KBL Environmental Ltd
#17 Cameron Road, P.O. Box 1895
Yellowknife, NT X1A 2P4

August 19, 2022

Attention: Renee White

File Number **G17L1 - 002**
Type of Operation **CLASS B - INDUSTRIAL**
Location

Dear Renee White,

An inspection of the KBL Environmental Ltd. Soil Treatment Facility (Expiry June 24, 2022) was conducted July 28, 2022. Specifically, the Water Licence was inspected to ensure that the terms and conditions were met. Enclosed is a copy of the inspection report for your review and records. A hard copy of this inspection report will also be mailed to you.

Please take note of the non – compliance violations identified in enclosed inspection report. It is the licensee's responsibility to adhere to all terms and conditions set out in the water licence. KBL Environmental Ltd.'s water license expired on June 24, 2022. The Licensee must submit a license renewal application to the Gwich'in Land and Water Board (GLWB). **KBL Environmental Ltd. cannot operate at this facility or accept any new material until an active water license is in place.**
An electronic and hard copy of this report will be sent to the GLWB for their review and posting on the Public Registry.

If you have any questions/concerns regarding the enclosed, please do not hesitate to contact Senior Water Resource Officer, Wendy Bidwell, at 867 - 872 - 6421, or myself at 867 - 678 - 6652.

Regards,

Original signed

Lloyd Gruben
Water Resource Officer
Environment and Natural Resources
Beaufort Delta Region
Inuvik, NT, X0E 0T0
Phone: 867 - 678 – 6652
Cell: 867 - 678 – 0623

Cc:
Norman Snowshoe - Regional Superintendent, Environment and Natural Resources
Leonard Debastien - Executive Director, Gwich'in Land and Water Board
AlecSandra Macdonald - Regulatory Specialist, Gwich'in Land and Water Board
Wendy Bidwell - Senior Water Resource Officer, Environment and Natural Resources
Gwich'in Land and Water Board Members

INDUSTRIAL WATER USE INSPECTION REPORT

LICENCE #:	**G17L1 - 002**	**EXPIRY DATE:**	**June 24, 2022**
LICENCEE:	**KBL Environmental Ltd**	**PREVIOUS INSPECTION:**	**N/A**
COMPANY REP:	**Renee White**	**INSPECTION DATE:**	**July 28, 2022**

SURVEILLANCE NETWORK PROGRAM

Samples Collected Licencee	Yes
Samples Collected ENR	No

Signs Posted: SNP	No	Warning	Yes

Surveillance Network Program Comments:
SNP samples were collected from groundwater monitoring wells surrounding the facility. Analytical results for treated water are attached to this report.

During the inspection it was noted that the SNP station 0037-3 (Drainage Ditch) was not signed. Please post a sign at this SNP station location.

GENERAL CONDITIONS/REPORTS/PLANS

Indicate: A - Acceptable U - Unacceptable N/A - Not Applicable N/I - Not Inspected

C &R Plan	A	Records & Reporting	A	Final Report	A
Geotechnical Inspection	A	Posting, Signage	A	Contingency Plan	A
Restorations Activities	A	Spills	A	O&M Plan	A
Maintenance	U	Modifications	A	Annual Report	A

General Condition Comments:
Skylar Kraus, the KLB representative on site during the inspection noted that fencing will be erected when material arrives on August 7th to prevent wildlife from entering the facility and surface run-off retention pond. The facility perimeter berm surrounding the contaminated soil windrows has cracks developing along the southeast side. To prevent structural collapse, or release of contaminants, the perimeter berm requires maintenance work as soon as possible. Contaminated soil from various projects are kept separate to prevent mixing.

KBL Environmental Ltd.'s water license expired on June 24, 2022. The Licensee must submit a license renewal application to the GLWB. **KBL Environmental Ltd. cannot operate at this facility, or accept any new material until an active water license is in place.**

INDUSTRIAL WATER USE INSPECTION REPORT

ADDITIONAL COMMENTS/REMARKS

All debris surrounding the Soil Treatment Facility is to be picked up and properly disposed of.

Ponded water was observed in the southeast area of the facility. Better drainage management is required to address this issue (see Figures 3 and 4).

Treated effluent from the Surface Run-off Rentention pond that is stored in totes, must be discharged to the receiving environment at a gradual rate to prevent erosion and sediment loading to any nearby water bodies.

MATTERS FOR FOLLOW UP

-Check if fencing has been erected to prevent wildlife from entering the facility.
-Check if maintenance work has been done to correct cracking along facility berms to prevent structural collapse, or release of contaminants.
-Check if all debris in and around the facility has been picked up and properly disposed of.
- Inquire with GLWB whether KBL Environmental Ltd. has submitted an application for water license renewal. KBL Environmental Ltd. cannot operate at this facility, or accept any new material until an active water license is in place.

NON-COMPLIANCE/VIOLATIONS OF ACT OR LICENCE

1. KBL Environmental Ltd is operating with an expired water license. The license expired June 24, 2022. KBL Environmental Ltd. must submit an application for license renewal as soon as possible and must not operate until an active license is in place.
2. Analytical results for sampling of soil, water and snow *must* be to be sent to the inspector prior to acceptance at the facility to confirm water license criteria is met as per license condition Part E, Item 15. The inspector has not received any analytical results for materials currently in the facility to date.
3. Debris was noted laying all over the facility rather than collecting and disposing of it at the Solid Waste Disposal Facility. As per license condition Part E, Item 11 this debris needs to be cleaned up and properly disposed of.
4. During the inspection it was noted that windrows exceed maximum height. Guidance on proper operation of Petroleum Hydrocarbon Contaminated Soil Treatment Facilities can be found in the Guideline for Petroleum Hydrocarbon Contaminated Soil Treatment Facilities in the Northwest Territories.
5. Please submit any outstanding administrative items to the Board, or Inspector as soon as possible.

