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The information provided in this report was compiled from existing documents, data collected during field studies carried out in support of the EIA, and data provided by SML and by applying currently accepted industry standard mitigation and prevention principles. This report represents the best professional judgment of Stantec personnel available at the time of its preparation. Stantec reserves the right to modify the contents of this report, in whole or in part, to reflect any new information that becomes available. If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we request that we be notified immediately to reassess the conclusions provided herein.

This document is the Final Environmental Impact Assessment (EIA) Report for the Sisson Project (the Project), pursuant to the New Brunswick *Environmental Impact Assessment Regulation – Clean Environment Act*. It has been translated from its original English version by the firm BeTranslated (www.betranslated.com). The English version of this report constitutes the official version. In the event of conflict between the English and French versions, the English version shall prevail.

Ce document est le Rapport final de l'évaluation de l'impact sur l'environnement (ÉIE) du Projet Sisson (le Projet), en vertu du *Règlement sur les études d'impact sur l'environnement* du Nouveau-Brunswick – *Loi sur l'assainissement de l'environnement*. Ce document a été traduit de sa version originale anglaise par la firme BeTranslated (www.betranslated.com). La version anglaise de ce rapport constitue la version officielle. En cas de conflit entre la version française et la version anglaise, la version anglaise prévaudra.

ABOUT THE PROPONENT

After submission of the Sisson Project EIA Report to governments in July 2013, Northcliff Resources Ltd. and Todd Minerals Ltd. entered into a limited partnership agreement to advance the development of the Sisson Project. As a result of this agreement, the Sisson Project is now being developed and advanced by Sisson Mines Ltd., on behalf, and as general partner, of the Sisson Project Limited Partnership. Thus, the Proponent of the Sisson Project is now Sisson Mines Ltd., and all references to Northcliff Resources Ltd. (Northcliff) in this document can be read as referring to Sisson Mines Ltd.

EXECUTIVE SUMMARY

This is the Final Environmental Impact Assessment (EIA) Report for the Sisson Project ("the Project") proposed by Sisson Mines Ltd. ("SML", "the Proponent"). After submission of the Sisson Project EIA Report to governments in July 2013, Northcliff Resources Ltd. (the Proponent at the time) and Todd Minerals Ltd. entered into a limited partnership agreement to advance the development of the Sisson Project. As a result of this agreement, the Sisson Project is now being developed and advanced by Sisson Mines Ltd., on behalf, and as general partner, of the Sisson Project Limited Partnership. Thus, the Proponent of the Sisson Project is now Sisson Mines Ltd., and any references to Northcliff Resources Ltd. (Northcliff) in this document can be read as referring to Sisson Mines Ltd.

The Sisson Project involves the development of a tungsten and molybdenum open pit mine, ore processing and associated facilities and infrastructure near Napadogan, in central New Brunswick. An environmental impact assessment (EIA) of the Project is required under the *Canadian Environmental Assessment Act* (*CEAA*) as well as under the New Brunswick *Environmental Impact Assessment Regulation–Clean Environment Act* (EIA Regulation). For the purpose of the provincial EIA process, this final version of the EIA Report supersedes the July 2013 version of this report (Stantec 2013g) submitted to both the provincial and federal governments for review. The July 2013 version remains the official version of the EIA Report for the purpose of the federal environmental assessment under *CEAA*.

The purpose of the EIA Report is to document the results of the EIA required to satisfy the requirements of *CEAA* and the EIA Regulation. The EIA Report describes the Project and its potential environmental effects, as well as measures to avoid or minimize environmental effects, through construction, operation, and closure of the Project. The significance of potential environmental effects (including cumulative environmental effects) of the Project is assessed, and methods for avoiding or minimizing adverse environmental effects that may result from the Project and for capturing environmental benefits are identified. The report recommends a follow-up and monitoring program as and where appropriate.

The scope of the Project is the construction, operation, and decommissioning, reclamation and closure of the Sisson Project mine, ore processing and associated facilities and infrastructure.

The Sisson Project Site

The Sisson Project site is on provincial Crown land in a sparsely populated rural area of Central New Brunswick, approximately 10 km southwest of the community of Napadogan and approximately 60 km directly northwest of the City of Fredericton (Figure E.1). The Project area is generally rolling, forested upland; small lakes and wetlands are common in low-lying areas. The Project site is drained by small headwater brooks, primarily Bird and Sisson brooks, to Napadogan Brook and then to the Nashwaak and the St. John rivers. Wildlife populations are like those in the rest of Central New Brunswick. Brook trout and several other species of fish are common in brooks in and around the site, and Atlantic salmon have been identified in Napadogan Brook.

