DRAFT FINAL REPORT
ADDITIONAL SITE INVESTIGATION

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1.0 INTRODUCTION

An Additional Site Investigation of the Tonawanda Coke Corporation (TCC) facility located on River Road in Tonawanda, New York was recently completed by Conestoga-Rovers & Associates (CRA). This investigation was conducted in order to supplement existing information regarding the hydrogeological and geochemical characteristics of the Site and to confirm the conclusions of the report entitled "Final Report - Supplemental Site Investigation". With the exception of limited data which raise questions about surface water and sediment cyanide contamination in and near the southeast corner of the Site, data collected during this Additional Site Investigation further support the conclusion of the Supplemental Site Investigation Report that an RI/FS is unwarranted because the Site does not pose a significant threat to public health or the environment.

This report summarizes the additional field work conducted in June and July 1991 and July 1992, in accordance with the Additional Work Plan for Supplemental Site Investigation which was submitted to the New York State Department of Environmental Conservation (NYSDEC) in October 1990. The work included test pit excavations, monitoring well installations, soil and water sampling for chemical analysis and other miscellaneous tasks. The previously established protocols from the Supplemental Site Investigation were utilized for all the above work activities including equipment cleaning and health and safety.

2.0 TEST PIT INVESTIGATION

On July 13 and 14, 1991, nine test pits were excavated at the TCC facility using a backhoe. The purpose of these excavations was to refine the definition of physical and chemical conditions and chemistry at the TCC Site.

A summary of the materials encountered during the test pit excavations is presented in Table 2.1.

Three test pits (TP-AA, TP-BB and TP-CC) were excavated along the coal field boundary as shown on Plan 1. These test pits were excavated to determine the thickness of overburden above native clay in the area so that a monitoring well could be installed in the deepest fill area. This was done to refine the definition of hydrogeological conditions and chemistry in the fill in this area of the plant. However, it was discovered that the greatest thickness of fill at the three test pit locations was at TP-AA where 1.8 feet of fill was observed. Therefore, another well was not installed in this location as the existing well, MW16-89, was determined to be representative of typical conditions.

A second set of three test pits (TP-X, TP-Y and TP-Z) was installed in locations shown on Plan 1 to more comprehensively characterize the waste/fill in the area of Area 108. Test pits TP-X and TP-Y were installed to native clay. Test pit TP-Z was terminated at 12.5 ft. BGS when a black vegetative mud unit was encountered. A chemical sample of only the black mud from TP-Z as well as a composite sample of test pits TP-X, TP-Y and TP-Z were taken for chemical analysis prior to backfilling. The samples were submitted for analysis

of the full Target Compound List and Target Analyte List of parameters including cyanide.

As a result of the discovery of the black vegetative mud unit in test pit TP-Z, additional test pits and a borehole were installed to further define both the vertical and areal extent of the unit. Three test pits (TP-DD, TP-EE and TP-FF) were excavated in locations shown on Plan 1. During the excavation of test pit TP-EE, a similar black mud unit was encountered and therefore, the third test pit (TP-FF) was excavated further west. Also, a borehole (BHZ-91) was drilled adjacent to test pit TP-Z in order to determine the depth of the black mud unit and the depth to the top of the native clay surface. Appendix A contains the stratigraphic log for this borehole.

During excavation of the test pits, background readings and air readings over the open hole were taken with an HNu Photoionization Detector. The readings observed are presented in Table 2.2.

3.0 MONITORING WELL INSTALLATIONS

Three monitoring wells were installed at or directly adjacent to the Site. One monitoring well (MW18-91) was installed on June 19, 1991 along the western boundary of the Site, north of MW-7, to assess the depth of alluvial materials or fill overlying the native clay at Area 108 and to monitor the groundwater leaving the Site via those materials. This well was installed to the native clay and screened in the alluvium. As recommended in the Supplemental Site Investigation Final Report, two other monitoring wells (MW19-91 and MW20-91) were installed on June 18, 1991 off Site to the northeast to determine the extent of the cyanide presence in the groundwater in that area. The monitoring well completion details are summarized on Table 3.1.

A fourth monitoring well was proposed for installation to replace MW16-89 in order to refine the definition of hydrogeological and chemical conditions at the southern edge of the coal field. However, since the test pits excavated in this area indicated a maximum fill depth of only 1.8 feet, MW16-89 was determined to be representative of the typical conditions in this area and another well was not installed.

The stratigraphic and instrumentation logs for the new well installations are found in Appendix A. Each of the monitoring wells was developed following drilling and installation.

4.0 GROUNDWATER SAMPLING

4.1 ROUND 4 (JULY 1991) SAMPLING

Following the installation and development of the new monitoring wells, the wells were purged and sampled for the Site Specific Indicator (SSI) parameters. This sampling event took place during the week of July 15, 1991, approximately one month following the well installations. In addition to the newly installed monitoring wells, MW8-89 and MW10-89 were included in this sampling event (denoted as Round 4) as a second set of analytical data had not previously been obtained for these wells.

Prior to purging and sampling, water level measurements were taken at all existing and newly installed monitoring wells. During purging activities, pH, conductivity and temperature readings were obtained and recorded. Purge logs for all wells included in the Round 4 sampling are presented in Appendix B.

Full sample sets were collected from wells MW18-91 and MW19-91. However, purging of MW20-91 indicated that there was insufficient sample volume available. A sufficient volume of water was also not available at wells MW8-89 and MW10-89. Although a new well was not installed adjacent to MW16-89, this well was revisited and a sample collected for analysis of TAL metals only. Due to laboratory error, two wells were revisited for replacement sample collection. MW16-89 was resampled for metals on July 19 and MW19-91 was resampled for PAHs on July 25. Table 4.1 summarizes the Round 4 groundwater sampling activities.

All collected groundwater samples were submitted to Advanced Environmental Services, Inc. (AES) for analysis of the Site-Specific Indicator (SSI) parameters, as determined during the previous Supplemental Site Investigation.

4.2 ROUND 5 (JULY 1992) SAMPLING

TCC also decided to conduct another sampling event to complete and update the existing data base. This sampling event took place during the week of July 6, 1992, approximately one year after the previous sampling event. In addition to resampling the most recent well installations, MW18-81 through MW20-91, seven other boundary wells were revisited to provide additional analytical data to confirm the absence of chemicals leaving the Site via the groundwater regime. Purge logs for all wells included during the Round 5 sampling are presented in Appendix B.

Full sample sets were collected from wells MW-7, MW11-89, MW14-89, MW16-89 and MW18-91 through MW20-91. A sufficient volume of water was not available at wells MW9-89, MW10-89 and MW15-89. Table 4.2 summarizes the Round 5 groundwater sampling activities.

5.0 SURFACE WATER/SEDIMENT SAMPLING

Due to concern expressed by the DEC over the correlation of CRA surface water and sediment sampling locations with previous DEC investigative sampling programs, TCC agreed to resample the surface water/sediment sampling locations in the southeast corner of the property. Although it was hoped that DEC personnel would verify the previous sampling locations, the DEC declined to send a representative during this additional surface water/sediment sampling event completed on July 8, 1992.

The surface water samples to be resampled were SW-11 through SW-15 along with sediment samples collected at SW-11 and SW-14, as shown on Plan 1. Although there was no surface water present at the SW-11 location sampled previously, a sediment sample was collected at this location and a surface water sample was collected 25 feet to the north and 25 feet to the west of the original location.

The collected samples were submitted for analysis of the SSI parameter list. Appendix C contains the surface water and sediment sampling logs. Table 5.1 summarizes the Round 3 surface water sampling activities while Table 5.2 summarizes the Round 2 sediment sampling activities.

6.0 ANALYTICAL RESULTS

Analysis of the samples collected during the Additional Site Investigation activities was performed by Advanced Environmental Services and reported to CRA following each sampling event. Appendix D presents the analytical data for the test pit soil, groundwater, surface water and sediment samples. Samples were submitted to the laboratory using a blind identification numbering system as identified on the previous sampling summary tables.

Upon receipt of each analytical data report, CRA performed a Quality Assurance/Quality Control (QA/QC) assessment of the data and the laboratory procedures. Although various qualifiers were required for some of the sample data, most of the sample data and associated QA/QC data was considered acceptable. A detailed discussion of the QA/QC data review and the QA/QC data for each sampling event is presented in Appendix E.

6.1 SOIL SAMPLES

One composite test pit soil sample from TP-X, TP-Y and TP-Z was submitted for analysis while an additional sample of only the black mud found at TP-Z was also submitted for analysis. These samples were both analyzed for the full Target Compound List (TCL)/Target Analyte List (TAL) parameters to more comprehensively characterize the alluvium/fill in the area of Area 108. A summary of the analytical results for the two soil samples is presented in Table 6.1 indicating only the detected compounds for each parameter group.

Table 6.1 shows that five detected VOCs were detected in the sample taken from the black mud in TP-Z. These same five detected VOCs were present in the composite sample, however, the concentrations in the composite sample were lower. Therefore, it appears that the VOC contamination noted in the composite sample was contributed solely by the black mud found in TP-Z.

Table 6.1 shows that there is a number of PAH compounds present in both the composite and black mud samples. Each of the PAH compounds identified in the recently collected samples were also identified in the test pit soil samples collected in the Area 108 area during the previous Supplemental Site Investigation. (It should be noted that the higher detection limits reported for the analytical data in Appendix A are due to the dilution of the sample matrix in order to quantify the presence of PAH compounds present.) Although some other PAH compounds were detected during the previous Supplemental Site Investigation, those compounds were not found in the samples from this investigation because all of the previously reported concentrations were below the detection levels achievable for this investigation.

Upon examination of the PAH concentrations present in the two discrete samples, it appears that the chemistry present was from the black mud found in TP-Z. For the parameters found in both the black mud and composite samples, the concentrations reported for the composite sample are approximately one-third or less of those reported for the black mud sample. As the composite sample contained approximately equal portions of the three test pit soils, the chemicals present can be accounted for solely on the basis of the soils collected from TP-Z. The concentrations of PAH compounds detected in the

black mud sample but not in the composite were never greater than three times the detection limit. Therefore, these chemicals can also be assumed to result solely from TP-Z soils, despite the higher detection limits used.

Table 6.1 also lists the detected inorganic analytes, specifically the heavy metals. Cyanide was not detected in either sample above the detection level of 0.1 mg/kg.

6.2 GROUNDWATER SAMPLES

During the Supplemental Site Investigation, analysis of the initial round of groundwater samples collected was performed for the full TCL/TAL parameters. Following review of this data, a set of Site-Specific Indicator (SSI) parameters was developed. The following list of SSI parameters was used for groundwater analyses during this Additional Site Investigation:

VOCs
- 1,2-Dichloroethene (total)
- 1,1,1-Trichloroethane
- Benzene
- Toluene
- Ethylbenzene
- Total Xylenes

PAHs

Cyanide

Hexavalent Chromium

Oil and Grease

6.2.1 Round 4 Sampling

Table 6.2 presents a summary of the detected SSI compounds for the two groundwater samples collected.

MW18-91 was installed in the northwest corner of Area 108, adjacent to the Niagara River. Analysis of the sample from this well indicated the presence of one VOC parameter (cis-1,2-dichloroethene) as well as cyanide and oil and grease. In comparison with the closest wells, MW-7 to the south along the River and MW8-89 to the southwest within Area 108, the chemistry found in the groundwater at MW18-91 is generally lower in concentration than that detected in those other two wells during previous sampling events. The cyanide, oil and grease and dichloroethene concentrations are all similar or lower than those found previously in the neighboring wells, while none of the other previously identified VOCs were detected in the MW18-91 sample. Moreover, all of the substances detected in MW18-91 were present at concentrations below the most stringent maximum contaminant level (MCL). Finally, the absence of any PAH compounds at MW18-91 is similar to the previous results documented for MW7 and MW8-89.

MW19-91 was installed off-Site within the ConRail track area, northeast of the TCC facility. This well was installed to investigate the possibility of cyanide migration across the Site boundary in this area. A second well, MW20-91, did not have sufficient groundwater recharge to produce the necessary sample volume for complete analysis. The cyanide concentration reported for MW19-91 (4 µg/L) is up to two orders of magnitude lower than that previously found at the adjacent on-Site wells, MW-2 and MW13-89, and well

below the most stringent MCL (100 µg/L). The absence of any VOC parameters is also similar to that previously reported at these neighboring boundary wells.

In the MW19-91 sample, PAH compounds were present at concentrations equivalent to or below the most stringent MCL; oil and grease was also found. The previous Supplemental Site Investigation sampling results showed that no PAH compounds were even detected at the boundary wells, MW-2 and MW13-89, while many of the PAH compounds found at MW-3 and MW3R-89, further to the south, were below the drinking water standards. MW-3 and MW3R-89 are located in the center of the groundwater mound and are adjacent to the coal piles in Area 110. But the total PAH concentration found off-Site at MW19-91 exceeds those found on Site at MW-3 and MW3R-89 by more than an order of magnitude and no PAH presence was detected at the boundary wells MW-2 and MW13-89, which are between MW19-91 and MW-3/MW3R-89. The presence of oil and grease at these wells is similar to the PAH presence, further indicating that the chemicals found off-Site are not related to the TCC Site conditions.

Table 6.3 presents the detected TAL metal compounds found at well MW16-89. This well was not sampled in the first round of groundwater sampling because the well was dry. Subsequent sampling at MW16-89 was solely for analysis of SSI parameters. Therefore no indication of metals presence was available for this boundary well. Several metals compounds were detected above the most stringent MCLs, including iron, manganese and sodium. Both iron and manganese are prevalent metal compounds which were also observed above MCLs at the other six wells sampled for TAL metals. The sodium concentration found at MW16-89 is similar to that found previously at MW14-89

and MW17-89 and although the levels are above the most stringent MCL for people on severely restricted sodium diets, they do not exceed the 270,000 µg/L level specified for consumption by people on moderately restricted sodium diets. The concentration of cadmium only slightly exceeds the most stringent MCL. However, the difference is less than an order of magnitude and within the range of potential analytical error.

6.2.2 Round 5 Sampling

Table 6.4 presents a summary of the detected SSI compounds for the eight Round 5 groundwater samples collected.

Only one VOC parameter, acetone, was detected and then only in two of the eight samples. In both instances, the presence of acetone had not been detected previously during the two 1989 sampling events at MW11-89 and the one 1991 sampling event at MW19-91. Although the quality control validation did not indicate any specific sample contamination problems, acetone results from the Supplemental Site Investigation have previously been qualified as likely due to lab contamination. No other VOC parameters were detected in any of the eight samples.

Only one sample revealed any PAH compounds to be present. At MW19-91, 12 PAHs were present in concentrations ranging from 11 to 57 µg/L. These concentrations are more than an order of magnitude lower than the previous 1991 results and, as discussed in the previous subsection, this PAH presence is not related to TCC Site conditions, as the boundary wells MW-2

and MW13-89 do not contain PAHs. Also, the other off-Site well, MW20-91, does not contain any PAH compounds above the detection limits.

Cyanide was detected in seven of the eight groundwater samples. However, the concentrations were equal or less than those previously reported and all were well below the most stringent MCL. The cyanide concentrations in the two new off-Site wells, MW19-91 and MW20-91, were 4 µg/L and ND, respectively. This confirms the previous conclusion that the cyanide found on Site has not migrated off Site via the groundwater regime in any significant manner.

Oil and grease was detected above 1,000 µg/L at four well locations; MW11-89, MW16-89, MW19-91 and MW20-91. Oil and grease had previously been observed at MW16-89 and MW19-91 at similar or higher concentrations. While no previous data are available for MW20-91, this well is adjacent to MW19-91 and the concentrations reported are similar. Only at MW11-89 is the newly acquired data significantly different from previous data in that oil and grease was previously non-detect. However, the concentration of this compound detected at MW11-89 is similar to that found at MW16-89.

In summary, the groundwater analytical results from the additional investigation activities indicated no significant off-Site contamination of groundwater due to TCC Site conditions. These recent results further support the conclusions made in the Supplemental Site Investigation Report.

6.3 SURFACE WATER SAMPLES

Table 6.5 presents a summary of the detected compounds for the six surface water samples collected.

Only one VOC parameter, acetone, was detected and only in one of the six samples. Acetone was also detected previously at SW-14 during the sampling on October 19, 1989, but the concentration was noted to be estimated due to potential field contamination. Despite this possible acetone presence at SW-14, acetone was not detected downstream at SW-13 and SW-11. All other VOC compounds were not detected in any of the six samples. These results are similar to those of the previous Supplemental Site Investigation.

No BNA compounds, including PAHs, were detected in any of the six surface water samples collected. The previous Supplemental Site Investigation results indicated low-level pyrene concentrations at SW-12, SW-14 and SW-15, with no pyrene detected downstream at SW-11 and SW-13. The source of the previously detected pyrene was unknown, however, its presence was no longer detected during this recent sampling event.

Only two metals, iron and manganese, were detected above the most stringent MCL (300 µg/L for each). Manganese concentrations above the MCL were reported for five of the six samples with the highest concentration (3,910 µg/L) being detected at SW-14. The concentrations reduce towards SW-11, further downstream, where the concentration is only 140 µg/L, less than the most stringent MCL.

Iron concentrations exceeding the most stringent groundwater MCL were reported in all six surface samples with the highest concentration also occurring at SW-14 (161,000 µg/L). As with manganese, the iron concentrations reduce towards SW-11 (1,370 µg/L) and, although this concentration is still above the most stringent MCL, the difference is less than an order of magnitude and within the range of potential analytical error.

Cyanide was only detected above the most stringent MCL (100 µg/L) on one occasion. At SW-11, the cyanide concentration was reported to be 138 µg/L which is only slightly above the MCL and within the range of potential analytical error. This presence is unexplained as all of the upstream locations had cyanide concentrations below the MCL, with the immediate upstream sampling location, SW-13, reporting non-detect. It should be noted that the 100 µg/L level is derived from a water supply sources regulation (10 NYCRR Part 170) while the Class GA groundwater standard (6 NYCRR Part 703.5) is 200 µg/L. The surface water in the wetlands to the southeast of the TCC plant is not used as a source of water supply.

Hexavalent chromium was only detected in one sample, SW-14, and this was below the most stringent groundwater MCL. Oil and grease was detected at low levels at only two locations, SW-11 and SW-12.

In summary, the detected concentrations in the surface waters to the southeast of the TCC plant were similar or lower than those reported in the Supplemental Site Investigation. Some elevated metals presence appears to originate in the area of SW-14 and there is an elevated cyanide presence in the SW-11 sample.

6.4 SEDIMENT SAMPLES

Table 6.6 presents a summary of the detected SSI compounds for the three sediment samples (includes one duplicate) collected.

For the SSI VOCs, the sediment at SW-14 contained more methylene chloride during this sampling event as compared with the Supplemental Site Investigation, but the presence of benzene, toluene and xylenes was now non-detect. It should be noted that the methylene chloride detection is suspect as the round one field blank also contained this parameter. At SW-11 the concentrations of the chemicals present are much lower than previously reported and this location is downstream of SW-14.

For the PAHs, the sediment results from the most recent sampling event are slightly lower in concentration at both SW-11 and SW-14 from the conditions observed two to three years ago.

Both sample locations indicated the presence of cyanide in the sediment soils where none was present previously. This cyanide presence should be investigated by additional sediment and surface water samples. A specific proposal for additional sampling is being developed for submittal.

7.0 SURFACE WATER FLOW PATTERNS

During a recent precipitation event, observations of surface water movement were made by TCC personnel across the TCC Site to confirm the surface water flow patterns. Surface water within the building/plant area of the Site is collected by the below ground sewer system and directed to the sewer outfall west of the Site. The topography in the southeast corner of the Site suggests a general surface water flow direction towards the low marshy area with the collected water outletting to the west. At the south boundary of the Site, approximately 500 feet east of River Road, there are two large underground culverts which direct all the surface water, both from TCC to the east and surrounding areas to the south, towards the north and under the adjacent Allied property. The surface water outletting from these two culverts then joins other TCC surface water drainage pathways prior to crossing River Road and traveling through Area 108 to the Niagara River. Plan 1 illustrates the general surface water flow directions observed which are identical to those used in the assumptions for the Supplemental Site Investigation Report.

8.0 MISCELLANEOUS TASKS

8.1 WETLANDS DEFINITION

Before beginning field work, CRA obtained maps showing DEC designated State wetlands to ensure proper wetlands definition. The designated wetlands area, BW-6, southeast of the TCC Site has been added to the enclosed Plan 1.

8.2 SSI PARAMETER SELECTION REVIEW

The SSI parameter list has been reviewed to ensure that it includes any parameters which were detected in groundwater and soil samples collected during the Phase II Site Investigation and USGS Sampling Programs. The only detected compounds from these programs not included on the SSI parameter list are carbon disulfide and phenols. However, neither of these parameters were detected in groundwater samples collected during Round 1 of the Supplemental Site Investigation in which groundwater samples were analyzed for the full TCL/TAL parameters. As a result, the SSI parameter list is appropriate for all subsequent groundwater and soil analyses.

8.3 ANALYTICAL DATA QUALITY REVIEW

Prior to groundwater, surface water and sediment sampling, the analytical data quality objectives were reevaluated to ensure that future

analytical detection levels are below or equivalent to groundwater standards. The detection levels used for the Supplemental Site Investigation were compared with the most stringent Maximum Contaminant Level (MCL) of the following New York State Groundwater Standards:

40 CFR 141,
Sanitary Code Part 5,
6 NYCRR Part 703.5, and
10 NYCRR Part 170.

The detection levels used were usually below or equivalent to the most stringent groundwater standards. Several instances of a higher detection level were reported for VOCs. However, subsequent analyses used lower detection levels and the parameters in question were still reported as ND.

The four regulatory documents listed above are all designed to suit different purposes. The first one is a federal regulation on primary drinking water standards. The second is a New York State Department of Health drinking water supply regulation. The third is a New York State Department of Environmental groundwater standards document. The fourth is a New York State regulation with regards to water supply sources.

8.4 EVALUATION OF TENTATIVELY IDENTIFIED COMPOUNDS

During the initial sampling events of the Supplemental Site Investigation, the analytical samples were analyzed for the complete set of TCL and TAL parameters except the pesticide fraction and the data were reported by

Contract Laboratory Procedures (CLP). This reported data included a listing of any Tentatively Identified Compounds (TICs) detected in the analyzed samples. For the groundwater samples, only a few TICs were reported (3 VOCs and 15 BNAs) and the majority of the TICs reported for the BNAs were listed as unknown under the compound name. For the soil samples, only 5 VOC TICs were reported. In addition, 21 specific BNA TICs plus 51 unknown BNA TICs were reported for the soil samples. Most of the specific BNA TICs were PAH isomers and, as the corresponding soil sample results indicated elevated PAH concentrations, these other compounds were not necessary.

In summary, the evaluation of the TICs (mostly unknowns) indicated no additional parameters need to be added to the SSI parameter list.

8.5 SUBSURFACE UTILITIES

CRA has reviewed the TCC maps with regards to subsurface utilities beneath the Site. Besides the known sewers beneath the main plant facilities, the only identified utilities on the TCC Site are two lines along the north side of Area 108, west of River Road. These two lines, a 30-inch diameter cast iron watermain and a 36-inch diameter reinforced concrete sewer run east-west along the property line and do not traverse any of the known disposal areas of Area 108. The locations of these utilities are illustrated on the enclosed Plan 1.

9.0 SITE HYDROGEOLOGY

As part of the data collection activities of the Additional Site Investigation, groundwater level monitoring was performed on April 15, 1992 and July 6, 1992. These levels were obtained in order to confirm the groundwater flow pattern presented in the Supplemental Site Investigation Report. Table 9.1 presents these groundwater elevations.

From Table 9.1 it can be seen that the groundwater elevations obtained this year are very similar to those recorded in 1989, as reported in the Supplemental Site Investigation Report. Figure 9.1 illustrates the overburden groundwater contours at the Site, based on the most recent data available.

10.0 CONCLUSIONS AND RECOMMENDATIONS

Following completion of the Additional Site Investigation at the TCC Site, the following conclusions have been formulated:

- VOCs and PAHs detected in the soil sample from TP-Z and a composite sample from TP-X, TP-Y and TP-Z appear to be localized to a depressed area centered around the TP-Z area. The area was apparently historically a low swampy area which collected the drainage from both the TCC facility and the oil processing areas south of the TCC facility. The groundwater samples from wells MW-2 and MW18-91 along the Niagara River have not exhibited any VOC or PAH presence exceeding the most stringent MCL, indicating no significant migration of this localized chemical presence to the Niagara River.

- Cyanide was found off-Site at MW19-91 at a concentration significantly lower than those found on-Site and well below the most stringent MCL, indicating no significant migration of cyanide across the Site boundary in this area.

- PAH and oil and grease presence northeast of the Site is not directly related to TCC and most likely due to the presence of the railroad tracks in the area, as discussed in the Supplemental Site Investigation Report.

- Cyanide found in the surface water and sediment samples collected from the low marshy area southeast of the Site should be verified and investigated further by additional sampling.

- With the exception of limited data which raise questions about surface water and sediment cyanide contamination in and near the southeast corner of the Site, data collected during the activities of the Additional Site Investigation further support the conclusion of the Supplemental Site Investigation report that the TCC Site does not pose a significant risk to public health or the environment.

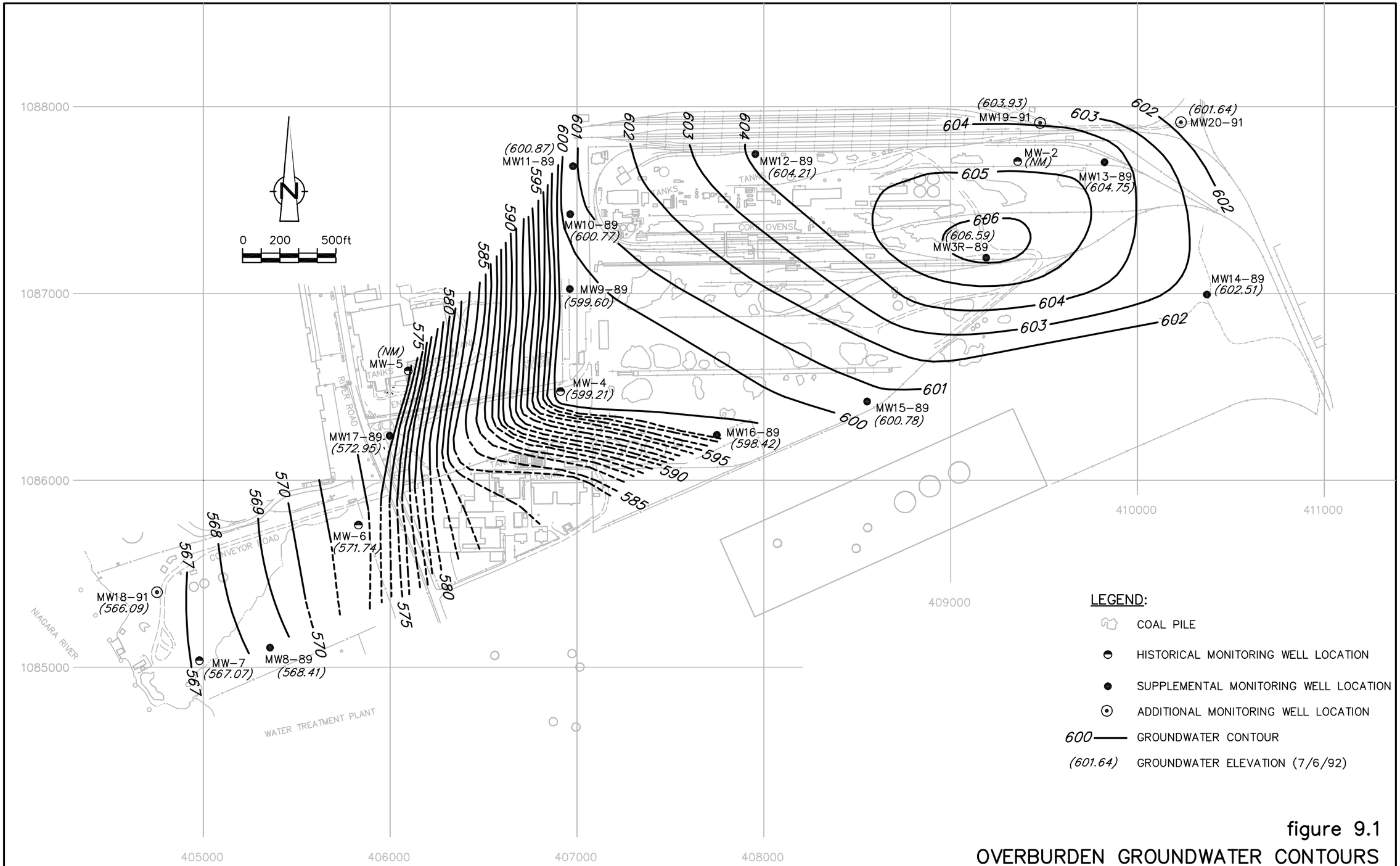
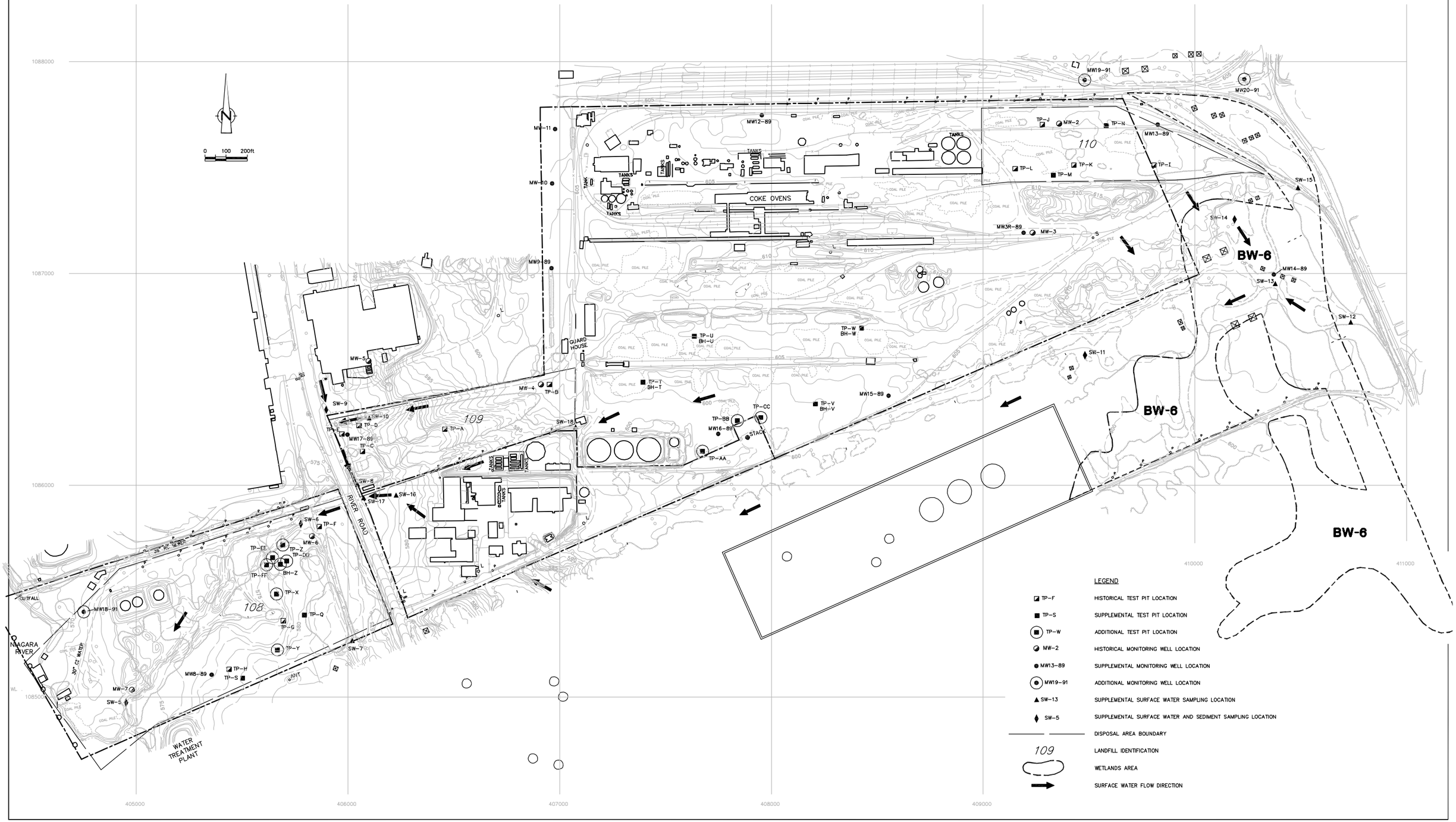


figure 9.1

OVERBURDEN GROUNDWATER CONTOURS
ADDITIONAL SITE INVESTIGATION
Tonawanda Coke Corporation

