Annual Report- 2017

Water Licence: 3BM-GJO1318

Date of expiry: Nov 12, 2018

EXECUTIVE SUMMARY:

Hamlet of Gjoa Haven has prepared the Annual Report 2017 to be submitted to the Nunavut Water Board to meet requirements of the Nunavut Water Board Licence 3BM-GJO 1318, Part B General Conditions, through part H conditions to the monitoring program. This report covers the period from January 01st, 2017 to December 31st 2017.

The Licensee has drawn water from the big Swan Lake through twin intake pumps, transformed the reheated intake water by 6 inch HDPE buried line to the Treatment Plant building 3.0 km away where this water has been treated using pressure filters followed by chlorination before truck fill outside by the hamlet trucks and delivered to household tanks for community water needs. Quantity of water uses during this period was about **45,919** m3, within allowable limit 62,000 m3 annually.

Sewage waste collected from household sewage tanks using hamlet operated vacuum trucks, hauled to community sewage lagoon and discharge at the designated dropping point. Raw sewage stayed inside the lagoon during the period Oct through June for almost 9 months freezing where these receive primary treatment naturally. Annual decanting carried during October to reduce quantity inside and make room for new candidate sewage waste. Samples collected from defined designated monitoring stations and tested at Taiga Laboratory Yellowknife.

Batteries, waste oil and waste paint drums replaced inside the seacan placed at Solid waste facility – plan for shipping out from site with certified handler. Non-hazardous waste disposed at the Solid waste facility using hamlet operated truck and pushed down with local cover materials.

Water system upgrade and SCADA monitoring repair:

About 1200m length of the buried water line was replaced in 2015 with HDPE insulated pipes of same diameter, but upgrading of reheat stations and re-sizing of pumps and heat exchanger carried during May-Oct 2017. This replacement was required to continue water supply from intake pump house that has suffered winter freeze-up partly during last 2-3 years. Monitoring of water supply, SCADA upgrading, PLC program and Chlorine measuring device replacement were carried during the summer and fall. With this replacement, water intake and supply efficiency increased but no changes to system, structure or program.

Increased amount of Chlorine in treated water were reported in some occurrences but minimized such escalation of chlorine by controlling the dosing and reducing the amount of extra chlorine addition into overnight trucked water. No other concern was reported in treated water or raw water quality. The licensee has maintained of sending water samples for parameters test to Taiga Lab in Yellowknife and bacteriological test samples to EHO lab in Cambridge Bay.

The amended and additional O&M manual for Free Chlorine measuring system, SCADA sensors and PLC upgrade including the as-built drawings were received and ready to send to Nunavut Water Board separately.

Part B: General Conditions:

- Tabular Form of Annual water consumption and sewage disposal are filled in NWB Form
- Quantities were measured on daily basis of water distribution and sewage disposal
- New engineered lagoon is in operation and changes the monitoring point to new drop-off and decanting locations.
- No modification to sewage waste wetland or solid waste site during 2017
- No unauthorized discharge or disposal to effluent or waste during this period.
- O&M manuals for sewage and solid waste facilities remains active, except an addition to Chlorine measuring and SCADA system upgrade for Water treatment and supply.
- Monitoring stations locations marked and updated with sign for the new station GJO-2 and GJO-4. Scope signage in standard Official languages of Nunavut not yet completed.
- No device Meter was used for volume measurement, however, truck-fill measurement uses
- Plan of Compliance remained active and implemented as approved by the Board.

Part C: Water Use:

- All water drawn from the Swan Lake for annual demand which was about **45,919** cubic metres and within the allowable annual limit **62,000** cubic metres.
- No erosion at the intake point or close proximity of pumps sucking point. Intake screen inside the lake intake point with clearance from bed and allowance frozen layer on top by 3m plus. No material removed from lake or intake bed near the screen.

