJO	MATRIX SPIKE	Chromium (VI)	2004/06/14		102	%	75 - 125
	QC STANDARD	Chromium (VI)	2004/06/14		96	%	85 - 115
	Spiked Blank	Chromium (VI)	2004/06/14		102	%	75 - 125
	Method Blank	Chromium (VI)	2004/06/14	ND		mg/L	
	RPD	Chromium (VI)	2004/06/14	NC		%	20
604227 TJO	MATRIX SPIKE	Chromium (VI)	2004/06/14		102	%	75 - 125
	QC STANDARD	Chromium (VI)	2004/06/14		103	%	85 - 115
	Spiked Blank	Chromium (VI)	2004/06/14		102	%	75 - 125
	Method Blank	Chromium (VI)	2004/06/14	ND		ug/g	
	RPD	Chromium (VI)	2004/06/14	NC		%	20
604261 KR	MATRIX SPIKE	Phenol-4AAP	2004/06/14		97	%	75 - 125
	QC STANDARD	Phenol-4AAP	2004/06/14		88	%	80 - 115
	Spiked Blank	Phenol-4AAP	2004/06/14		100	%	75 - 125
	Method Blank	Phenol-4AAP	2004/06/14	ND		mg/L	
	RPD	Phenol-4AAP	2004/06/14	NC		%	20
604290 LJC	Spiked Blank	Dissolved Antimony (Sb)	2004/06/14		94	%	82 - 115
		Dissolved Arsenic (As)	2004/06/14		99	%	86 - 115
		Dissolved Barium (Ba)	2004/06/14		100	%	83 - 115
		Dissolved Beryllium (Be)	2004/06/14		104	%	85 - 132
		Dissolved Boron (B)	2004/06/14		99	%	78 - 115
		Dissolved Cadmium (Cd)	2004/06/14		91	%	85 - 115
		Dissolved Chromium (Cr)	2004/06/14		99	%	76 - 120
		Dissolved Cobalt (Co)	2004/06/14		98	%	82 - 117
		Dissolved Copper (Cu)	2004/06/14		98	%	79 - 115
		Dissolved Lead (Pb)	2004/06/14		119	%	80 - 115
		Dissolved Molybdenum (Mo)	2004/06/14		90	%	82 - 117
		Dissolved Nickel (Ni)	2004/06/14		96	%	81 - 117
		Dissolved Selenium (Se)	2004/06/14		96	%	82 - 115
		Dissolved Silver (Ag)	2004/06/14		101	%	75 - 125
		Dissolved Sodium (Na)	2004/06/14		107	%	75 - 125
		Dissolved Thallium (Tl)	2004/06/14		104	%	80 - 129
		Dissolved Vanadium (V)	2004/06/14		99	%	82 - 115
		Dissolved Zinc (Zn)	2004/06/14		100	%	80 - 125
	Method Blank	Dissolved Antimony (Sb)	2004/06/14	ND		mg/L	
		Dissolved Arsenic (As)	2004/06/14	ND		mg/L	
		Dissolved Barium (Ba)	2004/06/14	ND		mg/L	
		Dissolved Beryllium (Be)	2004/06/14	ND		mg/L	
		Dissolved Boron (B)	2004/06/14	ND		mg/L	
		Dissolved Cadmium (Cd)	2004/06/14	ND		mg/L	
		Dissolved Chromium (Cr)	2004/06/14	ND		mg/L	
		Dissolved Cobalt (Co)	2004/06/14	ND		mg/L	
		Dissolved Copper (Cu)	2004/06/14	ND		mg/L	
		Dissolved Lead (Pb)	2004/06/14	ND		mg/L	
		Dissolved Molybdenum (Mo)	2004/06/14	ND		mg/L	
		Dissolved Nickel (Ni)	2004/06/14	ND		mg/L	
		Dissolved Selenium (Se)	2004/06/14	ND		mg/L	
		Dissolved Silver (Ag)	2004/06/14	ND		mg/L	
		Dissolved Sodium (Na)	2004/06/14	ND		mg/L	
		Dissolved Thallium (Tl)	2004/06/14	ND		mg/L	
		Dissolved Vanadium (V)	2004/06/14	ND		mg/L	
		Dissolved Zinc (Zn)	2004/06/14	ND		mg/L	
604327 ISI	QC STANDARD	Acid Extractable Barium (Ba)	2004/06/14		103	%	83 - 119
		Acid Extractable Beryllium (Be)	2004/06/14		103	%	76 - 115
		Acid Extractable Cadmium (Cd)	2004/06/14		101	%	75 - 117

Quality Assurance Report (Continued)  
 Maxxam Job Number: MA426406

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits		
604327 ISI	QC STANDARD	Acid Extractable Chromium (Cr)	2004/06/14		99	%	90 - 110		
		Acid Extractable Cobalt (Co)	2004/06/14		102	%	77 - 119		
		Acid Extractable Copper (Cu)	2004/06/14		99	%	73 - 120		
		Acid Extractable Lead (Pb)	2004/06/14		101	%	76 - 119		
		Acid Extractable Molybdenum (Mo)	2004/06/14		103	%	76 - 120		
		Acid Extractable Nickel (Ni)	2004/06/14		100	%	79 - 118		
		Acid Extractable Silver (Ag)	2004/06/14		101	%	90 - 109		
		Acid Extractable Vanadium (V)	2004/06/14		101	%	90 - 110		
		Acid Extractable Zinc (Zn)	2004/06/14		101	%	80 - 115		
		Method Blank	Acid Extractable Barium (Ba)	2004/06/14		ND		ug/g	
			Acid Extractable Beryllium (Be)	2004/06/14		ND		ug/g	
			Acid Extractable Cadmium (Cd)	2004/06/14		ND		ug/g	
			Acid Extractable Chromium (Cr)	2004/06/14		ND		ug/g	
	Acid Extractable Cobalt (Co)		2004/06/14		ND		ug/g		
	Acid Extractable Copper (Cu)		2004/06/14		0.9		ug/g		
	Acid Extractable Lead (Pb)		2004/06/14		ND		ug/g		
	604370 MC	QC STANDARD	Acid Extractable Molybdenum (Mo)	2004/06/14		ND	ug/g		
			Acid Extractable Nickel (Ni)	2004/06/14		ND	ug/g		
		Method Blank	Acid Extractable Silver (Ag)	2004/06/14		1.1		ug/g	
			Acid Extractable Vanadium (V)	2004/06/14		0.4		ug/g	
Acid Extractable Zinc (Zn)			2004/06/14		0.4		ug/g		
Acid Extractable Arsenic (As)			2004/06/14			107	%	30 - 170	
Acid Extractable Antimony (Sb)			2004/06/14		ND		ug/g		
Acid Extractable Arsenic (As)			2004/06/14		ND		ug/g		
Acid Extractable Selenium (Se)			2004/06/14		ND		ug/g		
Acid Extractable Thallium (Tl)			2004/06/14		ND		ug/g		
604802 KR	RPD	Acid Extractable Arsenic (As)	2004/06/14		NC	%	20		
	MATRIX SPIKE	Phenol-4AAP	2004/06/15			%	75 - 125		
		QC STANDARD	Phenol-4AAP	2004/06/15		96	%	80 - 115	
	Method Blank	Spiked Blank	Phenol-4AAP	2004/06/15		100	%	75 - 125	
		Method Blank	Phenol-4AAP	2004/06/15	0.01		ug/g		
	RPD	Phenol-4AAP	2004/06/15		NC	%	20		

ND = Not detected  
 N/A = Not Applicable  
 NC = Non-calculable  
 RPD = Relative Percent Difference  
 QC Standard = Quality Control Standard  
 SPIKE = Fortified sample

Mississauga: 5540 McAdam Road L4Z 1P1 Telephone(905) 890-2555 FAX(905) 890-0370

MAXXAM ANALYTICS INC.  
Mississauga - Ontario  
5540 McADAM ROAD  
MISSISSAUGA, ON  
Canada L4Z 1P1

**Attention: JAMIE JOHNSTON**

**Report Date: 2004/06/16**  
**Report #: NM-1198**

Your Project #: A426406

**ANALYTICAL REPORT**

**MAXXAM JOB #: A409608**

**Received: 2004/06/10, 10:30**

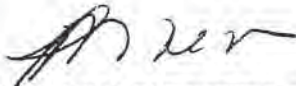
Sample Matrix: SOIL  
# Samples Received: 2

<u>Analyses</u>	<u>Quantity</u>	<u>Date</u> <u>Extracted</u>	<u>Date</u> <u>Analyzed</u>	<u>Laboratory Method</u>	<u>Analytical Metho</u>
Total Cyanide	2	2004/06/14	2004/06/14	Que SOP-0076:Rev3	Colorimetry

MAXXAM ANALYTIQUE INC.



NATHALIE MARION, B.Sc.  
Technical representative



LORENA DI BENEDETTO, B.Sc., Chemist  
Operations Manager



NM/sb3  
encl.

**CONVENTIONAL PARAMETERS (SOIL)**

Maxxam ID		680188	680189		
Sampling Date		2004/06/08	2004/06/08		
	<b>Units</b>	<b>SED-33095-060804-TB1</b>	<b>SED-33095-060804-TB2</b>	<b>DL</b>	<b>QC Batch</b>

% Moisture	%	17	16	N/A	N/A
<b>CONVENTIONALS</b>					
Total Cyanide (CN)	mg/kg	ND	ND	0.5	256607

ND = Not detected  
N/A = Not Applicable  
DL = Detection Limit  
QC Batch = Quality Control Batch  
Please check for attached comments

**GENERAL COMMENTS**

Condition of sample(s) upon receipt: GOOD

All results are calculated on a dry weight basis except where not applicable.

**CONVENTIONAL PARAMETERS (SOIL)**

Please note that the results have not been corrected for QC recoveries. Please note that the results have been corrected for the blank.

Results relate only to the items tested.

This report dated: 2004/06/16 replaces all previous reports.

Quality Assurance Report  
 Maxxam Job Number: A409608

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units
256607 DB1	QC STANDARD	Total Cyanide (CN)	2004/06/14		95	%
	BLANK	Total Cyanide (CN)	2004/06/14	ND		mg/kg

ND = Not detected  
 QC Standard = Quality Control Standard

# CHAIN OF CUSTODY RECORD

**CRA**  
 CONESTOGA-ROVERS & ASSOCIATES  
 651 Colby Drive  
 Waterloo, Ont. N2V 1C2 (519)884-0510

SHIPPED TO (Laboratory Name):

**MAXXAM**

REFERENCE NUMBER:

**33095**

MA 47640  
 A-1-1-1

SAMPLER'S SIGNATURE: *[Signature]* PRINTED NAME: **Trevor Bastie**

SEQ. No.	DATE	TIME	SAMPLE No.	SAMPLE TYPE	PARAMETERS			REMARKS
					NO OF CONTAINERS	Metals	THRS	
	06/09/04		SW-33095-060804-TB1	water	9	X	X	
			SW-33095-060804-TB2	water	9	X	X	
			SED-33095-060804-TB1		3	X	X	
			SED-33095-060804-TB2		3	X	X	
								Pls per m. Sands correspondence
								Metals samples not field filtered - please lab filter

TOTAL NUMBER OF CONTAINERS: **24** HEALTH/CHEMICAL HAZARDS

RELINQUISHED BY: *[Signature]* DATE: 06/09/04 TIME: 4pm  
 RECEIVED BY: *[Signature]* DATE: 2006-06-09 TIME: 2:00pm

RELINQUISHED BY: *[Signature]* DATE: 2006-06-09 TIME: 2:00pm  
 RECEIVED BY: *[Signature]* DATE: 2006-06-09 TIME: 2:00pm

RELINQUISHED BY: *[Signature]* DATE: 2006-06-09 TIME: 2:00pm  
 RECEIVED BY: *[Signature]* DATE: 2006-06-09 TIME: 2:00pm

METHOD OF SHIPMENT: **WAY BILL No.**

White  
 Yellow  
 Pink  
 Goldenrod

SAMPLE TEAM: **T. Bastie**

RECEIVED FOR LABORATORY BY: *[Signature]*

DATE: 06/17/04 TIME: 17:45

LAB NO: **26297**

Conestoga-Rovers & Associates  
Bathurst  
651 Colby Dr  
Waterloo, ON  
N2V 1C2

33095  
MONITORING DATA

**Attention: Melissa Ford**

**Report Date: 2004/07/2**

Your P.O. #: 20-004178  
Your Project #: 33095

**ANALYTICAL REPORT**

**MAXXAM JOB #: A425898**

**Received: 2004/06/04, 17:00**

Sample Matrix: LIQUID  
# Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Chromium (VI)	5	N/A	2004/06/08	Ont SOP 0104	EPA 7196
Total Cyanide	1	2004/06/08	2004/06/08		EPA 9012 Modified
Total Cyanide	4	2004/06/09	2004/06/09		EPA 9012 Modified
Total Metals Analysis of Water by GF	5	2004/06/14	2004/06/14	Ont SOP 0095	EPA 7010
Mercury	5	2004/06/09	2004/06/09	Ont SOP 0112	EPA 7470
Total Metals Analysis of Water by ICP	5	2004/06/15	2004/06/15	Ont SOP 0072	EPA 6010
Polycyclic Aromatic Hydrocarbons (PAH)	5	2004/06/09	2004/06/09	EPA 8270	GC/MS
Phenol (4AAP)	5	N/A	2004/06/10	Ont SOP 0113	EPA 9066
Volatile Organic Compounds	6	N/A	2004/06/08	Ont SOP 0126	EPA 8260

MAXXAM ANALYTICS INC.



