



NORTH COAL LIMITED
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Date Received: 23-JUN-20
Report Date: 06-JUL-20 07:51 (MT)
Version: FINAL

Client Phone: 250-423-8854

Certificate of Analysis

Lab Work Order #: L2464354
Project P.O. #: NOT SUBMITTED
Job Reference: 18CANA02
C of C Numbers:
Legal Site Desc:

Patryk Wojciak, B.Sc., P.Chem.
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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L2464354-1 Water 22-JUN-20 09:30 MICH 33.8	L2464354-2 Water 22-JUN-20 11:10 MICH 13.0	L2464354-3 Water 22-JUN-20 10:10 AND1	L2464354-4 Water 22-JUN-20 11:00 DUPLICATE	
Grouping	Analyte					
WATER						
Physical Tests	Colour, True (CU)	<5.0	5.7	<5.0	<5.0	
	Hardness (as CaCO ₃) (mg/L)	133	112	102	104	
	Total Suspended Solids (mg/L)	<3.0	7.7	<3.0	<3.0	
	Total Dissolved Solids (mg/L)	171 ^{DLHC}	143 ^{DLHC}	126 ^{DLHC}	127 ^{DLHC}	
	Turbidity (NTU)	2.70	4.45	0.96	0.69	
Anions and Nutrients	Alkalinity, Total (as CaCO ₃) (mg/L)	107	83.9	96.0	98.5	
	Ammonia as N (mg/L)	0.0103	0.0093	0.0175	<0.0050	
	Bicarbonate (HCO ₃) (mg/L)	131	102	117	120	
	Bromide (Br) (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Carbonate (CO ₃) (mg/L)	<5.0	<5.0	<5.0	<5.0	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	
	Conductivity (EC) (uS/cm)	255	211	186	186	
	Fluoride (F) (mg/L)	0.160	0.099	0.176	0.175	
	Hydroxide (OH) (mg/L)	<5.0	<5.0	<5.0	<5.0	
	Nitrate (as N) (mg/L)	0.277	0.143	0.108	0.104	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	0.0011	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.052	0.088	<0.050	<0.050	
	pH (pH)	8.30	8.16	8.27	8.27	
	Orthophosphate-Dissolved (as P) (mg/L)	0.0027	0.0125 ^{RRV}	0.0024	0.0025	
	Phosphorus (P)-Total (mg/L)	0.0046	0.0137	0.0029	0.0043	
	Sulfate (SO ₄) (mg/L)	33.2	27.1	5.91	5.87	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	0.86	1.86	0.76	0.77	
	Total Organic Carbon (mg/L)	0.97	1.91	0.78	0.74	
Total Metals	Aluminum (Al)-Total (mg/L)	0.0398	0.118	0.0210	0.0288	
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00010	<0.00010	<0.00010	
	Arsenic (As)-Total (mg/L)	0.00044	0.00031	0.00052	0.00053	
	Barium (Ba)-Total (mg/L)	0.0159	0.0516	0.00983	0.00996	
	Beryllium (Be)-Total (mg/L)	<0.000020	0.000030	<0.000020	<0.000020	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Total (mg/L)	0.0000436	0.0000686	0.0000176	0.0000216	
	Calcium (Ca)-Total (mg/L)	39.9	29.7	33.3	32.3	
	Chromium (Cr)-Total (mg/L)	0.00030	0.00035	0.00028	0.00029	
	Cobalt (Co)-Total (mg/L)	0.00053	0.00023	<0.00010	<0.00010	
	Copper (Cu)-Total (mg/L)	<0.00050	0.00053	<0.00050	<0.00050	
	Iron (Fe)-Total (mg/L)	0.031	0.123	0.011	0.018	

