Water Resources Division
Nunavut Regional Office
Iqaluit, NU
X0A 0H0

NWB File: 1AR-POL0311
CIDMS #: 497917

December 22, 2011

Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU
X0B 1J0

Re: #1AR-POL0311 – Teck Resources Ltd. Letter of Proposal for the Cancellation of Existing Water License #1AR-POL0311 and the Application of a New Type 'B' Water License for the Polaris Mine Site - Polaris Mine – Teck Resources Ltd.

Please be advised that the Water Resources Division of Aboriginal Affairs and Northern Development Canada (**AANDC**) have completed a review of the October 17, 2011 letter prepared by Teck Resources Ltd. (**Teck**) regarding the expiry of their Type 'A' Water Licence, #1AR-POL0311. The Nunavut Water Board (**NWB**, or **Board**) circulated Teck's letter for comment on November 25, 2011. All documents related to the letter posted on the NWB ftp site under 1AR-POL0311 were included in AANDC's review (See attached Technical Review Memo).

Should you have any questions or comments, please do not hesitate to contact either myself at (867) 975-4282 or by email at Ian.Parsons@aandc-aadnc.gc.ca. or Andrea Cull at (867) 975-4566 or by email at Andrea.Cull@aandc-aadnc.gc.ca.

Sincerely,

Original signed by

Ian Parsons
Regional Coordinator

Technical Review Memorandum

To: Phyllis Beaulieu – Manager of Licensing, Nunavut Water Board

From: Ian Parsons – Regional Coordinator, Aboriginal Affairs & Northern Development Canada.
Andrea Cull – Pollution Policy Specialist, Aboriginal Affairs & Northern Development Canada.

Re: #1AR-POL0311 – Teck Resources Ltd. Letter of Proposal for the Cancellation of Existing Type 'A' Water License, #1AR-POL0311, and the Application of a New Type 'B' Water License for the Polaris Mine Site - Polaris Mine – Teck Resources Ltd.

1.0 Background

The current water license for the Polaris mine site, #1AR-POL0311, is set to expire on December 31, 2011. The owner, Teck has submitted a proposal to the NWB suggesting the cancellation of the Type 'A' Water License and then making application for a new Type 'B; Water License.

The Nunavut Water Board circulated a request for comments on November 17, 2011. Specifically, the Board has sought comment on the following four issues:

1. The appropriateness of cancelling the existing Type 'A' Licence (recognizing that under s. 46 of the *Nunavut Waters and Nunavurt Surface Rights Tribunal Act (***NWNSRTA**), the expiry or cancellation of a licence does not relieve the holder from any obligations imposed by the licence);

2. Further, prior to considering cancellation of the Type 'A' and/or issuance of a Type "B" water licence, what information should be required by the NWB beyond the current license compliance reporting documentation and normal Type 'A' renewal or Type "B" water licence application information?;

3. Whether, if the Type 'A' Licence is cancelled, the on-going post-closure and reclamation monitoring activity is such that the Board can issue a Type "B" Licence to regulate only that activity; and

4. For those parties holding reclamation security, direction regarding the effects (if any) that the cancellation of the Type 'A' Water Licence may

have on the reclamation security that is held (including any changes to the amounts and mechanisms for releasing security in whole or in part).

2.0 Recommendations/Comments

2.1 AANDC Comments in response to specific questions set by the Board

1. The appropriateness of cancelling the existing Type 'A' Licence (recognizing that under s. 46 of the NWNSRTA, the expiry or cancellation of a licence does not relieve the holder from any obligations imposed by the licence)

AANDC believes that it would be inappropriate to cancel the existing Type 'A' License and rely solely on s.46 of the NWNSRTA in respect of Teck's continuing obligations associated with the Polaris Mine. While s. 46 does provide an available compliance and enforcement mechanism, AANDC respectfully reminds the Board that it maintains jurisdiction over the closing and abandonment of the Polaris Mine as an "appurtenant undertaking" to the existing licensed use of water and deposit of waste associated with that mine. It would be inappropriate to allow cancellation or expiry of Teck's licence until the Board is satisfied that the closure, abandonment and reclamation of the mine has been satisfactorily completed and the post-closure life-cycle of the appurtenant undertaking has come to an end. This needs to be satisfactorily demonstrated to the Board by Teck.

