Annual Report -2020

Water Licence: 3BM-PEL 1929

Hamlet of Kugaaruk, NU

January 29, 2021




Submitted to:

Nunavut Water Board (NWB)

Kugaaruk Water Licence: 3BM-PEL 1929 Annual Report 2020

February 02, 2021
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1L0
Attention: Richard Dwyer, Manager of Licensing, Manager of Licensing

RE: 3BM-PEL-1929 Annual Report 2020, Hamlet of Kugaaruk

Dear Richard,

The Hamlet of Kugaaruk is pleased to submit to Nunavut Water Board the Annual Report 2020 of water uses and sewage solid waste disposal as directed under compliances of Water Licence 3BM-PEL 1929. Copies of samples test reports are appended under Part B of this report.

The Licensee has made effective measures to ensure quality and compliances for sewage, solid waste management as determined in the license which include cleaning hazardous waste from access road, outside of facility, waste batteries storage, hazardous segregation and secure in a designated cell, sewage sludge management, aid in treatment process and monitoring sampling and test results review. The sewage lagoon was fully re-emptied by decanting and de-sludge the sediment into the geotube pad and facilitated for raw sewage deposition during the lagoon improvement work until the completion in mid-October 2020. Samples test result shown control on contaminants parameters. We have summarized compliances to conditions requirements as outlined in Parts B – I in the license.

We hope that Nunavut Water Board will find this report and supporting test results valuable in operating the Water Licence for water supply, and sewage waste management for community residents. We thank the Board for considering increased annual water quantity to 60,000m3 and exemption from the need of acute lethality test for waste disposal in the amendment license.

Best Regards,

Shah Alam, P. Eng. E.P.
Municipal Planning Engineer,
Government of Nunavut, Community and Government Services
Kitikmeot Region, Cambridge Bay, Nu
Phone: 867-983-4156, fax: 867-983-4124
salam@gov.nu.ca<mailto:salam@gov.nu.ca>

CC: Chantal Dowden, Chief Administrative Officer, Hamlet of Kugaaruk, NU
Baba Pedersen, Resource Management Officer, CIRNAC

EXECUTIVE SUMMARY:

This Annual Report 2020 prepared to meet requirements and compliances set out in the Nunavut Water License 3BM-PEL1929 for the hamlet of Kugaaruk, the owner and responsible for operation and monitoring program. This report covers the period January 01 to December 31, 2020.

Raw water intake from the Kugajuk river at the location PEL- 1 identified the placement of intake screen at a depth of about 2.4 m below of normal water surface. Intake water is treated by Cartridge filters series of 20 M - 1M, followed by UV system, and chlorination before truckfill from outside of the WTP and delivery to household tanks. Quantity of water uses during this period is **37,006** m3 which is within the allowable limit of 60,000 m3 annually.

Raw sewage water collected from household sewage tanks using hamlet operated vacuum trucks, hauled to sewage lagoon. Raw sewage deposited in the lagoon during winter and spring, with only exception of Aug-Oct when sewage water deposited in the geotube pad temporarily when sewage lagoon improvement works resumed that left incomplete last year. Raw sewage stayed inside the lagoon for almost 9 months frozen and then decanted the sewage water into the outer cell on wet land. Sludge and sediments are decanted into the geotube from where effluent washout towards the outer cell. Raw sewage flowed on geomembrane sloping ground and air bubbled from bottom of the decanted cell continuously to expedite the treatment process. It was required to empty the lagoon cell again to prepare bottom area with HDPE liner on compacted sand layer. Lagoon improvement work completed, and sewage deposition resumed as of October 15. Improved lagoon berm secured with metal fence and vehicular roadway on top width with gate access control. Decanting point on existing location with new pump and pipe hose assembly. Samples were collected and tested at the Taiga Laboratory for compliance parameter values to the Environmental regulation.

Household wastes collected from waste bins and hauled to dump site by hamlet operators. Private and commercial wastes hauled by their own trucks and deposited on designated location with the direction by hamlet operators when available. Major cleanup to solid waste facility carried during July-Sep and on occupation as needed including pushing down loose waste to low gradient. Lined cells at metal dumps used for temporary storage of crushed drums and hazardous waste were cleaned and waste batteries replaced into C-cans. Debris and metal wastes dumps outside of the facility were cleaned as determined and requested by the inspector.

Signs were re-installed at locations identified as active stations PEL-4 as sewage effluent Final discharge, and PEL-6, PEL-9.2 for solid waste and metal dump facilities. It would the discretion of the inspector to re-arrange titles of those stations for operational easiness and inactive stations will be kept on records only as determined in the license. The Licensee also noting that sludge mixed wastes on geotube outside of the lagoon main cell will be facilitated for washout and monitor of the effluent quality along with the decanted sewage on wetland during summer -fall period.

Hamlet of Kugaaruk is committed to fulfill requirement compliances as determined in the water license and inspection direction by CIRNA. We thank the Board to relief requirements of acute lethality testing for Rainbow Trout and Daphnia magna of waste disposal as these are not effective with current facility.

ᑐᑭᒧᐊᖅᑎᑦᑎᔨᑉ ᐅᓂᒃᑳᓕᐊᖏᑦ:

ᑖᓐᓇ ᐅᑭᐅᖅᒧ ᓇᓪᓕᐅᒪᔪᖅ ᐅᓂᒃᑳᓕᐊᖅ 2020ᒥᒃ ᐃᓪᓗᐊᖅᓴᕐᑕᐅᔪᖅ ᐊᒪᓗ ᒪᓕᒃᓯᒪᓗᓂᓗ ᓄᓇᕗᒻᒥᐅᓄ ᐃᒪᖅᒧ ᓚᐃᓴᐅᔪᖅ 3BM-PEL 1929 -ᒧ ᐃᓪᓗᐊᖅᓴᕐᓯᒪᔪᖅ Hᐋᓪᓚᑦᑐᔪᓄ ᑯᓘᖅᔫᒃᓄ, ᑎᒍᒥᐊᖅᑐᖅ ᓇᒥᓂᖅ ᐊᒪᓗ ᑲᒪᕋᑕᖅᑐᖅ ᐱᔭᒃᓴᖅᓯᒪᔪᖅ ᐃᖏᕋᓂᐊᓄ ᐊᒪᓗ ᖃᐅᔨᓴᖅᓂᖅᒧ ᐱᔭᒃᓴᐅᔪᒧ. ᑖᓐᓇ ᐅᓂᒃᑳᓕᐊᖅ ᑕᕿᐅᔪᒧ ᔭᓄᐊᕆ 01ᒥᒃ - ᑎᓴᒻᐳ 31, 2020ᒧ.

ᐃᒪᖅ ᐃᓚᓯᒪᕆᑐᖅ ᑯᓘᖅᔫᑉ ᐃᒥᖅᑕᕝᕕᐅᕙᑦᑐᖅ ᓱᖅᐸᓃᓂᖓ ᓇᓗᓇᐃᔭᖅᓯᒪᔪ PEL-1 -ᒥᒃ ᐃᓕᑕᕆᔭᐅᓯᒪᔪᖅ ᐃᒥᖅᑕᕝᕕᐅᕙᑦᑐᖅ ᐃᑎᓂᖓ 2.4ᓂᒃ ᒦᑕᐅᓪᓗᓂ ᐆᒃᑐᕋᐅᑎ. ᐃᒪᖅᓗ ᐃᒥᖅᑕᐅᑎᒧᖓᓕᕚᖓ ᑕᐃᑰᓇ ᓴᓗᒪᐃᖅᑕᐃᓕᔪᑎᒃᑰᕋᑕᖅᓯᒪᓗᓂ ᓈᓴᐅᑎᖃᑦᑐᖅ 20 M -1M, ᐊᒪᓗ ᑕᒃᕗᓈᓚᐅᖅᓗᓂ ᐃᓚᕆᓪᓕᐊᕋᑕᖅᑐᖅ ᑐᕐᑯᓇᖅᒥ ᐃᒥᖅᑕᐅᑎᒧᖓᖅᐸᓪᓕᐊᑎᓪᓗᒍ ᑕᐃᑲᖓ ᐃᒥᖅᑕᖅᕕᒃᒥ ᐊᒪᓗ ᐃᒥᖅᑕᓕᖅᓗᑎᓗ ᐃᓄᐃᑦ ᐃᒃᓗᖅᔪᐊᖏᓐᓄ. ᑕᐃᒪᓕ ᐃᒪᓐᓇ ᐊᖏᑎᕆᔪᒥ ᐃᒥᖅᑕᒪᔪᑕᐅᕋᑕᖅᑐᖅ 37,006 ᐆᒃᑐᕋᐅᑎ ᐱᖓᓱᐃᖅᑕᖅᓗᒍ ᐊᒪᓗ ᐅᑭᐅᓕᒫᒧ ᑭᒃᓕᖃᖅᓯᒪᔭᕈᐊᖃᕋᓗᐊᖅᓗᓂ 60,000ᓂᒃ ᐱᖓᓱᐃᖅᑕᖅᓗᒍ.

ᐃᒪᐃᔭᖅᑕᐅᕋᑕᖅᑐᖅᓗ ᑯᕕᕋᐃᕕᒃᒧ ᐃᒃᓗᖅᔪᐊᖅᓂᖕᖔᑦᑐᖅ ᐃᒪᐃᔭᐅᑎᒧ ᓄᓇᒃᑰᕈᑎᒃᑯᑦ ᐊᐅᓚᑕᐅᓯᒪᔪᖅ Hᐋᓪᓚᑦᑯᓐᓂᒃ ᑯᕕᕋᖅᑕᐅᕋᑦᑐᖅ ᑯᕕᕋᐃᕕᒃᒧ. ᑯᕕᕋᖅᑕᐅᕋᑦᑐᖅ ᐅᑭᐅᒃᑯᑦ ᐊᒪᓗ ᐅᐱᖖᒃᓵᒧ, ᑭᓯᐊᓂᓕ ᐋᒡᓘᔅ ᐊᒪᓗ ᐋᒃᑐᐸ ᑕᕿᖏᓐᓄ ᐃᓚᐅᓯᒪᕆᑎᓪᓗᒋᑦ ᐊᒪᓗ ᑯᕕᕋᖅᑕᐅᔪᖅ ᑯᕕᕋᐃᕕᒃᒧ ᑐᖓᑎᕆᔭᖓ ᐊᒪᓗ ᑕᒪᓐᓇ ᐊᑦᑖᓂ ᐱᐊᓂᒃᑕᐅᓯᒪᖏᓚᐅᖅᒪ ᓴᓇᔭᐅᓂᖓ ᐃᓗᐊᖅᓯᕆᐊᕐᑕᐅᔭᕆᐊᖃᓚᐅᖅᒪ ᐊᑦᑖᓂ. ᑕᐃᒪᓕ ᑕᕿᓪᓗᐊᖅᓄ ᖁᓚᐅᖏᓄᐊᖅᑐᓄ ᑯᕕᕋᖅᕕᐅᔪᒧ ᐃᒪᐃᖅᑎᕋᑕᖏᓪᒪ ᐅᑭᐅᒃᑯᑦ ᑭᓯᐊᓂᓕ ᓯᓚ ᐅᐱᖖᖅᒧ ᑐᕌᖅᐸᓪᓕᐊᑎᓪᓗᒍ ᑕᐃᑯᖓᑦᑕᐅᖅ ᑯᕕᕋᖅᑕᐅᔪᖅ ᐃᒪᐃᕈᑎᓓᓪᓕᐊᕋᑕᖅᑐᖅ ᓴᓇᔭᐅᓯᒪᔪᖅᒧ ᑯᕕᕋᐃᕕᐅᑉ ᐃᓛᒃᑰᖅᓯᒪᔪᑎᖓᒍᒍ. ᑕᐃᒪᓗ ᐊᓇᖅᑕᐅᓯᒪᓃᑦ ᐊᒪᓗ ᓴᓗᒪᐃᓂᖏᑦ ᔫᖅᑐᕐᐸᓪᓕᐊᕋᑦᑐᖅ ᓱᑉᓗᒧ ᐃᓕᐅᖅᑦᑕᐅᓯᒪᔪᒧ ᑯᕕᕋᐃᕕᒃᒥ. ᓱᓕᒃᑕᐅᖅ ᐃᒪᐃᖅᐸᓪᓕᐊᑎᓪᓗᒍ ᑖᓐᓇ ᑯᕕᕋᐃᕕᒃ ᓄᑖᖅᒥ ᑯᕕᕋᖅᕕᐅᓕᕚ ᑕᒪᓐᓇ ᑯᕕᕋᖅᕕᐅᕋᑦᑐᖅ ᐃᓕᕐᑯᓯᒥᑎᑐ ᑯᕕᕋᐃᕝᕕᒃ ᓴᓇᓂᖃᕋᑕᖅᓯᒪᔪᖅ ᐃᒃᒪᒃᐸᓪᓕᐊᑎᓪᓗᒍ ᖃᐅᔨᓴᕈᑏᑦ ᑯᕕᕋᐃᕕᒥ ᖃᐅᔨᓴᑦᑎᐊᕋᑕᖅᓯᒪᔪᖅ ᐊᒪᓗ ᑕᒪᓐᓇ ᑯᕕᕋᖅᑕᐅᓪᓕᐊᔪᖅ ᖃᐅᔨᓴᕈᑕᐅᓂᖅᒧ ᐱᓪᓕᐊᕋᑦᑐᖅ. ᑭᓯᐊᓂᓕ ᑖᓐᓇ ᑯᕕᕋᐃᕝᕕᒃ ᐃᓗᐊᖅᓯᕆᐊᖅᑕᐅᓯᒪᓂᖓ ᐱᐊᓂᒃᓯᒪᓕᑦᑐᖅ, ᐊᒪᓗ ᑯᕕᕋᐃᕝᕕᐅᕋᑦᑐᖅ ᐋᒃᑐᐸ 15ᒥᒃ ᓴᓇᔭᐅᑖᖅᒪ ᐊᑐᖅᑕᐅᓕᓚᐅᖅᒥᔪᖅ ᑯᕕᕋᖅᑎᐅᔪᓂ. ᐃᓗᐊᖅᓯᕆᐊᖅᐅᓯᒪᔪᖅ ᑯᕕᕋᐃᕝᕕᐅᑉ ᐊᕆᓪᓗᐊ ᐃᓗᑐᓂᖃᖅᓯᒪᓗᓂ ᐊᒪᓗ ᐊᕆᓪᓗᖃᖅᓯᒪᓗᓂ ᓴᕕᐅᔪᒥ ᐊᒪᓗ ᑯᕕᕋᐃᑎᒧ ᓄᓇᒃᑰᕈᑎᒧ ᐊᕐᑯᑎᖓ ᐃᓂᒃᓴᖃᖅᑎᑕᐅᓯᒪᓕᖅᓗᓂ. ᑕᐃᒪᓗ ᑯᕕᕋᖅᑕᐅᕋᑦᑐᖅ ᖃᐅᔨᓴᖅᑕᐅᕋᑕᖅᓯᒪᔪᐃ ᑲᑎᖅᓱᕐᑕᐅᓗᑎᓗ ᐊᒪᓗ ᖃᐅᔨᓴᖅᑕᐅᓯᒪᕋᑕᖅᓗᑎᓗ ᑕᒪᓐᓇ ᖃᐅᔨᓴᖅᑕᐅᕋᑕᕆᐊᖃᕐᓂᖅ ᒪᓕᒃᑕᐅᔭᕆᐊᖃᖅᒪ ᐊᕙᑎᓕᕆᓂᖅᒧ ᒪᓕᒐᖅᔪᐊᖓᓂ.

