Mackenzie Valley Land and Water Board
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Staff Report

Applicant: Teck Metals Ltd.	
Location: Pine Point, NT	**Application:** MV2017L2-0007
Date Prepared: October 16, 2017	**Meeting Date:** October 25, 2017
Subject: Type B Water Licence Renewal Application	

1. Purpose/Report Summary

The purpose of this Report is to present to the Mackenzie Valley Land and Water Board (MVLWB/the Board):

a) a Type B Water Licence (Licence) renewal Application submitted by Teck Metals Ltd.;
b) Seek confirmation on preliminary screening exemption;
c) Consider the Water Management Plan (Water Treatment Manual);
d) Consider the Operations and Maintenance Plan;
e) Consider the Closure and Reclamation Plan;
f) Consider the Spill Contingency Plan; and
g) Consider the Engagement Plan.

2. Background

- October 26, 2007 – Issuance of Licence MV2006L2-0013 for 10 years;
- August 22, 2017 – Application received (via email);
- August 30, 2017 – Application fee and hard copy received; review commenced;
- September 21, 2017 – Reviewer comments and recommendations due and received on the Application;
- September 22, 2017 – Draft Licence distributed for review;
- October 3, 2017 – Responses received on the Application;
- October 6, 2017 – Reviewer comments and recommendations due and received on the draft Licence;
- October 13, 2017 – Responses received on the draft Licence;
- **October 25, 2017 – Application presented to the Board for decision;** and
- October 28, 2017 – Expiration of current Licence MV2006L2-0013.

3. Discussion

Project History

The Pine Point mine was operated by Cominco from 1964 to 1988 and produced 70 million tons of ore, with grades of 2.9% lead and 6.8% zinc. The project has operated under a water licence since 1975. When the mine closed in 1988, a Closure and Reclamation Plan, which had been approved June 1987, was implemented. The Plan was updated in 1990 and 1991 during reclamation activities. A Type B Licence N1L3-0035 was issued on June 1, 1993 for five years, which was followed by Type B Licence N1L2-0035, issued on July 1, 1997, for a ten-year term to June 30, 2007. In July 2001, Cominco and Teck Metals merged. Since the merger, Teck Metals has managed the site. In June 2009, Teck Cominco Metals Ltd. changed its name to Teck Metals Ltd. The current Type B Licence MV2006L2-0013 expires on October 28, 2017; this is also referred to as a post-closure licence.

Submission Description

On August 22, 2017, Teck Metals Ltd. (Teck Metals) submitted a renewal application for a Type B Water Licence to the Board (attached). The purpose of this Application is to continue water monitoring and management at the Pine Point Tailings Impoundment Area (TIA). The TIA is located to the north of the former Pine Point mill site on terrain which slopes downwards towards the northwest. The terrain slopes gently for about 13 km towards Great Slave Lake from an approximate elevation of 230 m at the former mill site to an approximate lake elevation of 160 m.

The effluent is the result of accumulation of natural precipitation and snowmelt that falls within the TIA, and then ponds at the north end of the facility. The contact water is then treated each open water season using a temporary water treatment plant located at the north end of the TIA (see attached maps). The treatment plan injects a lime/water mixture into the contact water as it flows into a serpentine settling channel (located within the TIA). As the water flows through the channel, the pH of the water is increased by the lime and zinc is precipitated out of solution and settles out of the water column. At the end of the settling channel, the water is periodically discharged from the TIA during the open water season to the receiving environment. The facility typically operates for 3 to 6 weeks each summer.

The existing SNP sample locations that were monitored during operation of the mine have been maintained through closure and into post-closure. These include one sample of tailings water before treatment, one sample of tailings water after treatment, and seven downstream stations between the impoundment and Great Slave Lake.

The 2006 update to the Closure and Reclamation Plan (previously titled Abandonment and Restoration Plan), which was included with this Application (attached) and was last updated prior to the issuance of the previous Licence MV2006L2-0013, clarified that the primary issue associated with effluent quality is dissolved zinc in the pond water, which exceeds the Licence limits and requires treatment prior to discharge. This water has been treated for each of the 10 years of the current Licence MV2006L2-0013.

As the mine remains permanently closed, there are no personnel on-site except during the summer when the treatment plant is operated.

Management Plans

A Water Management Plan, Operations and Maintenance Plan, Closure and Reclamation Plan, Spill Contingency Plan, and Engagement Plan were included with the Application.

The Engagement Plan and Spill Contingency Plan appear to meet applicable guidelines and sufficiently reflect the scope of the proposed activities.

The Water Management Plan (or Water Treatment Manual) describes how water flows and is treated on site to meet Licence requirements.

The Operation and Maintenance Plan submitted with the Application was completed in February 2017, and contained appropriate and relevant information, and is an adequate Plan.

The Closure and Reclamation Plan submitted with this Application was a 2006 update to the 1991 Abandonment and Restoration Plan. This Plan (1991 version with 2006 update) does not adhere to the Mackenzie Valley Land and Water Board and Aboriginal Affairs and Northern Development Canada's November 2013 *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories.*

Eligibility

Following initial implementation of the closure and reclamation activities in accordance with the Closure and Reclamation Plan (1991 version), surface leases were surrendered back to the Crown during the mid to late 1990s, with the exception of one surface lease (#85B/16-9-9), which encompasses the TIA (attached: Figure 2 of this Application). This retained surface lease allows Teck Metals to continue to manage the TIA and treat ponded water. All mining claims were also surrendered back to the Crown.

Fees

The required Application Fee was included with the Application (attached).

Term

Teck Metals Ltd. has applied for a term of 10 years.

4. Comments

Triggers

The activities as described trigger a Type B Licence in accordance with Schedule H, item 3 of the Waters Regulations: 'All other deposits of waste'.

No land use permit is required as none of the triggers described in subsection 4(b) of the Mackenzie Valley Land Use Regulations will be met for this land.

5. Reviewer Comments

Application

By September 21, 2017, comments and recommendations on the Application were received from the following reviewers:

- Environment and Climate Change Canada (ECCC); and
- Government of the Northwest Territories – Environment and Natural Resources (GNWT-ENR).

Teck Metals responded on October 3, 2017.

GNWT-ENR and ECCC commented that certain Figures were incorrect and missing from the Application cover letter. Teck Metals responded by resubmitting an updated cover letter (in the attached application).

Further information was requested by ECCC and ENR on the Surveillance Network Program (SNP), and on water quality results, correlations and trends. This information was provided in the responses, and raw data was provided in an attached excel spreadsheet (attached).

Draft Licence

By October 6, 2017, comments and recommendations on the Draft Licence were received from GNWT – Environment and Natural Resources (GNWT-ENR). Teck Metals Ltd. responded on October 13, 2017.

The Review Summary and Attachments (attached) presents the concerns identified through the review of the Application and the Draft Licence.

Notable Comments and Responses

Evidence and recommendations regarding the upper limit for pH discharge criteria were presented, as seen in GNWT-ENR comments 7 and 13. Teck Metal's current water treatment methods rely upon elevated pH to assist in precipitating metals (e.g. zinc), which makes it difficult for them to meet CCME guidelines of pH 9.0. Based on review comments, GNWT-ENR has suggested discharge criteria for pH of 9.5, which is consistent with the Metal Mining Effluent Regulations (MMER). Teck Metals has requested discharge criteria of pH 10. Board staff agree with GNWT-ENR, in that Board staff can only support a maximum upper limit of pH 9.5 to be included in the authorization. In the meantime, Teck Metals has agreed to research and test treatment mechanisms or controls to lower pH in the existing treatment system, which will allow Teck Metals to meet the upper limit of pH 9.5 during treatment. Teck Metals could be required to update their Water Management Plan prior to implementing the proposed changes. Board staff recognize that prior to implementing additional treatment mechanisms to reduce pH, Teck Metals may have difficulties meeting discharge criteria of pH 9.5 in the 2018 season.

In addition, GNWT-ENR stated that they support Teck Metals request to change the sampling frequency at SNP station 35-1 from daily to weekly, as seen in GNWT-ENR comment 19, and requested that results from the Hach treatment system monitoring be included in annual SNP Report.

Additionally, in the Application, Teck Metals requested to remove SNP station 35-6, as it has been dry since 2011, and samples that were taken previously were well below Licence limits. As described in GNWT-ENR comment 22, ENR recommends keeping this sampling station for two additional years, and if no flow or no exceedances are noted in that time, then Teck Metals could request to amend the Licence SNP, or have an Inspector submit an SNP change/discontinuance request to the Board. Teck Metals agreed with this recommendation in their response.

Multiple comments and recommendations were made during the application and draft Licence reviews on Closure and Reclamation. During the review, ENR recommended that Teck Metals update the Closure and Reclamation Plan to include closure strategies, methods and activities that are intended to set closure goals, objectives and criteria. The current Plan does not fully meet the Mackenzie Valley Land and Water Board and Aboriginal Affairs and Northern Development Canada's November 2013 Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories. In the draft Licence that went out for review, Board staff included a condition for an updated Closure and Reclamation Plan to be submitted by May 1, 2018. Teck Metal's responded stating that the development of these strategies and methodologies will require a significant amount of technical evaluation and engineering studies, and requested that the Board allow Teck Metals to complete these evaluations and studies as a requirement under the renewed Licence MV2017L2-0007 with a commitment to submit the results of these analyses and studies by December 31, 2020. ENR commented on this request, supporting a deadline of December 31, 2020 to provide a more complete assessment of the Pine Point site, given the relative stability of the site. ENR suggested that Teck Metals provide a research and study plan that would provide necessary detail and type of research or study it believes would be required to provide an updated Closure and Reclamation Plan as a requirement of the Licence. Board staff agree with the recommendations made by both Teck Metals and ENR, and have updated the draft Licence to include a Closure and Reclamation Plan submission by December 31, 2020, and a Reclamation Research Plan by May 1, 2018.

Preliminary Screening

Teck Metals has requested to be exempt from Preliminary Screening and provided evidence in their Application in the form of a letter from the Minister of Indian and Northern Development, from 1993, which states:

> *A screening of the water use application pursuant to the **Environmental Assessment and Review Process Guidelines Order** was completed and I am satisfied that any potentially adverse environmental and related social effects that may be caused by the project are insignificant or mitigatable with known technology.*

The Board confirmed the exemption of a Preliminary Screening in 2007 prior to issuance of Licence MV2006L2-0013, as per Schedule 1, Part 1, item 2 of the Exemption Regulations, which state:

> **2** A development, or a part thereof, for which renewal of a permit, licence or authorization is requested that
>
> (a) has not been modified; and
>
> (b) has fulfilled the requirements of the environmental assessment process established by the *Mackenzie Valley Resource Management Act,* the *Canadian Environmental Assessment Act* or the ***Environmental Assessment Review Process Guidelines Order***.

Board staff are of the opinion that the development described in this Application has not been modified. Teck Metals submitted further email confirmation on October 10, 2017 (attached).

6. Security

The current Licence MV2006L2-0013 has a security of $100,000.00 posted with the GNWT (attached).

Teck Metals included a security estimate calculated using RECLAIM in the Application, and determined a total reclamation cost of $2,176,095.00 (attached). The GNWT-ENR noted during the Application review period that this includes provisions for carrying out 10 years of water treatment and 10 years of site monitoring and inspection. GNWT-ENR has issues with this approach since it does not align with the requirements under Indian Affairs and Northern Development Canada's *Mine Site Reclamation Policy for the Northwest Territories*, which states that the purpose of the reclamation security is to provide access to sufficient funds to complete all the activities required to bring a site to final closure, including conducting any long-term monitoring that is required to confirm that all closure objectives have been met. As such, security should include activities that are to be completed beyond the current Water Licence term. In response, Teck Metals considered these recommendations and submitted an updated RECLAIM calculation, totalling $5,534,500.00, on October 3, 2017.

During the draft Licence review, on October 6, 2017, GNWT-ENR stated their intent to submit a RECLAIM estimate by October 13, 2017. On October 17, 2017, GNWT-ENR submitted a RECLAIM estimate, totalling $8,905,028.00. This was provided to Teck Metals on October 17, 2017 for comment.

In summary:

	Teck Metals	GNWT-ENR	Difference
Current Licence MV2006L2-00013	$100,000.00	-	-
Initial Estimate	$2,176,095.00	-	-
Revised Estimate	$5,534,500.00	$8,905,028.00	$3,370,528.00

A more comprehensive table summarizing the differences between these estimates will be developed following Teck Metal's responses on the GNWT-ENR's estimate, and will be provided to the Board prior to the Board meeting.

7. Conclusion

The draft Licence conditions are based upon recently issued licences, reviewer comments, and Board staff recommendations. Board staff concludes that the conditions contained within this draft Licence should mitigate the potential environmental impacts this development may have on the land and water.

8. Recommendation

Board staff recommends the Board:

a) Confirm the Application is exempt from preliminary screening;
b) Approve the Type B Water Licence, with a term of 10 years;
c) Approve the Reasons for Decision;
d) Approve the Water Management Plan;
e) Approve the Operations and Maintenance Plan;
f) Approve the Closure and Reclamation Plan (1991 version with 2006 update) as an interim Plan, and require a revised Plan to be submitted by December 31, 2020;
g) Approve the Spill Contingency Plan; and
h) Approve the Engagement Plan.

A draft decision letter is attached for the Board's consideration.

9. Attachments

- Application
  - Water Management Plan (Water Treatment Manual)
  - Operations and Maintenance Plan
  - Closure and Reclamation Plan (1991 Abandonment and Restoration Plan) with 2006 update
  - Spill Contingency Plan
  - Engagement Plan
  - Email from Teck Metals confirming no modifications to development – re screening
  - Maps – Tailings Impoundment Area and SNP stations
  - Fee Receipt
  - Additional Excel Data provided in Application review responses
- Review Summary and Attachments
- Security Receipt – MV2006L2-0013 Licence
- Initial Security Estimate – Teck Metals Ltd.
- Revised Security Estimate – Teck Metals Ltd.
- Security Estimate – GNWT
- Draft Water Licence Cover Page
- Draft Water Licence Conditions
- General Procedures (Water Licence)
- Draft Reasons for Decision
- Draft Decision Letter from the Board

Respectfully submitted,

Kierney Leach

Kierney Leach
Regulatory Specialist

From: Unger Michelle KIMB
To: Kierney Leach; Liskowich, Mark
Subject: RE: Teck Metals - Preliminary Screening Exemption (MV2017L2-0007)
Date: October-10-17 3:30:35 PM

Hi Kierney, I can confirm that there have been no modifications since the screening was completed.