SAMI JAMOKHA, M.Sc., C.Chem.



TROY CARRIÈRE, B.Sc.  
Inorganics Supervisor, Environmental Division

SJA/lt  
encl.

Total cover pages: 1





Maxxam Job #: A425898  
 Report Date: 2004/07/22

Conestoga-Rovers & Associates  
 Client Project #: 33095  
 Project name:  
 Your P.O. #: 20-004178  
 Sampler Initials:

**RESULTS OF ANALYSES OF LIQUID**

Maxxam ID		C88750		C88756		
Sampling Date		2004/06/04		2004/06/04		
	Units	GW-33095-060404-TB-BH6D	DL	GW-33095-060404-TB-BH5	DL	QA Batch

<b>CONVENTIONALS</b>						
Phenol-4AAP	mg/L	ND	0.001	ND	0.001	603145
Total Cyanide (CN)	mg/L	1.04	0.05	0.096	0.005	602870

ND = Not detected  
 QC Batch = Quality Control Batch  
 Please check for attached comments

Maxxam ID		C88757		C88758		
Sampling Date		2004/06/04		2004/06/04		
	Units	GW-33095-060404-TB-BH6	DL	QA Batch	GW-33095-060404-TB-BH100	DL QA Batch

<b>CONVENTIONALS</b>						
Phenol-4AAP	mg/L	ND	0.001	603145	ND	0.001 603146
Total Cyanide (CN)	mg/L	0.21	0.05	602870	0.099	0.005 602870

ND = Not detected  
 QC Batch = Quality Control Batch  
 Please check for attached comments

Maxxam ID		C88763			
Sampling Date		2004/06/04			
	Units	GW-33095-060404-TB-BH200	DL	QA Batch	

<b>CONVENTIONALS</b>					
Phenol-4AAP	mg/L	ND	0.001	603146	
Total Cyanide (CN)	mg/L	ND	0.005	602280	

ND = Not detected  
 QC Batch = Quality Control Batch  
 Please check for attached comments

**ELEMENTS BY ATOMIC SPECTROSCOPY (LIQUID)**

Maxxam ID		C88750	C88756	C88757		
Sampling Date		2004/06/04	2004/06/04	2004/06/04		
	Units	GW-33095-060404-TB-BH6D	GW-33095-060404-TB-BH5	GW-33095-060404-TB-BH6	DL	QA Batch

CONVENTIONALS						
Chromium (VI)	mg/L	ND	ND	ND	0.005	602287
METALS						
Total Barium (Ba)	mg/L	0.106	0.098	0.051	0.001	604722
Total Beryllium (Be)	mg/L	ND	ND	ND	0.001	604722
Total Boron (B)	mg/L	0.091	0.077	0.077	0.005	604722
Total Cadmium (Cd)	mg/L	ND	ND	ND	0.003	604722
Total Chromium (Cr)	mg/L	ND	ND	ND	0.005	604722
Total Cobalt (Co)	mg/L	ND	ND	ND	0.005	604722
Total Copper (Cu)	mg/L	ND	ND	ND	0.004	604722
Total Lead (Pb)	mg/L	ND	ND	ND	0.025	604722
Total Mercury (Hg)	mg/L	ND	ND	ND	0.0001	602662
Total Molybdenum (Mo)	mg/L	ND	0.007	ND	0.006	604722
Total Nickel (Ni)	mg/L	ND	ND	ND	0.01	604722
Total Silver (Ag)	mg/L	ND	ND	ND	0.007	604722
Total Sodium (Na)	mg/L	1070	1370	983	0.9	604722
Total Vanadium (V)	mg/L	ND	ND	ND	0.003	604722
Total Zinc (Zn)	mg/L	0.005	0.053	0.008	0.003	604722
METALS						
Total Antimony (Sb)	mg/L	ND	ND	ND	0.002	604666
Total Arsenic (As)	mg/L	ND	0.097	ND	0.002	604666
Total Selenium (Se)	mg/L	0.005	0.004	0.005	0.002	604666
Total Thallium (Tl)	mg/L	0.002	0.007	0.003	0.002	604666

ND = Not detected  
QC Batch = Quality Control Batch  
Please check for attached comments

**ELEMENTS BY ATOMIC SPECTROSCOPY (LIQUID)**

Maxxam ID		C88758		C88763		
Sampling Date		2004/06/04		2004/06/04		
	Units	GW-33095-060404-TB-BH100	DL	GW-33095-060404-TB-BH200	DL	QA Batch

CONVENTIONALS						
Chromium (VI)	mg/L	ND	0.005	ND	0.005	602287
METALS						
Total Barium (Ba)	mg/L	0.100	0.001	ND	0.001	604722
Total Beryllium (Be)	mg/L	ND	0.001	ND	0.001	604722
Total Boron (B)	mg/L	0.081	0.005	ND	0.005	604722
Total Cadmium (Cd)	mg/L	ND	0.003	ND	0.003	604722
Total Chromium (Cr)	mg/L	ND	0.005	ND	0.005	604722
Total Cobalt (Co)	mg/L	ND	0.005	ND	0.005	604722
Total Copper (Cu)	mg/L	ND	0.004	ND	0.004	604722
Total Lead (Pb)	mg/L	ND	0.025	ND	0.025	604722
Total Mercury (Hg)	mg/L	ND	0.0001	ND	0.0001	602662
Total Molybdenum (Mo)	mg/L	0.011	0.006	ND	0.006	604722
Total Nickel (Ni)	mg/L	ND	0.01	ND	0.01	604722
Total Silver (Ag)	mg/L	ND	0.007	ND	0.007	604722
Total Sodium (Na)	mg/L	1400	0.9	0.79	0.09	604722
Total Vanadium (V)	mg/L	ND	0.003	ND	0.003	604722
Total Zinc (Zn)	mg/L	0.028	0.003	ND	0.003	604722
METALS						
Total Antimony (Sb)	mg/L	0.002	0.002	ND	0.002	604666
Total Arsenic (As)	mg/L	0.102	0.002	ND	0.002	604666
Total Selenium (Se)	mg/L	0.006	0.002	ND	0.002	604666
Total Thallium (Tl)	mg/L	0.005	0.002	0.003	0.002	604666

ND = Not detected  
QC Batch = Quality Control Batch  
Please check for attached comments



Maxxam Job #: A425898  
 Report Date: 2004/07/22

Conestoga-Rovers & Associates  
 Client Project #: 33095  
 Project name:  
 Your P.O. #: 20-004178  
 Sampler Initials:

**VOLATILE ORGANICS BY GC-MS (LIQUID)**

Maxxam ID		C88747	C88750		
Sampling Date		2004/06/04	2004/06/04		
	Units	GW-33095-060404-TB-BH1	GW-33095-060404-TB-BH6D	DL	QA Batch

VOLATILES					
1,1-Dichloroethane	ug/L	ND	ND	0.4	602215
1,1-Dichloroethylene	ug/L	ND	ND	0.5	602215
1,1,1-Trichloroethane	ug/L	ND	ND	0.5	602215
1,1,1,2-Tetrachloroethane	ug/L	ND	ND	0.5	602215
1,1,2-Trichloroethane	ug/L	ND	ND	0.5	602215
1,1,2,2-Tetrachloroethane	ug/L	ND	ND	1	602215
1,2-Dibromoethane (EDB)	ug/L	ND	ND	0.5	602215
1,2-Dichlorobenzene	ug/L	ND	ND	0.5	602215
1,2-Dichloroethane	ug/L	ND	ND	0.5	602215
cis-1,2-Dichloroethylene	ug/L	ND	ND	1	602215
trans-1,2-Dichloroethylene	ug/L	ND	ND	1	602215
1,2-Dichloropropane	ug/L	ND	ND	0.5	602215
1,3-Dichlorobenzene	ug/L	ND	ND	0.5	602215
cis-1,3-Dichloropropene	ug/L	ND	ND	0.14	602215
trans-1,3-Dichloropropene	ug/L	ND	ND	0.14	602215
1,4-Dichlorobenzene	ug/L	ND	ND	0.5	602215
2-Chloroethylvinyl ether	ug/L	ND	ND	10	602215
2-Hexanone	ug/L	ND	ND	10	602215
Acetone	ug/L	ND	ND	15	602215
Acrolein	ug/L	ND	ND	10	602215
Acrylonitrile	ug/L	ND	ND	5	602215
Benzene	ug/L	ND	ND	0.5	602215
Bromodichloromethane	ug/L	ND	ND	0.2	602215
Bromoform	ug/L	ND	ND	0.2	602215
Bromomethane	ug/L	ND	ND	3	602215
Carbon Tetrachloride	ug/L	ND	ND	0.5	602215
Chlorobenzene	ug/L	ND	ND	0.5	602215
Chloroethane	ug/L	ND	ND	1	602215
Chloroform	ug/L	0.3	0.9	0.2	602215
Chloromethane	ug/L	ND	ND	2	602215
Dibromochloromethane	ug/L	ND	ND	0.2	602215
Dichloromethane(Methylene Chloride)	ug/L	ND	ND	1	602215
Ethylbenzene	ug/L	ND	ND	0.5	602215

ND = Not detected  
 QC Batch = Quality Control Batch  
 Please check for attached comments



Maxxam Job #: A425898  
 Report Date: 2004/07/22

Conestoga-Rovers & Associates  
 Client Project #: 33095  
 Project name:  
 Your P.O. #: 20-004178  
 Sampler Initials:

**VOLATILE ORGANICS BY GC-MS (LIQUID)**

Maxxam ID		C88747	C88750		
Sampling Date		2004/06/04	2004/06/04		
	Units	GW-33095-060404-TB-BH1	GW-33095-060404-TB-BH6D	DL	QA Batch
2-Butanone (Methyl Ethyl Ketone)	ug/L	ND	ND	15	602215
Methyl t-butyl ether (MTBE)	ug/L	ND	ND	2	602215
4-Methyl-2-Pentanone (MIBK)	ug/L	ND	ND	10	602215
Styrene	ug/L	ND	ND	0.5	602215
Tetrachloroethylene	ug/L	ND	ND	0.5	602215
Toluene	ug/L	ND	ND	0.5	602215
Trichloroethylene	ug/L	ND	ND	0.5	602215
Trichlorofluoromethane (FREON 11)	ug/L	ND	ND	2	602215
Vinyl Chloride	ug/L	ND	ND	0.2	602215
o-Xylene	ug/L	ND	ND	0.5	602215
p+m-Xylene	ug/L	ND	ND	0.5	602215
Xylene (Total)	ug/L	ND	ND	1	602215
Total Trihalomethanes	ug/L	ND	0.9	0.8	602215
<b>Surrogate Recovery (%)</b>					
4-Bromofluorobenzene	%	85	87		602215
D4-1,2-Dichloroethane	%	105	99		602215
D8-Toluene	%	103	101		602215
ND = Not detected QC Batch = Quality Control Batch Please check for attached comments					



Maxxam Job #: A425898  
 Report Date: 2004/07/22

Conestoga-Rovers & Associates  
 Client Project #: 33095  
 Project name:  
 Your P.O. #: 20-004178  
 Sampler Initials:

**VOLATILE ORGANICS BY GC-MS (LIQUID)**

Maxxam ID		C88756	C88757		
Sampling Date		2004/06/04	2004/06/04		
	Units	GW-33095-060404-TB-BH5	GW-33095-060404-TB-BH6	DL	QA Batch

