

Analysis Report



REPORT ON: Analysis of Soil, Water Samples

REPORTED TO: Gartner Lee Limited
Suite 300
300 Town Centre Boulevard
Markham, ON
L3R 5Z6

Att'n: Tim Boc

CHAIN OF CUSTODY: 2118991
PROJECT NAME: CAM-4
PROJECT NUMBER: 80-297
P.O. NUMBER: 6076

NUMBER OF SAMPLES: 5

REPORT DATE: August 28, 2008

DATE SUBMITTED: August 19, 2008

GROUP NUMBER: 90819109

SAMPLE TYPE: Soil, Water

NOTE: Results contained in this report refer only to the testing of samples as submitted. Other information is available on request.

TEST METHODS:


CCME Petroleum Hydrocarbons in Soil - analysis was performed using Canadian Council of Ministers of the Environment (CCME) "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil" approved December 2000. The method involves extraction of the different hydrocarbon fractions and analysis by gas chromatography with flame ionization detection (GC/FID).

Canada-Wide Standard for Petroleum Hydrocarbons in Soil (F1 Fraction) - The F1 Fraction (nC6 to nC10) was analyzed based on the CCME Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method (2001). Analysis involves methanol extraction and quantitation using GasChromatography with Flame Ionization Detector (GC-FID). The F1 Fraction is reported with the BTEX compounds (benzene, toluene, ethylbenzene, and ortho, meta and para-xylenes) subtracted (e.g. corrected). These BTEX compounds analyzed by GCMS may be included in this report on request by the customer.

Canada-Wide Standard for Petroleum Hydrocarbons in Soil (F1 Fraction) - The F1 Fraction (nC6 to nC10) analysis was performed based on the CCME Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method (2001). Analysis involves methanol extraction and quantitation using Gas Chromatography with a Flame Ionization Detector (GC-FID). The F1 Fraction is reported with the BTEX compounds (Benzene, Toluene, Ethylbenzene, and Total Xylenes) subtracted (e.g. corrected). These BTEX compounds may be included in this report on request by the customer.

(Continued)

CANTEST LTD.


Anna Becalska, PhD
Trace Metals Coordinator

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Canada-Wide Standard for Petroleum Hydrocarbons in Soil (F2,F3 and F4 Fractions) - The F2 to F4 Fractions (nC10 to nC50) analysis was performed based on the CCME Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method (2001). Analysis involves extraction with 50:50 hexane:acetone, silica-gel cleanup and quantitation using Gas Chromatography with a Flame Ionization Detector (GC-FID).

Moisture in Soil - analysis was performed gravimetrically by heating a separate sample portion at 105 C and measuring the weight loss.

pH in Soil or Solid - analysis was performed based on procedures described in the "Manual on Soil Sampling and Methods of Analysis" (1993) published by the Canadian Society of Soil Science. The test was performed using a deionized water leach with measurement by pH meter.

Conventional Parameters - analyses were performed using procedures based on those described in the most current editions of "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials", (2005 edition) Province of British Columbia and "Standard Methods for the Examination of Water and Wastewater" (21st Edition), published by the American Public Health Association.

Mercury in Water - analysis was performed using procedures based on U. S. EPA Method 245.7, oxidative digestion using bromination, and analysis using Cold Vapour Atomic Fluorescence Spectroscopy.

Metals in Water - analysis was performed using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP), Inductively Coupled Plasma-Mass Spectroscopy (ICP/MS).

Polychlorinated Biphenyls - analysis was performed using procedures based upon U.S. EPA Methods 608/8080, involving extraction, clean-up steps, and analysis using GC/ECD. Aroclors 1242, 1248, 1254 and 1260 were included.

Total Extractable Hydrocarbons (TEH) - analysis was performed using procedures based on USEPA Method 8015 and BC MOELP Environmental Laboratory Manual (1994) Method X366, involving dichloromethane extraction and analysis using GC/FID. Components in the C10 to C30 range are included, using an alkane standard for quantitation. The report states if silica gel cleanup was used.

Silver in Soil - analysis was performed using Inductively Coupled Plasma Mass Spectrometry (ICP/MS).

Arsenic in Soil - analysis was performed using Inductively Coupled Plasma Mass Spectrometry (ICP/MS).

Cadmium in Soil - analysis was performed using Inductively Coupled Plasma Mass Spectrometry (ICP/MS).

Mercury in Soil - analysis was performed using Cold Vapour Atomic Fluorescence.

Molybdenum in Soil - analysis was performed using an acid digestion followed by determination using Inductively Coupled Plasma Mass Spectrometry (ICP/MS).

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Strong Acid Leachable Metals in Soil - analysis was performed using B.C. MOELP Method "Strong Acid Leachable Metals in Soil, Version 1.0". The method involves drying the sample at 60 C, sieving using a 2 mm (10 mesh) sieve and digestion using a mixture of hydrochloric and nitric acids. Analysis was performed using Inductively Coupled Argon Plasma Spectroscopy (ICAP) or by specific techniques as described.