Part D: Waste Disposal

- The municipal sewage waste contains both grey and black water; urinal& toilet flush water mix with bath & kitchen water in the same tank. Combined sewage stay inside the house tank for average 3-4 days before collecting by vacuum truck to discharge into the lagoon.
- Amount of sewage generated during this period 01 Jan - 31 Dec is less than 43,000 m3. Quantity of sewage is calculated considering 90-95 % of water supply by truck.
- All sewage and solid waste disposal done to the designated location of sewage lagoon and waste facility using hamlet operated trucks. Sewage and effluent samples were taken from location Station GJO-3A and Final Discharge Point GJO-4, test result shown contaminants parameters within allowable limits (FC: 10,000 CFU/dl; BOD_5:80; TSS: 100; P^H: 6-9; Oil & grease: none for station GJO-4). Results are attached including a summary.
- Freeboard at sewage lagoon remained more than1.0 m since it was decanted.
- The existing wetland area and facilities used for effluent treatment and remediation. Test results shown the effluent from Final Discharge Point (GJO-4) within limiting values (BOD: 80; TSS:100; 10,000 CFU/dl; P^H: 6-9) and not acutely toxic to Rainbow Trout or crustacean fish food.

Non-hazardous domestic Solid Waste:

- Solid wastes were disposed in the waste facility which is fenced in 3-sides and and leachate run-off at the downstream where sampled and tested at Taiga Lab. It requires some works to segregate hazardous waste from regular waste and secure confined or containment.
- Light materials, paper, paper boards and loose materials segregated and reduced by slow burning inside trench and pushed down burn ashes under the cover materials inside.
- Animal carcass supposed to bury inside sand-pit and cover, but lack proper cell inside the facility has limited the activity and therefore could not be secured. The AANDC inspector has raised this concern during the inspection. The Licensee will prepare some measures in coming summer to deal with animal carcass management.

Part E-G: Modification, construction, operation, A&R

- No modifications to sewage or solid waste facilities and operational plan since developed.
- Upgrading to SCADA control, PLCs system and Free Chlorine measuring devices carried during this period. The operational manual and as-built drawing are ready for submission to the Board.
- No spills occurred during this period. No reclamation to facilities and therefore, no activities related to vegetation growth or seed deposition carried.

Part H: Monitoring Program

- Annual monitoring of sewage and solid waste effluent has been carried during the summer and fall by the Licensee and the consultant at the water treatment system. Annual cleanup to water storage tank was carried and water samples were tested before delivery. Effluent samples were taken from monitoring stations where available as indicated in Part H of the licence, tested at Taiga Laboratory, Yellowknife (CALA approved). Test results are included.

  Station GJO-4 noted as the Final Discharge point from wetland to ocean; therefore, parameters constraints are mostly applicable for sample taken from this station.

  Station GJO-2 has been re-arranged on the wetland where sewage effluent run off merges to solid waste effluent before ending to Final point GJO-4. GPS addresses were established for new location and included in the report.

ANNUAL REPORT

YEAR BEING REPORTED: 2017

The following information is compiled pursuant to the requirements of Part B, Item 1 of Water Licence 3BM-GJO-1318 issued to the Hamlet of Gjoa Haven
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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	3,873,733.60	Same
February	3,582,631.00	Same
March	3,940,795.40	Same
April	3,762,316.00	Same
May	3,947,774.58	Same
June	3,510,738.60	Same
July	3,552,010.76	Same
August	4,065,644.30	Same
September	3,732,935.80	Same
October	3,825,366.30	Same
November	3,865,149.70	Same
December	4,259,915.68	Same
ANNUAL TOTAL	45,919,011.72	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;

PLC control system and SCADA upgrading activities for water treatment plant has completed in March 2017 and Chlorine injection system and Free Chlorine measuring devices upgrading completed in Oct 2017 by Stantec consulting Ltd.

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

No reportable unauthorized discharge but only the water from the storage tank clean-up carried on July 05 as part of the Annual operation. Water delivery was suspended for about 8 hours from the treatment plant, but alternative truckfill from intake pumphouse was available. Water delivery resumed from the treatment plant at 9:00 pm on the same day.

Effluent overflows on the wide area of wetland instead of the defined trench-line along GJO-4 when summer freshen and snow melts, but it helps also contaminants parameters polishing in the presence of sunlight, wind and oxygen ingress.

