PHASE II ENVIRONMENTAL SITE ASSESSMENT

3706 – 18 AVENUE

COLEMAN, ALBERTA

Prepared for:

BLUE FALLS MANUFACTURING LTD.
Box 560, 4549 – 52 Street
Thorsby, Alberta
T0C 2P0

Attention: Mr. James Keirstead

April 30, 2010

PHH ARC Environmental Ltd. Project No.: 51645D

MEMBER OF
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EXECUTIVE SUMMARY

Under the authorisation of James Keirstead of Blue Falls Manufacturing Ltd. (Client), PHH ARC Environmental Ltd. (PHH ARC) conducted a Phase II Environmental Site Assessment (ESA) of the property located at 3706 – 18 Avenue, Coleman, Alberta (Site).

The Site was developed with a two-storey industrial building (Site Building) occupied by Arctic Spas.

The purpose of this Phase II ESA was to address the potential environmental concerns identified during the Phase I ESA conducted by PHH ARC in May 2008, in relation to the potential refinancing of the Site.

The above referenced Phase I ESA identified the following potential environmental concerns that could give rise to potential subsurface impacts in connection with the Site:

- A railway right-of-way adjacent to the north boundary of the Site, and a spur line located on the north perimeter of the Site;
- A former lumber yard with reported underground storage tanks (USTs) for fuel approximately 25 m north of the Site;
- The Devon Canada Corporation sour gas plant east of the Site (containing numerous aboveground storage tanks (ASTs), a retention pond, a large sulphur block, and several large emission stacks);
- A former landfill located directly adjacent to the south boundary of the Site where a remediation program was reportedly performed, but heavy metal constituents (copper, lead, and zinc) along with petroleum hydrocarbons were reportedly remaining; and
- Staining was observed beneath the purple diesel fuel AST in the eastern portion of the Site, and drums of solvents were being stored on pallets with no secondary containment in the eastern portion of the Site.

Based on the findings above, PHH ARC recommended further investigation at the Site to confirm or refute the presence of soil or groundwater impacts originating from these areas of concern.

On March 25 and 26, 2010, PHH ARC conducted a Phase II ESA on the Site. A total of eight (8) boreholes (MW100-10, MW101-10, BH102-10 to BH105-10, MW106-10, and MW107-10) were drilled to a maximum depth of 9.9 meters below ground surface (m bgs) using a truck-mounted Becker Hammer percussion rig. In addition, ten surface soil samples were collected from locations in the east portion of the Site. Site conditions were recorded, and a detailed Site diagram was prepared. To facilitate the groundwater monitoring, four boreholes were completed as groundwater monitoring wells MW100-10, MW101-10, MW106-10 and MW107-10. Surveying of the boreholes and monitoring wells was also completed at this time.

Soil samples were obtained from the boreholes during the drilling at regular depth intervals of 0.75 m and were submitted to laboratory for analysis of benzene, toluene,

ethylbenzene and xylene (BTEX); petroleum hydrocarbon (PHC) fractions F1 to F4; trace metals; salinity parameters; volatile organic compounds (VOCs); polycyclic aromatic compounds (PAHs); sterilants; diisopropanolamine (DIPA); particle size analysis; and elemental sulphur, in accordance with the 2009 *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (Tier 1 SGRG) of Alberta Environment (AENV). In additional one composite soil sample was collected from the drill cutting to determine if the cuttings are suitable for disposal at a Class II Industrial Landfill.

On April 1, 2010, after the groundwater level in the monitoring wells attained equilibrium, the groundwater monitoring and sampling of the newly installed monitoring wells was conducted. The collected groundwater water samples were submitted to laboratory for analysis of BTEX and PHC fractions F1 and F2; dissolved metals; salinity parameters; PAHs; sterilants; DIPA; and glycols and alcohols.

The laboratory results of soil samples indicated that, with the exception of naphthalene and phenanthrene in a soil sample from BH105-10 at a depth of 0.76 m bgs and pH in a soil sample from BH102-10 at a depth of 1.52 m bgs, concentrations of all other analysed parameters were below laboratory detection limits, and therefore did not exceed the applicable criteria.

The exceedances of naphthalene, phenanthrene, pyrene, and indeno(1,2,3-c,d)pyrene are likely associated with the rail spur line located on-Site. It is recommended that these impacts be remediated when this infrastructure is eventually decommissioned and removed from the Site. PHH ARC also recommends that additional groundwater sampling be performed on-Site to reassess groundwater conditions in relation to trace PAH-related exceedances found in MW107-10.

It is PHH ARC's observation that certain parameters may exceed regulatory criteria at various locations within the Province of Alberta without being associated with anthropogenic activities. The exceedances of iron, manganese, selenium and TDS within groundwater in MW101-10, as well as the trace exceedance of pH in a soil sample obtained from BH102-10, may likely be associated with natural background concentrations and do not require any further assessment at this time.

This Executive Summary is subject to the same standard limitations as contained in the report and must be read in conjunction with the entire report.

TABLE OF CONTENTS

APPENDICES

FIGURES

TABLES

1.0 INTRODUCTION

Under the authorisation of James Keirstead of Blue Falls Manufacturing Ltd. (Client), PHH ARC Environmental Ltd. (PHH ARC) conducted a Phase II Environmental Site Assessment (ESA) of the property located at 3706 – 18 Avenue, Coleman, Alberta (Site).

The Site was developed with a two-storey industrial building (the Site Building) occupied by Arctic Spas.

The purpose of this Phase II ESA was to address the potential environmental concerns identified during the Phase I ESA conducted by PHH ARC in May 2008, in relation to the potential refinancing of the Site.

This Phase II ESA was completed in general accordance with the Canadian Standards Association (CSA) document titled *Phase II Environmental Site Assessment, CSA Standard Z769-00* dated April 2003.

1.1 Background

The 2008 PHH ARC Phase I ESA identified the following potential environmental concerns that could give rise to potential subsurface impacts in connection with the Site:

- A railway right-of-way adjacent to the north boundary of the Site, and a spur line located on the north perimeter of the Site;
- A former lumber yard with reported fuel underground storage tanks (USTs) approximately 25 m north of the Site;
- The Devon Canada Corporation sour gas plant east of the Site (containing numerous aboveground storage tanks (ASTs), a retention pond, a large sulphur block, and several large emission stacks);
- A former landfill located directly adjacent to the south boundary of the Site that, although a remediation program was reportedly performed, heavy metal constituents (copper, lead, and zinc) along with petroleum hydrocarbons were reportedly remaining; and
- Staining was observed beneath the purple diesel fuel AST in the eastern portion of the Site, and drums of solvents were being stored on pallets with no secondary containment in the eastern portion of the Site.

Based on the findings above, PHH ARC recommended further investigation at the Site to confirm or refute the presence of soil or groundwater impacts originating from these areas of concern.

1.2 Scope of Work

The scope of work to complete the Phase II ESA consisted of:

- Drilling eight (8) boreholes and installing four (4) groundwater monitoring wells to a maximum depth of 9.9 m below ground surface (bgs);
- Collecting soil samples from regular depth intervals during drilling;

- Logging and field screening the collected soil samples for headspace hydrocarbon vapour (HHV) concentrations;
- Collecting eight surficial soil samples from the east portion of the Site, in the area of the chemical storage where any potential fall-out from the nearby gas plant is most likely to occur;
- Collecting two surficial soil samples from the area of the on-Site rail spur line;
- Conducting groundwater monitoring, sampling, and surveying of the new groundwater monitoring wells;
- Submitting selected soil and groundwater samples to the laboratory for analyses of benzene, toluene, ethylbenzene and xylene (BTEX); petroleum hydrocarbon (PHC) fractions F1 to F4; trace metals; salinity parameters; volatile organic compounds (VOCs); polycyclic aromatic compounds (PAHs); sterilants; diisopropanolamine (DIPA); elemental sulphur; and glycols and alcohols; and,
- Preparing a report based on the findings of this assessment.

2.0 METHODOLOGY

2.1 Borehole Investigation

Before beginning the Phase II ESA, Alberta One-Call located and marked underground utility lines. In addition, underground line locates were conducted by Advanced Locating Services.

On March 25 and 26, 2010, PHH ARC completed borehole drilling with a truck-mounted Becker Hammer percussion rig provided by Beck Drilling and Environmental Ltd. A total of eight boreholes (MW100-10, MW101-10, BH102-10 to BH105-10, MW106-10, and MW107-10) were drilled to a maximum depth of 9.9 m bgs. Site conditions were recorded, the newly installed monitoring wells were surveyed, and a detailed Site diagram was prepared (see Figure 2). To facilitate groundwater monitoring, four boreholes were completed as groundwater monitoring wells (MW100-10, MW101-10, MW106-10 and MW107-10) to a maximum depth of 9.9 m bgs.

Soil samples were obtained during drilling at 0.75 m depth intervals. The soil samples were visually logged in accordance with the modified Unified Soil Classification System and examined for hydrocarbon staining and odour. In addition, ten surface soil samples were collected from locations in the east portion of the Site. Soil sample HHV concentrations were measured at ambient temperatures using a GasTech™ 1238ME hydrocarbon detector calibrated to two hexane standards in methane elimination mode.

Each borehole was installed and each surface soil sample was collected for a distinct contaminant(s) of concern:

- MW100-10 was located in the southern portion of the Site, closest to the former landfill south of the Site;
- MW101-10 was located in the southeast corner of the Site close to the former landfill and close to the shared property boundary between the Site and the Devon gas plant;
- BH102-10 and BH103-10 were located downgradient of the chemical storage areas located in the eastern portion of the Site;
- BH104-10 was located immediately downgradient of a diesel fuel AST located in the eastern portion of the Site;
- BH105-10 was located downgradient of the historical lumber yard and railway line and was close to the shared property boundary between the Site and the Devon gas plant;
- MW106-10 was located in the northeast portion of the Site, south of the historical lumber yard and railway line;

- MW107-10 was located downgradient of the railway line. Additionally, MW107-10 was located in an area not suspected to be impacted with metal or salinity parameters and was to be used to determine natural background concentrations of these analytes;
- SS1 to SS8 were hand-excavated from the surface in the east portion of the Site, closest to the Devon Canada Corporation sour gas plant located east of the Site where aerial fall-out from the Devon gas plant was most likely to occur; and,
- Railway 1 and Railway 2 were hand-excavated from the surface adjacent to the on-Site rail spur line located in the northeast portion of the Site.

The borehole locations are shown in Figure 2 included in Appendix A. A description of the subsurface stratigraphy encountered during the drilling program is documented in the borehole logs included in Appendix B.

2.2 Monitoring Well Installation

Groundwater monitoring wells MW100-10, MW101-10, MW106-10 and MW107-10 were installed to a maximum depth of 9.9 m bgs. After the groundwater level in the monitoring wells attained equilibrium, PHH ARC personnel returned to the Site on April 1, 2010, to conduct groundwater monitoring and sampling of the newly installed monitoring wells.

2.3 Sampling and Laboratory Analysis

2.3.1 Soil

Based on field screening results of soil HHV concentrations and visual observations, a total of 15 soil samples were submitted to Maxxam Analytics (Maxxam) of Calgary, AB for analysis of BTEX and PHC fractions F1 to F4; trace metals; salinity parameters; VOCs; PAHs; sterilants; DIPA; and elemental sulphur. One (1) soil sample was submitted for particle size analysis (PSA) and one composite soil sample collected from the drill cuttings was submitted for analysis of landfill parameters for disposal.

2.3.2 Groundwater

On April 1, 2010, all the monitoring wells were monitored for HHV concentrations and liquid levels, and were purged until dry. On April 1, 2010, groundwater samples were collected from all the monitoring wells. The location of the monitoring wells is shown in Figure 2 of Appendix A.

2.4 Quality Assurance/Quality Control Protocols

All soil and groundwater samples were placed into laboratory-prepared sample bottles and stored in ice-packed coolers. All collected soil and groundwater samples were delivered to Maxxam in Calgary, Alberta. A formal chain of custody record was maintained between PHH ARC and the staff at Maxxam.

Quality assurance/quality control (QA/QC) protocols were followed during the field work to ensure that representative samples were obtained. Field QA/QC protocols that were employed include:

- Soil samples collected were placed in laboratory-supplied glass sample jars;
- If feasible, monitoring wells were developed by removing stagnant water within the well to three well volumes or until the well was dry;
- Groundwater samples were collected with dedicated sampling equipment to minimize the chance for cross-contamination;
- Refrigeration of all samples immediately upon collection and maintained en route to the laboratory; and
- Use of dedicated and disposable Nitrile™ gloves for all sample handling.

Maxxam laboratory QA/QC consisted of surrogate recoveries, matrix spikes and laboratory duplicate samples.

2.5 Regulatory Criteria Selection

The Site is on privately owned land located in the Province of Alberta. Environmental matters pertaining to contaminated sites in Alberta fall under the jurisdiction of Alberta Environment (AENV). The regulatory criteria selection for the Site is subjected to the AENV's *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (Tier 1 SGRG), 2009.

A land use assessment was completed for the regulatory criteria selection of the Site that included the Site's surrounding land use, receptors at risk, and exposure pathways. The following table summarizes the results of land use assessment:

Background Information	Description
Site Description	Arctic Spas - industrial facility with a slab-on-grade foundation and associated equipment storage yard.
Surrounding Land Use	North – Railway followed by vacant land – formerly a lumberyard South – Storage yard West – Allison Creek followed by gravel yard/vacant land East – Undeveloped land followed by the Devon Canada Corporation Sour Gas Plant
Subsurface Materials	Lower Mesozoic/lower Cretaceous. Dark grey or black siltstone; dolomitic siltstone and limestone; silty dolomite, limestone, breccia and gypsum (EUB, 1999)
Surface Drainage	Overland flow
Other Environmental Considerations	Allison Creek located directly adjacent to the west boundary of the Site; the Crowsnest River is located approximately 430 m south of the Site. According to the AENV Groundwater Information System website, there were 5 groundwater wells within 1.0 km of the Site, including three (3) observation wells, and two (2) municipal uses. The nearest wells were three (3) observation wells and one (1) municipal well approximately 40 m north of the Site.
Future Land Use	Planned light industrial

PSA was completed on two soil samples that represented the typical soil encountered across the Site, obtained from MW100-10 at 4.57 m bgs and BH105-10 at 0.76 m bgs. The PSA indicated that 80% and 19% of soil by weight, respectively, was retained on a 75 µm sieve, indicating both fine and coarse-grained soils were encountered on-Site. The coarse grained soil material was utilized based on the high occurrence of sands and gravels as compared to silts and clays and because the coarse grained soils will, most likely, be the preferred pathway for contaminants.

Based on the Site's surrounding land use, proximity to surface water and underlying coarse-grained soil profile, the soil quality at the Site was compared to the AENV *Tier 1 SGRG* criteria for agricultural land use and coarse-grained soil. According to the AENV *Tier 1 SGRG*, if an adjacent property with a different land use than the Site is present, the lowest criteria value of the two land uses must be used within 30 m of the adjacent property. Potential agricultural and grazing areas are located within 30 m from the Site.

The AENV *Tier 1 SGRG* emphasizes that the lowest criteria value of the constituents of concern for all the applicable exposure pathways shall serve as risk management criteria.

3.0 RESULTS

3.1 Stratigraphy

The soils observed during the drilling of boreholes indicated that silt, gravel and sand, and silty sand were the predominant soil types at the Site. Sandstone bedrock was encountered in all boreholes from depths ranging from 0.61 m to 8.84 m bgs in BH104-10 and MW100-10, respectively. Silty clay was encountered in MW100-10 from 0.05 m to 1.52 m bgs.

A description of the subsurface stratigraphy encountered during borehole advancement is documented in the borehole logs located in Appendix B.

3.2 Hydrogeology

The depth to groundwater measured on April 1, 2010, ranged between 4.63 m to 8.71 m bgs. The groundwater monitoring data are provided in Table 1. The locations of boreholes and groundwater monitoring wells are shown on Figure 2. Based on groundwater elevation measurements collected during these monitoring events, the principle direction of shallow groundwater flow across the Site was inferred to the south, southwest. The average hydraulic gradient was calculated as 0.9%. These groundwater data are presented in Figure 3 and are likely representative of the local shallow groundwater table.

3.3 Petroleum Hydrocarbons

3.3.1 Liquid Petroleum Hydrocarbons

Phase separated liquid petroleum hydrocarbons (LPH) were not observed in soil or groundwater during these investigation activities on March 25 and 26, and April 1, 2010.

3.3.2 Petroleum Hydrocarbon Vapours

The soil HHV concentrations ranged from non-detect to 25 ppm in soil samples collected during drilling. The maximum soil concentration of 25 ppm was measured in the soil samples obtained from MW100-10 at a depth of 3.8 m bgs, and MW107-10 at a depth of 3 m bgs. The soil field screening results are provided in Table 2. The soil sample HHV concentration readings are also presented on the attached borehole logs.

The monitoring well HHV concentrations were all non-detect on April 1, 2010. Summaries of groundwater monitoring well HHV concentration readings are presented in Table 11.

3.3.3 Petroleum Hydrocarbons in Soil

The laboratory analytical results of PHCs in soil are summarized in Table 2. As indicated, the concentrations of BTEX and PHC fractions F1 to F4 in all the analysed soil samples did not exceed the applicable regulatory criteria.

3.3.4 Volatile Organic Compounds in Soil

The laboratory analytical results of VOCs in soil are summarized in Table 3. As indicated, the concentrations of VOCs in all the analysed soil samples did not exceed the applicable regulatory criteria.

3.3.5 Polycyclic Aromatic Hydrocarbons in Soil

Laboratory analytical results for PAHs in soil are summarised in Table 4. As indicated the concentrations of PAHs in soil did not exceed the applicable regulatory criteria with the exception of naphthalene (0.028 mg/kg) which exceeded the AENV *Tier 1 SGRG* (2009) of 0.018 mg/kg, and phenanthrene (0.1 mg/kg) which exceeded the AENV *Tier 1 SGRG* (2009) of 0.061 mg/kg in sample BH105-10 at a depth of 0.76 m bgs. The duplicate sample indicated similar exceedances.

3.3.6 Salinity Parameters in Soil

The laboratory analytical results of salinity parameters in soil are summarized in Table 5. As indicated, the concentrations of salinity parameters in all the analysed soil samples did not exceed the applicable regulatory criteria with the exception of soil sample BH102-10 with a pH of 8.93 which did not fall within the AENV *Tier 1 SGRG* (2009) acceptable range of 6.0 - 8.5.

3.3.7 Trace Metals in Soil

The laboratory analytical results of trace metals in soil are summarized in Table 6. As indicated, the concentrations of trace metals in all the analysed soil samples did not exceed the applicable regulatory criteria.

3.3.8 Extractable Diisopropanolamine in Soil

The laboratory analytical results of extractable DIPA in soil are summarized in Table 7. As indicated, the concentrations of extractable DIPA in the analysed soil sample did not exceed the applicable regulatory criteria.

3.3.9 Sulphur in Soil

The laboratory analytical results of sulphur in soil are summarized in Table 8. As indicated, the concentrations of sulphur in all the analysed soil samples did not exceed the applicable regulatory criteria.

3.3.10 Sterilant Parameters in Soil

The laboratory analytical results of sterilants in soil are summarized in Table 9. As indicated, the concentrations of sterilants in all the analysed soil samples did not exceed the applicable regulatory criteria.

3.3.11 Landfill Parameters

The laboratory analytical results of a Class II landfill characterisation on a representative soil sample are summarized in Table 10. The analytical results indicated that all parameters were below the regulatory criteria and the soil drill cuttings were deemed suitable for transportation and disposal at a landfill as non-hazardous.

3.3.12 Petroleum Hydrocarbons in Groundwater

The laboratory analytical results of PHCs in groundwater are summarized in Table 11. As indicated, the concentrations of BTEX and PHC fractions F1 to F4 in all the analysed groundwater samples did not exceed the applicable regulatory criteria.

3.3.13 Polycyclic Aromatic Hydrocarbons in Groundwater

Laboratory analytical results for PAHs in groundwater are summarised in Table 12. As indicated the concentrations of PAHs in groundwater did not exceed the applicable regulatory criteria with the exception of pyrene (0.000043 mg/L) which exceeded the AENV *Tier 1 SGRG* (2009) of 0.000025 mg/L, indeno(1,2,3-c,d)pyrene (0.00027 mg/L) which exceeded the AENV *Tier 1 SGRG* (2009) of 0.00021 mg/L, and carcinogenic PAHs (0.00004 mg/L) which exceeded the AENV *Tier 1 SGRG* (2009) of 0.00001 mg/L in a groundwater sample from MW107-10.

3.3.14 Salinity Parameters in Groundwater

The laboratory analytical results of salinity parameters in groundwater are summarized in Table 13. As indicated, the concentrations of salinity parameters in all the analysed groundwater samples did not exceed the applicable regulatory criteria with the exception of TDS in a groundwater sample from MW101-10 with a value of 502 which exceeded the AENV *Tier 1 SGRG* (2009) of 500.

3.3.15 Dissolved Metals in Groundwater

Laboratory analytical results for dissolved metals in groundwater are summarised in Table 14. As indicated the concentrations of dissolved metals in groundwater did not exceed the applicable regulatory criteria with the exception of iron (0.41 mg/L) which exceeded the AENV *Tier 1 SGRG* (2009) of 0.3 mg/L, manganese (0.15 mg/L) which exceeded the AENV *Tier 1 SGRG* (2009) of 0.05 mg/L, and selenium (0.0014 mg/L) which exceeded the AENV *Tier 1 SGRG* (2009) of 0.001 mg/L in a groundwater sample MW101-10.

3.3.16 Diisopropanolamine in Groundwater

The laboratory analytical results of DIPA in groundwater are summarized in Table 15. As indicated, the concentrations of DIPA in the analysed groundwater sample did not exceed the applicable regulatory criteria.

3.3.17 Glycols and Alcohols in Groundwater

The laboratory analytical results of glycols and alcohols in groundwater are summarized in Table 16. As indicated, the concentrations of glycols and alcohols in the analysed groundwater sample did not exceed the applicable regulatory criteria.

3.3.18 Sterilant Parameters in Groundwater

The laboratory analytical results of sterilants in groundwater are summarized in Table 17. As indicated, the concentrations of sterilants in the analysed groundwater sample did not exceed the applicable regulatory criteria. The laboratory detection limit of Linuron does exceed the regulatory criteria, however, based on the parameter being non-detect, it is not considered a concern at this time.

4.0 DISCUSSION

The exceedances of naphthalene, phenanthrene, pyrene, and indeno(1,2,3-c,d)pyrene are likely associated with the rail line and rail spur line located north and northeast of the Site (respectively). Based on previous assessments conducted with similar impacts identified, it is PHH ARC's opinion that the on-Site PAH-related soil impacts are primarily surficial and localised in their extent. Given that the railway infrastructure is integral to future Site operations, it is recommended that the identified impacts be remediated when the on-Site spur line is planned to be decommissioned at a later date. The exceedances of PAH-related parameters within groundwater obtained from MW107-10 were slightly above regulatory guidelines, and MW106-10 (located adjacent to the identified surficial soil impacts along the on-Site rail spur line) was dry at the time of this assessment. Therefore, it may be prudent to re-sample both wells in the next 60 days when it is estimated that the spring run-off will elevate the local groundwater table to its highest level of the year, in order to reassess groundwater conditions on-Site.

It is also PHH ARC's opinion that various trace metals and TDS exceed regulatory criteria at various locations within the Province of Alberta without being associated with anthropogenic activities. The exceedances of iron, manganese, selenium and TDS within MW101-10 may likely be associated with natural background concentrations. It is unlikely that these concentrations are directly related to the reported historical landfill cell located further southeast of the Site given the measured south/southwest groundwater flow direction that was identified during the course of this assessment.

The identified trace pH exceedance from a soil sample obtained at 1.52 m bgs from BH102-10 is not considered to be elevated to a degree that would require further assessment and/or active remediation. No other parameters of concern were found to exceed regulatory criteria from this sample, and therefore, this may be representative of naturally occurring conditions.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the work completed as part of this Phase II ESA and the subsequent laboratory analytical results, the concentrations of all analysed parameters were below the applicable regulatory criteria, with the exception of the following:

- Naphthalene and phenanthrene slightly exceeded the applicable regulatory criteria in a soil sample from BH105-10 at a depth of 0.76 m bgs;
- pH slightly exceeded the applicable regulatory criteria in a soil sample from BH102-10 at a depth of 1.5 m bgs;
- Pyrene, indeno(1,2,3-c,d)pyrene, and carcinogenic PAHs slightly exceeded the applicable regulatory criteria in a groundwater sample from MW107-10;
- TDS slightly exceeded the applicable regulatory criteria in a groundwater sample from MW101-10; and
- Iron, manganese and selenium slightly exceeded the applicable regulatory criteria in a groundwater sample from MW101-10.

The exceedances of naphthalene, phenanthrene, pyrene, and indeno(1,2,3-c,d)pyrene are likely associated with the rail spur line located on-Site. It is recommended that these impacts be remediated when this infrastructure is eventually decommissioned and removed from the Site. PHH ARC also recommends that additional groundwater sampling be performed on-Site to reassess groundwater conditions in relation to trace PAH-related exceedances found in MW107-10.

It is PHH ARC's observation that certain parameters may exceed regulatory criteria at various locations within the Province of Alberta without being associated with anthropogenic activities. The exceedances of iron, manganese, selenium and TDS within groundwater in MW101-10, as well as the trace exceedance of pH in a soil sample obtained from BH102-10, may likely be associated with natural background concentrations and do not require any further assessment at this time.

6.0 REFERENCES

1. Alberta Energy and Utilities (EUB), Alberta Geological Survey, *Geological Map of Alberta*, February, 1999.
2. Alberta Environment. February 2009. *Alberta Tier 1 Soil and Groundwater Remediation Guidelines.* Edmonton, AB.
3. Accessed Alberta Environment Groundwater Information System website April 21, 2010 (http://www3.gov.ab.ca/env/water/groundwater/).
4. PHH ARC Environmental Ltd. March 2008. *Phase I Environmental Site Assessment.*

7.0 DISCLAIMER

This Phase II ESA was performed in order to identify current and/or recognized environmental conditions at the Site. The term recognized environmental condition means the presence or likely presence of any hazardous substance on a property under conditions that indicate an existing release, past release, or a material threat of a release of a hazardous substance into structures on the property or into the ground, groundwater, or surface water of the property. This Phase II ESA does not quantify the extent of the current and/or recognized environmental condition or the cost of any remediation.

Conclusions derived are specific to the immediate area of study and cannot be extrapolated extensively away from sample locations. Samples have been analysed for a limited number of contaminants that are expected to be present at the site, and the absence of information relating to a specific contaminant does not indicate that it is not present.

No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions on the property. Performance of this Phase II ESA to the standards established by PHH ARC is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions on the property, and recognizes reasonable limits on time and cost.

PHH ARC warrants that this Phase II ESA was performed in general compliance with currently acceptable practices for environmental site investigations, and specific client requests, as applicable to this Site. This report was prepared for the exclusive use of Blue Falls Manufacturing Ltd., subject to the conditions and limitations contained within the duly authorized workplan. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third parties. If additional parties require reliance on this report, written authorization from PHH ARC will be required. PHH ARC disclaims responsibility of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs. No other warranties are implied or expressed.

We trust that the foregoing information is satisfactory for your present requirements.

Should you have any questions about the report or require additional information, please contact the undersigned.

Yours truly,

PHH ARC ENVIRONMENTAL LTD.

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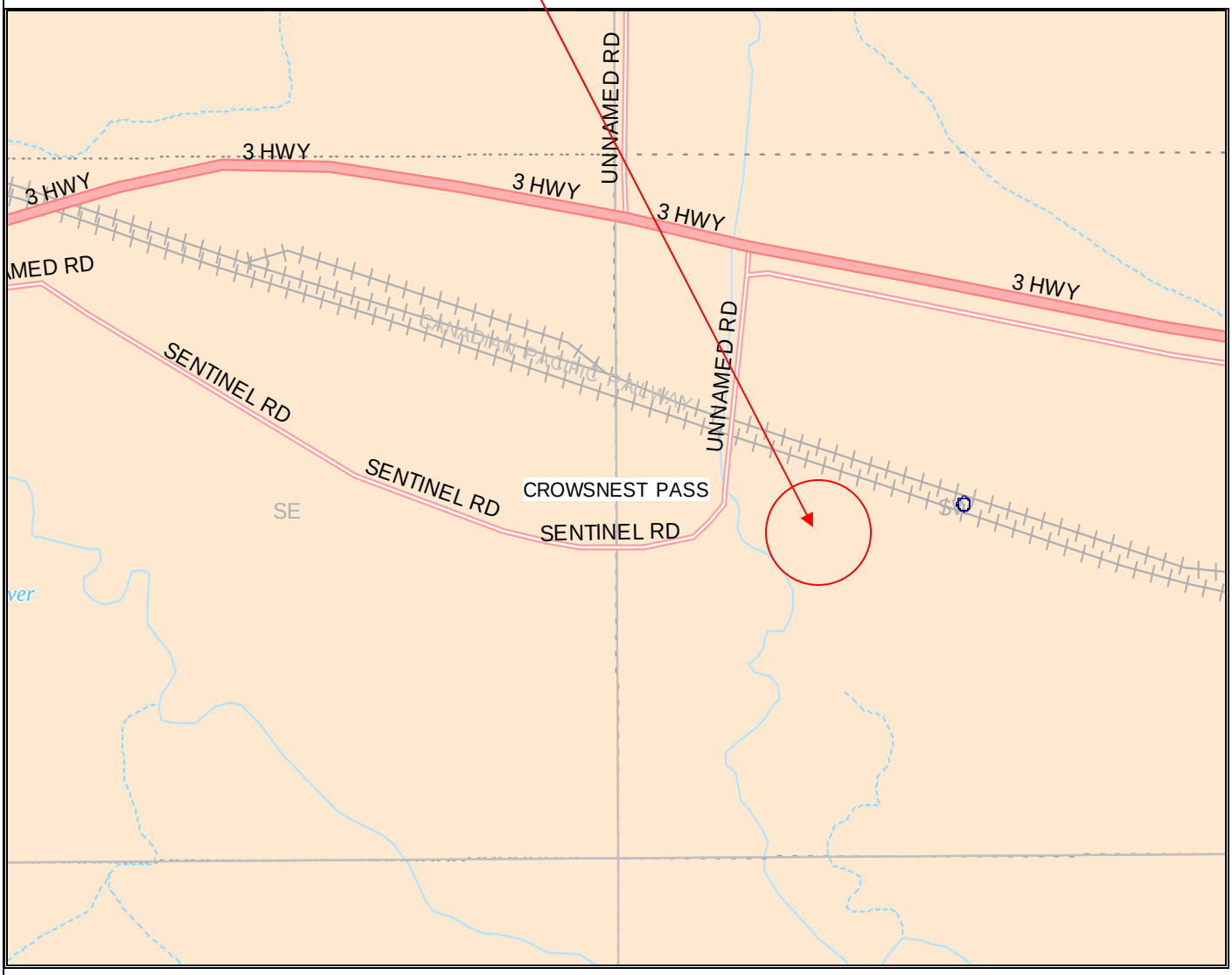
APEGGA Permit to Practice No. P 6504

51645D Phase II ESA – Final Report.doc

APPENDIX A
FIGURES



PHH ARC ENVIRONMENTAL

PROJECT NAME: PHASE II ENVIRONMENTAL SITE ASSESSMENT			
CLIENT NAME: BLUE FALLS MANUFACTURING LTD.			
PROJECT LOCATION: 3706 – 18 AVENUE, COLEMAN, AB			
DRAWING NAME: KEY MAP			DRAWING NO.: 1
SCALE: NTS	PROJECT NO.: 51645D	DATE: APRIL 2010	

RAIL LINE

SPURLINE

MW106-10

RAIL LINE 1

RAIL LINE 2

MW107-10

SITE
BUILDING

SS8

SS7

BH105-10

CHEMICAL
STORAGE

SS6

SS5

AST

BH104-10

SS4

BH103-10

SS3

CHEMICAL
STORAGE

SS2

SS1

BH102-10

AST

PUMP
HOUSE

MW100-10

MW101-10

LEGEND

- SITE BUILDINGS
- MONITORING WELL LOCATION
- BOREHOLE LOCATIONS
- SOIL SAMPLE LOCATION
- BARBED FENCE

0 10 20 30 40m

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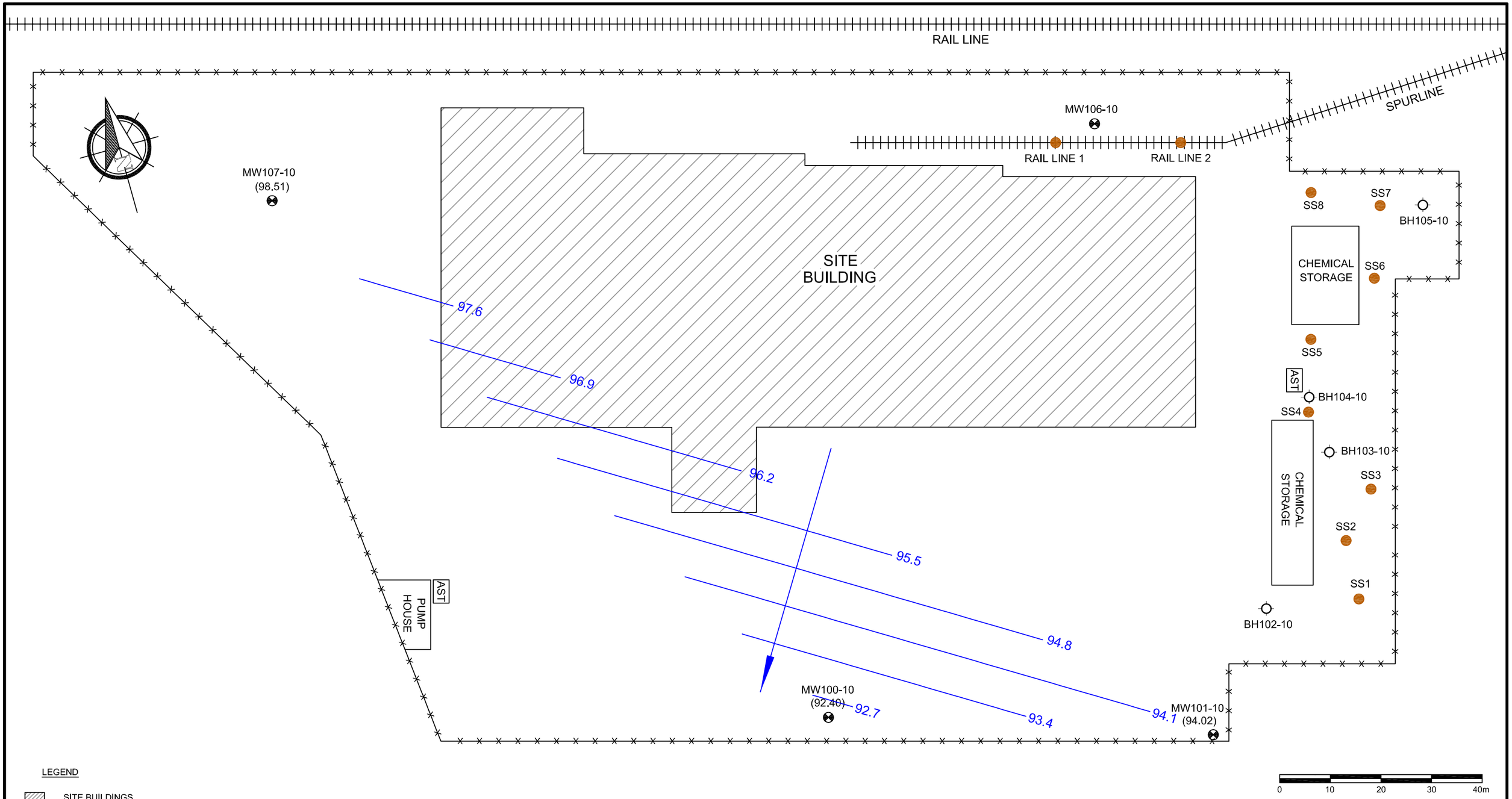
BLUE FALLS MANUFACTURING

3706 - 18 AVENUE, COLEMAN, ALBERTA

SITE PLAN WITH BOREHOLE AND MONITORING WELL LOCATIONS

Date:	Drawn By:	Scale	Project No.	Figure
08/04/2010	EK	1:710	51645D	2
	Checked By: GR		File No. 51645D-02	



LEGEND

- SITE BUILDINGS
- MONITORING WELL LOCATION
- BOREHOLE LOCATIONS
- BARBED FENCE
- INFERRED GROUNDWATER FLOW DIRECTION
- INFERRED GROUNDWATER CONTOUR LINE
- (92.40) GROUNDWATER ELEVATION (m)

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Calgary, Alberta
Canada T2Z 4B1
www.phharcenv.com

BLUE FALLS MANUFACTURING

3706 - 18 AVENUE, COLEMAN, ALBERTA

INFERRED GROUNDWATER FLOW DIRECTION - APRIL 2010

Date:	Drawn By:	Scale	Project No.	Figure
08/04/2010	EK	1:710	51645D	3
	Checked By: GR		File No. 51645D-03	

APPENDIX B
BOREHOLE LOGS

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FIELD BOREHOLE LOG

WITH MONITORING WELL INSTALLATION NOTES

MONITORING WELL ID: ***MW100-10***

TOTAL DEPTH: ***9.91 m bgs***

PROJECT INFORMATION

CLIENT: Blue Falls Manufacturing Ltd.

