Hamlet of Kugaaruk, Nunavut
Water Licence 3BM-PEL0712

Clarification and Addendum to
Part F(i & ii), F (vi) and H (x) and others

References:

NWB Letters: April 24, 2013 and February 10, 2014
NWB Letters: Jan14, 2010 and Feb 22-23, 2010

By
Shah Alam, P. Eng.
Municipal Planning Engineer,
Cambridge Bay, NU

Feb 17, 2014

Part F, Item 1. (i) Water Collection and Distribution Operation and maintenance (O&M) Manual

(a) Water drawn from the Kugajuk river using twin intake pump, treats (disinfect) in the treatment plant and deliver to community house tanks by truck-fill for residential, institutional and household uses.

All operations for water supply remain unchanged. The only change will be addition of a new intake pumphouse, treatment plant and power line to Water System. An application for inclusion of Water Treatment Plant and new pumphouse will be submitted once completed, expecting such completion by Aug 2014. The new O&M manual for the Water System, pumphouse, intake line, treatment plant and water distribution will be submitted to the Board by the owner or its agent once the new treatment plant completed and commissioned for operation. An A&R plan also will be included for the existing pumphouse which will be refurbished for storage of materials and equipment.

In event of the proposed new O&M manual for water system and distribution, any existing O&M manual will be no longer useful for this new water system. The construction and installation of the new Water System started in fall 2013 and expecting full completion by Aug 2014. Therefore, ***the Hamlet is requesting for an exemption of updating or revision of old O&M manual of water system for now.***

(b) O&M Manual and Plan for Sewage Facility: submitted to the Board and approved for operation (Ref. NWB Letter Dated February 22, 2010).
(c) O&M Manual and Plan for Solid Waste Facility: submitted to the Board and approved for operation (Ref. NWB Letter Dated February 23, 2010)

Annual reviewing of the plan and operation remains in effect with appropriate maintenance as required for summer and winter monitoring. Operators training continued since summer 2012 and recur in summer 2014 including field operation of facilities.

Part F, Item 2 Spill Contingency Plan:

The spill contingency plan was approved by the Board on January 22, 2010, but requested addendum for some item. Clarification and addendum are explained as below and referring requests:

Ref. Plan submission Review by Environment Canada, Dated January 15, 2010

Section 3.2 Potential Environmental Impacts of Spills
(Include with the O&M manual)

Antifreeze: Environmental Impacts:

- Antifreeze made from glycol is harmful to animal and human.
- Used antifreeze (from automobile)contains copper, zinc, lead and benzene can pose severe risk to environment and aquatic life when leach to water
- Potential impact to ground water if spills and leach to ground

- Degradation of glycol in antifreeze demands large amount of oxygen- thus reduces oxygen in the water used by aquatic life for survival.
- Oil spills when reaches coastline, reacts with coast sand, rock, vegetation and others causing marine plants die slowly.

Worst case Scenario: container of antifreeze open and pour on ground or direct through on ground will leach into ground water when snow melts and summer rains.

Section 3.3.5 Procedure for Transferring, storing and managing Spills related wastes

In general all contaminated material generated from spills, will be stored in steel drum temporarily for appropriate disposal at a later time which may include off-site transport to an approved facility. Labeled with materials information and contact addresses on the container will be transport through sealift barge or contractor transport.

Section 3.3.7 (as shown 3.3.6) Procedure for Restoring Affected Areas

Determination of the required level of final clean-up, restoration, and ongoing monitoring will be completed in consultation with or to the satisfaction of the AANDC inspector and Nunavut Water Board. Site specific studies may be required to determine the appropriate final clean-up criteria.

Section 4.2 Off-site Resources: (correct contact address)

- NT-NU 24-hours Spill line: 867-920-8130
- Environment Canada, Emergency Duty Officer 1-866-845-6037

Part F, Item 6 Geotechnical Inspection of engineered facility by a geotechnical engineer

Report of geotechnical inspection was submitted to the Board in 2010 by AMEC Earth and Environmental. The Board has recommended to follow-up the geotechnical inspection to comply Dam Safety regulation during summer or fall (Aug-Sep) when effluent level attains maximum at the lagoon. A review/follow up inspection by a geotechnical engineer for lagoon dam safety and containment is planned in August 2014 and report to the Board thereafter by Sep 30, 2014.

