IEG CONSULTANTS LTD.

September 25, 2013

Northwest Territories Water Board
P.O. Box 2531
#302, 125 Mackenzie Road
Inuvik, NT
X0E 0T0

Mr. Ron Wallace
Executive Director

Dear Mr. Wallace:

Unipkat I-22
2013 Monitoring and Sampling Program Report
For Type B Water License N7L1-1831

IEG Consultants Ltd. (IEG) is pleased to submit the 2013 Site Monitoring and Sampling Program Report to the Northwest Territories Water Board in accordance with the requirements of the current water licence N7L1-1831.

If you have any questions, please call the undersigned at (403) 730-6809.

Yours truly,
IEG CONSULTANTS LTD.

Nicole Wills

Nicole Wills, P. AG.

NW
c.c. Randall Warren – Shell Canada Energy
c.c. Veronique D'Amours-Gauthier – Fisheries and Oceans Canada

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IEG CONSULTANTS LTD.

Shell Canada Energy

Unipkat I-22Shell Canada Energy

2013 Monitoring and Sampling Program Report

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Certificate No. FS 62747

Shell Canada Energy

Unipkat I-22

2013 Monitoring and Sampling Program Report

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1 BACKGROUND

The Unipkat I-22 wellsite (site) was an exploration natural gas well drilled by Shell Canada Ltd. (Shell) in 1972 and 1973. The well was originally spudded on September 8, 1972 and the drilling rig was released on March 6, 1973. Drilling was completed at the site under Indian and Northern Affairs Canada land use license N72A088. The drilling sump was constructed on July 29, 1972, enlarged during drilling operations, and capped April 3, 1972.

Shell conducted a drilling sump remediation program at the site between February and April 2011. The site is located within the Inuvialuit Settlement Region, along the eastern bank of Arvoknar Channel, southwest of the Kendall Island Bird Sanctuary. The closest community is Tuktoyaktuk, Northewest Territories (NT).

As part of the remedial program a Type "B" water licence was granted by the Northwest Territories Water Board (NWTWB). Licence N7L1-1831 requires that a site monitoring and sampling program, approved by the NWTWB, be conducted in 2012 and 2013. The site monitoring and sampling plan (IEG, 2011) was submitted in June 2011 to the NWTWB for review, and approval was granted in February 2012. This report summarizes the activities conducted by IEG Consultants Ltd. (IEG) at the site in 2013.

2 OBJECTIVE AND SCOPE OF WORK

The objective of the 2013 Site Monitoring and Sampling Program was to monitor the remediated drilling sump and site conditions. The scope of work included the following:

- mobilization to site;
- conduct a visual inspection of the site;
- collect groundwater samples from the existing monitoring wells for chemical analyses;
- collect thermal data from the existing thermistor installations for interpretation;
- promote slope stabilization of the eroding river bank with the placement of timber debris and willow staking;
- install fluorescent markers at 5 meter intervals from the riverbank to the well centre for erosion monitoring;
- collect six surface soil samples in the area north of the remediated drilling sump and submit for laboratory analysis;
- demobilization from site; and,
- preparation and submission of a report summarizing the 2013 site activities.

3 METHODOLOGY

The 2013 Site Monitoring and Sampling Program included five aspects: visual inspection of the site, collection and analysis of groundwater samples from existing monitoring wells on-site, collection and

analysis of data from existing thermistors on-site, site maintenance, and surface soil sample collection and analysis.

3.1 Visual Inspection and Site Maintenance

IEG personnel conducted a visual inspection of the site on August 17 and September 2, 2013. Data collected included:

- date, monitoring event number, weather conditions (temperature, precipitation, cloud cover, and wind direction) at the time of inspection;
- name of inspector;
- observations of: subsidence, erosion or frost action, potential seepage, areas of water pooling or discharge, resurgence, shoreline stability, soil staining, vegetation stress, odours and/or hydrocarbon sheen;
- condition of monitoring well/thermistors; and,
- photographic evidence of the inspection.

During the visual inspection, global positioning system data of the current shoreline of the Arvoknar Channel adjacent to the site was collected (Figure 1).

Site maintenance activities conducted on August 17, 2013 involved the placement of timber debris and willow staking to promote slope stabilization and installation of fluorescent markers to monitor erosion.

3.2 Groundwater Monitoring and Sampling

There are currently 10 groundwater monitoring wells installed at the site. The monitoring program included monitoring and sampling the existing (and functioning) monitoring wells. Locations of the current monitoring wells are shown on Figure 1.

The following protocol applied at each monitoring well location:

- measurement of the groundwater/product level with an interface probe; and,
- measurement of combustible vapours in the monitoring well head spaces (using an RKI Instruments Eagle hydrocarbon surveyor)

Following monitoring groundwater conditions, approximately one well volume of groundwater was purged and disposed on-site to allow for recharging of fresh groundwater into the well screen in preparation for sampling.

Subsequent to purging, groundwater samples were collected using new waterra tubing and footvalves to reduce the risk of contamination. Samples were collected in laboratory supplied sterile bottles and stored in a cooler with ice to preserve sample integrity. The samples were transported to AGAT in Edmonton, Alberta under standard chain-of-custody protocol for laboratory analysis of:

- petroleum hydrocarbon (PHC) parameters including benzene, toluene, ethylbenzene, xylenes (BTEX) and fractions F1 to F4;
- polyaromatic hydrocarbons (PAHs);
- total and dissolved metals; and,
- routine potability.

3.3 Thermal Data Collection

There are currently two thermistors installed at the site. The thermistors are used to monitor the ground thermal profile within the backfilled former drilling sump compared to a control point on the site. The thermistor locations are shown on Figure 1. Thermistor data was downloaded onto a field laptop on September 2, 2013.

3.4 Soil Sampling

Surface soil samples were collected on August 17, 2013, north of the sump remediated in 2011 to characterize surface soil where residual exceedances were identified. Test holes were advanced using a shovel and samples were collected at 0.0 m to 0.15 m, 0.15 m to 0.3 m, and 0.3 m to 0.6 m depth intervals.

Soil samples were collected in laboratory supplied sterile jars and kept cool prior to transport off site. Samples were submitted under standard chain of custody protocol to AGAT in Edmonton, Alberta for analysis of:

- PHC parameters including BTEX and fractions F1 to F4;
- PAHs;
- regulated metals including barium by fusion; and,
- detailed salinity.

3.5 Quality Assurance and Quality Control

One soil replicate sample was collected as per Canadian Council of Ministers of the Environment (CCME) Guidance, as part of the quality assurance/quality control (QA/QC) program for the site. The replicate sample was submitted to the laboratory under a blind sample designation (Dup A) and analyzed in order to evaluate analytical precision and sampling procedures. The data was evaluated using Zeiner's (1994) relative percent difference method.

Field sampling QA/QC measures included implementation of IEG's site investigation manual for guidelines and protocols regarding field instrument calibration, sampling techniques, and personal protection equipment. To prevent cross contamination, new/or cleaned (as appropriate) sampling equipment was used during sample collection. Nitrile gloves were worn when handling samples and were changed between sampling locations.

3.6 Soil and Groundwater Quality Assessment Guidelines

The dominant soil texture at the site was determined during previous assessments to be fine-grained. Based on the land use of the site and the surrounding properties, BTEX and inorganic parameters (salinity and metals) in soil were compared to the fine-textured soil guidelines found in the CCME Canadian Environmental Quality Guidelines (CEQG), (Update 7.0, September 2007) for residential/parkland land use, where applicable. True total barium results were compared to the Alberta Environment (AENV) Soil Remediation Guidelines for Barite: Environmental Health and Human Health guidelines (AENV, 2009). Groundwater was also compared to the CCME CEQG, 1999 (Update 7.0, September 2007) for residential/parkland land use, where applicable.

4 RESULTS AND DISCUSSION

4.1 Visual Inspection and Site Maintenance

Based on the 2013 visual inspection, the backfilled former drilling sump area and shoreline exhibited signs of erosion where sloughing has resulted in soil loss. At the section of shoreline observed to have the greatest degree of erosion, the shoreline has eroded approximately 9 m since June 2012 and approximately 13 m since June 2011. The rate of erosion is expected to stabilize over time and will continue to be monitored. Signs of staining, vegetative stress or cap failure were not observed. Two of the monitoring wells (MW1 and MW3) were observed to be damaged (Appendix I, Photograph 1) and one monitoring well (MW4) could not be located.

Site maintenance involved the relocation of timber debris from the site to the eroding river bank (Appendix I, Photographs 2 and 3) and the placement of fluorescent markers at 5 m intervals from the riverbank to the well center to monitor erosion (Appendix I, Photograph 4). Site maintenance also included planting two rows of approximately ten willow stakes along the east corner and southern extent of the eroding riverbank to assist with slope stabilization (Appendix I, Photograph 2).

4.2 Groundwater Monitoring and Sampling

In September 2013, monitoring wells MW1 and MW3 were observed to be damaged and monitoring well MW4 could not be located. The remaining monitoring wells were monitored for depth to groundwater and total well depth. The headspace of each well was monitored for organic vapours using an RKI Instruments Eagle hydrocarbon surveyor. Each monitoring well, with the exception of monitoring well MW11-03, was found to be dry. Groundwater monitoring well details and groundwater monitoring results are included in Table 1.

Following monitoring groundwater conditions, at monitoring well MW11-03, approximately one well volume of groundwater was purged and disposed on-site to allow for recharging of fresh groundwater into the well screen in preparation for sampling (Appendix I, Photograph 5).

Laboratory analytical results indicated concentrations of routine potability parameters chloride (723 mg/L) and iron (3.3 mg/L) at monitoring well MW11-03 exceeded the applicable guidelines (120 mg/L and 0.3 mg/L).

Laboratory analytical results for dissolved metals were compared to the CCME CEQG guidelines for dissolved metals in groundwater and indicated concentrations of cadmium (0.000660 mg/L), copper (0.008 mg/L), iron (3.3 mg/L), selenium (0.005 mg/L), silver (0.000310 mg/L), and zinc (0.046 mg/L) at monitoring well MW11-03 exceeded the applicable guidelines (0.00002 mg/L, 0.004 mg/L, 0.3 mg/L, 0.001 mg/L, 0.0001 mg/L, and 0.03 mg/L, respectively). Laboratory analytical results for total metals were also compared to CCME CEQG guidelines for dissolved metals in groundwater as there is not a guideline for total metals in groundwater. Total metals parameters aluminum, cadmium, copper, iron, selenium, silver, and zinc exceeded the applicable dissolved metals guidelines. Laboratory analytical results for dissolved and totals metals are included in Table 2.

Laboratory analytical results indicated concentrations of PHC and PAH parameters at monitoring well MW11-03 were below the applicable guidelines (Table 3).

Laboratory analytical reports are included in Appendix II. Monitoring well logs are included in Appendix III.

4.3 Thermal Data Analysis

Thermistor T3 is located to the north of the excavation towards the lease boundary, while thermistor T4 is within the backfilled former drilling sump. Thermal records were downloaded from the T3 and T4 dataloggers in September 2013. The downloaded data spanned from September 2012 to August 2013. The data for thermistor T3 was corrupted and could not be analyzed. A graph showing average monthly temperatures for each bead depth at thermistor T4 is provided in Appendix IV. Previously reported thermal data were presented in the Stage 1 – 2011 Site Remediation Report (IEG, 2012a) and the Unipkat I-22 2012 Monitoring and Sampling Program (IEG, 2012b) submitted by IEG in March 2012 and September 2012. The graphs from those submissions (with data spanning from March 2011 to August 2011 for T3 and April 2011 to August 2012 for T4) are also included in Appendix IV.

The graphs depict average changes in temperature with depth for each month that data was recorded. On the 2011 graph of the T3 data, at depths of between 1.5 m below ground surface (bgs) and 5.0 m bgs, the temperature of the ground was less than zero degrees Celcius, which is consistent with historical values at this location and at other previously installed locations.

Similar to the 2011 and 2012 graphs, the 2013 graph of the T4 data indicates the temperature of the ground was less than zero degrees Celcius below approximately 1.0 m bgs. The 2012 graph shows the variation decreased between the sampling months from what was shown on the 2011 graph, indicating the ground was returning to equilibrium with the general thermal regime at the site. The results from 2013 support this further as the temperature variation between sampling months from 2012 to 2013 was minimal.

4.4 Soil Sampling

Six samples were collected north of the sump remediated in 2011 to characterize surface soil where residual exceedances were identified (Appendix I, Photograph 6). Surface soil samples were collected at 0.0 m to 0.15 m, 0.15 m to 0.3 m, and 0.3 m to 0.6 m depth intervals. The sample locations are

shown on Figure 1. The soil analytical results are summarized in Table 4 and Table 5, and laboratory analytical reports are included in Appendix II.

Laboratory results reported indicate that soil exceeded the applicable EC guideline (2 dS/m) in nine of the 12 soil samples collected. The EC values in 2013 ranged from 1.01 dS/m at sample location TH13-05 (0.3-0.6m) to 8.89 dS/m at sample location TH13-02 (0.0-0.15m). The SAR value (5.47 dS/m) at sample location TH13-02 (0.0-0.15m) was slightly above the SAR guideline. The Arvoknar Channel is presumed to have elevated salinity due to mixing water from the Beaufort Sea.

Reported metals parameters were less than applicable guidelines for the samples submitted with the exception of total barium. Exceedances of the CCME guideline for total barium were reported in each sample collected with the exception of samples TH13-04 (0.0-0.15 m), TH13-05 (0.0-0.15 m), and TH13-05 (0.3-0.6 m). The samples were analyzed for barium by fusion and the results were less than the applicable guideline.

The PHC results for each of the 12 soil samples reported concentrations less than the applicable guidelines. Soil samples TH13-01 (0.0-0.15) and TH13-02 (0.0-0.15) were analyzed for PAHs and reported concentrations less than the detection limit and applicable guideline for each PAH parameter.

4.5 Quality Assurance/Quality Control Results

Quality assurance and quality control for analytical data was assessed by collecting a field replicate sample. A blind replicate was obtained with a frequency of 10% of the samples collected. A replicate soil sample was collected from sample location TH13-02 (0.0-0.15 m) and labeled Dup A. Replicate sample laboratory analytical results are included in Table 6.

Zeiner's *Environmental Standard's Field Duplicate Criteria* has been applied in order to evaluate the precision of the analytical results (Zeiner, 1994). Precision in analytical results may be evaluated by calculating the relative percent difference (RPD) or absolute difference (AD) of duplicate samples using the following formulae:

$$RPD = \frac{(S - D)}{(S + D) / 2} \; x\,100 \qquad AD = (S - D)$$

where: RPD and AD are absolute values
S is the original sample result (mg/kg)
D is the duplicate sample result (mg/kg)

If both the original and replicate soil sample concentrations are greater than or equal to five times the laboratory detection limit for a given parameter, the RPD must be less than or equal to 40%. If the results lie outside of the range, they should be considered estimates only (Zeiner, 1994).

If at least one of the sample concentrations is less than or equal to five times the laboratory detection limit for a given parameter, the AD should be less than or equal to twice the detection limit. If the AD

is greater than twice the detection limit, the results should be considered estimates only (Zeiner, 1994).

If one of the sample concentrations is above the detection limit and its replicate sample concentration is less than the detection limit, the difference between the reported concentration and one-half the detection limit should be less than or equal to twice the detection limit. If the difference is greater than twice the detection limit, the results should be considered estimates only (Zeiner, 1994).

Analyzed parameters from 2013 were assessed using the Zeiner criteria. The replicate sample submitted did not meet the Zeiner criteria for Total Barium. Based on the results of the replicate analysis, analytical results for Total Barium should be considered estimates.

Additionally, AGAT conducts quality assurance and quality control procedures during analysis, including the regular use of calibration checks, surrogate matrix spikes, blanks, and laboratory duplicates. Laboratory quality assurance reports and analytical methods are included in Appendix II.

5 CONCLUSIONS AND RECOMMENDATIONS

IEG personnel conducted the 2013 Site Monitoring and Sampling Program, which included a visual inspection, groundwater monitoring, soil sampling and thermal monitoring, at the site in September 2013. Based on the 2013 visual inspection, the backfilled former drilling sump area and shoreline exhibited signs of erosion where sloughing has resulted in soil loss. At the section of shoreline observed to have the greatest degree of erosion, the shoreline has eroded approximately 9 m since June 2012 and approximately 13 m since June 2011. The rate of erosion is expected to stabilize over time and will continue to be monitored. There were no observed signs of staining, vegetative stress or cap failure observed.

Monitoring wells MW1 and MW3 were found to be damaged during the site visit and monitoring well MW4 could not be located. Each of the remaining monitoring wells, with the exception of monitoring well MW11-03, were found to be dry.

Laboratory analytical results indicated concentrations of routine potability parameters chloride and iron, and dissolved metals parameters cadmium, copper, iron, selenium, silver, and zinc exceeded the applicable guidelines at monitoring well MW11-03.

Based on the thermal monitoring data, the ground is frozen from approximately 1.0 m bgs to the maximum depth of investigation of 5.5 m bgs. Minimal variation in temperature between the same sampling month at T4 indicates the ground has returned to equilibrium with the general thermal regime at the site.

Soil analytical data reported EC and SAR results greater than the applicable guideline values of 2 dS/m and 5 dS/m. These results are expected to be elevated based on proximity of the source area (Arvoknar Channel) and the Beaufort Sea.

IEG recommends continuing site visits on an annual basis to conduct maintenance activities and monitor erosion.

6 CLARIFICATIONS OF THIS REPORT

This report was prepared by IEG for the account of Shell Canada Energy. The material in it reflects IEG's best judgment in light of the information available to it at the time of preparation. 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 such third parties. IEG accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The interpretations and conclusions contained herein are based on data derived from a sampling program, where a limited number of soil samples were collected at widely spaced intervals. The sampling method determines surface and subsurface conditions at specific locations where samples were taken and where in-situ tests were conducted, only at the time they were obtained and to the depths penetrated.

The samples and tests cannot be relied upon to accurately reflect the nature and extent of variations that usually exist between sampling or testing locations. The recommendations included herein are based in part on assumptions about variations between sampling or testing locations.

7 CLOSING

We trust this report meets your approval and satisfies your current needs. Should you have any questions or comments, please contact the undersigned at (403) 730-6809.

IEG CONSULTANTS LTD.

Nicole Wills, P. Ag. (Alberta)

REFERENCES

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Zeiner, S.T., 1994. *Realistic Criteria for the Evaluation of Field Duplicate Sample Results*. Reported from the Proceeding of Superfund XV November 29-December 1, 1994 Sheraton Washington Hotel, Washington D.C.

TABLES

Table 1: Summary of Groundwater Analytical Results for Field and Routine Potability Parameters

GENERAL		FIELD			ROUTINE POTABILITY																			
Location	Sample Date (yyyy-mm-dd)	Depth to Groundwater	Total Well Depth	Organic Vapour Analysis	pH	Electrical Conductivity	Total Alkalinity	Hardness - dissolved as $CaCO_3$	Total Dissolved Solids	Bicarbonate	Carbonate	Hydroxide	Fluoride	Chloride	Sulphate	Calcium	Magnesium	Manganese	Iron	Sodium	Potassium	Ionic Balance	Nitrate as Nitrogen	Nitrite as Nitrogen
Units		mV	mg/L	ppm	-	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	mg-N/L	mg-N/L
GUIDELINES																								
CEQG - Freshwater Aquatic Life		-	-	-	**6.5-8.5**	-	-	-	-	-	-	-	**0.12**	**120**	-	-	-	-	**0.3**	-	-	-	**13**	**0.06**
ANALYTICAL																								
MW11-01	2013-09-02	-	4.517	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW11-02	2013-09-02	-	5.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW11-03	2013-09-02	1.953	2.340	10	7.66	3200	543	1350	1890	662	<5	<5	<0.05	723	157	431	67.3	2.52	3.3	175	8.7	102	<0.113	<0.015
MW11-04	2013-09-02	-	2.401	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW1	2013-09-02	-	NM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW2	2013-09-02	-	2.064	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW3	2013-09-02	-	2.050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW6	2013-09-02	-	NM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW10	2013-09-02	-	1.085	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1. Current and/or relevant guidelines are bolded
2. (yellow highlight) = Exceeds applicable guidelines
3. (orange highlight) = Method detection limit is greater than applicable guidelines
4. NM = Not Measured
5. View analytical report for more comprehensive results
6. Guidelines are based on the CCME CEQG = Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG), 1999 (Update 7.0, September 2007)

Table 2: Summary of Groundwater Analytical Results for Total and Dissolved Metals Parameters

GENERAL		TOTAL AND DISSOLVED METALS																						
Location	Sample Date (yyyy-mm-dd)	Aluminum	Antimony	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Iron	Lead	Lithium	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Strontium	Thallium	Tin	Uranium	Vanadium	Zinc
Units		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
GUIDELINES																								
CEQG - Freshwater Aquatic Life		**0.100**	**-**	**0.005**	**-**	**-**	**0.00002**	**-**	**0.004**	**0.3**	**0.007**	**-**	**-**	**0.0001**	**0.073**	**0.15**	**0.001**	**0.0001**	**-**	**0.0008**	**-**	**-**	**-**	**0.03**
ANALYTICAL																								
MW11-003 (Total Metals)	2013-09-02	0.499	<0.001	0.003	0.17	0.0415	0.000578	0.00415	0.013	4.6	0.001	0.054	2.50	<0.000025	<0.003	0.033	0.008	0.000277	1.39	0.0001	0.00279	0.0122	0.003	0.043
MW11-003 (Dissolved Metals)	2013-09-02	0.072	<0.001	0.003	0.16	0.0400	0.000660	0.00600	0.008	3.3	0.001	0.050	2.52	<0.000025	<0.003	0.029	0.005	0.000310	1.39	0.0001	0.00200	0.011	0.002	0.046

Notes:

1. Current and/or relevant guidelines are bolded
2. (yellow highlight) = Exceeds applicable guidelines
3. (orange highlight) = Method detection limit is greater than applicable guidelines
4. View analytical report for more comprehensive results
5. - data not available and/or analyzed
6. Guidelines are based on the CCME CEQG = Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG), 1999 (Update 7.0, September 2007)
7. Aluminum guideline is 0.005 mg/L at pH < 6.5 ; 0.1 mg/L at pH > 6.5
8. CCME Cadmium guideline(mg/L) = $0.001 * 10^{A}$ where $A = 0.86(\log(\text{hardness})) - 3.2$
9. CCME Lead guideline is 0.001 mg/L at hardness of 0 to 60 mg/L; 0.002 mg/L at hardness of 60 to 120 mg/L; 0.004 mg/L at hardness of 120 to 180 mg/L; 0.007 mg/L at hardness > 180 mg/L
10. CCME Nickel guideline is 0.025 mg/L at hardness of 0-60 mg/L ; 0.065 mg/L at hardness of 60-120 mg/L; 0.11 mg/L at hardness of 120-180 mg/L ; 0.15 mg/L at hardness > 180 mg/L