Kind regards,

Michelle

Michelle Unger, B.Sc.
Manager, Environmental Compliance, Legacy Properties
Teck Resources Limited
Direct Phone: 250-427-8422
Mobile: 250-432-5264
Fax: 250-427-8451
eMail: michelle.unger@teck.com
www.teck.com

From: Kierney Leach [mailto:kleach@mvlwb.com]
Sent: Tuesday, October 10, 2017 12:10 PM
To: Liskowich, Mark; Unger Michelle KIMB
Subject: Teck Metals - Preliminary Screening Exemption (MV2017L2-0007)

Hi Mark and Michelle,

I have begun putting together your Board Package for Teck Metals' Type B Water Licence Renewal (MV2017L2-0007). You indicated in your application that the project has already been screened, and provided the necessary documentation. However, I also need confirmation from you in writing that the project has not been modified since it was last screened. See the Exemption Regs Listed below:

2 A development, or a part thereof, for which renewal of a permit, licence or authorization is requested that

(a) has not been **modified**; and

(b) has fulfilled the requirements of the environmental assessment process established by the *Mackenzie Valley Resource Management Act*, the *Canadian Environmental Assessment Act* or the *Environmental Assessment Review Process Guidelines Order*.

modification, in respect of a structure, means a change, other than an expansion, that does not alter the purpose or function of the structure.

As per the attachments in your application, 2b has been fulfilled; however, it would be great to have confirmation in writing from Teck that part 2a is also fulfilled. Based on our discussions and the information in your application, I assume there have been no modifications, but it would be helpful to have an email from Teck confirming this to add to the Board package, for further justification to

the Board.

Thanks very much for your understanding,

Kierney Leach B.Sc., M.Eng
Technical Regulatory Specialist
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Meters
0 100 200 400 600 800 1,000

PROJECT
TECK
PINE POINT, NT

TITLE
TAILINGS IMPOUNDEMENT AREA

REFERENCE

BASE PLAN PROVIDED BY TECK COMINCO
CAD FILE: PINE_POINT_01.MXD
DATED: OCTOBER 14, 2006

Golder Associates

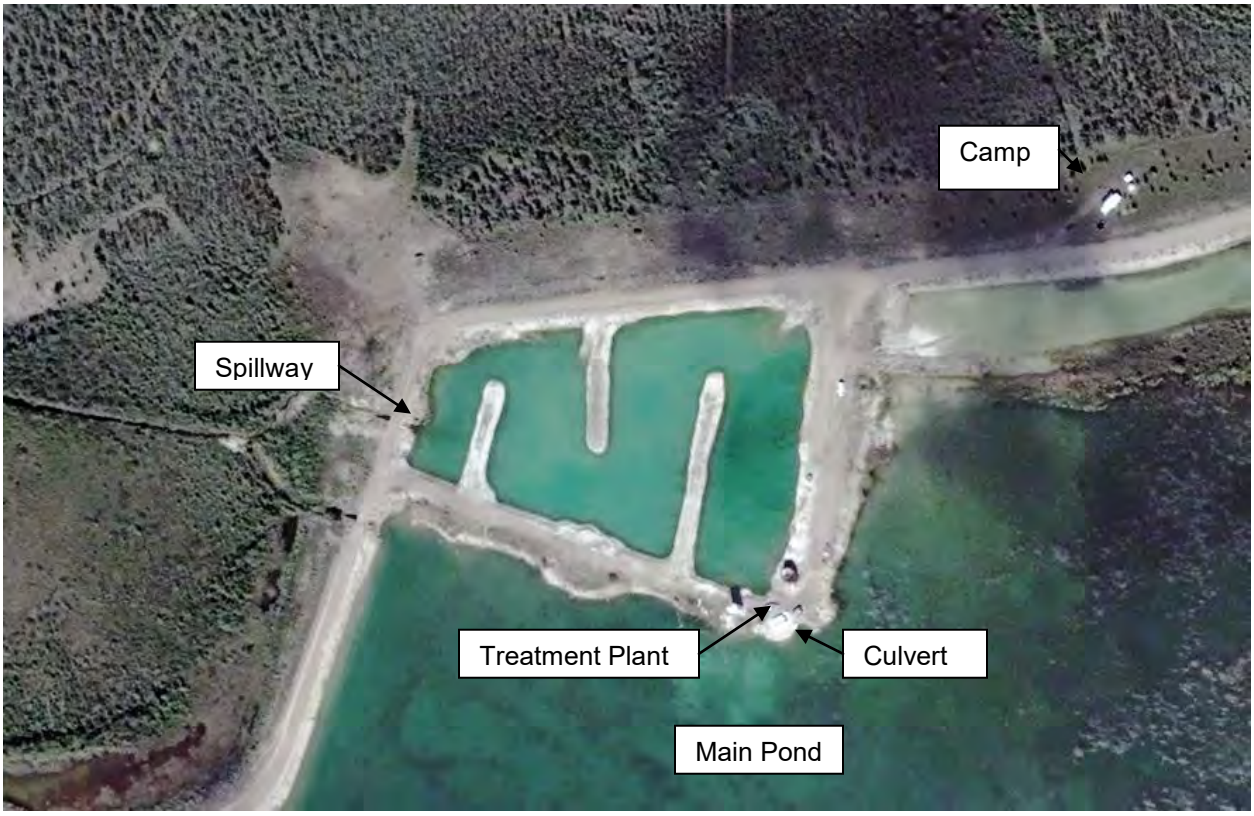
PROJECT No.		1656457	FILE No.		1656457-1400-001
DESIGN	JH	30JAN09	SCALE	AS SHOWN	REV.
CADD	GG	30JAN09			
CHECK	MW	20FEB17			
REVIEW	BW	20FEB17			

FIGURE 2

DRAWING DATE: 04-Feb-09 COREL FILE: N:\Bur-Graphics\Projects\20071141\3\07-1413-0068\Drafting\4000\FIGURE 2.cdr

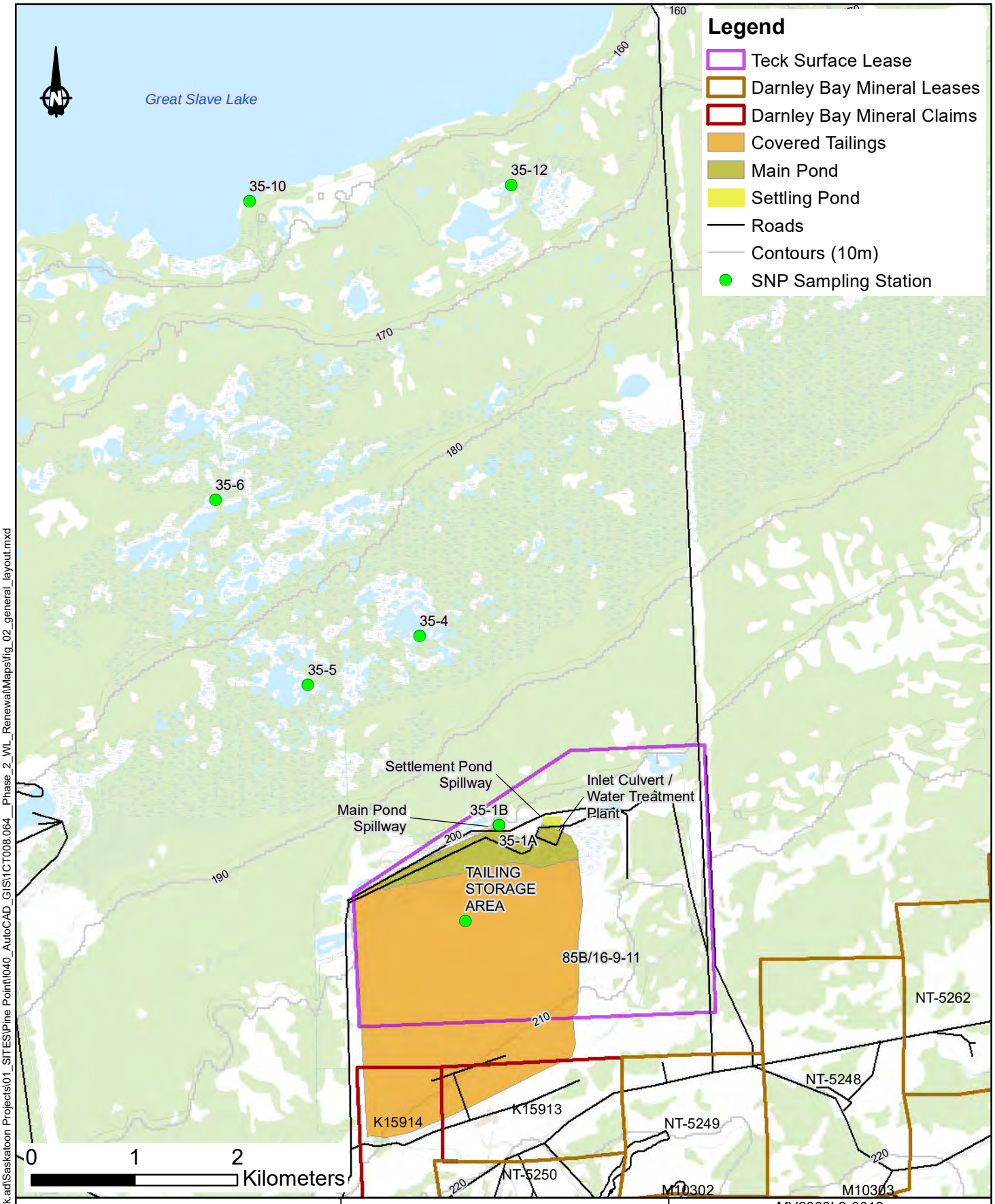
4. System Overview:

The treatment system is a gravity flow process from the main pond through the serpentine channel to the discharge spillway located at the end of the serpentine channel. The flow through the channel is controlled by five siphons in the discharge spillway.
The serpentine channel is connected to the Main Pond by a culvert that is equipped with a gate valve to isolate the channel from the Main Pond.



Overview of Serpentine Channel

The Treatment Plant Equipment is located near the culvert and the Lime Silo and Lime Slurry Tank are left on site at all times. The lime silo is a gravity flow bin with gate and an auger located on the bottom to feed lime into the jet mixer. The lime pump and air blower are mounted on a trailer as is the Laboratory. The lime pump is used for circulating lime through the slurry tank and mixing the lime. The blower is used to agitate the lime slurry tank and to mix the lime and water in the culvert. Other equipment includes: 5 KW generator, jet mixer, water pump, peristaltic pumps, diesel fuel tank, fuel pump and laboratory equipment.



Path: \\SSK-SVR0.ssk.na.srk.ad\Saskatoon Projects\01_SITES\Pine Point\1040_AutoCAD_GIS\1CT008.064__Phase_2_WL_RenewalMaps\fig_02_general_layout.mxd

srk consulting

Teck

MV2006L2-0013
Application for Water Licence Renewal

Pine Point
Tailing Impoundment Area Site Plan

Job No: 1CT008.064

Filename: fig_02_general_layout

PINE POINT, NT

Date:	Approved:	Figure:
May 2017	AL	2

Review Comment Table

Board:	MVLWB
Review Item:	Teck Metals Ltd. - Type B Water Licence Renewal Application (MV2017L2-0007)
File(s):	MV2017L2-0007
Proponent:	Teck Metals Ltd.
Document(s):	MV2017L2-0007 - Teck Metals - Draft Security Estimate (322KB) MV2017L2-0007 - Teck Metals - Engagement Plan and Log (1.6MB) MV2017L2-0007 - Teck Metals - Spill Contingency Plan (1.2 MB) MV2017L2-0007 - Teck Metals - Operations and Maintenance Plan (1.5MB) MV2017L2-0007 - Teck Metals - Closure and Reclamation Plan (159KB) MV2017L2-0007 - Teck Metals - Water Licence Renewal Application (19.3MB) MV2017L2-0007 - Teck Metals - Water Treatment Manual / Water Management Plan (5 MB) DRAFT WL CONDITIONS (277 KB)
Item For Review Distributed On:	Aug 30 at 14:35 Distribution List
Reviewer Comments Due By:	Oct 6, 2017
Proponent Responses Due By:	Oct 12, 2017
Item Description:	**SEPT 22, 2017 UPDATE** Teck Metals Inc. has submitted an updated Cover Letter to their Type B water licence application to include missing Figures that were identified in review comments during the application review period. This updated Cover Letter is attached to the application listed below.

DRAFT WL CONDITIONS have also been added to this review and are attached below. The review comment deadline for the draft conditions is **Friday October 6, 2017 at 5pm MST.**

Teck Metals Inc. (Teck Metals) submitted a renewal application for a type B water licence to the MVLWB. The purpose of this Application is to continue water monitoring and management at the Pine Point Tailings Impoundment Area. The effluent is the result of accumulation of natural precipitation in the pond. Therefore, the treatment and discharge of effluent from the tailings pond will occur from time to time during the open-water season. Teck Metals has also requested an exemption from preliminary screening because the Proponent believes that the project has not been modified since it was licenced previously. Teck Metals has requested a licence term of 10 years.

Reviewers are invited to submit questions, comments and recommendations using the Online Review System (ORS) by **September 21, 2017**. Please provide comments and recommendations on the:

- **Renewal Application;**
- **Draft Security Estimate;**
- **Preliminary Screening Exemption Request;**
- **Engagement Plan and Log;**
- **Water Management Plan (Water Treatment Manual);**
- **Spill Contingency Plan;**
- **Operations and Maintenance Plan; and**
- **Closure and Reclamation Plan.**

**Please note that a draft water licence will be added to this review by September 22, 2017. At that time, additional weeks will be provided for the review of the draft licence.

The purpose of the draft Licence is to allow parties to comment on Board staff's suggested conditions. These draft materials are not intended to limit in any way the scope of parties' comments. The Board is not bound by the contents of the draft Licence and will make its decision at the close of the proceeding on the basis of all the evidence and arguments filed by all parties.

All documents that have been uploaded to this review are also available on our public registry. If you have any questions or comments regarding this Application or using the Online Review System, please contact Kierney Leach at 867-766-7470 or kleach@mvlwb.com.