Retention and discharge through the controlled dyke into the second cell of the sewage system ensured the full compliance in 2012 and 2013 and effluent sample result shows effluent remediation parameters within MAC limits as expected (Ref Annual Report 2012 and 2013).

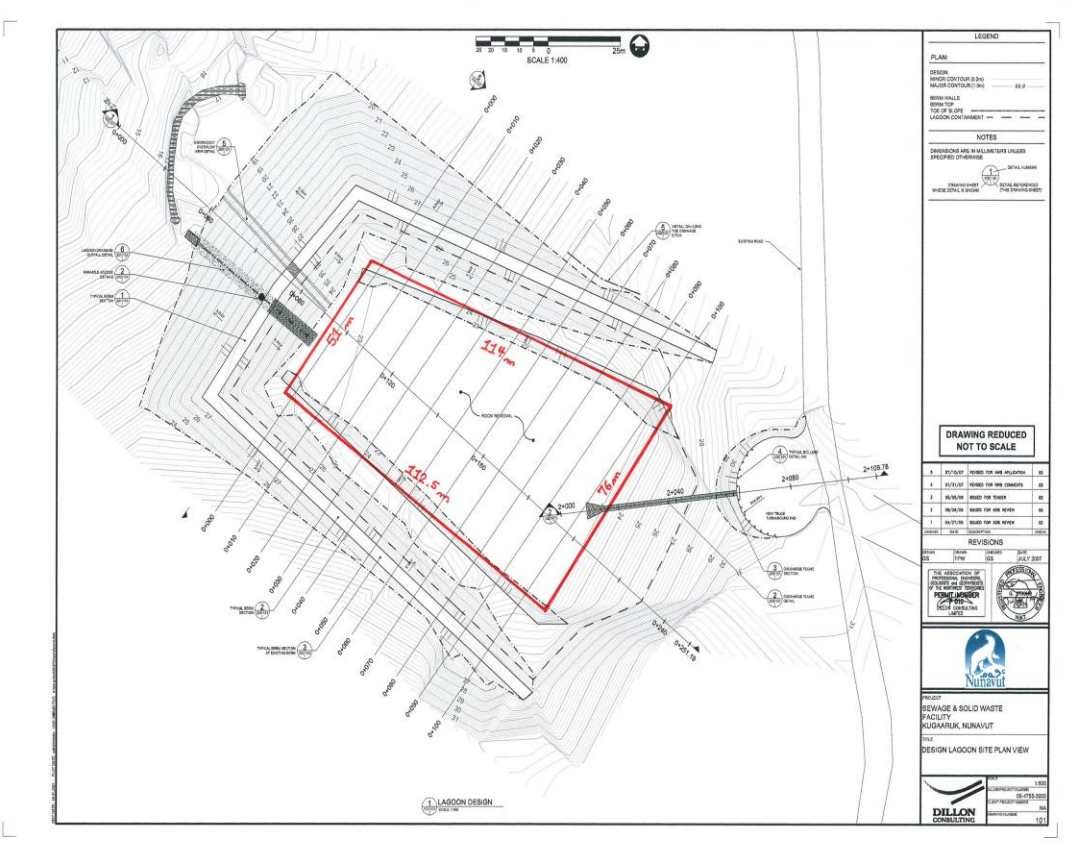
Ref. NWB Letter, February 22, 2010 Items 1-4 for New Sewage Lagoon

- Effluent from lagoon will be discharged once per year (July- October)
- Valve in discharge pipe will be opened and effluent from main cell to the smaller holding cell.