VOLATILES					
1,1-Dichloroethane	ug/L	ND	ND	0.4	602215
1,1-Dichloroethylene	ug/L	ND	ND	0.5	602215
1,1,1-Trichloroethane	ug/L	ND	ND	0.5	602215
1,1,1,2-Tetrachloroethane	ug/L	ND	ND	0.5	602215
1,1,2-Trichloroethane	ug/L	ND	ND	0.5	602215
1,1,2,2-Tetrachloroethane	ug/L	ND	ND	1	602215
1,2-Dibromoethane (EDB)	ug/L	ND	ND	0.5	602215
1,2-Dichlorobenzene	ug/L	ND	ND	0.5	602215
1,2-Dichloroethane	ug/L	ND	ND	0.5	602215
cis-1,2-Dichloroethylene	ug/L	ND	ND	1	602215
trans-1,2-Dichloroethylene	ug/L	ND	ND	1	602215
1,2-Dichloropropane	ug/L	ND	ND	0.5	602215
1,3-Dichlorobenzene	ug/L	ND	ND	0.5	602215
cis-1,3-Dichloropropene	ug/L	ND	ND	0.14	602215
trans-1,3-Dichloropropene	ug/L	ND	ND	0.14	602215
1,4-Dichlorobenzene	ug/L	ND	ND	0.5	602215
2-Chloroethylvinyl ether	ug/L	ND	ND	10	602215
2-Hexanone	ug/L	ND	ND	10	602215
Acetone	ug/L	ND	ND	15	602215
Acrolein	ug/L	ND	ND	10	602215
Acrylonitrile	ug/L	ND	ND	5	602215
Benzene	ug/L	ND	ND	0.5	602215
Bromodichloromethane	ug/L	ND	ND	0.2	602215
Bromoform	ug/L	ND	ND	0.2	602215
Bromomethane	ug/L	ND	ND	3	602215
Carbon Tetrachloride	ug/L	ND	ND	0.5	602215
Chlorobenzene	ug/L	ND	ND	0.5	602215
Chloroethane	ug/L	ND	ND	1	602215
Chloroform	ug/L	ND	0.5	0.2	602215
Chloromethane	ug/L	ND	ND	2	602215
Dibromochloromethane	ug/L	ND	ND	0.2	602215
Dichloromethane(Methylene Chloride)	ug/L	ND	ND	1	602215
Ethylbenzene	ug/L	ND	ND	0.5	602215

ND = Not detected  
 QC Batch = Quality Control Batch  
 Please check for attached comments

**VOLATILE ORGANICS BY GC-MS (LIQUID)**

Maxxam ID		C88756	C88757		
Sampling Date		2004/06/04	2004/06/04		
	Units	GW-33095-060404-TB-BH5	GW-33095-060404-TB-BH6	DL	QA Batch
2-Butanone (Methyl Ethyl Ketone)	ug/L	ND	ND	15	602215
Methyl t-butyl ether (MTBE)	ug/L	ND	ND	2	602215
4-Methyl-2-Pentanone (MIBK)	ug/L	ND	ND	10	602215
Styrene	ug/L	ND	ND	0.5	602215
Tetrachloroethylene	ug/L	ND	ND	0.5	602215
Toluene	ug/L	ND	ND	0.5	602215
Trichloroethylene	ug/L	ND	ND	0.5	602215
Trichlorofluoromethane (FREON 11)	ug/L	ND	ND	2	602215
Vinyl Chloride	ug/L	ND	ND	0.2	602215
o-Xylene	ug/L	ND	ND	0.5	602215
p+m-Xylene	ug/L	ND	ND	0.5	602215
Xylene (Total)	ug/L	ND	ND	1	602215
Total Trihalomethanes	ug/L	ND	ND	0.8	602215
<b>Surrogate Recovery (%)</b>					
4-Bromofluorobenzene	%	85	86		602215
D4-1,2-Dichloroethane	%	99	98		602215
D8-Toluene	%	99	101		602215
ND = Not detected QC Batch = Quality Control Batch Please check for attached comments					

**VOLATILE ORGANICS BY GC-MS (LIQUID)**

Maxxam ID		C88758	C88763		
Sampling Date		2004/06/04	2004/06/04		
	Units	GW-33095-060404-TB-BH100	GW-33095-060404-TB-BH200	DL	QA Batch

VOLATILES					
1,1-Dichloroethane	ug/L	ND	ND	0.4	602215
1,1-Dichloroethylene	ug/L	ND	ND	0.5	602215
1,1,1-Trichloroethane	ug/L	ND	ND	0.5	602215
1,1,1,2-Tetrachloroethane	ug/L	ND	ND	0.5	602215
1,1,2-Trichloroethane	ug/L	ND	ND	0.5	602215
1,1,2,2-Tetrachloroethane	ug/L	ND	ND	1	602215
1,2-Dibromoethane (EDB)	ug/L	ND	ND	0.5	602215
1,2-Dichlorobenzene	ug/L	ND	ND	0.5	602215
1,2-Dichloroethane	ug/L	ND	ND	0.5	602215
cis-1,2-Dichloroethylene	ug/L	ND	ND	1	602215
trans-1,2-Dichloroethylene	ug/L	ND	ND	1	602215
1,2-Dichloropropane	ug/L	ND	ND	0.5	602215
1,3-Dichlorobenzene	ug/L	ND	ND	0.5	602215
cis-1,3-Dichloropropene	ug/L	ND	ND	0.14	602215
trans-1,3-Dichloropropene	ug/L	ND	ND	0.14	602215
1,4-Dichlorobenzene	ug/L	ND	ND	0.5	602215
2-Chloroethylvinyl ether	ug/L	ND	ND	10	602215
2-Hexanone	ug/L	ND	ND	10	602215
Acetone	ug/L	ND	ND	15	602215
Acrolein	ug/L	ND	ND	10	602215
Acrylonitrile	ug/L	ND	ND	5	602215
Benzene	ug/L	ND	ND	0.5	602215
Bromodichloromethane	ug/L	ND	ND	0.2	602215
Bromoform	ug/L	ND	ND	0.2	602215
Bromomethane	ug/L	ND	ND	3	602215
Carbon Tetrachloride	ug/L	ND	ND	0.5	602215
Chlorobenzene	ug/L	ND	ND	0.5	602215
Chloroethane	ug/L	ND	ND	1	602215
Chloroform	ug/L	ND	ND	0.2	602215
Chloromethane	ug/L	ND	ND	2	602215
Dibromochloromethane	ug/L	ND	ND	0.2	602215
Dichloromethane(Methylene Chloride)	ug/L	ND	ND	1	602215
Ethylbenzene	ug/L	ND	ND	0.5	602215

ND = Not detected  
QC Batch = Quality Control Batch  
Please check for attached comments





Maxxam Job #: A425898  
 Report Date: 2004/07/22

Conestoga-Rovers & Associates  
 Client Project #: 33095  
 Project name:  
 Your P.O. #: 20-004178  
 Sampler Initials:

**VOLATILE ORGANICS BY GC-MS (LIQUID)**

Maxxam ID		C88758	C88763		
Sampling Date		2004/06/04	2004/06/04		
	Units	GW-33095-060404-TB-BH100	GW-33095-060404-TB-BH200	DL	QA Batch
2-Butanone (Methyl Ethyl Ketone)	ug/L	ND	ND	15	602215
Methyl t-butyl ether (MTBE)	ug/L	ND	ND	2	602215
4-Methyl-2-Pentanone (MIBK)	ug/L	ND	ND	10	602215
Styrene	ug/L	ND	ND	0.5	602215
Tetrachloroethylene	ug/L	ND	ND	0.5	602215
Toluene	ug/L	ND	ND	0.5	602215
Trichloroethylene	ug/L	ND	ND	0.5	602215
Trichlorofluoromethane (FREON 11)	ug/L	ND	ND	2	602215
Vinyl Chloride	ug/L	ND	ND	0.2	602215
o-Xylene	ug/L	ND	ND	0.5	602215
p+m-Xylene	ug/L	ND	ND	0.5	602215
Xylene (Total)	ug/L	ND	ND	1	602215
Total Trihalomethanes	ug/L	ND	ND	0.8	602215
<b>Surrogate Recovery (%)</b>					
4-Bromofluorobenzene	%	82	83		602215
D4-1,2-Dichloroethane	%	98	97		602215
D8-Toluene	%	100	100		602215
ND = Not detected QC Batch = Quality Control Batch Please check for attached comments					



Maxxam Job #: A425898  
 Report Date: 2004/07/22

Conestoga-Rovers & Associates  
 Client Project #: 33095  
 Project name:  
 Your P.O. #: 20-004178  
 Sampler Initials:

**SEMI-VOLATILE ORGANICS BY GC-MS (LIQUID)**

Maxxam ID		C88750	C88756		
Sampling Date		2004/06/04	2004/06/04		
	Units	GW-33095-060404-TB-BH6D	GW-33095-060404-TB-BH5	DL	QA Batch

PAH'S					
Naphthalene	ug/L	ND	0.63	0.05	602836
Acenaphthylene	ug/L	ND	0.56	0.05	602836
Acenaphthene	ug/L	ND	0.25	0.05	602836
Fluorene	ug/L	ND	0.40	0.05	602836
Phenanthrene	ug/L	ND	3.31	0.05	602836
Anthracene	ug/L	ND	1.46	0.05	602836
Fluoranthene	ug/L	0.73	6.15	0.05	602836
Pyrene	ug/L	1.22	5.34	0.05	602836
Benzo(a)anthracene	ug/L	0.30	3.05	0.05	602836
Chrysene	ug/L	0.17	2.81	0.05	602836
Benzo(b)fluoranthene	ug/L	ND	2.92	0.05	602836
Benzo(j)fluoranthene	ug/L	ND	2.35	0.05	602836
Benzo(k)fluoranthene	ug/L	ND	2.04	0.05	602836
Benzo(a)pyrene	ug/L	ND	4.72	0.01	602836
Indeno(1,2,3-cd)pyrene	ug/L	ND	3.7	0.1	602836
Dibenzo(a,h)anthracene	ug/L	ND	0.8	0.1	602836
Benzo(ghi)perylene	ug/L	ND	3.8	0.1	602836
<b>Surrogate Recovery (%)</b>					
2-Fluorobiphenyl	%	***	43		602836
D14-Terphenyl	%	66	75		602836
D5-Nitrobenzene	%	49	45		602836

ND = Not detected  
 QC Batch = Quality Control Batch  
 Please check for attached comments

**SEMI-VOLATILE ORGANICS BY GC-MS (LIQUID)**

Maxxam ID		C88757	C88758		
Sampling Date		2004/06/04	2004/06/04		
	Units	GW-33095-060404-TB-BH6	GW-33095-060404-TB-BH100	DL	QA Batch

PAH'S					
Naphthalene	ug/L	ND	1.72	0.05	602836
Acenaphthylene	ug/L	ND	1.81	0.05	602836
Acenaphthene	ug/L	ND	0.76	0.05	602836
Fluorene	ug/L	ND	1.24	0.05	602836
Phenanthrene	ug/L	0.07	11.5	0.05	602836
Anthracene	ug/L	0.07	3.67	0.05	602836
Fluoranthene	ug/L	0.45	20.5	0.05	602836
Pyrene	ug/L	0.38	17.2	0.05	602836
Benzo(a)anthracene	ug/L	ND	8.59	0.05	602836
Chrysene	ug/L	0.13	8.26	0.05	602836
Benzo(b)fluoranthene	ug/L	0.10	8.87	0.05	602836
Benzo(j)fluoranthene	ug/L	0.10	5.83	0.05	602836
Benzo(k)fluoranthene	ug/L	0.09	5.28	0.05	602836
Benzo(a)pyrene	ug/L	0.16	11.8	0.01	602836
Indeno(1,2,3-cd)pyrene	ug/L	ND	10.2	0.1	602836
Dibenzo(a,h)anthracene	ug/L	ND	2.1	0.1	602836
Benzo(ghi)perylene	ug/L	ND	9.5	0.1	602836
Surrogate Recovery (%)					
2-Fluorobiphenyl	%	63	89		602836
D14-Terphenyl	%	56	103		602836
D5-Nitrobenzene	%	71	92		602836

ND = Not detected  
QC Batch = Quality Control Batch  
Please check for attached comments

**SEMI-VOLATILE ORGANICS BY GC-MS (LIQUID)**

Maxxam ID		C88763		
Sampling Date		2004/06/04		
	Units	GW-33095-060404-TB-BH200	DL	QA Batch

PAH'S				
Naphthalene	ug/L	0.08	0.05	602836
Acenaphthylene	ug/L	ND	0.05	602836
Acenaphthene	ug/L	ND	0.05	602836
Fluorene	ug/L	ND	0.05	602836
Phenanthrene	ug/L	ND	0.05	602836
Anthracene	ug/L	ND	0.05	602836
Fluoranthene	ug/L	ND	0.05	602836
Pyrene	ug/L	ND	0.05	602836
Benzo(a)anthracene	ug/L	ND	0.05	602836
Chrysene	ug/L	ND	0.05	602836
Benzo(b)fluoranthene	ug/L	ND	0.05	602836
Benzo(j)fluoranthene	ug/L	ND	0.05	602836
Benzo(k)fluoranthene	ug/L	ND	0.05	602836
Benzo(a)pyrene	ug/L	ND	0.01	602836
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.1	602836
Dibenzo(a,h)anthracene	ug/L	ND	0.1	602836
Benzo(ghi)perylene	ug/L	ND	0.1	602836
<b>Surrogate Recovery (%)</b>				
2-Fluorobiphenyl	%	87		602836
D14-Terphenyl	%	96		602836
D5-Nitrobenzene	%	93		602836

ND = Not detected  
QC Batch = Quality Control Batch  
Please check for attached comments



Maxxam Job #: A425898  
Report Date: 2004/07/22

Conestoga-Rovers & Associates  
Client Project #: 33095  
Project name:  
Your P.O. #: 20-004178  
Sampler Initials:

**GENERAL COMMENTS**

Sample C88750-01: For PAH-SIM-L Analysis;  
\*\*\*: surrogate compound could not be detected due to matrix effect.