CRA

2428 (5) SEPT 17/92 REV.0 (P-10)



Nº	Revision	Date	Initial

Approved

TONAWANDA COKE CORPORATION

SUPPLEMENTAL SITE INVESTIGATION

ADDITIONAL MONITORING WELLS / TEST PITS

CRA
CONESTOGA-ROVERS & ASSOCIATES

Drawn by: LDM	Scale: 1" = 200'	Date: SEPTEMBER 1992	File Nº: P-09	Rev.Nº: 0
Designed by: CRH				
Checked by: JKK	Field book:	Project Nº: 2428	Drawing Nº: PLAN 1	

OCT 20/92

TEST PIT STRATIGRAPHIC SUMMARIES
TONAWANDA COKE CORPORATION

TP-X		
0 to 1.0 ft BGS	-	Brown, black and tan SILT, some fine to medium sand and cinders, FILL
1.0 to 8.0 ft BGS	-	PLASTIC, BRICKS and WOOD, some black silt and tar paper, little glass, moist
8.0 to 13.0 ft BGS	-	Black SILT with vegetation, NATIVE
13.0 to 15.0 ft BGS	-	Black SILT and fine SAND, little clay, wet
15.0 ft BGS	-	Bottom of test pit
TP-Y		
0 to 3.5 ft BGS	-	Brown SILT and fine SAND, little roots and vegetation, FILL
3.5 to 7.0 ft BGS	-	Black CINDERS, some brick, wood and plastic, trace foundry core
7.0 to 9.0 ft BGS	-	Reddish brown CLAY, little silt, NATIVE
9.0 ft BGS	-	Bottom of test pit
TP-Z		
0 to 11.5 ft BGS	-	Brown and black SILT, some fine sand,bricks and concrete, little medium and coarse sand, trace wood, plastic, wire, metal, roots and vegetation, dry to moist, FILL
11.5 to 12.5 ft BGS	-	Black vegetative MUD, some vegetation, wet, NATIVE**
12.5 ft BGS	-	Bottom of test pit
TP-AA		
0 to 1.6 ft BGS	-	COAL, grain size range from coarse sand to coarse gravel
1.6 to 1.8 ft BGS	-	Reddish-Brown CLAY with trace silt, NATIVE
1.8 ft BGS	-	Bottom of test pit
TP-BB		
0 to 1.2 ft BGS	-	COAL, grain size range from coarse sand to coarse gravel
1.2 to 1.4 ft BGS	-	Reddish-brown CLAY with trace silt, NATIVE
1.4 ft BGS	-	Bottom of test pit

TEST PIT STRATIGRAPHIC SUMMARIES
TONAWANDA COKE CORPORATION

TP-CC		
0 to 0.8 ft BGS	-	COAL, grain size range from coarse sand to coarse gravel
0.8 to 1.0 ft BGS	-	Reddish-brown CLAY with trace silt, NATIVE
1.0 ft BGS	-	Bottom of test pit
TP-DD		
0 to 13.0 ft BGS	-	Black SILT and fine SAND, some bricks and concrete, little wood and clay, trace roots and vegetation, moist, FILL
13.0 to 13.5 ft BGS	-	Black VEGETATION, wet, NATIVE
13.5 to 15.5 ft BGS	-	Dark brown SILT, little fine to medium sand, trace clay, moist
15.5 to 16.5 ft BGS	-	Gray fine SAND, some silt, little medium sand, moist
16.5 ft BGS	-	Bottom of test pit
TP-EE		
0 to 11.0 ft BGS	-	Black SILT with red and white bricks, little wood, clay and sand, trace plastic and metal, moist, FILL
11.0 to 12.5 ft BGS	-	Black VEGETATION, wet, NATIVE
12.5 ft BGS	-	Bottom of test pit
TP-FF		
0 to 14.5 ft BGS	-	Black SILT and fine to medium SAND, some bricks and wood, little plastic and paper, moist, FILL
14.5 to 15.0 ft BGS	-	Black VEGETATION, wet, NATIVE
15.0 to 15.5 ft BGS	-	Dark gray SILT, little clay, trace wood, moist
15.5 ft BGS	-	Bottom of test pit

Note:

** - HNU readings of 140 ppm above background, abandoned test pit and backfilled due to high readings

TABLE 2.2

AIR MONITORING (HNU) SUMMARY
TONAWANDA COKE CORPORATION

Test Pit/Well Location	*Date*	*Background Reading*	*Highest Reading Over Open Hole*
TP-X	6-14-91	0.9	*
TP-Y	6-14-91	1	3.5
TP-Z	6-14-91	1.2	140
TP-DD	6-14-91	*	4
TP-EE	6-14-91	*	25
BH-TP-Z	6-17-91	3	0.5
MW18-91	6-17-91	1.1	0
MW18-91	6-18-91	1.6	0
MW18-91	6-19-91	1.8	0
MW19-91	6-18-91	1.6	0.6
MW20-91	6-18-91	1.8	0.7

Notes:

* - HNu readings not recorded
No HNu readings were reported for TP-AA, TP-BB, TP-CC and TP-FF

TABLE 3.1

MONITORING WELL COMPLETION DETAILS
TONAWANDA COKE CORPORATION

Well No.	*Ground Elevation (ft. AMSL)*	*Top of Casing (ft. AMSL)*	*Depth of Hole (ft. BGS)*	*Screened Interval (ft. AMSL)*	*Sandpack Interval (ft. AMSL)*	*Bentonite Plug Interval (ft. AMSL)*
MW18-91	570.2	572.20	22.0	562.2 - 552.2	566.7 - 548.2	569.2 - 566.7
MW19-91	505.4	607.17	4.0	603.6 - 601.6	603.9 - 601.4	604.9 - 603.9
MW20-91	603.5	605.33	4.0	602.0 - 600.0	602.0 - 599.5	603.0 - 602.0

Notes:

AMSL Above mean sea level (based on NGVD 1929 datum).
BGS Below ground surface.

TABLE 4.1

ROUND 4 WELL SAMPLING SUMMARY
TONAWANDA COKE CORPORATION

Sample Location	*Sample Number*	*Sample Date*	*Sample Time*	*Shipping Date*	*Chain-of-Custody Number*	*Comments*
MW16-89	W-2428-BC-002	7-18-91	0900	7-18-91	012141	Sample for metals only.
	W-2428-JOS-002	7-19-91	0930	7-19-91	012142	Resample due to lab error.
MW18-91	W-2428-BC-001	7-16-91	1230	7-16-91	012140	--
MW19-91	W-2428-BC-003	7-18-91	0930	7-18-91	012141	--
	W-2428-BC-003R	7-25-91	1130	7-25-91	012143	Resample for PAHs due to lab error.

TABLE 4.2

ROUND 5 WELL SAMPLING SUMMARY
TONAWANDA COKE CORPORATION

Sample Location	*Sample Number*	*Sample Date*	*Sample Time*	*Shipping Date*	*Chain-of-Custody Number*	*Comments*
MW-7	W-2428-792-04	7-7-92	1430	7-7-92	20787	--
	W-2428-792-05	7-7-92	1630	7-7-92	20787	Blind Duplicate
MW11-89	W-2428-792-18	7-9-92	1100	7-9-92	20791	--
MW14-89	W-2428-792-19	7-10-92	0900	7-10-92	20792	--
MW16-89	W-2428-792-17	7-9-92	1000	7-9-92	20791	--
MW18-91	W-2428-792-03	7-7-92	1500	7-7-92	20787	Plus MS/MSD
MW19-91	W-2428-792-02	7-6-02	1645	7-6-92	20786	--
MW20-91	W-2428-792-01	7-6-92	1545	7-6-92	20786	--
Rinse Blank	W-2428-792-06	7-7-92	1515	7-7-92	20788	--

TABLE 5.1

ROUND 3 SURFACE WATER SAMPLING SUMMARY
TONAWANDA COKE CORPORATION

Sample Location	*Sample Number*	*Sample Date*	*Sample Time*	*Shipping Date*	*Chain-of-Custody Number*	*Comments*
SW-11	SW-2428-792-16	7-9-92	0915	7-9-92	20791	--
SW-12	SW-2428-792-12	7-8-92	1130	7-8-92	20790	Plus MS/MSD
SW-13	SW-2428-792-13	7-8-92	1200	7-8-92	20790	--
SW-14	SW-2428-792-09	7-8-92	1030	7-8-92	20789	--
SW-15	SW-2428-792-07	7-8-92	1000	7-8-92	20789	--
	SW-2428-792-08	7-8-92	1015	7-8-92	20789	Blind Duplicate

TABLE 5.2

ROUND 2 SURFACE WATER SAMPLING SUMMARY
TONAWANDA COKE CORPORATION

Sample Location	*Sample Number*	*Sample Date*	*Sample Time*	*Shipping Date*	*Chain-of-Custody Number*	*Comments*
SW-11	SD-2428-792-15	7-8-92	1415	7-8-92	20790	--
SW-14	SD-2428-792-10	7-8-92	1035	7-8-92	20790	--
	SD-2428-792-11	7-8-92	1040	7-8-92	20790	Blind Duplicate

TEST PIT SOIL SAMPLE ANALYTICAL RESULTS
TONAWANDA COKE CORPORATION

Test Pit # *Sample Type* *Date*	*TP-X,Y,Z* *COMPOSITE* *6-14-91*	*TP-Z* *GRAB* *6-14-91*	*Background* *Surface Soil* *Concentrations*
TCL VOCs (mg/kg)			
Benzene	2.8	66	
Toluene	6.4	140	
Ethylbenzene	22	60	
m/p-Xylene	6.4	100	
o-Xylene	8	98	
TCL BNAs (mg/kg)			
Naphthalene	92	270	
Phenanthrene	62	180	
Anthracene	ND(33)	74	
Fluoranthene	67	150	
Pyrene	44	99	
Benzo(a)Anthracene	ND(33)	57	
Chrysene	ND(33)	47	
Benzo(b)Fluoranthene	ND(33)	40	
Benzo(k)Fluoranthene	ND(33)	45	
Benzo(a)Pyrene	ND(33)	47	
2-Methylnaphthalene	ND(33)	86	
Dibenzofuran	ND(33)	69	
Fluorene	ND(33)	85	

TEST PIT SOIL SAMPLE ANALYTICAL RESULTS
TONAWANDA COKE CORPORATION

Test Pit #	*TP-X,Y,Z*	*TP-Z*	*Background*
Sample Type	*COMPOSITE*	*GRAB*	*Surface Soil*
Date	*6-14-91*	*6-14-91*	*Concentrations*
TAL Metals (mg/kg)			
Aluminum	15,000	22,500	4,500-100,000
Arsenic	10.1	240	<1-9.3
Barium	16.2	46.7	10-3,000
Cadmium	1.05	ND(0.05)	
Calcium	9,490	496	
Chromium	24.1	16.7	7-1,500
Copper	50.7	64	3-300
Iron	32,000	77,100	5,000-50,000
Lead	108	172	<10-70
Magnesium	4,250	3,480	
Manganese	245	190	20-3,000
Mercury	4	3.5	0.02-1.50
Nickel	362	83	<5-150
Potassium	875	1,590	
Selenium	1.43	ND(0.5)	
Silver	1.74	23.3	0.2-3.2
Sodium	365	488	
Vanadium	1.6	13.8	0.7-98
Zinc	145	204	<5-300

Note: ND(#) - Not detected above quantifiable limits stated in parentheses

TABLE 6.2

ROUND 4 GROUNDWATER ANALYTICAL RESULTS - SSIs
TONAWANDA COKE CORPORATION

Well #	*MW18-91*	*MW19-91*	*Most Stringent*
Date	*7-16-91*	*7-18-91*	*MCL*
Units	*µg/L*	*µg/L*	*µg/L*
SSI VOCs			
cis-1,2-Dichloroethene	7.68	ND(1)	5
SSI BNAs			
Acenaphthene	ND(5)	<80**D	50
Acenphthylene	ND(5)	<80**D	50
Anthracene	ND(5)	174D	50
Benzo(a)anthracene	ND(5)	493D	50
Benzo(a)pyrene	ND(5)	563D	ND
Benzo(b)&(k)fluoranthene	ND(5)	418D	50
Benmzo(g,h,i)perylene	ND(5)	714D	50
Chrysene	ND(5)	478D	50
Dibenzo(a,h)anthracene	ND(5)	405D	50
Fluoranthene	ND(5)	805D	50
Fluorene	ND(5)	117D	50
Indeno(1,2,3-cd)pyrene	ND(5)	553D	50
Napthalene	ND(5)	<80**D	50
Phenanthrene	ND(5)	511D	50
Pyrene	ND(5)	685D	50
Other Compounds			
Cyanide	36	12	100
Oil and Grease	3,800	44,000	

Notes:

ND(#) - Not detected above quantifiable limits stated in parentheses.
** - High quantifiable limits due to the necessary dilution of the sample.
D - The associated value exceeded the NYSDOH Drinking Water Standards (Sanitary Code Part 5)

TABLE 6.3

ROUND 4 GROUNDWATER ANALYTICAL RESULTS - METALS
TONAWANDA COKE CORPORATION

Well #	*MW16-89*	*Most Stringent*
Date	*7-16-91*	*MCL*
Units	*µg/L*	*µg/L*
TAL Metals		
Arsenic	10	25
Cadmium	19A	10
Calcium	361,000	
Chromium	25	50
Copper	157	200
Iron	160,000A	300
lead	6	25
Magnesium	183,000	
Manganese	11,200A	300
Mercury	0.7	2
Nickel	73	
Potassium	5,880	
Silver	16	50
Sodium	183,000B	20,000*
Vanadium	4	
Zinc	30	300

Notes:

All other TAL metals were not detected.

ND(#) - Not detected above quantifiable limits stated in parentheses.

A - The associated value exceeded NYSDEC Class GA Groundwater Standards (6NYCRR Part 703.5).

B - The associated value exceeded NYSDOH Drinking Water Standards (Sanitary Code Part 5).

* - Water containing more than 20,000 µg/L of sodium should not be used for drinking by people on severely restricted sodium diets (270,000 µg/L for moderately restricted sodium diets).

TABLE 6.4

ROUND 5 GROUNDWATER ANALYTICAL RESULTS
TONAWANDA COKE CORPORATION

Well #	*MW-7*	*MW-7 dup.*	*MW11-89*	*MW14-89*	*MW16-89*	*MW18-91*	*MW19-91*	*MW20-91*	*Most*
Date	*7-7-92*	*7-7-92*	*7-9-92*	*7-10-92*	*7-9-92*	*7-7-92*	*7-6-92*	*7-6-92*	*Stringent MCL*
Units	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*
SSI VOCs									
Acetone	ND(50)	ND(50)	685D	ND(50)	ND(50)	ND(50)	76D	ND(50)	50
SSI BNAs									
Acenaphthylene	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	16	ND(10)	50
Anthracene	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	17	ND(10)	50
Benzo(a)anthracene	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	31	ND(10)	50
Benzo(a)pyrene	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	29A	ND(10)	50
Benzo(b)&(k)fluoranthene	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	26	ND(10)	50
Chrysene	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	31	ND(10)	50
Dibenzofuran	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	11	ND(10)	50
Fluoranthene	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	57D	ND(10)	50
Fluorene	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	17	ND(10)	50
Phenanthrene	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	55D	ND(10)	50
Pyrene	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	57D	ND(10)	50
Other Compounds									
Cyanide	37	26	4	8	6	40	4	ND(1)	100
Oil and Grease	ND(1,000)	ND(1,000)	8,300	ND(1,000)	9,100	ND(1,000)	2,200	2,200	--

Notes:

ND(#) - Not detected above quantifiable limits stated in parentheses.

A - The associated value exceeded NYSDEC Class GA Groundwater Standards (6NYCRR Part 703.5).

D - The associated value exceeded the NYSDOH Drinking Water Standards (Sanitary Code Part 5)

TABLE 6.5

ROUND 3 SURFACE WATER ANALYTICAL RESULTS
TONAWANDA COKE CORPORATION

Surface Water #	*SW-11*	*SW-12*	*SW-13*	*SW-14*	*SW-15*	*SW-15 dup.*	*Most*
Date	*7-9-92*	*7-8-92*	*7-8-92*	*7-8-92*	*7-8-92*	*7-8-92*	*Stringent MCL*
Units	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*
VOCs							
Acetone	ND(50)	ND(50)	ND(50)	364 D	ND(50)	ND(50)	50
BNAs							
All compounds	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	50
Metals							
Aluminum	330	10	ND(5)	8,100	540	400	--
Arsenic	ND(2)	ND(2)	ND(2)	ND(2)	3	3	25
Barium	10	40	40	10	3	3	1,000
Calcium	113,000	101,000	105,000	489,000	106,000	106,000	--
Chromium	ND(10)	ND(10)	ND(10)	10	ND(10)	ND(10)	50
Cobalt	ND(5)	ND(5)	ND(5)	30	ND(5)	5	--
Copper	20	ND(10)	ND(10)	20	ND(10)	ND(10)	200
Iron	1,370 AD	3,360 AD	1,090 AD	161,000 AD	4,580 AD	4,330 AD	300
Lead	4	5	ND(2)	7	8	4	25
Magnesium	21,300	17,300	17,300	64,800	18,100	18,300	--
Manganese	140	480 AD	470 AD	3,910 AD	600 AD	600 AD	300
Nickel	ND(20)	ND(20)	ND(20)	100	ND(20)	ND(20)	--
Potassium	900	340	890	10,100	3,270	3,550	--
Selenium	4	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	--
Silver	ND(5)	ND(5)	ND(5)	ND(5)	10	9	--
Sodium	7,870	8,630	7,940	11,600	12,200	12,300	20,000
Vanadium	10	10	10	80	20	20	--
Zinc	40	20	10	450	ND(10)	ND(10)	300

TABLE 6.5

ROUND 3 SURFACE WATER ANALYTICAL RESULTS
TONAWANDA COKE CORPORATION

Surface Water #	*SW-11*	*SW-12*	*SW-13*	*SW-14*	*SW-15*	*SW-15 dup.*	*Most*
Date	*7-9-92*	*7-8-92*	*7-8-92*	*7-8-92*	*7-8-92*	*7-8-92*	*Stringent MCL*
Units	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*
Other Compounds							
Cyanide	138	ND(4)	ND(4)	12	30	28	100
Oil and Grease	2,000	1,900	ND(1,000)	ND(1,000)	ND(1,000)	ND(1,000)	--
Hexavalent Chromium	ND(10)	ND(10)	ND(10)	30	ND(10)	ND(10)	50

Notes:

ND(#) - Not detected above quantifiable limits stated in parentheses.

A - The associated value exceeded NYSDEC Class GA Groundwater Standards (6NYCRR Part 703.5).

D - The associated value exceeded the NYSDOH Drinking Water Standards (Sanitary Code Part 5)

TABLE 6.6

ROUND 2 SEDIMENT ANALYTICAL RESULTS
TONAWANDA COKE CORPORATION

Sediment #	*SW-11*	*SW-14*	*SW-14 dup.*
Date	*7-8-92*	*7-8-92*	*7-8-92*
Units	*µg/kg*	*µg/kg*	*µg/kg*
SSI VOCs			
Methylene Chloride	40.1	2,620	2,090
Toluene	11.8	ND(500)	ND(500)
SSI BNAs			
Acenaphthylene	ND(330)	680	790
Anthracene	ND(330)	1,000	940
Benzo(a)anthracene	ND(330)	4,700	4,700
Benzo(b)fluoranthene	480	5,900	6,200
Benzo(k)fluoranthene	440	7,300	5,900
Chrysene	340	5,400	5,300
Fluoranthene	400	7,200	6,700
Fluorene	ND(330)	510	580
Phenanthrene	ND(330)	4,400	4,100
Pyrene	460	9,200	8,000
Other Compounds			
Cyanide	2,400	30,300	21,900

Notes:

ND(#) - Not detected above quantifiable limits stated in parentheses.

TABLE 9.1

GROUNDWATER ELEVATIONS
TONAWANDA COKE CORPORATION

Well Number	*Top of Casing Elevation*	*Groundwater Elevation*	
		4-15-92	*7-6-92*
MW-2	609.57	NM	NM
MW-3	610.49	NM	605.23
MW3R-89	611.16	606.99	606.59
MW-4	602.84	NM	599.21
MW-5	580.56	574.56	NM
MW-6	579.78	573.36	571.74
MW-7	575.15	NM	567.07
MW8-89	578.99	569.74	568.41
MW9-89	604.92	599.92	599.60
MW10-89	605.54	601.12	600.77
MW11-89	603.77	600.60	600.87
MW12-89	609.19	604.02	604.21
MW13-89	608.39	605.47	604.75
MW14-89	605.57	NM	602.51
MW15-89	605.99	601.99	600.78
MW16-89	603.46	599.71	598.42
MW17-89	579.15	574.48	572.95
MW18-91	572.20	566.03	566.09
MW19-91	607.17	604.84	603.93
MW20-91	605.33	602.50	601.64

APPENDIX A

STRATIGRAPHIC AND INSTRUMENTATION LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-24)

PROJECT NAME: TONAWANDA COKE CORPORATION
PROJECT NO.: 2428
CLIENT: TONAWANDA COKE CORPORATION
LOCATION: WEST OF RIVER ROAD IN SITE 108

HOLE DESIGNATION: BHZ-91
DATE COMPLETED: JUNE 17, 1991
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: J. WILLIAMS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE
	GROUND SURFACE	579.4				
	Black fine SAND, some silt, some brick fragments, little wood, dry, FILL			1SS		24
		577.4				
2.5	Black SILT and fine SAND, little fine to coarse gravel, concrete and brick, trace wood, moist			2SS		14
		575.4				
5.0	Dark brown SILT, little clay and fine to coarse gravel, trace fine sand, concrete and cinders, moist			3SS		4
	Brown SILT, some clay and cinders, little fine to coarse gravel, trace wood, moist			4SS		3
7.5						
		571.4		5SS		4
	Black fine SAND, little silt and clay, trace fine to medium gravel, moist					
10.0		569.4	8" ø BOREHOLE	6SS		8
	Gray fine to coarse GRAVEL and CONCRETE FRAGMENTS, wet					
12.5		566.9		7SS		7
	Black VEGETATION, some silt and clay, little fine to medium gravel, wet, NATIVE					
	Same, except no gravel, brown and black			8SS		6
15.0						
		563.4	CEMENT/ BENTONITE GROUT	9SS		3
	Gray SILT, some vegetation, little clay and fine sand, wet					
17.5		561.4		10SS		2
	Gray fine SAND, some silt, little vegetation, wet					
20.0	Same, except trace silt, no vegetation			11SS		3
	Same, except fine to medium grained					
22.5				12SS		5
	Same, except medium to coarse grained, little fine to coarse gravel					
25.0				13SS		5
	Gray coarse SAND and fine GRAVEL, WET					
				14SS		3
27.5	Gray fine GRAVEL, little coarse sand, wet					
				15SS		4
30.0	Same, except fine to coarse grained, some medium to coarse sand					
				16SS		53
		547.9				
	Gray CLAY, trace fine gravel, moist	547.4				
32.5	END OF HOLE @ 32.0 FT. BGS					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

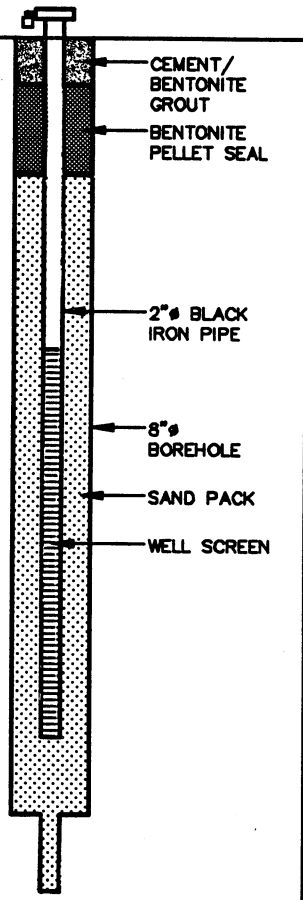
(L-25)

PROJECT NAME: TONAWANDA COKE CORORATION
PROJECT NO.: 2428
CLIENT: TONAWANDA COKE CORORATION
LOCATION: NORTHEAST CORNER OF SITE 108

HOLE DESIGNATION: MW18-91
DATE COMPLETED: JUNE 19, 1991
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: J. WILLIAMS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL
	REFERENCE ELEVATION (Top of Riser)	572.20
	GROUND SURFACE	570.2
	Black COAL, moist, FILL	569.7
2.5	Gray coarse GRAVEL, some concrete, moist Gray fine to coarse GRAVEL, little coarse sand, moist to wet	
		566.2
5.0	Gray fine SAND, some silt, little clay and vegetation, moist, NATIVE Same, except little silt, no clay	
7.5	Dark gray fine to medium SAND, little vegetation, trace silt, wet	
10.0	Same, except no vegetation	
12.5	Same, except no silt	
15.0		
17.5		
20.0		
		548.2
22.5	END OF HOLE @ 22.0 FT. BGS NOTES: 1. At completion a 2.0" ID observation well was installed to 18.0 ft BGS.	
25.0		
27.5		
30.0		
32.5		

MONITOR INSTALLATION



SCREEN DETAILS:
Screened Interval:
8.0 to 18.0' BGS
Length -10.0'
Diameter -2.0"
Slot # 10
Material -Stainless Steel
Sand pack interval:
3.5 to 22.0' BGS
Material -QROC #2

SAMPLE NUMBER	STATE	'N' VALUE
1SS	X	32
2SS	X	94
3SS	X	2
4SS	X	2
5SS	X	7
6SS	X	6
7SS	X	13
8SS	X	7
9SS	X	11
10SS	X	9
11SS	X	15

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-26)

PROJECT NAME: TONAWANDA COKE CORPORATION
PROJECT NO.: 2428
CLIENT: TONAWANDA COKE CORPORATION
LOCATION: OFFSITE, NORTH OF SITE 110

HOLE DESIGNATION: MW19-91
DATE COMPLETED: JUNE 18, 1991
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: J. WILLIAMS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE
	REFERENCE POINT (Top of Riser) GROUND SURFACE	607.17 605.4				
1.0	Black COAL, some cinders, little red brick, little coarse gravel, moist, FILL		CEMENT/ BENTONITE GROUT BENTONITE PELLET SEAL	1SS		14
2.0		603.4	2"ø BLACK IRON PIPE			
	Black fine to coarse GRAVEL, some coal and cinders, moist		SAND PACK			
3.0		602.1	8"ø BOREHOLE	2SS		4
	Reddish brown CLAY, little silt, moist, NATIVE		WELL SCREEN			
4.0	END OF HOLE @ 4.0 FT. BGS	601.4				
	NOTES: 1. At completion a 2.0" ID observation well was installed to 3.8 ft BGS.		SCREEN DETAILS: Screened Interval: 1.8 to 3.8' BGS Length -2.0' Diameter -2.0" Slot # 10 Material -Stainless Steel Sand pack interval: 1.5 to 4.0' BGS Material -QROC #2			
5.0						
6.0						
7.0						
8.0						
9.0						
10.0						
11.0						
12.0						
13.0						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

GRAIN SIZE ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-27)

PROJECT NAME: TONAWANDA COKE CORPORATION
PROJECT NO.: 2428
CLIENT: TONAWANDA COKE CORPORATION
LOCATION: OFFSITE, NORTHEAST OF SITE 110

HOLE DESIGNATION: MW20-91
DATE COMPLETED: JUNE 18, 1991
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: J. WILLIAMS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE
	REFERENCE POINT (Top of Riser) GROUND SURFACE	605.33 603.5				
1.0	Black COAL, some gravel and cinders, little vegetation and roots, moist, FILL		CEMENT/ BENTONITE GROUT BENTONITE PELLET SEAL 2"ø BLACK IRON PIPE 8"ø BOREHOLE SAND PACK WELL SCREEN	1SS		12
2.0	Black COAL, some cinders, some medium to coarse gravel, moist					
3.0	Reddish brown CLAY, little silt, moist	600.5		2SS		6
4.0	END OF HOLE @ 4.0 FT. BGS NOTES: 1. At completion a 2.0" ID observation well was installed to 3.5 ft BGS.	599.5	SCREEN DETAILS: Screened Interval: 1.5 to 3.5' BGS Length -2.0' Diameter -2.0" Slot # 10 Material -Stainless Steel Sand pack interval: 1.5 to 4.0' BGS Material -QROC #2			
5.0						
6.0						
7.0						
8.0						
9.0						
10.0						
11.0						
12.0						
13.0						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

GRAIN SIZE ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

APPENDIX B

WELL PURGING LOGS

PURGING LOG - TONAWANDA COKE CORPORATION

ROUND 4

Well Number:	MW 8-89	Date:	7/15 to 7/17/91
Well Type:	Overburden	Well Diameter:	2.0 in.
Initial Depth to Water:	8.73 ft. BGS	Well Screen Length:	2 ft.
Well Depth:	10.06 ft. BGS	Screen Slot Size:	#10
One Well Volume:	0.18 gal.	Conducted By:	B. Carpenter
Required Number of Well Volumes:	5		
Required Purge Volume:	0.90 gal.		
Purging Method:	Peristaltic Pump		

Time	Cumulative Volumes Removed(gal)	pH	Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)	Notes
7/15/91 1318	0.2	6.53	1400	25.5	--	Purged 0.2 gallons, well went dry.
7/16/91 1240	0.4	7.00	1300	24.1	39.1	Purged 0.2 gallons, well went dry.
7/17/91 1015	0.6	6.48	1590	24.0	41.2	Purged 0.2 gallons, well went dry.

Comments: Initial water quality: black, much suspended material, petroleum odor.
Final water quality: black, much suspended material, petroleum odor.
Sample attempted 7/18/91, insufficient volume due to dry well.
Well development and purging occured coincidentally.
Turbidity not recorded on 7/15/91.

PURGING LOG - TONAWANDA COKE CORPORATION

ROUND 4

Well Number:	MW 10-89	Date:	7/15 to 7/17/91
Well Type:	Overburden	Well Diameter:	2.0 in.
Initial Depth to Water:	3.59 ft. BGS	Well Screen Length:	2 ft.
Well Depth:	4.50 ft. BGS	Screen Slot Size:	#10
One Well Volume:	0.12 gal.	Conducted By:	B. Carpenter
Required Number of Well Volumes:	5		
Required Purge Volume:	0.60 gal.		
Purging Method:	SS Bailer		

Time	Cumulative Volumes Removed(gal)	pH	Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)	Notes
7/15/91 --	0.12	7.46	600	21.3	--	Purged 0.12 gallons, well went dry.
7/17/91 --	0.22	7.61	430	--	28.7	Purged 0.10 gallons, well went dry.

Comments: Initial water quality: dark brown, very cloudy, much suspended material, no odor.
Final water quality: dark brown, very cloudy, much suspended material, no odor.
Sample attempted 7/18/91, insufficient volume due to dry well.
7/16/91 water level 4.18 ft. BGS, no water purged.
7/18/91 water level 4.14 ft. BGS, no water purged.
Turbidity not recorded 7/15/91.
Temperature not recorded 7/17/91.

PURGING LOG - TONAWANDA COKE CORPORATION

ROUND 4

Well Number:	MW 16-89	Date:	7/15 to 7/17/91
Well Type:	Overburden	Well Diameter:	2.0 in.
Initial Depth to Water:	1.44 ft. BGS	Well Screen Length:	2 ft.
Well Depth:	3.50 ft. BGS	Screen Slot Size:	#10
One Well Volume:	0.33 gal.	Conducted By:	B. Carpenter
Required Number of Well Volumes:	5		
Required Purge Volume:	1.65 gal.		
Purging Method:	Peristaltic Pump		

Time	Cumulative Volumes Removed(gal)	pH	Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)	Notes
7/15/91						
1545	0.50	6.48	1850	24.4	--	Purged 0.5 gallons, well went dry.
7/16/91						
1130	1.00	6.29	1910	23.1	24.4	Purged 0.5 gallons, well went dry.
7/17/91						
900	1.20	6.07	1800	26.4	11.3	Purged 0.2 gallons, well went dry.

Comments: Initial water quality: black, very cloudy, much suspended material, no odor.
Final water quality: brown/black, slightly cloudy, trace suspended material, no odor.
Sampled 7/18/91 for metals only.
Resampled 7/19/91 due to lab error.
Turbidity not recorded 7/15/91.

