



Mackenzie Valley Land and Water Board

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July 6, 2010

File: MV2001L3-0012

Distribution List - attached

Dear Sir/Madam:

Plan Submission Review - Updated Glycol Mitigation Operational Plan

Attached for your review and comments is an updated Plan Submission for the Water Licence which is incorporated under the Terms and Conditions of the Type B Water Licence submitted to the Mackenzie Valley Land and Water Board by GNWT-Department of Transportation as requested May 13, 2010.

Your comments should be submitted in writing by July 29, 2010 at 3:00pm quoting MV2001L3-0012. If you require additional time to complete further studies or investigations, or if you have any questions regarding this application, please telephone (867) 669-0506 or email permits@mvlwb.com prior to this date.

Yours sincerely,

A handwritten signature in black ink that reads "Tyree Mullaney".

Tyree Mullaney
Regulatory Officer

Attachment

June 23, 2010

Ms. Tyree Mullaney, Regulatory Officer
Mackenzie Valley Land and Water Board
7th Floor - 4922 48th Street
PO BOX 2130
YELLOWKNIFE NT X1A 2P6

Dear Ms. Mullaney:

Modification to Waste Disposal Facilities, Yellowknife Airport

This is in response to Mr. Willard Hagen's letter of May 13, 2010 regarding the subject matter. In his letter he indicated that the Board requested:

1. An abandonment and restoration plan for the existing Glycol Retention Facility (GRF); and
2. An updated Glycol Mitigation Operational Plan (GMOP).

The Department of Transportation does not plan to abandon the current GRF. In the short term the Department plans to use the existing facility as a test pond to help apply established treatment practices to Northern conditions. In the long term the pond may be used to provide additional storage or to supplement treatment. Transfer of glycol impacted water between the two ponds will be done using a pumper truck.

An updated GMOP is attached for the Board's approval.

If you require further information please contact me at 873-4680 or by e-mail at steve_loutitt@gov.nt.ca.

Yours truly,



for Steve Loutitt
Regional Airport Manager
Yellowknife Airport

- c. Ms. Rhonda Batchelor, Senior Environmental Analyst
DOT, GNWT

Mr. Michael Martin, Water Resources Officer
Indian and Northern Affairs Canada

Mr. Robert Jenkins, Water Resources Division, INAC

Mr. Michael Conway, Regional Superintendent
DOT, GNWT



2008 GLYCOL MITIGATION OPERATIONAL PLAN

Revised June 2010

**Yellowknife Airport Water License
MV2001L3-0012**

Submitted to:

**Mackenzie Valley Land and Water Board
Box 2130
Yellowknife, NT
X1A 2P6**

Prepared By:

Department of Transportation
Government of the Northwest Territories



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1.0 Introduction

The Glycol Mitigation Operational Plan (GMOP) addresses the potential risks associated with the use of de-icing products (glycol) at the Yellowknife Airport. The purpose of this plan is to:

- Ensure that adequate measures are in place to account for product storage, handling, and usage, as well as runoff containment and waste storage; and,
- Limit airport liability while ensuring compliance with applicable regulations, standards and guidelines.

The GMOP has been compiled in consultation with the Airport Manager's office and Environmental Affairs in the Department of Transportation (DoT) and is intended as a reference document for airport operators and staff. The GMOP fulfills the requirement of the Mackenzie Valley Land and Water Board (MVLWB) for the Yellowknife Airport Water License MV2001L3-0012.

This version of the GMOP was revised in accordance with the conditions of the MVLWB's letter of May 13, 2010 waiving the requirement for a 60 day notification of modification to the Glycol Retention Facility (GRF).

2.0 De-icing

2.1 De-icing Fluids

De-icing fluids are used by Air Carriers during cold months to remove ice from aircraft. De-icing fluids are composed of a combination of glycol, water, and additives. Although there are different types of glycol used in de-icing fluids, only Type I De-icing fluid, which consists of ethylene glycol, is used for regular de-icing procedures at the Yellowknife Airport. Ethylene glycol is the more harmful of the different types of glycol, however it is more efficient and smaller amounts are therefore required. Yellowknife Airport tenants currently use: UCAR™ Aircraft Deicing Fluid XL 54 SAE/ ISO Type I. Refer to Appendix C for Material Safety Data Sheet for Ethylene Glycol.

Tenants are required to report any changes to the type of de-icing fluid that is used on their properties to the Airport Manager.