ᐃᒃᓗᖅᔪᐊᖅᓂ ᐃᒪᐃᔭᖅᑕᐅᕋᑕᖅᑐᐃ Hᐋᓪᓚᑦᑯᓐᓂ ᐊᒪᓗ ᐃᒃᓗᕆᔭᐅᔪᐃ ᓇᒥᓂᕆᔭᐅᔪᐃ ᐃᒪᐃᔭᖅᑕᐅᕋᑕᖅᑐ ᑕᒪᐃᑕ Hᐋᓪᓚᑦᑯᓐᓂᒃ ᐊᒪᓗ ᑎᑎᕋᖅᕖᓪᓗ ᐃᒪᐃᔭᖅᑕᐅᕋᑦᑐᖅ Hᐋᓪᓚᑦᑯᓐᓂ ᓱᓕ ᐃᒪᐃᔭᖅᑕᐅᔭᕆᐊᖃᕐᓕᕚᓚᑕ. ᑕᐃᒪᓕ ᓴᓗᒪᖅᓴᕐᑕᐅᕋᑦᑐᖅ ᑯᕕᕋᐃᕝᕕᒃ ᑕᕿᐅᔪᓂᒃ ᔪᓚᐃ-ᒥᒃ ᓯᑕᒻᐳ-ᒧ ᐱᔭᕆᐊᖃᕐᓕᕚᓚ ᑕᒪᒃᑯᐊᓪᓗ ᐊᔭᐅᖅᑐᕐᑕᐅᕋᑦᑕᖅᑐᖅ ᐊᖅᓇᐃᑦ. ᑕᐃᒪᓗ ᑕᒪᒃᑯᐊ ᖃᑦᑕᐅᔭᐃᓪᓗ ᐊᒪᓗ ᐃᓗᓕᖃᐅᖅᓯᒪᔪᐃᑦ ᓴᓗᒪᐃᑐᓂᒃ ᐊᒪᓗ ᓴᓂᕆᖅᓯᒪᔪᐃᑦ ᑯᕕᕋᐃᑎᓗ ᑯᕕᓯᓕᕌᖓ ᖃᑦᑕᐅᔭᐃᑦ ᖄᖓᒍ ᓴᓗᒪᐃᓕᕋᖅᒪᑕ ᖄᖓᒍ, ᑕᒪᒃᑯᐊᑦᑕᐅᖅ ᓴᓗᒪᖅᓴᕐᑕᐅᕋᑕᖅᑐᖅ, ᓱᓕᒃᑕᐅᖅ ᐹᑐᓖᕕᓃᑦ ᔫᖅᑐᕐᑕᐅᑎᐊᕋᑕᖅᓗᑎ ᐃᒋᑕᐅᕋᑦᑕᖅᑐᖅ ᑕᒪᒃᑯᐊ ᑯᕕᕋᐃᕕᐅᑉ ᐊᕙᑖᓃᑦᑐᖅ ᖃᐅᔨᓴᖅᑕᐅᑎᐊᕋᑦᑕᖅᑐᖅ ᓴᓗᒪᐃᓂᖃᕐᒪᖔᑕ.

ᓇᒃᐸᖅᓯᓚᐅᖅᒥᔪᐃᑦ ᑎᑎᖃᓂᒃ ᓇᓗᓇᐃᑯᑕᖅᓂ ᐃᓕᑕᕆᔭᐅᓯᒪᔭᐅᕐᑯᓗᕆ ᐊᑑᑎᖃᖅᓯᒪᔪᐃᑦ ᒫᓐᓇᐅᔪᒧ ᓇᓗᓇᐃᑯᑕᓕᑦ ᑎᑎᖃᓂᒃ ᐃᒪᐃᑑᔪᓂ PEL-4 ᒥᒃ ᑯᕕᕋᐃᕕᐅᕋᑦᑐᖅ, ᐊᒪᓗ ᓇᓗᓇᐃᑯᑕᓖᑦ PEL-6, PEL-9.2 -ᒥᒃ ᐊᑦᑕᖅᕕᒃ ᓄᓇᓕᒃᒥᐅᑕᓄ ᐊᒪᓗ ᓴᕕᐅᓂᖅᓴᓄ ᓇᓗᓇᐃᑯᑕᐅᔪᐃ. ᑕᐃᒪᓗ ᖃᐅᔨᓴᖅᑎᐅᔪᒥ ᑕᒪᒃᑯᐊ ᑎᑎᖃᖃᖏᓐᓂᖅᓴᐃ ᓇᓗᓇᐃᑯᑕᖅᓂ ᑎᑎᕋᖅᑕᐅᓯᒪᕋᑕᖅᑐᖅ ᑎᑎᖃᒃᑯᑦ ᑐᑭᓕᐅᖅᑕᐅᓯᒪᓗᑎ ᐊᑑᑎᖃᖅᒥᒻᒪᑕ ᐊᒪᓗ ᓚᐃᓴᒃᑯᑦ ᓇᓗᓇᐃᔭᖅᑕᐅᓯᒪᔪᐃᑦ. ᓚᐃᓴᐅᔪᖅ ᓱᓕ ᑎᑎᖃᖃᓯᒪᔪᖅ ᓇᓗᓇᐃᑯᑕᐅᓗᓂᓗ ᐃᒪᐃᔭᖅᑕᐅᔪᐃᑦ ᐃᒪᐃᖅᑎᑉᐸᓪᓕᐊᕋᑕᖅᒪ ᑕᐃᑯᖓ ᑯᕕᕋᐃᕕᐅᑉ ᐃᓛᒍ, ᐃᓛᒃᑯᖅᓯᒪᒐ ᐊᒪᓗ ᖃᐅᔨᓴᑦᑎᐊᖅᑕᐅᕋᑦᑐᖅ ᖃᓄᖅ ᓴᓗᒪᐃᑎᕆᒃᒪ ᑯᕕᕋᖅᑕᐅᕆᐊᖅᐸᓪᓕᐊᕐᓕᕚ. ᐱᓗᐊᖅᑐᒥ ᐊᐅᔭᒃᑯ ᐊᒪᓗ ᐅᑭᐊᒃᓵᒃᑯᑦ.

Hᐋᓪᓚᑦᑯ ᑯᓘᖅᔫᒃᓂ ᒪᓕᒃᑎᐊᖅᓯᒪᔪᒪᔪᐃᑦ ᒪᓕᒐᖅᒥ ᑖᒃᓯᒧᖓ ᓚᐃᓴᐅᑉ ᒪᓕᒐᖓᓂ ᐊᒪᓗ ᓚᐃᓴᐅᑉ ᐃᓗᐊᓃᒃᒪᑕ ᒪᓕᒃᓴᐃ ᐊᒪᓗ ᑐᑭᒧᐊᖅᑎᑎᔨᖃᖅᓗᑎᓗ ᑲᓇᑕᒥ ᖃᐅᔨᓴᖅᑎᖅᔪᐊᖑᔪᓂ. ᑕᐃᒪᓕ ᖁᔭᓕᓯᒪᕗᒍ ᑲᑎᒪᔨᐅᔪᓄ ᐱᔭᕆᐊᖃᕐᑐᓂ ᒪᓕᒃᓯᒪᓯᑕᖅᒪᑕ ᖃᐅᔨᓴᐃᓂᖅᒧᑯᐊᖅᑕᐅᔪᓄ ᐊᒪᓗ ᓴᓗᒪᐃᑑᔪᓂ ᐃᒋᐅᖅᑕᐅᓯᒪᔪᓂᒃ, ᑭᓯᐊᓂᓕ ᓴᓗᒪᐃᓐᓂᖅ ᐊᔾᔨᐅᖅᑐᓂ ᓴᕿᐅᒪᔪᖃᓕᖅᓂᖅᐸ ᑎᑎᖅᑯᑎᖅᕿᔭᖅᑐᖅ ᒫᓐᓇᐅᔪᒧ.

Annual Report-2020

PART: A

Water Licence: 3BM-PEL 1929

Hamlet of Kugaaruk, NU

3BM - PEL 1929

Annual Report-2020

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PART-A

PART:B

Attachments:

General Conditions:

- The water quantity recorded as intake from all sources supplied to residents, commercial, institution and other uses in the community from monthly records, and sewage volume estimated as maximum percentage of possible water volume, measured on daily basis.
- Existing sewage improved to full engineered lagoon system with increased capacity on the same footprint area by blasting and grading bottom edge near the raw sewage deposition chute and re-pitching gravels on inner slope on HDPE liner bed. Air vent exhaust system added at 4 locations to relief naturally of any unexpected entrap gas under the HDPE liner. Freeboard marked 1.0m and free-flow ditch on berm prepared with HDPE liner gradient to natural discharge of access water towards outside to prevent berm materials washout if overflow happened.
- Decanting system improved with mechanical pump and piping system placed on the same location of the existing lagoon. It is expected to decant sewage water 1-2 times annually from the main cell to the outer cell (referred as decanted cell).
- Existing lagoon was fully cleaned up and excess sludge waste deposited on geotube pad to the north-east of the main cell. Sludge washout effluent was monitored and facilitated with air bubbles from underneath to expedite treatment process. Samples were taken and tested.
- No other unauthorized discharge to water or waste noted during this duration.
- O&M manuals for sewage and solid waste facilities updated on Aug 2019 and no changes required, only update will be for the improved lagoon prepared as part of the project work.
- Spill Contingency Plans for sewage and solid waste management updated Aug 2019 which also covered potential spills materials useable to water treatment plant such as Chlorine, wastewater tank, filter materials and heating fuels.
- Annual quantity of **37,006 m3** water drawn from the river is within the allowable annual limit **60,000** m3. Water supply to household tanks by Hamlet operated trucks 7days a week.
- Truckfill operation can be done by using control device on wall near the truckfill arm and the can be done from inside SCADA panel. The licensee maintains the truck turn around area clean, level, graded and secure the intake point at river water mark with no erosion. Water intakes point PEL-1 was elaborated as PEL-1A, PEL-1B at the riverbank and at the intake to treatment line inside the plant building as directed by the Inspector.

Sewage and Waste:

- Sewage waste both grey and black combined from urinal, toilet flush and shower and kitchen water stored in the household tank are collected and hauled to sewage lagoon as the objective of sewage management and natural treatment system. Amount of sewage water is calculated considering 90-95 % of potable water used by all purposes during this period.
- Information and relevant photographs are included of the modification of the sewage facility as requested in the condition requirements license (Part B, item 1. h)
- Signages installed at location determined before and amended: PEL-2 sewage drop-off point PEL 3-1 decant intake point inside lagoon, PEL 3-2 decanting cell on wetland, PEL-4 effluent Final discharge point to water body, PEL-6 solid waste runoff sump point, PEL 9-2 Metal

dump leachate run-off sump (we propose to rename it as PEL-7 with the direction of the inspector at site visit). Sewage lagoon facility sign in different language is installed near the access gate.

- Spills reporting NWT-NU 24-hours with contact information updated with the SC plan.
- No changes to existing wetland and trenches used for final treatment of effluent with the aid of sunlight, air flow, oxygen ingress and nutrients reduction by grass willow and sand gravel spongy wet surface.

Non-hazardous domestic Solid Waste:

- Household waste collected waste bins and hauled to the dump site 3-5 days a week with on call as required for commercial waste (mostly commercial waste hauled by the owner) and deposit at designated location predetermined by types. Hazardous waste was separated from regular waste and secured inside the C-can for shipping out which include waste batteries, waste paints, waste oils, antifreeze, halogen tubes and others.
- Used oil drums crated on wood planks, and tied up together to secure from wind blown
- Loose waste burnt onsite and buried inside trenches along with small debris, pushed down and covered by sand-gravels.
- Facility monitoring normally carried during summer – fall for major components, other than follow up and store on site during winter. The licensee keeps manual monitoring through observation and drive through as feasible.
- Effluent samples collection normally during July-September from monitoring stations as available and test results confirm the QA/QC management as determined in the license.

ANNUAL REPORT

YEAR BEING REPORTED: 2020

The following information is compiled pursuant to the requirements of Part B, Item 1 of Water Licence **3BM-PEL1929** issued to the **Hamlet of Kugaaruk**

i) - iii) tabular summaries of all data generated under the "Monitoring Program"; monthly and annual quantities in cubic metres of freshwater obtained from all sources; monthly and annual quantities in cubic metres of each and all wastes discharged

Attached are quantities of water used as reported in our On Tap Water Delivery System and the estimated discharge of sewage waste based on quantities used.

