ALS Environmental

CERTIFICATE OF ANALYSIS

Date:	October 11, 2006
ALS File No.	Z1767
Report On:	PIN-3 Soil/Water Analysis
Report To:	**Gartner Lee Ltd.** Sperling Plaza Suite 490, 6400 Roberts Street Burnaby, BC V5G 4C9
Attention:	**Mr. Dennis Lu**
Received:	August 28, 2006

ALS ENVIRONMENTAL
per:

Can Dang, B.Sc. - Senior Account Manager
Janice Pearson, - Account Manager

File No. Z1767

RESULTS OF ANALYSIS - Sediment/Soil [1]

Sample ID		TP-1	TP-2	TP-3	TP-4	TP-5
ALS ID		*1*	*2*	*3*	*4*	*5*
Physical Tests						
Moisture	%	2.38	4.62	14.7	3.56	2.85
pH		8.41	8.53	8.00	8.43	8.57
Total Metals						
Antimony	T-Sb	<10	<10	<10	<10	<10
Arsenic	T-As	1.06	0.955	0.795	0.983	1.30
Barium	T-Ba	17.5	30.5	22.2	26.5	134
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	5.7	3.4	5.6	5.3	6.1
Cobalt	T-Co	2.4	<2.0	2.1	2.6	2.9
Copper	T-Cu	10.9	3.8	7.5	11.1	10.2
Lead	T-Pb	3.8	<2.0	<2.0	<2.0	2.5
Mercury	T-Hg	0.0163	0.0054	0.0098	<0.0050	0.0063
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	<5.0	<5.0	<5.0	5.4	<5.0
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	17.8	16.3	19.4	20.6	22.6
Zinc	T-Zn	8.1	6.9	7.4	8.6	10.0

CWS = CCME - Canada Wide Standards.
< = Less than the detection limit indicated.
VPH = Volatile Petroleum Hydrocarbons.
EPH = Extractable Petroleum Hydrocarbons.
EPH10-19 is equivalent to EHw10-19.
[1]Results are expressed as milligrams per dry kilogram except where noted.

File No. Z1767

RESULTS OF ANALYSIS - Sediment/Soil [1]

Sample ID	TP-1	TP-2	TP-3	TP-4	TP-5
ALS ID	*1*	*2*	*3*	*4*	*5*
Non-Halogenated Volatiles					
Benzene	<0.040	<0.040	<0.040	<0.040	<0.040
Ethylbenzene	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl t-butyl ether (MTBE)	<0.20	<0.20	<0.20	<0.20	<0.20
Styrene	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	<0.050	<0.050	<0.050	<0.050	<0.050
meta- & para-Xylene	<0.050	<0.050	<0.050	<0.050	<0.050
ortho-Xylene	<0.050	<0.050	<0.050	<0.050	<0.050
Total Xylenes	<0.10	<0.10	<0.10	<0.10	<0.10
Volatile Hydrocarbons (VH6-10)	<100	<100	<100	<100	<100
VPH	<100	<100	<100	<100	<100
CCME Hydrocarbon Fractions					
F1 (C6-C10)	<10	<10	<10	<10	<10
F1-BTEX	<10	<10	<10	<10	<10
F2 (C10-C16)	<5.0	<5.0	<5.0	9.0	<5.0
F3 (C16-C34)	<5.0	<5.0	18.0	19.0	8.0
F4 (C34-C50)	<5.0	<5.0	6.0	<5.0	<5.0
F4G-SG Required (yes/no)	No	No	No	No	No
Polychlorinated Biphenyls					
Total Polychlorinated Biphenyls	<0.010	<0.010	<0.010	<0.018	<0.010

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EPH10-19 is equivalent to EHw10-19.
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File No. Z1767

RESULTS OF ANALYSIS - Sediment/Soil [1]

Sample ID		TP-6	TP-7	TP-8	TP-9	TP-10
ALS ID		*6*	*7*	*8*	*9*	*10*
Physical Tests						
Moisture	%	3.29	10.2	13.1	5.41	6.65
pH		8.77	7.99	8.16	8.36	8.26
Total Metals						
Antimony	T-Sb	<10	<10	<10	<10	<10
Arsenic	T-As	1.70	0.447	0.903	1.52	1.53
Barium	T-Ba	30.4	11.2	51.9	55.5	56.3
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	4.5	2.9	6.1	6.3	5.3
Cobalt	T-Co	2.3	<2.0	2.6	2.8	2.8
Copper	T-Cu	8.6	4.2	6.8	9.1	10.3
Lead	T-Pb	2.6	<2.0	<2.0	3.3	3.1
Mercury	T-Hg	0.0133	<0.0050	0.0054	0.0081	0.0066
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	<5.0	<5.0	<5.0	<5.0	<5.0
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	20.9	8.6	20.5	21.6	23.0
Zinc	T-Zn	8.1	4.8	9.5	9.9	10.8