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L2464354-1 Water 22-JUN-20 09:30 MICH 33.8	L2464354-2 Water 22-JUN-20 11:10 MICH 13.0	L2464354-3 Water 22-JUN-20 10:10 AND1	L2464354-4 Water 22-JUN-20 11:00 DUPLICATE	
Grouping	Analyte					
WATER						
Total Metals	Lead (Pb)-Total (mg/L)	<0.000050	0.000122	<0.000050	<0.000050	
	Lithium (Li)-Total (mg/L)	0.0024	0.0024	<0.0010	<0.0010	
	Magnesium (Mg)-Total (mg/L)	10.5	8.87	5.38	5.50	
	Manganese (Mn)-Total (mg/L)	0.00427	0.00561	0.00036	0.00058	
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
	Molybdenum (Mo)-Total (mg/L)	0.000457	0.000514	0.000320	0.000339	
	Nickel (Ni)-Total (mg/L)	0.00412	0.00227	0.00054	0.00061	
	Phosphorus (P)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Potassium (K)-Total (mg/L)	0.35	0.47	0.16	0.17	
	Selenium (Se)-Total (mg/L)	0.00156	0.00106	0.000697	0.000673	
	Silicon (Si)-Total (mg/L)	1.32	1.93	1.12	1.08	
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Total (mg/L)	1.96	1.70	0.226	0.223	
	Strontium (Sr)-Total (mg/L)	0.0980	0.0808	0.0713	0.0697	
	Sulfur (S)-Total (mg/L)	12.0	8.93	2.30	2.05	
	Thallium (Tl)-Total (mg/L)	0.000055	0.000034	0.000057	0.000057	
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Total (mg/L)	0.00088	0.00178	0.00039	0.00061	
	Uranium (U)-Total (mg/L)	0.000535	0.000371	0.000316	0.000301	
	Vanadium (V)-Total (mg/L)	<0.00050	0.00076	<0.00050	<0.00050	
	Zinc (Zn)-Total (mg/L)	0.0054	0.0036	<0.0030	<0.0030	
	Zirconium (Zr)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	0.0036	0.0085	0.0036	0.0027	
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Arsenic (As)-Dissolved (mg/L)	0.00043	0.00028	0.00052	0.00051	
	Barium (Ba)-Dissolved (mg/L)	0.0157	0.0537	0.0101	0.0101	
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Dissolved (mg/L)	0.0000259	0.0000227	0.0000137	0.0000115	
	Calcium (Ca)-Dissolved (mg/L)	37.5	29.3	31.7	32.3	
	Chromium (Cr)-Dissolved (mg/L)	0.00021	0.00011	0.00023	0.00020	
	Cobalt (Co)-Dissolved (mg/L)	0.00039	0.00011	<0.00010	<0.00010	
	Copper (Cu)-Dissolved (mg/L)	<0.00020	0.00027	<0.00020	0.00037	
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	