Table 3: Summary of Groundwater Analytical Results for Petroleum Hydrocarbon and Polyaromatic Hydrocarbon Parameters

GENERAL		PETROLEUM HYDROCARBONS								POLYAROMATIC HYDROCARBONS																			
Location	Sample Date (yyyy-mm-dd)	Benzene	Toluene	Ethylbenzene	Xylenes (o+m+p)	F1 (C6-C10)	F2 (C10-C16)	F3 (C16-C34)	F4 (C34-C50)	Acenapthene	Acenaphthylene	Acridine	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(g,h,i)perylene	Benzo(b+j)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	2-Methylnaphthalene	Naphthalene	Quinoline	Phenanthrene	Pyrene
Units		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
GUIDELINES																													
CEQG - Freshwater Aquatic Life		**0.37**	**0.002**	**0.09**	-	-	-	-	-	-	-	**0.0044**	-	-	-	-	-	-	**192**	-	-	-	-	-	**0.0011**	**0.0034**	-	**0.025**
ANALYTICAL																													
MW11-003	2013-09-02	<0.005	<0.005	<0.005	<0.005	<0.1	6.1	0.1	0.2	<0.00001	<0.00001	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00005	<0.00001	<0.00001

Notes:

1. Current and/or relevant guidelines are bolded
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4. View analytical report for more comprehensive results
5. Guidelines are based on the CCME CEQG = Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG), 1999 (Update 7.0, September 2007)

Table 4: Summary of Surface Soil Analytical Results for Salinity, Physical, and Trace Metal Parameters

												PHYSICAL			TRACE METALS																							
Sample Designation	Sample Depth (m bgs)	Sample Date (yyyy-mm-dd)	pH ($CaCl_2$ Extraction)	Electrical Conductivity, EC (dS/m)	Sodium Adsorption Ratio, SAR	Calcium	Potassium	Magnesium	Sodium	Chloride	Sulfate-S	Saturation Percentage	Texture (hydrometer)	75 micron sieve	Antimony	Arsenic	Total Barium	True Total Barium	Beryllium	Boron(Hot Water Extraction)	Cadmium	Chromium	Chromium, Hexavalent	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Tin	Uranium	Vanadium	Zinc
			-	dS/cm	dS/cm	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	-	-	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
CCME CEQG	Residential/Parkland (Fine Textured Surface Soil)		**6-8**	**2**	**5**	-	-	-	-	-	-	-	-	-	**20**	**12.0**	**500**	-	**4**	-	**10.0**	**64**	**0**	**50**	**63**	**140**	**6.6**	**10**	**50**	**1**	**20**	**1**	**50**	**23**	**130**	**200**
AENV 2009 Barite	Residential/Parkland		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**10,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TH13-01	0.0-0.15	2013-08-17	7.41	3.66	1.97	198	10	74	82	96	820	41	-	-	<0.5	6.2	472	826	<0.5	<0.5	<0.5	15	<0.3	7	16	8	<0.5	1	23	1	<0.5	<0.5	<0.5	1	29	79
TH13-01	0.3-0.6	2013-08-17	7.39	3.17	1.26	250	9	50	57	134	752	47	-	-	<0.5	6.2	641	931	<0.5	<0.5	<0.5	14	<0.3	7	15	8	<0.5	1	22	1	<0.5	<0.5	<0.5	1	29	75
TH13-02	0.0-0.15	2013-08-17	7.43	8.89	5.47	380	21	140	326	876	964	44	-	-	<0.5	6.3	1530	1460	<0.5	<0.5	<0.5	15	<0.3	8	16	8	<0.5	2	23	1	<0.5	<0.5	<0.5	1	29	77
TH13-02	0.3-0.6	2013-08-17	7.34	2.19	1.01	158	10	32	35	77	458	44	-	-	<0.5	5.6	726	1010	<0.5	<0.5	<0.5	13	<0.3	7	13	7	<0.5	1	20	1	<0.5	<0.5	<0.5	1	27	69
TH13-03	0.0-0.15	2013-08-17	7.35	6.28	3.16	408	16	111	198	665	915	50	-	-	<0.5	7.0	1120	1210	1	<0.5	<0.5	17	<0.3	8	17	9	<0.5	2	25	1	<0.5	<0.5	<0.5	1	33	82
TH13-03	0.3-0.6	2013-08-17	7.39	4.16	2.10	247	11	61	93	283	692	43	-	-	<0.5	5.4	555	1070	<0.5	<0.5	<0.5	13	<0.3	7	13	6	<0.5	1	19	1	<0.5	<0.5	<0.5	1	27	68
TH13-04	0.0-0.15	2013-08-17	6.81	2.25	0.95	168	10	34	35	116	443	47	-	-	<0.5	6.5	479	864	1	<0.5	0.5	16	<0.3	8	16	8	<0.5	1	24	1	<0.5	<0.5	<0.5	1	32	79
TH13-04	0.3-0.6	2013-08-17	7.24	1.82	1.24	110	18	24	37	83	307	44	-	-	<0.5	6.3	636	1030	<0.5	<0.5	<0.5	15	<0.3	7	15	8	<0.5	1	22	1	<0.5	<0.5	<0.5	1	31	74
TH13-05	0.0-0.15	2013-08-17	7.39	1.99	0.85	191	9	47	40	97	538	62	-	-	<0.5	6.6	447	854	1	<0.5	0.5	16	<0.3	8	16	8	<0.5	1	24	1	<0.5	<0.5	<0.5	1	32	83
TH13-05	0.3-0.6	2013-08-17	7.00	1.01	0.45	56	4	11	8	21	112	35	-	-	<0.5	6.0	530	960	<0.5	<0.5	<0.5	14	<0.3	7	15	7	<0.5	1	21	1	<0.5	<0.5	<0.5	1	30	75
TH13-06	0.0-0.15	2013-08-17	7.16	2.46	0.90	239	11	50	43	62	778	54	-	-	<0.5	6.2	449	854	<0.5	<0.5	0.5	15	<0.3	7	15	7	<0.5	1	23	1	<0.5	<0.5	<0.5	1	30	78
TH13-06	0.3-0.6	2013-08-17	7.24	3.19	0.74	289	12	52	35	59	952	46	-	-	<0.5	6.0	797	989	<0.5	<0.5	<0.5	14	<0.3	7	14	7	<0.5	1	21	1	<0.5	<0.5	<0.5	1	29	71

Notes:

1. m bgs = metres below ground surface
2. Current and/or applicable guidelines are bolded
   (yellow highlight) = Exceeds applicable guidelines
3. View analytical report for more comprehensive results
4. CCME CEQG = Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG), 1999 (Update 7.0, September 2007)
5. AENV 2009 Barite = AENV (Alberta Environment), 2009. *Soil Quality Guidelines for Barite: Environmental Health and Human Health* . February, 2009. Pub. No. T/738.

Table 5: Summary of Surface Soil Analtyical Results for Petroleum Hydrocarbon and Polyaromatic Hydrocarbon Parameters

			PETROLEUM HYDROCARBONS									POLYAROMATIC HYDROCARBONS																	
Sample Designation	Sample Depth (m bgs)	Sample Date (yyyy-mm-dd)	OVA	Benzene	Toluene	Ethylbenzene	Xylenes	F1	F2	F3	F4	Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(a)anthracene (mg/kg)	Benzo(a)pyrene (mg/kg)	Benzo(g,h,i)perylene (mg/kg)	Benzo[b+j]fluoranthene	Benzo(k)fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz(a,h)anthracene (mg/kg)	Fluoranthene (mg/kg)	2-Fluorobiphenyl (mg/kg)	Fluorene (mg/kg)	Indeno(1,2,3-c,d)pyrene (mg/kg)	2-Methylnaphthalene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
			ppm	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
CCME CEQG	Residential/Parkland (Fine Textured Surface Soil)		-	0.21	110	120	65	210	150	1300	5600	-	-	-	1	0.7	-	-	1	-	1	-	-	-	1	-	0.6	5	10
TH13-01	0.0-0.15	2013-08-17	-	<0.005	<0.05	<0.01	<0.05	<10	<10	35	<10	<0.005	<0.005	<0.004	<0.03	<0.03	<0.05	<0.05	<0.05	<0.05	<0.005	0.01	75	<0.02	<0.05	0.035	0.022	0.05	0.02
TH13-01	0.3-0.6	2013-08-17	-	<0.005	<0.05	<0.01	<0.05	<10	<10	20	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TH13-02	0.0-0.15	2013-08-17	-	<0.005	<0.05	<0.01	<0.05	<10	58	111	71	<0.005	<0.005	<0.004	<0.03	<0.03	<0.05	<0.05	<0.05	<0.05	<0.005	0.01	81	<0.02	<0.05	0.046	0.028	0.05	0.03
TH13-02	0.3-0.6	2013-08-17	-	<0.005	<0.05	<0.01	<0.05	<10	<10	10	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TH13-03	0.0-0.15	2013-08-17	-	<0.005	<0.05	<0.01	<0.05	<10	<10	23	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TH13-03	0.3-0.6	2013-08-17	-	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TH13-04	0.0-0.15	2013-08-17	-	<0.005	<0.05	<0.01	<0.05	<10	<10	35	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TH13-04	0.3-0.6	2013-08-17	-	<0.005	<0.05	<0.01	<0.05	<10	<10	25	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TH13-05	0.0-0.15	2013-08-17	-	<0.005	<0.05	<0.01	<0.05	<10	<10	27	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TH13-05	0.3-0.6	2013-08-17	-	<0.005	<0.05	<0.01	<0.05	<10	<10	12	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TH13-06	0.0-0.15	2013-08-17	-	<0.005	<0.05	<0.01	<0.05	<10	<10	17	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TH13-06	0.3-0.6	2013-08-17	-	<0.005	<0.05	<0.01	<0.05	<10	<10	21	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

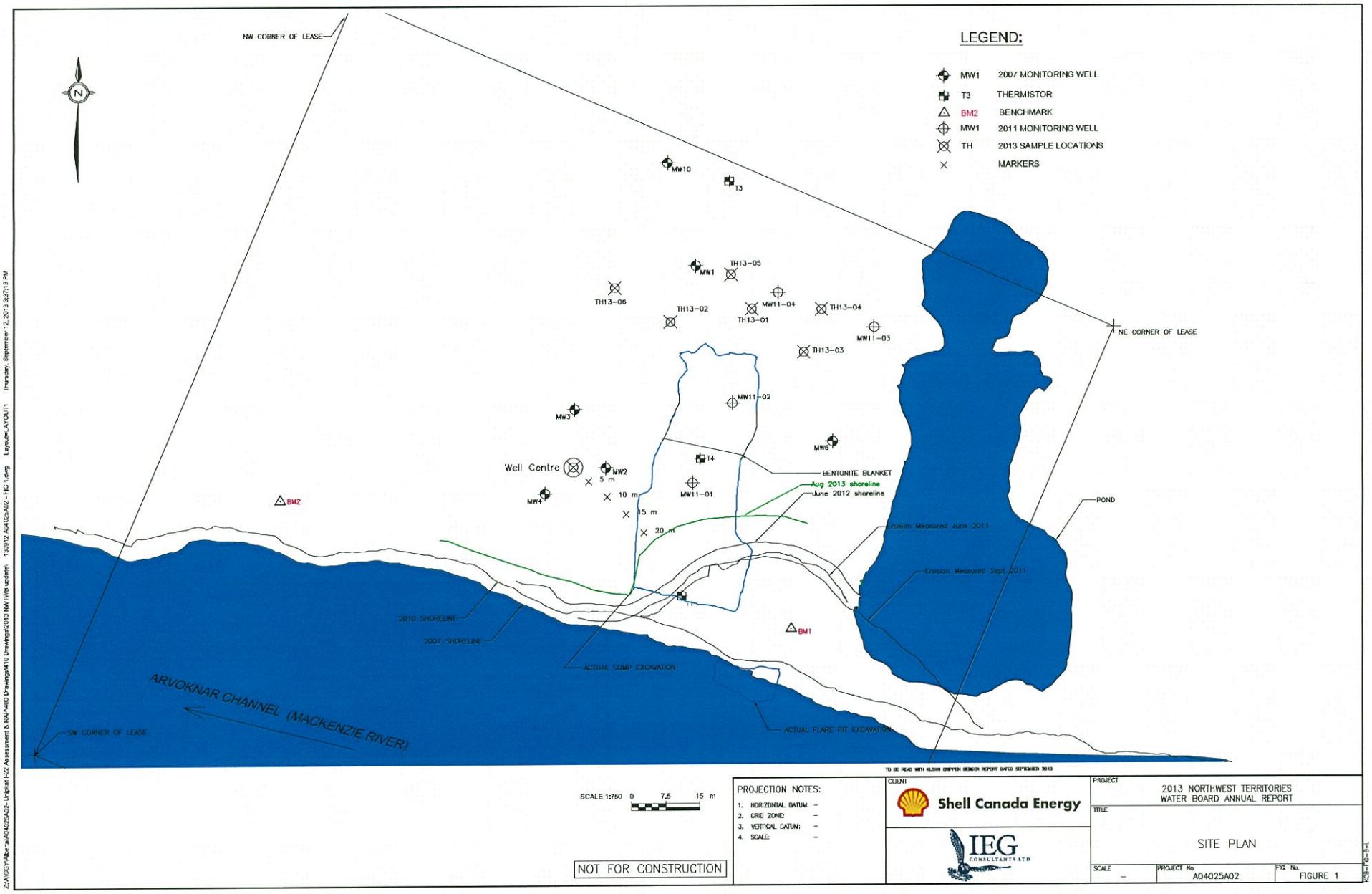
Notes:
1. m bgs = metres below ground surface
2. Current and/or applicable guidelines are bolded
   (yellow highlight) = Exceeds applicable guidelines
3. View analytical report for more comprehensive results
4. CCME CEQG = Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG), 1999 (Update 7.0, September 2007)

Table 6: Soil Analytical Quality Assurance / Quality Control

			GENERAL									PHYSICAL	TRACE METALS																				
Sample Designation	Sample Depth (m bgs)	Sample Date (yyyy-mm-dd)	pH (CaCl2 Extraction)	Electrical Conductivity, EC (dS/m)	Sodium Adsorption Ratio, SAR	Calcium	Potassium	Magnesium	Sodium	Chloride	Sulfate-S	Saturation Percentage	Antimony	Arsenic	Total Barium	Beryllium	Boron (Hot Water Extraction)	Cadmium	Chromium	Chromium, Hexavalent	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Tin	Uranium	Vanadium	Zinc
			-	dS/cm	-	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Soils Data			-	0.01	-	1	2	1	2	2	2	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1
TH13-02	0.0-0.15	2013-08-17	7.43	8.89	5.47	380	21	140	326	876	964	44	<0.5	6.3	1530	<0.5	<0.5	<0.5	15	<0.3	7.5	16.0	8.2	<0.5	1.5	23.0	0.7	<0.5	<0.5	<0.5	0.9	28.5	77
Dup A	0.0-0.15	2013-08-17	7.35	7.78	4.7	362	20	119	291	770	988	52	<0.5	5.9	821	<0.5	<0.5	<0.5	14.6	<0.3	7.3	15.1	8.2	<0.5	1.3	23.2	0.8	<0.5	<0.5	0.9	0.9	27.6	72
Relative Percent Difference (RPD) (%)			1%	13.9%	15%	5%	5%	16%	11%	13%	2%	17%	-	7%	60%	-	-	-	5%	-	3%	6%	0%	-	14%	3%	13%	-	-	-	0%	9%	7%
Absolute Difference			0.08	1.11	0.77	18	1	21	35	106	24	8	-	0.4	709	-	-	-	0.7	-	0.2	0	0	-	0.2	0.2	0.1	-	-	-	0	0.9	5

Notes:
1. Applicable values (RPD or AD) are bolded. RPD is applicable if parameter concentrations in both samples are greater than or equal to 5x the detection limit; otherwise AD is applicable.
2. ☐ (yellow highlight) = Exceeds Zenor criteria (RPD must be less than or equal to 20%, or AD is greater than method detection limit).
3. View analytical report for more comprehensive results
4. - data not available and or analyzed

FIGURES


LEGEND:
MW1 2007 MONITORING WELL
T3 THERMISTOR
BM2 BENCHMARK
MW1 2011 MONITORING WELL
TH 2013 SAMPLE LOCATIONS
MARKERS
NW CORNER OF LEASE
NE CORNER OF LEASE
SW CORNER OF LEASE
MW10
T3
MW1
TH13-05
TH13-06
TH13-02
TH13-01
MW11-04
TH13-04
MW11-03
TH13-03
MW11-02
MW3
MW6
T4
Well Centre
MW2
MW4
5 m
10 m
15 m
20 m
MW11-01
BM2
BENTONITE BLANKET
Aug 2013 shoreline
June 2012 shoreline
POND
Erosion Measured June 2011
Erosion Measured Sept 2011
T1
BM1
2010 SHORELINE
2007 SHORELINE
ACTUAL SUMP EXCAVATION
ACTUAL FLARE PIT EXCAVATION
ARVOKNAR CHANNEL (MACKENZIE RIVER)
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED SEPTEMBER 2013
SCALE 1:750 0 7,5 15 m
PROJECTION NOTES:
1. HORIZONTAL DATUM: –
2. GRID ZONE: –
3. VERTICAL DATUM: –
4. SCALE: –
NOT FOR CONSTRUCTION
CLIENT
Shell Canada Energy
IEG CONSULTANTS LTD
PROJECT
2013 NORTHWEST TERRITORIES WATER BOARD ANNUAL REPORT
TITLE
SITE PLAN
SCALE –
PROJECT No. A04025A02
FIG. No. FIGURE 1

APPENDIX I

Site Photographs

Photograph 1: View of damaged monitoring well MW 1 (September 2, 2013).

Photograph 2: View northeast of eroded river bank, markers, and willow stakes (August 17, 2013).

Photograph 3: View southwest of timber debris placed on eroded riverbank (August 17, 2013).

Photograph 4: View southeast of Unipkat I-22 well center sign and markers (August 17, 2013).

Photograph 5: View east of groundwater sampling at monitoring well MW11-003 (September 2, 2013).

Photograph 6: View of surface soil sample locations (August 17, 2013).

APPENDIX II

Laboratory Analytical Reports

AGAT Laboratories

6310 ROPER ROAD
EDMONTON, ALBERTA
CANADA T6B 3P9
TEL (780)395-2525
FAX (780)462-2490
http://www.agatlabs.com

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)
PO BOX 3178
INUVIK, NT X0E0T0
(403) 262-5505

ATTENTION TO: Nicole Wills

PROJECT NO: A04025A02/Unipkat I-22

AGAT WORK ORDER: 13E754530

TRACE ORGANICS REVIEWED BY: Jarrod Roberts, Operations Manager

WATER ANALYSIS REVIEWED BY: Jarrod Roberts, Operations Manager

DATE REPORTED: Sep 10, 2013

PAGES (INCLUDING COVER): 16

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (780) 395-2525

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

6310 ROPER ROAD
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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 13E754530

PROJECT NO: A04025A02/Unipkat I-22

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

Petroleum Hydrocarbons (BTEX/F1-F4) in Water

DATE RECEIVED: 2013-09-04

DATE REPORTED: 2013-09-10

		SAMPLE DESCRIPTION:		MW11-003
		SAMPLE TYPE:		Water
		DATE SAMPLED:		9/2/2013
Parameter	**Unit**	**G / S**	**RDL**	**4708770**
Benzene	mg/L		0.0005	<0.0005
Toluene	mg/L		0.0005	<0.0005
Ethylbenzene	mg/L		0.0005	<0.0005
Xylenes	mg/L		0.0005	<0.0005
C6 - C10 (F1)	mg/L		0.1	<0.1
C6 - C10 (F1 minus BTEX)	mg/L		0.1	<0.1
C>10 - C16	mg/L		0.1	6.1
C>16 - C34	mg/L		0.1	0.1
C>34 - C50	mg/L		0.1	0.2
Surrogate	**Unit**	**Acceptable Limits**		
Toluene-d8 (BTEX)	%	50-150		103
o-Terphenyl (F2-F4)	%	50-150		121

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4708770 The C>6 - C10 fraction is calculated using the toluene response factor.
The C10 - C16 fraction is calculated using the average response factor for nC10, nC16 and nC34.
BTEX has NOT been subtracted from Fraction 1.
Sample is blank corrected.

Certified By:

AGAT Laboratories
6310 ROPER ROAD
EDMONTON, ALBERTA
CANADA T6B 3P9
TEL (780)395-2525
FAX (780)462-2490
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 13E754530

PROJECT NO: A04025A02/Unipkat I-22

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

Polyaromatic Hydrocarbon Analysis - Water FWAL

DATE RECEIVED: 2013-09-04

DATE REPORTED: 2013-09-10

		SAMPLE DESCRIPTION:		MW11-003
		SAMPLE TYPE:		Water
		DATE SAMPLED:		9/2/2013
Parameter	Unit	G / S	RDL	4708770
Naphthalene	mg/L		0.00001	<0.00001
2-Methylnaphthalene	mg/L		0.00001	<0.00001
Quinoline	mg/L		0.00005	<0.00005
Acenaphthylene	mg/L		0.00001	<0.00001
Acenaphthene	mg/L		0.00001	<0.00001
Fluorene	mg/L		0.00001	<0.00001
Phenanthrene	mg/L		0.00001	<0.00001
Anthracene	mg/L		0.00001	<0.00001
Acridine	mg/L		0.00005	<0.00005
Fluoranthene	mg/L		0.00001	<0.00001
Pyrene	mg/L		0.00001	<0.00001
Benzo(a)anthracene	mg/L		0.00001	<0.00001
Chrysene	mg/L		0.00001	<0.00001
Benzo(b)fluoranthene	mg/L		0.00001	<0.00001
Benzo(k)fluoranthene	mg/L		0.00001	<0.00001
Benzo(a)pyrene	mg/L		0.00001	<0.00001
Indeno(1,2,3-cd)pyrene	mg/L		0.00001	<0.00001
Dibenzo(ah)anthracene	mg/L		0.00001	<0.00001
Benzo(ghi)perylene	mg/L		0.00001	<0.00001
Surrogate	Unit	Acceptable Limits		
2-Fluorobiphenyl	%	50-150		100
p-Terphenyl-d14	%	50-150		94

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4708770 Based on GC/MS target ion analysis.
Isomers Benzo(b)fluoranthene and Benzo(j)fluoranthene have the same GC retention time and are reported as the sum based on the Benzo(b)fluoranthene response.
Sample arrived at laboratory with air included in sample container.

