



KSM MINING ULC
A SUBSIDIARY OF SEABRIDGE GOLD INC.

KSM Project

**Application for an Extension of
Environmental Assessment
Certificate M#14-01:
Comment Response Report**

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KSM Project

Application for an Extension of Environmental Assessment Certificate M#14-01: Comment Response Report



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1. INTRODUCTION

KSM Mining ULC (KSM Mining) submitted an application to the British Columbia (BC) Environmental Assessment Office (EAO; Extension Application) in July 2020 for a second extension to the KSM Project Environmental Assessment Certificate (M#14-01; Certificate).

KSM Mining is seeking at least a two-year variance under Section 46 of the *Environmental Assessment Act* (2018 Act) in light of the global COVID-19 pandemic and national and federal and provincial state of emergency. Under subsection 46(1), if the minister considers there is an emergency or other comparable circumstance that warrants or will warrant the variation of one or more provisions of the [2018] Act, and the variation is in the public interest, the minister may order a variation that the minister considers necessary to respond to the emergency or other circumstance.

A five-year extension of the Certificate was granted on March 21, 2019. BC's 2018 *Environmental Assessment Act* (2018 Act) allows one certificate extension for up to five years. The Certificate will now expire on July 29, 2024, if the project is not substantially started by then.

The EAO sought feedback on the Extension Application from the public, Indigenous nations and federal and provincial government agencies as follows:

- EAO posted the Extension Application its electronic Project Information Centre (ePIC).
- EAO held a 14-day comment period from November 19, 2020 to December 3, 2020 and posted a notice advertising the comment period to ePIC.
- EAO provided the Extension Application was provided to numerous Indigenous groups (Tahltan Central Government, Nisga'a Lisims Government (NLG), Gitanyow Hereditary Chiefs, Gitxsan (including Gasla Lax Loobit and Simgiget'm Gitwangak on behalf of Lax Behlit and Xsu Gwin Yookhl) and Skii km Lax Ha), federal government departments (Environment and Climate Change Canada (ECCC)), and Fisheries and Oceans Canada (DFO)) and BC ministries (Ministry of Energy, Mines and Low Carbon Innovation (EMLI), Ministry of Environment and Climate Strategy (ENV) and Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) and Northern Health (NH).

This report provides KSM Mining responses to the comments submitted by the public, Indigenous nations, federal departments and BC ministries on the Extension Application.

2. PUBLIC COMMENTS

A total of eleven public comments were submitted during the comment period. Subject to the length of the KSM Mining response, responses are either provided in Table 1 or in standalone responses in Appendix A as follows:

- Table 1 includes each public comment and responses to comments from two members of the public and three organizations (NW Response Ltd, Salmon Beyond Borders and Trout Unlimited).
- Appendix A includes standalone responses to comments from Northern Confluence in Table A1; Alaska Trollers Association in Table A2; Rivers Without Borders in Table A3; Southeast Alaska Indigenous Transboundary Commission in Table A4; SkeenaWild Conservation Trust in Table A5 and one member of the public in Table A6.

3. INDIGENOUS GROUPS AND GOVERNMENT AGENCIES' COMMENTS

Responses to comments from Nisga'a Lisims Government, Gitanyow Hereditary Chiefs Office, Office of the Gitksan Hereditary Chiefs, ECCC, DFO, EMLI and FLNRORD are provided in Table 2 and summarized below:

- The Gitksan Nation agrees with and supports KSM Mining ULC's recent application to extend the Environmental Assessment Certificate M14-01 in respect of the Kerr-Sulphurets-Mitchell Project (the "Project") for two years because of the impacts of the COVID-19 pandemic on its ability to advance the Project and on its prospects for attracting a joint venture partner.
- Nisga'a Lisims Government noted that they have no comments on the Extension Application and reserved the right to provide comments on the Extension Application until NLG and the EAO have undertaken the engagement steps referred to below (see engagement steps identified in NLG comment in Table 2). NLG noted that the information provided by KSM under section 5.4 of the Extension Application with respect to the Gitanyow Hereditary Chiefs' petition challenging two decisions of the Minister of Forests, Lands and Natural Resource Operations arising from the operation of the Nisga'a Final Agreement (the "Nisga'a Treaty") is not up to date and provided an update on the litigation.
- The Gitanyow:
 - Provided a legal opinion prepared by Ecojustice, which opines on the issues of whether the Minister of Environment and Climate Change Strategy (the "Minister") has jurisdiction to issue the emergency order and, if so, whether it is appropriate under these circumstances.
 - Provided a report prepared by Lynker to review modeling results related to potential dam failures at the proposed KSM mine in Klohn Crippen Berger (2012). Dam Break and Inundation Study for TMF (Appendix 35-C of KSM Environmental Assessment).
 - Commented that they "*...did not support the first extension granted by the BC Environmental Assessment Office (BCEAO) in 2018-19 and ... continues to call for a re-assessment of the findings of the original assessment as it relates to water quality impacts in the Nass River Watershed, drawing on new data gathered since 2014 and the adoption of the United Nations Declaration on the Rights of Indigenous Peoples by the provincial government*".
 - Re-submitted 2018 comments that were provided during the review of the Project's July 2018 application to extend the Certificate deadline. KSM Mining responded to these comments, which are posted to EAO's electronic information centre (https://projects.eao.gov.bc.ca/api/public/document/5c93ea6ecc874000241c9d2b/download/Master%20WG_Comments_Responses%20FINAL%20March%202021.pdf). These comments were considered and resolved by EAO in the process of its decision to grant the Project's July 2018 application to extend the Certificate deadline, which was issued in March 2019.

4. SUPPORTING TECHNICAL REPORTS AND ANALYSES

The following documents have been prepared to respond to comments on the Extension Application:

- Appendix B:
 - Appendix B1: Klohn Crippen Berger Response to Lynker KSM Dam Failures Review Memorandum (January 2021).
 - Appendix B2: BMO Capital Markets KSM Process and Market Update (November 2020).
 - Appendix B3: Grant Thornton Impact of COVID-19 Pandemic on Environmental Assessment Certificate M14-01 and the KSM Project (January 2021).
 - Appendix B4: Compilation of newspaper articles regarding COVID-19 impacts on northwest BC communities and the mining sector.
 - Appendix B5: BioteQ Environmental Technologies Final Data Report – Pilot Demonstration of Selenium Removal from KSM Seepage using Selen-IX™.
 - Appendix B6: Blakes Memorandum (February 2, 2021) related to the Jurisdiction of British Columbia Minister of Environment to issue emergency variation order to allow the CEAO to extend deadline in environmental assessment certificate.
- Appendix C: 2019 Joint Information Requirement for *Mines Act* and *Environmental Management Act* Permits (Ministry of Energy, Mines and Petroleum Resources and Ministry of Environment and Climate Change).

Table 1: KSM Mining ULC Responses to Public Comments on the KSM Project July 2020 Extension Application

CMT#	Date	Organization/ Individual	Topic	Comment	KSM Mining ULC Response
1	11/19/2020	Nikki Spruce, Northern Confluence	Size of tailings dam and downstream impacts, mine site downstream impacts, failure of BC to implement Mount Polley Expert Panel recommendations, lack of company history operating mine sites, failure to meet all Certificate conditions, inability to attract an investor due to COVID-19, COVID-19 impact on 2020 field programs, Extension Application not in accordance with Certificate Extension Policy (2020) and lack of downstream engagement with Alaska Tribes on environmental assessment and variance	<p>Northern Confluence is an initiative based out of Smithers that focuses on land-use decisions in northern B.C., including mining development. We are writing with regards to Seabridge Gold's KSM letter requesting further extension due to COVID-19.</p> <p>There is no doubt that the pandemic has impacted all corners of the province. However, this is clearly an attempt to take advantage of a crisis situation.</p> <p>To begin, the EAO just recently granted the certificate holder of the KSM project an extension to substantial start to July 29th, 2024 (issued March 21, 2019). This will be a full ten-year extension from the time the permit was first granted. KSM believes "a variance under subsection 46(1) to extend the duration of the Certificate would be in the public interest" (emphasis added). The Seabridge Gold KSM mining proposal is not in the public interest. In particular with its current tailings storage proposal that would create the largest mine dam in North America with a proposed storage volume of 1,213 million cubic metres. This proposed tailings dam also has those downstream, both of Riske and Treaty creeks, and the Unuk River, concerned about risks given acid-mine drainage, BC mining laws and regulations yet to fully implement the Mount Polley Expert Panel recommendations, and lack of company history operating mine sites.</p> <p>Seabridge has only met 26 of the 41 conditions in its environmental assessment certificate to date. In particular, it has yet to meet the condition of being able to effectively treat selenium at the proposed volumes of the mine. This is likely to remain a barrier to "substantially start" but that has nothing to do with the pandemic and more to do with the feasibility of the mine and best available technology. We have seen deadly impacts to fish from selenium in the Elk and Fording Rivers in southeast B.C. Few along the Unuk and Skeena watersheds would support these potential risks to our salmon.</p> <p>One of the rationales KSM uses for its extension request is that COVID-19 has "temporarily depressed the copper market, effectively putting new investments such as the copper intensive KSM Project on hold until market conditions normalize". This is false. Copper prices were low before the pandemic and is a commodity that regularly sees fluctuations. In fact, the trading price for copper at the moment (2.97) is where prices were at when Seabridge was first granted its permit. In addition, the KSM Project also states that it has gold and silver which are trading at record high prices.</p> <p>The Province of BC made a decision to include mineral exploration and mining as essential services during the pandemic. KSM tries to use the argument for an extension that they were unable to conduct field work and expect further slow downs due to COVID-19 to impede their ability to "substantially start". Other mineral and mining companies have had no problems adjusting to the safety measures and continuing on business as usual. In addition, it appears as though Seabridge itself has been conducting field operations at the KSM site. A Seabridge Press Release dated July 9, 2020 summarized the geotechnical drilling along the proposed Mitchell Treaty Tunnel route that is underway at that site (Footnote 1: Geotechnical Drilling Begins Along Tunnel Route for Seabridge Gold's KSM Project. Thursday, 9th July 2020).</p> <p>Section 31(5) of the <i>Environmental Assessment Act</i> requires the EAO to achieve consensus with participating Indigenous nations and any appropriate stakeholders or agency representatives to grant an extension. It's inherent on the EAO in this case to ensure that the Gitanyow and other Indigenous nations support a further extension; and that there's meaningful engagement with downstream Alaska Tribes who have expressed concerns about potential impacts. However, based on the evidence, there is no need to grant Seabridge KSM an extension to substantially start beyond their extension from last year to 2024. It is not in the public interest, all relevant stakeholders have not been adequately engaged, and their arguments are weak at best.</p> <p>However, based on the evidence, there is no need to grant Seabridge KSM an extension to substantially start beyond their extension from last year to 2024. It is not in the public interest, all relevant stakeholders have not been adequately engaged, and their arguments are weak at best.</p>	Thank you for submitting comments. Please see response in Table A1 in Appendix A of the KSM Mining Project Comment Response Report.
2	11/19/2020	Anonymous	Support for extension	I support Seabridge Gold request for a 2 year extension on the KSM Project. Mining Projects such as this provide significant benefit to our Province as a whole and we need to ensure that the Mining industry continues to provide well paying jobs for Northern BC, support for the Business environment throughout BC and continued tax revenue for the provincial government. Several of our Mines in Northern BC are mature and end of life is in the forecast. We need to continue supporting Mining and mining revenue into the future.	Thank you for submitting comments and your support for the extension request.

CMT#	Date	Organization/ Individual	Topic	Comment	KSM Mining ULC Response
3	11/20/2020	Anonymous	Historical mining impacts	<p>I noticed this opportunity to make comments on an extension request in our local paper and decided I wanted to send along my thoughts as a lay person, totally not versed in mining or environmental assessment, but someone who spends months each year in the north of our province as well as in the Yukon and regularly sees the abhorrent mess made and walked away from, by mining companies. My views are general and do not specifically apply to any one project in particular. There is a long history of resource extraction all over our beautiful province and an equally long history of absolutely no stewardship or social conscience on part of the lucrative mining ventures and their shareholders. Time and time again, companies are approved to tear into the land, destroy habitat of all kinds, take as much as possible then once the earth is no longer a money maker, these companies close the doors, walk away and remediate nothing. When public pressure comes to bear and the government of the day half heartedly looks into the mess left behind and pursues the company, lo and behold, they're insolvent. No money is recovered to clean up, no accountability is assumed and months or years later, another company shows up hoping to do it all over again. It's a shameful pattern that replays itself over and over with much tsk tsking and no appreciable action. Perhaps someday, the powers that be will force accountability first and grant permits, extensions etc. second. This would involve courage, ethics and foresight...all sadly lacking it would appear. Companies wanting to take from the land must pay into a hefty remediation trust which they can not access under any circumstances. The government holds that money in trust and uses every dime for remediation and clean up after the project wraps up. No chasing debunk companies for blood from the proverbial stone, no excuses about how costly it is to heal the scars on the land, no whining about cutting into profits or maybe taking jobs somewhere else. Pay big dollars up front if companies want the privilege, not the right, to make massive profits on the backs of the environment. The failure to do something of this nature results in, as we all know... the tax payer...that's me... being stuck with huge bills... e.g the Cassiar mine site decades long clean up... or worse yet, absolute blind eyes on the part of government regulators to the tons of rusting metal, collapsed buildings, toxic waste piles and destruction of the land that sits, mostly hidden from the eyes of the general public, in the mountains of our province. Over the last few years there have been rumblings from our provincial government about the billions of dollars worth of mining remediation that needs to be done but precious little in action toward that end. Instead of continuing to do the same procedural things that have created the current mess and will continue to enable companies to pillage the land and never truly clean up, the government needs to step up and do something drastic, for a change and make companies pay first and profit later. Thank you for the opportunity to share my views.</p>	<p>Thank you for submitting comments. The BC <i>Mines Act</i> requires mining companies to post a financial security as a condition of a <i>Mines Act</i> permit. Securities are held until the BC Chief Inspector is satisfied that all reclamation requirements have been fulfilled. The security is set at a level that reflects outstanding reclamation and closure obligations associated with the site. The security amount may be increased or decreased at the discretion of the Chief Inspector based on the risks at any time. Securities can only be released by the authority of the Chief Inspector of Mines. The Project's estimated reclamation and closure cost at approximately C\$195.5 million (Seabridge 2016 Prefeasibility Study). KSM Mining has also committed to establish a separate fund, which would be built up over the operating years of the mine, to finance long term water treatment costs. The security for the mine will be set by the BC Ministry of Energy, Mines and Low Carbon Innovation during <i>Mines Act</i> permitting which KSM Mining has yet to undertake.</p>
4	11/21/2020	Ray Hollenberg, Principal, NW Response Ltd.	Rigour of EA and permitting process	<p>Thank you for the opportunity provide public comment regarding the Certificate Extension Request for the KSM Project (Environmental Assessment Certificate #M 14-01). I have been involved in the BC Mining Sector from 1989-1995 when I worked for the Ministry of Environment and from 1995 until present as an Environmental Impact Assessment Consultant through Northwest Response Ltd.</p> <p>Over the past 31-years I have personally experienced the transformation of the Mining Sector from a relatively simple Permitting Process to a multi-year complex Permitting Process. The current level of professional accountability and responsibility to our environment, stakeholders including First Nations and the general public is among the most rigorous in the World, an achievement we are all proud of.</p> <p>The time-frame required to prepare for Certification is intense and not easily obtained without a dedicated team, strong financial support and the reliance on multi-disciplinary, international expertise. Under normal conditions, meeting the conditions outlined in an Environmental Certificate can be challenging, add in a Global Pandemic and the challenges can increase exponentially.</p> <p>The Canadian economy has been hit very hard with this Global Pandemic. Using the Global Pandemic as a last-ditch effort to shut down a Certification Process is not the correct way to manage the Mining Sector in British Columbia or Canada.</p> <p>The Environmental Certification Process holds everyone involved accountable to ensure that new mines in BC meet all the current environmental standards and that all public concerns and stakeholder concerns are addressed. We need to trust the process.</p> <p>Under the current challenging times, this extension request is warranted. Furthermore, by allowing this extension, BC sends a strong international message that the process we currently subscribe to is one we can trust and rely on for long-term stability.</p>	<p>Thank for your comments highlighting the rigour in BC's EA and permitting processes.</p>

CMT#	Date	Organization/ Individual	Topic	Comment	KSM Mining ULC Response
5	11/25/2020	Jill Weitz, Director, Salmon Beyond Borders	COVID-19 impact on 2020 field programs, modelling of potential tailing dam failure, BC's commitment to UNDRIP	<p>Salmon Beyond Borders is a campaign driven by sport and commercial fishermen, community leaders, tourism and recreation business owners and thousands of concerned citizens, in collaboration with Tribes and First Nations, united across the Alaska / British Columbia (B.C.) border to defend and sustain our transboundary rivers, jobs and way of life. Please accept this as the second submission on behalf of Salmon Beyond Borders for the second request for an extension to the Environmental Certificate for KSM Mining Inc. (KSM) for their proposed KSM mine.</p> <p>Salmon Beyond Borders wrote to the B.C. Environmental Assessment Office (EAO) on October 8th, 2020, referencing our support for the objection to this extension request made by the Southeast Alaska Indigenous Transboundary Commission (SEITC) and the 15 of the 19 federally recognized tribes they represent in Southeast Alaska, as well as the objection made by the Gitanyow Hereditary Chiefs, per Section 31(5) of the <i>Environmental Assessment Act</i> (EA). Furthermore, the Province of B.C. made a decision to include mineral exploration and mining as essential services during this COVID-19 global pandemic. Seabridge Gold / KSM has tried to justify an extension based on the grounds that they were unable to conduct field work and expect further delays due to COVID-19 to impede their ability to "substantially start." Other mineral and mining companies have had no problems adjusting to the safety measures and continuing on business as usual. In addition, Seabridge Gold has been conducting field operations at the KSM site. A Seabridge Gold Press Release dated July 9, 2020 summarized the geotechnical drilling along the proposed Mitchell Treaty Tunnel route that is underway at that site.</p> <p>Following our initial submission, new information regarding KSM's proposed mine has come to our attention. Salmon Beyond Borders has been working to support an effort led by the Gitanyow First Nation as they undertake a visual representation of a potential tailings dam failure at the proposed mine to better educate impacted communities on the potential risks associated with the project. Gitanyow Hereditary Chiefs have retained Lynker Technologies (Lynker) to conduct a two-phase initiative for this effort. Upon first phase completion, Lynker has found several deficiencies regarding KSM's projection of a tailings dam failure, including out of date information and modeling. A technical memo is attached for reference.</p> <p>The Gitanyow Hereditary Chiefs and SEITC, as well as many other impacted communities within and outside of B.C. jurisdiction, have expressed multiple times to the government of B.C. their concerns regarding KSM's potential impacts to water quality, fish and fish habitat, and Indigenous rights. In the face of climate change, emerging methods and scientific studies for tailings dam failures, and B.C.'s commitment to the United Nation's Declaration on the Rights of Indigenous Peoples (UNDRIP), Salmon Beyond Borders maintains that B.C. must uphold and implement its commitments towards meaningful UNDRIP and climate change legislation, and not only reject the current request from KSM for an extension but require KSM to address the aforementioned technical data deficiencies within their original EA certificate.</p> <p>Gunalchéesh / Háw'aa / Thank You.</p>	<p>Thank you for submitting comments.</p> <p>KSM Mining has not yet applied for and obtained the necessary authorizations to construct and operate the mine. The start of the 2020 field programs was delayed in order to identify and put in place measures to respond to BC government COVID-19 requirements and to safeguard the well-being of contractors, employees and communities in which KSM works. The scope of the programs was substantially reduced to comply with pandemic restrictions. The camp capacity was reduced by 50%, which resulted in:</p> <ul style="list-style-type: none"> ■ The Mitchell Treaty Tunnel drilling program was reduced from 40 to 10 holes, which has delayed geotechnical, geological and metallurgical data collection required for the Feasibility Study and the <i>Mines Act</i> permit application; and ■ Reduced scope for environmental field programs. <p>Collectively, these changes have delayed or will delay KSM Mining's ability to undertake a final Feasibility Study, which is necessary to justify the next stage of Project investment. The pandemic has made engaging with Indigenous groups challenging. Most communities are understandably unwilling to allow visitors, and adequate digital infrastructure is not always available to conduct these processes remotely. Most Indigenous communities have also requested more time to review draft permit applications and other regulatory materials due to the challenges caused by the pandemic. Given the current state of the pandemic, KSM Mining anticipates the current COVID-19 restrictions and the rise of the new COVID variants will also impact the 2021 field programs. KSM Mining defers to the Environmental Assessment Office to respond to comments related to UNDRIP.</p>

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5b	11/25/2020	Attached to Salmon Without Borders and Skeena Wild Conservation Trust comments; Cameron Wobus & Bill Szafranski, Lynker Technologies' comments	Review of Klohn Crippen Berger, 2012. (KCB 2012) Dam Break and Inundation Study for Tailing Management Facility (Appendix 35-C of Seabridge Application for an Environmental Assessment Certificate 2013)	<p>Lynker was retained by the Gitanyow Hereditary Chiefs to review modeling results from Seabridge Gold related to potential dam failures at the proposed KSM mine. We focused this review on a Seabridge modeling report that summarizes results from tailings transport simulations resulting from a failure of tailings management facility (TMF) dam: Klohn Crippen Berger, 2012. Dam Break and Inundation Study for TMF. Appendix 35-C of KSM Environmental Assessment (herein referred to as KCB, 2012) Our review focused on the model and assumptions used, the parameters and data used to feed the model, and the general results of the modeling studies. This memorandum summarizes four key findings, described below.</p> <p>The Simulated TMF Release is Smaller than Available Data would Predict</p> <p>The assumed size of the release from the tailing management facility (TMF) is a key assumption that is fundamental to the TMF failure modeling results. Specifically, the fraction of the tailings that would be released if the dam fails controls the downstream impacts.</p> <p>KCB (2012) simulates two different types of failures of the TMF dams: overtopping failures and piping failures. The volumes released from these two failure types are different: approximately 7% for the piping failure, and approximately 27% for the overtopping failure. The overtopping failure volume is based on a KCB assumption that the tailings remaining in the impoundment after failure would settle at an angle of repose of 5 degrees, and all tailings above this angle would be released. Based on KCB's calculations, which are not included in the report, the release of all material above this angle results in a release volume of 27% of the full TMF contents. KCB contends that this volume is in general agreement with two references, Azam and Li (2010) and USCOLD (1995), which suggest that historical tailings dam failures typically release 20-25% of the stored tailings. However, there are at least two problems with the 27% release assumption, described below.</p> <p>First, this release volume apparently relies on the assumption that the tailings remaining behind the dam would settle at an "angle of repose" of 5 degrees. This number is based on an unpublished dissertation from 1981 (Lucia, 1981), whose conclusions are at odds with both this 5 degree angle of repose and the estimated release volume. Chapter 6 of Lucia (1981) summarizes the five main conclusions of the dissertation. The two conclusions relevant to tailings release volumes are conclusions 2 and 5, which are as follows:</p> <p>2) A review of case histories of failures shows that liquefied mine tailings composed primarily of sand and silt sizes have some small residual strength after liquefaction, and they will come to rest at slopes of one degree to four degrees. [...] 5) The volume of tailings involved in a flow failure is usually considerably less than the total volume impounded, although in some cases, especially where the tailings are extremely fluid, the entire volume of tailings in the pond did flow, therefore, in the absence of evidence to the contrary, it appears that the most appropriate assumption will often be that 100% of the tailings will flow (Lucia, 1981, p. 106-107; emphasis added). Thus, the main reference KCB (2012) draws on to arrive at its 27% release assumption actually concludes that the tailings remaining would settle at much lower angles than 5 degrees (thus releasing a larger fraction of the total tailings); and that the most appropriate approach may be to assume that all of the tailings will be released.</p> <p>The second problem with the 27% release assumption is that it is not well-supported by more recent information on tailings dam failures. The USCOLD (1995) dataset cited by Seabridge is more than 25 years old, and the Azam and Li (2010) study does not explicitly link release volumes to storage volumes. Available data from two comprehensive studies suggest that the release volume could be much larger than 27%. For example, a well-cited study by Rico et al., (2008) suggests that on average, the volume released in a tailings dam failure event is closer to 40% of the stored tailings, larger than the largest release volume assumed by KCB (2012). Empirical data from 35 historical tailings dam failures compiled by Concha Larrauri and Lall (2018) also suggest an average release volume closer to 40%, with a range between 1% and 100%.</p> <p>All of the historical failures studied by Rico et al. (2008) and Concha Larrauri and Lall (2018) are from much smaller tailings management facilities than those proposed for KSM (at 74 Mm³, the facility that failed at Mt Polley is the largest in the historical dataset, but the storage volume behind the proposed North Dam at KSM is more than 7 times as large as this). Thus, there is considerable uncertainty in using these historical failures to estimate what could happen if the KSM facility were to fail. Because there is ample evidence that the release volume could be much larger than 27%, however, Seabridge should at a minimum include larger failures in their simulations to evaluate how those releases would affect downstream risks.</p> <p><i>Key Point #1: The tailings release volume from a TMF failure would likely be much larger than the 27% release assumed by KCB (2012). Since all of the downstream impacts of a TMF will scale with the assumed volume of the release, the study should evaluate impacts from larger failure volumes.</i></p> <p>2. The Context for Presenting Failure Results is Misleading</p> <p>The results of the overtopping failure simulations are shown in Figures 5.1 and 5.2 of KCB (2012). Notably, the flood depths and discharges for these failure scenarios are superimposed on the probable maximum flood, or PMF. In the context of the PMF, many of these dam failure results do not look particularly large: the flood depths on the Bell Irving River below the Bowser River confluence are on the order of 50% higher than the "baseline" PMF. This gives the impression that the dam failure scenario is not far outside the range of otherwise normal flooding. KCB (2012) explicitly cites this as an indication that the risks from a TMF failure are not very large: Results shows that Bell 2 Lodge, New Aiyansh, Gitwinksihlkw (Canyon City), Laxgalts'ap (Greenville), 10 highway sections, as well as existing cabins and outfitter/guide facilities located on riverbanks, floodplains or close to natural floodplains will likely be inundated by an overtopping failure of the Ultimate Southeast Dam. However, most of these locations would also be flooded under naturally occurring flows (PMF), therefore the incremental consequence of an Ultimate Southeast Dams overtopping failure is small. (KCB, 2012a p. 39; emphasis added)</p>	Thank you for submitting comments. See KCB response in Appendix B1 of the KSM Mining Comment Response Report.

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				<p>The problem with this depiction is that the PMF is such an extremely unlikely event that it dwarfs any reasonable metrics of flood risk. The PMF is defined as the theoretically largest flood that could occur in a given area, and is estimated by combining the most severe conceivable hydrologic conditions that could plausibly occur (LaRocque, 2013). Although it is difficult to estimate the probability of a PMF, various authors have estimated that it is an event with a 1:100,000 to 1:1,000,000 probability of occurring in any given year (e.g., Shalaby, 1994).</p> <p>In the Bell Irving River basin, the PMF discharge is approximately 19,000 m³/s downstream of the Bowser River confluence, and the tailings failure increases the magnitude of this flood wave by approximately 10,000 m³/s, or about 50% (Figure 5.2 of KCB, 2012a). For comparison, based on streamflow data from the nearest gage site on the Bell-Irving River, we estimate that the 100-year flow is on the order of 4,000 m³/s. Thus, while the flood wave due to the tailings dam failure is less than half the PMF, it is approximately 2.5 times the magnitude of the 100- year flood event.</p> <p><i>Key Point #2: Presenting the failure simulation relative to the probable maximum flood (PMF) is misleading, as the PMF is an extremely large event that is not commonly used in flood risk delineation.</i></p> <p>3. HEC-RAS is an Inappropriate Tool to Simulate a TMF Failure</p> <p>For its modeling of a tailings dam failure, KCB chose to use the software HEC-RAS, a model that was primarily developed to simulate “clear water” floods (i.e., floods with low sediment concentrations). However, because the thick, sediment-laden flows common in tailings dam failures have different physical properties than “clear water” flows, this model choice could introduce significant uncertainties into the model results.</p> <p>In the mining industry, it has become more common to use a code like FLO-2D to simulate the release and downstream routing of tailings, because these other codes can simulate “non-Newtonian” fluids like mudflows: Mudflows are non-homogeneous, non-Newtonian, transient flood events whose fluid properties change significantly as they flow down steep watershed channels or across alluvial fans. Mudflow behavior is a function of the fluid matrix properties, channel geometry, slope and roughness. The fluid matrix consists of water and fine sediments. At sufficiently high concentrations, the fine sediments alter the properties of the fluid including density, viscosity and yield stress. (FLO-2D, 2017, p. 70)</p> <p>KCB (2012) states that they modeled tailings releases with 65% solids by weight, which means that the tailings are likely to exhibit non-Newtonian, mudflow behavior. Since HEC-RAS was developed only to model water flows, the model simulation is unable to capture the non-Newtonian properties of a tailings release with these sediment concentrations. Seabridge states that this is a “conservative assumption since the tailings would be more viscous than water and not flow as easily.” (KCB, 2012, p. 18). However, this assumption is overly simplistic and calls the overall results into question, as sediment-laden flows will behave fundamentally differently from “clear water” flows with much lower sediment concentrations.</p> <p><i>Key Point #3: Tailings floods flow in a way that is fundamentally different from water floods. HEC-RAS is an inappropriate tool for simulating tailings floods.</i></p> <p>4. The Model Sensitivity Analyses are Insufficient</p> <p>Because numerical modeling is inherently uncertain, it is important for the modeller to understand how the choice of different parameter inputs will affect model outputs. For a tailings dam failure simulation, assumptions like the physical characteristics of the flow, the total volume of the release, and the duration of the release could all significantly influence the model outcomes.</p> <p>KCB's (2012) sensitivity tests focused on only two parameters – the roughness characteristics of the channels downstream of the release (“Manning’s n”), and the breach formation time. Both of these parameters are adjusted upward and downward by approximately 50%, and the results of these sensitivity analyses are shown in tabular form in Table 5.13 of KCB (2012).</p> <p>KCB found that the model was highly sensitive to the choice of Manning’s n – peak flow increased by as much as 60% when Manning’s n was decreased by 50%, and peak flow decreased by as much as 30% when Manning’s n was increased by 50%. Similarly, the model is very sensitive to the breach formation time: decreasing the breach formation time by 40% increased the peak flow near the dam by 70%, and increasing the breach formation time by 40% decreased the peak flow by 30%. However, TMF breach failures can often occur much faster than 3 hours. Eyewitness accounts of historical TMF failures have demonstrated that tailings dam failures, when they do occur, can happen in a matter of seconds or minutes, rather than hours (Petley, 2019). There is no information provided as to how the peak discharge would increase due to a much faster breach like this. Given the variability in outputs based on breach formation times from 3-8 hours, a much shorter breach would generate a much larger flood peak.</p> <p>Finally, there are a number of other parameters the model may be sensitive to, but which are not evaluated at all. These include the total volume of the release, the resolution of the digital elevation model used, the characteristics of the flow (sediment concentration, the yield stress, etc.), and other items. Note that many of these sensitivity tests cannot be performed using HEC-RAS because this code can only simulate ‘clear water’ flows. As noted in bullet #3 above, the tailings dam analysis should be updated to use a modeling package that can explore model sensitivity to these additional parameters.</p>	