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Sample ID Description Sampled Date Sampled Time Client ID		L2464354-1 Water 22-JUN-20 09:30 MICH 33.8	L2464354-2 Water 22-JUN-20 11:10 MICH 13.0	L2464354-3 Water 22-JUN-20 10:10 AND1	L2464354-4 Water 22-JUN-20 11:00 DUPLICATE	
Grouping	Analyte					
WATER						
Dissolved Metals	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Lithium (Li)-Dissolved (mg/L)	0.0018	0.0022	<0.0010	<0.0010	
	Magnesium (Mg)-Dissolved (mg/L)	9.64	9.36	5.42	5.60	
	Manganese (Mn)-Dissolved (mg/L)	0.00188	0.00141	<0.00010	<0.00010	
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
	Molybdenum (Mo)-Dissolved (mg/L)	0.000412	0.000496	0.000331	0.000357	
	Nickel (Ni)-Dissolved (mg/L)	0.00330	0.00181	<0.00050	<0.00050	
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Potassium (K)-Dissolved (mg/L)	0.33	0.44	0.16	0.16	
	Selenium (Se)-Dissolved (mg/L)	0.00140	0.00116	0.000808	0.000735	
	Silicon (Si)-Dissolved (mg/L)	1.18	1.67	1.01	0.984	
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Dissolved (mg/L)	1.72	1.79	0.221	0.222	
	Strontium (Sr)-Dissolved (mg/L)	0.0921	0.0794	0.0672	0.0670	
	Sulfur (S)-Dissolved (mg/L)	10.3	8.59	1.95	1.96	
	Thallium (Tl)-Dissolved (mg/L)	0.000034	<0.000010	0.000050	0.000045	
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
	Uranium (U)-Dissolved (mg/L)	0.000491	0.000347	0.000291	0.000294	
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Zinc (Zn)-Dissolved (mg/L)	0.0062	0.0023	0.0021	0.0021	
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
Aggregate Organics	Chemical Oxygen Demand (mg/L)	<10	<10	<10	<10	
Volatile Organic Compounds	Acetone (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Acrolein (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Acrylonitrile (mg/L)	<0.020	<0.020	<0.020	<0.020	
	Benzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Bromobenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Bromochloromethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Bromodichloromethane (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Bromoform (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Bromomethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	2-Butanone (MEK) (mg/L)	<0.020	<0.020	<0.020	<0.020	
	n-Butylbenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	sec-Butylbenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	tert-Butylbenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2464354-1	L2464354-2	L2464354-3	L2464354-4	
		Description	Water	Water	Water	Water	
		Sampled Date	22-JUN-20	22-JUN-20	22-JUN-20	22-JUN-20	
		Sampled Time	09:30	11:10	10:10	11:00	
		Client ID	MICH 33.8	MICH 13.0	AND1	DUPLICATE	
Grouping	Analyte						
WATER							
Volatile Organic Compounds	Carbon disulfide (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	
	Carbon tetrachloride (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	
	Chlorobenzene (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	
	Dibromochloromethane (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	
	Chloroethane (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	
	Chloroform (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	
	Chloromethane (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	
	2-Chlorotoluene (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	
	4-Chlorotoluene (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	
	1,2-Dibromo-3-chloropropane (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	
	Ethylene dibromide (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	
	Dibromomethane (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	
	cis-1,4-Dichloro-2-butene (mg/L)		<0.0050	<0.0050	<0.0050	<0.0050	
	trans-1,4-Dichloro-2-butene (mg/L)		<0.0050	<0.0050	<0.0050	<0.0050	
	1,2-Dichlorobenzene (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	
	1,3-Dichlorobenzene (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	
	1,4-Dichlorobenzene (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	
	Dichlorodifluoromethane (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	
	1,1-Dichloroethane (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	
	1,2-Dichloroethane (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	
	1,1-Dichloroethene (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	
	cis-1,2-Dichloroethene (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	
	trans-1,2-Dichloroethene (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	
	Methylene chloride (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	
	1,2-Dichloropropane (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	
	1,3-Dichloropropane (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	
	2,2-Dichloropropane (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	
	1,1-Dichloropropene (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	
	cis-1,3-Dichloropropene (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	
	trans-1,3-Dichloropropene (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	
	Ethanol (mg/L)		<0.20	<0.20	<0.20	<0.20	
	Ethyl methacrylate (mg/L)		<0.0050	<0.0050	<0.0050	<0.0050	
	Ethylbenzene (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	
	Hexachlorobutadiene (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	
	2-Hexanone (mg/L)		<0.0050	<0.0050	<0.0050	<0.0050	
	Iodomethane (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	
	Isopropylbenzene (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2464354-1	L2464354-2	L2464354-3	L2464354-4	
		Description	Water	Water	Water	Water	
		Sampled Date	22-JUN-20	22-JUN-20	22-JUN-20	22-JUN-20	
		Sampled Time	09:30	11:10	10:10	11:00	
		Client ID	MICH 33.8	MICH 13.0	AND1	DUPLICATE	
Grouping	Analyte						
WATER							
Volatile Organic Compounds	p-Isopropyltoluene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	4-Methyl-2-pentanone (MIBK) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050		
	Methyl-t-butyl ether (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	n-Propylbenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Styrene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	1,1,1,2-Tetrachloroethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	1,1,2,2-Tetrachloroethane (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	Tetrachloroethylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	Toluene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	1,2,3-Trichlorobenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	1,2,4-Trichlorobenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	1,3,5-Trichlorobenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	1,1,1-Trichloroethane (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	1,1,2-Trichloroethane (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	Trichloroethene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	Trichlorofluoromethane (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	1,2,3-Trichloropropane (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	1,2,4-Trimethylbenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	1,3,5-Trimethylbenzene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010		
	Vinyl chloride (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	o-Xylene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	m+p-Xylenes (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050		
	Xylenes (mg/L)	<0.00071	<0.00071	<0.00071	<0.00071		
	Surrogate: 4-Bromofluorobenzene (%)	72.0	73.1	76.5	71.2		
	Surrogate: 3,4-Dichlorotoluene (%)	73.8	93.2	125.0	122.9		
	Surrogate: 1,4-Difluorobenzene (%)	81.6	81.9	80.6	80.8		
Hydrocarbons	EPH10-19 (ug/L)	<100	<100	<100	<100		
	EPH19-32 (ug/L)	<100	<100	<100	<100		
	Surrogate: 2-Bromobenzotrifluoride (%)	86.0	90.7	85.0	94.4		

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Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Qualifiers for Individual Parameters Listed:			
Qualifier	Description		
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).		
RRV	Reported Result Verified By Repeat Analysis		

