

Atuat Shouldice
Water Resource Officer
Indigenous and Northern Affairs
Kivalliq Regional Office
Ikingutigiit Center Suite 1, PO Box 129
Rankin Inlet, NU X0C 0G0

July 26, 2018

RE: Water Licence No. 3BM-WHA1520 Notice of Lagoon Decant

Dear: Atuat Shouldice;

As per Part D, Item 13 of the Hamlet of Whale Cove Water Licence No. 3BM – WHA1510, this is notification of intent to discharge effluent from the sewage lagoon. The annual decant of the sewage lagoon will begin the week of August 6, 2018.

Samples taken July 12, 2018 confirm the effluent meets the criteria set out in Part D, Item 4 of Water Licence No. 3BM – WHA1510. A photo of the site (Figure 1), summary table comparing effluent quality limits to the sampling results, and the Certificate of Analysis are attached for reference.

Should you have any questions, please contact me at 867-645-8127 or cdubiel@gov.nu.ca.

Sincerely,

Pauline

Chelsea Dubiel
Municipal Engineering Student
Community and Government Services
Kivalliq Region, Government of Nunavut

cc: Ian Copeland, Senior Administrative Officer, Hamlet of Whale Cove
Megan Lusty, Community and Government Services
NWB Licencing Department

Enclosure:
Summary of WHA-3 Sampling Parameters July 12, 2018
ALS, Certificate of Analysis, July 12, 2018, Lab Work Order #: L2128984*

*WHA-3 results were reported under the title WHA-4 within the Certificate of Analysis



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Building *Nunavut* Together
Nunavut liuqatigiingniq
Bâtir le *Nunavut* ensemble

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Department of Community and Government Services
Nunalingni Kavamatkunnilu Pivikhaqautikkut
Ministère des Services Communautaires et gouvernementaux

Figure 1: Whale Cove Sewage Lagoon July 12, 2018



P.O. Box 490 Government of Nunavut, Rankin Inlet, NU. X0C 0G0

☎ (867) 645-8119 📠 (867) 645-8141



Department of Community and Government Services
Nunalingni Kavamatkunnilu Pivikhaqautikkut
Ministère des Services Communautaires et gouvernementaux

Effluent Quality Guidelines Part D, Item 4	Maximum Concentration of Any Grab	WHA-3 July 12, 2018 Results
BOD ₅	120 mg/L	27.2 mg/L
Total Suspended Solids	180 mg/L	13.6 mg/L
Fecal Coliforms	1x10 ⁶ CFU/100ml	8160 MPN/100ml**
Oil and Grease	No visible sheen	<5.0 mg/L
pH	Between 6 and 9	7.51

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Hamlet of Whale Cove
ATTN: IAN COPLAND
PO Box 120
Whale Cove NU X0C 0J0

Date Received: 13-JUL-18
Report Date: 24-JUL-18 10:39 (MT)
Version: FINAL

Client Phone: 867-896-9961

Certificate of Analysis

Lab Work Order #: L2128984
Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:



Hua Wo
Chemistry Laboratory Manager

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ADDRESS: 1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4 Canada | Phone: +1 204 255 9720 | Fax: +1 204 255 9721
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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2128984-1 WHA-2							
Sampled By: CLIENT on 12-JUL-18 @ 09:10							
Matrix: WW							
BTEX plus F1-F4							
BTX plus F1 by GCMS							
Benzene	<0.00050		0.00050	mg/L		17-JUL-18	R4131791
Toluene	<0.0010		0.0010	mg/L		17-JUL-18	R4131791
Ethyl benzene	<0.00050		0.00050	mg/L		17-JUL-18	R4131791
o-Xylene	<0.00050		0.00050	mg/L		17-JUL-18	R4131791
m+p-Xylenes	<0.00040		0.00040	mg/L		17-JUL-18	R4131791
F1 (C6-C10)	<0.10		0.10	mg/L		17-JUL-18	R4131791
Surrogate: 4-Bromofluorobenzene (SS)	95.9		70-130	%		17-JUL-18	R4131791
CCME PHC F2-F4 in Water							
F2 (C10-C16)	<0.10		0.10	mg/L	16-JUL-18	17-JUL-18	R4130550
F3 (C16-C34)	0.28		0.25	mg/L	16-JUL-18	17-JUL-18	R4130550
F4 (C34-C50)	<0.25		0.25	mg/L	16-JUL-18	17-JUL-18	R4130550
Surrogate: 2-Bromobenzotrifluoride	82.9		60-140	%	16-JUL-18	17-JUL-18	R4130550
CCME Total Hydrocarbons							
F1-BTEX	<0.10		0.10	mg/L		20-JUL-18	
F2-Naphth	<0.10		0.10	mg/L		20-JUL-18	
F3-PAH	0.28		0.25	mg/L		20-JUL-18	
Total Hydrocarbons (C6-C50)	<0.38		0.38	mg/L		20-JUL-18	
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.00064		0.00064	mg/L		18-JUL-18	
Polyaromatic Hydrocarbons (PAHs)							
1-Methyl Naphthalene	0.000027		0.000020	mg/L	18-JUL-18	18-JUL-18	R4134327
2-Methyl Naphthalene	0.000024		0.000020	mg/L	18-JUL-18	18-JUL-18	R4134327
Acenaphthene	0.000052		0.000020	mg/L	18-JUL-18	18-JUL-18	R4134327
Acenaphthylene	<0.000020		0.000020	mg/L	18-JUL-18	18-JUL-18	R4134327
Anthracene	<0.000010		0.000010	mg/L	18-JUL-18	18-JUL-18	R4134327
Acridine	<0.000020		0.000020	mg/L	18-JUL-18	18-JUL-18	R4134327
Benzo(a)anthracene	<0.000010		0.000010	mg/L	18-JUL-18	18-JUL-18	R4134327
Benzo(a)pyrene	<0.0000050		0.0000050	mg/L	18-JUL-18	18-JUL-18	R4134327
Benzo(b&j)fluoranthene	<0.000010		0.000010	mg/L	18-JUL-18	18-JUL-18	R4134327
Benzo(g,h,i)perylene	<0.000020		0.000020	mg/L	18-JUL-18	18-JUL-18	R4134327
Benzo(k)fluoranthene	<0.000010		0.000010	mg/L	18-JUL-18	18-JUL-18	R4134327
Chrysene	<0.000020		0.000020	mg/L	18-JUL-18	18-JUL-18	R4134327
Dibenzo(a,h)anthracene	<0.0000050		0.0000050	mg/L	18-JUL-18	18-JUL-18	R4134327
Fluoranthene	<0.000020		0.000020	mg/L	18-JUL-18	18-JUL-18	R4134327
Fluorene	<0.000020		0.000020	mg/L	18-JUL-18	18-JUL-18	R4134327
Indeno(1,2,3-cd)pyrene	<0.000010		0.000010	mg/L	18-JUL-18	18-JUL-18	R4134327
Naphthalene	0.000123		0.000050	mg/L	18-JUL-18	18-JUL-18	R4134327
Phenanthrene	<0.000050		0.000050	mg/L	18-JUL-18	18-JUL-18	R4134327
Pyrene	<0.000010		0.000010	mg/L	18-JUL-18	18-JUL-18	R4134327
Quinoline	0.000044		0.000020	mg/L	18-JUL-18	18-JUL-18	R4134327
B(a)P Total Potency Equivalent	<0.000030		0.000030	mg/L	18-JUL-18	18-JUL-18	R4134327
Surrogate: Acenaphthene d10	87.3		40-130	%	18-JUL-18	18-JUL-18	R4134327
Surrogate: Acridine d9	91.7		40-130	%	18-JUL-18	18-JUL-18	R4134327
Surrogate: Chrysene d12	90.1		40-130	%	18-JUL-18	18-JUL-18	R4134327
Surrogate: Naphthalene d8	81.7		40-130	%	18-JUL-18	18-JUL-18	R4134327
Surrogate: Phenanthrene d10	90.4		40-130	%	18-JUL-18	18-JUL-18	R4134327
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO3)	237		1.2	mg/L		17-JUL-18	
Alkalinity, Carbonate							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2128984-1 WHA-2							
Sampled By: CLIENT on 12-JUL-18 @ 09:10							
Matrix: WW							
Alkalinity, Carbonate							
Carbonate (CO3)	<0.60		0.60	mg/L		17-JUL-18	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		17-JUL-18	
Alkalinity, Total (as CaCO3)							
Alkalinity, Total (as CaCO3)	195		1.0	mg/L		16-JUL-18	R4128971
Ammonia by colour							
Ammonia, Total (as N)	0.049		0.020	mg/L		14-JUL-18	R4129527
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	12.5		6.0	mg/L		14-JUL-18	R4134017
Carbonaceous BOD							
BOD Carbonaceous	8.3		6.0	mg/L		14-JUL-18	R4134017
Chloride in Water by IC							
Chloride (Cl)	74.3		0.50	mg/L		14-JUL-18	R4131207
Conductivity							
Conductivity	695		1.0	umhos/cm		16-JUL-18	R4128971
Fecal coliforms, 1:10 dilution by QT97							
Fecal Coliforms	420		10	MPN/100mL		13-JUL-18	R4124985
Hardness Calculated							
Hardness (as CaCO3)	191	HTC	0.20	mg/L		19-JUL-18	
Mercury Total							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L	16-JUL-18	18-JUL-18	R4132708
Nitrate in Water by IC							
Nitrate (as N)	<0.020		0.020	mg/L		14-JUL-18	R4131207
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		18-JUL-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		14-JUL-18	R4131207
Oil & Grease - Gravimetric							
Oil and Grease	<5.0		5.0	mg/L		23-JUL-18	R4138284
Phenol (4AAP)							
Phenols (4AAP)	0.0032		0.0010	mg/L		17-JUL-18	R4131590
Phosphorus, Total							
Phosphorus (P)-Total	0.249		0.0010	mg/L		19-JUL-18	R4133029
Sulfate in Water by IC							
Sulfate (SO4)	47.5		0.30	mg/L		14-JUL-18	R4131207
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0196		0.0030	mg/L	17-JUL-18	18-JUL-18	R4132485
Antimony (Sb)-Total	0.00516		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Arsenic (As)-Total	0.00276		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Barium (Ba)-Total	0.0324		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	17-JUL-18	18-JUL-18	R4132485
Boron (B)-Total	0.204		0.010	mg/L	17-JUL-18	18-JUL-18	R4132485
Cadmium (Cd)-Total	0.0000473		0.0000050	mg/L	17-JUL-18	18-JUL-18	R4132485
Calcium (Ca)-Total	60.0		0.050	mg/L	17-JUL-18	18-JUL-18	R4132485
Cesium (Cs)-Total	0.000044		0.000010	mg/L	17-JUL-18	18-JUL-18	R4132485
Chromium (Cr)-Total	0.00105		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Cobalt (Co)-Total	0.00186		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Copper (Cu)-Total	0.00571		0.00050	mg/L	17-JUL-18	18-JUL-18	R4132485
Iron (Fe)-Total	2.55		0.010	mg/L	17-JUL-18	18-JUL-18	R4132485
Lead (Pb)-Total	0.000686		0.000050	mg/L	17-JUL-18	18-JUL-18	R4132485
Lithium (Li)-Total	0.0083		0.0010	mg/L	17-JUL-18	18-JUL-18	R4132485