2.2 De-icing Season

Due to the nature of de-icing requirements, the use of de-icing fluid normally extends from September 15 through May 15. Therefore the number of days in an average de-icing season is 244 days. However, because the de-icing season is highly dependent upon weather patterns, the length of the season is subject to change.

2.3 Volumes

The use of de-icing product by air carriers is monitored, and this data is compiled and submitted to the Airport Manager's Office via the Airline Monthly Report. The average

annual volume of de-icing products used during the past five years is 90,961 L. See Table 1 below for annual use figures.

Table 1: Seasonal Glycol Use

Year	Quantity (L)
2009/10	122,825
2008/09	88,787
2007/08	74,014
2006/07	112,919
2005/06	92,680

2.3 Storage and Handling

De-icing fluid is transported onto airport property using de-icing vehicles. It is applied from specialized equipment designed specifically for that purpose. In most cases, the fluid comes in 1,000 L totes, which are securely stored outdoors. First Air, however, has a bulk storage facility on site and the de-icing fluid is delivered by tanker truck. Air carriers are responsible for reporting any changes in equipment or storage in the Airline Monthly Report (See Section 5.3).

3.0 De-icing Fluid Use

3.1 Environmental Concerns

The introduction of de-icing fluid into the natural environment is of special concern to DoT due to the close proximity of Long Lake to the airport. Long Lake is considered a sensitive environment because:

1. It is an ecological zone that harbors animals and plants;
2. It is the source of non-potable water for the airport; and
3. It is a recreational park with a public beach.

The water table on the airport property is relatively close to the surface (1-2 meters) and the gradient flow is towards Long Lake¹. In the past surface water runoff was directed towards the north of the property, draining into Long Lake.

3.2 Mitigation

It became clear during the spring of 2010 that flows of glycol impacted water towards Long Lake had not been mitigated by the North Apron Expansion that included a sloped de-icing bay directing surface flow towards the infield. Following the discovery of an accumulation of glycol impacted ice and snow at the foot of the de-icing bay DoT implemented a clean-up operation and relocated the de-icing bay southeast of the former location on the apron to the front of the air terminal building.

¹ Department of Transportation. 2002. Ground and Surface Water Monitoring at the Yellowknife Airport

A Glycol Impacted Snow Storage Area (GISSA) will be constructed upon the infield area directly south of the new de-icing pad (see appendix A). This will be a lined facility designed to temporarily contain any glycol run-off and impacted snowmelt until it can be transferred to the newly constructed Glycol Retention and Treatment Facility (GRTF) located near the existing GRF (see appendix B).

The GRTF has a capacity of 2,000 m³ and is equipped with an impermeable liner. DoT will employ treatment that includes aeration and biological methods to aid in the breakdown of the glycol. The current GRF will be retained as a test facility to apply established treatment methods to our unique environment and identify optimal treatment strategies.

4.0 De-icing Fluid Management

4.1 Snow Removal

Removal of glycol-impacted snow occurs based on a number of factors including snow fall, fluid use, etc. Once enough glycol-impacted snow has accumulated on the apron, it is collected and removed using sweepers and plow trucks. DoT is also researching other equipment options for the collection of glycol run-off from the tarmac surface after de-icing operations to further enhance collection of waste glycol.

The impacted snow, ice and water will be transported to the GISSA where it will be staged temporarily. Because Transport Canada sets restrictions on the amount of snow that is allowed in the infield, snow placed here is done so temporarily. Once snow has accumulated to regulated levels, it will be removed and relocated to its final holding place - the GRTF. Removal of snow to the GRTF can occur at any time during the de-icing season under the direction of the Airport Manager's Office.

4.2 The Glycol Retention and Treatment Facilities

In May/June of 2010, a new GRTF was constructed adjacent to the existing GRF in the Training Area of the Yellowknife Airport (see design drawing in Appendix B). It was built to the specifications of, and under the direct supervision of, a geotechnical/geomembrane specialist: A & A Technical Services. The new bermed and lined containment facility measures approximately 30m x 74m in accordance with the attached drawing. The methodology for construction was as follows:

- Surveyed and staked area;
- Excavated area to required depth;
- Graded, watered and compacted area;
- Constructed berms to required grades using available granular materials;
- Bermed material compacted as it was placed to prevent settling subsequent to construction;
- Removed all organics, lumps, large stones under areas to be lined;
- Placed 300 mm of sand as a base for the liner;
- Installed HDPE liner sandwiched between two layers of nonwoven geo-textile; and
- Placed a 300mm layer of sand overlain by 600mm of 20mm minus granular

