Annual Report -2018

Water, sewage and waste results Water

Licence: 3BM-KUG 1520

Hamlet of Kugluktuk, NU

Date: March 25, 2019

Submitted to:

Nunavut Water Board

Appendix: A

Water Test Results 2018

Water Licence: 3BM-KUG 1520

Hamlet of Kugluktuk, NU

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180376

- FINAL REPORT -

Prepared For: Hamlet of Kugluktuk

Address: P.O. Box 271
Kugluktuk, NU,X0B 0E0

Attn: **Don LeBlanc** **Facsimile: 867-982-3060**

Final report has been reviewed and approved by:

Judy Mah
Client Service Officer

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) to ISO/IEC 17025 as a testing laboratory for specific tests registered with CALA.
- Routine methods are based on recognized procedures from sources such as
  - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
  - Environment Canada
  - USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

ReportDate: Tuesday, June 26, 2018
Print Date: ***Tuesday, June 26, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180376

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-1 **Taiga Sample ID:** 001

Client Project: Kugluktuk Water
Sample Type: Raw Water
Received Date: 13-Jun-18
Sampling Date: 13-Jun-18
Sampling Time: 9:45
Location: KUG-1
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Organic Carbon, Dissolved	2.2	0.5	mg/L	18-Jun-18	SM5310:B	
Organic Carbon, Total	2.2	0.5	mg/L	18-Jun-18	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	28.7	0.4	mg/L	13-Jun-18	SM2320:B	
Colour, Apparent	16	5	CU	13-Jun-18	SM2120:B	
Conductivity, Specific (@25C)	72.4	0.4	µS/cm	13-Jun-18	SM2510:B	
pH	7.72		pH units	13-Jun-18	SM4500-H:B	
Solids, Total Dissolved	22	10	mg/L	15-Jun-18	SM2540:C	
Solids, Total Suspended	< 3	3	mg/L	15-Jun-18	SM2540:D	
Turbidity	1.81	0.05	NTU	13-Jun-18	SM2130:B	
Major Ions						
Calcium	6.1	0.1	mg/L	15-Jun-18	SM4110:B	
Chloride	2.7	0.7	mg/L	15-Jun-18	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	15-Jun-18	SM4110:B	

ReportDate: Tuesday, June 26, 2018
Print Date: ***Tuesday, June 26, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180376

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-1 **Taiga Sample ID:** 001

Hardness	30.5	0.7	mg/L	15-Jun-18	SM4110:B
Magnesium	3.7	0.1	mg/L	15-Jun-18	SM4110:B
Nitrate as Nitrogen	0.07	0.01	mg/L	15-Jun-18	SM4110:B
Nitrate+Nitrite as Nitrogen	0.07	0.01	mg/L	15-Jun-18	SM4110:B
Potassium	0.5	0.1	mg/L	15-Jun-18	SM4110:B
Sodium	1.8	0.1	mg/L	15-Jun-18	SM4110:B
Sulphate	3	1	mg/L	15-Jun-18	SM4110:B
Microbiology					
Coliforms, Total	5.2	1.0	MPN/100ml	13-Jun-18	SM9223:B
Escherichia coli	< 1.0	1.0	MPN/100ml	13-Jun-18	SM9223:B
Subcontracted Inorganics					
Sulphide	< 0.0015	0.0015	mg/L	18-Jun-18	APHA4500-S2
Subcontracted Organics					
Cyanide, Total	< 0.0050	0.005	mg/L	21-Jun-18	APHA4500-CN
Phenols, Total	< 0.0010	0.001	mg/L	21-Jun-18	AB ENV.06537
Trace Metals, Total					
Aluminum	69.2	5	µg/L	19-Jun-18	EPA200.8
Arsenic	< 0.2	0.2	µg/L	19-Jun-18	EPA200.8
Beryllium	< 0.1	0.1	µg/L	19-Jun-18	EPA200.8
Cadmium	< 0.1	0.1	µg/L	19-Jun-18	EPA200.8
Chromium	0.2	0.1	µg/L	19-Jun-18	EPA200.8
Copper	2.5	0.2	µg/L	19-Jun-18	EPA200.8
Iron	74	5	µg/L	19-Jun-18	EPA200.8
Lead	0.2	0.1	µg/L	19-Jun-18	EPA200.8
Manganese	3.7	0.1	µg/L	19-Jun-18	EPA200.8

ReportDate: Tuesday, June 26, 2018
Print Date: *Tuesday, June 26, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180376

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-1 **Taiga Sample ID:** 001

Mercury	< 0.01	0.01	µg/L	19-Jun-18	EPA200.8
Nickel	0.4	0.1	µg/L	19-Jun-18	EPA200.8
Selenium	< 0.5	0.5	µg/L	19-Jun-18	EPA200.8
Silver	< 0.1	0.1	µg/L	19-Jun-18	EPA200.8
Zinc	< 5.0	5	µg/L	19-Jun-18	EPA200.8

ReportDate: Tuesday, June 26, 2018
Print Date: *Tuesday, June 26, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180376

- CERTIFICATE OF ANALYSIS -

Client Sample ID: New WTP **Taiga Sample ID:** 002

Client Project: Kugluktuk Water
Sample Type: Treated Water
Received Date: 13-Jun-18
Sampling Date: 13-Jun-18
Sampling Time: 9:30
Location: New WTP
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Organic Carbon, Dissolved	2.0	0.5	mg/L	18-Jun-18	SM5310:B	
Organic Carbon, Total	1.9	0.5	mg/L	18-Jun-18	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	46.2	0.4	mg/L	13-Jun-18	SM2320:B	
Colour, Apparent	< 5	5	CU	13-Jun-18	SM2120:B	
Conductivity, Specific (@25C)	106	0.4	µS/cm	13-Jun-18	SM2510:B	
pH	8.04		pH units	13-Jun-18	SM4500-H:B	
Solids, Total Dissolved	36	10	mg/L	15-Jun-18	SM2540:C	
Solids, Total Suspended	< 3	3	mg/L	15-Jun-18	SM2540:D	
Turbidity	1.17	0.05	NTU	13-Jun-18	SM2130:B	
Major Ions						
Calcium	11.7	0.1	mg/L	15-Jun-18	SM4110:B	
Chloride	2.2	0.7	mg/L	15-Jun-18	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	15-Jun-18	SM4110:B	
Hardness	47.3	0.7	mg/L	15-Jun-18	SM4110:B	
Magnesium	4.4	0.1	mg/L	15-Jun-18	SM4110:B	

ReportDate: Tuesday, June 26, 2018
Print Date: ***Tuesday, June 26, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180376

- CERTIFICATE OF ANALYSIS -

Client Sample ID: New WTP **Taiga Sample ID:** 002

Nitrate as Nitrogen	0.11	0.01	mg/L	15-Jun-18	SM4110:B
Nitrate+Nitrite as Nitrogen	0.11	0.01	mg/L	15-Jun-18	SM4110:B
Potassium	0.7	0.1	mg/L	15-Jun-18	SM4110:B
Sodium	2.1	0.1	mg/L	15-Jun-18	SM4110:B
Sulphate	4	1	mg/L	15-Jun-18	SM4110:B
Microbiology					
Coliforms, Total	< 1.0	1.0	MPN/100ml	13-Jun-18	SM9223:B
Escherichia coli	< 1.0	1.0	MPN/100ml	13-Jun-18	SM9223:B
Organics					
Bromodichloromethane	< 0.005	0.005	mg/L	20-Jun-18	EPA8260B
Bromoform	< 0.005	0.005	mg/L	20-Jun-18	EPA8260B
Chloroform	< 0.005	0.005	mg/L	20-Jun-18	EPA8260B
Dibromochloromethane	< 0.005	0.005	mg/L	20-Jun-18	EPA8260B
Trihalomethanes, Total	< 0.005	0.005	mg/L	20-Jun-18	EPA8260B
Subcontracted Inorganics					
Sulphide	< 0.0015	0.0015	mg/L	18-Jun-18	APHA4500-S2
Subcontracted Organics					
Cyanide, Total	< 0.0050	0.005	mg/L	21-Jun-18	APHA4500-CN
Phenols, Total	< 0.0010	0.001	mg/L	21-Jun-18	AB ENV.06537
Trace Metals, Total					
Aluminum	47.0	0.6	µg/L	19-Jun-18	EPA200.8
Arsenic	0.5	0.2	µg/L	19-Jun-18	EPA200.8
Beryllium	< 0.1	0.1	µg/L	19-Jun-18	EPA200.8
Cadmium	< 0.04	0.04	µg/L	19-Jun-18	EPA200.8
Chromium	< 0.1	0.1	µg/L	19-Jun-18	EPA200.8

ReportDate: Tuesday, June 26, 2018
Print Date: *Tuesday, June 26, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180376