Inspector's Signature: Original signed_____

INDUSTRIAL WATER USE INSPECTION REPORT

INSPECTION IMAGES

Figure 1

Debris surrounding Soil Treatment Facility

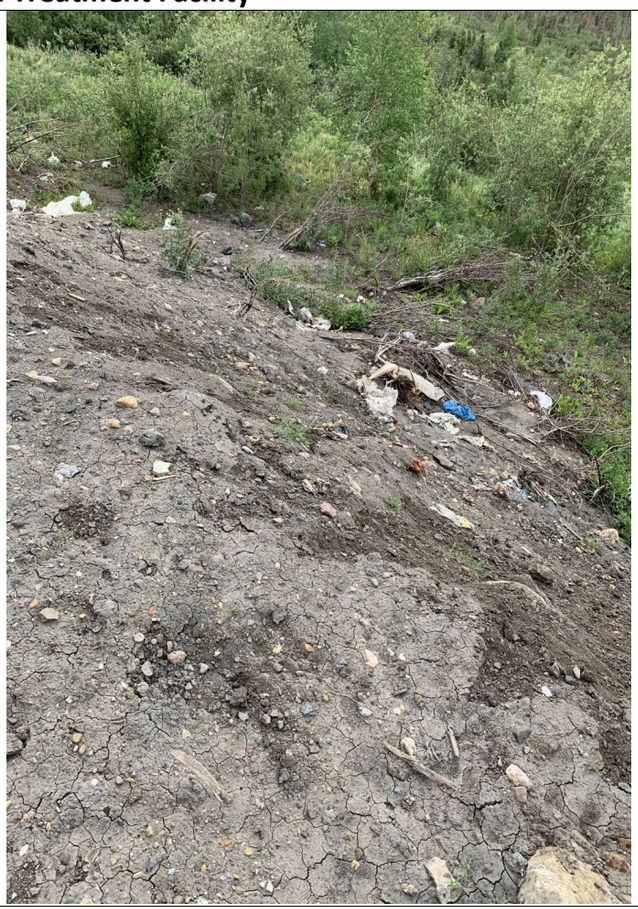
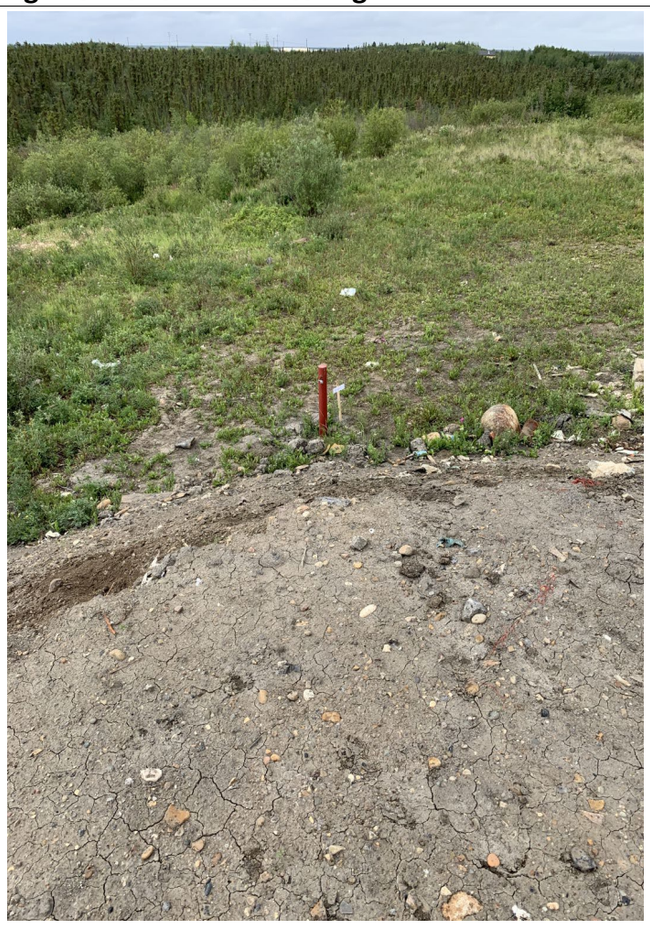