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BE-D-L-CCMS-CL	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
BE-T-L-CCMS-CL	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
BR-L-IC-N-CL	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
C-DIS-ORG-LOW-CL	Water	Dissolved Organic Carbon	APHA 5310 B-Instrumental
This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.			
The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.			
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.			
C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This method is applicable to the analysis of ground water, wastewater, and surface water samples. The form detected depends upon sample pretreatment: Unfiltered sample = TC, 0.45um filtered = TDC. Samples are injected into a combustion tube containing an oxidation catalyst. The carrier gas containing the combustion product from the combustion tube flows through an inorganic carbon reactor vessel and is then sent through a halogen scrubber into a sample cell set in a non-dispersive infrared gas analyzer (NDIR) where carbon dioxide is detected. For total inorganic carbon and dissolved inorganic carbon, the sample is injected into an IC reactor vessel where only the IC component is decomposed to become carbon dioxide.			
The peak area generated by the NDIR indicates the TC/TDC or TIC/DIC as applicable. The total organic carbon content of the sample is calculated by subtracting the TIC from the TC.			
TOC = TC-TIC, DOC = TDC-DIC, Particulate = Total - Dissolved.			
CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
COD-T-COL-CL	Water	Chemical Oxygen Demand (COD)	APHA 5220 D Colorimetry
Samples are analyzed using the closed reflux colourimetric method			
COLOUR-TRUE-CL	Water	Colour (True) by Spectrometer	APHA 2120 Color
True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.			
EPH-L-ME-FID-CL	Water	EPH (C10-C19) & EPH (C19-C32)	BC Lab manual
EPH is extracted from water using a hexane micro-extraction technique, with analysis by GC-FID, as per the BC Lab Manual. EPH results include PAHs and are therefore not equivalent to LEPH or HEPH.			
F-IC-N-CL	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
HARDNESS-CALC-CL	Water	Hardness	APHA 2340 B

Reference Information

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO₃ equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-CL Water Dissolved Mercury in Water by CVAAS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 µm), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

HG-T-CVAA-CL Water Total Mercury in Water by CVAAS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-D-CCMS-CL Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 µm), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-CL Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MTBE-ADD-CL Water MTBE - additional to BTEX EPA 8260C/5021A

The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. MTBE Target compound concentration is measured using mass spectrometry detection.

NH3-L-F-CL Water Ammonia, Total (as N) J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-CL Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-CL Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-L-COL-CL Water Phosphorus (P)-Total APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH/EC/ALK-CL Water pH, Conductivity and Total Alkalinity APHA 4500H,2510,2320

All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)

pH measurement is determined from the activity of the hydrogen ions using a hydrogen electrode and a reference electrode.

Alkalinity measurement is based on the sample's capacity to neutralize acid

Conductivity measurement is based on the sample's capacity to convey an electric current

PO4-DO-L-COL-CL Water Orthophosphate-Dissolved (as P) APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-CL Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-CL Water Total Dissolved Solids APHA 2540 C

A well-mixed sample is filtered through a glass fibre filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2 °C. The increase in vial weight represents the total dissolved solids (TDS).

TKN-L-F-CL Water Total Kjeldahl Nitrogen APHA 4500-NORG (TKN)

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TSS-CL Water Total Suspended Solids APHA 2540 D-Gravimetric

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, and by drying the filter at 104 deg. C.

TURBIDITY-CL Water Turbidity APHA 2130 B-Nephelometer

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

VOC-HS-MS-CL Water VOCs in Water EPA 8260C/5021A

Reference Information

The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. VOC Target compound concentrations are measured using mass spectrometry detection.

XYLENES-CALC-CL	Water	Sum of Xylene Isomer Concentrations	CALCULATION
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 square root of the sum of the squares of the DLs of the individual Xylenes.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg ww - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