Land use in the vicinity of the Project is dominated by forest resource harvesting, and the site is well serviced with forestry roads connected to the provincial highway system. Land uses also include hunting, fishing, and other outdoor recreational activities. There are about 39 recreational campsite leases (including cabins) nearby, the nearest of which is about 1.5 km to the east of the proposed open pit location. The nearest permanent residence is in Napadogan. The land and resources in the Project area are reported to be currently used for traditional purposes by Maliseet First Nations people.

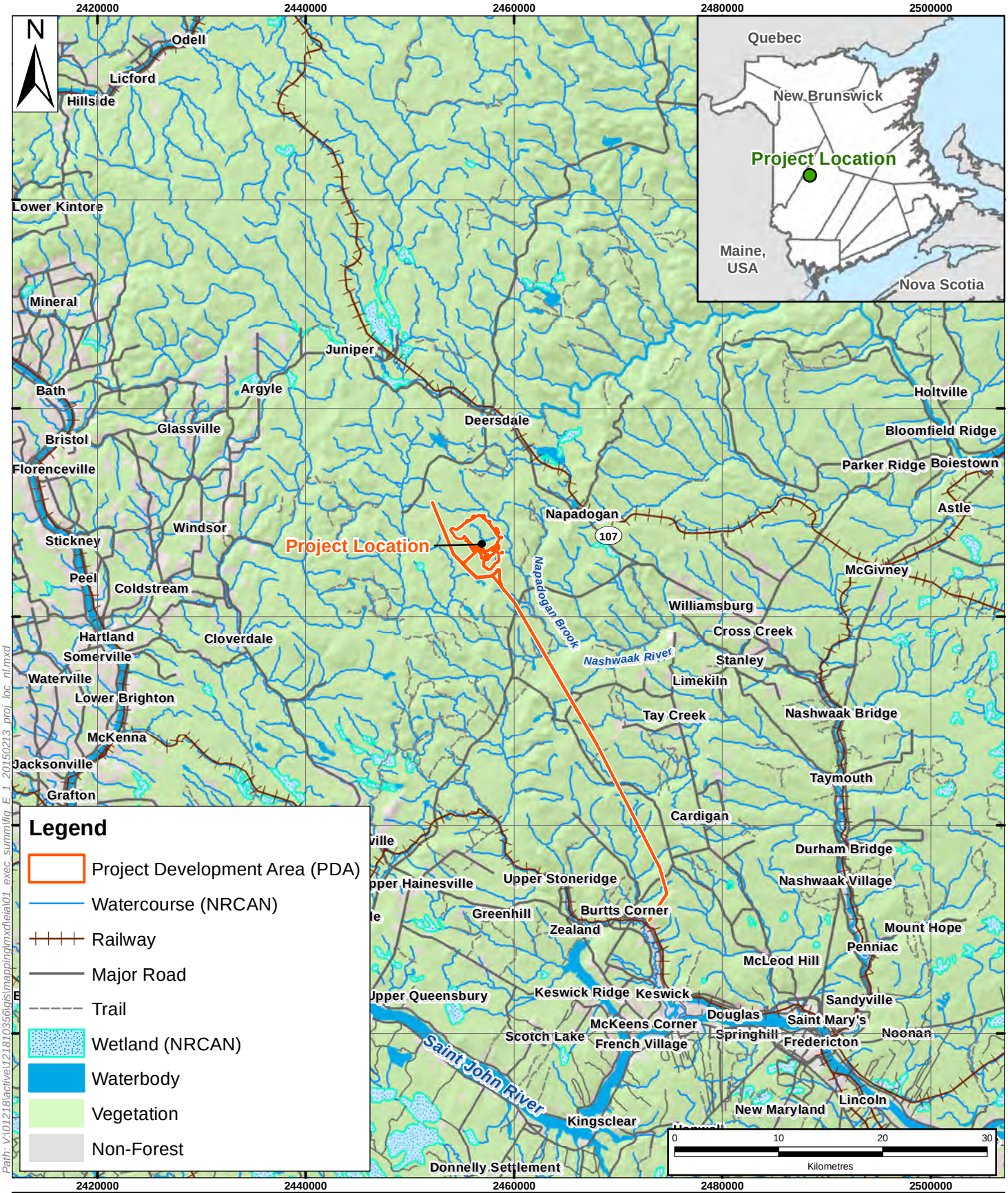
Project Description

Following an approximate two-year construction period, the Sisson Project will operate for about 27 years after which it will be decommissioned, and the site will be reclaimed and closed. The capital cost of the Project is estimated at C$579 million, and the expenditures for the entire period of Operation are estimated at C$3,730 million. The Project will create up to 500 direct jobs at the peak of Construction and up to 300 direct full-time jobs over its operating life.