Figure 2

Groundwater Monitoring Well for SNP Monitoring



INDUSTRIAL WATER USE INSPECTION REPORT

Figure 3

Small pile of soil to be aerated, segregated from main windrow to prevent mixing

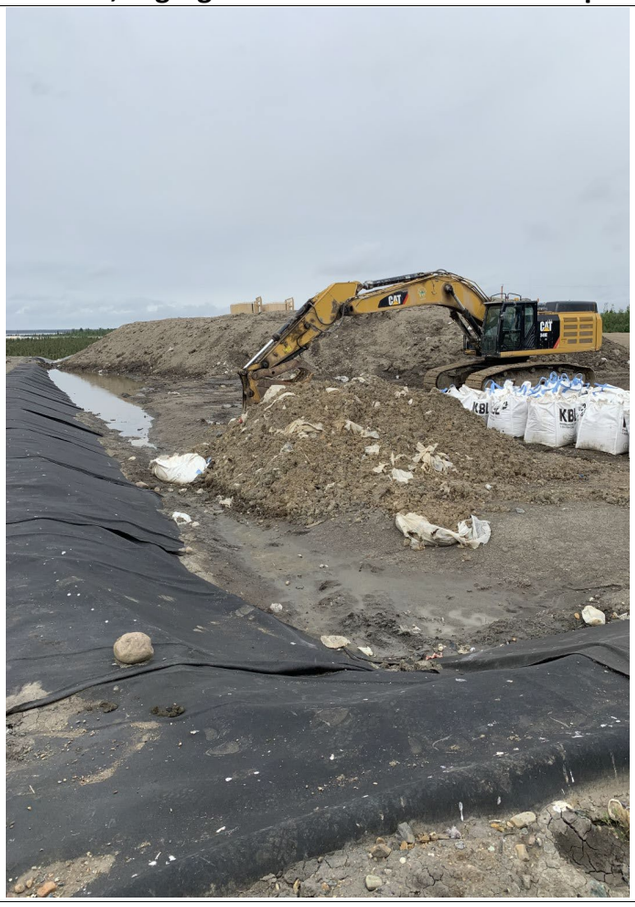
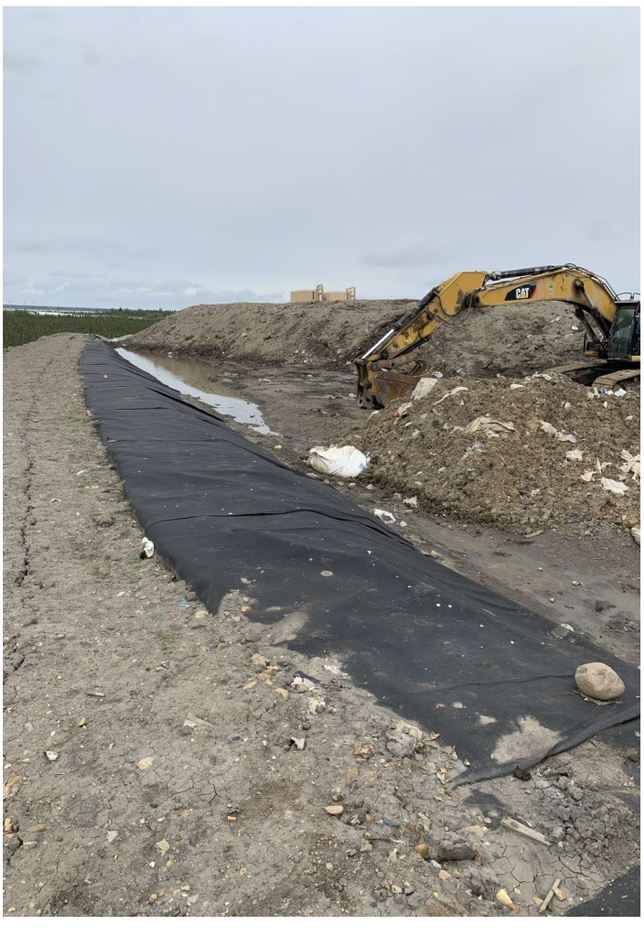