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				<p><i>Key Point #4: Both the number and range of parameters evaluated in the sensitivity analysis is extremely limited. Thus, the study does not explore a wide enough range of potential outcomes to fully evaluate risk.</i></p> <p>References</p> <p>Azam, Sahid and Li, Qiren (2010). Tailings Dam Failures: A Review of the Last One Hundred Years, <i>Geotechnical News</i>, December. B.C. Hydro (1986). <i>Modeling Procedures for Dam Breach Inundation Studies</i>, Revised September 1986. Concha Larrauri, P. and Lall, U. (2018). Tailings Dams Failures: Updated Statistical Model for Discharge Volume and Runout. <i>Environments</i>, 5(2), 28. https://doi.org/10.3390/environments5020028FLO-2D. (2017). <i>FLO-2D Reference Manual</i>. Build No. 17 2017. Nutrioso, AZ. Retrieved from https://www.flo2d.com/download/. Klohn Crippen Berger. (2012). Dam Break and Inundation Study for TMF. Appendix 35-C of <i>KSM Environmental Assessment</i>. LaRocque A. (2013) Probable Maximum Flood (PMF). In: Bobrowsky P.T. (eds) <i>Encyclopedia of Natural Hazards</i>. Encyclopedia of Earth Sciences Series. Springer, Dordrecht. https://doi.org/10.1007/978-1-4020-4399-4_276. Petley, D. (2019). <i>First Thoughts on the Brumadinho Dam Collapse Video</i> https://blogs.agu.org/landslideblog/2019/02/01/brumadinho-tailings-dam-video/. Rico, M., Benito, G., & Diez-Herrero, A. (2008). Floods from tailings dam failures. <i>Journal of Hazardous Materials</i>, 154(1-3), 79-87. Shalaby, A. I. (1994). Estimating probable maximum flood probabilities. <i>JAWRA Journal of the American Water Resources Association</i>, 30(2), 307-318.</p>	
6	11/27/2020 (Letter dated June 24, 2020)	Amy Daugherty, Executive Director, Alaska Trollers Association	COVID-19 impact on KSM Project 2020 field programs, inability to attract investor due to COVID-19	<p>Alaska Trollers Association (ATA) represents the small boat salmon harvesters who bring fish aboard individually in a slow and careful manner downstream from your beautiful country and communities. ATA has been in existence since 1924 and our troll fishery data at Alaska Department of Fish and Game (ADFG) pre-dates 1911 when harvest data collection officially began here. Our rural fishermen's long term historical dependency on salmon is governed by the Pacific Salmon Treaty (PST) and only overshadowed by the series of cuts we have endured from a grueling Treaty process which reduced our Chinook TAC by 65% in the last 22 years.</p> <p>As you may or may not know, we are also impacted by Stocks of Concern (SOC) designations which is when ADFG lists by regulation a river system that doesn't meet sufficient escapement levels for a few years. Of greatest concern presently are the weak returns on the Unuk, Stikine and Taku Rivers, the transboundary rivers with low escapement for multiple years now, KSM mining activity will impact the Unuk further. While Alaskan fishermen are making deep sacrifices in order to avoid catching these fish, both Alaska and BC need to protect healthy fish populations as SOC designations are a serious indicator of unsustainable returns of our mutually-appreciated resource, Chinook salmon.</p> <p>Accordingly, we believe transboundary mining should be prudently permitted, conducted and monitored. And more specifically, the KSM mine, which is of colossal size and potential environmental impacts, should not receive a further extension from your office. ATA is aware that KSM's stated reasoning is "Covid" but as you know and is stated on your BC Covid website, https://www2.gov.bc.ca/gov/content/safety/emergency-preparedness-response-recovery/covid-19-provincial-support/essential-services-covid-19#industry the entire BC mining industry with its supporting businesses has been "encouraged to remain open" and operate without restriction: "Businesses that ensure global continuity of supply of mining materials and products (e.g. metals such as copper, nickel and gold) and that support supply chains including mining operations, production and processing; mineral exploration and development; and mining supply and services that support supply chains in the mining industry including maintenance of operations, health and safety." KSM's other stated reason speaks to metal commodity pricing, which is also a weak argument as no metals are experiencing declines and most have very strong markets. Assertion of these comments only seems to illustrate that there is not credible reason for a further extension.</p> <p>British Columbia and Alaska should be working constructively together for clean transboundary rivers and the fish stocks they support. ATA hopes that your office seriously scrutinizes this application for an extension and any other unsound requests in the area of mine permitting. The long term resource reputation is in your hands.</p>	<p>Thank you for submitting comments. See response in Table A2 in Appendix A of the KSM Public Comment Response Report.</p>
7	1/12/20	Austin Williams, Trout Unlimited	COVID-19 impact on 2020 field programs	<p>Please accept these comments on behalf of Trout Unlimited (TU) in opposition to Kerr Sulphurets-Mitchell (KSM) Mining ULC's request for an emergency variance of the deadline for its Environmental Assessment Certificate.</p> <p>Trout Unlimited is a non-profit organization incorporated in the United States with 300,000 members and supporters dedicated to conserving, protecting and restoring North America's coldwater fisheries and their watersheds. Our work in southeast Alaska is driven by a coalition of sport, commercial, and subsistence fishermen, business owners and operators, and private citizens working together to conserve high-quality salmon and trout spawning and rearing habitat in the Tongass National Forest, America's largest national forest. As residents downstream from the KSM Project, TU and its supporters are deeply concerned about, and would be severely impacted by, impacts this project could have to Alaska waters and fisheries.</p> <p>KSM Mining ULC is requesting a second extension on the deadline of its certificate because it argues it has been unable to conduct field work and expects additional delays due to the COVID-19 pandemic; however, this argument is without merit since other mining companies have been able to continue operations and not experienced delays during the pandemic.</p> <p>Southeast Alaska's economy relies heavily on the fishing and tourism industries, which support 26% of local jobs and contribute \$2 billion to the local economy. Due to the proximity of the KSM Project to the Unuk watershed, which is one of the top salmon producing rivers feeding into Southeast Alaska, this project is of utmost concern to TU</p>	<p>Thank you for submitting comments. KSM Mining has not yet applied for and obtained the necessary authorizations to construct and operate the mine. As indicated in the Extension Application, further field programs are required to support the Feasibility Study and permit applications for construction and operations. The start of the 2020 field programs was delayed in order to identify and put in place measures to respond to BC government COVID-19 requirements and to safeguard the well-being of contractors, employees and communities in which KSM works. The scope of the programs was</p>

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				<p>and its supporters. Because of the great public interest at stake, TU encourages the Minister to ensure the project complies fully with the <i>Environmental Assessment Act</i> by denying the request for an emergency variance.</p> <p>Thank you.</p>	<p>substantially reduced to comply with pandemic restrictions. The camp capacity was reduced by 50%, which resulted in:</p> <ul style="list-style-type: none"> ■ The Mitchell Treaty Tunnel drilling program was being reduced from 40 to 10 holes, which has delayed the collection of geotechnical, geological and metallurgical data collection required for the Feasibility Study and the <i>Mines Act</i> permit application; and ■ Reduced scope for Environmental field programs being reduced in scope. <p>Collectively, these changes have delayed or will delay KSM Mining's ability to undertake a final Feasibility Study, which is necessary to justify the next stage of Project investment.</p> <p>The pandemic has made engaging with Indigenous groups challenging. Most communities are understandably unwilling to allow visitors, and adequate digital infrastructure is not always available to conduct these processes remotely. Most Indigenous communities have also requested more time to review draft permit applications and other regulatory materials due to the challenges caused by the pandemic.</p> <p>Given the current state of the pandemic, KSM Mining anticipates the current COVID-19 restrictions and the rise of the new COVID variants will also impact the 2021 field programs.</p> <p>In approving the environmental assessment, each of the federal and BC governments concluded that: KSM Mining conducted significant, meaningful engagement with all interested parties, including Alaskans; Alaskans' concerns were properly addressed and mitigated during the environmental assessment processes; and the Project would have no residual environmental effects on water quality in the Unuk River in Alaska.¹</p>

¹ Canadian Environmental Assessment Agency Comprehensive Study Report (2014); Environmental Assessment Office Assessment Report (2014).

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8	2/12/20	Bryan Lynch, Alaska Transboundary Watersheds Conservation Associate, Rivers Without Borders	Inability to attract investor due to COVID-19, COVID-19 impact on KSM Project 2020 field programs, Extension Application not in accordance with Certificate Extension Policy (2020) and lack of downstream engagement with Alaska Tribes on environmental assessment and variance applications, addition of new conditions if variance granted, dated environmental assessment	<p>Rivers Without Borders (RWB) is a nonprofit conservation organization working in both Canada and the U.S. to raise awareness of the outstanding ecological values of the B.C.- Alaska transboundary watersheds and promoting ecosystem-based stewardship to sustain those values.</p> <p>On August 6, 2020 KSM Mining ULC (KSM) submitted an application (Application) requesting a variance from the limitation of the issuance of only a one-time extension of Environmental Assessment Certificate #M14-01 (Certificate) for the KSM Project under Section 46 of the <i>Environmental Assessment Act</i> (Act). Under subsection 46(1), "if the minister considers there is an emergency or other comparable circumstance that warrants or will warrant the variation of one or more provisions of the Act, and the variation is in the public interest, the minister may order a variation that the minister considers necessary to respond to the emergency or other circumstance."</p> <p>RWB believes the COVID-19 emergency rationale presented in the extension application is flawed and without merit and that the application for a two-year extension to the original 5-year extension should be rejected and the request denied.</p> <p>In the Application, KSM states that "KSM Mining believes a variance under subsection 46(1) to extend the duration of the Certificate would be in the public interest" and lists five bullet points that summarize the basis for seeking at least a two-year variance under that section. These points address capital market disruptions and a depressed copper market, COVID-19 imposed safety requirements that limit their field operations, COVID-19 induced slowdown of permitting efforts and subsequent COVID-19 waves that will further exacerbate the above mentioned points. However, we believe the COVID-19 emergency has little actual bearing on the need for a variance to the initial one-time 5-year extension.</p> <p>The KSM October 2, 2018 application for the initial one-time 5-year extension stated that a "five-year extension to the Certificate deadline will provide KSM Mining with additional time to secure a joint venture partner with the technical and financial capabilities to responsibly develop the Project, and to substantially start the Project prior to a new deadline of July 29, 2024." In the four years since it was updated, the KSM economic assessment has apparently generated little interest from the investment community. It seems unlikely that a two-year or longer Certificate extension at this time will result in a more positive investment climate given the project's recent economic profile regardless of any effects from the COVID emergency.</p> <p>The Application's first two bullets state that COVID-19 has seriously disrupted capital markets and has temporarily depressed the copper market. However, this contention is not supported by recent trends in metals prices. We also want to point out that the KSM Project is not strictly a copper mine, but it is also a gold and silver mine. KSM updated their initial 2012 Preliminary Economic Assessment (PEA) in 2016 because of base metal value declines in 2016 (Footnote 1: https://ksmproject.com/wp-content/uploads/2019/03/Economics-Infographic-2019.pdf). The updated 2016 PEA was based on 48 million ounces of gold at \$1,300/ounce, 13.6 billion pounds of copper at \$3.00 a pound and 253 million ounces of silver at \$20 an ounce (Footnote 2: Ibid). Since the 2016 PEA update and at the date of this letter, the price of all three metals has increased with gold and silver showing significant increase s (Footnote 3: https://www.bloomberg.com/markets/commodities/futures/metals). KSM also completed an updated PEA on April 3, 2020 but even that update significantly underestimated current metals prices. Based on this information, the first two bullet points in the Application should be disregarded in consideration for a Certificate variance.</p> <p>The third bullet point in the Application states that "New safety requirements imposed by COVID-19 have severely limited KSM Mining's ability to mount and execute the field programs scheduled for 2020, forcing delays to the planned start of project construction." While there may have been some initial mining closures while companies developed new COVID-19 infection prevention measures, mining was declared an essential activity by the B.C. Provincial government and operations were never fully shut down and major mines are being constructed and operated worldwide regardless of COVID-19 (Footnote 4: https://www2.gov.bc.ca/gov/content/safety/emergency-preparedness-recovery/covid-19-provincial-support/essential-services-covid-19#industry). Despite KSM's assertion of COVID-19 induced field program delays, Seabridge Gold announced in a July 9, 2020 News Release that geotechnical drilling has begun along the proposed route of the Mitchell Treaty Tunnels (MTT), a key infrastructure component of the KSM project (Footnote 5: https://www.seabridgegold.com/pdf/NR/NJul9-20.pdf). Seabridge Gold's website also has other News Releases posted that announce active field programs at other mining projects this during the height of the COVID-19 pandemic which also casts doubt on the veracity of the field program concerns expressed in the Application (Footnote 6: https://www.seabridgegold.com/news-events/press-releases).</p> <p>The permit for the MTT drill program was obtained from the BC government on June 30, 2020 which would seem to also somewhat contradict the assertion in the fourth bullet point that COVID-19 is slowing down permitting efforts at least to the point field programs are being curtailed.</p> <p>The Application's fifth bullet point addresses the potential for a second COVID-19 wave disrupting future field data collection and permitting and partnering efforts. No one knows for sure what is going to happen with COVID-19 in the future and a second serious wave is a definite possibility. However, that is not an issue that should be considered at this time in a decision with respect to the variance.</p> <p>The Application does not seem to be in accordance with the current Certificate Extension Policy (CEP). According to Section 31(5) of the Act, the EAO "must seek to achieve, with respect to the application being considered under that subsection, consensus with participating Indigenous nations. The CEP also requires that " While Alaska Indigenous Tribes and Alaska municipalities or other stakeholders who may be impacted by the KSM project now have the opportunity to comment on this variance application, they were never granted full consultation in the initial one-time EA extension application granted in July, 2019 nor have they yet been granted full consultation in this variance application. In fact, they were never granted a full seat at the table during the EAO's assessment of the KSM project itself. This despite multiple requests that the B.C. government address</p>	Thank you for submitting comments. See response in Table A3 in Appendix A of the KSM Mining Comment Response Report.

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				<p>their concerns about KSM's potential impact on aquatic resources and Indigenous rights. Until consultation is allowed, information on key environmental components potentially affected in areas on the Alaska side of the border will be missing from the EAO's assessment of the project and this request for a variance. Objection to this variance request has also been made by the Southeast Alaska Indigenous Transboundary Commission and the 15 of the 19 federally recognized Southeast Alaska tribes they represent as well as the Gitanyow Hereditary Chiefs. Rivers Without Borders supports these objections and urges the BC EAO to heed these objections.</p> <p>Section 31(4) of the Act states that an EA certificate can be extended on one occasion only for not more than 5 years and that new conditions can be attached to the certificate at the time an extension is granted. While RWB believes the Application is flawed and without merit and that it should be rejected, we also strongly suggest that the following conditions be placed on any extension that may be granted. 1. KSM, BC EAO and the CEAO must hold meaningful consultations with the downstream Alaska Tribes and other stakeholders that share the watersheds affected by the KSM Project. The lack of full consultation with Alaska Tribes is also inconsistent with the United Nations Declaration on the Rights of Indigenous Peoples and Bill 51; 2. KSM Mining must be able to demonstrate that the project has the ability to treat and remove all forms of selenium released in the wastewater to levels below Alaska Water Quality Criteria maximum concentration of 20 µg/l (expressed as total recoverable metal) prior to any further development or construction.</p> <p>While our letter has focused specifically on the flawed justifications contained in the Application, the KSM mine proposal itself is based on what we believe is an inadequate and now dated EA review. KSM warrants much more stringent international review than what that EA process provided. Granting the requested variance and extending the Certificate beyond the initial one-time only 5-year extension based on that questionable EA review would be irresponsible. No variance beyond the Certificate expiration date of July 29, 2024 should be granted and if, at that time, KSM Mining ULC believes that the KSM Project is a viable project a new Environmental Assessment should be required.</p> <p>In conclusion we believe that granting this variance would not be in the best interest of the public. There is no compelling evidence that the Covid-19 pandemic has created any need for Seabridge Gold/KSM Mining ULC to seek an extension of its initial substantially started extension granted in 2019. In fact, we view this variance request as a disingenuous maneuver by Seabridge Gold/KSM Mining ULC to exploit the Covid-19 emergency simply to be granted more time to find a joint venture partner.</p> <p>Thank you for the opportunity to comment on the Application for a second extension of KSM Project Environmental Assessment Certificate #M14-01.</p>	
9	12/2/2020	Rob Sanderson, Chair, SEITC	Inability to attract investor due to COVID-19, COVID-19 impact on KSM Project 2020 field programs, Extension Application not in accordance with Certificate Extension Policy (2020) and lack of downstream engagement with Alaskan Tribes on environmental assessment and variance applications.	<p>The Southeast Alaska Indigenous Transboundary Commission (SEITC) objects to the Application for a variance extending KSM Project's Environmental Assessment Certificate #M14-01 for Gold Mine Project #0539620-0028 due to the Impact of the COVID-19 Pandemic. The reasons presented by the proponent are baseless and a variance is unnecessary for the reasons stated below.</p> <p>KSM Mining ULC (KSM) has submitted an application to request a variance under Section 46 of the <i>Environmental Assessment Act</i> (2018; EAA) limitation of issuing only a one-time extension to Environmental Assessment Certificate #M14-01 for the KSM Project (Extension Application). KSM Mining received a five-year extension to the Certificate on March 2019 that is in effect until July 29, 2024. KSM is now applying for at least a two-year variance under Section 46 of the <i>Environmental Assessment Act</i> (2018; EAA) in light of COVID-19 and the subsequent state of emergency.</p> <p>The rationale given for the original one-time 5-year extension was to provide "KSM Mining with additional time to secure a joint venture partner with the technical and financial capabilities to responsibly develop the Project." See Application at iii. The variance claims that the effects of Covid-19 will continue to hinder investment interest and require an emergency variance extending the deadline for the Project to reach significant completion. See Application at iii.</p> <p>It is unreasonable to consider that COVID-19 has or will have any effect on this project's inability to attract an investor. The project's economics are fundamentally flawed and a two or more-year extension is not going to generate any additional interest by the investment community. This project has been unable to generate any investment interest (hence the 5- year extension) since the Environmental Certificate was issued. Updating the mine plan and Preliminary Economic Assessment in 2016 still has not attracted any investment.</p> <p>Secondly, the rationale given that COVID-19 has temporarily depressed the copper market, effectively putting new investments such as the copper-intensive KSM Project on hold until market conditions normalize, is a false dilemma. The KSM Project is not just a copper mine, it is also a gold and silver mine. The market conditions for gold have never been better despite (or because of) COVID-19. The price of silver in March 2020 was above the lowest price of silver in 2016. The price of copper now is similar to 2014 and trending upward. Furthermore, the Southeast Alaska Federally recognized sovereign Tribes have never been consulted either during the Environmental Assessment process or for the application for the extension despite these Tribes submitting numerous notices of interest and comment letters throughout the process.</p> <p>Inability to Attract an Investor</p> <p>The KSM Project itself is justified only by its own highly speculative projections. Relying on the ability to predict performance and "everything going according to plan" for 59 years, the KSM Project could be expected to contribute billions of dollars to the British Columbia economy. KSM released the first Preliminary Feasibility Assessment (PEA) in June of 2011. It was updated in 2016. For nine years leading up to COVID-19, the KSM has been unable to attract investment.</p> <p>The update in 2016 reflected the need to adjust the project's economics because of a decline in the base metal market in 2016 (Footnote 1: https://www.globenewswire.com/news-release/2016/09/19/872771/0/en/Updated-Preliminary-Feasibility-Study-Completed-for-Seabridge-Gold-s-KSM-Project.html).</p>	Thank you for submitting comments. See response in Table A4 in Appendix A of the KSM Mining Comment Response Report.

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				<p>The updated PEA is based on reserves of 48 million ounces of gold at \$1300/ounce, 13.6 billion pounds of copper at \$3.00 a pound and 253 million ounces of silver at \$20 an ounce. Id.</p> <p>Under subsection 46(1), if the minister considers there is an emergency or other comparable circumstance that warrants or will warrant the variation of one or more provisions of the Act, and the variation is in the public interest, the minister may order a variation that the minister considers necessary to respond to the emergency or other circumstance. To support this declaration of emergency, the Application (first bullet) states that COVID-19 has seriously disrupted capital markets and has temporarily depressed the copper market. Actual copper commodity market prices tell a different story. Copper hit a low price per pound on March 23, 2002 at \$2.08 a pound. The market price has generally increased ever since.</p> <p>Currently, the price of gold is \$1,811 an ounce, a 39% increase since the PEA was published (Footnote 2: https://www.monex.com/gold-prices/ Last accessed on December 1, 2020). During the same period, silver has experienced a 20 % increase in price and is now \$ 23.91 per ounce (Footnote 3: https://www.monex.com/silver-prices/. Last accessed on December 1, 2020). Copper is currently selling for \$3.48 per pound, a 71 % increase (Footnote 4: https://www.moneymetals.com/copper-prices. Last accessed on December 1, 2020). Clearly, commodity prices (affected or not by COVID-19) are not the reason KSM has been unable to secure a joint venture partner with financial capabilities to responsibly develop the Project.</p> <p>Another justification given for the variance is that new safety requirements imposed by COVID19 have severely limited KSM's ability to execute the field programs scheduled for 2020, forcing delays to the planned start of project construction. First of all, as stated above, the delay to construction is KSM's inability to attract an investor and secondly, major mines are being constructed and operated world-wide and within the Province regardless of COVID-19. Mining was declared an essential activity and never fully shut down operations except for some initial closures while companies came up with new COVID-19 infection prevention measures. Clearly, COVID-19 would affect field data collection programs less than a fully operating mine.</p> <p>The current extension, pushing back the date for significant completion another 5 years, does not expire for another four and a half years. Giving 2 years (at least) to accomplish what they could not do in the previous 10 years is not supported by the facts. There is no justification to use COVID-19 for a variance now and even less based on any prediction of the effects of COVID-19 after July of 2024.</p> <p>The evidence presented to demonstrate a public interest in granting the original 5-year extension was that the KSM Project would be a major revenue and jobs producer for the Province and that the Project is "not likely to result in direct or indirect significant adverse environmental, social, economic, heritage or health effects." Application at ii.</p> <p>A major joint partner on this project facilitating development stands to gain much more revenue than the Province, and take more risk, yet no major investor has stepped forward since the original PEA in 2011. Those that stand the most to gain and lose are not biting. The Applicants projections of revenue and employment are just that, projections. The Project is still not attractive after the PEA was modified in 2016.</p> <p>A more reasonable explanation is that the BC EAO's Assessment Report and certificate concluded that the Project is not likely to result in direct or indirect significant adverse environmental, social, economic, heritage or health effects (Application at ii). However, according to the BC Environmental Assessment Office, KSM has an unproven water treatment technology at operational scale (BC EAO 2014b p. 59) and "should be considered an uncertainty" (BC EAO 2014b p. 59).</p> <p>All the data collected during the environmental assessment process ended at the BC-Alaska border. KSM Mining collected environmental and social baseline data to support the development of the EA up "in areas potentially affected by the Project up to the Alaska-BC border." The interests of the sovereign Tribes of southeast Alaska were not considered. These interests predate the US/Canada border. Investors are aware of the risk inherent in a project where the analysis and potential liabilities have not been fully assessed. Any potential investor is aware of these shortcomings and the potential of long-term liabilities.</p> <p>Application not in Accordance with Current Certificate Extension Policy (CEP)</p> <p>Pursuant to Section 31(5) of the Act, before making a decision with respect to an extension, the EAO must seek to achieve consensus with participating Indigenous nations and "any appropriate stakeholders or agency representatives." CEP at 5. Alaska Indigenous Nations have been denied official participation.</p> <p>Before submitting an application, the Holder should engage about the extension with Indigenous nations that participated in the EA of the project and any appropriate stakeholders or agency representatives. CEP at 7. SEITC has made numerous attempts to engage the Ministry by submitting comments, requesting a federal Panel Review of the Project, and passing resolutions. All to no avail.</p> <p>The meteorology, geohazards, water quality, water quantity, terrestrial, wetlands, fish and aquatic, wildlife, archaeology, social, and traditional knowledge data in areas potentially affected by the Project on the Alaska side of the border are missing. This information could change the conclusions reached in the EAO's assessment of the project and ultimately this request for a variance. This new information could include new scientific and technical information (for example, a new dataset in respect of a key valued component (VC) of interest) or a new best management practice and new information regarding Indigenous interests. CEP at 7. Until consultation occurs, this will remain an undefined risk. This raises concerns that the EAO's approach to consultation is inconsistent with the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and Bill 51.</p>	

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				<p>Any variance from the one-time extension offered under Section 46 of the <i>Environmental Assessment Act</i> (2018; EAA) based on the effects of COVID-19 is unwarranted.</p> <p>The Laws and Regulations Have Changed</p> <p>Another reason this project has not been able to proceed toward construction is that Canadian and British Columbia laws and regulation have changed, yet the Project has not, resulting in further uncertainty from potential investors.</p> <p>In June 2019, the Government of Canada passed a new federal <i>Impact Assessment Act</i> to replace existing federal environmental assessment legislation. The new Act and associated regulations came into effect in August 2019. The Canadian Minerals and Metals Plan (CMMP) was jointly authored by mining ministers across the country. The CMMP addresses systematic changes to the participation of Indigenous peoples, community benefits and respect for the environment. KSM and provincial and Canadian federal governments have refused to consult with the downstream Sovereign Nations represented by SEITC and who share the watersheds.</p> <p>The 2016 update to the PEA reduced the amount of acid generating rock dumped in the headwaters of the Unuk River and reduced the volume of waste water requiring treatment prior to release just above the Alaska/BC border. Yet the plan still calls for billions of tons of waste rock. KSM has been unable to produce any water treatment technology capable of treating water at even these lower volumes. The dam technology designed for the Bell-Irving watersheds is fundamentally the same as was employed at Mount Polley. The Expert Panel Report on the failure at Mount Polley recommended that “the future requires not only an improved adoption of best applicable practices (BAP), but also a migration to best available technology (BAT). Examples of BAT are filtered, unsaturated, compacted tailings and reduction in the use of water covers in a closure setting.” (Footnote 5: Report on Mount Polley Tailings Storage Facility Breach at iv. Available at: https://www.mountpolleyreviewpanel.ca/sites/default/files/report/ReportonMountPolleyTailingsStorageFacilityBreach.pdf. KSM has failed to explain how the continued reliance on water covers and isolating the worst acid producing tailings within an additional internal dam lessens the probability of failure. Investors take this into account as well.</p> <p>If Variance is Granted, Conditions Should Be Placed on the Extension</p> <p>The CEO, on one occasion only, can extend the deadline by not more than five years. The CEO also has the ability to add new conditions to the EAC at the time an extension is granted. See Section 31(4)(a). SEITC requests these conditions be placed on any variance granting extension, if granted.</p> <p>KSM and the CEO must hold meaningful consultations with the downstream Alaska Tribes that share the watershed. The recognition of Indigenous rights and the Canadian government’s responsibility do not end at the border.</p> <p>KSM Mining must be able to demonstrate at scale that the project has the ability to treat and remove all forms of selenium released in the waste water to levels below Alaska Water Quality Criteria maximum concentration of 20 ug/l (expressed as total recoverable metal; Footnote 6: https://www.epa.gov/sites/production/files/2014-12/documents/ak-toxics-manual.pdf) prior to any further development or construction.</p> <p>The Environmental Assessment must be amended to account for the effects on the Alaska side of the watersheds including social and economic as well as environmental considerations. Formed in 2014, the Southeast Alaska Indigenous Transboundary Commission (SEITC) is a consortium of fifteen Federally-recognized Southeast Alaska Tribal governments created to protect Tribal lands and waterways for future generations. Each SEITC representative on our Board of Directors is elected or appointed by their Tribal Council.</p> <p>We seek to protect our customary and traditional ways of life and shared headwaters of our transboundary rivers. Our diverse, isolated communities depend on healthy rivers and watersheds for natural foods, medicines, and maintaining our cultural connections to the land that we’ve lived on since time immemorial.</p> <p>We appreciate your consideration of our objections and look forward to your reply.</p>	
10	12/3/2020	Gary Knox, Executive Director, SkeenaWild Conservation Trust	COVID-19 impact on KSM Project field programs, dated environmental assessment and baseline information, failure to consider recommendations of the Mount Polley Independent Expert Investigation and	<p>Please accept SkeenaWild’s submission to the British Columbia Environmental Assessment Office (EAO) regarding the application (the Application) submitted by KSM Mining ULC (KSM) on August 6, 2020 requesting an emergency variance of the Kerr Sulphurets Mitchell project’s (the Project) Environmental Assessment Certificate (the Certificate) deadline to extend it by at least two years, citing impacts of the global COVID-19 pandemic.</p> <p>SkeenaWild is committed to safeguard the environmental, social, cultural, health and economic values of northwestern British Columbia (BC), while supporting responsible natural resource development. After review of the Application and relevant circumstances surrounding the Project, we believe the rationale presented for an emergency extension of the Certificate is flawed, and that any further delays to expiry of the Certificate is not in the interest of the public or key stakeholders impacted by the project. We therefore urge the BC EAO to deny KSM’s request.</p> <p>To begin, many of the reasons presented for KSM’s emergency variance request are without foundation: a. They claim the pandemic has forced delays to fieldwork programs and other tasks related to baseline data collection and the development of environmental mitigation and management plans; however, the mining industry has been deemed an essential industry in BC, not subject to the same level of restrictions as many other industries. Throughout the province, and across the world, major mining companies are continuing construction, operation, and environmental management activities without significant delays during the pandemic (e.g., Barrick Gold (Footnote 1: https://s25.q4cdn.com/322814910/files/presentation/2020/Barrick-Q2-2020-Results-Presentation.pdf and Newcrest Mines Footnote 2:</p>	<p>Thank you for submitting comments. See response in Table A5 in Appendix A of the KSM Mining Comment Response Report.</p>

CMT#	Date	Organization/ Individual	Topic	Comment	KSM Mining ULC Response
			<p>Review Panel, lack of operationally proven treatment technology for selenium,</p>	<p>https://www.newcrest.com/covid-19 b. KSM also claims the pandemic has depressed commodity prices, particularly of copper, causing potential joint venture partners to revoke interest in investing in the Project. This argument is simply not supported by recent market trends. Metal prices and the mining industry in general have already recovered from initial downturn in the Spring. Specifically, the prices of copper, gold, and silver (all of which will be produced by the Project) are now even higher than they were when the initial EA was granted and when previous Preliminary Economic Assessments (PEAs) were released related to the Project Footnote 3: https://www.globenewswire.com/news-release/2016/09/19/872771/0/en/Updated-Preliminary-Feasibility-Study-Completed-for-Seabridge-Gold-s-KSM-Project.html; Footnote 4: https://www.globenewswire.com/news-release/2016/09/19/872771/0/en/Updated-Preliminary-Feasibility-Study-Completed-for-Seabridge-Gold-s-KSM-Project.html). Commodity prices therefore do not appear relevant to KSM's lack of success in securing a joint venture.c. Simply invoking the urgency of an "emergency" is unfounded at this point in time. The Project still has nearly four years remaining on its original extension of the Certificate to July 29, 2024, and any long-term impacts of the pandemic on the Project have yet to even be realized.</p> <p>However, even if the EAO deems the arguments presented in the Application to be with merit, extending the Certificate any longer would not be in the public interest. The <i>Environmental Assessment Act</i> (EAA) is designed for projects to be built while assessment of social and environmental impacts is still current. As it stands, data and information relied upon during the initial Environmental Assessment (EA) for the Project is already becoming increasingly obsolete, and any further extension would be wholly irresponsible: a. The Project sits within challenging topography, and a sensitive receiving environment. These factors make environmental analyses related to the Project outdate more quickly, rendering any extension – even the first five-year extension it has already received – risky. b. Environmental and legislative changes have occurred since the Project's initial Certificate was granted and since the first extension was granted, including: i. Noticeable changes resulting from climate change to water quality, fish, and fish habitat in the Project's receiving environment (Footnote 5: https://www.projects.eao.gov.bc.ca/api/public/document/5d1e77858195ae00215f00e8/download/KSM%/2018%20App%220Extend%20EA%20Certificate%20Review%20TBL%20Memo%20Nov%2020%202018.pdf), ii. Legislation of a new EAA (2018), containing updated protections of the environment and public and Indigenous rights Footnote 6: https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/environmental-assessments/environmental-assessment-revitalization), Changes to the <i>Fisheries Act</i>, including Metal Mining Effluent Regulations (Footnote 7: https://www.canada.ca/en/environment-climate-change/services/managing-pollution/sources-industry/mining/amendments-metal-diamond-mining-effluent-regulations.html), and iv. Legislation of the United Nations Declaration on the Rights of Indigenous Peoples by the BC government (Footnote 8: https://www2.gov.bc.ca/gov/content/governments/indigenous-people/new-relationship/united-nations-declaration-on-the-rights-of-indigenous-peoples).</p> <p>The Project's EA was approved under now-outdated legislation. Was the EA being conducted today, all of the abovementioned changes would have bearing on the process, predicted Project effects, planned mitigations, and assessment outcome as they relate to water quality, fish and fish habitat, and Indigenous rights.</p> <p>c. New research and predictive modelling have already rendered the projections for potential tailings dam failure relied upon in the Project's initial EA deficient and/or outdated (Footnote 9: See attached Lynker November 24, 2020 memo).d. Significant changes to the Project's design have already occurred as the result of continued exploration, and KSM anticipates these changes to continue when and if they finally secure a financial partner (Footnote 10: https://www.projects.eao.gov.bc.ca/api/public/document/5f0ca6609e70cd00219c1802/download/07032020). In addition, we believe the Project has significant overall safety and feasibility issues that will not be helped by yet another extension:a. The Project includes plans for the largest mine dam in North America, built using centreline construction similar to the failed Mount Polley dam, which disregard the recommendations of the Mount Polley Independent Expert Investigation and Review Panel (Footnote 11: https://www.mountpolleyreviewpanel.ca/sites/default/files/report/ReportonMountPolleyTailingsStorageFacilityBreach.pdf).b. The Project has huge risks associated with Acid Rock Drainage and selenium contamination – probably the most significant barrier to development of the Project and acquisition of a joint venture is the lack of operationally proven treatment technology for selenium, a problem that is completely unrelated to the pandemic.c. The EA was performed and Certificate issued without adequate consultation and engagement with all affected Indigenous groups (particularly the Gitanyow in BC and a number of groups in Alaska), and without adequate baseline data collection and impact prediction beyond the BC/Alaska border. The Project is financially flawed; its original PEA was released nine years ago, with an updated mine plan and PEA released in 2016, yet it still has not attracted investment.</p> <p>The sheer scale of the Project, and its potential social and environmental impacts, warrants an enormously high degree of caution from authorizing bodies. Granting this request for an unprecedented Certificate extension, thereby postponing expiry of an already lengthy gap between assessment and project operation would undermine the power of the EAA, and place economic values over the values of environment and Indigenous rights that the EAO exists to protect. The apparent sensitivity of this Project to small delays, and short-term market fluctuations points to larger issues with the Project that should not be scapegoated by the pandemic. On the contrary, we urge that KSM's extension request be rejected, and additionally that the EAO require KSM to address the already-existing issues with the Project mentioned here. Owing to the pandemic or otherwise, if the Project needs more than 10 years to accomplish a "substantial start" (as KSM points out is now permitted under the revised EAA legislation), then a new EA should be initiated under the revised legislation, and the public and stakeholders given a new opportunity to ensure the Project is built in the best possible manner that minimizes risks.</p> <p>Thank you for the opportunity to comment.</p>	