PURGING LOG - TONAWANDA COKE CORPORATION

ROUND 4

Well Number:	MW 18-91	Date:	7/15 to 7/16/91
Well Type:	Overburden	Well Diameter:	2.0 in.
Initial Depth to Water:	4.12 ft. BGS	Well Screen Length:	2 ft.
Well Depth:	18.00 ft. BGS	Screen Slot Size:	#10
One Well Volume:	2.22 gal.	Conducted By:	B. Carpenter
Required Number of Well Volumes:	5		
Required Purge Volume:	11.1 gal.		
Purging Method:	Peristaltic Pump		

Time	Cumulative Volumes Removed(gal)	pH	Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)	Notes
7/15/91						
1400	2.50	7.51	230	26.3	--	
1405	5.00	7.58	200	26.3	--	
1408	7.50	7.84	360	24.8	--	
1410	10.00	7.95	370	24.8	--	
1413	12.50	7.96	490	23.2	--	
7/16/91						
1140	15.00	8.11	470	24.1	11.4	
1144	17.50	8.24	480	25.2	13.0	
1148	20.00	8.32	220	26.7	50.5	
1153	22.50	8.40	380	23.3	8.6	
1159	25.00	8.23	480	24.5	8.7	

Comments: Initial water quality: grey, very cloudy, some suspended material, no odor.
Final water quality: clear, colorless, no suspended material, no odor.
Well development and purging occurred coincidentally.
Malfunction in turbidimeter on 7/15/91.

PURGING LOG - TONAWANDA COKE CORPORATION

ROUND 4

Well Number:	MW 19-91	Date:	7/15 to 7/17/91
Well Type:	Overburden	Well Diameter:	2.0 in.
Initial Depth to Water:	1.96 ft. BGS	Well Screen Length:	2 ft.
Well Depth:	3.98 ft. BGS	Screen Slot Size:	#10
One Well Volume:	0.32 gal.	Conducted By:	B. Carpenter
Required Number of Well Volumes:	5		
Required Purge Volume:	1.60 gal.		
Purging Method:	SS Bailer		

Time	Cumulative Volumes Removed(gal)	pH	Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)	Notes
7/15/91						
1610	0.50	7.67	200	25.8	--	Purged 0.5 gallons, well went dry.
7/16/91						
1300	1.00	7.04	240	25.3	17.2	Purged 0.5 gallons, well went dry.
7/17/91						
945	1.30	6.65	210	25.0	20.3	Purged 0.3 gallons, well went dry.

Comments: Initial water quality: grey, very cloudy, much suspended material, no odor.
Final water quality: grey-brown, very cloudy, much suspended material, no odor.
Sampled 7/18/91.
Resampled 7/25/91 for PAH due to lab error.
Turbidity not measured 7/15/91.

PURGING LOG - TONAWANDA COKE CORPORATION

ROUND 4

Well Number:	MW 20-91	Date:	7/15 to 7/17/91
Well Type:	Overburden	Well Diameter:	2.0 in.
Initial Depth to Water:	2.54 ft. BGS	Well Screen Length:	2 ft.
Well Depth:	3.67 ft. BGS	Screen Slot Size:	#10
One Well Volume:	0.18 gal.	Conducted By:	B. Carpenter
Required Number of Well Volumes:	5		
Required Purge Volume:	0.90 gal.		
Purging Method:	SS Bailer		

Time	Cumulative Volumes Removed(gal)	pH	Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)	Notes
7/15/91 1615	0.18	7.42	300	24.8	--	Purged 0.18 gallons, well went dry.
7/16/91 1305	0.31	6.58	370	25.0	109.3	Purged 0.13 gallons, well went dry.
7/17/91 1000	0.41	6.37	300	25.7	186.4	Purged 0.10 gallons, well went dry.

Comments: Initial water quality: grey, very cloudy, much suspended material, no odor.
Final water quality: grey, very cloudy, much suspended material, no odor.
Sample attempted 7/18/91, insufficient volume due to dry well.
Turbidity not measured 7/15/91.
Well development and purging occurred coincidentally.

PURGING LOG - TONAWANDA COKE CORPORATION

ROUND 5

Well Number:	MW-7	Date:	7/7/92
Well Type:	Overburden	Well Diameter:	2.0 in.
Initial Depth to Water:	6.58 ft. BGS	Well Screen Length:	2 ft.
Well Depth:	12.15 ft. BGS	Screen Slot Size:	#10
One Well Volume:	0.91 gal.	Conducted By:	J. Williams
Required Number of Well Volumes:	5		G.Gill
Required Purge Volume:	4.55 gal.		
Purging Method:	Peristaltic Pump		

Time	Cumulative Volumes Removed(gal)	pH	Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)	Notes
7/7/92						
1448	1.0	6.84	1070	12.9	8.4	
1453	2.0	6.74	1090	12.3	5.8	
1457	3.0	6.76	1090	12.2	2.5	

Comments: Initial water quality: clear, no odor.
Final water quality: clear, no odor.
Sampled 7/7/92.

PURGING LOG - TONAWANDA COKE CORPORATION

ROUND 5

Well Number:	MW 9-89	Date:	7/6 to 7/8/92
Well Type:	Overburden	Well Diameter:	2.0 in.
Initial Depth to Water:	2.92 ft. BGS	Well Screen Length:	2 ft.
Well Depth:	4.00 ft. BGS	Screen Slot Size:	#10
One Well Volume:	0.18 gal.	Conducted By:	J. Williams
Required Number of Well Volumes:	5		G.Gill
Required Purge Volume:	0.90 gal.		
Purging Method:	Peristaltic Pump		

Time	Cumulative Volumes Removed(gal)	pH	Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)	Notes
7/6/92						
1400	0.2	6.54	2900	16.3	64	Purged 0.2 gallons, well went dry.
7/7/92						
0915	0.4	7.25	2560	14.9	50	Purged 0.2 gallons, well went dry.
7/8/92						
1440	0.6	6.85	2390	15.0	84	Purged 0.2 gallons, well went dry.

Comments: Initial water quality: mostly clear, some silt.
Final water quality: cloudy, slight odor.
Sample attempted 7/9/92, insufficient volume due to dry well.

PURGING LOG - TONAWANDA COKE CORPORATION

ROUND 5

Well Number:	MW 10-89	Date:	7/6 to 7/8/92
Well Type:	Overburden	Well Diameter:	2.0 in.
Initial Depth to Water:	2.85 ft. BGS	Well Screen Length:	2 ft.
Well Depth:	4.50 ft. BGS	Screen Slot Size:	#10
One Well Volume:	0.22 gal.	Conducted By:	J. Williams
Required Number of Well Volumes:	5		G.Gill
Required Purge Volume:	1.10 gal.		
Purging Method:	Peristaltic Pump		

Time	Cumulative Volumes Removed(gal)	pH	Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)	Notes
7/6/92 1345	0.25	6.51	1200	15.5	28.5	Purged 0.25 gallons, well went dry.
7/7/92 0930	0.50	7.74	1050	15.3	46.5	Purged 0.25 gallons, well went dry.
7/8/92 1500	0.75	7.06	1020	14.6	15.0	Purged 0.25 gallons, well went dry.

Comments: Initial water quality: grey, cloudy, slight odor.
Final water quality: clear, slight odor.
Sample attempted 7/9/92, insufficient volume due to dry well.

PURGING LOG - TONAWANDA COKE CORPORATION

ROUND 5

Well Number:	MW 11-89	Date:	7/6 to 7/8/92
Well Type:	Overburden	Well Diameter:	2.0 in.
Initial Depth to Water:	0.90 ft. BGS	Well Screen Length:	2 ft.
Well Depth:	3.50 ft. BGS	Screen Slot Size:	#10
One Well Volume:	0.42 gal.	Conducted By:	J. Williams
Required Number of Well Volumes:	5		G.Gill
Required Purge Volume:	2.1 gal.		
Purging Method:	Peristaltic Pump		

Time	Cumulative Volumes Removed(gal)	pH	Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)	Notes
7/6/92						
1315	0.5	5.76	1700	16.2	102	Purged 0.5 gallons, well went dry.
7/7/92						
0935	1.0	7.94	940	16.3	34	Purged 0.5 gallons, well went dry.
7/8/92						
1450	1.4	7.43	930	15.8	31	Purged 0.4 gallons, well went dry.

Comments: Initial water quality: black to cloudy, silty, no odor.
Final water quality: cloudy, slight odor.
Sampled 7/9/92.

PURGING LOG - TONAWANDA COKE CORPORATION

ROUND 5

Well Number:	MW 14-89	Date:	7/6 to 7/9/92
Well Type:	Overburden	Well Diameter:	2.0 in.
Initial Depth to Water:	1.00 ft. BGS	Well Screen Length:	2 ft.
Well Depth:	4.00 ft. BGS	Screen Slot Size:	#10
One Well Volume:	0.50 gal.	Conducted By:	J. Williams
Required Number of Well Volumes:	5		G.Gill
Required Purge Volume:	2.50 gal.		
Purging Method:	Peristaltic Pump		

Time	Cumulative Volumes Removed(gal)	pH	Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)	Notes
7/7/92						
1100	0.50	7.25	1650	16.5	152.0	Purged 0.5 gallons, well went dry.
7/8/92						
1515	1.00	7.13	1640	15.8	108.0	Purged 0.5 gallons, well went dry.
7/9/92						
1120	1.50	7.25	1790	15.6	152.0	Purged 0.5 gallons, well went dry.

Comments: Initial water quality: brown, opaque, slight odor.
Final water quality: cloudy to clear, no odor.
Sampled 7/10/92.

PURGING LOG - TONAWANDA COKE CORPORATION

ROUND 5

Well Number:	MW 15-89	Date:	7/6 to 7/8/92
Well Type:	Overburden	Well Diameter:	2.0 in.
Initial Depth to Water:	2.91 ft. BGS	Well Screen Length:	2 ft.
Well Depth:	4.00 ft. BGS	Screen Slot Size:	#10
One Well Volume:	0.18 gal.	Conducted By:	J. Williams
Required Number of Well Volumes:	5		G.Gill
Required Purge Volume:	0.90 gal.		
Purging Method:	Peristaltic Pump		

Time	Cumulative Volumes Removed(gal)	pH	Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)	Notes
7/6/92						
1415	0.20	4.7	3320	16.5	>200	Purged 0.2 gallons, well went dry.
7/7/92						
0955	0.25	5.53	2670	16.3	>200	Purged 0.05 gallons, well went dry.
7/8/92						
1420	0.25	--	--	--	--	Well dry.

Comments: Initial water quality: rust brown, silty, slight odor.
Final water quality: orange brown, cloudy, slight odor.
Sample attempted 7/10/92, insufficient volume due to dry well.

PURGING LOG - TONAWANDA COKE CORPORATION

ROUND 5

Well Number:	MW 16-89	Date:	7/6 to 7/8/92
Well Type:	Overburden	Well Diameter:	2.0 in.
Initial Depth to Water:	1.94 ft. BGS	Well Screen Length:	2 ft.
Well Depth:	3.50 ft. BGS	Screen Slot Size:	#10
One Well Volume:	0.25 gal.	Conducted By:	J. Williams
Required Number of Well Volumes:	5		G.Gill
Required Purge Volume:	1.25 gal.		
Purging Method:	Peristaltic Pump		

Time	Cumulative Volumes Removed(gal)	pH	Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)	Notes
7/6/92						
1430	0.25	5.74	2850	16.0	71.0	Purged 0.25 gallons, well went dry.
7/7/92						
1005	0.45	7.27	2500	16.0	93.0	Purged 0.2 gallons, well went dry.
7/8/92						
1430	0.65	6.78	2230	15.7	64.0	Purged 0.2 gallons, well went dry.

Comments: Initial water quality: grey, cloudy, slight odor.
Final water quality: brown, cloudy, slight odor.
Sampled 7/9/92.

PURGING LOG - TONAWANDA COKE CORPORATION

ROUND 5

Well Number:	MW 18-91	Date:	7/7/92
Well Type:	Overburden	Well Diameter:	2.0 in.
Initial Depth to Water:	4.11 ft. BGS	Well Screen Length:	2 ft.
Well Depth:	18.00 ft. BGS	Screen Slot Size:	#10
One Well Volume:	2.26 gal.	Conducted By:	J. Williams
Required Number of Well Volumes:	5		G.Gill
Required Purge Volume:	11.3 gal.		
Purging Method:	Peristaltic Pump		

Time	Cumulative Volumes Removed(gal)	pH	Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)	Notes
7/7/92						
1322	2.50	9.36	690	12.9	10.2	
1336	5.00	9.29	680	12.4	5.2	
1342	7.50	9.55	660	12.0	3.4	

Comments: Initial water quality: clear, sulphur odor.
Final water quality: clear, sulphur odor.
Sampled 7/7/92.

PURGING LOG - TONAWANDA COKE CORPORATION

ROUND 5

Well Number:	MW 19-91	Date:	7/6/92
Well Type:	Overburden	Well Diameter:	2.0 in.
Initial Depth to Water:	1.47 ft. BGS	Well Screen Length:	2 ft.
Well Depth:	3.98 ft. BGS	Screen Slot Size:	#10
One Well Volume:	0.41 gal.	Conducted By:	J. Williams
Required Number of Well Volumes:	5		G.Gill
Required Purge Volume:	2.05 gal.		
Purging Method:	Peristaltic Pump		

Time	Cumulative Volumes Removed(gal)	pH	Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)	Notes
7/6/92						
1610	0.25	--	--	18.5	--	
1613	0.50	--	--	17.5	--	
1616	0.75	--	--	17.0	--	
1618	1.00	--	--	17.2	--	
1620	1.25	--	--	17.4	--	

Comments: Initial water quality: opaque, slight odor.
Final water quality: grey, cloudy, no odor.
Sampled 7/6/92.
Conductivity and pH meters not reading properly.
Turbidity not measured.

PURGING LOG - TONAWANDA COKE CORPORATION

ROUND 5

Well Number:	MW 20-91	Date:	7/6/92
Well Type:	Overburden	Well Diameter:	2.0 in.
Initial Depth to Water:	1.86 ft. BGS	Well Screen Length:	2 ft.
Well Depth:	3.67 ft. BGS	Screen Slot Size:	#10
One Well Volume:	0.30 gal.	Conducted By:	J. Williams
Required Number of Well Volumes:	5		G.Gill
Required Purge Volume:	1.50 gal.		
Purging Method:	Peristaltic Pump		

Time	Cumulative Volumes Removed(gal)	pH	Conductivity (umhos/cm)	Temperature (°C)	Turbidity (NTU)	Notes
7/6/92						
1505	0.30	6.9	940	18.7	--	
1530	0.60	6.75	752	18.8	--	
1535	1.00	6.3	785	19.1	--	
1540	1.30	6.6	860	19.1	--	
1545	1.60	6.64	820	19.1	--	

Comments: Initial water quality: clear, no odor.
Final water quality: clear, no odor.
Sampled 7/6/92.
Turbidity not measured.

APPENDIX C

SURFACE WATER AND SEDIMENT LOGS

SURFACE WATER LOG - TONAWANDA COKE CORPORATION - ROUND 3

Surface H2O Number:	SW-11
Date Sampled:	7/9/92
Conducted by:	J. Williams / B. Carpenter
Location:	25 ft. north and 25 ft. west of SD-11.

Water Quality:

Comments: Sample attempt was made 7/8/92 by J.W./G.G. but location selected to sample was dry.

SURFACE WATER LOG - TONAWANDA COKE CORPORATION - ROUND 3

Surface H2O Number:	SW-12
Date Sampled:	7/8/92
Conducted by:	J. Williams / G. Gill
Location:	110 ft. west from where access road turns away from trucks. Right hand side of road 10 ft. in. Location is staked.
Water Quality:	Clear, swampy odor, vegetation, sheen in areas.
Comments:	Duplicate sample collected for MS/MSD.

SURFACE WATER LOG - TONAWANDA COKE CORPORATION - ROUND 3

Surface H2O Number:	SW-13
Date Sampled:	7/8/92
Conducted by:	J. Williams / G. Gill
Location:	From MW-14, 100 ft. south along access road on left side of road, 3 ft. off road.
Water Quality:	Clear, sheen in areas, swampy odor, vegetation.
Comments:	

SURFACE WATER LOG - TONAWANDA COKE CORPORATION - ROUND 3

Surface H2O Number:	SW-14
Date Sampled:	7/8/92
Conducted by:	J. Williams / G. Gill
Location:	55 ft. south of old east-west fence and 100 ft. east of old north-south fence at old SW-14 location.
Water Quality:	Clear, slight odor.
Comments:	

SURFACE WATER LOG - TONAWANDA COKE CORPORATION - ROUND 3

Surface H2O Number:	SW-15
Date Sampled:	7/8/92
Conducted by:	J. Williams / G. Gill
Location:	Facing east at split in railroad tracks, 25 ft. past old gate, 15 ft. left of railroad tracks. Location marked with a stake.
Water Quality:	Clear, weedy, slight odor.
Comments:	Duplicate sample collected.

SEDIMENT LOG - TONAWANDA COKE CORPORATION - ROUND 2

Sample Location Number:	SD-11
Date Sampled:	7/8/92
Conducted by:	J. Williams / G. Gill
Location:	100 ft. east of centre power tower (1st set of power towers south-east of 3 old trunks.)

Sample Description:

Comments:

SEDIMENT LOG - TONAWANDA COKE CORPORATION - ROUND 2

Sample Location Number:	SD-14
Date Sampled:	7/8/92
Conducted by:	J. Williams / G. Gill
Location:	55 ft. south of old east-west fence and 100 ft. east of old north-south fence at old SW-14 location.

Sample Description:

Comments: Duplicate sample collected.

APPENDIX D

ANALYTICAL DATA

APPENDIX D.1

JUNE 1991 SOILS DATA

Type of Analysis: ORGANICS
Client: CONESTOGA-ROVERS & ASSOCIATES

A.E.S. Job Code: FIK
Units: mg/kg, ppm (as received)

Analytical Parameter(s)	Method No.	Practical **Quantifiable Limit	A.E.S. Lab No..... 4984 Customer ID..... TP-X,Y,Z 06/14/91 COMPOSITE	4985 TP-Z 06/14/91 GRAB
TCL VOLATILES	SW 846 8240			
Chloromethane	SW 846 8240	1.2	BQL*	BQL
Vinyl Chloride	SW 846 8240	1.2	"	"
Chloroethane	SW 846 8240	1.2	"	"
Bromomethane	SW 846 8240	1.2	"	"
Acetone	SW 846 8240	12	"	"
1,1-Dichloroethene	SW 846 8240	1.2	"	"
Carbon Disulfide	SW 846 8240	1.2	"	"
Methylene Chloride	SW 846 8240	10	"	"
trans-1,2-Dichloroethene	SW 846 8240	1.2	"	"
1,1-Dichloroethane	SW 846 8240	1.2	"	"
Vinyl acetate	SW 846 8240	1.2	"	"
2-Butanone	SW 846 8240	12	"	"
Chloroform	SW 846 8240	1.2	"	"
1,1,1-Trichloroethane	SW 846 8240	1.2	"	"

* Below Quantifiable Limits
** High limits due to sample matrix; dilution was necessary.

Type of Analysis: ORGANICS
Client: CONESTOGA-ROVERS & ASSOCIATES

A.E.S. Job Code: FIK
Units: mg/kg, ppm (as received)

Analytical Parameter(s)	Method No.	Practical ** Quantifiable Limit	A.E.S. Lab No..... 4984 Customer ID..... TP-X,Y,Z 06/14/91 COMPOSITE	4985 TP-Z 06/14/91 GRAB		
Carbon Tetrachloride	SW 846 8240	1.2	BQL *	BQL		
Benzene	SW 846 8240	1.2	2.8	66		
1,2-Dichloroethane	SW 846 8240	1.2	BQL	BQL		
Trichloroethene	SW 846 8240	1.2	"	"		
1,2-Dichloropropane	SW 846 8240	1.2	"	"		
Bromodichloromethane	SW 846 8240	1.2	"	"		
2-Chloroethyl vinyl ether	SW 846 8240	1.2	"	"		
4-Methyl-2-pentanone	SW 846 8240	12	"	"		
cis-1,3-Dichloropropene	SW 846 8240	1.2	"	"		
Toluene	SW 846 8240	1.2	6.4	140		
trans-1,3-Dichloropropene	SW 846 8240	1.2	BQL	BQL		
1,1,2-Trichloroethane	SW 846 8240	1.2	"	"		
Tetrachloroethene	SW 846 8240	1.2	"	"		
Chlorodibromomethane	SW 846 8240	1.2	"	"		
Chlorobenzene	SW 846 8240	1.2	"	"		
Ethylbenzene	SW 846 8240	1.2	22	60		

* Below Quantifiable Limits.

** High limits due to sample matrix; dilution was necessary.

Type of Analysis: ORGANICS
Client: CONESTOGA-ROVERS & ASSOCIATES

A.E.S. Job Code: FIK
Units: mg/kg, ppm (as received)

Analytical Parameter(s)	Method No.	Practical ** Quantifiable Limit	A.E.S. Lab No..... 4984 Customer ID..... TP-X,Y,Z 06/14/91 COMPOSITE	4985 TP-Z 06/14/91 GRAB		
Bromoform	SW 846 8240	1.2	BQL *	BQL		
1,1,2,2-Tetrachloroethane	SW 846 8240	1.2	"	"		
2-Hexanone	SW 846 8240	12	"	"		
m/p-Xylene	SW 846 8240	1.2	6.4	100		
o-Xylene	SW 846 8240	1.2	8.0	98		
Styrene	SW 846 8240	1.2	BQL	BQL		

* Below Quantifiable Limits
** High limits due to sample matrix; dilution was necessary.

ADVANCED ENVIRONMENTAL SERVICES, INC.
LABORATORY REPORT

JOB# 911979

Type of Analysis: ORGANICS
Client: CONESTOGA-ROVERS & ASSOCIATES

A.E.S. Job Code: FIK
Units: mg/kg, ppm

Analytical Parameter(s)	Method No.	** Practical Quantifiable Limit	A.E.S. Lab No..... 4984 Customer ID..... TP-X,Y,Z 06/14/91 COMPOSITE	4985 TP-Z 06/14/91 GRAB		
TCL SEMI-VOLATILES	SW 846 8270					
N-Nitrosodimethylamine	SW 846 8270	33	BQL *	BQL		
Aniline	SW 846 8270	33	"	"		
Phenol	SW 846 8270	33	"	"		
Bis(2-chloroethyl) ether	SW 846 8270	33	"	"		
2-Chlorophenol	SW 846 8270	33	"	"		
1,3-Dichlorobenzene	SW 846 8270	33	"	"		
1,4-Dichlorobenzene	SW 846 8270	33	"	"		
Benzyl Alcohol	SW 846 8270	33	"	"		
1,2-Dichlorobenzene	SW 846 8270	33	"	"		
2-Methylphenol	SW 846 8270	33	"	"		
bis(2-Chloroisopropyl) ether	SW 846 8270	33	"	"		
4-Methylphenol	SW 846 8270	33	"	"		
N-Nitrosodinpropylamine	SW 846 8270	33	"	"		
Hexachloroethane	SW 846 8270	33	"	"		

** High limits due to sample matrix, dilution was necessary.

* Below quantifiable limits.

Type of Analysis: ORGANICS
Client: CONESTOGA-ROVERS & ASSOCIATES

A.E.S. Job Code: FIK
Units: mg/kg, ppm

Analytical Parameter(s)	Method No.	Practical ** Quantifiable Limit	A.E.S. Lab No..... 4984 Customer ID..... TP-X,Y,Z 06/14/91 COMPOSITE	4985 TP-Z 06/14/91 GRAB		
Nitrobenzene	SW 846 8270	33	BQL *	BQL		
Isophorone	SW 846 8270	33	"	"		
2-Nitrophenol	SW 846 8270	33	"	"		
2,4-Dimethylphenol	SW 846 8270	33	"	"		
Bis(2-chloroethoxy) methane	SW 846 8270	33	"	"		
Benzoic Acid	SW 846 8270	99	"	"		
2,4-Dichlorophenol	SW 846 8270	33	"	"		
1,2,4-Trichlorobenzene	SW 846 8270	33	"	"		
Naphthalene	SW 846 8270	33	92	270		
4-Chloroaniline	SW 846 8270	33	BQL	BQL		
Hexachlorobutadiene	SW 846 8270	33	"	"		
Hexachlorobenzene	SW 846 8270	33	"	"		
Pentachlorophenol	SW 846 8270	99	"	"		
Phenanthrene	SW 846 8270	33	62	180		
Anthracene	SW 846 8270	33	BQL	74		
Di-n-Butylphthalate	SW 846 8270	33	"	BQL		

** High limits due to sample matrix, dilution was necessary.

* Below Quantifiable Limits.

Type of Analysis: ORGANICS
Client: CONESTOGA-ROVERS & ASSOCIATES

A.E.S. Job Code: FIK
Units: mg/kg, ppm

Analytical Parameter(s)	Method No.	** Practical Quantifiable Limit	A.E.S. Lab No..... 4984 Customer ID..... TP-X,Y,Z 06/14/91 COMPOSITE	4985 TP-Z 06/14/91 GRAB		
Fluoranthene	SW 846 8270	33	67	150		
Benzidine	SW 846 8270	99	BQL *	BQL		
Pyrene	SW 846 8270	33	44	99		
Butylbenzylphthalate	SW 846 8270	33	BQL	BQL		
3,3-Dichlorobenzidine	SW 846 8270	99	"	"		
Benzo (a) Anthracene	SW 846 8270	33	"	57		
bis(2-ethylhexyl) Phthalate	SW 846 8270	33	"	BQL		
Chrysene	SW 846 8270	33	"	47		
Di-n-octylphthalate	SW 846 8270	33	"	BQL		
Benzo (b) fluoranthene	SW 846 8270	33	"	40		
Benzo (k) fluoranthene	SW 846 8270	33	"	45		
Benzo (a) pyrene	SW 846 8270	33	"	47		
Indeno (1,2,3-cd) pyrene	SW 846 8270	33	"	BQL		
Dibenzo (a,h) anthracene	SW 846 8270	33	"	"		
Benzo (g,h,i) perylene	SW 846 8270	33	"	"		
4-Chloro-3-Methylphenol	SW 846 8270	33	"	"		

** High limits due to sample matrix, dilution was necessary.

* Below Quantifiable Limits.

Type of Analysis: ORGANICS
Client: CONESTOGA-ROVERS & ASSOCIATES

A.E.S. Job Code: FIK
Units: mg/kg, ppm

Analytical Parameter(s)	Method No.	** Practical Quantifiable Limit	A.E.S. Lab No..... 4984 Customer ID..... TP-X,Y,Z 06/14/91 COMPOSITE	4985 TP-Z 06/14/91 GRAB		
2-Methylnaphthalene	SW 846 8270	33	BQL*	86		
Hexachlorocyclopentadiene	SW 846 8270	33	"	BQL		
2,4,6-Trichlorophenol	SW 846 8270	33	"	"		
2,4,5-Trichlorophenol	SW 846 8270	33	"	"		
2-Chloromaphthalene	SW 846 8270	33	"	"		
2-Nitroaniline	SW 846 8270	33	"	"		
Dimethylphthalate	SW 846 8270	33	"	"		
2,6-Dinitrotoluene	SW 846 8270	33	"	"		
Acenaphthylene	SW 846 8270	33	"	"		
3-Nitroaniline	SW 846 8270	33	"	"		
Acenaphthene	SW 846 8270	33	"	"		
2,4-Dinitrophenol	SW 846 8270	99	"	"		
Dibenzofuran	SW 846 8270	33	"	69		
2,4-Dinitrotoluene	SW 846 8270	33	"	BQL		
4-Nitrophenol	SW 846 8270	99	"	"		
Diethylphthalate	SW 846 8270	33	"	"		

** High limits due to sample matrix; dilution was necessary.

* Below Quantifiable Limits.

Type of Analysis: ORGANICS
Client: CONESTOGA-ROVERS & ASSOCIATES

A.E.S. Job Code: FIK
Units: mg/kg, ppm

Analytical Parameter(s)	Method No.	** Practical Quantifiable Limit	A.E.S. Lab No..... 4984 Customer ID..... TP-X,Y,Z 06/14/91 COMPOSITE	4985 TP-Z 06/14/91 GRAB		
4-Chlorophenyl-phenylether	SW 846 8270	33	BQL *	BQL		
Fluorene	SW 846 8270	33	"	85		
4-Nitroaniline	SW 846 8270	33	"	BQL		
4,6-Dinitro-2-methylphenol	SW 846 8270	99	"	"		
N-Nitrosodiphenylamine	SW 846 8270	33	"	"		
1,2-Diphenylhydrazine	SW 846 8270	33	"	"		
4-Bromophenyl-phenylether	SW 846 8270	33	"	"		

FOOTNOTES

**High limits due to sample matrix; dilution was necessary.
* Below Quantifiable Limits.

Type of Analysis: ORGANICS
Client: CONESTOGA-ROVERS & ASSOCIATES

A.E.S. Job Code: FIK
Units: mg/kg, ppm (as received)

Analytical Parameter(s)	Method No.	Practical Quantifiable Limit	A.E.S. Lab No..... 4984 Customer ID..... TP-X,Y,Z 06/14/91 COMPOSITE	4985 TP-Z 06/14/91 GRAB		
TCL PESTICIDES AND PCB's	SW 846 8080					
alpha BHC	SW 846 8080	2.50	BQL*	<5.00 **		
beta BHC	SW 846 8080	2.50	"	<5.00 **		
delta BHC	SW 846 8080	2.50	"	<5.00 **		
gamma BHC (lindane)	SW 846 8080	2.50	"	<5.00 **		
Heptachlor	SW 846 8080	2.50	"	<5.00 **		
Aldrin	SW 846 8080	2.50	"	<5.00 **		
Heptachlor epoxide	SW 846 8080	2.50	"	<5.00 **		
Endosulfan I	SW 846 8080	2.50	BQL *	<5.00 **		
Dieldrin	SW 846 8080	2.50	"	<5.00 **		
4,4'-DDE	SW 846 8080	2.50	"	<5.00 **		
Endrin	SW 846 8080	2.50	"	<5.00 **		
Endosulfan II	SW 846 8080	2.50	"	<5.00 **		
4,4'-DDD	SW 846 8080	2.50	"	<5.00 **		

* Below Quantifaible Limits
** High limits due to sample matrix; dilution was necessary.

ADVANCED ENVIRONMENTAL SERVICES, INC.
LABORATORY REPORT

JOB# 911979

Type of Analysis: ORGANICS
Client: CONESTOGA-ROVERS & ASSOCIATES

A.E.S. Job Code: FIK
Units: mg/kg, ppm (as received)

Analytical Parameter(s)	Method No.	Practical Quantifiable Limit	A.E.S. Lab No..... 4984 Customer ID..... TP-X,Y,Z 06/14/91 COMPOSITE	4985 TP-Z 06/14/91 GRAB		
Endosulfan Sulfate	SW 846 8080	2.50	BQL*	<5.00 **		
4,4'-DDT	SW 846 8080	2.50	"	<5.00 **		
Endrin Ketone	SW 846 8080	2.50	"	<5.00 **		
Methoxychlor	SW 846 8080	12.5	"	<25.0 **		
Chlordane	SW 846 8080	25.0	"	<50.0 **		
Toxaphene	SW 846 8080	125	"	<250 **		
PCB 1016	SW 846 8080	25.0	"	<50.0 **		
PCB 1221	SW 846 8080	25.0	"	<50.0 **		
PCB 1232	SW 846 8080	25.0	"	<50.0 **		
PCB 1242	SW 846 8080	25.0	"	<50.0 **		
PCB 1248	SW 846 8080	25.0	BQL *	<50.0 **		
PCB 1254	SW 846 8080	25.0	"	<50.0 **		
PCB 1260	SW 846 8080	25.0	"	<50.0 **		

FOOTNOTES

* Below Quantifiable Limits.
** High quantifiable limits due to the necessary dilution of the sample.

ADVANCED ENVIRONMENTAL SERVICES, INC.
LABORATORY REPORT

JOB# 911979

Type of Analysis: INORGANICS
Client: CONESTOGA-ROVERS & ASSOCIATES

A.E.S. Job Code: FIK
Units: mg/kg

Analytical Parameter(s)	Method No.	Practical Quantifiable Limit	A.E.S. Lab No..... 4984 Customer ID..... TP-X,Y,Z 06/14/91 COMPOSITE	4985 TP-Z 06/14/91 GRAB		
Aluminum	SW 846 7020	500	15100	22500		
Antimony	SW 846 7041	2.00	BQL *	BQL		
Arsenic	SW 846 7060	0.50	10.1	240		
Barium	SW 846 7081	1.00	16.2	46.7		
Beryllium	SW 846 7091	0.100	BQL	BQL		
Cadmium	SW 846 7131	0.05	1.05	BQL		
Calcium	SW 846 7140	25.0	9490	496		
Chromium	SW 846 7191	0.500	24.1	16.7		
Copper	SW 846 7210	20.0	50.7	64.0		
Cobalt	SW 846 7201	0.500	BQL	BQL		
Iron	SW 846 7380	30.0	32900	77100		
Lead	SW 846 7421	0.500	108	172		
Magnesium	SW 846 7450	100	4250	3480		
Manganese	SW 846 7460	10.0	245	190		
Mercury	SW 846 7471	0.500	4.00	3.50		
Mercury	SW 846 7471	0.500	4.00	3.00		

* Below Quantifiable Limits

Type of Analysis: INORGANICS
Client: CONESTOGA-ROVERS & ASSOCIATES

A.E.S. Job Code: FIK
Units: mg/kg

Analytical Parameter(s)	Method No.	Practical Quantifiable Limit	A.E.S. Lab No..... 4984 Customer ID..... TP-X,Y,Z 06/14/91 COMPOSITE	4985 TP-Z 06/14/91 GRAB		
Mercury	SW 846 7471	0.500	4.00	3.50		
Nickel	SW 846 7521	0.500	362	83.0		
Potassium	SW 846 7610	100	875	1590		
Selenium	SW 846 7740	0.50	1.43	BQL		
Silver	SW 846 7761	0.100	1.74	23.3		
Sodium	SW 846 7770	3.00	365	488		
Thallium	SW 846 7841	0.500	BQL *	BQL		
Vanadium	SW 846 7911	1.00	1.60	13.8		
Zinc	SW 846 7950	5.00	145	204		
Total Cyanide	SW 846 9012	0.1	BQL	BQL		

FOOTNOTES

* Below Quantifiable Limits.