Figure 4

Photo of long crack along southeast berm surrounding main soil windrow



INDUSTRIAL WATER USE INSPECTION REPORT

Figure 5

Long crack along southeast berm surrounding main windrow pile – looking south

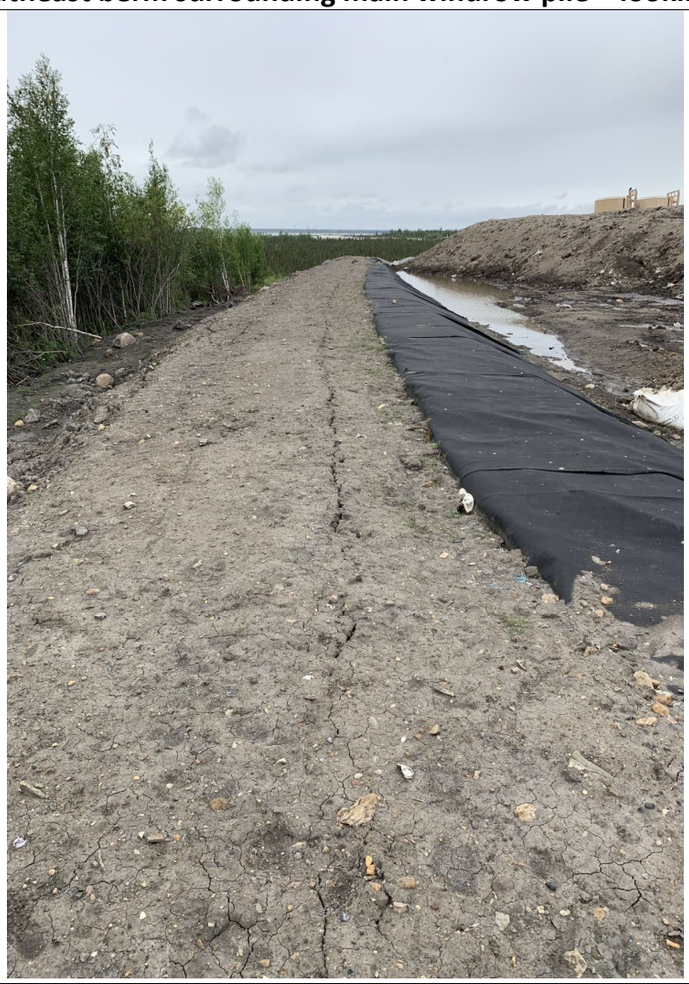
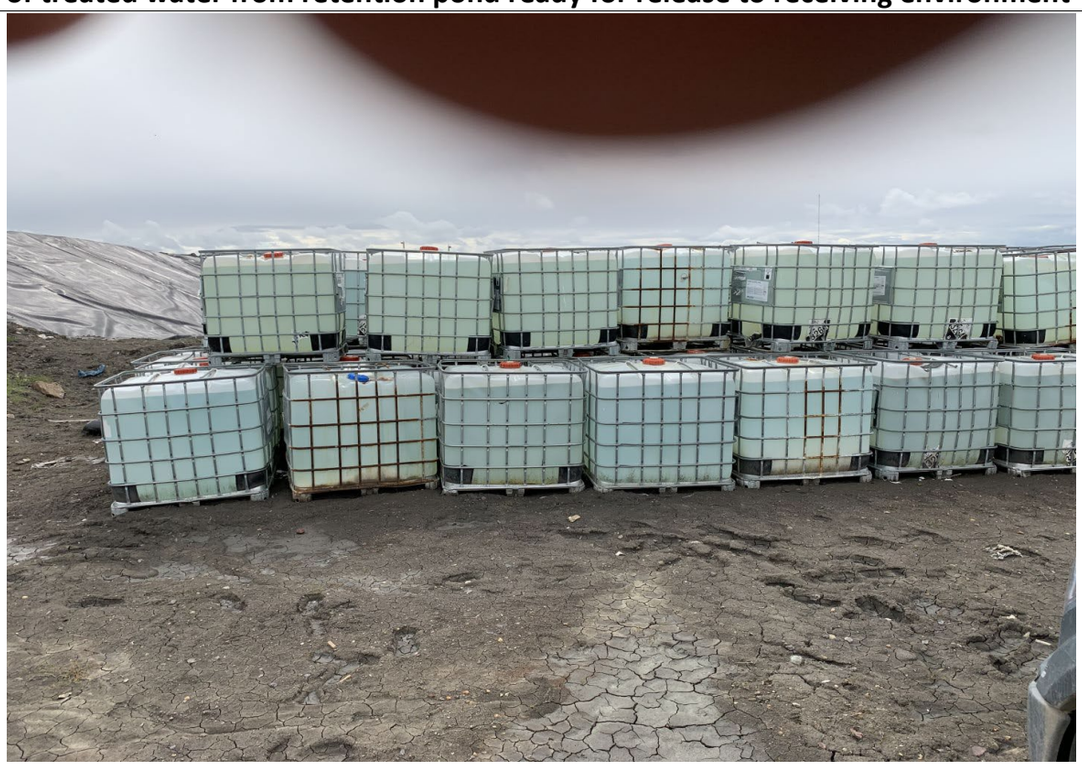


Figure 6

Totes of treated water from retention pond ready for release to receiving environment



INDUSTRIAL WATER USE INSPECTION REPORT

Figure 7

Height of main soil windrow exceeds maximum height allowance

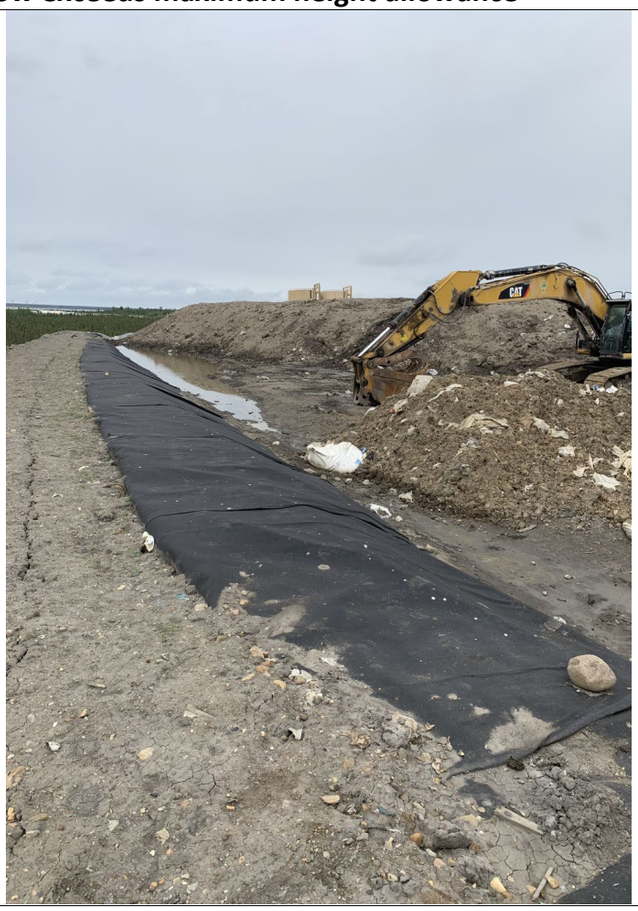
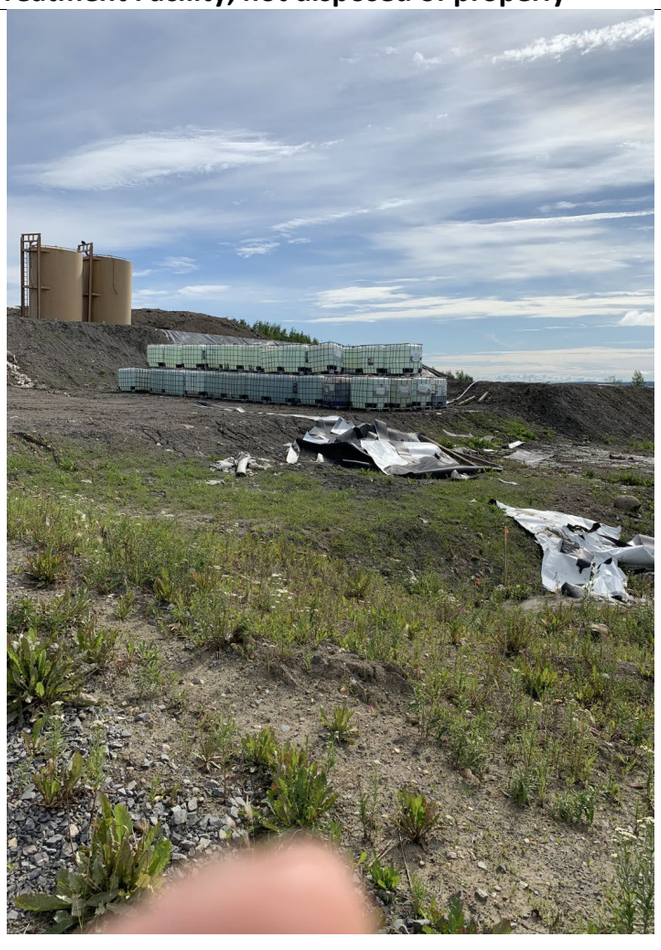