**Results relate only to the items tested.**

Quality Assurance Report  
 Maxxam Job Number: MA425898

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
602215 SSS	Spiked Blank	4-Bromofluorobenzene	2004/06/08		111	%	75 - 115
		D4-1,2-Dichloroethane	2004/06/08		111	%	85 - 120
		D8-Toluene	2004/06/08		103	%	75 - 115
		1,1-Dichloroethane	2004/06/08		96	%	79 - 120
		1,1-Dichloroethylene	2004/06/08		94	%	80 - 120
		1,1,1-Trichloroethane	2004/06/08		93	%	70 - 132
		1,1,1,2-Tetrachloroethane	2004/06/08		93	%	40 - 130
		1,1,2-Trichloroethane	2004/06/08		94	%	81 - 120
		1,1,2,2-Tetrachloroethane	2004/06/08		95	%	74 - 123
		1,2-Dibromoethane (EDB)	2004/06/08		95	%	40 - 130
		1,2-Dichlorobenzene	2004/06/08		90	%	76 - 120
		1,2-Dichloroethane	2004/06/08		95	%	85 - 117
		cis-1,2-Dichloroethylene	2004/06/08		93	%	52 - 163
		trans-1,2-Dichloroethylene	2004/06/08		97	%	79 - 120
		1,2-Dichloropropane	2004/06/08		100	%	83 - 120
		1,3-Dichlorobenzene	2004/06/08		89	%	79 - 116
		cis-1,3-Dichloropropene	2004/06/08		89	%	61 - 118
		trans-1,3-Dichloropropene	2004/06/08		93	%	65 - 121
		1,4-Dichlorobenzene	2004/06/08		91	%	77 - 117
		2-Chloroethylvinyl ether	2004/06/08		94	%	70 - 130
		2-Hexanone	2004/06/08		101	%	40 - 130
		Acetone	2004/06/08		86	%	40 - 130
		Acrolein	2004/06/08		96	%	40 - 130
		Acrylonitrile	2004/06/08		104	%	40 - 130
		Benzene	2004/06/08		92	%	84 - 119
		Bromodichloromethane	2004/06/08		90	%	70 - 131
		Bromoform	2004/06/08		90	%	55 - 138
		Bromomethane	2004/06/08		86	%	80 - 125
		Carbon Tetrachloride	2004/06/08		92	%	74 - 129
		Chlorobenzene	2004/06/08		91	%	80 - 116
		Chloroethane	2004/06/08		97	%	81 - 121
		Chloroform	2004/06/08		94	%	76 - 120
		Chloromethane	2004/06/08		87	%	64 - 140
		Dibromochloromethane	2004/06/08		90	%	60 - 136
		Dichloromethane(Methylene Chloride)	2004/06/08		108	%	82 - 119
		Ethylbenzene	2004/06/08		97	%	82 - 115
		2-Butanone (Methyl Ethyl Ketone)	2004/06/08		106	%	40 - 130
		Methyl t-butyl ether (MTBE)	2004/06/08		98	%	40 - 130
		4-Methyl-2-Pentanone (MIBK)	2004/06/08		102	%	40 - 130
		Styrene	2004/06/08		90	%	40 - 130
		Tetrachloroethylene	2004/06/08		91	%	77 - 120
		Toluene	2004/06/08		91	%	82 - 118
		Trichloroethylene	2004/06/08		97	%	82 - 122
		Trichlorofluoromethane (FREON 11)	2004/06/08		80	%	79 - 119
		Vinyl Chloride	2004/06/08		96	%	79 - 129
		o-Xylene	2004/06/08		91	%	83 - 117
		p+m-Xylene	2004/06/08		91	%	84 - 115
	Method Blank	4-Bromofluorobenzene	2004/06/08		83	%	75 - 115
		D4-1,2-Dichloroethane	2004/06/08		96	%	85 - 120
		D8-Toluene	2004/06/08		99	%	75 - 115
		1,1-Dichloroethane	2004/06/08	ND		ug/L	
		1,1-Dichloroethylene	2004/06/08	ND		ug/L	
		1,1,1-Trichloroethane	2004/06/08	ND		ug/L	
		1,1,1,2-Tetrachloroethane	2004/06/08	ND		ug/L	
		1,1,2-Trichloroethane	2004/06/08	ND		ug/L	
		1,1,2,2-Tetrachloroethane	2004/06/08	ND		ug/L	

Quality Assurance Report (Continued)  
 Maxxam Job Number: MA425898

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
602215 SSS	Method Blank	1,2-Dibromoethane (EDB)	2004/06/08	ND		ug/L	
		1,2-Dichlorobenzene	2004/06/08	ND		ug/L	
		1,2-Dichloroethane	2004/06/08	ND		ug/L	
		cis-1,2-Dichloroethylene	2004/06/08	ND		ug/L	
		trans-1,2-Dichloroethylene	2004/06/08	ND		ug/L	
		1,2-Dichloropropane	2004/06/08	ND		ug/L	
		1,3-Dichlorobenzene	2004/06/08	ND		ug/L	
		cis-1,3-Dichloropropene	2004/06/08	ND		ug/L	
		trans-1,3-Dichloropropene	2004/06/08	ND		ug/L	
		1,4-Dichlorobenzene	2004/06/08	ND		ug/L	
		2-Chloroethylvinyl ether	2004/06/08	ND		ug/L	
		2-Hexanone	2004/06/08	ND		ug/L	
		Acetone	2004/06/08	ND		ug/L	
		Acrolein	2004/06/08	ND		ug/L	
		Acrylonitrile	2004/06/08	ND		ug/L	
		Benzene	2004/06/08	ND		ug/L	
		Bromodichloromethane	2004/06/08	ND		ug/L	
		Bromoform	2004/06/08	ND		ug/L	
		Bromomethane	2004/06/08	ND		ug/L	
		Carbon Tetrachloride	2004/06/08	ND		ug/L	
		Chlorobenzene	2004/06/08	ND		ug/L	
		Chloroethane	2004/06/08	ND		ug/L	
		Chloroform	2004/06/08	ND		ug/L	
		Chloromethane	2004/06/08	ND		ug/L	
		Dibromochloromethane	2004/06/08	ND		ug/L	
		Dichloromethane(Methylene Chloride)	2004/06/08	ND		ug/L	
		Ethylbenzene	2004/06/08	ND		ug/L	
		2-Butanone (Methyl Ethyl Ketone)	2004/06/08	ND		ug/L	
		Methyl t-butyl ether (MTBE)	2004/06/08	ND		ug/L	
		4-Methyl-2-Pentanone (MIBK)	2004/06/08	ND		ug/L	
		Styrene	2004/06/08	ND		ug/L	
		Tetrachloroethylene	2004/06/08	ND		ug/L	
		Toluene	2004/06/08	ND		ug/L	
		Trichloroethylene	2004/06/08	ND		ug/L	
		Trichlorofluoromethane (FREON 11)	2004/06/08	ND		ug/L	
		Vinyl Chloride	2004/06/08	ND		ug/L	
		o-Xylene	2004/06/08	ND		ug/L	
		p+m-Xylene	2004/06/08	ND		ug/L	
		Xylene (Total)	2004/06/08	ND		ug/L	
		Total Trihalomethanes	2004/06/08	ND		ug/L	
602280 TJO	MATRIX SPIKE QC STANDARD Spiked Blank Method Blank RPD	Total Cyanide (CN)	2004/06/08		106	%	75 - 125
		Total Cyanide (CN)	2004/06/08		106	%	85 - 115
		Total Cyanide (CN)	2004/06/08		96	%	75 - 125
		Total Cyanide (CN)	2004/06/08	ND		mg/L	
602287 TJO	MATRIX SPIKE QC STANDARD Spiked Blank Method Blank	Total Cyanide (CN)	2004/06/08	NC		%	2
		Chromium (VI)	2004/06/08		102	%	75 - 125
		Chromium (VI)	2004/06/08		97	%	85 - 115
		Chromium (VI)	2004/06/08		102	%	75 - 125
602662 MC	MATRIX SPIKE QC STANDARD Spiked Blank Method Blank RPD	Chromium (VI)	2004/06/08	ND		mg/L	
		Total Mercury (Hg)	2004/06/09		97	%	75 - 125
		Total Mercury (Hg)	2004/06/09		102	%	88 - 115
		Total Mercury (Hg)	2004/06/09		103	%	88 - 115
602836 NMO	Spiked Blank	Total Mercury (Hg)	2004/06/09	ND		mg/L	
		Total Mercury (Hg)	2004/06/09	NC		%	20
		2-Fluorobiphenyl	2004/06/09		74	%	40 - 130
		D14-Terphenyl	2004/06/09		95	%	40 - 130

Quality Assurance Report (Continued)

Maxxam Job Number: MA425898

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
602836 NMO	Spiked Blank	D5-Nitrobenzene	2004/06/09		82	%	40 - 130
		Naphthalene	2004/06/09		56	%	40 - 140
		Acenaphthylene	2004/06/09		71	%	40 - 140
		Acenaphthene	2004/06/09		67	%	40 - 140
		Fluorene	2004/06/09		71	%	40 - 140
		Phenanthrene	2004/06/09		86	%	40 - 140
		Anthracene	2004/06/09		87	%	40 - 140
		Fluoranthene	2004/06/09		98	%	40 - 140
		Pyrene	2004/06/09		98	%	40 - 140
		Benzo(a)anthracene	2004/06/09		102	%	40 - 140
		Chrysene	2004/06/09		102	%	40 - 140
		Benzo(b)fluoranthene	2004/06/09		108	%	40 - 140
		Benzo(j)fluoranthene	2004/06/09		98	%	40 - 140
		Benzo(k)fluoranthene	2004/06/09		97	%	40 - 140
		Benzo(a)pyrene	2004/06/09		100	%	40 - 140
		Indeno(1,2,3-cd)pyrene	2004/06/09		101	%	40 - 140
		Dibenzo(a,h)anthracene	2004/06/09		114	%	40 - 140
		Benzo(ghi)perylene	2004/06/09		103	%	40 - 140
	Method Blank	2-Fluorobiphenyl	2004/06/09		77	%	40 - 130
		D14-Terphenyl	2004/06/09		94	%	40 - 130
		D5-Nitrobenzene	2004/06/09		85	%	40 - 130
		Naphthalene	2004/06/09	ND		ug/L	
		Acenaphthylene	2004/06/09	ND		ug/L	
		Acenaphthene	2004/06/09	ND		ug/L	
		Fluorene	2004/06/09	ND		ug/L	
		Phenanthrene	2004/06/09	ND		ug/L	
		Anthracene	2004/06/09	ND		ug/L	
		Fluoranthene	2004/06/09	ND		ug/L	
		Pyrene	2004/06/09	ND		ug/L	
		Benzo(a)anthracene	2004/06/09	ND		ug/L	
		Chrysene	2004/06/09	ND		ug/L	
		Benzo(b)fluoranthene	2004/06/09	ND		ug/L	
		Benzo(j)fluoranthene	2004/06/09	ND		ug/L	
		Benzo(k)fluoranthene	2004/06/09	ND		ug/L	
		Benzo(a)pyrene	2004/06/09	ND		ug/L	
		Indeno(1,2,3-cd)pyrene	2004/06/09	ND		ug/L	
		Dibenzo(a,h)anthracene	2004/06/09	ND		ug/L	
		Benzo(ghi)perylene	2004/06/09	ND		ug/L	
602870 TJO	MATRIX SPIKE	Total Cyanide (CN)	2004/06/09		112	%	75 - 125
	QC STANDARD	Total Cyanide (CN)	2004/06/09		102	%	85 - 115
	Spiked Blank	Total Cyanide (CN)	2004/06/09		92	%	75 - 125
	Method Blank	Total Cyanide (CN)	2004/06/09	ND		mg/L	
	RPD	Total Cyanide (CN)	2004/06/09	4.7		%	20
603145 KR	MATRIX SPIKE	Phenol-4AAP	2004/06/10		99	%	75 - 125
	QC STANDARD	Phenol-4AAP	2004/06/10		91	%	80 - 115
	Spiked Blank	Phenol-4AAP	2004/06/10		101	%	75 - 125
	Method Blank	Phenol-4AAP	2004/06/10	ND		mg/L	
	RPD	Phenol-4AAP	2004/06/10	NC		%	20
603146 KR	MATRIX SPIKE	Phenol-4AAP	2004/06/10		93	%	75 - 125
	QC STANDARD	Phenol-4AAP	2004/06/10		89	%	80 - 115
	Spiked Blank	Phenol-4AAP	2004/06/10		96	%	75 - 125
	Method Blank	Phenol-4AAP	2004/06/10	ND		mg/L	
	RPD	Phenol-4AAP	2004/06/10	NC		%	20
604666 MC	QC STANDARD	Total Antimony (Sb)	2004/06/14		90	%	82 - 128
		Total Arsenic (As)	2004/06/14		98	%	86 - 119
		Total Selenium (Se)	2004/06/14		106	%	82 - 118