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

Restoration activities carried for Free Chlorine measuring system, PLC communication to HMI units and auto-control on pump selection at the intake pumphouse. Upgrading to reheat station pumps and heating control devices were completed as part of previous year works. Free chlorine reading sensor, temperature reader and tank water level sensor- all re-installed outside the tank and synchronized to the PLC control Board.

Fallen fence components and open area at the north side of solid waste were fixed by hamlet resource during the summer, but no fence or gate at the entrance. Lack of proper equipment, materials and budget are constraints for the Licensee, unless a GN project in coming year.

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;

Annual inspection revealed the necessity for solid waste facility improvement as it has been issues of capacity, unauthorized access through open areas along the perimeter, leaching effluent water overflown outside when summer freshen due to lack of protection berm, and mixing of wastes inside due to lack of identified cells by type. The Board is aware of these issues and limitations from previous years but a GN initiative is expecting under the Capital Fund with standardize improvement activities. A study and assessment project is expecting in coming summer 2018.

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

No specific issues on water uses or waste disposal requested by the Board or the inspector. The inspector has received information water, sewage and waste volume and measurement system.

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

Updated O&M manuals for Model FCL (Free Chlorine measuring system) and PLC control system are ready and will be submitted to the Board separately.
New water and sewage trucks were added with existing fleet and had replaced the older truck.
Water delivery and sewage disposal operations were carried on regular hours and as needed:

- 3-trucks on road and 1-truck standby, for water delivery 7 days a week
- 3-trucks on road and 2 trucks standby for sewage delivery 7 days a week

One out of two truckfill outside of the water treatment plant is currently active, and the other one has some electrical connection seized up. A plan for repair or improvement works for this truckfill will be taken in coming summer 2018; the GN O&M department is acknowledged the issue.
The solid waste facility is running to capacity issues and waste bulks heaping on sides. The licensee has a plan for bulk reduction with the help of GN funding in coming year(s), a project is expecting for waste reduction and improvement in the coming summer by GN CGS.

No changes to Operation plan for water and sewage, and no major maintenance required for water delivery system or sewage disposal operation.

ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:

No additional fire storage water tank in the community and therefore all 3-water trucks are kept full overnight for fire emergency. Free Chlorine level sometimes reduced in overnight storage water and the operator add the difference Chlorine solution to cover the demand before the water delivery to household tank. Regular daily fill also test at least one time per truck; Chlorine Log sheet maintains at the operator office and forward to CGS office weekly.
The treatment plant operator carries Chlorine test on a regular weekly/monthly basis for E. coli and Total Coliform, and water samples also sent to EHO office in Cambridge Bay.

Water chemical tests and sewage water/ effluent tests were carried at Taiga Lab in Yellowknife.

FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:

Some follow up update were carried in regards to concerns by AANDC inspector on July 11, 2017:

- The truckfill turn around area has been kept clean and free of snow accumulation and ponding water cleared through drainage for easy access/exit of water truck. A limitation of space for

two trucks filling at a time keeps one diver waiting until the front truck leaves the spot. The Licensee is working with GN department to facilitate both truckfill to delivery water when a rush hour needs more supply.

- Ponding snow piles outside the building made ingress of water inside the building and caused flooding under the tank. The licensee used temporary measures to overcome the situation of snow pile, but no permanent scope as the WTP building plinth is almost same level of truckfill driveway.
- The fuel tank outside the intake pumphouse is double shelled and the inner layer hold the fuel, any potential leaked fuel still will be within the containment by the outer shell. The bank of intake pumphouse and fuel tank is covered and protected by gravels. No other permanent berm along the shore line or outside of the intake pumphouse is in plan.
- The chipped door panel at the intake pumphouse entry has been repaired, which alarmed the proper closing and thus loosing heat energy from inside.
- Monitoring stations re-arranged with GPS system:
  - GJO-2 moves down to sewage lagoon from previous location down of solid waste facility with GPS address: N 68^0 37′ 13.7″ and W 95^0 50′ 23.2″
  - GJO-4 (Final Discharge point) at: N 68^0 36′ 59.6″ and W 95^0 49′ 48.0″