



Mackenzie Valley Land and Water Board
7th Floor - 4910 50th Avenue
P.O. Box 2130
YELLOWKNIFE NT X1A 2P6
Phone (867) 669-0506
FAX (867) 873-6610

Staff Report

Applicant: Government of the Northwest Territories - Department of Transportation	
Location: Yellowknife Airport	Application: MV2001L3-0012
Date Prepared: April 28, 2010	Meeting Date: April 29, 2010
Subject: Request to spray glycol-contaminated water to infield	

1. Purpose/Report Summary

The purpose of this report is to present to the Board the Government of the Northwest Territories – Department of Transportation’s (GNWT-DOT) request to spray glycol-contaminated water to the infield on the airport property.

Mr. Michael Martin, Inspector, Indian and Northern Affairs Canada, will be present at the meeting to provide additional information on the spill and the progress made to date.

2. Background

- December 14, 2001 – application for water licence (WL) submitted to the Board;
- June 13, 2002 – WL issued for a period of two years;
- June 11, 2004 – WL expiry;
- April 15, 2005 – WL renewal application received;
- September 7, 2005 – WL renewal issued for a period of five years;
- April 7, 2010 – Notification to Board staff of glycol spill at the airport;
- April 15, 2010 – Briefing note presented to the Board;
- April 20, 2010 – Meeting with GNWT-DOT to discuss the spill and options available;
- April 21, 2010 – letter received from GNWT-DOT requesting Board approval for spraying glycol-contaminated water to the infield;
- April 22, 2010 – Phone call to Brian Collins requesting additional information;

- April 27, 2010 – Email from GNWT-DOT requesting official letter from MVLWB for the additional information. Letter sent to GNWT-DOT requesting the submission of the additional information by 2pm Wednesday April 28th, 2010.
- April 28, 2010 – Additional information received from GNWT-DOT; and
- September 6, 2010 – WL expiry.

3. Discussion

The purpose of the renewal WL was to manage waste glycol associated with the de-icing of aircraft, management of the Maintenance Garage Septic Field and Oil/Water Separator effluent, and monitoring of the decommissioned Airport Terminal Building Septic Tile Field effluent. This field was decommissioned in the summer of 2004 and replaced with a pump-out sewage holding tank.

Prior to the issuance of the renewal WL, studies conducted by GNWT-Department of Transportation (GNWT-DOT) show elevated levels of glycol in surface run-off at the airport site during spring freshet. To prevent glycol- contaminated water from entering Long Lake, GNWT-DOT planned to construct a Glycol Retention Facility (GRF) on site in which to place contaminated snow during the winter months.

In October 2008, GNWT-DOT requested that the Board allow it to temporarily store glycol as the GRF was reaching capacity. The Board acknowledged the request and permitted the temporary storage of glycol in tanks that were on site for the year. The amount of glycol was between 135 and 150 cubic metres. The Board permitted this as long as an updated glycol management operation plan was submitted to the Board by February 1, 2009. This plan would define acceptable disposal methods and contingency plans (not including the use of Fiddler's Lagoon). Staff reviewed the draft update in March 2010; however, no formal updated plan has been submitted to the Board.

During the week of April 1, 2009, a glycol spill occurred at the airport; the MVLWB were notified of the incident on the afternoon of April 7, 2010. The airport has an excess of glycol-contaminated snow that has not been moved to the centre field or to the GRF. GNWT-DOT attributes the excess to over- spraying during de-icing. The contaminated snow was located on or near the de-icing pad which is in the vicinity of the highway and Long Lake. Warm weather has caused the snow to melt and the water to evaporate. The result has been a pool or build-up of glycol. The estimated volume of pooling glycol is 300,000 litres.

There has been a number of Inspectors orders issued to GNWT-DOT for the cleanup of the glycol-contaminated water.

GNWT-DOT's request

On April 21, 2010, GNWT-DOT sent a letter to Mr. Hagen requesting emergency approval under the water licence to dispose of glycol-contaminated water by spraying it to the infield within airport property.

GNWT-DOT is making this request as there is a large quantity of glycol-contaminated water on site, situated in ditches, the glycol retention facility, the storage tank, and most recently, in B-train's. Information provided by GNWT-DOT was incomplete and further information was required to understand fully what they would like to do with the water. The request for additional information was made verbally over the phone to Mr. Brian Collins, GNWT-DOT on April 22, 2010. A follow-up letter, as requested by GNWT-DOT, was provided by Board staff on April 27, 2010, stipulating that the additional information needs to be provided by 2pm on April 28th, 2010.

The additional information was provided at 3pm on April 28, 2010. Board staff had a few additional questions for GNWT-DOT, which were relayed verbally and by email to Mr. Darren Campbell. GNWT-DOT responded via email to these additional questions.