Quality Assurance Report (Continued)

Maxxam Job Number: MA425898

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits	
604666 MC	QC STANDARD	Total Thallium (Tl)	2004/06/14		108	%	80 - 129	
		Total Antimony (Sb)	2004/06/14		106	%	82 - 117	
		Total Arsenic (As)	2004/06/14		91	%	86 - 111	
		Total Selenium (Se)	2004/06/14		108	%	82 - 118	
		Total Thallium (Tl)	2004/06/14		110	%	80 - 129	
	Method Blank	Total Antimony (Sb)	2004/06/14		ND		mg/L	
		Total Arsenic (As)	2004/06/14		ND		mg/L	
		Total Selenium (Se)	2004/06/14		ND		mg/L	
		Total Thallium (Tl)	2004/06/14		ND		mg/L	
604722 ISI	MATRIX SPIKE	Total Barium (Ba)	2004/06/15		109	%	75 - 127	
		Total Beryllium (Be)	2004/06/15		107	%	75 - 127	
		Total Boron (B)	2004/06/15		105	%	75 - 125	
		Total Cadmium (Cd)	2004/06/15		107	%	75 - 125	
		Total Chromium (Cr)	2004/06/15		109	%	75 - 127	
		Total Cobalt (Co)	2004/06/15		108	%	75 - 127	
		Total Copper (Cu)	2004/06/15		108	%	75 - 127	
		Total Lead (Pb)	2004/06/15		107	%	75 - 125	
		Total Molybdenum (Mo)	2004/06/15		109	%	75 - 127	
		Total Nickel (Ni)	2004/06/15		108	%	75 - 127	
		Total Vanadium (V)	2004/06/15		107	%	75 - 127	
		Total Zinc (Zn)	2004/06/15		110	%	75 - 125	
		QC STANDARD	Total Barium (Ba)	2004/06/15		99	%	83 - 119
			Total Beryllium (Be)	2004/06/15		99	%	76 - 111
			Total Boron (B)	2004/06/15		100	%	77 - 121
			Total Cadmium (Cd)	2004/06/15		98	%	75 - 117
			Total Chromium (Cr)	2004/06/15		98	%	90 - 110
			Total Cobalt (Co)	2004/06/15		100	%	77 - 111
			Total Copper (Cu)	2004/06/15		98	%	73 - 121
			Total Lead (Pb)	2004/06/15		100	%	76 - 119
	Total Molybdenum (Mo)		2004/06/15		103	%	76 - 120	
	Total Nickel (Ni)		2004/06/15		98	%	79 - 111	
	Spiked Blank	Total Silver (Ag)	2004/06/15		100	%	90 - 109	
		Total Sodium (Na)	2004/06/15		110	%	91 - 112	
		Total Vanadium (V)	2004/06/15		100	%	90 - 110	
		Total Zinc (Zn)	2004/06/15		99	%	80 - 117	
		Total Barium (Ba)	2004/06/15		109	%	83 - 117	
		Total Beryllium (Be)	2004/06/15		108	%	76 - 117	
		Total Boron (B)	2004/06/15		106	%	77 - 121	
		Total Cadmium (Cd)	2004/06/15		107	%	75 - 117	
		Total Chromium (Cr)	2004/06/15		109	%	75 - 127	
		Total Cobalt (Co)	2004/06/15		110	%	77 - 117	
	Method Blank	Total Copper (Cu)	2004/06/15		109	%	73 - 120	
		Total Lead (Pb)	2004/06/15		106	%	76 - 119	
		Total Molybdenum (Mo)	2004/06/15		109	%	76 - 120	
		Total Nickel (Ni)	2004/06/15		110	%	79 - 117	
		Total Vanadium (V)	2004/06/15		107	%	75 - 125	
		Total Zinc (Zn)	2004/06/15		112	%	80 - 117	
		Total Barium (Ba)	2004/06/15		ND		mg/L	
		Total Beryllium (Be)	2004/06/15		ND		mg/L	
Total Boron (B)		2004/06/15		ND		mg/L		
Total Cadmium (Cd)		2004/06/15		ND		mg/L		
Total Chromium (Cr)	2004/06/15		ND		mg/L			
Total Cobalt (Co)	2004/06/15		0.005		mg/L			
Total Copper (Cu)	2004/06/15		ND		mg/L			
Total Lead (Pb)	2004/06/15		ND		mg/L			
Total Molybdenum (Mo)	2004/06/15		ND		mg/L			

Quality Assurance Report (Continued)  
 Maxxam Job Number: MA425898

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
604722 ISI	Method Blank	Total Nickel (Ni)	2004/06/15	ND		mg/L	
		Total Silver (Ag)	2004/06/15	ND		mg/L	
		Total Sodium (Na)	2004/06/15	ND		mg/L	
		Total Vanadium (V)	2004/06/15	ND		mg/L	
		Total Zinc (Zn)	2004/06/15	ND		mg/L	

ND = Not detected  
 NC = Non-calculable  
 RPD = Relative Percent Difference  
 QC Standard = Quality Control Standard  
 SPIKE = Fortified sample

Mississauga: 5540 McAdam Road L4Z 1P1 Telephone(905) 890-2555 FAX(905) 890-0370

# CHAIN OF CUSTODY RECORD

<p><b>CRA</b>                  CONESTOGA-ROVERS &amp; ASSOCIATES                  651 Colby Drive                  Waterloo, Ont. N2V 1C2 (519)884-0510</p>			<p>SHIPPED TO (Laboratory Name):                  Reference Number: 015</p>				
<p>SAMPLER'S SIGNATURE: <i>[Signature]</i></p>			<p>PRINTED NAME: <u>Frank Bond</u></p>				
SEQ. No.	DATE	TIME	SAMPLE No.	SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS	REMARKS
				Water	3	VOC, PCB, Chlordane, Heptachlor, Aldrin	
				Water	9	VOC only	
				Water	9		
				Water	9		
				Water	9		
				Water	9		

TOTAL NUMBER OF CONTAINERS ~~48~~ 49 HEALTH/CHEMICAL HAZARDS

RELINQUISHED BY: <i>[Signature]</i>	DATE: <u>02/04/84</u>
	TIME: <u>3:00pm</u>
RELINQUISHED BY: _____	RECEIVED BY: _____
	DATE: _____
	TIME: _____
RELINQUISHED BY: _____	RECEIVED BY: _____
	DATE: _____
	TIME: _____

METHOD OF SHIPMENT: WAY BILL No.

<p>White                  Yellow                  Pink                  Goldenrod</p>	<p>SAMPLE TEAM:                  - Fully Executed Copy                  - Receiving Laboratory Copy                  - Shipper Copy                  - Sampler Copy</p>
---	---

RECEIVED FOR LABORATORY BY: *[Signature]* DATE: 02/04/84 TIME: 3:00pm

Conestoga-Rovers & Associates  
Bathurst  
651 Colby Dr  
Waterloo, ON  
N2V 1C2

**Attention: Melissa Ford**

**Report Date: 2004/10/04**

Your P.O. #: 20-004641  
Your Project #: 33095  
Your C.O.C. #: 248046

**ANALYTICAL REPORT**

**MAXXAM JOB #: A445341**

**Received: 2004/09/29, 11:45**

Sample Matrix: SOLID  
# Samples Received: 1

Analyses	Quantity	Date		Laboratory Method	Method Reference
		Extracted	Analyzed		
Hot Water Extractable Boron	1	2004/09/30	2004/09/30	Ont SOP 0102	EPA 3050B
Chromium (VI)	1	2004/09/29	2004/09/29	Ont SOP 0104	EPA 7196
Acid Extractable Metals in Soil by GF	1	2004/09/30	2004/09/30	Ont SOP 0095	EPA 7010
Mercury	1	2004/09/30	2004/09/30	Ont SOP 0112	EPA 7470
Acid Extractable Metals by ICP	1	2004/09/30	2004/09/30	Ont SOP 0072	EPA 6010
MOISTURE	1	N/A	2004/10/01		MOE HANDBOOK(1983)
Polycyclic Aromatic Hydrocarbons (PAH)	1	2004/09/30	2004/09/30	EPA 8270	GC/MS
Phenol (4AAP)	1	N/A	2004/10/01	Ont SOP 0113	EPA 9066
Volatile Organic Compounds	1	N/A	2004/09/29	Ont SOP 0126	EPA 8260

**MAXXAM ANALYTICS INC.**

SAMI JAMOKHA, M.Sc., C.Chem.

TROY CARRIERE, B.Sc.  
Inorganics Supervisor, Environmental Division

SJA/lt  
encl.

Total cover pages: 1

Mississauga Env: 6740 Campobello Road L5N 2L8 Telephone(905) 817-5700 FAX(905) 817-5777

Maxxam Job #: A445341  
Report Date: 2004/10/04

Conestoga-Rovers & Associates  
Client Project #: 33095  
Project name:  
Your P.O. #: 20-004641  
Sampler Initials:

**RESULTS OF ANALYSES OF SOLID**

Maxxam ID		D68814		
Sampling Date		2004/09/29		
		10:00		
	<b>Units</b>	<b>SED-33095-092904-CS-3</b>	<b>DL</b>	<b>QC Batch</b>

<b>CONVENTIONALS</b>				
Moisture	%	8.0	0.2	641915
<b>CONVENTIONALS</b>				
Phenol-4AAP	ug/g	0.01	0.01	641914
QC Batch = Quality Control Batch Please check for attached comments				

Maxxam Job #: A445341  
Report Date: 2004/10/04

Conestoga-Rovers & Associates  
Client Project #: 33095  
Project name:  
Your P.O. #: 20-004641  
Sampler Initials:

**ELEMENTS BY ATOMIC SPECTROSCOPY (SOLID)**

Maxxam ID		D68814		
Sampling Date		2004/09/29 10:00		
	<b>Units</b>	<b>SED-33095-092904-CS-3</b>	<b>DL</b>	<b>QC Batch</b>

<b>CONVENTIONALS</b>				
Chromium (VI)	ug/g	ND	0.05	641036
<b>METALS</b>				
Acid Extractable Antimony (Sb)	ug/g	ND	1	641595
Acid Extractable Arsenic (As)	ug/g	2	1	641595
Acid Extractable Barium (Ba)	ug/g	19.6	0.1	641587
Acid Extractable Beryllium (Be)	ug/g	ND	0.1	641587
Acid Extractable Cadmium (Cd)	ug/g	1.4	0.3	641587
Acid Extractable Chromium (Cr)	ug/g	6.7	0.5	641587
Acid Extractable Cobalt (Co)	ug/g	1.7	0.5	641587
Acid Extractable Copper (Cu)	ug/g	18.2	0.4	641587
Acid Extractable Lead (Pb)	ug/g	91.0	2.5	641587
Acid Extractable Mercury (Hg)	ug/g	0.13	0.05	641619
Acid Extractable Molybdenum (Mo)	ug/g	ND	0.6	641587
Acid Extractable Nickel (Ni)	ug/g	3	1	641587
Acid Extractable Selenium (Se)	ug/g	ND	1	641595
Acid Extractable Silver (Ag)	ug/g	ND	0.7	641587
Acid Extractable Thallium (Tl)	ug/g	ND	1	641595
Acid Extractable Vanadium (V)	ug/g	6.0	0.3	641587
Acid Extractable Zinc (Zn)	ug/g	338	0.3	641587
<b>METALS</b>				
Hot Water Ext. Boron (B)	ug/g	0.80	0.01	641703
ND = Not detected QC Batch = Quality Control Batch Please check for attached comments				