Certified By:

AGAT Laboratories

6310 ROPER ROAD
EDMONTON, ALBERTA
CANADA T6B 3P9
TEL (780)395-2525
FAX (780)462-2490
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 13E754530

PROJECT NO: A04025A02/Unipkat I-22

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

CCME / Alberta Tier 1 Metals (Dissolved) (Full Package)

DATE RECEIVED: 2013-09-04

DATE REPORTED: 2013-09-10

		SAMPLE DESCRIPTION:		MW11-003
		SAMPLE TYPE:		Water
		DATE SAMPLED:		9/2/2013
Parameter	Unit	G / S	RDL	4708770
Dissolved Aluminum	mg/L	0.005	0.002	**0.072**
Dissolved Antimony	mg/L	0.006	0.001	<0.001
Dissolved Arsenic	mg/L	0.005	0.001	0.003
Dissolved Barium	mg/L	1	0.05	0.16
Dissolved Boron	mg/L	0.5	0.01	0.04
Dissolved Cadmium	mg/L	0.000017	0.000016	**0.000660**
Dissolved Calcium	mg/L		0.3	431
Dissolved Chromium	mg/L		0.001	0.006
Dissolved Copper	mg/L	0.002	0.002	**0.008**
Dissolved Iron	mg/L	0.3	0.1	**3.3**
Dissolved Lead	mg/L	0.001	0.001	0.001
Dissolved Lithium	mg/L		0.001	0.050
Dissolved Magnesium	mg/L		0.2	67.3
Dissolved Manganese	mg/L	0.05	0.005	**2.52**
Dissolved Mercury (Low Level)	mg/L	0.000026	0.000025	<0.000025
Dissolved Molybdenum	mg/L		0.003	<0.003
Dissolved Nickel	mg/L	0.025	0.003	**0.029**
Dissolved Phosphorus	mg/L		0.08	<0.08
Dissolved Potassium	mg/L		0.6	8.7
Dissolved Selenium	mg/L	0.001	0.001	**0.005**
Dissolved Silver	mg/L	0.0001	0.00001	**0.00031**
Dissolved Silicon	mg/L		0.032	3.05
Dissolved Sodium	mg/L	200	0.6	175
Dissolved Strontium	mg/L		0.001	1.39
Dissolved Sulphur	mg/L		0.3	51.3
Dissolved Thallium	mg/L		0.0001	0.0001
Dissolved Tin	mg/L		0.00025	0.00200
Dissolved Uranium	mg/L	0.01	0.001	**0.011**
Dissolved Vanadium	mg/L		0.001	0.002
Dissolved Zinc	mg/L	0.03	0.001	**0.046**
Dissolved Zirconium	mg/L		0.06	<0.06

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Certificate of Analysis

AGAT WORK ORDER: 13E754530

PROJECT NO: A04025A02/Unipkat I-22

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

CCME / Alberta Tier 1 Metals (Dissolved) (Full Package)

DATE RECEIVED: 2013-09-04

DATE REPORTED: 2013-09-10

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ABTier1 GW (Ag, F)
4708770 < - Values refer to Method Detection Limit.

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Certificate of Analysis

AGAT WORK ORDER: 13E754530

PROJECT NO: A04025A02/Unipkat I-22

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

CCME / Alberta Tier 1 Metals (Total) (Full Package)

DATE RECEIVED: 2013-09-04

DATE REPORTED: 2013-09-10

		SAMPLE DESCRIPTION:		MW11-003
		SAMPLE TYPE:		Water
		DATE SAMPLED:		9/2/2013
Parameter	Unit	G / S	RDL	4708770
Total Aluminum	mg/L	0.005	0.002	**0.499**
Total Antimony	mg/L	0.006	0.001	<0.001
Total Arsenic	mg/L	0.005	0.001	0.003
Total Barium	mg/L	1	0.05	0.17
Total Boron	mg/L	0.5	0.0011	0.0415
Total Cadmium	mg/L	0.000017	0.000016	**0.000578**
Total Calcium	mg/L		0.3	408
Total Chromium	mg/L		0.00012	0.00415
Total Copper	mg/L	0.002	0.002	**0.013**
Total Iron	mg/L	0.3	0.1	**4.6**
Total Lead	mg/L	0.001	0.001	0.001
Total Lithium	mg/L		0.001	0.054
Total Magnesium	mg/L		0.2	64.4
Total Manganese	mg/L	0.05	0.005	**2.50**
Total Mercury (Low Level)	mg/L	0.000026	0.000025	<0.000025
Total Molybdenum	mg/L		0.003	<0.003
Total Nickel	mg/L	0.025	0.003	**0.033**
Total Phosphorus	mg/L		0.08	<0.08
Total Potassium	mg/L		0.6	9.0
Total Selenium	mg/L	0.001	0.001	**0.008**
Total Silicon	mg/L		0.032	3.80
Total Silver	mg/L	0.0001	0.000005	**0.000277**
Total Sodium	mg/L	200	0.6	166
Total Strontium	mg/L		0.001	1.39
Total Sulphur	mg/L		0.3	49.5
Total Thallium	mg/L		0.00006	0.00011
Total Tin	mg/L		0.000025	0.00279
Total Uranium	mg/L	0.01	0.00007	**0.0122**
Total Vanadium	mg/L		0.001	0.003
Total Zinc	mg/L	0.03	0.001	**0.043**
Total Zirconium	mg/L		0.01	<0.01

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Certificate of Analysis

AGAT WORK ORDER: 13E754530

PROJECT NO: A04025A02/Unipkat I-22

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

CCME / Alberta Tier 1 Metals (Total) (Full Package)

DATE RECEIVED: 2013-09-04

DATE REPORTED: 2013-09-10

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ABTier1 GW (Ag, F)
4708770 < - Values refer to Report Detection Limits.

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AGAT WORK ORDER: 13E754530

PROJECT NO: A04025A02/Unipkat I-22

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

Routine Chemistry Water Analysis

DATE RECEIVED: 2013-09-04

DATE REPORTED: 2013-09-10

		SAMPLE DESCRIPTION:		MW11-003
		SAMPLE TYPE:		Water
		DATE SAMPLED:		9/2/2013
Parameter	Unit	G / S	RDL	4708770
pH	pH Units	6.5-8.5	NA	7.66
p - Alkalinity (as CaCO3)	mg/L		5	<5
T - Alkalinity (as CaCO3)	mg/L		5	543
Bicarbonate	mg/L		5	662
Carbonate	mg/L		5	<5
Hydroxide	mg/L		5	<5
Electrical Conductivity	uS/cm		1	3200
Fluoride	mg/L	1.5	0.05	<0.05
Chloride	mg/L	250	1	**723**
Nitrite	mg/L	3.2	0.05	<0.05
Nitrate	mg/L	45	0.5	<0.5
Sulfate	mg/L	500	1	157
Dissolved Calcium	mg/L		0.3	431
Dissolved Magnesium	mg/L		0.2	67.3
Dissolved Sodium	mg/L	200	0.6	175
Dissolved Potassium	mg/L		0.6	8.7
Dissolved Iron	mg/L	0.3	0.1	**3.3**
Dissolved Manganese	mg/L	0.05	0.005	**2.52**
Calculated TDS	mg/L		1	1890
Hardness	mg CaCO3/L		1	1350
Ion Balance	%		0.1	102
Nitrate + Nitrite-N	mg/L		0.01	<0.01
Nitrate-N	mg/L		0.113	<0.113
Nitrite-N	mg/L		0.015	<0.015

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to CCME (D Water)
4708770 < - Values refer to Report Detection Limits.

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Quality Assurance

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 13E754530

PROJECT NO: A04025A02/Unipkat I-22

ATTENTION TO: Nicole Wills

Trace Organics Analysis

RPT Date: Sep 10, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Petroleum Hydrocarbons (BTEX/F1-F4) in Water															
Benzene	438	TW	< 0.0005	< 0.0005	0.0%	< 0.0005	95%	80%	120%	97%	80%	120%	111%	70%	130%
Toluene	438	TW	< 0.0005	< 0.0005	0.0%	< 0.0005	98%	80%	120%	98%	80%	120%	111%	70%	130%
Ethylbenzene	438	TW	< 0.0005	< 0.0005	0.0%	< 0.0005	100%	80%	120%	99%	80%	120%	109%	70%	130%
Xylenes	438	TW	< 0.0005	< 0.0005	0.0%	< 0.0005	100%	80%	120%	104%	80%	120%	117%	70%	130%
C6 - C10 (F1)	438	TW	< 0.1	< 0.1	0.0%	< 0.1	96%	80%	120%	101%	80%	120%	94%	70%	130%
C>10 - C16	460	4705740	< 0.1	< 0.1	0.0%	< 0.1	97%	80%	120%	115%	80%	120%	127%	70%	130%
C>16 - C34	460	4705740	< 0.1	< 0.1	0.0%	< 0.1	105%	80%	120%	105%	80%	120%	95%	70%	130%
C>34 - C50	460	4705740	< 0.1	< 0.1	0.0%	< 0.1	102%	80%	120%						
Polyaromatic Hydrocarbon Analysis - Water FWAL															
Naphthalene	240	TW	0.00012	0.00014	15.4%	< 0.00001	100%	70%	130%	99%	70%	130%	95%	70%	130%
2-Methylnaphthalene	240	TW	0.00001	0.00001	0.0%	< 0.00001				94%	70%	130%	89%	70%	130%
Quinoline	240	TW	< 0.00005	< 0.00005	0.0%	< 0.00005	99%	70%	130%	96%	70%	130%	93%	70%	130%
Acenaphthylene	240	TW	< 0.00001	< 0.00001	0.0%	< 0.00001	104%	70%	130%	101%	70%	130%	97%	70%	130%
Acenaphthene	240	TW	< 0.00001	< 0.00001	0.0%	< 0.00001	97%	70%	130%	98%	70%	130%	94%	70%	130%
Fluorene	240	TW	0.00002	0.00002	0.0%	< 0.00001	92%	70%	130%	94%	70%	130%	89%	70%	130%
Phenanthrene	240	TW	0.00006	0.00006	0.0%	< 0.00001	96%	70%	130%	101%	70%	130%	97%	70%	130%
Anthracene	240	TW	< 0.00001	< 0.00001	0.0%	< 0.00001	100%	70%	130%	93%	70%	130%	93%	70%	130%
Acridine	240	TW	< 0.00005	< 0.00005	0.0%	< 0.00005	111%	70%	130%	103%	70%	130%	104%	70%	130%
Fluoranthene	240	TW	0.00001	0.00001	0.0%	< 0.00001	103%	70%	130%	102%	70%	130%	95%	70%	130%
Pyrene	240	TW	< 0.00001	< 0.00001	0.0%	< 0.00001	101%	70%	130%	99%	70%	130%	94%	70%	130%
Benzo(a)anthracene	240	TW	< 0.00001	< 0.00001	0.0%	< 0.00001	99%	70%	130%	89%	70%	130%	79%	70%	130%
Chrysene	240	TW	< 0.00001	< 0.00001	0.0%	< 0.00001	109%	70%	130%	104%	70%	130%	91%	70%	130%
Benzo(b)fluoranthene	240	TW	< 0.00001	< 0.00001	0.0%	< 0.00001	118%	70%	130%	113%	70%	130%	87%	70%	130%
Benzo(k)fluoranthene	240	TW	< 0.00001	< 0.00001	0.0%	< 0.00001	112%	70%	130%	111%	70%	130%	84%	70%	130%
Benzo(a)pyrene	240	TW	< 0.00001	< 0.00001	0.0%	< 0.00001	122%	70%	130%	110%	70%	130%	79%	70%	130%
Indeno(1,2,3-cd)pyrene	240	TW	< 0.00001	< 0.00001	0.0%	< 0.00001	109%	70%	130%	100%	70%	130%	78%	70%	130%
Dibenzo(ah)anthracene	240	TW	< 0.00001	< 0.00001	0.0%	< 0.00001	103%	70%	130%	96%	70%	130%	75%	70%	130%
Benzo(ghi)perylene	240	TW	< 0.00001	< 0.00001	0.0%	< 0.00001	110%	70%	130%	104%	70%	130%	81%	70%	130%

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Quality Assurance

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 13E754530

PROJECT NO: A04025A02/Unipkat I-22

ATTENTION TO: Nicole Wills

Water Analysis

RPT Date: Sep 10, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Routine Chemistry Water Analysis															
pH	407	4705739	6.57	6.57	0.0%		100%	80%	120%						
T - Alkalinity (as CaCO3)	407	4705739	97	97	0.0%	< 5	101%	80%	120%						
Bicarbonate	407	4705739	118	118	0.0%	< 5									
Electrical Conductivity	407	4705739	5220	5230	0.2%	< 1	104%	80%	120%						
Fluoride	432	4708001	< 0.05	< 0.05	0.0%	< 0.05	96%	80%	120%	100%	80%	120%	100%	80%	120%
Chloride	432	4708001	7	7	0.0%	< 1	105%	80%	120%	107%	80%	120%	105%	80%	120%
Nitrite	432	4708001	< 0.05	< 0.05	0.0%	< 0.05	102%	80%	120%	107%	80%	120%	101%	80%	120%
Nitrate	432	4708001	< 0.5	< 0.5	0.0%	< 0.5	100%	80%	120%	100%	80%	120%	100%	80%	120%
Sulfate	432	4708001	< 1	< 1	0.0%	< 1	102%	80%	120%	110%	80%	120%	104%	80%	120%
Comments: N/A - Not Available.															
CCME / Alberta Tier 1 Metals (Dissolved) (Full Package)															
Dissolved Aluminum	653	4708001	0.010	0.010	0.0%	< 0.002	103%	80%	120%				97%	80%	120%
Dissolved Antimony	653	4708001	0.001	0.001	0.0%	< 0.001	109%	80%	120%				92%	80%	120%
Dissolved Arsenic	653	4708001	0.004	0.004	0.0%	< 0.001	98%	80%	120%				98%	80%	120%
Dissolved Barium	653	4708001	0.14	0.14	0.0%	< 0.05	119%	80%	120%				110%	80%	120%
Dissolved Boron	653	4708001	0.72	0.75	4.1%	< 0.01	104%	80%	120%				104%	80%	120%
Dissolved Cadmium	653	4708001	0.000124	0.000101	20.4%	< 0.000016	98%	80%	120%				94%	80%	120%
Dissolved Calcium	430	4710228	312	313	0.3%	< 0.3	100%	80%	120%				101%	80%	120%
Dissolved Chromium	653	4708001	0.007	0.007	0.0%	< 0.001	102%	80%	120%				97%	80%	120%
Dissolved Copper	653	4708001	0.014	0.014	0.0%	< 0.002	98%	80%	120%				90%	80%	120%
Dissolved Iron	430	4710228	<0.1	<0.1	0.0%	< 0.1	94%	80%	120%				93%	80%	120%
Dissolved Lead	653	4708001	< 0.001	< 0.001	0.0%	< 0.001	101%	80%	120%				94%	80%	120%
Dissolved Lithium	653	4708001	0.038	0.039	2.6%	< 0.001	96%	80%	120%				109%	80%	120%
Dissolved Magnesium	430	4710228	97.5	91.4	6.4%	< 0.2	94%	80%	120%				106%	80%	120%
Dissolved Manganese	430	4710228	0.467	0.465	0.3%	< 0.005	97%	80%	120%				94%	80%	120%
Dissolved Mercury (Low Level)	113	4708001	<0.	<0.	0.0%	< 0.000025	105%	80%	120%				87%	80%	120%
Dissolved Molybdenum	653	4708001	0.018	0.018	0.0%	< 0.003	100%	80%	120%				98%	80%	120%
Dissolved Nickel	653	4708001	0.016	0.017	6.1%	< 0.003	97%	80%	120%				92%	80%	120%
Dissolved Phosphorus	430	4710228	<0.08	<0.08	0.0%	< 0.08	85%	80%	120%				103%	80%	120%
Dissolved Potassium	430	4710228	12.8	12.8	0.8%	< 0.6	89%	80%	120%				96%	80%	120%
Dissolved Selenium	653	4708001	0.007	0.007	0.0%	< 0.001	101%	80%	120%				98%	80%	120%
Dissolved Silver	653	4708001	< 0.00001	0.00001	NA	< 0.00001	90%	80%	120%				82%	80%	120%
Dissolved Silicon	430	4710228	7.69	7.62	1.0%	< 0.032	95%	80%	120%				104%	80%	120%
Dissolved Sodium	430	4710228	524	526	0.4%	< 0.6	90%	80%	120%				100%	80%	120%
Dissolved Strontium	430	4710228	1.25	1.25	0.5%	< 0.001	95%	80%	120%				95%	80%	120%
Dissolved Sulphur	430	4710228	327	323	1.3%	< 0.3	95%	80%	120%				103%	80%	120%
Dissolved Thallium	653	4708001	< 0.0001	< 0.0001	0.0%	< 0.0001	99%	80%	120%				94%	80%	120%
Dissolved Tin	653	4708001	< 0.00025	< 0.00025	0.0%	< 0.00025	105%	80%	120%				94%	80%	120%

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Quality Assurance

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 13E754530

PROJECT NO: A04025A02/Unipkat I-22

ATTENTION TO: Nicole Wills

Water Analysis (Continued)

RPT Date: Sep 10, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Dissolved Uranium	653	4708001	0.045	0.046	2.2%	< 0.001	100%	80%	120%				106%	80%	120%
Dissolved Vanadium	653	4708001	0.004	0.005	0.0%	< 0.001	102%	80%	120%				101%	80%	120%
Dissolved Zinc	653	4708001	0.030	0.030	0.0%	< 0.001	101%	80%	120%				95%	80%	120%
Dissolved Zirconium	430	4710228	<0.06	<0.06	0.0%	< 0.06	101%	80%	120%				98%	80%	120%
CCME / Alberta Tier 1 Metals (Total) (Full Package)															
Total Aluminum	654	4710228	0.163	0.173	6.0%	< 0.002	105%	80%	120%				108%	80%	120%
Total Antimony	654	4710228	0.001	0.001	0.0%	< 0.001	105%	80%	120%				93%	80%	120%
Total Arsenic	654	4710228	0.004	0.004	0.0%	< 0.001	97%	80%	120%				100%	80%	120%
Total Barium	654	4710228	0.13	0.13	0.0%	< 0.05	103%	80%	120%				99%	80%	120%
Total Boron	654	4710228	0.818	0.830	1.5%	< 0.0011	105%	80%	120%				98%	80%	120%
Total Cadmium	654	4710228	0.000103	0.000107	3.8%	< 0.000016	101%	80%	120%				97%	80%	120%
Total Calcium	431	4710228	328	322	1.8%	< 0.3	105%	80%	120%				102%	80%	120%
Total Chromium	654	4710228	0.0051	0.0050	2.0%	< 0.00012	98%	80%	120%				100%	80%	120%
Total Copper	654	4710228	0.016	0.016	0.0%	< 0.002	97%	80%	120%				97%	80%	120%
Total Iron	431	4710228	0.6	0.6	0.0%	< 0.1	105%	80%	120%				96%	80%	120%
Total Lead	654	4710228	< 0.001	< 0.001	0.0%	< 0.001	96%	80%	120%				94%	80%	120%
Total Lithium	654	4710228	0.040	0.040	0.0%	< 0.001	99%	80%	120%				106%	80%	120%
Total Magnesium	431	4710228	105	105	0.5%	< 0.2	101%	80%	120%				100%	80%	120%
Total Manganese	431	4710228	0.533	0.532	0.2%	< 0.005	104%	80%	120%				95%	80%	120%
Total Mercury (Low Level)	133	4710228	< 0.000025	< 0.000025	0.0%	< 0.000025	102%	80%	120%				102%	80%	120%
Total Molybdenum	654	4710228	0.019	0.019	0.0%	< 0.003	98%	80%	120%				106%	80%	120%
Total Nickel	654	4710228	0.018	0.018	0.0%	< 0.003	97%	80%	120%				98%	80%	120%
Total Phosphorus	431	4710228	0.14	0.13	7.4%	< 0.08	105%	80%	120%				101%	80%	120%
Total Potassium	431	4710228	13.8	13.7	0.7%	< 0.6	95%	80%	120%				96%	80%	120%
Total Selenium	654	4710228	0.007	0.007	0.0%	< 0.001	97%	80%	120%				97%	80%	120%
Total Silicon	431	4710228	8.5	8.4	1.2%	< 0.032	NA	80%	120%				103%	80%	120%
Total Silver	654	4710228	0.000056	0.000042	0.0%	< 0.000005	89%	80%	120%				88%	80%	120%
Total Sodium	431	4710228	561	533	5.1%	< 0.6	96%	80%	120%				102%	80%	120%
Total Strontium	654	4710228	1.26	1.25	0.8%	< 0.001	95%	80%	120%				100%	80%	120%
Total Sulphur	431	4710228	345	345	0.0%	< 0.3	112%	80%	120%				106%	80%	120%
Total Thallium	654	4710228	0.00008	0.00008	0.0%	< 0.00006	95%	80%	120%				95%	80%	120%
Total Tin	654	4710228	0.000092	0.000133	NA	< 0.000025	103%	80%	120%				97%	80%	120%
Total Uranium	654	4710228	0.0477	0.0474	0.6%	< 0.00007	98%	80%	120%				101%	80%	120%
Total Vanadium	654	4710228	0.0045	0.0044	2.2%	< 0.001	98%	80%	120%				106%	80%	120%
Total Zinc	654	4710228	0.018	0.012	40.0%	< 0.001	101%	80%	120%				89%	80%	120%
Total Zirconium	431	4710228	<0.01	<0.01	0.0%	< 0.01	110%	80%	120%				98%	80%	120%

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TEL (780)395-2525
FAX (780)462-2490
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 13E754530

PROJECT NO: A04025A02/Unipkat I-22

ATTENTION TO: Nicole Wills

Water Analysis (Continued)

RPT Date: Sep 10, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By:

AGAT Laboratories

6310 ROPER ROAD
EDMONTON, ALBERTA
CANADA T6B 3P9
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FAX (780)462-2490
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Method Summary