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File No. Z1767

RESULTS OF ANALYSIS - Sediment/Soil [1]

Sample ID	TP-6	TP-7	TP-8	TP-9	TP-10
ALS ID	*6*	*7*	*8*	*9*	*10*
Non-Halogenated Volatiles					
Benzene	<0.040	<0.040	<0.040	<0.040	<0.040
Ethylbenzene	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl t-butyl ether (MTBE)	<0.20	<0.20	<0.20	<0.20	<0.20
Styrene	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	<0.050	<0.050	<0.050	<0.050	<0.050
meta- & para-Xylene	<0.050	<0.050	<0.050	<0.050	<0.050
ortho-Xylene	<0.050	<0.050	<0.050	<0.050	<0.050
Total Xylenes	<0.10	<0.10	<0.10	<0.10	<0.10
Volatile Hydrocarbons (VH6-10)	<100	<100	<100	<100	<100
VPH	<100	<100	<100	<100	<100
CCME Hydrocarbon Fractions					
F1 (C6-C10)	<10	<10	<10	<10	<10
F1-BTEX	<10	<10	<10	<10	<10
F2 (C10-C16)	<5.0	<5.0	<5.0	<5.0	<5.0
F3 (C16-C34)	<5.0	<5.0	<5.0	<5.0	<5.0
F4 (C34-C50)	<5.0	<5.0	<5.0	<5.0	<5.0
F4G-SG Required (yes/no)	No	No	No	No	No
Polychlorinated Biphenyls					
Total Polychlorinated Biphenyls	<0.010	<0.010	<0.010	<0.010	<0.010

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File No. Z1767

RESULTS OF ANALYSIS - Sediment/Soil [1]

Sample ID		TP-11	TP-12	TP-13	TP-14	TP-15
ALS ID		*11*	*12*	*13*	*14*	*15*
Physical Tests						
Moisture	%	6.47	2.68	41.4	5.85	17.3
pH		8.04	8.28	7.34	8.07	7.88
Total Metals						
Antimony	T-Sb	<10	<10	<10	<10	<10
Arsenic	T-As	1.04	1.43	0.934	0.865	1.50
Barium	T-Ba	12.3	27.0	36.2	19.2	25.9
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	3.7	6.8	4.8	4.5	6.0
Cobalt	T-Co	<2.0	3.3	<2.0	<2.0	3.2
Copper	T-Cu	6.8	11.8	12.9	6.1	11.0
Lead	T-Pb	<2.0	2.1	2.1	<2.0	3.8
Mercury	T-Hg	<0.0050	0.0052	0.0182	<0.0050	0.0095
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	<5.0	6.2	<5.0	<5.0	5.6
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	11.1	25.7	9.6	13.9	18.2
Zinc	T-Zn	4.5	10.7	10.2	6.7	9.8

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File No. Z1767

RESULTS OF ANALYSIS - Sediment/Soil [1]

Sample ID	TP-11	TP-12	TP-13	TP-14	TP-15
ALS ID	*11*	*12*	*13*	*14*	*15*
Non-Halogenated Volatiles					
Benzene	<0.040	<0.040	<0.040	<0.040	<0.040
Ethylbenzene	<0.050	<0.050	<0.050	<0.050	<0.050
Methyl t-butyl ether (MTBE)	<0.20	<0.20	<0.20	<0.20	<0.20
Styrene	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	<0.050	<0.050	<0.050	<0.050	<0.050
meta- & para-Xylene	<0.050	<0.050	<0.050	<0.050	<0.050
ortho-Xylene	<0.050	<0.050	<0.050	<0.050	<0.050
Total Xylenes	<0.10	<0.10	<0.10	<0.10	<0.10
Volatile Hydrocarbons (VH6-10)	<100	<100	<100	<100	<100
VPH	<100	<100	<100	<100	<100
CCME Hydrocarbon Fractions					
F1 (C6-C10)	<10	<10	<10	<10	<10
F1-BTEX	<10	<10	<10	<10	<10
F2 (C10-C16)	<5.0	<5.0	<5.0	<5.0	<5.0
F3 (C16-C34)	9.0	10.0	50.0	<5.0	16.0
F4 (C34-C50)	10.0	<5.0	74.0	<5.0	14.0
F4G-SG Required (yes/no)	No	No	No	No	No
Polychlorinated Biphenyls					
Total Polychlorinated Biphenyls	<0.010	<0.010	<0.020	<0.010	<0.010