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2128984-1 WHA-2 Sampled By: CLIENT on 12-JUL-18 @ 09:10 Matrix: WW							
Total Metals in Water by CRC ICPMS							
Magnesium (Mg)-Total	9.93		0.0050	mg/L	17-JUL-18	18-JUL-18	R4132485
Manganese (Mn)-Total	0.370		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Molybdenum (Mo)-Total	0.0321		0.000050	mg/L	17-JUL-18	18-JUL-18	R4132485
Nickel (Ni)-Total	0.00667		0.00050	mg/L	17-JUL-18	18-JUL-18	R4132485
Potassium (K)-Total	11.5		0.050	mg/L	17-JUL-18	18-JUL-18	R4132485
Phosphorus (P)-Total	0.244		0.050	mg/L	17-JUL-18	18-JUL-18	R4132485
Rubidium (Rb)-Total	0.0120		0.00020	mg/L	17-JUL-18	18-JUL-18	R4132485
Selenium (Se)-Total	0.000188		0.000050	mg/L	17-JUL-18	18-JUL-18	R4132485
Silicon (Si)-Total	1.55		0.10	mg/L	17-JUL-18	18-JUL-18	R4132485
Silver (Ag)-Total	0.000015		0.000010	mg/L	17-JUL-18	18-JUL-18	R4132485
Sodium (Na)-Total	52.2		0.050	mg/L	17-JUL-18	18-JUL-18	R4132485
Strontium (Sr)-Total	0.385		0.00020	mg/L	17-JUL-18	18-JUL-18	R4132485
Sulfur (S)-Total	20.1		0.50	mg/L	17-JUL-18	18-JUL-18	R4132485
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	17-JUL-18	18-JUL-18	R4132485
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	17-JUL-18	18-JUL-18	R4132485
Thorium (Th)-Total	<0.00010		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Tin (Sn)-Total	0.00024		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Titanium (Ti)-Total	0.00075		0.00030	mg/L	17-JUL-18	18-JUL-18	R4132485
Tungsten (W)-Total	0.00022		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Uranium (U)-Total	0.000529		0.000010	mg/L	17-JUL-18	18-JUL-18	R4132485
Vanadium (V)-Total	0.00055		0.00050	mg/L	17-JUL-18	18-JUL-18	R4132485
Zinc (Zn)-Total	0.196		0.0030	mg/L	17-JUL-18	18-JUL-18	R4132485
Zirconium (Zr)-Total	0.000163		0.000060	mg/L	17-JUL-18	18-JUL-18	R4132485
Total Organic Carbon by Combustion							
Total Organic Carbon	17.1		0.50	mg/L		23-JUL-18	R4138739
Total Suspended Solids							
Total Suspended Solids	12.2		3.0	mg/L		19-JUL-18	R4138185
pH							
pH	7.56		0.10	pH units		16-JUL-18	R4128971
L2128984-2 WHA-3 Sampled By: CLIENT on 12-JUL-18 @ 09:30 Matrix: WW							
Nunavut WW Group 1							
Alkalinity, Bicarbonate							
Bicarbonate (HCO ₃)	309		1.2	mg/L		17-JUL-18	
Alkalinity, Carbonate							
Carbonate (CO ₃)	<0.60		0.60	mg/L		17-JUL-18	
Alkalinity, Hydroxide							
Hydroxide (OH)	<0.34		0.34	mg/L		17-JUL-18	
Alkalinity, Total (as CaCO₃)							
Alkalinity, Total (as CaCO ₃)	253		1.0	mg/L		16-JUL-18	R4128971
Ammonia by colour							
Ammonia, Total (as N)	0.037		0.010	mg/L		14-JUL-18	R4129527
Biochemical Oxygen Demand (BOD)							
Biochemical Oxygen Demand	9.0		2.0	mg/L		14-JUL-18	R4134017
Carbonaceous BOD							
BOD Carbonaceous	7.0		2.0	mg/L		14-JUL-18	R4134017
Chloride in Water by IC							
Chloride (Cl)	113		1.0	mg/L		14-JUL-18	R4131207
Conductivity							
Conductivity	871		1.0	umhos/cm		16-JUL-18	R4128971

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2128984-2 WHA-3							
Sampled By: CLIENT on 12-JUL-18 @ 09:30							
Matrix: WW							
Fecal coliforms, 1:10 dilution by QT97							
Fecal Coliforms	20		10	MPN/100mL		13-JUL-18	R4124985
Hardness Calculated							
Hardness (as CaCO3)	216	HTC	0.20	mg/L		19-JUL-18	
Mercury Total							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L	16-JUL-18	18-JUL-18	R4132708
Nitrate in Water by IC							
Nitrate (as N)	<0.040	DLM	0.040	mg/L		14-JUL-18	R4131207
Nitrate+Nitrite							
Nitrate and Nitrite as N	<0.070		0.070	mg/L		18-JUL-18	
Nitrite in Water by IC							
Nitrite (as N)	<0.020	DLM	0.020	mg/L		14-JUL-18	R4131207
Oil & Grease - Gravimetric							
Oil and Grease	<5.0		5.0	mg/L		23-JUL-18	R4138284
Phenol (4AAP)							
Phenols (4AAP)	0.0012		0.0010	mg/L		17-JUL-18	R4131590
Phosphorus, Total							
Phosphorus (P)-Total	5.71		0.010	mg/L		19-JUL-18	R4133029
Sulfate in Water by IC							
Sulfate (SO4)	27.3		0.60	mg/L		14-JUL-18	R4131207
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0794		0.0030	mg/L	17-JUL-18	18-JUL-18	R4132485
Antimony (Sb)-Total	0.00020		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Arsenic (As)-Total	0.00637		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Barium (Ba)-Total	0.0227		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	17-JUL-18	18-JUL-18	R4132485
Boron (B)-Total	0.247		0.010	mg/L	17-JUL-18	18-JUL-18	R4132485
Cadmium (Cd)-Total	0.0000091		0.0000050	mg/L	17-JUL-18	18-JUL-18	R4132485
Calcium (Ca)-Total	62.8		0.050	mg/L	17-JUL-18	18-JUL-18	R4132485
Cesium (Cs)-Total	0.000022		0.000010	mg/L	17-JUL-18	18-JUL-18	R4132485
Chromium (Cr)-Total	0.00042		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Cobalt (Co)-Total	0.00073		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Copper (Cu)-Total	0.00238		0.00050	mg/L	17-JUL-18	18-JUL-18	R4132485
Iron (Fe)-Total	1.24		0.010	mg/L	17-JUL-18	18-JUL-18	R4132485
Lead (Pb)-Total	0.000166		0.000050	mg/L	17-JUL-18	18-JUL-18	R4132485
Lithium (Li)-Total	0.0123		0.0010	mg/L	17-JUL-18	18-JUL-18	R4132485
Magnesium (Mg)-Total	14.3		0.0050	mg/L	17-JUL-18	18-JUL-18	R4132485
Manganese (Mn)-Total	0.481		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Molybdenum (Mo)-Total	0.00219		0.000050	mg/L	17-JUL-18	18-JUL-18	R4132485
Nickel (Ni)-Total	0.00393		0.00050	mg/L	17-JUL-18	18-JUL-18	R4132485
Potassium (K)-Total	15.2		0.050	mg/L	17-JUL-18	18-JUL-18	R4132485
Phosphorus (P)-Total	6.87		0.050	mg/L	17-JUL-18	18-JUL-18	R4132485
Rubidium (Rb)-Total	0.00946		0.00020	mg/L	17-JUL-18	18-JUL-18	R4132485
Selenium (Se)-Total	0.000195		0.000050	mg/L	17-JUL-18	18-JUL-18	R4132485
Silicon (Si)-Total	3.15		0.10	mg/L	17-JUL-18	18-JUL-18	R4132485
Silver (Ag)-Total	<0.000010		0.000010	mg/L	17-JUL-18	18-JUL-18	R4132485
Sodium (Na)-Total	106		0.050	mg/L	17-JUL-18	18-JUL-18	R4132485
Strontium (Sr)-Total	0.378		0.00020	mg/L	17-JUL-18	18-JUL-18	R4132485
Sulfur (S)-Total	13.7		0.50	mg/L	17-JUL-18	18-JUL-18	R4132485
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	17-JUL-18	18-JUL-18	R4132485
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	17-JUL-18	18-JUL-18	R4132485
Thorium (Th)-Total	<0.00010		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2128984-2 WHA-3 Sampled By: CLIENT on 12-JUL-18 @ 09:30 Matrix: WW Total Metals in Water by CRC ICPMS Tin (Sn)-Total Titanium (Ti)-Total Tungsten (W)-Total Uranium (U)-Total Vanadium (V)-Total Zinc (Zn)-Total Zirconium (Zr)-Total Total Organic Carbon by Combustion Total Organic Carbon Total Suspended Solids Total Suspended Solids pH pH	0.00015 0.00391 <0.00010 0.00120 0.00156 0.0048 0.000176 25.9 <3.0 7.60		0.00010 0.00030 0.00010 0.000010 0.00050 0.0030 0.000060	mg/L mg/L mg/L mg/L mg/L mg/L mg/L	17-JUL-18 17-JUL-18 17-JUL-18 17-JUL-18 17-JUL-18 17-JUL-18 17-JUL-18	18-JUL-18 18-JUL-18 18-JUL-18 18-JUL-18 18-JUL-18 18-JUL-18 18-JUL-18	R4132485 R4132485 R4132485 R4132485 R4132485 R4132485 R4132485
L2128984-3 WHA-4 Sampled By: CLIENT on 12-JUL-18 @ 09:40 Matrix: WW Nunavut WW Group 1 Alkalinity, Bicarbonate Bicarbonate (HCO3) Alkalinity, Carbonate Carbonate (CO3) Alkalinity, Hydroxide Hydroxide (OH) Alkalinity, Total (as CaCO3) Alkalinity, Total (as CaCO3) Ammonia by colour Ammonia, Total (as N) Biochemical Oxygen Demand (BOD) Biochemical Oxygen Demand Carbonaceous BOD BOD Carbonaceous Chloride in Water by IC Chloride (Cl) Conductivity Conductivity Fecal coliforms, 1:10 dilution by QT97 Fecal Coliforms Hardness Calculated Hardness (as CaCO3) Mercury Total Mercury (Hg)-Total Nitrate in Water by IC Nitrate (as N) Nitrate+Nitrite Nitrate and Nitrite as N Nitrite in Water by IC Nitrite (as N) Oil & Grease - Gravimetric Oil and Grease Phenol (4AAP) Phenols (4AAP)	299 <0.60 <0.34 245 33.8 27.2 18.4 82.6 822 8160 113 0.0000067 <0.040 <0.070 <0.020 <5.0 0.0026		1.2 0.60 0.34 1.0 5.0 6.0 6.0 1.0 1.0 10 0.20 0.0000050 0.040 0.070 0.020 5.0 0.0010	mg/L mg/L mg/L mg/L mg/L mg/L mg/L umhos/cm MPN/100mL mg/L mg/L mg/L mg/L	17-JUL-18 17-JUL-18 17-JUL-18 16-JUL-18 17-JUL-18 14-JUL-18 14-JUL-18 14-JUL-18 16-JUL-18 13-JUL-18 19-JUL-18 16-JUL-18 14-JUL-18 18-JUL-18 14-JUL-18 23-JUL-18 17-JUL-18	18-JUL-18 18-JUL-18 18-JUL-18 18-JUL-18 18-JUL-18 18-JUL-18 18-JUL-18 18-JUL-18 18-JUL-18 18-JUL-18 18-JUL-18 18-JUL-18 18-JUL-18 18-JUL-18 18-JUL-18 18-JUL-18 18-JUL-18	R4132485 R4132485 R4132485 R4132485 R4132485 R4132485 R4132485 R4132485 R4132485 R4132485 R4132485 R4132485 R4132485 R4132485 R4132485 R4132485 R4132485