General Reviewer Information:	This Review Item has also been distributed by fax to the following organizations: Fort Resolution Métis Council Trudy King (867)394-3322; Fieldworker.frmc53@northwestel.net; Hay River Metis Council Trevor Beck President (867)874-4472; hrmc@northwestel.net; NWT Metis Nation Tim Heron NWTMN IMA Coordinator (867)872-3586; rcc.nwtmn@northwestel.net; Fort Liard Metis Local #67 Ernie McLeod President (867)770-4573; Fort Simpson Métis Local #52 Marie Lafferty President (867)695-2040; Hay River Metis Council Trevor Beck President (867)874-4472; hrmc@northwestel.net; Northwest Territory Métis Nation Garry Bailey c/o Tim Heron NWTMN IMA Coordinator (867)872-3586; rcc.nwtmn@northwestel.net;
Contact Information:	Jen Potten 867-766-7468 Julian Morse 867-766-7453 Kierney Leach 867-766-7470

Comment Summary

Teck Metals Ltd. (Proponent)				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Staff Response**
1	General File	**Comment** (doc) Teck Metals Ltd. - Comments on Draft Licence **Recommendation**		Noted.
Environment and Climate Change Canada: Bradley Summerfield				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Staff Response**
1	General File	**Comment** (doc) ECCC cover letter **Recommendation**		Noted.
2	Renewal Application Missing Figures	**Comment** Figure 4 (Total Zinc in Tailings Pond Water, Pre-treatment), Figure 6 (Total Zinc Concentrations in Receiving environment compared to CCME), and Figure 7 (Total zinc concentrations at Station 35-6) are missing from pages 3 and 4 of the renewal application. **Recommendation** ECCC recommends that the Proponent submit Figures 4, 6, and 7, and associated data.	**Sep 22:** The missing Figures 4 and 6 have been corrected and are now included in the application document. The caption to Figure 7 was a formatting error and the reference has now been removed from the application document.	The proponent has updated these pages of the application.
3	Zinc concentrations in the Tailings ponds	**Comment** It is mentioned that zinc is the main contaminant of concern in the tailings ponds that requires treatment. However, given that figure 4 is missing, it is not apparent what the concentrations are prior to treatment as these results are not included elsewhere in the document. **Recommendation** ECCC recommends that the Proponent provide the results of the water quality prior to treatment.	**Sep 22:** The results of the water quality prior to treatment is shown in Figure 4 which is now included in the application document	Acceptable response.

4	Removal of SNP Station 35-6	**Comment** The Proponent has requested to remove sampling station 35-6 from the SNP program based on the well being dry in recent history and being below guidelines when it was last able to be sampled. The water license indicates that this sampling station is "muskeg surface water 1.5 miles due south of station number 35-5" however there is no indication of whether this location was selected to act as a reference or to be sampled for potential contamination. **Recommendation** ECCC recommends that the Proponent indicate what SNP 35-6 was originally established to monitor for and based on this discuss whether it is more appropriate to establish a new location or discontinue sampling altogether.	**Oct 3:** The SNP stations were originally established during operations prior to the 1990s and unfortunately the rationale for the location cannot be determined. With that being said, the sites can be described as follows. Location 35-1B discharges to muskeg via a defined channel and the nearest monitoring stations are 35-4 and 35-5. Station 35-4 is directly connected to 35-1B, and 35-6 further downstream is connected to 35-4. This is turn drains to 35-12 and 35-10, which are both located on the shore of Great Slave Lake. Based on the site locations and review of the data, the analytical results collected from SNP 35-6 for the past ten years confirms there is no 'environmental protection' value to the continuation of sampling this station. Zn concentrations of SNP 35-6 have consistently been lower than CCME guidelines for the protection of aquatic life from 1996 - 2011. From 2012 to 2016 this station was dry and therefore no sample was available. As noted above, station 35-4 is located immediately downstream of the treated effluent discharged at station 35-1B and is directly connected upstream of station 35-6. Based on the past 10 year's data, station 35-4 has consistently shown Zn levels well below CCME guidelines for the protection of aquatic life. Downstream stations 35-10 and 35-13 have also reported Zn concentrations well below	Acceptable response.

			CCME guidelines with the exception of 2008. In summary, Zn concentrations over the last 10 years for stations 35-4, 35-6 and 35-13, which are believed to be directly downstream of one another show a good correlation all with Zn concentrations below CCME guidelines. Note that Station 35-5 which is located near, but not necessarily hydraulically connected to 35-6 reported Zn concentrations slightly above CCME guidelines from 1996 to 2009 however the reported values from this station fell well below CCME guidelines between 2009 and 2016. The relatively higher Zn concentrations reported at station 35-5 (1996-2009) as compared to stations upstream and downstream (35-4, 35-6, 35-10, 35-13) suggest the Zn concentrations at 35-5 were not necessarily related to the Pine Point water treatment operation. However, as noted the Zn concentrations at 35-5 have been consistently below CCME guidelines since 2009. The data supporting the above statements has been uploaded to the registry in an excel file, under Tab ‘All Downstream Zn’, and this excel file is also attached below. **Oct 3:** Supporting Data (Tab:39;All Downstream Zn)	

5	Sampling Frequency	**Comment** The Proponent has requested to reduce laboratory sampling frequency from once per day to once per week with the rationale that the Hach system they employ is sufficient to test for zinc concentrations to ensure they are meeting their effluent quality criteria. Prior to reducing sampling frequency a comparison on the accuracy of the Hach system compared to laboratory analysis should be completed to ensure the two are comparably accurate so as to not mistakenly discharge water above effluent quality criteria due to measurement error. **Recommendation** ECCC recommends that the Proponent provide a comparison of water quality results using the Hach system and laboratory based analysis to provide support for moving from daily sampling to weekly sampling.	**Oct 3:** A comparison of water quality results using the Hach system and laboratory analysis has been completed and shows a good correlation. The data supporting this statement has been uploaded to the registry in an excel file, and is also attached below. **Oct 3:** WQ Data	Acceptable response.
GNWT - ENR: Central Email GNWT				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Staff Response**
12	General File	**Comment** (doc) ENR Letter with Comments and Recommendations **Recommendation**		Noted.

25	General File	**Comment** (doc) ENR Letter with Comments and Recommendations on Draft Water Licence **Recommendation**		Noted.
1	Topic 1: Zinc Water Quality Trends	**Comment** On page 3 of the renewal application, ENR notes that there is a reference regarding declining zinc trends. There is reference to a figure titled "Figure 4: Total Zinc in Tailings Pond Water - Pre-Treatment"; however, the figure is missing. Also, on Page 4, there is a figure titled "Figure 6: Total Zinc Concentrations in Receiving Environment Compared to CCME". That figure is missing as well. Further in the application, within the Closure and Reclamation Plan, there is a reference that "(i)n the past 10 years there has been no apparent trend of either increasing or decreasing zinc concentrations in the tailings pond water (SRK letter report 'Pine Point Mine - Review of Tailings Discharge Monitoring Data', December 14, 2006)." This is inconsistent with the statement on page 3 that zinc concentrations are declining. **Recommendation** 1) ENR recommends that Figure 4, Figure 6 and any other figures be provided outlining trends in zinc concentrations along with all raw data (in excel format) should also be provided with the application.	**Sep 22:** The missing Figures 4 and 6 are now available in the application document. The raw data for all water licence SNP stations as well as influent quality will be provided.	The proponent has updated these pages of the application.

2	None	**Comment** None **Recommendation** 2) ENR recommends that statements regarding zinc trends be clarified and references in the various plans be updated or revised as required.	**Oct 3:** The trends analysis included in the 2006 Closure and Reclamation Plan indicates that there has been no apparent trend of either increasing or decreasing zinc concentrations in the tailings pond water. Figure 4 in the 2017 application demonstrates a slight decreasing trend. A revised figure including a trend linear regression line has been uploaded to the registry in an excel file titled: Pine Point WQ Data Compilation WL Application Response to Reviewers 20170930, tab 'Pre-Treatment_Zn' **Oct 3:** See tab:Pre-Treatment_Zn; in the attached excel file.	Acceptable response.
3	Topic 2: Surveillance Network Program - Signage	**Comment** The renewal application referenced that a 2014 Annual Inspection Report noted that SNP signage was absent. It is unclear if this has been remedied. **Recommendation** 1) ENR requests an update on SNP signage.	**Sep 22:** Signage has been posted at all the SNP locations. Photographs of the signage is available if needed.	Acceptable response.
4	Topic 3: Surveillance Network Program	**Comment** Teck Metals Inc. (Teck) has requested that SNP Station 35-6 be removed from the Surveillance Network Program (SNP) as it has been dry since 2011. They also note that when water is present at that location, it has been below CCME guidelines. However, the figure in this section titled "Figure 7: Total Zinc Concentrations at Station 35-6" is missing. Again, ENR would like to review this figure and all historic data before making a determination about the future of SNP	**Sep 22:** The caption to Figure 7 was a formatting error and the reference has now been removed from the application document. The water quality at SNP station 35-6 is included as Figure 6 in the application document.	Acceptable response.

		35-6. Regarding the purpose of this SNP station, ENR would like to know more about the background of this site and its selection before ENR can agree to remove it from the SNP. If Teck or the MVLWB has any background information on the selection and purpose of this SNP station, please provide it such that a more thorough evaluation of removal of this site can be made. **Recommendation** 1) ENR recommends that Figure 7 be provided as well all historical information outlining zinc concentrations and absence of water at SNP Station 35-6.		
5	None	**Comment** None **Recommendation** 2) ENR recommends that Teck or the MVLWB provide any background as to the purpose and intent of this SNP station and if it is still required moving forward. Options could include moving the station to another area if it is beneficial to the operator and the MVLWB.	**Oct 3:** The SNP stations were originally established during operations prior to the 1990s and unfortunately the rationale for the location cannot be determined. With that being said, the sites can be described as follows. Location 35-1B discharges to muskeg via a defined channel and the nearest monitoring stations are 35-4 and 35-5. Station 35-4 is directly connected to 35-1B, and 35-6 further downstream is connected to 35-4. This is turn drains to 35-12 and 35-10, which are both located on the shore of Great Slave Lake. Based on the site locations and review of the data, the analytical results collected from SNP 35-6 for the past ten years confirms there is no "environmental protection" value to the continuation of sampling this station. Zn concentrations of SNP 35-6	Board staff have searched through old paper records and note that the SNP locations were discovered to have been established during mine operations, prior to 1975. There is little in record from this time, and therefore rationale for SNP station location placement is not available. Teck Metals has provided an acceptable response.

			have consistently been lower than CCME guidelines for the protection of aquatic life from 1996 - 2011. From 2012 to 2016 this station was dry and therefore no sample was available. As noted above, station 35-4 is located immediately downstream of the treated effluent discharged at station 35-1B and is directly connected upstream of station 35-6. Based on the past 10 year's data, station 35-4 has consistently shown Zn levels well below CCME guidelines for the protection of aquatic life. Downstream stations 35-10 and 35-13 have also reported Zn concentrations well below CCME guidelines with the exception of 2008. In summary, Zn concentrations over the last 10 years for stations 35-4, 35-6 and 35-13, which are believed to be directly downstream of one another show a good correlation all with Zn concentrations below CCME guidelines. Note that Station 35-5 which is located near, but not necessarily hydraulically connected to 35-6 reported Zn concentrations slightly above CCME guidelines from 1996 to 2009 however the reported values from this station fell well below CCME guidelines between 2009 and 2016. The relatively higher Zn concentrations reported at station 35-5 (1996-2009) as compared to stations upstream and downstream (35-4, 35-6, 35-10, 35-13) suggest the Zn concentrations at 35-5	

			were not necessarily related to the Pine Point water treatment operation. However, as noted the Zn concentrations at 35-5 have been consistently below CCME guidelines since 2009. The data supporting the above statements has been uploaded to the registry in an excel file titled: Pine Point WQ Data Compilation WL Application Response to Reviewers 20170930, tab 'All Downstream Zn' **Oct 3:** See tab:All Downstream Zn; in the attached excel file.	
6	Topic 4: Sampling Frequency	**Comment** The second SNP change that Teck is requesting is a reduced monitoring frequency of treated effluent from daily to weekly. The rationale provided is that on-site operators are using a Hach kit to make any operational changes during treatment and as such Teck does not believe laboratory tests adds value nor does it improve efficiency. There has been no information provided regarding the correlation between the laboratory results and the field testing performed by the Hach kits. Laboratory samples are required for effluent release for compliance assessment purposes as DL and methods are controlled. Field meters are useful tools; however, accuracy can vary and their precision is based on frequent maintenance and calibration. ENR request an analysis of laboratory sample results to field results (e.g. correlation plots) for problem parameters	**Oct 3:** A comparison of water quality results using the Hach system and laboratory analysis has been completed and shows a good correlation. The data supporting this statement has been uploaded to the registry in an excel file titled: Pine Point WQ Data Compilation WL Application Response to Reviewers 20170930, tab '2017_Zn_FieldvsLab' **Oct 3:** See tab: 2017_Zn_FieldvsLab in the attached excel file	Acceptable response.

		such as zinc such that reviewers can assess this request more thoroughly. **Recommendation** 1) ENR recommends that Teck provide additional correlations of historical laboratory and field sampling results for review and evaluation. This information will be used to assess Teck's request.		
7	Topic 5: 2016 Water Quality	**Comment** ENR makes the following comments in relation to the 2016 Water Quality Data presented in Section 6.8 of the Mining Industry Questionnaire as they relate to the Effluent Quality Criteria (EQCs) in Part C of the Water Licence: ENR notes that the pH range of effluent in 2016 was 7.63 - 10.1. Adverse impacts may occur at higher pH ranges; however, Part D of the Water Licence only includes a minimum pH value of 6. ENR believes that a higher pH limit should also be included. CCME recommends a pH range of 6.5 - 9.0 for freshwater environments. . There are EQCs for arsenic and cyanide in Part D; however, these parameters are not reported on in Section 6.8. . The maximum concentration for suspended solids in the Water Licence is listed as 50 mg/L whereas the range in 2016 in Section 6.8 is listed as 78 mg/L. Result of greater than 50 mg/L would be non-compliant. The cause of the non-compliance event(s) has not been noted. Further details should be included in the application including if and when notice	**Oct 3:** As per ENRs recommendations regarding water quality. The treatment for removing zinc from the influent relies on the addition of lime. As shown in the pH vs time and Zn vs time plots, found in the in an excel file titled: Pine Point WQ Data Compilation WL Application Response to Reviewers 20170930, tabs, 'pH vs time' and zn vs time', recently uploaded to the registry, the trend of lower treated effluent pH in recent years coincides with elevated zinc. In general, total zinc decreases with increased pH. From 1991 to 2010, the effluent pH was essentially above 10 and zinc concentrations were less than 0.5 mg/L. From 2011 to present, the pH was lower (often less than 10) and zinc concentrations were generally greater than before 2011 but still less than 0.5 mg/L. The current water treatment configuration does not allow for the reduction of a pH less than 9.0. Due to the operational challenges and the relationship between Zn and pH. Teck proposes an average upper range of 10.0	Thank you for your response. Please see GNWT-ENR comment 13 below (added on Oct 6 during review of draft Licence), and Board staff response.