CLIENT NAME: IEG ENVIRONMENTAL (NORTH) **AGAT WORK ORDER: 13E754530**

PROJECT NO: A04025A02/Unipkat I-22 **ATTENTION TO: Nicole Wills**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	ORG-170-5110/5140/5430/5440	EPA SW846 8260	GC/MS
Toluene	ORG-170-5110/5140/5430/5440	EPA SW846 8260	GC/MS
Ethylbenzene	ORG-170-5110/5140/5430/5440	EPA SW846 8260	GC/MS
Xylenes	ORG-170-5110/5140/5430/5440	EPA SW846 8260	GC/MS
C6 - C10 (F1)	ORG-170-5110/5140/5430/5440	CCME Tier 1 Method	GC/FID
C6 - C10 (F1 minus BTEX)	ORG-170-5110/5140/5430/5440	CCME Tier 1 Method	GC/FID
C>10 - C16	ORG-170-5120/5300	CCME Tier 1 Method	GC/FID
C>16 - C34	ORG-170-5120/5300	CCME Tier 1 Method	GC/FID
C>34 - C50	ORG-170-5120/5300	CCME Tier 1 Method	GC/FID
Toluene-d8 (BTEX)	ORG-170-5110/5140/5430/5440	EPA SW846 8260	GC/FID
o-Terphenyl (F2-F4)	ORG-170-5120/5300	CCME Tier 1 Method	GC/FID
Naphthalene	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
2-Methylnaphthalene	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
Quinoline	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
Acenaphthylene	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
Acenaphthene	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
Fluorene	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
Phenanthrene	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
Anthracene	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
Acridine	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
Fluoranthene	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
Pyrene	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
Benzo(a)anthracene	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
Chrysene	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
Benzo(b)fluoranthene	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
Benzo(k)fluoranthene	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
Benzo(a)pyrene	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
Dibenzo(ah)anthracene	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
Benzo(ghi)perylene	ORG-170-5421	EPA SW-846 3510 & 8270	GC/MS
2-Fluorobiphenyl	ORG-170-5420/-5421	EPA SW-846 3510 & 8270	GC/MS
p-Terphenyl-d14	ORG-170-5420/-5421	EPA SW-846 3510 & 8270	GC/MS

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Method Summary

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 13E754530

PROJECT NO: A04025A02/Unipkat I-22

ATTENTION TO: Nicole Wills

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Dissolved Aluminum	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP/MS
Dissolved Antimony	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP-MS
Dissolved Arsenic	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP-MS
Dissolved Barium	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP-MS
Dissolved Boron	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP-MS
Dissolved Cadmium	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP/MS
Dissolved Calcium	INOR-171-6202, INOR-171-6100	SM 3120 B	ICP/OES
Dissolved Chromium	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP/MS
Dissolved Copper	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP-MS
Dissolved Iron	INOR-171-6202, INOR-171-6100	SM 3120 B	ICP/OES
Dissolved Lead	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP/MS
Dissolved Lithium	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP/MS
Dissolved Magnesium	INOR-171-6201, INOR-171-6100	SM 3120 B	ICP/OES
Dissolved Manganese	INOR-171-6202, INOR-171-6100	SM 3120 B	ICP/OES
Dissolved Mercury (Low Level)	INOR-171-6202, INOR-171-6100	SM 3112 B	ICP/MS
Dissolved Molybdenum	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP/MS
Dissolved Nickel	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP/MS
Dissolved Phosphorus	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP/OES
Dissolved Potassium	INOR-171-6201, INOR-171-6100	SM 3120 B	ICP/OES
Dissolved Selenium	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP/MS
Dissolved Silver	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP/MS
Dissolved Silicon	INOR-171-6201, INOR-171-6100	SM 3120 B	ICP/OES
Dissolved Sodium	INOR-171-6201, INOR-171-6100	SM 3120 B	ICP/OES
Dissolved Strontium	INOR-171-6202, INOR-171-6100	SM 3120 B	ICP/OES
Dissolved Sulphur	INOR-171-6201, INOR-171-6100	SM 3120 B	ICP/OES
Dissolved Thallium	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP/MS
Dissolved Tin	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP/MS

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Method Summary

CLIENT NAME: IEG ENVIRONMENTAL (NORTH) **AGAT WORK ORDER: 13E754530**

PROJECT NO: A04025A02/Unipkat I-22 **ATTENTION TO: Nicole Wills**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Dissolved Uranium	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP/MS
Dissolved Vanadium	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP/MS
Dissolved Zinc	INOR-171-6202, INOR-171-6100	SM 3125 B	ICP-MS
Dissolved Zirconium	INOR-171-6201, INOR-171-6100	SM 3120 B	ICP/OES
Total Aluminum	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP/MS
Total Antimony	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP-MS
Total Arsenic	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP-MS
Total Barium	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP/MS
Total Boron	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP/MS
Total Cadmium	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP/MS
Total Calcium	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3120 B	ICP/OES
Total Chromium	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP/MS
Total Copper	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP/MS
Total Iron	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3120 B	ICP/OES
Total Lead	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP-MS
Total Lithium	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP/MS
Total Magnesium	INOR-171-6201, INOR-171-6100	SM 3030 E; SM 3120 B	ICP/OES
Total Manganese	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3120 B	ICP/OES
Total Mercury (Low Level)	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3112 B	ICP/MS
Total Molybdenum	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP/MS
Total Nickel	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP/MS
Total Phosphorus	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP/OES
Total Potassium	INOR-171-6201, INOR-171-6100	SM 3030 E; SM 3120 B	ICP/OES
Total Selenium	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP-MS
Total Silicon	INOR-171-6201, INOR-171-6100	SM 3030 E; SM 3120 B	ICP/OES
Total Silver	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP/MS
Total Sodium	INOR-171-6201, INOR-171-6100	SM 3030 E; SM 3120 B	ICP/OES
Total Strontium	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3120 B	ICP/OES

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Method Summary

CLIENT NAME: IEG ENVIRONMENTAL (NORTH) **AGAT WORK ORDER: 13E754530**

PROJECT NO: A04025A02/Unipkat I-22 **ATTENTION TO: Nicole Wills**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Sulphur	INOR-171-6201, INOR-171-6100	SM 3030 E; SM 3120 B	ICP/OES
Total Thallium	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP/MS
Total Tin	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP/MS
Total Uranium	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP/MS
Total Vanadium	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP/MS
Total Zinc	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3125 B	ICP/MS
Total Zirconium	INOR-171-6202, INOR-171-6100	SM 3030 E; SM 3120 B	ICP/OES
pH	INOR-171-6205	SM 4500 H+	PC Titrate
p - Alkalinity (as CaCO3)	INOR-171-6205	SM 2320 B	PC Titrate
T - Alkalinity (as CaCO3)	INOR-171-6205	SM 2320 B	PC Titrate
Bicarbonate	INOR-171-6205	SM 2320 B	PC Titrate
Carbonate	INOR-171-6205	SM 2320 B	PC Titrate
Hydroxide	INOR-171-6205	SM 2320 B	PC Titrate
Electrical Conductivity	INOR-171-6205	SM 2510 B	PC Titrate
Fluoride	INOR-171-6200	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-171-6200	SM 4110 B	ION CHROMATOGRAPH
Nitrite	INOR-171-6200	SM 4110 B	ION CHROMATOGRAPH
Nitrate	INOR-171-6200	SM 4110 B	ION CHROMATOGRAPH
Sulfate	INOR-171-6200	SM 4110 B	ION CHROMATOGRAPH
Dissolved Calcium	INOR-171-6201, INOR-171-6100	SM 3120 B	ICP/OES
Dissolved Magnesium	INOR-171-6201, INOR-171-6100	SM 3120 B	ICP/OES
Dissolved Sodium	INOR-171-6201, INOR-171-6100	SM 3120 B	ICP/OES
Dissolved Potassium	INOR-171-6201, INOR-171-6100	SM 3120 B	ICP/OES
Dissolved Iron	INOR-171-6201, INOR-171-6100	SM 3120 B	ICP/OES
Dissolved Manganese	INOR-171-6201, INOR-171-6100	SM 3120 B	ICP/OES

AGAT Laboratories

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Edmonton, Alberta
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Chain of Custody Record

Rush Turnaround Requests
Upon filling out this section, client accepts that surcharges will be attached to this analysis. If NOT completed, regular TAT will be default.

- ☐ Less than 24 hours (200%)
- ☐ 24 to 48 hours (100%)
- ☐ 48 to 72 hours (50%)

Date Required: _____
Please contact laboratory to notify

Report To:
Company: IEG Consultants LTD.
Contact: Nicole Wills
Address: 2618 Hopewell Pl NE
Calgary Postal Code: T1Y 7S7
Phone: 403-829-3048 Fax: _____
LSD: Uniplat I-22
Client Project #: A04025A02

Report Information
1. Name: Nicole Wills
Email: NWills@kelohn.com
2. Name: Jesse Collins
Email: jcollins@kelohn.com

Report Format
- ☐ Single Sample per page
- ☒ Multiple Samples per page
- ☒ Excel Format Included

Laboratory Use Only
Date and Time: 13 SEP -4 -9 :54
Arrival Temperature: 8.4°C
AGAT Job Number: 13E754530

Invoice To: Same (Y / N) – Circle
Company: _____
Contact: _____
Address: _____
Postal code: _____
Phone: _____ Fax: _____
PO/AFE #: _____

Regulatory Requirements (Check one):
- ☐ CCME
  - ☐ Agricultural
  - ☐ Residential/Park
  - ☐ Commercial
  - ☐ Industrial
  - ☐ Drinking Water
  - ☐ FWAL
- ☐ AB Tier 1
  - ☐ Natural Area
  - ☐ Agricultural
  - ☐ Residential/Park
  - ☐ Commercial
  - ☐ Industrial
- ☐ Other
  - ☐ D50 (Drilling)
  - ☐ SPIGEC

Laboratory Use (Lab ID #)	Sample Identification	Sample Matrix	Date/Time Sampled	Comments – Site/Sample Info. Sample Containment	Number of Containers	Detailed Soil Salinity (Sat. Paste)	CCME BTEX/F1-F4	Metals ☐ HWS-B, Cr6 & Hg	Routine Water Potability	Metals ☐ Diss ☐ Total ☐ Hg	AB Class 2 Landfill	Microtox	D50 Detailed Soil Salinity (As received)	PAH	Fe, Mn					Hold for	Contaminated/Hazardous (Y/N)
770	MW11-003	GW	13/09/02		10		X		X					X	X						N

Samples Relinquished by (print name & sign): Jesse Collins — Date/Time: Sept 3, 2013 — Samples Received by (Print name & sign): [illegible] — Date/Time: [illegible]
Samples Relinquished by (print name & sign): — Date/Time: — Samples Received by (Print name & sign): — Date/Time:
Samples Relinquished by (print name & sign): — Date/Time: — Samples Received by (Print name & sign): — Date/Time:

Pink Copy – Client
Yellow Copy – AGAT
White Copy – AGAT

Page 1 of 1
NO: 052669

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - Edmonton

Received by: Lucas Wyatt

RECEIVING BASICS

Date & Time: Sept 4th 9:54 am / pm Courier: Canadian North Prepaid / Collect Waybill# 683966274
Branch received from: N/A Relinquished by: canadian north Company/Consultant: Tetra Consultants
Client left without count verified: Yes / No Custody Seal Intact: Yes / No / NA

COC INFORMATION

COC received: Yes / No Emailed to CPM TAT: 24hr 24-48hr 48-72hr Reg Other
COC Complete? Yes / No *If NO why: Workorder Number 13E-754530
COC Numbers: 252664
Sample Quantities: Coolers: 1 Bottles/Jars: 10 Bags: 0 Other: 0 COC Container Count: 10
*If COC Container count differs from what was received why:

TIME SENSITIVE ISSUES

Earliest Date Sampled: Sept 2nd/13 ALREADY EXCEEDED? Yes No
Microbiology/Time Sensitive Test*: Expiry:
Hydrocarbon Test: BTEX F1-F4 / PAH Expiry: Sept 9th
Are samples received more than 5 days after sampling: Yes No
Residual Chlorine, Dissolved Oxygen, Turbidity, BOD, Nitrate/Nitrite, Microtox

SAMPLE INTEGRITY

Hazardous Samples
Why hazardous: N/A Precaution taken: N/A

Specialty Issues
Legal Samples: Yes / No International Samples: Yes / No Proper tape/labels applied: Yes / No

Damaged: Yes / No If YES why? No Bubble Wrap Frozen Courier Other:

Temperature *(to be recorded from bottles/jars only)* N/A – Only Soil Bags received
(1) (Bottle/Jar) 3.6 + 2.5 = 8.4 °C (2) (Bottle/Jar) ___+___+___=___°C (3) (Bottle/Jar) ___+___+___=___°C

(4) (Bottle/Jar) ___+___+___=___°C (5) (Bottle/Jar) ___+___+___=___°C (6) (Bottle/Jar) ___+___+___=___°C
(If more than 6 coolers are received use another sheet of paper and attach)

Coolant used: Icepack (Top / Bottom / Side) Bagged Ice (Top / Bottom / Side) Free Ice None

Correct Sample Requirements for Testing *(to be completed by Logistics staff during login process)*
Bottles: Yes / No Amount: Yes / No Labels: Yes / No
*If NO to any of the above explain why:

Visible Sediment: Yes / No / NA(soil)

Additional integrity issues (Indicate issues below and on the CoC next to the sample ID):
Preserved in LC

Account Project Manager: have they been notified of the above issues: Yes No
Whom spoken to: Date and Time: CPM Initial:

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CLIENT NAME: IEG ENVIRONMENTAL (NORTH)
PO BOX 3178
INUVIK, NT X0E0T0
(403) 262-5505

ATTENTION TO: Nicole Wills

PROJECT NO: Unipkat I-22 / A04025A02

AGAT WORK ORDER: 13E750792

SOIL ANALYSIS REVIEWED BY: Joydee Saez, Technical Reviewer

TRACE ORGANICS REVIEWED BY: Jarrod Roberts, Operations Manager

DATE REPORTED: Aug 29, 2013

PAGES (INCLUDING COVER): 14

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (780) 395-2525

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Certificate of Analysis

AGAT WORK ORDER: 13E750792
PROJECT NO: Unipkat I-22 / A04025A02

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

CCME / Alberta Tier 1 Metals + Hg + HWS B + Cr6 (soil)

DATE RECEIVED: 2013-08-21

DATE REPORTED: 2013-08-29

		SAMPLE DESCRIPTION:		TH-13-01 (0-0.15m)	TH-13-01 (0.3-0.6m)	TH-13-02 (0-0.15m)	TH-13-02 (0.3-0.6m)	TH-13-03 (0-0.15m)	TH-13-03 (0.3-0.6m)	TH-13-04 (0-0.15m)	TH-13-04 (0.3-0.6m)
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013
Parameter	Unit	G / S	RDL	4679798	4679800	4679801	4679803	4679804	4679806	4679807	4679809
Antimony Dry Weight	mg/kg	20	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	mg/kg	17	0.5	6.2	6.2	6.3	5.6	7.0	5.4	6.5	6.3
Barium	mg/kg	750	0.5	472	641	1530	726	1120	555	479	636
Beryllium	mg/kg	5	0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	0.5	<0.5
Boron (Hot water extraction)	mg/kg	2	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	mg/kg	1.4	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5
Chromium	mg/kg	64	0.5	15.0	14.4	15.3	13.1	17.0	13.4	15.8	15.1
Chromium, Hexavalent	mg/kg	0.4	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Cobalt	mg/kg	20	0.5	7.4	7.2	7.5	6.8	8.1	6.7	7.5	7.2
Copper	mg/kg	63	0.5	15.6	15.3	15.6	13.0	16.8	12.5	16.0	14.7
Lead	mg/kg	70	0.5	7.8	7.7	8.2	6.8	9.0	6.3	7.5	7.7
Mercury	mg/kg	6.6	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum	mg/kg	4	0.5	1.3	1.4	1.5	1.2	1.5	1.2	1.3	1.4
Nickel	mg/kg	50	0.5	22.5	22.3	23.0	20.2	24.6	19.2	23.6	21.8
Selenium	mg/kg	1	0.5	0.6	0.7	0.7	0.5	0.7	0.6	0.7	0.6
Silver	mg/kg	20	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	mg/kg	1	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tin	mg/kg	5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	mg/kg	23	0.5	0.9	1.0	0.9	0.9	1.0	0.9	1.0	1.0
Vanadium	mg/kg	130	0.5	29.0	28.8	28.5	27.2	33.3	27.4	31.6	30.9
Zinc	mg/kg	200	1	79	75	77	69	82	68	79	74

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

CCME / Alberta Tier 1 Metals + Hg + HWS B + Cr6 (soil)

DATE RECEIVED: 2013-08-21

DATE REPORTED: 2013-08-29

				TH-13-05	TH-13-05 (0.	TH-13-06	TH-13-06 (0.
SAMPLE DESCRIPTION:				(0-0.15m)	3-0.6m)	(0-0.15m)	3-0.6m)
SAMPLE TYPE:				Soil	Soil	Soil	Soil
DATE SAMPLED:				8/17/2013	8/17/2013	8/17/2013	8/17/2013
Parameter	Unit	G / S	RDL	4679810	4679812	4679813	4679815
Antimony Dry Weight	mg/kg	20	0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	mg/kg	17	0.5	6.6	6.0	6.2	6.0
Barium	mg/kg	750	0.5	447	530	449	797
Beryllium	mg/kg	5	0.5	0.5	<0.5	<0.5	<0.5
Boron (Hot water extraction)	mg/kg	2	0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	mg/kg	1.4	0.5	0.5	<0.5	0.5	<0.5
Chromium	mg/kg	64	0.5	15.7	14.4	14.8	14.0
Chromium, Hexavalent	mg/kg	0.4	0.3	<0.3	<0.3	<0.3	<0.3
Cobalt	mg/kg	20	0.5	7.9	7.1	7.4	7.2
Copper	mg/kg	63	0.5	16.4	15.0	15.4	14.2
Lead	mg/kg	70	0.5	8.0	7.4	7.3	7.3
Mercury	mg/kg	6.6	0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum	mg/kg	4	0.5	1.4	1.3	1.3	1.3
Nickel	mg/kg	50	0.5	23.9	21.4	22.6	21.1
Selenium	mg/kg	1	0.5	0.7	0.6	0.6	0.6
Silver	mg/kg	20	0.5	<0.5	<0.5	<0.5	<0.5
Thallium	mg/kg	1	0.5	<0.5	<0.5	<0.5	<0.5
Tin	mg/kg	5	0.5	<0.5	<0.5	<0.5	<0.5
Uranium	mg/kg	23	0.5	1.0	1.0	0.9	0.9
Vanadium	mg/kg	130	0.5	31.6	29.8	29.6	29.0
Zinc	mg/kg	200	1	83	75	78	71

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ABTier1 Soil (Ag, F)
4679798-4679815 Results are based on the dry weight of the sample.

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

Soil Analysis - Barium by Fusion ICP

DATE RECEIVED: 2013-08-21

DATE REPORTED: 2013-08-29

				TH-13-01	TH-13-01 (0.	TH-13-01 (0.	TH-13-02	TH-13-02 (0.	TH-13-02 (0.	TH-13-03	TH-13-03 (0.
SAMPLE DESCRIPTION:				(0-0.15m)	15-0.3m)	3-0.6m)	(0-0.15m)	15-0.3m)	3-0.6m)	(0-0.15m)	15-0.3m)
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013
Parameter	Unit	G / S	RDL	4679798	4679799	4679800	4679801	4679802	4679803	4679804	4679805
True Barium by Fusion ICP				826	912	931	1460	883	1010	1210	1200

				TH-13-03 (0.	TH-13-04	TH-13-04 (0.	TH-13-04 (0.	TH-13-05	TH-13-05 (0.	TH-13-05 (0.	TH-13-06
SAMPLE DESCRIPTION:				3-0.6m)	(0-0.15m)	15-0.3m)	3-0.6m)	(0-0.15m)	15-0.3m)	3-0.6m)	(0-0.15m)
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013
Parameter	Unit	G / S	RDL	4679806	4679807	4679808	4679809	4679810	4679811	4679812	4679813
True Barium by Fusion ICP				1070	864	1290	1030	854	863	960	854

				TH-13-06 (0.	TH-13-06 (0.
SAMPLE DESCRIPTION:				15-0.3m)	3-0.6m)
SAMPLE TYPE:				Soil	Soil
DATE SAMPLED:				8/17/2013	8/17/2013
Parameter	Unit	G / S	RDL	4679814	4679815
True Barium by Fusion ICP				1070	989

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
4679798-4679815 Result is based on the dry weight of the sample.