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2128984-3 WHA-4							
Sampled By: CLIENT on 12-JUL-18 @ 09:40							
Matrix: WW							
Phosphorus, Total							
Phosphorus (P)-Total	6.48		0.020	mg/L		19-JUL-18	R4133029
Sulfate in Water by IC							
Sulfate (SO4)	24.6		0.60	mg/L		14-JUL-18	R4131207
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0570		0.0030	mg/L	17-JUL-18	18-JUL-18	R4132485
Antimony (Sb)-Total	0.00019		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Arsenic (As)-Total	0.00093		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Barium (Ba)-Total	0.00481		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Bismuth (Bi)-Total	0.000239		0.000050	mg/L	17-JUL-18	18-JUL-18	R4132485
Boron (B)-Total	0.113		0.010	mg/L	17-JUL-18	18-JUL-18	R4132485
Cadmium (Cd)-Total	0.0000197		0.000050	mg/L	17-JUL-18	18-JUL-18	R4132485
Calcium (Ca)-Total	33.6		0.050	mg/L	17-JUL-18	18-JUL-18	R4132485
Cesium (Cs)-Total	0.000109		0.000010	mg/L	17-JUL-18	18-JUL-18	R4132485
Chromium (Cr)-Total	0.00031		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Cobalt (Co)-Total	0.00064		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Copper (Cu)-Total	0.0294		0.00050	mg/L	17-JUL-18	18-JUL-18	R4132485
Iron (Fe)-Total	0.169		0.010	mg/L	17-JUL-18	18-JUL-18	R4132485
Lead (Pb)-Total	0.000685		0.000050	mg/L	17-JUL-18	18-JUL-18	R4132485
Lithium (Li)-Total	0.0035		0.0010	mg/L	17-JUL-18	18-JUL-18	R4132485
Magnesium (Mg)-Total	7.12		0.0050	mg/L	17-JUL-18	18-JUL-18	R4132485
Manganese (Mn)-Total	0.0823		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Molybdenum (Mo)-Total	0.000848		0.000050	mg/L	17-JUL-18	18-JUL-18	R4132485
Nickel (Ni)-Total	0.00245		0.00050	mg/L	17-JUL-18	18-JUL-18	R4132485
Potassium (K)-Total	17.2		0.050	mg/L	17-JUL-18	18-JUL-18	R4132485
Phosphorus (P)-Total	6.11		0.050	mg/L	17-JUL-18	18-JUL-18	R4132485
Rubidium (Rb)-Total	0.0179		0.00020	mg/L	17-JUL-18	18-JUL-18	R4132485
Selenium (Se)-Total	0.000338		0.000050	mg/L	17-JUL-18	18-JUL-18	R4132485
Silicon (Si)-Total	2.33		0.10	mg/L	17-JUL-18	18-JUL-18	R4132485
Silver (Ag)-Total	0.000087		0.000010	mg/L	17-JUL-18	18-JUL-18	R4132485
Sodium (Na)-Total	56.9		0.050	mg/L	17-JUL-18	18-JUL-18	R4132485
Strontium (Sr)-Total	0.149		0.00020	mg/L	17-JUL-18	18-JUL-18	R4132485
Sulfur (S)-Total	13.9		0.50	mg/L	17-JUL-18	18-JUL-18	R4132485
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	17-JUL-18	18-JUL-18	R4132485
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	17-JUL-18	18-JUL-18	R4132485
Thorium (Th)-Total	<0.00010		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Tin (Sn)-Total	0.00079		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Titanium (Ti)-Total	0.00818		0.00030	mg/L	17-JUL-18	18-JUL-18	R4132485
Tungsten (W)-Total	<0.00010		0.00010	mg/L	17-JUL-18	18-JUL-18	R4132485
Uranium (U)-Total	0.000074		0.000010	mg/L	17-JUL-18	18-JUL-18	R4132485
Vanadium (V)-Total	<0.00050		0.00050	mg/L	17-JUL-18	18-JUL-18	R4132485
Zinc (Zn)-Total	0.0175		0.0030	mg/L	17-JUL-18	18-JUL-18	R4132485
Zirconium (Zr)-Total	0.00173		0.000060	mg/L	17-JUL-18	18-JUL-18	R4132485
Total Organic Carbon by Combustion							
Total Organic Carbon	26.4		0.50	mg/L		23-JUL-18	R4138739
Total Suspended Solids							
Total Suspended Solids	13.6		6.0	mg/L		19-JUL-18	R4138185
pH							
pH	7.51		0.10	pH units		16-JUL-18	R4128971