- CERTIFICATE OF ANALYSIS -

Client Sample ID: New WTP **Taiga Sample ID:** 002

Copper	24.7	0.2	µg/L	19-Jun-18	EPA200.8
Iron	7	5	ug/L	19-Jun-18	EPA200.8
Lead	4.3	0.1	µg/L	19-Jun-18	EPA200.8
Manganese	0.2	0.1	µg/L	19-Jun-18	EPA200.8
Mercury	< 0.01	0.01	µg/L	19-Jun-18	EPA200.8
Nickel	0.3	0.1	µg/L	19-Jun-18	EPA200.8
Selenium	< 0.3	0.3	µg/L	19-Jun-18	EPA200.8
Silver	< 0.1	0.1	µg/L	19-Jun-18	EPA200.8
Zinc	25.5	0.4	µg/L	19-Jun-18	EPA200.8

ReportDate: Tuesday, June 26, 2018
Print Date: *Tuesday, June 26, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180376

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Old WTP **Taiga Sample ID:** 003

Client Project: Kugluktuk Water
Sample Type: Treated Water
Received Date: 13-Jun-18
Sampling Date: 13-Jun-18
Sampling Time: 9:30
Location: Old WTP
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Organic Carbon, Dissolved	2.6	0.5	mg/L	18-Jun-18	SM5310:B	
Organic Carbon, Total	2.5	0.5	mg/L	18-Jun-18	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	28.3	0.4	mg/L	13-Jun-18	SM2320:B	
Colour, Apparent	18	5	CU	13-Jun-18	SM2120:B	
Conductivity, Specific (@25C)	79.2	0.4	µS/cm	13-Jun-18	SM2510:B	
pH	7.73		pH units	13-Jun-18	SM4500-H:B	
Solids, Total Dissolved	22	10	mg/L	15-Jun-18	SM2540:C	
Solids, Total Suspended	< 3	3	mg/L	15-Jun-18	SM2540:D	
Turbidity	2.05	0.05	NTU	13-Jun-18	SM2130:B	
Major Ions						
Calcium	6.6	0.1	mg/L	15-Jun-18	SM4110:B	
Chloride	4.8	0.7	mg/L	15-Jun-18	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	15-Jun-18	SM4110:B	
Hardness	32.1	0.7	mg/L	15-Jun-18	SM4110:B	
Magnesium	3.8	0.1	mg/L	15-Jun-18	SM4110:B	

ReportDate: Tuesday, June 26, 2018
Print Date: ***Tuesday, June 26, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180376

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Old WTP **Taiga Sample ID:** 003

Nitrate as Nitrogen	0.16	0.01	mg/L	15-Jun-18	SM4110:B
Nitrate+Nitrite as Nitrogen	0.16	0.01	mg/L	15-Jun-18	SM4110:B
Potassium	0.5	0.1	mg/L	15-Jun-18	SM4110:B
Sodium	3.1	0.1	mg/L	15-Jun-18	SM4110:B
Sulphate	3	1	mg/L	15-Jun-18	SM4110:B
Microbiology					
Coliforms, Total	8.5	1.0	MPN/100ml	13-Jun-18	SM9223:B
Escherichia coli	< 1.0	1.0	MPN/100ml	13-Jun-18	SM9223:B
Subcontracted Inorganics					
Sulphide	< 0.0015	0.0015	mg/L	18-Jun-18	APHA4500-S2
Subcontracted Organics					
Cyanide, Total	< 0.0050	0.005	mg/L	21-Jun-18	APHA4500-CN
Phenols, Total	< 0.0010	0.001	mg/L	21-Jun-18	AB ENV.06537
Trace Metals, Total					
Aluminum	83.5	5	µg/L	19-Jun-18	EPA200.8
Arsenic	0.2	0.2	µg/L	19-Jun-18	EPA200.8
Beryllium	< 0.1	0.1	µg/L	19-Jun-18	EPA200.8
Cadmium	< 0.1	0.1	µg/L	19-Jun-18	EPA200.8
Chromium	0.2	0.1	µg/L	19-Jun-18	EPA200.8
Copper	11.9	0.2	µg/L	19-Jun-18	EPA200.8
Iron	113	5	µg/L	19-Jun-18	EPA200.8
Lead	0.7	0.1	µg/L	19-Jun-18	EPA200.8
Manganese	3.9	0.1	µg/L	19-Jun-18	EPA200.8
Mercury	< 0.01	0.01	µg/L	19-Jun-18	EPA200.8
Nickel	0.4	0.1	µg/L	19-Jun-18	EPA200.8

ReportDate: Tuesday, June 26, 2018
Print Date: *Tuesday, June 26, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180376

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Old WTP **Taiga Sample ID:** 003

Selenium	< 0.5	0.5	µg/L	19-Jun-18	EPA200.8
Silver	< 0.1	0.1	µg/L	19-Jun-18	EPA200.8
Zinc	7.2	5	µg/L	19-Jun-18	EPA200.8

ReportDate: Tuesday, June 26, 2018
Print Date: *Tuesday, June 26, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180376

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill **Taiga Sample ID:** 004

Client Project: Kugluktuk Water
Sample Type: Treated Water
Received Date: 13-Jun-18
Sampling Date: 13-Jun-18
Sampling Time: 9:25
Location: Truckfill
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Organic Carbon, Dissolved	2.0	0.5	mg/L	18-Jun-18	SM5310:B	
Organic Carbon, Total	2.0	0.5	mg/L	18-Jun-18	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	46.6	0.4	mg/L	13-Jun-18	SM2320:B	
Colour, Apparent	< 5	5	CU	13-Jun-18	SM2120:B	
Conductivity, Specific (@25C)	107	0.4	µS/cm	13-Jun-18	SM2510:B	
pH	8.04		pH units	13-Jun-18	SM4500-H:B	
Solids, Total Dissolved	32	10	mg/L	15-Jun-18	SM2540:C	
Solids, Total Suspended	< 3	3	mg/L	15-Jun-18	SM2540:D	
Turbidity	0.11	0.05	NTU	13-Jun-18	SM2130:B	
Major Ions						
Calcium	11.8	0.1	mg/L	15-Jun-18	SM4110:B	
Chloride	2.4	0.7	mg/L	15-Jun-18	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	15-Jun-18	SM4110:B	
Hardness	47.4	0.7	mg/L	15-Jun-18	SM4110:B	
Magnesium	4.3	0.1	mg/L	15-Jun-18	SM4110:B	

ReportDate: Tuesday, June 26, 2018
Print Date: ***Tuesday, June 26, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180376

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill **Taiga Sample ID:** 004

Nitrate as Nitrogen	0.11	0.01	mg/L	15-Jun-18	SM4110:B
Nitrate+Nitrite as Nitrogen	0.11	0.01	mg/L	15-Jun-18	SM4110:B
Potassium	0.7	0.1	mg/L	15-Jun-18	SM4110:B
Sodium	2.2	0.1	mg/L	15-Jun-18	SM4110:B
Sulphate	4	1	mg/L	15-Jun-18	SM4110:B
Microbiology					
Coliforms, Total	< 1.0	1.0	MPN/100ml	13-Jun-18	SM9223:B
Escherichia coli	< 1.0	1.0	MPN/100ml	13-Jun-18	SM9223:B
Organics					
Bromodichloromethane	< 0.005	0.005	mg/L	20-Jun-18	EPA8260B
Bromoform	< 0.005	0.005	mg/L	20-Jun-18	EPA8260B
Chloroform	< 0.005	0.005	mg/L	20-Jun-18	EPA8260B
Dibromochloromethane	< 0.005	0.005	mg/L	20-Jun-18	EPA8260B
Trihalomethanes, Total	< 0.005	0.005	mg/L	20-Jun-18	EPA8260B
Subcontracted Inorganics					
Sulphide	< 0.0015	0.0015	mg/L	18-Jun-18	APHA4500-S2
Subcontracted Organics					
Cyanide, Total	< 0.0050	0.005	mg/L	21-Jun-18	APHA4500-CN
Phenols, Total	< 0.0010	0.001	mg/L	21-Jun-18	AB ENV.06537
Trace Metals, Total					
Aluminum	47.4	0.6	µg/L	19-Jun-18	EPA200.8
Arsenic	0.5	0.2	µg/L	19-Jun-18	EPA200.8
Beryllium	< 0.1	0.1	µg/L	19-Jun-18	EPA200.8
Cadmium	< 0.04	0.04	µg/L	19-Jun-18	EPA200.8
Chromium	< 0.1	0.1	µg/L	19-Jun-18	EPA200.8

ReportDate: Tuesday, June 26, 2018
Print Date: *Tuesday, June 26, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180376

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill **Taiga Sample ID:** 004

Copper	2.6	0.2	µg/L	19-Jun-18	EPA200.8
Iron	< 5	5	ug/L	19-Jun-18	EPA200.8
Lead	< 0.1	0.1	µg/L	19-Jun-18	EPA200.8
Manganese	0.2	0.1	µg/L	19-Jun-18	EPA200.8
Mercury	< 0.01	0.01	µg/L	19-Jun-18	EPA200.8
Nickel	0.2	0.1	µg/L	19-Jun-18	EPA200.8
Selenium	< 0.3	0.3	µg/L	19-Jun-18	EPA200.8
Silver	< 0.1	0.1	µg/L	19-Jun-18	EPA200.8
Zinc	0.8	0.4	µg/L	19-Jun-18	EPA200.8

ReportDate: Tuesday, June 26, 2018
Print Date: *Tuesday, June 26, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180376