Month Reported	Quantity of Water Obtained from all sources (litres)	Quantity of Sewage Waste Discharged
January	3,109,892.50	Same
February	2,938,894.10	Same
March	3,218,238.30	Same
April	2,955,547.60	Same
May	2,963,347.70	Same
June	2,835,443.00	Same
July	3,265,784.30	Same
August	3,140,236.10	Same
September	3,108,398.00	Same
October	3,169,332.60	Same
November	3,221,481.10	Same
December	3,078,850.50	Same
ANNUAL TOTAL	**37,005,445.80**	Same

iv. 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

Water Treatment and supply:

- No major works for water treatment plant but replaced one of the intake pump motor that was burned out due to duct tapes jam inside the impeller.

  Intake water pump #2 has not been working during October 10-12, 2020. The operator has tried to manually switch the pump (pump #1 to pump #2) but was not kicking on the intake. The operator has noticed small pieces of duct tapes are coming with water at the filters and assumed more duct tapes might went inside the pump impeller and stopped the pump spinning to pull water from river intake. The operator then pulled out the pump and opened the motor from the pump port. It was found the impeller area full of duct tapes and stopped spinning and burnt the motor.

- Cartage filters changes in 2-3 months and UV tube lights (after 1000 hours running) or as needed which is part of treatment plant operation.
- Potholes on truckfill turn around area and riverbank washout area were filled by gravel sands and graded by hamlet operator.

  Kugaaruk Water Treatment system integrates with twin intake lines housed in 300 mm HDPE casings, connected to cylindrical screen (Johnson) inside the Kugajuk River. Twin pumps of 15 hp (Grundfos Canada) capable to water intake at a rate of 18.9 L/s.

  Water treatment system comprises with cartridge filtration system ranging 10 M-1M in two trains followed by UV disinfection (Neotech) with recirculation pump.

  Intake control salinity sensor (Walchem), turbidity sensor (HF Scientific) & flow meter, auto dialling telephone system to transmit and alarm for operators.
  Chlorination: using mixing tank (66 L) and holding tank (114 L) in two steps Cl2 dosing

  Power: The treatment system and intake run by 3-phase power line and a generator for backup power (in old treatment building) when grid power (3p) fails

  Tanks: Sanitary tank of 1200 L and domestic water tank of 114 L for plant building uses
  Truckfill: two truckfill arms, one on each side of the building outside
- Sewage facility improvement work completed this year and started sewage deposition.

v. a list of unauthorized discharges and summary of follow-up action taken;

No unauthorized discharge of water, sewage, or solid waste effluent to any water body. The only exception of redirecting the sludge washed water from the geotube pad towards the decanted cell

of partially treated sewage water with approval during the lagoon cell improvement work. Samples were collected time to time during the wastewater flow and test results shown values within the allowable limits of most parameters with an increased value of BOD and CBOD at station point PEL3-2 of effluent inside the decanted cell before merging towards wetland but has shown within the limit at the Final discharge point, that ensures final polishing quality of effluent. Attached summary results shown the quality compliance of effluent parameters.

vi. a summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year;

Sewage facility:

The existing sewage facility has leaking issues on one side of the berm over few years and raised concerns of compliance requirements. GN CGS capital project has hired consultant and contractor to improve the existing lagoon cell to an engineered lagoon system with full liner and entrap gas exhaust system out of berm. Construction work was started in 2019 but left incomplete sand bed and liner due to cold weather not suitable for liner welding. The construction work resumed in summer 2020, and completed to operation turn over on Oct 15, 2020. The engineered lagoon is secured with fence and gate, and vehicle driveway on berm top.

Sludge-mud deposited on geo-tube outside of the lagoon cell secured with lined gravel berm and allowed melted water screen-out towards the decanted cell on wetland. Once completed washout of sludge materials, residual granular will be repurposed for solid waste cover, driveway and trench.

The improvement work carried on the same footprint of the existing lagoon cell with little blasting and bottom levelling on one side which has increases the capacity of containment inside the cell. The lagoon improvement work was not involved any real abandonment of the facility, but a restoration of the existing lagoon cell only.

There is no further plan of any facility abandonment or restoration for water supply, sewage waste deposition in near future.

vii. **a summary of any studies requested by the Board that relate to waste disposal, water use or reclamation, and a brief description of any future studies planned**;

The Board has requested updated O&M manual for sewage waste management and a standalone QA/QC plan for the waste facility operation monitoring in the amendment licensee once the sewage facility turned operation after improvement completed.
Previously leaked sewage deposited outside of the lagoon cell and mostly washed out towards the grassy land and dried up on localized area in addition to a major portion has merged to water body across the wetland. The licensee has no plan to conduct a study on that land area for quality monitor unless an issue or concern to environmental compliance, there may be a re-assessment plan of the wetland study and sludge management in next few years.

viii. any other details on water use or waste disposal requested by the Board by November 1st of the year being reported; and

CIRNAC inspector has identified metal dumps on wet ground across the road outside of the fence area and used oil drums within upper gradient ground inside the facility, which cleanup requested to be done by the next March 2021. The inspector has also advised to reduce loose waste, wood products, paper and household waste by control burning on site before winter freeze up.

ix. **updates or revisions to the approved Operation and Maintenance Plans**.

The licensee will update the amendment version of the O&M manual including for a compliance plan once received the copy from the contractor or consultant. There will not be any difference of annual monitoring of the facility, sampling location or decanting schedule but an improved decanting device.

ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:

The licensee has noted salinity in water intake occurs historically once in about 20 years with the last occurrence in 2011. Dredging from river bottom sediment near the intake point can be carried when needed was suggested by the study of the WTP project.

FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:

The licensee has managed loose burning on site as requested, cleaned the debris from liner cell inside metal dump and rehoused bulky metals inside the metal dump facility from wet ground outside of fence area. Used batteries secured inside C-cans and waste oil drums crated on wood planks.

2020 Kugaaruk Water Quality Summary

Parameters			October 26 2020			November 20 2020			
	Units	MAC	Raw (PEL 1)	Tuck 1	Truck 2	Raw (PEL 1)	Tuck 1	Truck 2	Domestic Tank
Colour	TCU	<=15							
pH		7- 10.5	7.87	7.9	7.92	7.64	7.65	7.70	7.64
Turbidity	NTU	<= 5	1.65	1.17	0.9	0.33	0.39	0.43	0.27
TDS			180	179	179	154	150	162	153
TSS			< 3	< 3	< 3	< 3	< 3	< 3	6
Alkalinity			65.1	65.1	63.8	63.2	63.3	63	62.8
Conductivity			321	334	333	283	290	292	295
Dissolved C	mg/L	45	3.3	3.3	3.4	3.2	3	3.3	2.9
Total C	mg/L		3.4	3.3	3.2	3.3	3.2	3.2	2.8
P, Total	mg/L								
Cyanide	mg/L	0.2	< 0.0050	< 0.0050	< 0.0050				
THMs	mg/L	0.1		0.0068	0.0073		0.037	0.013	
Phenol, Total			< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	<0.0010
Bromo-CH4				0.0017	0.0020		0.014	< 0.005	
Nitrate N	mg/L		0.06	0.05	0.05	0.06	0.05	0.04	0.06
Hardness	mg/L		122	125	126	109	111	112	
Chloride	mg/L	<=250	35.5	37.9	37.7	30.4	32.4	32.8	32.5
Fluoride	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1
Sodium	mg/L	<=200	15.6	17.8	17.2	14.3	16.4	16.4	15.6
Sulphate	mg/L	<=500	38	38	38	24	24	24	27
Magnesium			13.6	13.8	14	11.9	12.2	12.0	12.2
Calcium			26.4	27.2	27.3	24.1	24.4	25.0	24.7
Total Coliform	CFU	none	63.1	< 1.0	< 1.0				
E. Coli	CFU	none	< 1.0	< 1.0	< 1.0				
Aluminium	µg/L	<100	70.4	51.4	47.1	11	13.2	18.1	9.7
Arsenic	µg/L	100	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Barium	µg/L	1	5.5	5.3	5.6	4.9	4.9	5.0	5.0
Cadmium	µg/L	5	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Chromium	µg/L	50	0.2	0.2	< 0.1	< 0.1	< 0.01	0.1	< 0.1
Copper	µg/L	<=1000	0.4	1.3	1.0	2.8	3.6	7.0	7.6
Iron	µg/L	<=300	79	59	45	24	26	37	21
Lead	µg/L	10	< 0.1	< 0.1	< 0.1	0.3	0.3	0.2	0.9
Manganese	µg/L	<=50	2.5	2.3	2.0	2.1	3.8	3.3	1.8
Selenium	µg/L	50	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Uranium	µg/L	20	0.5	0.5	0.5	0.3	0.4	0.4	0.4
Zinc	µg/L	<=5000	0.9	1.7	1.8	8.3	5.8	6.1	52.8
Mercury	µg/L	1							
Nickel	µg/L		0.2	0.2	0.2	0.2	0.3	0.2	1.7

2020 Kugaaruk Sewage effluent waste results

Parameters	Units	MAC	MAC	June 29, 2020		
				swage PEL 3-1	Effluent PEL 3-2	Final disch PEL 4
Alkalinity T($CaCO_3$)	mg/L			271	8.7	67.4
Conductivity (@25 C)	µS/cm			871	64.7	545
pH		6-9	6-9	7.5	6.85	7.32
TSS	mg/L	180	45	31	<3	<3
Ammonia as N_2	mg/L			61.9	1.03	0.486
BOD	mg/L	120	45	225	15	8
CBOD	mg/L			219	21	6
Dissolved, C	mg/L					
Total, C	mg/L			133		11.9
Nitrate as N_2	mg/L	45	45	<0.020	0.41	2.62
Calcium	mg/L	32	32	19.9	2.45	60.7
Chloride	mg/L	100	100	67.5	10.6	25
Hardness	mg/L	500	500	93	11.3	193
Magnesium	mg/L			10.5	1.27	10
Potassium	mg/L			19.3	1.18	7.93
Sodium	mg/L			539	6.2	35.4
Sulphate	mg/L			14.6	2.57	155
Fecal Coliform	CFU/100mL	$1x10^6$	$1x10^6$	83000	<10	<100
Oil & Grease, Visible	Visibility			Non-visible	Non-visible	Non-visible
Benzene	mg/L					
Ethylbenzene	mg/L					
Toulene	mg/L					
Xylenes	mg/L					
HC, Total Extractable	mg/L					
HC, Total Purgeable	mg/L					
F1: C6-C10	mg/L					
F2: C10-C16	mg/L					
F3: C16-C34	mg/L					
F4: C34-C50	mg/L					
Aluminium	µg/L		200	339	108	44.7
Arsenic	µg/L		25	1.3	0.7	0.8
Cadmium	µg/L		5	<0.1	<0.1	<0.1
Chromium	µg/L		50			
Cobalt	µg/L		50			
Copper	µg/L		200	89.9	2.8	6.0
Iron	µg/L		500	472	121	162
Lead	µg/L		10	1.0	0.2	0.3
Manganese	µg/L		50			
Mercury	µg/L			0.01	<0.01	0.01
Nickel	µg/L		200	1.9	0.3	1.7
Zinc	µg/L		500	59.4	5.2	<5.0
Phenol, Total	µg/L			0.181	0.0014	<0.0010

2020 Kugaaruk Sewage effluent wate results

Parameters	Units	August 4, 2020			
		Sewage Pel 3-1	Wetland Pel 3-2	Final Pel 4	Solid waste Pel 8
Alkalinity T($CaCO_3$)	mg/L	430	477	480	34.2
Conductivity (@25 C)	µS/cm	2190	1640	1500	157
pH		7.82	7.69	7.55	7.24
TSS	mg/L	86	131	17	4
Ammonia as N_2	mg/L				
BOD	mg/L	91	259	123	3
CBOD	mg/L	135	280	122	< 2
Dissolved, C	mg/L				
Total, C	mg/L	71.7	155	113	3.1
Nitrate as N_2	mg/L		<0.0200	<0.0200	<0.0200
Calcium	mg/L	48.9	37.6	41.6	12.9
Chloride	mg/L	335	154	132	19.8
Hardness	mg/L	254	177	175	43.4
Magnesium	mg/L	32.1	20.1	17.1	2.69
Potassium	mg/L	32.3	31.2	27.3	1.35
Sodium	mg/L	310	142	114	13.0
Sulphate	mg/L	149	32.3	2.80	9.94
Fecal Coliform	CFU/100mL	1000	960000	<1	<1
Oil & Grease, Visible	Visibility	Non-visible	Non-visible	Non-visible	Non-Visible
Benzene	mg/L				<0.0050
Ethylbenzene	mg/L				<0.0050
Toulene	mg/L				<0.00050
Xylenes	mg/L				<0.00050
HC, Total Extractable	mg/L				<0.2
HC, Total Purgeable	mg/L				
F1: C6-C10	mg/L				<0.10
F2: C10-C16	mg/L				<0.2
F3: C16-C34	mg/L				<0.2
F4: C34-C50	mg/L				<0.2
Aluminium	µg/L	2200	6390	74.5	20.8
Arsenic	µg/L	3.9	3.7	4.1	0.4
Cadmium	µg/L	< 0.1	<0.1	<0.1	<0.04
Chromium	µg/L				<0.1
Cobalt	µg/L	3.8	4.6	2.3	<0.1
Copper	µg/L	11.0	43.0	17.8	1.8
Iron	µg/L	3640	8560	982	16
Lead	µg/L	4.3	5.7	3.7	<0.1
Manganese	µg/L	357	376	436	0.9
Mercury	µg/L	0.02	0.01	0.01	<0.01
Nickel	µg/L	7.7	10.9	6.3	0.2
Zinc	µg/L	12.3	58.1	8.8	11.2
Phenol, Total	µg/L	0.1350	1.100	0.8140	<0.0010