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-CO3CO3-CALC-WP	Water	Alkalinity, Carbonate	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by carbonate is calculated and reported as mg CO3 2-/L.			
ALK-HCO3HCO3-CALC-WP	Water	Alkalinity, Bicarbonate	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by bicarbonate is calculated and reported as mg HCO3-/L			
ALK-OHOH-CALC-WP	Water	Alkalinity, Hydroxide	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by hydroxide is calculated and reported as mg OH-/L.			
ALK-TITR-WP	Water	Alkalinity, Total (as CaCO3)	APHA 2320B
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. Total alkalinity is determined by titration with a strong standard mineral acid to the successive HCO3- and H2CO3 endpoints indicated electrometrically.			
BOD-CBOD-WP	Water	Carbonaceous BOD	APHA 5210 B
Samples are diluted and seeded, have TCMP added to inhibit nitrogenous demands, and then are incubated in airtight bottles at 20°C for 5 days. Dissolved oxygen is measured initially and after incubation, and results are computed from the difference between initial and final DO.			
BOD-WP	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B
Samples are diluted and seeded and then incubated in airtight bottles at 20°C for 5 days. Dissolved oxygen is measured initially and after incubation, and results are computed from the difference between initial and final DO.			
BTEXS+F1-HSMS-WP	Water	BTX plus F1 by GCMS	EPA 8260C / EPA 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. Target compound concentrations are measured using mass spectrometry detection.			
C-TOC-HTC-WP	Water	Total Organic Carbon by Combustion	APHA 5310 B-WP
Sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO2 which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.			
CL-IC-N-WP	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
EC-WP	Water	Conductivity	APHA 2510B
Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.			
F1-F4-CALC-WP	Water	CCME Total Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001-L
Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.			
In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.			
In samples where BTEX and F1 were analyzed, F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.			
In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.			

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:

1. All extraction and analysis holding times were met.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene. 3. Linearity of gasoline response within 15% throughout the calibration range.			
Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges: 1. All extraction and analysis holding times were met. 2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average. 3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors. 4. Linearity of diesel or motor oil response within 15% throughout the calibration range.			
F2-F4-FID-WP	Water	CCME PHC F2-F4 in Water	EPA 3511
Petroleum hydrocarbons in water are determined by liquid-liquid micro-scale solvent extraction using a reciprocal shaker extraction apparatus prior to capillary column gas chromatography with flame ionization detection (GC-FID) analysis.			
FC10-QT97-WP	Water	Fecal coliforms, 1:10 dilution by QT97	APHA 9223B QT97
Analysis is carried out using procedures adapted from APHA 9223 "Enzyme Substrate Coliform Test". Fecal (thermotolerant) coliform bacteria are determined by mixing a 1:10 dilution of sample with a product containing hydrolyzable substrates and sealing in a 97-well packet. The packet is incubated at 44.5 – 0.2°C for 18 hours and then the number of wells exhibiting positive responses are counted. The final results are obtained by comparing the number of positive responses to a probability table.			
HARDNESS-CALC-WP	Water	Hardness Calculated	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
HG-T-CVAF-WP	Water	Mercury Total	EPA245.7 V2.0
Mercury in filtered and unfiltered waters is oxidized with Bromine monochloride and analyzed by cold-vapour atomic fluorescence spectrometry.			
MET-T-CCMS-WP	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.			
NH3-COL-WP	Water	Ammonia by colour	APHA 4500 NH3 F
Ammonia in water samples forms indophenol when reacted with hypochlorite and phenol. The intensity is amplified by the addition of sodium nitroprusside and measured colourmetrically.			
NO2+NO3-CALC-WP	Water	Nitrate+Nitrite	CALCULATION
NO2-IC-N-WP	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-IC-N-WP	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
OG-GRAV-WP	Water	Oil & Grease - Gravimetric	EPA 1664 (modified)
Water samples are acidified and extracted with hexane; the hexane extract is collected in a pre-weighed vial. The solvent is evaporated and Total Oil & Grease is determined from the weight of the residue in the vial.			
P-T-L-COL-WP	Water	Phosphorus, Total	APHA 4500 P PHOSPHORUS-L
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorous is determined colourimetrically after persulphate digestion of the sample.			
PAH,PANH-WP	Water	Polyaromatic Hydrocarbons (PAHs)	EPA SW 846/8270-GC/MS
Water is spiked with a surrogate spike mix and extracted using solvent extraction techniques. Analysis is performed by GC/MS in the selected ion monitoring (SIM) mode.			
PH-WP	Water	pH	APHA 4500H
The pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.			
PHENOLS-4AAP-WT	Water	Phenol (4AAP)	EPA 9066
An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.			
SO4-IC-N-WP	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
SOLIDS-TOTSUS-WP	Water	Total Suspended Solids	APHA 2540 D (modified)
Total suspended solids in aqueous matrices is determined gravimetrically after drying the residue at 103 105°C.			
XYLENES-SUM-CALC-WP	Water	Sum of Xylene Isomer Concentrations	CALCULATED RESULT
Total xylenes represents the sum of o-xylene and m&p-xylene.			

** 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
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

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

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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.