Certified By: Joyce M. Fong

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Certificate of Analysis

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

Soil Analysis - Salinity (AB Tier 1 - pH Calcium Chloride)

DATE RECEIVED: 2013-08-21

DATE REPORTED: 2013-08-29

Parameter	Unit	G / S	RDL	TH-13-01 (0-0.15m) Soil 8/17/2013 4679798	TH-13-01 (0. 3-0.6m) Soil 8/17/2013 4679800	TH-13-02 (0-0.15m) Soil 8/17/2013 4679801	TH-13-02 (0. 3-0.6m) Soil 8/17/2013 4679803	TH-13-03 (0-0.15m) Soil 8/17/2013 4679804	TH-13-03 (0. 3-0.6m) Soil 8/17/2013 4679806	TH-13-04 (0-0.15m) Soil 8/17/2013 4679807	TH-13-04 (0. 3-0.6m) Soil 8/17/2013 4679809
SAMPLE DESCRIPTION:											
SAMPLE TYPE:											
DATE SAMPLED:											
pH (CaCl2 Extraction)	pH Units		N/A	7.41	7.39	7.43	7.34	7.35	7.39	6.81	7.24
Electrical Conductivity (Sat. Paste)	dS/m		0.01	3.66	3.17	8.89	2.19	6.28	4.16	2.25	1.82
Sodium Adsorption Ratio				1.97	1.26	5.47	1.01	3.16	2.10	0.95	1.24
Saturation Percentage	%		N/A	41	47	44	44	50	43	47	44
Chloride, Soluble	mg/L		5	233	285	1990	174	1330	657	247	188
Calcium, Soluble	mg/L		1	484	532	863	358	816	574	358	250
Potassium, Soluble	mg/L		2	25	19	47	23	32	26	21	40
Magnesium, Soluble	mg/L		1	181	107	318	72	221	142	72	55
Sodium, Soluble	mg/L		2	200	122	740	80	395	217	75	83
Sulfur (as Sulfate), Soluble	mg/L		2	2000	1600	2190	1040	1830	1610	943	697
Calcium, Soluble (meq/L)	meq/L		0.05	24.2	26.5	43.1	17.9	40.7	28.6	17.9	12.5
Calcium, Soluble (mg/kg)	mg/kg		1	198	250	380	158	408	247	168	110
Chloride, Soluble (meq/L)	meq/L		0.06	6.57	8.04	56.1	4.91	37.5	18.5	6.97	5.30
Chloride, Soluble (mg/kg)	mg/kg		2	96	134	876	77	665	283	116	83
Magnesium, Soluble (meq/L)	meq/L		0.08	14.9	8.80	26.2	5.92	18.2	11.7	5.92	4.53
Magnesium, Soluble (mg/kg)	mg/kg		1	74	50	140	32	111	61	34	24
Potassium, Soluble (meq/L)	meq/L		0.05	0.64	0.49	1.20	0.59	0.82	0.66	0.54	1.02
Potassium, Soluble (mg/kg)	mg/kg		2	10	9	21	10	16	11	10	18
Sodium, Soluble (meq/L)	meq/L		0.09	8.70	5.31	32.2	3.48	17.2	9.44	3.26	3.61
Sodium, Soluble (mg/kg)	mg/kg		2	82	57	326	35	198	93	35	37
Sulfur (as Sulfate), Soluble (meq/L)	meq/L		0.04	41.6	33.3	45.6	21.7	38.1	33.5	19.6	14.5
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg		2	820	752	964	458	915	692	443	307
Theoretical Gypsum Requirement	tonnes/ha			0	0	0	0	0	0	0	0

Certified By: Joyce M. Fong

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Certificate of Analysis

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

Soil Analysis - Salinity (AB Tier 1 - pH Calcium Chloride)

DATE RECEIVED: 2013-08-21

DATE REPORTED: 2013-08-29

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: TH-13-05 (0-0.15m)	TH-13-05 (0. 3-0.6m)	TH-13-06 (0-0.15m)	TH-13-06 (0. 3-0.6m)
			SAMPLE TYPE:	Soil	Soil	Soil	Soil
			DATE SAMPLED:	8/17/2013	8/17/2013	8/17/2013	8/17/2013
				4679810	4679812	4679813	4679815
pH (CaCl2 Extraction)	pH Units		N/A	7.39	7.00	7.16	7.24
Electrical Conductivity (Sat. Paste)	dS/m		0.01	1.99	1.01	2.46	3.19
Sodium Adsorption Ratio				0.85	0.45	0.90	0.74
Saturation Percentage	%		N/A	62	35	54	46
Chloride, Soluble	mg/L		5	156	61	115	129
Calcium, Soluble	mg/L		1	308	160	442	628
Potassium, Soluble	mg/L		2	15	12	21	26
Magnesium, Soluble	mg/L		1	75	32	92	113
Sodium, Soluble	mg/L		2	64	24	80	77
Sulfur (as Sulfate), Soluble	mg/L		2	948	319	1440	2070
Calcium, Soluble (meq/L)	meq/L		0.05	15.4	7.98	22.1	31.3
Calcium, Soluble (mg/kg)	mg/kg		1	191	56	239	289
Chloride, Soluble (meq/L)	meq/L		0.06	4.40	1.72	3.24	3.64
Chloride, Soluble (mg/kg)	mg/kg		2	97	21	62	59
Magnesium, Soluble (meq/L)	meq/L		0.08	6.17	2.63	7.57	9.30
Magnesium, Soluble (mg/kg)	mg/kg		1	47	11	50	52
Potassium, Soluble (meq/L)	meq/L		0.05	0.38	0.31	0.54	0.66
Potassium, Soluble (mg/kg)	mg/kg		2	9	4	11	12
Sodium, Soluble (meq/L)	meq/L		0.09	2.78	1.04	3.48	3.35
Sodium, Soluble (mg/kg)	mg/kg		2	40	8	43	35
Sulfur (as Sulfate), Soluble (meq/L)	meq/L		0.04	19.7	6.64	30.0	43.1
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg		2	588	112	778	952
Theoretical Gypsum Requirement	tonnes/ha			0	0	0	0

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ABTier1 (Ag,F)

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Certificate of Analysis

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2013-08-21

DATE REPORTED: 2013-08-29

		SAMPLE DESCRIPTION:		TH-13-01 (0-0.15m)	TH-13-01 (0. 3-0.6m)	TH-13-02 (0-0.15m)	TH-13-02 (0. 3-0.6m)	TH-13-03 (0-0.15m)	TH-13-03 (0. 3-0.6m)	TH-13-04 (0-0.15m)	TH-13-04 (0. 3-0.6m)
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013
Parameter	Unit	G / S	RDL	4679798	4679800	4679801	4679803	4679804	4679806	4679807	4679809
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	58	<10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	35	20	111	10	23	<10	35	25
C34 - C50 (F4)	mg/kg		10	<10	11	71	<10	14	<10	21	16
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	25	26	26	23	25	22	29	29
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		111	112	112	112	112	112	113	112
Ethylbenzene-d10 (BTEX)	%	50-150		107	112	119	82	78	80	78	86
o-Terphenyl (F2-F4)	%	50-150		93	93	94	91	87	86	112	91

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Certificate of Analysis

AGAT WORK ORDER: 13E750792
PROJECT NO: Unipkat I-22 / A04025A02

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2013-08-21

DATE REPORTED: 2013-08-29

				TH-13-05	TH-13-05 (0.	TH-13-06	TH-13-06 (0.
		SAMPLE DESCRIPTION:		(0-0.15m)	3-0.6m)	(0-0.15m)	3-0.6m)
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		8/17/2013	8/17/2013	8/17/2013	8/17/2013
Parameter	Unit	G / S	RDL	4679810	4679812	4679813	4679815
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	27	12	17	21
C34 - C50 (F4)	mg/kg		10	21	<10	<10	13
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A
Moisture Content	%		1	29	29	30	21
Surrogate	Unit	Acceptable Limits					
Toluene-d8 (BTEX)	%	50-150		112	114	112	113
Ethylbenzene-d10 (BTEX)	%	50-150		80	79	83	78
o-Terphenyl (F2-F4)	%	50-150		95	86	96	90

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ABTier1 (Ag,F)

4679798-4679815 Results are based on the dry weight of the sample.
The C6-C10 (F1) fraction is calculated using toluene response factor.
The C10 - C16 (F2), C16 - C34 (F3), and C34 - C50 (F4) fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons (F4g) are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH contributions (if requested).
Quality control data is available upon request.
Assistance in the interpretation of data is available upon request.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
The chromatogram returned to baseline by the retention time of nC50.
Extraction and holding times were met for this sample.

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 13E750792
PROJECT NO: Unipkat I-22 / A04025A02

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

Polyaromatic Hydrocarbon Analysis - Soil

DATE RECEIVED: 2013-08-21

DATE REPORTED: 2013-08-29

				TH-13-01	TH-13-02
		SAMPLE DESCRIPTION:		(0-0.15m)	(0-0.15m)
		SAMPLE TYPE:		Soil	Soil
		DATE SAMPLED:		8/17/2013	8/17/2013
Parameter	Unit	G / S	RDL	4679798	4679801
Naphthalene	mg/kg	0.018	0.005	0.022	0.028
2-Methylnaphthalene	mg/kg		0.005	0.035	0.046
Acenaphthylene	mg/kg	6.0	0.005	<0.005	<0.005
Acenaphthene	mg/kg	0.38	0.005	<0.005	<0.005
Fluorene	mg/kg	0.34	0.02	<0.02	<0.02
Phenanthrene	mg/kg	0.061	0.02	0.05	0.05
Anthracene	mg/kg	0.0056	0.004	<0.004	<0.004
Fluoranthene	mg/kg	0.039	0.01	0.01	0.01
Pyrene	mg/kg	0.040	0.01	0.02	0.03
Benz[a]anthracene	mg/kg	0.083	0.03	<0.03	<0.03
Chrysene	mg/kg	6.2	0.05	<0.05	<0.05
Benzo[b+j]fluoranthene	mg/kg	6.2	0.05	<0.05	<0.05
Benzo[k]fluoranthene	mg/kg	6.2	0.05	<0.05	<0.05
Benzo[a]pyrene	mg/kg		0.03	<0.03	<0.03
Indeno[1,2,3-cd]pyrene	mg/kg		0.05	<0.05	<0.05
Dibenz[ah]anthracene	mg/kg	8.4	0.005	<0.005	<0.005
Benzo[ghi]perylene	mg/kg		0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits			
2-Fluorobiphenyl (PAH)	%	50-150		75	81
p-Terphenyl-d14 (PAH)	%	50-150		73	71

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ABTier1 Soil (Ag, C)
4679798-4679801 Results are based on the dry weight of the sample.
Based on GC/MS target ion analysis.
Isomers Benzo(b)fluoranthene and Benzo(j)fluoranthene have the same GC retention time and are reported as the sum based on the Benzo(b)fluoranthene response.

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Quality Assurance

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

ATTENTION TO: Nicole Wills

Soil Analysis

RPT Date: Aug 29, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Soil Analysis - Salinity (AB Tier 1 - pH Calcium Chloride)															
pH (CaCl2 Extraction)	686	4679810	7.39	7.37	0.3%	N/A	100%	90%	110%						
Electrical Conductivity (Sat. Paste)	686	4679810	1.99	2.06	3.5%	< 0.01	108%	90%	110%						
Saturation Percentage	665	4679810	62	61	1.6%	N/A	100%	80%	120%						
Chloride, Soluble	689	4679704	< 5	< 5	0.0%	< 5	97%	80%	120%	102%	80%	120%	103%	80%	120%
Calcium, Soluble	421	4679704	27	27	1.7%	< 1	112%	80%	120%				109%	80%	120%
Potassium, Soluble	421	4679704	<2	<2	0.0%	< 2	104%	80%	120%				100%	80%	120%
Magnesium, Soluble	421	4679704	14	15	2.0%	< 1	109%	80%	120%				103%	80%	120%
Sodium, Soluble	421	4679704	25	24	2.3%	< 2	102%	80%	120%				102%	80%	120%
Sulfur (as Sulfate), Soluble	421	4679704	36	36	0.4%	< 2	110%	80%	120%				104%	80%	120%
Comments: N/A: Not applicable															
CCME / Alberta Tier 1 Metals + Hg + HWS B + Cr6 (soil)															
Antimony Dry Weight	644	4679798	< 0.5	< 0.5	0.0%	< 0.5	98%	80%	120%				94%	80%	120%
Arsenic	644	4679798	6.2	6.3	1.6%	< 0.5	99%	80%	120%				96%	80%	120%
Barium	644	4679798	472	462	2.1%	< 0.5	109%	80%	120%				115%	80%	120%
Beryllium	644	4679798	< 0.5	< 0.5	0.0%	< 0.5	98%	80%	120%				102%	80%	120%
Boron (Hot water extraction)	420	4681227	<0.5	<0.5	0.0%	< 0.5	110%	80%	120%				108%	80%	120%
Cadmium	644	4679798	< 0.5	< 0.5	0.0%	< 0.5	98%	80%	120%				96%	80%	120%
Chromium	644	4679798	15.0	14.8	1.3%	< 0.5	91%	80%	120%				97%	80%	120%
Chromium, Hexavalent	180	4682290	< 0.3	< 0.3	0.0%	< 0.3	97%	80%	120%	95%	80%	120%	96%	80%	120%
Cobalt	644	4679798	7.4	7.5	1.3%	< 0.5	90%	80%	120%				95%	80%	120%
Copper	644	4679798	15.6	16.0	2.5%	< 0.5	94%	80%	120%				92%	80%	120%
Lead	644	4679798	7.8	7.8	0.0%	< 0.5	94%	80%	120%				92%	80%	120%
Mercury	644	4679798	< 0.5	< 0.5	0.0%	< 0.5	106%	80%	120%				96%	80%	120%
Molybdenum	644	4679798	1.3	1.3	0.0%	< 0.5	96%	80%	120%				97%	80%	120%
Nickel	644	4679798	22.5	22.6	0.4%	< 0.5	92%	80%	120%				95%	80%	120%
Selenium	644	4679798	0.6	0.6	0.0%	< 0.5	105%	80%	120%				93%	80%	120%
Silver	644	4679798	< 0.5	< 0.5	0.0%	< 0.5	93%	80%	120%				97%	80%	120%
Thallium	644	4679798	< 0.5	< 0.5	0.0%	< 0.5	92%	80%	120%				93%	80%	120%
Tin	644	4679798	< 0.5	< 0.5	0.0%	< 0.5	92%	80%	120%				97%	80%	120%
Uranium	644	4679798	0.9	0.9	0.0%	< 0.5	95%	80%	120%				108%	80%	120%
Vanadium	644	4679798	29.0	28.4	2.1%	< 0.5	92%	80%	120%				115%	80%	120%
Zinc	644	4679798	79	78	1.3%	< 1	107%	80%	120%				97%	80%	120%
Soil Analysis - Barium by Fusion ICP															
Barium by Fusion ICP-OES	436	4679798	860	850	1.2%	< 40	95%	80%	120%				96%	80%	120%
CCME / Alberta Tier 1 Metals + Hg + HWS B + Cr6 (soil)															
Chromium, Hexavalent	195	4732666	< 0.3	< 0.3	0.0%	< 0.3	113%	80%	120%	100%	80%	120%	103%	80%	120%

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Quality Assurance

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

ATTENTION TO: Nicole Wills

Soil Analysis (Continued)

RPT Date: Aug 29, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By:

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Quality Assurance

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

ATTENTION TO: Nicole Wills

Trace Organics Analysis

RPT Date: Aug 29, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	466	4679798	<0.005	<0.005	0.0%	< 0.005	95%	80%	120%	104%	80%	120%	113%	60%	140%
Toluene	466	4679798	<0.05	<0.05	0.0%	< 0.05	93%	80%	120%	99%	80%	120%	111%	60%	140%
Ethylbenzene	466	4679798	<0.01	<0.01	0.0%	< 0.01	85%	80%	120%	88%	80%	120%	99%	60%	140%
Xylenes	466	4679798	<0.05	<0.05	0.0%	< 0.05	89%	80%	120%	87%	80%	120%	98%	60%	140%
C6 - C10 (F1)	466	4679798	<10	<10	0.0%	< 10	93%	80%	120%	113%	80%	120%	123%	60%	140%
C10 - C16 (F2)	340	4679798	<10	<10	0.0%	< 10	89%	80%	120%	83%	80%	120%	90%	60%	140%
C16 - C34 (F3)	340	4679798	35	<10	NA	< 10	92%	80%	120%	92%	80%	120%	99%	60%	140%
C34 - C50 (F4)	340	4679798	<10	<10	0.0%	< 10	81%	80%	120%	118%	80%	120%	132%	60%	140%
Moisture Content	340	4679798	25	27	7.7%	< 1									
Polyaromatic Hydrocarbon Analysis - Soil															
Naphthalene	237	4678982	< 0.005	< 0.005	0.0%	< 0.005	95%	70%	130%	90%	70%	130%	86%	70%	130%
2-Methylnaphthalene	237	4678982	< 0.005	< 0.005	0.0%	< 0.005				78%	70%	130%	77%	70%	130%
Acenaphthylene	237	4678982	< 0.005	< 0.005	0.0%	< 0.005	94%	70%	130%	86%	70%	130%	91%	70%	130%
Acenaphthene	237	4678982	< 0.005	< 0.005	0.0%	< 0.005	84%	70%	130%	78%	70%	130%	79%	70%	130%
Fluorene	237	4678982	< 0.02	< 0.02	0.0%	< 0.02	83%	70%	130%	83%	70%	130%	76%	70%	130%
Phenanthrene	237	4678982	< 0.02	< 0.02	0.0%	< 0.02	94%	70%	130%	92%	70%	130%	85%	70%	130%
Anthracene	237	4678982	< 0.004	< 0.004	0.0%	< 0.004	96%	70%	130%	97%	70%	130%	91%	70%	130%
Fluoranthene	237	4678982	< 0.01	< 0.01	0.0%	< 0.01	114%	70%	130%	103%	70%	130%	100%	70%	130%
Pyrene	237	4678982	< 0.01	< 0.01	0.0%	< 0.01	117%	70%	130%	106%	70%	130%	90%	70%	130%
Benz[a]anthracene	237	4678982	< 0.03	< 0.03	0.0%	< 0.03	92%	70%	130%	80%	70%	130%	74%	70%	130%
Chrysene	237	4678982	< 0.05	< 0.05	0.0%	< 0.05	97%	70%	130%	79%	70%	130%	74%	70%	130%
Benzo[b+j]fluoranthene	237	4678982	< 0.05	< 0.05	0.0%	< 0.05	92%	70%	130%	84%	70%	130%	75%	70%	130%
Benzo[k]fluoranthene	237	4678982	< 0.05	< 0.05	0.0%	< 0.05	90%	70%	130%	71%	70%	130%	71%	70%	130%
Benzo[a]pyrene	237	4678982	< 0.03	< 0.03	0.0%	< 0.03	111%	70%	130%	78%	70%	130%	75%	70%	130%
Indeno[1,2,3-cd]pyrene	237	4678982	< 0.05	< 0.05	0.0%	< 0.05	100%	70%	130%	75%	70%	130%	76%	70%	130%
Dibenz[ah]anthracene	237	4678982	< 0.005	< 0.005	0.0%	< 0.005	94%	70%	130%	73%	70%	130%	74%	70%	130%
Benzo[ghi]perylene	237	4678982	< 0.05	< 0.05	0.0%	< 0.05	87%	70%	130%	72%	70%	130%	74%	70%	130%

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Method Summary

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

ATTENTION TO: Nicole Wills

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony Dry Weight	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Antimony	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Arsenic	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Barium	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Beryllium	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Boron (Hot water extraction)	INOR-171-6201 & INOR-171-6005	Carter 12.2.4/ EPA 6010; SHEPPARD	ICP/OES
Cadmium	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Chromium	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Chromium, Hexavalent	INOR-171-6215	ASA 20-4.3; REISENAUER 1982	SPECTROPHOTOMETER
Cobalt	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Copper	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Lead	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Mercury	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Molybdenum	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Nickel	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Selenium	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Silver	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Thallium	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Tin	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Uranium	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Vanadium	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Zinc	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
pH (CaCl2 Extraction)	INOR-171-6207	SHEPPARD 2007; HENDERSHOT 2008	PH METER
Electrical Conductivity (Sat. Paste)	INOR-171-6208	SHEPPARD 2007; MILLER 2007	CONDUCTIVITY METER
Sodium Adsorption Ratio	INOR-171-6201 & INOR-171-6002	McKeague 3.26	CALCULATION
Saturation Percentage	INOR-171-6002	MILLER 2007; SHEPPARD 2007	GRAVIMETRIC
Chloride, Soluble	INOR-171-6200 & INOR-171-6002	SHEPPARD 2007, EATON 2005	CONTINUOUS FLOW ANALYZER
Calcium, Soluble	INOR-171-6201 & INOR-171-6002	SHEPPARD 2007; EATON 2005; MILLER 2007, SM 3120B	ICP/OES
Potassium, Soluble	INOR-171-6201 & INOR-171-6002	SHEPPARD 2007; EATON 2005; MILLER 2007, SM 3120B	ICP/OES

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Method Summary

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

ATTENTION TO: Nicole Wills

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Magnesium, Soluble	INOR-171-6201 & INOR-171-6002	SHEPPARD 2007; EATON 2005; MILLER 2007, SM 3120B	ICP/OES
Sodium, Soluble	INOR-171-6201 & INOR-171-6002	SHEPPARD 2007; EATON 2005; MILLER 2007, SM 3120B	ICP/OES
Sulfur (as Sulfate), Soluble	INOR-171-6201 & INOR-171-6002	SHEPPARD 2007; EATON 2005; MILLER 2007, SM 3120B	ICP/OES
Trace Organics Analysis			
Benzene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260	GC/MS
Toluene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260	GC/MS
Ethylbenzene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260	GC/MS
Xylenes	ORG-170-5110/5140/5430/5440	EPA SW-846 8260	GC/MS
C6 - C10 (F1)	ORG-170-5110/5140/5430/5440	CCME Tier 1 Method	GC/FID
C6 - C10 (F1 minus BTEX)	ORG-170-5110/5140/5430/5440	CCME Tier 1 Method	GC/FID
C10 - C16 (F2)	ORG-170-5120/5300	CCME Tier 1 Method	GC/FID
C16 - C34 (F3)	ORG-170-5120/5300	CCME Tier 1 Method	GC/FID
C34 - C50 (F4)	ORG-170-5120/5300	CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	ORG-170-5120/5300	CCME Tier 1 Method	GC/FID
Moisture Content	LAB-175-4002	CCME Tier 1 Method	GRAVIMETRIC
Toluene-d8 (BTEX)	ORG-170-5110/5140/5430/5440	EPA SW-846 8260	GC/MS
Ethylbenzene-d10 (BTEX)	ORG-170-5110/5140/5430/5440	EPA SW-846 8260	GC/MS
o-Terphenyl (F2-F4)	ORG-170-5120/5300	CCME Tier 1 Method	GC/FID
Naphthalene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
2-Methylnaphthalene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Acenaphthylene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Acenaphthene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Fluorene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Phenanthrene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Anthracene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Fluoranthene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Pyrene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Benz[a]anthracene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Chrysene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Benzo[b+j]fluoranthene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Benzo[k]fluoranthene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Benzo[a]pyrene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Indeno[1,2,3-cd]pyrene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Dibenz[ah]anthracene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Benzo[ghi]perylene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
2-Fluorobiphenyl (PAH)	TO 0500	EPA SW846 8270 D/3540 C/3570	GC/MS
p-Terphenyl-d14 (PAH)	TO 0500	EPA SW846 8270 D/3540 C/3570	GC/MS

AGAT Laboratories

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Chain of Custody Record

Rush Turnaround Requests
Upon filling out this section, client accepts that surcharges will be attached to this analysis. If NOT completed, regular TAT will be default.
- ☒ Less than 24 hours (200%)
- ☒ 24 to 48 hours (100%)
- ☐ 48 to 72 hours (50%)

Date Required:
Please contact laboratory to notify

Report To: TEG Consultants LTD.
Company:
Contact: Nicole Wills
Address: 209 Hopewell Place NE
Calgary AB Postal Code: T1Y 7S7
Phone: 403 815 3048 Fax:
LSD: Unpkt I-22
Client Project #: A040254002

Report Information
1. Name: Nicole Wills
Email: NWills@klohn.com
2. Name: Jesse Collins
Email: jcollins@klohn.com

Report Format
- ☐ Single Sample per page
- ☒ Multiple Samples per page
- ☒ Excel Format Included

Laboratory Use Only
Date and Time: 13 AUG 21 -9 53
Arrival Temperature: 6.2°C
AGAT Job Number: 13E15072

Invoice To: Same (Y / N) - Circle
Company:
Contact:
Address:
Postal code:
Phone: Fax:
PO/AFE #:

Regulatory Requirements (Check one):
- ☒ CCME
  - ☐ Agricultural
  - ☐ Residential/Park
  - ☐ Commercial
  - ☒ Industrial
  - ☐ Drinking Water
  - ☐ FWAL
- ☐ AB Tier 1
  - ☒ Natural Area
  - ☒ Agricultural
  - ☒ Residential/Park
  - ☐ Commercial
  - ☒ Industrial
- ☐ Other
  - ☐ D50 (Drilling) ☐ SPIGEC