Maxxam Job #: A445341  
 Report Date: 2004/10/04

Conestoga-Rovers & Associates  
 Client Project #: 33095  
 Project name:  
 Your P.O. #: 20-004641  
 Sampler Initials:

**VOLATILE ORGANICS BY GC-MS (SOLID)**

Maxxam ID		D68814		
Sampling Date		2004/09/29 10:00		
	Units	SED-33095-092904-CS-3	DL	QC Batch

VOLATILES				
1,1-Dichloroethane	ug/g	ND	0.01	641134
1,1-Dichloroethylene	ug/g	ND	0.0024	641134
1,1,1-Trichloroethane	ug/g	ND	0.01	641134
1,1,1,2-Tetrachloroethane	ug/g	ND	0.01	641134
1,1,2-Trichloroethane	ug/g	ND	0.02	641134
1,1,2,2-Tetrachloroethane	ug/g	ND	0.01	641134
1,2-Dibromoethane (EDB)	ug/g	ND	0.005	641134
1,2-Dichlorobenzene	ug/g	ND	0.01	641134
1,2-Dichloroethane	ug/g	ND	0.01	641134
cis-1,2-Dichloroethylene	ug/g	ND	0.01	641134
trans-1,2-Dichloroethylene	ug/g	ND	0.01	641134
1,2-Dichloropropane	ug/g	ND	0.01	641134
1,3-Dichlorobenzene	ug/g	ND	0.01	641134
cis-1,3-Dichloropropene	ug/g	ND	0.005	641134
trans-1,3-Dichloropropene	ug/g	ND	0.005	641134
1,4-Dichlorobenzene	ug/g	ND	0.01	641134
Acetone	ug/g	ND	0.15	641134
Benzene	ug/g	ND	0.005	641134
Bromodichloromethane	ug/g	ND	0.01	641134
Bromoform	ug/g	ND	0.02	641134
Bromomethane	ug/g	ND	0.02	641134
Carbon Tetrachloride	ug/g	ND	0.01	641134
Chlorobenzene	ug/g	ND	0.005	641134
Chloroform	ug/g	ND	0.01	641134
Dibromochloromethane	ug/g	ND	0.01	641134
Dichloromethane(Methylene Chloride)	ug/g	ND	0.01	641134
Ethylbenzene	ug/g	ND	0.005	641134
2-Butanone (Methyl Ethyl Ketone)	ug/g	ND	0.15	641134
Methyl t-butyl ether (MTBE)	ug/g	ND	0.02	641134
4-Methyl-2-Pentanone (MIBK)	ug/g	ND	0.1	641134
Styrene	ug/g	ND	0.01	641134
Tetrachloroethylene	ug/g	ND	0.01	641134

ND = Not detected  
 QC Batch = Quality Control Batch  
 Please check for attached comments

Maxxam Job #: A445341  
Report Date: 2004/10/04

Conestoga-Rovers & Associates  
Client Project #: 33095  
Project name:  
Your P.O. #: 20-004641  
Sampler Initials:

**VOLATILE ORGANICS BY GC-MS (SOLID)**

Maxxam ID		D68814		
Sampling Date		2004/09/29 10:00		
	<b>Units</b>	<b>SED-33095-092904-CS-3</b>	<b>DL</b>	<b>QC Batch</b>
Toluene	ug/g	ND	0.005	641134
Trichloroethylene	ug/g	ND	0.01	641134
Vinyl Chloride	ug/g	ND	0.003	641134
o-Xylene	ug/g	ND	0.005	641134
p+m-Xylene	ug/g	ND	0.005	641134
2-Chloroethylvinyl ether	ug/g	ND	0.1	641134
Chloroethane	ug/g	ND	0.02	641134
Chloromethane	ug/g	ND	0.02	641134
Trichlorofluoromethane (FREON 11)	ug/g	ND	0.02	641134
Xylene (Total)	ug/g	ND	0.01	641134
<b>Surrogate Recovery (%)</b>				
4-Bromofluorobenzene	%	86		641134
D4-1,2-Dichloroethane	%	110		641134
D8-Toluene	%	92		641134
ND = Not detected QC Batch = Quality Control Batch Please check for attached comments				



Maxxam Job #: A445341  
Report Date: 2004/10/04

Conestoga-Rovers & Associates  
Client Project #: 33095  
Project name:  
Your P.O. #: 20-004641  
Sampler Initials:

**SEMI-VOLATILE ORGANICS BY GC-MS (SOLID)**

Maxxam ID		D68814		
Sampling Date		2004/09/29 10:00		
	<b>Units</b>	<b>SED-33095-092904-CS-3</b>	<b>DL</b>	<b>QC Batch</b>

<b>PAH'S</b>				
Naphthalene	ug/Kg	276	25	641361
Acenaphthylene	ug/Kg	71	25	641361
Acenaphthene	ug/Kg	578	50	641361
Fluorene	ug/Kg	897	25	641361
Phenanthrene	ug/Kg	5840	250	641361
Anthracene	ug/Kg	2090	25	641361
Fluoranthene	ug/Kg	8040	250	641361
Pyrene	ug/Kg	6920	250	641361
Benzo(a)anthracene	ug/Kg	4170	50	641361
Chrysene	ug/Kg	2540	50	641361
Benzo(b)fluoranthene	ug/Kg	2470	50	641361
Benzo(k)fluoranthene	ug/Kg	1300	50	641361
Benzo(a)pyrene	ug/Kg	2900	25	641361
Indeno(1,2,3-cd)pyrene	ug/Kg	1440	100	641361
Dibenzo(a,h)anthracene	ug/Kg	485	100	641361
Benzo(ghi)perylene	ug/Kg	1460	100	641361
<b>Surrogate Recovery (%)</b>				
2-Fluorobiphenyl	%	86		641361
D14-Terphenyl	%	97		641361
D5-Nitrobenzene	%	***		641361

QC Batch = Quality Control Batch  
Please check for attached comments

Maxxam Job #: A445341  
Report Date: 2004/10/04

Conestoga-Rovers & Associates  
Client Project #: 33095  
Project name:  
Your P.O. #: 20-004641  
Sampler Initials:

**GENERAL COMMENTS**

Sample D68814-01: For PAH-SIM-S Analysis;  
The samples was diluted due to high concentration of target analytes. MDLs were adjusted accordingly.  
\*\*\*: surrogate compound could not be detected due to matrix effect.

Results relate only to the items tested.

Conestoga-Rovers & Associates  
 Attention: Melissa Ford  
 Client Project #: 33095  
 P.O. #: 20-004641  
 Project name:

Quality Assurance Report  
 Maxxam Job Number: MA445341

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
641036 TJO	MATRIX SPIKE	Chromium (VI)	2004/09/29		101	%	75 - 125
	QC STANDARD	Chromium (VI)	2004/09/29		98	%	85 - 115
	Spiked Blank	Chromium (VI)	2004/09/29		101	%	75 - 125
	Method Blank	Chromium (VI)	2004/09/29	ND, DL=0.05		ug/g	
641134 JGE	RPD	Chromium (VI)	2004/09/29	NC		%	20
	Spiked Blank	4-Bromofluorobenzene	2004/09/29		97	%	60 - 120
		D4-1,2-Dichloroethane	2004/09/29		108	%	84 - 120
		D8-Toluene	2004/09/29		104	%	74 - 120
		1,1-Dichloroethane	2004/09/29		91	%	N/A
		1,1-Dichloroethylene	2004/09/29		91	%	N/A
		1,1,1-Trichloroethane	2004/09/29		91	%	N/A
		1,1,1,2-Tetrachloroethane	2004/09/29		95	%	N/A
		1,1,2-Trichloroethane	2004/09/29		89	%	N/A
		1,1,2,2-Tetrachloroethane	2004/09/29		89	%	N/A
		1,2-Dibromoethane (EDB)	2004/09/29		92	%	N/A
		1,2-Dichlorobenzene	2004/09/29		91	%	N/A
		1,2-Dichloroethane	2004/09/29		90	%	N/A
		cis-1,2-Dichloroethylene	2004/09/29		97	%	N/A
		trans-1,2-Dichloroethylene	2004/09/29		90	%	N/A
		1,2-Dichloropropane	2004/09/29		94	%	N/A
		1,3-Dichlorobenzene	2004/09/29		91	%	N/A
		cis-1,3-Dichloropropene	2004/09/29		88	%	N/A
		trans-1,3-Dichloropropene	2004/09/29		84	%	N/A
		1,4-Dichlorobenzene	2004/09/29		93	%	N/A
		Acetone	2004/09/29		90	%	N/A
		Benzene	2004/09/29		97	%	N/A
		Bromodichloromethane	2004/09/29		91	%	N/A
		Bromoform	2004/09/29		86	%	N/A
		Bromomethane	2004/09/29		111	%	N/A
		Carbon Tetrachloride	2004/09/29		98	%	N/A
		Chlorobenzene	2004/09/29		98	%	N/A
		Chloroform	2004/09/29		98	%	N/A
		Dibromochloromethane	2004/09/29		83	%	N/A
		Dichloromethane(Methylene Chloride)	2004/09/29		86	%	N/A
		Ethylbenzene	2004/09/29		95	%	N/A
		2-Butanone (Methyl Ethyl Ketone)	2004/09/29		98	%	N/A
		Methyl t-butyl ether (MTBE)	2004/09/29		92	%	N/A
4-Methyl-2-Pentanone (MIBK)	2004/09/29		88	%	N/A		
Styrene	2004/09/29		91	%	N/A		
Tetrachloroethylene	2004/09/29		103	%	N/A		
Toluene	2004/09/29		95	%	N/A		
Trichloroethylene	2004/09/29		96	%	N/A		
Vinyl Chloride	2004/09/29		93	%	N/A		
o-Xylene	2004/09/29		91	%	N/A		
p+m-Xylene	2004/09/29		95	%	N/A		
2-Chloroethylvinyl ether	2004/09/29		113	%	N/A		
Chloroethane	2004/09/29		93	%	N/A		
Chloromethane	2004/09/29		92	%	N/A		
Trichlorofluoromethane (FREON 11)	2004/09/29		92	%	N/A		
Method Blank	4-Bromofluorobenzene	2004/09/29		88	%	60 - 120	
	D4-1,2-Dichloroethane	2004/09/29		109	%	84 - 120	
	D8-Toluene	2004/09/29		91	%	74 - 120	
	1,1-Dichloroethane	2004/09/29	ND, DL=0.01		ug/g		
	1,1-Dichloroethylene	2004/09/29	ND, DL=0.0024		ug/g		
	1,1,1-Trichloroethane	2004/09/29	ND, DL=0.01		ug/g		
	1,1,1,2-Tetrachloroethane	2004/09/29	ND, DL=0.01		ug/g		

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Conestoga-Rovers & Associates  
 Attention: Melissa Ford  
 Client Project #: 33095  
 P.O. #: 20-004641  
 Project name:

