

December 1, 2014
Project No.: 0255-025

Mr. Ivor McWilliams, Environmental Manager
Nyrstar Myra Falls Ltd.
PO Box 8000
Campbell River, BC, V9W 5E2

Dear Mr. McWilliams

**Re: 2014 Independent Review/Audit of Tailings Dam Safety Inspection and
Consequence Classification: Myra Falls Mine, BC**

1.0 INTRODUCTION

1.1. Background

BGC Engineering Inc. (BGC) was retained by Nyrstar Myra Falls Ltd. (Nystar) to conduct an independent third party review/audit of the 2014 Dam Safety Inspection (DSI) report for the tailings dams at Nyrstar's Myra Falls Mine, as well as a review of the failure consequence classification for the associated dams. The Myra Falls Mine is located in Strathcona-Westmin Provincial Park, approximately 90 km southwest of Campbell River, British Columbia (BC) and has been in operation since 1966.

Myra Falls Tailings Disposal Facilities (TDF's) comprise the original or "Old TDF" and the newer Lynx TDF. The Old TDF was designed by Knight Piesold Ltd. (KP) as a modified-centerline (upstream) constructed tailings retention facility in the early 1980's. In the early 2000's, it was determined that the Old TDF had reached its practical elevation limit. Following that, Klohn Crippen Berger Ltd. (Klohn), designed cells and a berm (the Paste Berm) to retain thickened paste in the Amalgamated Paste Area (APA) on the previous tailings surface. The Lynx TDF is located within the old Lynx open pit and the retention dam is designed as a centerline constructed rockfill dam, across the low side of the open pit. Construction of the starter berm for Lynx TDF dam began in 2006 and was completed in 2011. Four (4) incremental raises of the dam have been completed between 2011 and 2014.

As noted before, tailings engineering was initially supplied by KP and then Klohn between 1997 and 2006. Since that time, AMEC Environment & Infrastructure (AMEC) and its predecessor companies have provided tailings engineering services to the mine. AMEC was responsible for the recent DSI report which is audited herein.

1.2. Scope of Work and Documents Reviewed

This work was carried out in general accordance with our proposal, dated October 10, 2014, and related Nyrstar's Purchase Order 4501315616, dated October 16, 2014, and Services Agreement NMF2014-10-001, dated October 29, 2014. This work is subsequent to the BC Chief Inspector of Mines' Order, dated August 18, 2014 (the "Order"), requiring an independent qualified third-party review of 2014 DSI's by December 1, 2014.

BGC's proposal outlined the four main tasks to be undertaken:

- Task 1 Project management including set-up and contract finalization.
- Task 2 Information review including 2014 DSI Report and Dam Breach Assessment, along with select aspects of both the EPP and OMS Manual, including a review of hazard classification.
- Task 3 Prepare draft audit review relative to BC Ministry of Energy and Mines (MEM) Guidelines for Annual Dam Safety Inspection (2013) and submit for client review.
- Task 4 Prepare and submit final audit review letter-report.

The five documents reviewed under this audit were the following:

- AMEC Environment & Infrastructure, 2014a. Myra Falls Tailings Storage Facilities, 2014-Q3 Dam Safety Inspection Report. Prepared for Nyrstar Myra Falls, November 2014, NX14001.0103, 45 pages plus figures and appendices.
- Nystar Myra Falls, 2014a. Operation, Maintenance and Surveillance (OMS) Manual for the Tailings Disposal Facilities and Water Treatment System. Updated November 2014, 115 pages plus appendices.
- Nystar Myra Falls, 2014b. Manual 1 Emergency Preparedness Plan. Updated November 2014, 18 pages plus appendices.
- Nystar Myra Falls, 2014c. Manual 2 Emergency Response Plan. Updated November 2014, 85 pages
- Nystar Myra Falls, 2014d. Manual 3 Emergency Management Program. Updated November 2014, 46 pages.

No other documents or reports were reviewed within this noted audit process.

As discussed further in Section 2.1, BGC did not undertake a review of the consequence classification.