APPENDIX D.2

JULY 1991 WATER DATA

ADVANCED
ENVIRONMENTAL SERVICES INC.
2186 Liberty Drive
P.O. Box 165
Niagara Falls, NY 14304

TONAWANDA COKE

Report Prepared For

CONESTOGA-ROVERS & ASSOCIATES

August 6, 1991

AES Report FIK

COMMITMENT
TO
HONESTY - QUALITY - SERVICE

QA/QC Verification

The following report, as well as the supporting data, have been carefully reviewed for accuracy, adherence to the cited methods, and completeness. All data contained in this report was generated in accordance with the AES Laboratory Quality Assurance/Quality Control Program.

Denise R. Tuhovak
Organics Supervisor

Gary L. Amato
Technical Supervisor

Paul T. McMahon
Quality Control Officer

Joseph J. Curtis
Customer Service Representative

CUST SAMPLE ID: W-2428-BC-001
COLLECTION DATE: 07/16/91

COLLECTION METHOD:
SAMPLE TYPE: WATER

LABORATORY JOB NO: 912326
LABORATORY REFERENCE NO: 5948
INORGANIC ANALYSIS

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Cyanide, Total (on water)	0.036	mg/l	---	0.004	EPA 335.3
Hexavalent Chromium, Total	BQL *	mg/l	---	0.01	EPA 7196

FOOTNOTES

* Below Quantifiable Limits.

CUST SAMPLE ID: W-2428-BC-001
COLLECTION DATE: 07/16/91

COLLECTION METHOD:
SAMPLE TYPE: WATER

LABORATORY JOB NO: 912326
LABORATORY REFERENCE NO: 5948
ORGANIC ANALYSIS

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
VOLATILE HALOCARBONS					SW 846 8010
trans-1,2-Dichloroethene	BQL *	ug/l,ppb	---	1.00	SW 846 8010
Methylene Chloride	BQL	ug/l,ppb	---	5.00	SW 846 8010
cis-1,2-Dichloroethene	7.68	ug/l,ppb	---	1.00	SW 846 8010
Surrogate Recoveries	122	%	---	1.00	SW 846 8010
Surrogate Recoveries	103	%	---	1.00	SW 846 8010
VOLATILE AROMATICS					SW 846 8020
Benzene	BQL *	ug/l,ppb	---	1.00	SW 846 8020
Toluene	BQL	ug/l,ppb	---	1.00	SW 846 8020
Ethylbenzene	BQL	ug/l,ppb	---	1.00	SW 846 8020
m/p-Xylene	BQL	ug/l,ppb	---	1.00	SW 846 8020
o-Xylene	BQL	ug/l,ppb	---	1.00	SW 846 8020
Surrogate Recoveries	134	%	---	1.00	SW 846 8020

FOOTNOTES

* Below Quantifiable Limits.

CUST SAMPLE ID: W-2428-BC-001
COLLECTION DATE: 07/16/91
COLLECTION METHOD:
SAMPLE TYPE: WATER

LABORATORY JOB NO: 912326
LABORATORY REFERENCE NO: 5948
ORGANIC ANALYSIS

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
POLYNUCLEAR AROMATIC HYDROCARBONS					SW 846 8100
Acenaphthene	BQL *	ug/l,ppb	---	5.00	SW 846 8100
Acenaphthylene	BQL	ug/l,ppb	---	5.00	SW 846 8100
Anthracene	BQL	ug/l,ppb	---	5.00	SW 846 8100
Benzo(a)Anthracene	BQL	ug/l,ppb	---	5.00	SW 846 8100
Benzo(a)Pyrene	BQL	ug/l,ppb	---	5.00	SW 846 8100
Benzo(b)Fluoranthene	BQL	ug/l,ppb	---	5.00	SW 846 8100
Benzo(k)Fluoranthene	BQL	ug/l,ppb	---	5.00	SW 846 8100
Benzo(g,h,i)Perylene	BQL	ug/l,ppb	---	5.00	SW 846 8100
Chrysene	BQL	ug/l,ppb	---	5.00	SW 846 8100
Dibenzo(a,h)Anthracene	BQL	ug/l,ppb	---	5.00	SW 846 8100
Fluoranthene	BQL	ug/l,ppb	---	5.00	SW 846 8100
Fluorene	BQL	ug/l,ppb	---	5.00	SW 846 8100
Indeno(1,2,3-c,d)Pyrene	BQL	ug/l,ppb	---	5.00	SW 846 8100
Naphthalene	BQL	ug/l,ppb	---	5.00	SW 846 8100
Phenanthrene	BQL	ug/l,ppb	---	5.00	SW 846 8100
Pyrene	BQL	ug/l,ppb	---	5.00	SW 846 8100
ORGANICS					
Oil & Grease	3.8	mg/l,ppm	1.0	---	SM 503A

FOOTNOTES

* Below Quantifiable Limits.

ADVANCED ENVIRONMENTAL SERVICES LABORATORY REPORT

CUST SAMPLE ID:
COLLECTION DATE:

LABORATORY JOB NO: 912326
LABORATORY REFERENCE NO:

COLLECTION METHOD:
SAMPLE TYPE:

INORGANIC ANALYSIS
METHOD BLANK

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Cyanide, Total (on water)	BQL *	mg/l	—	0.004	EPA 335.3
Hexavalent Chromium, Total	BQL	mg/l	—	0.01	EPA 7196

FOOTNOTES:

* Below Quantifiable Limits.

ADVANCED ENVIRONMENTAL SERVICES LABORATORY REPORT

CUST SAMPLE ID:
COLLECTION DATE:

COLLECTION METHOD:
SAMPLE TYPE:

LABORATORY JOB NO: 912326
LABORATORY REFERENCE NO:

ORGANIC ANALYSIS
METHOD BLANK

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
VOLATILE HALOCARBONS					SW 846 8010
trans-1,2-Dichloroethene	BQL *	ug/l,ppb	—	1.00	SW 846 8010
Methylene Chloride	BQL	ug/l,ppb	—	5.00	SW 846 8010
cis-1,2-Dichloroethene	BQL	ug/l,ppb	—	1.00	SW 846 8010
Surrogate Recoveries	110	%	—	1.00	SW 846 8010
Surrogate Recoveries	114	%	—	1.00	SW 846 8010
VOLATILE AROMATICS					SW 846 8020
Benzene	BQL	ug/l,ppb	—	1.00	SW 846 8020
Toluene	BQL	ug/l,ppb	—	1.00	SW 846 8020
Ethylbenzene	BQL	ug/l,ppb	—	1.00	SW 846 8020
m/p-Xylene	BQL	ug/l,ppb	—	1.00	SW 846 8020
o-Xylene	BQL	ug/l,ppb	—	1.00	SW 846 8020
Surrogate Recoveries	114	%	—	1.00	SW 846 8020

FOOTNOTES:

* Below Quantifiable Limits.

ADVANCED ENVIRONMENTAL SERVICES LABORATORY REPORT

CUST SAMPLE ID:
COLLECTION DATE:

COLLECTION METHOD:
SAMPLE TYPE:

LABORATORY JOB NO: 912326
LABORATORY REFERENCE NO:
ORGANIC ANALYSIS
METHOD BLANK

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
POLYNUCLEAR AROMATIC HYDROCARBONS					
Acenaphthene	BQL *	ug/l,ppb	—	5.00	SW 846 8100
Acenaphthylene	BQL	ug/l,ppb	—	5.00	SW 846 8100
Anthracene	BQL	ug/l,ppb	—	5.00	SW 846 8100
Benzo(a)Anthracene	BQL	ug/l,ppb	—	5.00	SW 846 8100
Benzo(a)Pyrene	BQL	ug/l,ppb	—	5.00	SW 846 8100
Benzo(b)Fluoranthene	BQL	ug/l,ppb	—	5.00	SW 846 8100
Benzo(k)Fluoranthene	BQL	ug/l,ppb	—	5.00	SW 846 8100
Benzo(g,h,i)Perylene	BQL	ug/l,ppb	—	5.00	SW 846 8100
Chrysene	BQL	ug/l,ppb	—	5.00	SW 846 8100
Dibenzo(a,h)Anthracene	BQL	ug/l,ppb	—	5.00	SW 846 8100
Fluoranthene	BQL	ug/l,ppb	—	5.00	SW 846 8100
Fluorene	BQL	ug/l,ppb	—	5.00	SW 846 8100
Indeno(1,2,3-c,d)Pyrene	BQL	ug/l,ppb	—	5.00	SW 846 8100
Naphthalene	BQL	ug/l,ppb	—	5.00	SW 846 8100
Phenanthrene	BQL	ug/l,ppb	—	5.00	SW 846 8100
Pyrene	BQL	ug/l,ppb	—	5.00	SW 846 8100
ORGANICS					
Oil & Grease	ND **	mg/l,ppm	1.0	—	SM 503A

FOOTNOTES:

* Below Quantifiable Limits.

** Not Detected.

ADVANCED ENVIRONMENTAL SERVICES, INC.
LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Type of Analysis: Matrix Spikes and E.P.A. Standards
Client: CONESTOGA-ROVERS & ASSOCIATES

A.E.S. Job Code: FIK
Units: ug/l or ppb

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
2-Fluorobiphenyl (surrogate)	Meth.Blank	H2O	29.2	BQL **	40.0	73
2-Fluorobiphenyl (surrogate)	5948	H2O	30.4	BQL	40.0	76

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / "Spike" Added Concentration)

* If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

FOOTNOTES

** Below Quantifiable Limits.

QUALITY CONTROL
SUMMARY

PARAMETER(S)	Type of QC	AES Number	Acceptance Criteria	Analyst Initial
Cyanide	EPA	—	Acceptable	TS
Hexavalent Chromium	INDSID	—	Acceptable	AW

QUALITY CONTROL
SUMMARY

Conestoga - Rovers & Associates

FIK

PARAMETER(S)	Type of QC	AES Number	Acceptance Criteria	Analyst Initial
Volatile Halocarbons 8010	SPK	5963	ok	CF
Volatile Halocarbons 8010	DUP	5963	ok	CF
Volatile Aromatics 8020	SPK	5963	ok	CF
Volatile Aromatics 8020	DUP	5963	ok	CF

QUALITY CONTROL
SUMMARY

Conestoga - Rovers & Associates

FIK

PARAMETER(S)	Type of QC	AES Number	Acceptance Criteria	Analyst Initial
8100	SPK	5936	ok	SWC
8100	SID	—	ok	SWC

5864

CRA Consulting Engineers
CONESTOGA-ROVERS & ASSOCIATES
651 Colby Drive, Waterloo, Ontario Canada N2V 1C2

SHIPPED TO (Laboratory name): AES Labs

CHAIN OF CUSTODY RECORD

PROJECT Nº: 2428

PROJECT NAME: Tonawanda Coke

SAMPLER'S SIGNATURE: [signature] (SIGN)

SEQ. Nº	SAMPLE Nº	DATE	TIME	SAMPLE LOCATOIN	SAMPLE TYPE	Nº OF CONTAINERS	REMARKS
W-	2428-BK-001	7-16-91	1230	HCL	Water	2	VOA 8010, 8020
						2	PAH (8100)
				NaOH		2	Cyanide
				HCL		2	Oil + Grease
						1	Cr+6
					TOTAL NUMBER OF CONTAINERS	9	

ANTICIPATED CHEMICAL HAZARDS: Unknown

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
1 [signature] (SIGN)	7-16-91 1430	2 [signature] (SIGN)
RELINQUISHED BY: 2 (SIGN)	DATE/TIME	RECEIVED BY: 3 (SIGN)
RELINQUISHED BY: 3 (SIGN)	DATE/TIME	RECEIVED BY: 4 (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

METHOD OF SHIPMENT:	SHIPPED BY:	RECEIVED FOR LABORATORY BY:	DATE/TIME
Hand Delivered	PAC	(SIGN) [signature]	7-16-91 2:25

CONDITION OF SEAL UPON RECEIPT: GENERAL CONDITION OF COOLER:	COOLER OPENED BY: (SIGN)	DATE/TIME

WHITE - CRA OFFICE COPY
YELLOW - RECEIVING LABORATORY COPY
PINK - CRA LABORATORY COPY
GOLDEN ROD - SHIPPERS

Nº 012140

ADVANCED
ENVIRONMENTAL SERVICES INC.

TONAWANDA COKE

Report Prepared For

CONESTOGA-ROVERS & ASSOCIATES

August 8, 1991

AES Report FIK

COMMITMENT TO

QUALITY *SERVICE*

ADVANCED ENVIRONMENTAL SERVICES LABORATORY REPORT

CUST SAMPLE ID: W-2428-BC-003
COLLECTION DATE: 07/18/91

LABORATORY JOB NO: 912351
LABORATORY REFERENCE NO: 6022
INORGANIC ANALYSIS

COLLECTION METHOD:
SAMPLE TYPE: WATER

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Cyanide, Total (on water)	0.012	mg/l	---	0.004	EPA 335.3
Hexavalent Chromium, Total	BQL *	mg/l	---	0.01	EPA 7196

FOOTNOTES

* Below Quantifiable Limits.

CUST SAMPLE ID: W-2428-BC-003
COLLECTION DATE: 07/18/91
COLLECTION METHOD:
SAMPLE TYPE: WATER

LABORATORY JOB NO: 912351
LABORATORY REFERENCE NO: 6022
ORGANIC ANALYSIS

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
VOLATILE HALOCARBONS					SW 846 8010
trans-1,2-Dichloroethene	BQL *	ug/l,ppb	---	1.00	SW 846 8010
Methylene Chloride	BQL	ug/l,ppb	---	5.00	SW 846 8010
cis-1,2-Dichloroethene	BQL	ug/l,ppb	---	1.00	SW 846 8010
Surrogate Recovery	105	%	---	1.00	SW 846 8010
Surrogate Recovery	100	%	---	1.00	SW 846 8010
VOLATILE AROMATICS					SW 846 8020
Benzene	BQL	ug/l,ppb	---	1.00	SW 846 8020
Toluene	BQL	ug/l,ppb	---	1.00	SW 846 8020
Ethylbenzene	BQL	ug/l,ppb	---	1.00	SW 846 8020
m/p-Xylene	BQL	ug/l,ppb	---	1.00	SW 846 8020
o-Xylene	BQL	ug/l,ppb	---	1.00	SW 846 8020
Surrogate Recovery	105	%	---	1.00	SW 846 8020
ORGANICS					SM 503A
Oil & Grease	44	mg/l,ppm	1.0	---	SM 503A

FOOTNOTES

* Below Quantifiable Limits.

CUST SAMPLE ID: W-2428-BC-003
COLLECTION DATE: 07/18/91
COLLECTION METHOD:
SAMPLE TYPE: WATER

LABORATORY JOB NO: 912351
LABORATORY REFERENCE NO: 6022
ORGANIC ANALYSIS

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
POLYNUCLEAR AROMATIC HYDROCARBONS					SW 846 8100
Acenaphthene	<80.0 *	ug/l,ppb	---	10.0	SW 846 8100
Acenaphthylene	<80.0 *	ug/l,ppb	---	10.0	SW 846 8100
Anthracene	174	ug/l,ppb	---	10.0	SW 846 8100
Benzo(a)Anthracene	493	ug/l,ppb	---	10.0	SW 846 8100
Benzo(a)Pyrene	563	ug/l,ppb	---	10.0	SW 846 8100
Benzo(b) and Benzo (k)Fluoranthene	418	ug/l,ppb	---	10.0	SW 846 8100
Benzo(g,h,i)Perylene	714	ug/l,ppb	---	10.0	SW 846 8100
Chrysene	478	ug/l,ppb	---	10.0	SW 846 8100
Dibenzo(a,h)Anthracene	405	ug/l,ppb	---	10.0	SW 846 8100
Fluoranthene	805	ug/l,ppb	---	10.0	SW 846 8100
Fluorene	117	ug/l,ppb	---	10.0	SW 846 8100
Indeno(1,2,3-c,d)Pyrene	553	ug/l,ppb	---	10.0	SW 846 8100
Naphthalene	<80.0 *	ug/l,ppb	---	10.0	SW 846 8100
Phenanthrene	511	ug/l,ppb	---	10.0	SW 846 8100
Pyrene	685	ug/l,ppb	---	10.0	SW 846 8100
Surrogate Recovery	102	%	---	10.0	SW 846 8100

FOOTNOTES

* High Quantifiable Limits due to the necessary dilution of the sample.

CUST SAMPLE ID: W-2428-BC-003R
COLLECTION DATE: 07/25/91

COLLECTION METHOD:
SAMPLE TYPE: WATER

LABORATORY JOB NO: 912351
LABORATORY REFERENCE NO: 6022
ORGANIC ANALYSIS

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
POLYNUCLEAR AROMATIC HYDROCARBONS					SW 846 8100
Acenaphthene	<80.0 *	ug/l,ppb	---	10.0	SW 846 8100
Acenaphthylene	<80.0 *	ug/l,ppb	---	10.0	SW 846 8100
Anthracene	176	ug/l,ppb	---	10.0	SW 846 8100
Benzo(a)Anthracene	493	ug/l,ppb	---	10.0	SW 846 8100
Benzo(a)Pyrene	563	ug/l,ppb	---	10.0	SW 846 8100
Benzo(b) and Benzo (k)Fluoranthene	418	ug/l,ppb	---	10.0	SW 846 8100
Benzo(g,h,i)Perylene	714	ug/l,ppb	---	10.0	SW 846 8100
Chrysene	478	ug/l,ppb	---	10.0	SW 846 8100
Dibenzo(a,h)Anthracene	405	ug/l,ppb	---	10.0	SW 846 8100
Fluoranthene	805	ug/l,ppb	---	10.0	SW 846 8100
Fluorene	117	ug/l,ppb	---	10.0	SW 846 8100
Indeno(1,2,3-c,d)Pyrene	553	ug/l,ppb	---	10.0	SW 846 8100
Naphthalene	<80.0 *	ug/l,ppb	---	10.0	SW 846 8100
Phenanthrene	511	ug/l,ppb	---	10.0	SW 846 8100
Pyrene	685	ug/l,ppb	---	10.0	SW 846 8100
Surrogate Recovery	102	%	---	10.0	SW 846 8100

FOOTNOTES

* High Quantifiable Limits due to the necessary dilution of the sample.

ADVANCED ENVIRONMENTAL SERVICES LABORATORY REPORT

CUST SAMPLE ID:
COLLECTION DATE:
COLLECTION METHOD:
SAMPLE TYPE:

LABORATORY JOB NO: 912351
LABORATORY REFERENCE NO:
INORGANIC ANALYSIS
METHOD BLANK

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Cyanide, Total (on water)	BQL *	mg/l	—	0.004	EPA 335.3
Hexavalent Chromium, Total	BQL	mg/l	—	0.01	EPA 7196

FOOTNOTES:
Below Quantifiable Limits.

COLLECTION DATE: 7/31/91

LABORATORY JOB NO: 912351
LABORATORY REFERENCE NO:

COLLECTION METHOD:
SAMPLE TYPE:

ORGANIC ANALYSIS
METHOD BLANK

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
VOLATILE HALOCARBONS					SW 846 8010
trans-1,2-Dichloroethene	BQL *	ug/l,ppb	—	1.00	SW 846 8010
Methylene Chloride	BQL	ug/l,ppb	—	5.00	SW 846 8010
cis-1,2-Dichloroethene	BQL	ug/l,ppb	—	1.00	SW 846 8010
Surrogate Recovery	130	%	—	1.00	SW 846 8010
Surrogate Recovery	104	%	—	1.00	SW 846 8010
VOLATILE AROMATICS					SW 846 8020
Benzene	BQL	ug/l,ppb	—	1.00	SW 846 8020
Toluene	BQL	ug/l,ppb	—	1.00	SW 846 8020
Ethylbenzene	BQL	ug/l,ppb	—	1.00	SW 846 8020
m/p-Xylene	BQL	ug/l,ppb	—	1.00	SW 846 8020
o-Xylene	BQL	ug/l,ppb	—	1.00	SW 846 8020
Surrogate Recovery	119	%	—	1.00	SW 846 8020
ORGANICS					SM 503A
Oil & Grease	ND **	mg/l,ppm	1.0	—	SM 503A

FOOTNOTES:

* Below Quantifiable Limits.

** None Detected.

QUALITY CONTROL SUMMARY

Type of Quality Control	AES Number	Acceptance Criteria	Analyst Initials
EPA	---	Acceptable	TS
IND. STD.	---	Acceptable	AW

QUALITY CONTROL SUMMARY

Type of Quality Control	AES Number	Acceptance Criteria	Analyst Initials
Volatile Halocarbons-Ref. Std.	6022	Acceptable	KSR
Volatile Aromatics-Ref. Std.	6022	Acceptable	KSR

QUALITY CONTROL SUMMARY

Type of Quality Control	AES Number	Acceptance Criteria	Analyst Initials
8100's-Reference Standard	---	Acceptable	SH

ADVANCED
ENVIRONMENTAL SERVICES INC.
2186 Liberty Drive
P.O. Box 165
Niagara Falls, NY 14304

TONAWANDA COKE

Report Prepared For

CONESTOGA-ROVERS & ASSOCIATES

August 9, 1991

AES Report FIK

COMMITMENT
TO
HONESTY - QUALITY - SERVICE

QA/QC Verification

The following report, as well as the supporting data, have been carefully reviewed for accuracy, adherence to the cited methods, and completeness. All data contained in this report was generated in accordance with the AES Laboratory Quality Assurance/Quality Control Program.

Denise R. Tuhovak
Organics Supervisor

Gary L. Amato
Technical Supervisor

Paul T. McMahon
Quality Control Officer

Joseph J. Curtis
Customer Service Representative

Type of Analysis: INORGANICS
Client: CONESTOGA-ROVERS & ASSOCIATES

A.E.S. Job Code: FIK
Units: mg/l

Analytical Parameter(s)	Method No.	Practical Quantifiable Limit	A.E.S. Lab No..... 6039 Customer ID..... W-2428-JOS-00 2 07/19/91	METHOD BLANK		
Aluminum - TAL Metal	SW 846 7020	0.20	ND *	ND		
Antimony - TAL Metal	SW 846 7041	0.005	ND	ND		
Arsenic - TAL Metal	SW 846 7060	0.002	0.010	ND		
Barium - TAL Metal	SW 846 7080	0.20	ND	ND		
Beryllium - TAL Metal	SW 846 7090	0.005	ND	ND		
Cadmium - TAL Metal	SW 846 7130	0.005	0.019	ND		
Calcium - TAL Metal	SW 846 7140	0.25	361	ND		
Chromium - TAL Metal	SW 846 7191	0.002	0.025	ND		
Cobalt - TAL Metal	SW 846 7200	0.05	ND	ND		
Copper - TAL Metal	SW 846 7210	0.025	0.157	ND		
Iron - TAL Metal	SW 846 7380	0.10	160	ND		
Lead - TAL Metal	SW 846 7421	0.002	0.006	ND		
Magnesium - TAL Metal	SW 846 7450	5.00	183	ND		
Manganese - TAL Metal	SW 846 7460	0.015	11.2	ND		
Mercury - TAL Metal	SW 846 7471	0.0002	0.0007	ND		
Nickel - TAL Metal	SW 846 7520	0.040	0.073	ND		

* None Detected.

Type of Analysis: INORGANICS
Client: CONESTOGA-ROVERS & ASSOCIATES

A.E.S. Job Code: FIK
Units: mg/l

Analytical Parameter(s)	Method No.	Practical Quantifiable Limit	A.E.S. Lab No..... 6039 Customer ID..... W-2428-JOS-00 2 07/19/91	METHOD BLANK		
Potassium - TAL Metal	SW 846 7610	5.00	5.88	ND		
Selenium - TAL Metal	SW 846 7740	0.002	ND *	ND		
Silver - TAL Metal	SW 846 7760	0.01	0.016	ND		
Sodium - TAL Metal	SW 846 7770	5.00	183	ND		
Thallium - TAL Metal	SW 846 7841	0.002	ND	ND		
Vanadium - TAL Metal	SW 846 7911	0.003	0.004	ND		
Zinc - TAL Metal	SW 846 7950	0.02	0.03	ND		

FOOTNOTES

* None Detected.

QUALITY CONTROL SUMMARY

Type of Quality Control	AES Number	Acceptance Criteria	Analyst Initials
Ind. (Fe) Std.	Spex-2	Acceptable	DJM
Method Blank	4.1.3 N/H	Acceptable	DJM
EPA (Cr) Std.	378	Acceptable	MM
Method Blank	4.1.3 N/H	Acceptable	MM
EPA (Tl) Std.	989	Acceptable	MM
Method Blank	4.1.3 N/H	Acceptable	MM
EPA (V) Std.	989	Acceptable	MM
Method Blank	4.1.3 N/H	Acceptable	MM
EPA (Se) Std.	1085	Acceptable	MM
Method Blank	4.1.3 N/H	Acceptable	MM

QUALITY CONTROL SUMMARY

Type of Quality Control	AES Number	Acceptance Criteria	Analyst Initials
Ind. (Be) Std.	Spex-2	Acceptable	MW
Method Blank	4.1.3 N/H	Acceptable	MW
EPA (Cd) Std.	1085	Acceptable	DJM
Method Blank	4.1.3 N/H	Acceptable	DJM
EPA (Sb) Std.	989	Acceptable	MM
Method Blank	4.1.3 N/H	Acceptable	MM
Ind. (Na) Std.	Chk. Std.	Acceptable	DJM
Method Blank	4.1.3 N/H	Acceptable	DJM
Ind. (Zn) Std.	Spex-1	Acceptable	DJM
Method Blank	4.1.3 N/H	Acceptable	DJM
EPA (Ca) Std.	686	Acceptable	DJM
Method Blank	4.1.3 N/H	Acceptable	DJM
Ind. (Cu) Std.	Spex-1	Acceptable	DJM
Method Blank	4.1.3 N/H	Acceptable	DJM
EPA (Ba) Std.	1085	Acceptable	MW
Method Blank	4.1.3 N/H	Acceptable	MW
EPA (Mg) Std.	686	Acceptable	MW
Method Blank	4.1.3 N/H	Acceptable	MW
EPA (K) Std.	686	Acceptable	DJM
Method Blank	4.1.3 N/H	Acceptable	DJM
EPA (Ag) Std.	1085	Acceptable	DJM
Method Blank	4.1.3 N/H	Acceptable	DJM
EPA (As) Std.	378	Acceptable	MM
Method Blank	4.1.3 N/H	Acceptable	MM
Ind. (Al) Std.	Spex-2	Acceptable	MW
Method blank	4.1.3 N/H	Acceptable	MW
Ind. (Ni) Std.	Spex-1	Acceptable	DJM
Method Blank	4.1.3 N/H	Acceptable	DJM
Ind. (Mn) Std.	Spex-2	Acceptable	DJM
Method Blank	4.1.3 N/H	Acceptable	DJM
EPA (Pb) Std.	1085	Acceptable	MM
Method Blank	4.1.3 N/H	Acceptable	MM
EPA (Hg) Std.	378	Acceptable	DM
Lab Blank	0.5 Nitric	Acceptable	DM
Ind. (Co) Std.	Spex-2	Acceptable	DJM
Method Blank	4.1.3 N/H	Acceptable	DJM

5899

CRA Consulting Engineers
CONESTOGA-ROVERS & ASSOCIATES
651 Colby Drive, Waterloo, Ontario Canada N2V 1C2

SHIPPED TO (Laboratory name): ADVANCED ENV. SERVICES

CHAIN OF CUSTODY RECORD

PROJECT №: 2428

PROJECT NAME: TONAWANDA COKE CO.

SAMPLER'S SIGNATURE: [signature] (SIGN)

SEQ. №	SAMPLE №	DATE	TIME	SAMPLE LOCATOIN	SAMPLE TYPE	№ OF CONTAINERS	REMARKS
	W-2428-JO3-00	7/10/91	0830	HNO_3	GROUNDWATER	1	500 ml METAL
					bottle is	half	Full
				TOTAL NUMBER OF CONTAINERS		1	

ANTICIPATED CHEMICAL HAZARDS: UNKNOWN

RELINQUISHED BY: 1 [signature] (SIGN)	DATE/TIME 7/11/91 | 1025	RECEIVED BY: 2 Marcia Lewis (SIGN)
RELINQUISHED BY: 2 (SIGN)	DATE/TIME |	RECEIVED BY: 3 (SIGN)
RELINQUISHED BY: 3 (SIGN)	DATE/TIME |	RECEIVED BY: 4 (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

METHOD OF SHIPMENT: HAND DELIVERED	SHIPPED BY: –	RECEIVED FOR LABORATORY BY: (SIGN) Marcia Lewis	DATE/TIME 7-14-91 | 10:30
CONDITION OF SEAL UPON RECEIPT: GENERAL CONDITION OF COOLER:		COOLER OPENED BY: (SIGN)	DATE/TIME |

WHITE – CRA OFFICE COPY
YELLOW – RECEIVING LABORATORY COPY
PINK – CRA LABORATORY COPY
GOLDEN ROD – SHIPPERS

№ 012142

APPENDIX D.3

JULY 1992 WATER/SOILS DATA

CONESTOGA-ROVERS & ASSOCIATES

TONAWANDA COKE

Prepared By:

ADVANCED ENVIRONMENTAL SERVICES INC.

"A Company Dedicated to Honesty, Quality and Service"

July 31, 1992

Ref. # FIK922460,922504,922505,922510,922511,922512,922530

QA/QC Verification

The following report, as well as the supporting data, have been carefully reviewed for accuracy, adherence to the cited methods, and completeness. All data contained in this report was generated in accordance with the AES Laboratory Quality Assurance/Quality Control Program.

Denise R. Tuhovak
Organics Supervisor

Linda A. Ratka
Report Validator

Paul T. McMahon
Quality Control Officer

Joseph J. Curtis
Project Manager

All "Total" results on soil matrices are calculated on a dry weight basis, unless otherwise noted.