Quality Assurance Report (Continued)  
 Maxxam Job Number: MA445341

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
641134 JGE	Method Blank	1,1,2-Trichloroethane	2004/09/29	ND, DL=0.02		ug/g	
		1,1,2,2-Tetrachloroethane	2004/09/29	ND, DL=0.01		ug/g	
		1,2-Dibromoethane (EDB)	2004/09/29	ND, DL=0.005		ug/g	
		1,2-Dichlorobenzene	2004/09/29	ND, DL=0.01		ug/g	
		1,2-Dichloroethane	2004/09/29	ND, DL=0.01		ug/g	
		cis-1,2-Dichloroethylene	2004/09/29	ND, DL=0.01		ug/g	
		trans-1,2-Dichloroethylene	2004/09/29	ND, DL=0.01		ug/g	
		1,2-Dichloropropane	2004/09/29	ND, DL=0.01		ug/g	
		1,3-Dichlorobenzene	2004/09/29	ND, DL=0.01		ug/g	
		cis-1,3-Dichloropropene	2004/09/29	ND, DL=0.005		ug/g	
		trans-1,3-Dichloropropene	2004/09/29	ND, DL=0.005		ug/g	
		1,4-Dichlorobenzene	2004/09/29	ND, DL=0.01		ug/g	
		Acetone	2004/09/29	ND, DL=0.15		ug/g	
		Benzene	2004/09/29	ND, DL=0.005		ug/g	
		Bromodichloromethane	2004/09/29	ND, DL=0.01		ug/g	
		Bromoform	2004/09/29	ND, DL=0.02		ug/g	
		Bromomethane	2004/09/29	ND, DL=0.02		ug/g	
		Carbon Tetrachloride	2004/09/29	ND, DL=0.01		ug/g	
		Chlorobenzene	2004/09/29	ND, DL=0.005		ug/g	
		Chloroform	2004/09/29	ND, DL=0.01		ug/g	
		Dibromochloromethane	2004/09/29	ND, DL=0.01		ug/g	
		Dichloromethane(Methylene Chloride)	2004/09/29	ND, DL=0.01		ug/g	
		Ethylbenzene	2004/09/29	ND, DL=0.005		ug/g	
		2-Butanone (Methyl Ethyl Ketone)	2004/09/29	ND, DL=0.15		ug/g	
		Methyl t-butyl ether (MTBE)	2004/09/29	ND, DL=0.02		ug/g	
		4-Methyl-2-Pentanone (MIBK)	2004/09/29	ND, DL=0.1		ug/g	
		Styrene	2004/09/29	ND, DL=0.01		ug/g	
		Tetrachloroethylene	2004/09/29	ND, DL=0.01		ug/g	
		Toluene	2004/09/29	ND, DL=0.005		ug/g	
		Trichloroethylene	2004/09/29	ND, DL=0.01		ug/g	
		Vinyl Chloride	2004/09/29	ND, DL=0.003		ug/g	
		o-Xylene	2004/09/29	ND, DL=0.005		ug/g	
		p-m-Xylene	2004/09/29	ND, DL=0.005		ug/g	
		2-Chloroethylvinyl ether	2004/09/29	ND, DL=0.1		ug/g	
Chloroethane	2004/09/29	ND, DL=0.02		ug/g			
Chloromethane	2004/09/29	ND, DL=0.02		ug/g			
Trichlorofluoromethane (FREON 11)	2004/09/29	ND, DL=0.02		ug/g			
Xylene (Total)	2004/09/29	ND, DL=0.01		ug/g			
641361 NMO	Spiked Blank	2-Fluorobiphenyl	2004/09/30		82	%	40 - 130
		D14-Terphenyl	2004/09/30		100	%	40 - 130
		D5-Nitrobenzene	2004/09/30		70	%	40 - 130
		Naphthalene	2004/09/30		79	%	40 - 140
		Acenaphthylene	2004/09/30		80	%	40 - 140
		Acenaphthene	2004/09/30		79	%	40 - 140
		Fluorene	2004/09/30		83	%	40 - 140
		Phenanthrene	2004/09/30		91	%	40 - 140
		Anthracene	2004/09/30		89	%	40 - 140
		Fluoranthene	2004/09/30		94	%	40 - 140
		Pyrene	2004/09/30		94	%	40 - 140
		Benzo(a)anthracene	2004/09/30		101	%	40 - 140
		Chrysene	2004/09/30		84	%	40 - 140
		Benzo(b)fluoranthene	2004/09/30		102	%	40 - 140
		Benzo(k)fluoranthene	2004/09/30		115	%	40 - 140
		Benzo(a)pyrene	2004/09/30		94	%	40 - 140
		Indeno(1,2,3-cd)pyrene	2004/09/30		93	%	40 - 140
Dibenzo(a,h)anthracene	2004/09/30		94	%	40 - 140		

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Conestoga-Rovers & Associates  
Attention: Melissa Ford  
Client Project #: 33095  
P.O. #: 20-004641  
Project name:

Quality Assurance Report (Continued)

Maxxam Job Number: MA445341

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits		
641361 NMO	Spiked Blank Method Blank	Benzo(ghi)perylene	2004/09/30		93	%	40 - 140		
		2-Fluorobiphenyl	2004/09/30		73	%	40 - 130		
		D14-Terphenyl	2004/09/30		95	%	40 - 130		
		D5-Nitrobenzene	2004/09/30		73	%	40 - 130		
		Naphthalene	2004/09/30	ND, DL=5			ug/Kg		
		Acenaphthylene	2004/09/30	ND, DL=5			ug/Kg		
		Acenaphthene	2004/09/30	ND, DL=10			ug/Kg		
		Fluorene	2004/09/30	ND, DL=5			ug/Kg		
		Phenanthrene	2004/09/30	ND, DL=5			ug/Kg		
		Anthracene	2004/09/30	ND, DL=5			ug/Kg		
		Fluoranthene	2004/09/30	ND, DL=5			ug/Kg		
		Pyrene	2004/09/30	ND, DL=5			ug/Kg		
		Benzo(a)anthracene	2004/09/30	ND, DL=10			ug/Kg		
		Chrysene	2004/09/30	ND, DL=10			ug/Kg		
		Benzo(b)fluoranthene	2004/09/30	ND, DL=10			ug/Kg		
	Benzo(k)fluoranthene	2004/09/30	ND, DL=10			ug/Kg			
	Benzo(a)pyrene	2004/09/30	ND, DL=5			ug/Kg			
	Indeno(1,2,3-cd)pyrene	2004/09/30	ND, DL=20			ug/Kg			
	Dibenzo(a,h)anthracene	2004/09/30	ND, DL=20			ug/Kg			
	Benzo(ghi)perylene	2004/09/30	ND, DL=20			ug/Kg			
	RPD	Naphthalene	2004/09/30	NC			%	N/A	
		Acenaphthylene	2004/09/30	NC			%	N/A	
		Acenaphthene	2004/09/30	NC			%	N/A	
		Fluorene	2004/09/30	NC			%	N/A	
		Phenanthrene	2004/09/30	NC			%	N/A	
		Anthracene	2004/09/30	NC			%	N/A	
		Fluoranthene	2004/09/30	NC			%	N/A	
		Pyrene	2004/09/30	NC			%	N/A	
		Benzo(a)anthracene	2004/09/30	NC			%	N/A	
		Chrysene	2004/09/30	NC			%	N/A	
		Benzo(b)fluoranthene	2004/09/30	NC			%	N/A	
		Benzo(k)fluoranthene	2004/09/30	NC			%	N/A	
		Benzo(a)pyrene	2004/09/30	NC			%	N/A	
Indeno(1,2,3-cd)pyrene		2004/09/30	NC			%	N/A		
Dibenzo(a,h)anthracene		2004/09/30	NC			%	N/A		
Benzo(ghi)perylene		2004/09/30	NC			%	N/A		
641587 ISI		QC STANDARD	Acid Extractable Barium (Ba)	2004/09/30		102	%	83 - 119	
			Acid Extractable Beryllium (Be)	2004/09/30		102	%	76 - 119	
	Acid Extractable Cadmium (Cd)		2004/09/30		101	%	75 - 117		
	Acid Extractable Chromium (Cr)		2004/09/30		101	%	90 - 110		
	Acid Extractable Cobalt (Co)		2004/09/30		102	%	77 - 119		
	Acid Extractable Copper (Cu)		2004/09/30		100	%	73 - 120		
	Acid Extractable Lead (Pb)		2004/09/30		101	%	76 - 119		
	Acid Extractable Molybdenum (Mo)		2004/09/30		103	%	76 - 120		
	Acid Extractable Nickel (Ni)		2004/09/30		100	%	79 - 118		
	Acid Extractable Silver (Ag)		2004/09/30		101	%	90 - 109		
	Acid Extractable Vanadium (V)		2004/09/30		101	%	90 - 110		
	Acid Extractable Zinc (Zn)		2004/09/30		102	%	80 - 115		
	Method Blank		Acid Extractable Barium (Ba)	2004/09/30	ND, DL=0.1			ug/g	
			Acid Extractable Beryllium (Be)	2004/09/30	ND, DL=0.1			ug/g	
		Acid Extractable Cadmium (Cd)	2004/09/30	ND, DL=0.3			ug/g		
		Acid Extractable Chromium (Cr)	2004/09/30	ND, DL=0.5			ug/g		
		Acid Extractable Cobalt (Co)	2004/09/30	ND, DL=0.5			ug/g		
		Acid Extractable Copper (Cu)	2004/09/30	ND, DL=0.4			ug/g		
		Acid Extractable Lead (Pb)	2004/09/30	ND, DL=2.5			ug/g		
	Acid Extractable Molybdenum (Mo)	2004/09/30	ND, DL=0.6			ug/g			

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Conestoga-Rovers & Associates  
 Attention: Melissa Ford  
 Client Project #: 33095  
 P.O. #: 20-004641  
 Project name:

Quality Assurance Report (Continued)  
 Maxxam Job Number: MA445341

QA/QC Batch	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
641587 ISI	Method Blank	Acid Extractable Nickel (Ni)	2004/09/30	ND, DL=1		ug/g	
		Acid Extractable Silver (Ag)	2004/09/30	ND, DL=0.7		ug/g	
		Acid Extractable Vanadium (V)	2004/09/30	ND, DL=0.3		ug/g	
		Acid Extractable Zinc (Zn)	2004/09/30	ND, DL=0.3		ug/g	
641595 ADA	RPD	Acid Extractable Lead (Pb)	2004/09/30	NC		%	20
	QC STANDARD	Acid Extractable Arsenic (As)	2004/09/30		95	%	30 - 170
	Method Blank	Acid Extractable Antimony (Sb)	2004/09/30	ND, DL=1		ug/g	
		Acid Extractable Arsenic (As)	2004/09/30	ND, DL=1		ug/g	
		Acid Extractable Selenium (Se)	2004/09/30	ND, DL=1		ug/g	
	RPD	Acid Extractable Thallium (Tl)	2004/09/30	ND, DL=1		ug/g	
		Acid Extractable Antimony (Sb)	2004/09/30	NC		%	20
		Acid Extractable Arsenic (As)	2004/09/30	NC		%	20
		Acid Extractable Selenium (Se)	2004/09/30	NC		%	20
	641619 MC	QC STANDARD	Acid Extractable Thallium (Tl)	2004/09/30	NC		%
Spiked Blank		Acid Extractable Mercury (Hg)	2004/09/30		110	%	85 - 115
		Acid Extractable Mercury (Hg)	2004/09/30		107	%	88 - 115
Method Blank		Acid Extractable Mercury (Hg)	2004/09/30	ND, DL=0.05		ug/g	
RPD		Acid Extractable Mercury (Hg)	2004/09/30	NC		%	20
641703 ISI	QC STANDARD	Hot Water Ext. Boron (B)	2004/09/30		103	%	77 - 121
	Method Blank	Hot Water Ext. Boron (B)	2004/09/30	ND, DL=0.01		ug/g	
641914 KR	MATRIX SPIKE	Phenol-4AAP	2004/10/01		99	%	75 - 125
	QC STANDARD	Phenol-4AAP	2004/10/01		89	%	80 - 115
	Spiked Blank	Phenol-4AAP	2004/10/01		97	%	75 - 125
	Method Blank	Phenol-4AAP	2004/10/01	0.001, DL=0.001		ug/g	
	RPD	Phenol-4AAP	2004/10/01	NC		%	20

ND = Not detected  
 N/A = Not Applicable  
 NC = Non-calculable  
 RPD = Relative Percent Difference  
 QC Standard = Quality Control Standard  
 SPIKE = Fortified sample

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Fax # (905) 817-5777

# MaxFax

Attn: Melissa Ford From: Jaime Johnston  
 Company: \_\_\_\_\_ Pages: \_\_\_\_\_ (including this one)  
 Fax: (519) 725-1394 Date: Oct. 4, 2004  
 Re: TCN results - A445341 cc: \_\_\_\_\_

Urgent     For Review     Please Comment     Please Reply     Please Recycle

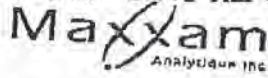
• Message:

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Maxxam Analytics Inc., 6740 Campobello Road, Mississauga, ON, L5N 2L8

905-817-5700, Toll Free: 800-563-6266, Fax: 905-817-5777





Maxxam Job #: A417295  
Report Date: 2004/10/04

MAXXAM ANALYTICS INC.  
Client Project #: A445341  
Project name:  
Sampler Initials:

CONVENTIONAL PARAMETERS (SOIL)

Maxxam ID	722435		
Sampling Date	2004/09/29		
Units	SED-33095-092904-CS-3	DL	QC Batch

% Moisture	%	7	N/A	N/A
CONVENTIONALS				
Total Cyanide (CN)	mg/kg	ND	0.5	Z70029

ND = Not detected  
N/A = Not Applicable  
DL = Detection Limit  
QC Batch = Quality Control Batch  
Please check for attached comments

MAXXAM ANALYTIQUE INC.