2020 Kugaaruk Sewage effluent waste results

Parameters	Units	September 16, 2020			
		Wetland Pel 3-2	Final Pel 4	Solid Waste Pel 6	Metal Waste Pel 7
Alkalinity T($CaCO_3$)	mg/L	404	453	180	39.4
Conductivity (@25 C)	µS/cm	1590	1820	645	257
pH		7.39	7.73	7.29	7.63
TSS	mg/L	118	61	8	<3
Ammonia as N_2	mg/L	87.5	63.6	0.759	
BOD	mg/L	235	21	3	<2
CBOD	mg/L	178	19	2	<2
Dissolved, C	mg/L				
Total, C	mg/L	198	45.6	12.1	3.8
Nitrate as N_2	mg/L				
Calcium	mg/L	27.9	46.4	87.9	20.9
Chloride	mg/L		262	254	40.2
Hardness	mg/L	132	200	8.45	70.9
Magnesium	mg/L	15.2	20.4	7.22	4.57
Potassium	mg/L	27.6	26.1	31.1	1.55
Sodium	mg/L	134	202	31.1	21.6
Sulphate	mg/L	35	18	104	15
Fecal Coliform	CFU/100mL	2080000	45000	3	2
Oil & Grease, Visible	Visibility	Non-visible	Non-visible	Non-visible	Non-visible
Benzene	mg/L			0.002	0.002
Ethylbenzene	mg/L			0.002	0.002
Toulene	mg/L			0.002	0.002
Xylenes	mg/L			0.002	0.002
HC, Total Extractable	mg/L			0.2	0.2
HC, Total Purgeable	mg/L			0.3	0.3
F1: C6-C10	mg/L				
F2: C10-C16	mg/L			0.2	0.2
F3: C16-C34	mg/L			0.2	0.2
F4: C34-C50	mg/L			0.2	0.2
Aluminium	µg/L	651	91.6	45.8	26.3
Arsenic	µg/L	1.3	3.1	0.4	<0.2
Cadmium	µg/L	<0.1	<0.1	0.1	<0.04
Chromium	µg/L	1.9	0.5	0.4	<0.1
Cobalt	µg/L				
Copper	µg/L	61.5	7.2	11.2	1.3
Iron	µg/L	973	680	2500	39
Lead	µg/L	1.9	1.1	0.7	0.1
Manganese	µg/L	133	540	588	5.4
Mercury	µg/L	0.04	0.02	<0.01	<0.01
Nickel	µg/L	3.9	5.4	6.6	0.3
Zinc	µg/L	91.0	6.5	269	28.5
Phenol, Total	µg/L	0.4150	0.0018	<0.0010	<0.0010

WATER LICENCE INSPECTION FORM

☒ **Original**
☐ **Follow-Up Report**

Licensee	**Licensee Representative**
Hamlet of Kugaaruk	Chantal Dowden
Licence No. / Expiry	**Representative's Title**
3BM-PEL1929	Senior Administrative Officer
Land / Other Authorizations	**Land / Other Authorizations**
Date of Inspection	**Inspector**
2020 August 14	Baba Pedersen

Activities Inspected

☐ Camp ☐ Drilling ☐ Mining ☐ Construction ☐ Reclamation ☐ Fuel Storage
☐ Roads/Hauling ☐ Other: ☒ Other: Municipal

Conditions: **A - Acceptable** **C - Concern** **U - Unacceptable** **NA – Not Applicable** **NI – Not Inspected**

Water Use	Condition	Comment	**Site Conditions**	Condition	Comment	**Haz/Mat Management**	Condition	Comment
Intake/Screen			Water Management Structures			Storage	C	6
Flow Measure. Device	A		Culverts / Bridges			Spills		
Source:			Drainage	C	7	Spill Plan		
Water Use:			Erosion / Sediment					
Recirculation (y /n)			Mitigation Measures	C	3	**Administrative**		
			Reclamation Activities	A	8	Records	NI	11
			Materials Storage	C	2	Reports	A	12
Waste Disposal			Signage	A		Plans		
Waste Water	A	9				Notifications		
Solid Waste	C	4 & 5	**Monitoring**			**Other**		
Hazardous Waste	C	1	Sample Collection / Analysis	A	10			

**The number in the comments field will correspond with specific comments provided below.*

Samples taken by Inspector:	Location(s):
☐ Yes ☒ No	

SECTION 1 ☒ **Comments** (s.__) ☐ **Non-Compliance with Act or Licence** (s.__) ☐ **Action Required** (s.__)

On Friday August 14, 2020, I Baba Pedersen, Resource Management and Water Resources Officer with Crown-Indigenous Relations and Northern Affairs Canada, the Writer of this Report, did Inspect the holder (Hamlet of Kugaaruk) of Water Licence number 3BM-PEL1929 issued for the Municipal Use of Water and Waste Disposal in the Hamlet of Kugaaruk in the Kitikmeot Region of Nunavut.

The Inspector was accompanied by Shah Alam, Municipal Planning Engineer from the GN-CGS and George Kakkianiun, Billy Oksokitok and Etienne with the Hamlet of Kugaaruk. The Site Inspections were preceded by a meeting in the offices of the Hamlet of Kugaaruk that also included Chantal Dowdan, Senior Administrative Officer for the Hamlet of Kugaaruk.

SECTION 2 ☒ **Comments** ☐ **Non-Compliance with Act or Licence** ☐ **Action Required**

During the Site Inspections, the following was observed by the Inspector;

1. The Used Oil Bermed Storage Area in the Metal Dump
2. Metal Dump Debris encroaching onto the Road
3. Accumulation of Debris in the Garbage Dump
4. Metal Dump Material stored in the Garbage Dump
5. Garbage being placed on the ground across the road outside the Fenced Area of the Garbage Dump
6. Temporary Used Battery Storage while waiting to be Crated
7. The Ditch outside the Garbage Dump Fenced Area near Sample Station PEL-6
8. The Construction of the New Sewage Lagoon
9. The Temporary Sewage Lagoon being used during the New Sewage Lagoon Construction
10. Decanting of the Sewage Lagoon
11. YTD Water Consumption Records
12. The Licence Holder has submitted the Annual Report to the Nunavut Water Board

SECTION 3 ☐ **Comments** ☐ **Non-Compliance with Act or Licence** ☒ **Action Required**

1. The Licence Holder shall remove the Rain Water from the Lower Cell into the Sewage Lagoon BEFORE FREEZE-UP, and place all Crushed Drums into the Lower Cell PRIOR TO March 31, 2021. Then the Licence Holder Shall place all Drums of Used Oil within the 3 Upper Bermed Areas PRIOR TO March 31, 2021.
2. The Licence Holder shall push back all Debris encroaching onto the Road from the Metal Dump PRIOR TO March 31, 2021.
3. The Licence holder shall IMMEDIATELY restart the Burn Program of Non-Hazardous Material in the Garbage Dump to reduce the volume of Waste Piles.

4. The Licence Holder Shall remove the large metal debris in the Garbage Dump and place it in the Metal Dump PRIOR TO Freeze-up.
5. The Licence Holder shall move all Garbage outside of the Garbage Dump Fenced Area to within the Garbage Dump PRIOR TO Freeze-up.
6. The Licence Holder shall Temporarily Store all Used Batteries waiting to be Crated within a Wooden Crate EFFECTIVE IMEDIATELY.
7. The Licence Holder shall remove all Debris from within the Ditch around the PEL-6 Sample Station PRIOR TO Freeze-up.
8. The Licence Holder along with the Gov't of Nunavut have a Contractor rebuilding the Sewage Lagoon which is expected to be in operation before Freeze-up this year. The Inspector has no concerns with this at this time.
9. The Licence Holder is using the Lower Cell of the Sewage Lagoon System as the Main Cell during the Construction Phase for the New Main Cell of the Sewage Lagoon. The Inspector has no concerns with this at this time.
10. The Licence Holder and the Contractor have already completed the Sample and Decant Programs for this season.
11. The Licence Holder shall supply the Inspector with the YTD Consumption Records from January through July in early September when Staff return to work from vacation. UPDATE: The License Holder provided this information to the Inspector on September 1, 2020 as promised, THANK YOU very much. The Consumption Records show usage from January through August is 24,427 Cubic Meters which is well within allowable limits.
12. Thank you for this, the Inspector has no concerns with this

Licensee or Representative	**Inspector's Name**
	Baba Pedersen
Signature	**Signature**
	Signed Original on File
Date	**Date**
	2020 October 30

Office Use Only:	Follow-up report to be issued by Inspector	☐ Yes	☒ No

cc. CIRNAC, Manager Field Operations, Iqaluit, justin.hack@canada.ca

Nunavut Water Board, Manager of Licensing, Gjoa Haven, licensing@nwb-oen.ca

Gov't of Nunavut, Municipal Engineer, Cambridge Bay, salam@gov.nu.ca

PHOTO LOG

Date	Camera	Inspector	Authorization
2020 August 14	Sony DSC-HX50V	Baba Pedersen	3BM-PEL1929

Photo Log # DSC06218

Photo 1

Description: Lower Cell of Used Oil Drum Bermed Area showing Rain Water to be transferred into the Sewage Lagoon

Photo Log # DSC06221

Photo 2

Description: Upper Bermed Area where All Drums of Used Oils should be stored

Photo Log # DSC06228

Photo 3

Description: Debris from the Metal Dump encroaching onto the Road requires to be pushed back away from the road

Photo Log # DSC06252

Photo 4

Description: Excessive Piles of Non-Hazardous Waste within the Garbage Dump requiring routine Burning to control volumes

Photo Log # DSC06253

Photo 5

Description: Large Metal Debris shown on Left Side of Photo should be moved and stored within the Metal Dump

Photo Log # DSC06245

Photo 6

Description: Used Batteries waiting to be Crated Up should be stored in an open wooden crate, not directly on the ground

Photo Log # DSC06260

Photo 7

Description: All Debris in the Ditch near Sample Station PEL-6 needs to be removed and placed within the Garbage Dump

Photo Log # DSC06264

Photo 8

Description: Contractor Rebuilding the Sewage Lagoon which is expected to be in use before freeze-up this season

Photo Log # DSC06284

Photo 9

Description: Lower Cell of the Sewage Lagoon being used as the Main Cell during the rebuilding Construction period

Photo Log # DSC06295

Photo 10

Description: Top view of the Decant Area for the Sewage Lagoon

Annual Report-2020

PART: B

Water Licence: 3BM-PEL 1929

Hamlet of Kugaaruk, NU

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

Taiga Batch No.: 200836

- FINAL REPORT -

Prepared For: Hamlet of Kugaaruk

Address: Box 205
Kugaaruk, NU,X0B 1K0

Attn: **Morag Macpherson** **Facsimile: 867-769-6069**

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: Monday, October 26, 2020
Print Date: ***Monday, October 26, 2020***

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

Taiga Batch No.: 200836

- CERTIFICATE OF ANALYSIS -

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

Client Project: Kugaaruk Water System
Sample Type: Raw Water
Received Date: 30-Sep-20
Sampling Date: 29-Sep-20
Sampling Time: 9:00
Location: PEL-1 raw water, truckfills - treated water
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Organic Carbon, Dissolved	3.3	0.5	mg/L	05-Oct-20	SM5310:B	
Organic Carbon, Total	3.4	0.5	mg/L	06-Oct-20	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	65.1	0.4	mg/L	30-Sep-20	SM2320:B	
Conductivity, Specific (@25C)	321	0.4	µS/cm	30-Sep-20	SM2510:B	
pH	7.87		pH units	30-Sep-20	SM4500-H:B	
Solids, Total Dissolved	180	10	mg/L	01-Oct-20	SM2540:C	
Solids, Total Suspended	< 3	3	mg/L	01-Oct-20	SM2540:D	
Turbidity	1.65	0.05	NTU	01-Oct-20	SM2130:B	
Major Ions						
Chloride	35.5	0.7	mg/L	05-Oct-20	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	05-Oct-20	SM4110:B	
Nitrate as Nitrogen	0.06	0.01	mg/L	05-Oct-20	SM4110:B	
Nitrite as Nitrogen	0.03	0.01	mg/L	05-Oct-20	SM4110:B	

ReportDate: Monday, October 26, 2020
Print Date: ***Monday, October 26, 2020***

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Taiga Batch No.: 200836

- CERTIFICATE OF ANALYSIS -

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

Sulphate	38	1	mg/L	05-Oct-20	SM4110:B	
Microbiology						
Coliforms, Total	63.1	1.0	MPN/100ml	30-Sep-20	SM9223:B	88
Escherichia coli	< 1.0	1.0	MPN/100ml	30-Sep-20	SM9223:B	88
Organics						
Oil and Grease, visible	Non-visible			30-Sep-20	Visual Exam	
Subcontracted Inorganics						
Calcium	26.4	0.05	mg/L	08-Oct-20	EPA200.2	
Hardness	122	0.13	mg/L	08-Oct-20	EPA200.2	
Magnesium	13.6	0.005	mg/L	08-Oct-20	EPA200.2	
Potassium	1.08	0.05	mg/L	08-Oct-20	EPA200.2	
Sodium	15.6	0.05	mg/L	08-Oct-20	EPA200.2	
Subcontracted Organics						
Cyanide, Total	< 0.0050	0.005	mg/L	08-Oct-20	APHA4500-CN	
Phenols, Total	< 0.0010	0.001	mg/L	06-Oct-20	AB ENV.06537	
Trace Metals, Total						
Aluminum	70.4	0.6	µg/L	02-Oct-20	EPA200.8	
Antimony	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8	
Arsenic	< 0.2	0.2	µg/L	02-Oct-20	EPA200.8	
Barium	5.5	0.1	µg/L	02-Oct-20	EPA200.8	
Beryllium	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8	
Cadmium	< 0.04	0.04	µg/L	02-Oct-20	EPA200.8	
Cesium	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8	
Chromium	0.2	0.1	µg/L	02-Oct-20	EPA200.8	
Cobalt	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8	

ReportDate: Monday, October 26, 2020
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Taiga Batch No.: 200836