CMT#	Date	Organization/ Individual	Topic	Comment	KSM Mining ULC Response
11	12/3/2020	Frederick Otilius Olsen, Jr	COVID-19 impact on Project 2020 field programs, inability to attract investor, unproven water treatment	<p>In objecting to Seabridge Gold's request for another construction extension regarding their KSM mine project, I comment as an indigenous person of Southeast Alaska, an enrolled Tribal Citizen of both Sitka Tribe of Alaska and Central Council Tlingit & Haida Indian Tribes of Alaska. I do not speak here for or on behalf of any organization whatsoever.</p> <p>It's Not COVID-19</p> <p>The COVID-19 virus does not delay construction of the Kerr-Sulphurets-Mitchell mine. No big investor has offered to put up the billions of dollars necessary to construct and operate the KSM mine because it is another "wrong mine in the wrong place", like the Pebble Mine in Alaska. Copper, Gold, and Silver prices are all well above levels Seabridge Gold determined would make the mine feasible. If this were only about making money, KSM would be operating.</p> <p>Seabridge Gold waves around the shiny object that is the COVID-19 virus with their left hand whilst directing attention away from the many potential environmental threats held in the right hand. COVID-19 becomes the reddest of red herrings. Hasn't British Columbia declared mining essential? Please do not let the company gaslight you on your own regulations. Asking for a construction extension because of COVID-19 when at the same time your industry has been declared as essential for operating during the COVID-19 pandemic is cynical at best. Worse, this ploy insults the memory of those folks who have lost their lives to the virus. Please do not fall for this ruse.</p> <p>It's Not in the Public Interest</p> <p>This is about losing money. Seabridge Gold has not shown that they can protect the watershed. They want to get as much money out of the area as possible and get out themselves, leaving behind massive, passive, unproven, water treatment "facilities" that would expose huge lakes of poison to the whims of Nature.</p> <p>Please consider the cautionary tale of the Tulsequah Chief Mine. Abandoned decades ago, the mine continues to pollute the Taku River watershed even as you read this. As you know, a government clean-up plan has recently been announced and a couple million dollars earmarked but the actual clean up will cost taxpayers tens of millions of dollars to complete. Pardon me, but the Tulsequah Chief is, in an analogy, a "hot dog stand" compared to KSM's "BC Place". A disaster at KSM would cause much more environmental harm than a Mount Polley has. Such a disaster would cost Seabridge Gold and its shareholders or, more likely, BC taxpayers many, many times more than will be spent on the tiny Tulsequah Chief site. A clean up could cost more than the mine's operating profits. That's risky business and bad government.</p> <p>Lastly, it is not in the public interest to work with dishonest partners. Partner? Yes, British Columbia and Seabridge Gold would have to monitor the unproven, passive, water treatment "facilities" at KSM for centuries. Hopefully both entities will endure that long to see the earthen dams withstand at least two and a half centuries of climate changes, seismic activity, and other potential calamities.</p> <p>Seabridge Gold lied to our faces during a presentation held in Craig, Alaska in March 2014 by deliberately calling KSM "an average-sized mine". https://youtu.be/N7zsY_YTzVk. As insiders know, if built, rather than an average-sized mine, KSM would be the largest open pit mine in North America, as well as the largest mine ever built in Canada. KSM has a similar tailings storage plan as the one designed for and failed at Mount Polley. Such a credibility issue combined with such tremendous odds of causing immeasurable environmental destruction in a disaster make KSM a poor investment for British Columbia taxpayers.</p> <p>Even if there was not a tailings storage dam failure in the future at KSM, the water treatment system designed for the mine has not proven it can keep Selenium at unarmful levels nor proven to work at the scale of the mega KSM project. If one or both of the tailings dams fail at KSM, "ponds" deeper than the height of Seattle's Space Needle will spew poison into the Nass and Unuk River watersheds. We face death by a thousand cuts or death by flood of poison. British Columbia taxpayers face millions of dollars of potential liability. Hāw'aa! Thank You!</p>	<p>Thank you for submitting comments.</p> <p>See response in Table A6 in Appendix A of the KSM Mining Comment Response Report.</p>

Table 2: KSM Project EA Certificate Extension Request (July 2020): KSM Mining Responses to Federal and BC Government and Indigenous Group Comments

ID#	Date	Organization/ Indigenous Nation	Subject	Comment	KSM Mining Response
1	7/10/2020	Gordon Sebastian Chief Executive Officer, Office of the Gitksan Hereditary Chiefs	Extension request	<p>KSM Mining ULC delivered a letter to our organization on July 7, 2020 which explained in detail the impacts of the COVID-19 pandemic on the KSM Project and its prospects for advancing a construction decision.</p> <p>After consideration of the matter, the Gitksan Chiefs Office wishes to inform the Environmental Assessment Office ("EAO"), that the Gitksan Nation agrees with and supports KSM Mining ULC's recent application to extend the Environmental Assessment Certificate M14-01 in respect of the Kerr-Sulphurets-Mitchell Project (the "Project") for two years because of the impacts of the COVID-19 pandemic on its ability to advance the Project and on its prospects for attracting a joint venture partner.</p> <p>The Gitksan appreciates the measures industry is taking to minimize the risk of the pandemic having adverse impacts on our people and wants to support the responsible advancement of the Project and the preservation of the near-term economic opportunities the Project offers by allowing KSM Mining ULC more time to get the Project substantially started.</p> <p>We look forward to working with the EAO and the KSM Mining Technical Working Group as your office officially evaluates and processes KSM's Mining ULC's request.</p>	KSM Mining thanks the Office of the Gitksan Hereditary Chiefs Gitksan for their support.
2	8/26/2020	Sean Shaw, Director, Technical Operations, Ministry of Energy, Mines and Low Carbon Innovation (formerly Ministry of Energy, Mines and Petroleum Resources)	Extension request	EMPR Major Mines Office has reviewed the Extension application provided by the EAO, from a technical perspective, and has no comments to provide.	KSM Mining thanks the ministry for its comments.
3	9/18/2020	Collier Azak, Chief Executive Officer, Nisga'a Lisims Government (NLG)	Extension request	<p>We write in response to your letter dated August 21, 2020 (the "Letter") seeking comments from Nisga'a Lisims Government ("NLG") on: (i) KSM Mining ULC's ("KSM") application to extend Environmental Assessment Certificate M14-01 (the "Certificate") a second time for a period of at least two years (the "Extension Application"); and (ii) KSM's request to use section 46 of the <i>Environmental Assessment Act</i> (the "Act"), which allows the Minister to vary the requirements of the Act in response to an emergency and where the variance is in the public interest.</p> <p>KSM's Extension Application</p> <p>At this stage, NLG has no comments on the Extension Application. However, we reserve the right to provide comments on the Extension Application until NLG and the EAO have undertaken the engagement steps referred to below.</p> <p>We note, however, that the information provided by KSM under section 5.4 of the Extension Application with respect to the Gitanyow Hereditary Chiefs' petition challenging two decisions of the Minister of Forests, Lands and Natural Resource Operations arising from the operation of the Nisga'a Final Agreement (the "Nisga'a Treaty") is not up to date. We recognize that KSM may not have been aware of the developments in respect of this litigation, as they are relatively recent.</p> <p>In the Extension Application, KSM correctly states that the Gitanyow Hereditary Chiefs' petition was dismissed by the Supreme Court of British Columbia (<i>Gamlaxyeltxw v. British Columbia</i> (Minister of Forests, Lands & Natural Resource Operations), 2018 BCSC 440).</p>	KSM Mining thanks NLG for its comments and the update on the Gitanyow Hereditary Chiefs' appeal of the 2018 decision of the Supreme Court of British Columbia.

ID#	Date	Organization/ Indigenous Nation	Subject	Comment	KSM Mining Response
				<p>We would like to add that the Gitanyow Hereditary Chiefs appealed the 2018 decision of the Supreme Court of British Columbia to the Court of Appeal for British Columbia, which appeal was heard in January 2020. Recently, on July 27, 2020, the Court of Appeal dismissed the appeal in its entirety (Gamlaxyeltxw v. British Columbia (Minister of Forests, Lands & Natural Resource Operations), 2020 BCCA 215).</p> <p>Section 46 of the Act</p> <p>NLG would like to reserve our right to comment on KSM's request to use section 46 of the Act to extend the Certificate until NLG and the EAO have undertaken the engagement steps referred to below.</p> <p>Engagement Steps</p> <p>In the Letter, the EAO proposed the following engagement steps for the Extension Application: Opportunity to discuss the extension process via teleconference at the request of NLG; Opportunity to participate in meetings and calls of technical reviewers; Opportunity to review the EAO's Extension Report and Recommendations; and seeking to achieve consensus with NLG on the extension request.</p> <p>NLG generally agrees with the EAO's proposed engagement steps for the Extension Application, as set out in the Letter. However, we would like to add the following: NLG would like to request a teleconference with the EAO to discuss the Extension Application and the extension process more fully; We confirm that we would like to participate in meetings and calls of technical reviewers; We confirm that we would like to review the Extension Report and Recommendations; and The objective of the efforts to achieve consensus with NLG on the Extension Application will be to achieve consensus on the extent of the potential impacts to Nisga'a Treaty interests, if any, as a result of the extension and Nisga'a views on the Extension Application.</p> <p>Next Steps</p> <p>Please let us know if you have any questions with respect to the contents of this letter. NLG looks forward to working with the EAO on the review of the Extension Application.</p>	
4	9/18/2020	Eric Forgeng, Archaeologist, Forests, Lands and Natural Resource Operations and Rural Development (FLNRORD)	Extension request	The Archaeology Branch, MFLNRORD, has no objections to the extension of KSM's EAO Certificate for the requested time. Please note that the two active <i>Heritage Conservation Act</i> permits for this project, 2018-0342 and 2018-0343, both expire on March 31, 2021. <i>HCA</i> permits must in place prior to any archaeological assessments, and prior to any development that extends into the boundaries of <i>HCA</i> -protected archaeological sites.	KSM Mining thanks FLNRORD for its comments. KSM Mining plans to renew its <i>Heritage Conservation Act</i> permits before they expire in 2021.
5	9/18/2020	Suzanne Earle, Senior Biologist, Fisheries and Oceans Canada (DFO)	Extension request	DFO has no objections to the requested extension for the KSM Project.	KSM Mining thanks DFO for its comments.

ID#	Date	Organization/ Indigenous Nation	Subject	Comment	KSM Mining Response
6	9/25/2020	Northern Health (NH)	Update socio-economic data Gender-Based Analysis	<p>The proponent comments that there are no changes to the negative or positive effects, even though six years have passed since their EA application was approved. We ask that KSM be mindful that medical infrastructure in a remote region is already limited and prone to significant fluctuations in service capacity. We note that KSM is conducting ongoing research and has committed to following the Northern Health “Health and Medical Services Plan Best Management Guide for Industrial Camps” (iv); in order to accurately inform such plans, they will need to keep their data updated as the construction period approaches.</p> <p>The proponent comments that the Environmental Assessment concluded there would be only beneficial economic effects. As noted above, six years have passed since their Environmental Assessment application was approved. It has been even longer since the data was collected to inform their conclusions.</p> <p>Additionally, in reference to “adverse residual effects on community well-being,” KSM states that “These effects are not anticipated to accrue disproportionately to any distinct human populations.” It is unclear how KSM arrived at this conclusion, particularly given that at the time of their assessment, EA regulations did not require Gender-Based Analysis.</p> <p>Since the original EA was completed, there have been improvements in social effects assessment methodologies and management practices, particularly as it relates to health services, emergency response, and community/socio-economic health-related impacts. Our understanding and body of evidence regarding the interactions between major projects and community well-being has grown.</p> <p>Northern Health recommends that new data be gathered to continue to inform their social and economic mitigation measures.</p>	<p>KSM Mining thanks NH for its comments. As noted in Northern Health's comments, KSM Mining has committed to follow the “Health and Medical Services Plan Best Management Guide for Industrial Camps” and other relevant guidance when the Project moves into permitting and operation.</p> <p>KSM Mining has reviewed the EAO's Human and Community Well-Being Guidelines (April 2020) and resources posted to BC's Gender Equity Office, including the factsheets: Closing the Gender Pay Gap and Gender-Based Analysis Plus (GBA). Section 25(2)(d) of the 2018 <i>Environmental Assessment Act</i> requires that every assessment consider the “disproportionate effects on distinct human populations, including populations identified by gender.” EAO's April 2020 Guidance notes assessment of effects to human and community well-being should include consideration of if/how certain effects may be experienced differentially or more acutely by specific sub-groups within the population. Factors that often contribute to differential effects includes demographic factors (for example, age, sex), socio-cultural factors (for example, gender, ethnicity), economic factors (for example, skills, employment, income level), geography (for example, location in relation to the project), or physiological factors (for example, existing health status).</p> <p>Seabridge's recruitment and hiring practices consider diversity, which is demonstrated in the KSM Project office in Smithers) and pay equity. Prior to commencing construction and operations, KSM Mining will collect additional data to support the development of KSM Project human resource policies that consider matters related to gender as well as mining industry, provincial, federal and regional data. The implementation of these polices will be monitored and adaptively managed.</p>
7	10/2/2020	Yee Ting Choy, Environmental Assessment Officer, Environment and Climate Change Canada (ECCC)	Air Quality	<p>While ECCC understands that there have not been any material and/or specific changes to the Project, the Proponent's original Application for an EAC/Environmental Impact Statement (EIS) considered the relevant federal and provincial ambient air quality standards at the time (Chapter 7, 2013). Subsequent to the EAC issuance in 2014, ambient air quality standards have been updated, including the development of a National Air Quality Management System (AQMS). As a result, federal, provincial and territorial governments are working collaboratively to improve air quality through the implementation of the AQMS. The Canadian Ambient Air Quality Standards (CAAQS) are a key element of the AQMS. They are health and environmental-based air quality objectives to further protect human health and the environment, and are the drivers for air quality improvement across Canada. The CAAQS are specific, numerical measures of the ambient concentration of certain common air pollutants and are applicable throughout Canada. For more information, the CAAQS are available here: http://airquality-qualitedelair.ccm.ca/en/</p>	<p>KSM Mining thanks ECCC for its comments. During the permitting phase, KSM Mining will update the Project's air quality model so the results can be incorporated into the joint <i>Mines Act/Environmental Management Act</i> permits application. The model rerun will incorporate an updated emissions inventory (e.g., mining equipment, point sources and fugitive emissions). The proposed air quality model plan will be provided to the Ministry of Environment and Climate Change Strategy for review and comment. Model results will be compared to current federal and provincial ambient air quality standards and inform measures to mitigate air quality impacts.</p>

ID#	Date	Organization/ Indigenous Nation	Subject	Comment	KSM Mining Response
7	10/2/2020	Yee Ting Choy, Environmental Assessment Officer, ECCC	Greenhouse Gases	<p>Since 2016, the Government of Canada has been working with provinces, territories, and Indigenous peoples, to implement the Pan-Canadian Framework on Clean Growth and Climate Change. This plan outlines over 50 concrete measures to reduce carbon pollution, help us adapt and become more resilient to the impacts of a changing climate, spur clean technology solutions, and create good jobs that contribute to a stronger economy.</p> <p>In Fall 2019, the Government of Canada announced further commitments to strengthen existing, and introduce new actions to exceed Canada's 2030 emission reduction target, and to develop a plan to set Canada on a path to achieve a prosperous net-zero emissions future by 2050.</p> <p>The <i>Impact Assessment Act</i> (IAA) came into force in August 2019. One of the factors to consider is the extent to which the effects of a designated project hinder to or contribute to the Government of Canada's ability to meet its commitments in respect of climate change, such as the Paris Agreement, Canada's 2030 target and the goal of Canada achieving net-zero emissions by 2050. The Strategic Assessment of Climate Change (SACC) will enable consistent, predictable, efficient and transparent consideration of climate change throughout the federal impact assessment process.</p> <p>The SACC applies to designated projects under the IAA; principles and objectives underlying the SACC will be built into guidance for the review of non-designated projects under the IAA (i.e., projects on federal lands and outside Canada, assessed under Section 82 of the IAA), as well as projects regulated by the Canada Energy Regulator (CER). Specifically, the SACC:</p> <ul style="list-style-type: none"> ■ Describes the greenhouse gas and climate change information that project proponents need to submit at each phase of a federal impact assessment; ■ Requires projects with a lifetime beyond 2050 to provide a credible plan that describes how the project will achieve net-zero emissions by 2050; and ■ Explains how the Impact Assessment Agency of Canada (IAAC) or lifecycle regulators, with support from expert federal authorities, will review, comment on and complement the climate change information provided by proponents. <p>As noted above, the SACC specifically applies to designated projects under the IAA; however, given the magnitude and lifespan of the KSM Project, and in consideration of the Government of Canada's goal to achieve net-zero emissions by 2050, ECCC encourages proponents of projects being assessed under previous environmental assessment legislation (i.e., <i>Canadian Environmental Assessment Act</i> (CEAA), 2012 or CEAA, 1992) to apply the principles and objectives of the SACC. More information on the SACC is available online at: https://www.canada.ca/en/services/environment/conservation/assessments/strategic-assessments/climate-change.html.</p>	<p>KSM Mining is aware of new actions by the federal and BC government related to climate change. Prior to commencing construction, KSM Mining will update the Project's GHG emissions assessment for each phase (construction, operations, closure and post closure) based on the mine plan and changes to emission factors. KSM Mining will comply with federal and provincial GHG legislation, such as reporting requirements, that applies to the KSM project. Power for the KSM Project will be provided by the Northwest Transmission Line (NTL) and KSM Mining is evaluating the ability to connect sooner to the NTL to reduce the use of diesel powered generators and reduce greenhouse gas emission. KSM Mining is also committed to electrify the project site to reduce reliance on diesel fuel.</p>
7	10/2/2020	Yee Ting Choy, Environmental Assessment Officer, ECCC	<i>International Rivers Improvement Act</i> (IRIA) licence	<p>A license under the <i>International River Improvements Act</i> (IRIA) is required from ECCC to construct, operate or maintain an international river improvement, such as a dam or water diversion. In 2016, ECCC issued an IRIA licence for the Project for a term of 25 years, as the Project's Water Storage Facility (WSF) and associated facilities are located on tributaries of the transboundary Unuk River system. ECCC notes that there have not been any material or specific changes in circumstances since the original EA that could impact the conclusions reached in the EA with respect to the IRIA licence. However, should there be changes to the Project's WSF and associated structures, additional updates and approvals for the Project's IRIA licence may be required.</p>	<p>KSM Mining will advise ECCC if there are changes to the WSF and associated facilities as described in KSM Mining's application for the IRIA licence.</p>

ID#	Date	Organization/ Indigenous Nation	Subject	Comment	KSM Mining Response
7	10/2/2020	Yee Ting Choy, Environmental Assessment Officer, ECCC	Metal and Diamond Effluent Regulations	<p>For the Project, there is a Schedule 2 Amendment to the Metal Mining Effluent Regulations (MMER), which were amended in 2018 and are now known as the Metal and Diamond Mining Effluent Regulations (MDMER).</p> <p>The MDMER will result in more stringent effluent limits for the Project, should the mine start releasing effluent on or after June 1, 2021. Additionally, should the EAC Extension request result in modification of the footprint of the Project's approved tailings impoundment area (TIA), additional updates and approvals for the Schedule 2 Amendment of the MDMER may be required. ECCC encourages the Proponent to review the new MDMER, and as necessary, to discuss changes in the regulatory environment with ECCC since the Project's approval in 2014.</p>	<p>The EAC extension request will not result in a modification to the Project's approved TIA footprint. KSM Mining will advise ECCC if there are any changes to the TIA as described in the Schedule 2 listing. KSM Mining will comply with the effluent limits in the MDMER.</p>
7	10/2/2020	Yee Ting Choy, Environmental Assessment Officer, ECCC	Wildlife and Migratory Birds	<p>Federal guidance exists for the following species that may occur in the Project area and have been added to Schedule 1 of the <i>Species at Risk Act</i> (SARA) since the EAC was granted in 2014:</p> <ul style="list-style-type: none"> ■ Western Toad (<i>Anaxyrus boreas</i>) ■ Little Brown Myotis (<i>Myotis lucifugus</i>) ■ Northern Myotis (<i>Myotis septentrionalis</i>) ■ Bank Swallow (<i>Riparia riparia</i>) <p>ECCC recommends that the Proponent update the Wildlife Effects Management Plan (WEMP) to include guidance on mitigation and monitoring procedures during all phases of the Project (construction, operations, closure, post-closure), as outlined in:</p> <ul style="list-style-type: none"> ■ The Federal Management Plan for Western Toad; available at: https://wildlifesppecies.canada.ca/species-risk-registry/virtual_sara/files/plans/mp-western-toad-eproposed.pdf ■ The Recovery Strategy for Little Brown Myotis and Northern Myotis available at: https://wildlife-species.canada.ca/species-risk-registry/virtual_sara/files/plans/Rs-TroisChauveSourisThreeBats-v01-2019Nov-Eng.pdf ■ Guidance for Bank Swallows in sandpits and quarries; available at: http://publications.gc.ca/collections/collection_2017/eccc/CW66-522-2016-eng.pdf ■ A description of Bank Swallow residences; available at: https://wildlifesppecies.canada.ca/species-risk-registry/virtual_sara/files/rd_bank_swallow_0419_e.pdf 	<p>Wildlife baseline studies to support the KSM Project Environmental Impact Statement (EIS; Seabridge 2013) included COSEWIC-designated and species listed on Schedule 1 of the <i>Species at Risk Act</i> (Table 18.1-1 in the EIS). Western toad, little brown myotis, northern myotis and bank swallow were identified as potentially occurring in the wildlife Regional Study Area (RSA). Surveys confirmed the presence of western toad and little brown myotis. Northern myotis and bank swallow were not detected in the wildlife RSA.</p> <p>Section 10.1 of the Certified Project Description (Schedule A of the BC EA Certificate) requires the development of a Wildlife Effects Monitoring Plan (WEMP). Since the issuance of the EA Certificate in 2014, KSM Mining has prepared a Wildlife Management and Monitoring Plan (WMMP), which incorporates: a Wildlife and Wildlife Habitat Management Plan; Ungulate Winter Range Management Plan; and WEMP. The WMMP has been informed by relevant federal and provincial guidance and includes mitigation measures for listed species, including Western toad and little brown myotis. The updated draft WMMP 2020 is being reviewed by Indigenous nations and will be provided to the EAO for posting to ePIC at a future date. KSM Mining will also convey the WMMP to ECCC and FLNRORD.</p>
7	10/2/2020	Yee Ting Choy, Environmental Assessment Officer, ECCC	Construction during Breeding Bird Periods	<p>The Extension Application states that Bank Swallow (<i>Riparia riparia</i>) and Barn Swallow (<i>Hirundo rustica</i>), listed as Threatened under Schedule 1 of the SARA in 2017, were assessed in the Forest and Alpine Bird Valued Component in the Environmental Assessment, and that wildlife management and monitoring plan measures will include mitigation for breeding birds during construction and operation (p. 52).</p> <p>Construction during the nesting period for migratory birds presents a potentially high risk of incidental take. Land clearing activities, if conducted during the migratory bird breeding season, could result in the destruction, disturbance, or harm to migratory birds, their eggs and nests. Birds that have fledged from nests often rely upon parental help for food and protection from predators for a period that extends beyond nesting. Clearing on a large scale can displace birds from territories, food, and shelter from predation.</p> <p>Furthermore, Section 33 of the SARA prohibits damaging or destroying the residence of a listed threatened, endangered, or extirpated species. Under SARA, the nest of a barn swallow, occupied or not, is considered a residence: - from May 1 or the date when adults are first seen building or occupying the nest, whichever is earlier, to August 31 or the date when a bird is last seen at the nest, whichever is later (https://wildlife-species.canada.ca/species-riskregistry/virtual_sara/files/rd_barn_swallow_0419_e.pdf).</p>	<p>As noted in the response above, wildlife baseline studies to support the KSM Project EIS (Seabridge 2013) included COSEWIC-designated and species listed on Schedule 1 of the <i>Species at Risk Act</i>. Bank swallows were not detected during surveys in the wildlife RSA. The Project is a greenfield site, and other than the exploration camp, there are no permanent structures so habitat suitability for barn swallow is low. Section 2.4.2 of the WMMP (2020) identifies timing windows for nesting birds and if work is proposed during timing windows, KSM Mining has committed to conduct pre-construction surveys. If active nests are observed, a suitable buffer will be established around nesting areas. If nests are found on buildings, KSM Mining has committed to not destroying any nests.</p>

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				<p>The Application for an EAC/EIS outlines mitigation measures during construction for Forest and Alpine Birds in Chapter 18, Table 18.7-1, and states clearing will occur “outside breeding periods (April 1 to July 31)” (p. 74).</p> <p>ECCC continues to recommend that clearing take place outside of the bird breeding window from April 1 to August 31 as described in the Avoidance Guidelines under General Nesting Periods of Migratory Birds in Canada, available at: https://www.ceaaacee.gc.ca/050/documents/p80054/121249E.pdf. After August 31, ECCC recommends surveying for Barn Swallow and Bank Swallow nests before clearing and construction, as outlined under Section 33 of the SARA.</p>	
8	10/15/2020	Ecojustice, submitted by Gitanyow Hereditary Chiefs Office	Legal opinion re: KSM Mining request to extend deadline to substantially start the KSM Project (see EAO website to view full legal opinion)	<p>We have been asked by Tara Marsden, on behalf of the Gitanyow Hereditary Chiefs (“Gitanyow”) to prepare a legal opinion regarding the August 6, 2020 application by KSM Mining ULC’s (“KSM”) for an extension to Environmental Assessment Certificate #M14-01, which it holds for the KSM Project. Our opinion on this matter is set out below. Our opinion is limited to the issues of whether the Minister of Environment and Climate Change Strategy (the “Minister”) has jurisdiction to issue the emergency order and, if so, whether it is appropriate under these circumstances. Our opinion does not address any other issues related to the larger project, nor does it advise on any issues related to the Gitanyow’s rights, the adequacy of consultation, or any agreements with KSM.</p> <p>This opinion addresses the following issues:</p> <ol style="list-style-type: none"> 1. Can the Minister, through s. 46, override the explicit prohibition in the <i>Environmental Assessment Act</i> (the “EAA”) against extending the deadline to substantially start a project more than once? 2. If an environmental assessment certificate (“certificate” or “EAC”) may be extended a second time under s. 46, what are the appropriate considerations for evaluating that request? 3. If a certificate may be extended a second time under s. 46, does the information provided in the application support granting that request? 4. Would issuing an emergency order in these circumstances undercut the public interests a protected by the EAA and pose a threat to the Act’s integrity? <p>Summary</p> <p>It is our opinion that the request for an emergency order cannot be granted or, if there is jurisdiction to grant the order, that it should be denied for the following reasons:</p> <p>(1) The EAA, as interpreted by the BC Court of Appeal in decisions related to the Jumbo Glacier Resort and Prosperity mine, does not permit extension of the time period to substantially start a project more than once, regardless of extenuating factors. Specifically, both the EAA itself and judicial interpretation of its provisions demonstrate a legislative intention that projects are to be built in a timely manner while assessment of environmental impacts is still current. The amount of time allowed to substantially start a project under the legislative scheme recognizes and accommodates the reality that any complex industrial undertaking will face financial, permitting, and physical challenges. The failure to substantially start a project within the deadline is not fatal to a project. It instead requires a proponent to re-apply and obtain a new certificate.</p>	<p>See memo from Blakes (2021) in Appendix B6 and summarized below:</p> <p><i>In our view, it is likely that section 46 of the 2018 Act gives the Minister discretion to vary the 2018 Act to allow the Chief Executive Assessment Officer (“CEAO”) to extend the Certificate deadline a second time in an “emergency or other comparable circumstance.” Section 46 of the 2018 Act provides that the Minister has the power to vary any provision of the 2018 Act or the regulations if the Minister considers that an “emergency or other comparable circumstance” exists and where the variation is in the public interest. In our view, this phrase permits the Minister to act in the event of unforeseeable or unpreventable circumstances which have or will have a significant impact on a party’s ability to comply with the legislation. This interpretation accords with the overall context and object of the 2018 Act, and the limited circumstances in which an emergency order might be necessary.</i></p> <p><i>Several factors lead us to adopt this interpretation, and reject the narrow interpretation suggested by Ecojustice:</i></p> <ol style="list-style-type: none"> 1. <i>The ordinary meaning of the phrase “emergency and other comparable circumstance” suggests that a narrow definition of “emergency” which is limited to urgent or imminent risk of harm, as argued by Ecojustice, was not intended by the Legislature. Moreover, the leading decision on the definition of “emergency” recognizes that the phrase may have different meanings in different contexts.</i> 2. <i>The definition of “emergency” in the Emergency Program Act is not limited to an imminent risk of immediate harm. This is evidenced by the fact that the current state of emergency in British Columbia has lasted for nearly eight months. The Environmental Assessment Office (“EAO”) has not issued any guidance documents which would suggest the Minister’s emergency powers are limited in any way beyond the express terms of the statute.</i> 3. <i>The emergency power is broader than the general power to extend time limits, which was considered by the Taseko Mines decision (relied on by Ecojustice and described below). An emergency order can be made where the Minister considers it to be “in the public interest”. That broad grant of power does not appear in the general power to extend time limits. Moreover, the Legislature expressly narrowed the general power to extend time limits in the 2018 Act by comparison with the former Environmental Assessment Act (“2002 Act”), (Footnote 3: Environmental Assessment Act, S.B.C. 2002, c. 43 (repealed) [2002 Act]) but did not narrow the Minister’s emergency powers.</i>

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8	10/15/2020	Ecojustice, submitted by Gitanyow Hereditary Chiefs Office	Legal Opinion re: KSM Mining request to extend deadline to substantially start the KSM Project	<p>(2) Even if the deadline to substantially start a project may be extended a second time under section 46, KSM's position that its request for an emergency order should be evaluated under the Certificate Extension Policy is legally incorrect. It would be an error to assess a request under section 46 pursuant to their "Certificate Extension Policy", which applies to certificate extensions explicitly contemplated under the EAA. Using section 46 to override the explicit prohibition in the EAA requires the purported emergency to "warrant" the variation, and for the variation to be "in the public interest". Neither condition has been satisfied here. Supposed compliance with the "Certificate Extension Policy" does not satisfy these conditions.</p> <p>(3) COVID-19, as it has impacted the KSM Mine, does not constitute the type of situation that justifies an emergency order. In particular, an "emergency" requires levels of urgency and serious harm to be avoided that are simply not present when KSM had four years remaining to substantially start the project when it made the request.</p> <p>(4) Under scrutiny, the concerns raised by KSM appear to be far less pressing than claimed in the application materials:</p> <p>a. KSM began the process of seeking the extension in March, 2020. While the prospective outlook for the project may have appeared dire at that time, metal prices are even better now and the mining industry as a whole is recovering and are arguably doing better than prior to COVID-19.</p> <p>b. KSM, as part of the "Industry and Manufacturing" sector, was given an exemption from the emergency declaration concerning COVID-19 requiring certain businesses to be shut down. While COVID-19 no doubt required additional efforts to maintain a safe working environment, other mining companies have reported the ability to maintain performance.</p> <p>c. The hardships claimed by KSM in conducting exploration and pursuing permits are belied by public statements and continued pursuit of exploration and permitting during the same period.</p> <p>(5) Granting of the request for an emergency order under these circumstances could set a dangerous precedent that could undermine the EAA and the goal of protecting the environment.</p>	<p>5. <i>The emergency power enables the Minister to balance proponents' desire to build infrastructure with the public interest in protecting the environment—being the object of the 2018 Act. It is within the Minister's jurisdiction to balance these competing aspects of the legislation. The Minister's decision in this regard is entitled to significant deference by any reviewing court. This is especially so given that the Legislature has chosen broad, open-ended, and highly qualitative language, and any ministerial orders are "final and binding."</i></p> <p>6. <i>The 2018 Act provides proponents with up to 15 years to substantially start their project, rather than the 10 years under the 2002 Act. An extension of the Certificate deadline for up to 5 years beyond the initial 10-year time period respects this legislative intent.</i></p> <p>7. <i>Cabinet has facilitated and the CEAO has ordered an extension beyond the 10-year certificate deadline in other circumstances. While KSM is seeking an extension pursuant to a different statutory provision, the existence of a further extension in respect of another project demonstrates the invalidity of the view espoused by Ecojustice that the 2018 Act "does not permit the extension of the deadline to substantially start a project more than once, regardless of extenuating factors." (Footnote 4: Ecojustice Letter at pp. 2, 3). The COVID-19 pandemic is clearly an exceptional and unforeseeable circumstance. The pandemic has had significant impacts on all aspects of the global economy and society, and the restrictions necessarily implemented in response to the pandemic have severely impacted KSM's ability to satisfy the substantial start requirement under the Certificate and the 2018 Act. These circumstances satisfy the definition of an "emergency or other comparable circumstance" under section 46 of the 2018 Act. Whether an emergency variation order is in the "public interest" is a matter to be determined by the Minister.</i></p>
9	16/10/2020	Glen Williams/Mali, President & Chief Negotiator, Gitanyow Hereditary Chiefs	Conveys Ecojustice legal opinion; Asks for re-assessment of findings in the original assessment; Requests BC EAO consider issues raised by Gitanyow in first extension	<p>This letter and attachments are in response to the request from <i>KSM Mining Inc.</i> for an additional extension to their Environmental Assessment Certificate, citing COVID19 and the global pandemic as an "emergency" affecting their project's viability.</p> <p>As you are well aware, Gitanyow did not support the first extension granted by the BC Environmental Assessment Office (BCEAO) in 2018-19. The issues raised in the attached correspondence were not resolved through the overly procedural nature of the BCEAO-led consultation with Gitanyow, and with an additional two years that have since passed, remain even more pressing. Gitanyow continues to call for a re-assessment of the findings of the original assessment as it relates to water quality impacts in the Nass River Watershed, drawing on new data gathered since 2014 and the adoption of the <i>United Nations Declaration on the Rights of Indigenous Peoples</i> by the provincial government.</p> <p>In determining whether to grant KSM Mining Inc. a further extension, Gitanyow seeks BCEAO consideration of: 1. The issues raised by Gitanyow in the previous EA Certificate extension for as outlined in the attached correspondence; 2. The legal arguments and analysis outlined in the attached memo from Ecojustice, on behalf the Gitanyow Hereditary Chiefs Office.</p> <p>Given the pressures on our office during the global pandemic, we are limited in our ability to engage in numerous meetings (either in-person or virtually). We request a response from the BCEAO in writing.</p>	<p>KSM Mining thanks the Gitanyow Hereditary Chiefs for its comments. We acknowledge the pressures on the Gitanyow Hereditary Chief's office during the global pandemic and wish to highlight that Seabridge Gold and its staff are under these same pressures. It is for these reasons that Seabridge has initiated the task of requesting an extraordinary extension to KSM's EA Certificate because of the occurrence of the global pandemic.</p> <p>KSM Mining continues to collect water quality data and voluntarily share this data with Indigenous nations at an annual environmental workshop and distribution of environmental baseline data reports. The last annual environmental management meeting was a virtual meeting held over two days on June 9/10, 2020.</p> <p>KSM Mining has compared the pre-EA Application surface water quality and hydrology baseline data (2007 - 2012 data) with the post-EA Application water quality data (2013 to 2019 data). With respect to the Processing Tailing and Management Area and potential downstream water quality effects, this analysis found the pre-EA Application and post-EA Application baseline hydrometric data are comparable and there are no substantive changes to surface water quality data.</p> <p>Before the Project can be developed, the KSM Project requires approvals from the Ministry of Energy, Mines and Low Carbon Innovation pursuant to the <i>Mines Act</i> and the Health, Safety and Reclamation Code for Mines in BC, and the Ministry of Environment and Climate Change Strategy for discharges to land, water and air pursuant to the</p>