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill **Taiga Sample ID:** 004

*** Taiga analytical methods are based on the following standard analytical methods**

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency

ReportDate: Tuesday, June 26, 2018

Print Date: *Tuesday, June 26, 2018*

Appendix: B

Effluent Waste Test Results 2018

Water Licence: 3BM-KUG 1520

Hamlet of Kugluktuk, NU

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180527

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-5 **Taiga Sample ID:** 004

Client Project:
Sample Type: Landfarm
Received Date: 10-Jul-18
Sampling Date: 10-Jul-18
Sampling Time: 9:00
Location: KUG-5
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Physicals						
pH	7.81		pH units	11-Jul-18	SM4500-H:B	
Organics						
Benzene	< 0.002	0.002	mg/L	17-Jul-18	EPA8260B	
Ethylbenzene	< 0.002	0.002	mg/L	17-Jul-18	EPA8260B	
Hexane Extractable Material	< 2.0	2.0	mg/L	16-Jul-18	EPA1664A	
Toluene	< 0.002	0.002	mg/L	17-Jul-18	EPA8260B	
Xylenes	< 0.002	0.002	mg/L	17-Jul-18	EPA8260B	
Subcontracted Organics						
Cyanide, Total	< 0.0050	0.005	mg/L	21-Jul-18	APHA4500-CN	
Haloacetic Acids, Total	< 0.0054	0.0054	mg/L	31-Jul-18	EPA 552	
Phenols, Total		0.001	mg/L		AB ENV.06537	16
Polychlorinated Biphenyls	< 0.00005	0.000050	mg/L	30-Jul-18	EPA3510	
Trace Metals, Dissolved						
Cadmium	< 0.04	0.04	µg/L	16-Jul-18	EPA200.8	
Chromium	0.3	0.1	µg/L	16-Jul-18	EPA200.8	
Cobalt	0.6	0.1	µg/L	16-Jul-18	EPA200.8	

ReportDate: Tuesday, August 07, 2018
Print Date: ***Tuesday, August 07, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180527

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-5 **Taiga Sample ID:** 004

Copper	0.6	0.2	µg/L	16-Jul-18	EPA200.8
Lead	< 0.1	0.1	µg/L	16-Jul-18	EPA200.8
Nickel	5.6	0.1	µg/L	16-Jul-18	EPA200.8
Trace Metals, Total					
Arsenic	1.1	0.2	µg/L	16-Jul-18	EPA200.8
Mercury	< 0.01	0.01	µg/L	16-Jul-18	EPA200.8

ReportDate: Tuesday, August 07, 2018
Print Date: *Tuesday, August 07, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180527

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-5 **Taiga Sample ID:** 004

- DATA QUALIFERS -

Data Qualifier Descriptions:

16 *Test requested but no sample bottle received*

207 *Detection limit adjusted due to sample matrix effects*

*** Taiga analytical methods are based on the following standard analytical methods**

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency

ReportDate: Tuesday, August 07, 2018

Print Date: ***Tuesday, August 07, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180527

- FINAL REPORT -

Prepared For: Hamlet of Kugluktuk

Address: P.O. Box 271
Kugluktuk, NU,X0B 0E0

Attn: **Don LeBlanc** **Facsimile: 867-982-3060**

Final report has been reviewed and approved by:

Glen Hudy
Quality Assurance Officer

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) to ISO/IEC 17025 as a testing laboratory for specific tests registered with CALA.
- Routine methods are based on recognized procedures from sources such as
  - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
  - Environment Canada
  - USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

ReportDate: Tuesday, August 07, 2018
Print Date: ***Tuesday, August 07, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180527

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-2 **Taiga Sample ID:** 001

Client Project:
Sample Type: Solid Waste
Received Date: 10-Jul-18
Sampling Date: 10-Jul-18
Sampling Time: 9:00
Location: KUG-2
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	0.109	0.005	mg/L	20-Jul-18	SM4500-NH3:G	
Biochemical Oxygen Demand	8	2	mg/L	11-Jul-18	SM5210:B	
CBOD	8	2	mg/L	11-Jul-18	SM5210:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	383	0.4	mg/L	11-Jul-18	SM2320:B	
Conductivity, Specific (@25C)	1060	0.4	µS/cm	11-Jul-18	SM2510:B	
pH	7.16		pH units	11-Jul-18	SM4500-H:B	
Solids, Total Suspended	86	3	mg/L	12-Jul-18	SM2540:D	
Major Ions						
Calcium	137	0.1	mg/L	12-Jul-18	SM4110:B	
Chloride	97.4	0.7	mg/L	12-Jul-18	SM4110:B	
Hardness	499	0.7	mg/L	12-Jul-18	SM4110:B	
Magnesium	38.0	0.1	mg/L	12-Jul-18	SM4110:B	
Nitrate as Nitrogen	0.61	0.01	mg/L	12-Jul-18	SM4110:B	

ReportDate: Tuesday, August 07, 2018
Print Date: ***Tuesday, August 07, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180527

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-2 **Taiga Sample ID:** 001

Nitrite as Nitrogen	< 0.01	0.01	mg/L	12-Jul-18	SM4110:B
Potassium	3.4	0.1	mg/L	12-Jul-18	SM4110:B
Sodium	27.8	0.1	mg/L	12-Jul-18	SM4110:B
Sulphate	39	1	mg/L	12-Jul-18	SM4110:B
Microbiology					
Coliforms, Fecal	3	1	CFU/100mL	10-Jul-18	SM9222:D
Organics					
Bromodichloromethane	< 0.005	0.005	mg/L	19-Jul-18	EPA8260B
Bromoform	< 0.005	0.005	mg/L	19-Jul-18	EPA8260B
Chloroform	< 0.005	0.005	mg/L	19-Jul-18	EPA8260B
Dibromochloromethane	< 0.005	0.005	mg/L	19-Jul-18	EPA8260B
F2: C10-C16	< 0.2	0.2	mg/L	23-Jul-18	EPA8015B
F3: C16-C34	< 0.2	0.2	mg/L	23-Jul-18	EPA8015B
F4: C34-C50	< 0.2	0.2	mg/L	23-Jul-18	EPA8015B
Hexane Extractable Material	< 2.0	2.0	mg/L	23-Jul-18	EPA1664A
Hydrocarbons, Total Extractable	< 0.2	0.2	mg/L	23-Jul-18	EPA8015B
Oil and Grease, visible	Non-visible			12-Jul-18	Visual Exam
Trihalomethanes, Total	< 0.005	0.005	mg/L	19-Jul-18	EPA8260B
Subcontracted Organics					
Cyanide, Total	< 0.0050	0.005	mg/L	21-Jul-18	APHA4500-CN
Haloacetic Acids, Total	< 0.0054	0.0054	mg/L	31-Jul-18	EPA 552
Phenols, Total	0.0205	0.001	mg/L	24-Jul-18	AB ENV.06537
Polychlorinated Biphenyls	< 0.00005	0.000050	mg/L	30-Jul-18	EPA3510
Trace Metals, Total					
Aluminum	245	5	µg/L	16-Jul-18	EPA200.8

ReportDate: Tuesday, August 07, 2018
Print Date: *Tuesday, August 07, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180527

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-2 **Taiga Sample ID:** 001

Arsenic	3.4	0.2	µg/L	16-Jul-18	EPA200.8
Cadmium	< 0.1	0.1	µg/L	16-Jul-18	EPA200.8
Chromium	0.6	0.1	µg/L	16-Jul-18	EPA200.8
Cobalt	6.4	0.1	µg/L	16-Jul-18	EPA200.8
Copper	2.2	0.2	µg/L	16-Jul-18	EPA200.8
Iron	14900	5	µg/L	16-Jul-18	EPA200.8
Lead	0.8	0.1	µg/L	16-Jul-18	EPA200.8
Manganese	5870	0.1	µg/L	16-Jul-18	EPA200.8
Nickel	5.4	0.1	µg/L	16-Jul-18	EPA200.8
Silver	< 0.1	0.1	µg/L	16-Jul-18	EPA200.8
Zinc	7.6	5	µg/L	16-Jul-18	EPA200.8

ReportDate: Tuesday, August 07, 2018
Print Date: *Tuesday, August 07, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180527

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-3 **Taiga Sample ID:** 002

Client Project:
Sample Type: Sewage Disposal
Received Date: 10-Jul-18
Sampling Date: 10-Jul-18
Sampling Time: 9:00
Location: KUG-3
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	56.3	0.005	mg/L	26-Jul-18	SM4500-NH3:G	
Biochemical Oxygen Demand	149	2	mg/L	11-Jul-18	SM5210:B	
CBOD	147	2	mg/L	11-Jul-18	SM5210:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	240	0.4	mg/L	11-Jul-18	SM2320:B	
Conductivity, Specific (@25C)	741	0.4	µS/cm	11-Jul-18	SM2510:B	
pH	7.38		pH units	11-Jul-18	SM4500-H:B	
Solids, Total Suspended	20	3	mg/L	12-Jul-18	SM2540:D	
Major Ions						
Calcium	13.6	0.1	mg/L	12-Jul-18	SM4110:B	
Chloride	43.8	0.7	mg/L	12-Jul-18	SM4110:B	
Hardness	91.9	0.7	mg/L	12-Jul-18	SM4110:B	
Magnesium	14.1	0.1	mg/L	12-Jul-18	SM4110:B	
Nitrate as Nitrogen	0.39	0.01	mg/L	12-Jul-18	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	12-Jul-18	SM4110:B	
Potassium	54.9	0.1	mg/L	12-Jul-18	SM4110:B	

