



Box 32, Wekweètì, NT X0E 1W0  
Tel: 867-713-2500 Fax: 867-713-2502  
(Main)

#1-4905 48<sup>th</sup> Street, Yellowknife, NT X1A 3S3  
Tel: 867-765-4592 Fax: 867-669-9593

December 13, 2011

File: W2007L2-0003

Mr. Stephen Bourn  
Diavik Diamond Mines Inc.  
P.O. Box 2498, 5007-50 Avenue  
Yellowknife, NT X1A 2P8

Dear Mr. Bourn:

**Re: DDMI's updates to the Ammonia Management Plan**

The Wek'èezhì Land and Water Board met on December 5, 2011 to consider the submission by Diavik Diamond Mines Inc. (DDMI) of the Ammonia Management Plan (Version 4.0) for approval, as required by Part H, Item 15 of Water Licence W2007L2-0003.

It was decided by the Board that, because ammonia concentrations are no longer of significant concern, it is no longer necessary for DDMI to continue quarterly ammonia reporting and that these reports should cease (please see the attached Staff Report for more details). Instead, the Board requests for DDMI to commit to notifying the Board of any trends or issues regarding ammonia in their Annual Report (required under Part B, Section 4 of W2007L2-0003).

Therefore, the Board has approved the Ammonia Management Plan on the condition that a revised Version 4.1 include the removal of the quarterly ammonia reporting requirement and a commitment from DDMI to notify the Board in their Annual Report should any sustained increasing trend in ammonia occur.

Furthermore, the Board would like to note that in order to ensure that the Ammonia Management Plan continues to reflect current operations on site; DDMI is requested to review it annually and modify it to reflect changes in operation or technology and results from relevant studies. The Board would like to take this opportunity to clarify this direction as a similar requirement appears throughout DDMI's Water Licence for other management and operations plans. This requirement has been included to ensure the proponent is annually reviewing all regulatory obligations and are updating them when necessary – DDMI is not expected to submit this plan on an annual basis unless there have been changes or a request from the Board.

Sincerely,

A handwritten signature in black ink, appearing to read "V. Camsell-Blondin".

Violet Camsell-Blondin  
Chair, WLWB

Copied: DDMI Distribution List



**STAFF REPORT**

<b>Company:</b> Diavik Diamond Mine Inc. (DDMI)	
<b>Location:</b> Lac de Gras	<b>Licence:</b> W2007L2-0003
<b>Date Prepared:</b> November 28, 2011	<b>Meeting Date:</b> December 5, 2011
<b>Subject:</b> Update to Diavik's Ammonia Management Plan, Version 4.0	

**Purpose/Report Summary**

The purpose of this staff report is to present DDMI's updated Ammonia Management Plan (Version 4.0) to the Wek'èezhìi Land and Water Board (WLWB) for approval, as required by Part H, Item 16 of Water Licence W2007L2-0003.

**Background**

The Ammonia Management Plan is meant to describe existing ammonia management requirements, procedures and investigations at the Diavik Diamond Mine. On March 31, 2010, the WLWB requested that DDMI update and submit by March 31, 2011, their Ammonia Management Plan to reflect changes, particularly in operations of the Processed Kimberlite Containment Facility, the North Inlet Water Treatment Plant, and the use of the new North Inlet to Process Plant pipeline.

Updates to the Ammonia Management Plan (Version 4.0) were received by the WLWB on March 31, 2011 and circulated for comment to the Diavik distribution list on October 19, 2011. Reviewers were given until November 10, 2011 to submit comments. Comments were received by Environment Canada (EC), Government of Northwest Territories – Environment and Natural Resources (GNWT), Aboriginal Affairs and Northern Development Canada (AANDC), and Fisheries and Oceans Canada (DFO).

**Discussion**

The majority of reviewer comments regarding Version 4.0 of the Ammonia Management Plan were that there were no concerns. One recommendation made by reviewers was that the WLWB should consider including a separate effluent quality criterion (EQC) for unionized ammonia in water licences. This is discussed further below.