Figure 8

Debris discarded at Soil Treatment Facility, not disposed of properly



		Date Sampled	29-Jun-2022	29-Jun-2022
		ALS Sample ID	YL2200797-001	YL2200797-002
Parameter	KBL Permit Discharge Limits	Units	Sub-Matrix: Water	Sub-Matrix: Water
antimony, total	0.006	mg/L	<0.00010	<0.00020
arsenic, total	0.005	mg/L	0.00016	<0.00020
barium, total	1	mg/L	0.0218	0.0237
beryllium, total	100	mg/L	<0.000020	0.000504
boron, total	1.5	mg/L	0.034	0.088
iron, total	0.3	mg/L	<0.010	<0.020
manganese, total	0.05	mg/L	0.00724	0.00845
selenium, total	0.001	mg/L	<0.000050	<0.000100
uranium, total	0.02	mg/L	0.000034	0.000280
zinc, total	0.03	mg/L	0.0068	0.0198
phenols, total (4AAP)	0.004	mg/L	<0.0010	<0.0010
benzene	5	µg/L	<0.50	<0.50
ethylbenzene	2.4	µg/L	<0.50	<0.50
styrene	72	µg/L	<0.50	<0.50
toluene	24	µg/L	<0.50	<0.50
xylenes, total	300	µg/L	0.54	<0.50
F1 (C6-C10)	2200	µg/L	<100	<100
F2 (C10-C16)	1100	µg/L	<300	<300
acenaphthene	5.8	µg/L	<0.010	<0.010
acenaphthylene	46	µg/L	<0.010	<0.010
anthracene	0.012	µg/L	<0.010	<0.010
benz(a)anthracene	0.018	µg/L	<0.010	<0.010
benzo(a)pyrene	0.017	µg/L	<0.0050	<0.0050
benzo(b+j)fluoranthene	0.48	µg/L	<0.010	<0.010
benzo(k)fluoranthene	0.48	µg/L	<0.010	<0.010
chrysene	1.4	µg/L	<0.010	<0.010
dibenz(a,h)anthracene	0.28	µg/L	<0.0050	<0.0050
fluoranthene	0.04	µg/L	<0.010	<0.010
fluorene	3	µg/L	<0.010	<0.010
indeno(1,2,3-c,d)pyrene	0.23	µg/L	<0.010	<0.010
naphthalene	1.1	µg/L	0.065	<0.050
phenanthrene	0.4	µg/L	<0.020	<0.020
pyrene	0.025	µg/L	<0.010	<0.010
B(a)P total potency equivalents [B(a)P TPE]	0.01	µg/L	<0.010	<0.010