ReportDate: Tuesday, August 07, 2018
Print Date: ***Tuesday, August 07, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180527

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-3 **Taiga Sample ID:** 002

Sodium	41.1	0.1	mg/L	12-Jul-18	SM4110:B	
Sulphate	14	1	mg/L	12-Jul-18	SM4110:B	
Microbiology						
Coliforms, Fecal	131000	1000	CFU/100mL	10-Jul-18	SM9222:D	
Organics						
Bromodichloromethane	< 0.005	0.005	mg/L	19-Jul-18	EPA8260B	
Bromoform	< 0.005	0.005	mg/L	19-Jul-18	EPA8260B	
Chloroform	< 0.005	0.005	mg/L	19-Jul-18	EPA8260B	
Dibromochloromethane	< 0.005	0.005	mg/L	19-Jul-18	EPA8260B	
F2: C10-C16	< 0.2	0.2	mg/L	23-Jul-18	EPA8015B	
F3: C16-C34	2.2	0.2	mg/L	23-Jul-18	EPA8015B	
F4: C34-C50	0.8	0.2	mg/L	23-Jul-18	EPA8015B	
Hexane Extractable Material	5.9	2.0	mg/L	23-Jul-18	EPA1664A	
Hydrocarbons, Total Extractable	3.2	0.2	mg/L	23-Jul-18	EPA8015B	
Oil and Grease, visible	Non-visible			12-Jul-18	Visual Exam	
Trihalomethanes, Total	< 0.005	0.005	mg/L	19-Jul-18	EPA8260B	
Subcontracted Organics						
Cyanide, Total	< 0.0050	0.005	mg/L	21-Jul-18	APHA4500-CN	
Haloacetic Acids, Total	< 0.0054	0.0054	mg/L	31-Jul-18	EPA 552	
Phenols, Total	0.4490	0.010	mg/L	24-Jul-18	AB ENV.06537	207
Polychlorinated Biphenyls	< 0.00005	0.000050	mg/L	30-Jul-18	EPA3510	
Trace Metals, Total						
Aluminum	221	5	µg/L	16-Jul-18	EPA200.8	
Arsenic	0.6	0.2	µg/L	16-Jul-18	EPA200.8	
Cadmium	< 0.1	0.1	µg/L	16-Jul-18	EPA200.8	

ReportDate: Tuesday, August 07, 2018
Print Date: *Tuesday, August 07, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180527

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-3 **Taiga Sample ID:** 002

Chromium	0.7	0.1	µg/L	16-Jul-18	EPA200.8
Cobalt	0.6	0.1	µg/L	16-Jul-18	EPA200.8
Copper	40.5	0.2	µg/L	16-Jul-18	EPA200.8
Iron	549	5	µg/L	16-Jul-18	EPA200.8
Lead	0.7	0.1	µg/L	16-Jul-18	EPA200.8
Manganese	43.3	0.1	µg/L	16-Jul-18	EPA200.8
Nickel	2.4	0.1	µg/L	16-Jul-18	EPA200.8
Silver	0.4	0.1	µg/L	16-Jul-18	EPA200.8
Zinc	45.4	5	µg/L	16-Jul-18	EPA200.8

ReportDate: Tuesday, August 07, 2018
Print Date: *Tuesday, August 07, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180527

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-4 **Taiga Sample ID:** 003

Client Project:
Sample Type: Outfall Wetland
Received Date: 10-Jul-18
Sampling Date: 10-Jul-18
Sampling Time: 9:00
Location: KUG-4
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	0.158	0.005	mg/L	20-Jul-18	SM4500-NH3:G	
Biochemical Oxygen Demand	4	2	mg/L	11-Jul-18	SM5210:B	
CBOD	5	2	mg/L	11-Jul-18	SM5210:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	62.8	0.4	mg/L	11-Jul-18	SM2320:B	
Conductivity, Specific (@25C)	357	0.4	µS/cm	11-Jul-18	SM2510:B	
pH	7.53		pH units	11-Jul-18	SM4500-H:B	
Solids, Total Suspended	< 3	3	mg/L	12-Jul-18	SM2540:D	
Major Ions						
Calcium	14.4	0.1	mg/L	12-Jul-18	SM4110:B	
Chloride	65.5	0.7	mg/L	12-Jul-18	SM4110:B	
Hardness	94.0	0.7	mg/L	12-Jul-18	SM4110:B	
Magnesium	14.1	0.1	mg/L	12-Jul-18	SM4110:B	
Nitrate as Nitrogen	0.71	0.01	mg/L	12-Jul-18	SM4110:B	
Nitrite as Nitrogen	0.08	0.01	mg/L	12-Jul-18	SM4110:B	
Potassium	2.4	0.1	mg/L	12-Jul-18	SM4110:B	

ReportDate: Tuesday, August 07, 2018
Print Date: ***Tuesday, August 07, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180527

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-4 **Taiga Sample ID:** 003

Sodium	37.3	0.1	mg/L	12-Jul-18	SM4110:B
Sulphate	8	1	mg/L	12-Jul-18	SM4110:B
Microbiology					
Coliforms, Fecal	22	1	CFU/100mL	10-Jul-18	SM9222:D
Organics					
Benzene	< 0.002	0.002	mg/L	20-Jul-18	EPA8260B
Ethylbenzene	< 0.002	0.002	mg/L	20-Jul-18	EPA8260B
F2: C10-C16	< 0.2	0.2	mg/L	23-Jul-18	EPA8015B
F3: C16-C34	< 0.2	0.2	mg/L	23-Jul-18	EPA8015B
F4: C34-C50	< 0.2	0.2	mg/L	23-Jul-18	EPA8015B
Hexane Extractable Material	< 2.0	2.0	mg/L	23-Jul-18	EPA1664A
Hydrocarbons, Total Extractable	< 0.2	0.2	mg/L	23-Jul-18	EPA8015B
Oil and Grease, visible	Non-visible			12-Jul-18	Visual Exam
Toluene	< 0.002	0.002	mg/L	20-Jul-18	EPA8260B
Xylenes	< 0.002	0.002	mg/L	20-Jul-18	EPA8260B
Subcontracted Organics					
Cyanide, Total	< 0.0050	0.005	mg/L	21-Jul-18	APHA4500-CN
Haloacetic Acids, Total	< 0.0054	0.0054	mg/L	31-Jul-18	EPA 552
Phenols, Total	< 0.0010	0.001	mg/L	24-Jul-18	AB ENV.06537
Polychlorinated Biphenyls	< 0.00005	0.000050	mg/L	30-Jul-18	EPA3510
Trace Metals, Total					
Aluminum	57.2	5	µg/L	16-Jul-18	EPA200.8
Arsenic	0.5	0.2	µg/L	16-Jul-18	EPA200.8
Cadmium	< 0.1	0.1	µg/L	16-Jul-18	EPA200.8
Chromium	0.3	0.1	µg/L	16-Jul-18	EPA200.8

ReportDate: Tuesday, August 07, 2018
Print Date: *Tuesday, August 07, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180527

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-4 **Taiga Sample ID:** 003

Cobalt	0.2	0.1	µg/L	16-Jul-18	EPA200.8
Copper	1.4	0.2	µg/L	16-Jul-18	EPA200.8
Iron	672	5	µg/L	16-Jul-18	EPA200.8
Lead	< 0.1	0.1	µg/L	16-Jul-18	EPA200.8
Manganese	89.3	0.1	µg/L	16-Jul-18	EPA200.8
Nickel	1.6	0.1	µg/L	16-Jul-18	EPA200.8
Silver	< 0.1	0.1	µg/L	16-Jul-18	EPA200.8
Zinc	< 5.0	5	µg/L	16-Jul-18	EPA200.8

ReportDate: Tuesday, August 07, 2018
Print Date: *Tuesday, August 07, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180527

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-5 **Taiga Sample ID:** 004

Client Project:
Sample Type: Landfarm
Received Date: 10-Jul-18
Sampling Date: 10-Jul-18
Sampling Time: 9:00
Location: KUG-5
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Physicals						
pH	7.81		pH units	11-Jul-18	SM4500-H:B	
Organics						
Benzene	< 0.002	0.002	mg/L	17-Jul-18	EPA8260B	
Ethylbenzene	< 0.002	0.002	mg/L	17-Jul-18	EPA8260B	
Hexane Extractable Material	< 2.0	2.0	mg/L	16-Jul-18	EPA1664A	
Toluene	< 0.002	0.002	mg/L	17-Jul-18	EPA8260B	
Xylenes	< 0.002	0.002	mg/L	17-Jul-18	EPA8260B	
Subcontracted Organics						
Cyanide, Total	< 0.0050	0.005	mg/L	21-Jul-18	APHA4500-CN	
Haloacetic Acids, Total	< 0.0054	0.0054	mg/L	31-Jul-18	EPA 552	
Phenols, Total		0.001	mg/L		AB ENV.06537	16
Polychlorinated Biphenyls	< 0.00005	0.000050	mg/L	30-Jul-18	EPA3510	
Trace Metals, Dissolved						
Cadmium	< 0.04	0.04	µg/L	16-Jul-18	EPA200.8	
Chromium	0.3	0.1	µg/L	16-Jul-18	EPA200.8	
Cobalt	0.6	0.1	µg/L	16-Jul-18	EPA200.8	