- CERTIFICATE OF ANALYSIS -

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

Copper	0.4	0.2	µg/L	02-Oct-20	EPA200.8
Iron	79	5	ug/L	02-Oct-20	EPA200.8
Lead	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8
Lithium	3.1	0.2	µg/L	02-Oct-20	EPA200.8
Manganese	2.5	0.1	µg/L	02-Oct-20	EPA200.8
Molybdenum	0.2	0.1	µg/L	02-Oct-20	EPA200.8
Nickel	0.2	0.1	µg/L	02-Oct-20	EPA200.8
Rubidium	1.1	0.1	µg/L	02-Oct-20	EPA200.8
Selenium	< 0.3	0.3	µg/L	02-Oct-20	EPA200.8
Silver	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8
Strontium	27.6	0.1	µg/L	02-Oct-20	EPA200.8
Thallium	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8
Titanium	4.9	0.1	µg/L	02-Oct-20	EPA200.8
Uranium	0.5	0.1	µg/L	02-Oct-20	EPA200.8
Vanadium	0.2	0.1	µg/L	02-Oct-20	EPA200.8
Zinc	0.9	0.4	µg/L	02-Oct-20	EPA200.8

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Taiga Batch No.: 200836

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill - 1 **Taiga Sample ID:** 002

Client Project: Kugaaruk Water System
Sample Type: Potable Water
Received Date: 30-Sep-20
Sampling Date: 29-Sep-20
Sampling Time: 9:00
Location: PEL-1 raw water, truckfills - treated water
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Organic Carbon, Dissolved	3.3	0.5	mg/L	05-Oct-20	SM5310:B	
Organic Carbon, Total	3.3	0.5	mg/L	06-Oct-20	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	65.1	0.4	mg/L	30-Sep-20	SM2320:B	
Conductivity, Specific (@25C)	334	0.4	µS/cm	30-Sep-20	SM2510:B	
pH	7.90		pH units	30-Sep-20	SM4500-H:B	
Solids, Total Dissolved	179	10	mg/L	01-Oct-20	SM2540:C	
Solids, Total Suspended	< 3	3	mg/L	01-Oct-20	SM2540:D	
Turbidity	1.17	0.05	NTU	01-Oct-20	SM2130:B	
Major Ions						
Chloride	37.9	0.7	mg/L	05-Oct-20	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	05-Oct-20	SM4110:B	
Nitrate as Nitrogen	0.05	0.01	mg/L	05-Oct-20	SM4110:B	
Nitrite as Nitrogen	0.03	0.01	mg/L	05-Oct-20	SM4110:B	
Sulphate	38	1	mg/L	05-Oct-20	SM4110:B	
Microbiology						

ReportDate: Monday, October 26, 2020
Print Date: ***Monday, October 26, 2020***

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Taiga Batch No.: 200836

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill - 1 **Taiga Sample ID:** 002

Coliforms, Total	< 1.0	1.0	MPN/100ml	30-Sep-20	SM9223:B
Escherichia coli	< 1.0	1.0	MPN/100ml	30-Sep-20	SM9223:B
Organics					
Oil and Grease, visible	Non-visible			30-Sep-20	Visual Exam
Subcontracted Inorganics					
Calcium	27.2	0.05	mg/L	08-Oct-20	EPA200.2
Hardness	125	0.13	mg/L	08-Oct-20	EPA200.2
Magnesium	13.8	0.005	mg/L	08-Oct-20	EPA200.2
Potassium	1.06	0.05	mg/L	08-Oct-20	EPA200.2
Sodium	17.8	0.05	mg/L	08-Oct-20	EPA200.2
Subcontracted Organics					
Bromodichloromethane	0.0017	0.001	mg/L	09-Oct-20	SW-846
Bromoform	< 0.0050	0.005	mg/L	09-Oct-20	SW-846
Chloroform	0.0037	0.001	mg/L	09-Oct-20	SW-846
Cyanide, Total	< 0.0050	0.005	mg/L	08-Oct-20	APHA4500-CN
Dibromochloromethane	0.0014	0.001	mg/L	09-Oct-20	SW-846
Phenols, Total	< 0.0010	0.001	mg/L	06-Oct-20	AB ENV.06537
Trihalomethanes, Total	0.0068	0.005	mg/L	09-Oct-20	SW-846
Trace Metals, Total					
Aluminum	51.4	0.6	µg/L	02-Oct-20	EPA200.8
Antimony	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8
Arsenic	< 0.2	0.2	µg/L	02-Oct-20	EPA200.8
Barium	5.3	0.1	µg/L	02-Oct-20	EPA200.8
Beryllium	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8
Cadmium	< 0.04	0.04	µg/L	02-Oct-20	EPA200.8

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Taiga Batch No.: 200836

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill - 1 **Taiga Sample ID:** 002

Cesium	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8
Chromium	0.2	0.1	µg/L	02-Oct-20	EPA200.8
Cobalt	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8
Copper	1.3	0.2	µg/L	02-Oct-20	EPA200.8
Iron	59	5	ug/L	02-Oct-20	EPA200.8
Lead	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8
Lithium	3.1	0.2	µg/L	02-Oct-20	EPA200.8
Manganese	2.3	0.1	µg/L	02-Oct-20	EPA200.8
Molybdenum	0.2	0.1	µg/L	02-Oct-20	EPA200.8
Nickel	0.2	0.1	µg/L	02-Oct-20	EPA200.8
Rubidium	1.0	0.1	µg/L	02-Oct-20	EPA200.8
Selenium	< 0.3	0.3	µg/L	02-Oct-20	EPA200.8
Silver	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8
Strontium	27.7	0.1	µg/L	02-Oct-20	EPA200.8
Thallium	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8
Titanium	3.0	0.1	µg/L	02-Oct-20	EPA200.8
Uranium	0.5	0.1	µg/L	02-Oct-20	EPA200.8
Vanadium	0.2	0.1	µg/L	02-Oct-20	EPA200.8
Zinc	1.7	0.4	µg/L	02-Oct-20	EPA200.8

ReportDate: Monday, October 26, 2020
Print Date: *Monday, October 26, 2020*

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

Taiga Batch No.: 200836

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill - 2 **Taiga Sample ID:** 003

Client Project: Kugaaruk Water System
Sample Type: Potable Water
Received Date: 30-Sep-20
Sampling Date: 29-Sep-20
Sampling Time: 9:00
Location: PEL-1 raw water, truckfills - treated water
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Organic Carbon, Dissolved	3.4	0.5	mg/L	19-Oct-20	SM5310:B	
Organic Carbon, Total	3.2	0.5	mg/L	06-Oct-20	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	63.8	0.4	mg/L	30-Sep-20	SM2320:B	
Conductivity, Specific (@25C)	333	0.4	µS/cm	30-Sep-20	SM2510:B	
pH	7.92		pH units	30-Sep-20	SM4500-H:B	
Solids, Total Dissolved	179	10	mg/L	01-Oct-20	SM2540:C	
Solids, Total Suspended	< 3	3	mg/L	01-Oct-20	SM2540:D	
Turbidity	0.90	0.05	NTU	01-Oct-20	SM2130:B	
Major Ions						
Chloride	37.7	0.7	mg/L	05-Oct-20	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	05-Oct-20	SM4110:B	
Nitrate as Nitrogen	0.05	0.01	mg/L	05-Oct-20	SM4110:B	
Nitrite as Nitrogen	0.03	0.01	mg/L	05-Oct-20	SM4110:B	
Sulphate	38	1	mg/L	05-Oct-20	SM4110:B	
Microbiology						

ReportDate: Monday, October 26, 2020
Print Date: ***Monday, October 26, 2020***

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Taiga Batch No.: 200836

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill - 2 **Taiga Sample ID:** 003

Coliforms, Total	< 1.0	1.0	MPN/100ml	30-Sep-20	SM9223:B
Escherichia coli	< 1.0	1.0	MPN/100ml	30-Sep-20	SM9223:B
Organics					
Oil and Grease, visible	Non-visible			30-Sep-20	Visual Exam
Subcontracted Inorganics					
Calcium	27.3	0.05	mg/L	08-Oct-20	EPA200.2
Hardness	126	0.13	mg/L	08-Oct-20	EPA200.2
Magnesium	14.0	0.005	mg/L	08-Oct-20	EPA200.2
Potassium	1.08	0.05	mg/L	08-Oct-20	EPA200.2
Sodium	17.2	0.05	mg/L	08-Oct-20	EPA200.2
Subcontracted Organics					
Bromodichloromethane	0.0020	0.001	mg/L	09-Oct-20	SW-846
Bromoform	< 0.0050	0.005	mg/L	09-Oct-20	SW-846
Chloroform	0.0038	0.001	mg/L	09-Oct-20	SW-846
Cyanide, Total	< 0.0050	0.005	mg/L	08-Oct-20	APHA4500-CN
Dibromochloromethane	0.0015	0.001	mg/L	09-Oct-20	SW-846
Phenols, Total	< 0.0010	0.001	mg/L	06-Oct-20	AB ENV.06537
Trihalomethanes, Total	0.0073	0.005	mg/L	09-Oct-20	SW-846
Trace Metals, Total					
Aluminum	47.1	0.6	µg/L	02-Oct-20	EPA200.8
Antimony	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8
Arsenic	< 0.2	0.2	µg/L	02-Oct-20	EPA200.8
Barium	5.6	0.1	µg/L	02-Oct-20	EPA200.8
Beryllium	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8
Cadmium	< 0.04	0.04	µg/L	02-Oct-20	EPA200.8

ReportDate: Monday, October 26, 2020
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Taiga Batch No.: 200836

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill - 2 **Taiga Sample ID:** 003

Cesium	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8
Chromium	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8
Cobalt	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8
Copper	1.0	0.2	µg/L	02-Oct-20	EPA200.8
Iron	45	5	ug/L	02-Oct-20	EPA200.8
Lead	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8
Lithium	3.0	0.2	µg/L	02-Oct-20	EPA200.8
Manganese	2.0	0.1	µg/L	02-Oct-20	EPA200.8
Molybdenum	0.2	0.1	µg/L	02-Oct-20	EPA200.8
Nickel	0.2	0.1	µg/L	02-Oct-20	EPA200.8
Rubidium	1.0	0.1	µg/L	02-Oct-20	EPA200.8
Selenium	< 0.3	0.3	µg/L	02-Oct-20	EPA200.8
Silver	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8
Strontium	27.5	0.1	µg/L	02-Oct-20	EPA200.8
Thallium	< 0.1	0.1	µg/L	02-Oct-20	EPA200.8
Titanium	2.5	0.1	µg/L	02-Oct-20	EPA200.8
Uranium	0.5	0.1	µg/L	02-Oct-20	EPA200.8
Vanadium	0.1	0.1	µg/L	02-Oct-20	EPA200.8
Zinc	1.8	0.4	µg/L	02-Oct-20	EPA200.8

ReportDate: Monday, October 26, 2020
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Taiga Batch No.: 200836

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill - 2 **Taiga Sample ID:** 003

- DATA QUALIFERS -

Data Qualifier Descriptions:

88 *Samples analysed past holding time, as per client request.*

*** 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: Monday, October 26, 2020

Print Date: ***Monday, October 26, 2020***

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

Taiga Batch No.: 200984

- FINAL REPORT -

Prepared For: Hamlet of Kugaaruk

Address: Box 205
Kugaaruk, NU,X0B 1K0

Attn: **Morag Macpherson** **Facsimile: 867-769-6069**

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, November 20, 2020
Print Date: ***Friday, November 20, 2020***

Taiga Environmental Laboratory
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Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 200984

- CERTIFICATE OF ANALYSIS -

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

Client Project:
Sample Type: Raw Water
Received Date: 06-Nov-20
Sampling Date: 04-Nov-20
Sampling Time: 9:00
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Organic Carbon, Dissolved	3.2	0.5	mg/L	09-Nov-20	SM5310:B	
Organic Carbon, Total	3.3	0.5	mg/L	09-Nov-20	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	63.2	0.4	mg/L	06-Nov-20	SM2320:B	
Conductivity, Specific (@25C)	283	0.4	µS/cm	06-Nov-20	SM2510:B	
pH	7.64		pH units	06-Nov-20	SM4500-H:B	
Solids, Total Dissolved	154	10	mg/L	10-Nov-20	SM2540:C	
Solids, Total Suspended	< 3	3	mg/L	10-Nov-20	SM2540:D	
Turbidity	0.33	0.05	NTU	06-Nov-20	SM2130:B	
Major Ions						
Chloride	30.4	0.7	mg/L	06-Nov-20	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	06-Nov-20	SM4110:B	
Nitrate as Nitrogen	0.06	0.01	mg/L	06-Nov-20	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	06-Nov-20	SM4110:B	

ReportDate: Friday, November 20, 2020
Print Date: ***Friday, November 20, 2020***

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Taiga Batch No.: 200984

- CERTIFICATE OF ANALYSIS -

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

Sulphate	24	1	mg/L	06-Nov-20	SM4110:B	
Microbiology						
Coliforms, Total		1.0	MPN/100ml		SM9223:B	105
Escherichia coli		1.0	MPN/100ml		SM9223:B	105
Organics						
Bromodichloromethane		0.005	mg/L		EPA8260B	111
Bromoform		0.005	mg/L		EPA8260B	111
Chloroform		0.005	mg/L		EPA8260B	111
Dibromochloromethane		0.005	mg/L		EPA8260B	111
Oil and Grease, visible	Non-visible			06-Nov-20	Visual Exam	
Trihalomethanes, Total		0.005	mg/L		EPA8260B	111
Subcontracted Inorganics						
Calcium	24.1	0.05	mg/L	16-Nov-20	EPA200.2	
Hardness	109	0.6	mg/L	16-Nov-20	EPA200.2	
Magnesium	11.9	0.005	mg/L	16-Nov-20	EPA200.2	
Potassium	1.000	0.05	mg/L	16-Nov-20	EPA200.2	
Sodium	14.3	0.05	mg/L	16-Nov-20	EPA200.2	
Subcontracted Organics						
Phenols, Total	< 0.0010	0.001	mg/L	17-Nov-20	AB ENV.06537	
Trace Metals, Total						
Aluminum	11.0	0.6	µg/L	19-Nov-20	EPA200.8	
Antimony	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8	
Arsenic	< 0.2	0.2	µg/L	19-Nov-20	EPA200.8	
Barium	4.9	0.1	µg/L	19-Nov-20	EPA200.8	
Beryllium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8	