Selenium in Soil - analysis was using Inductively Coupled Plasma Mass Spectrometry (ICP/MS).

Thallium in Soil - analysis was performed using Inductively Coupled Plasma Mass Spectrometry (ICP/MS).

Total Petroleum Hydrocarbons - analysis was performed using procedures based on Alberta Environment Site Investigation requirements, involving summation of the total volatile (purgeable) and semi-volatile (extractable) hydrocarbons.

TEST RESULTS:

(See following pages)

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Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	Hardness (Total) CaCO ₃
MW-20	Aug 15/08	808190321	112
MW-15	Aug 16/08	808190325	342
DETECTION LIMIT UNITS			1 mg/L

mg/L = milligrams per liter

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Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		MW-20	MW-15	DETECTION LIMIT	UNITS
SAMPLE PREPARATION:		TOTAL	TOTAL		
DATE SAMPLED:		Aug 15/08	Aug 16/08	DETECTION LIMIT	UNITS
CANTEST ID:		808190321	808190325		
Aluminum	Al	0.2	0.042	0.005	mg/L
Antimony	Sb	0.089	<	0.001	mg/L
Arsenic	As	<	0.001	0.001	mg/L
Barium	Ba	0.003	0.095	0.001	mg/L
Beryllium	Be	<	<	0.001	mg/L
Bismuth	Bi	<	<	0.001	mg/L
Boron	B	0.08	0.19	0.05	mg/L
Cadmium	Cd	<	<	0.0002	mg/L
Calcium	Ca	37	112	0.05	mg/L
Chromium	Cr	<	<	0.001	mg/L
Cobalt	Co	<	0.002	0.001	mg/L
Copper	Cu	0.003	0.001	0.001	mg/L
Iron	Fe	0.18	1.44	0.05	mg/L
Lead	Pb	<	<	0.001	mg/L
Lithium	Li	0.004	0.001	0.001	mg/L
Magnesium	Mg	4.79	15	0.05	mg/L
Manganese	Mn	0.031	2.34	0.001	mg/L
Mercury	Hg	<	<	0.02	µg/L
Molybdenum	Mo	0.0043	0.002	0.0005	mg/L
Nickel	Ni	<	0.007	0.001	mg/L
Phosphorus	P	<	<	0.15	mg/L
Potassium	K	4.5	9.2	0.1	mg/L
Selenium	Se	<	0.002	0.001	mg/L
Silicon	Si	2.2	3.9	0.25	mg/L
Silver	Ag	<	<	0.00025	mg/L
Sodium	Na	20.5	40.2	0.05	mg/L
Strontium	Sr	0.046	0.26	0.001	mg/L
Tellurium	Te	<	<	0.001	mg/L
Thallium	Tl	<	<	0.0001	mg/L
Thorium	Th	<	<	0.0005	mg/L
Tin	Sn	<	<	0.001	mg/L

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Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		MW-20	MW-15		
SAMPLE PREPARATION:		TOTAL	TOTAL		
DATE SAMPLED:		Aug 15/08	Aug 16/08		
CANTEST ID:		808190321	808190325	DETECTION LIMIT	UNITS
Titanium	Ti	0.009	0.002	0.001	mg/L
Uranium	U	0.061	0.036	0.0005	mg/L
Vanadium	V	<	0.002	0.001	mg/L
Zinc	Zn	0.022	0.32	0.005	mg/L
Zirconium	Zr	<	<	0.01	mg/L

mg/L = milligrams per liter

µg/L = micrograms per liter

< = Less than detection limit

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Total Extractable Hydrocarbons in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	TEH
MW-20	Aug 15/08	808190321	1300
MW-15	Aug 16/08	808190325	5400
DETECTION LIMIT UNITS			100 $\mu\text{g/L}$

$\mu\text{g/L}$ = micrograms per liter

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Polychlorinated Biphenyls in Water

CLIENT SAMPLE IDENTIFICATION:	MW-20	MW-15	
DATE SAMPLED:	Aug 15/08	Aug 16/08	
CANTEST ID:	808190321	808190325	DETECTION LIMIT
Arochlor 1242	<	<	0.1
Arochlor 1248	<	<	0.1
Arochlor 1254	<	<	0.1
Arochlor 1260	<	<	0.1
Total PCB	<	<	0.4
Surrogate Recovery			
2,2',4,4',6,6'-hexabromobiphenyl	85	100	-

Results expressed as micrograms per liter ($\mu\text{g/L}$)

Surrogate recoveries expressed as percent (%)

< = Less than detection limit

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Conventional Parameters in Soil

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	Moisture	pH
MW-14-A-30	Aug 14/08	808190310	15.1	7.1
BMW-3-40	Aug 14/08	808190315	11.0	6.6
MW-20-35	Aug 15/08	808190318	5.0	7.2
DETECTION LIMIT UNITS			0.1 %	0.1 pH units