SITE LOCATION: 3706 - 18 Avenue, Coleman, Alberta

PROJECT #: 51645D

LOGGED BY: Greg Rusling

DATE(S) DRILLED: March 25, 2010

DRILLING INFORMATION

DRILLING CO.: Beck Drilling

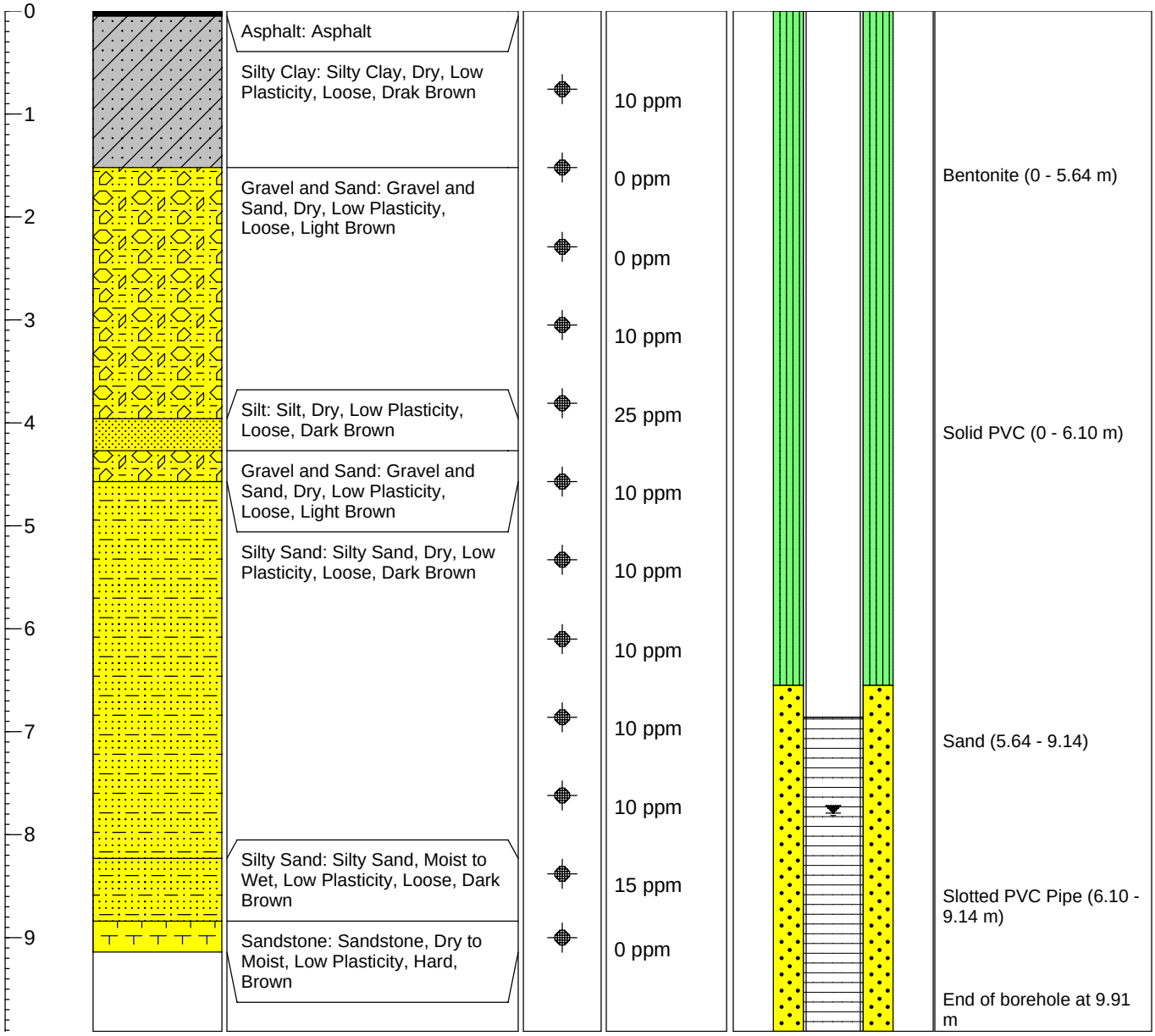
RIG TYPE: Truck Mounted

METHOD OF DRILLING: Becker Hammer Rig

WELL CASING ELEVATION:

NOTES:

MONITORING WELL LOCATION: Southwest Area of Site



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FIELD BOREHOLE LOG

WITH MONITORING WELL INSTALLATION NOTES

MONITORING WELL ID: ***MW101-10***

TOTAL DEPTH: ***6.10 m bgs***

PROJECT INFORMATION

CLIENT: Blue Falls Manufacturing Ltd.

SITE LOCATION: 3706 - 18 Avenue, Coleman, Alberta

PROJECT #: 51645D

LOGGED BY: Greg Rusling

DATE(S) DRILLED: March 25, 2010

DRILLING INFORMATION

DRILLING CO.: Beck Drilling

RIG TYPE: Truck Mounted

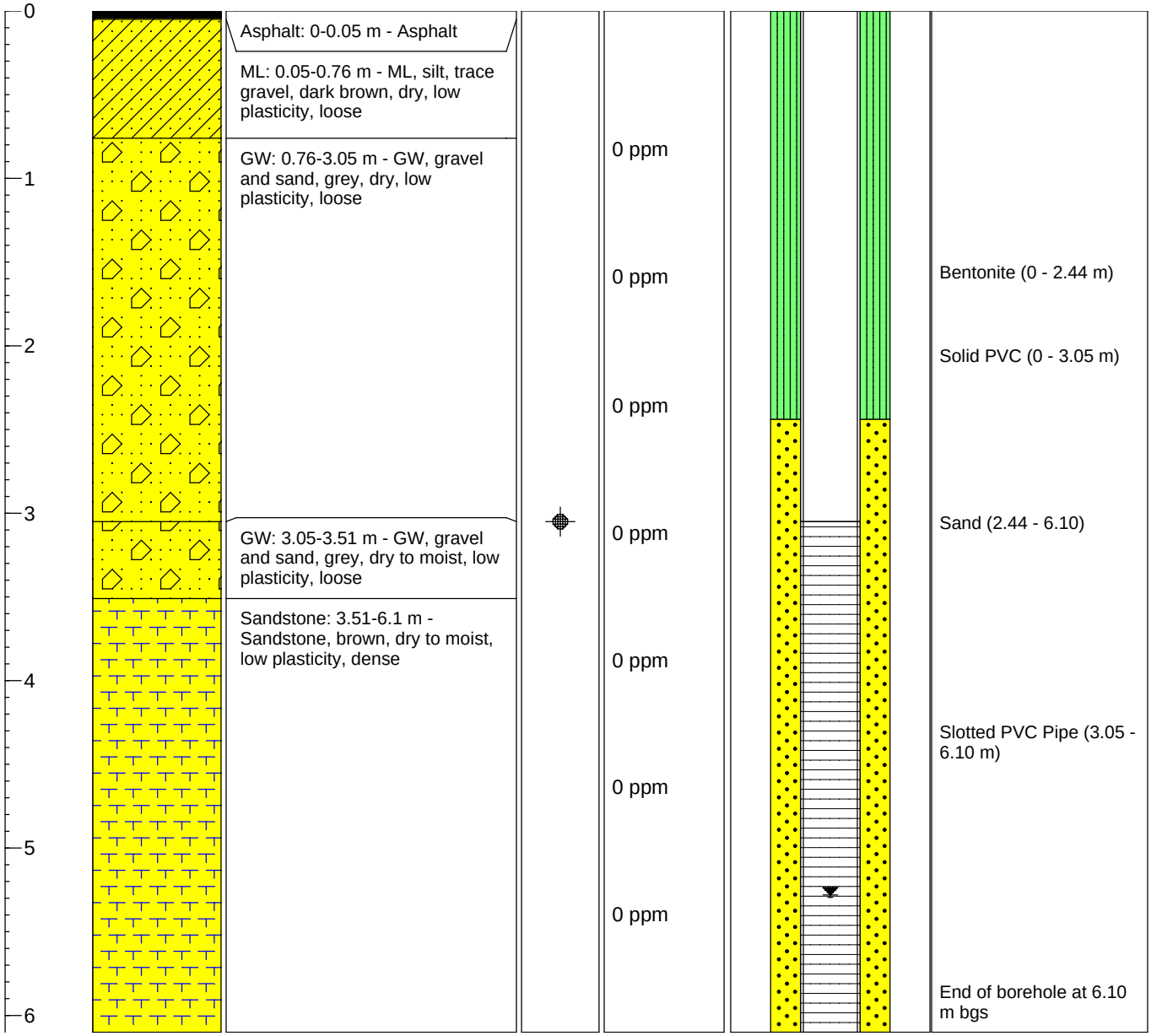
METHOD OF DRILLING: Becker Hammer Rig

WELL CASING ELEVATION: 99.294

NOTES: USCS Classification

MONITORING WELL LOCATION: Southern Area of Site

DEPTH (m)	LITHOLOGY	SOIL DESCRIPTION	LAB SAMPLE	HEADSPACE (ppm)	MONITORING WELL	WELL COMMENTS
0		Asphalt: 0-0.05 m - Asphalt		0 ppm		
		ML: 0.05-0.76 m - ML, silt, trace gravel, dark brown, dry, low plasticity, loose				
1		GW: 0.76-3.05 m - GW, gravel and sand, grey, dry, low plasticity, loose		0 ppm		Bentonite (0 - 2.44 m)
2				0 ppm		Solid PVC (0 - 3.05 m)
3		GW: 3.05-3.51 m - GW, gravel and sand, grey, dry to moist, low plasticity, loose		0 ppm		Sand (2.44 - 6.10)
		Sandstone: 3.51-6.1 m - Sandstone, brown, dry to moist, low plasticity, dense		0 ppm		Slotted PVC Pipe (3.05 - 6.10 m)
4				0 ppm		
5				0 ppm		
6						End of borehole at 6.10 m bgs



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FIELD BOREHOLE LOG

BOREHOLE ID: ***BH102-10***
TOTAL DEPTH: ***3.05 m bgs***

PROJECT INFORMATION

CLIENT: Blue Falls Manufacturing Ltd.
SITE LOCATION: 3706 - 18 Avenue, Coleman, Alberta
PROJECT #: 51645D
LOGGED BY: Greg Rusling
PROJECT MANAGER: Chris Gill
DATE(S) DRILLED: March 25, 2010

DRILLING INFORMATION

DRILLING CO.: Beck Drilling
DRILLER: N/A
RIG TYPE: Truck Mounted
METHOD OF DRILLING: Becker Hammer Rig
SAMPLING METHOD: Direct
OTHER NOTES: USCS Classification

BOREHOLE LOCATION: **Southeast Area of Site**

DEPTH (m)	LITHOLOGY	SOIL DESCRIPTION	LAB SAMPLE	HEADSPACE (ppm)	BACKFILL	BACKFILL DESCRIPTION
0		Asphalt: 0-0.05 m - Asphalt ML: 0.05-0.76 m - ML, silt, some gravel, dark brown, dry, low plasticity, loose				Bentonite
1		GW: 0.76-2.13 m - GW, gravel and sand, light grey, dry, low plasticity, loose		10 ppm 0 ppm		
2		Sandstone: 2.13-3.05 m - Sandstone, brown, dry to moist, low plasticity, dense		15 ppm		End of borehole at 3.05 m bgs
3				0 ppm		

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FIELD BOREHOLE LOG

BOREHOLE ID: ***BH103-10***
TOTAL DEPTH: ***3.05 m bgs***

PROJECT INFORMATION

CLIENT: Blue Falls Manufacturing Ltd.
SITE LOCATION: 3706 - 18 Avenue, Coleman, Alberta
PROJECT #: 51645D
LOGGED BY: Greg Rusling
PROJECT MANAGER: Chris Gill
DATE(S) DRILLED: March 25, 2010

DRILLING INFORMATION

DRILLING CO.: Beck Drilling
DRILLER: N/A
RIG TYPE: Truck Mounted
METHOD OF DRILLING: Becker Hammer Rig
SAMPLING METHOD: Direct
OTHER NOTES: USCS Classification

BOREHOLE LOCATION: **Eastern Area of Site**

DEPTH (m)	LITHOLOGY	SOIL DESCRIPTION	LAB SAMPLE	HEADSPACE (ppm)	BACKFILL	BACKFILL DESCRIPTION
0		Fill: 0-0.15 m - Gravel fill, grey, dry, low plasticity, loose		0 ppm		Cuttings
		SM: 0.15-0.91 m - SM, silty sand, trace gravel, dark brown, dry, low plasticity, loose				
1		Sandstone: 0.91-3.05 m - Sandstone, brown, dry to moist, low plasticity, dense		10 ppm		Bentonite
2				0 ppm		End of borehole at 3.05 m bgs
3				0 ppm		

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FIELD BOREHOLE LOG

BOREHOLE ID: ***BH104-10***

TOTAL DEPTH: ***3.05 m bgs***

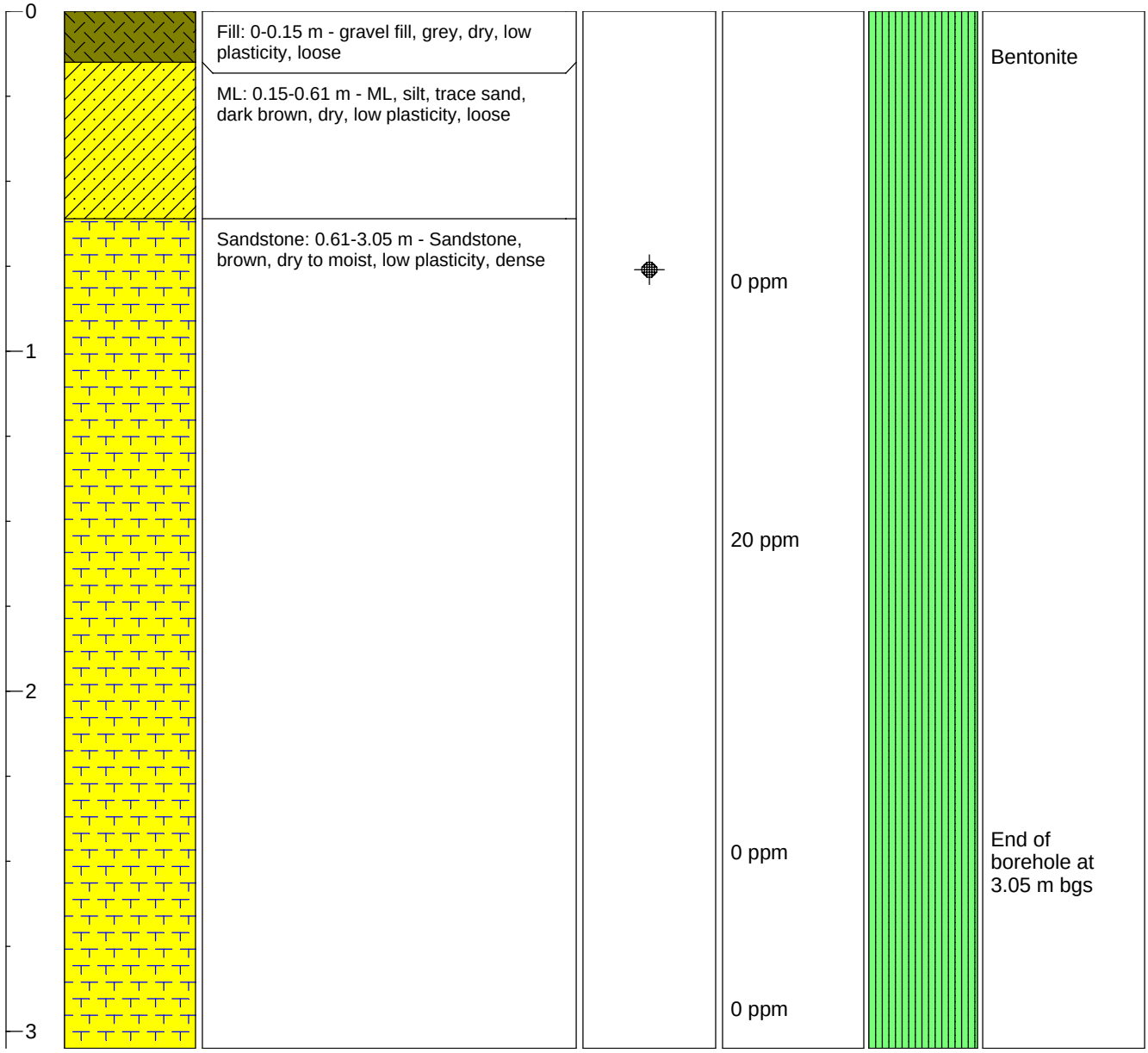
PROJECT INFORMATION

CLIENT: Blue Falls Manufacturing Ltd.
SITE LOCATION: 3706 - 18 Avenue, Coleman, Alberta
PROJECT #: 51645D
LOGGED BY: Greg Rusling
PROJECT MANAGER: Chris Gill
DATE(S) DRILLED: March 25, 2010

DRILLING INFORMATION

DRILLING CO.: Beck Drilling
DRILLER: N/A
RIG TYPE: Truck Mounted
METHOD OF DRILLING: Becker Hammer Rig
SAMPLING METHOD: Direct
OTHER NOTES: USCS Classification

BOREHOLE LOCATION: **Northeast Area of Site**



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FIELD BOREHOLE LOG

BOREHOLE ID: ***BH105-10***
TOTAL DEPTH: ***4.57 m bgs***

PROJECT INFORMATION

CLIENT: Blue Falls Manufacturing Ltd.
SITE LOCATION: 3706 - 18 Avenue, Coleman, Alberta
PROJECT #: 51645D
LOGGED BY: Greg Rusling
PROJECT MANAGER: Chris Gill
DATE(S) DRILLED: March 25, 2010

DRILLING INFORMATION

DRILLING CO.: Beck Drilling
DRILLER: N/A
RIG TYPE: Truck Mounted
METHOD OF DRILLING: Becker Hammer Rig
SAMPLING METHOD: Direct
OTHER NOTES: USCS Classification

BOREHOLE LOCATION: **Northeast Area of Site**

DEPTH (m)	LITHOLOGY	SOIL DESCRIPTION	LAB SAMPLE	HEADSPACE (ppm)	BACKFILL	BACKFILL DESCRIPTION
0		Fill: 0-0.15 m - Gravel fill, grey, dry, low plasticity, loose		0 ppm		Bentonite
1		SM: 0.15-1.22 m - SM, silty sand, brown, dry, low plasticity, loose		0 ppm		
2		Sandstone: 1.22-4.57 m - Sandstone, brown, dry to moist, low plasticity, dense		0 ppm		
3				0 ppm		
4				0 ppm		End of borehole at 4.57 m bgs

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FIELD BOREHOLE LOG

WITH MONITORING WELL INSTALLATION NOTES

MONITORING WELL ID: ***MW106-10***

TOTAL DEPTH: ***6.10 m bgs***

PROJECT INFORMATION

CLIENT: Blue Falls Manufacturing Ltd.

SITE LOCATION: 3706 - 18 Avenue, Coleman, Alberta

PROJECT #: 51645D

LOGGED BY: Greg Rusling

DATE(S) DRILLED: March 26, 2010

DRILLING INFORMATION

DRILLING CO.: Beck Drilling

RIG TYPE: Truck Mounted

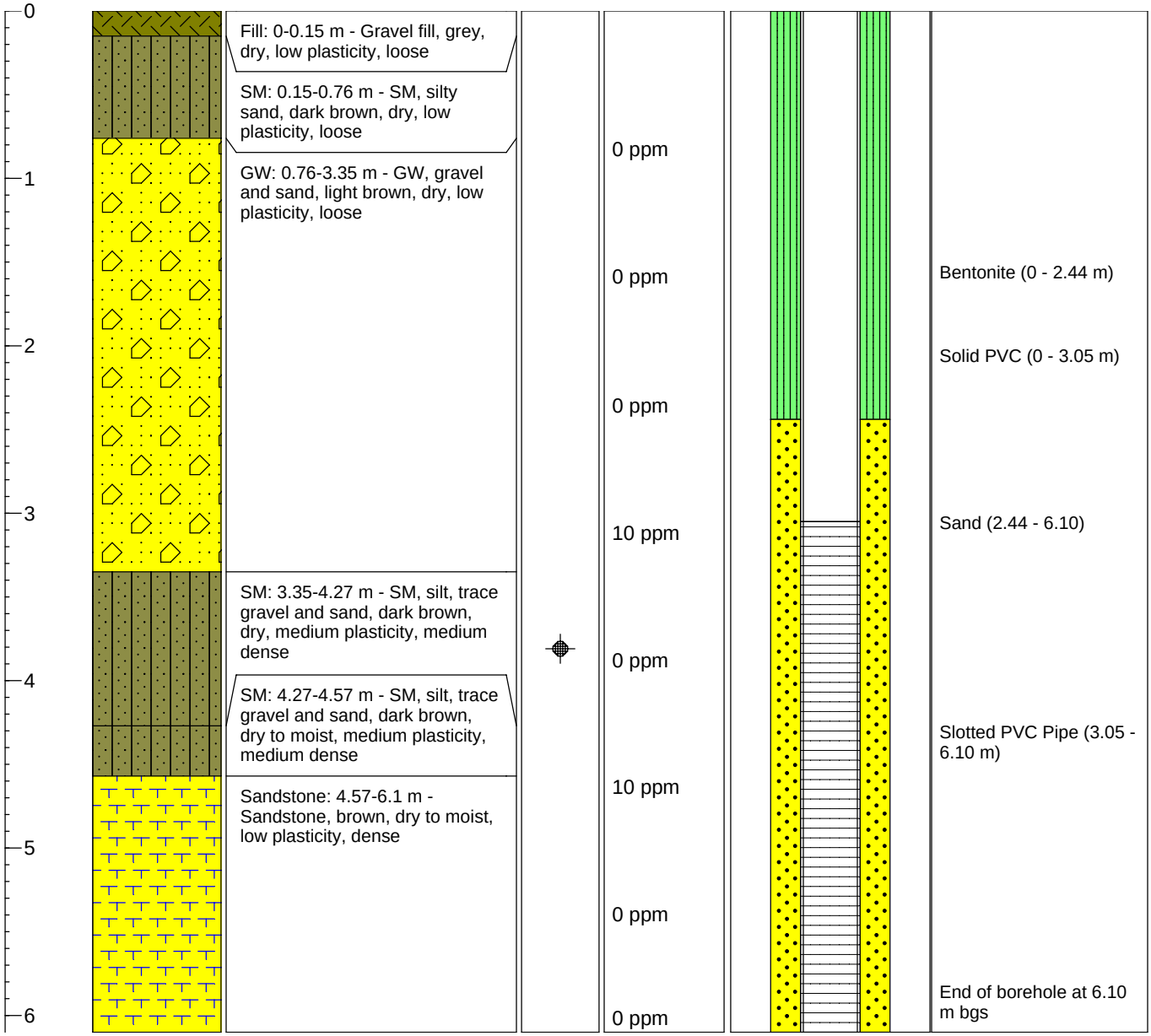
METHOD OF DRILLING: Becker Hammer Rig

WELL CASING ELEVATION: 100.760

NOTES: USCS Classification

MONITORING WELL LOCATION: Northern Area of Site

DEPTH (m)	LITHOLOGY	SOIL DESCRIPTION	LAB SAMPLE	HEADSPACE (ppm)	MONITORING WELL	WELL COMMENTS
0		Fill: 0-0.15 m - Gravel fill, grey, dry, low plasticity, loose		0 ppm		
		SM: 0.15-0.76 m - SM, silty sand, dark brown, dry, low plasticity, loose		0 ppm		Bentonite (0 - 2.44 m)
1		GW: 0.76-3.35 m - GW, gravel and sand, light brown, dry, low plasticity, loose		0 ppm		Solid PVC (0 - 3.05 m)
2				10 ppm		Sand (2.44 - 6.10)
3		SM: 3.35-4.27 m - SM, silt, trace gravel and sand, dark brown, dry, medium plasticity, medium dense		0 ppm		Slotted PVC Pipe (3.05 - 6.10 m)
4		SM: 4.27-4.57 m - SM, silt, trace gravel and sand, dark brown, dry to moist, medium plasticity, medium dense		10 ppm		
5		Sandstone: 4.57-6.1 m - Sandstone, brown, dry to moist, low plasticity, dense		0 ppm		End of borehole at 6.10 m bgs
6				0 ppm		



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FIELD BOREHOLE LOG
WITH MONITORING WELL INSTALLATION NOTES

MONITORING WELL ID: ***MW107-10***

TOTAL DEPTH: ***6.10 m bgs***

PROJECT INFORMATION

CLIENT: Blue Falls Manufacturing Ltd.

SITE LOCATION: 3706 - 18 Avenue, Coleman, Alberta

PROJECT #: 51645D

LOGGED BY: Greg Rusling

DATE(S) DRILLED: March 26, 2010

DRILLING INFORMATION

DRILLING CO.: Beck Drilling

RIG TYPE: Truck Mounted

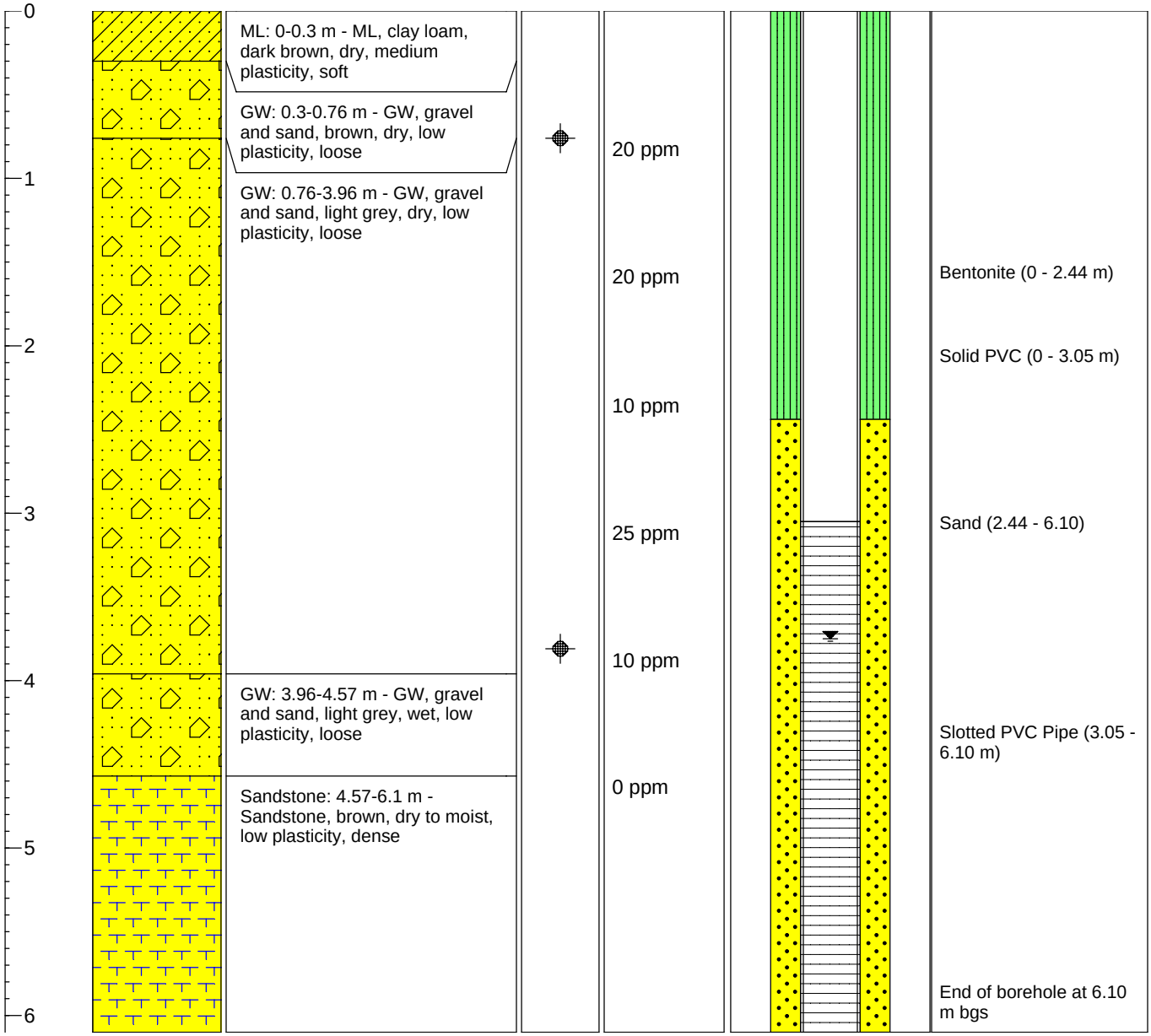
METHOD OF DRILLING: Becker Hammer Rig

WELL CASING ELEVATION: 102.260

NOTES: USCS Classification

MONITORING WELL LOCATION: Northwest Area of Site

DEPTH (m)	LITHOLOGY	SOIL DESCRIPTION	LAB SAMPLE	HEADSPACE (ppm)	MONITORING WELL	WELL COMMENTS
0		ML: 0-0.3 m - ML, clay loam, dark brown, dry, medium plasticity, soft		20 ppm		Bentonite (0 - 2.44 m)
		GW: 0.3-0.76 m - GW, gravel and sand, brown, dry, low plasticity, loose				
1		GW: 0.76-3.96 m - GW, gravel and sand, light grey, dry, low plasticity, loose		20 ppm		
2				10 ppm		Solid PVC (0 - 3.05 m)
3				25 ppm		Sand (2.44 - 6.10)
4		GW: 3.96-4.57 m - GW, gravel and sand, light grey, wet, low plasticity, loose		10 ppm		Slotted PVC Pipe (3.05 - 6.10 m)
5		Sandstone: 4.57-6.1 m - Sandstone, brown, dry to moist, low plasticity, dense		0 ppm		
6						End of borehole at 6.10 m bgs



APPENDIX C
SUMMARY TABLES

Table 1: Groundwater Monitoring Data (2010)
Project Number: 51645D
Site Location: 3706 - 18 Avenue, Coleman, Alberta
Client: Blue Falls Manufacturing Ltd.

Monitoring Well ID	Depth to GW[a] (m)	Depth to LPH[a] (if any) (m)	Total Depth of Well[b] (m)	TOC Elevation[c] (m)	Grade Elevation[c] (m)	GW Elevation[d] (m)	Depth to GW below-grade (m)
1-Apr-10							
MW100-10	8.71	ND	10.72	101.160	100.255	92.45	7.81
MW101-10	6.20	ND	6.66	100.218	99.294	94.02	5.28
MW106-10	Dry	ND	6.80	101.800	100.760	NM	NM
MW107-10	4.63	ND	6.52	103.141	102.260	98.51	3.75

Notes:
a - Depth measured from top of casing of the monitoring well.
b - From TOC to bottom of hole.
c - Elevation calculated relative to a local datum (taken as 100.0 m).
GW - Groundwater.
LPH - Liquid petroleum hydrocarbons.
ND - Not detected.
NM - Not monitored.
TOC - Top of casing.

Table 2: Soil Analytical Results - Petroleum Hydrocarbons (2010)
Project Number: 51645D
Site Location: 3706 - 18 Avenue, Coleman, Alberta
Client: Blue Falls Manufacturing Ltd.

Sample ID	Sample Depth [a] (m)	Soil HHV (ppm or as specified)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	PHC F1 (mg/kg)	PHC F2 (mg/kg)	PHC F3 (mg/kg)	PHC F4 (mg/kg)	PSA
25-Mar-10											
MW100-10	4.57	10	<0.0050	<0.020	<0.010	<0.040	<12	<10	<10	<10	80
MW101-10	3.05	0	<0.0050	<0.020	<0.010	<0.040	<12	<10	28	<10	NT
BH102-10	1.52	0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<10	34	NT
BH103-10	0.76	0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<10	<10	NT
BH104-10	0.76	0	<0.0050	<0.020	<0.010	<0.040	<12	<10	36	<10	NT
BH105-10	0.76	0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<10	<10	19
26-Mar-10											
MW106-10	3.81	0	<0.0050	<0.020	<0.010	<0.040	<12	<10	<10	<10	NT
Surface Soil Criteria[a]			0.073	0.49	0.21	12	24	130	300	2,800	2,800
Subsurface Soil Criteria[a]			0.078	0.49	0.21	16	30	160	600	5,600	5,600

Notes:
Values in mg/kg unless otherwise stated.
Bold and Shaded - Value exceeds criteria.
< - Concentration was less than laboratory analytical method detection limit.
a - Surface soil criteria applies to a depth of 3 m bgs and subsurface soil applies below 3 m bgs.
b - *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (2009) for Agricultural Land-Use and Coarse-Grained Soils.
NS - Not specified.
NT - Not tested.
PHC - Petroleum hydrocarbon fractions; F1 (C6 – C10), F2 (C>10 – C16), F3 (C>16 – C34), and F4 (C>34).
ppm - Parts per million.
PSA - Particle size analysis; percentage of sample with particle size exceeding 0.075 mm diameter.

Table 3: Soil Analytical Results - Volatile Organic Compounds (2010)
Project Number: 51645D
Site Location: 3706 - 18 Avenue, Coleman, Alberta
Client: Blue Falls Manufacturing Ltd.

Sample ID	**BH102-10**	**BH104-10**	**Criteria[a]**
Sample Depth (m)	**1.52**	**0.76**	
Date Sampled	***25-Mar-10***	***25-Mar-10***	
Chlorinated Aliphatics			
Vinyl Chloride	<0.0003	<0.0003	0.00034
1,1-Dichloroethene	<0.02	<0.02	0.021
Trichloroethene	<0.01	<0.01	0.012
Tetrachloroethene	<0.02	<0.02	0.16
1,2-Dichloroethane	<0.002	<0.002	0.0027
Dichloromethane	<0.01	<0.01	0.048
Trichloromethane[b]	<0.0008	<0.0008	0.0010
Tetrachloromethane[c]	<0.0005	<0.0005	0.00056
Dibromochloromethane[d]	<0.02	<0.02	0.12
Chlorinated Aromatics			
Chlorobenzene	<0.001	<0.001	0.018
1,2-Dichlorobenzene	<0.02	<0.02	0.18
1,4-Dichlorobenzene	<0.02	<0.02	0.098
1,2,3-Trichlorobenzene	<0.04	<0.04	0.26
1,2,4-Trichlorobenzene	<0.04	<0.04	0.23
1,3,5-Trichlorobenzene	<0.04	<0.04	0.13

Notes:

Values in mg/kg unless otherwise stated.

Bold and Shaded - Value exceeds criteria.

< - Indicates that the concentration was less than laboratory analytical method detection limit.

a - *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (2009) for Agricultural Land-Use and Coarse-Grained Soils.

b - also known as Chloroform

c - also known as Carbon tetrachloride

d - also known as Chlorodibromomethane

Table 4: Soil Analytical Results - Polycyclic Aromatic Hydrocarbons (2010)
Project Number: 51645D
Site Location: 3706 - 18 Avenue, Coleman, Alberta
Client: Blue Falls Manufacturing Ltd.