### *Effluent Quality Criteria of Ammonia*

Ammonia can occur as unionized ( $\text{NH}_3$ ) or ionized ( $\text{NH}_4^+$ ). Total ammonia is a measure of both of these. Although both forms of ammonia are toxic to aquatic life, the unionized form is much more toxic to fish than the ionized form. This is why DFO has recommended, in its comments on the AMP, that the Board should consider setting an EQC for unionized ammonia in addition to the current EQC for total ammonia. However, Board staff note that Diavik's current EQC for total ammonia (6 mg/L for maximum average and 12 mg/L for maximum grab concentrations) were set based predominantly on what was technologically achievable through best management practices. Thus, the current limits are actually lower than what is required to protect aquatic life in Lac de Gras from either form of ammonia. As well, DDMI has implemented an internal protocol to use pH control at the NIWTP in the event that the level of unionized ammonia exceeds 0.1 mg/L. To date, this pH-control system has not been required.

Board staff, therefore, do not think that adding an EQC for unionized ammonia is necessary at this time, however, suggest that this may be considered in the future during the water licence renewal.

### *Submission of Ammonia Management Plans*

Part H, Item 16 of DDMI's Water Licence W2007L2-0003 requires that DDMI:

*"shall annually and upon request of the Board, review the Ammonia Management Plan and shall modify the Plan to reflect directives from the Board, changes in operations and technology, and results from relevant studies. The modified Plan shall be submitted to the Board by March 31 each year, and implemented upon Board approval."*

Board staff note that DDMI must annually review the Ammonia Management Plan, however, submission to the Board of a modified plan is only required if DDMI has received direction from the Board to do so, or to reflect changes in operation and technology, and results from relevant studies. Board staff would like to reiterate that an annual submission of this plan is not expected unless DDMI has received direction from the Board, or to reflect changes in operation and technology, and results from relevant studies.

### *Quarterly Ammonia Reporting*

As part of the Ammonia Management Plan, the Board requires DDMI to submit Quarterly Ammonia Reports which were meant to assess whether the mitigation measures and/or management options were actually working to decrease ammonia. The Quarterly Ammonia reports and the monthly Surveillance Network Program (SNP) reports over the past several years have indicated that ammonia concentrations have been consistently well below EQC limits. These continual low levels are due to several reasons including the decrease in open pit blasting (since most of the ammonia in mine water is derived from explosives used during mining). Because ammonia concentrations are no longer of concern, Board staff believe it isn't necessary for Diavik to continue quarterly ammonia reporting and suggest that these reports cease. Board staff suggest that instead, DDMI commit to notifying the Board of any trends or issues regarding ammonia in their Annual Report (required under Part B, Section 4 of W2007L2-0003).

## Recommendations

Board Staff recommend that:

- 1) the Board approve the Ammonia Management Plan on the condition that a revised Version 4.1 include the removal of the quarterly ammonia reporting requirement and a commitment from DDMI to notify the Board in their Annual Report should any sustained increasing trend in ammonia occur;
- 2) the Board reaffirm that the proponent shall annually review all regulatory requirements listed in the Water Licence but that the Board doesn't expect an annual submission of the Ammonia Management Plan unless DDMI updates this plan to reflect directives from the Board, changes in operations or technology, and results from other studies; and
- 3) Board staff conduct a conformity check on Version 4.1 to verify that recommendation one has been fulfilled and will present the conformity check to the Board for approval. After the Board has considered the conformity check, parties will be notified of the Boards' decision.