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File No. Z1767

RESULTS OF ANALYSIS - Sediment/Soil [1]

Sample ID		TP-16	TP-17	TP-18
ALS ID		*16*	*17*	*18*
Physical Tests				
Moisture	%	4.14	5.96	4.12
pH		8.10	8.32	7.81
Total Metals				
Antimony	T-Sb	<10	<10	<10
Arsenic	T-As	1.19	0.705	0.881
Barium	T-Ba	24.6	26.5	53.6
Beryllium	T-Be	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50
Chromium	T-Cr	7.8	4.1	4.9
Cobalt	T-Co	3.4	2.1	2.5
Copper	T-Cu	8.8	4.1	10.8
Lead	T-Pb	2.2	<2.0	<2.0
Mercury	T-Hg	0.0196	0.0090	0.0081
Molybdenum	T-Mo	<4.0	<4.0	<4.0
Nickel	T-Ni	6.1	<5.0	<5.0
Selenium	T-Se	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0
Vanadium	T-V	21.3	15.5	17.4
Zinc	T-Zn	10.5	6.7	7.9

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File No. Z1767

RESULTS OF ANALYSIS - Sediment/Soil [1]

Sample ID	TP-16	TP-17	TP-18
ALS ID	*16*	*17*	*18*
Non-Halogenated Volatiles			
Benzene	<0.040	<0.040	<0.040
Ethylbenzene	<0.050	<0.050	<0.050
Methyl t-butyl ether (MTBE)	<0.20	<0.20	<0.20
Styrene	<0.050	<0.050	<0.050
Toluene	<0.050	<0.050	<0.10
meta- & para-Xylene	<0.050	<0.050	<0.050
ortho-Xylene	<0.050	<0.050	<0.050
Total Xylenes	<0.10	<0.10	<0.10
Volatile Hydrocarbons (VH6-10)	<100	<100	<100
VPH	<100	<100	<100
CCME Hydrocarbon Fractions			
F1 (C6-C10)	<10	<10	<10
F1-BTEX	<10	<10	<10
F2 (C10-C16)	<5.0	<5.0	5.0
F3 (C16-C34)	<5.0	<5.0	18.0
F4 (C34-C50)	<5.0	<5.0	23.0
F4G-SG Required (yes/no)	No	No	No
Polychlorinated Biphenyls			
Total Polychlorinated Biphenyls	<0.010	<0.010	<0.010

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EPH10-19 is equivalent to EHw10-19.
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File No. Z1767

RESULTS OF ANALYSIS - Water[1]