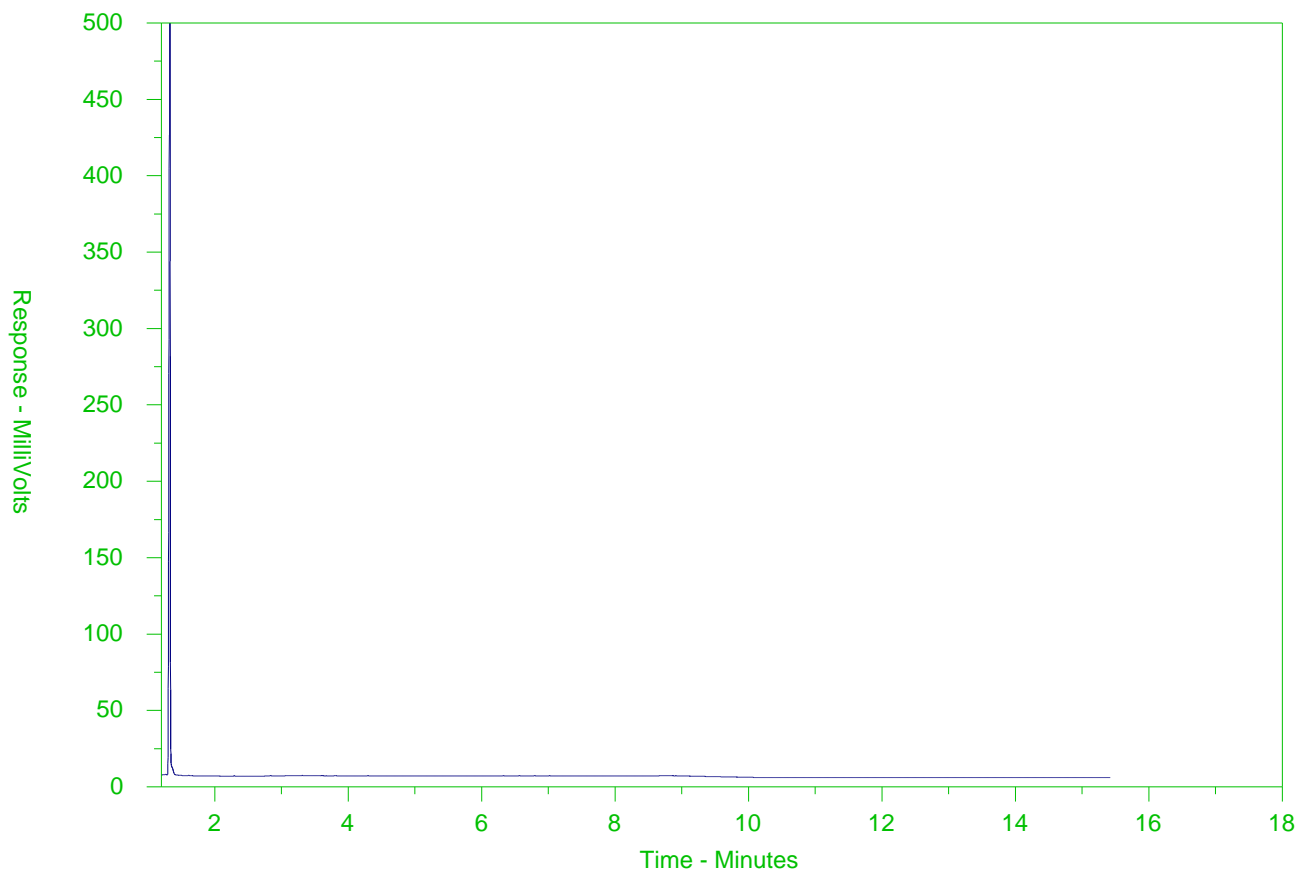
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2464354-1
 Client Sample ID: MICH 33.8



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34		nC50
174°C	287°C		481°C		575°C
346°F	549°F		898°F		1067°F
← Gasoline →			← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