Sample ID	BH105-10	BH105-10 (dup)	MW106-10	Rail line 1	Rail line 2	Criteria[a]
Sample Depth (m)	0.76	0.76	3.81	0 - 0.15 m	0 - 0.15 m	
Date Sampled	*25-Mar-10*	*25-Mar-10*	*26-Mar-10*	*26-Mar-10*	*26-Mar-10*	
Acenapthene	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.38
Acenapthylene	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	6
Anthracene	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	0.0056
Fluoranthene	0.014	0.011	<0.0050	0.014	0.011	0.039
Fluorene	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.34
Naphthalene	**0.028**	**0.029**	<0.0050	0.0085	0.0071	0.018
Phenanthrene	**0.10**	**0.11**	0.013	0.028	0.025	0.061
Pyrene	0.016	0.017	<0.0050	0.012	0.011	0.04
Carcinogenic PAHs	<0.1	-	<0.1	<0.1	<0.1	<1.0[b]
Benz(a)anthracene[c]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.083
Benzo(b+j)fluoranthene[c]	0.039	0.046	<0.0050	0.012	0.017	6.2
Benzo(k)fluoranthene[c]	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	6.2
Benzo(g,h,i)perylene	0.041	0.045	<0.0050	0.01	0.022	NS
Benzo(a)pyrene[c]	<0.0050	<0.0050	<0.0050	<0.0050	0.0053	0.6
Chrysene[c]	<0.045*	<0.040	<0.0050	0.013	0.028	6.2
Dibenz(a,h)anthracene[c]	0.0086	0.0094	<0.0050	<0.0050	<0.0050	8.4
Indeno(1,2,3-c,d)pyrene	0.0080	0.0086	<0.0050	0.0053	0.0074	NS

Notes:
Values in mg/kg unless otherwise stated.
Bold and Shaded - Value exceeds criteria.
< - Indicates that the concentration was less than laboratory analytical method detection limit.
a - *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (2009) for Agricultural Land-Use and Coarse-Grained Soils.
b - See Alberta Tier 1 SGRG (2009) for Index of Additive Cancer Risk (IACR) calculation.
c - Overall guideline value for ecological receptors only.
IARC - Index of Additive Cancer Risk (see note b as well).
NS - Not specified.
* - Detection limit raised die to matrix interference

Table 5: Soil Analytical Results - Salinity Parameters (2010)
Project Number: 51645D
Site Location: 3706 - 18 Avenue, Coleman, Alberta
Client: Blue Falls Manufacturing Ltd.

Sample ID	Sample Depth (m)	EC (dS/m)	pH	SAR	Chloride (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Sulphate (mg/L)
March 25 to March 26, 2010										
MW100-10	4.57	0.57	8.26	1.3	47	55	18	42	6.3	130
MW101-10	3.05	0.36	8.10	1.0	30	41	5.9	26	4.0	42
BH102-10	1.52	0.42	**8.93**	1.5	30	45	5.3	41	4.5	95
BH104-10	0.76	0.53	8.01	0.8	82	58	16	27	2.4	33
BH105-10	0.76	0.35	8.00	1.3	15	21	15	33	4.3	51
MW106-10	3.81	0.46	8.34	2.2	46	39	7.3	58	3.6	58
MW107-10	0.76	0.77	7.39	0.4	26	130	21	18	7.2	45
MW107-10	3.81	0.31	8.21	0.6	20	40	8.9	17	3.6	37
Topsoil Criteria[a]	<2	6 to 8.5	<4	NS	NS	NS	NS	NS	NS	NS
Rating Categories for Subsoil										
Good	<3		<4							
Fair	*3 to 5*		*4 to 8*							
Poor	*5 to 10*		*8 to 12*							
Unsuitable	**>10**		**>12**							
Commercial/Industrial Soil Land Use	4		12							

Notes:
Values in mg/kg unless otherwise stated.
Shaded - Value exceeds criteria.
< - Concentration was less than laboratory analytical method detection limit.
a - *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (2009) for Agricultural Land-Use and Coarse-Grained Soils.
EC - Electrical conductivity.
SAR - Sodium adsorption ratio.
NS - Not specified.
NT - Not tested.

Table 6: Soil Analytical Results - Trace Metals (2010)
Project Number: 51645D
Site Location: 3706 - 18 Avenue, Coleman, Alberta
Client: Blue Falls Manufacturing Ltd.

Sample ID	**MW100-10**	**MW101-10**	**BH102-10**	**BH103-10**	**BH104-10**	**BH105-10**	**MW106-19**	**MW107-10**	**MW107-10**	**Criteria[a]**
Sample Depth (m)	**4.57**	**3.05**	**1.52**	**0.76**	**0.76**	**0.76**	**3.81**	**0.76**	**3.81**	
Date Sampled	***25-Mar-10***	***25-Mar-10***	***25-Mar-10***	***25-Mar-10***	***25-Mar-10***	***25-Mar-10***	***26-Mar-10***	***26-Mar-10***	***26-Mar-10***	
Boron (hot water soluble)	0.2	0.1	0.2	0.3	0.2	0.3	0.2	0.3	0.1	2
Chromium (Hexavalent)	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	0.4
Mercury (Hg)	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	<0.05	<0.05	<0.05	6.6
Antimony (Sb)	<1	<1	<1	<1	<1	<1	<1	<1	<1	20
Arsenic (As)	5	4	3	8	6	11	4	7	4	17
Barium (Ba)[b]	110	170	110	370	370	470	88	190	80	750
Beryllium (Be)	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.4	<0.4	5
Cadmium (Cd)	0.4	0.3	0.4	0.1	0.2	0.1	0.3	0.4	0.4	1.4
Chromium (Total)	7	7	5	13	9	12	6	25	6	64
Cobalt (Co)	3	3	2	6	5	7	2	5	2	20
Copper (Cu)	11	6	<5	14	18	23	11	20	10	63
Lead (Pb)	7	5	4	10	11	12	4	11	4	70
Molybdenum (Mo)	0.8	0.5	0.4	0.5	0.7	0.5	0.5	1.0	0.6	4
Nickel (Ni)	12	11	8	24	20	29	11	24	11	50
Selenium (Se)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1
Silver (Ag)	<1	<1	<1	<1	<1	<1	<1	<1	<1	20
Thallium (Tl)	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	1
Tin (Sn)	<1	<1	<1	<1	<1	<1	<1	<1	<1	5
Uranium (U)	<1	<1	<1	<1	<1	<1	<1	<1	<1	23
Vanadium (V)	12	11	9	17	16	19	10	28	10	130
Zinc (Zn)	28	31	21	59	55	73	26	68	25	200

Notes:
Values in mg/kg unless otherwise stated.
Bold and Shaded - Value exceeds criteria.
< - Indicates that the concentration was less than laboratory analytical method detection limit.
a - *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (2009) for Agricultural Land-Use and Coarse-Grained Soils.
b - True total barium as measured by fusion-XRF or fusion-ICP. For more information see *Soil Remediation Guidelines for Barite: Environmental Health and Human Health.*
NS - Not specified.
NT - Not tested.

Table 7: Soil Analytical Results - Extractable Diisopropanolamine (2010)
Project Number: 51645D
Site Location: 3706 - 18 Avenue, Coleman, Alberta
Client: Blue Falls Manufacturing Ltd.

Sample ID	**MW101-10**	**MW101-10 (dup)**	**BH105-10**	**Criteria[a]**
Sample Depth (m)	**3.05**	**3.05**	**0.76**	
Date Sampled	***25-Mar-10***	***25-Mar-10***	***25-Mar-10***	
Extractable Diisopropanolamine (DIPA)	<3*	<3*	<0.5	17

Notes:
Values in mg/kg unless otherwise stated.
Bold and Shaded - Value exceeds criteria.
< - Indicates that the concentration was less than laboratory analytical method detection limit.
a - *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (2009) for Agricultural Land-Use and Coarse-Grained Soils.
* - Detection limits raised due to matrix interference

Table 8: Soil Analytical Results - Sulphur (2010)
Project Number: 51645D
Site Location: 3706 - 18 Avenue, Coleman, Alberta
Client: Blue Falls Manufacturing Ltd.

Sample ID	**SS1**	**SS1 (dup)**	**SS3**	**SS5**	**SS7**	**Criteria**[a]
Sample Depth (m)	**0 - 0.10**	**0 - 0.10**	**0 - 0.10**	**0 - 0.10**	**0 - 0.10**	
Date Sampled	***26-Mar-10***	***26-Mar-10***	***26-Mar-10***	***26-Mar-10***	***26-Mar-10***	
Sulphur (Elemental and Polysulphide)	<100	<100	<100	<100	<100	500

Notes:
Values in mg/kg unless otherwise stated.
Bold and Shaded - Value exceeds criteria.
< - Indicates that the concentration was less than laboratory analytical method detection limit.
a - *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (2009) for Agricultural Land-Use and Coarse-Grained Soils.

Table 9: Soil Analytical Results - Sterilant Parameters (2010)
Project Number: 51645D
Site Location: 3706 - 18 Avenue, Coleman, Alberta
Client: Blue Falls Manufacturing Ltd.

Sample ID	**BH105-10**	**BH105-10 (dup)**	**MW106-10**	**Criteria**[a]
Sample Depth (m)	**0.76**	**0.76**	**3.81**	
Date Sampled	***25-Mar-10***	***25-Mar-10***	***26-Mar-10***	
Tebuthiuron	<0.0050	<0.0050	<0.0050	0.1
Atrazine	<0.0050	<0.0050	<0.0050	0.010
Simazine	<0.0050	<0.0050	<0.0050	0.038
Diuron	<0.0050	<0.0050	<0.0050	3.5
Linuron	<0.0050	<0.0050	<0.0050	0.059
Bromacil	<0.0050	<0.0050	<0.0050	NS

Notes:
Values in mg/kg unless otherwise stated.
Bold and Shaded - Value exceeds criteria.
< - Indicates that the concentration was less than laboratory analytical method detection limit.
a - *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (2009) for Agricultural Land-Use and Coarse-Grained Soils.
NS - Not specified

Table 10: Soil Analytical Results - Landfill Characterisation (2010)
Project Number: 51645D
Site Location: 3706 - 18 Avenue, Coleman, Alberta
Client: Blue Falls Manufacturing Ltd.

Sample ID	Comp	Criteria[a]
Date Sampled	*26-Mar-10*	
Leachable Metals		
Antimony	<1	500
Arsenic	<0.5	5
Barium	2	100
Beryllium	<0.5	5
Boron	<1	500
Cadmium	<0.1	1
Chromium	<0.5	5
Cobalt	<1	100
Copper	<1	100
Iron	2	1,000
Lead	<0.5	5
Mercury	<0.02	0.2
Nickel	<0.5	5
Selenium	<0.1	1
Silver	<0.5	5
Thallium	<0.5	5
Uranium	<0.2	2
Vanadium	<1	100
Zinc	<1	500
Zirconium	<1	500
Leachable BTEX		
Benzene	<0.010	0.5
Toluene	<0.010	0.5
Ethylbenzene	<0.010	0.5
Xylenes	<0.020	0.5
Flashpoint (^{o}C)	>75	>61
pH	9.09	2 - 12.5
Paint Filter Test	Pass	Pass/Fail

Notes:
Values in mg/L unless otherwise stated.
Bold and Shaded - Value exceeds criteria.
< - Indicates that the concentration was less than laboratory analytical method detection limit.
a - Alberta Environmental Protection, *Alberta User Guide for Waste Managers* , Table 2 (August 1996).

Table 11: Groundwater Analytical Results - Petroleum Hydrocarbons (2010)
Project Number: 51645D
Site Location: 3706 - 18 Avenue, Coleman, Alberta
Client: Blue Falls Manufacturing Ltd.

Monitoring Well ID	Monitoring Well Headspace Vapour Concentration (ppm unless otherwise specfied)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	PHC F1 (mg/L)	PHC F2 (mg/L)
MW100-10	0	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1
MW101-10	0	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1
MW101-10 (dup)	0	NT	NT	NT	NT	NT	<0.1
MW107-10	0	<0.0004	<0.0004	<0.0004	<0.0008	<0.1	<0.1
Criteria[a]		0.005	0.024	0.0024	0.3	0.81	1.1

Notes:
Values in mg/L unless otherwise stated.
Bold and Shaded - Value exceeds criteria.
< - Concentration was less than laboratory analytical method detection limit.
a - *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (2009) for Agricultural Land-Use and Coarse-Grained Soils.
NT - Not tested.
PHC - Petroleum hydrocarbon fractions, F1 (C6 – C10), and F2 (C>10 – C16).
ppm - Parts per million.

Table 12: Groundwater Analytical Results - Polycyclic Aromatic Hydrocarbons (2010)
Project Number: 51645D
Site Location: 3706 - 18 Avenue, Coleman, Alberta
Client: Blue Falls Manufacturing Ltd.

Sample ID	**MW107-10**	**Criteria**[a]
Date Sampled	***1-Apr-10***	
Acenapthene	<0.00010	0.0058
Acenapthylene	<0.00010	0.046
Anthracene	<0.000010	0.000012
Fluoranthene	<0.000040	0.00004
Fluorene	<0.000050	0.003
Naphthalene	<0.00010	0.0011
Phenanthrene	0.000062	0.0004
Pyrene	**0.000043**	0.000025
Carcinogenic PAHs	-	-
Benz(a)anthracene[b]	<0.0000085*	0.000018
Benzo(b+j)fluoranthene[b]	<0.0000085*	0.00048
Benzo(k)fluoranthene[b]	<0.0000085*	0.00048
Benzo(g,h,i)perylene	0.000037*	0.00017
Benzo(a)pyrene[b]	<0.0000075*	0.000015
Chrysene[b]	<0.0000085*	0.0014
Dibenz(a,h)anthracene[b]	0.000028*	0.00026
Indeno(1,2,3-c,d)pyrene	**0.00027***	0.00021

Notes:
Values in mg/L unless otherwise stated.
Bold and Shaded - Value exceeds criteria.
< - Indicates that the concentration was less than laboratory analytical method detection limit.
a - Alberta Tier 1 Soil and Groundwater Remediation Guidelines (2009) for Agricultural Land-Use and Coarse-Grained Soils.
b - Overall guideline value for ecological receptors only.
* - Matrix spikes exceeds acceptance limits due to matrix interference. Reanalysis yields similar results

Table 13: Groundwater Analytical Results - Salinity Parameters (2010)
Project Number: 51645D
Site Location: 3706 - 18 Avenue, Coleman, Alberta
Client: Blue Falls Manufacturing Ltd.

Sample ID	MW100-10	MW101-10	MW107-10	Criteria[a]
Date Sampled	*1-Apr-10*	*1-Apr-10*	*1-Apr-10*	
Hardness (as $CaCO_3$)	300	370	240	NS
Ion Balance	0.97	0.92	0.98	NS
TDS	338	**502**	269	500
EC (dS/m)	0.58	0.84	0.46	NS
pH (unitless)	8.00	8.01	8.07	6.5-8.5
Total Alkalinity	250	320	190	NS
Bicarbonate	300	400	240	NS
Carbonate	<0.5	<0.5	<0.5	NS
Fluoride	NT	NT	NT	0.12
Hydroxide	<0.5	<0.5	<0.5	NS
Sulphate	60	120	57	500
Chloride	7	13	1	100
Sodium	7.5	21	3.6	200
Sulphide (as H_2S)	NT	NT	NT	0.002
Nitrate + Nitrite (as nitrogen)	1.5	0.76	0.35	100
Nitrate	6.3	2.3	1.5	13
Nitrate (as nitrogen)	1.4	0.53	0.35	NS
Nitrite	0.13	0.76	<0.01	NS
Nitrite (as nitrogen)	0.041	0.23	<0.003	0.06

Notes:
Values in mg/L unless otherwise stated.
Bold and Shaded - Value exceeds criteria.
< - Concentration less than laboratory analytical method detection limit.
a - *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (2009) for Agricultural Land-Use and Coarse-Grained Soils.
EC - Electrical conductivity.
NS - Not specified.
NT - Not tested.
TDS - Total dissolved solids.

Table 14: Groundwater Analytical Results - Dissolved Metals (2010)
Project Number: 51645D
Site Location: 3706 - 18 Avenue, Coleman, Alberta
Client: Blue Falls Manufacturing Ltd.

Sample ID	MW100-10	MW101-10	MW107-10	Criteria[a]
Date Sampled	*1-Apr-10*	*1-Apr-10*	*1-Apr-10*	
Cadmium	0.000017	0.00019	0.000018	0.005[b]
Aluminum	0.010	0.39	0.015	0.1[c]
Antimony	<0.0002	0.0004	<0.0002	0.006
Arsenic	0.0003	0.0012	<0.0002	0.005
Barium	0.12	0.15	0.09	1
Beryllium	<0.001	<0.001	<0.001	NS
Boron	0.02	0.10	<0.02	0.5
Calcium	89	110	72	NS
Chromium (Total)	<0.001	<0.001	<0.001	0.05[d]
Cobalt	<0.0003	0.0027	<0.0003	NS
Copper	0.0015	0.0044	0.0010	0.2[d]
Iron	<0.06	**0.41**	<0.06	0.3
Lead	<0.0002	0.0010	<0.0002	0.01[d]
Lithium	<0.02	<0.02	<0.02	NS
Magnesium	18	21	15	NS
Manganese	0.025	**0.15**	0.007	0.05
Molybdenum	0.0011	0.0019	0.0006	NS
Nickel	0.0015	0.0076	0.0011	0.2[d]
Phosphorus	<0.1	0.2	<0.1	NS
Potassium	2.4	14	0.6	NS
Selenium	0.0009	**0.0014**	0.0008	0.001
Silicon	3.3	6.2	2.3	NS
Silver	<0.0001	<0.0001	<0.0001	0.02[d]
Strontium	0.28	0.28	0.24	NS
Sulphur	18	34	17	NS
Thallium	<0.0002	<0.0002	<0.0002	NS
Tin	<0.001	0.002	<0.001	NS
Titanium	<0.001	0.002	<0.001	NS
Uranium	0.0014	0.0043	0.0005	0.01
Vanadium	<0.001	<0.001	<0.001	NS
Zinc	0.007	0.016	0.006	0.03
Mercury				0.001

Notes:
Values in mg/L unless otherwise stated.
Bold and Shaded - Value exceeds criteria.
< - Concentration less than laboratory analytical method detection limit.
a - *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (2009) for Agricultural Land-Use and Coarse-Grained Soils.
b - The cadmium criteria is calculated using the equation 10 {0.86[LOG(hardness)] – 3.2} individually for each groundwater sample.
c - Criteria value is pH dependent for Freshwater Aquatic Life, and is noted in accordance with Alberta Tier 1 SGRG (2009).
d - Criteria value is hardness dependent for Freshwater Aquatic Life, and is noted in accordance with Alberta Tier 1 SGRG (2009).
1 - Detection limits raised due to dilution to bring analyte within the calibrated range.
NS - Not specified.

Table 15: Groundwater Analytical Results - Diisopropanolamine (2010)
Project Number: 51645D
Site Location: 3706 - 18 Avenue, Coleman, Alberta
Client: Blue Falls Manufacturing Ltd.

Sample ID	**MW101-10**	**Criteria[a]**
Date Sampled	***1-Apr-10***	
Diisopropanolamine (DIPA)	<0.05	1.6

Notes:
Values in mg/L unless otherwise stated.
Bold and Shaded - Value exceeds criteria.
< - Indicates that the concentration was less than laboratory analytical method detection limit.
a - Alberta Tier 1 Soil and Groundwater Remediation Guidelines (2009) for Agricultural Land-Use and Coarse-Grained Soils.

Table 16: Groundwater Analytical Results - Glycol and Alcohols (2010)
Project Number: 51645D
Site Location: 3706 - 18 Avenue, Coleman, Alberta
Client: Blue Falls Manufacturing Ltd.

Sample ID	**MW101-10**	**Criteria[a]**
Date Sampled	***1-Apr-10***	
Glycol		
Ethylene Glycol	<10	31
Diethylene Glycol	<10	NS
Triethylene Glycol	<10	NS
Tetraethylene	<10	NS
Propylene Glycol	<10	NS
Alcohol		
Methanol	<1	NS

Notes:
Values in mg/L unless otherwise stated.
Bold and Shaded - Value exceeds criteria.
< - Indicates that the concentration was less than laboratory analytical method detection limit.
a - Alberta Tier 1 Soil and Groundwater Remediation Guidelines (2009) for Agricultural Land-Use and Coarse-Grained Soils.
NS - Not specified.

Table 17: Soil Analytical Results - Sterilant Parameters (2010)
Project Number: 51645D
Site Location: 3706 - 18 Avenue, Coleman, Alberta
Client: Blue Falls Manufacturing Ltd.

Sample ID	**MW107-10**	**Criteria**[a]
Date Sampled	***1-Apr-10***	
Tebuthiuron	<0.00010	0.00027
Atrazine	<0.00010	0.0018
Simazine	<0.00010	0.0005
Diuron	<0.00010	0.15
Linuron	<0.00010*	0.000071
Bromacil	<0.00010	NS

Notes:
Values in mg/L unless otherwise stated.
Bold and Shaded - Value exceeds criteria.
< - Indicates that the concentration was less than laboratory analytical method detection limit.
a - Alberta Tier 1 Soil and Groundwater Remediation Guidelines (2009) for Agricultural Land-Use and Coarse-Grained Soils.
NS - Not specified
* - Detction limit exceeds guideline

APPENDIX D

LABORATORY CERTIFICATES OF ANALYSIS

Your Project #: 51645D
Your C.O.C. #: 105472, 105473

Attention: GREG RUSLING
PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
#111, 11505 - 35 Street SE
CALGARY, AB
CANADA T2Z 4B1

Report Date: 2010/03/31

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B017883
Received: 2010/03/27, 9:00

Sample Matrix: Leachate
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX in Leachates by P&T GC/MS	1	2010/03/30	2010/03/31	CAL SOP-00190	EPA 1311/8260C
ICPMS Metals on TCLP Leachate	1	2010/03/30	2010/03/31	CAL SOP-00191	EPA SW-846/6020A

Sample Matrix: Soil
Samples Received: 14

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Boron (Hot Water Soluble)	9	2010/03/29	2010/03/30	CAL SOP-00192	EPA SW846/6010B
BTEX/F1 by HS GC/MS (MeOH extract)	7	2010/03/28	2010/03/29	CAL SOP-00190	EPA 8260C/CCME
Cation/EC Ratio	8	N/A	2010/03/30		
Chloride (soluble)	8	2010/03/29	2010/03/30	CAL SOP-00043 CAL SOP-00046	SM 4110-B
Hexavalent Chromium	9	2010/03/29	2010/03/29	CAL SOP-00056	SM 3500-Cr B
Diisopropanolamine (DIPA)	2	N/A	2010/03/30	CAL SOP-00052	DX 034217
Conductivity (Soluble)	8	2010/03/30	2010/03/30	AB SOP-00004	SSMA 15.3
Elemental Sulphur	4	2010/03/30	2010/03/30	CAL SOP-00018	SPEC
CCME Hydrocarbons (F2-F4 in soil)	6	2010/03/28	2010/03/30	CAL SOP-00086	CCME PHC-CWS
CCME Hydrocarbons (F2-F4 in soil)	1	2010/03/28	2010/03/31	CAL SOP-00086	CCME PHC-CWS
Flash Point	1	N/A	2010/03/30	CAL SOP-00019 CAL SOP-00175	ASTM D93-07, 3828-05
Elements by ICPMS - Soils	9	2010/03/29	2010/03/30	CAL SOP-00191	EPA SW-846 6020A
Ion Balance	8	N/A	2010/03/29	CAL WI-00053	SM 1030E
Sum of Cations, Anions	8	N/A	2010/03/30	CAL WI-00053	SM 1030E
Moisture	9	N/A	2010/03/29	CAL SOP-00023	McKeague MSSMA 2.411
Benzo[a]pyrene Equivalency	2	N/A	2010/03/31	AB SOP-00003	EPA 8270D
Polycyclic Aromatic Hydrocarbons in soil	2	2010/03/30	2010/03/30	CAL SOP-00165	EPA 3540C/8270D
Free Liquid (Paint filter)	1	N/A	2010/03/30	CAL SOP-00020	EPA SW846/9095B
pH (1:2 Calcium Chloride Extract)	8	2010/03/29	2010/03/29	AB SOP-00006	SSMA 16.3
pH (1:1 extract, solid waste)	1	2010/03/29	2010/03/29	AB SOP-00006	SSMA 16.3
Particle Size by Sieve (75 micron)	2	N/A	2010/03/31	CAL SOP-00025	SSMA 47.4
Sodium Adsorption Ratio	8	N/A	2010/03/30	CAL WI-00053	SSMA 15.4.4
Ca,Mg,Na,K,SO4 (Soluble)	8	2010/03/29	2010/03/30	CAL SOP-00192	EPA SW846/6010B
Soluble Paste	8	2010/03/29	2010/03/29	AB SOP-00033	SSMA 15.2
Sterilants	2	2010/03/29	2010/03/30	CAL SOP-00101	EPA 8270 D
Theoretical Gypsum Requirement	8	N/A	2010/03/30	CAL WI-00087	SSMA 18.4.4

../2

Your Project #: 51645D
Your C.O.C. #: 105472, 105473

Attention: GREG RUSLING
PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
#111, 11505 - 35 Street SE
CALGARY, AB
CANADA T2Z 4B1

Report Date: 2010/03/31

CERTIFICATE OF ANALYSIS

Sample Matrix: Soil
Samples Received: 14

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Low Level VOCs in Soil by Direct Purge	2	2010/03/28	2010/03/31	CAL SOP-00104	EPA 8260 C
VOCs in Soil by P&T GC/MS (Std List)	2	2010/03/28	2010/03/30	CAL SOP-00104	EPA 8260 C

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

LESLEY LEM, Project Manager
Email: lesley.lem@maxxamanalytics.com
Phone# (403) 291-3077

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 2

Maxxam Job #: B017883
Report Date: 2010/03/31

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Sampler Initials: GR

AT1 BTEX AND F1-F4 IN SOIL (SOIL)

Maxxam ID		T37955	T37956	T37957	T37958	T37960		
Sampling Date		2010/03/25	2010/03/25	2010/03/25	2010/03/25	2010/03/26		
COC Number		105472	105472	105472	105472	105472		
	Units	**MW101-10 @ 10**	**BH102-10 @ 5**	**BH103-10 @ 2.5**	**BH104-10 @ 2.5**	**MW106-10 @ 12.5**	**RDL**	**QC Batch**
Physical Properties								
Moisture	%	2.4	2.9	7.7	6.6	2.5	0.3	3847334
Ext. Pet. Hydrocarbon								
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	<10	<10	<10	<10	10	3849909
F3 (C16-C34 Hydrocarbons)	mg/kg	28	<10	<10	36	<10	10	3849909
F4 (C34-C50 Hydrocarbons)	mg/kg	<10	34	<10	<10	<10	10	3849909
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	Yes	Yes	N/A	3849909
Volatiles								
Benzene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	3846024
Toluene	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	3846024
Ethylbenzene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	3846024
Xylenes (Total)	mg/kg	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	3846024
m & p-Xylene	mg/kg	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	3846024
o-Xylene	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	3846024
F1 (C6-C10) - BTEX	mg/kg	<12	<12	<12	<12	<12	12	3846024
(C6-C10)	mg/kg	<12	<12	<12	<12	<12	12	3846024
Surrogate Recovery (%)								
4-BROMOFLUOROBENZENE (sur.)	%	94	89	89	93	89	N/A	3846024
D10-ETHYLBENZENE (sur.)	%	92	88	90	91	90	N/A	3846024
D4-1,2-DICHLOROETHANE (sur.)	%	92	99	98	96	96	N/A	3846024
D8-TOLUENE (sur.)	%	100	101	103	100	96	N/A	3846024
O-TERPHENYL (sur.)	%	93	90	88	89	86	N/A	3849909

N/A = Not Applicable
RDL = Reportable Detection Limit

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Maxxam Job #: B017883
Report Date: 2010/03/31

Sampler Initials: GR

AT1 BTEX, F1-F4, AND SIEVE (SOIL)

Maxxam ID		T37954	T37954	T37959	T37959		
Sampling Date		2010/03/25	2010/03/25	2010/03/25	2010/03/25		
COC Number		105472	105472	105472	105472		
	Units	**MW100-10 @ 15**	**MW100-10 @ 15 Lab-Dup**	**BH105-10 @ 2.5**	**BH105-10 @ 2.5 Lab-Dup**	**RDL**	**QC Batch**
Physical Properties							
Moisture	%	5.3	5.1	5.8	N/A	0.3	3847334
Sieve - Pan	%	20	N/A	81	N/A	0.2	3846728
Sieve - #200 (>0.075mm)	%	80	N/A	19	N/A	0.2	3846728
Grain Size	%	COARSE	N/A	FINE	N/A	0.2	3846728
Ext. Pet. Hydrocarbon							
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	N/A	<10	<10	10	3849909
F3 (C16-C34 Hydrocarbons)	mg/kg	<10	N/A	<10	<10	10	3849909
F4 (C34-C50 Hydrocarbons)	mg/kg	<10	N/A	<10	<10	10	3849909
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	Yes	N/A	3849909
Volatiles							
Benzene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	3846024
Toluene	mg/kg	<0.020	N/A	<0.020	N/A	0.020	3846024
Ethylbenzene	mg/kg	<0.010	N/A	<0.010	N/A	0.010	3846024
Xylenes (Total)	mg/kg	<0.040	N/A	<0.040	N/A	0.040	3846024
m & p-Xylene	mg/kg	<0.040	N/A	<0.040	N/A	0.040	3846024
o-Xylene	mg/kg	<0.020	N/A	<0.020	N/A	0.020	3846024
F1 (C6-C10) - BTEX	mg/kg	<12	N/A	<12	N/A	12	3846024
(C6-C10)	mg/kg	<12	N/A	<12	N/A	12	3846024
Surrogate Recovery (%)							
4-BROMOFLUOROBENZENE (sur.)	%	96	N/A	91	N/A	N/A	3846024
D10-ETHYLBENZENE (sur.)	%	87	N/A	91	N/A	N/A	3846024
D4-1,2-DICHLOROETHANE (sur.)	%	96	N/A	95	N/A	N/A	3846024
D8-TOLUENE (sur.)	%	104	N/A	100	N/A	N/A	3846024
O-TERPHENYL (sur.)	%	85	N/A	87	92	N/A	3849909

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B017883
Report Date: 2010/03/31

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Sampler Initials: GR

BASIC CLASS II LANDFILL PACKAGE (LEACHATE)

Maxxam ID		T37978		
Sampling Date		2010/03/26		
COC Number		105473		
	Units	**COMP**	**RDL**	**QC Batch**
Elements				
Leachable Antimony (Sb)	mg/L	<1	1	3852698
Leachable Arsenic (As)	mg/L	<0.5	0.5	3852698
Leachable Barium (Ba)	mg/L	2	1	3852698
Leachable Beryllium (Be)	mg/L	<0.5	0.5	3852698
Leachable Boron (B)	mg/L	<1	1	3852698
Leachable Cadmium (Cd)	mg/L	<0.1	0.1	3852698
Leachable Chromium (Cr)	mg/L	<0.5	0.5	3852698
Leachable Cobalt (Co)	mg/L	<1	1	3852698
Leachable Copper (Cu)	mg/L	<1	1	3852698
Leachable Iron (Fe)	mg/L	2	1	3852698
Leachable Lead (Pb)	mg/L	<0.5	0.5	3852698
Leachable Mercury (Hg)	mg/L	<0.02	0.02	3852698
Leachable Nickel (Ni)	mg/L	<0.5	0.5	3852698
Leachable Selenium (Se)	mg/L	<0.1	0.1	3852698
Leachable Silver (Ag)	mg/L	<0.5	0.5	3852698
Leachable Thallium (Tl)	mg/L	<0.5	0.5	3852698
Leachable Uranium (U)	mg/L	<0.2	0.2	3852698
Leachable Vanadium (V)	mg/L	<1	1	3852698
Leachable Zinc (Zn)	mg/L	<1	1	3852698
Leachable Zirconium (Zr)	mg/L	<1	1	3852698
Volatiles				
Leachable (ZH) Benzene	ug/L	<10	10	3851438
Leachable (ZH) Toluene	ug/L	<10	10	3851438
Leachable (ZH) Ethylbenzene	ug/L	<10	10	3851438
Leachable (ZH) o-Xylene	ug/L	<10	10	3851438
Leachable (ZH) m & p-Xylene	ug/L	<20	20	3851438
Leachable (ZH) Xylenes (Total)	ug/L	<20	20	3851438
Surrogate Recovery (%)				
Leachable (ZH) 4-BROMOFLUOROBENZENE (sur.)	%	94	N/A	3851438
Leachable (ZH) D4-1,2-DICHLOROETHANE (sur.)	%	102	N/A	3851438
Leachable (ZH) D8-TOLUENE (sur.)	%	99	N/A	3851438

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B017883
Report Date: 2010/03/31

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Sampler Initials: GR

BASIC CLASS II LANDFILL PACKAGE (SOIL)

Maxxam ID		T37978	
Sampling Date		2010/03/26	
COC Number		105473	
	Units	**COMP**	**QC Batch**
Soluble Parameters			
Soluble (1:1) pH	N/A	9.09	3846265
Physical Properties			
Closed Cup Flash point	deg. C	>75	3852329
Free Liquid	N/A	PASS	3852331

Maxxam Job #: B017883
Report Date: 2010/03/31

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Sampler Initials: GR

REGULATED METALS (CCME/AT1)

Maxxam ID		T37954	T37955	T37956	T37957	T37958	T37959	T37960		
Sampling Date		2010/03/25	2010/03/25	2010/03/25	2010/03/25	2010/03/25	2010/03/25	2010/03/26		
COC Number		105472	105472	105472	105472	105472	105472	105472		
	Units	**MW100-10 @ 15**	**MW101-10 @ 10**	**BH102-10 @ 5**	**BH103-10 @ 2.5**	**BH104-10 @ 2.5**	**BH105-10 @ 2.5**	**MW106-10 @ 12.5**	**RDL**	**QC Batch**
Elements										
Soluble (Hot water) Boron (B)	mg/kg	0.2	0.1	0.2	0.3	0.2	0.3	0.2	0.1	3850256
Hex. Chromium (Cr 6+)	mg/kg	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	0.15	3846219
Total Antimony (Sb)	mg/kg	<1	<1	<1	<1	<1	<1	<1	1	3848515
Total Arsenic (As)	mg/kg	5	4	3	8	6	11	4	1	3848515
Total Barium (Ba)	mg/kg	110	170	110	370	370	470	88	10	3848515
Total Beryllium (Be)	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.4	3848515
Total Cadmium (Cd)	mg/kg	0.4	0.3	0.4	0.1	0.2	0.1	0.3	0.1	3848515
Total Chromium (Cr)	mg/kg	7	7	5	13	9	12	6	1	3848515
Total Cobalt (Co)	mg/kg	3	3	2	6	5	7	2	1	3848515
Total Copper (Cu)	mg/kg	11	6	<5	14	18	23	11	5	3848515
Total Lead (Pb)	mg/kg	7	5	4	10	11	12	4	1	3848515
Total Mercury (Hg)	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	3848515
Total Molybdenum (Mo)	mg/kg	0.8	0.5	0.4	0.5	0.7	0.5	0.5	0.4	3848515
Total Nickel (Ni)	mg/kg	12	11	8	24	20	29	11	1	3848515
Total Selenium (Se)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	3848515
Total Silver (Ag)	mg/kg	<1	<1	<1	<1	<1	<1	<1	1	3848515
Total Thallium (Tl)	mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.3	3848515
Total Tin (Sn)	mg/kg	<1	<1	<1	<1	<1	<1	<1	1	3848515
Total Uranium (U)	mg/kg	<1	<1	<1	<1	<1	<1	<1	1	3848515
Total Vanadium (V)	mg/kg	12	11	9	17	16	19	10	1	3848515
Total Zinc (Zn)	mg/kg	28	31	21	59	55	73	26	10	3848515

RDL = Reportable Detection Limit

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Maxxam Job #: B017883
Report Date: 2010/03/31

Sampler Initials: GR

REGULATED METALS (CCME/AT1)