ReportDate: Tuesday, August 07, 2018
Print Date: ***Tuesday, August 07, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180527

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-5 **Taiga Sample ID:** 004

Copper	0.6	0.2	µg/L	16-Jul-18	EPA200.8
Lead	< 0.1	0.1	µg/L	16-Jul-18	EPA200.8
Nickel	5.6	0.1	µg/L	16-Jul-18	EPA200.8
Trace Metals, Total					
Arsenic	1.1	0.2	µg/L	16-Jul-18	EPA200.8
Mercury	< 0.01	0.01	µg/L	16-Jul-18	EPA200.8

ReportDate: Tuesday, August 07, 2018
Print Date: *Tuesday, August 07, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180527

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-5 **Taiga Sample ID:** 004

- DATA QUALIFERS -

Data Qualifier Descriptions:

16 *Test requested but no sample bottle received*

207 *Detection limit adjusted due to sample matrix effects*

*** Taiga analytical methods are based on the following standard analytical methods**

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency

ReportDate: Tuesday, August 07, 2018

Print Date: ***Tuesday, August 07, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.:
180923

- FINAL REPORT -

Prepared For: Hamlet of Kugluktuk

Address: P.O. Box 271
Kugluktuk, NU,X0B 0E0

Attn: **Don LeBlanc** **Facsimile: 867-982-3060**

Final report has been reviewed and approved by:

Glen Hudy
Quality Assurance Officer

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) to ISO/IEC 17025 as a testing laboratory for specific tests registered with CALA.
- Routine methods are based on recognized procedures from sources such as
  - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
  - Environment Canada
  - USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

ReportDate: Friday, October 05, 2018
Print Date: ***Friday, October 05, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180923

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-2 **Taiga Sample ID:** 001

Client Project:
Sample Type: Solid Waste
Received Date: 12-Sep-18
Sampling Date: 11-Sep-18
Sampling Time:
Location: KUG-2
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	0.247	0.005	mg/L	12-Sep-18	SM4500-NH3:G	
Biochemical Oxygen Demand	10	2	mg/L	12-Sep-18	SM5210:B	
CBOD	9	2	mg/L	12-Sep-18	SM5210:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	279	0.4	mg/L	12-Sep-18	SM2320:B	
Conductivity, Specific (@25C)	1030	0.4	µS/cm	12-Sep-18	SM2510:B	
pH	7.61		pH units	12-Sep-18	SM4500-H:B	
Solids, Total Suspended	34	3	mg/L	17-Sep-18	SM2540:D	
Major Ions						
Calcium	122	0.1	mg/L	12-Sep-18	SM4110:B	
Chloride	123	0.7	mg/L	12-Sep-18	SM4110:B	
Hardness	389	0.7	mg/L	12-Sep-18	SM4110:B	
Magnesium	20.6	0.1	mg/L	12-Sep-18	SM4110:B	
Nitrate as Nitrogen	0.69	0.01	mg/L	12-Sep-18	SM4110:B	

ReportDate: Friday, October 05, 2018
Print Date: ***Friday, October 05, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180923

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-2 **Taiga Sample ID:** 001

Nitrite as Nitrogen	< 0.01	0.01	mg/L	12-Sep-18	SM4110:B
Potassium	6.1	0.1	mg/L	12-Sep-18	SM4110:B
Sodium	27.0	0.1	mg/L	12-Sep-18	SM4110:B
Sulphate	67	1	mg/L	12-Sep-18	SM4110:B
Microbiology					
Coliforms, Fecal	186	1	CFU/100mL	12-Sep-18	SM9222:D
Organics					
Oil and Grease, visible	Non-visible			14-Sep-18	Visual Exam
Trace Metals, Total					
Aluminum	1590	5	µg/L	04-Oct-18	EPA200.8
Arsenic	1.5	0.2	µg/L	04-Oct-18	EPA200.8
Cadmium	0.1	0.1	µg/L	04-Oct-18	EPA200.8
Chromium	2.5	0.1	µg/L	04-Oct-18	EPA200.8
Cobalt	2.9	0.1	µg/L	04-Oct-18	EPA200.8
Copper	10.3	0.2	µg/L	04-Oct-18	EPA200.8
Iron	3310	5	µg/L	04-Oct-18	EPA200.8
Lead	3.2	0.1	µg/L	04-Oct-18	EPA200.8
Manganese	1130	0.1	µg/L	04-Oct-18	EPA200.8
Nickel	5.4	0.1	µg/L	04-Oct-18	EPA200.8
Zinc	277	5	µg/L	04-Oct-18	EPA200.8

ReportDate: Friday, October 05, 2018
Print Date: *Friday, October 05, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180923

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-3 **Taiga Sample ID:** 002

Client Project:
Sample Type: Sewage Disposal
Received Date: 12-Sep-18
Sampling Date: 11-Sep-18
Sampling Time:
Location: KUG-3
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	21.4	0.005	mg/L	12-Sep-18	SM4500-NH3:G	
Biochemical Oxygen Demand	63	2	mg/L	12-Sep-18	SM5210:B	
CBOD	62	2	mg/L	12-Sep-18	SM5210:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	219	0.4	mg/L	12-Sep-18	SM2320:B	
Conductivity, Specific (@25C)	690	0.4	µS/cm	12-Sep-18	SM2510:B	
pH	7.44		pH units	12-Sep-18	SM4500-H:B	
Solids, Total Suspended	162	3	mg/L	17-Sep-18	SM2540:D	
Major Ions						
Calcium	11.7	0.1	mg/L	12-Sep-18	SM4110:B	
Chloride	48.0	0.7	mg/L	12-Sep-18	SM4110:B	
Hardness	58.3	0.7	mg/L	12-Sep-18	SM4110:B	
Magnesium	7.1	0.1	mg/L	12-Sep-18	SM4110:B	
Nitrate as Nitrogen	0.46	0.01	mg/L	12-Sep-18	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	12-Sep-18	SM4110:B	
Potassium	12.6	0.1	mg/L	12-Sep-18	SM4110:B	

ReportDate: Friday, October 05, 2018
Print Date: ***Friday, October 05, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180923

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-3 **Taiga Sample ID:** 002

Sodium	36.8	0.1	mg/L	12-Sep-18	SM4110:B
Sulphate	15	1	mg/L	12-Sep-18	SM4110:B
Microbiology					
Coliforms, Fecal	1260000	10000	CFU/100mL	12-Sep-18	SM9222:D
Organics					
Oil and Grease, visible	Non-visible			14-Sep-18	Visual Exam
Trace Metals, Total					
Aluminum	159	5	µg/L	04-Oct-18	EPA200.8
Arsenic	0.8	0.2	µg/L	04-Oct-18	EPA200.8
Cadmium	< 0.1	0.1	µg/L	04-Oct-18	EPA200.8
Chromium	0.6	0.1	µg/L	04-Oct-18	EPA200.8
Cobalt	0.7	0.1	µg/L	04-Oct-18	EPA200.8
Copper	40.3	0.2	µg/L	04-Oct-18	EPA200.8
Iron	753	5	µg/L	04-Oct-18	EPA200.8
Lead	0.6	0.1	µg/L	04-Oct-18	EPA200.8
Manganese	58.6	0.1	µg/L	04-Oct-18	EPA200.8
Nickel	2.7	0.1	µg/L	04-Oct-18	EPA200.8
Zinc	37.9	5	µg/L	04-Oct-18	EPA200.8

ReportDate: Friday, October 05, 2018
Print Date: *Friday, October 05, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180923

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-4 **Taiga Sample ID:** 003

Client Project:
Sample Type: Outfall Wetland
Received Date: 12-Sep-18
Sampling Date: 11-Sep-18
Sampling Time:
Location: KUG-4
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	21.6	0.005	mg/L	12-Sep-18	SM4500-NH3:G	
Biochemical Oxygen Demand	18	2	mg/L	12-Sep-18	SM5210:B	
CBOD	15	2	mg/L	12-Sep-18	SM5210:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	130	0.4	mg/L	12-Sep-18	SM2320:B	
Conductivity, Specific (@25C)	640	0.4	µS/cm	12-Sep-18	SM2510:B	
pH	7.62		pH units	12-Sep-18	SM4500-H:B	
Solids, Total Suspended	40	3	mg/L	17-Sep-18	SM2540:D	
Major Ions						
Calcium	15.6	0.1	mg/L	12-Sep-18	SM4110:B	
Chloride	94.1	0.7	mg/L	12-Sep-18	SM4110:B	
Hardness	140	0.7	mg/L	12-Sep-18	SM4110:B	
Magnesium	24.5	0.1	mg/L	12-Sep-18	SM4110:B	
Nitrate as Nitrogen	1.26	0.01	mg/L	12-Sep-18	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	12-Sep-18	SM4110:B	
Potassium	11.7	0.1	mg/L	12-Sep-18	SM4110:B	