Quality Control Report

Workorder: L2128984

Report Date: 24-JUL-18

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Client: Hamlet of Whale Cove
PO Box 120
Whale Cove NU X0C 0J0

Contact: IAN COPLAND

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-TITR-WP								
Water								
Batch	R4128971							
WG2824108-5	DUP	L2128984-1						
Alkalinity, Total (as CaCO3)		195	194		mg/L	0.1	20	16-JUL-18
WG2824108-4	LCS							
Alkalinity, Total (as CaCO3)			102.5		%		85-115	16-JUL-18
WG2824108-1	MB							
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	16-JUL-18
BOD-CBOD-WP								
Water								
Batch	R4134017							
WG2822428-3	DUP	L2128984-1						
BOD Carbonaceous		8.3	9.1		mg/L	9.2	20	14-JUL-18
WG2822428-2	LCS							
BOD Carbonaceous			93.2		%		85-115	14-JUL-18
WG2822428-1	MB							
BOD Carbonaceous			<2.0		mg/L		2	14-JUL-18
BOD-WP								
Water								
Batch	R4134017							
WG2822428-2	LCS							
Biochemical Oxygen Demand			97.8		%		85-115	14-JUL-18
WG2822428-1	MB							
Biochemical Oxygen Demand			<2.0		mg/L		2	14-JUL-18
BTEXS+F1-HSMS-WP								
Water								
Batch	R4131791							
WG2825106-2	LCS							
Benzene			112.0		%		70-130	17-JUL-18
Toluene			113.6		%		70-130	17-JUL-18
Ethyl benzene			123.7		%		70-130	17-JUL-18
o-Xylene			118.5		%		70-130	17-JUL-18
m+p-Xylenes			128.7		%		70-130	17-JUL-18
WG2825106-3	LCS							
F1 (C6-C10)			91.6		%		70-130	17-JUL-18
WG2825106-1	MB							
Benzene			<0.00050		mg/L		0.0005	17-JUL-18
Toluene			<0.0010		mg/L		0.001	17-JUL-18
Ethyl benzene			<0.00050		mg/L		0.0005	17-JUL-18
o-Xylene			<0.00030		mg/L		0.0003	17-JUL-18
m+p-Xylenes			<0.00040		mg/L		0.0004	17-JUL-18
F1 (C6-C10)			<0.10		mg/L		0.1	17-JUL-18



Workorder: L2128984

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTEXS+F1-HSMS-WP		Water						
Batch	R4131791							
WG2825106-1	MB							
Surrogate: 4-Bromofluorobenzene (SS)			93.3		%		70-130	17-JUL-18
C-TOC-HTC-WP		Water						
Batch	R4138739							
WG2830567-2	LCS							
Total Organic Carbon			98.9		%		80-120	23-JUL-18
WG2830567-1	MB							
Total Organic Carbon			<0.50		mg/L		0.5	23-JUL-18
CL-IC-N-WP		Water						
Batch	R4131207							
WG2822669-7	DUP	L2128984-1						
Chloride (Cl)			74.3		mg/L	0.0	20	14-JUL-18
WG2822669-2	LCS							
Chloride (Cl)			101.9		%		90-110	14-JUL-18
WG2822669-6	LCS							
Chloride (Cl)			102.0		%		90-110	14-JUL-18
WG2822669-1	MB							
Chloride (Cl)			<0.50		mg/L		0.5	14-JUL-18
WG2822669-5	MB							
Chloride (Cl)			<0.50		mg/L		0.5	14-JUL-18
WG2822669-8	MS	L2128984-1						
Chloride (Cl)			101.3		%		75-125	14-JUL-18
EC-WP		Water						
Batch	R4128971							
WG2824108-5	DUP	L2128984-1						
Conductivity			695		umhos/cm	2.3	10	16-JUL-18
WG2824108-3	LCS							
Conductivity			98.0		%		90-110	16-JUL-18
WG2824108-1	MB							
Conductivity			<1.0		umhos/cm		1	16-JUL-18
F2-F4-FID-WP		Water						
Batch	R4130550							
WG2823496-2	LCS							
F2 (C10-C16)			97.0		%		70-130	17-JUL-18
F3 (C16-C34)			106.4		%		70-130	17-JUL-18
F4 (C34-C50)			92.2		%		70-130	17-JUL-18
WG2823496-1								

Quality Control Report

Workorder: L2128984

Report Date: 24-JUL-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-FID-WP								
Water								
Batch R4130550								
WG2823496-1 MB								
F2 (C10-C16)			<0.10		mg/L		0.1	17-JUL-18
F3 (C16-C34)			<0.25		mg/L		0.25	17-JUL-18
F4 (C34-C50)			<0.25		mg/L		0.25	17-JUL-18
Surrogate: 2-Bromobenzotrifluoride			83.9		%		60-140	17-JUL-18
FC10-QT97-WP								
Water								
Batch R4124985								
WG2821922-2 DUP								
Fecal Coliforms		L2128984-1 420	410		MPN/100mL	1.9	65	13-JUL-18
WG2821922-1 MB								
Fecal Coliforms			<1		MPN/100mL		1	13-JUL-18
HG-T-CVAF-WP								
Water								
Batch R4132708								
WG2826724-2 LCS								
Mercury (Hg)-Total			92.8		%		80-120	18-JUL-18
WG2826724-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	18-JUL-18
MET-T-CCMS-WP								
Water								
Batch R4132485								
WG2824230-2 LCS								
Aluminum (Al)-Total			101.1		%		80-120	18-JUL-18
Antimony (Sb)-Total			103.4		%		80-120	18-JUL-18
Arsenic (As)-Total			102.5		%		80-120	18-JUL-18
Barium (Ba)-Total			104.9		%		80-120	18-JUL-18
Beryllium (Be)-Total			105.4		%		80-120	18-JUL-18
Bismuth (Bi)-Total			107.4		%		80-120	18-JUL-18
Boron (B)-Total			107.3		%		80-120	18-JUL-18
Cadmium (Cd)-Total			104.0		%		80-120	18-JUL-18
Calcium (Ca)-Total			103.3		%		80-120	18-JUL-18
Cesium (Cs)-Total			103.3		%		80-120	18-JUL-18
Chromium (Cr)-Total			104.7		%		80-120	18-JUL-18
Cobalt (Co)-Total			104.7		%		80-120	18-JUL-18
Copper (Cu)-Total			103.9		%		80-120	18-JUL-18
Iron (Fe)-Total			103.8		%		80-120	18-JUL-18
Lead (Pb)-Total			105.1		%		80-120	18-JUL-18
Lithium (Li)-Total			99.1		%		80-120	18-JUL-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP		Water						
Batch	R4132485							
WG2824230-2	LCS							
Magnesium (Mg)-Total			108.6		%		80-120	18-JUL-18
Manganese (Mn)-Total			104.4		%		80-120	18-JUL-18
Molybdenum (Mo)-Total			101.1		%		80-120	18-JUL-18
Nickel (Ni)-Total			105.0		%		80-120	18-JUL-18
Potassium (K)-Total			109.1		%		80-120	18-JUL-18
Phosphorus (P)-Total			111.3		%		80-120	18-JUL-18
Rubidium (Rb)-Total			111.0		%		80-120	18-JUL-18
Selenium (Se)-Total			103.3		%		80-120	18-JUL-18
Silicon (Si)-Total			108.4		%		80-120	18-JUL-18
Silver (Ag)-Total			105.1		%		80-120	18-JUL-18
Sodium (Na)-Total			107.1		%		80-120	18-JUL-18
Strontium (Sr)-Total			102.5		%		80-120	18-JUL-18
Sulfur (S)-Total			97.9		%		80-120	18-JUL-18
Tellurium (Te)-Total			105.2		%		80-120	18-JUL-18
Thallium (Tl)-Total			103.8		%		80-120	18-JUL-18
Thorium (Th)-Total			102.0		%		80-120	18-JUL-18
Tin (Sn)-Total			102.3		%		80-120	18-JUL-18
Titanium (Ti)-Total			101.8		%		80-120	18-JUL-18
Tungsten (W)-Total			101.9		%		80-120	18-JUL-18
Uranium (U)-Total			107.5		%		80-120	18-JUL-18
Vanadium (V)-Total			108.3		%		80-120	18-JUL-18
Zinc (Zn)-Total			101.4		%		80-120	18-JUL-18
Zirconium (Zr)-Total			96.4		%		80-120	18-JUL-18
WG2824230-1	MB							
Aluminum (Al)-Total			<0.0030		mg/L		0.003	18-JUL-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	18-JUL-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	18-JUL-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	18-JUL-18
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	18-JUL-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	18-JUL-18
Boron (B)-Total			<0.010		mg/L		0.01	18-JUL-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	18-JUL-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	18-JUL-18
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	18-JUL-18