Sample ID			MW-1	MW-2	MW-3	MW-4	MW-5
ALS ID			*19*	*20*	*21*	*22*	*23*
Physical Tests							
Hardness		CaCO3	663	405	245	1550	1170
Total Metals							
Aluminum	T-Al		0.013	14.0	74.6	0.160	0.118
Antimony	T-Sb		<0.0010	<0.0010	<0.0050	<0.0025	<0.0025
Arsenic	T-As		0.0015	<0.0010	<0.0050	<0.0025	<0.0050
Barium	T-Ba		0.083	<0.020	<0.020	0.031	0.032
Beryllium	T-Be		<0.0020	<0.0020	<0.010	<0.0050	<0.0050
Boron	T-B		0.18	0.15	<0.10	0.43	0.33
Cadmium	T-Cd		<0.000034	<0.000034	<0.00017	<0.000085	<0.000085
Calcium	T-Ca		138	132	97.4	373	196
Chromium	T-Cr		<0.0020	0.0171	<0.010	<0.0050	0.0127
Cobalt	T-Co		0.00559	<0.00060	<0.0030	<0.0015	<0.0015
Copper	T-Cu		<0.0020	<0.0020	<0.010	<0.0050	<0.0050
Iron	T-Fe		1.23	<0.030	<0.030	<0.030	0.379
Lead	T-Pb		<0.0010	<0.0010	<0.0050	<0.0025	0.0035
Lithium	T-Li		<0.010	0.024	<0.050	<0.025	<0.025
Magnesium	T-Mg		77.4	18.2	0.33	151	166
Manganese	T-Mn		0.660	<0.00060	<0.0030	0.0187	0.0361
Mercury	T-Hg		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Molybdenum	T-Mo		0.0104	0.0113	<0.010	<0.0050	0.0052
Nickel	T-Ni		0.0103	0.0020	<0.010	0.0218	0.0052
Potassium	T-K		9.1	14.5	26.2	18.0	38.8
Selenium	T-Se		<0.0020	<0.0020	<0.010	<0.0050	<0.0050
Silver	T-Ag		<0.000040	<0.000040	<0.00020	<0.00010	<0.00010
Sodium	T-Na		62.7	83.3	99.7	111	735
Thallium	T-Tl		<0.00040	<0.00040	<0.0020	<0.0010	<0.0010
Tin	T-Sn		<0.0010	<0.0010	<0.0050	<0.0025	<0.0025
Titanium	T-Ti		<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	T-U		0.0157	<0.00040	<0.0020	0.0281	0.0034
Vanadium	T-V		<0.030	<0.030	<0.030	<0.030	<0.030
Zinc	T-Zn		<0.010	<0.010	<0.050	<0.025	0.028

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EPH10-19 is equivalent to EHw10-19.
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File No. Z1767

RESULTS OF ANALYSIS - Water[1]

Sample ID	MW-1	MW-2	MW-3	MW-4	MW-5
ALS ID	*19*	*20*	*21*	*22*	*23*
Non-Halogenated Volatiles					
Benzene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Styrene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Toluene	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
meta- & para-Xylene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
ortho-Xylene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Total Xylenes	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Volatile Hydrocarbons (VH6-10)	<0.10	<0.10	<0.10	<0.10	<0.10
VPH	<0.10	<0.10	<0.10	<0.10	<0.10
Extractable Hydrocarbons					
EPH10-19	<0.25	<0.25	<0.25	<0.25	<0.25
EPH19-32	<0.25	<0.25	<0.25	<0.25	<0.25
Polychlorinated Biphenyls					
Total Polychlorinated Biphenyls	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

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File No. Z1767

RESULTS OF ANALYSIS - Water[1]

Sample ID			MW-6	MW-9
ALS ID			*24*	*27*
Physical Tests				
Hardness		CaCO3	1040	2340
Total Metals				
Aluminum	T-Al		<0.050	0.183
Antimony	T-Sb		<0.0050	<0.0025
Arsenic	T-As		<0.0070	<0.0050
Barium	T-Ba		0.028	0.045
Beryllium	T-Be		<0.010	<0.0050
Boron	T-B		0.29	0.76
Cadmium	T-Cd		<0.00017	0.000087
Calcium	T-Ca		187	481
Chromium	T-Cr		<0.010	<0.0050
Cobalt	T-Co		<0.0030	<0.0015
Copper	T-Cu		<0.010	<0.0050
Iron	T-Fe		0.237	<0.030
Lead	T-Pb		<0.0050	<0.0025
Lithium	T-Li		<0.050	<0.025
Magnesium	T-Mg		138	275
Manganese	T-Mn		0.0443	0.0242
Mercury	T-Hg		<0.000020	<0.000020
Molybdenum	T-Mo		0.011	<0.0050
Nickel	T-Ni		<0.010	0.0067
Potassium	T-K		30.6	44.7
Selenium	T-Se		<0.010	<0.0050
Silver	T-Ag		<0.00020	<0.00010
Sodium	T-Na		524	373
Thallium	T-Tl		<0.0020	<0.0010
Tin	T-Sn		<0.0050	<0.0025
Titanium	T-Ti		<0.010	<0.010
Uranium	T-U		0.0070	0.0237
Vanadium	T-V		<0.030	<0.030
Zinc	T-Zn		0.054	<0.025

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RESULTS OF ANALYSIS - Water[1]