1.3. Limitations

This audit report does not address the safety of the structures under assessment, as this was beyond the scope and intent of this review work. This report addresses whether the 2014 DSI report was in conformance, or deficient, relative to the guidelines presented in BC MEM (2013).

This audit work was a desktop study and as such, no site visit was conducted by BGC. Further from this, BGC has relied on the site observations and thorough review of data on site by other third parties for completeness without any independent verification directly by BGC. These limitations are important and should be acknowledged. Furthermore, BGC's review herein

does not relieve the professional engineer conducting the DSI and engineer of record (EOR) work and/or owner of their relevant responsibilities.

2.0 AUDIT REVIEW

2.1. Consequence Classification

At the time the audit was performed, updated dam break assessment and dam consequence classification had not been submitted to BGC, although they were noted to be in preparation.

AMEC (2014a) noted that both the Old TDF and the Lynx TDF were classified as “high” hazard dams, according to the definition provided in Table 2-1 of 2007 CDA Guidelines. These classifications were based on potential environmental losses due to loss or deterioration of important fish habitat. The DSI report notes that these classifications were “both deemed reasonable and prudent by Robertson GeoConsultants Inc. (RGC) in the 2013 Dam Safety Reviews for the Old TDF and Lynx TDF”. Given that the previous consequence classification was reviewed by the third-party already (RGC), BGC did not review their rationale.

2.2. DSI Report

The 2014 DSI Report for Myra Falls TDF by AMEC (AMEC, 2014a) was prepared by Mr. Dan Hughes-Games, P.Eng. and reviewed by Mr. Steve Rice, P.Eng. This report has 46 pages of text with an Executive Summary, 2 figures, 10 drawings and 7 appendices.

Section 6.1 of their report notes that AMEC inspected the Old TDF, Lynx TDF and the diversion ditch systems on an approximately monthly basis during the first half of the year; the associated Appendix G provides AMEC’s site inspection reports. Based on those reports, site inspection were carried out on the following dates in 2014; Jan. 31, Feb. 28, Mar. 27, Apr. 30, May 22, June 25, and Sept. 4, 5 and 8. Following from this information, it appears seven (7) inspection visits were undertaken during 2014 with the last one in September being the most extensive and covering three days. It was undertaken by Mr. Hughes-Games, who is the professional engineer responsible for signing the DSI report and the EOR.

BGC’s audit compares the content of AMEC (2014a) versus the requirements of BC MEM Guidelines (2013). Table 1 provides this comparison with associated commentary including factual information in regular font and BGC’s interpretation in italics.

Table 1. DSI Report Audit Compared to BC MEM (2013) Requirements

Requirement No.	BC 2013 Requirements	Discussion Included in Report	Comments
1a	Classification of the dam(s) in terms of Consequence of Failure in accordance with Table 2-1 of the CDA Dam Safety Guidelines (2007).	Yes and No	The Executive Summary noted that both the Old TDF and Lynx TDF were classified as high and as reviewed and agreed to in RGC (2014). <i>However, only limited background justification ("environmental incremental losses") was provided. An updated classification was not provided.</i>
1b	Significant changes in instrumentation and/or visual monitoring records.	Yes	<p>Piezometer readings in Old TDF were similar to previous years. Piezometer thresholds remain unchanged from previous year.</p> <p>In 2014, an additional 15 piezometers were installed into the foundation and embankment for the Lynx TDF and monitoring began in August 2014. <i>Since these are new piezometers, no previous readings will exist as baseline. Therefore, any new values should be compared to design expectations and stability models by AMEC.</i></p> <p>Survey monuments on the Old TDF were not monitored as most were destroyed in previous years. Installation of new survey monuments is underway. <i>Since these are new monuments, no previous readings will exist as baseline. Therefore, any new values should be compared to design expectations and stability models by AMEC.</i></p> <p>Visual inspections noted by both Nyrstar and AMEC staff; deficiencies noted in three aspects at the Old TDF. Table 9 summarizes anomalous inspection observations by AMEC. Mitigation actions are also provided in that table. Table 10 outlines anomalous inspection observations by Nyrstar, including resulting action.</p>