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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WP		Water						
Batch	R4132485							
WG2824230-1 MB								
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	18-JUL-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	18-JUL-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	18-JUL-18
Iron (Fe)-Total			<0.010		mg/L		0.01	18-JUL-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	18-JUL-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	18-JUL-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	18-JUL-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	18-JUL-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	18-JUL-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	18-JUL-18
Potassium (K)-Total			<0.050		mg/L		0.05	18-JUL-18
Phosphorus (P)-Total			<0.050		mg/L		0.05	18-JUL-18
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	18-JUL-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	18-JUL-18
Silicon (Si)-Total			<0.10		mg/L		0.1	18-JUL-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	18-JUL-18
Sodium (Na)-Total			<0.050		mg/L		0.05	18-JUL-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	18-JUL-18
Sulfur (S)-Total			<0.50		mg/L		0.5	18-JUL-18
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	18-JUL-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	18-JUL-18
Thorium (Th)-Total			<0.00010		mg/L		0.0001	18-JUL-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	18-JUL-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	18-JUL-18
Tungsten (W)-Total			<0.00010		mg/L		0.0001	18-JUL-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	18-JUL-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	18-JUL-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	18-JUL-18
Zirconium (Zr)-Total			<0.000060		mg/L		0.00006	18-JUL-18
NH3-COL-WP		Water						
Batch	R4129527							
WG2824197-6 LCS								
Ammonia, Total (as N)			99.6		%		85-115	14-JUL-18
WG2824197-5 MB								

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
OG-GRAV-WP		Water						
Batch	R4138284							
WG2827993-2	LCS							
Oil and Grease			91.5		%		70-130	23-JUL-18
WG2827993-1	MB							
Oil and Grease			<5.0		mg/L		5	23-JUL-18
P-T-L-COL-WP		Water						
Batch	R4133029							
WG2825387-6	LCS							
Phosphorus (P)-Total			95.6		%		80-120	19-JUL-18
WG2825387-5	MB							
Phosphorus (P)-Total			<0.0010		mg/L		0.001	19-JUL-18
PAH,PANH-WP		Water						
Batch	R4134327							
WG2826083-2	LCS							
1-Methyl Naphthalene			110.9		%		60-130	18-JUL-18
2-Methyl Naphthalene			103.8		%		60-130	18-JUL-18
Acenaphthene			105.7		%		60-130	18-JUL-18
Acenaphthylene			97.4		%		60-130	18-JUL-18
Anthracene			101.1		%		60-130	18-JUL-18
Acridine			101.3		%		60-130	18-JUL-18
Benzo(a)anthracene			99.5		%		60-130	18-JUL-18
Benzo(a)pyrene			85.3		%		60-130	18-JUL-18
Benzo(b&j)fluoranthene			90.0		%		60-130	18-JUL-18
Benzo(g,h,i)perylene			95.4		%		60-130	18-JUL-18
Benzo(k)fluoranthene			120.7		%		60-130	18-JUL-18
Chrysene			103.2		%		60-130	18-JUL-18
Dibenzo(a,h)anthracene			108.1		%		60-130	18-JUL-18
Fluoranthene			106.4		%		60-130	18-JUL-18
Fluorene			103.5		%		60-130	18-JUL-18
Indeno(1,2,3-cd)pyrene			89.8		%		60-130	18-JUL-18
Naphthalene			112.4		%		50-130	18-JUL-18
Phenanthrene			109.0		%		60-130	18-JUL-18
Pyrene			108.1		%		60-130	18-JUL-18
Quinoline			120.8		%		60-130	18-JUL-18
WG2826083-1	MB							
1-Methyl Naphthalene			<0.000020		mg/L		0.00002	18-JUL-18
2-Methyl Naphthalene			<0.000020		mg/L		0.00002	18-JUL-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH,PANH-WP		Water						
Batch R4134327								
WG2826083-1 MB								
Acenaphthene			<0.000020		mg/L		0.00002	18-JUL-18
Acenaphthylene			<0.000020		mg/L		0.00002	18-JUL-18
Anthracene			<0.000010		mg/L		0.00001	18-JUL-18
Acridine			<0.000020		mg/L		0.00002	18-JUL-18
Benzo(a)anthracene			<0.000010		mg/L		0.00001	18-JUL-18
Benzo(a)pyrene			<0.0000050		mg/L		0.000005	18-JUL-18
Benzo(b&j)fluoranthene			<0.000010		mg/L		0.00001	18-JUL-18
Benzo(g,h,i)perylene			<0.000020		mg/L		0.00002	18-JUL-18
Benzo(k)fluoranthene			<0.000010		mg/L		0.00001	18-JUL-18
Chrysene			<0.000020		mg/L		0.00002	18-JUL-18
Dibenzo(a,h)anthracene			<0.0000050		mg/L		0.000005	18-JUL-18
Fluoranthene			<0.000020		mg/L		0.00002	18-JUL-18
Fluorene			<0.000020		mg/L		0.00002	18-JUL-18
Indeno(1,2,3-cd)pyrene			<0.000010		mg/L		0.00001	18-JUL-18
Naphthalene			<0.000050		mg/L		0.00005	18-JUL-18
Phenanthrene			<0.000050		mg/L		0.00005	18-JUL-18
Pyrene			<0.000010		mg/L		0.00001	18-JUL-18
Quinoline			<0.000020		mg/L		0.00002	18-JUL-18
Surrogate: Acenaphthene d10			92.2		%		40-130	18-JUL-18
Surrogate: Acridine d9			100.3		%		40-130	18-JUL-18
Surrogate: Chrysene d12			107.8		%		40-130	18-JUL-18
Surrogate: Naphthalene d8			89.9		%		40-130	18-JUL-18
Surrogate: Phenanthrene d10			95.4		%		40-130	18-JUL-18
PH-WP		Water						
Batch R4128971								
WG2824108-5 DUP		L2128984-1						
pH		7.56	7.55	J	pH units	0.01	0.2	16-JUL-18
WG2824108-2 LCS								
pH			7.43		pH units		7.3-7.5	16-JUL-18
PHENOLS-4AAP-WT		Water						
Batch R4131590								
WG2823731-10 LCS								
Phenols (4AAP)			101.4		%		85-115	17-JUL-18
WG2823731-9 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	17-JUL-18