Sample ID	MW-6	MW-9
ALS ID	*24*	*27*
Non-Halogenated Volatiles		
Benzene	<0.00050	<0.00050
Ethylbenzene	<0.00050	<0.00050
Styrene	<0.0010	<0.0010
Toluene	<0.0010	<0.0010
meta- & para-Xylene	<0.00050	<0.00050
ortho-Xylene	<0.00050	<0.00050
Total Xylenes	<0.0010	<0.0010
Volatile Hydrocarbons (VH6-10)	<0.10	<0.10
VPH	<0.10	<0.10
Extractable Hydrocarbons		
EPH10-19	<0.25	<0.25
EPH19-32	<0.25	<0.25
Polychlorinated Biphenyls		
Total Polychlorinated Biphenyls	<0.0010	<0.0010

CWS = CCME - Canada Wide Standards.
< = Less than the detection limit indicated.
VPH = Volatile Petroleum Hydrocarbons.
EPH = Extractable Petroleum Hydrocarbons.
EPH10-19 is equivalent to EHw10-19.
[1]Results are expressed as milligrams per litre except where noted.

Appendix 1 - QUALITY CONTROL - Replicates

Sediment/Soil [1]		TP-9	TP-9 QC # 519175	TP-18	TP-18 QC # 519176
Physical Tests					
pH		8.36	8.26	7.81	7.76
Total Metals					
Antimony	T-Sb	<10	<10	<10	<10
Barium	T-Ba	55.5	47.3	53.6	35.8
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	6.3	5.4	4.9	6.0
Cobalt	T-Co	2.8	2.7	2.5	2.7
Copper	T-Cu	9.1	10.2	10.8	10.0
Lead	T-Pb	3.3	3.1	<2.0	<2.0
Mercury	T-Hg	0.0081	0.0078	0.0081	0.0070
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	<5.0	<5.0	<5.0	<5.0
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	21.6	21.2	17.4	29.7
Zinc	T-Zn	9.9	9.1	7.9	9.6
Non-Halogenated Volatiles					
Benzene		<0.040	<0.040	<0.040	<0.040
Ethylbenzene		<0.050	<0.050	<0.050	<0.050
Methyl t-butyl ether (MTBE)		<0.20	<0.20	<0.20	<0.20
Styrene		<0.050	<0.050	<0.050	<0.050
Toluene		<0.050	<0.050	<0.10	<0.10
meta- & para-Xylene		<0.050	<0.050	<0.050	<0.050
ortho-Xylene		<0.050	<0.050	<0.050	<0.050
Total Xylenes		<0.10	<0.10	<0.10	<0.10
Volatile Hydrocarbons (VH6-10)		<100	<100	<100	<100
VPH		<100	<100	<100	<100

CWS = CCME - Canada Wide Standards.
< = Less than the detection limit indicated.
VPH = Volatile Petroleum Hydrocarbons.
EPH = Extractable Petroleum Hydrocarbons.
EPH10-19 is equivalent to EHw10-19.
[1] Results are expressed as milligrams per dry kilogram except where noted.

Appendix 1 - QUALITY CONTROL - Replicates

Sediment/Soil [1]	TP-9	TP-9 QC # 519175	TP-18	TP-18 QC # 519176
CCME Hydrocarbon Fractions				
F1 (C6-C10)	<10	<10	<10	<10
F1-BTEX	<10	<10	<10	<10
Polychlorinated Biphenyls				
Total Polychlorinated Biphenyls	<0.010	<0.010	-	-

CWS = CCME - Canada Wide Standards.
< = Less than the detection limit indicated.
VPH = Volatile Petroleum Hydrocarbons.
EPH = Extractable Petroleum Hydrocarbons.
EPH10-19 is equivalent to EHw10-19.
[1] Results are expressed as milligrams per dry kilogram except where noted.

Appendix 2 - METHODOLOGY

Outlines of the methodologies utilized for the analysis of the samples submitted are as follows

Moisture in Sediment/Soil

Method Revised and Replaced: 2006 09 11

pH in Soil

This analysis is carried out in accordance with procedures described in "Soil Sampling and Methods of Analysis" (CSSS). The procedure involves mixing the air-dried sample with deionized/distilled water. The pH of the solution is then measured using a standard pH probe. A one to two ratio of sediment to water is used for mineral soils and a one to ten ratio is used for highly organic soils.