- Once holding cell filled, the valve will be throttled back to maintain discharge flow runs over the top of secondary cell rip rap berm and enter into wetland for secondary treatment. INAC inspector will be informed at least 10 days ahead of such discharge or decanting.
- Flow to secondary cell and wetland regulated, so wetland is not overwhelmed by large volume.
- Final Completion and operation: Sep 10, 2010
- Dimension of lagoon base: short sides: 51m & 76m and long sides: 112m & 114m
- Capacity of Lagoon: Able to treat 46,600 m3 sewage annually

Method of sludge sample (Ref. section 3.2.3.2 O&M manual)

Sludge should be sampled every 5 (Five) years to determine the depth of sludge blanket. As a guide, if the height of sludge is thicker than 0.5m from the bottom of the lagoon floor, the sludge should be removed from lagoon and treat in appropriate facility (such as land fill cell). Hamlet has to retain the services of an engineer for the design of an appropriate sludge removal, treatment and disposal option. Hamlet will retain the services of a geotechnical engineer in Aug 2014 for the lagoon dam safety inspection and sludge sampling and operation for sludge disposal (if needed).



The new lagoon was constructed on the location of the old lagoon with similar system of two cells system with improvement and upgrading to meet the next 20 years sewage treatment facility. The

upper and lower berm constructed to incorporate the use of adjacent wetland and a valve controlled discharge dyke in between two cells. With the improvement of the new lagoon, the old lagoon no longer exists and merged into the new lagoon facility. During the improvement work, residual sewage from old lagoon pumped into the secondary cell where secondary remediation took place and finally discharged to ocean. This was part of the improvement works for new lagoon.

Part H, Item 10 Quality Assurance /Quality Control Plan for Sewage and Solid Waste

Approved O&M manuals included and explained the plan for Quality Assurance and Quality Control of sewage and Solid waste disposal. A short explanation outlined as below:

1. Field Sampling

As shown in Figures 5-1 and 5-2 (O&M manual for Solid waste), sampling points for solid waste and metal dump designated as PEL-6, PEL-7, PEL-8 (1,2), PEL-9(1,2) and PEL-10(1,2) with location:

Station	Latitude	Longitude
PEL-6	68° 31' 14.01" N	89° 49' 43.67" W
PEL-7	68° 31' 03.65" N	89° 49' 03.14" W
PEL-8-1	68° 31' 08.93" N	89° 49' 31.79" W
PEL-8-2	68° 31' 13.30" N	89° 49' 23.75" W
PEL-9-1	68° 30' 58.76" N	89° 49' 24.04" W
PEL-9-2	68° 30' 59.94" N	89° 49' 26.21" W
PEL-10-1	68° 31' 13.50" N	89° 49' 42.05" W
PEL-10-2	68° 31' 09.61" N	89° 49' 41.99" W

Figure 3-1, (O&M manual for Sewage Lagoon) shows sampling points for effluent monitoring and testing to ensure quality of effluent remediation before ending to ocean.

GPS Coordinates for Sampling Stations

Station	Latitude	Longitude
PEL-2	68° 31' 13.66" N	89° 49' 49.25" W
PEL-3-1	68° 31' 16.74" N	89° 50' 05.68" W
PEL-3-2	68° 31' 17.91" N	89° 50' 03.19" W
PEL-4	68° 31' 21.38" N	89° 50' 16.06" W
PEL-5	5m offset from shore into ocean where PEL-4 is located	

All sampling, sample preservation and analysis are conducted in accordance with methods described in the current edition of Standard Methods for Examination of Water and Wastewater. Samples collected in prescribed bottle from Taiga Laboratory (CALA Laboratory), correct labelling with

date/time/sampler/location, placed in prescribed container and deliver in air cargo to the laboratory within scheduled time-all are in accordance with the standard set out in the manual and guideline by the Laboratory. Sample should be collected at a minimum once per year or as per direction by the Board (Ref. O&M manual). Currently, samples are collecting on a monthly basis during the duration June-Sep when run-off available.

Sample(s) will be analyzed for the following parameters as shown in the tabular form to comply with limiting contaminants as set out in the CCME guideline for municipal waste.

Run-off from landfill (municipal Solid waste) is to be collected from the receiving water body by immersing the sample bottle into the run-off neck first to a depth of 5-10 cm (if possible).