Respectfully submitted,



Sarah Elsasser  
Regulatory Specialist



Ryan Fequet  
Regulatory Coordinator



Kathy Racher  
Technical Coordinator

Attached:     - DDMI's submission of the Ammonia Management Plan, Mar. 31, 2011 (CD)  
                  - Comment Summary Table  
                  - Reviewer Cover letters (EC, AANDC, and GNWT)

## Review Comment Table

### W2007L2-0003 - Diavik - Ammonia Management Plan - Version 4.0 (WLWB)

<b>Item description :</b>	Update to Diavik's Ammonia Management Plan (Version 4) as per Part H Item 15 of Water Licence W2007L2-0003.
<b>Proponent:</b>	Diavik Diamond Mines Inc.
<b>File(s):</b>	W2007L2-0003
<b>Document(s):</b>	W2007L2-0003 - Diavik - Ammonia Management Plan - Version 4 - Mar31_11 (1051 kb)
<b>Reviewer Comments Due By:</b>	Nov 10, 2011
<b>Proponent Responses Due By:</b>	Nov 24, 2011
<b>Distribution List:</b>	Oct 19 at 19:41 .
<b>Contact Information:</b>	Ryan Fequet 867-765-4589 Sarah Elsasser 867-765-4583

## Comment Summary

Environment Canada: Sarah-Lacey McMillan				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response
1	General File	<b>Comment:</b> EC Comments		
Fisheries and Oceans Canada: Bruce Hanna				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response
1	General Comment	<b>Comment:</b> As identified by Diavik, unionized ammonia is much more toxic to aquatic life than ionized ammonia. EQC in the WL stipulate an operational maximum average concentration for total ammonia of 6.0 mg/L and a maximum concentration of any		<b>Nov 29:</b> class="MsoNormal" style="line-height: normal; margin: 0cm 0cm 0pt">Board staff note that Diavik's

		<p>grab sample of 12.0 mg/L. To address the issue of unionized ammonia being more toxic, Diavik has implemented an internal criterion for unionized ammonia of 0.1 mg/L .</p> <p><b>Recommendation:</b> The WLWB should consider including a separate criterion for unionized ammonia in Water Licences to account for the higher toxicity.</p>		<p>current EQC for total ammonia (6 mg/L for maximum average and 12 mg/L for maximum grab concentrations) were set based predominantly on what was technologically achievable through best management practices. Thus, the current limits are actually lower than what is required to protect aquatic life in Lac de Gras from either form of ammonia. Board staff, therefore, do not think that adding an EQC for unionized ammonia is necessary at this time, however, suggest that this may be considered in the future during the water licence renewal.</p>
--	--	---	--	--

**GNWT - Environment and Natural Resources: Patrick Clancy**

<b>ID</b>	<b>Topic</b>	<b>Reviewer Comment/Recommendation</b>	<b>Proponent Response</b>	<b>Board Staff Response</b>
1	General Comment	<p><b>Comment:</b> No Comments</p> <p><b>Recommendation:</b> No Recommendations</p>		<p><b>Nov 28:</b> No Proponent or Board staff comment required</p>

Environmental Protection Operations  
Prairie and Northern  
5019 52nd Street, 4th Floor  
P.O. Box 2310  
Yellowknife, NT, X1A 2P7

10 November 2011

EC file:4780 014 110  
WLWB file: W2007L2-0003

Wek'èezhii Land and Water Board  
1-4905 48th St,  
Yellowknife, NT X1A 3S3

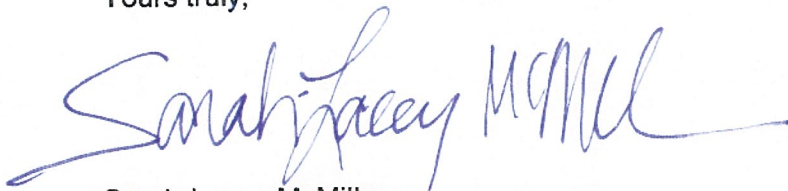
Via Online submission

Attention: Ryan Fequet  
Regulatory Mining Specialist

**RE: W2007L2-0003 - Diavik - Ammonia Management Plan - Version 4**

EC does not have any comments, regarding the Diavik Ammonia Management Plan, to submit to the Board at this time. If you wish clarification, please feel free to contact Lisa Lowman at (867) 669-4721 or by email at [lisa.lowman@ec.gc.ca](mailto:lisa.lowman@ec.gc.ca)