GNWT-DOT Additional Information

The additional information provided by GNWT-DOT is as follows:

- Discharging a volume of glycol-contaminated water which is greater than 100mg/l in concentration.
- A volume of between 500m³ and 700m³ will be sprayed.
- The glycol-contaminated water from the onsite storage tank, three B-trains and the GRF.
- The discharge area, as shown on the maps provided, is 900m away from Long Lake.
- The discharge area is 52,500 m².
- The spraying of the glycol-contaminated water will be conducted over the next 15 days.
- The glycol-contaminated water will be sprayed with a highways pump truck with an automatically monitored nozzle. Each pass will spray a 200' diameter.
- Concentrations of the water to be sprayed (as of April 21/22, 2010):

Source	Concentration	Volume
Above ground storage tank	4200mg/l	100m ³
B-trains (from GRF)	4000mg/l	111m ³
GRF	4000mg/l	300m ³

Additional information

Board staff conducted a brief review of documentation from the original licence submission and documentation on glycol and glycol management from other jurisdictions. The additional information is as such:

- MV2001L3-0012 application file;
- Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, CCME, 1999.
- Email from Anne Wilson of Environment Canada

Existing Licence Information:

During the original issuance of this licence in 2001, information regarding the site was provided. Information regarding the physical properties of the soil were provided which were specific to the location of the septic tank. As this characterization of the soils is for one specific area, it could be safe to say that the soils would be consistent in the general area of the airport.

From a 2001 field investigation done by EBA Engineering Consultants Ltd (EBA) the following soil properties at the leaching field for the septic tank were found:

Soil Layer	Thickness
Duff Layer	Minimal
Sand/gravel till	1.8m
Peat (intermittent)	0.9 to 1.8m
Clay	1.9m
Silt	Unknown
Bedrock	Unknown

Groundwater depth is estimated, in 2001, to vary between a minimum depth of 1.2m (SE side of runway 09-27) to a maximum depth of 3.3m (along taxiway).

Glycol Management in other jurisdictions:

During the brief review, Board staffs were able to read a few Glycol Management plans for other airports (Edmonton International Airport and Toronto International Airport). Under both of the plans, spent glycol is managed by the collection of the glycol on the ground, and transference to a holding tank for eventual discharge to the storm water system.

For Toronto, a series of storm water control facilities have been built to control any excess glycol from de-icing procedures. Glycol-contaminated water, once it reaches the federal effluent guideline for ethylene glycol (100ml/l), is released to the municipal storm water sewer system. There

are no references to discharge of glycol-contaminated water to the ground. In a Staff Report to the City of Toronto Council in 2002 by Dr. Sheela V. Basrur, Medical Officer of Health, it was stated that:

“Although ethylene glycol is readily broken down in the environment through the action of naturally occurring microorganisms in the soil, surface water and groundwater, evidence of high levels reaching the environment has caused considerable concern”.

Additionally, it states:

“as a result of degradation by micro organisms that use free oxygen, rapid breakdown of large volumes of ethylene glycol in surface water can result in significant oxygen depletion, which can be detrimental to populations of aquatic organisms in the receiving environment.”

And, when talking about runoff water:

“the vaporized fluid, if not broken down, will enter the soil eventually when washed down by rainfall or snow. Ethylene glycol is highly soluble in water, does not adhere to soil significantly, and therefore is expected to be highly mobile in soil. Although the potential for groundwater contamination exists, the available data indicate that the environmental impact is of less concern than surface water contamination”.

Soil Quality Guidelines:

The Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, CCME, 1999 (soil guidelines), provide guidelines for ethylene glycol in soil for a variety of different land uses.

Parameter	Guideline
Soil quality guidelines for environmental health (Industrial land use)	960mg/l
Soil contact guideline (industrial land use)	1800mg/l
Groundwater guideline/check value (industrial land use)	960mg/l

The soil guidelines state that ethylene glycol has a high water solubility which indicates a low potential for soil and sediment adsorption. Ethylene glycol has a high potential to leach into ground water.

Environment Canada:

Board staff contacted Ms. Anne Wilson of Environment Canada on April 28th, 2010 to ask for some input. In an email from Ms. Wilson, she provided additional information pertaining to landspraying of glycol-contaminated water. From the documentation provided, it shows that land treatment is a reasonable approach if it is done properly. She states that the current request does not fully address the environmental conditions

beyond a basic soil holding capacity. Further information would be required from GNWT-DOT in order to demonstrate that degradation will occur, provisional guidelines are not exceeded, and that there would be no risk to fish-bearing waters.

4. Conclusion

Based on the information provided by GNWT-DOT and the additional information, there are still unknown factors associated with the disposal of the glycol-contaminated water by spraying it to the infield. As Ms. Wilson stated, the current request doesn't fully address the environmental conditions associated with the activity.

Given the physical properties of ethylene glycol and the physical characteristics of the soil at the airport, there is a risk that the glycol-contaminated water can reach the ground water and flow towards Long Lake.

If the Board were to consider granting GNWT-DOT's request, there should be additional monitoring wells installed to ensure that the groundwater does not become contaminated by the glycol. The location of the monitoring wells can be placed under direction of the INAC inspector.

5. Recommendation

Based on the information provided, there are three options available to the Board:

1. The Board can approve the spraying of the glycol-contaminated water as proposed by GNWT-DOT, or in a manner acceptable by the Board;
2. The Board can deny the spraying of the glycol-contaminated water; or
3. The Board can defer a decision until such time that a comprehensive study can be provided to the Board.

6. Attachments

- Letter from DOT, April 21, 2010
- Additional information from DOT, April 28, 2010

Respectfully submitted,

Tyree Mullaney
Regulatory Officer
and
Anne Umpleby
Regulatory Manager