BOD (Biochemical Oxygen Demand)
pH
Total Suspended Solids
Nitrate-Nitrite
Total Phenols
Total Hardness
Magnesium
Sodium
Total Arsenic
Total Copper
Total Iron
Total Mercury
Fecal Coliforms
Conductivity
Oil and Grease
Ammonia Nitrogen
Total Alkalinity
Calcium
Potassium
Sulphate
Total Cadmium
Total Chromium
Total Lead
Total Nickel
TPH (Total Petroleum Hydrocarbons)
PAH (Polycyclic Aromatic Hydrocarbons)
BTEX (Benzene, Toluene, Ethylbenzene, Xylene)

Site Records

- All test results, monitoring and operation maintenance information are kept at Hamlet Office and Operation/ maintenance site office/garage. Records included:
- Volume of waste discharges/disposal, types and information of remedial measure (if needed)
- Spill contingency Plan and record (if any) and responding measure
- Emergency respond plan and contact information
- On site and on-duty safety plan and measure
- Records of site visit and recommendation of inspection
- Copy of Water Licence
- Records of operating vehicles, operator and employee in dealing with waste and sewage.

Ref. AANDC multi-year Compliance Summary including non-compliance overview

Requested by the inspector for as-built drawing of new sewage lagoon, the Hamlet has submitted the sketch drawing of the completed lagoon. Also, description details of the lagoon background history and structure explained in the O&M manual. This report also included the sketch of the as-built drawing of the lagoon for information and reference.

An updated Compliance Summary included here for water, sewage and solid waste management for short term and long term basis. Also, an updating can be submitted for every year implementation of the plan as per request and requires.

Kugaaruk Water Licence: 3BM-PEL 0712; Type 'B'

Date of issuance**:** September 07, 2007
Date of Expiry: December 31, 2012

Allowable Water quantity intake: 35,000 cu. Meter annually
Renewal Application submitted: December 03, 2012

Feedback: Phyllis Beaulieu's request on April 14, 2013 for:
- Water collection & distribution,
- addendum on Spill Contingency plan,
- Geo inspection follow up of lagoon when maximum effluent level in summer
- QA/QC plan sewage lagoon and solid waste facilities with approved CALA

Plan for Compliance:

Item	Licence Condition	Current Status	Plan/comments
B-1	Annual Report, Monitoring program, water quantity, facility modification etc.	Annual Reports submitted 2011- 2012 Annual Report 2013 submission by Mar 31,'14 QA/QC plan submitted on Oct 06, 2009 inside the O&M manuals.	Annual review QA/QC in effect. Follow up July 2014.
B-2	Monthly bacterial Test Daily Chlorine Test Spill Contingency plan	Cl2 log received weekly basis and updated No Spills happened in 2013. Plan was submitted to NWB Oct 06, 2009. INAC (by Ian Parsons) requested for detail with map showing storage location, procedure for transportation in managing hazardous waste.	Section 3.3.5 O&M manual shows detail- Hazardous waste place inside the facility for off-site transport during summer-fall barge.
B-5	Signage of monitoring station	Signage installed for monitoring stations PEL-3 through PEL-10 with sub-points	Hamlet will install Facility signage in July-Aug 2014.
F-1	O & M manual and plan for Sewage & Solid waste.	O&M manuals submitted on Oct 06, 2009 NWB requested (Apr14,2013) for plan of solid waste reduction	Annual segregation of solid waste will recur July-Sep, 2014
H-1	Annual quantities of water intake and use	2012: water intake 27,160 cu meters 2013: water intake 27,697 cu meters Allowable quantity 35,000 cu meters.	2013 Annual Report included
H(3-5)	Monitoring program	• Raw water intake volume- monthly • Bacterial test for supply water- monthly • Chlorine test - daily at least 1 sample from each truck operating for the day.	Hamlet will continue updating Log Sheet weekly and monthly

Lagoon operation: (Ref. Item 3.2 O&M Manual)

New lagoon completed and started operation in 2009

- Effluent from lagoon will be discharged once per year (July- October) as requires.
- Valve in discharge pipe will be opened and effluent flow from main cell to the smaller holding cell.
- Once holding cell has filled, the valve will be throttled back to maintain discharge flow runs over the top of secondary cell's rip rap berm and enter into wetland for secondary treatment. INAC inspector must be informed at least 10 days ahead of such discharge or decanting.
- Flow to secondary cell and wetland regulate, so that wetland is not overwhelmed by any large volume of effluent.
- Lagoon must be inspected by a Geotechnical Engineer in either July or August of each year and report to be submitted to NWB within 60 days of inspection including a copy of Hamlet's plan to implement any recommendation suggested in the report.