		was provided to the ENR inspector and/or the Board. **Recommendation** 1) ENR recommends the following related to water quality: ENR recommends an upper range of 9.0 be added to the pH limit in Part D of the Water Licence; ENR recommends that a range for arsenic and cyanide from 2016 be provided, including any previous years for comparison. ENR requests additional information on any suspended solids exceedances in 2016 and an outline of action that was taken as a result. Any information about previous suspended solids results should also be provided for comparison (e.g. 2015, 2014, etc.).	be added to the pH limit with a maximum upper range of 10.5. As shown in Teck's 2016 Annual Water Licence Report and on the SNP 2016 tab excel file titled: Pine Point WQ Data Compilation WL Application Response to Reviewers 20170930 recently uploaded to the registry, the pH readings of all SNP stations were below 8.2 which is well below CCME guidelines for the protection of aquatic life. . Tabs '2016 Results Summary' and '35-1B CN & As' found in the excel file titled: Pine Point WQ Data Compilation WL Application Response to Reviewers 20170930 recently uploaded to the registry provide the 2016 Arsenic data as well as the previous 10 years of Arsenic data for station 35-1B. This data supports the conclusion that arsenic is not a constituent of concern with results reporting well below the previous license limits as well as CCME guidelines. Tabs '2016 CN data' and '35-1B CN & As' in the excel file titled: Pine Point WQ Data Compilation WL Application Response to Reviewers 20170930 recently uploaded to the registry provides the 2016 CN data and the previous 10 years of CN data for station 35-1B. CN is reported near or below detection limits for the duration of the previous 10 year licence term. This data supports the conclusion that cyanide is not a constituent of concern. Based on the data for both arsenic and cyanide	

			Teck respectfully requests that monitoring for both arsenic and cyanide be eliminated from the monitoring requirements of the renewed water license. . A sample collected on August 1, 2016 reported a TSS result of 78 mg/L. Teck immediately followed up with the lab regarding the result and the lab reported that the result should have been 17 mg/L. The lab's explanation for the error is perhaps a transcription error or wrong sample. A record of this correspondance is found on tab 'TSS explanation' in the excel file titled: Pine Point WQ Data Compilation WL Application Response to Reviewers 20170930 recently uploaded to the registry. **Oct 3:** See tab: TSS sxplanation' in the attached excel file.	
8	Topic 6: Closure Planning	**Comment** The 2006 Closure Plan Update identifies that water will be treated until such time as the water quality improves to a level that it can be discharged without treatment. Teck does not provide an estimate of the time required for this to occur. This is troublesome for ENR as the GNWT must be secured against all current liability which could include more permanent treatment situations (e.g. 50 years, 100 years, etc.). It is acknowledged however, there may be opportunity to reduce or optimize treatment at the facility over time, for example: divert	**Oct 3:** Teck will update the Closure Plan to include closure strategies, methods and activities that are intended to set closure goals, objectives and criteria. However, the development of these will require a significant amount of technical evaluation and engineering studies. Although these studies will not be overly onerous as individual studies each study completed will depend on the results of its predecessor in order to formulate an accurate long term prediction of water quality leaving the site. The implications of this water quality to the recieving	Noted. Acceptable response.

		clean water; treat smaller volumes; remove dams/barriers; passive treatment options; etc. Closure planning in the NWT has evolved, and the MVLWB has issued Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories (the Closure Guidelines). The Closure Guidelines recommend using an objectives-based approach for closure planning. The process identifies closure goals that guide the selection of closure objectives which are confirmed with measureable closure criteria. These are then supported by developing strategies, methods and activities that will lead to successful closure of the site. This systematic approach helps to define other aspects of the mine closure process like security because closure activities, their scope, frequency and duration can be estimated monetarily. Further, this approach allows for clear distinctions of when security can be returned and successful reclamation has been achieved. ENR notes that this final state may be decades away for this facility. Teck should update the 2006 Reclamation Plan into an objectives based format. This would include identifying criteria for final water quality and estimating timelines for when these criteria would be met. **Recommendation** 1) ENR recommends	environment will help define the most appropriate mitigation, if any is required, as well as its the potential cost and time and level of effort to implement. Therefore, Teck respectfully requests that the MVLWB allow Teck to complete these evaluations and studies as a requirement under the renewed water license with the a commitment to submit the results of these analyses and studies by December 31, 2020. Given the uncertainty of our ability at this time to predict at what time in the future the 'status' water management of the site can be reduced to a more passive nature Teck has committed to an increase in the site security bond equal to the maintenance and water treatment costs for a 20-year period, 10 years longer than the license term requested in the approved renewal submission. Please refer to the recently amended RECLAIM model found on tabs RECLAIM Water Treatment and RECLAIM PostClosure, in the excel file titled: Pine Point WQ Data Compilation WL Application Response to Reviewers 20170930 recently uploaded to the registry. This excel file is attached below. **Oct 3:** See tabs: RECLAIM Water Treatment and RECLAIM PostClosure; in the attached excel document.	

		that Teck update the 2006 Closure Plan to include closure strategies, methods and activities that are intended to meet set closure goals, objectives and criteria. The timing of this submission, post renewal, should be determined by the Board and included in the Water Licence.		
9	Topic 7: Security Estimate	**Comment** Teck has applied for a 10 year Water Licence term, and has provided a security estimate that includes provisions for carrying out 10 years of water treatment and 10 years of site monitoring and inspection. ENR has issues with this approach since it does not align with the requirements under the Mine Site Reclamation Policy for the Northwest Territories (note the GNWT has adopted this Policy on an interim basis until such time as the GNWT develops its own). The Mine Site Reclamation Policy outlines that the purpose of the reclamation security is to provide access to sufficient funds to complete all the activities required to bring a site to final closure, including conducting any long-term monitoring that is required to confirm that all closure objectives have been met. As such, security is to include activities that are to be completed beyond the current Water Licence term. The current estimate only considers 10 years of water treatment and site monitoring. Further, the 2006 the Closure Plan includes a second stage of activities that will be implemented once	**Oct 3:** Teck is currently not in a position to provide a security estimate to include second stage activities until the appropriate closure planning options and tehnical analysis have been conducted (see response to GNWT #8 above). At this time Teck is prepared to continue water treatment activities at the site for the long term. Teck is a strong company with a strong commitment to evaluating and implementing options for further closure work that could eliminate the need for active water treatment at some point. In order to provide the security for water treatment and eventually the second stage activities, Teck believes that providing security for water treatment and maintenance for 20 years is sufficient to cover the site's financial liabilities for the term of the renewed water license (10 years) and until the revised closure plan is provided. Teck is requesting the submission date for this plan to be December 2020 (see answer to GNWT comment # 8).	Acceptable response.

		the tailings contact water no longer requires treatment. This second stage will include activities such as constructing a spillway through the north dyke and re-contouring the dykes to reduce slope angle; however, these activities are not included in the security estimate. This reclamation activity is part of the GNWT's associated liability for the tailings pond facility and as such must be reflected in the current security estimate. As noted in a previous comment, the Closure Plan should be updated to include Closure Goals, Objectives and Criteria for the site. The update should provide information on how much time will be required to fully reclaim the site, and will help to inform estimates on the length of time active treatment and monitoring will be conducted. Additionally, the closure criteria will be used to confirm that the closure objectives have been met, and when security can be returned. ENR is willing to work with Teck to help determine the scope and duration of remediation activities such as long term water treatment. **Recommendation** 1) ENR recommends that the security estimate be updated to include the second stage activities such as constructing a spillway and re-contouring the dykes.		
10	None	**Comment** None **Recommendation** 2) ENR recommends	**Oct 3:** Teck is committed to evaluating and implementing options for further	Acceptable response.

		that the security estimate be updated to reflect the actual number of years of treatment and monitoring required before the site can be considered closed (e.g. 50 yrs, 100 yrs, etc.).	closure work that could eliminate the need for active water treatment in the future. Until the closure plan is updated with set closure objectives and accepted, Teck believes providing security for water treatment and maintenance for 20 years is sufficient to cover the site's financial liabilities for the term of the renewed water license (10 years) and until the revised closure plan is provided. Teck is requesting the submission date for this plan to be December 2020 (see answer to GNWT comment # 8).	
11	Topic 8: Security Estimate â€“ Net Present Value	**Comment** Teck has applied a Net Present Value (NPV) calculation to the security estimate, and has used a discount rate of 3.77%. This rate was reportedly developed using the procedure described in the Saskatchewan site reclamation program. ENR has two different issues with the proposal by Teck: a) The use of the 3.77% NPV discount rate itself; and, b) How the NPV discount rate has been applied. Information provided to ENR by Ernst & Young (Pers. Comm., July 19, 2017) indicates that a rate of around 2.0% would be more appropriate given current financial market conditions. In regards to the application of NPV, ENR's preferred practice is to apply it to capital or operating costs that will not be realized until some point in the future. ENR does not support using NPV for amounts that are required immediately, such as current	**Oct 3:** Following discussions with the GNWT Teck has re-run the RECLAIM model for the Pine Point site. Teck has reduced the discount rate to zero and ran the model for a 20 year time frame, 10 years longer than the license term requested. As shown in the cover letter of the original RECLAIM submitted as part of the approved license application, these costs are based on actual annual costs incurred to complete all maintenance activities, water treatment operations, inspections, SNP sampling, reporting and management of the site. By reducing the discount rate to 0 and calculating these costs for a 20 year period as opposed to 10 results with a total cost of $5,534,500 more than double of that proposed in the approved application and significantly higher than the $100,000 security the property was bonded for over the 10 year	Acceptable response.

		and near future (e.g. within the next 20 years) of water treatment and monitoring costs. These issues would be most efficiently addressed through continued meetings and discussion between Teck and the GNWT. **Recommendation** 1) The GNWT would like to discuss the use of NPV and an appropriate rate with the company given existing market conditions. Following these discussions a revised estimate would be prepared and submitted for the Boar's consideration.	term of the previous Type B Water License. The recalculated RECLAIM, which now also includes an allowance for sludge removal every five years from the treatment ponds is found on tabs 'RECLAIM Water Treatment' and 'RECLAIM PostClosure' in the excel file titled: Pine Point WQ Data Compilation WL Application Response to Reviewers 20170930 recently uploaded to the registry. Following Teck's revision of the Closure Plan (December 31, 2020 requested delivery date) Teck is prepared to renegotiate the this security amount with the GNWT and the Board if the findings of the revised closure plan warrant an adjustment to the security amount.	
The following comments were made during the review of the DRAFT LICENCE on October 6				
13	Draft Water Licence Comments Topic 1: Effluent Quality Criteria	**Comment** ENR notes that the MVLWB have added an upper limit of 9.0 to the pH limit as requested in our comments dated September 20, 2017. However, in their response dated October 3rd, 2017, Teck outlined the current water treatment configuration does not allow for the reduction of pH to less than 9.0. ENR recognizes that Teck's water treatment methods rely upon elevated pH to assist in precipitating metals (e.g. zinc), and notes that all SNP monitoring downstream of SNP 35-1B have showed	**Oct 13:** As mentioned, to date, all downstream SNP stations have reported pH readings less than 8.2. Throughout the last 10 year term of the water license all of the water quality discharged at station 35-1B has met the license discharge limits. Teck believes it is more appropriate to benchmark the water quality at this station against MMER as opposed to CCME guidelines given that the water discharged at this station is treated effluent. Teck agrees with using CCME guidelines as a benchmark for all SNP	Board staff agree with ENR, in that the Metal Mining Effluent Regulations restrict pH to a range of 6.0 - 9.5, and Board staff can only support a maximum upper limit of pH 9.5. Board staff recognize that Teck Metal's water treatment methods rely upon elevated pH to assist in precipitating metals (e.g. zinc), which makes it difficult to

		pH values less than 8.2, which is within CCME guidelines. However, SNP 35-1B does discharge directly into the receiving environment and CCME guidelines recommend that any discharge to the receiving environment have a pH between 6.5-9.0 in order to protect aquatic life. Also, the Metal Mining Effluent Regulations restrict pH to a range of 6.0 - 9. 5 (note: ENR understands that Teck does not fall under the MMER but has referenced the MMER as a guidance document in this case). As such, ENR can only support a maximum pH limit of 9.5. ENR recommends that Teck consider available treatment options to better neutralize and lower pH prior to discharge, and work towards installing a mechanism in order to achieve recommend pH. Options do exist, for example, an CO2 Gas Dispenser at the end of the Treatment Pond to reduce pH. ENR also notes that Teck has requested the removal of arsenic and cyanide sampling from the monitoring program. On October 3rd, Teck provided additional information outlining the concentrations of arsenic and cyanide at Station 35-1B which illustrates that these parameters are often below detection limits and have been consistently well below Licence limits over the past 10+ years. Regarding arsenic, it would be ENR's preference that arsenic remain in the Water Licence as it	stations downstream of 35-1B. Given the water treatment process for the Pine Point operation is a seasonal process that runs for approximately 3 to 6 weeks annually Teck respectfully requests a variance to the MMER limits throughout this treatment campaign allowing a maximum grab sample of a pH of 10 and a maximum average pH of 9.5 which is consistent with the MMER pH limit. At a minimum Teck requests this variance for the treatment season of 2018 in order to allow testing of treatment mechanisms or controls to lower pH to the existing treatment system which will allow Teck to meet the upper limit of 9.5 during the treatment seasons of 2019 through 2027. This one year exemption will be necessary in order to test and confirm possible additions to the treatment process within the short treatment season of 3 to 6 weeks.	maintain a pH of <9.5. Board staff also recognize that Teck Metal's has agreed to research and test treatment mechanisms or controls to lower pH in the existing treatment system, to help stay in compliance with a pH <9.5, and that this may take a year prior to implementation and compliance with all samples.

		is a component of a standard metal suite and is consistent in northern mining Licences issued by the Boards. Regarding cyanide, ENR is of the opinion that if cyanide was used in mineral processing at any time during the life of the Pine Point Mine, there still may be a potential that it could become an issue in the future. However, if Teck could provide information to the Board confirming that cyanide was not used at the Pine Point site during operations, ENR would be supportive of its removal from monitoring requirements. At this time, ENR recommends the continued monitoring of cyanide **Recommendation** 1) ENR supports a maximum pH limit of 9.5. ENR also recommends that Teck install treatment mechanisms or controls to lower pH if pre-release effluent has elevated pH.		
14	None	**Comment** None **Recommendation** 2) ENR recommends that arsenic remain as a monitoring requirement of the Water Licence.	**Oct 13:** Thank you for your comment	Noted.
15	None	**Comment** None **Recommendation** 3) ENR recommends that cyanide remain as monitoring requirement of the Water Licence.	**Oct 13:** Thank you for your comment	Noted.