VERONIC BEAUSEJOUR, B.Sc., Chemist

VB/vb







Maxxam Job #: A417295  
Report Date: 2004/10/04

MAXXAM ANALYTICS INC.  
Client Project #: A445341  
Project name:  
Sampler Initials:

GENERAL COMMENTS

Condition of sample(s) upon receipt: GOOD

All results are calculated on a dry weight basis except where not applicable.

CONVENTIONAL PARAMETERS (SOIL)

Please note that the results have not been corrected for QC recoveries. Please note that the results have been corrected for the blank.

Results relate only to the items tested.

MAXXAM ANALYTIQUE INC.

VERONIC BEAUSEJOUR, B.Sc., Chemist

VB/vb



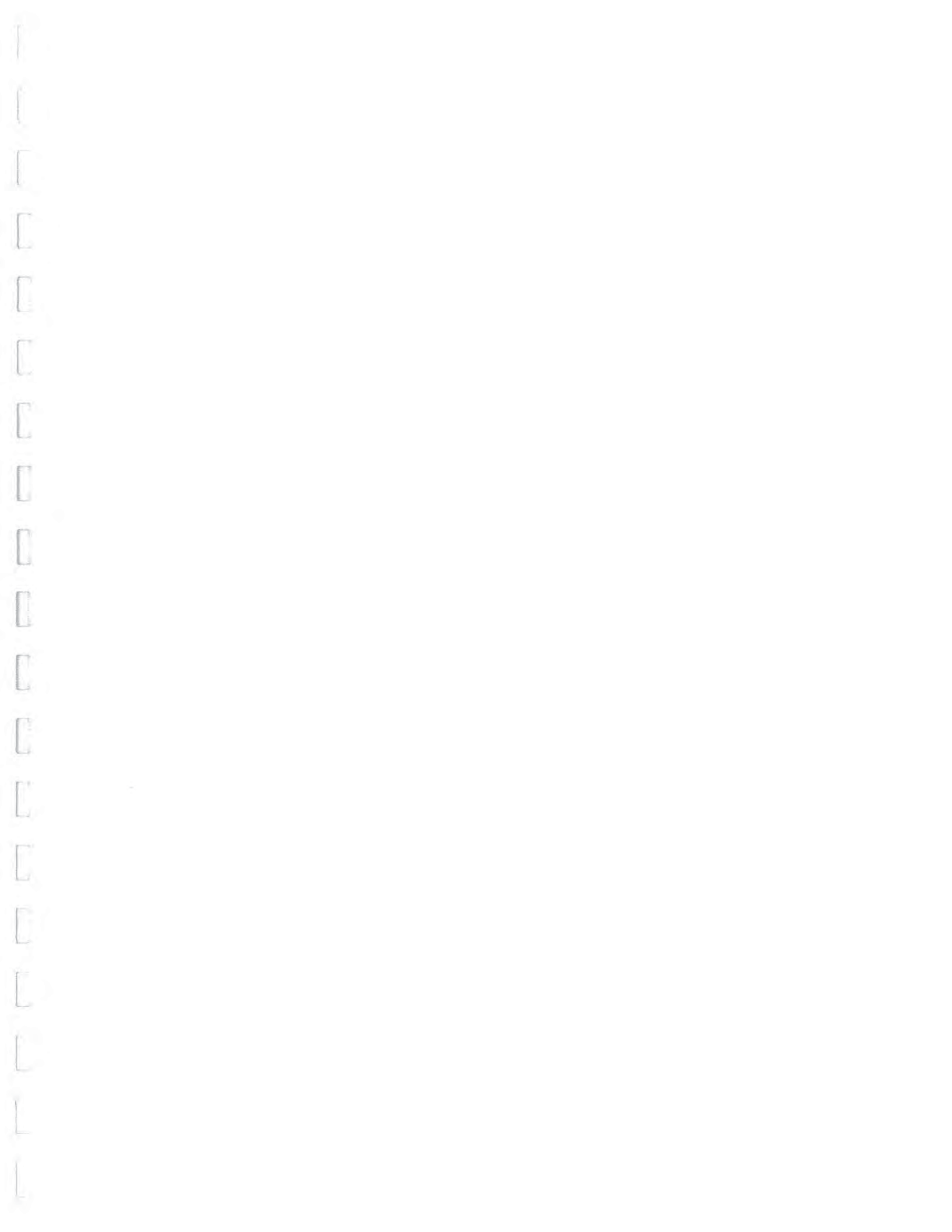


MAXXAM ANALYTICS INC.  
Attention: JAMIE JOHNSTON  
Client Project #: A445341  
P.O. #:  
Project name:

Quality Assurance Report  
Maxxam Job Number: A417295

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units
270029 DG1	QC STANDARD	Total Cyanide (CN)	2004/10/01		113	%
	BLANK	Total Cyanide (CN)	2004/10/01	ND, DL=0,5		mg/kg

ND = Not detected  
DL = Detection Limit  
QC Standard = Quality Control Standard





APPENDIX D  
INVESTIGATION PROGRAM

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## 1.0 INTRODUCTION

Two significant data gaps remain at the former Guelph Manufactured Gas Plant (MGP). The data gaps are:

1. location of source material; and
2. extent of groundwater quality effects.

Source material presents a threat of future release that requires additional definition to assess the potential future release and to determine the effect of source materials on re-development options.

Groundwater is a pathway that could eventually lead to exposure opportunities.

A phased program to address data gaps is presented in the following sections of this appendix.

### **2.2.1 LOCATE MONITORING WELLS BH7, BH7D, AND BH8**

These three monitoring wells should be located and rehabilitated, if possible. This will require careful removal of asphalt and up to 0.5 metre of subgrade material. When located, the well risers should be carefully cleaned and sounded to determine if there are any obstructions in the wells. The well riser should be repaired and a new protective surface casing installed. If the wells can not be repaired they should be removed and replaced. If the wells can not be found they should be replaced with new wells.

### **2.2.2 INSTALL NEW OVERBURDEN WELLS**

A total of four new overburden monitoring wells should be installed. Three overburden wells should be installed on the east side of Surrey Street East. They should be approximately equally spaced between the south side of the Taco Bell property to Wyndham Street. A fourth overburden well should be installed near the original BH10.

These overburden wells will enhance the definition of overburden groundwater flow. They may or may not complete the areal definition of PAHs in overburden groundwater.

### **2.2.3 SHALLOW BEDROCK WELLS**

Shallow bedrock monitoring wells should be installed at the location of the two most southerly overburden wells on the east side of Surrey Street and at the location of the new overburden well at the original BH10 location.

These wells will provide an indication of groundwater flow in bedrock, which could be influenced by municipal wells, and the distribution of vertical gradients between the overburden and bedrock. These wells may or may not complete the areal and vertical definition of PAHs in bedrock groundwater.

### **2.2.4 DEEP BEDROCK WELLS**

A deep bedrock well should be installed approximately 12 metres into the rock adjacent to BH7D (or its replacement). This well will be used to assess vertical gradients within the rock as well as water quality with depth.



Additional deep bedrock wells may also be required. The next logical increment would see these wells at locations that follow PAH concentrations in shallow bedrock.

The definition of extensive coal tar deposits remaining in place could trigger the need for coal tar removal in the short-term to protect groundwater quality. In the absence of defining coal tar deposits through the Supplemental Investigation it is probable that coal tar removal can await re-development of the property and can be completed as part of Site preparation.

APPENDIX D  
INVESTIGATION PROGRAM



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## 1.0 INTRODUCTION

Two significant data gaps remain at the former Guelph Manufactured Gas Plant (MGP). The data gaps are:

1. location of source material; and
2. extent of groundwater quality effects.

Source material presents a threat of future release that requires additional definition to assess the potential future release and to determine the effect of source materials on re-development options.

Groundwater is a pathway that could eventually lead to exposure opportunities.

A phased program to address data gaps is presented in the following sections of this appendix.

## 2.0 PHASE I SUPPLEMENTAL INVESTIGATION

### 2.1 SOURCE MATERIAL INVESTIGATION

Test pits have determined that some underground pipes containing coal tar remain in place at the former MGP. However, the units that are most likely to contain residual tar have not been investigated. The MGP process units most likely to contain residual tar are the gas holders and an underground tar tank.

The gas holder design or style does not appear to be known. Two basic design styles were used. The older style, common before 1900, was constructed with a masonry, below grade basement. A telescoping steel tank floated in a water bath that acted as a seal around the steel shell and allowed the tank to rise and fall with gas pressure. Tar was frequently pumped into the water bath to control water leakage through the masonry wall. This design is most likely to have tar residuals remaining in the ground.

The newer design (post-1900) consisted of telescoping steel tanks or a floating roof steel tank installed on a concrete pad at grade. This style is less likely to have residual tar remaining in the ground.

To investigate the gas holders and assess their potential to be an ongoing source of coal tar two boreholes should be installed to bedrock within the perimeter of each of the three gas holders.

The underground tar tank, commonly referred to as a tar well, should also have a soil boring installed to bedrock to assess its potential to be an ongoing source of coal tar.

All source borings should have continuous soil sample collection to define stratigraphy. Samples for chemical analysis are not necessary. The presence of coal tar, the source material, will be obvious.

### 2.2 GROUNDWATER INVESTIGATION

Groundwater should be considered in three parts: overburden, shallow bedrock (<5 metres in rock), and deep bedrock (>5 metres in rock).

Additional information about groundwater quality in all three groundwater parts is required as follows.

### 2.2.1 LOCATE MONITORING WELLS BH7, BH7D, AND BH8

These three monitoring wells should be located and rehabilitated, if possible. This will require careful removal of asphalt and up to 0.5 metre of subgrade material. When located, the well risers should be carefully cleaned and sounded to determine if there are any obstructions in the wells. The well riser should be repaired and a new protective surface casing installed. If the wells can not be repaired they should be removed and replaced. If the wells can not be found they should be replaced with new wells.

### 2.2.2 INSTALL NEW OVERBURDEN WELLS

A total of four new overburden monitoring wells should be installed. Three overburden wells should be installed on the east side of Surrey Street East. They should be approximately equally spaced between the south side of the Taco Bell property to Wyndham Street. A fourth overburden well should be installed near the original BH10.

These overburden wells will enhance the definition of overburden groundwater flow. They may or may not complete the areal definition of PAHs in overburden groundwater.

### 2.2.3 SHALLOW BEDROCK WELLS

Shallow bedrock monitoring wells should be installed at the location of the two most southerly overburden wells on the east side of Surrey Street and at the location of the new overburden well at the original BH10 location.

These wells will provide an indication of groundwater flow in bedrock, which could be influenced by municipal wells, and the distribution of vertical gradients between the overburden and bedrock. These wells may or may not complete the areal and vertical definition of PAHs in bedrock groundwater.

### 2.2.4 DEEP BEDROCK WELLS

A deep bedrock well should be installed approximately 12 metres into the rock adjacent to BH7D (or its replacement). This well will be used to assess vertical gradients within the rock as well as water quality with depth.



### 2.2.5 WATER LEVEL MEASUREMENT

All new well installation must be surveyed to define the well head elevation. Water levels should be measured manually at all locations quarterly for 1 year. This data will be used to confirm groundwater flow and vertical gradients.

In addition, water levels should be recorded every hour for 2 weeks at BH7D (or its replacement) and the new deep bedrock well at this location. The pattern of water level change will be used to determine if there is a direct response to well field pumping at this location.

### 2.2.6 WATER QUALITY MONITORING

All new wells will be developed to remove excessive turbidity. All wells (new and existing) will be sampled and analyzed for BTEX and PAH parameters. The results will be compared to MOE Table 2 criteria and used to assess the extent of BTEX and PAH in groundwater.

### 2.2.7 REPORTING

A report of results should be prepared to evaluate the data and determine if further groundwater quality definition is required.

If further groundwater quality definition is required then an appropriate next phase of investigation must be designed.

When a determination that groundwater quality definition is complete has been made a risk assessment should be completed to assess the need for remedial action.

### 2.3 POTENTIAL FUTURE WORK

If further groundwater quality definition is required the next logical increment of monitoring well installation would be to install up to six overburden monitoring wells on private property between Surrey Street and Wellington Street. Up to three of these locations would also have shallow bedrock wells installed.

Additional deep bedrock wells may also be required. The next logical increment would see three wells at locations that follow PAH concentrations in shallow bedrock.

The definition of extensive coal tar deposits remaining in place could trigger the need for coal tar removal in the short-term to protect groundwater quality. In the absence of defining coal tar deposits through the Supplemental Investigation it is probable that coal tar removal can await re-development of the property and can be completed as part of Site preparation.