The Sisson mineral deposit is near surface and thus is only suitable for open pit mining. An average of 30,000 tonnes per day of ore will be mined by conventional drilling, blasting and hauling methods, then crushed and conveyed to an on-site ore processing plant. The ore will be processed to tungsten and molybdenum concentrates using conventional flotation technology. The tungsten concentrate will be further refined on-site to produce a higher value crystalline tungsten product, ammonium paratungstate (APT). The APT plant design is based on proven metallurgical and chemical processes, using alkali pressure leach technology, in a series of continuous and batch operations. The final mineral products will be packaged and trucked off-site to rail facilities or directly to markets. A new electrical transmission line from the Keswick terminal will be constructed by NB Power to supply the Project with electricity.

Mine waste rock and process tailings (*i.e.,* fine ground host rock remaining after mineral removal, in a water slurry) will be stored in a tailings storage facility (TSF), along with wastes from the APT plant. All waste rock and APT waste, as well as potentially acid generating tailings, will be stored sub-aqueously in the TSF to effectively mitigate the potential onset of acid generation. The TSF embankments will be constructed of non-potentially acid generating rock quarried on-site. The embankments are designed to exceed the requirements set forth in the Canadian Dam Association's "Dam Safety Guidelines", and in so doing, will readily withstand extreme storm events and earthquakes.

Except for a small amount of fresh water supplied by wells, all Project water requirements will be met by re-using surface and groundwater collected on-site and stored in the TSF. The water management systems include open pit dewatering, water management ponds (WMPs) to collect TSF embankment run-off and seepage for pump-back to the TSF, and engineered drainage channels to either divert clean water away from Project facilities or to collect "mine contact" water for Project use. Wells will be developed below the WMPs to monitor groundwater quality and, if necessary to ensure acceptable water quality downstream, pump it back to the TSF. Tailings "beaches" will be developed around the inside perimeter of the TSF to keep the supernatant pond away from the embankments. Water in the pond will be recycled to the process plant and returned with the tailings. About eight years into Operation, the Project will have a surplus of water which will be treated as needed to meet discharge permit requirements and then discharged to the natural environment via the former Sisson Brook channel.



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Project Location

Sisson Project:
Environmental Impact Assessment (EIA) Report, Napadogan, N.B.

Client: Sisson Mines Ltd.

Scale:	Project No.:	Data Sources:	Fig. No.:
1:500,000	121810356	SNB NRCAN, ESRI	E.1

Date: (dd/mm/yyyy)	Dwn. By:	Appd. By:
13/02/2015	JAB	DLM

Stantec

Map: NAD83 CSRS NB Double Stereographic

At Closure, drainage from the TSF will be routed to the open pit, which will fill in about 12 years. After this, the level of the pit lake will be maintained at an elevation that ensures groundwater only flows into it; surplus water will be treated as necessary before discharge. This practice will continue for as long as is necessary to ensure acceptable discharge water quality. When the pit lake can be directly discharged without treatment, treatment will cease, and the lake level will be allowed to rise so that it drains naturally to the former Sisson Brook channel. A decommissioning, reclamation and closure plan been developed, and the cost of a financial security to ensure acceptable closure at any stage of the Project life is included in the Project costing.

Project facilities will permanently take up parts of the watersheds of the small brooks draining the site. Since some water is trapped in the tailings voids within the TSF during Operation, there will be downstream flow reductions until the open pit is filled during Project Closure. A plan to offset for lost fish habitat and the consequent environmental effects on fish habitat must be approved under the federal *Fisheries Act* before the Project can proceed; a fish habitat offsetting plan has been developed and is included in the estimated Project cost. Similarly, a compensation plan for wetland losses must be approved under the New Brunswick *Clean Water Act* before the Project can proceed.

Reclamation Cost Estimate

The estimated costs for closure and reclamation throughout the mine life will increase over time. It is proposed that the bonding requirement be reviewed on a five-year “look forward” basis once the mill reaches full production and be adjusted as required.

The estimated maximum bonding requirement is $9 million at the start of construction (*i.e.*, beginning of Year -2), at $49.8 million at the commencement of full production (*i.e.*, beginning of Year 2), and at $65.3 million at the end of the estimated life of the mine after 27 years. Note that no discount or interest rate was utilized for estimating the bonding requirements for each of these periods. Note also that these estimates are subject to change as further discussions are carried out on the planned reclamation and closure approach, in concert with the approval of the Project under the *Mining Act*.