Laboratory Location: ALS Environmental, Vancouver

Metals in Sediment/Soil

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B or Method 3051, United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by either hotplate or block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic absorption/fluorescence spectrophotometry (EPA Method 7000 series), inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B), and/or inductively coupled plasma - mass spectrometry (EPA Method 6020).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Recommended Holding Time:
- Sample: 6 months (Hg = 28 days)
- Extract: 6 months (Hg = 28 days, Sb & Sn = 7 days)
- Reference: BCMELP

Laboratory Location: ALS Environmental, Vancouver

VOC in Sediment/Soil by Methanol Extraction Purge and Trap Analysis

Volatile Organic Compounds (VOC) are extracted from sediment or soil with methanol, following a procedure from the British Columbia Ministry of Water Land and Air Protection (BCWLAP) Analytical Method for Contaminated Sites "Volatile Hydrocarbons in Solids by GC/FID" (Version 2.1 July 1999).

A portion of the extract is then analyzed by purge and trap gas chromatography with mass spectrometric detection (GC/MS), using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260B, published by the United States Environmental Protection Agency (EPA).

Recommended Holding Time:
Sample: 14 days Extract: 40 days
Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

Calculation of Total Xylenes

Total Xylenes is the sum of the concentrations of the ortho, meta, and para Xylene isomers. Results below detection limit (DL) are treated as zero. The DL for Total Xylenes is set to a value no less than the sum of the DLs of the individual Xylenes.

Laboratory Location: ALS Environmental, Vancouver

Volatile Hydrocarbons in Sediment/Soil

This analysis involves the extraction of a subsample of the sediment/soil with methanol. Aliquots of the methanol extract are then analyzed for Volatile Hydrocarbons (VH) by capillary column gas chromatography with flame-ionization detection (GC/FID). The methanol extraction and VH analysis are carried out in accordance with the British Columbia Ministry of Environment, Lands and Parks (BCMELP) Analytical Method for Contaminated Sites "Volatile Hydrocarbons in Solids by GC/FID" (Version 2.1 July 1999).

Recommended Holding Time:
Sample: 7 days Extract: 40 days
Reference: BCMELP

Laboratory Location: ALS Environmental, Vancouver

Volatile Petroleum Hydrocarbons (VPH) in Solids

These results are determined according to the British Columbia Ministry of Environment, Lands, and Parks Analytical Method for Contaminated Sites "Calculation of Volatile Petroleum Hydrocarbons in Solids or Water" (Version 2.1, July 20, 1999). According to this method, the concentrations of specific Monocyclic Aromatic Hydrocarbons (Benzene, Toluene, Ethylbenzene, Xylenes and Styrene) are subtracted from the collective concentration of Volatile Hydrocarbons (VH) that elute between n-hexane (nC6) and n-decane (nC10). Analysis of Volatile Hydrocarbons adheres to all prescribed elements of BCMELP method "Volatile Hydrocarbons in Solids by GC/FID" (Version 2.1, July 20, 1999).

Recommended Holding Time: Not Applicable

Laboratory Location: ALS Environmental, Vancouver

Petroleum Hydrocarbons in Sediment/Soil (Canada-Wide Standard)

This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." For C6 to C10 hydrocarbons (F1) a subsample of the sediment/soil is extracted with methanol. For C10 to C50 hydrocarbons (F2, F3, F4) and gravimetric heavy hydrocarbons (F4G, F4G-sg) a subsample of the sediment/soil is extracted with 1:1 hexane:acetone using an Accelerated Solvent Extractor (ASE) or Soxhlet apparatus. For F1 the extract is analyzed by purge and trap capillary column gas chromatography with flame ionization detection (GC/FID). For F2, F3, F4 and F4G-sg the extract is undergoes a silica-gel clean-up to remove polar compounds, and is analyzed by on column GC/FID, except F4G-sg. F4G and F4G-sg are analyzed gravimetrically.

Notes:

1. Where F4 (C34-C50) and F4G (or F4G-sg) results are reported for a sample, the larger of of the reported values is used for comparison against the relevant CCME standard for F4.

2. The gravimetric heavy hydrocarbons (F4G or F4G-sg) results cannot be added to the C6 to C50 hydrocarbons results.

3. Benzene, toluene, ethylbenzene, and the xylene isomers have been subtracted from F1 results to derive F1-BTEX.

4. Naphthalene's contribution to F2 has been subtracted from F2 to derive the F2-naphth result.

5. Select PAH compounds have been subtracted from the F3 fraction to derive the F3-PAH result.

6. This method is validated for use.

7. Data from analysis of quality control samples is available upon request.

Recommended Holding Time:
Sample: 7 days for F1 (C6-C10)
14 days for all Fractions except F1 (C6-C10)
Extract: 7 days for all Fractions
Reference: CCME
Laboratory Location: ALS Environmental, Vancouver

Polychlorinated Biphenyls in Sediment/Soil

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3500, 3620, 3630, 3660, 3665 & 8082, published by the United States Environmental Protection Agency (EPA). The procedure involves a solid-liquid extraction of a subsample of the sediment/soil using a mixture of hexane and acetone. Water is added to the extract and the resulting hexane extract undergoes one or more of the following clean-up procedures (if required): florisil clean-up, silica gel clean-up, sulphur clean-up and/or sulphuric acid clean-up. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).