Laboratory Use (Lab ID #)	Sample Identification	Sample Matrix	Date/Time Sampled	Comments - Site/Sample Info, Sample Containment	Number of Containers	Detailed Soil Salinity/SAT Pastel	CCME BTEX/F1-F4	Metals ☒ HWS-B, Cr6 & Hg	Routine Water Potability	Metals ☐ Diss ☐ Total ☐ Hg	AB Class 2 Landfill	Microtox	D50 Detailed Soil Salinity (As Received)	PAH					Hold for Wills	Contaminated/Hazardous (Y/N)
AG79798	TH-13-01 (0-0.15m)	Soil	13/08/17		3	X	X	X						X						N
799	TH-13-01 (0.15-0.3m)				3	X	X	X											X	N
800	TH-13-01 (0.3-0.6m)				3	X	X	X												N
801	TH-13-02 (0-0.15m)				3	X	X	X						X						N
802	TH-13-02 (0.15-0.3m)				3	X	X	X											X	N
803	TH-13-02 (0.3-0.6m)				3	X	X	X												N
804	TH-13-03 (0-0.15m)				3	X	X	X												N
805	TH-13-03 (0.15-0.3m)				3	X	X	X											X	N
806	TH-13-03 (0.3-0.6m)				3	X	X	X												N
807	TH-13-04 (0-0.15m)				3	X	X	X												N
808	TH-13-04 (0.15-0.3m)				3														X	N
809	TH-13-04 (0.3-0.6m)	↓	↓		3	X	X	X												N

Samples Relinquished by (print name & sign): Jesse Collins	Date/Time: 13/08/18 1430	Samples Received by (Print name & sign):	Date/Time: 21/Aug/13	Pink Copy - Client / Yellow Copy - AGAT / White Copy - AGAT
Samples Relinquished by (print name & sign):	Date/Time:	Samples Received by (Print name & sign):	Date/Time:	
Samples Relinquished by (print name & sign):	Date/Time:	Samples Received by (Print name & sign):	Date/Time:	

Page 1 of 2

No: 052647

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Chain of Custody Record

Report To:
Company: Same as Page 1
Contact:
Address:
Postal Code:
Phone: Fax:
LSD:
Client Project #:

Report Information
1. Name: Pg 1
Email:
2. Name:
Email:

Report Format
- [x] Single Sample per page
- [x] Multiple Samples per page
- [x] Excel Format Included

Rush Turnaround Requests
Upon filling out this section, client accepts that surcharges will be attached to this analysis. If NOT completed, regular TAT will be default.
- [ ] Less than 24 hours (200%)
- [ ] 24 to 48 hours (100%)
- [x] 48 to 72 hours (50%)

Date Required:
Please contact laboratory to notify

Laboratory Use Only
Date and Time: 13 AUG 21 9 54
Arrival Temperature:
AGAT Job Number: BE150792

Invoice To: Same (Y) / N - Circle
Company:
Contact:
Address:
Postal code:
Phone: Fax:
PO/AFE #:

Regulatory Requirements (Check one):
- [x] CCME
- [x] AB Tier 1
- [x] Agricultural
- [x] Residential/Park
- [ ] Commercial
- [x] Industrial
- [ ] Drinking Water
- [ ] FWAL
- [ ] Other
- [ ] D50 (Drilling) [ ] SPIGEC

- [x] Natural Area
- [x] Agricultural
- [x] Residential/Park
- [x] Commercial
- [x] Industrial

Laboratory Use (Lab ID #)	Sample Identification	Sample Matrix	Date/Time Sampled	Comments - Site/Sample Info, Sample Containment	Number of Containers	Detailed Soil Salinity (Sat. Paste)	CCME BTEX/F1-F4	Metals & HWSB: As & Hg	Routine Water Potability	Metals ☐ Diss. ☐ Total ☐ Hg	AB Class 2 Landfill	Microtox	D50 Detailed Soil Salinity (As received)	PAH				Hold for WT (2 weeks)	Contaminated/Hazardous (Y/N)
10	TH-13-05 (0-0.15m)	Soil	13/08/17		3	X	X	X											N
11	TH-13-05 (0.15-0.3m)				3													X	
12	TH-13-05 (0.3-0.6m)				3	X	X	X											
13	TH-13-06 (0-0.15m)				3	X	X	X											
14	TH-13-06 (0.15-0.3m)				3													X	
15	TH-13-06 (0.3-0.6m)	↓	↓		3	X	X	X											

Samples Relinquished by (print name & sign): Jesse Gillis
Date/Time: 13/08/18 1930
Samples Received by (print name & sign): [illegible]
Date/Time: 13/08/2021

Samples Relinquished by (print name & sign):
Date/Time:
Samples Received by (print name & sign):
Date/Time:

Samples Relinquished by (print name & sign):
Date/Time:
Samples Received by (print name & sign):
Date/Time:

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

NO: 052649

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - Edmonton Received by: Sean L

RECEIVING BASICS

Date & Time: 21/Aug/13 4:53 am/pm Courier: Canada Post Prepaid / Collect Waybill# 818 YEV 1839262
Branch received from: AA Relinquished by: Jesse Collins Company/Consultant: EG
Client left without count verified: Yes / No Custody Seal Intact: Yes / No / NA

COC INFORMATION

COC received: Yes / No Emailed to CPM TAT: 24hr 24-48hr 48-72hr Reg Other
COC Complete? Yes / No *If NO why: Workorder Number 13E15012
COC Numbers: 05869 12547
Sample Quantities: Coolers: 2 Bottles/Jars: 36 Bags: 18 Other: X COC Container Count: 54
*If COC Container count differs from what was received why:

TIME SENSITIVE ISSUES

Earliest Date Sampled: 17/Aug/2013 ALREADY EXCEEDED? Yes No
Microbiology/Time Sensitive Test*: n/a Expiry: n/a
Hydrocarbon Test: BTEX Expiry: 31/Aug/2013
Are samples received more than **5 days** after sampling: Yes No
**Residual Chlorine, Dissolved Oxygen, Turbidity, BOD, Nitrate/Nitrite, Microtox*

SAMPLE INTEGRITY

Hazardous Samples
Why hazardous: n/a Precaution taken: n/a

Specialty Issues
Legal Samples: Yes / No International Samples: Yes / No Proper tape/labels applied: Yes / No

Damaged: Yes / No If YES why? No Bubble Wrap Frozen Courier Other:

Temperature *(to be recorded from bottles/jars only)* N/A - Only Soil Bags received
(1) (Bottle/Jar) 6.2 + 6.3 + 6.3 = 18.8 °C (2) (Bottle/Jar) 6.6 + 6.6 + 6.4 = 19.6 °C (3) (Bottle/Jar) ___ + ___ + ___ = ___ °C

(4) (Bottle/Jar) ___ + ___ + ___ = ___ °C (5) (Bottle/Jar) ___ + ___ + ___ = ___ °C (6) (Bottle/Jar) ___ + ___ + ___ = ___ °C
(If more than 6 coolers are received use another sheet of paper and attach)

Coolant used: Icepack (Top / Bottom / Side) Bagged Ice (Top / Bottom / Side) Free Ice None

Correct Sample Requirements for Testing *(to be completed by Logistics staff during login process)*
Bottles: Yes / No Amount: Yes / No Labels: Yes / No
*If NO to any of the above explain why:

Visible Sediment: Yes / No / NA(soil)

Additional integrity issues (Indicate issues below and on the CoC next to the sample ID): 6.2°C

Account Project Manager: have they been notified of the above issues: Yes No
Whom spoken to: Date and Time: CPM Initial:

In the fridge

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FAX (780)462-2490
http://www.agatlabs.com

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)
PO BOX 3178
INUVIK, NT X0E0T0
(403) 262-5505

ATTENTION TO: Nicole Wills

PROJECT NO: Unipkat I-22 / A04025A02

AGAT WORK ORDER: 13E750792

SOIL ANALYSIS REVIEWED BY: Jarrod Roberts, Operations Manager

TRACE ORGANICS REVIEWED BY: Jarrod Roberts, Operations Manager

DATE REPORTED: Aug 29, 2013

PAGES (INCLUDING COVER): 12

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (780) 395-2525

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Certificate of Analysis

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

CCME / Alberta Tier 1 Metals + Hg + HWS B + Cr6 (soil)

DATE RECEIVED: 2013-08-21

DATE REPORTED: 2013-08-29

Parameter	Unit	G / S	RDL	TH-13-01 (0-0.15m) Soil 8/17/2013 4679798	TH-13-01 (0. 3-0.6m) Soil 8/17/2013 4679800	TH-13-02 (0-0.15m) Soil 8/17/2013 4679801	TH-13-02 (0. 3-0.6m) Soil 8/17/2013 4679803	TH-13-03 (0-0.15m) Soil 8/17/2013 4679804	TH-13-03 (0. 3-0.6m) Soil 8/17/2013 4679806	TH-13-04 (0-0.15m) Soil 8/17/2013 4679807	TH-13-04 (0. 3-0.6m) Soil 8/17/2013 4679809
SAMPLE DESCRIPTION:											
SAMPLE TYPE:											
DATE SAMPLED:											
Antimony Dry Weight	mg/kg	20	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	mg/kg	17	0.5	6.2	6.2	6.3	5.6	7.0	5.4	6.5	6.3
Barium	mg/kg	750	0.5	472	641	1530	726	1120	555	479	636
Beryllium	mg/kg	5	0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	0.5	<0.5
Boron (Hot water extraction)	mg/kg	2	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	mg/kg	1.4	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5
Chromium	mg/kg	64	0.5	15.0	14.4	15.3	13.1	17.0	13.4	15.8	15.1
Chromium, Hexavalent	mg/kg	0.4	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Cobalt	mg/kg	20	0.5	7.4	7.2	7.5	6.8	8.1	6.7	7.5	7.2
Copper	mg/kg	63	0.5	15.6	15.3	15.6	13.0	16.8	12.5	16.0	14.7
Lead	mg/kg	70	0.5	7.8	7.7	8.2	6.8	9.0	6.3	7.5	7.7
Mercury	mg/kg	6.6	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum	mg/kg	4	0.5	1.3	1.4	1.5	1.2	1.5	1.2	1.3	1.4
Nickel	mg/kg	50	0.5	22.5	22.3	23.0	20.2	24.6	19.2	23.6	21.8
Selenium	mg/kg	1	0.5	0.6	0.7	0.7	0.5	0.7	0.6	0.7	0.6
Silver	mg/kg	20	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	mg/kg	1	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tin	mg/kg	5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	mg/kg	23	0.5	0.9	1.0	0.9	0.9	1.0	0.9	1.0	1.0
Vanadium	mg/kg	130	0.5	29.0	28.8	28.5	27.2	33.3	27.4	31.6	30.9
Zinc	mg/kg	200	1	79	75	77	69	82	68	79	74

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Certificate of Analysis

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

CCME / Alberta Tier 1 Metals + Hg + HWS B + Cr6 (soil)

DATE RECEIVED: 2013-08-21

DATE REPORTED: 2013-08-29

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: TH-13-05 (0-0.15m)	TH-13-05 (0. 3-0.6m)	TH-13-06 (0-0.15m)	TH-13-06 (0. 3-0.6m)
				SAMPLE TYPE: Soil	Soil	Soil	Soil
				DATE SAMPLED: 8/17/2013	8/17/2013	8/17/2013	8/17/2013
				4679810	4679812	4679813	4679815
Antimony Dry Weight	mg/kg	20	0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	mg/kg	17	0.5	6.6	6.0	6.2	6.0
Barium	mg/kg	750	0.5	447	530	449	797
Beryllium	mg/kg	5	0.5	0.5	<0.5	<0.5	<0.5
Boron (Hot water extraction)	mg/kg	2	0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	mg/kg	1.4	0.5	0.5	<0.5	0.5	<0.5
Chromium	mg/kg	64	0.5	15.7	14.4	14.8	14.0
Chromium, Hexavalent	mg/kg	0.4	0.3	<0.3	<0.3	<0.3	<0.3
Cobalt	mg/kg	20	0.5	7.9	7.1	7.4	7.2
Copper	mg/kg	63	0.5	16.4	15.0	15.4	14.2
Lead	mg/kg	70	0.5	8.0	7.4	7.3	7.3
Mercury	mg/kg	6.6	0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum	mg/kg	4	0.5	1.4	1.3	1.3	1.3
Nickel	mg/kg	50	0.5	23.9	21.4	22.6	21.1
Selenium	mg/kg	1	0.5	0.7	0.6	0.6	0.6
Silver	mg/kg	20	0.5	<0.5	<0.5	<0.5	<0.5
Thallium	mg/kg	1	0.5	<0.5	<0.5	<0.5	<0.5
Tin	mg/kg	5	0.5	<0.5	<0.5	<0.5	<0.5
Uranium	mg/kg	23	0.5	1.0	1.0	0.9	0.9
Vanadium	mg/kg	130	0.5	31.6	29.8	29.6	29.0
Zinc	mg/kg	200	1	83	75	78	71

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ABTier1 Soil (Ag, F)
4679798-4679815 Results are based on the dry weight of the sample.

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Certificate of Analysis

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

Soil Analysis - Salinity (AB Tier 1 - pH Calcium Chloride)

DATE RECEIVED: 2013-08-21

DATE REPORTED: 2013-08-29

Parameter	Unit	G / S	RDL	TH-13-01 (0-0.15m) Soil 8/17/2013 4679798	TH-13-01 (0. 3-0.6m) Soil 8/17/2013 4679800	TH-13-02 (0-0.15m) Soil 8/17/2013 4679801	TH-13-02 (0. 3-0.6m) Soil 8/17/2013 4679803	TH-13-03 (0-0.15m) Soil 8/17/2013 4679804	TH-13-03 (0. 3-0.6m) Soil 8/17/2013 4679806	TH-13-04 (0-0.15m) Soil 8/17/2013 4679807	TH-13-04 (0. 3-0.6m) Soil 8/17/2013 4679809
SAMPLE DESCRIPTION:											
SAMPLE TYPE:											
DATE SAMPLED:											
pH (CaCl2 Extraction)	pH Units		N/A	7.41	7.39	7.43	7.34	7.35	7.39	6.81	7.24
Electrical Conductivity (Sat. Paste)	dS/m		0.01	3.66	3.17	8.89	2.19	6.28	4.16	2.25	1.82
Sodium Adsorption Ratio				1.97	1.26	5.47	1.01	3.16	2.10	0.95	1.24
Saturation Percentage	%		N/A	41	47	44	44	50	43	47	44
Chloride, Soluble	mg/L		5	233	285	1990	174	1330	657	247	188
Calcium, Soluble	mg/L		1	484	532	863	358	816	574	358	250
Potassium, Soluble	mg/L		2	25	19	47	23	32	26	21	40
Magnesium, Soluble	mg/L		1	181	107	318	72	221	142	72	55
Sodium, Soluble	mg/L		2	200	122	740	80	395	217	75	83
Sulfur (as Sulfate), Soluble	mg/L		2	2000	1600	2190	1040	1830	1610	943	697
Calcium, Soluble (meq/L)	meq/L		0.05	24.2	26.5	43.1	17.9	40.7	28.6	17.9	12.5
Calcium, Soluble (mg/kg)	mg/kg		1	198	250	380	158	408	247	168	110
Chloride, Soluble (meq/L)	meq/L		0.06	6.57	8.04	56.1	4.91	37.5	18.5	6.97	5.30
Chloride, Soluble (mg/kg)	mg/kg		2	96	134	876	77	665	283	116	83
Magnesium, Soluble (meq/L)	meq/L		0.08	14.9	8.80	26.2	5.92	18.2	11.7	5.92	4.53
Magnesium, Soluble (mg/kg)	mg/kg		1	74	50	140	32	111	61	34	24
Potassium, Soluble (meq/L)	meq/L		0.05	0.64	0.49	1.20	0.59	0.82	0.66	0.54	1.02
Potassium, Soluble (mg/kg)	mg/kg		2	10	9	21	10	16	11	10	18
Sodium, Soluble (meq/L)	meq/L		0.09	8.70	5.31	32.2	3.48	17.2	9.44	3.26	3.61
Sodium, Soluble (mg/kg)	mg/kg		2	82	57	326	35	198	93	35	37
Sulfur (as Sulfate), Soluble (meq/L)	meq/L		0.04	41.6	33.3	45.6	21.7	38.1	33.5	19.6	14.5
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg		2	820	752	964	458	915	692	443	307
Theoretical Gypsum Requirement	tonnes/ha			0	0	0	0	0	0	0	0

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Certificate of Analysis

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

Soil Analysis - Salinity (AB Tier 1 - pH Calcium Chloride)

DATE RECEIVED: 2013-08-21

DATE REPORTED: 2013-08-29

				TH-13-05	TH-13-05 (0.	TH-13-06	TH-13-06 (0.
SAMPLE DESCRIPTION:				(0-0.15m)	3-0.6m)	(0-0.15m)	3-0.6m)
SAMPLE TYPE:				Soil	Soil	Soil	Soil
DATE SAMPLED:				8/17/2013	8/17/2013	8/17/2013	8/17/2013
Parameter	Unit	G / S	RDL	4679810	4679812	4679813	4679815
pH (CaCl2 Extraction)	pH Units		N/A	7.39	7.00	7.16	7.24
Electrical Conductivity (Sat. Paste)	dS/m		0.01	1.99	1.01	2.46	3.19
Sodium Adsorption Ratio				0.85	0.45	0.90	0.74
Saturation Percentage	%		N/A	62	35	54	46
Chloride, Soluble	mg/L		5	156	61	115	129
Calcium, Soluble	mg/L		1	308	160	442	628
Potassium, Soluble	mg/L		2	15	12	21	26
Magnesium, Soluble	mg/L		1	75	32	92	113
Sodium, Soluble	mg/L		2	64	24	80	77
Sulfur (as Sulfate), Soluble	mg/L		2	948	319	1440	2070
Calcium, Soluble (meq/L)	meq/L		0.05	15.4	7.98	22.1	31.3
Calcium, Soluble (mg/kg)	mg/kg		1	191	56	239	289
Chloride, Soluble (meq/L)	meq/L		0.06	4.40	1.72	3.24	3.64
Chloride, Soluble (mg/kg)	mg/kg		2	97	21	62	59
Magnesium, Soluble (meq/L)	meq/L		0.08	6.17	2.63	7.57	9.30
Magnesium, Soluble (mg/kg)	mg/kg		1	47	11	50	52
Potassium, Soluble (meq/L)	meq/L		0.05	0.38	0.31	0.54	0.66
Potassium, Soluble (mg/kg)	mg/kg		2	9	4	11	12
Sodium, Soluble (meq/L)	meq/L		0.09	2.78	1.04	3.48	3.35
Sodium, Soluble (mg/kg)	mg/kg		2	40	8	43	35
Sulfur (as Sulfate), Soluble (meq/L)	meq/L		0.04	19.7	6.64	30.0	43.1
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg		2	588	112	778	952
Theoretical Gypsum Requirement	tonnes/ha			0	0	0	0

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ABTier1 (Ag,F)

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Certificate of Analysis

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2013-08-21

DATE REPORTED: 2013-08-29

		SAMPLE DESCRIPTION:		TH-13-01 (0-0.15m)	TH-13-01 (0. 3-0.6m)	TH-13-02 (0-0.15m)	TH-13-02 (0. 3-0.6m)	TH-13-03 (0-0.15m)	TH-13-03 (0. 3-0.6m)	TH-13-04 (0-0.15m)	TH-13-04 (0. 3-0.6m)
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013	8/17/2013
Parameter	Unit	G / S	RDL	4679798	4679800	4679801	4679803	4679804	4679806	4679807	4679809
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	58	<10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	35	20	111	10	23	<10	35	25
C34 - C50 (F4)	mg/kg		10	<10	11	71	<10	14	<10	21	16
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	25	26	26	23	25	22	29	29
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		111	112	112	112	112	112	113	112
Ethylbenzene-d10 (BTEX)	%	50-150		107	112	119	82	78	80	78	86
o-Terphenyl (F2-F4)	%	50-150		93	93	94	91	87	86	112	91

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Certificate of Analysis

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE RECEIVED: 2013-08-21

DATE REPORTED: 2013-08-29

				TH-13-05	TH-13-05 (0.	TH-13-06	TH-13-06 (0.
		SAMPLE DESCRIPTION:		(0-0.15m)	3-0.6m)	(0-0.15m)	3-0.6m)
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		8/17/2013	8/17/2013	8/17/2013	8/17/2013
Parameter	Unit	G / S	RDL	4679810	4679812	4679813	4679815
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	27	12	17	21
C34 - C50 (F4)	mg/kg		10	21	<10	<10	13
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A
Moisture Content	%		1	29	29	30	21
Surrogate	Unit	Acceptable Limits					
Toluene-d8 (BTEX)	%	50-150		112	114	112	113
Ethylbenzene-d10 (BTEX)	%	50-150		80	79	83	78
o-Terphenyl (F2-F4)	%	50-150		95	86	96	90

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ABTier1 (Ag,F)

4679798-4679815 Results are based on the dry weight of the sample.
The C6-C10 (F1) fraction is calculated using toluene response factor.
The C10 - C16 (F2), C16 - C34 (F3), and C34 - C50 (F4) fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons (F4g) are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH contributions (if requested).
Quality control data is available upon request.
Assistance in the interpretation of data is available upon request.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
The chromatogram returned to baseline by the retention time of nC50.
Extraction and holding times were met for this sample.

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Certificate of Analysis

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

ATTENTION TO: Nicole Wills

Polyaromatic Hydrocarbon Analysis - Soil

DATE RECEIVED: 2013-08-21

DATE REPORTED: 2013-08-29

				TH-13-01	TH-13-02
		SAMPLE DESCRIPTION:		(0-0.15m)	(0-0.15m)
		SAMPLE TYPE:		Soil	Soil
		DATE SAMPLED:		8/17/2013	8/17/2013
Parameter	Unit	G / S	RDL	4679798	4679801
Naphthalene	mg/kg	0.018	0.005	0.022	0.028
2-Methylnaphthalene	mg/kg		0.005	0.035	0.046
Acenaphthylene	mg/kg	6.0	0.005	<0.005	<0.005
Acenaphthene	mg/kg	0.38	0.005	<0.005	<0.005
Fluorene	mg/kg	0.34	0.02	<0.02	<0.02
Phenanthrene	mg/kg	0.061	0.02	0.05	0.05
Anthracene	mg/kg	0.0056	0.004	<0.004	<0.004
Fluoranthene	mg/kg	0.039	0.01	0.01	0.01
Pyrene	mg/kg	0.040	0.01	0.02	0.03
Benz[a]anthracene	mg/kg	0.083	0.03	<0.03	<0.03
Chrysene	mg/kg	6.2	0.05	<0.05	<0.05
Benzo[b+j]fluoranthene	mg/kg	6.2	0.05	<0.05	<0.05
Benzo[k]fluoranthene	mg/kg	6.2	0.05	<0.05	<0.05
Benzo[a]pyrene	mg/kg		0.03	<0.03	<0.03
Indeno[1,2,3-cd]pyrene	mg/kg		0.05	<0.05	<0.05
Dibenz[ah]anthracene	mg/kg	8.4	0.005	<0.005	<0.005
Benzo[ghi]perylene	mg/kg		0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits			
2-Fluorobiphenyl (PAH)	%	50-150		75	81
p-Terphenyl-d14 (PAH)	%	50-150		73	71

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ABTier1 Soil (Ag, C)

4679798-4679801 Results are based on the dry weight of the sample.
Based on GC/MS target ion analysis.
Isomers Benzo(b)fluoranthene and Benzo(j)fluoranthene have the same GC retention time and are reported as the sum based on the Benzo(b)fluoranthene response.