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					<p><i>Environmental Management Act</i>. KSM Mining will also be required to meet all Certificate conditions at various points over all phases of the Project. Surface water quality modelling and assessment of downstream effects will be updated to support the Project's joint <i>Mines Act/Environmental Management Act</i> permits application (see 2019 <i>Joint Information Requirement for Mines Act/Environmental Management Act Permits</i> in Appendix C). Updated water quality predictions will be compared to current federal and provincial water quality guidelines. KSM Mining will engage with Indigenous nations on permit applications individually and through the Ministry of Energy, Mines and Low Carbon Innovation Major Mines Office permitting process.</p>
10	11/24/2020	Glen Williams/Mali, President & Chief Negotiator, Gitanyow Hereditary Chiefs	Assessment of potential risks associated with tailing dam failure; Conveys Lynker assessment based on review of KCB 2012	<p>Please accept this as the second submission on behalf of the Gitanyow Hereditary Chiefs ("Gitanyow") for the second request for an extension to the Environmental Certificate (the "Certificate") for KSM Mining Inc. ("KSM") for their proposed mine north and upstream of the Gitanyow Lax'yip. New and material information relevant to the KSM request has recently come to our attention.</p> <p>Gitanyow first wrote to the BC Environmental Assessment Office ("BCEAO") on Oct. 16, 2020. In the submission we outlined an assessment of the KSM request for a further extension to their Certificate, based on their claims of the COVID19 pandemic as affecting their project. We also attached a summary report prepared by Ecojustice Canada, detailing their legal opinion that a second extension to the Certificate was not legally permissible under the <i>Environmental Assessment Act</i>, even on an emergency basis.</p> <p>Since that time, Gitanyow has been attempting to undertake a visual representation of a potential tailings dam failure at the proposed mine to better inform our members on the potential risks associated with the project. Gitanyow has retained Lynker Technologies ("Lynker") to conduct a two-phase initiative that includes first an assessment of the data and assumptions behind the original information in the environmental assessment application, and second, if that information is acceptable, to then use it to provide a visual representation of a tailings dam failure.</p> <p>Upon completion of the first phase, Lynker has found there are several instances of deficient information relied upon in KSM's projection of a tailings dam failure, including out of date information and modelling. A Technical Memo outlining these issues is attached for your reference. What you will see in the Memo is that since the original Certificate was granted in 2014, there have been advancements in the scientific literature and modelling approaches to assessing a potential tailings dam failure.</p> <p>These deficiencies are preventing Gitanyow from proceeding to the next phase of the work, because our expert advisors do not believe that a visual representation based on the KSM work will provide an accurate portrayal to better inform our members. Throughout our engagement with our members, there have been concerns about what a potential tailings dam failure could look like and what the long-term impacts would be to the waters and ecosystems downstream of the mine. We are simply trying to provide those answers to our members in an accurate visual format.</p>	<p>Subsequent to the EA Certificate issuance in 2014, Seabridge voluntarily completed a best available technology (BAT) study in 2016 to re-evaluate its proposed tailings management strategy for the KSM Project based on a new EAO requirement in light of the Mt Polley dam breach. The 2016 study found that the tailings management strategy proposed in the EA Application (2013) is the most appropriate option to minimize physical, geochemical, biophysical and social risks over the life of the KSM Project. See KCB response (January 2021) in Appendix B1 of the KSM Mining Comment Response Report.</p>

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10	11/24/2020	Glen Williams/Mali, President & Chief Negotiator, Gitanyow Hereditary Chiefs	Assessment of potential risks associated with tailing dam failure; Conveyed Lynker assessment based on review of KCB 2012	<p>The information provided here is another example, and a crucial one, of how this Certificate is not passing the test of time. With the effects of climate change, the introduction of the <i>United Nations Declaration on the Rights of Indigenous Peoples</i> into law in British Columbia, and the emerging methods and scientific studies around tailings dam failures, the BCEAO must heed this and acknowledge that it constitutes <u>new and material information</u> that has a bearing on the original assessment of significance of impacts to water quality, fish and fish habitat, and Indigenous rights. Before KSM's application can be considered, the material deficiencies in the data provided must be addressed, so that both the BCEAO and our members can make an informed decision around the risk of a tailings dam failure.</p> <p>The longer it takes the proponent to secure a financial partner for the development of the project, the more out of date the Certificate becomes. This further heightens the risk of an already risky project. Gitanyow is calling on the BCEAO to reject the current request for a further extension, and that if a financial partner is found for the project a new assessment should occur with proper participation by Gitanyow.</p> <p>Thank you for your consideration of our second submission and we look forward to hearing from you.</p>	<p>See KCB response (January 2021) in Appendix B1 of the KSM Mining Comment Response Report.</p> <p>The KSM Project requires approvals from the Ministry of Energy, Mines and Low Carbon Innovation pursuant to the <i>Mines Act</i> and the Health, Safety and Reclamation Code for Mines in BC, and the Ministry of Environment and Climate Change Strategy for discharges to land, water and air pursuant to the <i>Environmental Management Act</i>. Surface water quality modelling, water quality predictions, and assessment of downstream impacts will be updated to support the Project's joint <i>Mines Act/ Environmental Management Act</i> permits application. KSM Mining will engage with Indigenous nations on permit applications individually and through the Ministry of Energy, Mines and Low Carbon Innovation Major Mines Office permitting process.</p>
11	11/24/2020	Cameron Wobus & Bill Szafranski, Lynker, submitted on behalf of Gitanyow Hereditary Chiefs Office	Review of Klohn Crippen Berger, 2012. (KCB 2012) Dam Break and Inundation Study for Tailing Management Facility (Appendix 35-C of Seabridge Application for an Environmental Assessment Certificate 2013)	<p>Lynker was retained by the Gitanyow Hereditary Chiefs to review modeling results from Seabridge Gold related to potential dam failures at the proposed KSM mine. We focused this review on a Seabridge modeling report that summarizes results from tailings transport simulations resulting from a failure of tailings management facility (TMF) dam: Klohn Crippen Berger, 2012. Dam Break and Inundation Study for TMF. Appendix 35-C of KSM Environmental Assessment (herein referred to as KCB, 2012) Our review focused on the model and assumptions used, the parameters and data used to feed the model, and the general results of the modeling studies. This memorandum summarizes four key findings, described below.</p> <p>The Simulated TMF Release is Smaller than Available Data would Predict</p> <p>The assumed size of the release from the tailing management facility (TMF) is a key assumption that is fundamental to the TMF failure modeling results. Specifically, the fraction of the tailings that would be released if the dam fails controls the downstream impacts.</p> <p>KCB (2012) simulates two different types of failures of the TMF dams: overtopping failures and piping failures. The volumes released from these two failure types are different: approximately 7% for the piping failure, and approximately 27% for the overtopping failure. The overtopping failure volume is based on a KCB assumption that the tailings remaining in the impoundment after failure would settle at an angle of repose of 5 degrees, and all tailings above this angle would be released. Based on KCB's calculations, which are not included in the report, the release of all material above this angle results in a release volume of 27% of the full TMF contents. KCB contends that this volume is in general agreement with two references, Azam and Li (2010) and USCOLD (1995), which suggest that historical tailings dam failures typically release 20-25% of the stored tailings. However, there are at least two problems with the 27% release assumption, described below.</p> <p>First, this release volume apparently relies on the assumption that the tailings remaining behind the dam would settle at an "angle of repose" of 5 degrees. This number is based on an unpublished dissertation from 1981 (Lucia, 1981), whose conclusions are at odds with both this 5 degree angle of repose and the estimated release volume. Chapter 6 of Lucia (1981) summarizes the five main conclusions of the dissertation. The two conclusions relevant to tailings release volumes are conclusions 2 and 5, which are as follows: 2) A review of case histories of</p>	<p>See KCB response (January 2021) in Appendix B1 of the KSM Mining Comment Response Report.</p>

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				<p>failures shows that liquefied mine tailings composed primarily of sand and silt sizes have some small residual strength after liquefaction, and they will come to rest at slopes of one degree to four degrees. [...] 5) The volume of tailings involved in a flow failure is usually considerably less than the total volume impounded, although in some cases, especially where the tailings are extremely fluid, the entire volume of tailings in the pond did flow, therefore, in the absence of evidence to the contrary, it appears that the most appropriate assumption will often be that 100% of the tailings will flow. (Lucia, 1981, p. 106-107; emphasis added)</p> <p>Thus, the main reference KCB (2012) draws on to arrive at its 27% release assumption actually concludes that the tailings remaining would settle at much lower angles than 5 degrees (thus releasing a larger fraction of the total tailings); and that the most appropriate approach may be to assume that all of the tailings will be released.</p>	
11	11/24/2020	Cameron Wobus & Bill Szafranski, Lynker, submitted on behalf of Gitanyow Hereditary Chiefs Office	Review of Klohn Crippen Berger, 2012. (KCB 2012) Dam Break and Inundation Study for Tailing Management Facility (Appendix 35-C of Seabridge Application for an Environmental Assessment Certificate 2013)	<p>The second problem with the 27% release assumption is that it is not well-supported by more recent information on tailings dam failures. The USCOLD (1995) dataset cited by Seabridge is more than 25 years old, and the Azam and Li (2010) study does not explicitly link release volumes to storage volumes. Available data from two comprehensive studies suggest that the release volume could be much larger than 27%. For example, a well-cited study by Rico et al., (2008) suggests that on average, the volume released in a tailings dam failure event is closer to 40% of the stored tailings, larger than the largest release volume assumed by KCB (2012). Empirical data from 35 historical tailings dam failures compiled by Concha Larrauri and Lall (2018) also suggest an average release volume closer to 40%, with a range between 1% and 100%.</p> <p>All of the historical failures studied by Rico et al. (2008) and Concha Larrauri and Lall (2018) are from much smaller tailings management facilities than those proposed for KSM (at 74 Mm³, the facility that failed at Mt. Polley is the largest in the historical dataset, but the storage volume behind the proposed North Dam at KSM is more than 7 times as large as this). Thus, there is considerable uncertainty in using these historical failures to estimate what could happen if the KSM facility were to fail. Because there is ample evidence that the release volume could be much larger than 27%, however, Seabridge should at a minimum include larger failures in their simulations to evaluate how those releases would affect downstream risks.</p> <p><i>Key Point #1: The tailings release volume from a TMF failure would likely be much larger than the 27% release assumed by KCB (2012). Since all of the downstream impacts of a TMF will scale with the assumed volume of the release, the study should evaluate impacts from larger failure volumes.</i></p> <p>2. The Context for Presenting Failure Results is Misleading</p> <p>The results of the overtopping failure simulations are shown in Figures 5.1 and 5.2 of KCB (2012). Notably, the flood depths and discharges for these failure scenarios are superimposed on the probable maximum flood, or PMF. In the context of the PMF, many of these dam failure results do not look particularly large: the flood depths on the Bell Irving River below the Bowser River confluence are on the order of 50% higher than the “baseline” PMF. This gives the impression that the dam failure scenario is not far outside the range of otherwise normal flooding. KCB (2012) explicitly cites this as an indication that the risks from a TMF failure are not very large:</p> <p>Results shows that Bell 2 Lodge, New Aiyansh, Gitwinksihlkw (Canyon City), Laxgalts’ap (Greenville), 10 highway sections, as well as existing cabins and outfitter/guide facilities located on riverbanks, floodplains or close to natural floodplains will likely be inundated by an overtopping failure of the Ultimate Southeast Dam. However, most of these locations would also</p>	See KCB response (January 2021) in Appendix B1 of the KSM Mining Comment Response Report.

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				<p>be flooded under naturally occurring flows (PMF), therefore the incremental consequence of an Ultimate Southeast Dams overtopping failure is small. (KCB, 2012a p. 39; emphasis added)</p> <p>The problem with this depiction is that the PMF is such an extremely unlikely event that it dwarfs any reasonable metrics of flood risk. The PMF is defined as the theoretically largest flood that could occur in a given area, and is estimated by combining the most severe conceivable hydrologic conditions that could plausibly occur (LaRocque, 2013). Although it is difficult to estimate the probability of a PMF, various authors have estimated that it is an event with a 1:100,000 to 1:1,000,000 probability of occurring in any given year (e.g., Shalaby, 1994).</p>	
11	11/24/2020	Cameron Wobus & Bill Szafranski, Lynker, submitted on behalf of Gitanyow Hereditary Chiefs Office	Review of Klohn Crippen Berger, 2012. (KCB 2012) Dam Break and Inundation Study for Tailing Management Facility (Appendix 35-C of Seabridge Application for an Environmental Assessment Certificate 2013)	<p>In the Bell Irving River basin, the PMF discharge is approximately 19,000 m³/s downstream of the Bowser River confluence, and the tailings failure increases the magnitude of this flood wave by approximately 10,000 m³/s, or about 50% (Figure 5.2 of KCB, 2012a). For comparison, based on streamflow data from the nearest gage site on the Bell-Irving River, we estimate that the 100-year flow is on the order of 4,000 m³/s. Thus, while the flood wave due to the tailings dam failure is less than half the PMF, it is approximately 2.5 times the magnitude of the 100- year flood event.</p> <p><i>Key Point #2: Presenting the failure simulation relative to the probable maximum flood (PMF) is misleading, as the PMF is an extremely large event that is not commonly used in flood risk delineation.</i></p> <p>3. HEC-RAS is an Inappropriate Tool to Simulate a TMF Failure</p> <p>For its modeling of a tailings dam failure, KCB chose to use the software HEC-RAS, a model that was primarily developed to simulate “clear water” floods (i.e., floods with low sediment concentrations). However, because the thick, sediment-laden flows common in tailings dam failures have different physical properties than “clear water” flows, this model choice could introduce significant uncertainties into the model results.</p> <p>In the mining industry, it has become more common to use a code like FLO-2D to simulate the release and downstream routing of tailings, because these other codes can simulate “non-Newtonian” fluids like mudflows: Mudflows are non-homogeneous, non-Newtonian, transient flood events whose fluid properties change significantly as they flow down steep watershed channels or across alluvial fans. Mudflow behavior is a function of the fluid matrix properties, channel geometry, slope and roughness. The fluid matrix consists of water and fine sediments. At sufficiently high concentrations, the fine sediments alter the properties of the fluid including density, viscosity and yield stress. (FLO-2D, 2017, p. 70).</p> <p>KCB (2012) states that they modeled tailings releases with 65% solids by weight, which means that the tailings are likely to exhibit non-Newtonian, mudflow behavior. Since HEC-RAS was developed only to model water flows, the model simulation is unable to capture the non-Newtonian properties of a tailings release with these sediment concentrations. Seabridge states that this is a “conservative assumption since the tailings would be more viscous than water and not flow as easily.” (KCB, 2012, p. 18). However, this assumption is overly simplistic and calls the overall results into question, as sediment-laden flows will behave fundamentally differently from “clear water” flows with much lower sediment concentrations.</p> <p><i>Key Point #3: Tailings floods flow in a way that is fundamentally different from water floods. HEC-RAS is an inappropriate tool for simulating tailings floods.</i></p>	See KCB response (January 2021) in Appendix B1 of the KSM Mining Comment Response Report.

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11	11/24/2020	Cameron Wobus & Bill Szafranski, Lynker, submitted on behalf of Gitanyow Hereditary Chiefs Office	Review of Klohn Crippen Berger, 2012. (KCB 2012) Dam Break and Inundation Study for Tailing Management Facility (Appendix 35-C of Seabridge Application for an Environmental Assessment Certificate 2013)	<p>4. The Model Sensitivity Analyses are Insufficient</p> <p>Because numerical modeling is inherently uncertain, it is important for the modeller to understand how the choice of different parameter inputs will affect model outputs. For a tailings dam failure simulation, assumptions like the physical characteristics of the flow, the total volume of the release, and the duration of the release could all significantly influence the model outcomes.</p> <p>KCB's (2012) sensitivity tests focused on only two parameters – the roughness characteristics of the channels downstream of the release ("Manning's n"), and the breach formation time. Both of these parameters are adjusted upward and downward by approximately 50%, and the results of these sensitivity analyses are shown in tabular form in Table 5.13 of KCB (2012).</p> <p>KCB found that the model was highly sensitive to the choice of Manning's n – peak flow increased by as much as 60% when Manning's n was decreased by 50%, and peak flow decreased by as much as 30% when Manning's n was increased by 50%. Similarly, the model is very sensitive to the breach formation time: decreasing the breach formation time by 40% increased the peak flow near the dam by 70%, and increasing the breach formation time by 40% decreased the peak flow by 30%. However, TMF breach failures can often occur much faster than 3 hours. Eyewitness accounts of historical TMF failures have demonstrated that tailings dam failures, when they do occur, can happen in a matter of seconds or minutes, rather than hours (Petley, 2019). There is no information provided as to how the peak discharge would increase due to a much faster breach like this. Given the variability in outputs based on breach formation times from 3-8 hours, a much shorter breach would generate a much larger flood peak.</p> <p>Finally, there are a number of other parameters the model may be sensitive to, but which are not evaluated at all. These include the total volume of the release, the resolution of the digital elevation model used, the characteristics of the flow (sediment concentration, the yield stress, etc.), and other items. Note that many of these sensitivity tests cannot be performed using HEC-RAS because this code can only simulate 'clear water' flows. As noted in bullet #3 above, the tailings dam analysis should be updated to use a modeling package that can explore model sensitivity to these additional parameters.</p> <p><i>Key Point #4: Both the number and range of parameters evaluated in the sensitivity analysis is extremely limited. Thus, the study does not explore a wide enough range of potential outcomes to fully evaluate risk.</i></p> <p>References</p> <p>Azam, Sahid and Li, Qiren (2010). Tailings Dam Failures: A Review of the Last One Hundred Years, <i>Geotechnical News</i>, December.</p> <p>B.C. Hydro (1986). <i>Modeling Procedures for Dam Breach Inundation Studies</i>, Revised September 1986.</p> <p>Concha Larrauri, P. and Lall, U. (2018). Tailings Dams Failures: Updated Statistical Model for Discharge Volume and Runout. <i>Environments</i>, 5(2), 28. https://doi.org/10.3390/environments5020028</p> <p>FLO-2D. (2017). <i>FLO-2D Reference Manual. Build No. 17 2017</i>. Nutrioso, AZ. Retrieved from https://www.flo2d.com/download/.</p> <p>Klohn Crippen Berger. (2012). Dam Break and Inundation Study for TMF. Appendix 35-C of <i>KSM Environmental Assessment</i>.</p>	See KCB response (January 2021) in Appendix B1 of the KSM Mining Comment Response Report.

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				<p>LaRocque A. (2013) Probable Maximum Flood (PMF). In: Bobrowsky P.T. (eds) Encyclopedia of Natural Hazards. Encyclopedia of Earth Sciences Series. Springer, Dordrecht. https://doi.org/10.1007/978-1-4020-4399-4_276</p> <p>Petley, D. (2019). First thoughts on the Brumadinho Dam Collapse Video https://blogs.agu.org/landslideblog/2019/02/01/brumadinho-tailings-dam-video/</p> <p>Rico, M., Benito, G., & Diez-Herrero, A. (2008). Floods from tailings dam failures. <i>Journal of Hazardous Materials</i>, 154(1-3), 79-87.</p> <p>Shalaby, A. I. (1994). Estimating probable maximum flood probabilities. <i>JAWRA Journal of the American Water Resources Association</i>, 30(2), 307-318.</p>	
12	2/19/2019	Glen Williams, President & Chief Negotiator, Gitanyow Hereditary Chiefs	Reassess water quality predictions; climate change effects	<p>Thank you for your letter dated Dec. 11, 2018 and I apologize for the delay in our response. During the time since our original submission to the BC Environmental Assessment Office ("EAO") on Nov. 30, 2018, Gitanyow has continued to seek independent expertise better understand how climate change may affect the findings of the 2014 environmental certificate, and what this could mean for Gitanyow and the project's downstream impacts.</p> <p>Since your letter, Gitanyow has also met with the EAO to discuss what we believe is new information, as outlined in our letters and memos (attached for your reference). Unfortunately this information was dismissed by the EAO at our recent meeting via conference call on Feb 1, 2019. To be clear, the intention of Gitanyow in presenting this evidence of 'new information' was not to oppose the project, and thus breach the agreement in place with Seabridge. The intent was to have the Crown, acting honourable and in its constitutional duty to Gitanyow, pause and conduct a joint assessment based on what we believe is new information.</p> <p>We have been unable to secure a commitment from either Seabridge or EAO at this time to reassess the water quality modelling, prediction of impacts, and determination of significance based on more recent baseline data collected by your company, as well as leading glacier and climate change studies and methods. Gitanyow is gravely concerned about the effect that climate change could have on the water quality impacts of your proposed project. Without a thorough assessment based on new information, it cannot be guaranteed that water quality effects have not changed since the 2014 certificate.</p> <p>In response to your letter and concerns that Gitanyow did not share our concerns earlier or directly with Seabridge, we do take exception to this statement. As outlined in Debra Stokes Memo (see November 25, 2020 referenced in the table) Gitanyow representatives raised questions at environmental meetings with Seabridge two consecutive years in a row. Following that, we tracked information including water levels and weather patterns in the Nass watershed. I apologize for not having adequate time to provide advance notice to Seabridge prior to our Nov. 30, 2018 EAO submission. As you can appreciate, we are a small organization and have numerous land and resource issues that we deal with on a daily basis.</p>	<p>The KSM Certificate lasts the life of the Project and the Certificate conditions do not address every detail of the Project and do not regulate the day-to-day construction or operation of the Project. Those details are left to the permitting stage of Project development. The KSM Project must meet current legislation when it prepares permit applications to construct the mine and through operations, closure and post-closure. Any changes to legislation and policies must also be considered (and were considered in preparing the 2020 Extension Application - see Section 5.1 of the Extension Application).</p> <p>As indicated in our responses to the KSM Project 2018 extension request, KSM Mining continues to collect and augment the Project's baseline dataset which will be incorporated into permit applications for mine construction. To prepare for permitting, model updates must be undertaken (e.g., surface water quality model, site wide water balance model, groundwater model) and model results considered in the <i>Mines Act</i> and <i>Environmental Management Act</i> permit applications and inform management plans. Model updates will incorporate all relevant data that has been collected for the Project (see 2019 <i>Joint Application Information Requirements for Mines Act and Environmental Management Act Permits</i> in Appendix C of KSM Mining Comment Response Report).</p> <p>KSM Mining has compared the pre-EA Application surface water quality and hydrology baseline data (2007 - 2012 data) with the post-EA Application water quality data (2013 to 2019 data). With respect to the Processing Tailing and Management Area (PTMA) and potential downstream water quality effects, this analysis found the pre-EA Application and post-EA Application baseline hydrometric data are comparable and there are no substantive changes to surface water quality data.</p> <p>KSM Mining acknowledges Gitanyow concerns related to climate change and potential impacts on water quality. In response to Gitanyow comments, KSM Mining expanded its glacier monitoring program in 2019 to include the Treaty glacier in the PTMA area. Glacier monitoring program in the mine site areas was also expanded. During the review of KSM Mining's 2018 EA certificate extension request, the Ministry of Environment and Climate Change Strategy noted that climate and glacier changes and associated changes to water quality, quantity and flow would be considered in the permitting process in consultation with Indigenous groups. The joint permitting process will involve a detailed review of the water models, including sources and changes in water supply and water quality. EMLI (formerly Ministry of Energy, Mines and Petroleum Resources) responded that they support the response provided by ENV (Refer to KCB response in Appendix B1 of KSM Mining's Comment Response Report).</p>

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12	2/19/2019	Glen Williams/Mali, President & Chief Negotiator, Gitanyow Hereditary Chiefs	Termination of Seabridge/Gitanyow agreement	<p>Your letter referred to Clause 23 of our agreement, and the commitment by Gitanyow to not oppose the KSM project-in-principle. We are well aware of this clause, and the price that Gitanyow has paid in self-censoring our concerns over the project. It was not until it appeared that government was not listening to our concerns, and our neighbouring First Nations were signing agreement in support of your project, that we felt that there was not other choice but to seek some form of agreement to monitor water and wildlife impacts within the Gitanyow Lax'yip.</p> <p>This is what was implied by the term 'duress' in our Nov. 30, 2018 letter to the EAO. At the time, government had not yet adopted the United Nations Declaration on the Rights of Indigenous Peoples ('UNDRIP'), and because the project fell outside our territory, there were few options available to Gitanyow but to try and work with your company. This is why UNDRIP and the articles on <i>free, prior and informed consent</i> are crucial. In 2014, Gitanyow did not have all of the information that we do now on water levels, glacial retreat, and climate change that we do now.</p> <p>As it stands today, Gitanyow continues to have concerns over downstream impacts that have not been adequately addressed by your company or the EAO. As stewards of our lands and waters, and upholding the principle of <i>Gwelx ye'ens</i>, we cannot continue to silence these concerns out of respect of our agreement with your company. Therefore, after careful deliberation and review of all available options to Gitanyow, we acknowledge your concern and respect what may be your company's desire to terminate the Agreement.</p> <p>In regards to funding provided to date, we have executed all of the work and submitted deliverables in accordance with the agreement. We acknowledge the efforts Seabridge has made recently to improve the relationship between Gitanyow and Seabridge. Despite our collective best efforts to establish and maintain a mutually beneficial and respectful relationship, the growing risk that your project poses to waters in the Gitanyow Lax'yip that sustain fish, plants, wildlife and ecosystems is to great and Gitanyow cannot support your project in light of climate change uncertainty.</p> <p>If you would like to meet to discuss termination of the Agreement, please provide some dates and times that are available for Seabridge. Alternatively, you may respond in writing and provide confirmation of Termination and suggested next steps.</p>	
13	11/30/2018	Glen Williams/Mali, President & Chief Negotiator, Gitanyow Hereditary Chiefs (Letter to EAO submitted to comment on 2018 KSM Mining Extension Request)	UNDRIP constitutes new information/material and specific change	<p>Thank you for your letter dated October 18, 2018 regarding the extension of the Environmental Assessment Certificate for the KSM Project (the "Project"). As previously outlined in emails from our Wilp Sustainability Director, Tara Marsden, the time you had originally allowed to provide confirmation of our participation in the Working Group (two days) and the time allowed for our response (3 weeks) was insufficient in proportion to the significance of the potential adverse impacts to Gitanyow of the proposed project. Thank you for allowing additional time to November 30 for this response.</p> <p>In your Nov. 22, 2018 email to Tara Marsden you stated the following: "The Province is committed to adopting and implementing UNDRIP. With respect to a Certificate Extension decision, the EAO generally considers whether there has been any material and specific changes in circumstances since the original environmental assessment (EA) that could impact the conclusions reached and whether there is potential for adverse effects to Gitanyow's rights or interests as a result of any changes in circumstances after considering the effect of all mitigation measures provided for in the Certificate."</p> <p>When asked if the provincial government's adoption of the United Nations Declaration on the Rights of Indigenous Peoples would constitute "new information" or "material and specific changes" you replied "while BC's commitment to UNDRIP will enhance how EAO engages</p>	<p>KSM Mining notes the Gitanyow 30 November 2018 letter was submitted during the review the Project's July 2018 application to extend the Certificate deadline. KSM Mining responded to comments to this letter, which are posted to EAO's electronic information centre (https://projects.eao.gov.bc.ca/api/public/document/5c93ea6ecc874000241c9d2b/download/Master%20WG_Comments_Responses%20FINAL%20March%202021.pdf).</p> <p>These comments were considered and resolved by EAO in the process of its decision to grant the Project's July 2018 application to extend the Certificate deadline, which was issued in March 2019.</p> <p>In addition to the responses provided to Gitanyow on the July 2018 extension application, KSM Mining notes:</p> <ul style="list-style-type: none"> ■ Baseline data does not become obsolete. ■ KSM Mining continues to collect and augment the Project's baseline data which will be incorporated into permit applications for mine construction. To prepare for permitting, model updates must be undertaken (e.g., surface water quality model, site wide water balance model, groundwater model) and model results considered in the <i>Mines Act</i> and <i>Environmental Management Act</i> permit applications and inform management plans.