ReportDate: Friday, October 05, 2018
Print Date: ***Friday, October 05, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180923

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-4 **Taiga Sample ID:** 003

Sodium	67.7	0.1	mg/L	12-Sep-18	SM4110:B
Sulphate	20	1	mg/L	12-Sep-18	SM4110:B
Microbiology					
Coliforms, Fecal	12700	100	CFU/100mL	12-Sep-18	SM9222:D
Organics					
Oil and Grease, visible	Non-visible			14-Sep-18	Visual Exam
Trace Metals, Total					
Aluminum	62.5	5	µg/L	04-Oct-18	EPA200.8
Arsenic	0.9	0.2	µg/L	04-Oct-18	EPA200.8
Cadmium	< 0.1	0.1	µg/L	04-Oct-18	EPA200.8
Chromium	0.5	0.1	µg/L	04-Oct-18	EPA200.8
Cobalt	0.9	0.1	µg/L	04-Oct-18	EPA200.8
Copper	11.3	0.2	µg/L	04-Oct-18	EPA200.8
Iron	1760	5	µg/L	04-Oct-18	EPA200.8
Lead	0.2	0.1	µg/L	04-Oct-18	EPA200.8
Manganese	234	0.1	µg/L	04-Oct-18	EPA200.8
Nickel	3.1	0.1	µg/L	04-Oct-18	EPA200.8
Zinc	6.9	5	µg/L	04-Oct-18	EPA200.8

ReportDate: Friday, October 05, 2018
Print Date: ***Friday, October 05, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180923

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-5 **Taiga Sample ID:** 004

Client Project:
Sample Type: Landfarm
Received Date: 12-Sep-18
Sampling Date: 11-Sep-18
Sampling Time:
Location: KUG-5
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Physicals						
pH	7.88		pH units	12-Sep-18	SM4500-H:B	
Organics						
Benzene	< 0.002	0.002	mg/L	15-Sep-18	EPA8260B	
Ethylbenzene	< 0.002	0.002	mg/L	15-Sep-18	EPA8260B	
Hexane Extractable Material	< 2.0	2.0	mg/L	12-Sep-18	EPA1664A	
Toluene	< 0.002	0.002	mg/L	15-Sep-18	EPA8260B	
Xylenes	< 0.002	0.002	mg/L	15-Sep-18	EPA8260B	
Subcontracted Organics						
Phenols, Total	0.0045	0.001	mg/L	18-Sep-18	AB ENV.06537	
Polychlorinated Biphenyls	< 0.00100	0.001	mg/L	21-Sep-18	EPA3510	
Trace Metals, Dissolved						
Cadmium	< 0.04	0.04	µg/L	04-Oct-18	EPA200.8	
Chromium	0.2	0.1	µg/L	04-Oct-18	EPA200.8	
Cobalt	0.7	0.1	µg/L	04-Oct-18	EPA200.8	
Copper	0.6	0.2	µg/L	04-Oct-18	EPA200.8	
Lead	< 0.1	0.1	µg/L	04-Oct-18	EPA200.8	

ReportDate: Friday, October 05, 2018
Print Date: ***Friday, October 05, 2018***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180923

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-5 **Taiga Sample ID:** 004

Nickel	5.8	0.1	µg/L	04-Oct-18	EPA200.8
Trace Metals, Total					
Arsenic	0.6	0.2	µg/L	04-Oct-18	EPA200.8
Mercury	< 0.01	0.01	µg/L	04-Oct-18	EPA200.8

ReportDate: Friday, October 05, 2018
Print Date: *Friday, October 05, 2018*

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 180923

- CERTIFICATE OF ANALYSIS -

Client Sample ID: KUG-5 **Taiga Sample ID:** 004

*** Taiga analytical methods are based on the following standard analytical methods**

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency

ReportDate: Friday, October 05, 2018

Print Date: ***Friday, October 05, 2018***

Appendix: C

Pages from Water Licence

Water Licence: 3BM-KUG 1520

Hamlet of Kugluktuk, NU

"**Water Retention Area**" compromises the 'Water Retention Area' as identified on Nuna Burnside Project No. N-O 09755.0 Drawing No.1," *The Hamlet of Kugluktuk, Solid Waste Disposal Facility Improvements*", record drawing dated November 18, 2008;

"**Wetland Treatment Area**" comprises the 'Expanded Wetland Treatment Area' as identified on Nuna Burnside Project No. N-O 09755.0 Drawing No.2, "*The Hamlet of Kugluktuk Sewage Lagoon Plan*" and the "*Meandering Wetland Treatment Area*" as identified on Drawing No.3, *The Hamlet of Nunavut Kugluktuk Proposed Sewage Lagoon Sections* stamped and dated June 18, 2007.

3. Enforcement

a. Failure to comply with this Licence will be a violation of the *Act*, subjecting the Licensee to the enforcement measures and the penalties provided for in the *Act*;

b. All inspection and enforcement services regarding this Licence will be provided by Inspectors appointed under the *Act*; and

c. For the purpose of enforcing this Licence and with respect to the use of Water and deposit or discharge of Waste by the Licensee, Inspectors appointed under the *Act*, hold all powers, privileges and protections that are conferred upon them by the *Act* or by other applicable law.

PART B: GENERAL CONDITIONS

1. The Licensee shall file an Annual Report on the Appurtenant Undertaking with the Board no later than 31st of March of the year following the calendar year being reported, containing the following information:

a. tabular summaries of all data generated under the "Monitoring Program" as described under Part H
b. the daily, monthly, and annual quantities, in cubic metres, of freshwater obtained from Monitoring Station KUG-1;
c. the daily, monthly and annual quantities in cubic metres of sewage effluent discharged at Monitoring Station KUG-3;
d. the monthly and yearly quantities of authorized Waste – bulky metal, hazardous, wood and soil—accepted at the Solid Waste Facilities;
e. a summary of modifications and/or major maintenance work carried out on the Water Supply and Waste Disposal Facilities, including all associated structures and facilities;
f. a list of unauthorized discharges and summary of follow-up action taken;
g. a summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year, including a summary of the Old Sewage Lagoon (Decommissioned Sewage Disposal Facility) Facility's Inspection Report in accordance with Part G, Item 1;
h. any updates or revisions for manuals and plans *(Including Operations and*

Maintenance Plans, Spill Contingency, Abandonment and Restoration, QA/QC Plans) as required by changes in operation and/or technology;

i. a summary of any studies, reports and plans requested by the Board that relate to Water use, Waste disposal or reclamation, and a brief description of any future studies planned;

j. summary of any inspections completed by federal or territorial authorities, geotechnical or municipal engineers, on undertakings related to Water use, Waste disposal or reclamation activities; and

k. any other details on Water use or Waste disposal requested by the Board by November 1st of the year being reported.

2. The Licensee shall notify the NWB of any changes in operating plans or conditions associated with this project at least thirty (30) days prior to any such change.

3. The Licensee shall comply with the "Monitoring Program" described in this Licence, and any amendments to the "Monitoring Program" as may be made from time to time, pursuant to the conditions of this Licence.

4. The "Monitoring Program" and compliance dates specified in the Licence may be modified at the discretion of the Board.

5. The Licensee shall install flow meters or other such devices, or implement suitable methods required for the measuring of Water volumes as required under Part H, Item 1.

6. The Licensee shall, post the necessary signs, to identify the stations of the "Monitoring Program". All signage shall be in the Official Languages of Nunavut.

7. The Licensee shall, for all Plans submitted under this Licence, include a proposed timetable for implementation. Plans submitted, cannot be undertaken without subsequent written Board approval and/or direction. The Board or an Inspector may alter or modify a Plan if necessary to achieve legislative objectives and will notify the Licensee in writing of acceptance, rejection or alteration of the Plan.

8. The Licensee shall, for all Plans submitted under this Licence, implement the Plan as approved by the Board in writing.

9. The Licensee shall review the Plans referred to in this Licence, as required by changes in operation and/or technology, and modify the Plan accordingly. Revisions to the Plans shall be submitted in the form of an Addendum to be included with the Annual Report.

10. Every Plan to be carried out pursuant to the terms and conditions of this Licence shall become a part of this Licence, and any additional terms and conditions imposed upon approval of a Plan by the Board become part of this Licence. All terms and conditions of the Licence should be contemplated in the development of a Plan where appropriate.

11. The Licensee shall ensure a copy of this Licence is maintained at the site of operations at

all times. Any communication with respect to this Licence shall be made in writing to the attention of:

(a) Manager of Licensing:
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0
Telephone: (867) 360-6338
Fax: (867) 360-6369
Email: licensing@nwb-oen.ca

(b) Inspector Contact:
Manager of Field Operations, AANDC
Nunavut District, Nunavut Region
P.O. Box 100
Iqaluit, NU X0A 0H0
Telephone: (867) 975-4295
Fax: (867) 979-6445

12. The Licensee shall submit one paper copy and one electronic copy of all reports, studies, and plans to the Board. Reports or studies submitted to the Board by the Licensee shall include a detailed executive summary in Inuktitut.