For the reasons set out in Sections 2.2 and 2.3 of this letter, AANDC believes that the life-cycle of the appurtenant undertaking is not yet complete.

AANDC also notes that it is unclear whether the water quality from the outflow of Garrow Lake will stay below water license criteria or exceed these criteria in the future thereby affecting the surrounding environment. This is discussed in Section 2.3 of this letter, below.

Accordingly, AANDC does not agree with Teck's assertion that a water license is not required simply because ongoing care and monitoring activities associated with the Polaris Mine do not in and of themselves use water or deposit fresh waste. Until such time as the Board is satisfied that the life-cycle of the appurtenant undertaking is complete and AANDC believes that a water license is appropriate in this case.

2. Further, prior to considering cancellation of the Type 'A' and/or issuance of a Type 'B' water licence, what information should be required by the NWB beyond the current license compliance reporting documentation and normal Type 'A' renewal or Type "B" water licence application information?

AANDC notes that the cancellation of a Type 'A' Water Licence would require a public hearing under s. 52(1) of the NWNSRTA if it resulted from an application by Teck under s. 43(1)(c)(i) of the NWNSRTA. If, on the other hand, a Type 'A' Water Licence is cancelled by the Board on its own motion under s. 43(1)(c)(iii) of the NWNSRTA, a public hearing may not be required under s. 52(1) of the NWNSRTA. However, a s. 43(1)(c)(iii) determination by the Board would still require an assessment of the public interest by the Board. It is difficult to see how this could be achieved without some form of a hearing by the Board in order to get evidence on the record to substantiate its assessment of the state of reclamation of the Polaris Mine and the public interest in cancellation of the Type 'A' Licence.

Therefore, in addition to the normal information requirements associated with a Type 'A' or 'B' Licence application, AANDC recommends that the Board determine the appropriate means of assessing the public interest in cancelling the Teck Type 'A' Water Licence without a public hearing, if that is the option chosen by the Board.

3. Whether, if the Type 'A' Licence is cancelled, the on-going post-closure and reclamation monitoring activity is such that the Board can issue a Type "B" Licence to regulate only that activity.

As stated above, AANDC believes that the Board has continued jurisdiction to issue a water license in respect of the Polaris Mine until such time as the life-cycle of the appurtenant undertaking to the licensed use of water and deposit of waste has come to an end. Given this continued jurisdiction, AANDC believes that the Board has the discretion to determine the appropriate class of license for Teck's remaining obligations in accordance with the regulations issued under the NWNSRTA and Teck's application. If the nature and quality of the activities associated with the appurtenant undertaking demand only a Type 'B' Licence, then AANDC would support a Type B licensing process.

AANDC recommends that the Board ensure through any future license conditions that Teck remains fully responsible for the ongoing monitoring, and any necessary care, maintenance and remediation activities at the mine site.

This is discussed in more detail in Section 2.2 and 2.3 of this letter.

4. For those parties holding reclamation security, direction regarding the effects (if any) that the cancellation of the Type 'A' Water Licence may have on the reclamation security that is held (including any changes to the amounts and mechanisms for releasing security in whole or in part).

AANDC does not hold any security under land tenure instruments associated with the Polaris Mine. AANDC does hold the sum of $3,539,000 pursuant to the terms and conditions of the existing licence.

AANDC recommends that the existing Type 'A' Licence not be cancelled or allowed to expire before a renewed Type 'A' Licence or successor Type 'B' Licence is issued and adequate security is retained under such a licence. Given AANDC's comments set out in Sections 2.1, 2.2 and 2.3 of this submission, AANDC would recommend a continued security requirement (subject to reassessment by the Board) under whatever successor licence the Board might issue.

2.2 Options

AANDC notes that three viable licensing options have been identified by the Board in its correspondence:

A. Cancellation or expiry of the existing Type 'A' License.

B. Renewal of Teck's Type 'A' License with an increase in the license term and also with reduced monitoring requirements.

C. Cancellation of the existing Type 'A' and issuance of Type B License for reduced monitoring requirements and any care, maintenance and remediation activities that may be required under the terms of that licence.

AANDC also notes that option C is the option that Teck are proposing in their letter to the NWB dated October 17, 2011.