ReportDate: Friday, November 20, 2020
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Taiga Batch No.: 200984

- CERTIFICATE OF ANALYSIS -

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

Cadmium	< 0.04	0.04	µg/L	19-Nov-20	EPA200.8
Cesium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Chromium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Cobalt	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Copper	2.8	0.2	µg/L	19-Nov-20	EPA200.8
Iron	24	5	ug/L	19-Nov-20	EPA200.8
Lead	0.3	0.1	µg/L	19-Nov-20	EPA200.8
Lithium	2.5	0.2	µg/L	19-Nov-20	EPA200.8
Manganese	2.1	0.1	µg/L	19-Nov-20	EPA200.8
Molybdenum	0.2	0.1	µg/L	19-Nov-20	EPA200.8
Nickel	0.2	0.1	µg/L	19-Nov-20	EPA200.8
Rubidium	0.9	0.1	µg/L	19-Nov-20	EPA200.8
Selenium	< 0.3	0.3	µg/L	19-Nov-20	EPA200.8
Silver	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Strontium	24.9	0.1	µg/L	19-Nov-20	EPA200.8
Thallium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Titanium	0.7	0.1	µg/L	19-Nov-20	EPA200.8
Uranium	0.3	0.1	µg/L	19-Nov-20	EPA200.8
Vanadium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Zinc	8.3	0.4	µg/L	19-Nov-20	EPA200.8

ReportDate: Friday, November 20, 2020
Print Date: *Friday, November 20, 2020*

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Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 200984

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill - 1 **Taiga Sample ID:** 002

Client Project:
Sample Type: Potable
Received Date: 06-Nov-20
Sampling Date: 04-Nov-20
Sampling Time: 9:00
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Organic Carbon, Dissolved	3.0	0.5	mg/L	09-Nov-20	SM5310:B	
Organic Carbon, Total	3.2	0.5	mg/L	09-Nov-20	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	63.3	0.4	mg/L	06-Nov-20	SM2320:B	
Conductivity, Specific (@25C)	290	0.4	µS/cm	06-Nov-20	SM2510:B	
pH	7.65		pH units	06-Nov-20	SM4500-H:B	
Solids, Total Dissolved	150	10	mg/L	10-Nov-20	SM2540:C	
Solids, Total Suspended	< 3	3	mg/L	10-Nov-20	SM2540:D	
Turbidity	0.39	0.05	NTU	06-Nov-20	SM2130:B	
Major Ions						
Chloride	32.4	0.7	mg/L	06-Nov-20	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	06-Nov-20	SM4110:B	
Nitrate as Nitrogen	0.05	0.01	mg/L	06-Nov-20	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	06-Nov-20	SM4110:B	
Sulphate	24	1	mg/L	06-Nov-20	SM4110:B	
Microbiology						

ReportDate: Friday, November 20, 2020
Print Date: ***Friday, November 20, 2020***

Taiga Environmental Laboratory
4601-52nd Ave., Box 1320, Yellowknife, NT. X1A 2L9
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Taiga Batch No.: 200984

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill - 1 **Taiga Sample ID:** 002

Coliforms, Total		1.0	MPN/100ml		SM9223:B	105
Escherichia coli		1.0	MPN/100ml		SM9223:B	105
Organics						
Bromodichloromethane	0.014	0.005	mg/L	13-Nov-20	EPA8260B	110
Bromoform	< 0.005	0.005	mg/L	13-Nov-20	EPA8260B	110
Chloroform	0.013	0.005	mg/L	13-Nov-20	EPA8260B	110
Dibromochloromethane	0.009	0.005	mg/L	13-Nov-20	EPA8260B	110
Oil and Grease, visible	Non-visible			06-Nov-20	Visual Exam	
Trihalomethanes, Total	0.037	0.005	mg/L	13-Nov-20	EPA8260B	110
Subcontracted Inorganics						
Calcium	24.4	0.05	mg/L	16-Nov-20	EPA200.2	
Hardness	111	0.6	mg/L	16-Nov-20	EPA200.2	
Magnesium	12.2	0.005	mg/L	16-Nov-20	EPA200.2	
Potassium	1.04	0.05	mg/L	16-Nov-20	EPA200.2	
Sodium	16.4	0.05	mg/L	16-Nov-20	EPA200.2	
Subcontracted Organics						
Phenols, Total	< 0.0010	0.001	mg/L	17-Nov-20	AB ENV.06537	
Trace Metals, Total						
Aluminum	13.2	0.6	µg/L	19-Nov-20	EPA200.8	
Antimony	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8	
Arsenic	< 0.2	0.2	µg/L	19-Nov-20	EPA200.8	
Barium	4.9	0.1	µg/L	19-Nov-20	EPA200.8	
Beryllium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8	
Cadmium	< 0.04	0.04	µg/L	19-Nov-20	EPA200.8	
Cesium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8	

ReportDate: Friday, November 20, 2020
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Taiga Batch No.: 200984

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill - 1 **Taiga Sample ID:** 002

Chromium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Cobalt	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Copper	3.6	0.2	µg/L	19-Nov-20	EPA200.8
Iron	26	5	ug/L	19-Nov-20	EPA200.8
Lead	0.3	0.1	µg/L	19-Nov-20	EPA200.8
Lithium	2.6	0.2	µg/L	19-Nov-20	EPA200.8
Manganese	3.8	0.1	µg/L	19-Nov-20	EPA200.8
Molybdenum	0.2	0.1	µg/L	19-Nov-20	EPA200.8
Nickel	0.3	0.1	µg/L	19-Nov-20	EPA200.8
Rubidium	0.9	0.1	µg/L	19-Nov-20	EPA200.8
Selenium	< 0.3	0.3	µg/L	19-Nov-20	EPA200.8
Silver	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Strontium	24.9	0.1	µg/L	19-Nov-20	EPA200.8
Thallium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Titanium	0.7	0.1	µg/L	19-Nov-20	EPA200.8
Uranium	0.4	0.1	µg/L	19-Nov-20	EPA200.8
Vanadium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Zinc	5.8	0.4	µg/L	19-Nov-20	EPA200.8

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Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 200984

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill - 2 **Taiga Sample ID:** 003

Client Project:
Sample Type: Potable
Received Date: 06-Nov-20
Sampling Date: 04-Nov-20
Sampling Time: 9:00
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Organic Carbon, Dissolved	3.3	0.5	mg/L	09-Nov-20	SM5310:B	
Organic Carbon, Total	3.2	0.5	mg/L	09-Nov-20	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	63.0	0.4	mg/L	06-Nov-20	SM2320:B	
Conductivity, Specific (@25C)	292	0.4	µS/cm	06-Nov-20	SM2510:B	
pH	7.70		pH units	06-Nov-20	SM4500-H:B	
Solids, Total Dissolved	162	10	mg/L	10-Nov-20	SM2540:C	
Solids, Total Suspended	< 3	3	mg/L	10-Nov-20	SM2540:D	
Turbidity	0.43	0.05	NTU	06-Nov-20	SM2130:B	
Major Ions						
Chloride	32.8	0.7	mg/L	06-Nov-20	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	06-Nov-20	SM4110:B	
Nitrate as Nitrogen	0.04	0.01	mg/L	06-Nov-20	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	06-Nov-20	SM4110:B	
Sulphate	24	1	mg/L	06-Nov-20	SM4110:B	
Microbiology						

ReportDate: Friday, November 20, 2020
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Taiga Batch No.: 200984

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill - 2 **Taiga Sample ID:** 003

Coliforms, Total		1.0	MPN/100ml		SM9223:B	105
Escherichia coli		1.0	MPN/100ml		SM9223:B	105
Organics						
Bromodichloromethane	< 0.005	0.005	mg/L	13-Nov-20	EPA8260B	
Bromoform	< 0.005	0.005	mg/L	13-Nov-20	EPA8260B	
Chloroform	0.007	0.005	mg/L	13-Nov-20	EPA8260B	
Dibromochloromethane	< 0.005	0.005	mg/L	13-Nov-20	EPA8260B	
Oil and Grease, visible	Non-visible			06-Nov-20	Visual Exam	
Trihalomethanes, Total	0.013	0.005	mg/L	13-Nov-20	EPA8260B	
Subcontracted Inorganics						
Calcium	25.0	0.05	mg/L	16-Nov-20	EPA200.2	
Hardness	112	0.6	mg/L	16-Nov-20	EPA200.2	
Magnesium	12.0	0.005	mg/L	16-Nov-20	EPA200.2	
Potassium	1.000	0.05	mg/L	16-Nov-20	EPA200.2	
Sodium	16.4	0.05	mg/L	16-Nov-20	EPA200.2	
Subcontracted Organics						
Phenols, Total	< 0.0010	0.001	mg/L	17-Nov-20	AB ENV.06537	
Trace Metals, Total						
Aluminum	18.1	0.6	µg/L	19-Nov-20	EPA200.8	
Antimony	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8	
Arsenic	< 0.2	0.2	µg/L	19-Nov-20	EPA200.8	
Barium	5.0	0.1	µg/L	19-Nov-20	EPA200.8	
Beryllium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8	
Cadmium	< 0.04	0.04	µg/L	19-Nov-20	EPA200.8	
Cesium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8	

ReportDate: Friday, November 20, 2020
Print Date: *Friday, November 20, 2020*

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

Taiga Batch No.: 200984

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Truckfill - 2 **Taiga Sample ID:** 003

Chromium	0.1	0.1	µg/L	19-Nov-20	EPA200.8
Cobalt	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Copper	7.0	0.2	µg/L	19-Nov-20	EPA200.8
Iron	37	5	ug/L	19-Nov-20	EPA200.8
Lead	0.2	0.1	µg/L	19-Nov-20	EPA200.8
Lithium	2.7	0.2	µg/L	19-Nov-20	EPA200.8
Manganese	3.3	0.1	µg/L	19-Nov-20	EPA200.8
Molybdenum	0.2	0.1	µg/L	19-Nov-20	EPA200.8
Nickel	0.2	0.1	µg/L	19-Nov-20	EPA200.8
Rubidium	0.9	0.1	µg/L	19-Nov-20	EPA200.8
Selenium	< 0.3	0.3	µg/L	19-Nov-20	EPA200.8
Silver	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Strontium	25.3	0.1	µg/L	19-Nov-20	EPA200.8
Thallium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Titanium	0.8	0.1	µg/L	19-Nov-20	EPA200.8
Uranium	0.4	0.1	µg/L	19-Nov-20	EPA200.8
Vanadium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Zinc	6.1	0.4	µg/L	19-Nov-20	EPA200.8

ReportDate: Friday, November 20, 2020
Print Date: *Friday, November 20, 2020*

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Taiga Batch No.: 200984

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Domestic Tank **Taiga Sample ID:** 004

Client Project:
Sample Type: Potable
Received Date: 06-Nov-20
Sampling Date: 04-Nov-20
Sampling Time: 9:00
Location:
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Organic Carbon, Dissolved	2.9	0.5	mg/L	09-Nov-20	SM5310:B	
Organic Carbon, Total	2.8	0.5	mg/L	09-Nov-20	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	62.8	0.4	mg/L	06-Nov-20	SM2320:B	
Conductivity, Specific (@25C)	295	0.4	µS/cm	06-Nov-20	SM2510:B	
pH	7.64		pH units	06-Nov-20	SM4500-H:B	
Solids, Total Dissolved	153	10	mg/L	10-Nov-20	SM2540:C	
Solids, Total Suspended	6	3	mg/L	10-Nov-20	SM2540:D	
Turbidity	0.27	0.05	NTU	06-Nov-20	SM2130:B	
Major Ions						
Chloride	32.5	0.7	mg/L	06-Nov-20	SM4110:B	
Fluoride	< 0.1	0.1	mg/L	06-Nov-20	SM4110:B	
Nitrate as Nitrogen	0.06	0.01	mg/L	06-Nov-20	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	06-Nov-20	SM4110:B	
Sulphate	27	1	mg/L	06-Nov-20	SM4110:B	
Microbiology						

ReportDate: Friday, November 20, 2020
Print Date: ***Friday, November 20, 2020***

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Taiga Batch No.: 200984

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Domestic Tank **Taiga Sample ID:** 004

Coliforms, Total		1.0	MPN/100ml		SM9223:B	105
Escherichia coli		1.0	MPN/100ml		SM9223:B	105
Organics						
Bromodichloromethane		0.005	mg/L		EPA8260B	111
Bromoform		0.005	mg/L		EPA8260B	111
Chloroform		0.005	mg/L		EPA8260B	111
Dibromochloromethane		0.005	mg/L		EPA8260B	111
Oil and Grease, visible	Non-visible			06-Nov-20	Visual Exam	
Trihalomethanes, Total		0.005	mg/L		EPA8260B	111
Subcontracted Inorganics						
Calcium	24.7	0.05	mg/L	16-Nov-20	EPA200.2	
Hardness	112	0.6	mg/L	16-Nov-20	EPA200.2	
Magnesium	12.2	0.005	mg/L	16-Nov-20	EPA200.2	
Potassium	0.984	0.05	mg/L	16-Nov-20	EPA200.2	
Sodium	15.6	0.05	mg/L	16-Nov-20	EPA200.2	
Subcontracted Organics						
Phenols, Total	< 0.0010	0.001	mg/L	17-Nov-20	AB ENV.06537	
Trace Metals, Total						
Aluminum	9.7	0.6	µg/L	19-Nov-20	EPA200.8	
Antimony	0.3	0.1	µg/L	19-Nov-20	EPA200.8	
Arsenic	< 0.2	0.2	µg/L	19-Nov-20	EPA200.8	
Barium	5.0	0.1	µg/L	19-Nov-20	EPA200.8	
Beryllium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8	
Cadmium	< 0.04	0.04	µg/L	19-Nov-20	EPA200.8	
Cesium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8	