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-WP								
Batch R4131207								
WG2822669-7	DUP	L2128984-1						
Sulfate (SO4)		47.5	47.4		mg/L	0.2	20	14-JUL-18
WG2822669-2	LCS							
Sulfate (SO4)			102.5		%		90-110	14-JUL-18
WG2822669-6	LCS							
Sulfate (SO4)			102.8		%		90-110	14-JUL-18
WG2822669-1	MB							
Sulfate (SO4)			<0.30		mg/L		0.3	14-JUL-18
WG2822669-5	MB							
Sulfate (SO4)			<0.30		mg/L		0.3	14-JUL-18
WG2822669-8	MS	L2128984-1						
Sulfate (SO4)			100.2		%		75-125	14-JUL-18
SOLIDS-TOTSUS-WP								
Batch R4138185								
WG2827786-29	LCS							
Total Suspended Solids			102.4		%		85-115	19-JUL-18
WG2827786-28	MB							
Total Suspended Solids			<2.0		mg/L		2	19-JUL-18

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Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH							
	1	12-JUL-18 09:10	16-JUL-18 12:00	0.25	99	hours	EHTR-FM
	2	12-JUL-18 09:30	16-JUL-18 12:00	0.25	98	hours	EHTR-FM
	3	12-JUL-18 09:40	16-JUL-18 12:00	0.25	98	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:

Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2128984 were received on 13-JUL-18 10:15.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

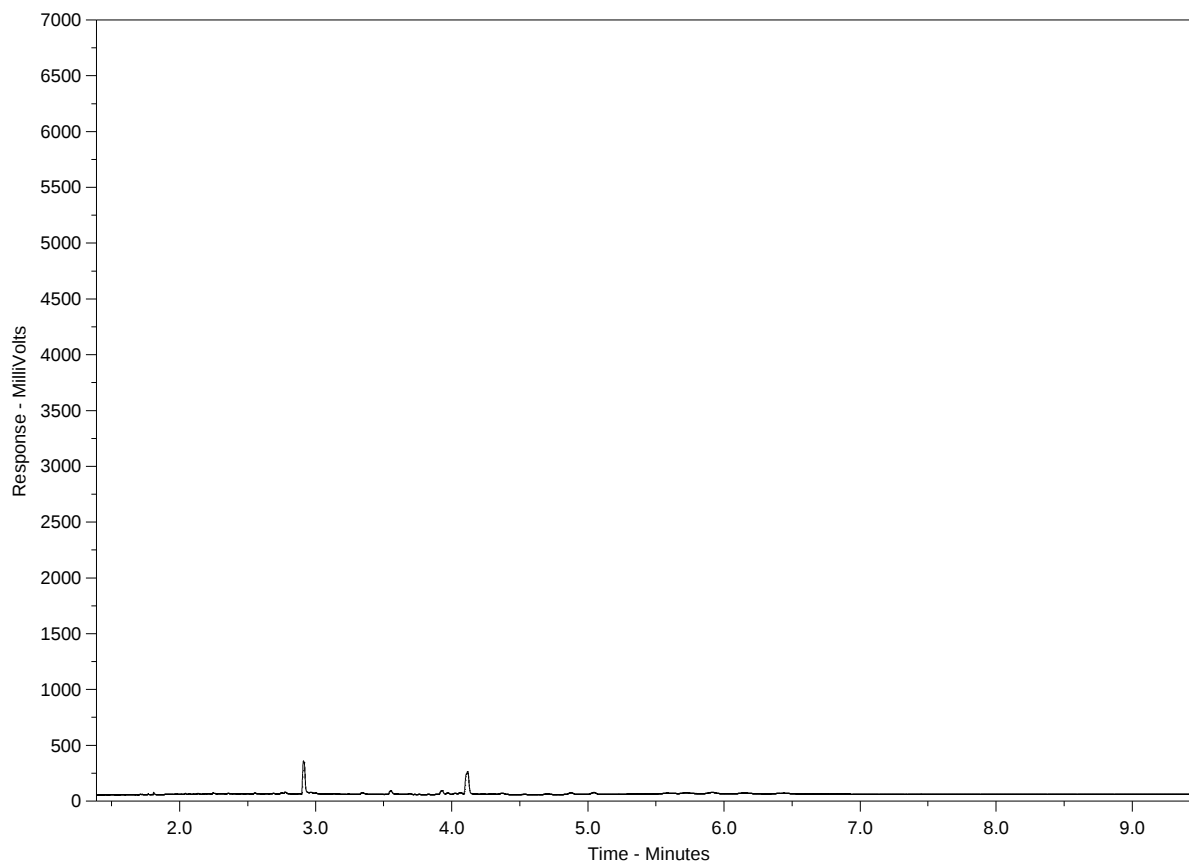
The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT



ALS Sample ID: L2128984-1
Client Sample ID: WHA-2



← 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.