The following are standard abbreviations:

BQL - Below Quantifiable Limits
ND - None Detected
NG - No Growth of Colonies
NR - Not Requested

CUST SAMPLE ID: W-2428-792-01
COLLECTION DATE(S): 07/06/92
LABORATORY JOB NO: 922460
LABORATORY REFERENCE NO: 17219

COLLECTION METHOD:
SAMPLE TYPE: Groundwater

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Total Cyanide	ND	mg/l	0.004	---	EPA 335.3
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	2.2	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	BQL	µg/l	---	50.0	SW 846 8240
1,2-Dichloroethene (Total)	BQL	µg/l	---	5.00	SW 846 8240
1,1,1-Trichloroethane	BQL	µg/l	---	5.00	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Ethylbenzene	BQL	µg/l	---	5.00	SW 846 8240
Total Xylene	BQL	µg/l	---	5.00	SW 846 8240
Naphthalene	BQL	µg/l	---	10	SW 846 8270
2-Methylnaphthalene	BQL	µg/l	---	10	SW 846 8270
Acenaphthylene	BQL	µg/l	---	10	SW 846 8270
Acenaphthene	BQL	µg/l	---	10	SW 846 8270
Fluorene	BQL	µg/l	---	10	SW 846 8270
Phenanthrene	BQL	µg/l	---	10	SW 846 8270
Anthracene	BQL	µg/l	---	10	SW 846 8270
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) anthracene	BQL	µg/l	---	10	SW 846 8270
Chyrsene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: W-2428-792-01
COLLECTION DATE(S): 07/06/92

COLLECTION METHOD:
SAMPLE TYPE: Groundwater

LABORATORY JOB NO: 922460
LABORATORY REFERENCE NO: 17219

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Benzo (b) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (k) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) pyrene	BQL	µg/l	---	10	SW 846 8270
Dibenzofuran	BQL	µg/l	---	10	SW 846 8270
Benzo (g,h,i) perylene	BQL	µg/l	---	10	SW 846 8270
Indeno (1,2,3-cd)pyrene	BQL	µg/l	---	10	SW 846 8270
2-Chloronaphthalene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: W-2428-792-02
COLLECTION DATE(S): 07/06/92
LABORATORY JOB NO: 922460
LABORATORY REFERENCE NO: 17220

COLLECTION METHOD:
SAMPLE TYPE: Groundwater

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Total Cyanide	0.004	mg/l	0.004	---	EPA 335.3
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	2.2	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	76.0	µg/l	---	50.0	SW 846 8240
1,2-Dichloroethene (Total)	BQL	µg/l	---	5.00	SW 846 8240
1,1,1-Trichloroethane	BQL	µg/l	---	5.00	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Ethylbenzene	BQL	µg/l	---	5.00	SW 846 8240
Total Xylene	BQL	µg/l	---	5.00	SW 846 8240
Naphthalene	BQL	µg/l	---	10	SW 846 8270
2-Methylnaphthalene	BQL	µg/l	---	10	SW 846 8270
Acenaphthylene	16	µg/l	---	10	SW 846 8270
Acenaphthene	BQL	µg/l	---	10	SW 846 8270
Fluorene	17	µg/l	---	10	SW 846 8270
Phenanthrene	55	µg/l	---	10	SW 846 8270
Anthracene	17	µg/l	---	10	SW 846 8270
Fluoranthene	57	µg/l	---	10	SW 846 8270
Pyrene	57	µg/l	---	10	SW 846 8270
Benzo (a) anthracene	31	µg/l	---	10	SW 846 8270
Chyrsene	31	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: W-2428-792-02
COLLECTION DATE(S): 07/06/92
LABORATORY JOB NO: 922460
LABORATORY REFERENCE NO: 17220

COLLECTION METHOD:
SAMPLE TYPE: Groundwater

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Benzo (b) fluoranthene	26	µg/l	---	10	SW 846 8270
Benzo (k) fluoranthene	26	µg/l	---	10	SW 846 8270
Benzo (a) pyrene	29	µg/l	---	10	SW 846 8270
Dibenzofuran	11	µg/l	---	10	SW 846 8270
Benzo (g,h,i) perylene	BQL	µg/l	---	10	SW 846 8270
Indeno (1,2,3-cd)pyrene	BQL	µg/l	---	10	SW 846 8270
2-Chloronaphthalene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: METHOD BLANK #1 LABORATORY JOB NO: 922460

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Total Cyanide	ND	mg/l	0.004	---	EPA 335.3
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	ND	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	BQL	µg/l	---	50.0	SW 846 8240
1,2-Dichloroethene (Total)	BQL	µg/l	---	5.00	SW 846 8240
1,1,1-Trichloroethane	BQL	µg/l	---	5.00	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Ethylbenzene	BQL	µg/l	---	5.00	SW 846 8240
Total Xylene	BQL	µg/l	---	5.00	SW 846 8240
Naphthalene	BQL	µg/l	---	10	SW 846 8270
2-Methylnaphthalene	BQL	µg/l	---	10	SW 846 8270
Acenaphthylene	BQL	µg/l	---	10	SW 846 8270
Acenaphthene	BQL	µg/l	---	10	SW 846 8270
Fluorene	BQL	µg/l	---	10	SW 846 8270
Phenanthrene	BQL	µg/l	---	10	SW 846 8270
Anthracene	BQL	µg/l	---	10	SW 846 8270
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) anthracene	BQL	µg/l	---	10	SW 846 8270
Chyrsene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: METHOD BLANK #1 LABORATORY JOB NO: 922460

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Benzo (b) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (k) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) pyrene	BQL	µg/l	---	10	SW 846 8270
Dibenzofuran	BQL	µg/l	---	10	SW 846 8270
Benzo (g,h,i) perylene	BQL	µg/l	---	10	SW 846 8270
Indeno (1,2,3-cd)pyrene	BQL	µg/l	---	10	SW 846 8270
2-Chloronaphthalene	BQL	µg/l	---	10	SW 846 8270

Type of Analysis: SURROGATE RECOVERIES #1
Client Name: Conestoga-Rovers & Associates

A.E.S. Job Code: FIK
Units: Percent (%)

Analytical Parameter(s)	Method No.	Acceptable Limits	A.E.S. Lab Number. 17219 Customer ID. W-2428-792-01 07/06/92	17220 W-2428-792-02 07/06/92		
2-Fluorophenol	SW 846 8270	21-100	54	48		
Phenol-d6	SW 846 8270	10-94	46	45		
2,4,6-Trichlorophenol	SW 846 8270	10-123	71	56		
Nitrobenzene-d5	SW 846 8270	35-114	68	68		
2-Fluorobiphenyl	SW 846 8270	43-116	62	67		
Terphenyl-d14	SW 846 8270	33-141	65	80		
1,2-Dichloroethane-d4	SW 846 8240	76-114	108	105		
Toluene-d8	SW 846 8240	88-110	103	107		
4-Bromofluorobenzene	SW 846 8240	86-115	104	106		

LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates
Type of Analysis: Independent Standards #1

A.E.S. Job Code: FIK
Units: mg/l

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
Hexavalent Chromium	---	Independent Standard	0.98	1.00	NONE	98
Cyanide	---	EPA	0.45	0.50	NONE	90
Oil & Grease	---	Independent Standard	27	---	28	96

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / Added Spike Concentration)

If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates
Type of Analysis: Independent Standards #1

A.E.S. Job Code: FIK
Units: µg/l,ppb

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
Phenol	---	Independent Standard	62.1	---	100	62
2-Chlorophenol	---	Independent Standard	83.9	---	100	84
1,4-Dichlorobenzene	---	Independent Standard	77.6	---	100	78
N-Nitrosodipropylamine	---	Independent Standard	97.6	---	100	98
1,2,4-Trichlorobenzene	---	Independent Standard	78.7	---	100	79
4-Chloro-3-Methylphenol	---	Independent Standard	85.8	---	100	86
Acenaphthene	---	Independent Standard	87.3	---	100	87
4-Nitrophenol	---	Independent Standard	61.9	---	100	62
2,4-Dinitrotoluene	---	Independent Standard	116	---	100	116
Pentachlorophenol	---	Independent Standard	88.3	---	100	88
Pyrene	---	Independent Standard	100	---	100	100

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / Added Spike Concentration)

If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

CUST SAMPLE ID: W-2428-792-03
COLLECTION DATE(S): 07/07/92

LABORATORY JOB NO: 922530
LABORATORY REFERENCE NO: 17364

COLLECTION METHOD:
SAMPLE TYPE: Groundwater

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Total Cyanide	0.040	mg/l	0.004	---	EPA 335.3
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	ND	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	BQL	µg/l	---	50.0	SW 846 8240
1,2-Dichloroethene (Total)	BQL	µg/l	---	5.00	SW 846 8240
1,1,1-Trichloroethane	BQL	µg/l	---	5.00	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Ethylbenzene	BQL	µg/l	---	5.00	SW 846 8240
Total Xylene	BQL	µg/l	---	5.00	SW 846 8240
Naphthalene	BQL	µg/l	---	10	SW 846 8270
2-Methylnaphthalene	BQL	µg/l	---	10	SW 846 8270
Acenaphthylene	BQL	µg/l	---	10	SW 846 8270
Acenaphthene	BQL	µg/l	---	10	SW 846 8270
Fluorene	BQL	µg/l	---	10	SW 846 8270
Phenanthrene	BQL	µg/l	---	10	SW 846 8270
Anthracene	BQL	µg/l	---	10	SW 846 8270
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) anthracene	BQL	µg/l	---	10	SW 846 8270
Chyrsene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: W-2428-792-03
COLLECTION DATE(S): 07/07/92
COLLECTION METHOD:
SAMPLE TYPE: Groundwater

LABORATORY JOB NO: 922530
LABORATORY REFERENCE NO: 17364

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Benzo (b) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (k) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) pyrene	BQL	µg/l	---	10	SW 846 8270
Dibenzofuran	BQL	µg/l	---	10	SW 846 8270
Benzo (g,h,i) perylene	BQL	µg/l	---	10	SW 846 8270
Indeno (1,2,3-cd)pyrene	BQL	µg/l	---	10	SW 846 8270
2-Chloronaphthalene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: W-2428-792-04
COLLECTION DATE(S): 07/07/92
LABORATORY JOB NO: 922530
LABORATORY REFERENCE NO: 17365

COLLECTION METHOD:
SAMPLE TYPE: Groundwater

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Total Cyanide	0.037	mg/l	0.004	---	EPA 335.3
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	ND	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	BQL	µg/l	---	50.0	SW 846 8240
1,2-Dichloroethene (Total)	BQL	µg/l	---	5.00	SW 846 8240
1,1,1-Trichloroethane	BQL	µg/l	---	5.00	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Ethylbenzene	BQL	µg/l	---	5.00	SW 846 8240
Total Xylene	BQL	µg/l	---	5.00	SW 846 8240
Naphthalene	BQL	µg/l	---	10	SW 846 8270
2-Methylnaphthalene	BQL	µg/l	---	10	SW 846 8270
Acenaphthylene	BQL	µg/l	---	10	SW 846 8270
Acenaphthene	BQL	µg/l	---	10	SW 846 8270
Fluorene	BQL	µg/l	---	10	SW 846 8270
Phenanthrene	BQL	µg/l	---	10	SW 846 8270
Anthracene	BQL	µg/l	---	10	SW 846 8270
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) anthracene	BQL	µg/l	---	10	SW 846 8270
Chyrsene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: W-2428-792-04
COLLECTION DATE(S): 07/07/92
LABORATORY JOB NO: 922530
LABORATORY REFERENCE NO: 17365

COLLECTION METHOD:
SAMPLE TYPE: Groundwater

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Benzo (b) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (k) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) pyrene	BQL	µg/l	---	10	SW 846 8270
Dibenzofuran	BQL	µg/l	---	10	SW 846 8270
Benzo (g,h,i) perylene	BQL	µg/l	---	10	SW 846 8270
Indeno (1,2,3-cd)pyrene	BQL	µg/l	---	10	SW 846 8270
2-Chloronaphthalene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: W-2428-792-05
COLLECTION DATE(S): 07/07/92
LABORATORY JOB NO: 922530
LABORATORY REFERENCE NO: 17366

COLLECTION METHOD:
SAMPLE TYPE: Groundwater

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Total Cyanide	0.026	mg/l	0.004	---	EPA 335.3
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	ND	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	BQL	µg/l	---	50.0	SW 846 8240
1,2-Dichloroethene (Total)	BQL	µg/l	---	5.00	SW 846 8240
1,1,1-Trichloroethane	BQL	µg/l	---	5.00	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Ethylbenzene	BQL	µg/l	---	5.00	SW 846 8240
Total Xylene	BQL	µg/l	---	5.00	SW 846 8240
Naphthalene	BQL	µg/l	---	10	SW 846 8270
2-Methylnaphthalene	BQL	µg/l	---	10	SW 846 8270
Acenaphthylene	BQL	µg/l	---	10	SW 846 8270
Acenaphthene	BQL	µg/l	---	10	SW 846 8270
Fluorene	BQL	µg/l	---	10	SW 846 8270
Phenanthrene	BQL	µg/l	---	10	SW 846 8270
Anthracene	BQL	µg/l	---	10	SW 846 8270
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) anthracene	BQL	µg/l	---	10	SW 846 8270
Chyrsene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: W-2428-792-05
COLLECTION DATE(S): 07/07/92
LABORATORY JOB NO: 922530
LABORATORY REFERENCE NO: 17366

COLLECTION METHOD:
SAMPLE TYPE: Groundwater

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Benzo (b) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (k) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) pyrene	BQL	µg/l	---	10	SW 846 8270
Dibenzofuran	BQL	µg/l	---	10	SW 846 8270
Benzo (g,h,i) perylene	BQL	µg/l	---	10	SW 846 8270
Indeno (1,2,3-cd)pyrene	BQL	µg/l	---	10	SW 846 8270
2-Chloronaphthalene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: W-2428-792-06
COLLECTION DATE(S): 07/07/92

LABORATORY JOB NO: 922530
LABORATORY REFERENCE NO: 17367

COLLECTION METHOD:
SAMPLE TYPE: Groundwater

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Total Cyanide	ND	mg/l	0.004	---	EPA 335.3
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	ND	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	BQL	µg/l	---	50.0	SW 846 8240
1,2-Dichloroethene (Total)	BQL	µg/l	---	5.00	SW 846 8240
1,1,1-Trichloroethane	BQL	µg/l	---	5.00	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Ethylbenzene	BQL	µg/l	---	5.00	SW 846 8240
Total Xylene	BQL	µg/l	---	5.00	SW 846 8240
Naphthalene	BQL	µg/l	---	10	SW 846 8270
2-Methylnaphthalene	BQL	µg/l	---	10	SW 846 8270
Acenaphthylene	BQL	µg/l	---	10	SW 846 8270
Acenaphthene	BQL	µg/l	---	10	SW 846 8270
Fluorene	BQL	µg/l	---	10	SW 846 8270
Phenanthrene	BQL	µg/l	---	10	SW 846 8270
Anthracene	BQL	µg/l	---	10	SW 846 8270
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) anthracene	BQL	µg/l	---	10	SW 846 8270
Chyrsene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: W-2428-792-06
COLLECTION DATE(S): 07/07/92
LABORATORY JOB NO: 922530
LABORATORY REFERENCE NO: 17367

COLLECTION METHOD:
SAMPLE TYPE: Groundwater

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Benzo (b) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (k) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) pyrene	BQL	µg/l	---	10	SW 846 8270
Dibenzofuran	BQL	µg/l	---	10	SW 846 8270
Benzo (g,h,i) perylene	BQL	µg/l	---	10	SW 846 8270
Indeno (1,2,3-cd)pyrene	BQL	µg/l	---	10	SW 846 8270
2-Chloronaphthalene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: METHOD BLANK #2 LABORATORY JOB NO: 922530

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Total Cyanide	ND	mg/l	0.004	---	EPA 335.3
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	ND	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	BQL	µg/l	---	50.0	SW 846 8240
1,2-Dichloroethene (Total)	BQL	µg/l	---	5.00	SW 846 8240
1,1,1-Trichloroethane	BQL	µg/l	---	5.00	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Ethylbenzene	BQL	µg/l	---	5.00	SW 846 8240
Total Xylene	BQL	µg/l	---	5.00	SW 846 8240
Naphthalene	BQL	µg/l	---	10	SW 846 8270
2-Methylnaphthalene	BQL	µg/l	---	10	SW 846 8270
Acenaphthylene	BQL	µg/l	---	10	SW 846 8270
Acenaphthene	BQL	µg/l	---	10	SW 846 8270
Fluorene	BQL	µg/l	---	10	SW 846 8270
Phenanthrene	BQL	µg/l	---	10	SW 846 8270
Anthracene	BQL	µg/l	---	10	SW 846 8270
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) anthracene	BQL	µg/l	---	10	SW 846 8270
Chyrsene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: METHOD BLANK #2 LABORATORY JOB NO: 922530

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Benzo (b) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (k) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) pyrene	BQL	µg/l	---	10	SW 846 8270
Dibenzofuran	BQL	µg/l	---	10	SW 846 8270
Benzo (g,h,i) perylene	BQL	µg/l	---	10	SW 846 8270
Indeno (1,2,3-cd)pyrene	BQL	µg/l	---	10	SW 846 8270
2-Chloronaphthalene	BQL	µg/l	---	10	SW 846 8270

ADVANCED ENVIRONMENTAL SERVICES, INC.
LABORATORY REPORT
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JOB# 922530

Type of Analysis: SURROGATE RECOVERIES #2
Client Name: Conestoga-Rovers & Associates

A.E.S. Job Code: FIK
Units: Percent (%)

Analytical Parameter(s)	Method No.	Practical Quantifiable Limit	A.E.S. Lab Number: 17364 Customer ID: W-2428-792-03 07/07/92	17365 W-2428-792-04 07/07/92	17366 W-2428-792-05 07/07/92	17367 W-2428-792-06 07/07/92
2-Fluorophenol	SW 846 8270	21-100	34	54	51	49
Phenol-d6	SW 846 8270	10-94	33	48	44	44
2,4,6-Tribromophenol	SW 846 8270	10-123	64	63	59	59
Nitrobenzene-d5	SW 846 8270	35-114	61	79	73	65
2-Fluorobiphenyl	SW 846 8270	43-116	67	74	71	65
Terphenyl-d14	SW 846 8270	33-141	65	71	69	61
1,2-Dichloroethane-d4	SW 846 8240	76-114	100	105	102	104
Toluene	SW 846 8240	88-110	106	107	107	108
4-Bromofluorobenzene	SW 846 8240	86-115	104	104	104	103

ADVANCED ENVIRONMENTAL SERVICES, INC.
LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates
Type of Analysis: Matrix Spike and Independent Standards #2

A.E.S. Job Code: FIK
Units: mg/l

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
Hexavalent Chromium	17274	Matrix Spike	1.03	ND	1.00	103
Hexavalent Chromium	17274	Matrix Spike Dup	1.02	ND	1.00	102
Hexavalent Chromium	---	Independent Standard	1.00	1.00	NONE	100
Cyanide	17274	Analytical Spike **	0.256	0.040	0.200	108
Cyanide	---	EPA	0.45	0.50	NONE	90
Oil & Grease, Gravimetric	17364	Matrix Spike	20	ND	20	100
Oil & Grease, Gravimetric	17364	Matrix Spike Dup	38	ND	40	95
Oil & Grease, Gravimetric	---	Independent Standard	49	---	50	98

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / Added Spike Concentration)

If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

FOOTNOTES

** Matrix spike was not performed due to matrix interferences in sample.
An analytical spike was performed instead.

LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates A.E.S. Job Code: FIK
Type of Analysis: Matrix Spike and Independent Standards #2 Units: µg/l,ppb

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
Phenol	---	Independent Standard	62.1	---	100	62
2-Chlorophenol	---	Independent Standard	83.9	---	100	84
1,4-Dichlorobenzene	---	Independent Standard	77.6	---	100	78
N-Nitrosodipropylamine	---	Independent Standard	97.6	---	100	98
1,2,4-Trichlorobenzene	---	Independent Standard	78.7	---	100	79
4-Chloro-3-Methylphenol	---	Independent Standard	85.8	---	100	86
Acenaphthene	---	Independent Standard	87.3	---	100	87
4-Nitrophenol	---	Independent Standard	61.9	---	100	62
2,4-Dinitrotoluene	---	Independent Standard	116	---	100	116
Pentachlorophenol	---	Independent Standard	88.3	---	100	88
Pyrene	---	Independent Standard	100	---	100	100

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / Added Spike Concentration)

If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates A.E.S. Job Code: FIK
Type of Analysis: Matrix Spike and Independent Standards #2 Units: µg/l,ppb

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
1,1-Dichloroethene	17364	Matrix Spike	58.7	BQL	50.0	117
Trichloroethene	17364	Matrix Spike	45.2	BQL	50.0	90
Benzene	17364	Matrix Spike	53.2	BQL	50.0	106
Toluene	17364	Matrix Spike	49.4	BQL	50.0	99
Chlorobenzene	17364	Matrix Spike	48.7	BQL	50.0	97
1,1-Dichloroethene	17364	Matrix Spike Dup	58.4	BQL	50.0	117
Trichloroethene	17364	Matrix Spike Dup	44.0	BQL	50.0	88
Benzene	17364	Matrix Spike Dup	52.6	BQL	50.0	105
Toluene	17364	Matrix Spike Dup	49.6	BQL	50.0	99
Chlorobenzene	17364	Matrix Spike Dup	48.1	BQL	50.0	96
1,1-Dichloroethene	---	Independent Standard	57.5	---	50.0	115
Trichloroethene	---	Independent Standard	44.2	---	50.0	88
Benzene	---	Independent Standard	51.2	---	50.0	102
Toluene	---	Independent Standard	50.6	---	50.0	101
Chlorobenzene	---	Independent Standard	49.9	---	50.0	100

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / Added Spike Concentration)

If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates A.E.S. Job Code: FIK
Type of Analysis: Matrix Spike and Independent Standards #2 Units: µg/l

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
Phenol	17364	Matrix Spike	95.5	BQL	200	48
2-Chlorophenol	17364	Matrix Spike	130	BQL	200	65
1,4-Dichlorobenzene	17364	Matrix Spike	75.6	BQL	100	76
N-Nitrosodipropylamine	17364	Matrix Spike	92.6	BQL	100	93
1,2,4-Trichlorobenzene	17364	Matrix Spike	82.8	BQL	100	83
4-Chloro-3-Methylphenol	17364	Matrix Spike	148	BQL	200	74
Acenaphthene	17364	Matrix Spike	81.4	BQL	100	81
4-Nitrophenol	17364	Matrix Spike	81.2	BQL	200	41
2,4-Dinitrotoluene	17364	Matrix Spike	109	BQL	100	109
Pentachlorophenol	17364	Matrix Spike	178	BQL	200	89
Pyrene	17364	Matrix Spike	82.1	BQL	100	82
Phenol	17364	Matrix Spike Dup	102	BQL	200	51
2-Chlorophenol	17364	Matrix Spike Dup	136	BQL	200	68
1,4-Dichlorobenzene	17364	Matrix Spike Dup	83.3	BQL	100	83
N-Nitrosodipropylamine	17364	Matrix Spike Dup	104	BQL	100	104
1,2,4-Trichlorobenzene	17364	Matrix Spike Dup	84.4	BQL	100	84

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / "Spike" Added Concentration)

* If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates
Type of Analysis: Matrix Spike and Independent Standards #2

A.E.S. Job Code: FIK
Units: µg/l

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
4-Chloro-3-Methylphenol	17364	Matrix Spike Dup	147	BQL	200	74
Acenaphthene	17364	Matrix Spike Dup	85.5	BQL	100	86
4-Nitrophenol	17364	Matrix Spike Dup	77.6	BQL	200	39
2,4-Dinitrotoluene	17364	Matrix Spike Dup	106	BQL	100	106
Pentachlorophenol	17364	Matrix Spike Dup	166	BQL	200	83
Pyrene	17364	Matrix Spike Dup	111	BQL	100	111

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / Added Spike Concentration)

If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

CUST SAMPLE ID: W-2428-792-17
COLLECTION DATE(S): 07/09/92

LABORATORY JOB NO: 922510
LABORATORY REFERENCE NO: 17313

COLLECTION METHOD:
SAMPLE TYPE: Groundwater

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Total Cyanide	0.006	mg/l	0.004	---	EPA 335.3
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	9.1	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	BQL	µg/l	---	50.0	SW 846 8240
1,2-Dichloroethene (Total)	BQL	µg/l	---	5.00	SW 846 8240
1,1,1-Trichloroethane	BQL	µg/l	---	5.00	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Ethylbenzene	BQL	µg/l	---	5.00	SW 846 8240
Total Xylene	BQL	µg/l	---	5.00	SW 846 8240
Naphthalene	BQL	µg/l	---	10	SW 846 8270
2-Methylnaphthalene	BQL	µg/l	---	10	SW 846 8270
Acenaphthylene	BQL	µg/l	---	10	SW 846 8270
Acenaphthene	BQL	µg/l	---	10	SW 846 8270
Fluorene	BQL	µg/l	---	10	SW 846 8270
Phenanthrene	BQL	µg/l	---	10	SW 846 8270
Anthracene	BQL	µg/l	---	10	SW 846 8270
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Benzo(a)anthracene	BQL	µg/l	---	10	SW 846 8270
Chrysene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: W-2428-792-17
COLLECTION DATE(S): 07/09/92
LABORATORY JOB NO: 922510
LABORATORY REFERENCE NO: 17313

COLLECTION METHOD:
SAMPLE TYPE: Groundwater

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Benzo(b)fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo(k)fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo(a)pyrene	BQL	µg/l	---	10	SW 846 8270
Dibenzofuran	BQL	µg/l	---	10	SW 846 8270
Benzo(g,h,i)perylene	BQL	µg/l	---	10	SW 846 8270
Indeno (1,2,3-cd)pyrene	BQL	µg/l	---	10	SW 846 8270
2-Chloronaphthalene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: W-2428-792-18
COLLECTION DATE(S): 07/09/92
LABORATORY JOB NO: 922510
LABORATORY REFERENCE NO: 17314

COLLECTION METHOD:
SAMPLE TYPE: Groundwater

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Total Cyanide	0.004	mg/l	0.004	---	EPA 335.3
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	8.3	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	50.0	SW 846 8240
Acetone	685	µg/l	---	5.00	SW 846 8240
1,2-Dichloroethene (Total)	BQL	µg/l	---	5.00	SW 846 8240
1,1,1-Trichloroethane	BQL	µg/l	---	5.00	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Ethylbenzene	BQL	µg/l	---	5.00	SW 846 8240
Total Xylene	BQL	µg/l	---	5.00	SW 846 8240
Naphthalene	BQL	µg/l	---	10	SW 846 8270
2-Methylnaphthalene	BQL	µg/l	---	10	SW 846 8270
Acenaphthylene	BQL	µg/l	---	10	SW 846 8270
Acenaphthene	BQL	µg/l	---	10	SW 846 8270
Fluorene	BQL	µg/l	---	10	SW 846 8270
Phenanthrene	BQL	µg/l	---	10	SW 846 8270
Anthracene	BQL	µg/l	---	10	SW 846 8270
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) anthracene	BQL	µg/l	---	10	SW 846 8270
Chyrsene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: W-2428-792-18
COLLECTION DATE(S): 07/09/92

COLLECTION METHOD:
SAMPLE TYPE: Groundwater

LABORATORY JOB NO: 922510
LABORATORY REFERENCE NO: 17314

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Benzo (b) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (k) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) pyrene	BQL	µg/l	---	10	SW 846 8270
Dibenzofuran	BQL	µg/l	---	10	SW 846 8270
Benzo (g,h,i) perylene	BQL	µg/l	---	10	SW 846 8270
Indeno (1,2,3-cd)pyrene	BQL	µg/l	---	10	SW 846 8270
2-Chloronaphthalene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: METHOD BLANK #3 LABORATORY JOB NO: 922510

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Total Cyanide	ND	mg/l	0.004	---	EPA 335.3
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	ND	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	BQL	µg/l	---	50.0	SW 846 8240
1,2-Dichloroethene (Total)	BQL	µg/l	---	5.00	SW 846 8240
1,1,1-Trichloroethane	BQL	µg/l	---	5.00	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Ethylbenzene	BQL	µg/l	---	5.00	SW 846 8240
Total Xylene	BQL	µg/l	---	5.00	SW 846 8240
Naphthalene	BQL	µg/l	---	10	SW 846 8270
2-Methylnaphthalene	BQL	µg/l	---	10	SW 846 8270
Acenaphthylene	BQL	µg/l	---	10	SW 846 8270
Acenaphthene	BQL	µg/l	---	10	SW 846 8270
Fluorene	BQL	µg/l	---	10	SW 846 8270
Phenanthrene	BQL	µg/l	---	10	SW 846 8270
Anthracene	BQL	µg/l	---	10	SW 846 8270
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) anthracene	BQL	µg/l	---	10	SW 846 8270
Chyrsene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: METHOD BLANK #3 LABORATORY JOB NO: 922510

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Benzo (b) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (k) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) pyrene	BQL	µg/l	---	10	SW 846 8270
Dibenzofuran	BQL	µg/l	---	10	SW 846 8270
Benzo (g,h,i) perylene	BQL	µg/l	---	10	SW 846 8270
Indeno (1,2,3-cd)pyrene	BQL	µg/l	---	10	SW 846 8270
2-Chloronaphthalene	BQL	µg/l	---	10	SW 846 8270

ADVANCED ENVIRONMENTAL SERVICES, INC.
LABORATORY REPORT

JOB# 922510

Type of Analysis: SURROGATE RECOVERIES #3
Client Name: Conestoga-Rovers & Associates

A.E.S. Job Code: FIK
Units: Percent (%)

Analytical Parameter(s)	Method No.	Practical Quantifiable Limit	A.E.S. Lab Number: 17313 Customer ID: W-2428-792-17 07/09/92	17314 W-2428-792-18 07/09/92		
2-Fluorophenol	SW 846 8270	21-100	59	60		
Phenol-d6	SW 846 8270	10-94	52	52		
2,4,6-Tribromophenol	SW 846 8270	10-123	62	63		
Nitrobenzene-d5	SW 846 8270	35-114	79	78		
2-Fluorobiphenyl	SW 846 8270	43-116	78	84		
Tetrphenyl-d14	SW 846 8270	33-141	78	86		
1,2-Dichloroethane-d4	SW 846 8240	76-114	101	109		
Toluene-d8	SW 846 8240	88-110	105	106		
4-Bromofluorobenzene	SW 846 8240	86-115	102	104		

ADVANCED ENVIRONMENTAL SERVICES, INC.
LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates
A.E.S. Job Code: FIK
Type of Analysis: Independent Standards #3
Units: mg/l

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
Hexavalent Chromium	---	Independent Standard	0.99	1.00	NONE	99
Cyanide	---	Independent Standard	0.45	0.50	NONE	90
Oil & Grease, Gravimetric	---	Independent Standard	28	---	28	100

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / Added Spike Concentration)

If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates
Type of Analysis: Independent Standards #3

A.E.S. Job Code: FIK
Units: µg/l,ppb

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
1,1-Dichloroethene	---	Independent Standard	62.6	BQL	50.0	125
Trichloroethene	---	Independent Standard	44.8	BQL	50.0	90
Benzene	---	Independent Standard	52.1	BQL	50.0	104
Toluene	---	Independent Standard	48.9	BQL	50.0	98
Chlorobenzene	---	Independent Standard	48.8	BQL	50.0	98
Phenol	---	Independent Standard	117	BQL	200	58
2-Chlorophenol	---	Independent Standard	140	BQL	200	70
1,4-Dichlorobenzene	---	Independent Standard	82.8	BQL	100	83
N-Nitrosodipropylamine	---	Independent Standard	96.7	BQL	100	97
1,2,4-Trichlorobenzene	---	Independent Standard	86.9	BQL	100	87
4-Chloro-3-Methylphenol	---	Independent Standard	151	BQL	200	76
Acebaphthene	---	Independent Standard	84.1	BQL	100	84
4-Nitrophenol	---	Independent Standard	101	BQL	200	50
2,4-Dinitrotoluene	---	Independent Standard	98.7	BQL	100	99
Pentachlorophenol	---	Independent Standard	163	BQL	200	82
Pyrene	---	Independent Standard	96.1	BQL	100	96

CUST SAMPLE ID: W-2428-792-19
COLLECTION DATE(S): 07/10/92
LABORATORY JOB NO: 922512
LABORATORY REFERENCE NO: 17316

COLLECTION METHOD:
SAMPLE TYPE: Groundwater

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Total Cyanide	0.008	mg/l	0.004	---	EPA 335.3
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	ND	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	BQL	µg/l	---	50.0	SW 846 8240
1,2-Dichloroethene (Total)	BQL	µg/l	---	5.00	SW 846 8240
1,1,1-Trichloroethane	BQL	µg/l	---	5.00	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Ethylbenzene	BQL	µg/l	---	5.00	SW 846 8240
Total Xylene	BQL	µg/l	---	5.00	SW 846 8240
Naphthalene	BQL	µg/l	---	10	SW 846 8270
2-Methylnaphthalene	BQL	µg/l	---	10	SW 846 8270
Acenaphthylene	BQL	µg/l	---	10	SW 846 8270
Acenaphthene	BQL	µg/l	---	10	SW 846 8270
Fluorene	BQL	µg/l	---	10	SW 846 8270
Phenanthrene	BQL	µg/l	---	10	SW 846 8270
Anthracene	BQL	µg/l	---	10	SW 846 8270
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) anthracene	BQL	µg/l	---	10	SW 846 8270
Chyrsene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: W-2428-792-19
COLLECTION DATE(S): 07/10/92
LABORATORY JOB NO: 922512
LABORATORY REFERENCE NO: 17316

COLLECTION METHOD:
SAMPLE TYPE: Groundwater

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Benzo (b) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (k) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) pyrene	BQL	µg/l	---	10	SW 846 8270
Dibenzofuran	BQL	µg/l	---	10	SW 846 8270
Benzo (g,h,i) perylene	BQL	µg/l	---	10	SW 846 8270
Indeno (1,2,3-cd)pyrene	BQL	µg/l	---	10	SW 846 8270
2-Chloronaphthalene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: METHOD BLANK #4 LABORATORY JOB NO: 922512

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Total Cyanide	ND	mg/l	0.004	---	EPA 335.3
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	ND	mg/l	1.0		SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	BQL	µg/l	---	50.0	SW 846 8240
1,2-Dichloroethene (Total)	BQL	µg/l	---	5.00	SW 846 8240
1,1,1-Trichloroethane	BQL	µg/l	---	5.00	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Ethylbenzene	BQL	µg/l	---	5.00	SW 846 8240
Total Xylene	BQL	µg/l	---	5.00	SW 846 8240
Naphthalene	BQL	µg/l	---	10	SW 846 8270
2-Methylnaphthalene	BQL	µg/l	---	10	SW 846 8270
Acenaphthylene	BQL	µg/l	---	10	SW 846 8270
Acenaphthene	BQL	µg/l	---	10	SW 846 8270
Fluorene	BQL	µg/l	---	10	SW 846 8270
Phenanthrene	BQL	µg/l	---	10	SW 846 8270
Anthracene	BQL	µg/l	---	10	SW 846 8270
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) anthracene	BQL	µg/l	---	10	SW 846 8270
Chyrsene	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: METHOD BLANK #4 LABORATORY JOB NO: 922512