ReportDate: Friday, November 20, 2020
Print Date: *Friday, November 20, 2020*

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Taiga Batch No.: 200984

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Domestic Tank **Taiga Sample ID:** 004

Chromium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Cobalt	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Copper	7.6	0.2	µg/L	19-Nov-20	EPA200.8
Iron	21	5	ug/L	19-Nov-20	EPA200.8
Lead	0.9	0.1	µg/L	19-Nov-20	EPA200.8
Lithium	2.9	0.2	µg/L	19-Nov-20	EPA200.8
Manganese	1.8	0.1	µg/L	19-Nov-20	EPA200.8
Molybdenum	0.2	0.1	µg/L	19-Nov-20	EPA200.8
Nickel	1.7	0.1	µg/L	19-Nov-20	EPA200.8
Rubidium	0.9	0.1	µg/L	19-Nov-20	EPA200.8
Selenium	< 0.3	0.3	µg/L	19-Nov-20	EPA200.8
Silver	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Strontium	25.7	0.1	µg/L	19-Nov-20	EPA200.8
Thallium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Titanium	0.5	0.1	µg/L	19-Nov-20	EPA200.8
Uranium	0.4	0.1	µg/L	19-Nov-20	EPA200.8
Vanadium	< 0.1	0.1	µg/L	19-Nov-20	EPA200.8
Zinc	52.8	0.4	µg/L	19-Nov-20	EPA200.8

ReportDate: Friday, November 20, 2020
Print Date: *Friday, November 20, 2020*

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Taiga Batch No.: 200984

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Domestic Tank **Taiga Sample ID:** 004

- DATA QUALIFERS -

Data Qualifier Descriptions:

105 *Samples received past hold time; analysis not possible.*

110 *Reported result uncertain, due to air in vial.*

111 *Vial contained air bubble, analysis not possible*

*** 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

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

Taiga Batch No.: 200300

- FINAL REPORT -

Prepared For: Hamlet of Kugaaruk

Address: Box 205
Kugaaruk, NU,X0B 1K0

Attn: **John Ivey** **Facsimile: 867-769-6069**

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: Monday, June 29, 2020
Print Date: ***Monday, June 29, 2020***

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

Taiga Batch No.: 200300

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL 3-1 **Taiga Sample ID:** 001

Client Project:
Sample Type: Lagoon Decant
Received Date: 18-Jun-20
Sampling Date: 18-Jun-20
Sampling Time: 9:40
Location: Sewage Lagoon
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	61.9	0.005	mg/L	23-Jun-20	SM4500-NH3:G	
Biochemical Oxygen Demand	225	2	mg/L	19-Jun-20	SM5210:B	
CBOD	219	2	mg/L	19-Jun-20	SM5210:B	
Organic Carbon, Total	133	0.5	mg/L	23-Jun-20	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	271	0.4	mg/L	19-Jun-20	SM2320:B	
Conductivity, Specific (@25C)	871	0.4	µS/cm	19-Jun-20	SM2510:B	
pH	7.50		pH units	19-Jun-20	SM4500-H:B	
Solids, Total Suspended	31	3	mg/L	23-Jun-20	SM2540:D	
Microbiology						
Coliforms, Fecal	83000	1000	CFU/100mL	19-Jun-20	SM9222:D	
Organics						
Oil and Grease, visible	Non-visible			18-Jun-20	Visual Exam	
Subcontracted Inorganics						
Calcium	19.9	0.05	mg/L	22-Jun-20	EPA200.2	

ReportDate: Monday, June 29, 2020
Print Date: ***Monday, June 29, 2020***

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Taiga Batch No.: 200300

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL 3-1 **Taiga Sample ID:** 001

Chloride	67.5	0.5	mg/L	22-Jun-20	EPA300.1	
Hardness	93.0	0.13	mg/L	22-Jun-20	EPA200.2	
Magnesium	10.5	0.005	mg/L	22-Jun-20	EPA200.2	
Nitrate as Nitrogen	< 0.0200	0.020	mg/L	22-Jun-20	EPA300.1	
Nitrite as N	< 0.0100	0.010	mg/L	22-Jun-20	EPA300.1	
NO2+NO3 - N	< 0.0220	0.022	mg/L	22-Jun-20	EPA300.1	
Potassium	19.3	0.05	mg/L	22-Jun-20	EPA200.2	
Sodium	539	0.05	mg/L	22-Jun-20	EPA200.2	
Sulphate	14.6	0.3	mg/L	22-Jun-20	EPA300.1	
Sulphide	1.15	0.015	mg/L	24-Jun-20	APHA4500-S2	224
Subcontracted Organics						
Phenols, Total	0.1810	0.0050	mg/L	22-Jun-20	AB ENV.06537	224
Trace Metals, Total						
Aluminum	339	5	µg/L	24-Jun-20	EPA200.8	
Arsenic	1.3	0.2	µg/L	24-Jun-20	EPA200.8	
Cadmium	< 0.1	0.1	µg/L	24-Jun-20	EPA200.8	
Copper	89.9	0.2	µg/L	24-Jun-20	EPA200.8	
Iron	472	5	µg/L	24-Jun-20	EPA200.8	
Lead	1.0	0.1	µg/L	24-Jun-20	EPA200.8	
Mercury	0.01	0.01	µg/L	24-Jun-20	EPA200.8	
Molybdenum	1.5	0.1	µg/L	24-Jun-20	EPA200.8	
Nickel	1.9	0.1	µg/L	24-Jun-20	EPA200.8	
Zinc	59.4	5	µg/L	24-Jun-20	EPA200.8	

ReportDate: Monday, June 29, 2020
Print Date: *Monday, June 29, 2020*

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Taiga Batch No.: 200300

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL 3-2 **Taiga Sample ID:** 002

Client Project:
Sample Type: Outercell Wetland
Received Date: 18-Jun-20
Sampling Date: 18-Jun-20
Sampling Time: 9:25
Location: Sewage Lagoon
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	1.03	0.005	mg/L	23-Jun-20	SM4500-NH3:G	
Biochemical Oxygen Demand	15	2	mg/L	19-Jun-20	SM5210:B	
CBOD	21	2	mg/L	19-Jun-20	SM5210:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	8.7	0.4	mg/L	19-Jun-20	SM2320:B	
Conductivity, Specific (@25C)	64.7	0.4	µS/cm	19-Jun-20	SM2510:B	
pH	6.85		pH units	19-Jun-20	SM4500-H:B	
Solids, Total Dissolved	56	10	mg/L	23-Jun-20	SM2540:C	
Solids, Total Suspended	< 3	3	mg/L	23-Jun-20	SM2540:D	
Microbiology						
Coliforms, Fecal	< 10	10	CFU/100mL	19-Jun-20	SM9222:D	
Organics						
Oil and Grease, visible	Non-visible			18-Jun-20	Visual Exam	
Subcontracted Inorganics						
Calcium	2.45	0.05	mg/L	22-Jun-20	EPA200.2	
Chloride	10.6	0.5	mg/L	22-Jun-20	EPA300.1	

ReportDate: Monday, June 29, 2020
Print Date: ***Monday, June 29, 2020***

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Taiga Batch No.: 200300

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL 3-2 **Taiga Sample ID:** 002

Hardness	11.3	0.13	mg/L	22-Jun-20	EPA200.2
Magnesium	1.27	0.005	mg/L	22-Jun-20	EPA200.2
Nitrate as Nitrogen	0.413	0.020	mg/L	22-Jun-20	EPA300.1
Nitrite as N	0.0130	0.010	mg/L	22-Jun-20	EPA300.1
NO2+NO3 - N	0.426	0.022	mg/L	22-Jun-20	EPA300.1
Potassium	1.18	0.05	mg/L	22-Jun-20	EPA200.2
Sodium	6.20	0.05	mg/L	22-Jun-20	EPA200.2
Sulphate	2.57	0.3	mg/L	22-Jun-20	EPA300.1
Sulphide	< 0.0015	0.0015	mg/L	24-Jun-20	APHA4500-S2
Subcontracted Organics					
Phenols, Total	0.0014	0.001	mg/L	22-Jun-20	AB ENV.06537
Trace Metals, Total					
Aluminum	108	5	µg/L	24-Jun-20	EPA200.8
Arsenic	0.7	0.2	µg/L	24-Jun-20	EPA200.8
Cadmium	< 0.1	0.1	µg/L	24-Jun-20	EPA200.8
Copper	2.8	0.2	µg/L	24-Jun-20	EPA200.8
Iron	121	5	µg/L	24-Jun-20	EPA200.8
Lead	0.2	0.1	µg/L	24-Jun-20	EPA200.8
Mercury	< 0.01	0.01	µg/L	24-Jun-20	EPA200.8
Molybdenum	0.8	0.1	µg/L	24-Jun-20	EPA200.8
Nickel	0.3	0.1	µg/L	24-Jun-20	EPA200.8
Zinc	5.2	5	µg/L	24-Jun-20	EPA200.8

ReportDate: Monday, June 29, 2020
Print Date: *Monday, June 29, 2020*

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Taiga Batch No.: 200300

- CERTIFICATE OF ANALYSIS -

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

Client Project:
Sample Type: Final Discharge Point
Received Date: 18-Jun-20
Sampling Date: 18-Jun-20
Sampling Time: 9:20
Location: Sewage Lagoon
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	0.486	0.005	mg/L	23-Jun-20	SM4500-NH3:G	
Biochemical Oxygen Demand	8	2	mg/L	19-Jun-20	SM5210:B	
CBOD	6	2	mg/L	19-Jun-20	SM5210:B	
Organic Carbon, Total	11.9	0.5	mg/L	23-Jun-20	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	67.4	0.4	mg/L	19-Jun-20	SM2320:B	
Conductivity, Specific (@25C)	545	0.4	µS/cm	19-Jun-20	SM2510:B	
pH	7.32		pH units	19-Jun-20	SM4500-H:B	
Solids, Total Dissolved	348	10	mg/L	23-Jun-20	SM2540:C	
Solids, Total Suspended	< 3	3	mg/L	23-Jun-20	SM2540:D	
Microbiology						
Coliforms, Fecal	< 100	100	CFU/100mL	19-Jun-20	SM9222:D	
Organics						
Oil and Grease, visible	Non-visible			18-Jun-20	Visual Exam	
Subcontracted Inorganics						
Calcium	60.7	0.05	mg/L	22-Jun-20	EPA200.2	

ReportDate: Monday, June 29, 2020
Print Date: ***Monday, June 29, 2020***

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Tel: (867)-767-9235 Fax: (867)-920-8740

Taiga Batch No.: 200300

- CERTIFICATE OF ANALYSIS -

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

Chloride	25.0	0.5	mg/L	22-Jun-20	EPA300.1
Hardness	193	0.13	mg/L	22-Jun-20	EPA200.2
Magnesium	10.0	0.005	mg/L	22-Jun-20	EPA200.2
Nitrate as Nitrogen	2.62	0.020	mg/L	22-Jun-20	EPA300.1
Nitrite as N	0.0650	0.010	mg/L	22-Jun-20	EPA300.1
NO2+NO3 - N	2.69	0.022	mg/L	22-Jun-20	EPA300.1
Potassium	7.93	0.05	mg/L	22-Jun-20	EPA200.2
Sodium	35.4	0.05	mg/L	22-Jun-20	EPA200.2
Sulphate	155	0.3	mg/L	22-Jun-20	EPA300.1
Sulphide	< 0.0015	0.0015	mg/L	24-Jun-20	APHA4500-S2
Subcontracted Organics					
Phenols, Total	< 0.0010	0.001	mg/L	22-Jun-20	AB ENV.06537
Trace Metals, Total					
Aluminum	44.7	5	µg/L	24-Jun-20	EPA200.8
Arsenic	0.8	0.2	µg/L	24-Jun-20	EPA200.8
Cadmium	< 0.1	0.1	µg/L	24-Jun-20	EPA200.8
Copper	6.0	0.2	µg/L	24-Jun-20	EPA200.8
Iron	162	5	µg/L	24-Jun-20	EPA200.8
Lead	0.3	0.1	µg/L	24-Jun-20	EPA200.8
Mercury	0.01	0.01	µg/L	24-Jun-20	EPA200.8
Molybdenum	1.1	0.1	µg/L	24-Jun-20	EPA200.8
Nickel	1.7	0.1	µg/L	24-Jun-20	EPA200.8
Zinc	< 5.0	5	µg/L	24-Jun-20	EPA200.8

ReportDate: Monday, June 29, 2020
Print Date: *Monday, June 29, 2020*

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Taiga Batch No.: 200300

- CERTIFICATE OF ANALYSIS -

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

- DATA QUALIFERS -

Data Qualifier Descriptions:

224 *Detection Limit Raised: Dilution required due to high concentration of test analyte(s).*

*** 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: Monday, June 29, 2020

Print Date: ***Monday, June 29, 2020***

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

Taiga Batch No.: 200654

- FINAL REPORT -

Prepared For: Hamlet of Kugaaruk

Address: Box 205
Kugaaruk, NU,X0B 1K0

Attn: **Chantal Dowden** **Facsimile: 867-769-6069**

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: Wednesday, September 16, 2020
Print Date: ***Wednesday, September 16, 2020***

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

Taiga Batch No.: 200654

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL 3-2 **Taiga Sample ID:** 001