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	STF-TOTES-A	STF-TOTES-B	---	---	---
					Client sampling date / time	29-Jun-2022 15:42	29-Jun-2022 15:56	---	---	---
						YL2200797-001	YL2200797-002	------	-------	--------
						Result	Result	---	---	---
Total Metals										
antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	<0.00020 DLA	---	---	---
arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00016	<0.00020 DLA	---	---	---
barium, total	7440-39-3	E420	0.00010	mg/L		0.0218	0.0237	---	---	---
beryllium, total	7440-41-7	E420	0.000020	mg/L		<0.000020	0.000504	---	---	---
boron, total	7440-42-8	E420	0.010	mg/L		0.034	0.088	---	---	---
iron, total	7439-89-6	E420	0.010	mg/L		<0.010	<0.020 DLA	---	---	---
manganese, total	7439-96-5	E420	0.00010	mg/L		0.00724	0.00845	---	---	---
selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	<0.000100 DLA	---	---	---
uranium, total	7440-61-1	E420	0.000010	mg/L		0.000034	0.000280	---	---	---
zinc, total	7440-66-6	E420	0.0030	mg/L		0.0068	0.0198	---	---	---
Aggregate Organics										
phenols, total (4AAP)	---	E562	0.0010	mg/L		<0.0010	<0.0010	---	---	---
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	---	---	---
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	<0.50	---	---	---
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	<0.50	---	---	---
styrene	100-42-5	E611A	0.50	µg/L		<0.50	<0.50	---	---	---
toluene	108-88-3	E611A	0.50	µg/L		<0.50	<0.50	---	---	---
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		<0.40	<0.40	---	---	---
xylene, o-	95-47-6	E611A	0.30	µg/L		0.54	<0.30	---	---	---
xylenes, total	1330-20-7	E611A	0.50	µg/L		0.54	<0.50	---	---	---
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		87.4	86.9	---	---	---
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		100	97.3	---	---	---
Hydrocarbons										
F1 (C6-C10)	---	E581.VH+F1	100	µg/L		<100	<100	---	---	---
F2 (C10-C16)	---	E601	300	µg/L		<300	<300	---	---	---
VHw (C6-C10)	---	E581.VH+F1	100	µg/L		<100	<100	---	---	---
F1-BTEX	---	EC580	100	µg/L		<100	<100	---	---	---
VPHw	---	EC580A	100	µg/L		<100	<100	---	---	---

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	STF-TOTES-A	STF-TOTES-B	----	----	----
					Client sampling date / time	29-Jun-2022 15:42	29-Jun-2022 15:56	----	----	----
						YL2200797-001	YL2200797-002	------	------	------
						Result	Result	---	---	---
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (F2-F4 surr)	392-83-6	E601	1.0	%		85.3	86.1	---	---	---
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		103	102	---	---	---
Polycyclic Aromatic Hydrocarbons										
acenaphthene	83-32-9	E641A	0.010	µg/L		<0.010	<0.010	---	---	---
acenaphthylene	208-96-8	E641A	0.010	µg/L		<0.010	<0.010	---	---	---
anthracene	120-12-7	E641A	0.010	µg/L		<0.010	<0.010	---	---	---
benz(a)anthracene	56-55-3	E641A	0.010	µg/L		<0.010	<0.010	---	---	---
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L		<0.0050	<0.0050	---	---	---
benzo(b+j)fluoranthene	n/a	E641A	0.010	µg/L		<0.010	<0.010	---	---	---
benzo(b+j+k)fluoranthene	n/a	E641A	0.015	µg/L		<0.015	<0.015	---	---	---
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L		<0.010	<0.010	---	---	---
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L		<0.010	<0.010	---	---	---
chrysene	218-01-9	E641A	0.010	µg/L		<0.010	<0.010	---	---	---
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L		<0.0050	<0.0050	---	---	---
fluoranthene	206-44-0	E641A	0.010	µg/L		<0.010	<0.010	---	---	---
fluorene	86-73-7	E641A	0.010	µg/L		<0.010	<0.010	---	---	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L		<0.010	<0.010	---	---	---
naphthalene	91-20-3	E641A	0.050	µg/L		0.065	<0.050	---	---	---
phenanthrene	85-01-8	E641A	0.020	µg/L		<0.020	<0.020	---	---	---
pyrene	129-00-0	E641A	0.010	µg/L		<0.010	<0.010	---	---	---
B(a)P total potency equivalents [B(a)P TPE]	----	E641A	0.010	µg/L		<0.010	<0.010	---	---	---
PAHs, total (EPA 16)	n/a	E641A	0.065	µg/L		0.065	<0.065	---	---	---
Polycyclic Aromatic Hydrocarbons Surrogates										
chrysene-d12	1719-03-5	E641A	0.1	%		110	113	---	---	---
naphthalene-d8	1146-65-2	E641A	0.1	%		102	104	---	---	---
phenanthrene-d10	1517-22-2	E641A	0.1	%		107	109	---	---	---
Polychlorinated Biphenyls										
polychlorinated biphenyls [PCBs], total	---	E685	1.0	µg/L		<1.0	<1.0	---	---	---
Polychlorinated Biphenyls Surrogates										
decachlorobiphenyl	2051-24-3	E685	1.0	%		83.1	81.8	---	---	---