16	None	**Comment** None **Recommendation** 4) ENR recommends that Teck provide additional background on the use of cyanide at the Pine Point site or information on its original inclusion in the Water Licence.	**Oct 13:** Teck does not have any additional information to provide regarding cyanide use at the site.	Noted.
17	Topic 2: Closure	**Comment** ENR notes that the MVLWB have added a requirement for an updated Closure and Reclamation Plan as requested in our comments dated September 20, 2017. Of note, the Board has recommended that the Closure Plan be submitted by May 1, 2018 while Teck has recommended a submission date of December 31st, 2020 would be more appropriate. Given the relative stability of the site, i.e. no immediate concerns, ENR supports Teck's recommendation of December 31st, 2020 to provide a more complete assessment of the Pine Point site. However, ENR would like Teck to provide a research and study plan that would provide necessary detail and type of research or study it believes would be required to provide an updated Closure and Reclamation Plan. This submission should be required in the Water Licence and have a due date of May 1, 2018. **Recommendation** 1) ENR supports Tecks request to submit a detailed Closure and Reclamation Plan on December 31st, 2020.	**Oct 13:** Thank you for your comment	Noted, thank you for your comment.

18	None	**Comment** None **Recommendation** 2) ENR recommends that Teck submit a Research and Study Plan that details the type of research and study required to support an updated Closure and Reclamation Plan. This submission should be a requirement of the Water Licence and have a due date of May 1, 2018.	**Oct 13:** Teck agrees to this approach	Noted, thank you for your comment.
19	Topic 3: Surveillance Network Program â€“ Sampling Frequency	**Comment** Board staff has requested reviewer input on the proposal from Teck to reduce sampling frequency of treated effluent from daily to weekly. In our comments dated September 20, 2017, ENR requested additional information in this regard in order to be able to fully assess Teck's request. On October 3rd, 2017, Teck provided a comparison of monitoring results using the Hach system and laboratory results. ENR has completed a cursory review of the data provided and concurs with Teck's assessment that Hach system appears to have strong correlation with the lab analysis. Given that effluent quality is relatively stable over the summer months and the above correlations seem adequate, ENR concurs with Teck's request to reduce sampling from daily to weekly. However, Teck should provide all monitoring data from the Hach system as a component of the Surveillance Network Program reporting to provide a clear record of sample results. Further, Teck	**Oct 13:** Thank you for your comment	Noted, thank you for your comment.

		should provide all Hack system calibration and maintenance records as part of the SNP reports (e.g. type, frequency, calibration results, etc.). ENR notes that in the event that the correlation between the lab and test kit results becomes less stable, then it may be necessary to return to a frequency of daily laboratory analysis. **Recommendation** 1) ENR concurs with Teck's recommendation that sampling frequency of treated effluent be reduced from daily to weekly.		
20	None	**Comment** None **Recommendation** 2) ENR recommends that results from the Hach system monitoring be provided to the Board as a component of the Surveillance Network Program Report as currently required under Annex A.	**Oct 13:** Agree	Noted, thank you for your comment.
21	None	**Comment** None **Recommendation** 3) ENR recommends that Teck should also provide all calibration and maintenance records as part of the SNP submissions to ensure the Hack system is properly maintained.	**Oct 13:** Agree	Noted, thank you for your comment.
22	Topic 4: Surveillance Network Program â€“ SNP Station 35-6	**Comment** Board staff has requested reviewer input on the proposal from Teck to remove SNP station 35-6. In our comments dated September 20, 2017, ENR requested additional information in this regard in order to be able to fully assess Teck's request. Subsequently, Teck provided additional information in Figure	**Oct 13:** Agree	Noted, thank you for your comment.

		6 illustrating that zinc levels are below Licence limits and closer in range to CCME guideline at Station 35-6. Teck has also noted that the area has been dry since 2011 and there are logistical constraints associated with this station. ENR notes that the original rationale for establishment of this SNP station not clear, and requests that the Board provide this rationale. Seeing that SNP 35-6 is not an excessive distance from other SNP monitoring stations in the area (assumedly accessed by helicopter as well), ENR would prefer that Teck continue to monitor this station for flow for the next two years. If there is evidence of flow, a sample should be collected. If the station is dry, this should be noted and reported in the Annual Report. Once the two year period has elapsed, and no flow or no exceedences are noted, then Teck could request to amend the Water Licence SNP, or have the Inspector request an SNP change/discontinuance request to the Board. **Recommendation** 1) ENR recommends that monitoring at SNP 35-6 station continue for two years, and if at such time no flow or no exceedences are noted at the station, then Teck could request to amend the Water Licence SNP to remove this station, or have the Inspector request an SNP change/discontinuance request to the Board.		

23	Topic 5: Security	**Comment** In our comments dated September 20, 2017, ENR requested additional information regarding the long term closure strategy for the site in order to be able to fully assess environmental liabilities at the site, which was provided by Teck on October 3rd. Given the short turnaround between Teck's response and this submission, ENR requires additional time to assess the information provided by Teck. In addition, there are information gaps related to closure planning that may not be rectified until that process is more complete (see comments on closure planning above). As such, it may be difficult to provide a comprehensive estimate until that time. As per discussions with Board staff, ENR can provide an interim security assessment by Friday, October 13th, 2017 based on all information received to date with the understanding that this estimate will be reviewed in conjunction with the advancement of closure planning. **Recommendation** 1) ENR requests that an extension of one week be granted (October 13th) to assess new information provided by Teck Metals Inc. prior to making a formal recommendation regarding securities.	**Oct 13:** Agree	Noted.

24	None	**Comment** None **Recommendation** 2) ENR notes that the October 13th estimate will be an interim security estimate until such time that additional information is available following approval of an updated Closure and Reclamation Plan.	**Oct 13:** Agree	Noted.

September 20, 2017

Jen Potten
Regulatory Officer
Mackenzie Valley Land and Water Board
7th Floor – 4910 50th Avenue
P.O. Box 2130
Yellowknife, NT
X1A 2P6

Dear Ms. Potten,

Re: Teck Metals Inc.
Water Licence Renewal Application – MV2017L2-0007
Continuance of Water Monitoring and Management
Pine Point Tailings Impoundment Area
Request for Comment

The Department of Environment and Natural Resources (ENR), Government of the Northwest Territories (GNWT) has reviewed the application at reference based on its mandated responsibilities under the *Environmental Protection Act,* the *Forest Management Act*, the *Forest Protection Act, the Species at Risk (NWT) Act, the Waters Act* and the *Wildlife Act* and provides the following comments and recommendations for the consideration of the Board.

Topic 1: Zinc Water Quality Trends

Comment(s):

On page 3 of the renewal application, ENR notes that there is a reference regarding declining zinc trends. There is reference to a figure titled "Figure 4: Total Zinc in Tailings Pond Water – Pre-Treatment"; however, the figure is missing. Also, on Page 4, there is a figure titled "Figure 6: Total Zinc Concentrations in Receiving Environment Compared to CCME". That figure is missing as well.

Further in the application, within the Closure and Reclamation Plan, there is a reference that "(i)n the past 10 years there has been no apparent trend of either increasing or decreasing zinc concentrations in the tailings pond water (SRK letter

report 'Pine Point Mine – Review of Tailings Discharge Monitoring Data', December 14, 2006)." This is inconsistent with the statement on page 3 that zinc concentrations are declining.

Recommendation(s):

1) ENR recommends that Figure 4, Figure 6 and any other figures be provided outlining trends in zinc concentrations along with all raw data (in excel format) should also be provided with the application.

2) ENR recommends that statements regarding zinc trends be clarified and references in the various plans be updated or revised as required.

Topic 2: Surveillance Network Program - Signage

Comment(s):

The renewal application referenced that a 2014 Annual Inspection Report noted that SNP signage was absent. It is unclear if this has been remedied.

Recommendation(s):

1) ENR requests an update on SNP signage.

Topic 3: Surveillance Network Program

Comment(s):

Teck Metals Inc. (Teck) has requested that SNP Station 35-6 be removed from the Surveillance Network Program (SNP) as it has been dry since 2011. They also note that when water is present at that location, it has been below CCME guidelines. However, the figure in this section titled "Figure 7: Total Zinc Concentrations at Station 35-6" is missing. Again, ENR would like to review this figure and all historic data before making a determination about the future of SNP 35-6.

Regarding the purpose of this SNP station, ENR would like to know more about the background of this site and its selection before ENR can agree to remove it from the SNP. If Teck or the MVLWB has any background information on the selection and purpose of this SNP station, please provide it such that a more thorough evaluation of removal of this site can be made.

Recommendation(s):

1) ENR recommends that Figure 7 be provided as well all historical information outlining zinc concentrations and absence of water at SNP Station 35-6.

2) ENR recommends that Teck or the MVLWB provide any background as to the purpose and intent of this SNP station and if it is still required moving forward. Options could include moving the station to another area if it is beneficial to the operator and the MVLWB.

Topic 4: Sampling Frequency

Comment(s):

The second SNP change that Teck is requesting is a reduced monitoring frequency of treated effluent from daily to weekly. The rationale provided is that on-site operators are using a Hach kit to make any operational changes during treatment and as such Teck does not believe laboratory tests adds value nor does it improve efficiency.

There has been no information provided regarding the correlation between the laboratory results and the field testing performed by the Hach kits. Laboratory samples are required for effluent release for compliance assessment purposes as DL and methods are controlled. Field meters are useful tools; however, accuracy can vary and their precision is based on frequent maintenance and calibration.

ENR request an analysis of laboratory sample results to field results (e.g. correlation plots) for problem parameters such as zinc such that reviewers can assess this request more thoroughly.

Recommendation(s):

1) ENR recommends that Teck provide additional correlations of historical laboratory and field sampling results for review and evaluation. This information will be used to assess Teck's request.

Topic 5: 2016 Water Quality

Comment(s):

ENR makes the following comments in relation to the 2016 Water Quality Data presented in Section 6.8 of the Mining Industry Questionnaire as they relate to the Effluent Quality Criteria (EQCs) in Part C of the Water Licence:

- ENR notes that the pH range of effluent in 2016 was 7.63 – 10.1. Adverse impacts may occur at higher pH ranges; however, Part D of the Water Licence only includes a minimum pH value of 6. ENR believes that a higher pH limit should also be included. CCME recommends a pH range of 6.5 – 9.0 for freshwater environments.
- There are EQCs for arsenic and cyanide in Part D; however, these parameters are not reported on in Section 6.8.
- The maximum concentration for suspended solids in the Water Licence is listed as 50 mg/L whereas the range in 2016 in Section 6.8 is listed as 78 mg/L. Result of greater than 50 mg/L would be non-compliant. The cause of the non-compliance event(s) has not been noted. Further details should be included in the application including if and when notice was provided to the ENR inspector and/or the Board.

Recommendation(s):

1) ENR recommends the following related to water quality:

- ENR recommends an upper range of 9.0 be added to the pH limit in Part D of the Water Licence;

- ENR recommends that a range for arsenic and cyanide from 2016 be provided, including any previous years for comparison.

- ENR requests additional information on any suspended solids exceedances in 2016 and an outline of action that was taken as a result. Any information about previous suspended solids results should also be provided for comparison (e.g. 2015, 2014, etc.).

Topic 6: Closure Planning

Comment(s):

The 2006 Closure Plan Update identifies that water will be treated until such time as the water quality improves to a level that it can be discharged without treatment. Teck does not provide an estimate of the time required for this to occur. This is troublesome for ENR as the GNWT must be secured against all current liability which could include more permanent treatment situations (e.g. 50 years, 100 years, etc.). It is acknowledged however, there may be opportunity to reduce or optimize treatment at the facility over time, for example: divert clean water; treat smaller volumes; remove dams/barriers; passive treatment options; etc.

Closure planning in the NWT has evolved, and the MVLWB has issued Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the

Northwest Territories (the Closure Guidelines). The Closure Guidelines recommend using an objectives-based approach for closure planning. The process identifies closure goals that guide the selection of closure objectives which are confirmed with measureable closure criteria. These are then supported by developing strategies, methods and activities that will lead to successful closure of the site. This systematic approach helps to define other aspects of the mine closure process like security because closure activities, their scope, frequency and duration can be estimated monetarily. Further, this approach allows for clear distinctions of when security can be returned and successful reclamation has been achieved. ENR notes that this final state may be decades away for this facility.

Teck should update the 2006 Reclamation Plan into an objectives based format. This would include identifying criteria for final water quality and estimating timelines for when these criteria would be met.

Recommendation(s):

1) ENR recommends that Teck update the 2006 Closure Plan to include closure strategies, methods and activities that are intended to meet set closure goals, objectives and criteria. The timing of this submission, post renewal, should be determined by the Board and included in the Water Licence.

Topic 7: Security Estimate

Comment(s):

Teck has applied for a 10 year Water Licence term, and has provided a security estimate that includes provisions for carrying out 10 years of water treatment and 10 years of site monitoring and inspection.