Requirement No.	BC 2013 Requirements	Discussion Included in Report	Comments
1c	Significant changes to dam stability and/or surface water control.	Yes	<p>Executive Summary notes that Old TDF Seismic Upgrade Project was completed in 2013 and new Factors of Safety are provided.</p> <p>Also noted that post-seismic stability of Amalgamated Paste Area (APA) did not meet required Factors of Safety. Reshaping during closure phase is proposed.</p> <p><i>APA stability non-conformance still exists. Review and assessment of this closure reshaping and stability assessment will be required when closure plan and design completed.</i></p> <p>Drilling in 2014 undertaken to assess foundation conditions of the Lynx TDF and analysis was on-going. <i>Later assessment required to determine if stability meets criteria or if possible non-conformance.</i></p> <p>Possible stability concern noted with respect to the upslope waste dumps and the Lynx TDF and AMEC formulating a plan for stability assessment. <i>Later assessment by AMEC to determine if dump stability meets criteria or if possible risk. If risk exists, then possible mitigation measures may be required.</i></p> <p>Concern noted that Lower Lynx Diversion Ditch is not capable to route Inflow Design Flood (IDF) recommended by CDA Guidelines. Interim upgrades up to Station 0+225 are underway and further upgrades are proposed for 2015. <i>When upgrades complete, need professional engineer confirmation that entire diversion ditch can route IDF.</i></p>
1d	For major impoundments, as defined in Part 10.5.2 of the Code, a current Operation, Maintenance and Surveillance (OMS) Manual is required. The annual report shall indicate the latest revision date of the OMS manual.	Yes	<p>The most recent version of the OMS Manual is dated November 2014. <i>Additional BGC discussion on the OMS Manual is provided in Section 2.3 of this letter-report.</i></p>

Requirement No.	BC 2013 Requirements	Discussion Included in Report	Comments
1e	For tailings dams classified as High, Very High, or Extreme Consequence, an Emergency Preparedness Plan (EPP) is required. The annual report shall indicate the latest revision date of the EPP document.	Yes	The most recent version of the Emergency Preparedness / Response Plan (EPRP) is dated November 2014. <i>Additional BGC discussion on the EPRP is provided in Section 2.4 of this letter-report.</i>
1f	Scheduled date for the next formal Dam Safety Review in accordance with Table 5-1 of the CDA Dam Safety Guidelines (2007). Formal Dam Safety Reviews are required every 5 to 10 years (depending on consequence classification) and differ from annual dam safety inspections.	Yes	Executive Summary notes that next DSR will be scheduled for 2015 given that several deficiencies were identified in RGC's DSR in 2013.

Requirement No.	BC 2013 Requirements	Discussion Included in Report	Comments
2	Summary of past years' construction (if any) with a description of any problems and stabilization.	Yes	<p>Executive Summary noted no significant construction activities on the Old TDF in 2014 except for interim remedial measures for seepage areas and minor piping erosion on the Paste Berm. <i>Seepage areas would be likely result on historical tailings areas but "minor piping erosion" requires context and explanation as potential hazard to be explained or managed. Table 9 noted minor piping erosion and approximately 0.1 m³ of tailings discharged. AMEC's letter of Oct. 25, 2014 (provided separately to BGC) addressed the issue including mitigation steps and need for permanent repair next summer.</i></p> <p>Executive Summary noted the Lynx TDF was subject to 5.5 m raise in 2014, along with partial construction of Lynx Springs Drain. <i>Dam raise is typical activity for tailings dam but specifically noted drain should have further context. Section 5.3.1 of their report notes IFC drawings for the drain, a French Drain, were issued on May 23, 2014, and construction to Stn. 2+00 is on-going. AMEC email of Aug. 13, 2014, discusses the drain concept, but also noting "no further delay is advisable". AMEC should confirm design objectives, materials and completion schedule for this element.</i></p> <p>Section 8 provides a larger discussion on 2014 construction activities noting a 2014 AMEC Construction Report will be prepared by March 31, 2015, for Lynx TDF activities. <i>The 2014 Construction Report should note the 2014 construction activities met required design criteria or note any variances from those.</i></p>
3	Plan and representative cross sections.	Yes	Appendix B provides plan and sections for the Lynx TDF as prepared by AMEC. Appendix C provides plan and sections for the Old TDF prepared by Klohn.
4	Site photographs.	Yes	Appendix A is labeled as "Select 2013 Photographs" but Figures 1 to 35 are labelled as "2014-Q3 Dam Safety Inspection" photos taken by AMEC. Appendix E provides Nyrstar inspection reports with tailings area photos.

Requirement No.	BC 2013 Requirements	Discussion Included in Report	Comments
5	Review of climate data.	Yes	Section 3.0 provides a review of climatic data with Appendix D providing monthly precipitation data by year. Monthly precipitation values until Sept. 2014 compared to long term values. January to September 2014 was slightly drier than average year. Comments on 2014 temperatures also provided.
6	Water balance review.	No	<p>Section 5.0 reviews water management for the site and notes detailed site water balance under peak demand is provided in a separately noted AMEC report (not provided to BGC). Also notes that work is currently proposed to update the water balance model (not noted specifically to one TDF or the other) in light of both hydrological updates and water management system. Section 5.3 explicitly notes that the Lynx TDF does not have a detailed water balance that is current.</p> <p><i>Current water balance models (conveyed and stored quantities and temporal variation) for both the Old TDF and Lynx TDF should be provided in the inspection report. In addition, any updates to the water balance models should be reflected in the operations and monitoring aspects of the OMS Manual.</i></p>

Requirement No.	BC 2013 Requirements	Discussion Included in Report	Comments
7	Freeboard and storage availability (in excess of the design flood).	Yes and No	<p>Table 1 indicates freeboard criteria for the Old TDF; store the 200-year return period 24 hour duration storm during operations. Closure scenarios may eliminate all ponding of water on Old TDF tailings surface. <i>The Old TDF does not retain a pond generally, but during heavy rainfall, run-off does accumulate in the APA and Strip Area (Mr. Paul Wells, personal communication). As such, both freeboard distance and storage volume and related availability volumes should be noted until no pond is ever retained. The intent of keeping safe (MEM wording) conditions in Old TDF during transition to closure implementation is noted in August 14, 2014 email from MEM to Nyrstar provided in Section 9. No specific statement on flood storage availability made.</i></p> <p>Table 3 indicates freeboard criteria for the Lynx TDF which is equal to IDF (1 in 1000 year return period, 24-hour duration storm) of 78,000 m³ plus 0.5 m of freeboard for wave action. Section 9 notes that RGC has recommended an operational freeboard of not less than 4 m be maintained at the Lynx TDF until AMEC completes a study of foundation conditions. Section 9 also notes that freeboard was over 4 m at the South and West Arm crests but less on the dam crest, where the facility design terms of reference (78,000 m³ and 0.5 m freeboard) are to be maintained.</p> <p><i>AMEC provides Lynx TDF freeboard requirements in a combination of m³ and vertical distance, which is difficult to measure / observe directly in the field. In addition, the recommended freeboard height by RGC was not met during operations for some portion of the dam crest, hence being inconsistent. A consistent set of freeboard heights and associated pond storage volumes should be stated and monitored for the lowest elevation on the dam crest. No specific statement on flood storage availability made except page iii where "sufficient freeboard for flood storage" was noted.</i></p>

Requirement No.	BC 2013 Requirements	Discussion Included in Report	Comments
8	Water discharge system, volumes, and quality.	Yes and No	<p>Non-contact water aspects reviewed in Section 5.1. <i>Given context of the requirement, BGC assumes that this requirement is focused on contact water.</i></p> <p>Section 5.2 reviews contact water aspects in the Old TDF. Three input sources noted with precipitation being the largest input. Water leaves the Old TDF by four (4) means with two on surface and two in subsurface. Flows from surface decants and subsurface drains reports to the Super Pond for treatment. Details of the water treatment system are provided in Nyrstar's 2013 Annual Environmental Report, which was not provided to BGC. <i>Discharge volumes and quality, except for sediment laden comment in Section 5.2.1, from Old TDF are not provided in the DSI report. This ties into previously noted issue that a water balance for the Old TDF does not currently exist.</i></p> <p>Section 5.3 reviews contact water aspects for the Lynx TDF. Four sources of water inputs noted with precipitation and groundwater both noted as significant inputs. Facility is operated with minimal water retained in a pond; water infiltrates into pit walls or is pumped to the treatment system. Water levels remained at normal operational levels. Details of the water treatment system are provided in Nyrstar's 2013 Annual Environmental Report, which was not provided to BGC. <i>Discharge volumes and quality from Lynx TDF are not provided in the DSI report. This ties into previously noted issue that a water balance for the Lynx TDF does not currently exist.</i></p>

Requirement No.	BC 2013 Requirements	Discussion Included in Report	Comments
9	Seepage occurrence and water quality.	Yes and No	<p>Section 5.2 notes that water leaves the Old TDF by two potential subsurface flows, with the flows from the drains reporting to the pumphouse. Minor seepage is occasionally noted at base of Paste Berm. Seepage and piping erosion noted on Oct. 23, 2014. Discharges noted on east abutment of Paste Berm with visual estimate of 0.3 m³/s provided in Section 5.2.2.and Table 9. Seepage noted at toe of APA in Table 10. <i>Select seepage occurrences noted but limited quantity and no quality information provided. On-going investigations occurring to characterize the discharge issue, as input to closure plan designs. Order 10 in Section 9 notes required design to control seepage at Old TDF abutment contact.</i></p> <p>Section 5.3 reviews Lynx TDF contact water issues. Specific seepage event noted on Lynx east arm in Table 9. Seepage noted in southeast corner of Lynx TDF in Table 11. Tailings seepage indicated by text content in Sections 5.3.2 (underground mine) and 5.3.3 (tailings depression). Underground bulkheads, monitoring and depression investigations are in use or underway.</p> <p><i>No explicit summary text on seepage locations, quantities and related water quality were provided in DSI report.</i></p> <p>Section 5.4 notes “other seepages” directed to the Super Pond.</p>

Requirement No.	BC 2013 Requirements	Discussion Included in Report	Comments
10	Surface water control and surface erosion.	Yes	<p>Non-contact diversion ditches are reviewed in Section 5.1, including Arnica Ditch, Lynx Ditch System and Alder Reach Ditch. Debris cleaning, maintenance and inspection were noted. Lower Lynx Ditch is the process of upgrade. Alder Reach Ditch in the process of full deactivation.</p> <p>Paste surface in APA is eroding into dendritic pattern with some channels 1.5 m deep by 3 m wide. AMEC recommends placement of layer of rockfill as soon as practical. Internal erosion of tailings causing tailings depression noted in Section 5.3.3 and investigations are underway to determine a cause and potential mitigation. Erosion (rilling) noted on upstream sand buttress on Lynx TDF.</p>
11a	Instrumentation review including: phreatic surfaces and piezometric data.	Yes	<p>Section 7.1 provided piezometric background on Lynx TDF including six (6) existing piezometers. Notes the gradual pore pressure rise until June 2014 followed by decrease until October 2014. Fifteen new piezometers were installed in 2014 in the Lynx TDF. <i>However, actual readings are not reviewed in the text or relative to any alert levels but plots, without alert levels, are provided in Appendix D. Baseline conditions should be assessed relative to alert levels which should be developed.</i></p> <p>Section 7.2 reviewed piezometric background in the Old TDF which comprises 55 active instruments. Appendix D provides summary tables and plots. The piezometric readings from 2014 were similar to previous years. Three levels of alert levels have been provided but AMEC proposes to review the rationale for threshold conditions in 2015. Review of the piezometric data relative to long term stability are to be developed during the closure plan. <i>Revised alert thresholds should be developed for the Old TDF relative to long term stability proposed within closure designs.</i></p>

Requirement No.	BC 2013 Requirements	Discussion Included in Report	Comments
11b	Instrumentation review including: settlement.	No	No monuments surveys were carried out in 2014 and plans for new monuments in both tailings areas has been proposed and being implemented by Nyrstar. <i>Baseline results and related settlement and deformation amounts should be reviewed later when new data is collected. These values should be compared to expected design values. Alert levels should be set for deformation amounts.</i>
11c	Instrumentation review including: lateral movement.	No	<i>No instrumentation reported to be installed for this type of monitoring.</i>
	The report shall be submitted by a qualified geotechnical engineer registered as a Professional Engineer (P.Eng.) in British Columbia. The professional engineer will be deemed the Engineer of Record for the facility unless another engineer is identified within the Dam Safety Inspection report as having this responsibility.	Yes	Mr. Hughes-Games, P.Eng., as noted on the APEGBC website, is registered as a professional engineer in British Columbia. <i>His qualifications as a geotechnical or tailings engineer were not however judged or reviewed by BGC.</i>

2.3. OMS Manual

The most recent version of the OMS Manual is dated November 2014 and appears produced by Nyrstar. In addition to the tailings facilities, it covers content for the water treatment system. This document was not reviewed in detail, but contains the following major sections in its table of contents:

1. Introduction;
2. Description of Facilities (including both Old TDF and Lynx TDF aspects);
3. Operations;
4. Maintenance;
5. Surveillance; and
6. Emergency Planning and Response.

Eight (8) appendices are also attached including numerous design and as-built drawings in Appendix I and numerous site photographs in Appendix II.

In general, this table of contents indicates general agreement with the suggested content provided by the Mining Association of Canada (2011)¹. This external document provides rationale, organization and suggested content for an OMS Manual.

Table 1-1 within the OMS Manual notes tailings and water treatment responsibilities including that Mr. Dan Hughes-Games of AMEC is the Engineer-of-Record for the facility. Section 6.3.5 also provides work and mobile phone numbers for Mr. Hughes-Games.

As noted in the summary table in Section 2.2 of the OMS Manual, water balance models for both tailings areas need to be updated. When these models are completed, operational and monitoring aspects of these water balances should be reflected within the OMS Manual for consistency.

Section 6.0 within the OMS Manual reviews emergency planning and response with Section 6.2.1 focused on failure of a tailings dam. Twenty-two action items are provided but they are general in nature without any specifics related to either the Old TDF or Lynx TDF. Action #11 therein refers to “NMF Tailings Dam Facility Emergency Preparedness Plan” which was not provided therein or provided to BGC for review. Further discussion on this document is also reviewed in Section 2.4 herein.

¹ Mining Association of Canada, 2011. Developing an Operation, Maintenance and Surveillance Manual for Tailings and Water Management Facilities. Copyright MAC, 52 pages.

2.4. Emergency Response Plan

Nyrstar's Emergency Management Program is documented in three manuals, dated November 2014 and contains the following major sections (subsection numbers not provided):

Manual 1 – Emergency Preparedness Plan

1. Emergency Management Program
2. Crisis Preparedness Organization
3. Crisis Response Organization
4. Emergency Response Organization

Manual 2 – Emergency Response Plan

1. Emergency Response Roles and Responsibilities
2. Emergency Response Activation Procedure
3. Incident Classification and Notification Protocol
4. Specific Incident Protocols
5. Emergency Command Centre
6. Initial Emergency Response Protocols
7. Emergency Response Equipment and Locations
8. Site Reference Manuals and Maps
9. Critical Incident Stress Management
10. Media Communications Plan Overview
11. Emergency Communications Systems
12. Emergency Response Forms
13. De-Briefing and Review Checklist

Manual 3 – Emergency Communication Plan

1. Initial Report of Incident Form
2. Internal Resources
3. External Resources
4. Notification of Corporate Office
5. Call Log
6. Satellite Phone Directions
7. Communication with the Media

These three (3) manuals were not reviewed in detail but each was searched for the keywords of “tailings”, “TDF”, “drill” and “test” to understand their content relative to TDF emergency response.

Tailings are only mentioned in Manual 1 relative to potential risks noted in Appendix 2. Response drills and tests protocols and exercise schedules are reviewed in Section 4.5 but no mention is made of the results of a recent emergency response test, as indicated in Bullet #9 of the Order.

The tailings dam failure protocol in Manual 2 Section 4.16 is general in nature and not explicit to either the Old TDF or Lynx TDF areas or to any specific failures modes or consequences. The protocol makes reference to “TDF Emergency Response Plan” which was not provided to

BGC. If such a specific tailings emergency response plan exists and is current, it should be integrated into the main emergency response plan. Manual 2 Section 8 notes again the existence of the tailings area emergency preparedness plan but the file name implies it is dated from 2007. If the implied date is indeed correct, then the tailings area response plan should be revised to reflect the current situation. No mention of response drills or tests is noted in Manual 2.

No significant content relative to tailings or mention of response drills or tests appears in Manual 3.

In summary, the three manuals provide comprehensive treatment regarding Nyrstar's emergency response management plan but little specific or detailed content on tailings area emergencies and responses. In addition, since an updated dam break assessment has not been prepared, the current emergency response plan cannot be informed and consistent with specifics of its consequences (as noted under Item 8 in the Order). It is possible that such specifics and details may be provided in the referenced tailings area response plan but this document was not provided to BGC and current information suggests it may be out of date. Emergency response plans and related aspects (e.g. equipment and materials at hand) should be detailed, specific and up-to-date with current configurations, including access and power supply constraints and expected consequences, including extent of failure run-out. Lastly, no summary of any emergency response test was noted in the three manuals, as requested in the Order.

3.0 SUMMARY

In general, the AMEC 2014 DSI report addressed the majority of the requirements as outlined in BC MEM (2013) and provided recommendations consistent with their observations and assessments. A significant limitation remains in that an updated dam breach assessment and related failure consequence was not submitted in time for review by BGC under this audit process. The consequence classification is basically the primary step in establishing design criteria for a dam and therefore, may have follow-on implications for later design and safety assessments and the EPRP as well.

Based on our limited scope review/audit of the 2014 DSI and other noted documents, BGC provides the following recommendations, not including the noted limitation above:

- New piezometer information in the Lynx TDF should be reviewed and evaluated relative to stability assessment of the Lynx dams. Recent subsurface information to be reviewed in this assessment as well.
- New settlements and deformation values from the Old TDF should be reviewed and evaluated relative to the stability assessment of relevant dams and berms.
- Post-seismic stability non-conformance exists with the APA. The closure plan and stability assessment should review transition and final configurations relative to accepted stability criteria.

- Waste dump stability above the Lynx TDF should be assessed and determine if risks exist.
- Require confirmation that entire Lower Lynx Diversion Ditch can route IDF when upgrades are completed.
- Require confirmation that design objectives, appropriate materials and completion schedule were met for construction of the Lynx Springs Drain
- Water balance models for both tailings areas need to be updated.
- Freeboard distances and available storage volumes should be provided in simple, concise terms for inclusion in inspection reports and OMS Manual.
- Discharge volumes and quality for each TDF should be explicitly stated. This ties back into the requirement to have current water balances for each TDF.
- Seepage locations, quantities and related water quality for each TDF should be explicitly stated. This ties back into the requirement to have current water balances for each TDF.
- Alert levels should be developed for all piezometric readings on the Lynx TDF.
- Revised alert levels should be developed for all piezometric readings on the Old TDF.
- Updated operational and monitoring aspects from the water balance models should be reflected within an updated OMS Manual.
- The EPRP does not contain any tailings response plans that are specific to the expected dam break consequences, since an updated dam break analyses was not prepared, and this revision should be undertaken.
- The EPRP should also indicate results of an emergency response drill or test and any suggested improvements.

4.0 CLOSURE

BGC Engineering Inc. (BGC) prepared this document for the account of Nyrstar Nyrstar Myra Falls Ltd. The material in it reflects the judgment of BGC staff in light of the information available to BGC at the time of document preparation. Any use which a third party makes of this document or any reliance on decisions to be based on it is the responsibility of such third parties. BGC accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this document.

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It should be noted that the conclusions and recommendations provided herein will change as the recommended assessments and mitigation measures are undertaken.

Yours sincerely,

BGC ENGINEERING INC.

per:



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JWC/RDP/gc/cs