Solid Waste Facility operation: (Ref. Item 3.1 O&M manual)

- Solid Waste Facility was completed and started operation in 2009

- Acceptable items at the facility: (**Ref. Item 3.1 O&M manual)**
    - plastic, metal, paper wastes, cardboard, food, rubber, animal and vegetable (organic) waste, leather, glass wood, clothing and textiles, electronics, furniture and major appliances, non-salvageable metals, tires, construction & demolition wastes (not a hazardous or banned material)

- Non-acceptable items at the facility:
    - Pathological and pathogenic wastes, radioactive wastes, hazardous wastes, asbestos, batteries, used oil etc.

- Items may be placed in specially designated areas for storage until they can be shipped by barge:
    - Hazardous wastes (pesticides, insecticides, oil-based paint, anti-freeze, small flammable or explosive containers, mercury thermometers and switches), batteries, used oil (must be placed in approved storage containers and stored in the designated area for hazardous waste)

- Signage (Ref. Item 3.4 O&M manual)

  Facility must have a sign posted at the entrance to inform the public of the location of the landfill and the bulky metals site. This sign must have the following information:
    - Site name
    - Materials/wastes accepted for landfill and recycling
    - Materials/wastes banned from the site
    - Penalties
- Personnel Training (Ref. Item 3.7)

The hamlet is responsible for training of staff. Staff should be trained to perform the job in a safe and environmentally responsible manner.

- Fencing (Item 4.5)
  The 1.8 m high fence is in place around the perimeter of landfill. Fence should be inspected and maintained with the effort of hamlet. Large boulders placed along the front of metal dumps to delineate the start of metal dumping area.

- Access Road (Item 4.6)
  Approximately 500 m long gravel road has to be maintained with at least twice per year grading and reshaping the surface area, snow removal in winter and maintained unrestricted access to the site.

- Litter, Odour, Bird control (Item 4.7)
  A clean litter free appearance has to be maintained all the time. Granular cover materials shall to be applied at the active disposal area and eliminate any ponding water in the facility.

- Sampling and monitoring (Item 5)
  Sampling points for solid waste and metal dump site are shown in the table with GPS location. Samples should be taken at least once per year in the spring or early summer when everything has thawed and groundwater flowing steadily.

  But it is recommended for sampling once in each month during May-Aug each year.

  - Table 5.1. GPS Locations of Sampling Points

Station	Latitude	Longitude
PEL-6	68° 31' 14.01" N	89° 49' 43.67" W
PEL-7	68° 31' 03.65" N	89° 49' 03.14" W
PEL-8-1	68° 31' 08.93" N	89° 49' 31.79" W
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PEL-9-2	68° 30' 59.94" N	89° 49' 26.21" W
PEL-10-1	68° 31' 13.50" N	89° 49' 42.05" W
PEL-10-2	68° 31' 09.61" N	89° 49' 41.99" W

ANNUAL REPORT

YEAR BEING REPORTED: 2013

The following information is compiled pursuant to the requirements of Part B, Item 1 of Water Licence 3BM-PEL-0712 issued to the Hamlet of Kugaaruk.

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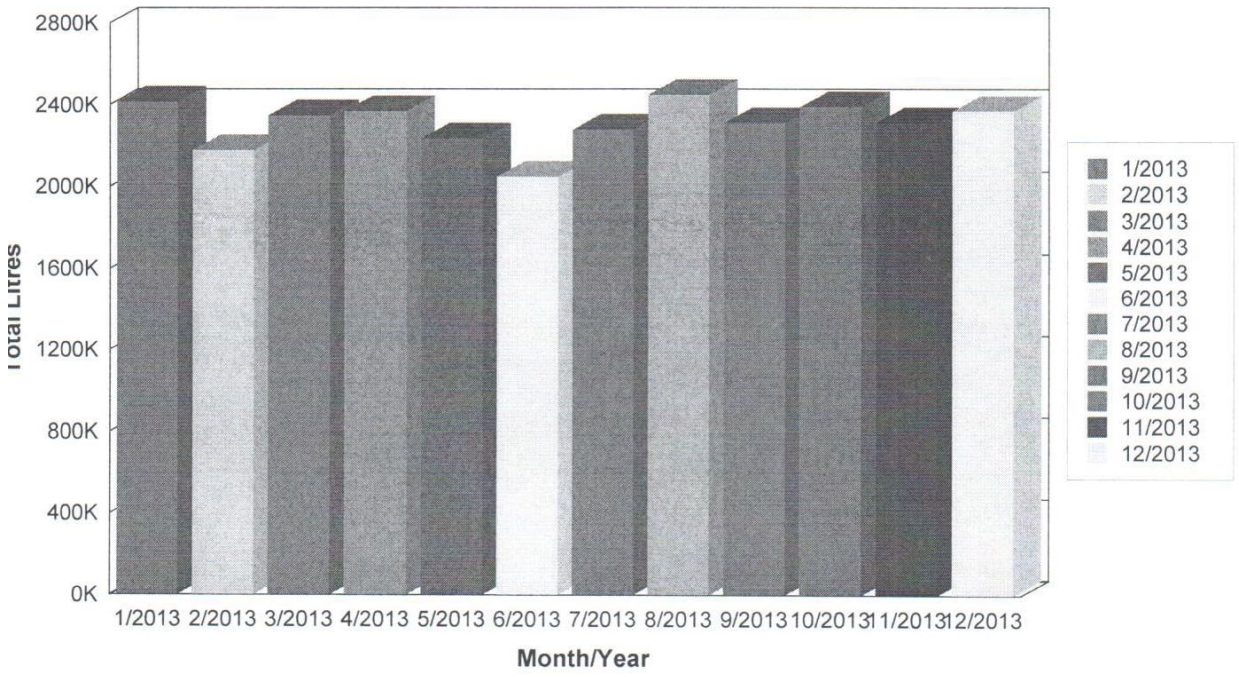
i) - iii) tabular summaries of all data generated under the "Monitoring Program"; monthly and annual quantities in cubic metres of freshwater obtained from all sources; monthly and annual quantities in cubic metres of each and all wastes discharged;

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	2,414,887.00	Same
February	2,176,719.80	Same
March	2,347,169.70	Same
April	2,368,039.30	Same
May	2,235,275.10	Same
June	2,048,207.70	Same
July	2,278,394.50	Same
August	2,448,061.00	Same
September	2,310,103.70	Same
October	2,389,421.50	Same
November	2,310,924.50	Same
December	2,369,162.20	Same
ANNUAL TOTAL	**27,696,366.00**	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;

- No major changes in water supply and waste disposal. Water collect by truck-fill from intake pumphouse station with chlorine mixing (dosing) and distribute to household tank for potable water to the resident and office/institution.
- New intake pumphouse and treatment plant under construction, expecting completion by Aug 2014. Current intake pumphouse will be refurbished for storage purpose for the treatment plant.
- New electrical line installed to connect intake pumphouse and treatment plant direct to power grid, backup power with current generator sets (two).
- No changes of sewage and waste disposal system. Sewage collect from house tank through vacuum truck and dispose to sewage lagoon main cell where raw sewage stays about a year before discharge to second cell through valve control dyke. Discharge from main cell to secondary cell by opening the valve manually, mostly in Aug-Sep when raw sewage melts to flow and main cell attains allowable height

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

- No unauthorized discharge carried anytime during this period (Jan- Dec 2013).
- All sewage waste discharged in the new lagoon using vacuum truck. Beside house sewage, no other black water (industrial or manufacture wastewater) discharged into the lagoon.

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

- No abandonment or restoration work carried during this period.
- However, a plan for current intake pumphouse refurbishment to a storage facility for new water treatment plant sometime in Aug 2014.

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;

- Lagoon Dam Safety inspection follow up requested by the Board which is related to sewage containment and facility full operation as per design and development.
- Plan for Geotechnical inspection follow up for lagoon dam safety and sludge management in Aug 2014.

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

- O&M Manual for current water system intake plant including QA/QC plan requested, plan for such submission for new water system by Dec 2014.
- Addendum to Spill Contingency Plan and O&M manuals for sewage and solid waste requested and responded to the Board.
- Plan for compliance for monitoring sewage and waste submitted to the Board with information for QA/QC with respect to standard and manual.

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

- Operation and maintenance plan for solid waste and sewage facility approved by the Board (Feb 22-23, 2010) with an addendum request. Those approved O&M plans remains functional and addendum clarification updated with the Board. Additional information including monitoring and Quality Assurance plan updated with the Licence Amendment Application (Dec 03, 2013) and follow up later.
- Revision of Operation and Maintenance plan for water supply updating once the new treatment plant starts operation-expecting Aug 2014.

ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:

- Semi engineered wetland for sewage effluent remediation working effectively. Environmental monitoring sample results shown contamination parameters within allowable limits.
- No evidence or sign of leak or crack across lagoon berm, dam or approach road. Request for geotechnical inspection follow up as per recommendation by the consultant (AMEC- report 2009) and sludge blanket thickness measurement in 5-years from starts operation. Hamlet is in plan to hire a geotechnical consultant for both activities sometime in July-Aug 2014.
- Current Water intake and truck-fill plant is over 20 years old, and no standard O&M manual available. The new treatment plant includes scope for O&M manual, operational training and monitoring which is under way and expecting completion by Aug 2014. Since a new O&M manual will be in place shortly, preparation or upgrading of old manual will no longer be effective, and therefore request to the Board for the exemption of the requirement of old O&M manual.
- No evidence of Bacteria or E. Coli in the source water or supply water as tested by the Regional Health & Environmental Laboratory in Cambridge Bay.
- There is no mechanical or digital system for water supply measurement, but truck-fill supply from Fluid Manger Data ensures the quantity of distribution.

FOLLOW-UP REGARDING INSPECTION/COMPLIANCE CONCERNS:

- Earlier submitted compliance plan has been updated with the Board for short term and long term implementation for sewage and solid waste site management.
- Results of monitoring samples are attached with this Annual Report and summarized in the Tabular Form for review and information.

Appendix A:

Sewage and Waste Effluent Results, 2013

Kugaaruk Water Licence 3BM-PEL0712

Wastewater/Sewage parameters

Sample date: July 08, 2013

Parameter	MAC Limits	units	Results of sample taken on July 08, 2013						
			PEL-3	PEL-4	PEL-5	PEL-6	PEL-7	PEL 8-1	PEL 8-2
Alkalinity		mg/L	23.4	66.3	43.0	112	22.1	23.7	26.3
Conductivity		µS/cm	121.0	470	4200	549	125	132	135
P^H	6-9		9.52	6.93	7.74	7.80	7.16	7.44	7.34
TSS	45	mg/L	12.0	<3	22	12	<3	6	8
Ammonia N2		mg/L	0.661	5.12	<0.005	0.08	<0.005	<0.005	<0.005
BOD	45	mg/L	12.0	5	<2	4	<2	<2	<2
CBOD		mg/L	14.0	17.3	4.4				
Nitrate N2		mg/L	0.64	10.7	<0.01	0.08	0.02	0.05	0.07
Calcium		mg/L	7.7	17.6	36.3	38.6	8.8	10.1	11.2
Chloride		mg/L	14.7	46.3	1180				
Hardness		mg/L	31.4	67.8	424	133	31.3	35.2	38.3
Magnesium		mg/L	3.0	5.8	81	9.0	2.3	2.4	2.5
Potasium		mg/L	2.5	9.9	24.6	5.7	0.9	0.9	1.0
Sodium		mg/L	11.1	49.5	646	55.6	12.6	12.1	12.1
Sulphate		mg/L	5	32	172	66	7	7	7
Fecal Coliform	$1x10^4$	CFU/100mL	<100	<100	<1	400	<100	<100	<100
Oil and Gas	Non-vis	µg/L	non-vis	non-vis	Non-vis				
Aluminium		µg/L	139	33	54				
Arsenic	100	µg/L	0.4	1.7	0.4	0.5	0.3	0.3	0.2
Cadmium	10	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	100	µg/L	0.5	0.4	0.3	0.5	0.4	0.8	1.0
Cobalt	50	µg/L	0.2	2.1	<0.1				
Copper	200	µg/L	6.3	4.9	<0.2	2.5	1.0	1.3	1.5
Iron		µg/L	172	305	69	402	166	452	605
Lead	50	µg/L	0.2	0.3	<0.1	0.2	<0.1	12.8	1.8
Manganese		µg/L	28.9	446	2.7				
Nickel	200	µg/L	0.8	3.3	0.4	1.6	0.5	0.7	1.0
Zinc	500	µg/L	<5	<5	<5				
Mercury	0.6	µg/L	<0.01	<0.01	0.05	<0.01	<0.01	<0.01	<0.01
PCB	1000	µg/L							
Phenols	20	µg/L	<0.002	<0.002	<0.002	0.004			
Hexane						<2.0	2.0	<2.0	<2.0

Monitoring Stations:

Monitoring Station	Description	Status
PEL-1	Raw water supply intake at the Kugajuk river	Active
PEL-2	Raw sewage from pump-out truck	Active (volume)
PEL-3	Discharge from sewage disposal facility at the controlled point of release following treatment	Active
PEL-4	Final discharge point of the wetland treatment area	Active
PEL-5	Ocean water five (5) meters from point where effluent enters ocean	Active (new)
PEL-6	Run-off from solid waste disposal facility	Active
PEL-7	Monitoring well located up gradient of solid waste facility	Active
PEL-8-1	Monitoring well located down gradient of solid waste facility	Active
PEL-8-2	Monitoring well located down gradient of solid waste facility	Active

Appendix B:

Improved Sewage Lagoon, completed 2009

Hamlet of Kugaaruk Water Licence 3BM-PEL0712

LEGEND

PLAN:

DESIGN:
MINOR CONTOUR (0.2m)
MAJOR CONTOUR (1.0m) ##.#

BERM WALLS
BERM TOP
TOE OF SLOPE
LAGOON CONTAINMENT

NOTES

DIMENSIONS ARE IN MILLIMETERS UNLESS SPECIFIED OTHERWISE

DETAIL NUMBER
DRAWING SHEET WHERE DETAIL IS SHOWN
DETAIL REFERENCED (THIS DRAWING SHEET)

DRAWING REDUCED NOT TO SCALE

CHANGE	DATE	DESCRIPTION	CHECK
5	07/10/07	REVISED FOR NWB APLLICATION	GS
4	01/31/07	REVISED FOR NWB COMMENTS	GS
3	05/05/06	ISSUED FOR TENDER	GS
2	08/29/05	ISSUED FOR 95% REVIEW	GS
1	04/27/05	ISSUED FOR 50% REVIEW	GS

REVISIONS

DESIGN	DRAWN	CHECKED	DATE
GS	TPW	GS	JULY 2007

THE ASSCCIATION OF PROFESSIONAL ENGINEERS, GEOLOGISTS and GEOPHYSICISTS OF THE NORTHWEST TERRITORIES
PERMIT NUMBER P 010
DILLON CONSULTING LIMITED

REGISTERED PROFESSIONAL ENGINEER G. STRONG N.W.T.

Nunavut

PROJECT
SEWAGE & SOLID WASTE FACILITY
KUGAARUK, NUNAVUT

TITLE
DESIGN LAGOON SITE PLAN VIEW

DILLON CONSULTING

SCALE 1:500
DILLON PROJECT NUMBER 05-4755-3000
CLIENT PROJECT NUMBER NA
DRAWING NUMBER 101