% = percent

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Polychlorinated Biphenyls in Soil

CLIENT SAMPLE IDENTIFICATION:	MW-14-A-30	BMW-3-40	MW-20-35	
DATE SAMPLED:	Aug 14/08	Aug 14/08	Aug 15/08	
CANTEST ID:	808190310	808190315	808190318	DETECTION LIMIT
Arochlor 1242	<	<	<	0.03
Arochlor 1248	<	<	<	0.03
Arochlor 1254	<	<	<	0.03
Arochlor 1260	<	<	<	0.03
Total PCB	<	<	<	0.03
Surrogate Recovery				
2,2',4,4',6,6'-hexabromobiphenyl	89	63	89	-

Results expressed as micrograms per gram, on a dry weight basis. ($\mu\text{g/g}$)

Surrogate recoveries expressed as percent (%)

< = Less than detection limit

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Total Petroleum Hydrocarbons in Soil

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	Total Petroleum Hydrocarbons
MW-14-A-30	Aug 14/08	808190310	<
BMW-3-40	Aug 14/08	808190315	<
MW-20-35	Aug 15/08	808190318	<
DETECTION LIMIT UNITS			20 $\mu\text{g/g}$

$\mu\text{g/g}$ = micrograms per gram, on a dry weight basis.

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CCME Petroleum Hydrocarbons in Soil

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	F1 (C6-C10) uncorrected	F1 minus BTEX (C6-C10)
MW-14-A-30	Aug 14/08	808190310	<	<
BMW-3-40	Aug 14/08	808190315	<	<
MW-20-35	Aug 15/08	808190318	<	<
DETECTION LIMIT UNITS			5 $\mu\text{g/g}$	5 $\mu\text{g/g}$

$\mu\text{g/g}$ = micrograms per gram, on a dry weight basis.

< = Less than detection limit

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CCME Petroleum Hydrocarbons in Soil

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	F2 (C10-C16) uncorrected	F3 (C16-C34) uncorrected
MW-14-A-30	Aug 14/08	808190310	<	<
BMW-3-40	Aug 14/08	808190315	<	<
MW-20-35	Aug 15/08	808190318	<	<
DETECTION LIMIT UNITS			5 $\mu\text{g/g}$	5 $\mu\text{g/g}$

$\mu\text{g/g}$ = micrograms per gram, on a dry weight basis.

< = Less than detection limit

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Strong Acid Soluble Metals in Soil

CLIENT SAMPLE IDENTIFICATION:		MW-14-A-30	BMW-3-40	MW-20-35	DETECTION LIMIT
DATE SAMPLED:		Aug 14/08	Aug 14/08	Aug 15/08	
CANTEST ID:		808190310	808190315	808190318	
Antimony	Sb	<	<	<	0.1
Arsenic	As	2.4	2.3	1.2	0.1
Barium	Ba	68	81	27	1
Beryllium	Be	<	<	<	1
Cadmium	Cd	<	<	<	0.2
Chromium	Cr	28	30	17	2
Cobalt	Co	7	8	4	1
Copper	Cu	11	12	8	1
Lead	Pb	8.4	8.3	10.4	0.2
Mercury	Hg	0.01	0.01	0.01	0.01
Molybdenum	Mo	0.4	0.5	0.4	0.1
Nickel	Ni	14	16	9	2
Selenium	Se	<	0.2	0.2	0.2
Silver	Ag	<	<	<	0.1
Thallium	Tl	0.2	0.3	0.1	0.1
Tin	Sn	<	<	<	5
Vanadium	V	33	36	23	1
Zinc	Zn	38	46	25	1
Aluminum	Al	12200	13400	6460	10
Boron	B	2	2	1	1
Calcium	Ca	2320	2260	1790	1
Iron	Fe	17700	19800	11200	2
Magnesium	Mg	5530	6180	3370	1
Manganese	Mn	190	246	115	1
Phosphorus	P	807	728	623	20
Potassium	K	3520	4000	1500	10
Sodium	Na	116	103	62	5
Strontium	Sr	7	8	4	1
Titanium	Ti	1030	1140	533	1
Zirconium	Zr	4	5	2	1

Results expressed as micrograms per gram, on a dry weight basis. (µg/g)

< = Less than detection limit

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CCME Petroleum Hydrocarbons in Soil

CLIENT SAMPLE IDENTIFICATION:	MW-14-A-30	BMW-3-40	MW-20-35	
DATE SAMPLED:	Aug 14/08	Aug 14/08	Aug 15/08	
CANTEST ID:	808190310	808190315	808190318	
Benzene	<	<	<	0.005
Ethylbenzene	<	<	<	0.018
Toluene	<	<	<	0.02
Total Xylenes	<	<	<	0.02

Results expressed as micrograms per gram, on a dry weight basis. ($\mu\text{g/g}$)

< = Less than detection limit