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Quality Assurance

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

ATTENTION TO: Nicole Wills

Soil Analysis

RPT Date: Aug 29, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Soil Analysis - Salinity (AB Tier 1 - pH Calcium Chloride)															
pH (CaCl2 Extraction)	686	4679810	7.39	7.37	0.3%	N/A	100%	90%	110%						
Electrical Conductivity (Sat. Paste)	686	4679810	1.99	2.06	3.5%	< 0.01	108%	90%	110%						
Saturation Percentage	665	4679810	62	61	1.6%	N/A	100%	80%	120%						
Chloride, Soluble	689	4679704	< 5	< 5	0.0%	< 5	97%	80%	120%	102%	80%	120%	103%	80%	120%
Calcium, Soluble	421	4679704	27	27	1.7%	< 1	112%	80%	120%				109%	80%	120%
Potassium, Soluble	421	4679704	<2	<2	0.0%	< 2	104%	80%	120%				100%	80%	120%
Magnesium, Soluble	421	4679704	14	15	2.0%	< 1	109%	80%	120%				103%	80%	120%
Sodium, Soluble	421	4679704	25	24	2.3%	< 2	102%	80%	120%				102%	80%	120%
Sulfur (as Sulfate), Soluble	421	4679704	36	36	0.4%	< 2	110%	80%	120%				104%	80%	120%
Comments: N/A: Not applicable															
CCME / Alberta Tier 1 Metals + Hg + HWS B + Cr6 (soil)															
Antimony Dry Weight	644	4679798	< 0.5	< 0.5	0.0%	< 0.5	98%	80%	120%				94%	80%	120%
Arsenic	644	4679798	6.2	6.3	1.6%	< 0.5	99%	80%	120%				96%	80%	120%
Barium	644	4679798	472	462	2.1%	< 0.5	109%	80%	120%				115%	80%	120%
Beryllium	644	4679798	< 0.5	< 0.5	0.0%	< 0.5	98%	80%	120%				102%	80%	120%
Boron (Hot water extraction)	420	4681227	<0.5	<0.5	0.0%	< 0.5	110%	80%	120%				108%	80%	120%
Cadmium	644	4679798	< 0.5	< 0.5	0.0%	< 0.5	98%	80%	120%				96%	80%	120%
Chromium	644	4679798	15.0	14.8	1.3%	< 0.5	91%	80%	120%				97%	80%	120%
Chromium, Hexavalent	180	4682290	< 0.3	< 0.3	0.0%	< 0.3	97%	80%	120%	95%	80%	120%	96%	80%	120%
Cobalt	644	4679798	7.4	7.5	1.3%	< 0.5	90%	80%	120%				95%	80%	120%
Copper	644	4679798	15.6	16.0	2.5%	< 0.5	94%	80%	120%				92%	80%	120%
Lead	644	4679798	7.8	7.8	0.0%	< 0.5	94%	80%	120%				92%	80%	120%
Mercury	644	4679798	< 0.5	< 0.5	0.0%	< 0.5	106%	80%	120%				96%	80%	120%
Molybdenum	644	4679798	1.3	1.3	0.0%	< 0.5	96%	80%	120%				97%	80%	120%
Nickel	644	4679798	22.5	22.6	0.4%	< 0.5	92%	80%	120%				95%	80%	120%
Selenium	644	4679798	0.6	0.6	0.0%	< 0.5	105%	80%	120%				93%	80%	120%
Silver	644	4679798	< 0.5	< 0.5	0.0%	< 0.5	93%	80%	120%				97%	80%	120%
Thallium	644	4679798	< 0.5	< 0.5	0.0%	< 0.5	92%	80%	120%				93%	80%	120%
Tin	644	4679798	< 0.5	< 0.5	0.0%	< 0.5	92%	80%	120%				97%	80%	120%
Uranium	644	4679798	0.9	0.9	0.0%	< 0.5	95%	80%	120%				108%	80%	120%
Vanadium	644	4679798	29.0	28.4	2.1%	< 0.5	92%	80%	120%				115%	80%	120%
Zinc	644	4679798	79	78	1.3%	< 1	107%	80%	120%				97%	80%	120%

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Quality Assurance

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

ATTENTION TO: Nicole Wills

Trace Organics Analysis

RPT Date: Aug 29, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	466	4679798	<0.005	<0.005	0.0%	< 0.005	95%	80%	120%	104%	80%	120%	113%	60%	140%
Toluene	466	4679798	<0.05	<0.05	0.0%	< 0.05	93%	80%	120%	99%	80%	120%	111%	60%	140%
Ethylbenzene	466	4679798	<0.01	<0.01	0.0%	< 0.01	85%	80%	120%	88%	80%	120%	99%	60%	140%
Xylenes	466	4679798	<0.05	<0.05	0.0%	< 0.05	89%	80%	120%	87%	80%	120%	98%	60%	140%
C6 - C10 (F1)	466	4679798	<10	<10	0.0%	< 10	93%	80%	120%	113%	80%	120%	123%	60%	140%
C10 - C16 (F2)	340	4679798	<10	<10	0.0%	< 10	89%	80%	120%	83%	80%	120%	90%	60%	140%
C16 - C34 (F3)	340	4679798	35	<10	NA	< 10	92%	80%	120%	92%	80%	120%	99%	60%	140%
C34 - C50 (F4)	340	4679798	<10	<10	0.0%	< 10	81%	80%	120%	118%	80%	120%	132%	60%	140%
Moisture Content	340	4679798	25	27	7.7%	< 1									
Polyaromatic Hydrocarbon Analysis - Soil															
Naphthalene	237	4678982	< 0.005	< 0.005	0.0%	< 0.005	95%	70%	130%	90%	70%	130%	86%	70%	130%
2-Methylnaphthalene	237	4678982	< 0.005	< 0.005	0.0%	< 0.005				78%	70%	130%	77%	70%	130%
Acenaphthylene	237	4678982	< 0.005	< 0.005	0.0%	< 0.005	94%	70%	130%	86%	70%	130%	91%	70%	130%
Acenaphthene	237	4678982	< 0.005	< 0.005	0.0%	< 0.005	84%	70%	130%	78%	70%	130%	79%	70%	130%
Fluorene	237	4678982	< 0.02	< 0.02	0.0%	< 0.02	83%	70%	130%	83%	70%	130%	76%	70%	130%
Phenanthrene	237	4678982	< 0.02	< 0.02	0.0%	< 0.02	94%	70%	130%	92%	70%	130%	85%	70%	130%
Anthracene	237	4678982	< 0.004	< 0.004	0.0%	< 0.004	96%	70%	130%	97%	70%	130%	91%	70%	130%
Fluoranthene	237	4678982	< 0.01	< 0.01	0.0%	< 0.01	114%	70%	130%	103%	70%	130%	100%	70%	130%
Pyrene	237	4678982	< 0.01	< 0.01	0.0%	< 0.01	117%	70%	130%	106%	70%	130%	90%	70%	130%
Benz[a]anthracene	237	4678982	< 0.03	< 0.03	0.0%	< 0.03	92%	70%	130%	80%	70%	130%	74%	70%	130%
Chrysene	237	4678982	< 0.05	< 0.05	0.0%	< 0.05	97%	70%	130%	79%	70%	130%	74%	70%	130%
Benzo[b+j]fluoranthene	237	4678982	< 0.05	< 0.05	0.0%	< 0.05	92%	70%	130%	84%	70%	130%	75%	70%	130%
Benzo[k]fluoranthene	237	4678982	< 0.05	< 0.05	0.0%	< 0.05	90%	70%	130%	71%	70%	130%	71%	70%	130%
Benzo[a]pyrene	237	4678982	< 0.03	< 0.03	0.0%	< 0.03	111%	70%	130%	78%	70%	130%	75%	70%	130%
Indeno[1,2,3-cd]pyrene	237	4678982	< 0.05	< 0.05	0.0%	< 0.05	100%	70%	130%	75%	70%	130%	76%	70%	130%
Dibenz[ah]anthracene	237	4678982	< 0.005	< 0.005	0.0%	< 0.005	94%	70%	130%	73%	70%	130%	74%	70%	130%
Benzo[ghi]perylene	237	4678982	< 0.05	< 0.05	0.0%	< 0.05	87%	70%	130%	72%	70%	130%	74%	70%	130%

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Method Summary

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

ATTENTION TO: Nicole Wills

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony Dry Weight	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Arsenic	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Barium	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Beryllium	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Boron (Hot water extraction)	INOR-171-6201 & INOR-171-6005	Carter 12.2.4/ EPA 6010; SHEPPARD	ICP/OES
Cadmium	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Chromium	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Chromium, Hexavalent	INOR-171-6215	ASA 20-4.3; REISENAUER 1982	SPECTROPHOTOMETER
Cobalt	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Copper	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Lead	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Mercury	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Molybdenum	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Nickel	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Selenium	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Silver	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Thallium	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Tin	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Uranium	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Vanadium	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Zinc	INOR-171-6202 & INOR-171-6006	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
pH (CaCl2 Extraction)	INOR-171-6207	SHEPPARD 2007; HENDERSHOT 2008	PH METER
Electrical Conductivity (Sat. Paste)	INOR-171-6208	SHEPPARD 2007; MILLER 2007	CONDUCTIVITY METER
Sodium Adsorption Ratio	INOR-171-6201 & INOR-171-6002	McKeague 3.26	CALCULATION
Saturation Percentage	INOR-171-6002	MILLER 2007; SHEPPARD 2007	GRAVIMETRIC
Chloride, Soluble	INOR-171-6200 & INOR-171-6002	SHEPPARD 2007, EATON 2005	CONTINUOUS FLOW ANALYZER
Calcium, Soluble	INOR-171-6201 & INOR-171-6002	SHEPPARD 2007; EATON 2005; MILLER 2007, SM 3120B	ICP/OES
Potassium, Soluble	INOR-171-6201 & INOR-171-6002	SHEPPARD 2007; EATON 2005; MILLER 2007, SM 3120B	ICP/OES
Magnesium, Soluble	INOR-171-6201 & INOR-171-6002	SHEPPARD 2007; EATON 2005; MILLER 2007, SM 3120B	ICP/OES

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Method Summary

CLIENT NAME: IEG ENVIRONMENTAL (NORTH)

AGAT WORK ORDER: 13E750792

PROJECT NO: Unipkat I-22 / A04025A02

ATTENTION TO: Nicole Wills

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Sodium, Soluble	INOR-171-6201 & INOR-171-6002	SHEPPARD 2007; EATON 2005; MILLER 2007, SM 3120B	ICP/OES
Sulfur (as Sulfate), Soluble	INOR-171-6201 & INOR-171-6002	SHEPPARD 2007; EATON 2005; MILLER 2007, SM 3120B	ICP/OES
Trace Organics Analysis			
Benzene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260	GC/MS
Toluene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260	GC/MS
Ethylbenzene	ORG-170-5110/5140/5430/5440	EPA SW-846 8260	GC/MS
Xylenes	ORG-170-5110/5140/5430/5440	EPA SW-846 8260	GC/MS
C6 - C10 (F1)	ORG-170-5110/5140/5430/5440	CCME Tier 1 Method	GC/FID
C6 - C10 (F1 minus BTEX)	ORG-170-5110/5140/5430/5440	CCME Tier 1 Method	GC/FID
C10 - C16 (F2)	ORG-170-5120/5300	CCME Tier 1 Method	GC/FID
C16 - C34 (F3)	ORG-170-5120/5300	CCME Tier 1 Method	GC/FID
C34 - C50 (F4)	ORG-170-5120/5300	CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	ORG-170-5120/5300	CCME Tier 1 Method	GC/FID
Moisture Content	LAB-175-4002	CCME Tier 1 Method	GRAVIMETRIC
Toluene-d8 (BTEX)	ORG-170-5110/5140/5430/5440	EPA SW-846 8260	GC/MS
Ethylbenzene-d10 (BTEX)	ORG-170-5110/5140/5430/5440	EPA SW-846 8260	GC/MS
o-Terphenyl (F2-F4)	ORG-170-5120/5300	CCME Tier 1 Method	GC/FID
Naphthalene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
2-Methylnaphthalene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Acenaphthylene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Acenaphthene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Fluorene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Phenanthrene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Anthracene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Fluoranthene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Pyrene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Benz[a]anthracene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Chrysene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Benzo[b+j]fluoranthene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Benzo[k]fluoranthene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Benzo[a]pyrene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Indeno[1,2,3-cd]pyrene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Dibenz[ah]anthracene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
Benzo[ghi]perylene	ORG-170-5420	EPA SW846 8270 D/3540 C/3570	GC/MS
2-Fluorobiphenyl (PAH)	TO 0500	EPA SW846 8270 D/3540 C/3570	GC/MS
p-Terphenyl-d14 (PAH)	TO 0500	EPA SW846 8270 D/3540 C/3570	GC/MS

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Chain of Custody Record

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Report To: IEC Consultants LTD.
Company:
Contact: Nicole Wills
Address: 249 Hopewell Place NE
Calgary AB Postal Code: T1Y 7S7
Phone: 403 825 3070 Fax:
LSD: Unpaid I-22
Client Project #: A04025A02

Report Information
1. Name: Nicole Wills
Email: NWills@klohn.com
2. Name: Jesse Collins
Email: jcollins@klohn.com

Report Format
- ☐ Single Sample per page
- ☒ Multiple Samples per page
- ☒ Excel Format Included

Rush Turnaround Requests
Upon filling out this section, client accepts that surcharges will be attached to this analysis. If NOT completed, regular TAT will be default.
- ☐ Less than 24 hours (200%)
- ☒ 24 to 48 hours (100%)
- ☐ 48 to 72 hours (50%)

Date Required:
Please contact laboratory to notify.

Laboratory Use Only
Date and Time: '13 AUG 21 -9 53
Arrival Temperature: 6.2°C
AGAT Job Number: 13E150792

Invoice To: Same (Y / N) - Circle
Company:
Contact:
Address:
Postal code:
Phone: Fax:
PO/AFE #:

Regulatory Requirements (Check one):
- ☒ CCME
  - ☐ Agricultural
  - ☐ Residential/Park
  - ☒ Commercial
  - ☐ Industrial
  - ☐ Drinking Water
  - ☒ FWAL
- ☒ AB Tier 1
  - ☒ Natural Area
  - ☐ Agricultural
  - ☐ Residential/Park
  - ☐ Commercial
  - ☐ Industrial
- ☐ Other
  - ☐ D50 (Drilling)
  - ☐ SPIGEC

Laboratory Use (Lab ID #)	Sample Identification	Sample Matrix	Date/Time Sampled	Comments - Site/Sample Info, Sample Containment	Number of containers	Detailed Soil Salinity/Sat.Paste	CCME BTEX/F1-F4	Metals ☒ HWS-B, CrVI & Hg	Routine Water Potability	Metals ☐ Diss ☐ Total ☐ Hg	ABClass 2 Landfill	Microtox	D50 Detailed Soil Salinity (As received)	PAH					Hold for WTL Comment	Contaminated/Hazardous (Y/N)
467798	TH-13-01 (0-0.15m)	Soil	13/08/17		3	X	X	X						X						N
799	TH-13-01 (0.15-0.30m)				3														X	
800	TH-13-01 (0.3-0.6m)				3	X	X	X											X	
801	TH-13-02 (0-0.15m)				3	X	X	X						X						
802	TH-13-02 (0.15-0.3m)				3														X	
803	TH-13-02 (0.3-0.6m)				3	X	X	X											X	
804	TH-13-03 (0-0.15m)				3	X	X	X												
805	TH-13-03 (0.15-0.3m)				3														X	
806	TH-13-03 (0.3-0.6m)				3	X	X	X											X	
807	TH-13-04 (0-0.15m)				3	X	X	X												
808	TH-13-04 (0.15-0.3m)				2														X	
809	TH-13-04 (0.3-0.6m)	V	V		2	X	X	X												V

Samples Relinquished by (print name & sign): Jesse Collins	Date/Time: 13/08/18 1930	Samples Received by (Print name & sign): Sean Gelever	Date/Time: 21/08/13	Pink Copy – Client
Samples Relinquished by (print name & sign):	Date/Time:	Samples Received by (Print name & sign):	Date/Time:	Yellow Copy – AGAT
Samples Relinquished by (print name & sign):	Date/Time:	Samples Received by (Print name & sign):	Date/Time:	White Copy – AGAT

Page 1 of 2

NO: 052647

AGAT Laboratories

6310 Roper Road NW
Edmonton, Alberta
T6B 3P9
webearth.agatlabs.com
Ph: 780.395.2525 • Fax: 780.462.2490

Chain of Custody Record

Report To:
Company: Same as Page 1
Contact:
Address:
Postal Code:
Phone: Fax:
LSD:
Client Project #:

Invoice To: Same (Y / N) = Circle
Company:
Contact:
Address:
Postal code:
Phone: Fax:
PO/AFE #:

Report Information
1. Name: Pg 1
Email:
2. Name:
Email:

Regulatory Requirements (Check one):
- ☒ CCME
- ☐ AB Tier 1
- ☐ Agricultural
- ☒ Residential/Park
- ☐ Commercial
- ☐ Industrial
- ☐ Drinking Water
- ☐ PWAL
- ☐ Other
- ☐ Natural Area
- ☐ Agricultural
- ☒ Residential/Park
- ☐ Commercial
- ☐ Industrial
- ☐ D50 (Drilling) ☐ SPIGEC

Report Format
- ☒ Single Sample per page
- ☒ Multiple Samples per page
- ☒ Excel Format Included

Rush Turnaround Requests
Upon filling out this section, client accepts that surcharges will be attached to this analysis. If NOT completed, regular TAT will be default.
- ☐ Less than 24 hours (200%)
- ☐ 24 to 48 hours (100%)
- ☒ 48 to 72 hours (50%)

Date Required:
Please contact laboratory to notify

Laboratory Use Only
Date and Time: 13 AUG 21 9 54
Arrival Temperature:
AGAT Job Number: BE150792

Laboratory Use (Lab ID #)	Sample Identification	Sample Matrix	Date/Time Sampled	Comments - Site/Sample Info, Sample Containment	Number of Containers	Detailed Soil Salinity (Sat. Paste)	CCME BTEX/F1-F4	Metals ☒ HWSB: Cr(6) & Hg	Routine Water Potability	Metals ☐ Diss ☐ Total ☐ Hg	AB Class 2 Landfill	Microtox	D50 Detailed Soil Salinity (As received)	PAH	Hold for W/U	Contaminated/Hazardous (Y/N)
810	TH-13-05 (0-0.15m)	Soil	13/03/17		3	X	X	X								N
811	TH-13-05 (0.15-0.3m)				3	X									X	
812	TH-13-05 (0.3-0.6m)				3	X	X	X								
813	TH-13-06 (0-0.15m)				3	X	X	X								
814	TH-13-06 (0.15-0.3m)				3	X	X	X							X	
815	TH-13-06 (0.3-0.6m)	↓	↓		3	X	X	X								

Samples Relinquished by (print name & sign): Jesse Gillis	Date/Time: 13/08/21 1930	Samples Received by (Print name & sign):	Date/Time: 21/Aug/2021	Pink Copy – Client	Page 1 of 2
Samples Relinquished by (print name & sign):	Date/Time:	Samples Received by (Print name & sign):	Date/Time:	Yellow Copy – AGAT	
Samples Relinquished by (print name & sign):	Date/Time:	Samples Received by (Print name & sign):	Date/Time:	White Copy – AGAT	NO: 052649

CCT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - Edmonton Received by: Jess C

RECEIVING BASICS

Date & Time: 21/Aug/2013 4:53 am/pm Courier: Calm Wash Prepaid / Collect Waybill# 818 YEV 0239262
Branch received from: Nisk Relinquished by: Jesse Collins Company/Consultant: LEG
Client left without count verified: Yes / No Custody Seal Intact: Yes / No / NA

COC INFORMATION

COC received: Yes / No Emailed to CPM TAT: 24hr 24-48hr 48-72hr Reg Other
COC Complete? Yes / No *If NO why: Workorder Number BE7S017
COC Numbers: 052649 052647
Sample Quantities: Coolers: 2 Bottles/Jars: 36 Bags: 18 Other: X COC Container Count: 54
*If COC Container count differs from what was received why:

TIME SENSITIVE ISSUES

Earliest Date Sampled: 17/Aug/2013 ALREADY EXCEEDED? Yes No
Microbiology/Time Sensitive Test*: n/a Expiry: n/a
Hydrocarbon Test: BTEX Expiry: 24/Aug/2013
Are samples received more than **5 days** after sampling: Yes No
**Residual Chlorine, Dissolved Oxygen, Turbidity, BOD, Nitrate/Nitrite, Microtox*

SAMPLE INTEGRITY

Hazardous Samples
Why hazardous: N/A Precaution taken: N/A

Specialty Issues
Legal Samples: Yes / No International Samples: Yes / No Proper tape/labels applied: Yes / No

Damaged: Yes / No If YES why? No Bubble Wrap Frozen Courier Other:

Temperature *(to be recorded from bottles/jars only)* N/A – Only Soil Bags received
(1) (Bottle/Jar) 6.2+6.5+6.1=5.9 °C (2) (Bottle/Jar) 6.6+6.6+6.4=6.6 °C (3) (Bottle/Jar) ___+___+___=___°C
(4) (Bottle/Jar) ___+___+___=___°C (5) (Bottle/Jar) ___+___+___=___°C (6) (Bottle/Jar) ___+___+___=___°C
(If more than 6 coolers are received use another sheet of paper and attach)

Coolant used: Icepack (Top / Bottom / Side) Bagged Ice (Top / Bottom / Side) Free Ice None