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Benzo (b) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (k) fluoranthene	BQL	µg/l	---	10	SW 846 8270
Benzo (a) pyrene	BQL	µg/l	---	10	SW 846 8270
Dibenzofuran	BQL	µg/l	---	10	SW 846 8270
Benzo (g,h,i) perylene	BQL	µg/l	---	10	SW 846 8270
Indeno (1,2,3-cd)pyrene	BQL	µg/l	---	10	SW 846 8270
2-Chloronaphthalene	BQL	µg/l	---	10	SW 846 8270

Type of Analysis: SURROGATE RECOVERIES #4
Client Name: Conestoga-Rovers & Associates

A.E.S. Job Code: FIK
Units: Percent (%)

Analytical Parameter(s)	Method No.	Practical Quantifiable Limit	A.E.S. Lab Number: 17316 Customer ID: W-2428-792-19 07/10/92			
2-Fluorophenol	SW 846 8270	21-100	56			
Phenol-d6	SW 846 8270	10-94	48			
2,4,6-Tribromophenol	SW 846 8270	10-123	57			
Nitrobenzene-d5	SW 846 8270	35-114	78			
2-Fluorobiphenyl	SW 846 8270	43-116	80			
Terphenyl-d14	SW 846 8270	33-141	85			
1,2-Dichloroethane-d4	SW 846 8240	76-114	100			
Toluene	SW 846 8240	88-110	108			
4-Bromofluorobenzene	SW 846 8240	86-115	99			

ADVANCED ENVIRONMENTAL SERVICES, INC.
LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates
Type of Analysis: Independent Standards #4

A.E.S. Job Code: FIK
Units: mg/l

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
Hexavalent Chromium	---	Independent Standard	0.51	0.50	NONE	102
Cyanide	---	Independent Standard	0.45	0.50	NONE	90
Oil and Grease, Gravimetric	---	Independent Standard	49	---	50	98

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / Added Spike Concentration)

If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates
Type of Analysis: Independent Standards #4

A.E.S. Job Code: FIK
Units: µg/l,ppb

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
1,1-Dichloroethene	---	Ref. Standard	67.8	---	50.0	136
Trichloroethene	---	Ref. Standard	54.4	---	50.0	109
Benzene	---	Ref. Standard	62.5	---	50.0	125
Toluene	---	Ref. Standard	59.6	---	50.0	119
Chlorobenzene	---	Ref. Standard	60.9	---	50.0	122
Phenol	---	Independent Standard	117	---	200	58
2-Chlorophenol	---	Independent Standard	140	---	200	70
1,4-Dichlorobenzene	---	Independent Standard	82.8	---	100	83
N-Nitrosodipropylamine	---	Independent Standard	96.7	---	100	97
1,2,4-Trichlorobenzene	---	Independent Standard	86.9	---	100	87
4-Chloro-3-Methylphenol	---	Independent Standard	151	---	200	76
Acenaphthene	---	Independent Standard	84.1	---	100	84
4-Nitrophenol	---	Independent Standard	101	---	200	50
2,4-Dinitrotoluene	---	Independent Standard	98.7	---	100	99
Pentachlorophenol	---	Independent Standard	163	---	200	82
Pyrene	---	Independent Standard	96.1	---	100	96

ADVANCED ENVIRONMENTAL SERVICES LABORATORY REPORT

CUST SAMPLE ID: SW-2428-792- 07
COLLECTION DATE(S): 07/08/92

LABORATORY JOB NO: 922505
LABORATORY REFERENCE NO: 17303

COLLECTION METHOD:
SAMPLE TYPE: Surface Water

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Aluminum	0.54	mg/l	0.05	---	SW 846 6010
Antimony	ND	mg/l	0.05	---	SW 846 6010
Arsenic	0.003	mg/l	0.002	---	SW 846 7060
Barium	0.03	mg/l	0.002	---	SW 846 6010
Beryllium	ND	mg/l	0.001	---	SW 846 7000
Cadmium	ND	mg/l	0.004	---	SW 846 6010
Calcium	106	mg/l	0.01	---	SW 846 6010
Chromium	ND	mg/l	0.01	---	SW 846 6010
Cobalt	ND	mg/l	0.005	---	SW 846 6010
Copper	ND	mg/l	0.01	---	SW 846 6010
Iron	4.58	mg/l	0.01	---	SW 846 7421
Lead	0.008	mg/l	0.002	---	SW 846 6010
Magnesium	18.1	mg/l	0.03	---	SW 846 6010
Manganese	0.60	mg/l	0.002	---	SW 846 7470
Mercury	ND	mg/l	0.0005	---	SW 846 6010
Nickel	ND	mg/l	0.02	---	SW 846 6010
Potassium	3.27	mg/l	0.40	---	SW 846 7740
Selenium	ND	mg/l	0.002	---	SW 846 6010
Silver	0.01	mg/l	0.005	---	SW 846 6010
Sodium	12.2	mg/l	0.10	---	SW 846 7841
Thallium	ND	mg/l	0.002	---	SW 846 6010
Vanadium	0.02	mg/l	0.01	---	SW 846 6010
Zinc	ND	mg/l	0.01	---	SW 846 6010
Total Cyanide	0.030	mg/l	0.004	---	EPA 335.3

CUST SAMPLE ID: SW-2428-792- 07
COLLECTION DATE(S): 07/08/92

LABORATORY JOB NO: 922505
LABORATORY REFERENCE NO: 17303

COLLECTION METHOD:
SAMPLE TYPE: Surface Water

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	ND	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	BQL	µg/l	---	50.0	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Phenol	BQL	µg/l	---	10	SW 846 8270
2-Methylphenol	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: SW-2428-792- 08
COLLECTION DATE(S): 07/08/92

LABORATORY JOB NO: 922505
LABORATORY REFERENCE NO: 17304

COLLECTION METHOD:
SAMPLE TYPE: Surface Water

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Aluminum	0.40	mg/l	0.05	---	SW 846 6010
Antimony	ND	mg/l	0.05	---	SW 846 6010
Arsenic	0.003	mg/l	0.002	---	SW 846 7060
Barium	0.06	mg/l	0.002	---	SW 846 6010
Beryllium	ND	mg/l	0.001	---	SW 846 7000
Cadmium	ND	mg/l	0.004	---	SW 846 6010
Calcium	106	mg/l	0.01	---	SW 846 6010
Chromium	ND	mg/l	0.01	---	SW 846 6010
Cobalt	0.005	mg/l	0.005	---	SW 846 6010
Copper	ND	mg/l	0.01	---	SW 846 6010
Iron	4.33	mg/l	0.01	---	SW 846 6010
Lead	0.004	mg/l	0.002	---	SW 846 7421
Magnesium	18.3	mg/l	0.03	---	SW 846 6010
Manganese	0.60	mg/l	0.002	---	SW 846 6010
Mercury	ND	mg/l	0.0005	---	SW 846 7470
Nickel	ND	mg/l	0.02	---	SW 846 6010
Potassium	3.55	mg/l	0.40	---	SW 846 6010
Selenium	ND	mg/l	0.002	---	SW 846 7740
Silver	0.009	mg/l	0.005	---	SW 846 6010
Sodium	12.3	mg/l	0.10	---	SW 846 6010
Thallium	ND	mg/l	0.002	---	SW 846 7841
Vanadium	0.02	mg/l	0.01	---	SW 846 6010
Zinc	ND	mg/l	0.01	---	SW 846 6010
Total Cyanide	0.028	mg/l	0.004	---	EPA 335.3

ADVANCED ENVIRONMENTAL SERVICES LABORATORY REPORT

CUST SAMPLE ID: SW-2428-792- 08
COLLECTION DATE(S): 07/08/92

COLLECTION METHOD:
SAMPLE TYPE: Surface Water

LABORATORY JOB NO: 922505
LABORATORY REFERENCE NO: 17304

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	ND	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	BQL	µg/l	---	50.0	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Phenol	BQL	µg/l	---	10	SW 846 8270
2-Methylphenol	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: SW-2428-792- 09
COLLECTION DATE(S): 07/08/92

LABORATORY JOB NO: 922505
LABORATORY REFERENCE NO: 17305

COLLECTION METHOD:
SAMPLE TYPE: Surface Water

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Aluminum	8.10	mg/l	0.05	---	SW 846 6010
Antimony	ND	mg/l	0.05	---	SW 846 6010
Arsenic	ND	mg/l	0.002	---	SW 846 7060
Barium	0.01	mg/l	0.002	---	SW 846 6010
Beryllium	ND	mg/l	0.001	---	SW 846 7000
Cadmium	ND	mg/l	0.004	---	SW 846 6010
Calcium	489	mg/l	0.01	---	SW 846 6010
Chromium	0.01	mg/l	0.01	---	SW 846 6010
Cobalt	0.03	mg/l	0.005	---	SW 846 6010
Copper	0.02	mg/l	0.01	---	SW 846 6010
Iron	161	mg/l	0.01	---	SW 846 6010
Lead	0.007	mg/l	0.002	---	SW 846 7421
Magnesium	64.8	mg/l	0.03	---	SW 846 6010
Manganese	3.91	mg/l	0.002	---	SW 846 6010
Mercury	ND	mg/l	0.0005	---	SW 846 7470
Nickel	0.10	mg/l	0.02	---	SW 846 6010
Potassium	10.1	mg/l	0.40	---	SW 846 6010
Selenium	ND	mg/l	0.002	---	SW 846 7740
Silver	ND	mg/l	0.005	---	SW 846 6010
Sodium	11.6	mg/l	0.10	---	SW 846 6010
Thallium	ND	mg/l	0.002	---	SW 846 7841
Vanadium	0.08	mg/l	0.01	---	SW 846 6010
Zinc	0.45	mg/l	0.01	---	SW 846 6010
Total Cyanide	0.012	mg/l	0.004	---	EPA 335.3

CUST SAMPLE ID: SW-2428-792- 09
COLLECTION DATE(S): 07/08/92

LABORATORY JOB NO: 922505
LABORATORY REFERENCE NO: 17305

COLLECTION METHOD:
SAMPLE TYPE: Surface Water

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Hexavalent Chromium, Total	0.03	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	ND	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	364	µg/l	---	50.0	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Phenol	BQL	µg/l	---	10	SW 846 8270
2-Methylphenol	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: SW-2428-792- 12
COLLECTION DATE(S): 07/08/92
LABORATORY JOB NO: 922505
LABORATORY REFERENCE NO: 17306

COLLECTION METHOD:
SAMPLE TYPE: Surface Water

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Aluminum	0.10	mg/l	0.05	---	SW 846 6010
Antimony	ND	mg/l	0.05	---	SW 846 6010
Arsenic	ND	mg/l	0.002	---	SW 846 7060
Barium	0.04	mg/l	0.002	---	SW 846 6010
Beryllium	ND	mg/l	0.001	---	SW 846 7000
Cadmium	ND	mg/l	0.004	---	SW 846 6010
Calcium	101	mg/l	0.01	---	SW 846 6010
Chromium	ND	mg/l	0.01	---	SW 846 6010
Cobalt	ND	mg/l	0.005	---	SW 846 6010
Copper	ND	mg/l	0.01	---	SW 846 6010
Iron	3.36	mg/l	0.01	---	SW 846 6010
Lead	0.005	mg/l	0.002	---	SW 846 7421
Magnesium	17.3	mg/l	0.03	---	SW 846 6010
Manganese	0.48	mg/l	0.002	---	SW 846 6010
Mercury	ND	mg/l	0.0005	---	SW 846 7470
Nickel	ND	mg/l	0.02	---	SW 846 6010
Potassium	0.34	mg/l	0.40	---	SW 846 6010
Selenium	ND	mg/l	0.002	---	SW 846 7740
Silver	ND	mg/l	0.005	---	SW 846 6010
Sodium	8.63	mg/l	0.10	---	SW 846 6010
Thallium	ND	mg/l	0.002	---	SW 846 7841
Vanadium	0.01	mg/l	0.01	---	SW 846 6010
Zinc	0.02	mg/l	0.01	---	SW 846 6010
Total Cyanide	ND	mg/l	0.004	---	EPA 335.3

CUST SAMPLE ID: SW-2428-792- 12
COLLECTION DATE(S): 07/08/92

COLLECTION METHOD:
SAMPLE TYPE: Surface Water

LABORATORY JOB NO: 922505
LABORATORY REFERENCE NO: 17306

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	1.9	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	BQL	µg/l	---	50.0	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Phenol	BQL	µg/l	---	10	SW 846 8270
2-Methylphenol	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: SW-2428-792- 13
COLLECTION DATE(S): 07/08/92
LABORATORY JOB NO: 922505
LABORATORY REFERENCE NO: 17307

COLLECTION METHOD:
SAMPLE TYPE: Surface Water

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Aluminum	ND	mg/l	0.05	---	SW 846 6010
Antimony	ND	mg/l	0.05	---	SW 846 6010
Arsenic	ND	mg/l	0.002	---	SW 846 7060
Barium	0.04	mg/l	0.002	---	SW 846 6010
Beryllium	ND	mg/l	0.001	---	SW 846 7000
Cadmium	ND	mg/l	0.004	---	SW 846 6010
Calcium	105	mg/l	0.01	---	SW 846 6010
Chromium	ND	mg/l	0.01	---	SW 846 6010
Cobalt	ND	mg/l	0.005	---	SW 846 6010
Copper	ND	mg/l	0.01	---	SW 846 6010
Iron	1.09	mg/l	0.01	---	SW 846 6010
Lead	ND	mg/l	0.002	---	SW 846 7421
Magnesium	17.3	mg/l	0.03	---	SW 846 6010
Manganese	0.47	mg/l	0.002	---	SW 846 6010
Mercury	ND	mg/l	0.0005	---	SW 846 7470
Nickel	ND	mg/l	0.02	---	SW 846 6010
Potassium	0.89	mg/l	0.40	---	SW 846 6010
Selenium	ND	mg/l	0.002	---	SW 846 7740
Silver	ND	mg/l	0.005	---	SW 846 6010
Sodium	7.94	mg/l	0.10	---	SW 846 6010
Thallium	ND	mg/l	0.002	---	SW 846 7841
Vanadium	0.01	mg/l	0.01	---	SW 846 6010
Zinc	0.01	mg/l	0.01	---	SW 846 6010
Total Cyanide	ND	mg/l	0.004	---	EPA 335.3

CUST SAMPLE ID: SW-2428-792- 13
COLLECTION DATE(S): 07/08/92

LABORATORY JOB NO: 922505
LABORATORY REFERENCE NO: 17307

COLLECTION METHOD:
SAMPLE TYPE: Surface Water

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	ND	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	BQL	µg/l	---	50.0	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Phenol	BQL	µg/l	---	10	SW 846 8270
2-Methylphenol	BQL	µg/l	---	10	SW 846 8270

CUST SAMPLE ID: METHOD BLANK #5 LABORATORY JOB NO: 922505

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Aluminum	ND	mg/l	0.05	---	SW 846 6010
Antimony	ND	mg/l	0.05	---	SW 846 6010
Arsenic	ND	mg/l	0.002	---	SW 846 7060
Barium	ND	mg/l	0.002	---	SW 846 6010
Beryllium	ND	mg/l	0.001	---	SW 846 7000
Cadmium	ND	mg/l	0.004	---	SW 846 6010
Calcium	ND	mg/l	0.01	---	SW 846 6010
Chromium	ND	mg/l	0.01	---	SW 846 6010
Cobalt	ND	mg/l	0.005	---	SW 846 6010
Copper	ND	mg/l	0.01	---	SW 846 6010
Iron	ND	mg/l	0.01	---	SW 846 6010
Lead	ND	mg/l	0.002	---	SW 846 7421
Magnesium	ND	mg/l	0.03	---	SW 846 6010
Manganese	ND	mg/l	0.002	---	SW 846 6010
Mercury	ND	mg/l	0.0005	---	SW 846 7470
Nickel	ND	mg/l	0.02	---	SW 846 6010
Potassium	ND	mg/l	0.40	---	SW 846 6010
Selenium	ND	mg/l	0.002	---	SW 846 7740
Silver	ND	mg/l	0.005	---	SW 846 6010
Sodium	ND	mg/l	0.10	---	SW 846 6010
Thallium	ND	mg/l	0.002	---	SW 846 7841
Vanadium	ND	mg/l	0.01	---	SW 846 6010
Zinc	ND	mg/l	0.01	---	SW 846 6010
Total Cyanide	ND	mg/l	0.004	---	EPA 335.3

CUST SAMPLE ID: METHOD BLANK #5

LABORATORY JOB NO: 922505

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	ND	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	BQL	µg/l	---	50.0	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Phenol	BQL	µg/l	---	10	SW 846 8270
2-Methylphenol	BQL	µg/l	---	10	SW 846 8270

ADVANCED ENVIRONMENTAL SERVICES, INC.
LABORATORY REPORT

JOB# 922505

Type of Analysis: SURROGATE RECOVERIES #5
Client Name: Conestoga-Rovers & Associates

A.E.S. Job Code: FIK
Units: Percent (%)

Analytical Parameter(s)	Method No.	Practical Quantifiable Limit	A.E.S. Lab Number. 17303 Customer ID. SW-2428-792-07 07/08/92	17304 SW-2428-792-08 07/08/92	17305 SW-2428-792-09 07/08/92	17306 SW-2428-792-12 07/08/92
2-Fluorophenol	SW 846 8270	21-100	39	47	53	51
Phenol-d6	SW 846 8270	10-94	34	41	47	44
2,4,6-Tribromophenol	SW 846 8270	10-123	48	59	70	74
Nitrobenzene-d5	SW 846 8270	35-114	53	71	82	83
2-Fluorobiphenyl	SW 846 8270	43-116	53	70	82	79
Terphenyl-d14	SW 846 8270	33-141	52	74	82	80
1,2-Dichloroethane-d4	SW 846 8240	76-114	100	107	107	100
Toluene-d8	SW 846 8240	88-110	104	105	102	96
4-Bromofluorobenzene	SW 846 8240	86-115	102	108	107	105

ADVANCED ENVIRONMENTAL SERVICES, INC.
LABORATORY REPORT

JOB# 922505

Type of Analysis: SURROGATE RECOVERIES #5
Client Name: Conestoga-Rovers & Associates

A.E.S. Job Code: FIK
Units: Percent (%)

Analytical Parameter(s)	Method No.	Practical Quantifiable Limit	A.E.S. Lab Number. 17307 Customer ID. SW-2428-792-13 07/08/92				
2-Fluorophenol	SW 846 8270	21-100	47				
Phenol-d6	SW 846 8270	10-94	41				
2,4,6-Tribromophenol	SW 846 8270	10-123	64				
Nitrobenzene-d5	SW 846 8270	35-114	81				
2-Fluorobiphenyl	SW 846 8270	43-116	80				
Terphenyl-d14	SW 846 8270	33-141	85				
1,2-Dichloroethane-d4	SW 846 8240	76-114	103				
Toluene-d8	SW 846 8240	88-110	100				
4-Bromofluorobenzene	SW 846 8240	86-115	107				

ADVANCED ENVIRONMENTAL SERVICES, INC.
LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

JOB# 922505 PAGE 1

Client: Conestoga-Rovers & Associates
Type of Analysis: Matrix Spike and Independent Standards #5

A.E.S. Job Code: FIK
Units: mg/l

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
Aluminum	EPA	Independent Standard	98.4	100	NONE	98
Antimony	EPA	Independent Standard	98.9	100	NONE	99
Arsenic	EPA	Independent Standard	0.051	0.050	NONE	102
Barium	EPA	Independent Standard	51.7	50.0	NONE	103
Beryllium	EPA	Independent Standard	106.2	100	NONE	106
Cadmium	EPA	Independent Standard	98.2	100	NONE	98
Calcium	EPA	Independent Standard	99.7	100	NONE	100
Chromium	EPA	Independent Standard	93.0	100	NONE	93
Cobalt	EPA	Independent Standard	91.7	100	NONE	92
Copper	EPA	Independent Standard	99.2	100	NONE	99
Iron	EPA	Independent Standard	91.7	100	NONE	92
Lead	1085-1	EPA	0.053	0.051	NONE	104
Magnesium	EPA	Independent Standard	96.5	100	NONE	96
Manganese	EPA	Independent Standard	96.2	100	NONE	96
Mercury	EPA	Independent Standard	0.0076	0.0076	NONE	100
Nickel	EPA	Independent Standard	91.2	100	NONE	91

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / "Spike" Added Concentration)

* If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates
Type of Analysis: Matrix Spike and Independent Standards #5

A.E.S. Job Code: FIK
Units: mg/l

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
Potassium	EPA	Independent Standard	953	1,000	NONE	95
Selenium	EPA	Independent Standard	0.045	0.046	NONE	98
Silver	EPA	Independent Standard	100	100	NONE	100
Sodium	EPA	Independent Standard	95.2	100	NONE	95
Thallium	EPA	Independent Standard	0.048	0.052	NONE	92
Vanadium	EPA	Independent Standard	101	100	NONE	101
Zinc	EPA	Independent Standard	92.8	100	NONE	93
Aluminum	17306	Matrix Spike	19.7	0.10	20.0	98
Aluminum	17306	Matrix Spike Dup	20.0	0.10	20.0	100
Antimony	17306	Matrix Spike	10.0	ND	10.0	100
Antimony	17306	Matrix Spike Dup	10.0	ND	10.0	100
Arsenic	17306	Matrix Spike	0.040	ND	0.050	80
Arsenic	17306	Matrix Spike Dup	0.044	ND	0.050	88
Barium	17306	Matrix Spike	9.64	0.04	10.0	96
Barium	17306	Matrix Spike Dup	9.78	0.04	10.0	98
Beryllium	17306	Matrix Spike	1.01	ND	1.00	101

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / "Spike" Added Concentration)

* If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates A.E.S. Job Code: FIK
Type of Analysis: Matrix Spike and Independent Standards #5 Units: mg/l

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
Beryllium	17306	Matrix Spike Dup	1.03	ND	1.00	103
Cadmium	17306	Matrix Spike	1.01	ND	1.00	101
Cadmium	17306	Matrix Spike Dup	1.02	ND	1.00	102
Calcium	17306	Matrix Spike	199	101	100	98
Calcium	17306	Matrix Spike Dup	201	101	100	100
Chromium	17306	Matrix Spike	4.72	ND	5.00	94
Chromium	17306	Matrix Spike Dup	4.78	ND	5.00	96
Cobalt	17306	Matrix Spike	3.79	ND	4.00	95
Cobalt	17306	Matrix Spike Dup	3.83	ND	4.00	96
Copper	17306	Matrix Spike	3.99	ND	4.00	100
Copper	17306	Matrix Spike Dup	4.04	ND	4.00	101
Iron	17306	Matrix Spike	7.26	3.36	4.00	98
Iron	17306	Matrix Spike Dup	7.35	3.36	4.00	100
Lead	17306	Matrix Spike	0.066	0.005	0.050	122
Lead	17306	Matrix Spike Dup	0.051	0.005	0.050	92
Magnesium	17306	Matrix Spike	119	17.3	100	102

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / "Spike" Added Concentration)

* If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates
Type of Analysis: Matrix Spike and Independent Standards #5

A.E.S. Job Code: FIK
Units: mg/l

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
Magnesium	17306	Matrix Spike Dup	119	17.3	100	102
Manganese	17306	Matrix Spike	2.41	0.48	2.00	96
Manganese	17306	Matrix Spike Dup	2.44	0.48	2.00	98
Mercury	17306	Matrix Spike	0.0091	ND	0.0100	91
Mercury	17306	Matrix Spike Dup	0.0094	ND	0.0100	94
Nickel	17306	Matrix Spike	3.82	ND	4.00	96
Nickel	17306	Matrix Spike Dup	3.88	ND	4.00	97
Potassium	17306	Matrix Spike	98.9	0.34	100	99
Potassium	17306	Matrix Spike Dup	100	0.34	100	100
Selenium	17306	Matrix Spike	0.053	ND	0.050	106
Selenium	17306	Matrix Spike Dup	0.051	ND	0.050	102
Silver	17306	Matrix Spike	1.82	ND	2.00	91
Silver	17306	Matrix Spike Dup	1.84	ND	2.00	92
Sodium	17306	Matrix Spike	111	8.63	100	102
Sodium	17306	Matrix Spike Dup	114	8.63	100	105
Thallium	17306	Matrix Spike	0.050	ND	0.050	100

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / "Spike" Added Concentration)

* If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates
Type of Analysis: Matrix Spike and Independent Standards #5

A.E.S. Job Code: FIK
Units: mg/l

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
Thallium	17306	Matrix Spike Dup	0.052	ND	0.050	104
Vanadium	17306	Matrix Spike	9.57	0.01	10.0	96
Vanadium	17306	Matrix Spike Dup	9.64	0.01	10.0	96
Zinc	17306	Matrix Spike	0.55	0.02	0.50	106
Zinc	17306	Matrix Spike Dup	0.55	0.02	0.50	106
Hexavalent Chromium	17306	Matrix Spike	1.06	ND	1.00	106
Hexavalent Chromium	17306	Matrix Spike Dup	1.06	ND	1.00	106
Hexavalent Chromium	---	Independent Standard	0.98	1.00	NONE	98
Cyanide	17306	Matrix Spike	0.189	ND	0.200	94
Cyanide	17306	Matrix Spike Dup	0.190	ND	0.200	95
Cyanide	---	Independent Standard	0.45	0.50	NONE	90
Oil & Grease, Gravimetric	17306	Matrix Spike	31	1.9	32	91
Oil & Grease, Gravimetric	17306	Matrix Spike Dup	27	1.9	29	87
Oil & Grease, Gravimetric	---	Independent Standard	28	---	28	100

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / Added Spike Concentration)

If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates
Type of Analysis: Matrix Spike and Independent Standards #5

A.E.S. Job Code: FIK
Units: µg/l,ppb

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
1,1-Dichloroethene	17306	Matrix Spike	69.4	BQL	50.0	139
Trichloroethene	17306	Matrix Spike	52.5	BQL	50.0	105
Benzene	17306	Matrix Spike	61.7	BQL	50.0	123
Toluene	17306	Matrix Spike	59.0	BQL	50.0	118
Chlorobenzene	17306	Matrix Spike	57.4	BQL	50.0	115
1,1-Dichloroethene	17306	Matrix Spike Dup	59.0	BQL	50.0	118
Trichloroethene	17306	Matrix Spike Dup	44.5	BQL	50.0	89
Benzene	17306	Matrix Spike Dup	51.3	BQL	50.0	103
Toluene	17306	Matrix Spike Dup	49.9	BQL	50.0	100
Chlorobenzene	17306	Matrix Spike Dup	49.4	BQL	50.0	99
1,1-Dichloroethene	---	Independent Standard	64.5	---	50.0	129
Trichloroethene	---	Independent Standard	49.4	---	50.0	99
Benzene	---	Independent Standard	58.3	---	50.0	117
Toluene	---	Independent Standard	54.2	---	50.0	108
Chlorobenzene	---	Independent Standard	55.0	---	50.0	110
Phenol	17306	Matrix Spike	111	BQL	200	55

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / "Spike" Added Concentration)

* If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

ADVANCED ENVIRONMENTAL SERVICES, INC.
LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

JOB# 922505 PAGE 7

Client: Conestoga-Rovers & Associates
Type of Analysis: Matrix Spike and Independent Standards #5

A.E.S. Job Code: FIK
Units: µg/l,ppb

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
2-Chlorophenol	17306	Matrix Spike	165	BQL	200	83
1,4-Dichlorobenzene	17306	Matrix Spike	95.1	BQL	100	95
N-Nitrosodipropylamine	17306	Matrix Spike	103	BQL	100	103
1,2,4-Trichlorobenzene	17306	Matrix Spike	102	BQL	100	102
4-Chloro-3-Methylphenol	17306	Matrix Spike	186	BQL	200	93
Acenaphthene	17306	Matrix Spike	98.3	BQL	100	98
4-Nitrophenol	17306	Matrix Spike	114	BQL	200	57
2,4-Dinitrotoluene	17306	Matrix Spike	103	BQL	100	103
Pentachlorophenol	17306	Matrix Spike	193	BQL	200	97
Pyrene	17306	Matrix Spike	105	BQL	100	105
Phenol	17306	Matrix Spike Dup	103	BQL	200	52
2-Chlorophenol	17306	Matrix Spike Dup	167	BQL	200	83
1,4-Dichlorobenzene	17306	Matrix Spike Dup	99.6	BQL	100	100
N-Nitrosodipropylamine	17306	Matrix Spike Dup	103	BQL	100	103
1,2,4-Trichlorobenzene	17306	Matrix Spike Dup	109	BQL	100	109
4-Chloro-3-Methylphenol	17306	Matrix Spike Dup	190	BQL	200	95

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / "Spike" Added Concentration)

* If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

ADVANCED ENVIRONMENTAL SERVICES, INC.
LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

JOB# 922505 PAGE 8

Client: Conestoga-Rovers & Associates
Type of Analysis: Matrix Spike and Independent Standards #5

A.E.S. Job Code: FIK
Units: µg/l,ppb

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
Acenaphthene	17306	Matrix Spike Dup	102	BQL	100	102
4-Nitrophenol	17306	Matrix Spike Dup	103	BQL	200	51
2,4-Dinitrotoluene	17306	Matrix Spike Dup	104	BQL	100	104
Pentachlorophenol	17306	Matrix Spike Dup	192	BQL	200	96
Pyrene	17306	Matrix Spike Dup	103	BQL	100	103
Phenol	---	Independent Standard	117	BQL	200	58
2-Chlorophenol	---	Independent Standard	140	BQL	200	70
1,4-Dichlorobenzene	---	Independent Standard	82.8	BQL	100	83
N-Nitrosodipropylamine	---	Independent Standard	96.7	BQL	100	97
1,2,4-Trichlorobenzene	---	Independent Standard	86.9	BQL	100	87
4-Chloro-3-Methylphenol	---	Independent Standard	151	BQL	200	76
Acenaphthene	---	Independent Standard	84.1	BQL	100	84
4-Nitrophenol	---	Independent Standard	101	BQL	200	50
2,4-Dinitrotoluene	---	Independent Standard	98.7	BQL	100	99
Pentachlorophenol	---	Independent Standard	163	BQL	200	82
Pyrene	---	Independent Standard	96.1	BQL	100	96

ADVANCED ENVIRONMENTAL SERVICES LABORATORY REPORT

CUST SAMPLE ID: SW-2428-792- 16
COLLECTION DATE(S): 07/09/92

COLLECTION METHOD:
SAMPLE TYPE: Surface Water

LABORATORY JOB NO: 922511
LABORATORY REFERENCE NO: 17315

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Aluminum	0.33	mg/l	0.05	---	SW 846 6010
Antimony	ND	mg/l	0.05	---	SW 846 6010
Arsenic	ND	mg/l	0.002	---	SW 846 7060
Barium	0.01	mg/l	0.002	---	SW 846 6010
Beryllium	ND	mg/l	0.001	---	SW 846 6010
Cadmium	ND	mg/l	0.004	---	SW 846 6010
Calcium	113	mg/l	0.01	---	SW 846 6010
Chromium	ND	mg/l	0.01	---	SW 846 6010
Cobalt	ND	mg/l	0.005	---	SW 846 6010
Copper	0.02	mg/l	0.01	---	SW 846 6010
Iron	1.37	mg/l	0.01	---	SW 846 6010
Lead	0.004	mg/l	0.002	---	SW 846 7421
Magnesium	21.3	mg/l	0.03	---	SW 846 6010
Manganese	0.14	mg/l	0.002	---	SW 846 6010
Mercury	ND	mg/l	0.0005	---	SW 846 6010
Nickel	ND	mg/l	0.02	---	SW 846 6010
Potassium	0.90	mg/l	0.40	---	SW 846 6010
Selenium	0.004	mg/l	0.002	---	SW 846 7740
Silver	ND	mg/l	0.005	---	SW 846 6010
Sodium	7.87	mg/l	0.10	---	SW 846 6010
Thallium	ND	mg/l	0.002	---	SW 846 7841
Vanadium	0.01	mg/l	0.01	---	SW 846 6010
Zinc	0.04	mg/l	0.01	---	SW 846 6010
Total Cyanide	0.138	mg/l	0.004	---	EPA 335.3

CUST SAMPLE ID: SW-2428-792- 16
COLLECTION DATE(S): 07/09/92

LABORATORY JOB NO: 922511
LABORATORY REFERENCE NO: 17315

COLLECTION METHOD:
SAMPLE TYPE: Surface Water

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	2.0	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	BQL	µg/l	---	50.0	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Phenol	BQL	µg/l	---	10	SW 846 8270
2-Methylphenol	BQL	µg/l	---	10	SW 846 8270