Recommended Holding Time:
Sample: 14 days Extract: 40 days
Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

Metals in Water

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" 21th Edition 2005 published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotplate or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by atomic absorption/emission spectrophotometry (EPA Method 7000 series), inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B), and/or inductively coupled plasma - mass spectrometry (EPA Method 6020).

Recommended Holding Time:
Sample: 6 months
Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

Mercury in Water

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" 20th Edition 1998 published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

Recommended Holding Time:

Sample: 28 days
Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

Volatile Organic Compounds and Volatile Hydrocarbons in Water

This procedure involves the purge and trap extraction of the sample prior to analysis for Volatile Hydrocarbons (VH) by capillary column gas chromatography with flame-ionization detection (GC/FID) and for specific Volatile Organic Compounds (VOC) by capillary column gas chromatography with mass spectrometric detection (GC/MS). The VH analysis is carried out in accordance with the British Columbia Ministry of Environment, Lands and Parks (BCMELP) Analytical Method for Contaminated Sites "Volatile Hydrocarbons in Water by GC/FID" (Version 2.1, July 1999). The VOC analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260, published by the United States Environmental Protection Agency (EPA).

Note:
For chlorinated waters certain conditions may cause the formation of trihalomethanes after sample collection. Appropriate chemical treatment of chlorinated waters will prevent trihalomethane formation in the samples.

Recommended Holding Time:
Sample: 7 days (VH); 14 days (VOC)
Reference: BCWLAP (VH); EPA (VOC)

Laboratory Location: ALS Environmental, Vancouver

Volatile Petroleum Hydrocarbons (VPH) in Water

These results are determined according to the British Columbia Ministry of Environment, Lands, and Parks Analytical Method for Contaminated Sites "Calculation of Volatile Petroleum Hydrocarbons in Solids or Water" (Version 2.1, July 20, 1999). According to this method, the concentrations of specific Monocyclic Aromatic Hydrocarbons (Benzene, Toluene, Ethylbenzene, and Xylenes) are subtracted from the collective concentration of Volatile Hydrocarbons (VH) that elute between n-hexane (nC6) and n-decane (nC10). Analysis of Volatile Hydrocarbons adheres to all prescribed elements of BCMELP method "Volatile Hydrocarbons in Water by GC/FID" (Version 2.1, July 20, 1999).

Recommended Holding Time: Not Applicable

Laboratory Location: ALS Environmental, Vancouver

Extractable Hydrocarbons in Water

This analysis is carried out in accordance with the British Columbia Ministry of Environment, Lands and Parks (BCMELP) Analytical Method for Contaminated Sites "Extractable Petroleum Hydrocarbons in Water by GC/FID" (Version 2.1, July 1999). The procedure involves extraction of the entire water sample with dichloromethane. The extract is then solvent exchanged to toluene and analysed by capillary column gas chromatography with flame ionization detection (GC/FID). EPH results include Polycyclic Aromatic Hydrocarbons (PAH) and are therefore not equivalent to Light and Heavy Extractable Petroleum Hydrocarbons (LEPH/HEPH).

Recommended Holding Time:
Sample: 7 days Extract: 40 days
Reference: BCMELP

Laboratory Location: ALS Environmental, Vancouver

Polychlorinated Biphenyls in Water

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3510, 3620, 3660, 3665 & 8082, published by the United States Environmental Protection Agency (EPA). The procedure involves a liquid-liquid extraction of the entire water sample using dichloromethane. The extract is then solvent exchanged to hexane followed by one or more of the following clean-up procedures (if required): florisil clean-up, sulphur clean-up and/or sulphuric acid clean-up. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).

Recommended Holding Time:
Sample: 7 days Extract: 40 days
Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

Results contained within this certificate relate only to the samples as submitted.

End of Report