



June 23, 2010

Mr. Bryan Purdy
Project Engineer
Government of Nunavut
Department of Community and Government Services
P.O. Bag 002
Rankin Inlet, Nunavut X0C 0G0

Dear Mr. Purdy:

**Re: Work Plan to Address INAC, DFO, and NWB License Compliance Issues
GN File 08-3025
Hamlet of Arviat, Nunavut
File No. N-O 15746.1**

1.0 Introduction

At the request of the Government of Nunavut (GN), Community and Government Services (CGS), on behalf of the Hamlet of Arviat, we provide herein a workplan to address environmental issues related to compliance with the Nunavut Water Board (NWB) expired license and ongoing application for a new Type A license.

The Technical Meeting/Pre-Hearing Conference conducted in Arviat in March 2010 resulted in the creation of a "Compilation of Issues", dated March 25, 2020. Many of these issues were derived from INAC Inspection Reports and review agency comments on the license application documents.

In May 2010 updated supporting documents for the NWB license application were submitted. They included O&M Plans for the Sewage Treatment Facility, Solid Waste Management Facility, and Water Supply Facility, as well as an Environmental Monitoring Program and QA/QC Control Plan, and Environmental Emergency Contingency Plan.

Each of these documents also noted issues that were out of compliance with the expired NWB license conditions and the expected conditions of a new Type A license.

The workplan outlined herein is designed to:

- Address the data and information gaps identified (i.e. as-built drawings, documentation, impact assessment, and reporting)
- Conduct studies to address outstanding issues (i.e. DFO fish habitat impact)
- Conduct sampling and data collection
- Conduct training of Hamlet staff as to sampling and information recording requirements

- Prepare Summary Reports and Annual Reports for the facilities and submit the documentation prior to December 31, 2010.

It is noted that some items may require engineering or additional detailed study to obtain compliance. The required engineering work, with estimates of cost and potential schedules, will be included in the submitted reports.

2.0 Workplan

2.1 Water Supply Facility

2.1.1 Issues

The Water Supply Facility consists of an intake from Wolf River that is pumped in late August and early September of each year, to fill the reservoirs in the Hamlet. A truck fill station at the reservoirs services the annual supply to the community.

A Water Supply Facility O&M Plan revised May 10, 2010 was submitted in support of the NWB license application.

The Technical Meeting/Pre-Hearing Conference for the new NWB License conducted in Arviat in March 2010 resulted in the creation of a Compilation of Issues related to the Water Supply Facility. A copy of a letter from DFO outlining their concerns includes the following comments:

Based on the above information and in conjunction with the review currently being undertaken by the NWB, DFO is in the opinion that the proposal could result in impacts to fish and fish habitat and requires additional information for further review. Of particular concern is draw down of the Wolf River and the intake fish screen.

In order to provide our advice with respect to the impact to fish and fish habitat or determine our potential role related to this Type "A" Water Licence, we require, at a minimum, the following additional information on impacts to fish and fish habitat:

- *A detailed assessment of the proposed volume of water to be withdrawn from Wolf River against total annual recharge and the potential ramifications of draw down*
- *A detailed description of the proposed water intake. Refer to the Freshwater Intake End-of-Pipe Fish Screen Guideline (DFO 1995), which is available at [www~ mpo.gc.ca/library/223669.pdf](http://www.mpo.gc.ca/library/223669.pdf).*

There is limited information available regarding Wolf River and the fish habitat, however local people indicate there is fish in Wolf River and there are concerns of impacts due to drawdown.

There are several issues that require the acquisition of field data during the late summer when reservoir filling occurs. We suggest that DFO's requirements be fulfilled by December 31, 2010. Should engineering and construction be required to achieve compliance with DFO requirements, we suggest that they be required to be completed by December 31, 2011.

INAC also requested “operating capacity of pump used and intake screen size used”.

As discussed above, no data was found detailing this information. Provision of this data including as-built drawings (or newly created as-builts if the originals cannot be found) will be needed.

2.1.2 2010 Work Program

To address these issues, the following work will be undertaken during the period of pumping from Wolf River in the late summer of 2010:

- Topographic survey including water depth measurements and flow measurements of the water intake area of Wolf River
- Measurements of the intake and facilities for the creation of basic as-built drawings sufficient for assessment of regulatory compliance
- Document the intake screen details, pump capacity, pumping rates, and duration
- Collect surface water samples for laboratory analysis including:
 - One upstream during pumping
 - One downstream during pumping
- Prepare an assessment report of the impact of seasonal withdrawals on Wolf River and fish habitat, including a projected impact due to withdrawals over the next 10 years, based on community growth and water supply demands
- Confirm through local knowledge and on Site observations the types of fish and fish habitat
- Evaluate the intake and impacts of withdrawals according to DFO Guidelines
- Conduct training of Hamlet staff to sample and record information needed for the Annual Report
- Establish long term monitoring locations and water level gauge stations with signs
- Prepare a report outlining the findings with conclusions and recommendations (including cost estimates and proposed schedule for any needed action) prior to December 31, 2010.

2.2 Sewage Treatment Facility

2.2.1 Issues

The supporting documents from the new NWB license application included a Sewage Treatment Facility O&M Plan revised May 2010.

In the process of applying for a NWB water license renewal, data gaps and missing information to meet the requirements of various regulatory agencies, as well as to meet the requirements of the expired license were identified.

Many of these items were documented in the Compilation of Issues generated from the Technical Meeting/Pre-Hearing Conference in March 2010.

Many of these items will require study during the summer and fall seasons, and the creation of base maps and engineering drawings. The issues include:

- Accumulation and management of sludge
- Monitoring discharge criteria
- Abandonment and restoration of the two old lagoons

- Evaluation of the effluent discharge flow path and long term attenuative capacity of wet land treatment system
- Lagoon discharge period and flows
- Quantification of retention times during different seasons (i.e. thawed and unthawed)
- Evaluation of the seepage area in the berm and its long term structural integrity
- The need for seasonal decanting
- Sludge thickness assessment and monitoring protocol.

It was also noted that the following should be implemented:

- Fence around the lagoon to prevent access by humans and animals
- Monitoring stations to be marked with a sign
- Signage on the fence and at locations in the Wetland Treatment Area indicating the presence of sewage impacted surface water
- Encourage the public to avoid travel through the Sewage Treatment Facility Area
- Prepare an Abandonment and Restoration Plan for the two old lagoons.

2.2.2 2010 Work Program

In order to address these issues, the following work will be undertaken in 2010:

- Topographic survey of the lagoon and wetland area including the two abandoned lagoons
- Lagoon, wetland, and abandoned lagoon inspection to identify environmental issues
- Determine the need for restoration work due to possible leaks
- Collection of water depth and sludge thickness in the lagoon and two abandoned lagoons
- Collect surface water samples for laboratory analysis including:
 - Lagoon intake area
 - Lagoon out fall area
 - Abandoned Lagoon 1
 - Abandoned Lagoon 2
 - Six samples in the wetland treatment area along the primary flow paths
- Excavation of test pits/boreholes into the active zone in late summer to develop an understanding of the active layer as a seasonal flow path
- Install a lagoon gauge station to monitor levels over time and install signs to identify sampling stations in the wetland
- Train Hamlet staff to collect samples and record the required monitoring information
- Prepare an Abandonment and Restoration Plan for the two old lagoons
- Use of Nunavut appropriate model to assess the current and potential future (based on Hamlet growth) effectiveness of the wetland treatment area and provide recommendations for any required alternations
- Prepare a technical report outlining the findings of the study, with conclusions and recommendations (with potential costs and timelines) for submission by December 31, 2010.

2.3 Solid Waste Management Facility

2.3.1 Issues

A Solid Waste Management Facility O&M Plan updated May 2010 was prepared by Nuna Burnside, as required by the original license and submitted in support of the application for a new license.

The Plan also addresses comments provided by review agencies during the Type A license application process, in particular the Compilation of Issues from the Technical Meeting/Pre-Hearing Conference conducted in March 2010.

It was noted in the O&M Plan, that existing facilities designed and constructed prior to the O&M Plan being prepared, have significant environmental compliance issues.

A new Solid Waste Management Facility was designed for the Hamlet of Arviat in May 2009 by Nuna Burnside. To date, the Hamlet has not reached a decision on the location of a new facility.

Currently the existing landfill, bulky metals area, and hazardous waste storage area are not in compliance. The O&M Plan outlined a "best efforts plan" to work with the current facilities until a new facility is constructed.

The following issues have been identified by regulatory agencies and documented in the Compilation of Issues during the Technical Meeting/Pre-Hearing Conference in March 2010:

- As-built plans for the bulky waste and hazardous waste storage area
- O&M Plan for the interim management of facilities
- Environmental assessment of the soil, surface water, and shallow groundwater in the active layer
- Lack of monitoring and reporting.

In the areas of the landfill, bulky metals, and hazardous waste storage:

- Evaluating and addressing the storage of contaminated soil at the bulky metals area
- Future method and process of disposal of sewage sludge
- Control and management of leachate discharge from the landfill bulky metals and hazardous waste storage areas
- Development and management of a landfarm to handle stockpiled hydrocarbon contained soil
- Abandonment and restoration plans
- As-built (or currently constructed) plans
- Burning control as per GN-DOE policy document "Municipal Solid Wastes Suitable for Open Burning"
- Adding a landfarm facility to the NWB license to handle hydrocarbon impacted soil.

2.3.2 2010 Work Program

It is recognized that there is significant work required, including studies, engineering, and training to bring the Solid Waste Management Facility into compliance. This work program will begin this process.

The following work will be undertaken in 2010:

- Topographic survey of the landfill site and surrounding area that may be impacted by leachate, waste topography (to assess remaining capacity), bulky metals area, and contaminated soil stockpiles, and hazardous waste storage area
- Inspection of the landfill, bulky metals, and hazardous waste storage area, to identify environmental impacts and collect samples of soil, surface water, and groundwater seepage in the active layer
- Laboratory analysis of samples of:
 - Surface water seepage from the land fill – three samples
 - Surface water seepage from the bulky waste and contaminated soil stockpile – four samples
 - Contaminated soil from the stockpile – four samples
 - Contaminated soil at the hazardous waste site – two samples
- Conduct a test pitting program around the sites to determine the potential for contaminated migration in the active layer
- Prepare as-builts of existing conditions sufficient for the assessments needed for regulatory compliance
- Determine the potential size and location of a landfarm for the contaminated soil
- Determine the remaining capacity in the landfill and suggest fill limits (vertically and laterally) for the final contours for the site
- Prepare Abandonment and Restoration Plans for the landfill site, bulky metals, and contaminated soil, and hazardous waste storage area
- Install signs to mark the location of level gauge stations and monitoring locations for compliance monitoring
- Train Hamlet staff to operate the facility, collect samples, and record data as outlined in the O&M Plan
- Prepare a report summarizing the findings with Conclusions and Recommendations (including potential costs and timeline) for submission prior to December 31, 2010.

2.4 Monitoring and Annual Reporting

2.4.1 Requirements

This Environmental Monitoring Program and Quality Assurance/Quality Control Plan for the Hamlet of Arviat, revised May 2010, and was prepared as a condition of the expired license and reflects the current condition of Hamlet facilities. It also includes the proposed requirements for the new license application.

Surveillance Network Program for Water License

Station	Description	Frequency	Analysis Requirements
ARV-1	Raw water supply at the Wolf River Water Supply prior to treatment	Monthly and annual	Measure and record in cubic metres of water pumped from station.

Station	Description	Frequency	Analysis Requirements
ARV-2	Effluent discharge from the Final Discharge Point of the Solid Waste Disposal Facility	Monthly from May to August, Inclusive	<ul style="list-style-type: none"> · BOD · Faecal Coliforms · pH · Conductivity · Total Suspended Solids · Ammonia Nitrogen · Nitrate-Nitrite · Total Phenols · Sulphate · Total Phosphorous · Sodium · Potassium · Magnesium · Calcium · Arsenic · Cadmium · Copper · Chromium · Iron · Lead · Mercury · Nickel · Zinc
ARV-3	Raw sewage at truck offload point	Monthly and annual	Measure and record in cubic metres the raw sewage offloaded from trucks.
ARV-4	Effluent Discharge from Final Discharge Point of the Sewage Disposal Facilities	Monthly from May to August, Inclusive	Same as ARV-2

In addition, Environment Canada recommends a Pass/Fail Bioassay Toxicity test prior to effluent discharge to the receiving environment (ARV-2). Toxicity testing provides an evaluation of effluent quality that integrates all measured parameter's and provides an indication of overall effluent characterization with respect to deleteriousness.

2.4.2 2010 Work Program

The following work will be conducted:

- Collect annual monitoring samples and measurements
- Submit samples for laboratory analysis as required by the water license (on two occasions) including:
 - ARV-2 discharge samples – two surface water and two bioassay toxicity tests
 - ARV-4 discharge samples – two surface water
- Obtain current and historical data from previous sampling work conducted by INAC, Universities, and others
- Record measurements and collect information required for the Annual Monitoring Report
- Help Hamlet staff construct, paint, and set up staff gauges and signs for monitoring locations
- Train Hamlet staff how to conduct sampling, record data, ship samples to the lab, and prepare the Annual Monitoring Report using a provided template
- Train Hamlet staff to use the O&M Plans
- Submit the Annual Monitoring Report prior to December 31, 2010.

3.0 Summary

The workplan, as outlined above, is designed to address the issues identified at the Technical Meeting/Pre-Hearing Conference and the resulting Compilation of Issues.

Sampling will be conducted on two occasions in compliance with the expired license and proposed conditions of the new license. Additional sampling will be conducted, as outlined, to address environmental impact concerns of the regulatory agencies. Training will be provided to up to four Hamlet staff, to operate the facilities in accordance with the O&M Plans, and conduct the future sampling and measurements required. Training will also be provided as to preparation of the Annual Report from a prepared template.

Field work is based on two trips by a Geoscientist for one week each trip and one trip for a Surveyor/Engineer for one week.

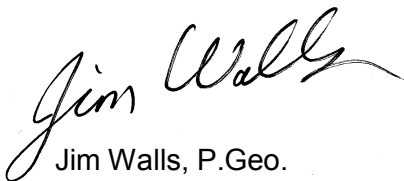
This workplan is based on two site visits during the summer of 2010. One site visit will be coordinated, if possible, with the INAC Inspection tentatively scheduled for September 2, 2010. This workplan does not include engineering designs for additional civil works, or physical improvements or alternations to existing systems.

Detailed costs will be provided under separate cover.

If you have any questions or comments, please contact the undersigned.

Yours truly,

Nuna Burnside Engineering and Environmental Ltd.



Jim Walls, P.Geo.

Enclosure

cc: Mr. Balihar Antaal, Project Officer, Government of Nunavut
Mr. Wayne Thistle, Regional Projects Manager, Government of Nunavut

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