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				<p>Gitanyow on the KSM Certificate Extension decision, it is not apparent how this constitutes “new information” as described.”</p> <p>We would like to draw your attention to Premier Horgan’s July 18, 2017 mandate letter to your Minister George Heyman, which states: <i>“As part of our commitment to true, lasting reconciliation with First Nations in British Columbia our government will be fully adopting and implementing the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), and the Calls to Action of the Truth and Reconciliation Commission. As minister, you are responsible for moving forward on the calls to action and reviewing policies, programs, and legislation to determine how to bring the principles of the declaration into action in British Columbia.”</i> [and] <i>“Revitalize the Environmental Assessment process and review the professional reliance model to ensure the legal rights of First Nations are respected, and the public’s expectation of a strong, transparent process is met.”</i></p>	<ul style="list-style-type: none"> ■ Model updates will incorporate all relevant data that has been collected for the Project (see <i>2019 Joint Application Information Requirements for Mines Act and Environmental Management Act Permits</i> in Appendix C of KSM Mining Comment Response Report). ■ The KSM Project must also meet current legislation when it prepares permit applications to construct the mine and through operations, closure and post-closure. Any changes to legislation and policies must also be considered (and were considered in preparing the 2020 Extension Application - see Section 5.1 of the Extension Application). <p>During the review of KSM Mining’s 2018 extension request, the Ministry of Environment and Climate Change Strategy (ENV) commented that climate and glacier changes and associated changes to water quality, quantity and flow would be considered in the permitting process in consultation with Indigenous groups. The joint permitting process will involve a detailed review of the water models, including sources and changes in water supply and water quality. EMLI (formerly Ministry of Energy, Mines and Petroleum Resource) responded that they support the ENV’s response.</p> <p>In response to TBL Consultant comments during the 2018 extension application review, EAO commented: “As part of the joint permit application review process, ECCS and EMPR will undertake detailed discussions and engagement with Indigenous Groups regarding water models including sources and changes in supply and quality”.</p>
13	11/30/2018	Glen Williams/Mali, President & Chief Negotiator, Gitanyow Hereditary Chiefs (Letter to EAO submitted to comment on 2018 KSM Mining Extension Request)	UNDRIP constitutes new information/material and specific change	<p>The current government was elected on promises made to implement the UN Declaration and to fundamentally change environmental assessment and relationships with Indigenous peoples. Nowhere in the above-mentioned mandate letter is there a disclaimer or notwithstanding clause that indicates that the EAO should not consider this mandate in its approach to existing projects or that it can be simply dismissed as not relevant by project assessment personnel.</p> <p>Further, as you are well aware, the province recently tabled new environmental assessment legislation. “Revitalization of the environmental process” is supposed to focus on three outcomes, one of which is “(a)dvancing reconciliation with First Nations”, including ensuring that “the legal right of First Nations are respected”. The Minister of Environment and Climate Strategy expressly stated that “(t)his work will also contribute to our government’s commitment to fully implement the United Nations Declaration on the Rights of Indigenous Peoples” (Footnote 1: See News Release from the Ministry of Environment and Climate Change Strategy dated March 7, 2018, “Revitalizing B.C.’s environmental assessment process”). Members of the provincial legislature have also recognized that the current environmental assessment process does not adequately consider climate change, cumulative impacts and new scientific standards, which is why amendments to the <i>Environmental Assessment Act</i> (Footnote 2: <i>Environmental Assessment Act</i>, SBC 2002, c 43) are necessary (Footnote 3: For example, see statements made by MLA Sonia Furstenu, as reported by Global News on November 5, 2018).</p> <p>In our opinion, both the adoption of and stated desire to implement the UN Declaration and the new environmental assessment legislation proposed by the provincial government are new information. The fact that this is not apparent to you is concerning to us, as it indicates a lack of commitment by your office to adopt and implement the UN Declaration in important decisions that have the potential to significantly and adversely affect Aboriginal rights, to properly and adequately assess environmental projects, to facilitate meaningful participation by Aboriginal peoples, and to ensure proper accommodations are in place.</p>	

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				<p>We would note that while the Proponent's Application for an Extension of the Environmental Assessment Certificate (the "Application") does state that BC has "committed to reconciliation with Indigenous peoples, including endorsement of the United Nations Declarations of Indigenous Peoples... and proposed changes to federal and provincial environmental assessment processes", it makes no comment of how these changes impact assessment of the Project.</p>	
13	11/30/2018	<p>Glen Williams/Mali, President & Chief Negotiator, Gitanyow Hereditary Chiefs (Letter to EAO submitted to comment on 2018 KSM Mining Extension Request)</p>	<p>UNDRIP constitutes new information/material and specific change</p>	<p>The Application also states that the Gitanyow Lax'yip does not overlap with any Project components. As you are aware, this is not an accurate reflection of the Project's potential impacts to our Lax'yip, which include impacts by the use of access roads to the proposed Project site, and Highway 37, including the potential effects arising from the transport of peoples, goods and hazardous materials, (Footnote 4: As set out in the Order under Section 13 Amending Section 11 Order for the Project dated September 29, 2011). As well as potentially significant downstream impacts. With respect, the 'no overlap' understanding represents an overly narrow appreciation of the Project's potential impacts to the Gitanyow and the Gitanyow Lax'yip.</p> <p>As well, while the Application mentions the Gitanyow Huwilp Recognition and Reconciliation Agreement executed in 2016, it does not address changes from the 2012 version, including its application to all Land and Resource Decisions, including decisions pursuant to the <i>Environmental Assessment Act</i>.</p> <p>The current request for an extension provides an opportunity to pause and reconsider the potential impacts of the Project in its current form in the current environment, and recognize that we do in fact have a new and different political and environmental climate in 2018 than we did in 2014. Specifically, that we have witnessed the Mount Polley incident and more greatly appreciated the significant risk that tailings treatment facilities pose to water, fish and wildlife.</p> <p>In addition to the Mount Polley incident, we have undertaken a review of the new scientific and legislative information related to the project (see attached Memorandum from TBL Consultants Ltd. dated November 20, 2018 (the "Memo")) which outlines concerns regarding water quality baseline studies from 2008-2011. We know from both our own observations and scientific study that climate change is having significant impacts on our territory and region including a Level 4 drought announced just this year (Footnote 5: https://www.cbc.ca/news/canada/british-columbia/drought-bc-impacting-wildlife-1.4866760). We have seen salmon spawning streams in the Nass Watershed with numerous dry and low flow sections, increased water temperatures, and we continue to see glaciers melting which will impact glacier fed habitat and water bodies in the near and long-term future.</p> <p>For example, while the Project Proponent (Footnote 6: Previously Seabridge Gold Inc.) and now KSM Mining ULC) 6 has been gathering additional baseline data since the granting of the original EA Certificate in 2014, this new data has not been used by the Proponent to inform new predictions, assessments or modelling on water quality and downstream impacts potentially affecting First Nations, including Gitanyow. The Memo notes a number of areas where information is simply lacking, missing or unknown, information that we believe is vital and relevant in any assessment or analysis by the EAO and the consultation process with Gitanyow, and without which those processes simply cannot properly occur.</p>	

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13	11/30/2018	Glen Williams/Mali, President & Chief Negotiator, Gitanyow Hereditary Chiefs (Letter to EAO submitted to comment on 2018 KSM Mining Extension Request)	UNDRIP implementation; obsolete baseline data	<p>As a part of our discussions with the Project Proponent, we committed to reporting to our membership and seeking their direction on KSM, and did so in May of this year. Our people have significant concerns over the potential impacts to water and fish in the Nass Watershed, which we do not believe are adequately addressed by the Project conditions currently in place, and as such we have elected to not pursue an Impact Benefits Agreement at this time.</p> <p>In the months leading up to the granting of the original EA Certificate in 2014, Gitanyow expended significant time and resources trying to engage the provincial government on the concerns regarding water quality, tailings management and fish habitat in the Nass Watershed. These concerns were largely ignored. As the provincial government erroneously deemed that the Project itself was not within the Gitanyow territory, there were limited options available to protect our interests through engagement with BC. As the province is well aware, its assessment of the scope of the Project was flawed and unreasonably narrow, and did not properly consider the actual potential adverse impacts and effects of the Project to the Gitanyow and the Lax'yip. We subsequently entered into an environmental agreement with Seabridge, under duress, in an attempt to protect water and wildlife values within Gitanyow territory.</p> <p>Because of the hurried approach and dismissive responses from EAO to our questions, we are concerned that the province will approve an extension and not seek any further assurances to ensure that meaningful consultation and the protection of our Aboriginal rights occur. To be clear, this has not been and still is not an acceptable approach or process by the Crown. We would also note that over a five year period it is likely that relevant data and information regarding impacts of the Project will continue to change and need to be updated and reassessed, particularly given the current rates of global warming and climate change that our world is experiencing, and changes in the legislation, law and relationships between our nations.</p> <p>In our view, a period of five years is too long and provides too great a risk that any relevant data and information relied upon in the assessment of impacts of the Project would be rendered obsolete, no longer entirely relevant and/or stale dated. Moreover, even with less than five years, Seabridge will still have the opportunity to update its water quality and water management and treatment assessment to incorporate new baseline data and climate change analyses.</p> <p>Accordingly, we are requesting that the decision to extend the Environmental Assessment Certificate be delayed to allow for a 90-day engagement process between our two governments to resolve outstanding issues and address the new information presented here.</p> <p>Your government's commitments to First Nations to fully adopt UN Declaration cannot continue to be postponed to another day. In your current engagement processes, you must look to the First Nation for input on how to implement the Declaration and its provisions related to Free, Prior and Informed Consent. We cannot wait for a legislative or policy framework to be developed, when we have significant projects such as the KSM Project posing long-term and irreversible risk to our territories and the water that flows through it.</p> <p>Thank you for your time and consideration and we look forward to your response.</p>	

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14	11/20/2018 (originally submitted with 2018 KSM Mining Extension Request)	Debra Stokes, TBL Consultants Ltd (appended to 11/20/2018 letter from Glen Williams/Mali, President & Chief Negotiator, Gitanyow Hereditary Chiefs)	New scientific and technical information, legislative changes, certificate conditions, climate change implications, potential need for additional water management treatment and structures	<p>KSM Mining ULC (KSM), is a subsidiary of Seabridge Gold (Seabridge). Seabridge was the initial EA Certificate holder for the KSM Mine which was transferred to KSM on October 1, 2018.</p> <p>KSM has applied for an EA Certificate extension for five years that would commence in July 2019. This memo identifies concerns associated with extending the EA Certificate based on a review of several documents related to predicted impacts to Treaty and Teigen Creeks.</p> <p>According to the <i>Requesting a Certificate Extension</i> guidance document (EAO, 2016), one of the questions to be thoroughly answered is as follows:</p> <p><i>Has new information come to light since the original certificate was granted that could impact the conclusions reached in the certificate? This could include:</i></p> <ul style="list-style-type: none"> ■ - <i>New scientific and technical information;</i> ■ - <i>Physical changes to the airshed, watershed or landscape;</i> ■ - <i>Previously unknown of undetected effects; or</i> ■ - <i>New information regarding Aboriginal interests.</i> <p>New Scientific and Technical Information</p> <p>Since 2012, new scientific and technical information has been acquired. Six additional years of baseline water quality and hydrology data is now available. In addition, baseline water quality data was collected sub-glacially under the Mitchell Glacier, where the twin tunnels will be constructed for the purposes of moving ore to the processing plant near the Tailings Management Facility (TMF)(Footnote: The TMF, when constructed, will be located at the headwaters of Treaty and Teigen Creeks).</p> <p>Legislative Changes</p> <p>Changes to the <i>Fisheries Act</i>, include changes to the Metal Mining Effects Regulations, where there are lower limits for listed harmful substances and new rules for acute toxicity. These changes may result in a need for additional mitigation to achieve acceptable discharge water quality from the TMF during all phases of project development.</p>	<p>KSM Mining notes the Gitanyow conveyed the TBL Consultants comments with its 30 November 2018 letter, submitted during the review the Project's July 2018 application to extend the Certificate deadline. KSM Mining responded to comments to TBL Consultants comments, which are posted to EAO's electronic information centre (https://projects.eao.gov.bc.ca/api/public/document/5c93ea6ecc874000241c9d2b/download/Master%20WG_Comments_Responses%20FINAL%20March%202021.pdf).</p> <p>These comments were considered and resolved by EAO in the process of its decision to grant the Project's July 2018 application to extend the Certificate deadline, which was issued in March 2019.</p> <p>In addition to the responses provided to TBL Consultants on the July 2018 extension application, KSM Mining notes:</p> <p>New Scientific and Technical Information - KSM Mining initiated its baseline program in 2007 and continues to collect and augment the Project's baseline data which will be incorporated into permit applications for mine construction. To prepare for permitting, model updates must be undertaken (e.g., surface water quality model, site wide water balance model, groundwater model) and model results considered in the <i>Mines Act</i> and <i>Environmental Management Act</i> permit applications and inform management plans.</p> <p>Model updates will incorporate all relevant data that has been collected for the Project (see 2019 Joint Application Information Requirements for <i>Mines Act</i> and <i>Environmental Management Act</i> Permits in Appendix C of KSM Mining Comment Response Report).</p> <p>Legislative Changes - The KSM Project must meet current legislation when it prepares permit applications to construct the mine and through operations, closure and post-closure. This includes changes to the <i>Fisheries Act</i> and Metal and Diamond Mining Effluent Regulations. The KSM Project must also meet the Certificate conditions.</p> <p>Certificate Conditions - Water treatment was discussed as additional mitigation during the environmental assessment review. KSM has proposed two primary water treatment methods: High Density Sludge (HDS); and SELEN IXTM for selenium removal – KSM Mining piloted the viability of this treatment method at KSM in 2014 when a pilot water treatment plant trail was conducted (Condition 1 of the Certificate). Approximately 30,000 gallons of water from Mitchell Creek was transported to Richmond, BC, where it was modified to represent the range of expected water quality and conditions for seepage from the Mitchell/McTagg RSF. The pilot demonstrated the capability of Selen-IXTM to remove Se to below 1 ppb (Bioteq Environmental Technologies 2015; Appendix B5 of the KSM Mining Comment Response Report). KSM Mining disagrees with the statement that additional mitigation will be required to meet an acceptable water quality at 100 m downstream from the discharge location. The water storage pond referenced by the reviewer, if needed, would be in the TMF footprint.</p>

ID#	Date	Organization/ Indigenous Nation	Subject	Comment	KSM Mining Response
14	11/20/2018	Debra Stokes, TBL Consultants Ltd (appended to 11/20/2018 letter from Glen Williams/Mali, President & Chief Negotiator, Gitanyow Hereditary Chiefs)		<p>Certificate Conditions</p> <p>The 2012 water quality predictions for TMF discharge to Treaty Creek (EA 2012 Surface Water Quality Section, page 190 of 272) was based on a location 900 m downstream from the discharge location (mixing zone is 900 m). Water quality impacts at these concentrations at this location were given the “not significant” designation in the EA which was accepted by the government of B.C. and Canada. However, Condition 8 of the 2014 EA Certificate approval from the BC Environmental Assessment Office requires water quality to meet BC Water Quality Guidelines (BCWQG), or Site-Specific Water Quality Objectives (SSWQO) at 100 m downstream from the discharge location (mixing zone is 100 m). An updated water quality prediction at the 100 m downstream location utilizing updated hydrology information, any new testing conducting on the supernatant from the TMF since 2011, combined with the new additional water quality baseline data is needed to confirm if this assessment of significance to impacts on water quality and aquatic habitat in Treaty Creek is still valid. It is anticipated additional mitigation will be required to meet an acceptable water quality at 100 m downstream from the discharge location that will result in minimal impacts to aquatic organisms. If mitigation includes a water treatment plant, or an additional water storage pond as anticipated by the IGRB (Independent Geotechnical Review Board, Part 2: Review of water management and tailings facility, KSM-IGRB Report No. 1, April 2016, accessed from http://ksmproject.com/independent-review-board/ on November 11, 2018), this would result in an effect that was not assessed in the original EA process and would therefore require a review and an amendment to the EA Certificate.</p> <p>Climate Change</p> <p>The 2012 KSM Mine Environmental Assessment predictions were based on data collected between 2008 and 2011 for meteorology, hydrology, hydrogeology, and water quality. Since 2011, Seabridge has collected additional baseline data for all of these valued components. While water quality baseline data results have been analyzed for 2008 to 2017, how these results compare to results reported in the 2012 EA has not been reported.</p> <p>Climate change is affecting hydrological and hydrogeological regimes throughout the world. In this particular geographic area, with several glaciers melting and affecting water flow and quality seasonally and annually and given the mine will be operating for approximately 50 yrs., there is a concern that climate change effects and predictions of environmental impacts from project developments may have changed since the 2012 EA predictions and associated mitigation measures. The issue regarding incorporating glacial melt into water flow and quality predictions was raised by Gitanyow in 2017 and 2018. Has there been any glacial melt monitoring conducted at the headwaters of Treaty and Teigen Creeks? Has glacial melt been incorporated into water flow and quality predictions? When do we expect each glacier to be completely melted and what will be the impacts to water quality and flow in Treaty and Teigen Creeks?</p>	<p>Climate Change</p> <p>KSM Mining acknowledges Gitanyow concerns related to climate change. In response to Gitanyow comments, KSM Mining initiated monitoring of the Treaty glacier. During the review of KSM Mining's 2018 extension request, the Ministry of Environment and Climate Change Strategy (ENV) commented that climate and glacier changes and associated changes to water quality, quantity and flow would be considered in the permitting process in consultation with Indigenous groups. The joint permitting process will involve a detailed review of the water models, including sources and changes in water supply and water quality. EMLI (formerly Ministry of Energy, Mines and Petroleum Resources) responded that they support the ENV's response. In response to TBL Consultant comments during the 2018 extension application review, EAO commented: <i>"As part of the joint permit application review process, ECCS and EMPR will undertake detailed discussions and engagement with Indigenous Groups regarding water models including sources and changes in supply and quality"</i>.</p> <p>Potential Need for Additional Management Treatment and Structures</p> <p>KSM Mining continues to collect and augment the Project's baseline data which will be incorporated into permit applications for mine construction. To prepare for permitting, model updates must be undertaken (e.g., surface water quality model, site wide water balance model, groundwater model) and model results considered in the <i>Mines Act</i> and <i>Environmental Management Act</i> permit applications and inform management plans. Model updates will incorporate all relevant data that has been collected for the Project (see 2019 <i>Joint Application Information Requirements for Mines Act and Environmental Management Act Permits</i> in Appendix C of KSM Mining Comment Response Report).</p> <p>The KSM Project must also meet current legislation when it prepares permit applications to construct the mine and through operations, closure and post-closure. Any changes to legislation and policies must also be considered (and were considered in preparing the 2020 Extension Application - see Section 5.1 of the Extension Application).</p> <p>KSM Mining disagrees with the statement that additional mitigation will be required to meet an acceptable water quality at 100 m downstream from the discharge location. The water storage pond referenced by the reviewer, if needed, would be in the TMF footprint.</p>

ID#	Date	Organization/ Indigenous Nation	Subject	Comment	KSM Mining Response
14	11/20/2018	Debra Stokes, TBL Consultants Ltd (appended to 11/20/2018 letter from Glen Williams/Mali, President & Chief Negotiator, Gitanyow Hereditary Chiefs)		<p>While 2016/2017 hydrometeorology data has been presented in the most recent baseline report, how does this information compare with what was reported in 2012, i.e. is the hydrological regime the same, or is there more variability seasonally and annually than described in the EA? It would be useful to update the discharge rating curve and compare the hydrograph from four years of data to nine years of data to determine if the additional data has provided more insight to the hydrological fluctuations seasonally and annually.</p> <p>The Potential Need for Additional Water Management Treatment and Structures</p> <p>As identified by the IGRB (2016), managing water quantity and quality at the TMF will be the most challenging task during all phases of the mine life, including closure and post closure, and is the “greatest project design, construction and operating risks” associated with the TMF. To adequately design the TMF during pre-feasibility and feasibility level engineering, along with the associated water management structures including any water treatment required, as mentioned previously here in this memo, an updated assessment utilizing all data and information collected since early baseline data collection and testing of the tailings’ supernatant should be carried out to assess for water quality discharge predictions during operations and post closure. These predictions must account for mixing within the 100 m zone from the discharge point to comply with Condition No. 8 of the EA Certificate. If water quality and flow predictions require additional mitigation to what was proposed in the 2012 EA, then these additional structures (such as a water management pond next to the TMF as recommended by the IGRB (2016)) should be proposed and reviewed by the EA Working Group, and if accepted, included in the amended EA Certificate approval.</p> <p>It is anticipated additional mitigation will be required to meet an acceptable water quality at 100 m downstream from the discharge location that will result in minimal impacts to aquatic organisms. If mitigation includes a water treatment plant, or an additional water storage pond as anticipated by the IGRB (Independent Geotechnical Review Board, Part 2: Review of water management and tailings facility, KSM-IGRB Report No. 1, April 2016, accessed from http://ksmproject.com/independent-review-board/ on November 11, 2018), this would result in an effect that was not assessed in the original EA process and would therefore require a review and an amendment to the EA Certificate.</p>	

**APPENDIX A KSM MINING RESPONSES TO COMMENTS SUBMITTED
DURING THE EAO PUBLIC COMMENT PERIOD
(NOVEMBER 19, 2020 TO DECEMBER 3, 2020)**

Appendix A: KSM Mining ULC Responses to Public Comments

1. NORTHERN CONFLUENCE

Table A1: Response to Northern Confluence Comments Dated September 25, 2020 (re-submitted during the Environmental Assessment Office (EAO) 14-day public comment period)

#	Northern Confluence Comment Summary	KSM Mining Response
1	Tailing management facility (TMF) design and mine site downstream impacts	<p>The TMF is located in a valley about 23 km east of the mine site. Surface waters in the valley drain both north and southward toward the Bell-Irving River via Teigen Creek and Treaty Creek respectively and ultimately to the Nass River and on to the Pacific Ocean. The mine site is located within the valleys of Mitchell Creek, McTagg Creek and Sulphurets Creek. Sulphurets Creek is a main tributary of the Unuk River, which flows to the Pacific Ocean via Alaska.</p> <p>The EAO Assessment Report (EAO; 2014) concluded that there would be no significant adverse effects to surface or groundwater quality or quantity, and fish or aquatic habitats, and no significant adverse effects to fish and aquatic habitat from degradation of water quality. The KSM Project Certificate includes legally-enforceable conditions to address potential effects to downstream water, fish and aquatic habitat, including: the requirement to have a fully operational selenium treatment plant by year five of operations; construction of water treatment facilities prior to the mining of any ore; and the requirement for an Aquatic Effects Management Plan, Selenium Management Plan, Water Management Plan and a Groundwater Monitoring and Mitigation Plan. A Metal Leaching/Acid Rock Drainage Plan must be included in the <i>Mines Act</i> permit application (2019 Joint Application Information Requirements for <i>Mines Act</i> and <i>Environmental Management Act</i> Permits; Appendix C of KSM Mining Comment Response Report).</p> <p>The Canadian Environmental Assessment Agency’s Comprehensive Study Report (CEA Agency; 2014) concluded that the Project is not likely to result in any significant adverse residual or cumulative effects.</p> <p>KSM Mining completed a Best Available Technology (BAT) study in 2016 to review the Project’s proposed TMF and evaluate alternate tailings management technologies based on Environment and Climate Change Canada’s Guidelines for the Assessment of Alternatives for Mine Waste Disposal and the recommendations of the Independent Expert Engineering Investigation and Review Panel Report of the Mount Polley Tailings Storage Facility Breach. The multiple accounts analysis in the BAT study identified the same option as selected in the KSM Project Application for an Environmental Assessment Certificate/Environmental Impact Statement (2013) – the Teigen-Treaty Cyclone Sand TMF – as preferred in comparison with filtered tailings options. The Teigen-Treaty Cyclone Sand TMF is the preferred option because it: has the lowest impact on environmental considerations; is the most technically feasible to construct, operate and close in a safe manner; has the fewest associated socio economic concerns; and is the best strategy to manage overall risk throughout the life of the Project.</p>

#	Northern Confluence Comment Summary	KSM Mining Response
		<p>The BAT study was independently reviewed by a former member of the Mount Polley Independent Expert Engineering Investigation and Review Panel (Dr. Dirk van Zyl), who supported the study's conclusions. The study is publically available on the KSM Project website and was shared with Indigenous nations and stakeholders, including the State of Alaska found here: https://ksmproject.com/bat-report/.</p>
2	<p>Failure of BC to fully implement the Mount Polley Expert Panel recommendations</p>	<p>The revised 2017 Health, Safety and Reclamation Code for Mines in British Columbia (Code) reflects the culmination of almost two years of work undertaken by a Code Review Committee and two technical sub-committees on tailings storage facilities and health and safety. The committees included representation from industry, labour and Indigenous nations.</p> <p>The 2017 Code includes updates to address the seven recommendations from the Mount Polley Independent Expert Engineering Panel and the recommendations of the Chief Inspector of Mines investigation into the Mount Polley tailing pond breach. The revisions include enhanced validation of safety and regulation of all phases of a TSF (all mines in BC with TSFs must have an Independent Tailings Review Board) and improved dam safety guidelines.</p> <p>KSM Mining established an Independent Geotechnical Review Board in 2015, consistent with current Code requirements, which has met and reported annually since inception. Table 5.1-2 in the Extension Application identifies how KSM Mining is addressing the Code changes.</p>
3	<p>Lack of company history operating mine sites</p>	<p>KSM Mining is seeking a joint venture partner with the financial and technical capacity to finance, construct and operate the Project.</p>
4	<p>Failure to meet all 41 Certificate conditions, including selenium treatment at proposed mine volumes</p>	<p>Many of the conditions are to be implemented prior to the start of construction or the start of mining operations, neither of these activities have been initiated by KSM. Table 4.3-1 in the Extension Application summarizes the work that has been undertaken to date to address the Certificate conditions. Seven conditions have been addressed (Conditions 6, 18, 29 - 32, 37), four conditions have been partially addressed (Conditions 7, 8[b], 28, and 39[b]), 15 conditions are in progress subject to permitting, the start of construction or operations (Conditions 9, 14 - 17, 22 - 27, 34, 35, 40 and 41), and 17 conditions will be implemented at the start of construction or operations (Conditions 1 - 5, 8(a)(c), 10 - 13, 19 - 21, 33, 36, 38 and 39[a]).</p> <p>KSM Mining has already demonstrated its ability to treat selenium (Se) at the Project site as was reported in 2015 to the EAO. KSM Mining piloted the viability of SELEN IX™ for selenium removal in 2014 (Condition 18 of the Certificate). Approximately 30,000 gallons of water from Mitchell Creek was transported to Richmond, BC, where it was modified to represent the range of expected water quality and conditions for seepage from the Mitchell/McTagg RSF. The pilot demonstrated the capability of Selen-IX™ to remove Se to below 1 parts per billion (ppb) (BioteQ Environmental Technologies 2015; Appendix B5 of the KSM Mining Comment Response Report).</p> <p>Subsequent to 2015, the SELEN IX™ has been trialed at many sites through Canada and the USA and most recently a SELN IX water treatment plant was installed at a BC mine site in late 2019.</p> <p>Condition 21 of the Certificate requires the selenium water treatment plant to be commissioned and constructed at a throughput of 500 L/s by the end of the fifth year of operation.</p>

#	Northern Confluence Comment Summary	KSM Mining Response
5	Inability to attract an investor due to COVID-19	<p>The Project requires a joint venture partner with the financial and technical capacity to finance, construct and operate the Project. The pandemic has temporarily interrupted KSM's negotiations with prospective partners.</p> <p>Two potential partners planned to make a joint venture proposal in March 2020. No proposal was made as a result of the pandemic. Each of the prospective partners indicated that they could not continue their negotiations with KSM in 2020 until the global economy had stabilized. Although gold prices have done well, base metals such as copper (which is particularly important to KSM) have suffered from slow demand.</p> <p>The second wave of the pandemic has begun, and pandemic restrictions are expected to last another 18-24 months. A third wave of the pandemic is appearing likely.</p> <p>Grant Thornton (2021; Appendix B3 of KSM Mining Public Comment Response Report) found that COVID-19 has impacted the mining industry as follows:</p> <ul style="list-style-type: none"> ■ Decrease in capital expenditures and capital expenditure guidance; ■ Decrease in merger & acquisition activity; and ■ Caution in ensuring sufficient cash and credit reserves. <p>Based on a review of seven mining companies covering a range of market capitalizations, Grant Thornton found that none of the companies completed acquisitions large enough to be disclosed in the most recent period and one company completed an acquisition in the prior year.</p> <p>BMO (2021; Appendix B2 of the KSM Project Public Comment Response Report) found that global mining companies are focused on addressing material challenges within their own businesses as a result of COVID-19:</p> <ul style="list-style-type: none"> ■ Companies are preserving capital to weather the uncertainty rather than showing optimism in pursuing investments. ■ Rather than deploy capital on external investment opportunities, companies have reduced or cut production guidance, dividends and capital spending. Specifically, several large mining companies have announced delays and suspensions to work on large-scale development projects (e.g., Teck Resources - Quebrada Blanca II and Galore Creek projects, Anglo American - Quellaveco project). ■ Companies have focused on the health and safety of their employees and the communities in which they operate. ■ A majority of companies have re-directed efforts internally and are less focused on external investment. <p>Prior crises suggest a return to normalized levels of merger and acquisitions can be prolonged, particularly for large scale projects. Further evidence of the pandemic's financial impacts on BC northwest communities and the mining sector is provided in newspaper articles in Appendix B4 of KSM Mining's Comment Response Report.</p>

#	Northern Confluence Comment Summary	KSM Mining Response
6	COVID-19 impact on KSM Project 2020 field programs	<p>KSM Mining has not yet applied for and obtained the necessary authorizations to construct and operate the mine. The start of the 2020 field programs was delayed in order to identify and put in place measures to respond to BC government COVID-19 requirements and to safeguard the well-being of contractors, employees and communities in which KSM works. The scope of the programs was substantially reduced to comply with pandemic restrictions. The camp capacity was reduced by 50% which resulted in:</p> <ul style="list-style-type: none"> ■ The Mitchell Treaty Tunnel drilling program was reduced from 40 to 10 holes, which has delayed geotechnical, geological and metallurgical data collection required for Feasibility Study and the <i>Mines Act</i> permit application; and ■ Reduced scope for environmental field programs. <p>Collectively, these changes have delayed or will delay KSM Mining's ability to undertake a final Feasibility Study, which is necessary to justify the next stage of Project investment.</p> <p>The pandemic has made engaging with Indigenous groups challenging. Most communities are understandably unwilling to allow visitors, and adequate digital infrastructure is not always available to conduct these processes remotely. Most Indigenous communities have also requested more time to review draft permit applications and other regulatory materials due to the challenges caused by the pandemic.</p> <p>Given the current state of the pandemic, KSM Mining anticipates the current COVID-19 restrictions and the rise of the new COVID variants will also impact the 2021 field programs.</p>
7	Extension Application not in accordance with Certificate Extension Policy (2020) and lack of downstream engagement with Alaska Tribes on environmental assessment and variance applications	<p>KSM Mining cannot comment on the requirement for EAO to seek consensus under Section 31(5) of the 2018 <i>Environmental Assessment Act</i> or EAO engagement with downstream Alaska Tribes and defers to the EAO to respond to these comments.</p> <p>KSM Mining discussed the variance request with the Nisga'a Lisims Government and Tahltan Central Government before submitting the Extension Application. The proposed extension was also discussed with the EAO and the Ministry of Energy, Mines and Petroleum Resources (now named the Ministry of Energy, Mines and Low Carbon Innovation). KSM Mining also wrote to Indigenous Groups (Nisga'a Lisims Government, Tahltan Central Government, Gitksan Chiefs' Office, Gitanyow Hereditary Chiefs and Tsetsaut Skii km Lax Ha) to advise that additional time was required due to the impacts of the COVID-19 pandemic on the Project's operations. The Office of the Gitksan Hereditary Chiefs has written to the EAO to indicate its support for the Certificate extension. KSM Mining provided a draft copy of the Extension Application to Indigenous Groups for review and comment on July 17, 2020. No comments were received on the draft Extension Application from the Indigenous groups.</p> <p>With respect to engagement with downstream Alaska Tribes during the environmental assessment, in approving the environmental assessment, each of the Canadian and BC governments concluded that: KSM Mining conducted significant, meaningful engagement with all interested parties, including Alaskans; Alaskans' concerns were properly addressed and mitigated during the environmental assessment processes; and the Project would have no residual environmental effects on water quality in the Unuk River in Alaska CEA Agency 2014 and EAO 2014b)</p>

2. ALASKA TROLLERS ASSOCIATION (ATA) COMMENTS

Table A2: Response to Alaska Trollers Association (ATA) Comments Dated June 24, 2020 (re-submitted during the EAO 14-day public comment period)

#	ATA Summary Comment	KSM Mining Response
1	<p>COVID-19 impact on KSM Project 2020 field programs</p>	<p>KSM Mining has not yet applied for and obtained the necessary authorizations to construct and operate the mine. The start of the 2020 field programs was delayed in order to identify and put in place measures to respond to BC government COVID-19 requirements and to safeguard the well-being of contractors, employees and communities in which KSM works. The scope of the programs was substantially reduced to comply with pandemic restrictions. The camp capacity was reduced by 50% which resulted in:</p> <ul style="list-style-type: none"> ■ The Mitchell Treaty Tunnel drilling program was reduced from 40 to 10 holes, which has delayed geotechnical, geological and metallurgical data collection required for Feasibility Study and the <i>Mines Act</i> permit application; and ■ Reduced scope for environmental field programs. <p>Collectively, these changes have delayed or will delay KSM Mining’s ability to undertake a final Feasibility Study, which is necessary to justify the next stage of Project investment.</p> <p>The pandemic has made engaging with Indigenous groups challenging. Most communities are understandably unwilling to allow visitors, and adequate digital infrastructure is not always available to conduct these processes remotely. Most Indigenous communities have also requested more time to review draft permit applications and other regulatory materials due to the challenges caused by the pandemic.</p> <p>Given the current state of the pandemic, KSM Mining anticipates the current COVID-19 restrictions and the rise of the new COVID variants will also impact the 2021 field programs.</p>
2	<p>Inability to attract an investor due to COVID-19</p>	<p>The Project requires a joint venture partner with the financial and technical capacity to finance, construct and operate the Project. The pandemic has temporarily interrupted KSM’s negotiations with prospective partners.</p> <p>Two potential partners planned to make a joint venture proposal in March 2020. No proposal was made as a result of the pandemic. Each of the prospective partners indicated that they could not continue their negotiations with KSM in 2020 until the global economy had stabilized. Although gold prices have done well, base metals such as copper (which is particularly important to KSM) have suffered from slow demand.</p> <p>The second wave of the pandemic has begun, and pandemic restrictions are expected to last another 18-24 months. A third wave of the pandemic is appearing likely.</p> <p>Grant Thornton (2021: Appendix B3 of KSM Mining’s Public Comment Response Report) found that COVID-19 has impacted the mining industry as follows:</p> <ul style="list-style-type: none"> ■ Decrease in capital expenditures and capital expenditure guidance; ■ Decrease in merger and acquisition activity; and ■ Caution in ensuring sufficient cash and credit reserves.

#	ATA Summary Comment	KSM Mining Response
		<p>Based on a review of seven mining companies covering a range of market capitalizations, Grant Thornton found that none of the companies completed acquisitions large enough to be disclosed in the most recent period and one company completed an acquisition in the prior year.</p> <p>BMO (2021; Appendix B2 of KSM Project Public Comment Response Report) found that global mining companies are focused on addressing material challenges within their own businesses as a result of COVID-19:</p> <ul style="list-style-type: none"> ■ Companies are preserving capital to weather the uncertainty rather than showing optimism in pursuing investments. ■ Rather than deploy capital on external investment opportunities, companies have reduced or cut production guidance, dividends and capital spending. Specifically, several large mining companies have announced delays and suspensions to work on large-scale development projects (e.g., Teck Resources - Quebrada Blanca II and Galore Creek projects, Anglo American - Quellaveco project). ■ Companies have focused on the health and safety of their employees and the communities in which they operate. ■ A majority of companies have re-directed efforts internally and are less focused on external investment. <p>Prior crises suggest a return to normalized levels of merger and acquisitions can be prolonged, particularly for large scale projects. Further evidence of the pandemic's financial impacts on BC northwest communities and the mining sector is provided in newspaper articles in Appendix B4 of KSM Mining's Comment Response Report.</p>

3. RIVERS WITHOUT BORDERS (RWB) COMMENTS

Table A3: Response to RWB Comments Dated December 2, 2020

#	RWB Summary Comment	KSM Mining Response
1	Inability to attract an investor due to COVID-19	<p>The Project requires a joint venture partner with the financial and technical capacity to finance, construct and operate the Project. The pandemic has temporarily interrupted all of KSM's negotiations with prospective partners. Two potential partners planned to make a joint venture proposal in March 2020. No proposal was made as a result of the pandemic. Each of the prospective partners indicated that they could not continue their negotiations with KSM in 2020 until the global economy has stabilized. Although gold prices have done well, base metals such as copper (which is particularly important to KSM) have suffered from slow demand.</p> <p>The second wave of the pandemic has begun, and pandemic restrictions are expected to last another 18-24 months. A third wave of the pandemic is appearing likely.</p> <p>Grant Thornton (2021; Appendix B3 of KSM Mining Public Comment Response Report) found that COVID-19 has impacted the mining industry as follows:</p> <ul style="list-style-type: none"> ■ Decrease in capital expenditures and capital expenditure guidance; ■ Decrease in merger and acquisition activity; and ■ Caution in ensuring sufficient cash and credit reserves. <p>Based on a review of seven mining companies covering a range of market capitalizations, Grant Thornton found none of the companies completed acquisitions large enough to be disclosed in the most recent period and one company completed an acquisition in the prior year.</p> <p>BMO (2021; Appendix B2 of KSM Mining Public Comment Response Report) found that global mining companies are focused on addressing material challenges within their own businesses as a result of COVID-19:</p> <ul style="list-style-type: none"> ■ Companies are preserving capital to weather the uncertainty rather than showing optimism in pursuing investments. ■ Rather than deploy capital on external investment opportunities, companies have reduced or cut production guidance, dividends and capital spending. Specifically, several large mining companies have announced delays and suspensions to work on large-scale development projects (e.g., Teck Resources - Quebrada Blanca II and Galore Creek projects, Anglo American - Quellaveco project). ■ Companies have focused on the health and safety of their employees and the communities in which they operate. ■ A majority of companies have re-directed efforts internally and are less focused on external investment. <p>Prior crises suggest a return to normalized levels of merger and acquisitions can be prolonged, particularly for large scale projects. Further evidence of the pandemic's financial impacts on the mining sector is provided in newspaper articles in Appendix B4 of KSM Mining's Comment Response Report.</p>

#	RWB Summary Comment	KSM Mining Response
2	COVID-19 impact on KSM Project 2020 field programs	<p>KSM Mining has not yet applied for and obtained the necessary authorizations to construct and operate the mine. The start of the 2020 field programs was delayed in order to identify and put in place measures to respond to BC government COVID-19 requirements and to safeguard the well-being of contractors, employees and communities in which KSM works. The scope of the programs was substantially reduced to comply with pandemic restrictions. The camp capacity was reduced by 50% which resulted in:</p> <ul style="list-style-type: none"> ■ The Mitchell Treaty Tunnel drilling program was reduced from 40 to 10 holes, which has delayed geotechnical, geological and metallurgical data collection required for Feasibility Study and the <i>Mines Act</i> permit application; and ■ Reduced scope for environmental field programs. <p>Collectively, these changes have delayed or will delay KSM Mining's ability to undertake a final Feasibility Study, which is necessary to justify the next stage of Project investment.</p> <p>The pandemic has made engaging with Indigenous groups challenging. Most communities are understandably unwilling to allow visitors, and adequate digital infrastructure is not always available to conduct these processes remotely. Most Indigenous communities have also requested more time to review draft permit applications and other regulatory materials due to the challenges caused by the pandemic.</p> <p>Given the current state of the pandemic, KSM Mining anticipates the current COVID-19 restrictions and the rise of the new COVID variants will also impact the 2021 field programs.</p>
3	Extension Application not in accordance with Certificate Extension Policy (2020) and lack of downstream engagement with Alaska Tribes on environmental assessment and variance applications	<p>KSM Mining cannot comment on the requirement for EAO to seek consensus under Section 31(5) of the 2018 <i>Environmental Assessment Act</i> or EAO engagement with downstream Alaska Tribes and defers to the EAO to respond to this comment.</p> <p>KSM Mining discussed the variance request with the Nisga'a Lisims Government and Tahltan Central Government before submitting the Extension Application. The proposed extension was also discussed with the EAO and the Ministry of Energy, Mines and Petroleum Resources (now named the Ministry of Energy, Mines and Low Carbon Innovation). KSM Mining also wrote to Indigenous Groups (Nisga'a Lisims Government, Tahltan Central Government, Gitksan Chiefs' Office, Gitanyow Hereditary Chiefs and Tsetsaut Skii km Lax Ha) to advise that additional time was required due to the impacts of the COVID-19 pandemic on the Project's operations. The Office of the Gitksan Hereditary Chiefs has written to the EAO to indicate its support for the Certificate extension. KSM Mining provided a draft copy of the Extension Application to Indigenous Groups for review and comment on July 17, 2020. No comments were received on the draft Extension Application from the Indigenous groups.</p> <p>With respect to engagement with downstream Alaska Tribes during the environmental assessment, in approving the environmental assessment, each of the Canadian and BC governments concluded that: KSM Mining conducted significant, meaningful engagement with all interested parties, including Alaskans; Alaskans' concerns were properly addressed and mitigated during the environmental assessment processes; and the Project would have no residual environmental effects on water quality in the Unuk River in Alaska (CEA Agency 2014 and EAO 2014b).</p>

#	RWB Summary Comment	KSM Mining Response
4	<p>If variance granted, place, add new conditions:</p> <p>1) KSM, BC EAO and the CEAO must hold meaningful consultations with the downstream Alaska Tribes and other stakeholders affected by the KSM Project 2) KSM Mining must be able to demonstrate that the project has the ability to treat and remove all forms of selenium released in the wastewater to levels below Alaska Water Quality Criteria maximum concentration of 20 µg/l (expressed as total recoverable metal) prior to any further development or construction</p>	<p>KSM Mining defers to the EAO to respond to the addition of new conditions if the Certificate extension is granted and consensus requirements pursuant to Section 31(5) of the <i>Environmental Assessment Act</i>.</p> <p>In approving the environmental assessment, each of the federal and BC governments concluded that: KSM Mining conducted significant, meaningful engagement with all interested parties, including Alaskans; Alaskans' concerns were properly addressed and mitigated during the environmental assessment processes; and the Project would have no residual environmental effects on water quality in the Unuk River in Alaska¹.</p> <p>KSM Mining defers to the EAO to respond to the addition of new conditions if the Certificate extension is granted and consensus requirements pursuant to Section 31(5) of the 2018 <i>Environmental Assessment Act</i>.</p> <p>The BC <i>Environmental Management Act</i> governs discharges to the environment (air, water and land). Conditions in the Certificate related to selenium include Conditions 8 and 17:</p> <p>Condition 8 requires:</p> <p>(a) <i>the Holder to ensure that water quality:</i></p> <ul style="list-style-type: none"> i) 400 m downstream of the discharge point of any temporary water treatment plants operating in Upper Treaty Creek or South Teigen Creek while these plants are in operation; ii) 100 m downstream of the North seepage dam in South Teigen Creek during the operations, closure, and post-closure phases of the Project; and iii) 100 m downstream of the effluent discharge point of the TMF pipeline into Treaty Creek, and 100 m downstream of the North seepage dam in South Teigen Creek during the operations, closure and post-closure phases of the proposed Project. Each ("Sampling Location") complies with British Columbia Water Quality Guidelines (includes BC Ministry of Environment. 2013. Water Quality Guidelines (Criteria Reports and A Compendium of Working Water Quality Guidelines for British Columbia, 2006). If MOE has approved site specific water quality objectives for one or more specific contaminants in accordance with 8(b) below (collectively "Site Specific Water Quality Objectives"), the EAC Holder must instead ensure that water quality for such contaminants at the Sampling Locations complies with such Site Specific Water Quality Objectives. <p>(b) <i>If required by MOE, and after making reasonable efforts to engage with the Nisga'a Lisims Government, Gitanyow Nation, Tahltan Nation and wilp Skii km Lax Ha, the EAC Holder must develop Site Specific Water Quality Objectives for mine related contaminants in the water occurring at the Sampling Locations:</i></p> <ul style="list-style-type: none"> i) <i>in accordance with methods described in the British Columbia Water Quality Guidelines; and</i> ii) <i>the EAC Holder must not proceed with construction of the Project elements described in 8(a) until any required Site Specific Water Quality Objectives have been approved by MOE.</i> <p>(c) <i>Despite Condition 8(a), if, from time to time, contaminant levels in the water at the Sampling Locations exceed the applicable British Columbia Water Quality Guideline or Site Specific Water Quality Objective</i></p>

¹ Canadian Environmental Assessment Agency Comprehensive Study Report (2014); Environmental Assessment Office Assessment Report (2014).

#	RWB Summary Comment	KSM Mining Response
		<p><i>(each such event, an “Exceedance”), then the EAC Holder will be deemed to remain in compliance with Condition 8(a) if, the EAC Holder:</i></p> <ul style="list-style-type: none"> <i>i) notifies MOE and the Nisga’a Lisims Government, Gitanyow Nation, Tahltan Nation and wilp Skii km Lax Ha upon becoming aware of the Exceedance within 48 hours once results are received from the testing facility; and</i> <i>ii) after making reasonable efforts to inform the Nisga’a Lisims Government, Gitanyow Nation, Tahltan Nation and wilp Skii km Lax Ha: a. takes such corrective measures as, in the opinion of MOE, are necessary to comply with Condition 8(a) as soon as reasonably possible; and b. mitigates the Exceedance as directed by, and using methods approved by, MOE.</i> <p>Condition 17 requires:</p> <p><i>As part of the Mines Act permit application for the construction of the TMF facility, the mining of the Mitchell Pit or the mining of ore from the Sulphurets Pit, and after making reasonable efforts to engage with respect of the application for the construction of the TMF, with the Nisga'a Lisims Government, Gitanyow Nation, Tahltan Nation and wilp Skii km Lax Ha, the EAC Holder must prepare and submit a plan (the “Selenium Management Plan”) to the satisfaction of MEM and MOE, that at a minimum, addresses all of the elements described in section 10-4 of the CPD [Certified Project Description]. The EAC Holder must implement and keep up to date the Selenium Management Plan, during all phases of the Project, to the satisfaction of MEM and MOE.</i></p> <p>KSM Mining has already demonstrated its ability to treat selenium (Se) at the Project site as was reported in 2015 to the EAO. KSM Mining piloted the viability of SELEN IX™ for selenium removal in 2014 (Condition 18 of the Certificate). Approximately 30,000 gallons of water from Mitchell Creek was transported to Richmond, BC, where it was modified to represent the range of expected water quality and conditions for seepage from the Mitchell/McTagg RSF. The pilot demonstrated the capability of Selen-IX™ to remove Se to below 1 ppb (BioteQ Environmental Technologies 2015; Appendix B5 of the KSM Mining Comment Response Report).</p> <p>Subsequent to 2015, the SELEN IX™ has been trialed at many sites through Canada and the USA and most recently a SELN IX water treatment plant was installed at a BC mine site in late 2019.</p> <p>Condition 21 of the Certificate requires the selenium water treatment plant be commissioned and constructed at a throughput of 500 L/s by the end of the fifth year of operation.</p>

#	RWB Summary Comment	KSM Mining Response
5	Outdated environmental assessment	<p>Pursuant to section 78 of the 2018 <i>Environmental Assessment Act</i>, the KSM Project is subject to the 2018 Act with respect to amendments, compliance and enforcement, and post certificate administration provisions.</p> <p>The KSM Certificate lasts the life of the Project and the Certificate conditions do not address every detail of the Project and do not regulate the day-to-day construction or operation of the Project. Those details are left to the permitting stage of Project development. The Project currently has 61 permits in place and another 140 (estimate) provincial and federal permits are required for full mine construction and operation.</p> <p>Changes to legislation and policies were considered in Section 5.1 of the Extension Application since the issuance of the KSM Project Certificate. These included new federal and provincial listed species at risk, new factors considered under the 2018 <i>Environmental Assessment Act</i> and 2019 <i>Impact Assessment Act</i> and other changes.</p> <p>The KSM Project Certificate 41 conditions must be met. The KSM Project must also meet current legislation when it prepares permit applications to construct the mine and through operations, closure and post-closure.</p> <p>Applications for <i>Mines Act</i> permits must:</p> <ul style="list-style-type: none"> ■ demonstrate compliance with the Health, Safety and Reclamation Code for Mines in British Columbia; ■ include detailed designs for all project components and phases of mine life, detailed engineering designs, management plans and monitoring programs; and ■ ensure the health and safety of mine personnel and the public as well as the protection and reclamation of the land and watercourses affected by mining activities (See 2019 Joint Application Information Requirements for <i>Mines Act</i> and <i>Environmental Management Act</i> Permits in Appendix C of KSM Mining Comment Response Report). <p>To prepare for permitting, model updates must be undertaken (e.g., surface water quality model, site wide water balance model, groundwater model) and model results considered in the <i>Mines Act</i> and <i>Environmental Management Act</i> applications and inform management plans (See 2019 <i>Joint Application Information Requirements for Mines Act and Environmental Management Act Permits</i> in Appendix C of KSM Mining Comment Response Report). Model updates will incorporate all relevant data that has been collected for the Project.</p> <p>Permit applications must also take into account recommendations from the KSM Project Independent Geotechnical Review Board, established by KSM Mining in 2015, with respect to the design of major infrastructure.</p>

4. RESPONSE TO SOUTHEAST ALASKA INDIGENOUS TRANSBOUNDARY COMMISSION (SEITC) COMMENTS

Table A4: Response to SEITC Comments Dated December 2, 2020

#	SEITC Summary Comment	KSM Mining Response
1	Inability to attract an investor due to COVID-19	<p>The Project requires a joint venture partner with the financial and technical capacity to finance, construct and operate the Project. The pandemic has temporarily interrupted KSM’s negotiations with prospective partners.</p> <p>Two potential partners planned to make a joint venture proposal in March 2020. No proposal was made as a result of the pandemic. Each of the prospective partners indicated that they could not continue their negotiations with KSM in 2020 until the global economy has stabilized. Although gold prices have done well, base metals such as copper (which is particularly important to KSM) have suffered from slow demand.</p> <p>The second wave of the pandemic has begun, and pandemic restrictions are expected to last another 18-24 months. A third wave of the pandemic is appearing likely.</p> <p>Grant Thornton (2021; Appendix B3 of KSM Mining Public Comment Response Report) found that COVID-19 has impacted the mining industry as follows:</p> <ul style="list-style-type: none"> ■ Decrease in capital expenditures and capital expenditure guidance; ■ Decrease in merger and acquisition activity; and ■ Caution in ensuring sufficient cash and credit reserves. <p>Based on a review of seven mining companies covering a range of market capitalizations, Grant Thornton found that none of the companies completed acquisitions large enough to be disclosed in the most recent period and one company completed an acquisition in the prior year.</p> <p>BMO (2021; Appendix B2 of KSM Mining Public Comment Response Report) found that global mining companies are focused on addressing material challenges within their own businesses as a result of COVID-19:</p> <ul style="list-style-type: none"> ■ Companies are preserving capital to weather the uncertainty rather than showing optimism in pursuing investments. ■ Rather than deploy capital on external investment opportunities, companies have reduced or cut production guidance, dividends and capital spending. Specifically, several large mining companies have announced delays and suspensions to work on large-scale development projects (e.g., Teck Resources – Quebrada Blanca II and Galore Creek projects, Anglo American – Quellaveco project). ■ Companies have focused on the health and safety of their employees and the communities in which they operate. ■ A majority of companies have re-directed efforts internally and are less focused on external investment. <p>Prior crises suggest a return to normalized levels of merger and acquisitions can be prolonged, particularly for large scale projects. Further evidence of the pandemic’s financial impacts on BC northwest communities and the mining sector is provided in newspaper articles in Appendix B4 of KSM Mining’s Comment Response Report.</p>

#	SEITC Summary Comment	KSM Mining Response
2	COVID-19 impact on KSM Project 2020 field programs	<p>KSM Mining has not yet applied for and obtained the necessary authorizations to construct and operate the mine. The start of the 2020 field programs was delayed in order to identify and put in place measures to respond to BC government COVID-19 requirements and to safeguard the well-being of contractors, employees and communities in which KSM works. The scope of the programs was substantially reduced to comply with pandemic restrictions.</p> <p>The camp capacity was reduced by 50% which resulted in:</p> <ul style="list-style-type: none"> ■ The Mitchell Treaty Tunnel drilling program was reduced from 40 to 10 holes, which has delayed geotechnical, geological and metallurgical data collection required for Feasibility Study and the <i>Mines Act</i> permit application; and ■ Reduced scope for environmental field programs. <p>Collectively, these changes have delayed or will delay KSM Mining's ability to undertake a final Feasibility Study, which is necessary to justify the next stage of Project investment.</p> <p>The pandemic has made engaging with Indigenous groups challenging. Most communities are understandably unwilling to allow visitors, and adequate digital infrastructure is not always available to conduct these processes remotely. Most Indigenous communities have also requested more time to review draft permit applications and other regulatory materials due to the challenges caused by the pandemic.</p> <p>Given the current state of the pandemic, KSM Mining anticipates the current COVID-19 restrictions and the rise of the new COVID variants will also impact the 2021 field programs.</p>
3	Extension Application not in accordance with Certificate Extension Policy (2020) and lack of downstream engagement with Alaskan Tribes on environmental assessment and variance applications	<p>KSM Mining cannot comment on the consensus requirements under Section 31(5) of the 2018 <i>Environmental Assessment Act</i> or EAO engagement with downstream Alaska Tribes and defers to the EAO) to respond to these comments.</p> <p>KSM Mining discussed the variance request with the Nisga'a Lisims Government and Tahltan Central Government before submitting the Extension Application. The proposed extension was also discussed with the EAO and the Ministry of Energy, Mines and Petroleum Resources (now named the Ministry of Energy, Mines and Low Carbon Innovation). KSM Mining also wrote to Indigenous Groups (Nisga'a Lisims Government, Tahltan Central Government, Gitksan Chiefs' Office, Gitanyow Hereditary Chiefs and Tsetsaut Skii km Lax Ha) to advise that additional time was required due to the impacts of the COVID-19 pandemic on the Project's operations. The Office of the Gitksan Hereditary Chiefs has written to the EAO to indicate its support for the Certificate extension. KSM Mining provided a draft copy of the Extension Application to Indigenous Groups for review and comment on July 17, 2020. No comments were received on the draft Extension Application from the Indigenous groups.</p> <p>With respect to engagement with downstream Alaska Tribes during the environmental assessment, in approving the environmental assessment, each of the Canadian and BC governments concluded that: KSM Mining conducted significant, meaningful engagement with all interested parties, including Alaskans; Alaskans' concerns were properly addressed and mitigated during the environmental assessment processes; and the Project would have no residual environmental effects on water quality in the Unuk River in Alaska. KSM Mining has continued to engage with Alaska interests after the issuance of federal and BC environmental assessment decisions in 2014.</p>

#	SEITC Summary Comment	KSM Mining Response
4	Unproven water treatment technology	<p>The environmental assessment predicted no residual environmental effects on water quality. Selenium concentrations at the Alaska border are predicted to stay below BC Water Quality Guidelines during all Project phases.</p> <p>The Project has mitigated possible downstream water quality exceedances in Alaska by, among many other things:</p> <ul style="list-style-type: none"> ■ siting the TMF within the Bell Irving watershed (not the Unuk watershed), which flows into entirely Canadian waters; ■ utilizing conservative water quality models; ■ developing a Groundwater Monitoring and Mitigation Plan, a Water Management Plan, a Selenium Management Plan, and an Aquatic Effects Monitoring Plan which will provide for monitoring and adaptive management; and ■ developing water treatment facilities and a seepage collection system. <p>KSM Mining is continuing to improve the Project design beyond the Certificate requirements including: identifying improved water management and water treatment approaches for the Project, which has included research into world-class selenium treatment methods, in partnership with BQE Water and the University of British Columbia. The research team recently registered a patent with the United States Patent and Trademark Office.</p> <p>KSM Mining disagrees that the proposed water treatment methods are unproven. KSM has proposed two primary methods:</p> <ul style="list-style-type: none"> ■ High Density Sludge (HDS) - a lime addition treatment method, with technology that has been in use for over 60 years at sites located throughout the world. ■ SELEN IX™ for Selenium Removal - KSM Mining piloted the viability of this treatment method at KSM in 2014 when a pilot water treatment plant trail was conducted (Condition 1 of the Certificate). Approximately 30,000 gallons of water from Mitchell Creek was transported to Richmond, BC, where it was modified to represent the range of expected water quality and conditions for seepage from the Mitchell/McTagg RSF. The pilot demonstrated the capability of Selen-IX™ to remove Se to below 1 ppb (BioteQ Environmental Technologies 2015; Appendix B5 of the KSM Mining Comment Response Report). <p>Subsequent to 2015, the SELEN IX Treatment Technology has been trialed at many sites through Canada and the USA and most recently a SELN IX water treatment plant was installed at a BC mine site in late 2019.</p>
5	Lack of engagement with downstream Alaska Tribes during the environmental assessment	<p>In approving the environmental assessment, each of the federal and BC governments concluded that: KSM Mining conducted significant, meaningful engagement with all interested parties, including Alaskans; Alaskans' concerns were properly addressed and mitigated during the environmental assessment processes; and the Project would have no residual environmental effects on water quality in the Unuk River in Alaska. KSM Mining has continued to engage Alaska interests since the issuance of federal and BC environmental assessment decisions in 2014.</p>

#	SEITC Summary Comment	KSM Mining Response
5	Lack of baseline information and impact prediction beyond the BC/Alaska border in the environmental assessment	Seabridge initiated comprehensive baseline data collection in 2007 and this data collection continues today resulting in a comprehensive dataset extending over 14 years of effort. Water quality baseline data from 2007 to 2012 was included in the Application (Seabridge 2013). Baseline data has not been collected beyond the BC/Alaska border because: Seabridge has no authority under Canadian and US laws to collect baseline data within Alaska. Seabridge has offered Alaskan Tribal representatives funding to do water quality sampling in the lower Unuk River area; the Tribes did not accept or respond to Seabridge's offer. KSM Mining has shared its Unuk River baseline data with the State of Alaska.
6	Implications of legislative changes on Project	<p>Pursuant to section 78 of the 2018 <i>Environmental Assessment Act</i>, the KSM Project is subject to the 2018 Act with respect to amendments, compliance and enforcement, and post certificate administration provisions.</p> <p>The KSM Certificate lasts the life of the Project and the Certificate conditions do not address every detail of the Project and do not regulate the day-to-day construction or operation of the Project. Those details are left to the permitting stage of Project development. The Project currently has 61 permits in place and another 140 (estimate) provincial and federal permits are required for full mine construction and operation.</p> <p>Changes to legislation and policies were considered in Section 5.1 of the Extension Application since the issuance of the KSM Project Certificate. These included new federal and provincial listed species at risk, new factors considered under the 2018 <i>Environmental Assessment Act</i> and 2019 <i>Impact Assessment Act</i> and other changes.</p> <p>The KSM Project Certificate 41 conditions must be met. The KSM Project must also meet current legislation when it prepares permit applications to construct the mine and through operations, closure and post –closure.</p> <p>Applications for <i>Mines Act</i> permits must:</p> <ul style="list-style-type: none"> ■ demonstrate compliance with the Health, Safety and Reclamation Code for Mines in British Columbia; ■ include detailed designs for all project components and phases of mine life, detailed engineering designs, management plans and monitoring programs; and ■ ensure the health and safety of mine personnel and the public as well as the protection and reclamation of the land and watercourses affected by mining activities (Ministry of Energy, Mines and Petroleum Resources & Ministry of Environment and Climate Change Strategy 2019). <p>To prepare for permitting, model updates must be undertaken (e.g., surface water quality model, site wide water balance model, groundwater model) and model results considered in the <i>Mines Act</i> and <i>Environmental Management Act</i> applications and inform management plans. Model updates will incorporate all relevant data that has been collected for the Project (see 2019 <i>Joint Application Information Requirements for Mines Act and Environmental Management Act Permits</i> in Appendix C of KSM Mining Comment Response Report). Permit applications will also take into account recommendations from the KSM Project Independent Geotechnical Review Board, established by KSM Mining in 2015, with respect to the design of major infrastructure.</p>

#	SEITC Summary Comment	KSM Mining Response
7	Tailing dam design and assessment of probability of dam failure	<p>Subsequent to the Mount Polley tailing breach in August 2014, KSM Mining completed a Best Available Technology (BAT) study (2016) to review the Project's proposed tailing management facility (TMF) and evaluate alternate tailings management technologies based on Environment and Climate Change Canada's Guidelines for the Assessment of Alternatives for Mine Waste Disposal and the recommendations of the Independent Expert Engineering Investigation and Review Panel Report of the Mount Polley Tailings Storage Facility Breach. The multiple accounts analysis in the BAT study identified the same option as selected in the KSM Project Application for an Environmental Assessment Certificate/Environmental Impact Statement (2013) – the Teigen-Treaty Cyclone Sand TMF – as preferred in comparison with filtered tailings options. The Teigen-Treaty Cyclone Sand TMF is the preferred option because it: has the lowest impact on environmental considerations; is the most technically feasible to construct, operate and close in a safe manner; has the fewest associated socio economic concerns; and is the best strategy to manage overall risk throughout the life of the Project.</p> <p>The BAT study was independently reviewed by a former member of the Mount Polley Independent Expert Engineering Investigation and Review Panel (Dr. Dirk van Zyl), who supported the study's conclusions. The study is publically available on the KSM Project website and was shared with Indigenous nations and stakeholders, including the State of Alaska found here: https://ksmproject.com/bat-report/</p> <p>See Klohn Crippen Berger response in Appendix B1 of the KSM Mining Comment Response Report). KCB responds to comments on the Dam Break and Inundation Study for Tailing Management in Seabridge 2013 Application for an Environmental Assessment Certificate.</p>
8	If variance granted, add new conditions, including meaningful consultation with downstream Alaska Tribes, demonstrate that the project has the ability to treat and remove all forms of selenium released in the wastewater to levels below Alaska Water Quality Criteria maximum concentration of 20 µg/l (expressed as total recoverable metal) prior to any further development or construction	<p>KSM Mining defers to the EAO to respond to the addition of new conditions if the Certificate extension is granted and consensus requirements pursuant to Section 31(5) of the 2018 <i>Environmental Assessment Act</i>.</p> <p>The BC <i>Environmental Management Act</i> governs discharges to the environment. Conditions in the Certificate related to selenium include Conditions 8 and 17:</p> <p>Condition 8 requires:</p> <p>(a) <i>the Holder to ensure that water quality:</i></p> <ul style="list-style-type: none"> i) 400 m downstream of the discharge point of any temporary water treatment plants operating in Upper Treaty Creek or South Teigen Creek while these plants are in operation; ii) 100 m downstream of the North seepage dam in South Teigen Creek during the operations, closure, and post-closure phases of the Project; and iii) 100 m downstream of the effluent discharge point of the TMF pipeline into Treaty Creek, and 100 m downstream of the North seepage dam in South Teigen Creek during the operations, closure and post-closure phases of the proposed Project. Each ("Sampling Location") complies with British Columbia Water Quality Guidelines (includes BC Ministry of Environment. 2013. <i>Water Quality Guidelines (Criteria Reports and A Compendium of Working Water Quality Guidelines for British Columbia, 2006)</i>. If MOE has approved site specific water quality objectives for one or more specific contaminants in accordance with 8(b) below

#	SEITC Summary Comment	KSM Mining Response
		<p>(collectively “Site Specific Water Quality Objectives”), the EAC Holder must instead ensure that water quality for such contaminants at the Sampling Locations complies with such Site Specific Water Quality Objectives.</p> <p>(b) If required by MOE, and after making reasonable efforts to engage with the Nisga’a Lisims Government, Gitanyow Nation, Tahltan Nation and wilp Skii km Lax Ha, the EAC Holder must develop Site Specific Water Quality Objectives for mine related contaminants in the water occurring at the Sampling Locations:</p> <ul style="list-style-type: none"> i) in accordance with methods described in the British Columbia Water Quality Guidelines; and ii) the EAC Holder must not proceed with construction of the Project elements described in 8(a) until any required Site Specific Water Quality Objectives have been approved by MOE. <p>(c) Despite Condition 8(a), if, from time to time, contaminant levels in the water at the Sampling Locations exceed the applicable British Columbia Water Quality Guideline or Site Specific Water Quality Objective (each such event, an “Exceedance”), then the EAC Holder will be deemed to remain in compliance with Condition 8(a) if, the EAC Holder:</p> <ul style="list-style-type: none"> i) notifies MOE and the Nisga’a Lisims Government, Gitanyow Nation, Tahltan Nation and wilp Skii km Lax Ha upon becoming aware of the Exceedance within 48 hours once results are received from the testing facility; and ii) after making reasonable efforts to inform the Nisga’a Lisims Government, Gitanyow Nation, Tahltan Nation and wilp Skii km Lax Ha: a. takes such corrective measures as, in the opinion of MOE, are necessary to comply with Condition 8(a) as soon as reasonably possible; and b. mitigates the Exceedance as directed by, and using methods approved by, MOE. <p>Condition 17 requires:</p> <p>As part of the Mines Act permit application for the construction of the TMF facility, the mining of the Mitchell Pit or the mining of ore from the Sulphurets Pit, and after making reasonable efforts to engage with respect of the application for the construction of the TMF, with the Nisga’a Lisims Government, Gitanyow Nation, Tahltan Nation and wilp Skii km Lax Ha, the EAC Holder must prepare and submit a plan (the “Selenium Management Plan”) to the satisfaction of MEM and MOE, that at a minimum, addresses all of the elements described in section 10-4 of the CPD [Certified Project Description]. The EAC Holder must implement and keep up to date the Selenium Management Plan, during all phases of the Project, to the satisfaction of MEM and MOE.</p>

5. RESPONSE TO SKEENAWILD CONSERVATION TRUST COMMENTS

Table A5: Response to SkeenaWild Comments Dated December 2, 2020

#	SkeenaWild	KSM Mining Response
1	COVID-19 impact on KSM Project field programs	<p>KSM Mining has not yet applied for and obtained the necessary authorizations to construct and operate the mine. The start of the 2020 field programs was delayed in order to identify and put in place measures to respond to BC government COVID-19 requirements and to safeguard the well-being of contractors, employees and communities in which KSM works. The scope of the programs was substantially reduced to comply with pandemic restrictions. The camp capacity was reduced by 50% which resulted in:</p> <ul style="list-style-type: none"> ■ The Mitchell Treaty Tunnel drilling program was reduced from 40 to 10 holes, which has delayed geotechnical, geological and metallurgical data collection required for Feasibility Study and the <i>Mines Act</i> permit application; and ■ Reduced scope for environmental field programs. <p>Collectively, these changes have delayed or will delay KSM Mining's ability to undertake a final Feasibility Study, which is necessary to justify the next stage of Project investment.</p> <p>The pandemic has made engaging with Indigenous groups challenging. Most communities are understandably unwilling to allow visitors, and adequate digital infrastructure is not always available to conduct these processes remotely. Most Indigenous communities have also requested more time to review draft permit applications and other regulatory materials due to the challenges caused by the pandemic.</p> <p>Given the current state of the pandemic, KSM Mining anticipates the current COVID-19 restrictions and the rise of the new COVID variants will also impact the 2021 field programs.</p>
2	Inability to attract an investor due to COVID-19	<p>The Project requires a joint venture partner with the financial and technical capacity to finance, construct and operate the Project. The pandemic has temporarily interrupted KSM's negotiations with prospective partners.</p> <p>Two potential partners planned to make a joint venture proposal in March 2020. No proposal was made as a result of the pandemic. Each of the prospective partners indicated they could not continue their negotiations with KSM in 2020 until the global economy has stabilized. Although gold prices have done well, base metals such as copper (which is particularly important to KSM) have suffered from slow demand.</p> <p>The second wave of the pandemic has begun, and pandemic restrictions are expected to last another 18-24 months. A third wave of the pandemic is appearing likely.</p> <p>Grant Thornton's (2021; Appendix B3 of KSM Mining Public Comment Response Report) found that COVID-19 has impacted the mining industry as follows:</p> <ul style="list-style-type: none"> ■ Decrease in capital expenditures and capital expenditure guidance; ■ Decrease in merger & acquisition activity; and ■ Caution in ensuring sufficient cash and credit reserves.

#	SkeenaWild	KSM Mining Response
		<p>Based on a review of seven mining companies covering a range of market capitalizations, Grant Thornton found that none of the companies completed acquisitions large enough to be disclosed in the most recent period and one company completed an acquisition in the prior year).</p> <p>BMO (2021; Appendix B2 of KSM Mining Public Comment Response Report) found that global mining companies are focused on addressing material challenges within their own businesses as a result of COVID-19:</p> <ul style="list-style-type: none"> ■ Companies are preserving capital to weather the uncertainty rather than showing optimism in pursuing investments. ■ Rather than deploy capital on external investment opportunities, companies have reduced or cut production guidance, dividends and capital spending. Specifically, several large mining companies have announced delays and suspensions to work on large-scale development projects (e.g., Teck Resources - Quebrada Blanca II and Galore Creek projects, Anglo American - Quellaveco project). ■ Companies have focused on the health and safety of their employees and the communities in which they operate. ■ A majority of companies have re-directed efforts internally and are less focused on external investment. <p>Prior crises suggest a return to normalized levels of merger and acquisitions can be prolonged, particularly for large scale projects. Further evidence of the pandemic's financial impacts on BC northwest communities and the mining sector is provided in newspaper articles in Appendix B4 of KSM Mining's Comment Response Report.</p>
3	Outdated dated environmental assessment and implications of legislative changes	<p>Pursuant to section 78 of the 2018 <i>Environmental Assessment Act</i>, the KSM Project is subject to the 2018 Act with respect to amendments, compliance and enforcement, and post certificate administration provisions.</p> <p>The KSM Certificate lasts the life of the Project and the Certificate conditions do not address every detail of the Project and do not regulate the day-to-day construction or operation of the Project. Those details are left to the permitting stage of Project development. The Project currently has 61 permits in place and another 140 (estimate) provincial and federal permits are required for full mine construction and operation.</p> <p>Changes to legislation and policies were considered in Section 5.1 of the Extension Application since the issuance of the KSM Project Certificate. These included new federal and provincial listed species at risk, new factors considered under the 2018 <i>Environmental Assessment Act</i> and 2019 <i>Impact Assessment Act</i> and other changes.</p> <p>The KSM Project Certificate 41 conditions must be met. The KSM Project must also meet current legislation when it prepares permit applications to construct the mine and through operations, closure and post-closure.</p> <p>Applications for <i>Mines Act</i> permits must:</p> <ul style="list-style-type: none"> ■ demonstrate compliance with the Health, Safety and Reclamation Code for Mines in British Columbia; ■ include detailed designs for all project components and phases of mine life, detailed engineering designs, management plans and monitoring programs; and ■ ensure the health and safety of mine personnel and the public as well as the protection and reclamation of the land and watercourses affected by mining activities. <p>To prepare for permitting, model updates must be undertaken (e.g., surface water quality model, site wide water balance model, groundwater model) and model results considered in the <i>Mines Act</i> and <i>Environmental Management</i></p>

#	SkeenaWild	KSM Mining Response
		<p>Act applications and inform management plans (see 2019 <i>Joint Application Information Requirements for Mines Act and Environmental Management Act Permits</i> in Appendix C of the KSM Mining Comment Response Report. Model updates will incorporate all relevant data that has been collected for the Project. Permit applications will also take into account recommendations from the KSM Project Independent Geotechnical Review Board, established by KSM Mining in 2015, with respect to the design of major infrastructure.</p>
3	<p>Failure to consider recommendations of the Mount Polley Independent Expert Investigation and Review Panel</p>	<p>Subsequent to the Mount Polley tailing breach, KSM Mining completed a BAT study in 2016 to review the Project's proposed TMF and evaluate alternate tailings management technologies based on Environment and Climate Change Canada's Guidelines for the Assessment of Alternatives for Mine Waste Disposal and the recommendations of the Independent Expert Engineering Investigation and Review Panel Report of the Mount Polley Tailings Storage Facility Breach. The multiple accounts analysis in the BAT study identified the same option as selected in the KSM Project Application for an Environmental Assessment Certificate/Environmental Impact Statement (2013) – the Teigen-Treaty Cyclone Sand TMF – as preferred in comparison with filtered tailings options. The Teigen-Treaty Cyclone Sand TMF is the preferred option because it: has the lowest impact on environmental considerations; is the most technically feasible to construct, operate and close in a safe manner; has the fewest associated socio economic concerns; and is the best strategy to manage overall risk throughout the life of the Project.</p> <p>The BAT study was independently reviewed by a former member of the Mount Polley Independent Expert Engineering Investigation and Review Panel (Dr. Dirk van Zyl), who supported the study's conclusions. The study is publically available on the KSM Project website and was shared with Indigenous nations and stakeholders, including the State of Alaska found here: https://ksmproject.com/bat-report/</p> <p>The revised 2017 Health, Safety and Reclamation Code for Mines in British Columbia (Code) reflects the culmination of almost two years of work undertaken by a Code Review Committee and two technical sub-committees on tailings storage facilities and health and safety. These committees included representation from industry, labour and Indigenous Nations. The 2017 Code includes updates to address the seven recommendations from the Mount Polley Independent Expert Engineering Panel and the recommendations of the Chief Inspector of Mines investigation into the Mount Polley tailing pond breach. The revisions include enhanced validation of safety and regulation of all phases of a TSF (all mines in BC with TSFs must have an Independent Tailings Review Board) and improved dam safety guidelines.</p> <p>KSM Mining established an Independent Geotechnical Review Board in 2015, consistent with current Code requirements, which has met and reported annually since inception. Table 5.1-2 in the Extension Application identifies how KSM Mining is addressing changes to the Code.</p>

#	SkeenaWild	KSM Mining Response
4	Lack of operationally proven treatment technology for selenium	<p>The environmental assessment predicted no residual environmental effects on water quality. Selenium concentrations at the Alaska border are predicted to stay below BC Water Quality Guidelines during all Project phases.</p> <p>The Project has mitigated possible downstream water quality exceedances in Alaska by, among many other things:</p> <ul style="list-style-type: none"> ■ siting the TMF within the Bell Irving watershed (not the Unuk watershed), which flows into entirely Canadian waters; ■ utilizing conservative water quality models; ■ developing a Groundwater Monitoring and Mitigation Plan, a Water Management Plan, a Selenium Management Plan, and an Aquatic Effects Monitoring Plan which will provide for monitoring and adaptive management; and ■ developing water treatment facilities and a seepage collection system. <p>KSM Mining is continuing to improve the Project design beyond the Certificate requirements including: identifying improved water management and water treatment approaches for the Project, which has included research into world-class selenium treatment methods, in partnership with BQE Water and the University of British Columbia. The research team recently registered a patent with the United States Patent and Trademark Office.</p> <p>KSM Mining disagrees that the proposed water treatment methods are unproven. KSM has proposed two primary methods:</p> <ul style="list-style-type: none"> ■ High Density Sludge (HDS) is a lime addition treatment method, with the technology in use for over 60 years at site located throughout the world. ■ SELEN IX™ for selenium removal. KSM Mining piloted the viability of this treatment method at KSM in 2014 when a pilot water treatment plant trial was conducted (Condition 18 of the Certificate). Approximately 30,000 gallons of water from Mitchell Creek was transported to Richmond, BC, where it was modified to represent the range of expected water quality and conditions for seepage from the Mitchell/McTagg RSF. The pilot demonstrated the capability of Selen-IX™ to remove Se to below 1 ppb (BioteQ Environmental Technologies 2015; Appendix B5 of the KSM Mining Comment Response Report). <p>Subsequent to 2015, the SELEN IX™ Treatment Technology has been trialed at many sites throughout Canada and the USA and most recently a SELN IX™ water treatment plant was installed at a BC mine site in late 2019.</p>
5	Inadequate consultation and engagement with affected Indigenous groups, including downstream Alaska Tribes during the environmental assessment	<p>In approving the environmental assessment, each of the federal and BC governments concluded that: KSM Mining conducted significant, meaningful engagement with all interested parties, including Alaskans; Alaskans' concerns were properly addressed and mitigated during the environmental assessment processes; and the Project would have no residual environmental effects on water quality in the Unuk River in Alaska (CEA Agency 2014 and EAO 2014b).</p> <p>KSM Mining discussed the variance request with the Nisga'a Lisims Government and Tahltan Central Government before submitting the Extension Application. The proposed extension was also discussed with the EAO and the Ministry of Energy, Mines and Petroleum Resources (now named the Ministry of Energy, Mines and Low Carbon Innovation). KSM Mining also wrote to Indigenous Groups (Nisga'a Lisims Government, Tahltan Central Government,</p>

#	SkeenaWild	KSM Mining Response
		<p>Gitxsan Chiefs' Office, Gitanyow Hereditary Chiefs and Tsetsaut Skii km Lax Ha) to advise that additional time was required due to the impacts of the COVID-19 pandemic on the Project's operations. The Office of the Gitxsan Hereditary Chiefs has written to the EAO to indicate its support for the Certificate extension. KSM Mining provided a draft copy of the Extension Application to Indigenous Groups for review and comment on July 17, 2020. No comments were received on the draft Extension Application from the Indigenous groups.</p> <p>In response to a Southeast Alaska Conservation Council (SEACC) complaint submitted in 2016, Canada's National Contact Point ("NCP") concluded in 2017 that the environmental assessment review process for the KSM Project did not merit further examination and closed the file after the initial assessment level of review (see case overview and status found here: https://complaints.oecdwatch.org/cases/Case_487).</p> <p>The NCP operates within the Canadian Department of Foreign Affairs and promotes adherence to the Organization for Economic Co-operation and Development's ("OECD") non-binding Guidelines for Multinational Enterprises (the "Guidelines").</p> <p>SEACC asserted that Seabridge violated the Guidelines by failing to disclose KSM project documents and engage appropriately with stakeholders in Alaska and that the company had not exercised sufficient due diligence regarding potential environmental and human rights impacts of the KSM Project. The NCP found that the KSM Project was subject to a rigorous and detailed environmental assessment process by both the federal and provincial governments. In its statement, the NCP reports that in its investigation into the complaint, which commenced in January of 2017, it discovered:</p> <ul style="list-style-type: none"> ■ • Seabridge had disclosed all of its relevant studies and plans related to the environment; ■ • federal and provincial environmental assessment agencies conducted public consultations; ■ • evidence that Seabridge had also engaged with Alaskans at multiple points during the environmental assessment process despite no legal requirement to do so; ■ • the federal and provincial environmental assessment review processes included examination of all potential negative impacts and identification of mitigation measures where needed; ■ • evidence that the concerns of stakeholders had been integrated into the environmental assessment process and ultimately had led to important changes in KSM Project design.
6.	Lack of baseline information and impact prediction beyond the BC/Alaska border in the environmental assessment	<p>Seabridge initiated comprehensive baseline data collection from 2007 and this data collection continues today. Water quality baseline data from 2007 to 2012 was included in the Application (Seabridge 2013). Baseline data has not been collected beyond the Alaskan border because: Seabridge has no authority under Canadian and US laws to collect baseline data within Alaska. Seabridge offered Alaskan Tribal representatives funding to do water quality sampling in the lower Unuk River area; the Tribes did not accept or respond to Seabridge's offer. KSM Mining has shared its Unuk River baseline data with the State of Alaska.</p>

6. RESPONSE TO FREDERICK OLSEN JR. COMMENTS

Table A6: Response to SEITC Comments Dated December 2, 2020

#	Olsen Comment	KSM Mining Response
1	COVID-19 impact on Project 2020 field programs	<p>KSM Mining has not yet applied for and obtained the necessary authorizations to construct and operate the mine. The start of the 2020 field programs was delayed in order to identify and put in place measures to respond to BC government COVID-19 requirements and to safeguard the well-being of contractors, employees and communities in which KSM works. The scope of the programs was substantially reduced to comply with pandemic restrictions.</p> <p>The camp capacity was reduced by 50% which resulted in:</p> <ul style="list-style-type: none"> ■ The Mitchell Treaty Tunnel drilling program was reduced from 40 to 10 holes, which has delayed geotechnical, geological and metallurgical data collection required for Feasibility Study and the <i>Mines Act</i> permit application; and ■ Reduced scope for environmental field programs. <p>Collectively, these changes have delayed or will delay KSM Mining's ability to undertake a final Feasibility Study, which is necessary to justify the next stage of Project investment.</p> <p>The pandemic has made engaging with Indigenous groups challenging. Most communities are understandably unwilling to allow visitors, and adequate digital infrastructure is not always available to conduct these processes remotely. Most Indigenous communities have also requested more time to review draft permit applications and other regulatory materials due to the challenges caused by the pandemic.</p> <p>Given the current state of the pandemic, KSM Mining anticipates the current COVID-19 restrictions and the rise of the new COVID variants will also impact the 2021 field programs.</p>
2	Inability to attract investor	<p>The Project requires a joint venture partner with the financial and technical capacity to finance, construct and operate the Project. The pandemic has temporarily interrupted KSM's negotiations with prospective partners.</p> <p>Two potential partners planned to make a joint venture proposal in March 2020. No proposal was made as a result of the pandemic. Each of the prospective partners indicated they could not continue their negotiations with KSM in 2020 until the global economy has stabilized. Although gold prices have done well, base metals such as copper (which is particularly important to KSM) have suffered from slow demand.</p> <p>The second wave of the pandemic has begun, and pandemic restrictions are expected to last another 18-24 months. A third wave of the pandemic is appearing likely.</p> <p>Grant Thornton's (2021; Appendix B3 of KSM Mining Public Comment Response Report) assessment found that COVID-19 has impacted the mining industry as follows:</p> <ul style="list-style-type: none"> ■ Decrease in capital expenditures and capital expenditure guidance; ■ Decrease in merger and acquisition activity; and ■ Caution in ensuring sufficient cash and credit reserves.

#	Olsen Comment	KSM Mining Response
		<p>Based on a review of seven mining companies covering a range of market capitalizations, Grant Thornton found that none of the companies completed acquisitions large enough to be disclosed in the most recent period and one company completed an acquisition in the prior year.</p> <p>BMO (2021; Appendix B2 of the KSM Project Public Comment Response Report) found that global mining companies are focused on addressing material challenges within their own businesses as a result of COVID-19:</p> <ul style="list-style-type: none"> ■ Companies are preserving capital to weather the uncertainty rather than showing optimism in pursuing investments. ■ Rather than deploy capital on external investment opportunities, companies have reduced or cut production guidance, dividends and capital spending. Specifically, several large mining companies have announced delays and suspensions to work on large-scale development projects (e.g., Teck Resources – Quebrada Blanca II and Galore Creek projects, Anglo American – Quellaveco project). ■ Companies have focused on the health and safety of their employees and the communities in which they operate. ■ A majority of companies have re-directed efforts internally and are less focused on external investment. <p>Prior crises suggest a return to normalized levels of merger and acquisitions can be prolonged, particularly for large scale projects. Further evidence of the pandemic’s financial impacts on BC northwest communities and the mining sector is provided in newspaper articles in Appendix B4 of KSM Mining’s Comment Response Report.</p>
3	Unproven water treatment technology	<p>The environmental assessment predicted no residual environmental effects on water quality. Selenium concentrations at the Alaska border are predicted to stay below BC Water Quality Guidelines during all Project phases.</p> <p>KSM Mining conducted a pilot water treatment plant using the selenium ion exchange process in 2014 (Condition 18). Approximately 30,000 gallons of water from Mitchell Creek was transported to Richmond, BC, where it was modified to represent the range of expected water quality and conditions for seepage from the Mitchell/McTagg RSF. The pilot demonstrated the capability of Selen-IX™ to remove Se to below 1 ppb (BioteQ Environmental Technologies 2015; Appendix B5 of the KSM Mining Comment Response Report).</p> <p>Subsequent to 2015, the SELEN IX™ Treatment Technology has been trialed at many sites throughout Canada and the USA and most recently a SELN IX™ water treatment plant was installed at a BC mine site in late 2019.</p> <p>The Project has mitigated possible downstream water quality exceedances in Alaska by, among many other things:</p> <ul style="list-style-type: none"> ■ siting the TMF within the Bell Irving watershed (not the Unuk watershed), which flows into entirely Canadian waters; ■ utilizing conservative water quality models; ■ developing a Groundwater Monitoring and Mitigation Plan, a Water Management Plan, a Selenium Management Plan, and an Aquatic Effects Monitoring Plan which will provide for monitoring and adaptive management; and ■ developing water treatment facilities and a seepage collection system. <p>KSM Mining is continuing to improve the Project design beyond the Certificate requirements including: identifying improved water management and water treatment approaches for the Project, which has included research into world-class selenium treatment methods, in partnership with BQE Water and the University of British Columbia. The research team recently registered a patent with the United States Patent and Trademark Office.</p>

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APPENDIX B TECHNICAL REPORTS AND ANALYSES

Appendix B1: Klohn Crippen Berger Response to Lynker KSM Dam Failures Review Memorandum (January 2021)

Appendix B2: BMO Capital Markets KSM Process and Market Update (November 2020)

Appendix B3: Grant Thornton Impact of COVID-19 Pandemic on Environmental Assessment Certificate M14-01 and the KSM Project (January 2021)

Appendix B4: Compilation of Newspaper Articles regarding COVID-19 Impacts on Northwest BC Communities and the Mining Sector

Appendix B5: BioteQ Environmental Technologies Final Data Report – Pilot Demonstration of Selenium Removal from KSM Seepage Using Selen-IX™

Appendix B6: Blakes Memorandum related to the Jurisdiction of British Columbia Minister of Environment to Issue Emergency Variation Order to Allow the CEAO to Extend Deadline in Environmental Assessment Certificate (February 2, 2021)

KSM PROJECT

Application for an Extension of Environmental Assessment
Certificate M#14-01: Comment Response Report

**APPENDIX B1 KLOHN CRIPPEN BERGER RESPONSE TO LYNKER KSM DAM
FAILURES REVIEW MEMORANDUM (JANUARY 2021)**

January 25, 2021

Seabridge Gold Inc.
106 Front Street East, Suite 400
Toronto, Ontario
M5A 1E1

Brent Murphy
Senior Vice President, Environmental Affairs

Dear Mr. Murphy:

**KSM Project Application for an Extension of Environmental Assessment Certificate M#14-01
Response to Lynker Memorandum: KSM Dam Failures Modelling Review**

1 INTRODUCTION AND SUMMARY

Klohn Crippen Berger Ltd. (KCB) was requested by Seabridge Gold Inc. (Seabridge) to respond to the November 24, 2020 comments submitted by Lynker Technologies LLC (Lynker) regarding the Dam Breach Assessments (DBAs)¹ of the Tailings Management Facility (TMF) for the KSM Project. Lynker was retained by the Gitanyow Hereditary Chiefs to review the modelling results related to a hypothetical dam failure. Lynker qualify their report as a *“focus on the model and assumptions used, the parameters and data used to feed the model, and the general results of the modeling studies that were used for the 2012 KCB assessment.”*

Seabridge acknowledges that a breach of a TMF dam would have catastrophic consequences and have incorporated a high level of governance and technical oversight to reduce the risk of a dam failure. Review of the governance and technical design of the KSM Project was an integral part of the federal and provincial environmental assessment (EA) review process. As the KSM Project proceeds into *Mines Act* permitting, dam breach studies will be reviewed and updated to reflect the current state of practice.

Summary

This letter provides a discussion of the state of practice of DBAs and addresses Lynker’s comments. Lynker’s comments suggest that the KSM DBAs may not have followed good practice and that the KCB modeling underestimates the consequences of a failure. Based on a review of Lynker’s comments, KCB’s opinion is that the KCB 2012 DBA² is consistent with current practices and provides a defensible assessment of the potential consequences of a hypothetical failure. Lynker’s suggestions

¹ Lynker Technologies LLC. 2020. “KCB Dam Failures Modelling Review”. November 24.

² Klohn Crippen Berger. 2012. “KSM Project Dam Break and Inundation Study for Tailings Management Facility”. October 15.

are not well supported and their opinions are only partially based on the evolving state of practice of DBAs.

Over the last 3 years, KCB has participated in the review of over 40 DBAs from various reputable consultants in over 10 countries. These DBAs use a wide range of hydrodynamic models and assumptions with respect to potential release volumes. While the state of practice for hydrodynamic modeling has been evolving over the years, the state of practice for incorporating the geotechnical properties of the tailings is in its infancy, and many consultants do not consider the differences in tailings properties, or the volume of stored water that can transport tailings during a dam failure. Unlike the common practice for many DBAs, the KCB 2012 DBA for KSM considered the geotechnical properties of the tailings and the volume of stored water. The hydrotechnical model used a conservative water/tailings transport volume and the geotechnical model assessed a “mudflow” runout of tailings, both of which are defensible methodologies.

The biggest challenge and unknown in DBAs is estimating the volume of tailings to input into the hydrodynamic model. Lynker’s suggestion (noted below) that the model should assume that 100% of the tailings would be released, is not realistic and KCB believe that the Mount Polley dam failure is a more representative of example of what could happen.

This opinion is based on the KSM tailings having similar geotechnical properties to the Mount Polley tailings. Scaling the results of the outflow volumes from Mount Polley (20 Mm³ to 24 Mm³) suggests that a possible outcome of the KSM estimate could be a release of 80 Mm³, versus the KCB 2012 DBA estimated outflow volume of 151 Mm³. In addition, the KCB 2012 DBA also considered a piping failure scenario that included liquefaction of the tailings, which estimated a total release of approximately 278 Mm³, with 40 Mm³ occurring as a hydrodynamic flood flow. This scenario was not considered by Lynker, who suggest that “the most appropriate assumption will often be 100 % of the tailings” (526 Mm³) and that the full volume should be input into the hydrodynamic model.

KCB’s opinion is that the KCB 2012 DBA for the KSM TMF represents what could potentially happen in the event of a dam failure. As the state of practice continues to evolve, the models used to simulate both the geotechnical and water transport mechanisms will also evolve.

2 STATE OF PRACTICE FOR DAM BREACH ANALYSIS

The state of practice for DBAs of tailings dams is changing as our understanding of dam breach mechanisms matures, and most designers use a hybrid of water dam practices along with observations from past tailings dam failures. Some important points on the state of practice are noted as follows:

- Many of the failures in the Rico³ database are dams that were more susceptible to catastrophic erosion because the tailings within the structural zone of the dam were not compacted. Compacted tailings dams, such as the design for the KSM TMF, provide

³ Rico, M., G. Benito, A. Diez-Herrero. 2008 “Floods from Tailings Dam Failures”. *Journal of Haz. Materials*. Pp 79-87.

improvements in dam breach behaviour. **More importantly, the historical data do not account for volumes of water at the time of failure, the geotechnical properties of the tailings, or the geotechnical mechanisms of failure.**

- There is a wide range of types of tailings and their respective geotechnical and flow properties. ICOLD (Draft 2019 - currently being published) identify five types, from finest grain sized to coarsest grain size: Ultra Fine (UFT), Fine (FT), Altered Rock (ART), Hard Rock (HRT), and Coarse (CT). Most copper-gold deposits in North America, such as KSM, fall in the HRT category. Examples of ART copper-gold projects are common in Peru and Chile and have a higher degree of alteration associated with the deposits. The iron ore slimes that were released in the Fundão and Feijão failures in Brazil are classified as “Fine Tailings”, which are much more susceptible to flow, and are much finer grained than KSM. The susceptibility to flow of different types of tailings is further described in the section on static liquefaction and mudflow below. The Rico database does not distinguish between types of tailings.

Dam Breach Progression

A dam breach progression involves two distinct mechanisms, outlined below, which sometimes happen concurrently or progress such that it is challenging to identify the transition between the two mechanisms.

Water transport/erosion of tailings

The first mechanism is erosion of tailings (and dam fill) during release of the free water pond on the surface of the tailings. An example of this is an overtopping failure, such as what occurred at Mount Polley in 2014. The solids concentration in the outflow reflects the volume of tailings eroded per volume of water. The solids concentration by weight will vary from very low at the start of the failure before increasing until it reaches in the order of 65% solids by weight and starts behaving as a non-Newtonian flow, sometimes described as mudflow or landslide-flow.

Recent experience with back-analyses of the Mount Polley failure indicated that approximately 1 m³ of tailings was transported for each 1 m³ of stored water⁴. This ratio indicates that the average solids density of the combined released flow is could be on the order of 50% solids by weight, which is a reasonable estimate considering that flow would have started as mainly water and increased to a maximum of approximately 65% solids by weight. Mount Polley had approximately 10 Mm³ of free water and the tailings release volume was approximately 10 Mm³ to 14 Mm³.

Static Liquefaction and Mudflow

The second mechanism is controlled by the geotechnical properties of the tailings. As water and tailings are released by erosion (the first mechanism), the static stresses in the remaining tailings may increase and lead to static liquefaction of the tailings. Mudflow may occur due to static or seismic

⁴ Chief Inspector of Mines Investigation Report on Mount Polley, 2015

liquefaction. In addition, steepened eroded slopes may have a factor of safety (FOS) less than 1.0 and fail by slumping.

Mount Polley had limited mudflow and the residual slopes within the impoundment were up to 2H:1V. Static liquefaction, which is the mechanism that leads to flow failure, is influenced by the amount of water within the voids of the saturated tailings particles (void ratio), which can be characterized with the geotechnical parameter referred to as the Liquidity Index (LI). Generally, a LI less than 1.0 is less susceptible to flow and a LI greater than 1.0 is more susceptible to flow. LI values of 2.0, such as the Fundão tailings slimes, are very susceptible to flow. It is important to note that the Lynker review did not consider the geotechnical properties of the tailings.

The KSM tailings stored within the impoundment are expected to have similar properties to the Mount Polley tailings, with a LI of less than 1.0.

Summary

It is KCB’s opinion that the common practice suggested by Lynker, of assuming an arbitrary release volume, is not good professional practice, can not be supported, and does not recognize the hydrotechnical and geotechnical mechanisms. Excellent research is being conducted to better understand the hydrodynamic and geotechnical mechanisms, for example, the work by CanBreach (Canadian Tailings Dam Breach Research), a consortium of Canadian universities, consultants, and industry, of which KCB is an active participant. Many practitioners recognize the challenges with DBAs and the complexity of geotechnical and hydrotechnical processes, and as the state of practice improves, the reliability of dam breach models will improve correspondingly.

3 REVIEW OF KSM DAM BREACH ANALYSES

Summary of KSM Dam Breach Cases

KCB’s approach to the KSM 2012 DBA was to consider both the hydrotechnical model and a mudflow estimate. The hydrotechnical models assessed a “rainy-day” overtopping event and a “sunny-day” piping event. Key parameters for the TMF North Dam are summarized in Table 3.1 as an example to support this discussion. KCB considered a mudflow volume estimate that could theoretically occur assuming liquefaction of the tailings combined with failure of the dam. The mudflow would settle in the flatter sections of the valley floor immediately downstream of the dam.

Table 3.1 Summary of KCB Dam Breach Volumes – TMF North Dam

Case	Stored Tailings (Mm ³)	Hydrodynamic Model Volumes (Mm ³)			Mudflow Estimates (Mm ³)
		Stored Water	Tailings Release	Tailings and Water Release	Tailings release
Rainy-Day Overtopping	526	42	109	151	Included in the hydrodynamic model
Sunny-Day Piping	526	13	25	38	240

Case Example – Mount Polley Failure

Mount Polley is a good case example of an overtopping failure and can be compared to the rainy-day overtopping case for the KSM TMF. Comparisons between Mount Polley actual and KSM TMF North Dam estimates are shown in Table 3.2. The table also includes a column of what could be a more realistic estimate of the KSM TMF dam breach assessment if the Mount Polley failure behaviour were to be applied to the KSM TMF rainy-day overtopping case.

Table 3.2 Comparison of KSM Dam Breach Parameters to Mount Polley

Parameters	Mount Polley (Estimates of Actual)	KSM TMF North Dam ⁵ (from KCB 2012 DBA)	Potential KSM Estimate Scaled to the Mount Polley Dam Breach ³
Height (m)	40	218	n/a
Volume tailings stored (Mm ³)	74	526	n/a
Volume water stored (Mm ³)	10	42 (includes 30-day PMF ⁶)	n/a
Dam type	Centerline: till core with 1.3H:1V compacted rockfill shell	Centerline: till core with 3H:1V compacted sand shell	n/a
Stored tailings type	Low plastic Hard Rock Tailings	Low plastic Hard Rock Tailings	n/a
Total tailings and water released (Mm ³)	21 ¹	151	84
Breach formation time (hours)	3 to 7 ²	6	6
Mudflow estimated volume released (Mm ³)	Estimated at about 3 Mm ³ of the total released tailings (equivalent to approximately 4% of total tailings)	240	20

Notes:

1. KCB's report titled "A Summary of Opinions in Support of CIM Investigation" (August 2015). Other estimates vary from 20 Mm³ to 24 Mm³.
2. Estimates of breach formation time are based on pump records and observations from Mount Polley employees.
3. Scaling used the approximate ratio of 1 m³ of tailings released for each 1 m³ of free water stored prior to release.
4. Shaded portion of table shows comparison of outflow volumes.
5. Table illustrates the North Dam - similar results were obtained for the DBA of the South Dam.
6. Probable Maximum Flood (PMF) volume based on 30-day probable maximum precipitation with snowmelt.

Key Observations

- The TMF North Dam breach release volumes are almost double what the Mount Polley case example would suggest, making them likely to be conservative estimates.
- KCB modelled a piping failure, although it is arguable that piping failure is not a credible failure mode as it would require movement of tailings through the compacted cyclone sand, which is not realistic due to the compatible and consistent gradations between the two materials.

- The KSM TMF modelled breach time compares reasonably well with Mount Polley estimated times.
- KSM stored tailings are classified as a **“Hard Rock Tailings” and are less susceptible to static liquefaction** than “Fine Tailings”, such as the catastrophic failures of Feijão and Fundão. With KSM, the prime mechanism is estimated to be hydraulic transport of tailings for the overtopping case, with some residual mudflow of locally liquefied tailings.
- The practice of assuming a dam breach volume based on a plot of case histories (Rico et al 2008⁵) must be used with extreme caution: the log-log plots do not illustrate the large variation between case histories and the large variation in site conditions, resulting in “apples to oranges” type comparisons. As confirmed by Lynker, historical release volumes vary from 0% to 100%, and therefore, choosing a value should not be an arbitrary decision.
- The practice of assuming that all tailings will liquefy and form a one-degree slope for both the entire dam and impoundment should also be used with extreme caution as it assumes that the compacted dam and all tailings liquefy. This is not supported by case histories of similar tailings.
- The practice of assuming 100% of the tailings released and behaves as a Newtonian **fluid is not consistent with good practice and is not supported by case histories of similar tailings.**

4 APPLICATION OF CONCURRENT FLOWS

The guidance for carrying out DBAs for the overtopping failure mode includes the assumption of extreme floods in the receiving water. The type of extreme hydrologic event (rain on snow) that would lead to infilling of the available storage volume (42 Mm³ for the North Impoundment) occurs over 30 days and would also reasonably be expected to result in flood flows in the receiving environment. The practice of basing dam consequence classifications on incremental consequences during flood-induced failures is consistent with CDA (2013) Dam Safety Guidelines⁶.

5 APPROPRIATENESS OF HEC-RAS TO SIMULATE A TAILINGS DAM FAILURE

KCB agrees that the industry is tending toward the use of hydraulic models that can simulate the non-Newtonian properties of mudflows for tailings dam failures; however, the use of these models still requires the assessment of the yield stress of the in situ tailings and the risk of static liquefaction. The state of practice for hydrodynamic modeling of dam breach outflow continues to evolve and as Lynker identified, *“the parameters and data used to feed the model”* are important. Newer models can incorporate higher solids concentrations and higher viscosities, which can start to model a mudflow or landslide-type flow; however, considerable professional judgement is still required to select the range of viscosity of the tailings and the estimated volume of released tailings.

⁵ Rico, M., G. Benito, A. Diez-Herrero. 2008. “Floods from Tailings Dam Failures”. *Journal of Haz. Materials*. pp. 79-87.

⁶ Canadian Dam Association (CDA). 2013. “Dam Safety Guidelines 2007 (Revised 2013)”.

Lynker correctly notes that newer models can incorporate the viscosity of tailings flows; however, KCB notes that the use of HEC-RAS to model the overtopping failure case for the KSM TMF is appropriate. Solids concentrations less than 20% by volume are commonly considered to behave like water and can be modelled as such using HEC-RAS. During the rainy-day failure event, the combination of released water, tailings, and high natural flows in the receiving environment could have a solids concentration less than 20% along most of the modelled reaches of the receiving streams and rivers.

6 MODEL SENSITIVITY

Sensitivity of model results to various parameters is a good tool for understanding the range of potential dam breach behaviour. The base case for the purposes of dam consequence classification and governance standards was to assume conservative parameters, namely maximum mobilization of tailings by the stored water, low viscosity flow, and consideration of mudflow runout into lower elevations near the dam. The KSM DBAs were reviewed by federal and provincial regulators and were used to support their EA decisions.

As KSM proceeds into Mines Act permitting, dam breach studies will be reviewed and updated to reflect current best practices and models, with due consideration of both geotechnical and hydrodynamic processes.

7 CLOSING

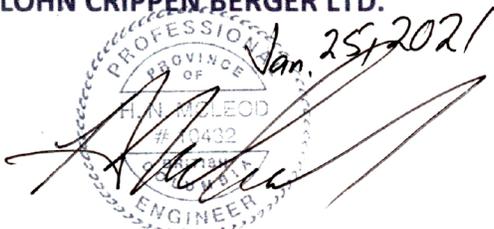
This report is an instrument of service of KCB. The report has been prepared for the use of Seabridge Gold Inc. for the specific application to the KSM Project, and it may not be relied upon by any other party without KCB's written consent.

KCB has prepared this letter report in a manner consistent with the level of care, skill and diligence ordinarily provided by members of the same profession for projects of a similar nature at the time and place the services were rendered. KCB makes no warranty, express or implied.

KCB should be consulted regarding the interpretation or application of the findings and recommendations in the report.

Yours truly,

KLOHN CRIPPEN BERGER LTD.



Harvey McLeod, P.Eng., P.Geo., MSc, D.I.C., FEC
Principal



Stephen Clark, P.Eng.
Water Resources Engineer

HM/SC/jc

Attached: Harvey McLeod: Curriculum Vitae

EXPERIENCE SUMMARY

Harvey McLeod, P.Eng., P.Geo., MSc, D.I.C, FEC

Harvey McLeod is a geotechnical engineer with over 45 years experience in mine environment and tailings projects spanning over 25 countries. He has worked directly on over 300 tailings facilities and has led environmental impact assessments on major projects in Canada and South America. As Chairman of the International Commission of Large Dams subcommittee on Tailings Dams, Harvey is instrumental in developing good practice guidance for tailings facility designers. He has directed the KCB engineering work on KSM since 2007.