Client Project: Kugaaruk Sewage + Waste
Sample Type: Decanted Sewage
Received Date: 26-Aug-20
Sampling Date: 25-Aug-20
Sampling Time: 9:00
Location: On Wetland (PEL3-2,PEL-4,and PEL-6,PEL-7)
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	87.5	0.005	mg/L	27-Aug-20	SM4500-NH3:G	
Biochemical Oxygen Demand	235	2	mg/L	26-Aug-20	SM5210:B	
CBOD	178	2	mg/L	26-Aug-20	SM5210:B	
Organic Carbon, Total	198	0.5	mg/L	29-Aug-20	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	404	0.4	mg/L	26-Aug-20	SM2320:B	
Conductivity, Specific (@25C)	1590	0.4	µS/cm	26-Aug-20	SM2510:B	
pH	7.39		pH units	26-Aug-20	SM4500-H:B	
Solids, Total Suspended	118	3	mg/L	31-Aug-20	SM2540:D	
Major Ions						
Chloride	179	0.7	mg/L	26-Aug-20	SM4110:B	
Nitrate+Nitrite as Nitrogen	0.28	0.01	mg/L	26-Aug-20	SM4110:B	
Sulphate	35	1	mg/L	26-Aug-20	SM4110:B	
Microbiology						

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Taiga Batch No.: 200654

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL 3-2 **Taiga Sample ID:** 001

Coliforms, Fecal	2080000	10000	CFU/100mL	26-Aug-20	SM9222:D	
Organics						
Oil and Grease, visible	Non-visible			26-Aug-20	Visual Exam	
Subcontracted Inorganics						
Calcium	27.9	0.05	mg/L	02-Sep-20	EPA200.2	
Hardness	132	0.13	mg/L	02-Sep-20	EPA200.2	
Magnesium	15.2	0.005	mg/L	02-Sep-20	EPA200.2	
Potassium	27.6	0.05	mg/L	02-Sep-20	EPA200.2	
Sodium	134	0.05	mg/L	02-Sep-20	EPA200.2	
Subcontracted Organics						
Phenols, Total	0.4150	0.050	mg/L	03-Sep-20	AB ENV.06537	224
Trace Metals, Total						
Aluminum	651	5	µg/L	03-Sep-20	EPA200.8	
Arsenic	1.3	0.2	µg/L	03-Sep-20	EPA200.8	
Cadmium	< 0.1	0.1	µg/L	03-Sep-20	EPA200.8	
Chromium	1.9	0.1	µg/L	03-Sep-20	EPA200.8	
Copper	61.5	0.2	µg/L	03-Sep-20	EPA200.8	
Iron	973	5	µg/L	03-Sep-20	EPA200.8	
Lead	1.9	0.1	µg/L	03-Sep-20	EPA200.8	
Manganese	133	0.1	µg/L	03-Sep-20	EPA200.8	
Mercury	0.04	0.01	µg/L	03-Sep-20	EPA200.8	
Nickel	3.9	0.1	µg/L	03-Sep-20	EPA200.8	
Silver	< 0.1	0.1	µg/L	03-Sep-20	EPA200.8	
Zinc	91.0	5	µg/L	03-Sep-20	EPA200.8	

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Taiga Batch No.: 200654

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-4 **Taiga Sample ID:** 002

Client Project: Kugaaruk Sewage + Waste
Sample Type: Final Discharge
Received Date: 26-Aug-20
Sampling Date: 25-Aug-20
Sampling Time: 9:00
Location: On Wetland (PEL3-2,PEL-4,and PEL-6,PEL-7)
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	63.6	0.005	mg/L	27-Aug-20	SM4500-NH3:G	
Biochemical Oxygen Demand	21	2	mg/L	26-Aug-20	SM5210:B	
CBOD	19	2	mg/L	26-Aug-20	SM5210:B	
Organic Carbon, Total	45.6	0.5	mg/L	29-Aug-20	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	453	0.4	mg/L	26-Aug-20	SM2320:B	
Conductivity, Specific (@25C)	1820	0.4	µS/cm	26-Aug-20	SM2510:B	
pH	7.73		pH units	26-Aug-20	SM4500-H:B	
Solids, Total Suspended	61	3	mg/L	31-Aug-20	SM2540:D	
Major Ions						
Chloride	262	0.7	mg/L	26-Aug-20	SM4110:B	
Nitrate+Nitrite as Nitrogen	0.16	0.01	mg/L	26-Aug-20	SM4110:B	
Sulphate	18	1	mg/L	26-Aug-20	SM4110:B	
Microbiology						
Coliforms, Fecal	45000	1000	CFU/100mL	26-Aug-20	SM9222:D	

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Taiga Batch No.: 200654

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-4 **Taiga Sample ID:** 002

Organics					
Oil and Grease, visible	Non-visible			26-Aug-20	Visual Exam
Subcontracted Inorganics					
Calcium	46.4	0.05	mg/L	02-Sep-20	EPA200.2
Hardness	200	0.13	mg/L	02-Sep-20	EPA200.2
Magnesium	20.4	0.005	mg/L	02-Sep-20	EPA200.2
Potassium	26.1	0.05	mg/L	02-Sep-20	EPA200.2
Sodium	202	0.05	mg/L	02-Sep-20	EPA200.2
Subcontracted Organics					
Phenols, Total	0.0018	0.001	mg/L	03-Sep-20	AB ENV.06537
Trace Metals, Total					
Aluminum	91.6	5	µg/L	03-Sep-20	EPA200.8
Arsenic	3.1	0.2	µg/L	03-Sep-20	EPA200.8
Cadmium	< 0.1	0.1	µg/L	03-Sep-20	EPA200.8
Chromium	0.5	0.1	µg/L	03-Sep-20	EPA200.8
Copper	7.2	0.2	µg/L	03-Sep-20	EPA200.8
Iron	680	5	µg/L	03-Sep-20	EPA200.8
Lead	1.1	0.1	µg/L	03-Sep-20	EPA200.8
Manganese	540	0.1	µg/L	03-Sep-20	EPA200.8
Mercury	0.02	0.01	µg/L	03-Sep-20	EPA200.8
Nickel	5.4	0.1	µg/L	03-Sep-20	EPA200.8
Silver	< 0.1	0.1	µg/L	03-Sep-20	EPA200.8
Zinc	6.5	5	µg/L	03-Sep-20	EPA200.8

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Taiga Batch No.: 200654

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-6 **Taiga Sample ID:** 003

Client Project: Kugaaruk Sewage + Waste
Sample Type: Solid Waste Run-off
Received Date: 26-Aug-20
Sampling Date: 25-Aug-20
Sampling Time: 9:00
Location: On Wetland (PEL3-2,PEL-4,and PEL-6,PEL-7)
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	0.759	0.005	mg/L	27-Aug-20	SM4500-NH3:G	
Biochemical Oxygen Demand	3	2	mg/L	26-Aug-20	SM5210:B	
CBOD	2	2	mg/L	26-Aug-20	SM5210:B	
Organic Carbon, Total	12.1	0.5	mg/L	29-Aug-20	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	180	0.4	mg/L	26-Aug-20	SM2320:B	
Conductivity, Specific (@25C)	645	0.4	µS/cm	26-Aug-20	SM2510:B	
pH	7.29		pH units	26-Aug-20	SM4500-H:B	
Solids, Total Suspended	8	3	mg/L	31-Aug-20	SM2540:D	
Major Ions						
Chloride	24.3	0.7	mg/L	26-Aug-20	SM4110:B	
Nitrate+Nitrite as Nitrogen	0.45	0.01	mg/L	26-Aug-20	SM4110:B	
Silica, Reactive	5.72	0.025	mg/L	27-Aug-20	SM4500-Si:D	
Sulphate	104	1	mg/L	26-Aug-20	SM4110:B	
Microbiology						

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Taiga Batch No.: 200654

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-6 **Taiga Sample ID:** 003

Coliforms, Fecal	3	1	CFU/100mL	26-Aug-20	SM9222:D	
Organics						
Benzene		0.002	mg/L		EPA8260B	16
Ethylbenzene		0.002	mg/L		EPA8260B	16
F2: C10-C16		0.2	mg/L		EPA8015B	16
F3: C16-C34		0.2	mg/L		EPA8015B	16
F4: C34-C50		0.2	mg/L		EPA8015B	16
Hydrocarbons, Total Extractable		0.2	mg/L		EPA8015B	16
Hydrocarbons, Total Purgeable		0.3	mg/L		EPA8015	16
Oil and Grease, visible	Non-visible			26-Aug-20	Visual Exam	
Toluene		0.002	mg/L		EPA8260B	16
Xylenes		0.002	mg/L		EPA8260B	16
Subcontracted Inorganics						
Calcium	87.9	0.05	mg/L	02-Sep-20	EPA200.2	
Hardness	254	0.13	mg/L	02-Sep-20	EPA200.2	
Magnesium	8.45	0.005	mg/L	02-Sep-20	EPA200.2	
Potassium	7.22	0.05	mg/L	02-Sep-20	EPA200.2	
Sodium	31.1	0.05	mg/L	02-Sep-20	EPA200.2	
Subcontracted Organics						
Phenols, Total	< 0.0010	0.001	mg/L	03-Sep-20	AB ENV.06537	
Trace Metals, Total						
Aluminum	45.8	5	µg/L	03-Sep-20	EPA200.8	
Arsenic	0.4	0.2	µg/L	03-Sep-20	EPA200.8	
Cadmium	0.1	0.1	µg/L	03-Sep-20	EPA200.8	
Chromium	0.4	0.1	µg/L	03-Sep-20	EPA200.8	

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Taiga Batch No.: 200654

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-6 **Taiga Sample ID:** 003

Copper	11.2	0.2	µg/L	03-Sep-20	EPA200.8
Iron	2500	5	µg/L	03-Sep-20	EPA200.8
Lead	0.7	0.1	µg/L	03-Sep-20	EPA200.8
Manganese	588	0.1	µg/L	03-Sep-20	EPA200.8
Mercury	< 0.01	0.01	µg/L	03-Sep-20	EPA200.8
Nickel	6.6	0.1	µg/L	03-Sep-20	EPA200.8
Silver	< 0.1	0.1	µg/L	03-Sep-20	EPA200.8
Zinc	269	5	µg/L	03-Sep-20	EPA200.8

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Taiga Batch No.: 200654

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-7 **Taiga Sample ID:** 004

Client Project: Kugaaruk Sewage + Waste
Sample Type: Metal Waste Run
Received Date: 26-Aug-20
Sampling Date: 25-Aug-20
Sampling Time: 9:00
Location: On Wetland (PEL3-2,PEL-4,and PEL-6,PEL-7)
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Ammonia as Nitrogen	< 0.005	0.005	mg/L	27-Aug-20	SM4500-NH3:G	
Biochemical Oxygen Demand	< 2	2	mg/L	26-Aug-20	SM5210:B	
CBOD	< 2	2	mg/L	26-Aug-20	SM5210:B	
Organic Carbon, Total	3.8	0.5	mg/L	29-Aug-20	SM5310:B	
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	39.4	0.4	mg/L	26-Aug-20	SM2320:B	
Conductivity, Specific (@25C)	257	0.4	µS/cm	26-Aug-20	SM2510:B	
pH	7.63		pH units	26-Aug-20	SM4500-H:B	
Solids, Total Suspended	< 3	3	mg/L	31-Aug-20	SM2540:D	
Major Ions						
Chloride	40.2	0.7	mg/L	26-Aug-20	SM4110:B	
Nitrate+Nitrite as Nitrogen	0.11	0.01	mg/L	26-Aug-20	SM4110:B	
Sulphate	15	1	mg/L	26-Aug-20	SM4110:B	
Microbiology						
Coliforms, Fecal	2	1	CFU/100mL	26-Aug-20	SM9222:D	

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Taiga Batch No.: 200654

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-7 **Taiga Sample ID:** 004

Organics						
Benzene		0.002	mg/L		EPA8260B	16
Ethylbenzene		0.002	mg/L		EPA8260B	16
F2: C10-C16		0.2	mg/L		EPA8015B	16
F3: C16-C34		0.2	mg/L		EPA8015B	16
F4: C34-C50		0.2	mg/L		EPA8015B	16
Hydrocarbons, Total Extractable		0.2	mg/L		EPA8015B	16
Hydrocarbons, Total Purgeable		0.3	mg/L		EPA8015	16
Oil and Grease, visible	Non-visible			26-Aug-20	Visual Exam	
Toluene		0.002	mg/L		EPA8260B	16
Xylenes		0.002	mg/L		EPA8260B	16
Subcontracted Inorganics						
Calcium	20.9	0.05	mg/L	02-Sep-20	EPA200.2	
Hardness	70.9	0.13	mg/L	02-Sep-20	EPA200.2	
Magnesium	4.57	0.005	mg/L	02-Sep-20	EPA200.2	
Potassium	1.55	0.05	mg/L	02-Sep-20	EPA200.2	
Sodium	21.6	0.05	mg/L	02-Sep-20	EPA200.2	
Subcontracted Organics						
Phenols, Total	< 0.0010	0.001	mg/L	03-Sep-20	AB ENV.06537	
Trace Metals, Total						
Aluminum	26.3	0.6	µg/L	03-Sep-20	EPA200.8	
Arsenic	< 0.2	0.2	µg/L	03-Sep-20	EPA200.8	
Cadmium	< 0.04	0.04	µg/L	03-Sep-20	EPA200.8	
Chromium	< 0.1	0.1	µg/L	03-Sep-20	EPA200.8	
Copper	1.3	0.2	µg/L	03-Sep-20	EPA200.8	

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Client Sample ID: PEL-7 **Taiga Sample ID:** 004

Iron	39	5	ug/L	03-Sep-20	EPA200.8
Lead	0.1	0.1	µg/L	03-Sep-20	EPA200.8
Manganese	5.4	0.1	µg/L	03-Sep-20	EPA200.8
Mercury	< 0.01	0.01	µg/L	03-Sep-20	EPA200.8
Nickel	0.3	0.1	µg/L	03-Sep-20	EPA200.8
Silver	< 0.1	0.1	µg/L	03-Sep-20	EPA200.8
Zinc	28.5	0.4	µg/L	03-Sep-20	EPA200.8

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Taiga Batch No.: 200654

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-7 **Taiga Sample ID:** 004

- DATA QUALIFERS -

Data Qualifier Descriptions:

16 *Test requested but no sample bottle received*

224 *Detection Limit Raised: Dilution required due to high concentration of test analyte(s).*

*** 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