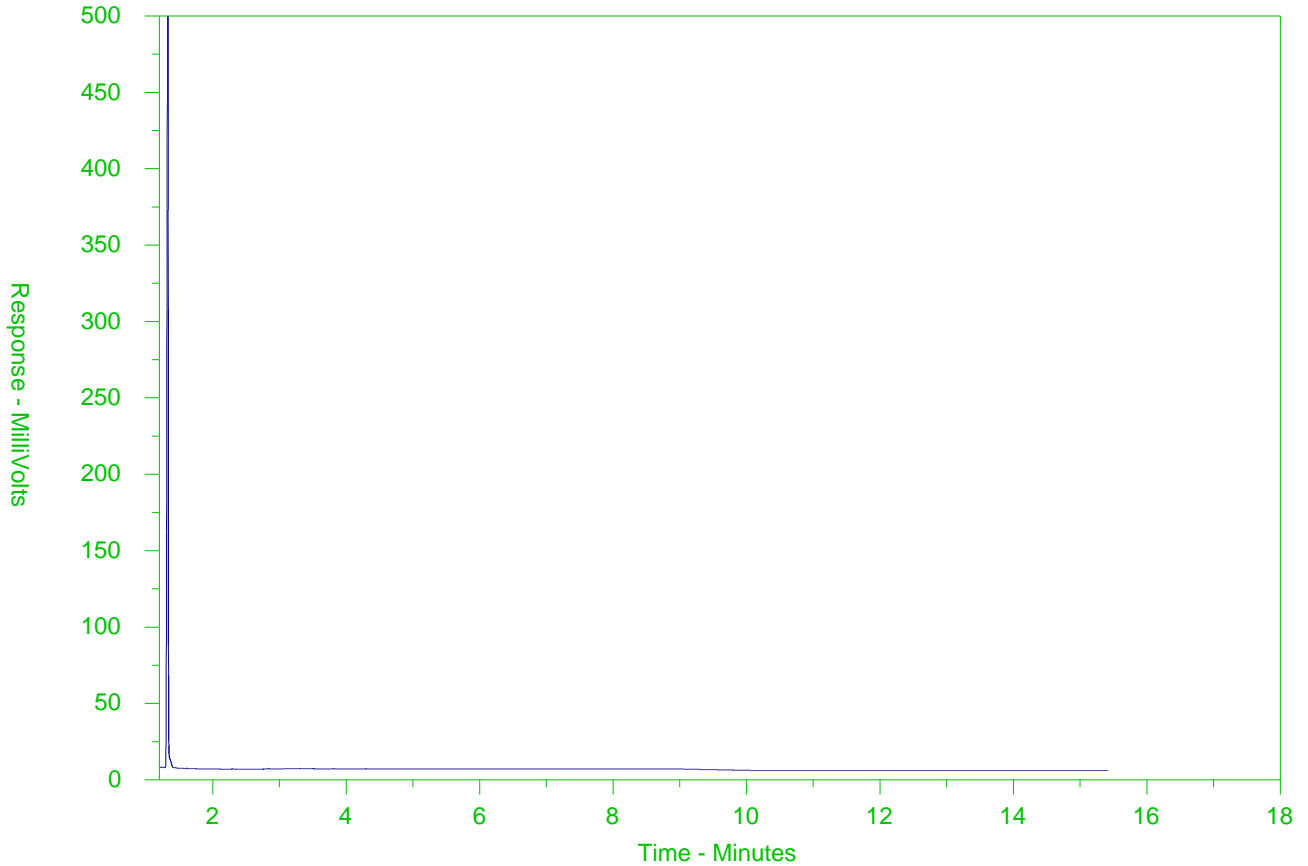
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2464354-2
Client Sample ID: MICH 13.0



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34	nC50	
174°C	287°C		481°C	575°C	
346°F	549°F		898°F	1067°F	
← Gasoline →		← Motor Oils/ Lube Oils/ Grease →			
← Diesel/ Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

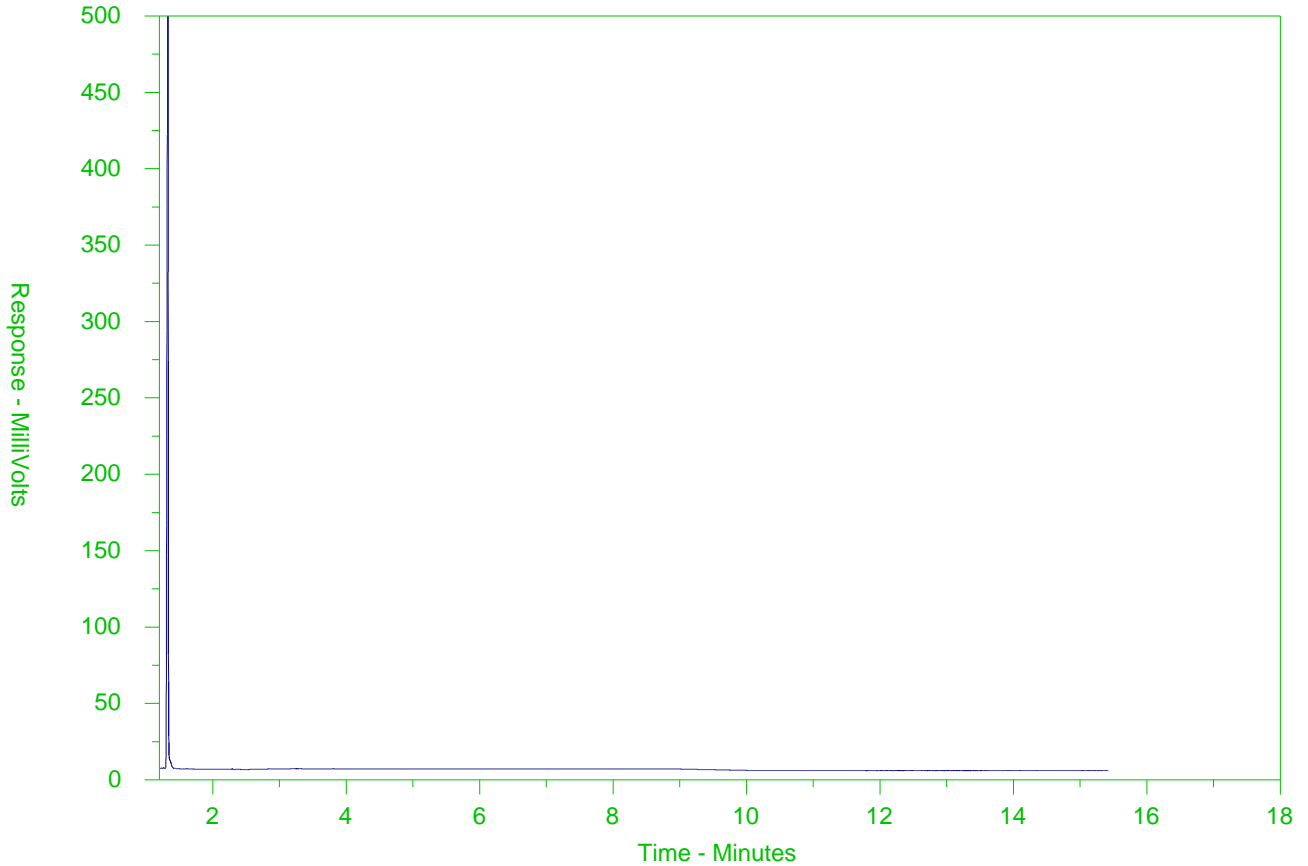
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2464354-3
Client Sample ID: AND1