Maxxam ID		T37961	T37973		
Sampling Date		2010/03/26	2010/03/26		
COC Number		105472	105472		
	Units	**MW107-10 @ 2.5**	**MW107-10 @ 12.5**	**RDL**	**QC Batch**
Elements					
Soluble (Hot water) Boron (B)	mg/kg	0.3	0.1	0.1	3850256
Hex. Chromium (Cr 6+)	mg/kg	<0.15	<0.15	0.15	3846219
Total Antimony (Sb)	mg/kg	<1	<1	1	3848515
Total Arsenic (As)	mg/kg	7	4	1	3848515
Total Barium (Ba)	mg/kg	190	80	10	3848515
Total Beryllium (Be)	mg/kg	0.4	<0.4	0.4	3848515
Total Cadmium (Cd)	mg/kg	0.4	0.4	0.1	3848515
Total Chromium (Cr)	mg/kg	25	6	1	3848515
Total Cobalt (Co)	mg/kg	5	2	1	3848515
Total Copper (Cu)	mg/kg	20	10	5	3848515
Total Lead (Pb)	mg/kg	11	4	1	3848515
Total Mercury (Hg)	mg/kg	<0.05	<0.05	0.05	3848515
Total Molybdenum (Mo)	mg/kg	1.0	0.6	0.4	3848515
Total Nickel (Ni)	mg/kg	24	11	1	3848515
Total Selenium (Se)	mg/kg	<0.5	<0.5	0.5	3848515
Total Silver (Ag)	mg/kg	<1	<1	1	3848515
Total Thallium (Tl)	mg/kg	<0.3	<0.3	0.3	3848515
Total Tin (Sn)	mg/kg	<1	<1	1	3848515
Total Uranium (U)	mg/kg	<1	<1	1	3848515
Total Vanadium (V)	mg/kg	28	10	1	3848515
Total Zinc (Zn)	mg/kg	68	25	10	3848515

RDL = Reportable Detection Limit

Maxxam Job #: B017883
Report Date: 2010/03/31

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Sampler Initials: GR

SOIL SALINITY 4 (SOIL)

Maxxam ID		T37954	T37955	T37956	T37958	T37959	T37960		
Sampling Date		2010/03/25	2010/03/25	2010/03/25	2010/03/25	2010/03/25	2010/03/26		
COC Number		105472	105472	105472	105472	105472	105472		
	Units	**MW100-10 @ 15**	**MW101-10 @ 10**	**BH102-10 @ 5**	**BH104-10 @ 2.5**	**BH105-10 @ 2.5**	**MW106-10 @ 12.5**	**RDL**	**QC Batch**
Calculated Parameters									
Anion Sum	meq/L	4.1	1.7	2.8	3.0	1.5	2.5	N/A	3845616
Cation Sum	meq/L	6.2	3.7	4.6	5.5	3.8	5.1	N/A	3845616
Cation/EC Ratio	N/A	11	10	11	10	11	11	0.1	3845611
Ion Balance	N/A	1.5	2.2	1.6	1.8	2.5	2.1	0.01	3845615
Soluble Parameters									
Soluble Chloride (Cl)	mg/L	47	30	30	82	15	46	5	3850830
Soluble Conductivity	dS/m	0.57	0.36	0.42	0.53	0.35	0.46	0.02	3850628
Soluble (CaCl2) pH	N/A	8.26	8.10	8.93	8.01	8.00	8.34	N/A	3846724
Sodium Adsorption Ratio	N/A	1.3	1.0	1.5	0.8	1.3	2.2	0.1	3845617
Soluble Calcium (Ca)	mg/L	55	41	45	58	21	39	1.5	3850109
Soluble Magnesium (Mg)	mg/L	18	5.9	5.3	16	15	7.3	1.0	3850109
Soluble Sodium (Na)	mg/L	42	26	41	27	33	58	2.5	3850109
Soluble Potassium (K)	mg/L	6.3	4.0	4.5	2.4	4.3	3.6	1.3	3850109
Saturation %	%	21.9	23.3	23.4	32.2	30.1	22.4	N/A	3848548
Soluble Sulphate (SO4)	mg/L	130	42	95	33	51	58	5.0	3850109
Theoretical Gypsum Requirement	tons/ac	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	3845619

RDL = Reportable Detection Limit

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Maxxam Job #: B017883
Report Date: 2010/03/31

Sampler Initials: GR

SOIL SALINITY 4 (SOIL)

Maxxam ID		T37961	T37973		
Sampling Date		2010/03/26	2010/03/26		
COC Number		105472	105472		
	Units	**MW107-10 @ 2.5**	**MW107-10 @ 12.5**	**RDL**	**QC Batch**
Calculated Parameters					
Anion Sum	meq/L	1.7	1.3	N/A	3845616
Cation Sum	meq/L	9.2	3.5	N/A	3845616
Cation/EC Ratio	N/A	12	12	0.1	3845611
Ion Balance	N/A	5.5	2.7	0.01	3845615
Soluble Parameters					
Soluble Chloride (Cl)	mg/L	26	20	5	3850830
Soluble Conductivity	dS/m	0.77	0.31	0.02	3850628
Soluble (CaCl2) pH	N/A	7.39	8.21	N/A	3846724
Sodium Adsorption Ratio	N/A	0.4	0.6	0.1	3845617
Soluble Calcium (Ca)	mg/L	130	40	1.5	3850109
Soluble Magnesium (Mg)	mg/L	21	8.9	1.0	3850109
Soluble Sodium (Na)	mg/L	18	17	2.5	3850109
Soluble Potassium (K)	mg/L	7.2	3.6	1.3	3850109
Saturation %	%	56.9	18.3	N/A	3848548
Soluble Sulphate (SO4)	mg/L	45	37	5.0	3850109
Theoretical Gypsum Requirement	tons/ac	<0.1	<0.1	0.1	3845619

RDL = Reportable Detection Limit

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Maxxam Job #: B017883
Report Date: 2010/03/31

Sampler Initials: GR

RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		T37955	T37955		T37959	T37961	T37973		
Sampling Date		2010/03/25	2010/03/25		2010/03/25	2010/03/26	2010/03/26		
COC Number		105472	105472		105472	105472	105472		
	Units	**MW101-10 @ 10**	**MW101-10 @ 10 Lab-Dup**	**RDL**	**BH105-10 @ 2.5**	**MW107-10 @ 2.5**	**MW107-10 @ 12.5**	**RDL**	**QC Batch**
Amines									
Extractable (Water) Diisopropanolamine(DIPA)	mg/kg	<3 (1)	<3	3	<0.5	N/A	N/A	0.5	3852272
Physical Properties									
Moisture	%	N/A	N/A	N/A	N/A	19	3.2	0.3	3847334

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) Detection limits raised due to matrix interference.
Matrix Spike recovery non calculable due to matrix interference. Original sample diluted to remove interference.

Maxxam ID		T37974	T37974	T37975	T37976		
Sampling Date		2010/03/26	2010/03/26	2010/03/26	2010/03/26		
COC Number		105472	105472	105472	105472		
	Units	**SS1**	**SS1 Lab-Dup**	**SS3**	**SS5**	**RDL**	**QC Batch**
Elemental Analysis							
Sulphur (Elemental & Polysulphide)	mg/kg	<100	<100	<100	<100	100	3852101

RDL = Reportable Detection Limit

Maxxam ID		T37977		
Sampling Date		2010/03/26		
COC Number		105473		
	Units	**SS7**	**RDL**	**QC Batch**
Elemental Analysis				
Sulphur (Elemental & Polysulphide)	mg/kg	<100	100	3852101

RDL = Reportable Detection Limit

Maxxam Job #: B017883
Report Date: 2010/03/31

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Sampler Initials: GR

STERILANTS (SOIL)

Maxxam ID		T37959	T37959	T37960		
Sampling Date		2010/03/25	2010/03/25	2010/03/26		
COC Number		105472	105472	105472		
	Units	**BH105-10 @ 2.5**	**BH105-10 @ 2.5 Lab-Dup**	**MW106-10 @ 12.5**	**RDL**	**QC Batch**
Sterilants						
Tebuthiuron	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	3846262
Atrazine	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	3846262
Simazine	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	3846262
Diuron	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	3846262
Linuron	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	3846262
Bromacil	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	3846262
Surrogate Recovery (%)						
PROPAZINE (sur.)	%	82	82	95	N/A	3846262

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B017883
Report Date: 2010/03/31

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Sampler Initials: GR

SEMIVOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		T37959		T37959		T37960		
Sampling Date		2010/03/25		2010/03/25		2010/03/26		
COC Number		105472		105472		105472		
	Units	**BH105-10 @ 2.5**	**RDL**	**BH105-10 @ 2.5 Lab-Dup**	**RDL**	**MW106-10 @ 12.5**	**RDL**	**QC Batch**
Polycyclic Aromatics								
Acenaphthene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	3849907
Benzo[a]pyrene equivalency	mg/kg	<0.1	0.1	N/A	0.1	<0.1	0.1	3845629
Acenaphthylene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	3849907
Acridine	mg/kg	<0.010	0.010	<0.010	0.010	<0.010	0.010	3849907
Anthracene	mg/kg	<0.0040	0.0040	<0.0040	0.0040	<0.0040	0.0040	3849907
Benzo(a)anthracene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	3849907
Benzo(b&j)fluoranthene	mg/kg	0.039	0.0050	0.046	0.0050	<0.0050	0.0050	3849907
Benzo(k)fluoranthene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	3849907
Benzo(g,h,i)perylene	mg/kg	0.041	0.0050	0.045	0.0050	<0.0050	0.0050	3849907
Benzo(c)phenanthrene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	3849907
Benzo(a)pyrene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	3849907
Benzo[e]pyrene	mg/kg	0.072	0.0050	0.076	0.0050	<0.0050	0.0050	3849907
Chrysene	mg/kg	<0.045 (1)	0.045	<0.040	0.040	<0.0050	0.0050	3849907
Dibenz(a,h)anthracene	mg/kg	0.0086	0.0050	0.0094	0.0050	<0.0050	0.0050	3849907
Fluoranthene	mg/kg	0.014	0.0050	0.011	0.0050	<0.0050	0.0050	3849907
Fluorene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	3849907
Indeno(1,2,3-cd)pyrene	mg/kg	0.0080	0.0050	0.0086	0.0050	<0.0050	0.0050	3849907
2-Methylnaphthalene	mg/kg	0.015	0.0050	0.016	0.0050	<0.0050	0.0050	3849907
Naphthalene	mg/kg	0.028	0.0050	0.029	0.0050	<0.0050	0.0050	3849907
Phenanthrene	mg/kg	0.10	0.0050	0.11	0.0050	0.013	0.0050	3849907
Perylene	mg/kg	<0.0050	0.0050	<0.0050	0.0050	<0.0050	0.0050	3849907
Pyrene	mg/kg	0.016	0.0050	0.017	0.0050	<0.0050	0.0050	3849907
Quinoline	mg/kg	<0.010	0.010	<0.010	0.010	<0.010	0.010	3849907
Surrogate Recovery (%)								
D10-ANTHRACENE (sur.)	%	114	N/A	112	N/A	114	N/A	3849907
D12-BENZO(A)PYRENE (sur.)	%	74	N/A	81	N/A	78	N/A	3849907
D8-ACENAPHTHYLENE (sur.)	%	98	N/A	99	N/A	97	N/A	3849907
TERPHENYL-D14 (sur.)	%	96	N/A	99	N/A	97	N/A	3849907

N/A = Not Applicable
RDL = Reportable Detection Limit
(1) Detection limits raised due to matrix interference.

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Maxxam Job #: B017883
Report Date: 2010/03/31

Sampler Initials: GR

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		T37956	T37958		
Sampling Date		2010/03/25	2010/03/25		
COC Number		105472	105472		
	Units	**BH102-10 @ 5**	**BH104-10 @ 2.5**	**RDL**	**QC Batch**
Volatiles					
Carbon tetrachloride	mg/kg	<0.0005	<0.0005	0.0005	3848373
Bromodichloromethane	mg/kg	<0.03	<0.03	0.03	3848370
Chlorobenzene	mg/kg	<0.001	<0.001	0.001	3848373
Bromoform	mg/kg	<0.06	<0.06	0.06	3848370
Chloroform	mg/kg	<0.0008	<0.0008	0.0008	3848373
1,2-dichloroethane	mg/kg	<0.002	<0.002	0.002	3848373
Bromomethane	mg/kg	<0.02	<0.02	0.02	3848370
Vinyl chloride	mg/kg	<0.0003	<0.0003	0.0003	3848373
1,2-dibromoethane	mg/kg	<0.002	<0.002	0.002	3848373
Chlorodibromomethane	mg/kg	<0.02	<0.02	0.02	3848370
Chloroethane	mg/kg	<0.02	<0.02	0.02	3848370
Chloromethane	mg/kg	<0.03	<0.03	0.03	3848370
1,2-dichlorobenzene	mg/kg	<0.02	<0.02	0.02	3848370
1,3-dichlorobenzene	mg/kg	<0.02	<0.02	0.02	3848370
1,4-dichlorobenzene	mg/kg	<0.02	<0.02	0.02	3848370
1,1-dichloroethane	mg/kg	<0.02	<0.02	0.02	3848370
1,1-dichloroethene	mg/kg	<0.02	<0.02	0.02	3848370
cis-1,2-dichloroethene	mg/kg	<0.02	<0.02	0.02	3848370
trans-1,2-dichloroethene	mg/kg	<0.02	<0.02	0.02	3848370
Dichloromethane	mg/kg	<0.01	<0.01	0.01	3848370
1,2-dichloropropane	mg/kg	<0.02	<0.02	0.02	3848370
cis-1,3-dichloropropene	mg/kg	<0.02	<0.02	0.02	3848370
trans-1,3-dichloropropene	mg/kg	<0.02	<0.02	0.02	3848370
Methyl methacrylate	mg/kg	<0.04	<0.04	0.04	3848370
Methyl-tert-butylether (MTBE)	mg/kg	<0.03	<0.03	0.03	3848370
Styrene	mg/kg	<0.02	<0.02	0.02	3848370
1,1,1,2-tetrachloroethane	mg/kg	<0.1	<0.1	0.1	3848370
1,1,2,2-tetrachloroethane	mg/kg	<0.1	<0.1	0.1	3848370
Tetrachloroethene	mg/kg	<0.02	<0.02	0.02	3848370
1,2,3-trichlorobenzene	mg/kg	<0.04	<0.04	0.04	3848370
1,2,4-trichlorobenzene	mg/kg	<0.04	<0.04	0.04	3848370
1,3,5-trichlorobenzene	mg/kg	<0.04	<0.04	0.04	3848370

RDL = Reportable Detection Limit

Maxxam Job #: B017883
Report Date: 2010/03/31

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Sampler Initials: GR

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		T37956	T37958		
Sampling Date		2010/03/25	2010/03/25		
COC Number		105472	105472		
	Units	**BH102-10 @ 5**	**BH104-10 @ 2.5**	**RDL**	**QC Batch**
1,1,1-trichloroethane	mg/kg	<0.02	<0.02	0.02	3848370
1,1,2-trichloroethane	mg/kg	<0.02	<0.02	0.02	3848370
Trichloroethene	mg/kg	<0.01	<0.01	0.01	3848370
Trichlorofluoromethane	mg/kg	<0.02	<0.02	0.02	3848370
1,2,4-trimethylbenzene	mg/kg	<0.6	<0.6	0.6	3848370
1,3,5-trimethylbenzene	mg/kg	<0.6	<0.6	0.6	3848370
Surrogate Recovery (%)					
4-BROMOFLUOROBENZENE (sur.)	%	104	79	N/A	3848373
D10-ETHYLBENZENE (sur.)	%	48	30	N/A	3848373
D4-1,2-DICHLOROETHANE (sur.)	%	104	106	N/A	3848373
D8-TOLUENE (sur.)	%	105	102	N/A	3848373
4-BROMOFLUOROBENZENE (sur.)	%	90	91	N/A	3848370
D10-ETHYLBENZENE (sur.)	%	86	83	N/A	3848370
D4-1,2-DICHLOROETHANE (sur.)	%	82	80	N/A	3848370
D8-TOLUENE (sur.)	%	95	95	N/A	3848370

N/A = Not Applicable
RDL = Reportable Detection Limit

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Maxxam Job #: B017883
Report Date: 2010/03/31
Client Project #: 51645D

Sampler Initials: GR

Package 1	8.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

Results relate only to the items tested.

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report

Maxxam Job Number: CB017883

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3846024	PX	Matrix Spike	4-BROMOFLUOROBENZENE (sur.)	2010/03/29		98	%	60 - 140
			D10-ETHYLBENZENE (sur.)	2010/03/29		91	%	30 - 130
			D4-1,2-DICHLOROETHANE (sur.)	2010/03/29		97	%	60 - 140
			D8-TOLUENE (sur.)	2010/03/29		95	%	60 - 140
			Benzene	2010/03/29		108	%	60 - 140
			Toluene	2010/03/29		106	%	60 - 140
			Ethylbenzene	2010/03/29		106	%	60 - 140
			m & p-Xylene	2010/03/29		117	%	60 - 140
			o-Xylene	2010/03/29		110	%	60 - 140
			(C6-C10)	2010/03/29		86	%	60 - 140
		Spiked Blank	4-BROMOFLUOROBENZENE (sur.)	2010/03/29		95	%	60 - 140
			D10-ETHYLBENZENE (sur.)	2010/03/29		88	%	30 - 130
			D4-1,2-DICHLOROETHANE (sur.)	2010/03/29		92	%	60 - 140
			D8-TOLUENE (sur.)	2010/03/29		110	%	60 - 140
			Benzene	2010/03/29		92	%	60 - 140
			Toluene	2010/03/29		105	%	60 - 140
			Ethylbenzene	2010/03/29		96	%	60 - 140
			m & p-Xylene	2010/03/29		104	%	60 - 140
			o-Xylene	2010/03/29		98	%	60 - 140
			(C6-C10)	2010/03/29		100	%	60 - 140
		Method Blank	4-BROMOFLUOROBENZENE (sur.)	2010/03/29		97	%	60 - 140
			D10-ETHYLBENZENE (sur.)	2010/03/29		93	%	30 - 130
			D4-1,2-DICHLOROETHANE (sur.)	2010/03/29		97	%	60 - 140
			D8-TOLUENE (sur.)	2010/03/29		103	%	60 - 140
			Benzene	2010/03/29	<0.0050		mg/kg	
			Toluene	2010/03/29	<0.020		mg/kg	
			Ethylbenzene	2010/03/29	<0.010		mg/kg	
			Xylenes (Total)	2010/03/29	<0.040		mg/kg	
			m & p-Xylene	2010/03/29	<0.040		mg/kg	
			o-Xylene	2010/03/29	<0.020		mg/kg	
			F1 (C6-C10) - BTEX	2010/03/29	<12		mg/kg	
			(C6-C10)	2010/03/29	<12		mg/kg	
		RPD	Benzene	2010/03/29	NC		%	50
			Toluene	2010/03/29	NC		%	50
			Ethylbenzene	2010/03/29	NC		%	50
			Xylenes (Total)	2010/03/29	NC		%	50
			m & p-Xylene	2010/03/29	NC		%	50
			o-Xylene	2010/03/29	NC		%	50
			F1 (C6-C10) - BTEX	2010/03/29	NC		%	50
			(C6-C10)	2010/03/29	NC		%	50
3846219	JBG	Matrix Spike	Hex. Chromium (Cr 6+)	2010/03/29		95	%	75 - 125
		Spiked Blank	Hex. Chromium (Cr 6+)	2010/03/29		100	%	90 - 110
		Method Blank	Hex. Chromium (Cr 6+)	2010/03/29	<0.15		mg/kg	
		RPD	Hex. Chromium (Cr 6+)	2010/03/29	NC		%	35
3846262	SJ1	Matrix Spike						
		[T37959-01]	PROPAZINE (sur.)	2010/03/30		86	%	30 - 130
			Tebuthiuron	2010/03/30		71	%	30 - 130
			Atrazine	2010/03/30		83	%	30 - 130
			Simazine	2010/03/30		54	%	30 - 130
			Diuron	2010/03/30		65	%	30 - 130
			Linuron	2010/03/30		90	%	30 - 130
			Bromacil	2010/03/30		60	%	30 - 130
		Spiked Blank	PROPAZINE (sur.)	2010/03/30		90	%	30 - 130
			Tebuthiuron	2010/03/30		95	%	30 - 130
			Atrazine	2010/03/30		85	%	30 - 130

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: CB017883

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3846262	SJ1	Spiked Blank	Simazine	2010/03/30		54	%	30 - 130
			Diuron	2010/03/30		69	%	30 - 130
			Linuron	2010/03/30		89	%	30 - 130
			Bromacil	2010/03/30		49	%	30 - 130
		Method Blank	PROPAZINE (sur.)	2010/03/30		91	%	30 - 130
			Tebuthiuron	2010/03/30	<0.0050		mg/kg	
			Atrazine	2010/03/30	<0.0050		mg/kg	
			Simazine	2010/03/30	<0.0050		mg/kg	
			Diuron	2010/03/30	<0.0050		mg/kg	
			Linuron	2010/03/30	<0.0050		mg/kg	
			Bromacil	2010/03/30	<0.0050		mg/kg	
		RPD [T37959-01]	Tebuthiuron	2010/03/30	NC		%	50
			Atrazine	2010/03/30	NC		%	50
			Simazine	2010/03/30	NC		%	50
			Diuron	2010/03/30	NC		%	50
			Linuron	2010/03/30	NC		%	50
			Bromacil	2010/03/30	NC		%	50
3846265	SP8	QC Standard	Soluble (1:1) pH	2010/03/29		100	%	91 - 109
		Spiked Blank	Soluble (1:1) pH	2010/03/29		100	%	97 - 102
3846724	SP8	QC Standard	Soluble (CaCl2) pH	2010/03/29		101	%	97 - 103
		Spiked Blank	Soluble (CaCl2) pH	2010/03/29		100	%	97 - 102
		RPD	Soluble (CaCl2) pH	2010/03/29	1.2		%	5
3846728	DH7	QC Standard	Sieve - Pan	2010/03/31		100	%	92 - 108
			Sieve - #200 (>0.075mm)	2010/03/31		99	%	79 - 121
		RPD	Sieve - Pan	2010/03/31	4.7		%	35
			Sieve - #200 (>0.075mm)	2010/03/31	0.5		%	35
3847334	JK5	RPD [T37954-01]	Moisture	2010/03/29	3.8		%	20
3848370	KB7	Matrix Spike	4-BROMOFLUOROBENZENE (sur.)	2010/03/30		101	%	60 - 140
			D10-ETHYLBENZENE (sur.)	2010/03/30		76	%	30 - 130
			D4-1,2-DICHLOROETHANE (sur.)	2010/03/30		95	%	60 - 140
			D8-TOLUENE (sur.)	2010/03/30		95	%	60 - 140
			Bromodichloromethane	2010/03/30		111	%	60 - 140
			Bromoform	2010/03/30		120	%	60 - 140
			Bromomethane	2010/03/30		116	%	60 - 140
			Chlorodibromomethane	2010/03/30		107	%	60 - 140
			Chloroethane	2010/03/30		114	%	60 - 140
			Chloromethane	2010/03/30		123	%	60 - 140
			1,2-dichlorobenzene	2010/03/30		107	%	60 - 140
			1,3-dichlorobenzene	2010/03/30		111	%	60 - 140
			1,4-dichlorobenzene	2010/03/30		111	%	60 - 140
			1,1-dichloroethane	2010/03/30		123	%	60 - 140
			1,1-dichloroethene	2010/03/30		125	%	60 - 140
			cis-1,2-dichloroethene	2010/03/30		113	%	60 - 140
			trans-1,2-dichloroethene	2010/03/30		123	%	60 - 140
			Dichloromethane	2010/03/30		105	%	60 - 140
			1,2-dichloropropane	2010/03/30		112	%	60 - 140
			cis-1,3-dichloropropene	2010/03/30		105	%	60 - 140
			trans-1,3-dichloropropene	2010/03/30		111	%	60 - 140
			Methyl methacrylate	2010/03/30		74	%	60 - 140
			Methyl-tert-butylether (MTBE)	2010/03/30		91	%	60 - 140
			Styrene	2010/03/30		123	%	60 - 140
			1,1,1,2-tetrachloroethane	2010/03/30		113	%	60 - 140
			1,1,2,2-tetrachloroethane	2010/03/30		127	%	60 - 140
			Tetrachloroethene	2010/03/30		114	%	60 - 140
			1,2,4-trichlorobenzene	2010/03/30		63	%	60 - 140

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: CB017883

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3848370	KB7	Matrix Spike	1,1,1-trichloroethane	2010/03/30		126	%	60 - 140
			1,1,2-trichloroethane	2010/03/30		110	%	60 - 140
			Trichloroethene	2010/03/30		116	%	60 - 140
			Trichlorofluoromethane	2010/03/30		130	%	60 - 140
			1,2,4-trimethylbenzene	2010/03/30		97	%	60 - 140
			1,3,5-trimethylbenzene	2010/03/30		85	%	60 - 140
		Spiked Blank	4-BROMOFLUOROBENZENE (sur.)	2010/03/30		100	%	60 - 140
			D10-ETHYLBENZENE (sur.)	2010/03/30		85	%	30 - 130
			D4-1,2-DICHLOROETHANE (sur.)	2010/03/30		95	%	60 - 140
			D8-TOLUENE (sur.)	2010/03/30		97	%	60 - 140
			Bromodichloromethane	2010/03/30		99	%	60 - 140
			Bromoform	2010/03/30		109	%	60 - 140
			Bromomethane	2010/03/30		77	%	60 - 140
			Chlorodibromomethane	2010/03/30		100	%	60 - 140
			Chloroethane	2010/03/30		81	%	60 - 140
			Chloromethane	2010/03/30		65	%	60 - 140
			1,2-dichlorobenzene	2010/03/30		95	%	60 - 140
			1,3-dichlorobenzene	2010/03/30		97	%	60 - 140
			1,4-dichlorobenzene	2010/03/30		98	%	60 - 140
			1,1-dichloroethane	2010/03/30		105	%	60 - 140
			1,1-dichloroethene	2010/03/30		96	%	60 - 140
			cis-1,2-dichloroethene	2010/03/30		97	%	60 - 140
			trans-1,2-dichloroethene	2010/03/30		101	%	60 - 140
			Dichloromethane	2010/03/30		85	%	60 - 140
			1,2-dichloropropane	2010/03/30		97	%	60 - 140
			cis-1,3-dichloropropene	2010/03/30		91	%	60 - 140
			trans-1,3-dichloropropene	2010/03/30		103	%	60 - 140
			Methyl methacrylate	2010/03/30		66	%	60 - 140
			Methyl-tert-butylether (MTBE)	2010/03/30		76	%	60 - 140
			Styrene	2010/03/30		107	%	60 - 140
			1,1,1,2-tetrachloroethane	2010/03/30		104	%	60 - 140
			1,1,2,2-tetrachloroethane	2010/03/30		110	%	60 - 140
			Tetrachloroethene	2010/03/30		99	%	60 - 140
			1,2,3-trichlorobenzene	2010/03/30		52 (1)	%	60 - 140
			1,2,4-trichlorobenzene	2010/03/30		55 (1)	%	60 - 140
			1,3,5-trichlorobenzene	2010/03/30		49 (1)	%	60 - 140
			1,1,1-trichloroethane	2010/03/30		108	%	60 - 140
			1,1,2-trichloroethane	2010/03/30		100	%	60 - 140
			Trichloroethene	2010/03/30		101	%	60 - 140
			Trichlorofluoromethane	2010/03/30		94	%	60 - 140
			1,2,4-trimethylbenzene	2010/03/30		85	%	60 - 140
			1,3,5-trimethylbenzene	2010/03/30		75	%	60 - 140
		Method Blank	4-BROMOFLUOROBENZENE (sur.)	2010/03/30		92	%	60 - 140
			D10-ETHYLBENZENE (sur.)	2010/03/30		82	%	30 - 130
			D4-1,2-DICHLOROETHANE (sur.)	2010/03/30		89	%	60 - 140
			D8-TOLUENE (sur.)	2010/03/30		97	%	60 - 140
			Bromodichloromethane	2010/03/30	<0.03		mg/kg	
			Bromoform	2010/03/30	<0.06		mg/kg	
			Bromomethane	2010/03/30	<0.02		mg/kg	
			Chlorodibromomethane	2010/03/30	<0.02		mg/kg	
			Chloroethane	2010/03/30	<0.02		mg/kg	
			Chloromethane	2010/03/30	<0.03		mg/kg	
			1,2-dichlorobenzene	2010/03/30	<0.02		mg/kg	
			1,3-dichlorobenzene	2010/03/30	<0.02		mg/kg	
			1,4-dichlorobenzene	2010/03/30	<0.02		mg/kg	

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: CB017883

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3848370	KB7	Method Blank	1,1-dichloroethane	2010/03/30	<0.02		mg/kg	
			1,1-dichloroethene	2010/03/30	<0.02		mg/kg	
			cis-1,2-dichloroethene	2010/03/30	<0.02		mg/kg	
			trans-1,2-dichloroethene	2010/03/30	<0.02		mg/kg	
			Dichloromethane	2010/03/30	<0.01		mg/kg	
			1,2-dichloropropane	2010/03/30	<0.02		mg/kg	
			cis-1,3-dichloropropene	2010/03/30	<0.02		mg/kg	
			trans-1,3-dichloropropene	2010/03/30	<0.02		mg/kg	
			Methyl methacrylate	2010/03/30	<0.04		mg/kg	
			Methyl-tert-butylether (MTBE)	2010/03/30	<0.03		mg/kg	
			Styrene	2010/03/30	<0.02		mg/kg	
			1,1,1,2-tetrachloroethane	2010/03/30	<0.1		mg/kg	
			1,1,2,2-tetrachloroethane	2010/03/30	<0.1		mg/kg	
			Tetrachloroethene	2010/03/30	<0.02		mg/kg	
			1,2,3-trichlorobenzene	2010/03/30	<0.04		mg/kg	
			1,2,4-trichlorobenzene	2010/03/30	<0.04		mg/kg	
			1,3,5-trichlorobenzene	2010/03/30	<0.04		mg/kg	
			1,1,1-trichloroethane	2010/03/30	<0.02		mg/kg	
			1,1,2-trichloroethane	2010/03/30	<0.02		mg/kg	
			Trichloroethene	2010/03/30	<0.01		mg/kg	
			Trichlorofluoromethane	2010/03/30	<0.02		mg/kg	
			1,2,4-trimethylbenzene	2010/03/30	<0.6		mg/kg	
			1,3,5-trimethylbenzene	2010/03/30	<0.6		mg/kg	
		RPD	Bromodichloromethane	2010/03/30	NC		%	50
			Bromoform	2010/03/30	NC		%	50
			Bromomethane	2010/03/30	NC		%	50
			Chlorodibromomethane	2010/03/30	NC		%	50
			Chloroethane	2010/03/30	NC		%	50
			Chloromethane	2010/03/30	NC		%	50
			1,2-dichlorobenzene	2010/03/30	NC		%	50
			1,3-dichlorobenzene	2010/03/30	NC		%	50
			1,4-dichlorobenzene	2010/03/30	NC		%	50
			1,1-dichloroethane	2010/03/30	NC		%	50
			1,1-dichloroethene	2010/03/30	NC		%	50
			cis-1,2-dichloroethene	2010/03/30	NC		%	50
			trans-1,2-dichloroethene	2010/03/30	NC		%	50
			Dichloromethane	2010/03/30	40.5		%	50
			1,2-dichloropropane	2010/03/30	NC		%	50
			cis-1,3-dichloropropene	2010/03/30	NC		%	50
			trans-1,3-dichloropropene	2010/03/30	NC		%	50
			Methyl methacrylate	2010/03/30	NC		%	50
			Methyl-tert-butylether (MTBE)	2010/03/30	NC		%	50
			Styrene	2010/03/30	NC		%	50
			1,1,1,2-tetrachloroethane	2010/03/30	NC		%	50
			1,1,2,2-tetrachloroethane	2010/03/30	NC		%	50
			Tetrachloroethene	2010/03/30	56.0 (1)		%	50
			1,2,3-trichlorobenzene	2010/03/30	NC		%	50
			1,2,4-trichlorobenzene	2010/03/30	NC		%	50
			1,3,5-trichlorobenzene	2010/03/30	NC		%	50
			1,1,1-trichloroethane	2010/03/30	NC		%	50
			1,1,2-trichloroethane	2010/03/30	NC		%	50
			Trichloroethene	2010/03/30	NC		%	50
			Trichlorofluoromethane	2010/03/30	NC		%	50
			1,2,4-trimethylbenzene	2010/03/30	NC		%	50
			1,3,5-trimethylbenzene	2010/03/30	NC		%	50

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: CB017883

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3848373	WW1	Matrix Spike	4-BROMOFLUOROBENZENE (sur.)	2010/03/30		120	%	60 - 140
			D10-ETHYLBENZENE (sur.)	2010/03/30		83	%	30 - 130
			D4-1,2-DICHLOROETHANE (sur.)	2010/03/30		117	%	60 - 140
			D8-TOLUENE (sur.)	2010/03/30		107	%	60 - 140
			Carbon tetrachloride	2010/03/30		86	%	60 - 140
			Chlorobenzene	2010/03/30		94	%	60 - 140
			Chloroform	2010/03/30		109	%	60 - 140
			1,2-dichloroethane	2010/03/30		116	%	60 - 140
			Vinyl chloride	2010/03/30		90	%	60 - 140
			1,2-dibromoethane	2010/03/30		103	%	60 - 140
		Spiked Blank	4-BROMOFLUOROBENZENE (sur.)	2010/03/30		121	%	60 - 140
			D10-ETHYLBENZENE (sur.)	2010/03/30		72	%	30 - 130
			D4-1,2-DICHLOROETHANE (sur.)	2010/03/30		106	%	60 - 140
			D8-TOLUENE (sur.)	2010/03/30		110	%	60 - 140
			Carbon tetrachloride	2010/03/30		98	%	60 - 140
			Chlorobenzene	2010/03/30		122	%	60 - 140
			Chloroform	2010/03/30		123	%	60 - 140
			1,2-dichloroethane	2010/03/30		120	%	60 - 140
			Vinyl chloride	2010/03/30		84	%	60 - 140
			1,2-dibromoethane	2010/03/30		109	%	60 - 140
		Method Blank	4-BROMOFLUOROBENZENE (sur.)	2010/03/30		122	%	60 - 140
			D10-ETHYLBENZENE (sur.)	2010/03/30		94	%	30 - 130
			D4-1,2-DICHLOROETHANE (sur.)	2010/03/30		104	%	60 - 140
			D8-TOLUENE (sur.)	2010/03/30		109	%	60 - 140
			Carbon tetrachloride	2010/03/30	<0.0005		mg/kg	
			Chlorobenzene	2010/03/30	<0.001		mg/kg	
			Chloroform	2010/03/30	<0.0008		mg/kg	
			1,2-dichloroethane	2010/03/30	<0.002		mg/kg	
			Vinyl chloride	2010/03/30	<0.0003		mg/kg	
			1,2-dibromoethane	2010/03/30	<0.002		mg/kg	
3848515	MB5	Matrix Spike	Total Antimony (Sb)	2010/03/30		85	%	75 - 125
			Total Arsenic (As)	2010/03/30		81	%	75 - 125
			Total Barium (Ba)	2010/03/30		NC	%	75 - 125
			Total Cadmium (Cd)	2010/03/30		86	%	75 - 125
			Total Chromium (Cr)	2010/03/30		NC	%	75 - 125
			Total Cobalt (Co)	2010/03/30		92	%	75 - 125
			Total Copper (Cu)	2010/03/30		86	%	75 - 125
			Total Lead (Pb)	2010/03/30		86	%	75 - 125
			Total Mercury (Hg)	2010/03/30		85	%	75 - 125
			Total Molybdenum (Mo)	2010/03/30		94	%	75 - 125
			Total Nickel (Ni)	2010/03/30		NC	%	75 - 125
			Total Selenium (Se)	2010/03/30		75	%	75 - 125
			Total Silver (Ag)	2010/03/30		80	%	75 - 125
			Total Thallium (Tl)	2010/03/30		86	%	75 - 125
			Total Tin (Sn)	2010/03/30		89	%	75 - 125
			Total Vanadium (V)	2010/03/30		NC	%	75 - 125
			Total Zinc (Zn)	2010/03/30		NC	%	75 - 125
		QC Standard	Total Arsenic (As)	2010/03/30		105	%	50 - 150
			Total Barium (Ba)	2010/03/30		97	%	69 - 131
			Total Chromium (Cr)	2010/03/30		107	%	41 - 159
			Total Cobalt (Co)	2010/03/30		105	%	75 - 125
			Total Copper (Cu)	2010/03/30		92	%	72 - 127
			Total Lead (Pb)	2010/03/30		90	%	54 - 146
			Total Mercury (Hg)	2010/03/30		95	%	75 - 125
			Total Nickel (Ni)	2010/03/30		110	%	61 - 139

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: CB017883

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3848515	MB5	QC Standard	Total Vanadium (V)	2010/03/30		120	%	50 - 150
			Total Zinc (Zn)	2010/03/30		82	%	72 - 128
		Spiked Blank	Total Antimony (Sb)	2010/03/30		109	%	75 - 125
			Total Arsenic (As)	2010/03/30		95	%	83 - 102
			Total Barium (Ba)	2010/03/30		102	%	75 - 125
			Total Beryllium (Be)	2010/03/30		95	%	75 - 118
			Total Cadmium (Cd)	2010/03/30		97	%	75 - 125
			Total Chromium (Cr)	2010/03/30		100	%	75 - 125
			Total Cobalt (Co)	2010/03/30		104	%	75 - 125
			Total Copper (Cu)	2010/03/30		111	%	75 - 125
			Total Lead (Pb)	2010/03/30		104	%	82 - 118
			Total Mercury (Hg)	2010/03/30		97	%	75 - 125
			Total Molybdenum (Mo)	2010/03/30		101	%	75 - 125
			Total Nickel (Ni)	2010/03/30		112	%	75 - 125
			Total Selenium (Se)	2010/03/30		89	%	75 - 125
			Total Silver (Ag)	2010/03/30		96	%	75 - 125
			Total Thallium (Tl)	2010/03/30		99	%	75 - 125
			Total Tin (Sn)	2010/03/30		98	%	75 - 125
			Total Uranium (U)	2010/03/30		97	%	75 - 125
			Total Vanadium (V)	2010/03/30		102	%	75 - 125
			Total Zinc (Zn)	2010/03/30		102	%	75 - 125
		Method Blank	Total Antimony (Sb)	2010/03/30	<1		mg/kg	
			Total Arsenic (As)	2010/03/30	<1		mg/kg	
			Total Barium (Ba)	2010/03/30	<10		mg/kg	
			Total Beryllium (Be)	2010/03/30	<0.4		mg/kg	
			Total Cadmium (Cd)	2010/03/30	<0.1		mg/kg	
			Total Chromium (Cr)	2010/03/30	<1		mg/kg	
			Total Cobalt (Co)	2010/03/30	<1		mg/kg	
			Total Copper (Cu)	2010/03/30	<5		mg/kg	
			Total Lead (Pb)	2010/03/30	<1		mg/kg	
			Total Mercury (Hg)	2010/03/30	<0.05		mg/kg	
			Total Molybdenum (Mo)	2010/03/30	<0.4		mg/kg	
			Total Nickel (Ni)	2010/03/30	<1		mg/kg	
			Total Selenium (Se)	2010/03/30	<0.5		mg/kg	
			Total Silver (Ag)	2010/03/30	<1		mg/kg	
			Total Thallium (Tl)	2010/03/30	<0.3		mg/kg	
			Total Tin (Sn)	2010/03/30	<1		mg/kg	
			Total Uranium (U)	2010/03/30	<1		mg/kg	
			Total Vanadium (V)	2010/03/30	<1		mg/kg	
			Total Zinc (Zn)	2010/03/30	<10		mg/kg	
		RPD	Total Antimony (Sb)	2010/03/30	NC		%	35
			Total Arsenic (As)	2010/03/30	3.3		%	35
			Total Barium (Ba)	2010/03/30	0.1		%	35
			Total Beryllium (Be)	2010/03/30	NC		%	35
			Total Cadmium (Cd)	2010/03/30	NC		%	35
			Total Chromium (Cr)	2010/03/30	2.8		%	35
			Total Cobalt (Co)	2010/03/30	0.4		%	35
			Total Copper (Cu)	2010/03/30	NC		%	35
			Total Lead (Pb)	2010/03/30	1		%	35
			Total Mercury (Hg)	2010/03/30	NC		%	35
			Total Molybdenum (Mo)	2010/03/30	NC		%	35
			Total Nickel (Ni)	2010/03/30	0.3		%	35
			Total Selenium (Se)	2010/03/30	NC		%	35
			Total Silver (Ag)	2010/03/30	NC		%	35
			Total Thallium (Tl)	2010/03/30	NC		%	35

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: CB017883

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3848515	MB5	RPD	Total Tin (Sn)	2010/03/30	NC		%	35
			Total Uranium (U)	2010/03/30	NC		%	35
			Total Vanadium (V)	2010/03/30	1.7		%	35
			Total Zinc (Zn)	2010/03/30	NC		%	35
3848548	LZ0	QC Standard	Saturation %	2010/03/29		100	%	93 - 107
		RPD	Saturation %	2010/03/29	2.0		%	12
3849907	SJ1	Matrix Spike [T37959-01]	D10-ANTHRACENE (sur.)	2010/03/30		111	%	30 - 130
			D12-BENZO(A)PYRENE (sur.)	2010/03/30		85	%	30 - 130
			D8-ACENAPHTHYLENE (sur.)	2010/03/30		102	%	30 - 130
			TERPHENYL-D14 (sur.)	2010/03/30		99	%	30 - 130
			Acenaphthene	2010/03/30		109	%	30 - 130
			Acenaphthylene	2010/03/30		101	%	30 - 130
			Acridine	2010/03/30		56	%	30 - 130
			Anthracene	2010/03/30		84	%	30 - 130
			Benzo(a)anthracene	2010/03/30		89	%	30 - 130
			Benzo(b&j)fluoranthene	2010/03/30		81	%	30 - 130
			Benzo(k)fluoranthene	2010/03/30		91	%	30 - 130
			Benzo(g,h,i)perylene	2010/03/30		95	%	30 - 130
			Benzo(c)phenanthrene	2010/03/30		88	%	30 - 130
			Benzo(a)pyrene	2010/03/30		79	%	30 - 130
			Benzo[e]pyrene	2010/03/30		80	%	30 - 130
			Chrysene	2010/03/30		90	%	30 - 130
			Dibenz(a,h)anthracene	2010/03/30		93	%	30 - 130
			Fluoranthene	2010/03/30		107	%	30 - 130
			Fluorene	2010/03/30		102	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2010/03/30		97	%	30 - 130
			2-Methylnaphthalene	2010/03/30		87	%	30 - 130
			Naphthalene	2010/03/30		108	%	30 - 130
			Phenanthrene	2010/03/30		106	%	30 - 130
			Perylene	2010/03/30		97	%	30 - 130
			Pyrene	2010/03/30		103	%	30 - 130
			Quinoline	2010/03/30		75	%	30 - 130
		Spiked Blank	D10-ANTHRACENE (sur.)	2010/03/30		116	%	30 - 130
			D12-BENZO(A)PYRENE (sur.)	2010/03/30		81	%	30 - 130
			D8-ACENAPHTHYLENE (sur.)	2010/03/30		102	%	30 - 130
			TERPHENYL-D14 (sur.)	2010/03/30		98	%	30 - 130
			Acenaphthene	2010/03/30		105	%	30 - 130
			Acenaphthylene	2010/03/30		102	%	30 - 130
			Acridine	2010/03/30		56	%	30 - 130
			Anthracene	2010/03/30		81	%	30 - 130
			Benzo(a)anthracene	2010/03/30		79	%	30 - 130
			Benzo(b&j)fluoranthene	2010/03/30		78	%	30 - 130
			Benzo(k)fluoranthene	2010/03/30		93	%	30 - 130
			Benzo(g,h,i)perylene	2010/03/30		89	%	30 - 130
			Benzo(c)phenanthrene	2010/03/30		85	%	30 - 130
			Benzo(a)pyrene	2010/03/30		72	%	30 - 130
			Benzo[e]pyrene	2010/03/30		75	%	30 - 130
			Chrysene	2010/03/30		88	%	30 - 130
			Dibenz(a,h)anthracene	2010/03/30		81	%	30 - 130
			Fluoranthene	2010/03/30		107	%	30 - 130
			Fluorene	2010/03/30		101	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2010/03/30		87	%	30 - 130
			2-Methylnaphthalene	2010/03/30		84	%	30 - 130
			Naphthalene	2010/03/30		106	%	30 - 130

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: CB017883

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3849907	SJ1	Spiked Blank	Phenanthrene	2010/03/30		105	%	30 - 130
			Perylene	2010/03/30		99	%	30 - 130
			Pyrene	2010/03/30		104	%	30 - 130
			Quinoline	2010/03/30		73	%	30 - 130
		Method Blank	D10-ANTHRACENE (sur.)	2010/03/30		126	%	30 - 130
			D12-BENZO(A)PYRENE (sur.)	2010/03/30		69	%	30 - 130
			D8-ACENAPHTHYLENE (sur.)	2010/03/30		103	%	30 - 130
			TERPHENYL-D14 (sur.)	2010/03/30		98	%	30 - 130
			Acenaphthene	2010/03/30	<0.0050		mg/kg	
			Acenaphthylene	2010/03/30	<0.0050		mg/kg	
			Acridine	2010/03/30	<0.010		mg/kg	
			Anthracene	2010/03/30	<0.0040		mg/kg	
			Benzo(a)anthracene	2010/03/30	<0.0050		mg/kg	
			Benzo(b&j)fluoranthene	2010/03/30	<0.0050		mg/kg	
			Benzo(k)fluoranthene	2010/03/30	<0.0050		mg/kg	
			Benzo(g,h,i)perylene	2010/03/30	<0.0050		mg/kg	
			Benzo(c)phenanthrene	2010/03/30	<0.0050		mg/kg	
			Benzo(a)pyrene	2010/03/30	<0.0050		mg/kg	
			Benzo[e]pyrene	2010/03/30	<0.0050		mg/kg	
			Chrysene	2010/03/30	<0.0050		mg/kg	
			Dibenz(a,h)anthracene	2010/03/30	<0.0050		mg/kg	
			Fluoranthene	2010/03/30	<0.0050		mg/kg	
			Fluorene	2010/03/30	<0.0050		mg/kg	
			Indeno(1,2,3-cd)pyrene	2010/03/30	<0.0050		mg/kg	
			2-Methylnaphthalene	2010/03/30	<0.0050		mg/kg	
			Naphthalene	2010/03/30	<0.0050		mg/kg	
			Phenanthrene	2010/03/30	<0.0050		mg/kg	
			Perylene	2010/03/30	<0.0050		mg/kg	
			Pyrene	2010/03/30	<0.0050		mg/kg	
			Quinoline	2010/03/30	<0.010		mg/kg	
		RPD [T37959-01]	Acenaphthene	2010/03/30	NC		%	50
			Acenaphthylene	2010/03/30	NC		%	50
			Acridine	2010/03/30	NC		%	50
			Anthracene	2010/03/30	NC		%	50
			Benzo(a)anthracene	2010/03/30	NC		%	50
			Benzo(b&j)fluoranthene	2010/03/30	14.9		%	50
			Benzo(k)fluoranthene	2010/03/30	NC		%	50
			Benzo(g,h,i)perylene	2010/03/30	9.9		%	50
			Benzo(c)phenanthrene	2010/03/30	NC		%	50
			Benzo(a)pyrene	2010/03/30	NC		%	50
			Benzo[e]pyrene	2010/03/30	5.7		%	50
			Chrysene	2010/03/30	NC		%	50
			Dibenz(a,h)anthracene	2010/03/30	NC		%	50
			Fluoranthene	2010/03/30	NC		%	50
			Fluorene	2010/03/30	NC		%	50
			Indeno(1,2,3-cd)pyrene	2010/03/30	NC		%	50
			2-Methylnaphthalene	2010/03/30	NC		%	50
			Naphthalene	2010/03/30	4.5		%	50
			Phenanthrene	2010/03/30	3.4		%	50
			Perylene	2010/03/30	NC		%	50
			Pyrene	2010/03/30	NC		%	50
			Quinoline	2010/03/30	NC		%	50
3849909	LSH	Matrix Spike [T37959-01]	O-TERPHENYL (sur.)	2010/03/30		94	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2010/03/30		100	%	50 - 130

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: CB017883

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3849909	LSH	Matrix Spike						
		[T37959-01]	F3 (C16-C34 Hydrocarbons)	2010/03/30		117	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2010/03/30		100	%	50 - 130
		Spiked Blank	O-TERPHENYL (sur.)	2010/03/30		95	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2010/03/30		100	%	80 - 120
			F3 (C16-C34 Hydrocarbons)	2010/03/30		96	%	80 - 120
			F4 (C34-C50 Hydrocarbons)	2010/03/30		83	%	80 - 120
		Method Blank	O-TERPHENYL (sur.)	2010/03/30		88	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2010/03/30	<10		mg/kg	
			F3 (C16-C34 Hydrocarbons)	2010/03/30	<10		mg/kg	
			F4 (C34-C50 Hydrocarbons)	2010/03/30	<10		mg/kg	
		RPD [T37959-01]	F2 (C10-C16 Hydrocarbons)	2010/03/30	NC		%	50
			F3 (C16-C34 Hydrocarbons)	2010/03/30	NC		%	50
			F4 (C34-C50 Hydrocarbons)	2010/03/30	NC		%	50
3850109	DP3	Matrix Spike	Soluble Calcium (Ca)	2010/03/30		NC	%	75 - 125
			Soluble Magnesium (Mg)	2010/03/30		99	%	75 - 125
			Soluble Sodium (Na)	2010/03/30		101	%	75 - 125
			Soluble Potassium (K)	2010/03/30		97	%	75 - 125
		QC Standard	Soluble Calcium (Ca)	2010/03/30		100	%	75 - 125
			Soluble Magnesium (Mg)	2010/03/30		105	%	76 - 124
			Soluble Sodium (Na)	2010/03/30		102	%	85 - 115
			Soluble Potassium (K)	2010/03/30		88	%	82 - 118
			Soluble Sulphate (SO4)	2010/03/30		99	%	75 - 125
		Spiked Blank	Soluble Calcium (Ca)	2010/03/30		103	%	87 - 116
			Soluble Magnesium (Mg)	2010/03/30		104	%	82 - 115
			Soluble Sodium (Na)	2010/03/30		107	%	84 - 119
			Soluble Potassium (K)	2010/03/30		101	%	81 - 115
		Method Blank	Soluble Calcium (Ca)	2010/03/30	<1.5		mg/L	
			Soluble Magnesium (Mg)	2010/03/30	<1.0		mg/L	
			Soluble Sodium (Na)	2010/03/30	<2.5		mg/L	
			Soluble Potassium (K)	2010/03/30	1.5, RDL=1.3		mg/L	
			Soluble Sulphate (SO4)	2010/03/30	<5.0		mg/L	
		RPD	Soluble Calcium (Ca)	2010/03/30	3.4		%	35
			Soluble Magnesium (Mg)	2010/03/30	0.6		%	35
			Soluble Sodium (Na)	2010/03/30	6.2		%	35
			Soluble Potassium (K)	2010/03/30	3.6		%	35
			Soluble Sulphate (SO4)	2010/03/30	2.2		%	35
3850256	DP3	Matrix Spike	Soluble (Hot water) Boron (B)	2010/03/30		NC	%	75 - 125
		Spiked Blank	Soluble (Hot water) Boron (B)	2010/03/30		97	%	80 - 120
		Method Blank	Soluble (Hot water) Boron (B)	2010/03/30	<0.1		mg/kg	
		RPD	Soluble (Hot water) Boron (B)	2010/03/30	15.5		%	35
3850628	LZ0	QC Standard	Soluble Conductivity	2010/03/30		103	%	84 - 116
		Spiked Blank	Soluble Conductivity	2010/03/30		99	%	95 - 105
		Method Blank	Soluble Conductivity	2010/03/30	<0.02		dS/m	
		RPD	Soluble Conductivity	2010/03/30	3.9		%	35
3850830	JBA	Matrix Spike	Soluble Chloride (Cl)	2010/03/30		NC	%	75 - 125
		QC Standard	Soluble Chloride (Cl)	2010/03/30		91	%	76 - 124
		Spiked Blank	Soluble Chloride (Cl)	2010/03/30		101	%	96 - 106
		Method Blank	Soluble Chloride (Cl)	2010/03/30	<5		mg/L	
		RPD	Soluble Chloride (Cl)	2010/03/30	2.1		%	35
3851438	DV1	Spiked Blank	Leachable (ZH) 4-BROMOFLUOROBENZEN	2010/03/31		102	%	60 - 140
			Leachable (ZH) D4-1,2-DICHLOROETHANE	2010/03/31		107	%	60 - 140
			Leachable (ZH) D8-TOLUENE (sur.)	2010/03/31		99	%	60 - 140
			Leachable (ZH) Benzene	2010/03/31		89	%	70 - 130
			Leachable (ZH) Toluene	2010/03/31		88	%	70 - 130

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: CB017883

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3851438	DV1	Spiked Blank	Leachable (ZH) Ethylbenzene	2010/03/31		86	%	70 - 130
			Leachable (ZH) o-Xylene	2010/03/31		86	%	70 - 130
			Leachable (ZH) m & p-Xylene	2010/03/31		85	%	70 - 130
		Method Blank	Leachable (ZH) 4-BROMOFLUOROBENZEN	2010/03/31		98	%	60 - 140
			Leachable (ZH) D4-1,2-DICHLOROETHANE	2010/03/31		105	%	60 - 140
			Leachable (ZH) D8-TOLUENE (sur.)	2010/03/31		102	%	60 - 140
			Leachable (ZH) Benzene	2010/03/31	<10		ug/L	
			Leachable (ZH) Toluene	2010/03/31	<10		ug/L	
			Leachable (ZH) Ethylbenzene	2010/03/31	<10		ug/L	
			Leachable (ZH) o-Xylene	2010/03/31	<10		ug/L	
			Leachable (ZH) m & p-Xylene	2010/03/31	<20		ug/L	
			Leachable (ZH) Xylenes (Total)	2010/03/31	<20		ug/L	
		RPD	Leachable (ZH) Benzene	2010/03/31	NC		%	50
			Leachable (ZH) Toluene	2010/03/31	NC		%	50
			Leachable (ZH) Ethylbenzene	2010/03/31	NC		%	50
			Leachable (ZH) o-Xylene	2010/03/31	NC		%	50
			Leachable (ZH) m & p-Xylene	2010/03/31	NC		%	50
			Leachable (ZH) Xylenes (Total)	2010/03/31	NC		%	50
3852101	MG3	QC Standard	Sulphur (Elemental & Polysulphide)	2010/03/30		84	%	75 - 125
		Method Blank	Sulphur (Elemental & Polysulphide)	2010/03/30	<100		mg/kg	
		RPD [T37974-01]	Sulphur (Elemental & Polysulphide)	2010/03/30	NC		%	35
3852272	AP1	Matrix Spike						
		[T37955-01]	Extractable (Water) Diisopropanolamine(DIP	2010/03/30		NC	%	30 - 130
		QC Standard	Extractable (Water) Diisopropanolamine(DIP	2010/03/30		77	%	40 - 80
		Spiked Blank	Extractable (Water) Diisopropanolamine(DIP	2010/03/30		102	%	70 - 115
		Method Blank	Extractable (Water) Diisopropanolamine(DIP	2010/03/30	<0.5		mg/kg	
		RPD [T37955-01]	Extractable (Water) Diisopropanolamine(DIP	2010/03/30	NC		%	50
3852329	SMB	QC Standard	Closed Cup Flash point	2010/03/30		101	%	85 - 115
		RPD	Closed Cup Flash point	2010/03/30	3.9		%	35
3852698	ST4	Matrix Spike	Leachable Antimony (Sb)	2010/03/31		104	%	80 - 120
			Leachable Arsenic (As)	2010/03/31		96	%	80 - 120
			Leachable Barium (Ba)	2010/03/31		NC	%	80 - 120
			Leachable Beryllium (Be)	2010/03/31		93	%	80 - 120
			Leachable Boron (B)	2010/03/31		96	%	75 - 125
			Leachable Cadmium (Cd)	2010/03/31		97	%	80 - 120
			Leachable Chromium (Cr)	2010/03/31		93	%	80 - 120
			Leachable Cobalt (Co)	2010/03/31		99	%	80 - 120
			Leachable Copper (Cu)	2010/03/31		89	%	80 - 120
			Leachable Iron (Fe)	2010/03/31		NC	%	75 - 125
			Leachable Lead (Pb)	2010/03/31		93	%	80 - 120
			Leachable Mercury (Hg)	2010/03/31		83	%	80 - 120
			Leachable Nickel (Ni)	2010/03/31		90	%	80 - 120
			Leachable Selenium (Se)	2010/03/31		98	%	80 - 120
			Leachable Silver (Ag)	2010/03/31		99	%	80 - 120
			Leachable Thallium (Tl)	2010/03/31		92	%	80 - 120
			Leachable Uranium (U)	2010/03/31		91	%	80 - 120
			Leachable Vanadium (V)	2010/03/31		97	%	80 - 120
			Leachable Zinc (Zn)	2010/03/31		90	%	80 - 120
			Leachable Zirconium (Zr)	2010/03/31		95	%	75 - 125
		Spiked Blank	Leachable Antimony (Sb)	2010/03/31		98	%	80 - 120
			Leachable Arsenic (As)	2010/03/31		92	%	83 - 104
			Leachable Barium (Ba)	2010/03/31		95	%	80 - 119
			Leachable Beryllium (Be)	2010/03/31		97	%	80 - 120
			Leachable Boron (B)	2010/03/31		100	%	80 - 120
			Leachable Cadmium (Cd)	2010/03/31		97	%	80 - 114

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: CB017883

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3852698	ST4	Spiked Blank	Leachable Chromium (Cr)	2010/03/31		92	%	80 - 115
			Leachable Cobalt (Co)	2010/03/31		100	%	80 - 120
			Leachable Copper (Cu)	2010/03/31		94	%	80 - 116
			Leachable Iron (Fe)	2010/03/31		85	%	80 - 120
			Leachable Lead (Pb)	2010/03/31		95	%	80 - 116
			Leachable Mercury (Hg)	2010/03/31		84	%	80 - 120
			Leachable Nickel (Ni)	2010/03/31		92	%	80 - 116
			Leachable Selenium (Se)	2010/03/31		91	%	80 - 117
			Leachable Silver (Ag)	2010/03/31		101	%	80 - 119
			Leachable Thallium (Tl)	2010/03/31		95	%	80 - 116
			Leachable Uranium (U)	2010/03/31		91	%	80 - 120
			Leachable Vanadium (V)	2010/03/31		100	%	80 - 120
			Leachable Zinc (Zn)	2010/03/31		92	%	80 - 120
			Leachable Zirconium (Zr)	2010/03/31		85	%	80 - 120
		Method Blank	Leachable Antimony (Sb)	2010/03/31	<1		mg/L	
			Leachable Arsenic (As)	2010/03/31	<0.5		mg/L	
			Leachable Barium (Ba)	2010/03/31	<1		mg/L	
			Leachable Beryllium (Be)	2010/03/31	<0.5		mg/L	
			Leachable Boron (B)	2010/03/31	<1		mg/L	
			Leachable Cadmium (Cd)	2010/03/31	<0.1		mg/L	
			Leachable Chromium (Cr)	2010/03/31	<0.5		mg/L	
			Leachable Cobalt (Co)	2010/03/31	<1		mg/L	
			Leachable Copper (Cu)	2010/03/31	<1		mg/L	
			Leachable Iron (Fe)	2010/03/31	<1		mg/L	
			Leachable Lead (Pb)	2010/03/31	<0.5		mg/L	
			Leachable Mercury (Hg)	2010/03/31	<0.02		mg/L	
			Leachable Nickel (Ni)	2010/03/31	<0.5		mg/L	
			Leachable Selenium (Se)	2010/03/31	<0.1		mg/L	
			Leachable Silver (Ag)	2010/03/31	<0.5		mg/L	
			Leachable Thallium (Tl)	2010/03/31	<0.5		mg/L	
			Leachable Uranium (U)	2010/03/31	<0.2		mg/L	
			Leachable Vanadium (V)	2010/03/31	<1		mg/L	
			Leachable Zinc (Zn)	2010/03/31	<1		mg/L	
			Leachable Zirconium (Zr)	2010/03/31	<1		mg/L	
		RPD	Leachable Antimony (Sb)	2010/03/31	NC		%	35
			Leachable Arsenic (As)	2010/03/31	NC		%	35
			Leachable Barium (Ba)	2010/03/31	NC		%	35
			Leachable Beryllium (Be)	2010/03/31	NC		%	35
			Leachable Boron (B)	2010/03/31	NC		%	35
			Leachable Cadmium (Cd)	2010/03/31	NC		%	35
			Leachable Chromium (Cr)	2010/03/31	NC		%	35
			Leachable Cobalt (Co)	2010/03/31	NC		%	35
			Leachable Copper (Cu)	2010/03/31	NC		%	35
			Leachable Iron (Fe)	2010/03/31	NC		%	35
			Leachable Lead (Pb)	2010/03/31	NC		%	35
			Leachable Mercury (Hg)	2010/03/31	NC		%	35
			Leachable Nickel (Ni)	2010/03/31	NC		%	35
			Leachable Selenium (Se)	2010/03/31	NC		%	35
			Leachable Silver (Ag)	2010/03/31	NC		%	35
			Leachable Thallium (Tl)	2010/03/31	NC		%	35
			Leachable Uranium (U)	2010/03/31	NC		%	35
			Leachable Vanadium (V)	2010/03/31	NC		%	35
			Leachable Zinc (Zn)	2010/03/31	NC		%	35
			Leachable Zirconium (Zr)	2010/03/31	NC		%	35

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: CB017883

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Validation Signature Page

Maxxam Job #: B017883

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

ABIDA MUSHTAQ,

JENNIFER LO, Senior Analyst, Organics Department

LILI ZHOU, Senior analyst, Inorganic department.

ORLA JORGENSEN, Organics Supervisor

VERONICA FALK, Scientific Specialist

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics

Calgary: 4000 19st St. NE, T2E 6P8 | Ph: (403) 291-3077 | Fax: (403) 735-2240 | Toll free: (800) 386-7247
Edmonton: 9331 – 48 Street, T6B 2R4 | Ph: (780) 465-1212 | Fax: (780) 450-4187 | Toll free: (877) 465-8889
www.maxxamanalytics.com

105472 **CHAIN OF CUSTODY**

Page: 1 of 2

Invoice To: Require Report? Yes [X] No [ ]	**Report To:**	
Company Name: P4H ARC ENVIRONMENTAL	Same	PO # / AFE #:
Contact Name: GREG RUSLING		Quotation #:
Address: 111, 11505-35 St. SE, CALGARY		Project #: 51645D
Prov: AB PC: T2Z 4B1	Prov: PC:	Project Name:
Contact #s: Ph: 403 875 5092 Fax: 403 291 0612	Ph: Fax:	Location:
		Sampler's Initials: GR/MW

DETECTION LIMIT REQUIREMENTS:
Check the applicable criterion and indicate land use
[X] AT1
[ ] CCME
[ ] OTHER

REPORT DISTRIBUTION:
EMAIL ADDRESS(S):
grusling@phhenv.com

SERVICE REQUESTED:
[ ] **RUSH** (Please ensure you contact the lab to reserve)
Date Required:
[X] REGULAR Turnaround (5 to 7 Days)

	Sample Identification	Matrix S/W	Date & Time Sampled Year/Month/Day	SOILS (footnotes defined on back): BTEX F1-F4	Sieve (75 micron)	Salinity 4	Regulated Metals (CCME / AT1)[1]	Assessment ICP Metals[2]	Paint Filter	Flashpoint	pH (1:1)	TCLP	BTEX	Metals	VOC	PAH	STERILENT	WATERS (footnotes defined on back): BTEX F1	VOCs	BTEX F1-F2	BTEX F1-F4	Routine Water Package	Turb	F	REGULATED METALS (CCME / AT1)[3] Total Preserved	Total Not Preserved	Dissolved Preserved	Dissolved Not Preserved	Dissolved Filtered	Dissolved Not Filtered	Mercury	Total	Dissolved	Ammonia	TKN	COD	TOC	DOC	OTHER TEST(S): AMINES (DIPA)	ELEMENTAL SULPHUR	*HOLD for 60 Days	# of Containers Submitted
1	MW100-10 @ 15	S	MARCH 25, 2010	X	X	X	X																																			
2	MW101-10 @ 10	S	"	X		X	X																																X			
3	BH102-10 @ 5	S	"	X		X	X							X																												
4	BH103-10 @ 2.5	S	"	X			X																																			
5	BH104-10 @ 2.5	S	"	X		X	X							X																												
6	BH105-10 @ 2.5	S	"	X	X	X	X								X	X																								X			
7	MW106-10 @ 12.5	S	MARCH 26, 2010	X		X	X								X	X																										
8	MW107-10 @ 2.5	S	"			X	X																																			
9	MW107-10 @ 12.5	S	"			X	X																																			
10	SS1																																							X		
11	SS3																																							X		
12	SS5																																							X		

*All samples are held for 60 calendar days after sample receipt. For long term storage please contact your project manager.

Maxxam Job #: B017883

Relinquished By: Greg Rusling Date/Time: March 26/10 8:00
Sign and Print:
COMMENTS/SPECIAL INSTRUCTIONS:

# JARS USED & NOT SUBMITTED	Received By	Temperature			Ice
	MAR 27 2010 AM 9:00	9	8	8	NO
	CUSTODY SEAL YES / NO				

Maxxam Analytics

Calgary: 4000 19st St. NE, T2E 6P8 | Ph: (403) 291-3077 | Fax: (403) 735-2240 | Toll free: (800) 386-7247
Edmonton: 9331 – 48 Street, T6B 2R4 | Ph: (780) 465-1212 | Fax: (780) 450-4187 | Toll free: (877) 465-8889
www.maxxamanalytics.com

105473 CHAIN OF CUSTODY

Page: 1 of 2

Invoice To: Require Report? Yes ☒ No ☐	Report To:	
Company Name: PHH ARC ENVIRONMENTAL	Same	PO # / AFE #:
Contact Name: GREG RUSLING		Quotation #:
Address: 111, 11505-35 St. SE, CALGARY		Project #: 516450
Prov: AB PC: T2Z 4B1	Prov: PC:	Project Name:
Contact #s: Ph: 403 875 5092 Fax: 403 291 0612	Ph: Fax:	Location:
		Sampler's Initials: GR / MW

DETECTION LIMIT REQUIREMENTS:
Check the applicable criterion and indicate land use
☒ AT1
☐ CCME
☐ OTHER

REPORT DISTRIBUTION:
EMAIL ADDRESS(S):
grusling@phharcenv.com

SERVICE REQUESTED:
☐ RUSH (Please ensure you contact the lab to reserve)
Date Required:
☒ REGULAR Turnaround (5 to 7 Days)

	Sample Identification	Matrix S/W	Date & Time Sampled Year/Month/Day	SOILS: BTEX F1-F4	Sieve (75 micron)	Salinity 4	Regulated Metals (CCME / AT1)[1]	Assessment ICP Metals[2]	☒ Paint Filter ☒ Flashpoint ☒ pH (1:1)	TCLP ☒ BTEX ☒ Metals	WATERS: ☐ BTEX F1 ☐ VOCs	☐ BTEX F1-F2 ☐ BTEX F1-F4	Routine Water Package ☐ Turb ☐ F	REGULATED METALS (CCME / AT1)[3]: Total ☐ Preserved ☐ Not Preserved	Dissolved ☐ Preserved ☐ Not Preserved ☐ Filtered ☐ Not Filtered	Mercury ☐ Total ☐ Dissolved	☐ Ammonia ☐ TKN ☐ COD	☐ TOC ☐ DOC	OTHER TEST(S): ELEMENTAL SULPHUR	*HOLD for 60 Days	# of Containers Submitted
1	SS7	S	MARCH 26, 2010																X		
2	COMP	S	MARCH 26, 2010						X	X											
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

*All samples are held for 60 calendar days after sample receipt. For long term storage please contact your project manager.

Maxxam Job #: B017883

Relinquished By: Greg Rusling Date/Time: March 26/10
Sign and Print:
COMMENTS/SPECIAL INSTRUCTIONS:

# JARS USED & NOT SUBMITTED	Received By	Temperature	Ice
	RECEIVED MAR 27 2010 AN7 9:00		NO
	CUSTODY SEAL YES / NO		

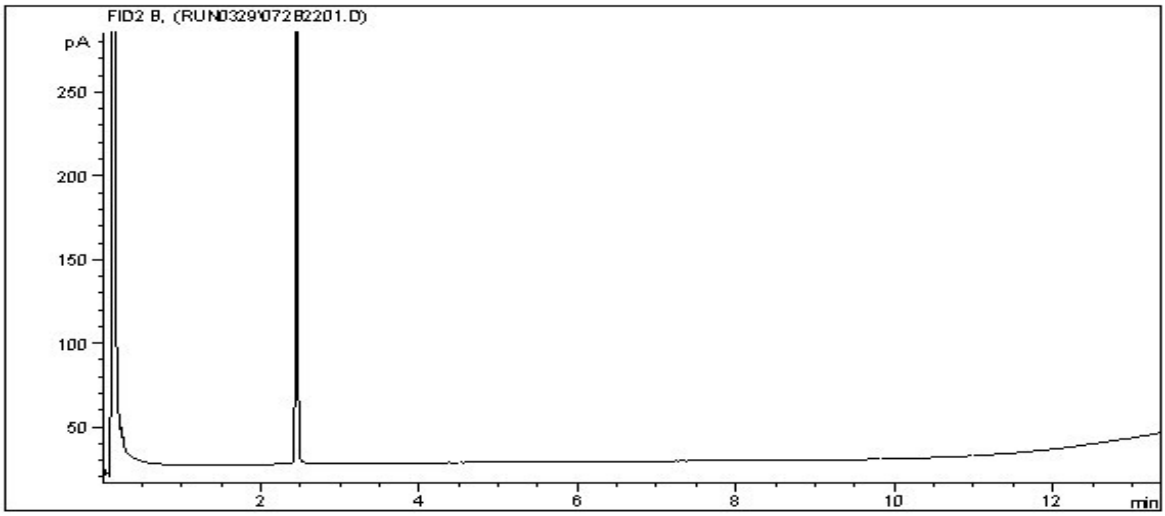
PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTR

Report Date: 2010/03/31
Maxxam Job #: B017883
Maxxam Sample: T37954

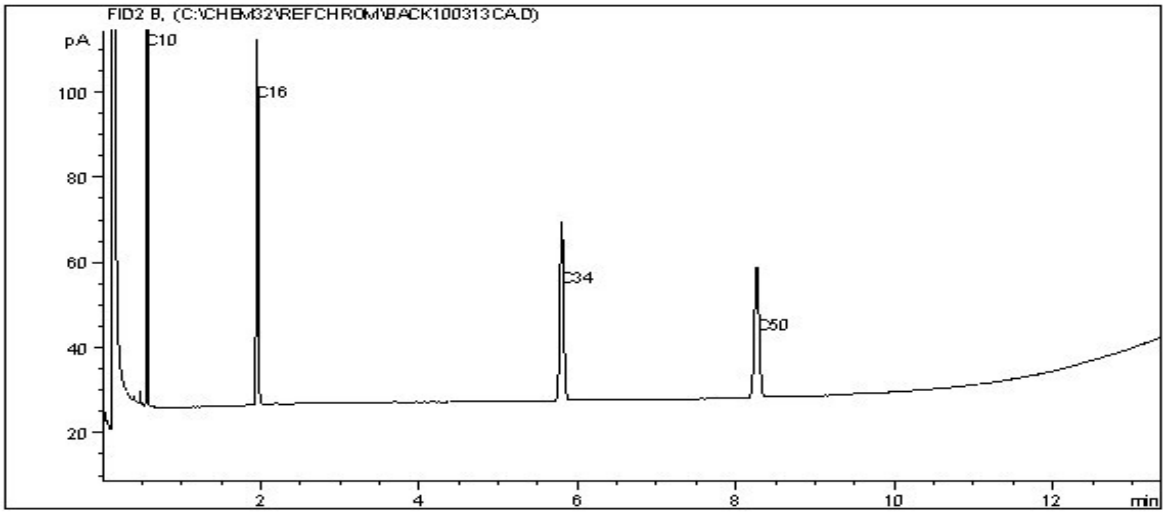
Client Project #: 51645D

Client ID: MW100-10 @ 15

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12		Diesel:	C8 - C22	
Varsol:	C8 - C12		Lubricating Oils:	C20 - C40	
Kerosene:	C7 - C16		Crude Oils:	C3 - C60+	

Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist intrepretation or fingerprinting be required to please contact the laboratory.

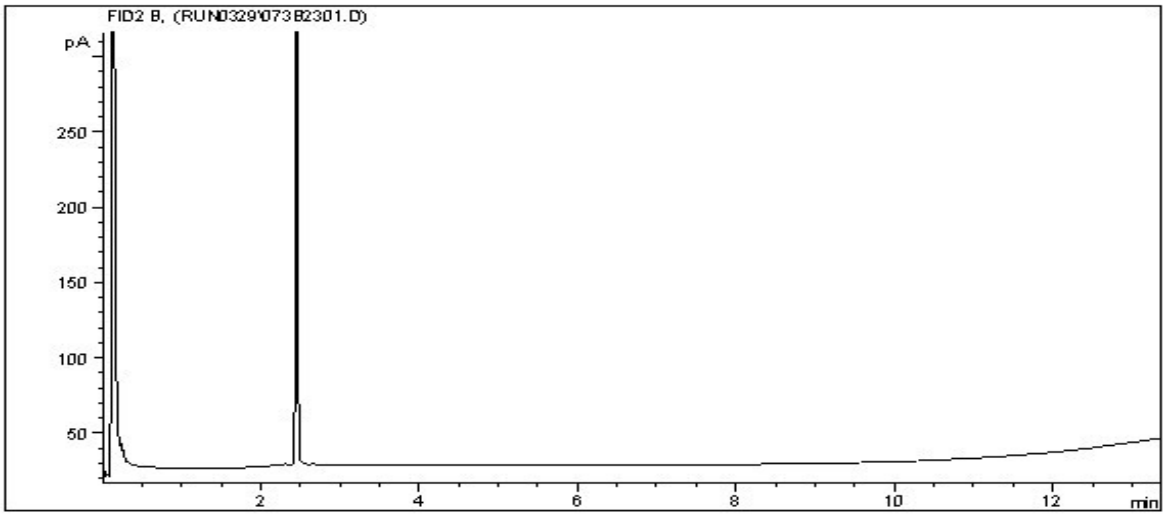
PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTR

Report Date: 2010/03/31
Maxxam Job #: B017883
Maxxam Sample: T37955

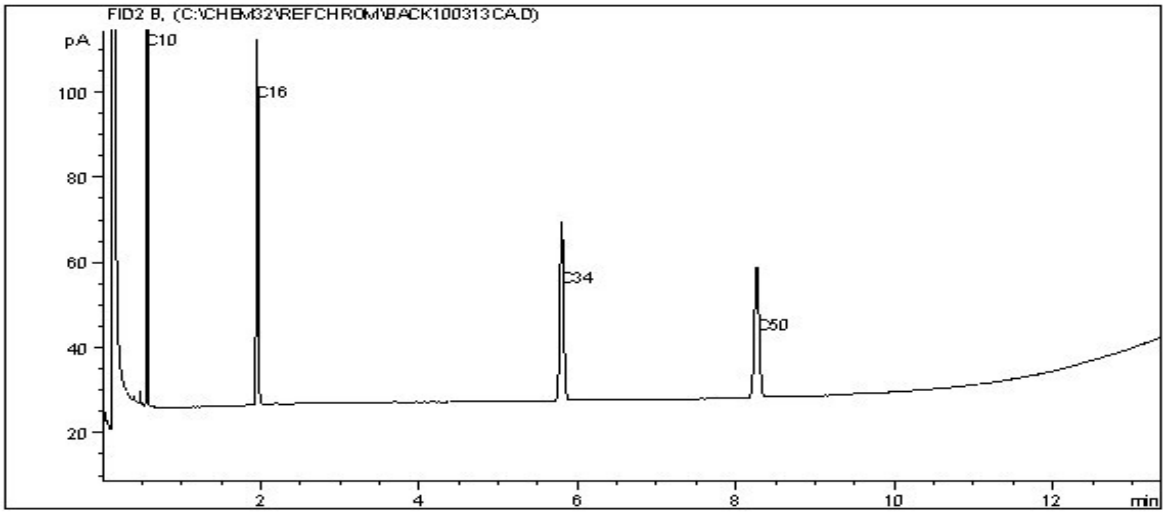
Client Project #: 51645D

Client ID: MW101-10 @ 10

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12		Diesel:	C8 - C22	
Varsol:	C8 - C12		Lubricating Oils:	C20 - C40	
Kerosene:	C7 - C16		Crude Oils:	C3 - C60+	

Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist intrepretation or fingerprinting be required to please contact the laboratory.

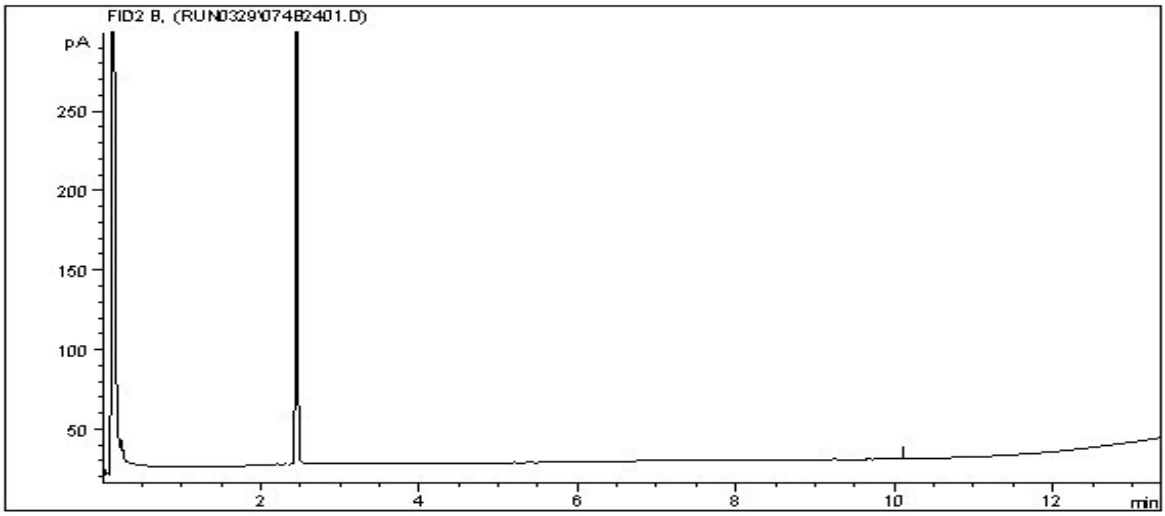
PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTR

Report Date: 2010/03/31
Maxxam Job #: B017883
Maxxam Sample: T37956

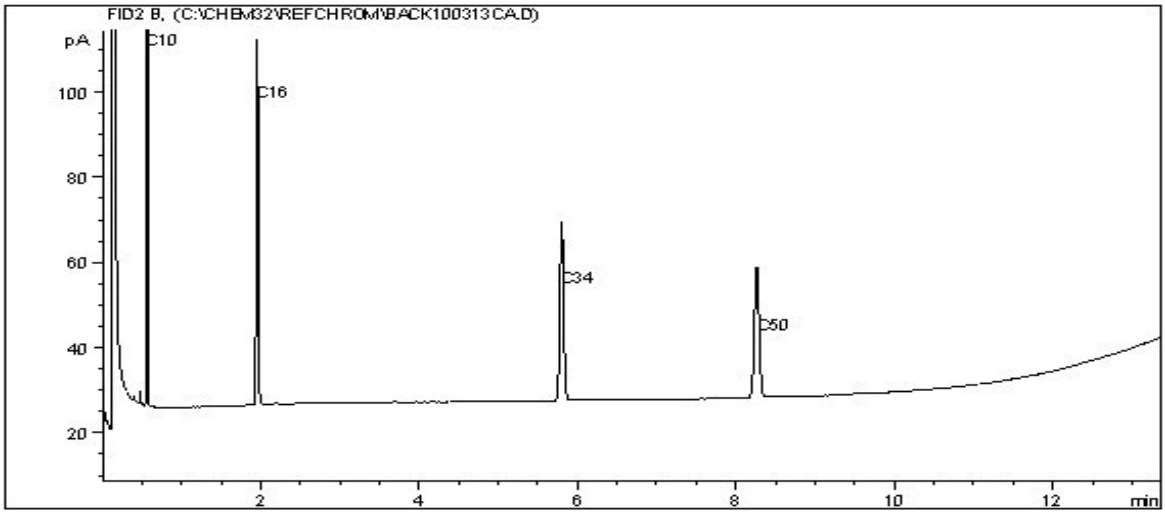
Client Project #: 51645D

Client ID: BH102-10 @ 5

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12		Diesel:	C8 - C22	
Varsol:	C8 - C12		Lubricating Oils:	C20 - C40	
Kerosene:	C7 - C16		Crude Oils:	C3 - C60+	

Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist intrepretation or fingerprinting be required to please contact the laboratory.

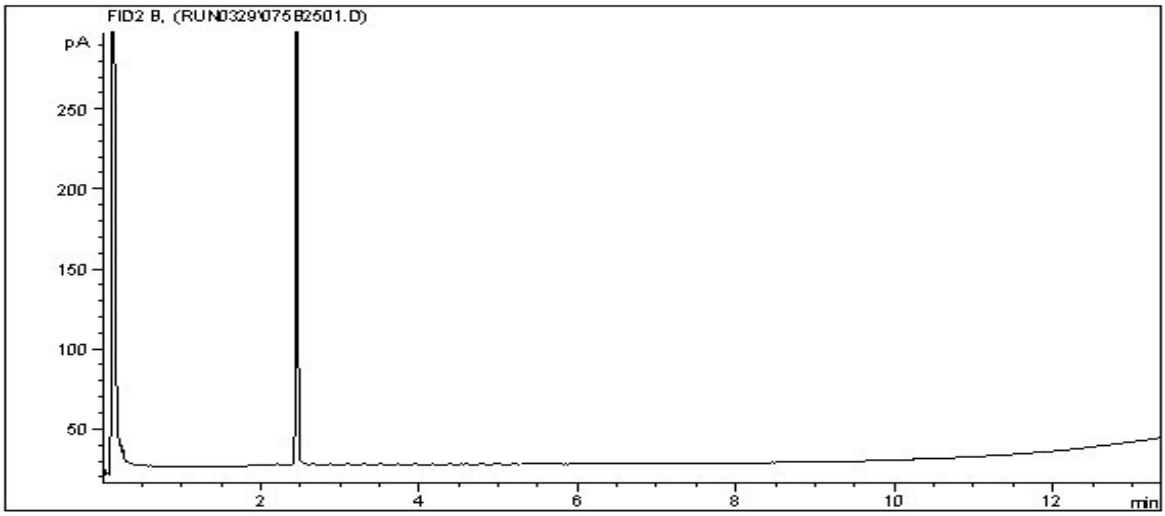
PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTR

Report Date: 2010/03/31
Maxxam Job #: B017883
Maxxam Sample: T37957

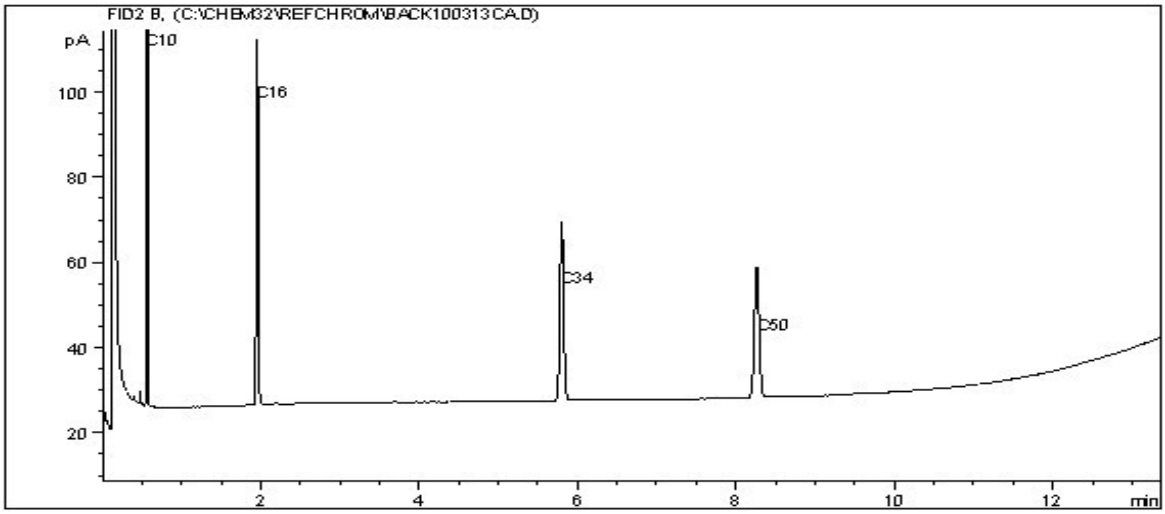
Client Project #: 51645D

Client ID: BH103-10 @ 2.5

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12		Diesel:	C8 - C22	
Varsol:	C8 - C12		Lubricating Oils:	C20 - C40	
Kerosene:	C7 - C16		Crude Oils:	C3 - C60+	

Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist intrepretation or fingerprinting be required to please contact the laboratory.

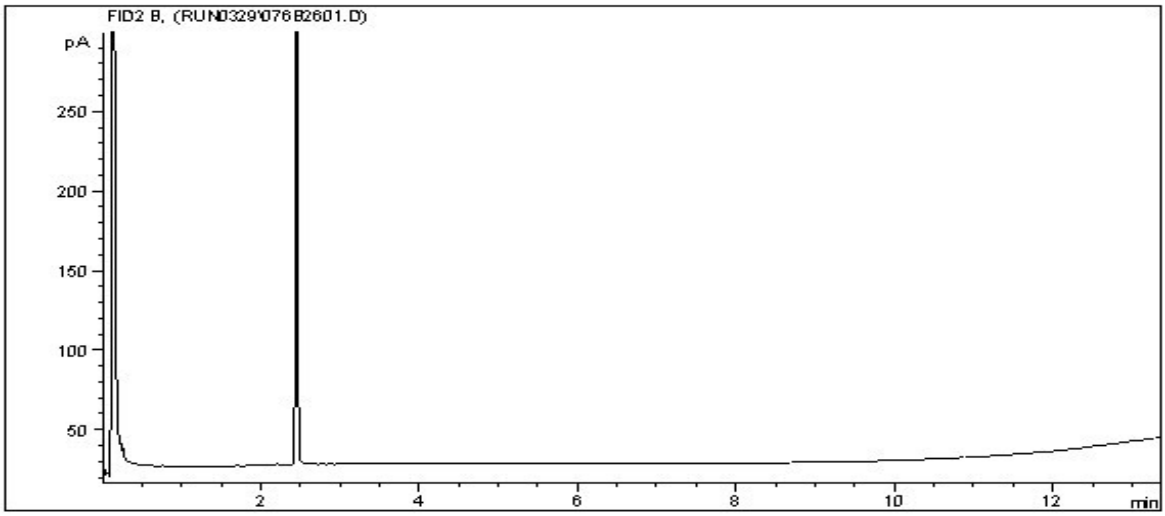
PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTR

Report Date: 2010/03/31
Maxxam Job #: B017883
Maxxam Sample: T37958

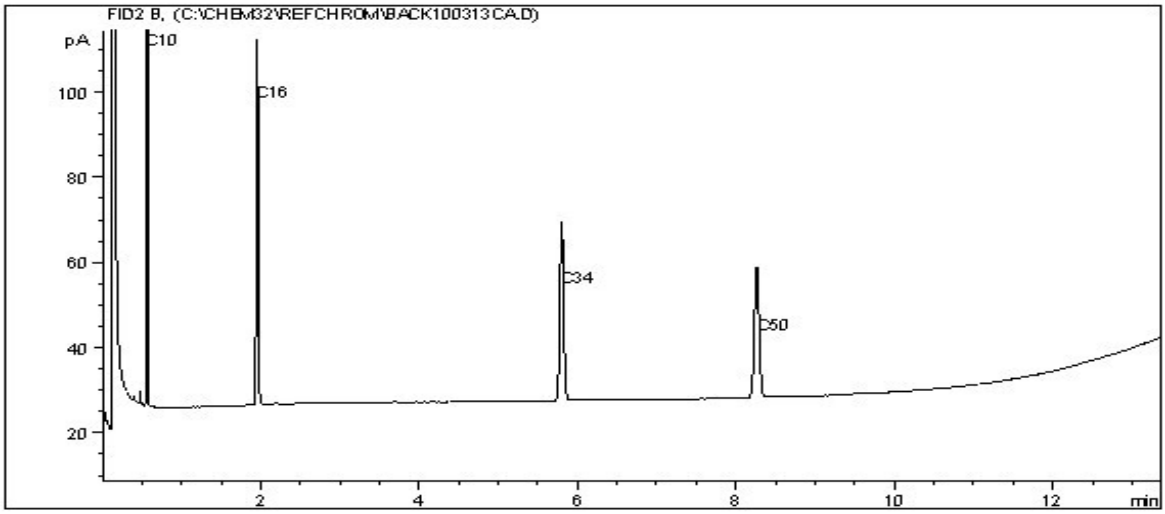
Client Project #: 51645D

Client ID: BH104-10 @ 2.5

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12		Diesel:	C8 - C22	
Varsol:	C8 - C12		Lubricating Oils:	C20 - C40	
Kerosene:	C7 - C16		Crude Oils:	C3 - C60+	

Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist intrepretation or fingerprinting be required to please contact the laboratory.

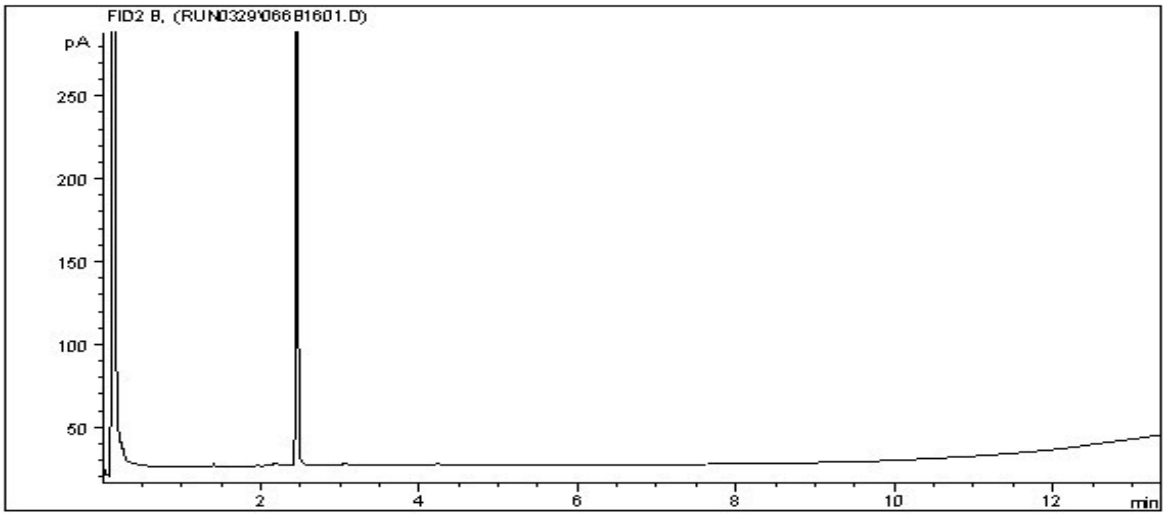
PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTR

Report Date: 2010/03/31
Maxxam Job #: B017883
Maxxam Sample: T37959

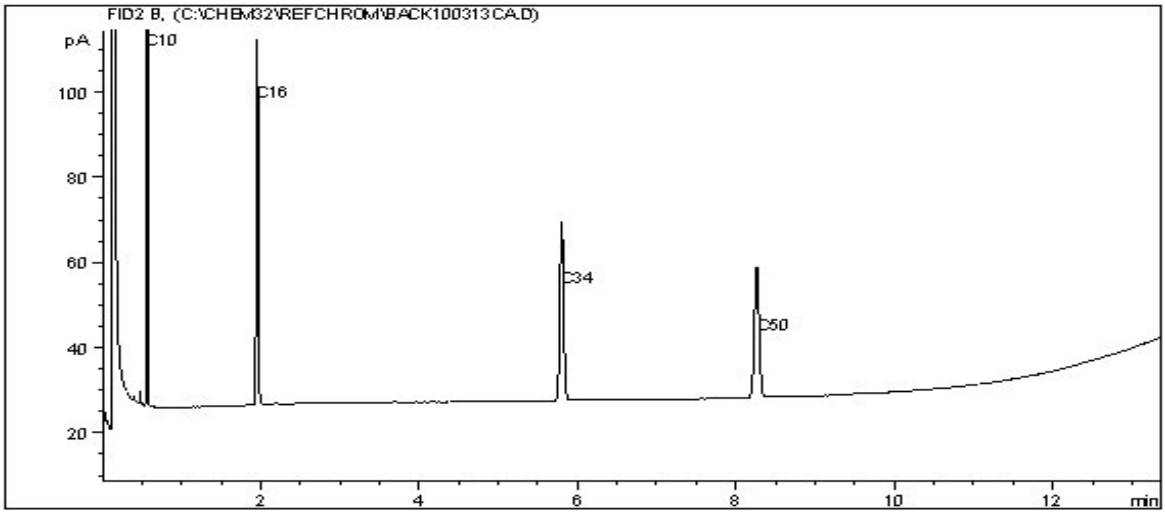
Client Project #: 51645D

Client ID: BH105-10 @ 2.5

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12		Diesel:	C8 - C22	
Varsol:	C8 - C12		Lubricating Oils:	C20 - C40	
Kerosene:	C7 - C16		Crude Oils:	C3 - C60+	

Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist intrepretation or fingerprinting be required to please contact the laboratory.

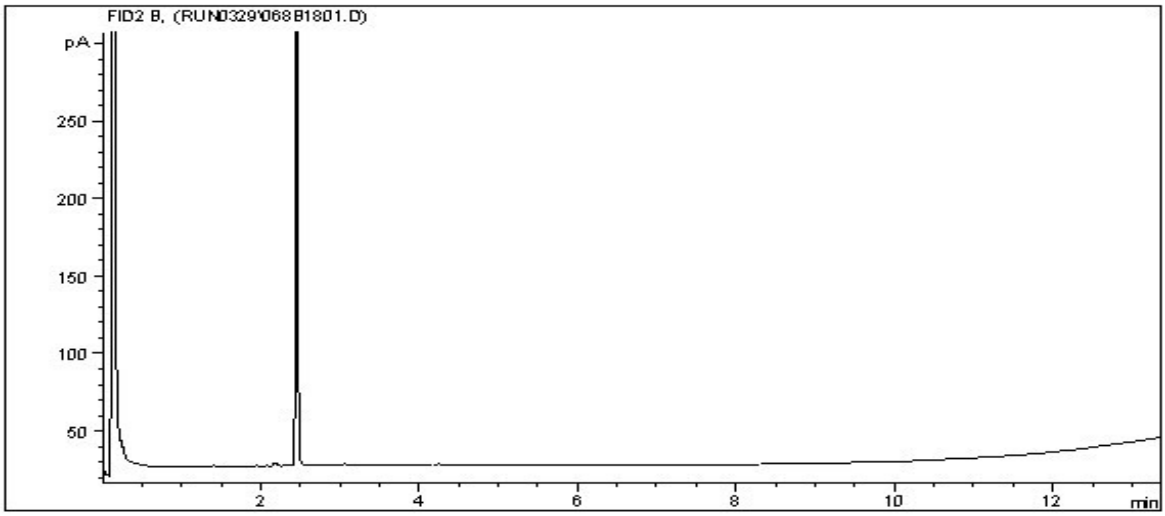
PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTR

Report Date: 2010/03/31
Maxxam Job #: B017883
Maxxam Sample: T37959

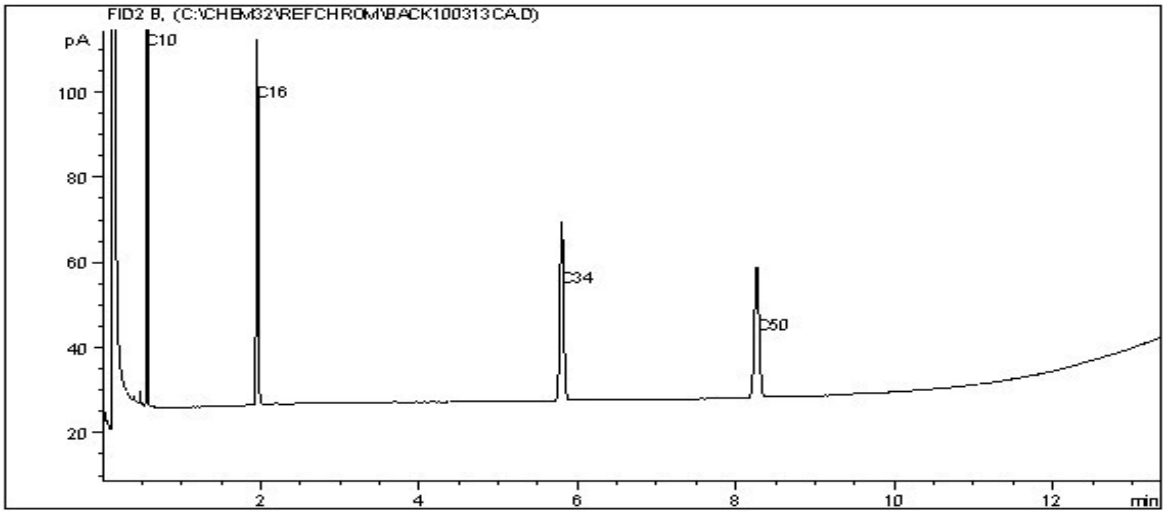
Client Project #: 51645D

Client ID: BH105-10 @ 2.5

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12		Diesel:	C8 - C22	
Varsol:	C8 - C12		Lubricating Oils:	C20 - C40	
Kerosene:	C7 - C16		Crude Oils:	C3 - C60+	

Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist intrepretation or fingerprinting be required to please contact the laboratory.

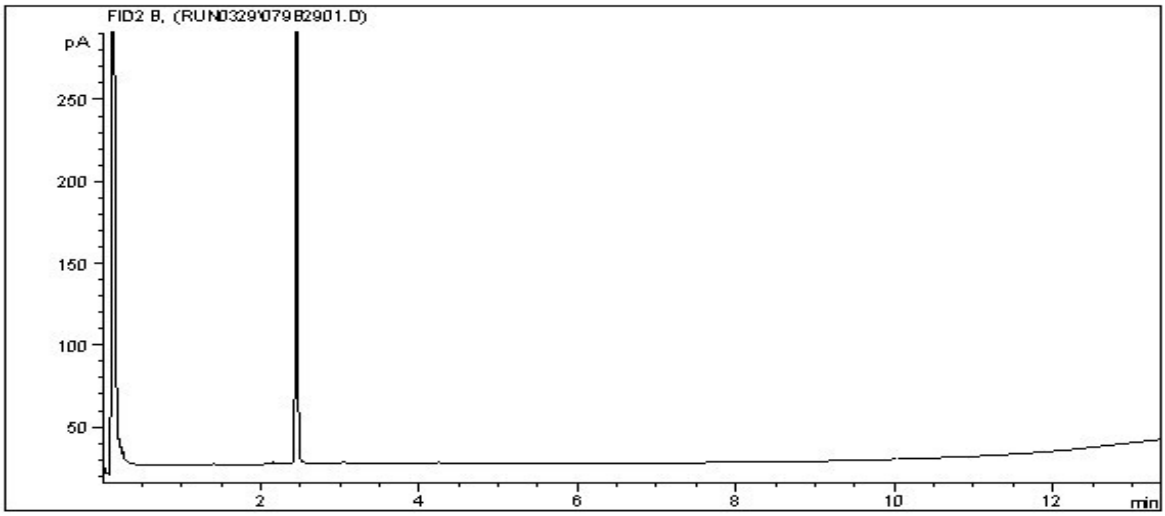
PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTR

Report Date: 2010/03/31
Maxxam Job #: B017883
Maxxam Sample: T37960

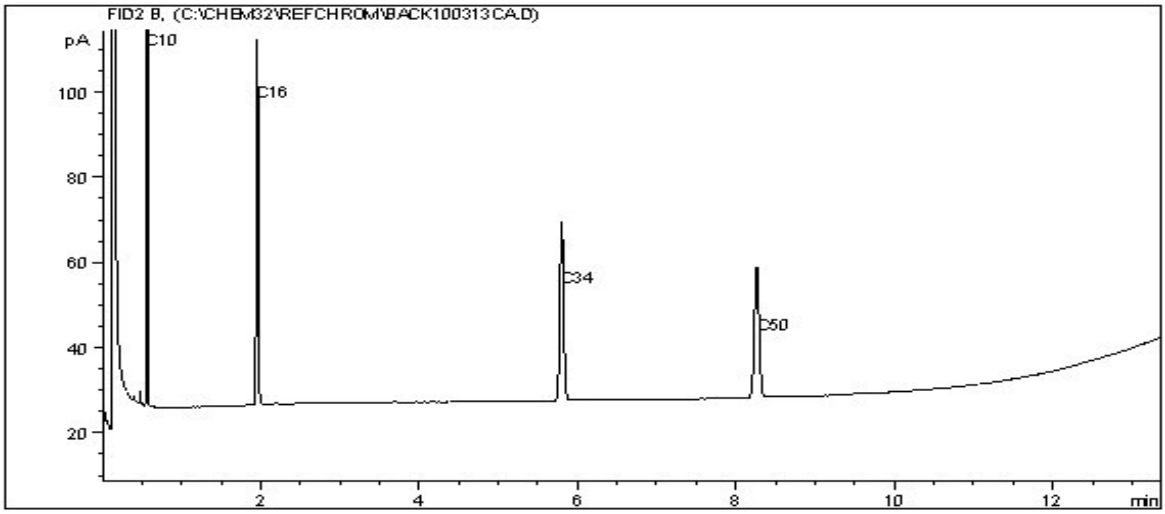
Client Project #: 51645D

Client ID: MW106-10 @ 12.5

CCME Hydrocarbons (F2-F4 in soil) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12		Diesel:	C8 - C22	
Varsol:	C8 - C12		Lubricating Oils:	C20 - C40	
Kerosene:	C7 - C16		Crude Oils:	C3 - C60+	

Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist intrepretation or fingerprinting be required to please contact the laboratory.

Your Project #: 51645D
Your C.O.C. #: 88253-01

Attention: GREG RUSLING
PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
#111, 11505 - 35 Street SE
CALGARY, AB
CANADA T2Z 4B1

Report Date: 2010/04/09

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B019189
Received: 2010/04/01, 17:25

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Methanol, Ethanol, Propanol, Butanol	1	N/A	2010/04/08	CAL SOP-00088	EPA 8015 D
Alkalinity (pp, total), CO3,HCO3,OH	3	N/A	2010/04/06	CAL SOP-00037	SM 2320-B
BTEX/F1 in Water by HS GC/MS	3	N/A	2010/04/07	CAL SOP-00190	EPA 8260 C / CCME
Cadmium - low level CCME - Dissolved	3	N/A	2010/04/06	CAL SOP-00191	EPA SW-846 6020A
Chloride by Automated Colourimetry	3	N/A	2010/04/06	CAL SOP-00044	EPA 325.2
Diisopropanolamine (DIPA)	1	N/A	2010/04/05	CAL SOP-00052	DX 034217
Conductivity	3	N/A	2010/04/06	CAL SOP-00037	SM 2510-B
CCME Hydrocarbons in Water (F2; C10-C16)	3	2010/04/03	2010/04/04	CAL SOP-00087	CCME PHC-CWS
Ethylene, Di, Tri & Tetraethylene glycol	1	N/A	2010/04/06	CAL SOP-00093	EPA 8015 D
Hardness	3	N/A	2010/04/06	CAL WI-00053	AEMM, Method 423
Elements by ICP - Dissolved	3	N/A	2010/04/06	CAL SOP-00192	EPA SW846 6010B
Elements by ICPMS - Dissolved	3	N/A	2010/04/05	CAL SOP-00191	EPA SW-846 6020A
Ion Balance	1	N/A	2010/04/04	CAL WI-00053	SM 1030E
Ion Balance	2	N/A	2010/04/05	CAL WI-00053	SM 1030E
Sum of cations, anions	3	N/A	2010/04/06	CAL WI-00053	SM 1030E
Nitrate and Nitrite	1	N/A	2010/04/05		CAL SOP-00060
Nitrate and Nitrite	2	N/A	2010/04/06		CAL SOP-00060
Nitrate + Nitrite-N (calculated)	1	N/A	2010/04/05	CAL SOP-00060	SM 4110-B
Nitrate + Nitrite-N (calculated)	2	N/A	2010/04/06	CAL SOP-00060	SM 4110-B
Nitrogen, (Nitrite, Nitrate) by IC	2	N/A	2010/04/03		SM 4110-B
Nitrogen, (Nitrite, Nitrate) by IC	1	N/A	2010/04/04		SM 4110-B
Benzo[a]pyrene Equivalency	1	N/A	2010/04/04	CAL SOP-00165	EPA 8270D
Polycyclic Aromatic Hydrocarbons (1)	1	2010/04/03	2010/04/04	CAL SOP-00165	EPA 3510C/8270D
pH (Alkalinity titrator)	3	N/A	2010/04/06	CAL SOP-00037	SM 4500-H B
Sulphate by Automated Colourimetry	3	N/A	2010/04/06	CAL SOP-00069	EPA 375.4
Sterilants	1	2010/04/07	2010/04/07	CAL SOP-00101	EPA 8270 D
Total Dissolved Solids (Calculated)	3	N/A	2010/04/07		SM 1030 E

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) B[a]P TPE is calculated using 1/2 of the RDL for non detect results as per Alberta Environment instructions. This protocol may not apply in other jurisdictions.

../2

Your Project #: 51645D
Your C.O.C. #: 88253-01

Attention: GREG RUSLING
PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
#111, 11505 - 35 Street SE
CALGARY, AB
CANADA T2Z 4B1

Report Date: 2010/04/09

CERTIFICATE OF ANALYSIS

-2-

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

LESLEY LEM, Project Manager
Email: lesley.lem@maxxamanalytics.com
Phone# (403) 291-3077

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 2

Maxxam Job #: B019189
Report Date: 2010/04/09

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Sampler Initials: GR

AT1 BTEX AND F1-F2 (WATER)

Maxxam ID		T44469	T44470	T44470	T44471		
Sampling Date		2010/04/01	2010/04/01	2010/04/01	2010/04/01		
COC Number		88253-01	88253-01	88253-01	88253-01		
	Units	**MW100-10**	**MW101-10**	**MW101-10 Lab-Dup**	**MW107-10**	**RDL**	**QC Batch**
Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	mg/L	<0.1	<0.1	<0.1	<0.1	0.1	3859024
Volatiles							
Benzene	mg/L	<0.0004	<0.0004	N/A	<0.0004	0.0004	3859160
Toluene	mg/L	<0.0004	<0.0004	N/A	<0.0004	0.0004	3859160
Ethylbenzene	mg/L	<0.0004	<0.0004	N/A	<0.0004	0.0004	3859160
o-Xylene	mg/L	<0.0004	<0.0004	N/A	<0.0004	0.0004	3859160
m & p-Xylene	mg/L	<0.0008	<0.0008	N/A	<0.0008	0.0008	3859160
Xylenes (Total)	mg/L	<0.0008	<0.0008	N/A	<0.0008	0.0008	3859160
F1 (C6-C10) - BTEX	mg/L	<0.1	<0.1	N/A	<0.1	0.1	3859160
(C6-C10)	mg/L	<0.1	<0.1	N/A	<0.1	0.1	3859160
Surrogate Recovery (%)							
4-BROMOFLUOROBENZENE (sur.)	%	97	96	N/A	97	N/A	3859160
D4-1,2-DICHLOROETHANE (sur.)	%	104	103	N/A	104	N/A	3859160
D8-TOLUENE (sur.)	%	104	104	N/A	104	N/A	3859160
O-TERPHENYL (sur.)	%	98	99	98	99	N/A	3859024

N/A = Not Applicable
RDL = Reportable Detection Limit

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Maxxam Job #: B019189
Report Date: 2010/04/09

Sampler Initials: GR

ROUTINE WATER & DISS. REGULATED METALS (WATER)

Maxxam ID		T44469		T44470		T44471		
Sampling Date		2010/04/01		2010/04/01		2010/04/01		
COC Number		88253-01		88253-01		88253-01		
	Units	**MW100-10**	**QC Batch**	**MW101-10**	**QC Batch**	**MW107-10**	**RDL**	**QC Batch**
Calculated Parameters								
Anion Sum	meq/L	6.5	3858238	9.4	3858238	5.1	N/A	3858238
Cation Sum	meq/L	6.3	3858238	8.7	3858238	5.1	N/A	3858238
Hardness (CaCO3)	mg/L	300	3858236	370	3858811	240	0.5	3858811
Ion Balance	N/A	0.97	3858237	0.92	3858237	0.98	0.01	3858237
Dissolved Nitrate (NO3)	mg/L	6.3	3858239	2.3	3858239	1.5	0.01	3858239
Nitrate plus Nitrite (N)	mg/L	1.5	3858240	0.76	3858240	0.35	0.003	3858240
Dissolved Nitrite (NO2)	mg/L	0.13	3858239	0.76	3858239	<0.01	0.01	3858239
Total Dissolved Solids	mg/L	338	3858243	502	3858243	269	10	3858243
Misc. Inorganics								
Conductivity	uS/cm	580	3864839	840	3864839	460	1	3864839
pH	N/A	8.00	3864840	8.01	3864840	8.07	N/A	3864840
Low Level Elements								
Dissolved Cadmium (Cd)	ug/L	0.017	3858469	0.19	3858469	0.018	0.005	3858469
Anions								
Alkalinity (PP as CaCO3)	mg/L	<0.5	3864569	<0.5	3864569	<0.5	0.5	3864569
Alkalinity (Total as CaCO3)	mg/L	250	3864569	320	3864569	190	0.5	3864569
Bicarbonate (HCO3)	mg/L	300	3864569	400	3864569	240	0.5	3864569
Carbonate (CO3)	mg/L	<0.5	3864569	<0.5	3864569	<0.5	0.5	3864569
Hydroxide (OH)	mg/L	<0.5	3864569	<0.5	3864569	<0.5	0.5	3864569
Dissolved Sulphate (SO4)	mg/L	60	3862265	120	3862265	57	1	3862265
Dissolved Chloride (Cl)	mg/L	7	3862226	13	3862226	1	1	3862226
Nutrients								
Dissolved Nitrite (N)	mg/L	0.041	3858957	0.23	3858957	<0.003	0.003	3859064
Dissolved Nitrate (N)	mg/L	1.4	3858957	0.53	3858957	0.35	0.003	3859064
Elements								
Dissolved Aluminum (Al)	mg/L	0.010	3858943	0.39	3858943	0.015	0.001	3858943
Dissolved Antimony (Sb)	mg/L	<0.0002	3858943	0.0004	3858943	<0.0002	0.0002	3858943
Dissolved Arsenic (As)	mg/L	0.0003	3858943	0.0012	3858943	<0.0002	0.0002	3858943
Dissolved Barium (Ba)	mg/L	0.12	3861010	0.15	3861010	0.09	0.01	3861010
Dissolved Beryllium (Be)	mg/L	<0.001	3858943	<0.001	3858943	<0.001	0.001	3858943
Dissolved Boron (B)	mg/L	0.02	3861010	0.10	3861010	<0.02	0.02	3861010
Dissolved Calcium (Ca)	mg/L	89	3861010	110	3861010	72	0.3	3861010
Dissolved Chromium (Cr)	mg/L	<0.001	3858943	<0.001	3858943	<0.001	0.001	3858943

RDL = Reportable Detection Limit

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Maxxam Job #: B019189
Report Date: 2010/04/09

Sampler Initials: GR

ROUTINE WATER & DISS. REGULATED METALS (WATER)

Maxxam ID		T44469		T44470		T44471		
Sampling Date		2010/04/01		2010/04/01		2010/04/01		
COC Number		88253-01		88253-01		88253-01		
	Units	**MW100-10**	**QC Batch**	**MW101-10**	**QC Batch**	**MW107-10**	**RDL**	**QC Batch**
Dissolved Cobalt (Co)	mg/L	<0.0003	3858943	0.0027	3858943	<0.0003	0.0003	3858943
Dissolved Copper (Cu)	mg/L	0.0015	3858943	0.0044	3858943	0.0010	0.0002	3858943
Dissolved Iron (Fe)	mg/L	<0.06	3861010	0.41	3861010	<0.06	0.06	3861010
Dissolved Lead (Pb)	mg/L	<0.0002	3858943	0.0010	3858943	<0.0002	0.0002	3858943
Dissolved Lithium (Li)	mg/L	<0.02	3861010	<0.02	3861010	<0.02	0.02	3861010
Dissolved Magnesium (Mg)	mg/L	18	3861010	21	3861010	15	0.2	3861010
Dissolved Manganese (Mn)	mg/L	0.025	3861010	0.15	3861010	0.007	0.004	3861010
Dissolved Molybdenum (Mo)	mg/L	0.0011	3858943	0.0019	3858943	0.0006	0.0002	3858943
Dissolved Nickel (Ni)	mg/L	0.0015	3858943	0.0076	3858943	0.0011	0.0005	3858943
Dissolved Phosphorus (P)	mg/L	<0.1	3861010	0.2	3861010	<0.1	0.1	3861010
Dissolved Potassium (K)	mg/L	2.4	3861010	14	3861010	0.6	0.3	3861010
Dissolved Selenium (Se)	mg/L	0.0009	3858943	0.0014	3858943	0.0008	0.0002	3858943
Dissolved Silicon (Si)	mg/L	3.3	3861010	6.2	3861010	2.3	0.1	3861010
Dissolved Silver (Ag)	mg/L	<0.0001	3858943	<0.0001	3858943	<0.0001	0.0001	3858943
Dissolved Sodium (Na)	mg/L	7.5	3861010	21	3861010	3.6	0.5	3861010
Dissolved Strontium (Sr)	mg/L	0.28	3861010	0.28	3861010	0.24	0.02	3861010
Dissolved Sulphur (S)	mg/L	18	3861010	34	3861010	17	0.2	3861010
Dissolved Thallium (Tl)	mg/L	<0.0002	3858943	<0.0002	3858943	<0.0002	0.0002	3858943
Dissolved Tin (Sn)	mg/L	<0.001	3858943	0.002	3858943	<0.001	0.001	3858943
Dissolved Titanium (Ti)	mg/L	<0.001	3858943	0.002	3858943	<0.001	0.001	3858943
Dissolved Uranium (U)	mg/L	0.0014	3858943	0.0043	3858943	0.0005	0.0001	3858943
Dissolved Vanadium (V)	mg/L	<0.001	3858943	<0.001	3858943	<0.001	0.001	3858943
Dissolved Zinc (Zn)	mg/L	0.007	3858943	0.016	3858943	0.006	0.003	3858943

RDL = Reportable Detection Limit

Maxxam Job #: B019189
Report Date: 2010/04/09

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Sampler Initials: GR

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		T44470		
Sampling Date		2010/04/01		
COC Number		88253-01		
	Units	**MW101-10**	**RDL**	**QC Batch**
Amines				
Diisopropanolamine(DIPA)	mg/L	<0.05	0.05	3859968

RDL = Reportable Detection Limit

Maxxam Job #: B019189
Report Date: 2010/04/09

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Sampler Initials: GR

GLYCOLS BY GC-FID (WATER)

Maxxam ID		T44470		
Sampling Date		2010/04/01		
COC Number		88253-01		
	Units	**MW101-10**	**RDL**	**QC Batch**
Glycols				
Ethylene Glycol	mg/L	<10	10	3859551
Diethylene Glycol	mg/L	<10	10	3859551
Triethylene Glycol	mg/L	<10	10	3859551
Tetraethylene Glycol	mg/L	<10	10	3859551
Propylene Glycol	mg/L	<10	10	3859551
Surrogate Recovery (%)				
Methyl Sulfone (sur.)	%	89	N/A	3859551

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B019189
Report Date: 2010/04/09

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Sampler Initials: GR

STERILANTS (WATER)

Maxxam ID		T44471		
Sampling Date		2010/04/01		
COC Number		88253-01		
	Units	**MW107-10**	**RDL**	**QC Batch**
Sterilants				
Tebuthiuron	mg/L	<0.00010	0.00010	3865086
Atrazine	mg/L	<0.00010	0.00010	3865086
Simazine	mg/L	<0.00010	0.00010	3865086
Diuron	mg/L	<0.00010	0.00010	3865086
Linuron	mg/L	<0.00010	0.00010	3865086
Bromacil	mg/L	<0.00010	0.00010	3865086
Surrogate Recovery (%)				
PROPAZINE (sur.)	%	86	N/A	3865086

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B019189
Report Date: 2010/04/09

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Sampler Initials: GR

SEMIVOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		T44471		
Sampling Date		2010/04/01		
COC Number		88253-01		
	Units	**MW107-10**	**RDL**	**QC Batch**
Polycyclic Aromatics				
Benzo[a]pyrene equivalency	ug/L	0.04	0.01	3858242
Acenaphthene	mg/L	<0.00010	0.00010	3859025
Acenaphthylene	mg/L	<0.00010	0.00010	3859025
Acridine	mg/L	<0.00020	0.00020	3859025
Anthracene	mg/L	<0.000010	0.000010	3859025
Benzo(a)anthracene	mg/L	<0.0000085 (1)	0.0000085	3859025
Benzo(b&j)fluoranthene	mg/L	<0.0000085 (2)	0.0000085	3859025
Benzo(k)fluoranthene	mg/L	<0.0000085 (3)	0.0000085	3859025
Benzo(g,h,i)perylene	mg/L	0.000037 (4)	0.0000085	3859025
Benzo(c)phenanthrene	mg/L	<0.000050	0.000050	3859025
Benzo(a)pyrene	mg/L	<0.0000075 (5)	0.0000075	3859025
Benzo[e]pyrene	mg/L	<0.000050 (6)	0.000050	3859025
Chrysene	mg/L	<0.0000085 (7)	0.0000085	3859025
Dibenz(a,h)anthracene	mg/L	0.000028 (8)	0.0000075	3859025
Fluoranthene	mg/L	<0.000040	0.000040	3859025
Fluorene	mg/L	<0.000050	0.000050	3859025
Indeno(1,2,3-cd)pyrene	mg/L	0.000027 (9)	0.0000085	3859025
2-Methylnaphthalene	mg/L	<0.00010	0.00010	3859025
Naphthalene	mg/L	<0.00010	0.00010	3859025
Phenanthrene	mg/L	0.000062	0.000050	3859025
Perylene	mg/L	<0.000050 (10)	0.000050	3859025

RDL = Reportable Detection Limit
(1) Matrix Spike exceeds acceptance limits due to matrix interference. Reanalysis yields similar results. (Recovery:24.58%, limits30-130%)
(2) Matrix Spike exceeds acceptance limits due to matrix interference. Reanalysis yields similar results. (Recovery:19.98%, limits30-130%)
(3) Matrix Spike exceeds acceptance limits due to matrix interference. Reanalysis yields similar results. (Recovery:24.59%, limits30-130%)
(4) Matrix Spike exceeds acceptance limits due to matrix interference. Reanalysis yields similar results. (Recovery:21.14%, limits30-130%)
(5) Matrix Spike exceeds acceptance limits due to matrix interference. Reanalysis yields similar results. (Recovery:19.01%, limits30-130%)
(6) Matrix Spike exceeds acceptance limits due to matrix interference. Reanalysis yields similar results. (Recovery:19.61%, limits30-130%)
(7) Matrix Spike exceeds acceptance limits due to matrix interference. Reanalysis yields similar results. (Recovery:20.59%, limits30-130%)
(8) Matrix Spike exceeds acceptance limits due to matrix interference. Reanalysis yields similar results. (Recovery:13.59%, limits30-130%)
(9) Matrix Spike exceeds acceptance limits due to matrix interference. Reanalysis yields similar results. (Recovery:21.20%, limits30-130%)
(10) Matrix Spike exceeds acceptance limits due to matrix interference. Reanalysis yields similar results. (Recovery:23.56%, limits30-130%)

Maxxam Job #: B019189
Report Date: 2010/04/09

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Sampler Initials: GR

SEMIVOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		T44471		
Sampling Date		2010/04/01		
COC Number		88253-01		
	Units	**MW107-10**	**RDL**	**QC Batch**
Pyrene	mg/L	0.000043	0.000020	3859025
Quinoline	mg/L	<0.00020	0.00020	3859025
Surrogate Recovery (%)				
D10-ANTHRACENE (sur.)	%	105	N/A	3859025
D12-BENZO(A)PYRENE (sur.)	%	92	N/A	3859025
D8-ACENAPHTHYLENE (sur.)	%	87	N/A	3859025
TERPHENYL-D14 (sur.)	%	93	N/A	3859025

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B019189
Report Date: 2010/04/09

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51645D

Sampler Initials: GR

ALCOHOLS BY GC-FID (WATER)

Maxxam ID		T44470		
Sampling Date		2010/04/01		
COC Number		88253-01		
	Units	**MW101-10**	**RDL**	**QC Batch**
Alcohols				
Methanol	mg/L	<1	1	3868116
Surrogate Recovery (%)				
METHYL ISO-BUTYL KETONE (sur.)	%	87	N/A	3868116

N/A = Not Applicable
RDL = Reportable Detection Limit

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Maxxam Job #: B019189
Report Date: 2010/04/09
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Sampler Initials: GR

Package 1	11.7°C

Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

Results relate only to the items tested.

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report

Maxxam Job Number: CB019189

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3858943	TDB	Matrix Spike	Dissolved Aluminum (Al)	2010/04/05		NC	%	80 - 120
			Dissolved Antimony (Sb)	2010/04/05		95	%	80 - 120
			Dissolved Arsenic (As)	2010/04/05		84	%	80 - 120
			Dissolved Beryllium (Be)	2010/04/05		89	%	80 - 120
			Dissolved Chromium (Cr)	2010/04/05		85	%	80 - 120
			Dissolved Cobalt (Co)	2010/04/05		NC	%	80 - 120
			Dissolved Copper (Cu)	2010/04/05		88	%	80 - 120
			Dissolved Lead (Pb)	2010/04/05		88	%	80 - 120
			Dissolved Molybdenum (Mo)	2010/04/05		105	%	80 - 120
			Dissolved Nickel (Ni)	2010/04/05		NC	%	80 - 120
			Dissolved Selenium (Se)	2010/04/05		88	%	80 - 120
			Dissolved Silver (Ag)	2010/04/05		89	%	80 - 120
			Dissolved Thallium (Tl)	2010/04/05		86	%	80 - 120
			Dissolved Tin (Sn)	2010/04/05		87	%	80 - 120
			Dissolved Titanium (Ti)	2010/04/05		94	%	80 - 120
			Dissolved Uranium (U)	2010/04/05		NC	%	80 - 120
			Dissolved Vanadium (V)	2010/04/05		100	%	80 - 120
			Dissolved Zinc (Zn)	2010/04/05		NC	%	80 - 120
		Spiked Blank	Dissolved Aluminum (Al)	2010/04/04		90	%	80 - 106
			Dissolved Antimony (Sb)	2010/04/04		101	%	80 - 114
			Dissolved Arsenic (As)	2010/04/04		97	%	85 - 109
			Dissolved Beryllium (Be)	2010/04/04		87	%	80 - 118
			Dissolved Chromium (Cr)	2010/04/04		98	%	80 - 105
			Dissolved Cobalt (Co)	2010/04/04		101	%	80 - 108
			Dissolved Copper (Cu)	2010/04/04		100	%	81 - 114
			Dissolved Lead (Pb)	2010/04/04		99	%	85 - 113
			Dissolved Molybdenum (Mo)	2010/04/04		102	%	80 - 106
			Dissolved Nickel (Ni)	2010/04/04		98	%	82 - 112
			Dissolved Selenium (Se)	2010/04/04		91	%	81 - 120
			Dissolved Silver (Ag)	2010/04/04		99	%	80 - 117
			Dissolved Thallium (Tl)	2010/04/04		98	%	80 - 111
			Dissolved Tin (Sn)	2010/04/04		96	%	80 - 112
			Dissolved Titanium (Ti)	2010/04/04		101	%	80 - 111
			Dissolved Uranium (U)	2010/04/04		90	%	80 - 114
			Dissolved Vanadium (V)	2010/04/04		102	%	80 - 119
			Dissolved Zinc (Zn)	2010/04/04		97	%	80 - 120
		Method Blank	Dissolved Aluminum (Al)	2010/04/04	<0.001		mg/L	
			Dissolved Antimony (Sb)	2010/04/04	0.0003, RDL=0.0002		mg/L	
			Dissolved Arsenic (As)	2010/04/04	<0.0002		mg/L	
			Dissolved Beryllium (Be)	2010/04/04	<0.001		mg/L	
			Dissolved Chromium (Cr)	2010/04/04	<0.001		mg/L	
			Dissolved Cobalt (Co)	2010/04/04	<0.0003		mg/L	
			Dissolved Copper (Cu)	2010/04/04	0.0003, RDL=0.0002		mg/L	
			Dissolved Lead (Pb)	2010/04/04	<0.0002		mg/L	
			Dissolved Molybdenum (Mo)	2010/04/04	<0.0002		mg/L	
			Dissolved Nickel (Ni)	2010/04/04	<0.0005		mg/L	
			Dissolved Selenium (Se)	2010/04/04	<0.0002		mg/L	
			Dissolved Silver (Ag)	2010/04/04	<0.0001		mg/L	
			Dissolved Thallium (Tl)	2010/04/04	<0.0002		mg/L	
			Dissolved Tin (Sn)	2010/04/04	<0.001		mg/L	
			Dissolved Titanium (Ti)	2010/04/04	<0.001		mg/L	
			Dissolved Uranium (U)	2010/04/04	<0.0001		mg/L	
			Dissolved Vanadium (V)	2010/04/04	<0.001		mg/L	
			Dissolved Zinc (Zn)	2010/04/04	<0.003		mg/L	
		RPD	Dissolved Aluminum (Al)	2010/04/05	NC		%	20

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: CB019189

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3858943	TDB	RPD	Dissolved Antimony (Sb)	2010/04/05	NC		%	20
			Dissolved Arsenic (As)	2010/04/05	NC		%	20
			Dissolved Beryllium (Be)	2010/04/05	NC		%	20
			Dissolved Chromium (Cr)	2010/04/05	NC		%	20
			Dissolved Cobalt (Co)	2010/04/05	NC		%	20
			Dissolved Copper (Cu)	2010/04/05	NC		%	20
			Dissolved Lead (Pb)	2010/04/05	NC		%	20
			Dissolved Molybdenum (Mo)	2010/04/05	NC		%	20
			Dissolved Nickel (Ni)	2010/04/05	NC		%	20
			Dissolved Selenium (Se)	2010/04/05	NC		%	20
			Dissolved Silver (Ag)	2010/04/05	NC		%	20
			Dissolved Thallium (Tl)	2010/04/05	NC		%	20
			Dissolved Tin (Sn)	2010/04/05	NC		%	20
			Dissolved Titanium (Ti)	2010/04/05	NC		%	20
			Dissolved Uranium (U)	2010/04/05	1.7		%	20
			Dissolved Vanadium (V)	2010/04/05	NC		%	20
			Dissolved Zinc (Zn)	2010/04/05	NC		%	20
3858957	KB0	Matrix Spike	Dissolved Nitrite (N)	2010/04/03		99	%	80 - 120
			Dissolved Nitrate (N)	2010/04/03		100	%	80 - 120
		Spiked Blank	Dissolved Nitrite (N)	2010/04/03		101	%	80 - 120
			Dissolved Nitrate (N)	2010/04/03		103	%	82 - 116
		Method Blank	Dissolved Nitrite (N)	2010/04/03	<0.003		mg/L	
			Dissolved Nitrate (N)	2010/04/03	<0.003		mg/L	
		RPD	Dissolved Nitrite (N)	2010/04/03	NC		%	20
			Dissolved Nitrate (N)	2010/04/03	NC		%	20
3859024	AM7	Matrix Spike						
		[T44469-02]	O-TERPHENYL (sur.)	2010/04/04		98	%	70 - 130
			F2 (C10-C16 Hydrocarbons)	2010/04/04		111	%	70 - 130
		Spiked Blank	O-TERPHENYL (sur.)	2010/04/04		95	%	70 - 130
			F2 (C10-C16 Hydrocarbons)	2010/04/04		98	%	70 - 130
		Method Blank	O-TERPHENYL (sur.)	2010/04/04		95	%	70 - 130
			F2 (C10-C16 Hydrocarbons)	2010/04/04	<0.1		mg/L	
		RPD [T44470-02]	F2 (C10-C16 Hydrocarbons)	2010/04/04	NC		%	40
3859025	DM	Matrix Spike						
		[T44471-02]	D10-ANTHRACENE (sur.)	2010/04/04		111	%	30 - 130
			D12-BENZO(A)PYRENE (sur.)	2010/04/04		101	%	30 - 130
			D8-ACENAPHTHYLENE (sur.)	2010/04/04		89	%	30 - 130
			TERPHENYL-D14 (sur.)	2010/04/04		101	%	30 - 130
			Acenaphthene	2010/04/04		111	%	30 - 130
			Acenaphthylene	2010/04/04		110	%	30 - 130
			Acridine	2010/04/04		57	%	30 - 130
			Anthracene	2010/04/04		71	%	30 - 130
			Benzo(c)phenanthrene	2010/04/04		41	%	30 - 130
			Fluoranthene	2010/04/04		84	%	30 - 130
			Fluorene	2010/04/04		109	%	30 - 130
			2-Methylnaphthalene	2010/04/04		91	%	30 - 130
			Naphthalene	2010/04/04		112	%	30 - 130
			Phenanthrene	2010/04/04		106	%	30 - 130
			Pyrene	2010/04/04		81	%	30 - 130
			Quinoline	2010/04/04		75	%	30 - 130
		Spiked Blank	D10-ANTHRACENE (sur.)	2010/04/03		105	%	30 - 130
			D12-BENZO(A)PYRENE (sur.)	2010/04/03		104	%	30 - 130
			D8-ACENAPHTHYLENE (sur.)	2010/04/03		96	%	30 - 130
			TERPHENYL-D14 (sur.)	2010/04/03		101	%	30 - 130
			Acenaphthene	2010/04/03		106	%	30 - 130

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: CB019189

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3859025	DM	Spiked Blank	Acenaphthylene	2010/04/03		99	%	30 - 130
			Acridine	2010/04/03		69	%	30 - 130
			Anthracene	2010/04/03		82	%	30 - 130
			Benzo(a)anthracene	2010/04/03		108	%	30 - 130
			Benzo(b&j)fluoranthene	2010/04/03		103	%	30 - 130
			Benzo(k)fluoranthene	2010/04/03		122	%	30 - 130
			Benzo(g,h,i)perylene	2010/04/03		105	%	30 - 130
			Benzo(c)phenanthrene	2010/04/03		95	%	30 - 130
			Benzo(a)pyrene	2010/04/03		101	%	30 - 130
			Benzo[e]pyrene	2010/04/03		95	%	30 - 130
			Chrysene	2010/04/03		72	%	30 - 130
			Dibenz(a,h)anthracene	2010/04/03		75	%	30 - 130
			Fluoranthene	2010/04/03		110	%	30 - 130
			Fluorene	2010/04/03		109	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2010/04/03		109	%	30 - 130
			2-Methylnaphthalene	2010/04/03		119	%	30 - 130
			Naphthalene	2010/04/03		114	%	30 - 130
			Phenanthrene	2010/04/03		115	%	30 - 130
			Perylene	2010/04/03		98	%	30 - 130
			Pyrene	2010/04/03		114	%	30 - 130
			Quinoline	2010/04/03		56	%	30 - 130
		Method Blank	D10-ANTHRACENE (sur.)	2010/04/03		100	%	30 - 130
			D12-BENZO(A)PYRENE (sur.)	2010/04/03		112	%	30 - 130
			D8-ACENAPHTHYLENE (sur.)	2010/04/03		107	%	30 - 130
			TERPHENYL-D14 (sur.)	2010/04/03		115	%	30 - 130
			Acenaphthene	2010/04/03	<0.00010		mg/L	
			Acenaphthylene	2010/04/03	<0.00010		mg/L	
			Acridine	2010/04/03	<0.00020		mg/L	
			Anthracene	2010/04/03	<0.000010		mg/L	
			Benzo(a)anthracene	2010/04/03	<0.0000085		mg/L	
			Benzo(b&j)fluoranthene	2010/04/03	<0.0000085		mg/L	
			Benzo(k)fluoranthene	2010/04/03	<0.0000085		mg/L	
			Benzo(g,h,i)perylene	2010/04/03	<0.0000085		mg/L	
			Benzo(c)phenanthrene	2010/04/03	<0.000050		mg/L	
			Benzo(a)pyrene	2010/04/03	<0.0000075		mg/L	
			Benzo[e]pyrene	2010/04/03	<0.000050		mg/L	
			Chrysene	2010/04/03	<0.0000085		mg/L	
			Dibenz(a,h)anthracene	2010/04/03	<0.0000075		mg/L	
			Fluoranthene	2010/04/03	<0.000040		mg/L	
			Fluorene	2010/04/03	<0.000050		mg/L	
			Indeno(1,2,3-cd)pyrene	2010/04/03	<0.0000085		mg/L	
			2-Methylnaphthalene	2010/04/03	<0.00010		mg/L	
			Naphthalene	2010/04/03	<0.00010		mg/L	
			Phenanthrene	2010/04/03	<0.000050		mg/L	
			Perylene	2010/04/03	<0.000050		mg/L	
			Pyrene	2010/04/03	<0.000020		mg/L	
			Quinoline	2010/04/03	<0.00020		mg/L	
		RPD	Acenaphthene	2010/04/04	NC		%	40
			Acenaphthylene	2010/04/04	NC		%	40
			Acridine	2010/04/04	NC		%	40
			Anthracene	2010/04/04	NC		%	40
			Benzo(a)anthracene	2010/04/04	NC		%	40
			Benzo(b&j)fluoranthene	2010/04/04	NC		%	40
			Benzo(k)fluoranthene	2010/04/04	NC		%	40
			Benzo(g,h,i)perylene	2010/04/04	NC		%	40

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: CB019189

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3859025	DM	RPD	Benzo(c)phenanthrene	2010/04/04	NC		%	40
			Benzo(a)pyrene	2010/04/04	NC		%	40
			Benzo[e]pyrene	2010/04/04	NC		%	40
			Chrysene	2010/04/04	NC		%	40
			Dibenz(a,h)anthracene	2010/04/04	NC		%	40
			Fluoranthene	2010/04/04	NC		%	40
			Fluorene	2010/04/04	NC		%	40
			Indeno(1,2,3-cd)pyrene	2010/04/04	NC		%	40
			2-Methylnaphthalene	2010/04/04	NC		%	40
			Naphthalene	2010/04/04	NC		%	40
			Phenanthrene	2010/04/04	NC		%	40
			Perylene	2010/04/04	NC		%	40
			Pyrene	2010/04/04	NC		%	40
			Quinoline	2010/04/04	NC		%	40
3859064	KB0	Matrix Spike	Dissolved Nitrite (N)	2010/04/04		107	%	80 - 120
			Dissolved Nitrate (N)	2010/04/04		108	%	80 - 120
		Spiked Blank	Dissolved Nitrite (N)	2010/04/04		101	%	80 - 120
			Dissolved Nitrate (N)	2010/04/04		102	%	88 - 112
		Method Blank	Dissolved Nitrite (N)	2010/04/04	<0.003		mg/L	
			Dissolved Nitrate (N)	2010/04/04	<0.003		mg/L	
		RPD	Dissolved Nitrite (N)	2010/04/04	5.4		%	20
			Dissolved Nitrate (N)	2010/04/04	0.7		%	20
3859160	DV1	Matrix Spike	4-BROMOFLUOROBENZENE (sur.)	2010/04/07		107	%	70 - 130
			D4-1,2-DICHLOROETHANE (sur.)	2010/04/07		103	%	70 - 130
			D8-TOLUENE (sur.)	2010/04/07		105	%	70 - 130
			Benzene	2010/04/07		110	%	70 - 130
			Toluene	2010/04/07		109	%	70 - 130
			Ethylbenzene	2010/04/07		108	%	70 - 130
			o-Xylene	2010/04/07		108	%	70 - 130
			m & p-Xylene	2010/04/07		105	%	70 - 130
		Spiked Blank	4-BROMOFLUOROBENZENE (sur.)	2010/04/07		103	%	70 - 130
			D4-1,2-DICHLOROETHANE (sur.)	2010/04/07		106	%	70 - 130
			D8-TOLUENE (sur.)	2010/04/07		101	%	70 - 130
			Benzene	2010/04/07		104	%	70 - 130
			Toluene	2010/04/07		101	%	70 - 130
			Ethylbenzene	2010/04/07		97	%	70 - 130
			o-Xylene	2010/04/07		96	%	70 - 130
			m & p-Xylene	2010/04/07		97	%	70 - 130
			(C6-C10)	2010/04/07		86	%	70 - 130
		Method Blank	4-BROMOFLUOROBENZENE (sur.)	2010/04/07		95	%	70 - 130
			D4-1,2-DICHLOROETHANE (sur.)	2010/04/07		100	%	70 - 130
			D8-TOLUENE (sur.)	2010/04/07		100	%	70 - 130
			Benzene	2010/04/07	<0.0004		mg/L	
			Toluene	2010/04/07	<0.0004		mg/L	
			Ethylbenzene	2010/04/07	<0.0004		mg/L	
			o-Xylene	2010/04/07	<0.0004		mg/L	
			m & p-Xylene	2010/04/07	<0.0008		mg/L	
			Xylenes (Total)	2010/04/07	<0.0008		mg/L	
			F1 (C6-C10) - BTEX	2010/04/07	<0.1		mg/L	
			(C6-C10)	2010/04/07	<0.1		mg/L	
		RPD	Benzene	2010/04/07	NC		%	40
			Toluene	2010/04/07	NC		%	40
			Ethylbenzene	2010/04/07	7.0		%	40
			o-Xylene	2010/04/07	NC		%	40
			m & p-Xylene	2010/04/07	7.9		%	40

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: CB019189

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3859160	DV1	RPD	Xylenes (Total)	2010/04/07	7.9		%	40
			F1 (C6-C10) - BTEX	2010/04/07	NC		%	40
			(C6-C10)	2010/04/07	NC		%	40
3859551	JG3	Matrix Spike	Methyl Sulfone (sur.)	2010/04/06		93	%	70 - 130
		Spiked Blank	Methyl Sulfone (sur.)	2010/04/06		94	%	70 - 130
			Ethylene Glycol	2010/04/06		103	%	70 - 130
			Diethylene Glycol	2010/04/06		87	%	70 - 130
			Triethylene Glycol	2010/04/06		82	%	70 - 130
			Tetraethylene Glycol	2010/04/06		79	%	70 - 130
			Propylene Glycol	2010/04/06		78	%	70 - 130
		Method Blank	Methyl Sulfone (sur.)	2010/04/06		97	%	70 - 130
			Ethylene Glycol	2010/04/06	<10		mg/L	
			Diethylene Glycol	2010/04/06	<10		mg/L	
			Triethylene Glycol	2010/04/06	<10		mg/L	
			Tetraethylene Glycol	2010/04/06	<10		mg/L	
			Propylene Glycol	2010/04/06	<10		mg/L	
		RPD	Ethylene Glycol	2010/04/09	0.6 (1)		%	20
			Diethylene Glycol	2010/04/09	NC		%	20
			Triethylene Glycol	2010/04/09	NC		%	20
			Tetraethylene Glycol	2010/04/09	NC		%	20
			Propylene Glycol	2010/04/09	NC		%	20
3859968	SL5	Matrix Spike	Diisopropanolamine(DIPA)	2010/04/05		80	%	70 - 130
		Spiked Blank	Diisopropanolamine(DIPA)	2010/04/05		107	%	70 - 115
		Method Blank	Diisopropanolamine(DIPA)	2010/04/05	<0.05		mg/L	
		RPD	Diisopropanolamine(DIPA)	2010/04/05	NC		%	40
3861010	PL	Matrix Spike	Dissolved Barium (Ba)	2010/04/06		96	%	80 - 120
			Dissolved Boron (B)	2010/04/06		98	%	80 - 120
			Dissolved Calcium (Ca)	2010/04/06		101	%	80 - 120
			Dissolved Iron (Fe)	2010/04/06		95	%	80 - 120
			Dissolved Lithium (Li)	2010/04/06		98	%	80 - 120
			Dissolved Magnesium (Mg)	2010/04/06		97	%	80 - 120
			Dissolved Manganese (Mn)	2010/04/06		97	%	80 - 120
			Dissolved Phosphorus (P)	2010/04/06		100	%	80 - 120
			Dissolved Potassium (K)	2010/04/06		95	%	80 - 120
			Dissolved Silicon (Si)	2010/04/06		87	%	80 - 120
			Dissolved Sodium (Na)	2010/04/06		99	%	80 - 120
			Dissolved Strontium (Sr)	2010/04/06		94	%	80 - 120
		Spiked Blank	Dissolved Barium (Ba)	2010/04/06		97	%	85 - 104
			Dissolved Boron (B)	2010/04/06		100	%	87 - 110
			Dissolved Calcium (Ca)	2010/04/06		104	%	88 - 111
			Dissolved Iron (Fe)	2010/04/06		97	%	84 - 108
			Dissolved Lithium (Li)	2010/04/06		98	%	80 - 116
			Dissolved Magnesium (Mg)	2010/04/06		99	%	91 - 113
			Dissolved Manganese (Mn)	2010/04/06		100	%	87 - 109
			Dissolved Phosphorus (P)	2010/04/06		102	%	89 - 109
			Dissolved Potassium (K)	2010/04/06		96	%	80 - 120
			Dissolved Silicon (Si)	2010/04/06		89	%	80 - 120
			Dissolved Sodium (Na)	2010/04/06		100	%	80 - 119
			Dissolved Strontium (Sr)	2010/04/06		96	%	85 - 106
		Method Blank	Dissolved Barium (Ba)	2010/04/06	<0.01		mg/L	
			Dissolved Boron (B)	2010/04/06	<0.02		mg/L	
			Dissolved Calcium (Ca)	2010/04/06	<0.3		mg/L	
			Dissolved Iron (Fe)	2010/04/06	<0.06		mg/L	
			Dissolved Lithium (Li)	2010/04/06	<0.02		mg/L	
			Dissolved Magnesium (Mg)	2010/04/06	<0.2		mg/L	

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: CB019189

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3861010	PL	Method Blank	Dissolved Manganese (Mn)	2010/04/06	<0.004		mg/L	
			Dissolved Phosphorus (P)	2010/04/06	<0.1		mg/L	
			Dissolved Potassium (K)	2010/04/06	<0.3		mg/L	
			Dissolved Silicon (Si)	2010/04/06	<0.1		mg/L	
			Dissolved Sodium (Na)	2010/04/06	<0.5		mg/L	
			Dissolved Strontium (Sr)	2010/04/06	<0.02		mg/L	
			Dissolved Sulphur (S)	2010/04/06	<0.2		mg/L	
		RPD	Dissolved Barium (Ba)	2010/04/06	NC		%	20
			Dissolved Boron (B)	2010/04/06	NC		%	20
			Dissolved Calcium (Ca)	2010/04/06	NC		%	20
			Dissolved Iron (Fe)	2010/04/06	NC		%	20
			Dissolved Lithium (Li)	2010/04/06	NC		%	20
			Dissolved Magnesium (Mg)	2010/04/06	NC		%	20
			Dissolved Manganese (Mn)	2010/04/06	NC		%	20
			Dissolved Phosphorus (P)	2010/04/06	NC		%	20
			Dissolved Potassium (K)	2010/04/06	NC		%	20
			Dissolved Silicon (Si)	2010/04/06	NC		%	20
			Dissolved Sodium (Na)	2010/04/06	NC		%	20
			Dissolved Strontium (Sr)	2010/04/06	NC		%	20
			Dissolved Sulphur (S)	2010/04/06	NC		%	20
3862226	JH0	Matrix Spike	Dissolved Chloride (Cl)	2010/04/06		NC	%	80 - 120
		Spiked Blank	Dissolved Chloride (Cl)	2010/04/06		97	%	92 - 113
		Method Blank	Dissolved Chloride (Cl)	2010/04/06	<1		mg/L	
		RPD	Dissolved Chloride (Cl)	2010/04/06	0.7		%	20
3862265	JH0	Matrix Spike	Dissolved Sulphate (SO4)	2010/04/06		NC	%	80 - 120
		Spiked Blank	Dissolved Sulphate (SO4)	2010/04/06		99	%	91 - 116
		Method Blank	Dissolved Sulphate (SO4)	2010/04/06	<1		mg/L	
		RPD	Dissolved Sulphate (SO4)	2010/04/06	0.08		%	20
3864569	LS0	Spiked Blank	Alkalinity (Total as CaCO3)	2010/04/06		102	%	98 - 103
		Method Blank	Alkalinity (PP as CaCO3)	2010/04/06	<0.5		mg/L	
			Alkalinity (Total as CaCO3)	2010/04/06	<0.5		mg/L	
			Bicarbonate (HCO3)	2010/04/06	<0.5		mg/L	
			Carbonate (CO3)	2010/04/06	<0.5		mg/L	
			Hydroxide (OH)	2010/04/06	<0.5		mg/L	
		RPD	Alkalinity (PP as CaCO3)	2010/04/06	NC		%	20
			Alkalinity (Total as CaCO3)	2010/04/06	5.1		%	20
			Bicarbonate (HCO3)	2010/04/06	5.1		%	20
			Carbonate (CO3)	2010/04/06	NC		%	20
			Hydroxide (OH)	2010/04/06	NC		%	20
3864839	LS0	Spiked Blank	Conductivity	2010/04/06		101	%	92 - 106
		Method Blank	Conductivity	2010/04/06	<1		uS/cm	
		RPD	Conductivity	2010/04/06	0.9		%	20
3864840	LS0	Spiked Blank	pH	2010/04/06		100	%	97 - 102
		RPD	pH	2010/04/06	3.4		%	5
3865086	SJ1	Spiked Blank	PROPAZINE (sur.)	2010/04/07		94	%	30 - 130
			Tebuthiuron	2010/04/07		109	%	30 - 130
			Atrazine	2010/04/07		101	%	30 - 130
			Simazine	2010/04/07		67	%	30 - 130
			Diuron	2010/04/07		109	%	30 - 130
			Linuron	2010/04/07		70	%	30 - 130
			Bromacil	2010/04/07		54	%	30 - 130
		Method Blank	PROPAZINE (sur.)	2010/04/07		108	%	30 - 130
			Tebuthiuron	2010/04/07	<0.00010		mg/L	
			Atrazine	2010/04/07	<0.00010		mg/L	
			Simazine	2010/04/07	<0.00010		mg/L	

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51645D
P.O. #:
Site Reference:

Quality Assurance Report (Continued)

Maxxam Job Number: CB019189

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3865086	SJ1	Method Blank	Diuron	2010/04/07	<0.00010		mg/L	
			Linuron	2010/04/07	<0.00010		mg/L	
			Bromacil	2010/04/07	<0.00010		mg/L	
3868116	AM7	Matrix Spike	METHYL ISO-BUTYL KETONE (sur.)	2010/04/08		92	%	70 - 130
			Methanol	2010/04/08		91	%	30 - 130
		Spiked Blank	METHYL ISO-BUTYL KETONE (sur.)	2010/04/08		94	%	70 - 130
			Methanol	2010/04/08		77	%	30 - 130
		Method Blank	METHYL ISO-BUTYL KETONE (sur.)	2010/04/08		86	%	70 - 130
			Methanol	2010/04/08	<1		mg/L	
		RPD	Methanol	2010/04/08	NC		%	40

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Validation Signature Page

Maxxam Job #: B019189

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

JANET GAO, Senior Analyst, Organics Department

LILI ZHOU, Senior analyst, Inorganic department.

ORLA JORGENSEN, Organics Supervisor

VERONICA FALK, Scientific Specialist

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics

Maxxam Analytics International Corporation o/a Maxxam Analytics
4000 19st N.E, Calgary, Alberta Canada T2E 6P8 Tel:(403) 291-3077 Toll-free:800-386-7247 Fax:(403) 735-2240 www.maxxam.ca

CHAIN OF CUSTODY RECORD

Page of

INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#4622 PHH ARC ENVIRONMENTAL LTD - NATIO	Company Name:		Quotation #:	A90096	MAXXAM JOB #:	BOTTLE ORDER #:
Contact Name:	GREG RUSLING	Contact Name:		P.O. #:		B019189	88253
Address:	#111, 11505 - 35 Street SE	Address:		Project #:	51645 D	CHAIN OF CUSTODY #:	PROJECT MANAGER:
	CALGARY AB T2Z 4B1			Project Name:		C#88253-01-01	LESLEY LEM
Phone:	(403) ~~250-5722~~ 875-5502 Fax: (403)543-1944	Phone:	Fax:	Site #:			
Email:	grusling@phharcenv.com	Email:		Sampled By:	Greg Rusling		

REGULATORY CRITERIA:

SPECIAL INSTRUCTIONS

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

ANALYSIS REQUESTED (Please be specific):

TURNAROUND TIME (TAT) REQUIRED:

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Regular (Standard) TAT: ☒
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission) ☐
Date Required: _____ Time Required: _____
Rush Confirmation Number: _____ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water? (Y / N)	Metals Field Filtered? (Y / N)	BTEX F1-F2	Regulated Metals (CCME/AT1) - Dissolved	Routine Water Analysis	Diisopropanolamine (DIPA)	Polycyclic Aromatic Hydrocarbons	Sterilants	Glycol	Methanol			# of Bottles	Comments
1		MW100-10	Apr 11		H2O			X	X	X									Metals preserved and filtered
2		MW101-10	↓		↓			X	X	X	X			X	X				
3		MW107-10						X	X	X		X	X						Metals not preserved or filtered
4																			
5																			
6																			
7																			
8																			
9																			
10																			

*RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time:	# Jars Used and Not Submitted
Greg Rusling	10/04/01	5:30p.m.				

Laboratory Use Only

Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
☐	MR7 17:25	☐ Yes ☐ No

RECEIVED APR 01 2010

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

10,12,13

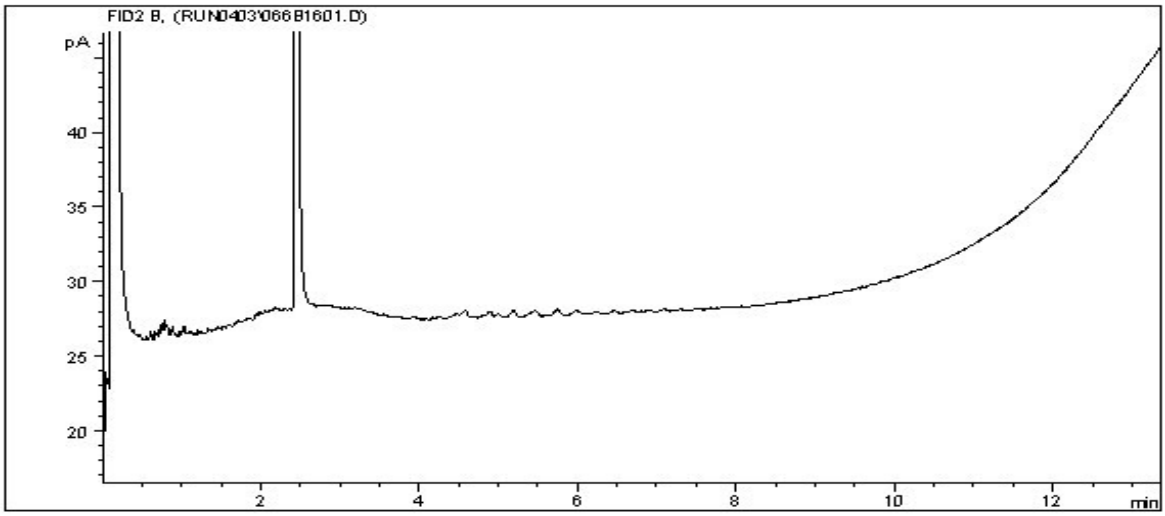
PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTR

Report Date: 2010/04/09
Maxxam Job #: B019189
Maxxam Sample: T44469

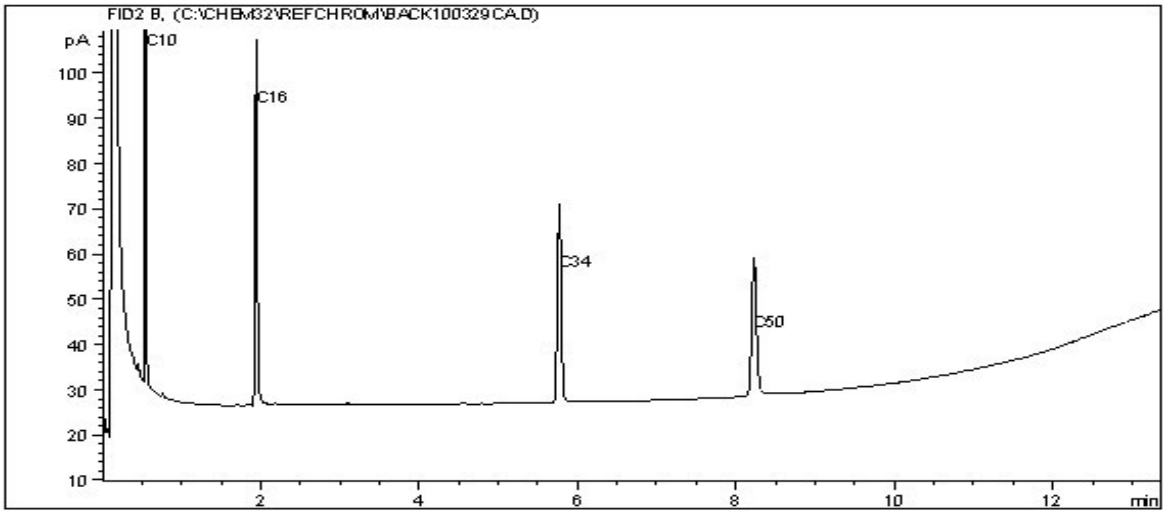
Client Project #: 51645D

Client ID: MW100-10

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist intrepretation or fingerprinting be required to please contact the laboratory.

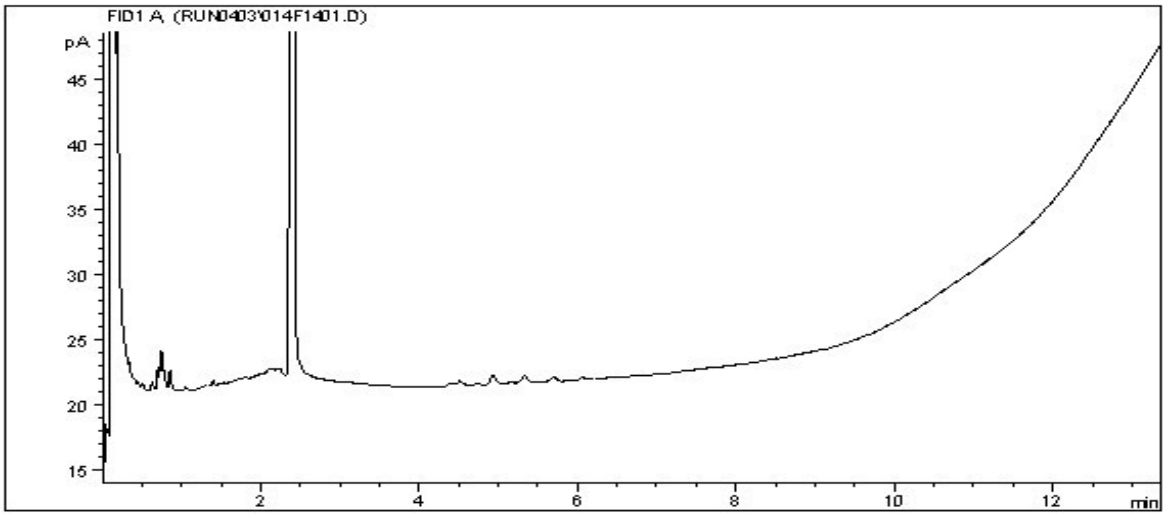
PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTR

Report Date: 2010/04/09
Maxxam Job #: B019189
Maxxam Sample: T44470

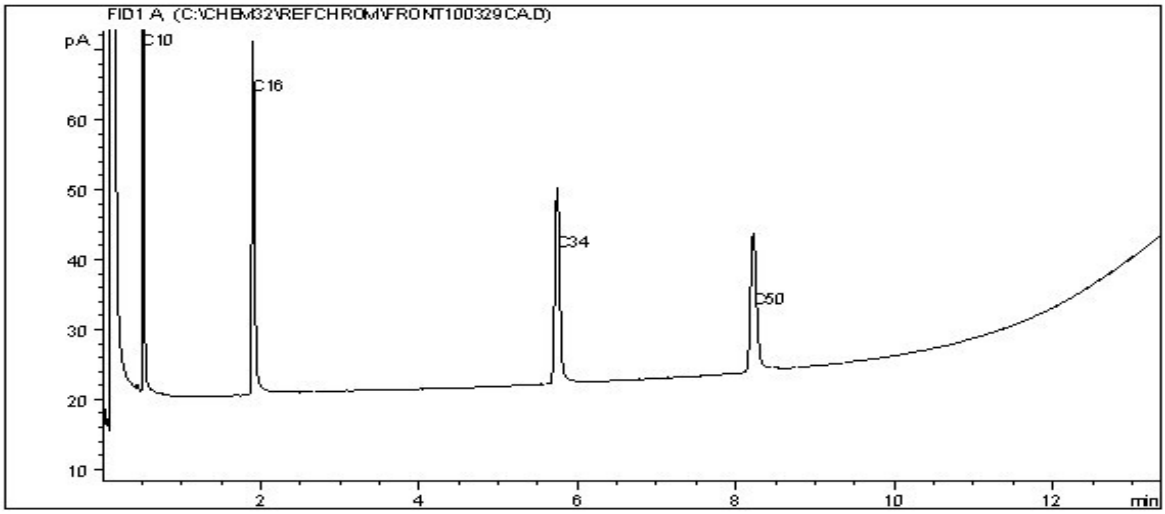
Client Project #: 51645D

Client ID: MW101-10

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist intrepretation or fingerprinting be required to please contact the laboratory.

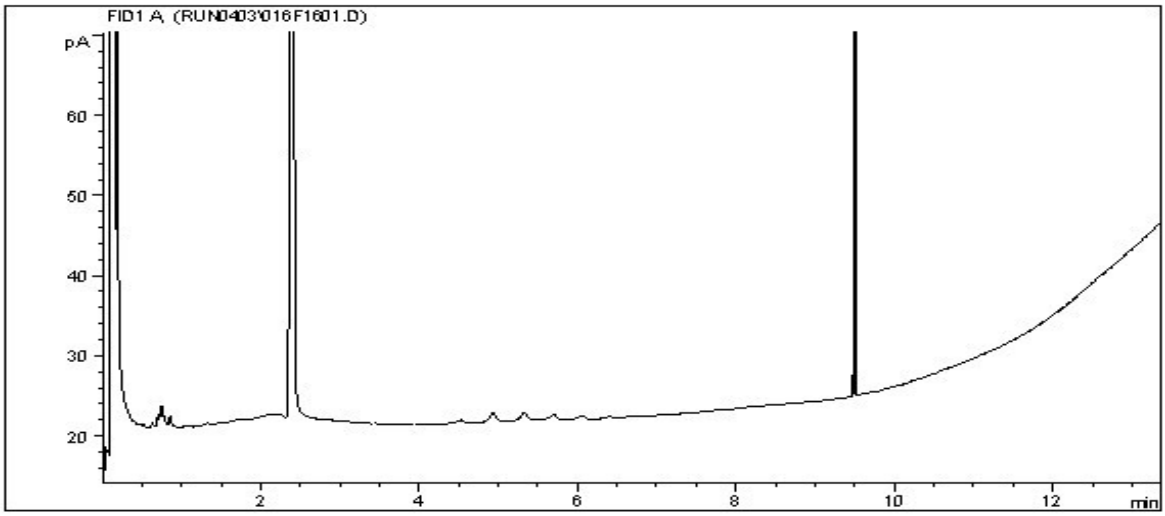
PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTR

Report Date: 2010/04/09
Maxxam Job #: B019189
Maxxam Sample: T44470

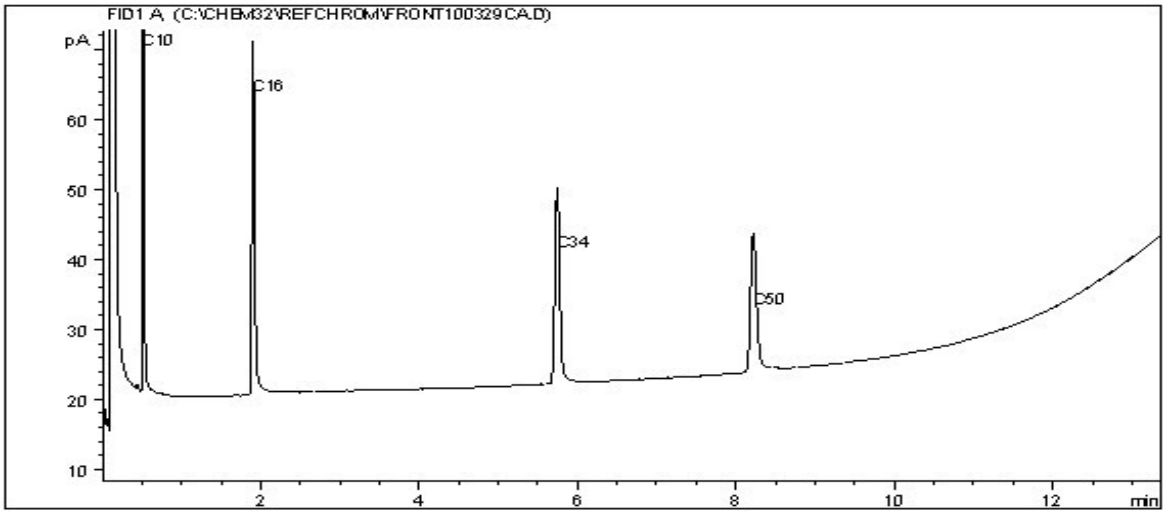
Client Project #: 51645D

Client ID: MW101-10

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist intrepretation or fingerprinting be required to please contact the laboratory.

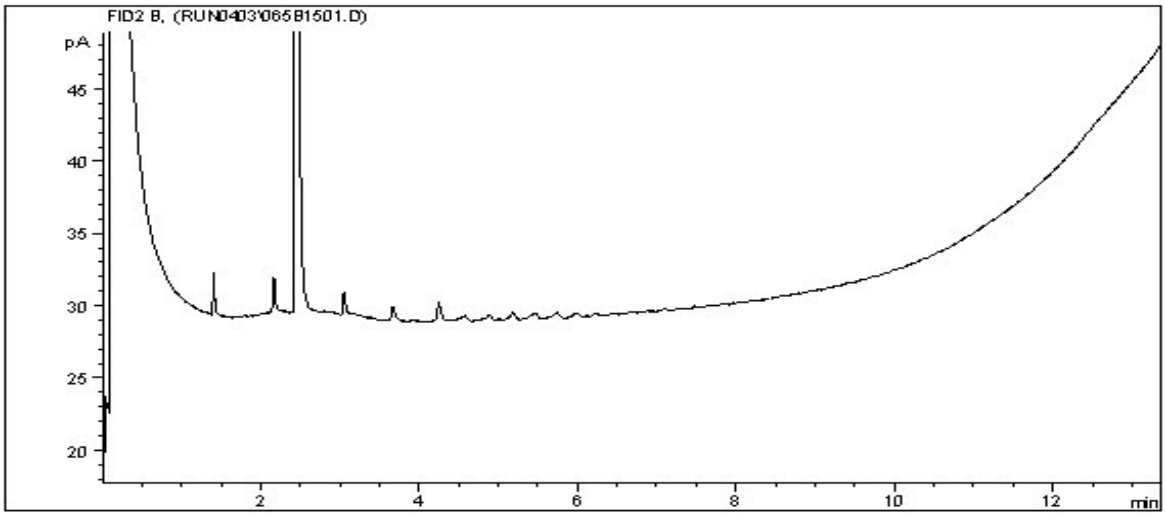
PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTR

Report Date: 2010/04/09
Maxxam Job #: B019189
Maxxam Sample: T44471

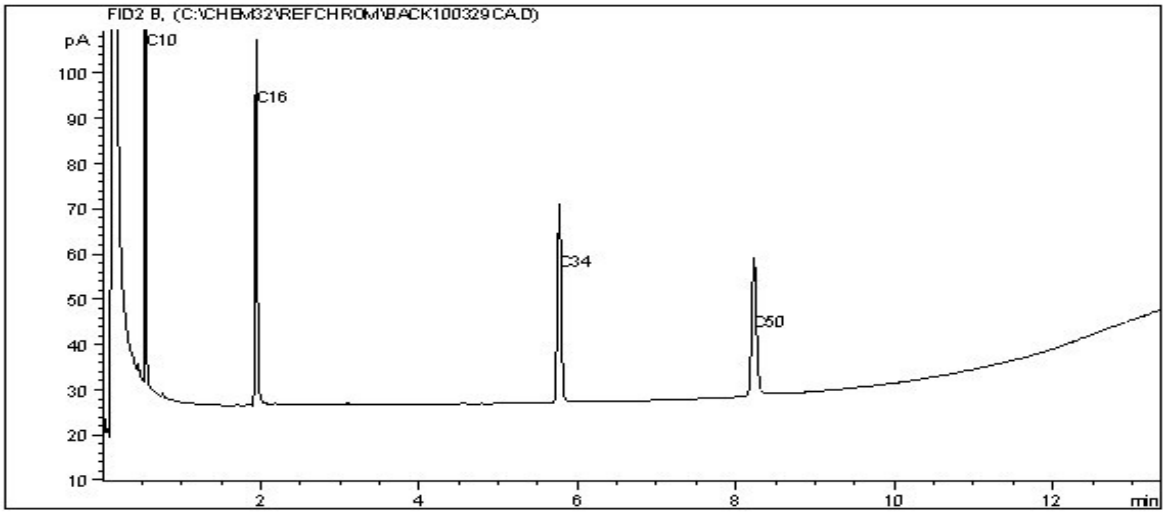
Client Project #: 51645D

Client ID: MW107-10

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Page 1 of 1

Note: This information is provided for reference purposes only. Should detailed chemist intrepretation or fingerprinting be required to please contact the laboratory.

Your Project #: 51G45D
Site: 3706-18 AVE COLEMAN, AB
Your C.O.C. #: 100636

Attention: GREG RUSLING
PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
#111, 11505 - 35 Street SE
CALGARY, AB
CANADA T2Z 4B1

Report Date: 2010/04/12

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B020591
Received: 2010/04/08, 13:00

Sample Matrix: Soil
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Moisture	2	N/A	2010/04/08	CAL SOP-00023	McKeague MSSMA 2.411
Benzo[a]pyrene Equivalency	2	N/A	2010/04/10	AB SOP-00003	EPA 8270D
Polycyclic Aromatic Hydrocarbons in soil	2	2010/04/08	2010/04/10	CAL SOP-00165	EPA 3540C/8270D

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

LESLEY LEM, Project Manager
Email: lesley.lem@maxxamanalytics.com
Phone# (403) 291-3077

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

Maxxam Job #: B020591
Report Date: 2010/04/12

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51G45D
Site Reference: 3706-18 AVE COLEMAN, AB
Sampler Initials: GR

RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		T51529	T51530		
Sampling Date		2010/03/26	2010/03/26		
COC Number		100636	100636		
	Units	**RAILLINE 1**	**RAILLINE 2**	**RDL**	**QC Batch**
Physical Properties					
Moisture	%	18	19	0.3	3871992

RDL = Reportable Detection Limit

Maxxam Job #: B020591
Report Date: 2010/04/12

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51G45D
Site Reference: 3706-18 AVE COLEMAN, AB
Sampler Initials: GR

SEMIVOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		T51529	T51530		
Sampling Date		2010/03/26	2010/03/26		
COC Number		100636	100636		
	Units	**RAILLINE 1**	**RAILLINE 2**	**RDL**	**QC Batch**
Polycyclic Aromatics					
Acenaphthene	mg/kg	<0.0050	<0.0050	0.0050	3868239
Benzo[a]pyrene equivalency	mg/kg	<0.1	<0.1	0.1	3868954
Acenaphthylene	mg/kg	<0.0050	<0.0050	0.0050	3868239
Acridine	mg/kg	<0.010	<0.010	0.010	3868239
Anthracene	mg/kg	<0.0040	<0.0040	0.0040	3868239
Benzo(a)anthracene	mg/kg	<0.0050	<0.0050	0.0050	3868239
Benzo(b&j)fluoranthene	mg/kg	0.012	0.017	0.0050	3868239
Benzo(k)fluoranthene	mg/kg	<0.0050	<0.0050	0.0050	3868239
Benzo(g,h,i)perylene	mg/kg	0.010	0.022	0.0050	3868239
Benzo(c)phenanthrene	mg/kg	<0.0050	<0.0050	0.0050	3868239
Benzo(a)pyrene	mg/kg	<0.0050	0.0053	0.0050	3868239
Benzo[e]pyrene	mg/kg	0.0098	0.023	0.0050	3868239
Chrysene	mg/kg	0.013	0.028	0.0050	3868239
Dibenz(a,h)anthracene	mg/kg	<0.0050	<0.0050	0.0050	3868239
Fluoranthene	mg/kg	0.014	0.011	0.0050	3868239
Fluorene	mg/kg	<0.0050	<0.0050	0.0050	3868239
Indeno(1,2,3-cd)pyrene	mg/kg	0.0053	0.0074	0.0050	3868239
2-Methylnaphthalene	mg/kg	0.013	0.0059	0.0050	3868239
Naphthalene	mg/kg	0.0085	0.0071	0.0050	3868239
Phenanthrene	mg/kg	0.028	0.025	0.0050	3868239
Perylene	mg/kg	<0.0050	0.0056	0.0050	3868239
Pyrene	mg/kg	0.012	0.011	0.0050	3868239
Quinoline	mg/kg	<0.010	<0.010	0.010	3868239
Surrogate Recovery (%)					
D10-ANTHRACENE (sur.)	%	97	100	N/A	3868239
D12-BENZO(A)PYRENE (sur.)	%	56	63	N/A	3868239
D8-ACENAPHTHYLENE (sur.)	%	93	100	N/A	3868239
TERPHENYL-D14 (sur.)	%	76	88	N/A	3868239

N/A = Not Applicable
RDL = Reportable Detection Limit

Maxxam Job #: B020591
Report Date: 2010/04/12

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Client Project #: 51G45D
Site Reference: 3706-18 AVE COLEMAN, AB
Sampler Initials: GR

Package 1	12.7°C

Each temperature is the average of up to three cooler temperatures taken at receipt

General Comments

Results relate only to the items tested.

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51G45D
P.O. #:
Site Reference: 3706-18 AVE COLEMAN, AB

Quality Assurance Report

Maxxam Job Number: CB020591

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3868239 SJ1	Matrix Spike	D10-ANTHRACENE (sur.)	2010/04/08		86	%	30 - 130
		D12-BENZO(A)PYRENE (sur.)	2010/04/08		75	%	30 - 130
		D8-ACENAPHTHYLENE (sur.)	2010/04/08		75	%	30 - 130
		TERPHENYL-D14 (sur.)	2010/04/08		79	%	30 - 130
		Acenaphthene	2010/04/08		89	%	30 - 130
		Acenaphthylene	2010/04/08		84	%	30 - 130
		Acridine	2010/04/08		45	%	30 - 130
		Anthracene	2010/04/08		92	%	30 - 130
		Benzo(a)anthracene	2010/04/08		76	%	30 - 130
		Benzo(b&j)fluoranthene	2010/04/08		80	%	30 - 130
		Benzo(k)fluoranthene	2010/04/08		70	%	30 - 130
		Benzo(g,h,i)perylene	2010/04/08		75	%	30 - 130
		Benzo(c)phenanthrene	2010/04/08		88	%	30 - 130
		Benzo(a)pyrene	2010/04/08		78	%	30 - 130
		Benzo[e]pyrene	2010/04/08		73	%	30 - 130
		Chrysene	2010/04/08		82	%	30 - 130
		Dibenz(a,h)anthracene	2010/04/08		48	%	30 - 130
		Fluoranthene	2010/04/08		86	%	30 - 130
		Fluorene	2010/04/08		83	%	30 - 130
		Indeno(1,2,3-cd)pyrene	2010/04/08		73	%	30 - 130
		2-Methylnaphthalene	2010/04/08		61	%	30 - 130
		Naphthalene	2010/04/08		102	%	30 - 130
		Phenanthrene	2010/04/08		71	%	30 - 130
		Perylene	2010/04/08		83	%	30 - 130
		Pyrene	2010/04/08		90	%	30 - 130
		Quinoline	2010/04/08		56	%	30 - 130
	Spiked Blank	D10-ANTHRACENE (sur.)	2010/04/08		90	%	30 - 130
		D12-BENZO(A)PYRENE (sur.)	2010/04/08		77	%	30 - 130
		D8-ACENAPHTHYLENE (sur.)	2010/04/08		76	%	30 - 130
		TERPHENYL-D14 (sur.)	2010/04/08		80	%	30 - 130
		Acenaphthene	2010/04/08		88	%	30 - 130
		Acenaphthylene	2010/04/08		84	%	30 - 130
		Acridine	2010/04/08		47	%	30 - 130
		Anthracene	2010/04/08		93	%	30 - 130
		Benzo(a)anthracene	2010/04/08		74	%	30 - 130
		Benzo(b&j)fluoranthene	2010/04/08		82	%	30 - 130
		Benzo(k)fluoranthene	2010/04/08		79	%	30 - 130
		Benzo(g,h,i)perylene	2010/04/08		76	%	30 - 130
		Benzo(c)phenanthrene	2010/04/08		79	%	30 - 130
		Benzo(a)pyrene	2010/04/08		78	%	30 - 130
		Benzo[e]pyrene	2010/04/08		75	%	30 - 130
		Chrysene	2010/04/08		72	%	30 - 130
		Dibenz(a,h)anthracene	2010/04/08		51	%	30 - 130
		Fluoranthene	2010/04/08		86	%	30 - 130
		Fluorene	2010/04/08		83	%	30 - 130
		Indeno(1,2,3-cd)pyrene	2010/04/08		79	%	30 - 130
		2-Methylnaphthalene	2010/04/08		62	%	30 - 130
		Naphthalene	2010/04/08		101	%	30 - 130
		Phenanthrene	2010/04/08		84	%	30 - 130
		Perylene	2010/04/08		83	%	30 - 130
		Pyrene	2010/04/08		88	%	30 - 130
		Quinoline	2010/04/08		53	%	30 - 130
	Method Blank	D10-ANTHRACENE (sur.)	2010/04/08		100	%	30 - 130
		D12-BENZO(A)PYRENE (sur.)	2010/04/08		70	%	30 - 130
		D8-ACENAPHTHYLENE (sur.)	2010/04/08		80	%	30 - 130

PHH ARC ENVIRONMENTAL LTD - NATIONAL CONTRACT
Attention: GREG RUSLING
Client Project #: 51G45D
P.O. #:
Site Reference: 3706-18 AVE COLEMAN, AB

Quality Assurance Report (Continued)

Maxxam Job Number: CB020591

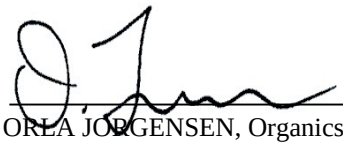
QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3868239	SJ1	Method Blank	TERPHENYL-D14 (sur.)	2010/04/08		86	%	30 - 130
			Acenaphthene	2010/04/08	<0.0050		mg/kg	
			Acenaphthylene	2010/04/08	<0.0050		mg/kg	
			Acridine	2010/04/08	<0.010		mg/kg	
			Anthracene	2010/04/08	<0.0040		mg/kg	
			Benzo(a)anthracene	2010/04/08	<0.0050		mg/kg	
			Benzo(b&j)fluoranthene	2010/04/08	<0.0050		mg/kg	
			Benzo(k)fluoranthene	2010/04/08	<0.0050		mg/kg	
			Benzo(g,h,i)perylene	2010/04/08	<0.0050		mg/kg	
			Benzo(c)phenanthrene	2010/04/08	<0.0050		mg/kg	
			Benzo(a)pyrene	2010/04/08	<0.0050		mg/kg	
			Benzo[e]pyrene	2010/04/08	<0.0050		mg/kg	
			Chrysene	2010/04/08	<0.0050		mg/kg	
			Dibenz(a,h)anthracene	2010/04/08	<0.0050		mg/kg	
			Fluoranthene	2010/04/08	<0.0050		mg/kg	
			Fluorene	2010/04/08	<0.0050		mg/kg	
			Indeno(1,2,3-cd)pyrene	2010/04/08	<0.0050		mg/kg	
			2-Methylnaphthalene	2010/04/08	<0.0050		mg/kg	
			Naphthalene	2010/04/08	<0.0050		mg/kg	
			Phenanthrene	2010/04/08	<0.0050		mg/kg	
			Perylene	2010/04/08	<0.0050		mg/kg	
			Pyrene	2010/04/08	<0.0050		mg/kg	
			Quinoline	2010/04/08	<0.010		mg/kg	
		RPD	Acenaphthene	2010/04/08	NC		%	50
			Acenaphthylene	2010/04/08	NC		%	50
			Acridine	2010/04/08	NC		%	50
			Anthracene	2010/04/08	NC		%	50
			Benzo(a)anthracene	2010/04/08	NC		%	50
			Benzo(b&j)fluoranthene	2010/04/08	NC		%	50
			Benzo(k)fluoranthene	2010/04/08	NC		%	50
			Benzo(g,h,i)perylene	2010/04/08	NC		%	50
			Benzo(c)phenanthrene	2010/04/08	NC		%	50
			Benzo(a)pyrene	2010/04/08	NC		%	50
			Benzo[e]pyrene	2010/04/08	NC		%	50
			Chrysene	2010/04/08	NC		%	50
			Dibenz(a,h)anthracene	2010/04/08	NC		%	50
			Fluoranthene	2010/04/08	NC		%	50
			Fluorene	2010/04/08	NC		%	50
			Indeno(1,2,3-cd)pyrene	2010/04/08	NC		%	50
			2-Methylnaphthalene	2010/04/08	NC		%	50
			Naphthalene	2010/04/08	NC		%	50
			Phenanthrene	2010/04/08	0.9		%	50
			Perylene	2010/04/08	NC		%	50
			Pyrene	2010/04/08	NC		%	50
			Quinoline	2010/04/08	NC		%	50
3871992	DN0	RPD	Moisture	2010/04/08	4.8		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Validation Signature Page

Maxxam Job #: B020591

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



ORLA JORGENSEN, Organics Supervisor

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics

Calgary: 4000 19st St. NE, T2E 6P8 | Ph: (403) 291-3077 | Fax: (403) 735-2240 | Toll free: (800) 386-7247
Edmonton: 9331 – 48 Street, T6B 2R4 | Ph: (780) 465-1212 | Fax: (780) 450-4187 | Toll free: (877) 465-8889
www.maxxamanalytics.com

100636 **CHAIN OF CUSTODY**

Page: _____ of _____

Invoice To: Require Report? Yes ☒ No ☐	**Report To:**	PO # / AFE #:
Company Name: PHH ARC Environmental		Quotation #:
Contact Name: Greg Rushing		Project #: 51645D
Address: 111, 11505 35 Street SE, Calgary		Project Name:
Prov: AB PC:	Prov: PC:	Location: 3706 18 Ave, Coleman, AB
Contact #s: Ph: 403-875-5092 Fax:	Ph: Fax:	Sampler's Initials: GR

DETECTION LIMIT REQUIREMENTS:
Check the applicable criterion and indicate land use

☒ AT1 _____
☐ CCME _____
☐ OTHER _____

REPORT DISTRIBUTION:
EMAIL ADDRESS(S):
grushing@phhenv.com

SERVICE REQUESTED:

☐ **RUSH** (Please ensure you contact the lab to reserve)
Date Required: _____
☒ REGULAR Turnaround (5 to 7 Days)

	Sample Identification	Matrix S/W	Date & Time Sampled Year/Month/Day	SOILS (footnotes defined on back): BTEX F1-F4	Sieve (75 micron)	Salinity 4	Regulated Metals (CCME / AT1)[1]	Assessment ICP Metals[2]	☐ Paint Filter ☐ Flashpoint ☐ pH (1:1)	TCLP ☐ BTEX ☐ Metals		WATERS (footnotes defined on back): ☐ BTEX F1 ☐ VOCs	☐ BTEX F1-F2 ☐ BTEX F1-F4	Routine Water Package ☐ Turb ☐ F	REGULATED METALS (CCME / AT1)[3]: Total ☐ Preserved ☐ Not Preserved	Dissolved ☐ Preserved ☐ Not Filtered ☐ Not Preserved ☐ Filtered	Mercury ☐ Total ☐ Dissolved	☐ Ammonia ☐ TKN ☐ COD	☐ TOC ☐ DOC	OTHER TEST(S)	*HOLD for 60 Days	# of Containers Submitted
1	Rail line1	S	March 26/10								X											
2	Rail line2	S	" "								X											
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						

*All samples are held for 60 calendar days after sample receipt. For long term storage please contact your project manager.

Maxxam Job #: B020591

Relinquished By: Greg Rushing Date/Time: Apr 8/10

Sign and Print: _____

COMMENTS/SPECIAL INSTRUCTIONS:

# JARS USED & NOT SUBMITTED	Received By	Temperature			Ice
	RECEIVED APR 0 8 2010 JBO 1300	12	14	12	X
	CUSTODY SEAL YES / NO				

Maxxam Analytics International Corporation o/a Maxxam Analytics CAL FCD-00357 Rev6 08/12