The closure bonding requirement generally increases over the mine life as additional development takes place and the Project footprint expands, which requires additional reclamation work and greater water treatment capacity.

The principal reclamation work areas included in the cost estimate were the TSF (including the contained barren rock and mid-grade ore), infrastructure decommissioning, and ongoing post-Closure monitoring and reclamation activities.

Environmental Management

The potential environmental issues to be addressed in the EIA of the Sisson Project have been comprehensively determined by the governments of New Brunswick and Canada, and have been further refined through engagement of the public, key stakeholders, and First Nations during the conduct of the EIA. The Final Guidelines for the EIA were approved by the Province of New Brunswick in March 2009 after consultation with the public, stakeholders, and the Aboriginal community. After similar consultation, in April 2012, the governments of New Brunswick and Canada approved the Terms of Reference for the EIA that define the specific requirements of both the provincial and federal EIA

processes. Together, the Final Guidelines and the Terms of Reference define the scope of the Project, factors to be considered, and the scope of factors to be considered in the EIA to meet *CEAA* and the EIA Regulation, which culminated in the submission of the Sisson Project Environmental Impact Assessment (EIA) Report to the federal and provincial governments in July 2013 (Stantec 2013g). For the purpose of the provincial EIA process, this final version of the EIA Report supersedes the July 2013 version of this report (Stantec 2013g) submitted to both the provincial and federal governments for review. The July 2013 version remains the official version of the EIA Report for the purpose of the federal environmental assessment under *CEAA*.

The planning and design of the Sisson Project has incorporated several features to avoid or minimize potential adverse environmental effects, and to respond positively to the principles of sustainable development and the precautionary approach. Key features of the Project include the following.

- The configuration of the open pit has been optimized to maximize the recovery of ore from the Sisson deposit while minimizing its footprint.
- The ore processing plant, TSF, and associated facilities are all sited within a single watershed, Napadogan Brook, for maximum effectiveness of responsible water management and ultimate closure of the project.
- The TSF has been designed to exceed the safety requirements of Canadian Dam Association guidelines.
- The TSF has been sited to avoid waterbodies to the extent possible, and its proposed location avoids disturbing lakes in the area, some of which support recreational fisheries. The size and configuration of the TSF have been optimized to avoid unnecessary disturbance or destruction of fish habitat as well as areas having concentrations of sites with elevated archaeological potential.
- All potentially acid generating tailings will be stored sub-aqueously in the TSF to effectively mitigate the potential onset of acid generation. For the same reason, all waste rock (some of which is potentially acid generating) will be stored sub-aqueously in the TSF rather than in a separate waste rock storage area on the land surface.
- No waste rock will be used to build the TSF embankments, since some of it is potentially acid generating. Instead, a quarry will be developed on-site to provide non-potentially acid generating rock for the embankments.
- APT will be produced on-site as an added-value end product, thereby enhancing job creation and economic benefits for the people of New Brunswick and Canada.

SML has developed a framework Environmental and Social Management System (ESMS) for the Sisson Project. The framework ESMS provides an outline of various environmental and social management plans, policies and procedures, and describes their implementation schedule and responsibilities. The ESMS is an operational document to ensure implementation of the commitments and mitigation strategies identified in the EIA Report, and to otherwise meet SML's "Principles of Responsible Mineral Development". The ESMS will become more developed and detailed as the

Project progresses through detailed design and permitting, and will be updated as required for continuous improvement over the life of the Project.

Key elements of the ESMS include:

- an site-specific Environmental Protection Plan (EPP) for construction that will be developed and submitted to the appropriate regulatory agencies for review and approval prior to the commencement of construction;
- an Emergency Preparedness and Response Plan (EPRP) for all phases of the Project;
- specific operational plans for the management of, for example, water and air quality, land and biodiversity, hazardous materials and waste, noise, community health and safety, cultural heritage, and EIA follow-up and environmental effects monitoring; and
- a Public, Stakeholder, and First Nations Engagement Plan to ensure the effective continuation of SML's engagement activities with the public, First Nations and stakeholder groups through all phases of the Project. These activities include a proposed Community Liaison Committee with a Follow-up and Monitoring Subcommittee.

Environmental Effects Assessment

Project interactions with all Valued Environmental Components (VECs) prescribed in the Terms of Reference were analyzed to determine the potential environmental effects associated with Project components and activities. Fourteen VECs were identified as relevant and important to the EIA of the Project. The analysis of potential environmental effects of the Project on each VEC was carried out for all Project phases, including the cumulative environmental effects of the Project in combination with other projects or activities that have been or will be carried out. These analyses were based on thresholds of significance that were defined in the Terms of Reference within appropriate boundaries for the assessment. The environmental effects of potential credible accidents, malfunctions and unplanned events were also assessed, as were the effects of the environment on the Project. The analysis used qualitative and, where possible, quantitative information available from existing knowledge and appropriate analytical tools, as well as considering identified mitigation measures. To eliminate or reduce any anticipated environmental effects, mitigation measures were incorporated into the Project design.

Residual environmental effects were predicted for VECs following the application of planned mitigation measures. The residual environmental effects of each Project phase were evaluated as either not significant ("NS"), significant ("S", with likelihood of occurrence identified in such cases), or positive ("P"), based on thresholds of significance previously defined in the Terms of Reference. The significance of residual environmental effects, as determined for each of the VECs, is summarized in Table E.1 below.

Table E.1 Summary of the Significance of Residual Environmental Effects

Valued Environmental Component (VEC)	Project Phase			Accidents, Malfunctions and Unplanned Events	Project Overall
	Construction	Operation	Decommissioning, Reclamation and Closure		
Atmospheric Environment	NS	NS	NS	NS	NS
Acoustic Environment	NS	NS	NS	NS	NS
Water Resources	NS	NS	NS	NS	NS
Aquatic Environment	NS	NS	NS	NS	NS
Terrestrial Environment	NS	NS	NS	S/U (SAR only) NS (all others)	NS
Vegetated Environment	NS	NS	NS	NS	NS
Wetland Environment	NS	NS	NS	NS	NS
Public Health and Safety	NS	NS	NS	S/U	NS
Labour and Economy	NS	NS/P	NS	NS	NS/P
Community Services and Infrastructure	NS	NS	NS	NS	NS
Land and Resource Use	NS	NS	NS	NS	NS
Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons	NS	NS	NS	NS	NS
Heritage Resources	NS	NS	NS	NS	NS
Transportation	NS	NS	NS	NS	NS
Effects of the Environment on the Project	NS	NS	NS	NS	NS

Notes:
NS = Not Significant Residual Environmental Effect Predicted.
S = Significant Residual Environmental Effect Predicted.
L = Residual Environmental Effect is Likely to Occur.
U = Residual Environmental Effect is Unlikely to Occur.
P = Positive Residual Environmental Effect Predicted.
SAR = Species at Risk.

The EIA determined that there would be no significant adverse residual environmental effects from the Sisson Project during all phases and in consideration of normal Project activities. Positive environmental effects were predicted for Labour and Economy, specifically for employment, incomes and government revenues, during both the Construction and Operation phases. Effects of the environment on the Project were predicted to be not significant due to the engineering design of Project components that incorporates factors of safety and other mitigation strategies to minimize the likelihood of a significant adverse effect of the environment on the Project. The potential residual environmental effects of Accidents, Malfunctions and Unplanned Events were also found to be not significant for the most part. The EIA determined that the only potentially significant environmental effects due to such events would be if a Project-related fire put the life and/or health of the public and/or Project employees in immediate danger, or if a Project-related fire or vehicle collision resulted in the death of listed species at risk (SAR). These environmental effects were predicted to be highly unlikely to occur. A major failure of containment in the tailings storage facility was determined to be extremely unlikely to occur, with an annual probability of occurrence of 1-in-1 million to 1-in-10 million, though if it did occur the environmental effects of such an event would likely be significant, especially for the Aquatic Environment.

Cumulative environmental effects that can result from the Project in combination with other past, present or reasonably foreseeable future projects or activities were also assessed. Project management and mitigation measures will be applied as part of the Project, such that the potential environmental effects of the Project in combination with other projects or activities that have been or will be carried out are rated not significant.

Follow-up and Monitoring

An appropriate follow-up program has been developed to verify the predictions of this EIA Report and to verify the effectiveness of mitigation. As well, monitoring measures have been developed to measure compliance with regulatory requirements, and to assist in the identification of adaptive management measures as necessary to avoid or minimize potentially significant adverse environmental effects should they be found to occur.

Conclusion

Overall, the EIA concluded that, with planned mitigation and the implementation of best practices to avoid or minimize adverse environmental effects, the residual environmental effects of the Project, including cumulative environmental effects and the effects of the environment on the Project, during all phases are rated not significant, except in the event of certain worse-case credible Accidents, Malfunctions and Unplanned Events, for which some environmental effects could be significant but are highly unlikely to occur.