ENR has issues with this approach since it does not align with the requirements under the Mine Site Reclamation Policy for the Northwest Territories (note the GNWT has adopted this Policy on an interim basis until such time as the GNWT develops its own). The Mine Site Reclamation Policy outlines that the purpose of the reclamation security is to provide access to sufficient funds to complete all the activities required to bring a site to final closure, including conducting any long-term monitoring that is required to confirm that all closure objectives have been met. As such, security is to include activities that are to be completed beyond the current Water Licence term.

The current estimate only considers 10 years of water treatment and site monitoring. Further, the 2006 the Closure Plan includes a second stage of activities that will be implemented once the tailings contact water no longer requires treatment. This second stage will include activities such as constructing a spillway

through the north dyke and re-contouring the dykes to reduce slope angle; however, these activities are not included in the security estimate. This reclamation activity is part of the GNWT's associated liability for the tailings pond facility and as such must be reflected in the current security estimate.

As noted in a previous comment, the Closure Plan should be updated to include Closure Goals, Objectives and Criteria for the site. The update should provide information on how much time will be required to fully reclaim the site, and will help to inform estimates on the length of time active treatment and monitoring will be conducted. Additionally, the closure criteria will be used to confirm that the closure objectives have been met, and when security can be returned.

ENR is willing to work with Teck to help determine the scope and duration of remediation activities such as long term water treatment.

Recommendation(s):

1) ENR recommends that the security estimate be updated to include the second stage activities such as constructing a spillway and re-contouring the dykes.

2) ENR recommends that the security estimate be updated to reflect the actual number of years of treatment and monitoring required before the site can be considered closed (e.g. 50 yrs, 100 yrs, etc.).

Topic 8: Security Estimate – Net Present Value

Comment(s):

Teck has applied a Net Present Value (NPV) calculation to the security estimate, and has used a discount rate of 3.77%. This rate was reportedly developed using the procedure described in the Saskatchewan site reclamation program.

ENR has two different issues with the proposal by Teck:

a) The use of the 3.77% NPV discount rate itself; and,
b) How the NPV discount rate has been applied.

Information provided to ENR by Ernst & Young (Pers. Comm., July 19, 2017) indicates that a rate of around 2.0% would be more appropriate given current financial market conditions.

In regards to the application of NPV, ENR's preferred practice is to apply it to capital or operating costs that will not be realized until some point in the future. ENR does not support using NPV for amounts that are required immediately, such as current

and near future (e.g. within the next 20 years) of water treatment and monitoring costs.

These issues would be most efficiently addressed through continued meetings and discussion between Teck and the GNWT.

Recommendation(s):

1) The GNWT would like to discuss the use of NPV and an appropriate rate with the company given existing market conditions. Following these discussions a revised estimate would be prepared and submitted for the Board's consideration.

Comments and recommendations were provided by ENR technical experts in the Water Resources Division and the South Slave Region and were coordinated and collated by the Environmental Assessment and Monitoring Section (EAM), Conservation, Assessment and Monitoring Division (CAM).

Should you have any questions or concerns, please do not hesitate to contact Patrick Clancy, Environmental Regulatory Analyst at (867) 767-9233 Ext: 53096 or email patrick_clancy@gov.nt.ca.

Sincerely,

Patrick Clancy
Environmental Regulatory Analyst
Environmental Assessment and Monitoring Section
Conservation, Assessment and Monitoring Division
Department of Environment and Natural Resources
Government of the Northwest Territories

October 6, 2017

Jen Potten
Regulatory Officer
Mackenzie Valley Land and Water Board
7th Floor – 4910 50th Avenue
P.O. Box 2130
Yellowknife, NT
X1A 2P6

Dear Ms. Potten,

Re: Teck Metals Inc. (Teck)
Water Licence Renewal Application – MV2017L2-0007
Continuance of Water Monitoring and Management
Pine Point Tailings Impoundment Area
Draft Water Licence Review
Request for Comment

The Department of Environment and Natural Resources (ENR), Government of the Northwest Territories has reviewed the draft Water Licence at reference based on its mandated responsibilities under the *Environmental Protection Act,* the *Forest Management Act*, the *Forest Protection Act, the Species at Risk (NWT) Act, the Waters Act* and the *Wildlife Act* and provides the following comments and recommendations for the consideration of the Board.

Draft Water Licence Comments

Topic 1: Effluent Quality Criteria

Comment(s):

ENR notes that the MVLWB have added an upper limit of 9.0 to the pH limit as requested in our comments dated September 20, 2017. However, in their response dated October 3rd, 2017, Teck outlined the current water treatment configuration does not allow for the reduction of pH to less than 9.0. ENR recognizes that Teck's water treatment methods rely upon elevated pH to assist in precipitating metals

(e.g. zinc), and notes that all SNP monitoring downstream of SNP 35-1B have showed pH values less than 8.2, which is within CCME guidelines. However, SNP 35-1B does discharge directly into the receiving environment and CCME guidelines recommend that any discharge to the receiving environment have a pH between 6.5-9.0 in order to protect aquatic life. Also, the Metal Mining Effluent Regulations restrict pH to a range of 6.0 – 9. 5 (note: ENR understands that Teck does not fall under the MMER but has referenced the MMER as a guidance document in this case). As such, ENR can only support a maximum pH limit of 9.5. ENR recommends that Teck consider available treatment options to better neutralize and lower pH prior to discharge, and work towards installing a mechanism in order to achieve recommend pH. Options do exist, for example, an CO2 Gas Dispenser at the end of the Treatment Pond to reduce pH.

ENR also notes that Teck has requested the removal of arsenic and cyanide sampling from the monitoring program. On October 3rd, Teck provided additional information outlining the concentrations of arsenic and cyanide at Station 35-1B which illustrates that these parameters are often below detection limits and have been consistently well below Licence limits over the past 10+ years.

Regarding arsenic, it would be ENR's preference that arsenic remain in the Water Licence as it is a component of a standard metal suite and is consistent in northern mining Licences issued by the Boards.

Regarding cyanide, ENR is of the opinion that if cyanide was used in mineral processing at any time during the life of the Pine Point Mine, there still may be a potential that it could become an issue in the future. However, if Teck could provide information to the Board confirming that cyanide was not used at the Pine Point site during operations, ENR would be supportive of its removal from monitoring requirements. At this time, ENR recommends the continued monitoring of cyanide

Recommendation(s):

1) ENR supports a maximum pH limit of 9.5. ENR also recommends that Teck install treatment mechanisms or controls to lower pH if pre-release effluent has elevated pH.

2) ENR recommends that arsenic remain as a monitoring requirement of the Water Licence.

3) ENR recommends that cyanide remain as monitoring requirement of the Water Licence.

4) ENR recommends that Teck provide additional background on the use of cyanide at the Pine Point site or information on its original inclusion in the Water Licence.

Topic 2: Closure

Comment(s):

ENR notes that the MVLWB have added a requirement for an updated Closure and Reclamation Plan as requested in our comments dated September 20, 2017. Of note, the Board has recommended that the Closure Plan be submitted by May 1, 2018 while Teck has recommended a submission date of December 31st, 2020 would be more appropriate.

Given the relative stability of the site, i.e. no immediate concerns, ENR supports Teck's recommendation of December 31st, 2020 to provide a more complete assessment of the Pine Point site.

However, ENR would like Teck to provide a research and study plan that would provide necessary detail and type of research or study it believes would be required to provide an updated Closure and Reclamation Plan. This submission should be required in the Water Licence and have a due date of May 1, 2018.

Recommendation(s):

1) ENR supports Teck's request to submit a detailed Closure and Reclamation Plan on December 31st, 2020.

2) ENR recommends that Teck submit a Research and Study Plan that details the type of research and study required to support an updated Closure and Reclamation Plan. This submission should be a requirement of the Water Licence and have a due date of May 1, 2018.

Topic 3: Surveillance Network Program – Sampling Frequency

Comment(s):

Board staff has requested reviewer input on the proposal from Teck to reduce sampling frequency of treated effluent from daily to weekly. In our comments dated September 20, 2017, ENR requested additional information in this regard in order to be able to fully assess Teck's request. On October 3rd, 2017, Teck provided a comparison of monitoring results using the Hach system and laboratory results.

ENR has completed a cursory review of the data provided and concurs with Teck's assessment that Hach system appears to have strong correlation with the lab analysis. Given that effluent quality is relatively stable over the summer months and the above correlations seem adequate, ENR concurs with Teck's request to reduce sampling from daily to weekly. However, Teck should provide all monitoring data from the Hach system as a component of the Surveillance Network Program

reporting to provide a clear record of sample results. Further, Teck should provide all Hack system calibration and maintenance records as part of the SNP reports (e.g. type, frequency, calibration results, etc.).

ENR notes that in the event that the correlation between the lab and test kit results becomes less stable, then it may be necessary to return to a frequency of daily laboratory analysis.

Recommendation(s):

1) ENR concurs with Teck's recommendation that sampling frequency of treated effluent be reduced from daily to weekly.

2) ENR recommends that results from the Hach system monitoring be provided to the Board as a component of the Surveillance Network Program Report as currently required under Annex A.

3) ENR recommends that Teck should also provide all calibration and maintenance records as part of the SNP submissions to ensure the Hack system is properly maintained.

Topic 4: Surveillance Network Program – SNP Station 35-6

Comment(s):

Board staff has requested reviewer input on the proposal from Teck to remove SNP station 35-6. In our comments dated September 20, 2017, ENR requested additional information in this regard in order to be able to fully assess Teck's request. Subsequently, Teck provided additional information in Figure 6 illustrating that zinc levels are below Licence limits and closer in range to CCME guideline at Station 35-6.

Teck has also noted that the area has been dry since 2011 and there are logistical constraints associated with this station. ENR notes that the original rationale for establishment of this SNP station not clear, and requests that the Board provide this rationale. Seeing that SNP 35-6 is not an excessive distance from other SNP monitoring stations in the area (assumedly accessed by helicopter as well), ENR would prefer that Teck continue to monitor this station for flow for the next two years. If there is evidence of flow, a sample should be collected. If the station is dry, this should be noted and reported in the Annual Report. Once the two year period has elapsed, and no flow or no exceedences are noted, then Teck could request to amend the Water Licence SNP, or have the Inspector request an SNP change/discontinuance request to the Board.

Recommendation(s):

1) ENR recommends that monitoring at SNP 35-6 station continue for two years, and if at such time no flow or no exceedences are noted at the station, then Teck could request to amend the Water Licence SNP to remove this station, or have the Inspector request an SNP change/discontinuance request to the Board.

Topic 5: Security

Comment(s):

In our comments dated September 20, 2017, ENR requested additional information regarding the long term closure strategy for the site in order to be able to fully assess environmental liabilities at the site, which was provided by Teck on October 3rd.

Given the short turnaround between Teck's response and this submission, ENR requires additional time to assess the information provided by Teck. In addition, there are information gaps related to closure planning that may not be rectified until that process is more complete (see comments on closure planning above). As such, it may be difficult to provide a comprehensive estimate until that time. As per discussions with Board staff, ENR can provide an interim security assessment by Friday, October 13th, 2017 based on all information received to date with the understanding that this estimate will be reviewed in conjunction with the advancement of closure planning.

Recommendation(s):

1) ENR requests that an extension of one week be granted (October 13th) to assess new information provided by Teck Metals Inc. prior to making a formal recommendation regarding securities.

2) ENR notes that the October 13th estimate will be an interim security estimate until such time that additional information is available following approval of an updated Closure and Reclamation Plan.

Comments and recommendations were provided by ENR technical experts in the Water Resources Division and the South Slave Region and were coordinated and collated by the Environmental Assessment and Monitoring Section (EAM), Conservation, Assessment and Monitoring Division (CAM).

Should you have any questions or concerns, please do not hesitate to contact Patrick Clancy, Environmental Regulatory Analyst at (867) 767-9233 Ext: 53096 or email patrick_clancy@gov.nt.ca.

Sincerely,

Patrick Clancy
Environmental Regulatory Analyst
Environmental Assessment and Monitoring Section
Conservation, Assessment and Monitoring Division
Department of Environment and Natural Resources
Government of the Northwest Territories

Environment and Climate Change Canada | Environnement et Changement climatique Canada

Environmental Protection Operations Directorate (EPOD)
Prairie & Northern Region (PNR)
5019 52nd Street, 4th Floor
P.O. Box 2310
Yellowknife, NT X1A 2P7

September 21, 2017

ECCC File: 5100 000 071/002
WLWB File: MV2017L2-0007

Jen Potten
Regulatory Coordinator
Mackenzie Valley Land and Water Board
7th Floor, 4922 48th St.
P.O. Box 2130
Yellowknife, NT X1A 2P6

Submitted via online review system

RE: MV2017L2-0007 – Teck Metals Ltd. – Type B Water Licence Renewal Application

Attention: Jen Potten

Environment and Climate Change Canada (ECCC) has reviewed the information submitted to the Mackenzie Valley Land and Water Board (MVLWB) regarding the above-mentioned renewal application and is submitting the attached comments to the MVLWB via the online review system. ECCC's specialist advice is provided based on our mandate pursuant to the *Canadian Environmental Protection Act,* the pollution prevention provisions of the *Fisheries Act*, the *Migratory Birds Convention Act,* and the *Species at Risk Act*.

Should you require further information, please do not hesitate to contact Gabriel Bernard-Lacaille at (867) 669-4746 or Gabriel.Bernard-Lacaille@Canada.ca

Sincerely,

Bradley Summerfield
Senior Environmental Assessment Coordinator, Environmental Assessment North (NT and NU), EPOD-PNR

Attachment: ECCC comments

cc: Georgina Williston, Head, Environmental Assessment North (NT and NU), EPOD-PNR
Gabriel Bernard-Lacaille, EA Coordinator, Environmental Assessment North, EPOD-PNR

DRAFT Type B Water Licence MV2017L2-0007
Teck Metals Ltd. – Pine Point Tailings Impoundment Area
Water Monitoring and Management

Table of Contents

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Part A: Scope and Definitions

1. Scope

a) This Licence entitles the Licensee to monitor and manage Water within the Tailings Impoundment Area, and dispose of Wastewater from the Main Pond at the former Pine Point Mine, Northwest Territories, as described in the Accepted Application.

b) This Licence is issued subject to the conditions contained herein with respect to the management of Water and the depositing of Waste of any type in any Waters or in any place under any conditions where such Waste or any other Waste that results from the deposit of such Waste may enter any Waters. Whenever new Regulations are made or existing Regulations are amended by the Commissioner in Executive Council under the Act, or other statutes imposing more stringent conditions relating to the quantity or type of Waste that may be so deposited or under which any such Waste may be so deposited this Licence shall be deemed, upon promulgation of such Regulations, to be automatically amended to conform with such Regulations.

c) Compliance with the term and conditions of this Licence does not relieve the Licensee from responsibility for compliance with the requirements of all applicable Federal, Territorial or municipal legislation.

d) The Licensee shall take every reasonable precaution to protect the environment.

e) In conducting its activities under this Licence, the Licensee shall make best efforts to consider and incorporate any scientific and Traditional Knowledge that is made available to the Licensee.

2. Definitions

Act - the *Waters Act*, S.N.W.T. 2014, c.18.

Accepted Application – the application and supporting documentation submitted August 22, 2017 and the additional information submitted during the regulatory process

Action Level – a predetermined qualitative or quantitative trigger which, if exceeded, requires the Licensee to take appropriate actions including, but not limited to: further investigations, changes to operations, or enhanced mitigation measures and reporting.

Analyst - an Analyst designated by the Minister under subsection 65(1) of the Act.

Board - the Mackenzie Valley Land and Water Board established under subsection 99(1) of the *Mackenzie Valley Resource Management Act*;

Construction - any activities undertaken to construct or build any components of, or associated with, the undertaking.

Dam Safety Guidelines - the Canadian Dam Association's (CDA) *Dam Safety Guidelines*, 2007. The scope and applicability of the Dam Safety Guidelines referred to in this Licence is presented in Section 1 of the Dam Safety Guidelines.

Discharge - the direct or indirect release of any Water or Waste to the Receiving Environment.

Engagement Plan - a document, developed in accordance with the Board's June 2013 *Engagement and Consultation Policy* and the *Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits* describes proposed engagement activities during the life of the undertaking.

Engineered Structures - any structure or facility related to Water Use or the deposit of Waste that is designed and approved by a Professional Engineer.

Freeboard - the vertical distance between the Water line and the effective containment crest on the upstream slope of a dam or dyke.

Groundwater - all Water below the ground surface.

Inspector - an Inspector designated by the Minister under subsection 65(1) of the Act.

Licensee – the holder of this Licence.

Main Pond – the pond located north of the mine tailings as outlined in Attachment 7, Figure 7 of the Accepted Application.

Maximum Average Concentration - the discrete average of four consecutive analytical results, or if less than four, the analytical results collected during a batch decant and as submitted to the Board in accordance with the sampling and analysis requirements specified in the Surveillance Network

Program.

Maximum Grab Concentration - a concentration of a parameter listed in the Licence that cannot exceeded in any one grab sample.

Minewater - Groundwater or any Water that is pumped or flows out of any underground working.

Minister - a duly appointed member of the Executive Council who is responsible for the *Waters Act* or the department responsible for administering that Act.

Modification - a change, other than an expansion, that does not alter the purpose or function of a structure.

Professional Engineer - a person who is registered with the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists in accordance with the *Engineering and Geoscience Professions Act.* S.N.W.T. 2006, V.16, as a Professional Engineer, and whose principal field of specialization is appropriate to address the components of the undertaking at hand.

Receiving Environment - the aquatic environment that receives any Water or Waste released from the undertaking.

Reclamation - activities which facilitate the return of areas affected by the undertaking to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment, human activities, and the surrounding environment.

Regulations - Regulations promulgated pursuant to section 63 of the Act.

Seepage - Water or Waste that drains through or escapes from any structure designed to contain, withhold, divert or retain Water or Waste.

Sewage - all Toilet Wastes and Greywater.

Spill Contingency Plan - a document, developed in accordance with Indian and Northern Affairs Canada's April 2007 *Guidelines for Spill Contingency Planning*, that describes the set of procedures to be implemented to minimize the effects of a spill.

Surveillance Network Program (SNP) - the totality of the sampling requirements detailed in Annex A of this Licence.

Traditional Knowledge - the cumulative collective body of knowledge, experience and values built up by a group of people through generations of living in close contact with nature. It builds upon the historic experiences of a people, and adapts to social, economic, environmental, spiritual and political change.

Tailings Impoundment Area - comprises the Tailings storage area and the Engineered Structures designed to contain Tailings as described in Teck's 2017 Operations and Maintenance Plan (Operations, Maintenance and Surveillance Manual for Pine Point Tailings Impoundment Area, 2017) and shown on Figure 2 (Pine Point Tailings Impoundment Area Site Plan) in the Accepted

Application.

Tailings – the materials rejected from the mill after the recoverable valuable minerals have been extracted.

Unauthorized Discharge - a Discharge or spill of any Water or Waste not authorized under this Licence.

Waste – any Waste as defined in section 1 of the Act.

Wastewater - any Water that is generated by activities or originates on site and contains Waste and includes, but is not limited to, runoff, Seepage, or Minewater.

Water - any Water as defined in section 1 of the Act.

Part B: General Conditions

1. The Licensee shall ensure a copy of this Licence is maintained on site at all times.

2. All references to policies, guidelines, codes of practice, statutes, Regulations or other authorities shall be read as a reference to the most recent versions.

3. All information submitted to the Board, as required by this Licence, shall:
   a) Be in accordance with the Mackenzie Valley Land and Water Board's March 2012, *Document Submission Standards;* and
   b) Include a section within each submission which identifies where the pertinent requirements of the Licence are addressed.

4. The Licensee shall operate in accordance with approved plans referred to in this Licence, including such revisions as may be made pursuant to the conditions of this Licence and as approved by the Board. If any plan is not approved by the Board, the Licensee shall revise the plan as directed and resubmit it to the Board for approval.

5. The Licensee shall comply with the **Schedules** which are annexed to and forms part of this Licence, and any changes to the Schedules as may be made from time to time by the Board.

6. The Licensee shall comply with the **Surveillance Network Program**, which is annexed to and forms part of this Licence, and any changes to the Surveillance Network Program as may be made from time to time by the Board.

7. The Schedules, Surveillance Network Program, and any compliance dates specified in this Licence may be changed at the discretion of the Board. If any date for a submission falls on a weekend or holiday, the submission shall be made on the following business day.

8. The Licensee shall maintain, to the satisfaction of an Inspector, the signs necessary to identify the stations of the Surveillance Network Program.

9. Meters, devices, or other such methods used for measuring the volumes of Water used and Waste Discharged shall be installed, operated, and maintained by the Licensee to the satisfaction of an Inspector.

10. Within 60 days following issuance of this Licence, the Licensee shall post signs to identify the Surveillance Network Program stations. All signs shall be located and maintained to the satisfaction of an Inspector.

11. The Licensee shall act in accordance with the **Engagement Plan,** once approved by the Board. The Licensee shall annually review the approved Plan and make any necessary revisions to reflect changes in operations, or as directed by the Board. The revised Plan shall include a brief summary of the changes made, and shall be submitted to the Board, for approval, at least 60 days prior to any proposed changes to the requirements in the approved Plan.

12. Beginning March 31, 2018, and no later than every March 31 thereafter, the Licensee shall submit to the Board, an **Annual Water Licence Report**, which shall be in accordance with Schedule 1,

Part C: Conditions Applying to Security Requirements

1. The Licensee shall post and maintain a security deposit in accordance with Schedule 2, item 1.

2. Upon request of the Board, the Licensee shall submit a revised Reclamation liability estimate utilizing the current version of RECLAIM or another method acceptable to the Board.

3. The amount of the security deposit required by Part C, item 1 and Schedule 2 may be revised by the Board based on estimates of the current Reclamation liability referred to in Part C, item 2 or based on such other information as may become available to the Board.

4. If the amount of the security deposit is revised by the Board as described under Part C, item 3, the Licensee shall post the revised amount with the Minister within 90 days of the Board giving notice of the revised amount.

Part D: Conditions Applying to Construction

1. The Licensee shall ensure that all structures intended to contain, withhold, divert, or retain Water or Wastes are designed, constructed, and maintained to prevent escape of Waste to the Receiving Environment.

2. The Licensee shall ensure that all Engineered Structures intended to contain, withhold, divert, or retain Water or Wastes and which meet the definition of a dam under the *Dam Safety Guidelines* are designed, constructed, and maintained to meet or exceed the *Dam Safety Guidelines.*

Part E: Conditions Applying to Modifications

1. The Licensee may, without written approval from the Board, carry out Modifications to the Engineered Structures provided that such Modifications are consistent with the terms of this License and the following requirements are met:

    a) The Licensee has notified the Board and an Inspector in writing of such proposed Modifications at least 60 days prior to beginning the Modifications;
    b) Such Modifications do not place the Licensee in contravention of either the License or the *Act*;
    c) The Board has not, during the 60 days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than 60 days;
    d) An Inspector has authorized the proposed Modifications and provided a letter of notification to the Board; and
    e) The Board has not rejected the proposed Modifications.

2. Modifications for which all of the conditions referred to in Part E, Item 1 have not been met, may be carried out only with written approval from the Board.

3. The Licensee shall provide to the Board as-built plans and drawings of the Modifications referred to in this License within 90 days of completion of the Modifications.

Part F: Conditions Applying to Waste and Water Management

1. The Licensee shall manage Water and Waste with the objectives of minimizing impacts on the quantity and quality of Water in the Receiving Environment through the use of appropriate mitigation measures, monitoring, and follow-up actions.

Management Plans and Monitoring Programs

2. The Licensee shall act in accordance with the **Water Management Plan,** once approved by the Board. The Licensee shall annually review the approved Plan and make any necessary revisions to reflect changes in operations, technology, chemicals, or fuels, or as directed by the Board. The revised Plan shall include a brief summary of the changes made, and shall be submitted to the Board, for approval, at least 60 days prior to any proposed changes to the requirements in the approved Plan.

3. The Licensee shall act in accordance with the **Operations and Maintenance Plan** in the Accepted Application, and submit a revised Plan by February 1, 2018, for approval, which shall include the addition of the following information:
   a) A description, including detailed rationale, of the monitoring endpoints (Action Levels) for each parameter monitored in the Surveillance Network Program;
   b) A description of response actions to be carried out if the Action Levels are exceeded; and
   c) Any other item as directed by the Board.

4. Once approved by the Board, the Licensee shall annually review the Operations and Maintenance Plan and make any necessary revisions to reflect changes in operations, or as directed by the Board. The revised Plan shall include a brief summary of the changes made, and shall be submitted to the Board, for approval, at least 60 days prior to any proposed changes to the requirements in the approved Plan.

Operations of Structures and Facilities

5. The Licensee shall maintain the Tailings Impoundment Area structures, and all other Waste storage facilities, to design specifications/engineering standards such that:
   a) The solids fraction of the Mill Tailings shall be permanently contained within the Tailings Impoundment Area;
   b) Seepage from the Tailings Impoundment Area is minimized;
   c) Any Seepage from the Tailings Impoundment Area that occurs and does not meet effluent quality requirements, as specified in Part F, item 10, shall be prevented from entering the Receiving Environment;
   d) A Freeboard limit of 1 meter is maintained at all times;
   e) The rate of Waste Discharge is controlled and measured at all times;
   f) Any constructed facilities that are eroded are repaired immediately; and
   g) Conditions for eventual closure and Reclamation of the Waste storage facilities are optimized.

Inspections of Structures and Facilities

6. The Licensee shall conduct daily inspections for erosion at Discharge points during periods of Discharge, or more frequently as directed by an Inspector. Records of these inspections shall be kept for review upon request of an Inspector.

7. The Licensee shall ensure that geotechnical inspections of the dams, dykes, culverts, spillways, and any other Engineered Structures are conducted annually, during the summer months, by a Professional Engineer and following any unforeseen extreme events (such as earthquakes, flooding, cracks, sinkhole formation, etc). The Licensee shall:
   a) Provide written notification to an Inspector a minimum of 2 weeks prior to inspections; and,
   b) Within 90 days of completing an inspection, the Licensee shall submit the Professional Engineer's full **Geotechnical Inspection Report** to the Board. The Report shall include a covering letter from the Licensee outlining an implementation plan to respond to any recommendations made by the Professional Engineer, including a rationale for any decisions that deviate from the Professional Engineer's recommendations.

8. The Licensee shall conduct inspections of the Tailings dams after spring freshet, once during the summer period, and again prior to spring freeze-up in the fall. Records of these inspections shall be kept for review upon request of an Inspector or the Board.

Effluent Quality Criteria

9. The Licensee shall provide Water sampling results from Surveillance Network Program (SNP) station 35-1b to an Inspector no later than five days prior to the first annual Discharge of treated Wastewater to the Receiving Environment. Discharge shall not commence until authorized in writing by an Inspector.

10. Discharges from SNP station 35-1b shall have a pH between 6.5 and 9.0 and meet the following EQC:

Parameter	Maximum Average Concentration (in mg/L)	Maximum Grab Concentration (in mg/L)
Total Arsenic		
Total Copper		
Total Cyanide		
Total Lead		
Total Zinc		
Ammonia as N		
Nitrate as N		
Total Suspended Solids		
Total Dissolved Solids		
BOD_5		
Faecal Coliforms		

mg/L = milligrams per l

Commented [KL2]: Board staff are seeking reviewer input on Discharge parameters and EQC.

Parameters listed have been extracted from current Licence MV2006L2-0013

11. If any of the EQC's as listed in Part F, item 10 are exceeded, the Licensee shall cease all Discharge to the Receiving Environment, shall notify the Board and an Inspector, and shall take the necessary corrective action to mitigate the exceedance, as outlined in the approved Operations and Maintenance Plan referred to in Part F, items 3 and 4, to the satisfaction of an Inspector immediately.

Part G: Conditions Applying to Contingency Planning

1. The Licensee shall act in accordance with the **Spill Contingency Plan**, once approved by the Board. The Licensee shall annually review the approved Plan and make any necessary revisions to reflect changes in operations, technology, chemicals, or fuels, or as directed by the Board. The revised Plan shall include a brief summary of the changes made, and shall be submitted to the Board, for approval, at least 60 days prior to any proposed changes to the requirements in the approved Plan.

2. If, during the period of this Licence, a spill or an Unauthorized Discharge occurs, or is foreseeable, the Licensee shall:
   a) Implement the Spill Contingency Plan referred to in Part G, item 1;
   b) Report the incident immediately via the 24-Hour Spill Reporting Line (867) 920-8130 in accordance with the instructions contained in the Spill Report Form NWT 1752/0593;
   c) Report each spill and Unauthorized Discharge to the Board and an Inspector within 24 hours; and
   d) Submit a detailed report on each spill and Unauthorized Discharge, including descriptions of root causes, response actions and any changes to procedures to prevent similar occurrences in the future, to the Board within 30 days.

3. All spills and Unauthorized Discharges of Water or Waste shall be reclaimed to the satisfaction of an Inspector.

Part H: Conditions Applying to Closure and Reclamation

1. The Licensee shall act in accordance with the **Closure and Reclamation Plan** in the Accepted Application, and submit a revised Plan, by May 1, 2018, for approval, in accordance with the Mackenzie Valley Land and Water Board and Aboriginal Affairs and Northern Development Canada's November 2013 *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories.*

2. The Licensee shall annually review the approved Closure and Reclamation Plan and make any necessary revisions to reflect changes in operations, technology, chemicals, or fuels, or as directed by the Board. The revised Plan shall include a brief summary of the changes made, and shall be submitted to the Board, for approval, at least 60 days prior to any proposed changes to the requirements in the approved Plan.

3. The Licensee shall carry out progressive Reclamation of areas as soon as is reasonably practicable.

Signed on behalf of the Mackenzie Valley Land and Water Board

Chair	**Witness**

Schedule 1:

Part B, item 1: Annual Water Licence Report

1. The **Annual Water Licence Report** referred to in Part B, item 12 of this Licence shall include, but not be limited to, the following:
   a) A summary of the calibration and status of the meters and devices referred to in Part B of this Licence;
   b) A summary of engagement activities conducted in accordance with the approved **Engagement Plan**, in Part B of this Licence, undertaken during the previous calendar year and shall include a brief description of activities planned for the forthcoming year;
   c) A summary of **Modification** activities and major maintenance work conducted in accordance with Part E of this Licence, undertaken during the previous calendar year;
   d) A summary of activities conducted in accordance with the approved **Water Management Plan**, required in Part F of this Licence, undertaken during the previous calendar year, including:
      i. A summary of updates or changes to the process or facilities required for the management of Water and Wastewater;
      ii. Daily, monthly and annual quantities in cubic metres of all Water and Wastewater collected, treated and pumped from the Post-Treatment Effluent Discharge point, identified by Discharge location;
   e) A summary of activities conducted in accordance with the approved **Operations and Maintenance Plan**, required in Part F of this Licence, undertaken during the previous calendar year, including:
      i. A summary of updates or changes to the process or facilities required for the management of the Tailings Impoundment Area;
      ii. A description of response actions that were carried out if any Action Levels were exceeded.
   f) A summary of activities conducted in accordance with the approved **Spill Contingency Plan**, required in Part G of this Licence, undertaken during the previous calendar year, including:
      i. A list and description for all Unauthorized Discharges that occurred during the previous calendar year, including the date, NWT spill number, volume, location, summary of the circumstances and follow-up actions taken, and status (i.e. open or closed), in accordance with the reporting requirements in Part G of this Licence; and
      ii. An outline of any spill training and communications exercises carried out during the previous calendar year.
   g) A summary of activities conducted in accordance with the **Closure and Reclamation Plan**, required in Part H of this Licence, completed during the year, a summary of updates or changes made, and an outline of any work anticipated for the next year;
   h) Any other details on Water Use or Waste disposal requested by the Board by November 1 of the year being reported;
   i) Tabular summaries of all data and information generated under the Surveillance Network Program and graphical summaries of parameters with effluent quality criteria referred to in Part F of this Licence, at the points of compliance (Surveillance Network Program station 35-1b), in excel, or an electronic and printed format acceptable to the Board. The Licensee

shall provide raw data in electronic form to the Board; and,

j) A summary of actions taken to address concerns, non-conformances, or deficiencies in any reports filed by an Inspector.

Schedule 2:

Part C, item 1: Security Requirements

1. Pursuant to section 35 of the Act and section 11 of the Waters Regulations, the Licensee shall post security totaling $_____

Commented [KL3]: Board staff seeking reviewer input on the security amount. The proponent suggested a security amount of: $2,171,954.

Annex A: Surveillance Network Program
Annexed to Water Licence MV2017L2-0007 Part B, item 6
Teck Metals Inc. – Pine Point Tailings Impoundment Area

Part A: Reporting Requirements

1. The effective date of this Surveillance Network Program (SNP) is _____.

Commented [Staff4]: To be determined by Board.

2. Beginning November 1, 2018, and every November 1 thereafter, the Licensee shall submit to the Board and an Inspector, a **Surveillance Network Program Report**, which shall include, but not be limited to the following:
   a) Electronic and tabular summaries of all data and information generated under the SNP for the month being reported, including rationale for SNP stations where samples were not collected and results and interpretation of quality assurance/quality control procedures;
   b) Graphical summaries and interpretation of the analytical results from the SNP samples collected at the points of compliance (SNP station 35-1) compared to the Effluent Quality Criteria under Part F of this Licence, for the previous two consecutive years;
   c) An explanation of any actions taken in response to any exceedances of the Effluent Quality Criteria;
   d) Information regarding the calibration and status of the meters and devices referred to in Part B of this Licence; and
   e) The coordinates of all SNP stations which were established within the month being reported, including an updated map identifying the locations of all the SNP stations.

3. More frequent sample collection may be required at the request of an Inspector.

4. All sampling, sample preservation, and analyses shall be conducted in accordance with methods prescribed in the current edition of American Public Health Association's (APHA) *Standard Methods for the Examination of Water and Wastewater* at the time of analysis, or by other such methods approved by an Analyst.

5. All analyses shall be performed in a laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA) for the specific analyses to be performed or as approved by an Analyst.

6. Prior to the collection of SNP samples, the Licensee shall submit to the Board and an Analyst, a **Quality Assurance and Quality Control Plan**, which shall include a list of techniques that will be used to collect and analyze samples collected under the SNP, for the purposes of quality assurance and quality control. The Analyst shall provide a recommendation to the Board. The Licensee shall not commence Discharge of Water until the Analyst has approved the Plan.

7. The Licensee shall adhere to the Quality Assurance and Quality Control Plan, once approved, and shall annually review the Plan and make any necessary revisions to reflect changes in Operations or as directed by the Board. Revisions to the Plan shall be submitted to the Board for a decision.

8. If the Quality Assurance and Quality Control Plan is not approved by the Analyst, the Licensee shall revise the Plan according to the Analyst's direction and re-submit it to the Analyst for a decision.

Part B: Site Descriptions and Monitoring Requirements

1. The location of sampling sites is subject to approval of an Inspector.

2. The sampling station locations and monitoring requirements are as follows:

SNP station 35-1

Description	The Tailings area Discharge at the decant structure.		
Location	60°53'41.3"N 114°25'30.7"W		
	35-1a: Main Pond		**35-1b: Post-Treatment Effluent Discharge**
Sampling Frequency	Weekly during Discharge	Water Level	Weekly during Discharge
Sampling Parameters	Total Copper; Total Lead; Total Zinc; pH; and Total Suspended Solids	3 times per year, once in spring, summer, and fall, during periods of open Water	Volume measured and recorded in cubic meters
Rationale	Compliance monitoring site, in accordance with EQCs listed in Part F.		
Status	Active during Discharge.		

SNP station 35-4

Description	Muskeg surface Water due north of Tailings area decant structures, 4.0 km from Great Slave Lake.
Location	60°54'41.8"N 114°26'17.2"W
Sampling Frequency	Annually; in Fall following Discharge.
Sampling Parameters	Total Copper; Total Lead; Total Zinc; and pH
Rationale	To ensure there are no mine related impacts to the Receiving Environment.
Status	Active.

Commented [KL5]: Board staff are requesting reviewer input on all parameters tested in the SNP for all stations. The parameters listed here have been taken from current Licence MV2006L2-0013.

Commented [KL6]: Note to reviewers: The previous licence MV2006L2-0013 had a frequency of "daily during discharge". Teck Metals Ltd. has proposed this change to weekly and provided some rationale in their application.

Board staff are looking for reviewer input on this sampling frequency.

SNP station 35-5

Description	Muskeg surface Water 1.6 km south of Great Slave Lake.
Location	60°54’27.7"N 114°26’17.2"W)
Sampling Frequency	Annually; in Fall following Discharge.
Sampling Parameters	Total Copper; Total Lead; Total Zinc; and pH
Rationale	To ensure there are no mine related impacts to the Receiving Environment.
Status	Active.

SNP station 35

Description	Muskeg surface Water 2.4 km due south of SNP station 35-5.
Location	60°55’26.6"N 114°28’25.4"W
Sampling Frequency	Annually; in Fall following Discharge.
Sampling Parameters	Total Copper; Total Lead; Total Zinc; and pH
Rationale	To ensure there are no mine related impacts to the Receiving Environment.
Status	Active.

Commented [KL7]: Teck Metals Inc. has requested the removal of this SNP station, and provided some rationale in the application for its removal.

Board staff are seeking reviewer input on the removal of this SNP station.

SNP station 35-9

Description	Great Slave Lake, 2.4 km southwest of Presquile Point.
Location	60°55’35.0"N 114°36’04.1"W
Sampling Frequency	Annually; in Fall following Discharge.
Sampling Parameters	Total Copper; Total Lead; Total Zinc; and pH
Rationale	To ensure there are no mine related impacts to the Receiving Environment.
Status	Active.

SNP station 35-10

Description	Great Slave Lake, 4.8 km east of Presquile Point.
Location	60°57’00.2"N 114°27’56.6"W
Sampling Frequency	Annually; in Fall following Discharge.
Sampling Parameters	Total Copper; Total Lead; Total Zinc; and pH
Rationale	To ensure there are no mine related impacts to the Receiving Environment.
Status	Active.

SNP station 35-12

Description	Muskeg surface Water 4.8 km north of Tailings area decant structures, 0.8 km south of Great Slave Lake shoreline.
Location	60°57’02.1"N 114°25’06.6"W
Sampling Frequency	Annually; in Fall following Discharge.
Sampling Parameters	Total Copper; Total Lead; Total Zinc; and pH
Rationale	To ensure there are no mine related impacts to the Receiving Environment.
Status	Active.

SNP station 35-13

Description	Muskeg surface Water, 4.0 km east of SNP Station 35-9, and 0.8 km south of Great Slave Lake shoreline.
Location	• 60°55’59.1"N 114°31’59.0"W
Sampling Frequency	Annually; in Fall following Discharge.
Sampling Parameters	Total Copper; Total Lead; Total Zinc; and pH
Rationale	To ensure there are no mine related impacts to the Receiving Environment.
Status	Active.

Signed the XX day of XX, XXXX on behalf of the Mackenzie Valley Land and Water Board

Chair	**Witness**

1 **Post Closure Water Treatment - Identified as long term/post-closure in 'Instructions' worksheet**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
ADDITION OF REAGENTS TO WTP						
H2O2		kg		#N/A	$0.00	$0
lime		kg		#N/A	$0.00	$13,000
ferric sulphate		kg		#N/A	$0.00	$0
ferrous sulphate		kg		#N/A	$0.00	$0
flocculents		kg		#N/A	$0.00	$0
Other				#N/A	$0.00	$0
LABOUR AND SUPPLIES						
Annual fuel		litres		#N/A	$0.00	$5,000
Annual power		kW-h		#N/A	$0.00	$0
Electrician/mechanic to maintain treatment plant		allow		#N/A	$0.00	$78,000
Equipment maintenance and parts		allow		#N/A	$0.00	$0
Misc. supplies, hoses, tools		allow		#N/A	$0.00	$2,300
Communications		allow		#N/A	$0.00	$5,100
Other *				#N/A	$0.00	$19,500
WTP WATER SAMPLING AND ANALYSES						
Sampling equipment		allow		#N/A	$0.00	$1,200
Analyses		allow		#N/A	$0.00	$3,500
Shipping to laboratory		allow		#N/A	$0.00	$1,000
Reporting		allow		#N/A	$0.00	$0
Other				#N/A	$0.00	$0
SITE ACCESS						
Road maintenance (incl. snow removal)		allow		#N/A	$0.00	$0
Winter road tariff		allow		#N/A	$0.00	$0
Truck rental		allow		#N/A	$0.00	$0
Air support		allow		#N/A	$0.00	$0
				Annual water treatment costs		$128,600
Number of years of water treatment		years	10			
					Total	$1,286,000

* Includes mob/demob, site support, and food

1 Post-Closure Monitoring & Maintenance:

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
MONITORING & INSPECTIONS						
Annual geotechnical inspection		each		#N/A	$0.00	$42,000
Survey inspection		each		#N/A	$0.00	$0
Regulatory costs*		each		#N/A	$0.00	$50,000
Site water monitoring (AEMP and SNP)		each		#N/A	$0.00	$29,625
- Active closure and flooding		each		#N/A	$0.00	$0
- Post pit flooding		each		#N/A	$0.00	$0
Air Quality Monitoring Program (AQMP)		each		#N/A	$0.00	$0
Wildlife Effects Monitoring Program (WEMP)		each		#N/A	$0.00	$0
Vegetation Monitoring		each		#N/A	$0.00	$0
Other				#N/A	$0.00	$4,500
COVER MAINTENANCE						
Repair erosion - infill gullies		allow		#N/A	$0.00	$0
Repair erosion - upgrade diversion ditches		allow		#N/A	$0.00	$0
Remove problem vegetation		allow		#N/A	$0.00	$0
Repair animal damage		allow		#N/A	$0.00	$0
Repair/upgrade access controls		allow		#N/A	$0.00	$0
Other				#N/A	$0.00	
SPILLWAY MAINTENANCE						
Repair erosion		m3		#N/A	$0.00	$5,000
Clear spillway and sludge removal		each		#N/A	$0.00	$17,000
CWTS MAINTENANCE						
Maintain flow, restore vegetation		allow		#N/A	$0.00	$0
POST-CLOSURE WATER TREATMENT						
Annual water treatment cost, from "Water Treatment"						$128,600
Subtotal, Annual post-closure costs						$276,725
Discount rate for calculation of net present value of post-closure cost, %				0.00%		
Number of years of post-closure activity				20	years	
Present Value of payment stream						$5,534,500

*Regulatory costs - annual reporting, management plans, progress reports etc.