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34		nC50
174°C	287°C		481°C		575°C
346°F	549°F		898°F		1067°F
← Gasoline →			← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →					

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

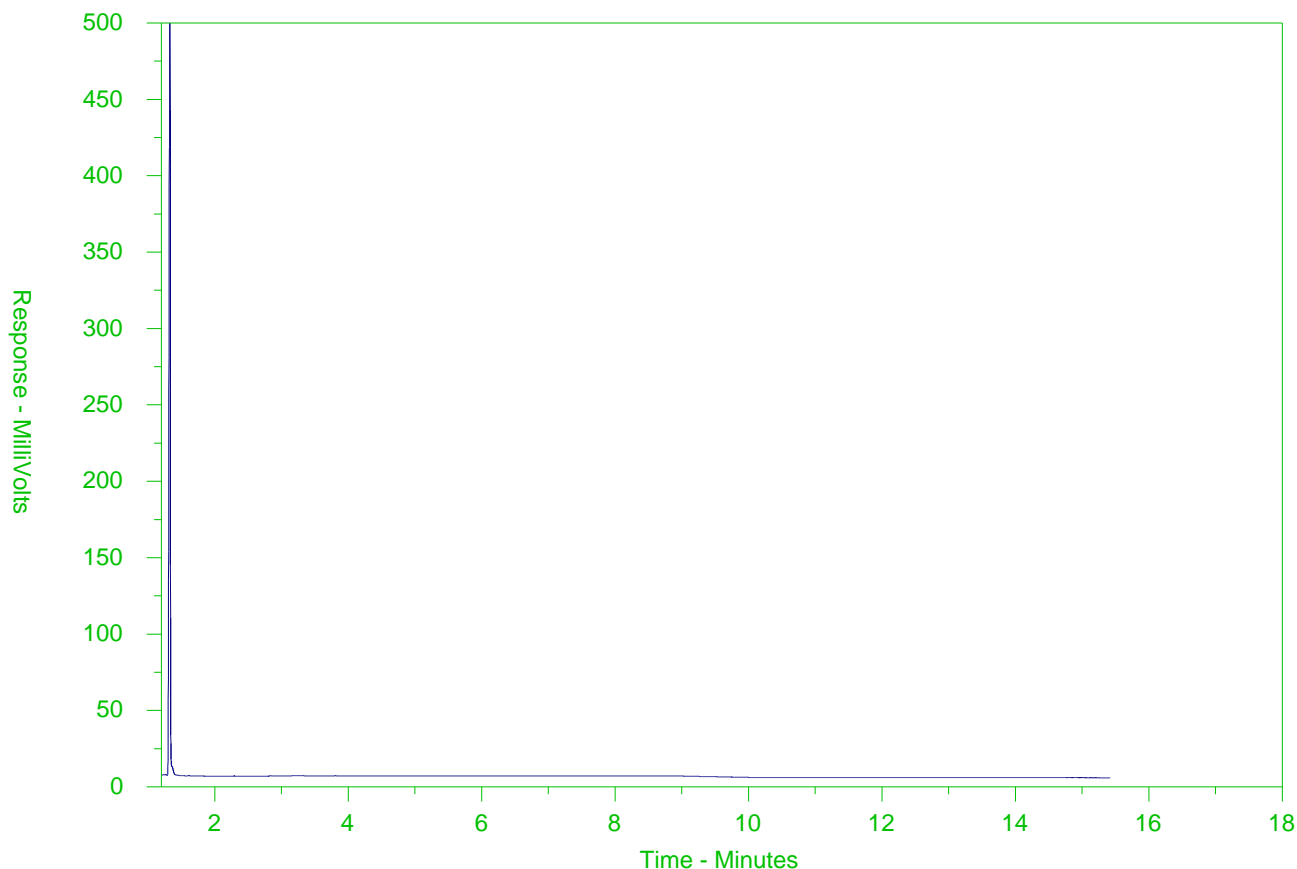
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2464354-4
 Client Sample ID: DUPLICATE