ADVANCED ENVIRONMENTAL SERVICES LABORATORY REPORT

CUST SAMPLE ID: METHOD BLANK #6

LABORATORY JOB NO: 922511

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Aluminum	ND	mg/l	0.05	---	SW 846 6010
Antimony	ND	mg/l	0.05	---	SW 846 6010
Arsenic	ND	mg/l	0.002	---	SW 846 7060
Barium	ND	mg/l	0.002	---	SW 846 6010
Beryllium	ND	mg/l	0.001	---	SW 846 6010
Cadmium	ND	mg/l	0.004	---	SW 846 6010
Calcium	ND	mg/l	0.01	---	SW 846 6010
Chromium	ND	mg/l	0.01	---	SW 846 6010
Cobalt	ND	mg/l	0.005	---	SW 846 6010
Copper	ND	mg/l	0.01	---	SW 846 6010
Iron	ND	mg/l	0.01	---	SW 846 6010
Lead	ND	mg/l	0.002	---	SW 846 7421
Magnesium	ND	mg/l	0.03	---	SW 846 6010
Manganese	ND	mg/l	0.002	---	SW 846 6010
Mercury	ND	mg/l	0.0005	---	SW 846 7470
Nickel	ND	mg/l	0.02	---	SW 846 6010
Potassium	ND	mg/l	0.40	---	SW 846 6010
Selenium	ND	mg/l	0.002	---	SW 846 7740
Silver	ND	mg/l	0.005	---	SW 846 6010
Sodium	ND	mg/l	0.10	---	SW 846 6010
Thallium	ND	mg/l	0.002	---	SW 846 7841
Vanadium	ND	mg/l	0.01	---	SW 846 6010
Zinc	ND	mg/l	0.01	---	SW 846 6010
Total Cyanide	ND	mg/l	0.004	---	EPA 335.3

CUST SAMPLE ID: METHOD BLANK #6 LABORATORY JOB NO: 922511

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Hexavalent Chromium, Total	ND	mg/l	0.01	---	EPA 7196
Oil and Grease, Gravimetric	ND	mg/l	1.0	---	SM 503A
Methylene chloride	BQL	µg/l	---	10.0	SW 846 8240
Acetone	BQL	µg/l	---	50.0	SW 846 8240
Benzene	BQL	µg/l	---	5.00	SW 846 8240
Toluene	BQL	µg/l	---	5.00	SW 846 8240
Fluoranthene	BQL	µg/l	---	10	SW 846 8270
Pyrene	BQL	µg/l	---	10	SW 846 8270
Phenol	BQL	µg/l	---	10	SW 846 8270
2-Methylphenol	BQL	µg/l	---	10	SW 846 8270

ADVANCED ENVIRONMENTAL SERVICES, INC.
LABORATORY REPORT
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JOB# 922511

Type of Analysis: SURROGATE RECOVERIES #6
Client Name: Conestoga-Rovers & Associates

A.E.S. Job Code: FIK
Units: Percent (%)

Analytical Parameter(s)	Method No.	Practical Quantifiable Limit	A.E.S. Lab Number. 17315 Customer ID. SW-2428-792-16 07/09/92			
2-Fluorophenol	SW 846 8270	21-100	56			
Phenol-d6	SW 846 8270	10-94	48			
2,4,6-Tribromophenol	SW 846 8270	10-123	69			
Nitrobenzene-d5	SW 846 8270	35-114	77			
2-Fluorbiphenyl	SW 846 8270	43-116	72			
Terphenyl-d14	SW 846 8270	33-141	70			
1,2-Dichloroethane-d4	SW 846 8240	76-114	102			
Toluene-d8	SW 846 8240	88-110	105			
4-Bromofluorobenzene	SW 846 8240	86-115	108			

LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates
Type of Analysis: Independent Standards #6

A.E.S. Job Code: FIK
Units: mg/l

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
Aluminum	EPA	Independent Standard	98.4	100	NONE	98
Antimony	EPA	Independent Standard	98.9	100	NONE	99
Arsenic	EPA	Independent Standard	0.051	0.050	NONE	102
Barium	EPA	Independent Standard	51.7	50.0	NONE	103
Beryllium	EPA	Independent Standard	106	100	NONE	106
Cadmium	EPA	Independent Standard	98.2	100	NONE	98
Calcium	EPA	Independent Standard	99.7	100	NONE	100
Chromium	EPA	Independent Standard	93.0	100	NONE	93
Cobalt	EPA	Independent Standard	91.7	100	NONE	92
Copper	EPA	Independent Standard	99.2	100	NONE	99
Iron	EPA	Independent Standard	91.7	100	NONE	92
Lead	EPA	Independent Standard	0.051	0.051	NONE	100
Magnesium	EPA	Independent Standard	96.5	100	NONE	97
Manganese	EPA	Independent Standard	96.2	100	NONE	96
Mercury	EPA	Independent Standard	0.0076	0.0076	NONE	100
Nickel	EPA	Independent Standard	91.2	100	NONE	91

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / "Spike" Added Concentration)

* If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates
Type of Analysis: Independent Standards #6

A.E.S. Job Code: FIK
Units: mg/l

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
Potassium	EPA	Independent Standard	953	100	NONE	95
Selenium	EPA	Independent Standard	0.045	0.046	NONE	98
Silver	EPA	Independent Standard	100	100	NONE	100
Sodium	EPA	Independent Standard	95.2	100	NONE	95
Thallium	EPA	Independent Standard	0.056	0.052	NONE	108
Vanadium	EPA	Independent Standard	101	100	NONE	101
Zinc	EPA	Independent Standard	92.8	100	NONE	93
Hexavalent Chromium	---	Independent Standard	0.99	1.00	NONE	99
Cyanide	---	Independent Standard	0.45	0.50	NONE	90
Oil & Grease, Gravimetric	---	Independent Standard	49	---	50	98

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / Added Spike Concentration)

If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates
Type of Analysis: Independent Standards #6

A.E.S. Job Code: FIK
Units: µg/l,ppb

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
1,1-Dichloroethene	---	Independent Standard	62.4	---	50.0	125
Trichloroethene	---	Independent Standard	47.8	---	50.0	96
Benzene	---	Independent Standard	56.6	---	50.0	113
Toluene	---	Independent Standard	55.8	---	50.0	112
Chlorobenzene	---	Independent Standard	55.2	---	50.0	110
Phenol	---	Independent Standard	117	---	200	58
2-Chlorophenol	---	Independent Standard	140	---	200	70
1,4-Dichlorobenzene	---	Independent Standard	82.8	---	100	83
N-Nitrosodipropylamine	---	Independent Standard	96.7	---	100	97
1,2,4-Trichlorobenzene	---	Independent Standard	86.9	---	100	87
4-Chloro-3-Methylphenol	---	Independent Standard	151	---	200	76
Acenaphthene	---	Independent Standard	84.1	---	100	84
4-Nitrophenol	---	Independent Standard	101	---	200	50
2,4-Dinitrophenol	---	Independent Standard	98.7	---	100	99
Pentachlorophenol	---	Independent Standard	163	---	200	82
Pyrene	---	Independent Standard	96.1	---	100	96

CUST SAMPLE ID: SD-2428-792- 10
COLLECTION DATE(S): 07/08/92

COLLECTION METHOD:
SAMPLE TYPE: Sediment

LABORATORY JOB NO: 922504
LABORATORY REFERENCE NO: 17300

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Cyanide, Total	30.3	mg/kg	0.2	---	SW 846 9012
Hexavalent Chromium, Total	<1.0 *	mg/kg	0.1	---	EPA 7196
Oil & Grease, Soxhlet	0.0002	%	0.0001	---	SM 503D
Methylene chloride	2.62	mg/kg	---	1.00	SW 846 8240
1,2-Dichloroethene (Total)	BQL	mg/kg	---	0.50	SW 846 8240
Benzene	BQL	mg/kg	---	0.50	SW 846 8240
Toluene	BQL	mg/kg	---	0.50	SW 846 8240
Total Xylenes	BQL	mg/kg	---	0.50	SW 846 8240
Ethylbenzene	BQL	mg/kg	---	0.50	SW 846 8240
Acenaphthylene	0.68	mg/kg	---	0.33	SW 846 8270
Phenanthrene	4.4	mg/kg	---	0.33	SW 846 8270
Pyrene	9.2	mg/kg	---	0.33	SW 846 8270
Anthracene	1.0	mg/kg	---	0.33	SW 846 8270
Benzo (a) anthracene	4.7	mg/kg	---	0.33	SW 846 8270
Benzo (b) fluoranthene	5.9	mg/kg	---	0.33	SW 846 8270
Benzo (k) fluoranthene	7.3	mg/kg	---	0.33	SW 846 8270
Chyrsene	5.4	mg/kg	---	0.33	SW 846 8270
Fluoranthene	7.2	mg/kg	---	0.33	SW 846 8270
Fluorene	0.51	mg/kg	---	0.33	SW 846 8270

FOOTNOTES

* Diluted 1:10 due to matrix interference.

CUST SAMPLE ID: SD-2428-792- 11
COLLECTION DATE(S): 07/08/92
LABORATORY JOB NO: 922504
LABORATORY REFERENCE NO: 17301

COLLECTION METHOD:
SAMPLE TYPE: Sediment

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Cyanide, Total	21.9	mg/kg	0.2	---	SW 846 9012
Hexavalent Chromium, Total	<1.0 *	mg/kg	0.1	---	EPA 7196
Oil & Grease, Soxhlet	0.0012	%	0.0001	---	SM 503D
Methylene chloride	2.09	mg/kg	---	1.00	SW 846 8240
1,2-Dichloroethene (Total)	BQL	mg/kg	---	0.50	SW 846 8240
Benzene	BQL	mg/kg	---	0.50	SW 846 8240
Toluene	BQL	mg/kg	---	0.50	SW 846 8240
Total Xylenes	BQL	mg/kg	---	0.50	SW 846 8240
Ethylbenzene	BQL	mg/kg	---	0.50	SW 846 8240
Acenaphthylene	0.79	mg/kg	---	0.33	SW 846 8270
Phenanthrene	4.1	mg/kg	---	0.33	SW 846 8270
Pyrene	8.0	mg/kg	---	0.33	SW 846 8270
Anthracene	0.94	mg/kg	---	0.33	SW 846 8270
Benzo (a) anthracene	4.7	mg/kg	---	0.33	SW 846 8270
Benzo (b) fluoranthene	6.2	mg/kg	---	0.33	SW 846 8270
Benzo (k) fluoranthene	5.9	mg/kg	---	0.33	SW 846 8270
Chyrsene	5.3	mg/kg	---	0.33	SW 846 8270
Fluoranthene	6.7	mg/kg	---	0.33	SW 846 8270
Fluorene	0.58	mg/kg	---	0.33	SW 846 8270

FOOTNOTES

* Diluted 1:10 due to matrix interference.

CUST SAMPLE ID: SD-2428-792- 15
COLLECTION DATE(S): 07/08/92

COLLECTION METHOD:
SAMPLE TYPE: Sediment

LABORATORY JOB NO: 922504
LABORATORY REFERENCE NO: 17302

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Cyanide, Total	2.40	mg/kg	0.2	---	SW 846 9012
Hexavalent Chromium, Total	<1.0 *	mg/kg	0.1	---	EPA 7196
Oil & Grease, Soxhlet	ND	%	0.0001	---	SM 503D
Methylene chloride	40.1	µg/kg	---	10.0	SW 846 8240
1,2-Dichloroethene (total)	BQL	µg/kg	---	5.00	SW 846 8240
Benzene	BQL	µg/kg	---	5.00	SW 846 8240
Toluene	11.8	µg/kg	---	5.00	SW 846 8240
Total Xylenes	BQL	µg/kg	---	5.00	SW 846 8240
Ethylbenzene	BQL	µg/kg	---	5.00	SW 846 8240
Acenaphthylene	BQL	mg/kg	---	0.33	SW 846 8270
Phenanthrene	BQL	mg/kg	---	0.33	SW 846 8270
Pyrene	0.46	mg/kg	---	0.33	SW 846 8270
Anthracene	BQL	mg/kg	---	0.33	SW 846 8270
Benzo (a) anthracene	BQL	mg/kg	---	0.33	SW 846 8270
Benzo (b) fluoranthene	0.48	mg/kg	---	0.33	SW 846 8270
Benzo (k) fluoranthene	0.44	mg/kg	---	0.33	SW 846 8270
Chyrsene	0.34	mg/kg	---	0.33	SW 846 8270
Fluoranthene	0.40	mg/kg	---	0.33	SW 846 8270
Fluorene	BQL	mg/kg	---	0.33	SW 846 8270

FOOTNOTES

* Diluted 1:10 due to matrix interference.

CUST SAMPLE ID: METHOD BLANK #7 LABORATORY JOB NO: 922504

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Cyanide, Total	ND	mg/kg	0.2	---	SW 846 9012
Hexavalent Chromium, Total	ND	mg/kg	0.1	---	EPA 7196
Oil & Grease, Soxhlet	ND	%	0.0001	---	SM 503D
Methylene chloride	BQL	mg/kg	---	1.00	SW 846 8240
1,2-Dichloroethene (Total)	BQL	mg/kg	---	0.50	SW 846 8240
Benzene	BQL	mg/kg	---	0.50	SW 846 8240
Toluene	BQL	mg/kg	---	0.50	SW 846 8240
Total Xylenes	BQL	mg/kg	---	0.50	SW 846 8240
Ethylbenzene	BQL	mg/kg	---	0.50	SW 846 8240
Acenaphthylene	BQL	mg/kg	---	0.33	SW 846 8270
Phenanthrene	BQL	mg/kg	---	0.33	SW 846 8270
Pyrene	BQL	mg/kg	---	0.33	SW 846 8270
Anthracene	BQL	mg/kg	---	0.33	SW 846 8270
Benzo (a) anthracene	BQL	mg/kg	---	0.33	SW 846 8270
Benzo (b) fluoranthene	BQL	mg/kg	---	0.33	SW 846 8270
Benzo (k) fluoranthene	BQL	mg/kg	---	0.33	SW 846 8270
Chyrsene	BQL	mg/kg	---	0.33	SW 846 8270
Fluoranthene	BQL	mg/kg	---	0.33	SW 846 8270
Fluorene	BQL	mg/kg	---	0.33	SW 846 8270

CUST SAMPLE ID: METHOD BLANK #7 LABORATORY JOB NO: 922504

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
Methylene chloride	BQL	µg/kg	---	10.0	SW 846 8240
trans-1,2-Dichloroethene	BQL	µg/kg	---	5.00	SW 846 8240
Benzene	BQL	µg/kg	---	5.00	SW 846 8240
Toluene	BQL	µg/kg	---	5.00	SW 846 8240
Ethylbenzene	BQL	µg/kg	---	5.00	SW 846 8240
m-Xylene	BQL	µg/kg	---	5.00	SW 846 8240
o/p-Xylene	BQL	µg/kg	---	5.00	SW 846 8240

Type of Analysis: SURROGATE RECOVERIES #7
Client Name: Conestoga-Rovers & Associates

A.E.S. Job Code: FIK
Units: Percent (%)

Analytical Parameter(s)	Method No.	Practical Quantifiable Limit	A.E.S. Lab Number. 17300 Customer ID. SD-2428-792-10 07/08/92	17301 SD-2428-792-11 07/08/92	17302 SD-2428-792-15 07/08/92	
2-Fluorophenol	SW 846 8270	25-121	58	62	59	
Phenol-d6	SW 846 8270	24-113	70	73	70	
2,4,6-Tribromophenol	SW 846 8270	19-122	62	62	65	
Nitrobenzene-d5	SW 846 8270	23-120	78	79	78	
2-Fluorobiphenyl	SW 846 8270	30-115	75	81	78	
Terphenyl-d14	SW 846 8270	18-137	100	90	89	
1,2-Dichloroethane-d4	SW 846 8240	70-121	104	87	95	
Toluene-d8	SW 846 8240	81-117	102	79	112	
4-Bromofluorobenzene	SW 846 8240	74-121	100	79	84	

LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates
Type of Analysis: Independent Standards #7

A.E.S. Job Code: FIK
Units: mg/kg

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
Hexavalent Chromium	---	Independent Standard	10.1	10.0	NONE	101
Cyanide	---	Independent Standard	22	25	NONE	88
Soxhlet (%)	---	Independent Standard	0.0822	0.0710	NONE	116

* % Recovery = 100 x ((Observed Concentration - "background" Original Concentration) / Added Spike Concentration)

If Added=NONE: % Recovery = 100 x (Observed Concentration / "background" Original Concentration)

LABORATORY CONTROL
QUALITY CONTROL - ACCURACY

Client: Conestoga-Rovers & Associates
Type of Analysis: Independent Standards #7

A.E.S. Job Code: FIK
Units: mg/kg,ppm

Analytical Parameters	Sample No.	Type	Observed Concentration	Original Concentration	Added Concentration	Percent Recovery*
1,1-Dichloroethene	---	Independent Standard	5.51	---	5.00	110
Trichloroethene	---	Independent Standard	4.65	---	5.00	93
Benzene	---	Independent Standard	5.60	---	5.00	112
Toluene	---	Independent Standard	5.39	---	5.00	108
Chlorobenzene	---	Independent Standard	5.27	---	5.00	105
Phenol	---	Independent Standard	2.4	---	3.3	73
2-Chlorophenol	---	Independent Standard	3.2	---	3.3	97
1,4-Dichlorobenzene	---	Independent Standard	3.0	---	3.3	91
N-Nitrosodipropylamine	---	Independent Standard	3.7	---	3.3	112
1,2,4-Trichlorobenzene	---	Independent Standard	3.1	---	3.3	94
4-Chloro-3-Methylphenol	---	Independent Standard	3.1	---	3.3	94
Acenaphthene	---	Independent Standard	3.1	---	3.3	94
4-Nitrophenol	---	Independent Standard	2.2	---	3.3	67
2,4-Dinitrotoluene	---	Independent Standard	4.2	---	3.3	127
Pentachlorophenol	---	Independent Standard	3.4	---	3.3	103
Pyrene	---	Independent Standard	3.7	---	3.3	112

Advanced Environmental Services
Sample Traceability Report
Inorganics Analysis #1

AES Job Code 922460

AES Job No. FIK

AES Sample Number	Sample Date	Sample Prep			Analysis		
		Method Number	Date	Analyst	Method Number	Date	Analyst
17219-20					7196	7-6-92	DTR
17219-20	7-6-92	412B	7-8-92	CW	335.3	7-10-92	TAL

Sample Traceability Report
Organics Analysis #1

Job [illegible]

AES Job No. 922460

AES Sample Number	Sample Date	Sample Prep			Analysis		
		Method Number	Date	Analyst	Method Number	Date	Analyst
17219	7-6-92	—	—	—	SM503A	7-9-92	CJ/ SK
17220	7-6-92	—	—	—	SM503A	7-9-92	CJ/ SK
17219-20	7-6-92	8270 (3510)	7-8-92	CJ/SK	8270	7-16-92	JF
17219-20	7/6/92	—	—	—	8240	7/14/92	KSL

Advanced Environmental Services Inc.

AES Job Code FIK

Sample Traceability Report

AES Job Number 922504

Organics Analysis #2

AES Sample Number	Sample Date	Extraction			Analysis		
		Method Number	Date	Analyst	Method Number	Date	Analyst
17300-17302	7/8/92	8270 (3550)	7-13-92	SF	8270	7/16/92	JF
17300	7/8/92	—	—	—	8240	7/16/92	KR
17301	"	—	—	—	"	7/16/92	KR
17302	"	—	—	—	"	7/20/92	KR

Ivar Env...nental Services
Sample Traceability Report
Inorganics Analysis #2

AES Job Code FIK

AES Job No. 9225041

AES Sample Number	Sample Date	Sample Prep			Analysis		
		Method Number	Date	Analyst	Method Number	Date	Analyst
17300-02							
17300-02	7-8-92	418.1	7-15-92	CW	7196	7-9-92	DTR
~~17300~~	~~7-8-92~~				9012 ~~33~~	7-16-92	MW
~~17301~~	~~7-8-92~~				~~5030~~	~~7-28-92~~	~~CW~~
17301-02	7-8-92				~~503D~~	~~7-17-92~~	~~CW~~
17300	7-8-92				5030	7-28-92	CW
					503D	7-28-92	CW

Advanced Environmental Services
Sample Traceability Report
Inorganics Analysis #3

AES Job Code FIA

AES Job No. 922505

AES Sample Number	Sample Date	Sample Prep			Analysis		
		Method Number	Date	Analyst	Method Number	Date	Analyst
17306	7-8-92	3005	7-10-92	Paula Donovan	7470	7-13-92	DTR
17304-05	"	3010	7-10-92	Paula Donovan	7470	7-13-92	DTR
17303	"	3020	7-10-92	Paula Donovan	7470	7-13-92	DTR
17307	"	7470/7060	7-10-92	Paula Donovan	7470	7-13-92	DTR
17306-7	"				7740	7-14-92	CO
17303-07	"				6010	7-15-92	WC
	"				7060	7-10-92	CO
	"				7481	7-10-92	CO
	"				7421	7-15-92	CO
17306	"				6010	7-16-92	WC
17303-17307	7-8-92				6010	7-16-92	WC

Advanced Environmental Services
Sample Traceability Report
Inorganics Analysis #3

AES Job Code FIK

AES Job No. 922505

AES Sample Number	Sample Date	Sample Prep			Analysis		
		Method Number	Date	Analyst	Method Number	Date	Analyst
17303-07					7196	7-8-92	DTR
17305-7	7/8/92	412B	7-10-92	CW	335.3	7-16-92	MW
17303-04	7-8-92	412B	7-10-92	CW	335.3	7-10-92	
1							

Advanced Environmental Services Inc.

AES Job Code FIK

Sample Traceability Report

AES Job Number 922505

Organics Analysis #3

AES Sample Number	Sample Date	Extraction			Analysis		
		Method Number	Date	Analyst	Method Number	Date	Analyst
17303	7/8/92	3510	7-10-92	MM	8270	7/14/92	JF
17304	"	"	"	"	"	7/15/92	"
17305	"	"	"	"	"	7/15/92	"
17306	"	"	"	"	"	7/14/92	"
17307	"	"	"	"	"	7/15/92	"
17303-07	7-8-92	—	—	—	SM503A	7-15-92	CF1 LR
17303-07	7/8/92	—	—	—	8240	7-15-7/16/92	KSR

Sample Traceability Report
Organics Analysis #4

A . Job Code 1 IK

AES Job No. 9225/0

AES Sample Number	Sample Date	Sample Prep			Analysis		
		Method Number	Date	Analyst	Method Number	Date	Analyst
17313	7-9-92	3510	7-10-92	MM	8270	7/15/92	JF
17314	7-9-92	1	1	1	1	7/16/92	JF
17313	7/9/92	—	—	—	8240	7/14/92	KSR
17314	7/9/92	—	—	—	8240	7/14/92	KSR
17313	7-9-92	—	—	—	SM 503A	7-15-92	CJ LK
17314	7-9-92	—	—	—	SM 503A	7-15-92	CJ LK

Advanced Environmental Services
Sample Traceability Report
Inorganics Analysis #4

AES Job Code FIK

AES Job No. 922513

AES Sample Number	Sample Date	Sample Prep			Analysis		
		Method Number	Date	Analyst	Method Number	Date	Analyst
17313-14					7196	7-9-92	DTR
1731314	7-9-92	412B	7-15-92	CW	335.3	7-16-92	MJ

Advanced Environmental Services
Sample Traceability Report
Inorganics Analysis #5

AES Job Code FIA

AES Job No. 922510

AES Sample Number	Sample Date	Sample Prep			Analysis		
		Method Number	Date	Analyst	Method Number	Date	Analyst
17315	7-9-92	3010	7-10-92	Paula Donovan	7470	7/13/92	DTR
↓	11	3005	7-10-92	Paula Donovan	7740	7-14-92	CO
17315	11	3020	7-10-92	Paula Donovan	6010	7-15-92	JNC
17315	11	7740/7060	7-10-92	Paula Donovan	6010	7-16-92	JNC
↓					7421	7-14-92	CO
					7481	7-10-92	CO
					7060	7-10-92	CO

Advanced Environmental Services
Sample Traceability Report
Inorganics Analysis #5

AES Job Code FIK

AES Job No. 922511

AES Sample Number	Sample Date	Sample Prep			Analysis		
		Method Number	Date	Analyst	Method Number	Date	Analyst
17315							
17315	7-9-92	412B	7-16-92	(W)	7196	7-9-92	DTR
					3353	7-16-92	MW

Sample Traceability Report
Organics Analysis #5

AES Job Code FTK

AES Job No. 922511

AES Sample Number	Sample Date	Sample Prep			Analysis		
		Method Number	Date	Analyst	Method Number	Date	Analyst
17315	7/9/92	3510	7/10/92	MM	8270	7-14-92	JF
17315	7-9-92	—	—	—	SM503A	7-14-92	GJ/JR
17315	7/9/92	—	—	—	8240	7/17/92	KSL

Advanced Environmental Services
Sample Traceability Report
Organics Analysis #6

AES Job Code FTK

AES Job No. 92351C

AES Sample Number	Sample Date	Sample Prep			Analysis		
		Method Number	Date	Analyst	Method Number	Date	Analyst
17316	7-10-92	3510	7-10-92	MM	8270	7-16-92	JF
17316	7-10-92	—	—	—	SM503A	7-14-92	CF+LK
17316	7/10/92	—	—	—	8240	7/18/92	KSL

A[illegible]ced [illegible]iron[illegible]al S[illegible]es
Sample Traceability Report
Inorganics Analysis #6

AES Job Code PIN

AES Job No. 9225/2

AES Sample Number	Sample Date	Sample Prep			Analysis		
		Method Number	Date	Analyst	Method Number	Date	Analyst
17316					7196	7-10-92	DTR
17314	7/14/92	412 B	7/16/92	DTR	3353	7-16-92	MJ

Advanced Environmental Services
Sample Traceability Report
Inorganics Analysis #7

AES Job Code FIK

AES Job No. 922530

AES Sample Number	Sample Date	Sample Prep			Analysis		
		Method Number	Date	Analyst	Method Number	Date	Analyst
17364	7-7-92	412B	7-9-92	CW	335.3	7-10-92	[illegible]
17365-67	7-7-92	412B	7-9-92	CW	335.3	7-10-92	[illegible]
17364	7-7-92	412B	7-15-92	CW			
17364	7-7-92	412B	7-20-92	CW			
17364-67	7-7-92				7196	7-7-92	DTR

Advanced Environmental Services Inc.

AES Job Code FIK

Sample Traceability Report

AES Job Number ~~922481~~ 922530

Organics Analysis #7

AES Sample Number	Sample Date	Extraction			Analysis		
		Method Number	Date	Analyst	Method Number	Date	Analyst
17364-67	7/7/92	8270 (3510)	7/8/92	CF/YL	8270	7/14/92	JF
17364-67	7/7/92	—	—	—	SM503A	7/14/92	CF/YL
17364-67	7/7/92	—	—	—	8240	7/15/92	KSM

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CONESTOGA-ROVERS & ASSOCIATES
651 Colby Drive, Waterloo, Ontario Canada N2V 1C2

SHIPPED TO (Laboratory name): AES

CHAIN OF CUSTODY RECORD

PROJECT Nº: 2428

PROJECT NAME: Tonawanda Coke

SAMPLER'S SIGNATURE: _____ (SIGN)

SEQ. Nº.	SAMPLE Nº.	DATE	TIME	SAMPLE LOCATOIN	SAMPLE TYPE	Nº OF CONTAINERS	REMARKS
	W-2428-792-01	7/6/92	1545		G/W	2x	40ml VOC (8240)
						1x	1L PAH
						1x	1L cyanide w/NaOH
						1x	1L oil + grease w/H2SO4
						1x	500ml Cr 6+
	W-2428-792-02	7/6/92	1645		G/W	2x	40ml VOC (8240)
						1x	1L PAH
						1x	1L cyanide w/NaOH
						1x	1L oil + grease w/HCl
						1x	500ml Cr 6+
				TOTAL NUMBER OF CONTAINERS		12	

ANTICIPATED CHEMICAL HAZARDS: Unknown

RELINQUISHED BY: [1] _____ (SIGN)	DATE/TIME 7/6/92 | 1725	RECEIVED BY: ② _____ (SIGN)
RELINQUISHED BY: [2] _____ (SIGN)	DATE/TIME _____ | _____	RECEIVED BY: ③ _____ (SIGN)
RELINQUISHED BY: [3] _____ (SIGN)	DATE/TIME _____ | _____	RECEIVED BY: ④ _____ (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

METHOD OF SHIPMENT: Auto.	SHIPPED BY: JJN/G.G	RECEIVED FOR LABORATORY BY: (SIGN) _____	DATE/TIME _____ | _____
CONDITION OF SEAL UPON RECEIPT: GENERAL CONDITION OF COOLER:		COOLER OPENED BY: (SIGN) _____	DATE/TIME _____ | _____

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651 Colby Drive, Waterloo, Ontario Canada N2V 1C2

SHIPPED TO (Laboratory name): AES

CHAIN OF CUSTODY RECORD

PROJECT Nº: 2428

PROJECT NAME: Tonawanda Coke

SAMPLER'S SIGNATURE: _____ (SIGN)

SEQ. Nº.	SAMPLE Nº.	DATE	TIME	SAMPLE LOCATOIN	SAMPLE TYPE	Nº OF CONTAINERS	REMARKS
	SD-2428-792-10	7/8/92	1035		Soil	1x	1L VOC, PAH, Cn, Cr^{6+}
	SD-2428-792-11	7/8/92	1040		Soil	1x	1L VOC, PAH, Cn, Cr^{6}
	SW-2428-792-12	7/8/92	1130		Surface Water	2x	40ml VOC (8240)
	~~Same~~	except	MS/MSD			1x	1L oil+grease w/
						1x	1L cyanide w/NaO
						1x	1L bn/ac
						1x	500ml Cr^{6+}
	Same	except	MS/MSD			1x	500ml TAL metals w
	SW-2428-792-13	7/8/92	1200			14	MS/MSD
						2x	40ml VOC (8240)
						1x	1L oil+grease w/
						1x	1L cyanide w/Na
						1x	1L bn/ac
						1x	500ml Cr^{6+}
	SD-2428-792-15	7/8/92	1415		Soil	1x	500ml TAL metals w
						1x	1L VOC, PAH, Cn, Cr^{6+}
						(31)	
				TOTAL NUMBER OF CONTAINERS		(52)	

ANTICIPATED CHEMICAL HAZARDS: Unknown

RELINQUISHED BY: [1] _____ (SIGN)	DATE/TIME 7/8/92 1605	RECEIVED BY: [2] _____ (SIGN)
RELINQUISHED BY: [2] _____ (SIGN)	DATE/TIME	RECEIVED BY: [3] _____ (SIGN)
RELINQUISHED BY: [3] _____ (SIGN)	DATE/TIME	RECEIVED BY: [4] _____ (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

METHOD OF SHIPMENT: Auto	SHIPPED BY: JJW / G.G.	RECEIVED FOR LABORATORY BY: (SIGN) _____	DATE/TIME
CONDITION OF SEAL UPON RECEIPT: GENERAL CONDITION OF COOLER:		COOLER OPENED BY: (SIGN) _____	DATE/TIME

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Nº 20790

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SHIPPED TO (Laboratory name): AES

CHAIN OF CUSTODY RECORD

PROJECT Nº: 2428

PROJECT NAME: Tonawanda Coke

SAMPLER'S SIGNATURE: _____ (SIGN)

SEQ. Nº.	SAMPLE Nº.	DATE	TIME	SAMPLE LOCATOIN	SAMPLE TYPE	Nº OF CONTAINERS	REMARKS
	SW-2428-792-16	7/9/92	0915		Surface Water	2x	40ml VOC (8240)
						1x	1L cyanide w/NaOH
						1x	1L oil+grease w/HCl
						1x	1L BN/AE
						1x	500ml Cr^{6+}
						1x	500ml TAL Metals w/HN
	W-2428-792-17	7/9/92	1000		G/W	2x	40ml VOC (8240)
						1x	1L cyanide w/NaOH
						1x	1L oil+grease w/HCl
						1x	1L PAH
						1x	500ml Cr^{6+}
	W-2428-792-18	7/9/92	1100		G/W	2x	40ml VOC (8240)
						1x	1L cyanide w/NaOH
						1x	1L oil+grease w/HCl
						1x	1L PAH
						1x	500ml Cr^{6+}
				TOTAL NUMBER OF CONTAINERS		19	

ANTICIPATED CHEMICAL HAZARDS: Unknown

RELINQUISHED BY: 1 (SIGN)	DATE/TIME 7/9/92 1320	RECEIVED BY: 2 (SIGN)
RELINQUISHED BY: 2 (SIGN)	DATE/TIME	RECEIVED BY: 3 (SIGN)
RELINQUISHED BY: 3 (SIGN)	DATE/TIME	RECEIVED BY: 4 (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

METHOD OF SHIPMENT: Auto	SHIPPED BY: JJW/BAC	RECEIVED FOR LABORATORY BY: (SIGN)	DATE/TIME
CONDITION OF SEAL UPON RECEIPT: GENERAL CONDITION OF COOLER:		COOLER OPENED BY: (SIGN)	DATE/TIME

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Nº 20791

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651 Colby Drive, Waterloo, Ontario Canada N2V 1C2

SHIPPED TO (Laboratory name): AES

CHAIN OF CUSTODY RECORD

PROJECT Nº: 2428

PROJECT NAME: Tonawanda Coke

SAMPLER'S SIGNATURE: [signature] (SIGN)

SEQ. Nº	SAMPLE Nº	DATE	TIME	SAMPLE LOCATOIN	SAMPLE TYPE	Nº OF CONTAINERS	REMARKS
	M-2428-792-14	7/10/92	0900		G/W	2x	40ml VOC (824
	↓	↓	↓			1x	1L cyanide a
						1x	1L oil + grease
	↓	↓	↓		↓	1x	1L PAH
						1x	500ml Cr 6+
				TOTAL NUMBER OF CONTAINERS		6	

ANTICIPATED CHEMICAL HAZARDS: Unknown

RELINQUISHED BY: 1 [signature] (SIGN)	DATE/TIME 7/10/92 1030	RECEIVED BY: 2 [signature] (SIGN)
RELINQUISHED BY: 2 (SIGN)	DATE/TIME	RECEIVED BY: 3 (SIGN)
RELINQUISHED BY: 3 (SIGN)	DATE/TIME	RECEIVED BY: 4 (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

METHOD OF SHIPMENT: Auto	SHIPPED BY: JJW/BAL	RECEIVED FOR LABORATORY BY: (SIGN)	DATE/TIME
CONDITION OF SEAL UPON RECEIPT: GENERAL CONDITION OF COOLER:		COOLER OPENED BY: (SIGN)	DATE/TIME

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Nº 20792

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651 Colby Drive, Waterloo, Ontario Canada N2V 1C2

SHIPPED TO (Laboratory name): AES

CHAIN OF CUSTODY RECORD

PROJECT Nº: 2428

PROJECT NAME: Tonawanda Coke

SAMPLER'S SIGNATURE: _____ (SIGN)

SEQ. Nº.	SAMPLE Nº.	DATE	TIME	SAMPLE LOCATOIN	SAMPLE TYPE	Nº OF CONTAINERS	REMARKS
	W-2428-792-03	7/7/92	1500		G/W	2x	40ml VOC (8240)
						1x	1L cyanide w/NaOH
						1x	1L PAH
						1x	1L oil + grease w/HCL
						1x	500ml Cr^{6+}
	W-2428-792-03	same	as above	except MS/MSD		12	MS/MSD
	W-2428-792-04	7/7/92	1430		G/W	2x	40ml VOC (8240)
						1x	1L Cyanide w/NaOH
						1x	1L PAH
						1x	1L oil + grease w/HCl
						1x	500ml Cr^{6+}
	W-2428-792-05	7/7/92	1630		G/W	2x	40ml VOC (8240)
						1x	1L cyanide w/NaOH
						1x	1L PAH
						1x	1L oil + grease w/HCL
						1x	500ml Cr^{6+}
				TOTAL NUMBER OF CONTAINERS		40	

ANTICIPATED CHEMICAL HAZARDS: Unknown

30 page 1 of 2

RELINQUISHED BY: [1] _____ (SIGN)	DATE/TIME 7/7/92 | 1630	RECEIVED BY: [2] _____ (SIGN)
RELINQUISHED BY: [2] _____ (SIGN)	DATE/TIME _____ | _____	RECEIVED BY: [3] _____ (SIGN)
RELINQUISHED BY: [3] _____ (SIGN)	DATE/TIME _____ | _____	RECEIVED BY: [4] _____ (SIGN)
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METHOD OF SHIPMENT: Auto	SHIPPED BY: JJN / G.G.	RECEIVED FOR LABORATORY BY: (SIGN) _____	DATE/TIME _____ | _____
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Nº 20787

CRA Consulting Engineers
CONESTOGA-ROVERS & ASSOCIATES
651 Colby Drive, Waterloo, Ontario Canada N2V 1C2

SHIPPED TO (Laboratory name): AES

CHAIN OF CUSTODY RECORD

PROJECT Nº: 2428

PROJECT NAME: Tonawanda Coke

SAMPLER'S SIGNATURE: _____ (SIGN)

SEQ. Nº.	SAMPLE Nº.	DATE	TIME	SAMPLE LOCATOIN	SAMPLE TYPE	Nº OF CONTAINERS	REMARKS
	N-2428-792-06	7/7/92	1515		G/W	2x	40ml VOC (8240)
						1x	1L cyanide w/NaOH
						1x	1L PAH
						1x	1L oil+grease w/HCl
						1x	500ml Cr6+

TOTAL NUMBER OF CONTAINERS: 46

ANTICIPATED CHEMICAL HAZARDS: Unknown

36 page 2 of 2

RELINQUISHED BY: [1] _____ (SIGN)	DATE/TIME 7/7/92 1630	RECEIVED BY: [2] _____ (SIGN)
RELINQUISHED BY: [2] _____ (SIGN)	DATE/TIME	RECEIVED BY: [3] _____ (SIGN)
RELINQUISHED BY: [3] _____ (SIGN)	DATE/TIME	RECEIVED BY: [4] _____ (SIGN)
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METHOD OF SHIPMENT: Auto	SHIPPED BY: TJW/G.G	RECEIVED FOR LABORATORY BY: (SIGN) _____	DATE/TIME
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CRA Consulting Engineers
CONESTOGA-ROVERS & ASSOCIATES
651 Colby Drive, Waterloo, Ontario Canada N2V 1C2

SHIPPED TO (Laboratory name): AES

CHAIN OF CUSTODY RECORD

PROJECT Nº: 2428

PROJECT NAME: Tonawanda Coke

SAMPLER'S SIGNATURE: _____ (SIGN)

SEQ. Nº.	SAMPLE Nº.	DATE	TIME	SAMPLE LOCATOIN	SAMPLE TYPE	Nº OF CONTAINERS	REMARKS
	SW-2428-792-07	7/8/92	1000		Surf. Water	2x	40ml VOC (8240
						1x	1L oil+grease w/HCl
						1x	1L cyanide w/NaOH
						1x	1L bn/ac
						1x	500ml Cr^{6+}
						1x	500ml TAL metals w/HN
	SW-2428-792-08	7/8/92	1015			2x	40ml VOC (8240)
						1x	1L oil+grease w/HCl
						1x	1L cyanide w/NaOH
						1x	1L bn/ac
						1x	500ml Cr^{6+}
						1x	500ml TAL metals w/HN
	SW-2428-792-09	7/8/92	1030			2x	40ml VOC (8240)
						1x	1L oil+grease w/HCl
						1x	1L cyanide w/NaOH
						1x	1L bn/ac
						1x	500ml Cr^{6+}
						1x	500ml TAL metals w/HN
				TOTAL NUMBER OF CONTAINERS		21	

ANTICIPATED CHEMICAL HAZARDS: unknown

RELINQUISHED BY: 1 _____ (SIGN)	DATE/TIME 7/8/92 1605	RECEIVED BY: 2 _____ (SIGN)
RELINQUISHED BY: 2 _____ (SIGN)	DATE/TIME _____	RECEIVED BY: 3 _____ (SIGN)
RELINQUISHED BY: 3 _____ (SIGN)	DATE/TIME _____	RECEIVED BY: 4 _____ (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

METHOD OF SHIPMENT: Auto	SHIPPED BY: JJN / G.G.	RECEIVED FOR LABORATORY BY: (SIGN) _____	DATE/TIME _____
CONDITION OF SEAL UPON RECEIPT: GENERAL CONDITION OF COOLER:		COOLER OPENED BY: (SIGN) _____	DATE/TIME _____

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Nº 20789

APPENDIX E

QA/QC REPORTS

APPENDIX E.1

JUNE 1991 SOILS REPORT

MEMO

To: Rick Hoekstra

From: Tracy Vonah

Reference No. 2428

Date: 7/19/91

Re: Analytical Data Assessment and Validation
Soil Samples
Tonawanda Coke
June 1991

The following memo details an assessment and validation of analytical results reported by Advanced Environmental Services (AES) for two soil samples collected at the Tonawanda Coke Site during June 1991 for Target Compound List (TCL) Volatile Organic Compounds (VOCs), TCL Base/Neutral Acid Extractables (BNAs), TCL pesticides/PCBs (Pest/PCB), Target Analyte List (TAL) Metals and Cyanide.

Evaluation of the data was based on information derived from the finished data sheets and Chain of Custody forms, blank data and recovery data for surrogate spikes. The assessment of analytical and in-house data included checks for: adherence to accuracy and precision criteria, transmittal errors, and anomalously high and low parameter values.

The QA/QC criteria by which these data have been assessed are outlined in the relevant Methods and the document entitled, "Functional Guidelines for Evaluating Organics and Inorganics Analyses", (February 1, 1988), prepared by the United States Environmental Protection Agency (USEPA) Data Review Work Group, hereinafter referred to as the "Guidelines".

Based on a review of this data set and related quality control data, the following are noted:

1. SAMPLE HOLDING TIMES

   As noted in the relevant methods, the maximum holding times for the respective parameters are listed in the following:

VOCs	7 days from VTSR[1] to analysis
BNAs	5 days from VTSR to extraction 40 days from VTSR to analysis
Metals	6 months from collection to analysis
Mercury	26 days from VTSR to analysis
Cyanide	14 days from collection to analysis

Comparison of the collection dates of all samples (from the notation appearing on the Chain of Custody documents) with the reported dates of analysis showed that both samples were analyzed prior to expiration of their prescribed holding times.

2. SURROGATE SPIKE RECOVERIES

Laboratory performance on individual samples is assessed on the basis of surrogate spike recoveries. Fortifying the sample with a known amount of the surrogate prior to sample preparation serves as an indicator of the efficiency of analyte extraction, dissolution, or other matrix modifying techniques. Based on the surrogate recoveries reported, the following observations were noted:

A. TCL VOCs

In accordance with Method 8240, the surrogate compounds 4-bromofluorobenzene, toluene-d8, and 1,2-dichloroethane-d4 were added to the samples submitted for the analysis of TCL VOCs prior to analysis. All samples yielded surrogate recoveries within the control limits established by the laboratory. Therefore qualification of TCL VOC data was not required on this basis.

B. TCL BNAs

In accordance with Method 8270, the surrogate compounds 1,4-dichlorbenzene-d4, naphthalene d8, acenaphthene-d10, phenanthrene-d10, chrysene-d12, and perylene-d12 were added to the samples submitted for TCL BNA analyses. However, the surrogates were diluted out due to sample matrix interference.

---

[1] VTSR - Validated Time of Sample Receipt.

Therefore, laboratory performance based on surrogate spike recoveries could not be assessed for these analyses.

3. METHOD BLANK ANALYSES

The purpose of assessing the results of method blank analyses is to determine the existence and magnitude of sample contamination problems. The method blanks for TCL VOCs, TCL BNAs, TAL metals, and cyanide all showed non-detected quantities of the analytes of interest, indicating that contamination attributable to laboratory conditions was minimal during these analyses.

4. ACCURACY AND PRECISION CRITERIA - TAL METALS

Based on a review of the quality control summary provided by AES for metals, it was noted that the laboratory found all matrix spikes to have recoveries within the established control limits, and all duplicate sample analyses to have adequate reproducibility. Therefore, qualification of the associated data on these bases was not required.

5. CONCLUSION

Based on the assessment detailed in the foregoing, the data produced by AES is acceptable for its intended uses.

APPENDIX E.2

JULY 1991 WATER REPORT

MEMO

WAT. FILE COPY

To: Rick Hoekstra

From: Tracy Vonah/js

Reference No.: 2428

Date: 8/19/91

Re: Analytical Data Assessment and Validation
Groundwater Samples
Tonawanda Coke
July 1991

Copies to: B. Clegg

The following memo details an assessment and validation of analytical results reported by Advanced Environmental Services (AES) for three groundwater samples collected at the Tonawanda Coke Site during July 1991.

Evaluation of the data was based on information derived from the finished data sheets and Chain of Custody forms, blank data and recovery data for surrogate spikes. The assessment of analytical and in-house data included checks for: adherence to accuracy and precision criteria, transmittal errors, and anomalously high and low parameter values.

A summary of the samples submitted for analysis and the analytical parameters analyzed for is presented in Table 1. The QA/QC criteria by which these data have been assessed are outlined in the relevant Methods listed in Table 1 and the USEPA Functional Guidelines for Evaluating Organic and Inorganics Analyses, hereinafter referred to as the "Guidelines".

1. SAMPLE HOLDING TIMES

Based on the criteria outlined in the relevant methods and NYSDEC sample holding time protocols, the following sample holding time requirements have been established:

VOCs	7 days from Validated Time of Sample Receipt (VTSR) to analysis (14 days when preserved with HCl)

PAHs	5 days from VTSR to extraction 40 days from VTSR to analysis
Metals	6 months from collection to analysis (mercury 26 days from VTSR to analysis)
Oil and Grease	26 days from VTSR to analysis
Cyanide	12 days from VTSR to analysis
Hexavalent Chromium	24 hours from collection to analysis

By comparing the sampling date of all samples (from the notation appearing on the chain of custody documents) with the reported dates of extraction and/or analysis, it is noted that all samples submitted for VOCs, PAHs, metal, oil and grease, cyanide, and hexavalent chromium were extracted and/or analyzed prior to expiration of their prescribed holding times.

2. SURROGATE SPIKE RECOVERIES

Laboratory performance on individual samples is established by spiking activities. All samples submitted for VOC and PAH determinations were fortified with surrogate compounds prior to sample preparation. Based on the surrogate recoveries reported, the following observations were noted:

A. GC Volatile Organic Compounds (Methods 8010, 8020)

The surrogate compounds bromochloromethane, 1,4-dichlorobutane, and a,a,a-trifluorotoluene were added to the samples submitted for GC VOC analysis.

One sample, W-2428-BC-003 demonstrated a surrogate recovery for a,a,a-trifluorotoluene of 105 percent, below the laboratory control limits of 113-142 percent. In accordance with the "Guidelines", the following qualification of associated data is recommended:

i) all positive results should be flagged as estimated (data qualifier J) indicating a low bias in sample results; and

ii) all practical quantitation limits for negative results should be flagged as estimated (data qualifier J), indicating a low bias in sample results.

Presented in the following is qualification of the affected sample data:

Sample I.D.	*Matrix*	*Parameter*	*Concentration (µg/L)*	*Qualifier*
W-2428-BC-003	Water	**VOCs**		
		Benzene	ND(1.00)	J
		Toluene	ND(1.00)	J
		Ethyl Benzene	ND(1.00)	J
		m/p-Xylene	ND(1.00)	J
		o-Xylene	ND(1.00)	J

All remaining samples submitted for GC VOC analyses demonstrated surrogate recoveries within the laboratory control limits. This indicated acceptable laboratory performance for these samples.

B. Polynuclear Aromatic Hydrocarbons (PAHs)

Both samples submitted for PAH determinations were spiked with the surrogate compound 2-fluorobiphenyl prior to sample extraction. Both samples yielded surrogate recoveries within the laboratory control limits. This indicated acceptable laboratory performance for these samples.

3. METHOD BLANK ANALYSES

The purpose of assessing the results of method blank analyses to determine the existence and magnitude of sample contamination problems. All laboratory blanks analyzed in conjunction with the groundwater samples were prepared from deionized water. Inspection of the laboratory blank analyses for GC VOCs, PAHs, oil and grease, TAL metals, cyanide, and hexavalent chromium yielded non-detected concentrations of these analytes. This indicated that contamination attributable to laboratory conditions was minimal for these analyses.

4. ACCURACY AND PRECISION CRITERIA - GC-VOCS

Based on a review of the quality control summary provided by AES for GC-VOCs, it was noted that the laboratory found all matrix spikes to have recoveries within the established control limits, and all duplicate sample analyses to have adequate reproducibility. Therefore, qualification of the associated data on these bases was not required.

5. CONCLUSION

Based on the assessment detailed in the foregoing, the data produced by AES is acceptable for its intended uses, with the specific qualifications noted herein.

TABLE 1

SUMMARY OF ANAYTICAL PROGRAM
JULY 1991 GROUNDWATER SAMPLES
TONAWANDA COKE CORPORATION

Analytical Parameter	*Methodology*	*Associated Samples*
Volatile Organic Compounds[1] (VOCs)	8010/8020 USEPA SW-846 (3rd Edition)	W-2428-BC-001 W-2428-BC-003[2] W-2428-BC-003R
Polynuclear Aromatic Hydrocarbons (PAHs)	8100 USEPA SW-846 (3rd Edition)	
Hexavalent Chromium	7196 USEPA SW-846 (3rd Edition)	
Cyanide	335.3 Methods for Chemical Analysis of Water and Wastes (3/83)	
Oil and Grease	503A Standard Methods for the Examination of Water and Wastewater (16th Edition)	
TAL-Metals	6010/7000 Series USEPA SW-846 (3rd Edition)	W-2428-JOS-002

Notes:

1 trans-1,2-dichloroethene, methylene chloride, cis-1,2-dichloroethene, benzene, toluene, ethyl benzene, m/p-xylene, o-xylene.

2 Sample W-2428-BC-003 for PAHs was lost in a laboratory accident. Sample W-2428-BC-003R was analyzed for PAHs only.

APPENDIX E.3

JULY 1992 WATER/SOILS REPORT

MEMO

To: Rick Hoekstra

From: Lisa Reyes/js

Reference No.: 2428

Date: 8/11/92

Re: Analytical Data Assessment and Validation
Groundwater, Surface Water and Sediment Samples
Tonawanda Coke
July 1992

The following memo details an assessment and validation of analytical results reported by Advanced Environmental Services (AES) for sediment, surface water, and groundwater samples collected at the Tonawanda Coke Site during July 1992.

Evaluation of the data was based on information derived from the finished data sheets and chain of custody forms, blank data and recovery data for surrogate and matrix spikes. The assessment of analytical and in-house data included checks for: adherence to accuracy and precision criteria, transmittal errors, and anomalously high and low parameter values.

A summary of the samples submitted for analysis and the analytical parameters analyzed for is presented in Table 1. The quality assurance/quality control (QA/QC) criteria by which these data have been assessed are outlined in the relevant Methods listed in Table 1 and the United States Environmental Protection Agency (USEPA) Functional Guidelines for Evaluating Organic and Inorganics Analyses, hereinafter referred to as the "Guidelines".

1.0 SAMPLE HOLDING TIMES

Based on the criteria outlined in the relevant methods and New York State Department of Environmental Conservation (NYSDEC) sample holding time protocols, the following sample holding time requirements have been established for water and sediment matrices:

VOCs	7 days from VTSR[1] to analysis (14 days when preserved with HCl)
BNAs	5 days from VTSR to extraction 40 days from VTSR to analysis
Metals	6 months from collection to analysis (mercury 26 days from VTSR to analysis)
Oil and Grease	26 days from VTSR to analysis
Cyanide	12 days from VTSR to analysis
Hexavalent Chromium	24 hours from collection to analysis

By comparing the sampling date of all samples (from the notation appearing on the chain of custody documents) with the reported dates of extraction and/or analysis, it is noted that all samples submitted for volatile organic compounds (VOCs), base/neutral acid extractables (BNAs), metals, oil and grease, cyanide, and hexavalent chromium were extracted and/or analyzed prior to expiration of their prescribed holding times.

2.0 SURROGATE SPIKE RECOVERIES

Laboratory performance on individual samples is established by spiking activities. All samples submitted for VOC and BNA determinations were fortified with surrogate compounds prior to sample preparation. Based on the surrogate recoveries reported, the following observations were noted:

2.1 VOC ANALYSES

Organic compounds added to samples prior to VOC determination consisted of the following: 1,2-dichloroethane-d_4, toluene-d_8, and 4-bromofluorobenzene. Percent recovery for all surrogates were within laboratory control limits for samples submitted herein. This indicates acceptable laboratory performance for these samples.

2.2 BNA ANALYSES

The surrogate compounds 2-fluorophenol, phenol-d_6, 2,4,6-trichlorophenol, nitrobenzene-d5, 2-fluorobiphenyl, and terphenyl-d14 were used for BNA

---

1 VTSR - Verified Time of Sample Receipt.

analyses. All samples submitted for analyses demonstrated surrogate recoveries within laboratory control limits. This indicates acceptable laboratory performance for these samples.

3.0 METHOD BLANK ANALYSES

The purpose of assessing the results of method blank analyses is to determine the existence and magnitude of sample contamination problems. Inspection of the laboratory blank analyses for VOCs, BNAs, oil and grease, Target Analyte List (TAL) metals, cyanide, and hexavalent chromium yielded non-detected concentrations of these analytes. This indicated that contamination attributable to laboratory conditions was minimal for these analyses.

4.0 BLANK SPIKE ANALYSES

The recoveries of blank spike analyses are used to assess the analytical accuracy achieved by the laboratory as blank spike analyses are independent of potential matrix effects. Blank spike analyses were performed with all parameters listed in Table 1, but referred to by AES as independent standards. A review of the blank spike data provided by AES indicates the following.

4.1 ORGANICS (VOCS AND BNAS)

In accordance with control limits established by the method for matrix spike recoveries, the following blank spikes yielded percent recoveries outside the control limits:

Sample I.D.(1)	*Matrix*	*Compound*	*Control Limits (Percent)*	*Percent Recovery*
IS#1	Groundwater	2,4-Dinitrotoluene(2)	24-96	116
IS#2	Groundwater	2,4-Dinitrotoluene	24-96	116
IS#3	Groundwater	2,4-Dinitrotoluene	24-96	99
IS#4	Groundwater	2,4-Dinitrotoluene	24-96	99
IS#5	Surface Water	2,4-Dinitrotoluene	24-96	99
IS#6	Surface Water	2,4-Dinitrotoluene	24-96	99
IS#7	Sediment	2,4-Dinitrotoluene	28-89	127

(1) IS - Independent Standards.
(2) BNA Compound.

2,4-Dinitrotoluene was not analyzed in any of the samples submitted for this round, therefore qualification was not necessary. All other compounds for

VOC and BNA analyses yielded percent recovery within method control limits as per matrix.

4.2 INORGANICS (CYANIDE, HEXAVALENT CHROMIUM, OIL AND GREASE, AND TAL METALS

In accordance with the "Guidelines", inorganic spike recoveries must be within the advisory control limits of 80 to 120 percent. In addition to blank spike analyses, AES also performed reference standard analyses to confirm analytical accuracy of the method. All inorganic blank spike (internal standards) and reference standard recoveries were within the control limits (80 to 120 percent). This indicates acceptable laboratory performance for these samples.

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

The recoveries of MS/MSD analyses are used to assess the analytical recovery on an individual sample basis, while relative percent difference (RPD) between MS and MSD indicates the analytical precision achieved for that sample. MS/MSD analyses were performed at a minimum frequency of one per 20 investigative samples for all parameters listed in Table 1. Samples W-2428-792-03 (AES #17364) and SW-2428-792-12 (AES #17306) were analyzed as MS/MSD samples. In accordance to the analytical methods and the "Guidelines", the following were noted.

5.1 ORGANICS (VOCS AND BNAS)

Each compound per matrix was evaluated for MS/MSD recovery and RPD in accordance to the analytical method. All VOC spike compounds yielded recoveries within the stipulated control limits. The following BNA compounds yielded recoveries outside the method control limits:

			Percent Recovery			Control Limits	
Sample I.D.	*Matrix*	*Compound*	*MS*	*MSD*	*RPD*	*MS/MSD (Percent)*	*RPD (Percent)*
W-2428-792-03	Groundwater	2,4-Dinitrotoluene	109*	106*	3	24-96	38
SW-2428-792-12	Surface Water	1,2,4-Trichlorobenzene	102*	109*	7	39-98	28
		2,4-Dinitrotoluene	103*	104*	1	24-96	38
		1,4-Dichlorobenzene	95	100*	5	36-97	28

* Outlying percent recovery for MS/MSD analyses.

Qualification of investigative samples was not necessary because outliers noted above were not analyzed in any samples submitted. All RPD values for organic MS/MSD analyses were within method control limits.

5.2 INORGANICS (CYANIDE, HEXAVALENT CHROMIUM, OIL AND GREASE, AND TAL METALS

MS/MSD analyses were not performed on sample W-2428-792-03 for cyanide and hexavalent chromium, yet yielded acceptable MS/MSD recoveries for sample SW-2428-792-12 for the same parameters. In accordance to the "Guidelines", control limits for MS/MSD recoveries should not exceed 75 to 125 percent. All inorganic MS/MSD recoveries for both water samples yielded acceptable recoveries. However, lead analysis for sample SW-2428-792-12 yielded an RPD value (28 percent) greater than the "Guidelines" control limit of 20 percent for waters. This indicates variability within the method of analysis. No qualification was assigned due to the acceptability of both MS/MSD recoveries of 122 percent and 92 percent. All other RPD values for inorganic MS/MSD analyses were less than 20 percent.

6.0 CONCLUSION

Based on the assessment detailed in the foregoing, the investigative sample data produced by AES are acceptable without qualification.

TABLE 1

SUMMARY OF ANALYTICAL PROGRAM
GROUNDWATER SAMPLES
TONAWANDA COKE CORPORATION
JULY 1992

Analytical Parameter	*Methodology*	*Associated Samples*
Selected Volatile Organic Compounds[1] (VOCs)	8240 USEPA SW-846 (3rd Edition)	W-2428-792-01 W-2428-792-02 W-2428-792-17 W-2428-792-18 W-2428-792-19 W-2428-792-06 W-2428-792-03 W-2428-792-04 W-2428-792-05
Selected Base/Neutral Acid Extractables[2] (BNAs)	8270 USEPA SW-846 (3rd Edition)	
Hexavalent Chromium	7196 USEPA SW-846 (3rd Edition)	
Cyanide	335.3 Methods for Chemical Analysis of Water and Wastes (3/83)	
Oil and Grease	503A Standard Methods for the Examination of Water and Wastewater (16th Edition)	

Notes:

(1) 1,2-Dichloroethene (total), methylene chloride, acetone, benzene, toluene, ethyl benzene, xylene (total), 1,1,1-trichloroethane.

(2) Naphthalene, 2-methylnaphthalene, acenaphthene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoroanthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenzofuran, benzo(g,h,i)perylene, indeno(1,2,3-c,d)pyrene, 2-chloronaphthalene.

TABLE 1

SUMMARY OF ANALYTICAL PROGRAM
SURFACE WATER SAMPLES
TONAWANDA COKE CORPORATION
JULY 1992

Analytical Parameter	*Methodology*	*Associated Samples*
Selected Volatile Organic Compounds[1] (VOCs)	8240 USEPA	SW-2428-792-12 SW-2428-792-13 SW-2428-792-16 SW-2428-792-07 SW-2428-792-08 SW-2428-792-09
Selected Base/Neutral Acid Extractables[2] (BNAs)	8270 USEPA SW-846 (3rd Edition)	
Hexavalent Chromium	7196 USEPA SW-846 (3rd Edition)	
Cyanide	335.3 Methods for Chemical Analysis of Water and Wastes (3/83)	
Oil and Grease	503A Standard Methods for the Examination of Water and Wastewater (16th Edition)	
TAL Metals	6010/7000 Series USEPA SW-846 (3rd Edition)	

Notes:

(1) Methylene chloride, acetone, benzene, and toluene.
(2) Fluoranthene, pyrene, phenol, 2-methylphenol.

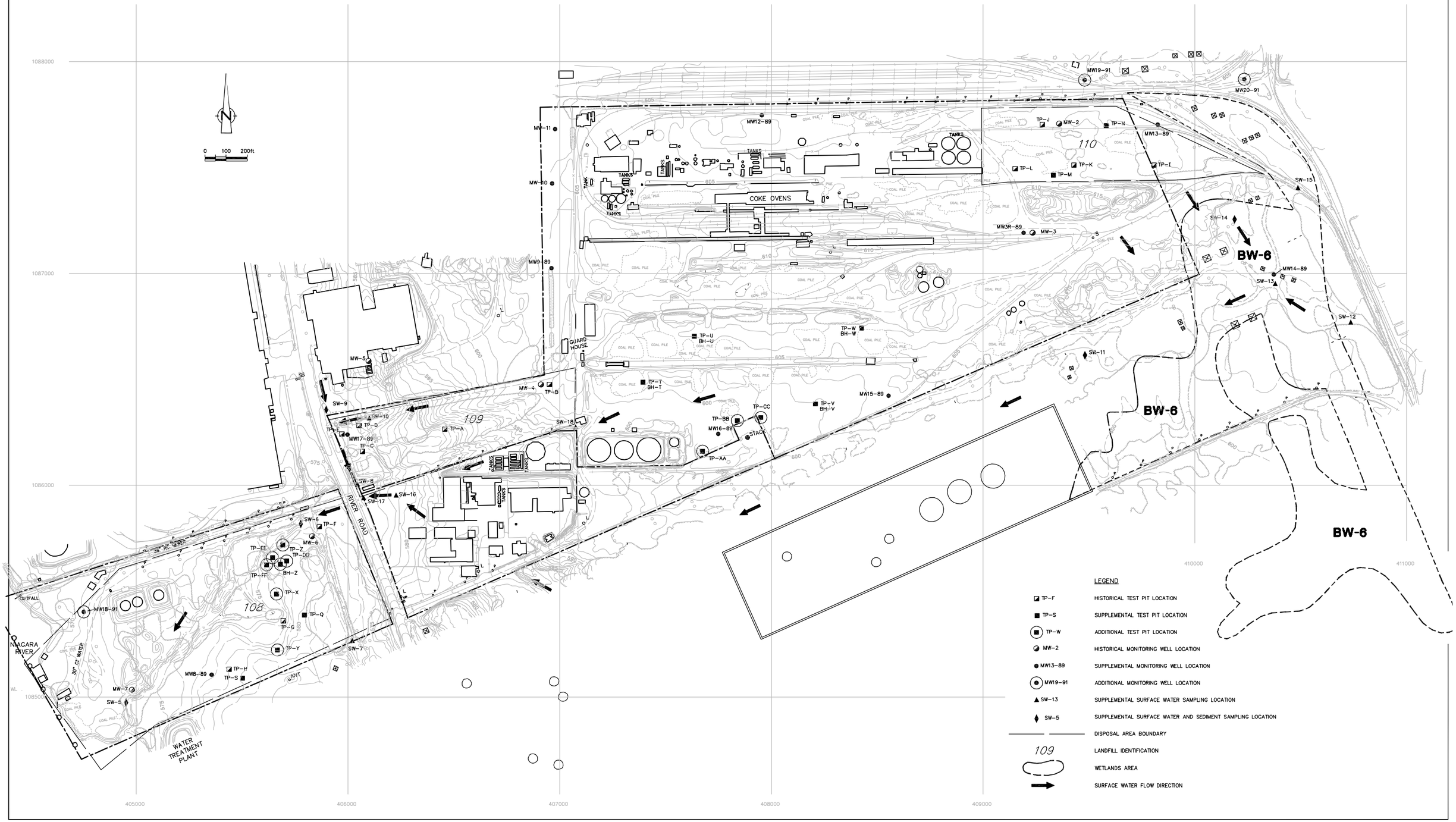
TABLE 1

SUMMARY OF ANALYTICAL PROGRAM
SEDIMENT SAMPLES
TONAWANDA COKE CORPORATION
JULY 1992

Analytical Parameter	*Methodology*	*Associated Samples*
Selected Volatile Organic Compounds[1] (VOCs)	8240 USEPA SW-846 (3rd Edition)	SD-2428-792-10 SD-2428-792-11 SD-2428-792-15
Selected Base/Neutral Acid Extractables[2] (BNAs)	8270 USEPA SW-846 (3rd Edition)	
Hexavalent Chromium	7196 USEPA SW-846 (3rd Edition)	
Cyanide	9012 USEPA SW-846 (3rd Edition)	
Oil and Grease	503D Standard Methods for the Examination of Water and Wastewater (16th Edition)	

Notes:

(1) Methylene chloride, 1,2-dichloroethene (total), benzene, toluene, total xylenes, ethylbenzene.
(2) Acenaphthylene, phenanthrene, pyrene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene.



Nº	Revision	Date	Initial

Approved

TONAWANDA COKE CORPORATION

SUPPLEMENTAL SITE INVESTIGATION

ADDITIONAL MONITORING WELLS / TEST PITS

CRA
CONESTOGA-ROVERS & ASSOCIATES

Drawn by: LDM	Scale: 1" = 200'	Date: SEPTEMBER 1992	File Nº: P-09	Rev.Nº: 0
Designed by: CRH				
Checked by: JKK	Field book:	Project Nº: 2428	Drawing Nº: PLAN 1	

OCT 20/92