Yours truly,



Sarah-Lacey McMillan  
Environmental Assessment Coordinator  
Environmental Protection Operations

cc:  
Carey Ogilvie, Head, Environmental Assessment-North, EPO,  
Lisa Lowman, Senior Environmental Assessment Coordinator, EPO  
Ryan Fequet, Wek'èezhii Land and Water Board

## Sarah Elsasser

---

**From:** Sarah Elsasser [selsasser@wlwb.ca]  
**Sent:** December-12-11 11:52 AM  
**To:** 'Sarah Elsasser'  
**Subject:** FW: Request for Comments on WLWB Item - W2007L2-0003 - Diavik - Ammonia Management Plan - Version 4

---

**From:** Nathen Richea [mailto:Nathen.Richea@aandc-aadnc.gc.ca]  
**Sent:** November-10-11 2:03 PM  
**To:** brett@wlwb.ca; Ryan Fequet  
**Subject:** Re: Request for Comments on WLWB Item - W2007L2-0003 - Diavik - Ammonia Management Plan - Version 4

Hi,

AANDC-WRD has reviewed DDMI's AMP and has no comments.

Thanks,  
Nathen

Nathen Richea  
Head, Regulatory and Science Advisory Section  
Water Resources Division  
Renewable Resources & Environment  
Indian and Northern Affairs Canada  
P.O. Box 1500  
Yellowknife, NT X1A 2R3  
Phone (867) 669-2657  
Fax (867) 669-2716

This message will be saved to CIDM (NWT).

>>> "LWB System Administrator" <[sqlmail@dpra.com](mailto:sqlmail@dpra.com)> 10/19/2011 3:45 PM >>>

The Wek'èezhìi Land and Water Board invites reviewers to submit comments on **W2007L2-0003 - Diavik - Ammonia Management Plan - Version 4** via the LWB Online Review System.

- To access **W2007L2-0003 - Diavik - Ammonia Management Plan - Version 4**, please follow this link: [LWB Online Review System](#).
- The deadline for reviewers to submit comments is Nov 10 at 11:59 PM.
- The deadline for the proponent to submit responses is Nov 24 at 11:59 PM.
- The User Manual for the LWB Online Review System is available [here](#).

This request is being distributed by email only. If you require materials to be mailed or faxed, or require other assistance, please contact the Wek'èezhìi Land and Water Board.

- Ryan Fequet: 867-765-4589 [rfequet@wlwb.ca](mailto:rfequet@wlwb.ca)
- Sarah Elsasser: 867-765-4583 [selsasser@wlwb.ca](mailto:selsasser@wlwb.ca)

This is a system generated email. Please do not respond to this message.



**Northwest Territories** Environment and Natural Resources

Land and Water Division  
Environmental Assessment and Monitoring  
Environment and Natural Resources  
PO BOX 1320  
Yellowknife NT X1A 2L9  
Telephone (867) 920-6591  
Fax (867) 873-4021

November 10, 2011

Ryan Fequet  
Wek'eezhii Land and Water Board  
#1-4905 48<sup>th</sup> Street  
Yellowknife, NT  
X1A 3S3

Dear Mr. Fequet,

**Re: Diavik Diamond Mine Inc.  
W2007L2-0003  
Update to Ammonia Management Plan  
Request for Comments**

The Department of Environment and Natural Resources has reviewed the plan at reference based on its mandated responsibilities under the *Environmental Protection Act*, the *Forest Management Act*, the *Forest Protection Act* and the *Wildlife Act* and has no comments or recommendations at this time.

If you have any questions or concerns, please do not hesitate to contact me at 920-6591 or email at [patrick\\_clancy@gov.nt.ca](mailto:patrick_clancy@gov.nt.ca).

Sincerely,

Patrick Clancy  
Environmental Regulatory Analyst  
Environmental Assessment and Monitoring  
Land and Water Division  
Department of Environment and Natural Resources  
Government of the Northwest Territories