← F2 →		← F3 →		← F4 →	
nC10	nC16		nC34		nC50
174°C	287°C		481°C		575°C
346°F	549°F		898°F		1067°F
← Gasoline →			← Motor Oils/ Lube Oils/ Grease →		
← Diesel/ Jet Fuels →					

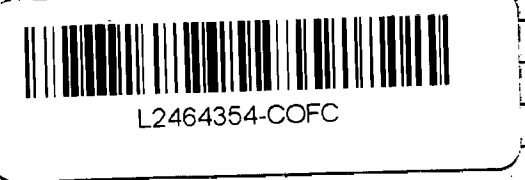
The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

Report To			Report Format / Distribution			Service Requested (Rush for routine analysis subject to availability)																																											
Company: North Coal Limited			<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Other			● Regular (Standard Turnaround Times - Business Days)																																											
Contact:			<input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax			○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT																																											
Address: #5000 Hwy 43			Email 1: barling@northcoal.ca			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT																																											
Sparwood, BC, V0B 2G1			Email 2: mike.robinson@lotic.co			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT																																											
Phone: Fax:			Email 3: mia.otto@lotic.co			Analysis Request																																											
Invoice To Same as Report? <input type="checkbox"/> Yes <input type="checkbox"/> No			Client / Project Information			Please indicate below Filtered, Preserved or both (F, P, F/P)																																											
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input type="checkbox"/> No			Job #: 18CANA02			<table border="1" style="width:100%; border-collapse: collapse; text-align: center;"> <tr> <td></td><td>P</td><td>F/P</td><td>P</td><td>P</td><td>F/P</td><td>P/F</td><td>P</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>General</td><td>EPH x2</td><td>DOC</td><td>COD/NH3/TKN/TOC</td><td>Total Metals</td><td>Dissolved Metals</td><td>Dissolved mercury</td><td>Total Mercury</td><td>VOC x2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>													P	F/P	P	P	F/P	P/F	P									General	EPH x2	DOC	COD/NH3/TKN/TOC	Total Metals	Dissolved Metals	Dissolved mercury	Total Mercury	VOC x2							
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Company:			PO / AFE:			<div style="display: flex; justify-content: space-between;"> <div> ALS Contact: Patryk Wojciak Sampler: Nicole Zathay </div> <div> Number of Containers </div> </div>																																											
Contact:			LSD:																																														
Address:			Quote #: Q75701																																														
Phone: Fax:																																																	
Lab Work Order # (lab use only)			ALS Contact: Patryk Wojciak			Sampler: Nicole Zathay																																											
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	General	EPH x2	DOC	COD/NH3/TKN/TOC	Total Metals	Dissolved Metals	Dissolved mercury	Total Mercury	VOC x2																																				
1	MICH 37.8	22-JUN-20	9:30	Surface Water	x	x	x	x	x	x	x	x	x		10																																		
2	MICH 13.0	22-JUN-20	11:10	Surface Water	x	x	x	x	x	x	x	x	x																																				
3	ANDI	22-JUN-20	10:10	Surface Water	x	x	x	x	x	x	x	x	x																																				
4	DUPLICATE	22-JUN-20	11:00	Surface Water	x	x	x	x	x	x	x	x	x																																				
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Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

EPH - hold extract for potential PAH at a later date.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT/RELEASE (client use)			SHIPMENT/RECEPTION (lab use only)			SHIPMENT VERIFICATION (lab use only)				
Released by: <i>Nicole Zathay</i>	Date (dd-mmm-yy): <i>22-JUN-20</i>	Time (hh-mm): <i>11:30</i>	Received by: <i>[Signature]</i>	Date: <i>6/23</i>	Time: <i>8:30</i>	Temperature: <i>5 °C</i>	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF