

Information Request (IR) No.: 4
Source: Pine Point CEP Technical Sessions – February 24 and 25, 2021
Topic: Waste Management Plan - Septic System and Wastewater Treatment Plant

Information Request:

PPML to provide details on the proposed options for the management of sewage (all toilet wastes and greywater) including, but not limited to, the following:

- Description of sewage generation volume; and
- Engineering designs for the storage, conveyance and treatment of sewage including:
 - Treatment mechanism(s);
 - Treatment efficacy;
 - Location and timing of effluent discharge; and
 - Assessment and mitigation of impacts from effluent discharge to the receiving environment.

Proponent Response:

Introduction

The Project Description for the Confirmation and Exploration Program describes the wastewater treatment options under consideration. It is anticipated that in the near term, with occupancy levels similar to the present authorisation, the camp would continue with the incinerating toilets and trucking of the ash to Hay River for disposal. As the camp expands to meet the program needs, a holding tank may be installed for sewage waste and this waste would be trucked to the Hay River Solid Waste Facility¹. Greywater would either continue to be directed to the sump near the camp or captured with the sewage and shipped to the Hay River facility.

As the camp population expands further, there are three options under consideration:

1. Installation of a modular wastewater treatment plant, or
2. Construction and operation of a sewage lagoon, or
3. Construction and operation of septic system with a dispersal field.

The final decision on the type of treatment process will be based on considerations of reliability, treatment capacity, and ability to produce the quality of effluent required for discharge. The Waste Management Plan will be updated once the details have been finalized and will be submitted for approval together with Engineering Drawings, prior to commencing construction.

¹ [Waste Disposal at Hay River Facilities - Approval by Town of Hay River.pdf](#)

Construction of these facilities would involve redistributing materials currently at surface (e.g., to form berms or dig trenches) and it is not anticipated that additional construction materials would be required.

Wastewater Treatment Plant

The wastewater treatment plant (WWTP) would be a modular container-based system and installed in the vicinity of the camp. The effluent would be discharged to the same area as the greywater is currently discharged. This option would be modelled on other installations in the NWT, such as at Gahcho Kué during the pre-construction period in 2014 and as included in authorizations MV2008C0022ⁱ and MV2013C0009ⁱⁱ in which a 180-person camp with a modular sewage treatment plant (STP) plant was operated. The effluent from the WWTP was discharged to a wetland at an approved location near the Gahcho Kué exploration camp and by a method approved by the Inspector. No effluent quality criteria (EQC) appear to have been specified; however, later in the year, the STP plant capacity was increased and the discharge location was moved from the on-shore wetland to an off-shore location and EQC at the offshore SNP location for fecal coliform was included (20 colony forming units [CFU]/100 mL maximum grab concentration) in the new authorization.

The STP proposed for PPML would have similar discharge quality to that used at Gahcho Kué, details of which would be provided to the Inspector for approval prior to installation.

Although not yet constructed, the Nechalacho Licence MV2020L2-0010 includes provisions for a STP for a 100-person camp. EQC for this facility are presented in Table 1.

Table 1: Effluent Quality Criteria for the Nechalacho Construction Camp

Parameter	Maximum Grab Concentration
Fecal Coliforms	20 CFU / 100 mL
Carbonaceous Biological Oxygen Demand (CBOD ₅)	25 mg/L
Total Suspended Solids	25 mg/L
pH	6 to 9

Sewage Lagoon

Sewage lagoons have been successfully operated in NWT, including at Pine Point township during the previous mining operation. Both the town of Hay River and the hamlet of Fort Resolution currently operate sewage lagoons.

The facility would be designed and Engineered Drawings provided with the updated Waste Management Plan for approval by the Inspector prior to construction. The discharge from the facility would be to a wetland from which the water would migrate naturally through the local drainage.

Similar facilities to the one proposed for the Pine Point Exploration Camp are in operation at Fort Resolution (MV2014L3-0008) and Hay River (MV2019L3-0010); EQC for these facilities are presented in Table 2. Effluent from these facilities is discharged continuously through fixed channels and pipes.

Table 2: Effluent Quality Criteria for Fort Resolution and Hay River Lagoons (Maximum Grab Concentrations)

Parameter	Fort Resolution	Hay River
Fecal Coliforms	1000 CFU / 100 mL	2000 FC / 1000 mL
Carbonaceous Biological Oxygen Demand (CBOD ₅)	25 mg/L	27 mg/L
Total Suspended Solids	25 mg/L	40 mg/L
Oil and Grease	5 mg/L	5 mg/L
pH	6 to 9	≥6

FC = Fecal Coliforms; CFU= Colony Forming Units.

Septic Tank and Absorption Field System

The option of using a septic tank and absorption bed for disposal of domestic sewage from the proposed 249-person camp at Pine Point is an acceptable option in the NWT where soil conditions allow.

In the NWT, one such installation occurs at the Bluefish Hydroelectric Facility for an 8-person camp. The Water Licence for the Bluefish Facility (MV2020L4-0002) has no EQC and no groundwater quality monitoring requirements.

A septic tank typically removes 25 to 40% of the biochemical oxygen demand (BOD) and 60 to 80% of the total suspended solids (TSS) present in the wastewater. Removal efficiency for other parameters such as phosphorus, nitrogen, and fecal coliforms is much lower.

The absorption field, to which the effluent from the septic tank is discharged, is responsible for a large part of the treatment and purification of the wastewater. This is done predominantly by bacteria present in the soil as well as by absorption and adsorption mechanisms within the soil.

Typically, no monitoring limits are set unless it is adjacent to potable water wells or waterbodies where nutrient enrichment is a concern. Placement of the absorption field and the distance from surface waterbodies or watercourses, would be taken into consideration during the design of the facility.

However, should there be concerns not yet identified with the location, then one or more of the parameters listed in Table 3 could be considered for any monitoring wells installed at appropriate locations on the absorption field perimeter, depending on the nature of the concern.

The facility would be designed and Engineered Drawings would be provided with the updated Waste Management Plan for approval by the Inspector prior to construction.

Table 3: Possible EQC Limits, if required, for Selected Parameters at Monitoring Wells

Parameter	Unit	Maximum Concentration	Comment
Nitrate	mg/L-N	10	Maximum under Guidelines for Canadian Drinking Water Quality
Nitrite	mg/L-N	1	Maximum under Guidelines for Canadian Drinking Water Quality

Fecal Coliform	CFU/100 ml	1000	Typical requirement in NWT for surface discharge to waterbody ^(a)
Carbonaceous Biological Oxygen Demand	mg/L	25	Typical requirement in NWT for surface discharge to waterbody ^(a)

(a) There is no direct discharge of the output from the septic absorption field to a surface water body.

ⁱ [MV2008C0022-MVL2003L2-0005 De Beers Gahcho Kue – LUP and WL Application Additional Information – Sep30-08.pdf](#) pdf page 13 of 15

ⁱⁱ [MV2013C0019-De Beers - Gahcho Kue - Pioneer LUP Application - Oct21-13.pdf](#)