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) STF-TOTES-A	E562	29-Jun-2022	----	----	----		15-Jul-2022	28 days	16 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) STF-TOTES-B	E562	29-Jun-2022	----	----	----		15-Jul-2022	28 days	16 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) STF-TOTES-A	E601	29-Jun-2022	10-Jul-2022	14 days	11 days	✓	11-Jul-2022	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) STF-TOTES-B	E601	29-Jun-2022	10-Jul-2022	14 days	11 days	✓	11-Jul-2022	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) STF-TOTES-A	E581.VH+F1	29-Jun-2022	13-Jul-2022	----	----		13-Jul-2022	14 days	13 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) STF-TOTES-B	E581.VH+F1	29-Jun-2022	13-Jul-2022	----	----		13-Jul-2022	14 days	13 days	✓
Polychlorinated Biphenyls : PCB Aroclors by GC-ECD										
Amber glass/Teflon lined cap STF-TOTES-A	E685	29-Jun-2022	14-Jul-2022	----	----		15-Jul-2022	40 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Polychlorinated Biphenyls : PCB Aroclors by GC-ECD										
Amber glass/Teflon lined cap STF-TOTES-B	E685	29-Jun-2022	14-Jul-2022	----	----		15-Jul-2022	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) STF-TOTES-A	E641A	29-Jun-2022	10-Jul-2022	14 days	11 days	✓	11-Jul-2022	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) STF-TOTES-B	E641A	29-Jun-2022	10-Jul-2022	14 days	11 days	✓	11-Jul-2022	40 days	1 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) STF-TOTES-A	E420	29-Jun-2022	----	----	----		08-Jul-2022	180 days	9 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) STF-TOTES-B	E420	29-Jun-2022	----	----	----		08-Jul-2022	180 days	9 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) STF-TOTES-A	E611A	29-Jun-2022	13-Jul-2022	----	----		13-Jul-2022	14 days	13 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) STF-TOTES-B	E611A	29-Jun-2022	13-Jul-2022	----	----		13-Jul-2022	14 days	13 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
BTEX by Headspace GC-MS	E611A	559795	1	10	10.0	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	564780	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	552554	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	559794	1	8	12.5	5.0	✓
Laboratory Control Samples (LCS)							
BTEX by Headspace GC-MS	E611A	559795	1	10	10.0	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	556341	1	3	33.3	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	556340	1	8	12.5	5.0	✓
PCB Aroclors by GC-ECD	E685	562429	1	13	7.6	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	564780	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	552554	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	559794	1	8	12.5	5.0	✓
Method Blanks (MB)							
BTEX by Headspace GC-MS	E611A	559795	1	10	10.0	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	556341	1	3	33.3	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	556340	1	8	12.5	5.0	✓
PCB Aroclors by GC-ECD	E685	562429	1	13	7.6	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	564780	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	552554	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	559794	1	8	12.5	5.0	✓
Matrix Spikes (MS)							
BTEX by Headspace GC-MS	E611A	559795	1	10	10.0	5.0	✓
Phenols (4AAP) in Water by Colorimetry	E562	564780	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	552554	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	559794	1	8	12.5	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Metals in Water by CRC ICPMS	E420 Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Phenols (4AAP) in Water by Colorimetry	E562 Edmonton - Environmental	Water	EPA 9066	This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide (K3Fe(CN)6) and 4-amino-antipyrine (4-AAP) to form a red complex which is measured colorimetrically.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
CCME PHCs - F2-F4 by GC-FID	E601 Vancouver - Environmental	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4).
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
PCB Aroclors by GC-ECD	E685 Vancouver - Environmental	Water	EPA 8082A (mod)	PCB Aroclors are analyzed by GC-ECD
F1-BTEX	EC580 Vancouver - Environmental	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.
PCB Aroclors Extraction	EP685 Vancouver - Environmental	Water	EPA 3510C (mod)	PCBs are extracted using an organic solvent liquid-liquid extraction.The 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.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Total Metals (QC Lot: 552554)											
CG2208562-009	Anonymous	antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	---
		arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	---
		barium, total	7440-39-3	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	---
		beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.020 µg/L	<0.000020	0	Diff <2x LOR	---
		boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	---
		iron, total	7439-89-6	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	---
		manganese, total	7439-96-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	---
		selenium, total	7782-49-2	E420	0.000050	mg/L	<0.050 µg/L	<0.000050	0	Diff <2x LOR	---
		uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	---
		zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	---
Aggregate Organics (QC Lot: 564780)											
VA22B4476-007	Anonymous	phenols, total (4AAP)	---	E562	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	---
Volatile Organic Compounds (QC Lot: 559795)											
KS2202375-008	Anonymous	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	---
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	---
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	---
Hydrocarbons (QC Lot: 559794)											
KS2202375-008	Anonymous	F1 (C6-C10)	---	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	---
		VHw (C6-C10)	---	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	---

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 552554)						
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	—
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	—
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	—
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	—
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	—
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	—
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	—
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	—
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	—
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	—
Aggregate Organics (QCLot: 564780)						
phenols, total (4AAP)	—	E562	0.001	mg/L	<0.0010	—
Volatile Organic Compounds (QCLot: 559795)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	—
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	—
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	—
styrene	100-42-5	E611A	0.5	µg/L	<0.50	—
toluene	108-88-3	E611A	0.5	µg/L	<0.50	—
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	—
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	—
Hydrocarbons (QCLot: 556341)						
F2 (C10-C16)	—	E601	100	µg/L	<100	—
Hydrocarbons (QCLot: 559794)						
F1 (C6-C10)	—	E581.VH+F1	100	µg/L	<100	—
VHw (C6-C10)	—	E581.VH+F1	100	µg/L	<100	—
Polycyclic Aromatic Hydrocarbons (QCLot: 556340)						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	—
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	—
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	—
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	—
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	—
benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	<0.010	—
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	—

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 556340) - continued						
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	—
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	—
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	—
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	—
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	—
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	—
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	—
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	—
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	—