13. The Licensee shall ensure that any document(s) or correspondence submitted by the Licensee to the NWB is received and acknowledged by the Manager of Licensing.

14. This Licence is assignable as provided for in Section 44 of the *Act*.

15. The expiry or cancellation of this Licence does not relieve the Licensee from any obligation imposed by the Licence, or any other regulatory requirement.

PART C: CONDITIONS APPLYING TO WATER USE

1. The Licensee shall obtain all freshwater for municipal purposes from the Coppermine River, as indicated in its Application.

2. The annual quantity of Water withdrawn for all purposes under Part C, Item 1 in this Licence shall not exceed seventy thousand (70,000) cubic metres *per year* at a maximum withdrawal rate of two-hundred and ninety-nine (299) cubic metres *per day*.

3. The Licensee shall equip all Water intake hoses with a screen of appropriate mesh size to ensure that fish are not entrained and shall withdraw Water at a rate such that fish do not become impinged on the screen.

4. Where the use of Water is of a sufficient volume that the source Water body may be drawn down, the Licensee shall submit to the Board for approval in writing, the

following:

a. details of Water volume involved;
b. hydrological overview of the Water body;
c. details of impacts; and
d. proposed mitigation measures.

5. The Licensee shall maintain the Water Supply Facility to the satisfaction of the Inspector.

6. The Licensee shall not remove any material from below the ordinary High Water Mark of any Water body unless approved by the Board in writing.

7. The Licensee shall not cause erosion to the banks of any body of Water and shall provide necessary controls to prevent such erosion.

8. The Licensee shall implement sediment and erosion control measures prior to and maintain as required during Hamlet operations, to prevent entry of sediment into Water.

PART D: CONDITIONS APPLYING TO WASTE DISPOSAL

1. The Licensee shall direct all Sewage to the Sewage Disposal Facility or as otherwise approved by the Board.

2. All Effluent discharged from the Sewage Disposal Facility at the Final Discharge Point at Monitoring Program Station KUG-3 end-of-pipe to the Wetland Treatment Area, shall not exceed the following Effluent quality limits:

Parameter	Maximum Concentration of any Grab Sample
BOD_5	120 mg/L
Total Suspended Solids	180 mg/L
Faecal Coliforms	1 x 10^6 CFU/100 mL
Oil and grease	No visible sheen
pH	Between 6 and 9

3. All Effluent discharged from the Old Sewage Lagoon, Monitoring Station KUG-6 shall not exceed the Effluent quality limits set under Part D, Item 2.

4. The Licensee shall maintain at all times a Freeboard limit of at least 1.0 metre, or as recommended by a qualified Geotechnical Engineer and as approved by the Board in writing, for all dams, dykes, or structures intended to contain, withhold, divert or retain Water or Waste.

5. The Sewage Disposal Facility shall be maintained and operated, to the satisfaction of an Inspector and in such a manner as to prevent structural failure.

6. All discharge of Effluent at Monitoring Program Station KUG-5, from within the perimeter of the Landfarm Facility, shall not exceed the following Effluent quality limits:

Parameter	Maximum Concentration of any Grab Sample (µg/L)
pH	6 to 9 (units)
Oil and Grease	5,000 and no visible sheen
TSS	15,000
Lead (dissolved)	1
Phenols	20
Benzene	370
Toluene	2
Ethylbenzene	90

7. The Licensee shall provide at least ten (10) days' notice to an Inspector, of the intent to discharge Effluent from the Old Sewage Disposal Facility or the Landfarm Facility.

8. The Effluent under Part D, Item 7 shall be discharged at a minimum distance of thirty-one (31) metres from the ordinary High Water Mark of any water body and where direct or indirect flow into a water body is not possible and no additional impacts are created.

9. The Licensee shall, prior to the removal of any treated soil for future use, confirm with the Government of Nunavut, Environmental Protection Service that the soils have been treated to meet all legislatively-required Treatment Objectives for its intended use.

10. The Licensee shall dispose of all Solid Wastes in such a manner as to prevent the deposition of such waste in to water.

11. The Licensee shall not open burn plastics, wood treated with preservatives, electric wire, Styrofoam, asbestos or painted wood to prevent the deposition of Waste materials of incomplete combustion and/or leachate from contaminated ash residual, from impacting any surrounding Waters, unless otherwise approved by the Board in writing.

12. The Licensee shall segregate and store all hazardous materials and/or Hazardous Waste in such a manner as to prevent the deposit of Waste into Water, until such time that the material have been removed for proper disposal at an approved facility.

PART E: CONDITIONS APPLYING TO MODIFICATIONS AND CONSTRUCTION

1. The Board has, with the issuance of this Licence, approved the amendment to the Water Supply Facility.

2. The Licensee shall submit to the Board for approval in writing, for-construction design drawings, stamped and signed by a qualified Engineer registered in Nunavut, at least sixty (60) days prior to the construction of any dams, dykes or structures intended to

contain, withhold, divert or retain Water or Wastes.

3. The Licensee may, without written consent from the Board, carry out Modifications to the Water Supply Facility and Waste Disposal Facilities provided that such Modifications are consistent with the conditions and scope of this Licence and the following requirements are met:

   a. the Licensee has notified the Board in writing of such proposed Modifications at least sixty (60) days prior to beginning the Modifications;
   b. such Modifications do not place the Licensee in contravention of the Licence or the *Act*;
   c. the Board has not, during the sixty (60) days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than sixty (60) days; and
   d. the Board has not rejected the proposed Modifications.

4. The Modifications for which all of the conditions referred to in Part E, Item 3, have not been met, may only be carried out upon written approval from the Board.

5. The Licensee shall, within ninety (90) days of completion of Modification or Construction of facilities and/or infrastructure associated with the project, submit to the Board a Construction Summary Report along with stamped as-built plans and drawings, providing explanation to reflect any deviations from the for construction drawings, taking into account construction and field decisions and how they may affect the performance of engineered facilities.

6. The Licensee shall submit to the Board for approval in writing, at least sixty (60) days prior to the construction of the new Water Treatment Plant (WTP), for-construction design drawings of the new WTP, stamped and signed by a qualified Engineer.

7. The Licensee shall within ninety (90) days of completion of modifications of the Water Supply Facility, submit to the Board for review and written acceptance a Construction Summary Report along with as-built plans and drawings of the new Water Intake Facility and the new Water Treatment Plant, stamped and signed by a qualified Engineer.

8. All activities shall be conducted in such a way as to minimize impacts on surface drainage and the Licensee shall immediately undertake any corrective measures in the event of any impacts on surface drainage.

9. The Licensee shall implement and maintain sediment and erosion control measures prior to and during activities carried out under this Part, to prevent negative impacts to Water resulting from the release of sediment and to minimize erosion.

10. With respect to earthworks, the Licensee shall not deposit debris or sediment into or onto any Water body. These materials shall be disposed of at a distance of at least thirty-one (31) metres from the ordinary High Water Mark in such a fashion that they do not enter

the Water.

11. The Licensee shall only use material that is free of contaminants, for construction, operation, and maintenance activities and that is obtained from approved sources, demonstrated not to be potentially acid generating and metal leaching.

PART F: CONDITIONS APPLYING TO OPERATION AND MAINTENANCE

1. The Licensee shall submit to the Board for approval in writing, within ninety (90) days of issuance of the Licence, an updated Sewage Treatment Facility Operation and Maintenance Manual. The updated Manual shall include:

    a. a Monitoring Program, which reflects the current operating and monitoring conditions of the Licenced Facilities;
    b. the Temperature Monitoring Program for the Sewage Lagoon Dyke; and
    c. the GPS coordinates of the Monitoring Stations.

2. The Board has approved the "Spill Contingency Plan" (SCP), dated November 28, 2014, which was submitted as additional information with the Application. The Licensee shall submit to the Board for review within ninety (90) day of the date of Licence issuance an addendum to the SCP to include:

    a. a detailed description of the secondary containment used as spill prevention measure during fuel or hazardous substance transfer at the Licenced Facilities.

3. The Licensee shall submit to the Board for approval in writing, within ninety (90) days of issuance of the Licence, an updated Solid Waste Facility Operation and Maintenance Plan prepared in accordance with the "Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories" (1996). The updated Plan shall take into consideration the comments received during the renewal application review process for expired Licence No. 3BM-KUG0914 including the following information:

    a. SWF Monitoring Plan: updated sampling locations, parameters and timing required
    b. a plan for the inspection, management and monitoring for the sewage sludge, which also identifies the remediation objectives for sewage sludge treated in the Landfarm Facility

4. The Licensee shall submit to the Board for approval in writing, within ninety (90) days of beginning operations, a Water Supply Facility (WSF) Operation and Maintenance Manual. The WSF Operation and Maintenance Manual should include an Operations and Maintenance Manual for the updated Water Treatment Facility and also include the " Kugluktuk Water Intake Operations and Maintenance (O&M) Manual" dated October 2014 and submitted as additional information with the Application.