As will be discussed below, AANDC is not in favour of Option A, but would support the approaches to licensing contemplated by Options B or C, as deemed appropriate by the Board on application by Teck. Given that the existing Type 'A' Water License for the Polaris Mine expires on December 31st, 2011, AANDC recommends that the Board consider a short term renewal of the existing license by a term of 60 days to allow Teck sufficient time to prepare its application materials.

Options Discussion:

Option A: Cancellation or Expiry of Teck Resources Ltd. Type 'A' license and reliance on s. 46 of the NWNSRTA.

For the reasons set out in Section 2.1, 1 of this submission, AANDC is not in favour of this option.

Option B: Renewal of Teck Resources Ltd. Type 'A' license to increase the term with reduced monitoring requirements.

After careful review and consideration, AANDC would support a renewal of Teck's existing Type 'A' Water Licence (#1AR-POL0311). AANDC would be open to a reduction in the monitoring and security requirements if Teck demonstrates to the satisfaction of the Board that this is appropriate.

This option would require a public hearing and the approval of the Minister. AANDC would be open to any Board suggestions for narrowing the scope of issues for a public hearing and/or an expeditious form of a hearing in this case, given the reduced risk and complexity associated with the appurtenant undertaking.

AANDC would recommend a short term renewal of the existing licence to give Teck sufficient time to apply for a renewal or a Type 'B' Licence.

Option C. Cancellation of Teck's Type 'A' license and issuance of a Type B license.

AANDC notes that this is the option that Teck deems preferable in its correspondence to the Board.

Given the reduced risk and complexity associated with the appurtenant undertaking in this case, AANDC, would also support this approach to licensing if it is deemed desirable by the Board. In AANDC's view, however, the existing Type 'A' Licence should not be cancelled until the replacement Type 'B' Licence has been issued and security has been posted with the Minister under same. AANDC would recommend a short term renewal of the existing licence to give Teck sufficient time to apply for a renewal of the Type 'A' Licence, or a Type 'B' Licence.

As noted in Section 2.1, Question #2, above, AANDC further notes that a cancellation of the existing Type 'A' licence would require a public hearing under s. 52(1) of the NWNSRTA if it resulted from an application by Teck under s. 43(1)(c)(i) of the NWNSRTA; but not if it resulted from the Board's own initiative under s. 43(1)(c)(iii) of the NWNSRTA. However, a s. 43(1)(c)(iii) determination by the Board would still require an assessment of the public interest by the Board

and it is difficult to see how this could be achieved without some form of a hearing by the Board.

AANDC notes that the cancellation of the Type 'A' license would require the Minister's approval under s. 56 of the NWNSRTA.

2.3 Preliminary Technical Comments.

The purpose of these preliminary technical comments is to demonstrate that the Board retains jurisdiction over the Polaris Mine. In AANDC's view, the life-cycle of the Polaris Mine as an appurtenant undertaking to the existing licensed use of water and deposit of waste is not yet complete.

AANDC's comments were derived from a comprehensive review of monitoring reports submitted by Teck and recent site visits (2009, 2010, and 2011).

This information is not intended to form the basis of any intervention or evidence in an eventual licence application for a Type 'A' or 'B' Licence, as the case may be.

AANDC recommends continued licensing for the Polaris Mine because despite Teck's satisfactory completion of the reclamation plan, there are two issues that require monitoring:

1) The long term stability of the subsidence zone.
2) Discharge from Garrow Lake (former tailings disposal area).

1) <u>Long Term Stability of the Subsidence Zone</u>

The initial and only major subsidence event at the Polaris Mine Site occurred in or around 1993 during mining operations, in an area known as the Keel Zone. Since this event mining operations were able to continue and only minor subsidence events, associated with mining operations, occurred in the area up until the closure of the mine in 2002.

Upon the cessation of mining operations the subsidence area was used as a landfill site to dispose of decommissioned mine equipment and other inert mine site materials (Reclamation Landfill). The landfilled materials were covered with a minimum aggregate cover of 1.8 m using rockfill quarried from the adjacent New Quarry.

Teck also estimated that an additional 10-15 m of fill was added to the subsidence zone to bring the ground surface back up to pre-mining levels. This backfill placement was done as part of the construction of the Reclamation

Landfill. The impact of this fill on subsidence rates was considered by Teck to be minor, based on the fact that there was about 150 m of existing rock cover over the stope.

Since closure in 2002, Teck has conducted annual topographical surveys of the subsidence area to monitor ground movements and to demonstrate that subsidence has ceased and that there is no long term risk to public safety or to wildlife.

However, the full extent of the affected area (Keel Zone) is still relatively unknown. Teck has noted that large-scale hangingwall caves are located in the underground workings of this zone, leaving large voids that were impossible to backfill.

Due to the lack of information regarding the actual extent of the underground openings undergoing caving subsidence, there is still a possibility that the current state of stability may be temporary and there is no guarantee that the ground won't subside again in the future.

Long term stability of the subsidence zone would only be assured if the failed stope were to become filled with bulked caved material and no voids have developed.

Since 2002, post-closure surveys over the subsidence zone conducted by Teck have indicated that there has been no significant ongoing subsidence and that the subsidence zone continues to remain stable at the surface and does not present a safety hazard to the public or wildlife at this time.

This assessment is based entirely on the ongoing annual visual and surveyed monitoring observations. It does not take into account the potential subsurface conditions that have progressively developed since the original stope failure during mining operations in the 1990s.

In 2009, a detailed assessment of the available data on the subsidence zone was conducted. This assessment concluded that the mechanism of movement was caving subsidence. This type of subsidence is associated with the physical collapse or drawing of broken rock and overburden material into an underlying void.

In contrast, mining induced subsidence results from the bending and deformation of relatively thick units of rock overlying laterally extensive areas of ore extraction. In the latter case, subsidence ceases when mining activity ceases.

With caving subsidence, there may be a risk of future caving to occur, if there is a void under the subsidence zone that has not become completely filled with caved material.

While there are certain indicators that indicate the risk of a future public hazard may be low, the subsidence zone represents a significant area of potential post-closure physical instability at the site. AANDC is of the view that this needs a longer term period of monitoring to establish site stability.

As well, based on the mechanism of caving subsidence (which has been determined to be the case here) Teck has not yet conclusively demonstrated that long term stability of the subsidence zone has been achieved.

AANDC recommends that Teck submit a stability and risk assessment report of the subsidence zone prepared by a professional geotechnical engineer. This report should include a risk assessment to provide regulators with further confidence that the long term risks do not impose an unacceptable liability.

2) Discharge from Garrow Lake

AANDC recommends that Teck be required to continue monitoring water quality at the outflow of Garrow Lake in accordance with a revised post-closure monitoring plan. This is due to the fact that mine tailings were disposed in Garrow Lake. To date, monitoring data demonstrate that the licensed discharge criteria are being met. However, it would be prudent to continue monitoring this discharge to confirm that this trend continues. Future monitoring reports submitted by Teck should contain a formal trend analysis that speaks to parameters of concern.

It should be noted that water column data collected by Teck shows an elevated zinc concentration at an approximate depth of 10.0 m in Garrow Lake. This depth corresponds to the upper boundary of a pycnocline that separates saline bottom waters from relatively fresh surface waters. In 2009, AANDC undertook a technical review of Teck's water column sampling data and the anomalous zinc concentration. The purpose of this was to determine the possible causes and assess if there is any risk of future impacts to receiving waters or to aquatic life. Their review concluded that the elevated levels of zinc are stable at this depth due to the meromictic (has layers of water that do not intermix) nature of Garrow Lake. After reviewing 2008, 2009 and 2010 water quality sampling data it was further concluded that the zinc maxima in the water column are likely due to dissolved zinc fractions that represent a relict signature of zinc inputs associated with historic tailings discharges.

3) Conclusions to Preliminary Technical Comments

AANDC recommends that whatever licensing process the Board chooses to adopt, the NWB should request that Teck provide a proposed geotechnical and surface water monitoring plan as well as an updated contingency plan. In

addition Teck should be required to submit a stability and risk assessment report of the subsidence zone (as referred to earlier in this correspondence). The report should be prepared by a professional geotechnical engineer. The current financial security may also have to be reassessed as part of any licence renewal or as part of a new Type 'B' water licence application. It is recommended that Teck engage the communities most affected to determine if there are any concerns with the current state of the former mine.

Cc. Bernie MacIsaac, Director of Operations - Aboriginal Affairs and Northern Development Canada, Nunavut Regional Office
David Abernethy, A/Manager of Water Resources – Aboriginal Affairs and Northern Development Canada, Nunavut Regional Office