Correct Sample Requirements for Testing *(to be completed by Logistics staff during login process)*
Bottles: Yes / No Amount: Yes / No Labels: Yes / No
*If NO to any of the above explain why:

Visible Sediment: Yes / No / NA(soil)

Additional integrity issues (Indicate issues below and on the CoC next to the sample ID): 6.2 °C

Account Project Manager: have they been notified of the above issues: Yes No
Whom spoken to: Date and Time: CPM Initial:

In the fridge

APPENDIX III

Monitoring Well Logs

Klohn Crippen Berger

BORE HOLE LOG - ENVIRONMENTAL **MW11-01**

CLIENT: Shell Canada Energy	PROJECT: Unipkat I-22 Remediation Program	
LOCATION: Unipkat I-22	PROJECT NO.: A04025A02	DATE: 14/04/2011
CO-ORDINATES: Not Measured	GROUND ELEVATION: Not Measured	CASING ELEVATION: N/A
HOLE DIA.: 0.15	CASING DIA.: N/A	TOTAL DEPTH OF HOLE: 4 m
DRILLING METHOD: Solid Stem Auger	DRILLING CONTRACTOR:	
LOGGED BY: RL	CHECKED BY: JW	Page 1 of 1

DEPTH (m)	SYMBOL	MATERIAL DESCRIPTION	WELL CONSTRUCTION	COMMENTS	SAMPLE TYPE	◆ OVA (ppm) 100 300 500 700 900 / × EC MEASUREMENTS (dS/m) 1 3 5 7 9
0		Silty sand (SM) Fill Loose, brown, moist.				
1						
2						
3						
4		End of Hole at: 4.00 m				
5						

Klohn Crippen Berger

BORE HOLE LOG - ENVIRONMENTAL **MW11-02**

CLIENT: Shell Canada Energy	PROJECT: Unipkat I-22 Remediation Program	
LOCATION: Unipkat I-22	PROJECT NO.: A04025A02	DATE: 15/04/2011
CO-ORDINATES: Not Measured	GROUND ELEVATION: Not Measured	CASING ELEVATION: N/A
HOLE DIA.: 0.15	CASING DIA.: N/A	TOTAL DEPTH OF HOLE: 4 m
DRILLING METHOD: Solid Stem Auger	DRILLING CONTRACTOR:	
LOGGED BY: RL	CHECKED BY: JW	Page 1 of 1

DEPTH (m)	SYMBOL	MATERIAL DESCRIPTION	WELL CONSTRUCTION	COMMENTS	SAMPLE TYPE	◆ OVA (ppm) 100 300 500 700 900 / × EC MEASUREMENTS (dS/m) 1 3 5 7 9
0		Silty sand (SM) Fill Loose, brown, moist.				
1						
2						
3						
4		End of Hole at: 4.00 m				
5						

KCBL ENVIRONMENTAL (1) UNIPKAT BH LOGS REMEDIATION PROGRAM.GPJ KCBL_CALGARY.GDT 9/25/12

Klohn Crippen Berger

BORE HOLE LOG - ENVIRONMENTAL **MW11-03**

CLIENT: Shell Canada Energy	PROJECT: Unipkat I-22 Remediation Program	
LOCATION: Unipkat I-22	PROJECT NO.: A04025A02	DATE: 15/04/2011
CO-ORDINATES: Not Measured	GROUND ELEVATION: Not Measured	CASING ELEVATION: N/A
HOLE DIA.: 0.15	CASING DIA.: N/A	TOTAL DEPTH OF HOLE: 4.3 m
DRILLING METHOD: Solid Stem Auger	DRILLING CONTRACTOR:	
LOGGED BY: RL	CHECKED BY: JW	Page 1 of 1

DEPTH (m)	SYMBOL	MATERIAL DESCRIPTION	WELL CONSTRUCTION	COMMENTS	SAMPLE TYPE	◆ OVA (ppm) 100 300 500 700 900 / × EC MEASUREMENTS (dS/m) 1 3 5 7 9
0		Silt (ML) Trace fine sand, soft, dark brown, odourless.				
1		Silt (ML) Dark brown, odour.				
2		Silt (ML + VS) Dark brown, odourless, frozen.				
3						
4		End of Hole at: 4.30 m				
5						

KCBL ENVIRONMENTAL (1) UNIPKAT BH LOGS REMEDIATION PROGRAM.GPJ KCBL_CALGARY.GDT 9/25/12

Klohn Crippen Berger

BORE HOLE LOG - ENVIRONMENTAL **MW11-04**

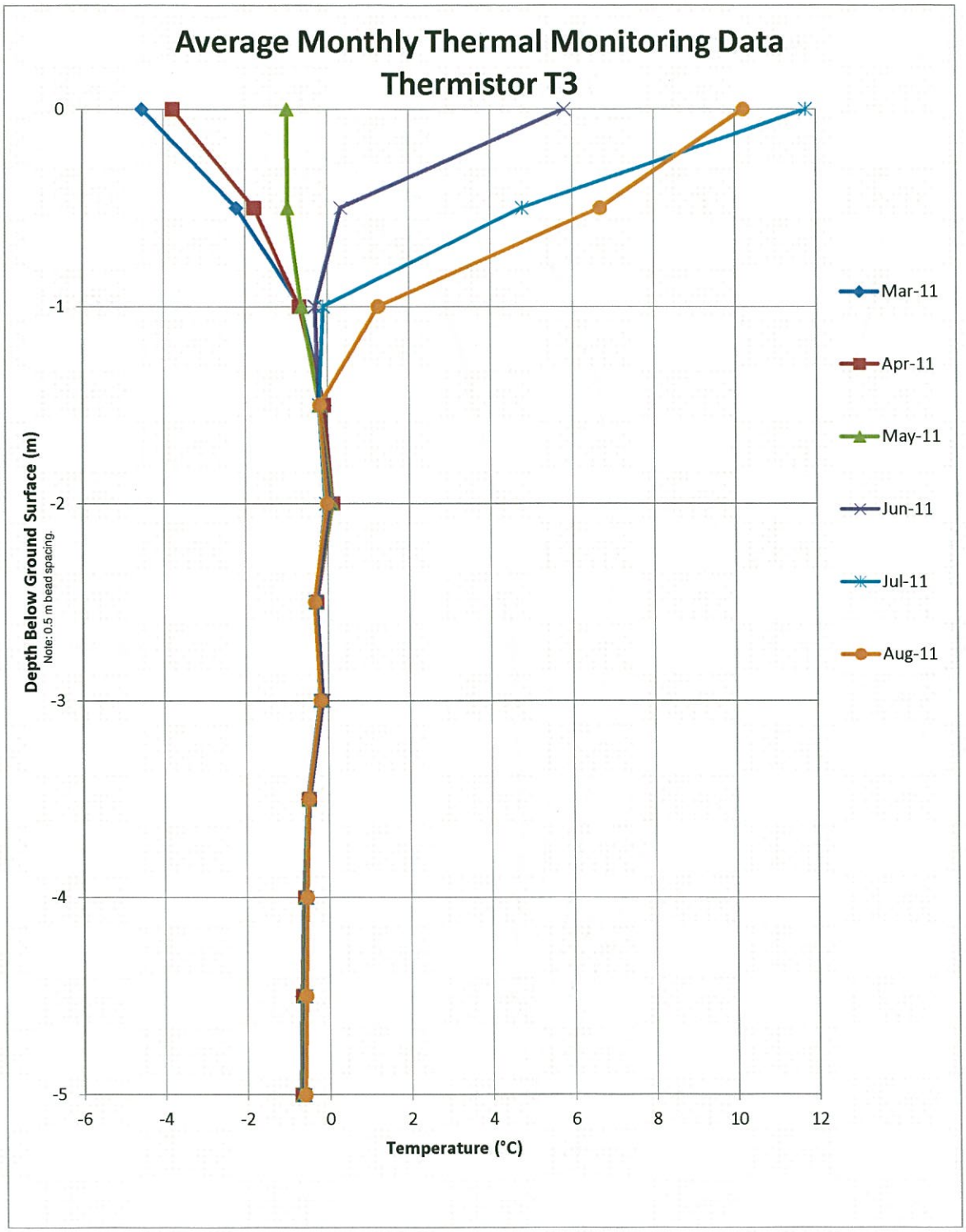
CLIENT: Shell Canada Energy	PROJECT: Unipkat I-22 Remediation Program	
LOCATION: Unipkat I-22	PROJECT NO.: A04025A02	DATE: 15/04/2011
CO-ORDINATES: Not Measured	GROUND ELEVATION: Not Measured	CASING ELEVATION: N/A
HOLE DIA.: 0.15	CASING DIA.: N/A	TOTAL DEPTH OF HOLE: 3.9 m
DRILLING METHOD: Solid Stem Auger	DRILLING CONTRACTOR:	
LOGGED BY: RL	CHECKED BY: JW	Page 1 of 1

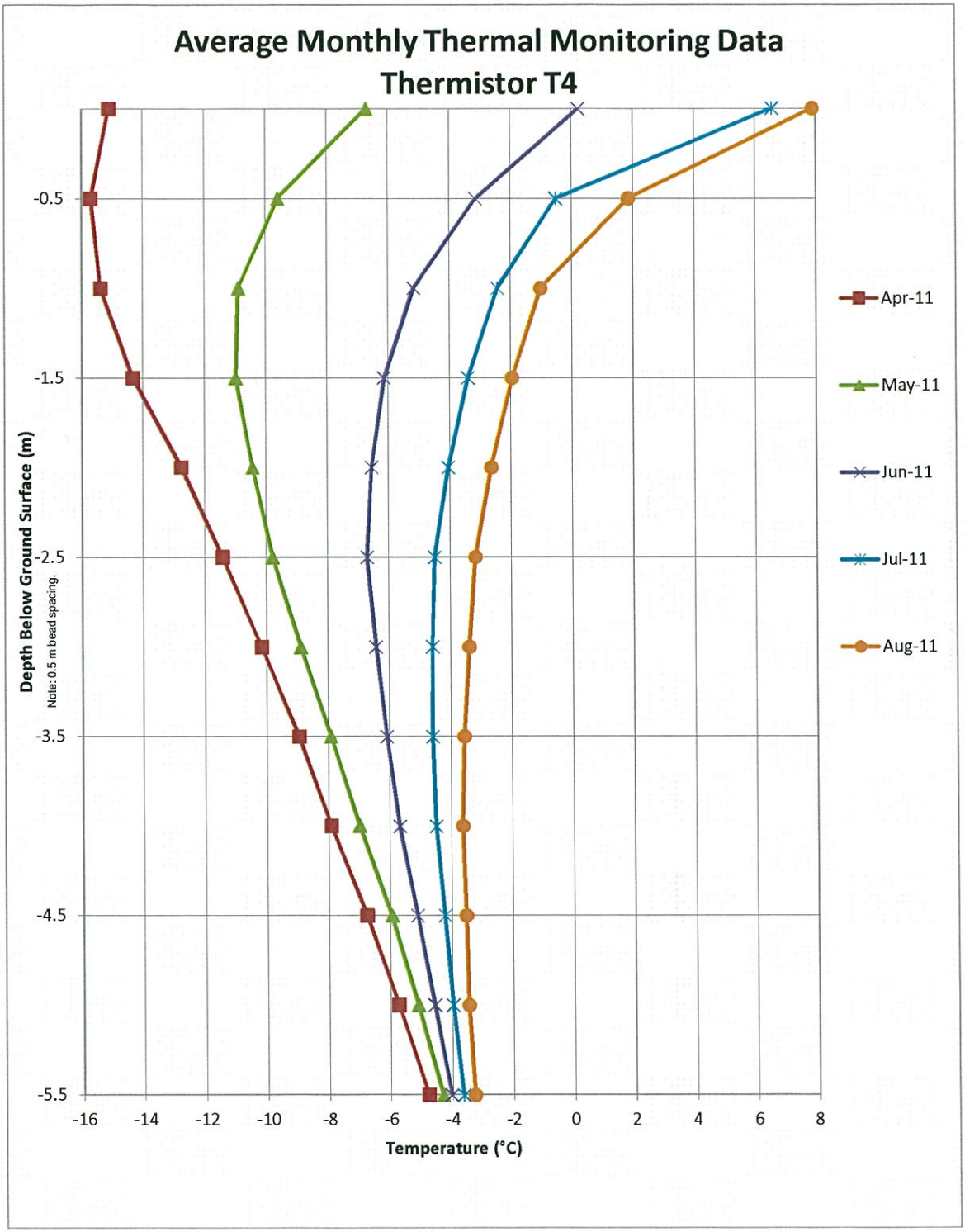
DEPTH (m)	SYMBOL	MATERIAL DESCRIPTION	WELL CONSTRUCTION	COMMENTS	SAMPLE TYPE	◆ OVA (ppm) 100 300 500 700 900 / × EC MEASUREMENTS (dS/m) 1 3 5 7 9
		Silt and Clay (ML + Cl) Brown, odourless, moist, trace peat.			Jar/Bag	1.5
		Organic Silt and Clay (OL) Peatey, brown, odourless, moist.			Jar/Bag	6.9
1		Silt and Clay (ML + Cl) Brown, odourless.			Jar/Bag	◆ 42.9
		2.7 - 3.9 Frozen			Jar/Bag	2.4
2					Jar/Bag	1.1
					Jar/Bag	2.3
3					Jar/Bag	1.1
					Jar/Bag	2.3
4		End of Hole at: 3.90 m				
5						

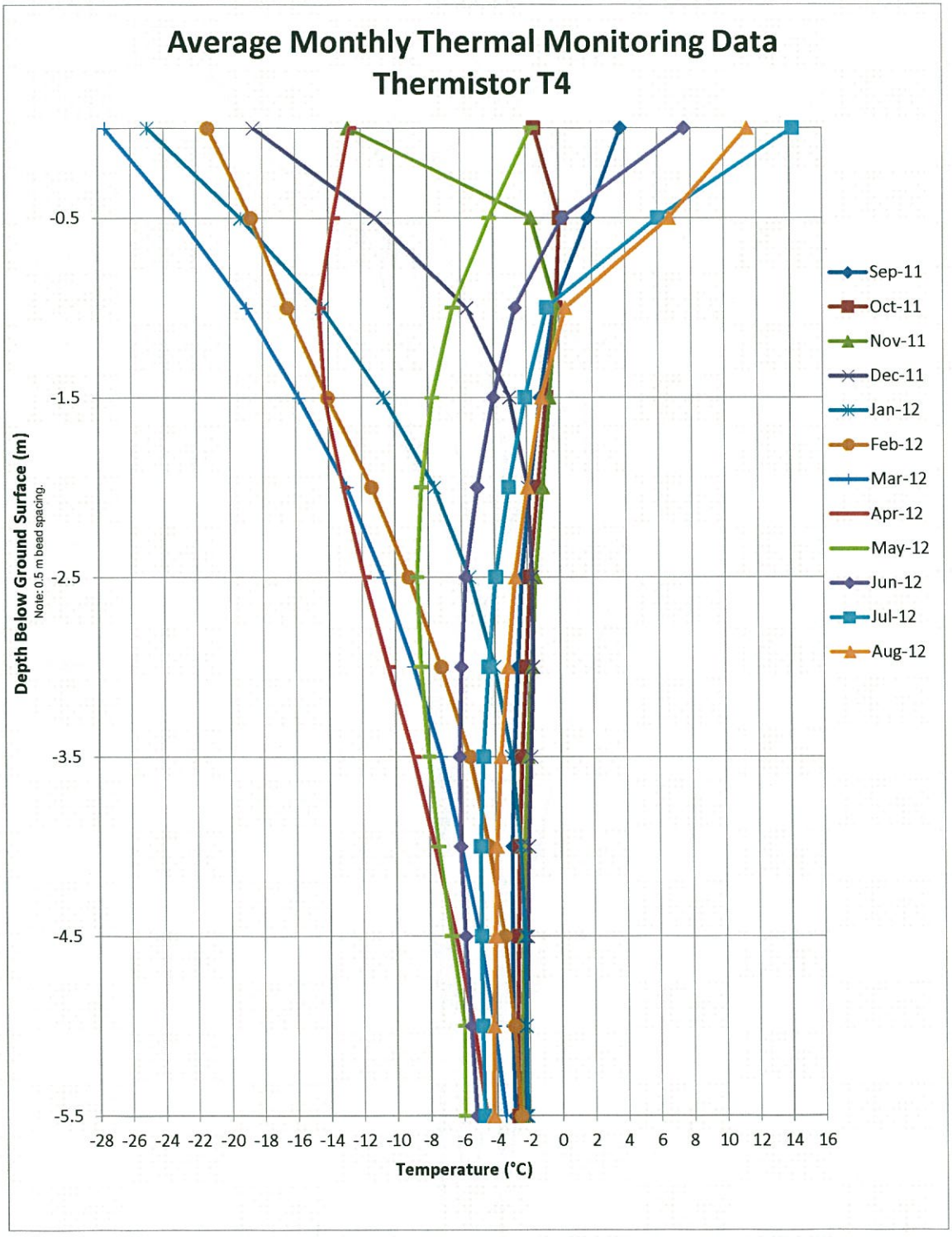
KCBL ENVIRONMENTAL (1) UNIPKAT BH LOGS REMEDIATION PROGRAM.GPJ KCBL_CALGARY.GDT 9/25/12

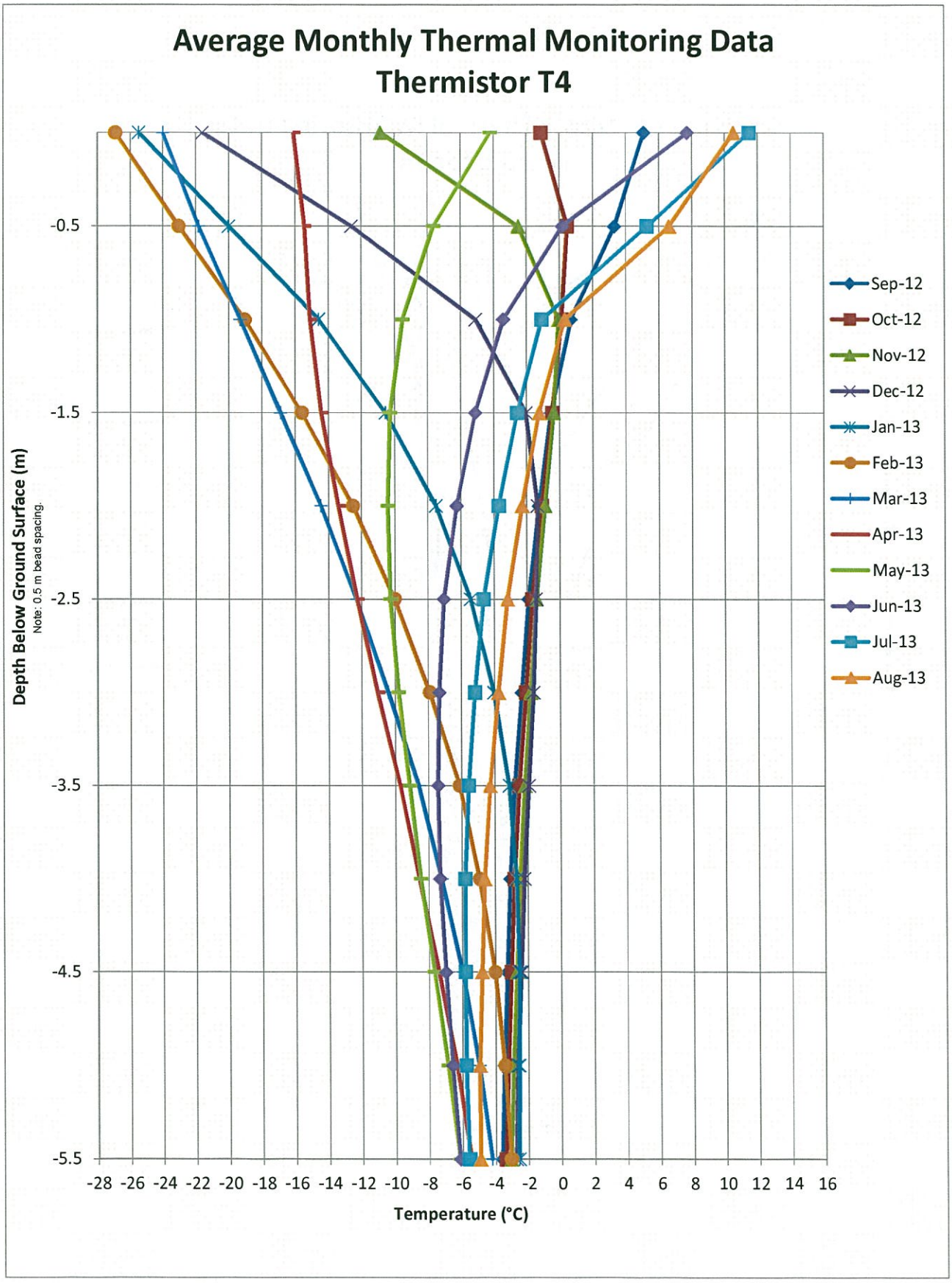
APPENDIX IV

Thermal Data


Average Monthly Thermal Monitoring Data
Thermistor T3
Depth Below Ground Surface (m)
Note: 0.5 m bead spacing
0
-1
-2
-3
-4
-5
-6
-4
-2
0
2
4
6
8
10
12
Temperature (°C)
Mar-11
Apr-11
May-11
Jun-11
Jul-11
Aug-11


Average Monthly Thermal Monitoring Data
Thermistor T4
Depth Below Ground Surface (m)
Note: 0.5 m bead spacing.
-0.5
-1.5
-2.5
-3.5
-4.5
-5.5
-16
-14
-12
-10
-8
-6
-4
-2
0
2
4
6
8
Temperature (°C)
Apr-11
May-11
Jun-11
Jul-11
Aug-11


Average Monthly Thermal Monitoring Data
Thermistor T4
Depth Below Ground Surface (m)
Note: 0.5 m bead spacing.
-0.5
-1.5
-2.5
-3.5
-4.5
-5.5
-28 -26 -24 -22 -20 -18 -16 -14 -12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12 14 16
Temperature (°C)
Sep-11
Oct-11
Nov-11
Dec-11
Jan-12
Feb-12
Mar-12
Apr-12
May-12
Jun-12
Jul-12
Aug-12


Average Monthly Thermal Monitoring Data
Thermistor T4
Depth Below Ground Surface (m)
Note: 0.5 m bead spacing.
-0.5
-1.5
-2.5
-3.5
-4.5
-5.5
-28 -26 -24 -22 -20 -18 -16 -14 -12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12 14 16
Temperature (°C)
Sep-12
Oct-12
Nov-12
Dec-12
Jan-13
Feb-13
Mar-13
Apr-13
May-13
Jun-13
Jul-13
Aug-13