5. An inspection of all engineered facilities related to the management of Water and Waste shall be carried out by an Engineer at a minimum of once annually, and before commissioning any engineered facility related to the management of Water and Waste. The Engineer's report shall be submitted to the Board within sixty (60) days of the inspection, including a cover letter from the Licensee outlining an implementation plan to address each of the Engineer's recommendations.

6. An inspection of all engineered facilities related to the management of Water and Waste shall be conducted by a Geotechnical Engineer in accordance with the *Canadian Dam Safety Guidelines*, at least one (1) year prior to the expiry of the Licence, during the open Water period (June/July/August). The Geotechnical Engineer's report shall be submitted to the Board for review within sixty (60) days of the inspection, including a cover letter from the Licensee outlining an implementation plan to address the Engineer's recommendations.

7. The Licensee shall perform more frequent inspections of the engineered facilities at the request of an Inspector.

8. If during the period of this Licence, an unauthorized discharge of Waste occurs, or if such a discharge is foreseeable, subject to the Act and the Nunavut adopted *Consolidated Spill Contingency Planning and Reporting Regulations* (R- 068-93), the Licensee shall:

    a. employ the appropriately approved Spill Contingency Plan for the Hamlet of Kugluktuk. Take whatever steps are immediately practicable to protect human life, health and the environment;
    b. report the incident immediately via the NWT/NU 24-Hour Spill Reporting Line at (867) 920-8130 and to the AANDC Manager of Field Operations at (867) 975-4295; and
    c. for each spill occurrence, submit to the Inspector not later than thirty (30) days after initially reporting the event, a detailed report that provides the necessary information on the location (including the GPS coordinates), amount and type of spilled product, initial response action, remediation/clean-up, status of response (ongoing, complete), proposed disposal options for dealing with contaminated materials and any preventative measures to be implemented.

9. The Licensee shall, in addition to Part F, Item 9, regardless of the quantity of releases of harmful substances, report to the NWT/NU Spill Line if the release is near or into a Water body.

PART G: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION

1. The Licensee shall submit to the Board for approval in writing, within ninety (90) days following the date of issuance of this Licence, an updated Abandonment and Restoration Plan for the Old Sewage Lagoon. The Plan shall include, but not be limited to:

    a. an implementation schedule for the Plan;

b. sludge treatment method and disposal options;
c. Effluent treatment and disposal;
d. Monitoring Program; and
e. Schedule of inspection and checklist.

2. The Licensee shall submit to the Board, for approval, an Abandonment and Restoration Plan, at least six (6) months prior to abandoning any facilities or upon submission of the final design drawings for the construction of new facilities to replace existing ones. Where applicable, the Plan shall include information on the following:

a. Water intake facilities;
b. the Water treatment and Waste disposal sites and facilities;
c. abandoned Water and Waste facilities;
d. petroleum and chemical storage areas;
e. any site affected by Waste spills;
f. leachate prevention;
g. an implementation schedule;
h. maps delineating site facilities;
i. consideration of altered drainage patterns;
j. type and source of cover materials;
k. future area use;
l. Hazardous Wastes; and
m. a proposal identifying measures by which restoration costs will be financed by the Licensee upon abandonment related to Water use, Waste deposit to Water, or appurtenant undertakings related to Water use and/or deposit of Waste to Water, subject to the act and regulations.

3. The Licensee shall complete all restoration work within the time schedule specified in the Plan, or as subsequently revised and approved by the Board.

4. The Licensee shall carry out progressive reclamation of any components of the project no longer required for the Licensee's operations.

5. In order to promote growth of vegetation and the needed microclimate for seed deposition, all disturbed surfaces shall be prepared by ripping, grading, or scarifying the surface to conform to the natural topography.

6. Areas that have been contaminated by hydrocarbons shall be reclaimed to meet objectives as outlined in the Government of Nunavut's *Environmental Guideline for Site Remediation* (Revised January 2009). The use of reclaimed soils for the purpose of back fill or general site grading may be carried out only upon consultation and approval by the Government of Nunavut, Department of Environment and an Inspector.

PART H: CONDITIONS APPLYING TO THE MONITORING PROGRAM

1. The Licensee shall maintain Monitoring Program Stations at the following locations:

Monitoring Program Station Identification	Description	Status
KUG-1	Raw Water Supply Intake at Coppermine River	Active (Volume)
KUG-2	Effluent discharge from the Water Retention Area in the Solid Waste Disposal Facilities	Active (Quality)
KUG-3	Effluent discharge end-of-pipe at Final Discharge Point from the Sewage Lagoon to the Wetland Treatment Area	Active (Quality)
KUG-4	Outfall area for the Wetland Treatment Area	Active (Quality)
KUG-5	Effluent discharge and run-off from the Landfarm Facility (controlled discharge)	Active (Quality)
KUG-6	Effluent discharge (controlled discharge)from the Old Sewage Lagoon	New/Active (Quality)
KUG-7	Thermistor readings in accordance with approved Temperature Monitoring Program for the Sewage Lagoon Dyke under Part F Item 2b	New/Active (Temperature)

2. The Licensee shall measure and record, in cubic metres, the daily, monthly, and annual quantities of Water extracted for all purposes at Monitoring Program Station KUG-1.

3. The Licensee shall sample monthly at Monitoring Program Station KUG-2, KUG-3 and KUG-4 during periods of observed flow and annual discharges.

4. All Samples obtained at KUG-2, KUG-3, KUG-4 and KUG-6 shall be analyzed for the following parameters:

Biological Oxygen Demand (BOD_5)	Fecal Coliforms
pH	Conductivity
Total Suspended Solids	Oil and Grease (visual)
Nitrate-Nitrite	Ammonia Nitrogen
Chloride	Sulphate
Sodium	Potassium
Magnesium	Calcium
Total Hardness	Total Alkalinity

Total Arsenic
Total Cadmium
Total Cobalt
Total Copper
Total Lead
Total Mercury
Total Zinc
Total Phenols
Total Aluminum
Total Chromium
Total Iron
Total Manganese
Total Nickel
Carbonaceous Biochemical Oxygen Demand (CBOD)

5. The Licensee shall sample monthly at Monitoring Program Station KUG-3, during periods of observed flow and annual discharges to verify compliance with effluent quality criteria under Part D Item 2.

6. The Licensee shall carry out inspections at Monitoring Program Stations KUG-2, KUG-3 and KUG-4, weekly from May to October inclusive, to determine Effluent or water flow in order to fulfill the monitoring requirements of Part H, Item 4 and 5. A record of inspections shall be retained and made available to an Inspector upon request.

7. The Licensee shall sample prior to discharge at Monitoring Program Station KUG-5, to verify compliance with Effluent quality criteria under Part D, Item 6.

8. All samples obtained at KUG-5 shall be analyzed for the following parameters:

pH
Total Suspended Solids
Total Hardness
Oil and Grease (visual)
Total Petroleum Hydrocarbons (TPH)
Polycyclic Aromatic Hydrocarbons (PAH)
BTEX:
Benzene
Toluene
Ethylbenzene
Xylene
Conductivity
Total Copper
Total Mercury
Total Zinc
Total Chromium
Total Lead
Nickel
Total Arsenic
Total Cadmium
PCB (Polychlorinated biphenyls

9. The Licensee shall sample prior to discharge at Monitoring Program Station KUG-6, to verify compliance with Effluent quality criteria under Part D, Item 2.

10. Additional monitoring stations, sampling and analysis may be requested by an Inspector.

11. The Licensee shall submit to the Board for review, within ninety (90) days of the date of issuance of the Licence, a Quality Assurance/Quality Control Plan based on the guidance document entitled *Quality Assurance (QA) and Quality Control (QC) Guidelines For Use by Class "B" Licences in Collecting Representative Water Samples in the Field and for Submission of a QAQC Plan* INAC (1996). The submitted Plan shall include a cover letter from an accredited laboratory confirming acceptance of the Plan for the monitoring

and analyses to be performed under the Licence.

12. The Licensee shall conduct all sampling, sample preservation and analyses in accordance with methods prescribed in the current edition of *Standard Methods for the Examination of Water and Wastewater*, or by such other methods approved by a laboratory certified by the Canadian Association for Laboratory Accreditation (CALA) or otherwise approved by the Board.

13. All analyses shall be performed in a laboratory accredited according to ISO/IEC Standard 17025. The accreditation shall be current and in good standing.

14. The Licensee shall monitor temperature at Monitoring Station(s) KUG-7 a minimum of twice annually, in early spring and mid to late fall or in accordance with the Sewage Lagoon Dyke Monitoring Program requested under Part F, Item 1b and 1c.

15. The Licensee shall provide the temperature readings at different depths at Monitoring Station(s) KUG-7 within the annual report, due no later than March 31. An annual evaluation of the geothermal data of the Sewage Disposal Facility shall be provided as an addendum to the Annual Report.

16. The Licensee shall include all of the data and information of the Monitoring Program, as required under Part B, Item 1(a), or as requested by an Inspector.

17. Modifications to the Monitoring Program including the Monitoring Program Stations and parameters may be made only upon written approval of the Board.