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 552554)									
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	108	80.0	120	—
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	106	80.0	120	—
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	103	80.0	120	—
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	112	80.0	120	—
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	104	80.0	120	—
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	113	80.0	120	—
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	107	80.0	120	—
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	106	80.0	120	—
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	108	80.0	120	—
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	106	80.0	120	—
Aggregate Organics (QCLot: 564780)									
phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	94.6	85.0	115	—
Volatile Organic Compounds (QCLot: 559795)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	93.9	70.0	130	—
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	90.6	70.0	130	—
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	98.9	70.0	130	—
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	96.1	70.0	130	—
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	98.2	70.0	130	—
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	97.3	70.0	130	—
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	93.4	70.0	130	—
Hydrocarbons (QCLot: 556341)									
F2 (C10-C16)	—	E601	100	µg/L	3538 µg/L	106	70.0	130	—
Hydrocarbons (QCLot: 559794)									
F1 (C6-C10)	—	E581.VH+F1	100	µg/L	6310 µg/L	105	70.0	130	—
VHw (C6-C10)	—	E581.VH+F1	100	µg/L	6310 µg/L	105	70.0	130	—
Polycyclic Aromatic Hydrocarbons (QCLot: 556340)									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	94.9	60.0	130	—
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	94.7	60.0	130	—
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	—
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	116	60.0	130	—

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 556340) - continued									
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	104	60.0	130	---
benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	0.5 µg/L	104	60.0	130	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	114	60.0	130	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	---
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	111	60.0	130	---
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	---
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	---
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	84.4	50.0	130	---
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	112	60.0	130	---
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	---

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND = Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 552554)										
CG2208562-010	Anonymous	antimony, total	7440-36-0	E420	0.0200 mg/L	0.02 mg/L	100.0	70.0	130	---
		arsenic, total	7440-38-2	E420	0.0192 mg/L	0.02 mg/L	96.2	70.0	130	---
		barium, total	7440-39-3	E420	0.0192 mg/L	0.02 mg/L	95.8	70.0	130	---
		beryllium, total	7440-41-7	E420	0.0416 mg/L	0.04 mg/L	104	70.0	130	---
		boron, total	7440-42-8	E420	0.102 mg/L	0.1 mg/L	102	70.0	130	---
		iron, total	7439-89-6	E420	1.98 mg/L	2 mg/L	99.0	70.0	130	---
		manganese, total	7439-96-5	E420	0.0199 mg/L	0.02 mg/L	99.4	70.0	130	---
		selenium, total	7782-49-2	E420	0.0401 mg/L	0.04 mg/L	100	70.0	130	---
		uranium, total	7440-61-1	E420	0.00398 mg/L	0.004 mg/L	99.6	70.0	130	---
		zinc, total	7440-66-6	E420	0.406 mg/L	0.4 mg/L	101	70.0	130	---
Aggregate Organics (QCLot: 564780)										
VA22B4476-007	Anonymous	phenols, total (4AAP)	---	E562	0.0191 mg/L	0.02 mg/L	95.7	75.0	125	---
Volatile Organic Compounds (QCLot: 559795)										
KS2202375-008	Anonymous	benzene	71-43-2	E611A	95.7 µg/L	100 µg/L	95.7	60.0	140	---
		ethylbenzene	100-41-4	E611A	87.5 µg/L	100 µg/L	87.5	60.0	140	---
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	96.4 µg/L	100 µg/L	96.4	60.0	140	---
		styrene	100-42-5	E611A	89.9 µg/L	100 µg/L	89.9	60.0	140	---
		toluene	108-88-3	E611A	98.2 µg/L	100 µg/L	98.2	60.0	140	---
		xylene, m+p-	179601-23-1	E611A	188 µg/L	200 µg/L	94.1	60.0	140	---
		xylene, o-	95-47-6	E611A	89.6 µg/L	100 µg/L	89.6	60.0	140	---
Hydrocarbons (QCLot: 559794)										
KS2202375-011	Anonymous	F1 (C6-C10)	---	E581.VH+F1	4560 µg/L	6310 µg/L	72.3	60.0	140	---
		VHw (C6-C10)	---	E581.VH+F1	4160 µg/L	6310 µg/L	65.9	60.0	140	---

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 - 823726

Page of

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	KBL Environmental	Select Report Format: ✓ PDF ✓ EXCEL ✓ EDD (DIGITAL)	Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Skylar Kraus	Quality Control (QC) Report with Report: ☐ YES ☐ NO	4 day [P4-20%] ☐ / 1 Business day [E - 100%] ☒
Phone:	905-239-9952	☐ Compare Results to Criteria on Report - provide details below if box checked	3 day [P3-25%] ☐ / Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐
	Company address below will appear on the final report	Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	2 day [P2-50%] ☐
Street:	Box 1895 17 Cameron Road	Email 1 or Fax: Koliver@KBLenv.com	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
City/Province:	Yellowknife NT	Email 2: NPrince@KBLenv.com	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	X1A 2P4	Email 3: SKraus@KBLenv.com	
Invoice To	Same as Report To ☐ YES ✓ NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution: ✓ EMAIL ☐ MAIL ☐ FAX	
Company:	KBL Environmental	Email 1 or Fax	
Contact:	Katie Oliver	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	4200 ISTF	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only):	ALS Contact:	Sampler:

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS: YL22-KBLEICO-003	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	STF-Totes-A	29-06-22	15:41	water	8 X		
	STF-Totes-B	29-06-22	15:56	water	8 X		

Environmental Division
Yellowknife
Work Order Reference
YL2200797

Telephone : +1 867 873 5693

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human consumption/ use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
8.6	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
Skylar Kraus	June 30, 2022	8:38	SA	JULY 4/2022	9:38			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

1 If any water samples are taken from a Regulated Drinking Water (DW) System please submit using an Authorized DW COC form