H. McLeod -- Relevant experience since Mount Polley (August 2014)

- Lead technical consultant for the Ministry of Energy and Mines (MEM) investigation into the Mount Polley failure. As part of the MEM investigation team: participated in all interviews, reviewed all documentation, authored the supporting report “a Summary of Opinions in Support of CIM Investigation”, August 2015.
- Chairman of the Code Sub-committee responsible for revising the tailings facility components of the Health, Safety and Reclamation Code for Mines in British Columbia. Worked with committee member (First Nations, Unions, Operators, Regulators and Legal) to develop a Code that requires adherence to good design and good governance of tailings facilities.
- Chairman of the Engineers, Geoscientists of British Columbia (EGBC) Committee to prepare the Guideline for Dam Foundations, which was a recommendation arising from the Expert Panel Report on Mount Polley.
- Conducted Dam Integrity Reviews for approximately half of the major mines owned by BHP.
- Program Lead for Dam Safety Assurance assessments for Glencore’s tailings and water storage facilities, which include over 140 tailings facilities which include over 400 dams, worldwide.
- Member of the Expert Review Panel for the Global Industrial Standard for Tailings Management (GISTM).
- Chairman of the ICOLD Subcommittee on tailings dams responsible for two key Bulletins:
 - ◆ Tailings Dam Design – Technology Update, currently being published; and
 - ◆ Tailings Dam Safety – Bulletin provides guidance for good design and good governance of tailings facilities – Draft stage for internal ICOLD member review.
- Principal adviser to BHP for their ongoing Risk Reviews of major tailings facilities.
- Advisor to Vale for development of Risk Assessment and Controls procedures and senior reviewer for KCB implementation of risk assessments at over 20 tailings facilities in the Americas.
- Senior review of dam safety assurance assessments for Anglo America Chilean operations.

- Advisor to the British Columbia Auditing Committee, which is currently auditing the HSRC Code and developing auditing processes for tailings facilities.
- Member of the CANBREACH research program which is researching and developing best practice procedures for dam break assessments.
- Technical review of dam break assessments for the over 140 tailings facilities owned by Glencore.

**APPENDIX B2 BMO CAPITAL MARKETS KSM PROCESS AND MARKET
UPDATE (NOVEMBER 2020)**

SEABRIDGE GOLD

KSM Process and Market Update

November 2020

BMO  Capital Markets®

KSM Partnering Process Update

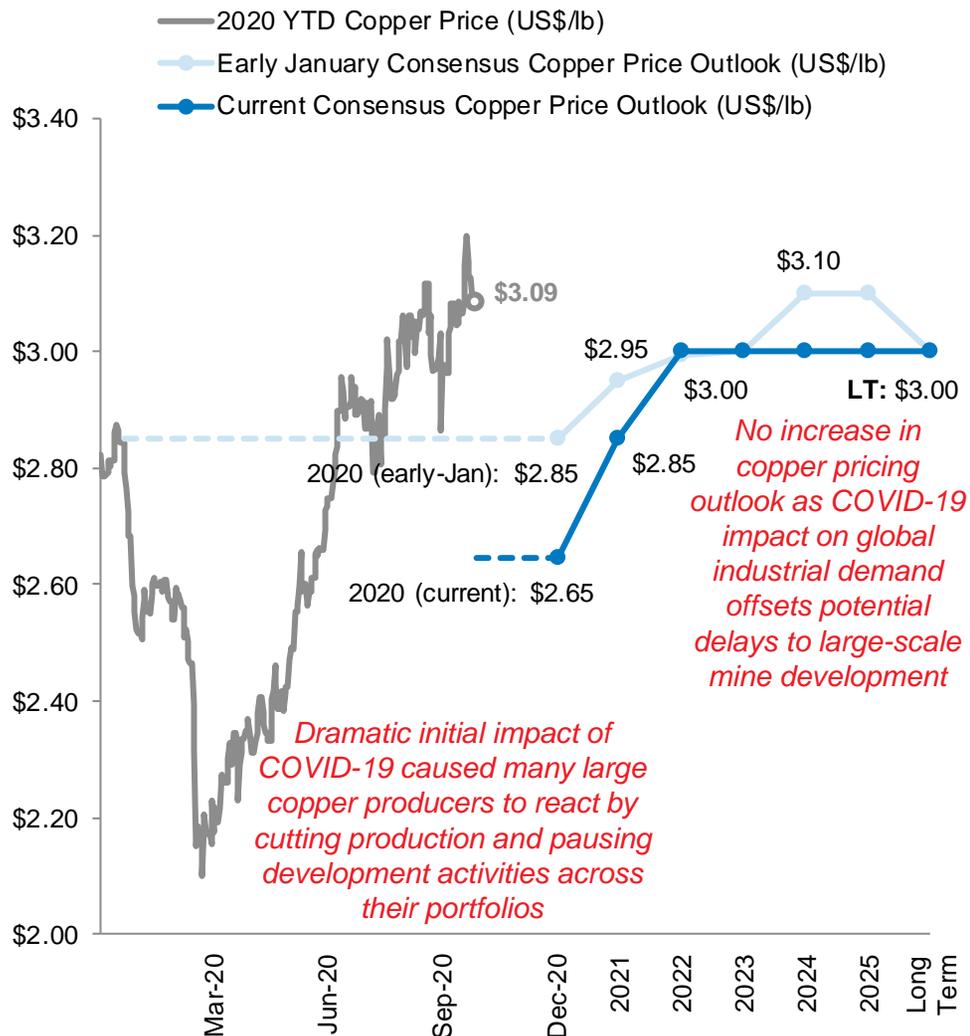
- BMO Capital Markets (“BMO”) was retained by Seabridge Gold (“Seabridge” or the “Company”) in July 2019 to assist in securing a joint venture partner for advancing the Company’s KSM project, located in northwestern British Columbia
- Between Q3 2019 and April 2020, Seabridge was engaged in dialogue with two counterparties interested in partnering with Seabridge to advance KSM; dialogue was primarily focused on technical aspects of advancing the KSM project in partnership
 - An initial meeting between Seabridge and the two potential partners occurred in November 2019
 - In January 2020, Seabridge hosted a technical workshop focused on specific aspects of the project identified by the two counterparties as being of high importance to align on a plan to advance the project
 - Subsequent to this meeting, Seabridge prepared several technical presentations to assist the two potential partners in advancing their due diligence
 - Both counterparties, under non-disclosure agreements, conducted an extensive review of information provided in Seabridge’s virtual data room
- A meeting between senior corporate executives of Seabridge and the two potential partners focused on commercial aspects of a partnership to advance the KSM project was hosted at BMO’s Global Metals & Mining Conference in Miami in February 2020
 - In concluding the meeting, the two potential partners indicated they would plan to share a proposed transaction framework in March 2020
- On March 23, 2020, shortly following the declaration of COVID-19 as a global pandemic, advanced discussions with the two potential partners were suspended at an in-person meeting between Seabridge Gold and lead representatives of the two counterparties
 - These discussions were revisited in June 2020, in the context a partial recovery from the initial market shock of COVID-19, however both parties remained internally focused on their own operations and large scale M&A is not a priority in the current environment

Sector Context

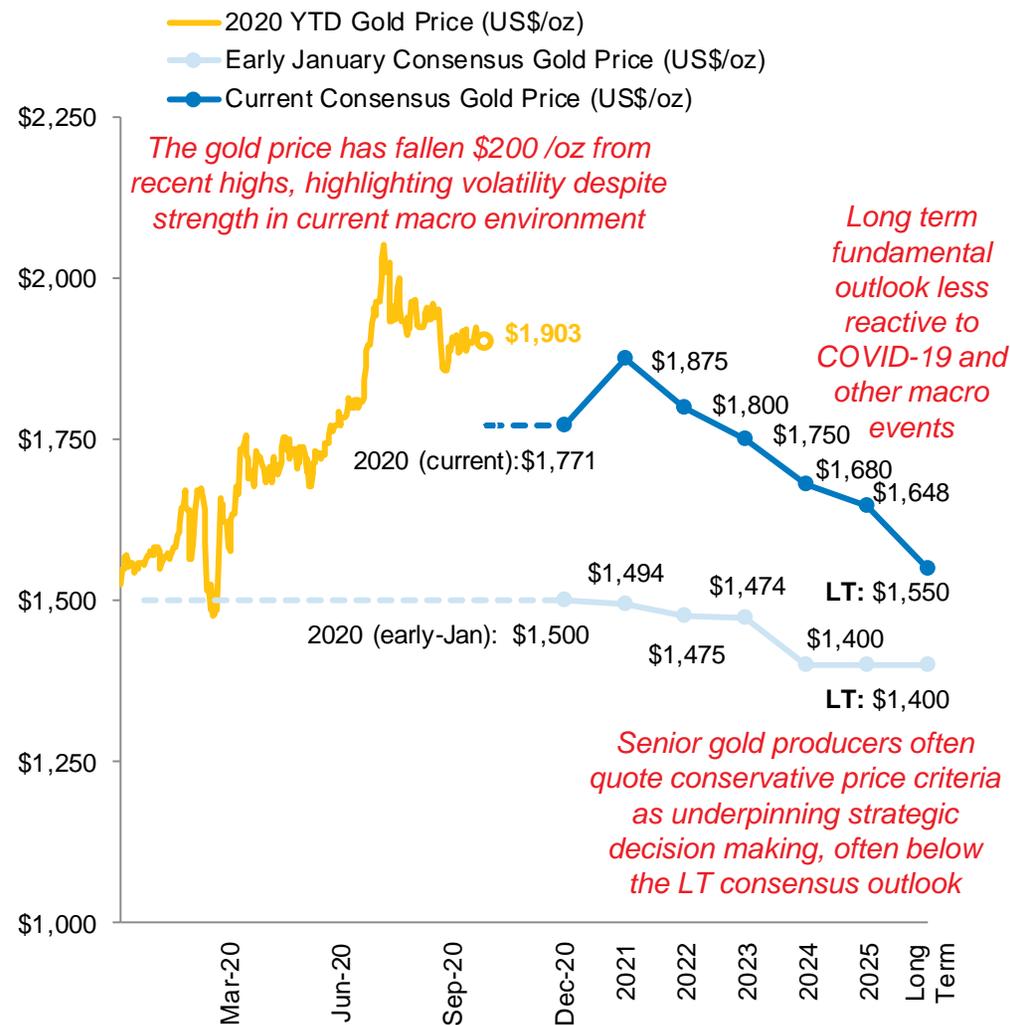
- KSM is the world's largest undeveloped copper-gold project by reserves, located in a tier 1 mining jurisdiction with established infrastructure, a stable regulatory and tax regime and access to a skilled workforce
 - When in production, KSM will be a world-class operation and among the largest-scale, lowest costs mines in the world
 - KSM can deliver multi-generational economic benefit to British Columbia and Canada through employment, tax revenues and infrastructure
 - Seabridge has established a strong social license with local communities, including the signing of IBA's with the Nisga'a and Tahltan Nations, and the documented support of the Gitxsan Hereditary Chiefs Office
- Given its large scale and capital requirements (pre-production capital of US\$5.2 billion), there are a select number of counterparties who are technically and financially capable of partnering with Seabridge
 - The large copper companies are better positioned than gold companies to build and ultimately operate a project of KSM's scale
- The COVID-19 pandemic continues to have an impact on global financial markets, resulting in increased uncertainty and volatility
 - Gold price and gold equities have performed strongly as investors flock to gold as the 'safe haven' asset, though physical operations remain impacted; despite strong gold pricing, companies rightly continue to focus on a conservative price outlook for long term strategic decision making
 - Base metals, and copper in particular, suffered a dramatic initial shock to pricing that prompted an operational and strategic response from the majority of miners, and demand will continue to suffer as economies around the world are impacted for the foreseeable future
 - Given KSM's significant exposure to both gold and copper, this dynamic between the two commodities presents challenges when potential partners assess KSM's economics
- Potential partners evaluating the KSM opportunity have faced material challenges within their own businesses as a result of COVID-19
 - Their key focus remains the health and safety of their employees and the communities in which they operate
 - Rather than deploy capital on external investment opportunities, these companies have reduced or cut production guidance, dividends and capital spending
 - Specifically, several large mining companies have announced delays and suspensions to work on large-scale development projects (e.g., Teck Resources - Quebrada Blanca II and Galore Creek projects, Anglo American - Quellaveco project)
- Majority of companies have re-directed efforts internally and are less able to focus on external investment or M&A
 - M&A that has occurred in the COVID-19 period has been weighted towards precious metals and producer-stage transactions, substantially different in nature than the opportunity offered by KSM
 - Of transactions that have come to market, many benefited from specific circumstances to facilitate execution in the current environment (e.g., well advanced prior to full impact of COVID-19, companies with pre-existing strategic relationships, or less impacted with respect to travel and other COVID-related restrictions)
 - Prior crises suggest a return to normalized levels of M&A can be prolonged, particularly for large scale projects

Copper & Gold Price Performance

COPPER PRICE AND STREET CONSENSUS OUTLOOK



GOLD PRICE AND STREET CONSENSUS OUTLOOK

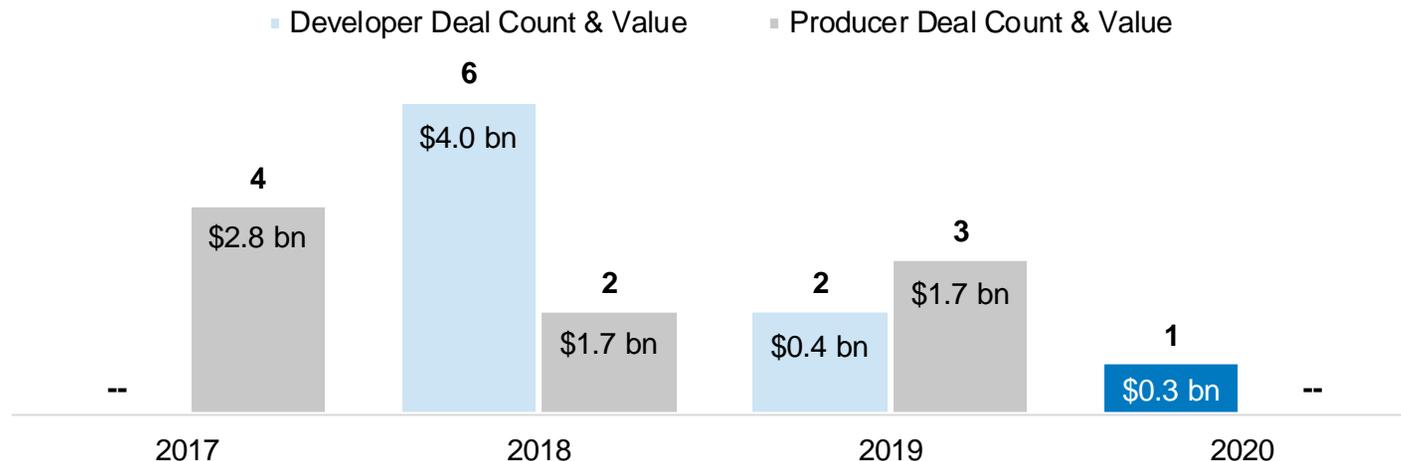


Spot prices have improved but remain volatile; corporate decision making, particularly for large development projects, remains founded on a price outlook that can be robust through the cycle

Source: FactSet, street research

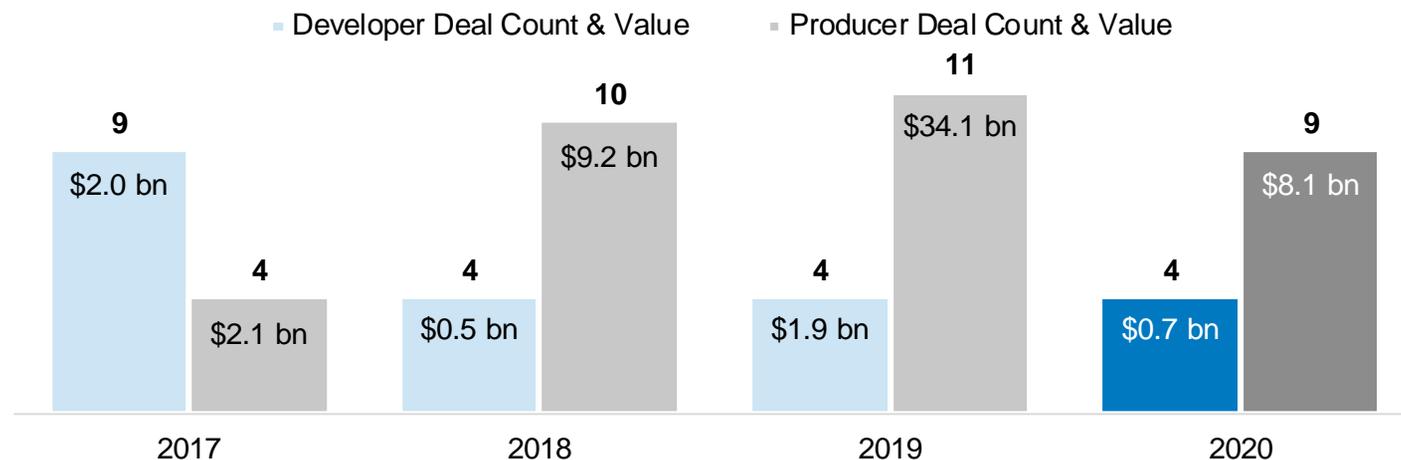
M&A Activity in Context

BASE METALS M&A SINCE 2017



- Base metals M&A activity has continued to decline with just one transaction announced in 2020
 - Mitsubishi / 30% Mantoverde, announced pre-COVID impact (Feb-20)
- Represents a historically low year for both number and value of base metals transactions

PRECIOUS METALS M&A SINCE 2017



- Precious metals transactions have continued to be strongly skewed toward producers in 2020
- A number of transactions would have been well advanced prior to COVID-19
 - Endeavour / SEMAFO (Mar-20)
 - Argonaut / Alio (Mar-20)
- More recent transactions have had circumstances necessary to facilitate a transaction at the current time
 - Northern Star / Saracen (Oct-20, Australia-only, existing partners)

M&A activity has been skewed towards precious metals, and producing assets, with base metals M&A at historically low levels

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All values in this document are in US\$ unless otherwise specified.

**APPENDIX B3 GRANT THORNTON IMPACT OF COVID-19 PANDEMIC ON
ENVIRONMENTAL ASSESSMENT CERTIFICATE M14-01 AND
THE KSM PROJECT (JANUARY 2021)**



SEABRIDGE GOLD

KSM Mining ULC

A subsidiary of Seabridge Gold Inc.

**Impact of COVID-19 pandemic on Environmental
Assessment Certificate M14-01 and the KSM Project**

January 12, 2021



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Trends observed through COVID-19 pandemic period	
Industry trends	
6) Concluding Remarks	Pg 32
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1) Background

Background

Purpose of this report:

Grant Thornton's mandate, and the purpose of this report, is to provide an objective third-party assessment of the impact the COVID-19 pandemic has had on:

- The mining industry globally and in Canada
- Capital investment activity and guidance
- Merger & acquisition, joint venture, and partnership activity

2) Executive Summary

Executive Summary

Grant Thornton's assessment shows that the COVID-19 pandemic's volatility and uncertainty has had a negative impact on the mining industry in the following areas:

- Decrease in capital expenditures and capital expenditure guidance
- Decrease in merger & acquisition activity
- Caution in ensuring sufficient cash and credit reserves

Our research supports Seabridge's assertion that the onset of the pandemic has impacted their ability to secure a deal in 2020 and into 2021.

3) Project Approach & Methodology

Project Approach

Our analysis approach was twofold:

1. Cash flow and balance sheet analysis of 7 mining companies in similar markets and profiles*
2. Industry research and report analysis

This approach allowed us to:

- Benchmark against representative mining companies
- Understand specific actions taken by these companies during the pandemic
- Quantitatively measure against historical industry trends
- Evaluate industry experts' opinions

*All financial information was obtained through public exchange filings

Project Approach

A list of 13 target companies was chosen for initial analysis at which time their market capitalization, commodities, markets, and assets in Canada were assessed (Appendix A – Slide 35). The companies were then grouped based on their market capitalization in \$USD to better identify the companies to analyze at each level.

Preference was given to companies with assets in Canada and that mine both gold and base metals.

From this list, we selected 7 companies covering a range of market capitalizations*:

- Broken Hill Proprietary (BHP) Company Limited (\$172.46B)
- Rio Tinto Limited (\$98.06B)
- Newmont Corporation (\$50.57B)
- Barrick Gold Corporation (\$43.46B)
- Agnico Eagle Mines Limited (\$17.96B)
- Kinross Gold Corporation (\$9.96B)
- Coeur Mining, Inc. (\$2.615B)

*Market capitalizations as of January 5, 2021

Project Approach – Methodology

For each company, we analyzed the following indicators and ratios from their:

Cash Flow Statement*:

- Purchase of property, plant and equipment
- Acquisitions
- Proceeds on financing

Balance Sheet*:

- Total assets
- Current liabilities
- Non-current liabilities
- Equity

*All financial information was obtained through public exchange filings

4) EcoJustice Opinion

EcoJustice Opinion

October 15, 2020

The EcoJustice opinion addresses the following issues:

1. Can the Minister, through s. 46, override the explicit prohibition in the Environmental Assessment Act (the “EAA”) against extending the deadline to substantially start a project more than once?
2. If an environmental assessment certificate (“certificate” or “EAC”) may be extended a second time under s. 46, what are the appropriate considerations for evaluating that request?
3. If a certificate may be extended a second time under s. 46, does the information provided in the application support granting that request?
4. Would issuing an emergency order in these circumstances undercut the public interests protected by the EAA and pose a threat to the Act’s integrity?

In response to item 3, the opinion states “Under scrutiny, the concerns raised by KSM appear to be much less pressing than claimed in the application materials.” This section addresses metals prices, the mining industry and impediments of COVID-19.

Our report addresses Item 3, specifically regarding the negative impacts of the COVID-19 pandemic on the mining industry, business confidence in mining and the actions taken by industry players in response to the pandemic.

EcoJustice Opinion – Metals Price

Gold prices are positively correlated with implied market volatility, suggesting that gold is used as a safe haven during times of uncertainty (Jubinski, D. & Lipton, A., 2013). The increased implied market volatility demonstrated by the CBOE – VIX during the COVID-19 pandemic again demonstrates this correlation as gold prices increased (Appendix C – Slide 37).

Grant Thornton Research highlights:

Despite this positive price trend, the mining companies are preserving capital to weather the uncertainty, rather than showing optimism in pursuing investments. This is consistent with PWC's opinion that they do not expect significant acquisitions to take place that were not already in play prior to January 2020.

Jubinski, Daniel & Lipton, Amy. (2013). VIX, Gold, Silver, and Oil: How do Commodities React to Financial Market Volatility?. *Journal of Accounting and Finance*. 13. 70.

PWC. (2020). *Mine 2020: Resilient and Resourceful*. Retrieved from Mine 2020: <https://www.pwc.com/gx/en/energy-utilities-mining/publications/pdf/pwc-mine-2020.pdf>

EcoJustice Opinion – Mining Industry

Our review of the mining industry, through third party research and review of financial statements, management discussion & analysis, and presentation materials, suggests that there is reason for optimism in mining. This optimism, however, is restricted to companies who were not impacted by shutdowns or only temporarily suspended due to COVID-19.

Additionally, capital investment and mergers & acquisitions have been muted since the pandemic began and several companies noted specific moves to hold sufficient cash and credit available to weather uncertainty.

EcoJustice Opinion – Mining Industry

Market reviews of the impact of COVID-19 suggest both an increase in risk in mining companies, as expressed through beta, and general caution when it comes to growth activities financed by debt.

This further supports Seabridge’s assertion of the impact of the pandemic on mining, impacting business confidence and investment in new projects.

Horstmeyer, D. & Vig, C.M. (2020). *Stocks Turned Upside Down? The COVID-19 Beta Effect*. Retrieved from <https://blogs.cfainstitute.org/investor/2020/07/14/stocks-turned-upside-down-the-covid-19-beta-effect/>

Hammond, J. (2020). *Aswath Damodaran on Valuations amid COVID-19: “Go Back to Basics”*. Retrieved from <https://blogs.cfainstitute.org/investor/2020/05/29/aswath-damodaran-on-valuations-amid-covid-19-go-back-to-basics/>

"Of the 285 companies with negative betas listed on the NYSE/NASDAQ last year, half were in the mining and extraction sector. Only 5% were in pharmaceuticals. This year, those numbers have completely reversed: Mining stocks compose just 5% of negative beta stocks, pharmaceuticals more than 50%."
(Horstmeyer and Vig, July 2020)

"Lower volatility sectors, such as mining, are now riskier in the COVID environment (higher beta). The common denominator for many of the worst affected companies was high up-front investment usually funded with debt. 'The cautionary tale coming out of this crisis is companies should be much more careful about pushing the financial leverage button to obtain growth,' Damodaran said. 'This is the dark side of debt.'" (Hammond, May 2020)

5) Research Findings

Financial indicators

Net change in (current over previous period)		Indicators Examined	
Company	PPE Purchases/ Total Assets	PPE Purchases/Total Assets	Across 4 companies, PPE Purchases / Total Assets were down which is in line with decreased spending on capital during the most recent period. In 3 cases, purchases were up. Across all companies, it was noted that purchases were primarily sustaining capital costs rather than new expansion (investment in a project such as KSM would be considered as an expansion).
Rio Tinto Ltd.	17%	Acquisitions/Total Assets	We examined Acquisitions over Total Assets, but found that of the 7 companies, 0 completed acquisitions large enough to be disclosed in the most recent period and only 1 company completed an acquisition in the prior period.
Broken Hill Proprietary (BHP) Company Ltd.	6%	Proceeds of Financing/Total Assets and Short Term Debt/Total Assets	Proceeds of Financing / Total Assets and Short Term Debt / Total Assets were examined across all companies, but were highly mixed and not a good indication of the purpose. Our examination found that some companies were increasing financing to have cash on hand, while others were paying down lines of credit to ensure credit availability. The commentary in financial statement notes and MD&A suggest that availability of cash and credit is a priority for companies to withstand uncertainty.
Newmont Corp.	-14%	Total Debt/Equity	The total Debt to Equity ratio was largely unchanged year over year for most companies.
Barrick Gold Corp.	16%		
Agnico Eagle Mines Ltd.	-26%		
Kinross Gold Corp.	-23%		
Coeur Mining, Inc.	-25%		

Trends observed through the COVID-19 pandemic period

Summary of financial trends we observed in our study of the companies we analyzed:

- Drawing down of facilities for standby due to volatility
- Reductions in capital expenditures

Drawing down facilities for standby due to volatility

Broken Hill Proprietary (BHP) Company Limited, September 2020

- Price volatility as a result of COVID-19 could impact and delay growth projects.

"As evidenced by price volatility during CY2020, there are and may continue to be potential short to medium-term impacts on certain commodity prices due to the COVID-19 pandemic that could impact values and result in growth project delays." (BHP, September 2020)

BHP. (2020). *Annual Report 2020*. Retrieved from <https://www.bhp.com/investor-centre/annual-report-2020/annual-report-2020/>

Drawing down facilities for standby due to volatility

Barrick Gold Corporation, November 2020

- The impact of COVID-19 on the mining industry is unprecedented with its future impacts still unknown.

"President and CEO Mark Bristow says while crises of one kind or another are endemic in big mining organizations, COVID-19 is a true Black Swan event"
(Barrick, November 2020)

"While we have not experienced any significant negative impact to date, the extent to which COVID-19 impacts future business activity or financial results, and the duration of any such negative impact, will depend on future developments, which are highly uncertain and unknown at this time" (Barrick, November 2020)

Barrick. (2020). *Q3 Report*. Retrieved from https://sq4cdn.com/322814910/files/doc_financial/quarterly_results/2020/Barrick-Q3-2020-Report.pdf

Drawing down facilities for standby due to volatility

Agnico Eagle Mines Limited, November 2020

- Drew down \$1B from the credit facility as a precautionary measure in Q1.

"In March 2020, the Company drew down \$1,000.0 million from the Credit Facility as a cautionary measure given the uncertainty with respect to the COVID-19 pandemic. In the second quarter of 2020, based on prevailing market conditions and the timing of the production ramp up of its operating mines, the Company repaid \$750.0 million outstanding on its Credit Facility. In the third quarter of 2020, the Company drew down an additional \$75.0 million for a total outstanding balance of \$325.0 million on its Credit Facility. The outstanding balance was repaid in full in September 2020. As at September 30, 2020, \$1,199.2 million was available for future drawdown under the Credit Facility. Credit Facility availability is reduced by outstanding letters of credit which were \$0.8 million as of September 30, 2020" (Agnico Eagle, November 2020)

Agnico Eagle. (2020). *Third Quarter Report*. Retrieved from https://s21.q4cdn.com/374334112/files/doc_financials/quarterly/2020/Q3-2020-Report.PDF

Drawing down facilities for standby due to volatility

Kinross Gold Corporation, November 2020

- Drew down \$750M from revolving line of credit as a precautionary measure in March 2020.

"The \$100.0 million outstanding on the revolving credit facility as at December 31, 2019 was repaid in early February 2020. On March 20, 2020, the Company drew down \$750.0 million from the \$1.5 billion revolving credit facility as a precautionary measure to protect against economic and business uncertainties caused by the COVID-19 pandemic and repaid \$250.0 million of the drawn amount on July 24, 2020. On April 9, 2020 the Company drew down \$200.0 million from the \$300.0 million Tasiast loan. In the first six months of 2019, net cash flow provided from financing activities included a net drawdown on the revolving credit facility of \$155.0 million, partially offset by interest and lease payments of \$28.4 million and \$7.2 million, respectively" (Kinross, November 2020)

Kinross Gold Corporation. (2020). *Management's Discussion and Analysis*. Retrieved from <https://www.sedar.com/GetFile.do?lang=EN&docClass=7&issuerNo=00002968&issuerType=03&projectNo=03130565&docId=4825988>

Drawing down facilities for standby due to volatility

Coeur Mining, Inc., November 2020

- Established a \$100M ATM program to increase financial flexibility.

"To provide additional flexibility to respond to potential downside scenarios, the Company has been able to periodically draw and make repayments under its RCF throughout the first nine months of 2020 and at September 30, 2020 had \$20.0 million outstanding under the RCF. Additionally, Coeur established the \$100.0 million ATM Program during the second quarter as a means to proactively increase its financial flexibility during the current period of volatility and uncertainty. At the date of this filing, the Company has yet to issue shares of its common stock under the ATM Program" (Coeur Mining, November 2020)

Coeur Mining. (2020). Q3 10-Q 2020. Retrieved from <https://www.sec.gov/Archives/edgar/data/215466/000021546620000144/cde-20200930.htm>

Capital expenditure reductions

Rio Tinto Limited, July 2020

- Reduction of \$1B in capital expenditures guidance compared to original guidance for 2020.

"Capital expenditure is expected to be around US\$6 billion in 2020. This is a reduction in capital expenditure from our original guidance of US\$7 billion. This is due to a stronger US dollar against our major operating currencies and impact of COVID-19 on our operations" (Rio Tinto, July 2020)

Rio Tinto. (2020). *Interim Results 2020*. Retrieved from <https://www.riotinto.com/-/media/Content/Documents/Invest/Financial-news-and-performance/Results/RT-Half-year-results-2020.pdf>

Capital expenditure reductions

Newmont Corporation, November 2020

- Overall reduction of \$72.8M in capital expenditures from prior year quarter.

"Capital expenditures decreased by 26 percent from the prior year quarter to \$280 million, primarily due to lower spend from five operations being placed into care and maintenance, lower sustaining capital spend from the sale of Red Lake and Kalgoorlie, and reduced spending from the completion of Borden Underground, Ahafo Mill Expansion, and other projects in 2019. Development capital expenditures in 2020 primarily include advancing Tanami Expansion 2, Yanacocha Sulfides, Ahafo North and Subika mining method change, Musselwhite Materials Handling and conveyor installation, Éléonore Lower Mine Material Handling System, Quecher Main, and projects associated with the Company's ownership interest in Nevada Gold Mines" (Newmont, November 2020)

In North America, there was a decrease of 56% in advanced projects, research and development and exploration spending from 2019 and a decrease of 52% in capital expenditures from 2019.

Newmont. (2020). Q3 10-Q 2020. Retrieved from [https://s24.q4cdn.com/382246808/files/doc_financials/2020/q3/Newmont-Third-Quarter-2020-10-Q-Final-\(10.29.2020\).pdf](https://s24.q4cdn.com/382246808/files/doc_financials/2020/q3/Newmont-Third-Quarter-2020-10-Q-Final-(10.29.2020).pdf)

Industry trends show that both M&A activity and capital raising have been negatively affected during the pandemic

Summary of industry trends we observed:

- 2020 deals in mining
- Key external drivers
- 2020 global industry risks
- Stock volatility
- Copper and base metal volatility

"The COVID-19 pandemic has undeniably affected both M&A activity and capital raising as significant market declines, physical distancing and a persistent state of volatility have created an environment that is not conducive to deal-making.

At the same time, the price of gold continues to rise and gold company shares have recently had some significant market support. Market sentiment suggests that when conditions improve there will be a flurry of M&A and financing activity." (Osler, April 2020)

Brown, J.R., Hutchison, A, Rowe, E, Der, C, Sullivan, P. (2020). *COVID-19's Impact on Mining*. Retrieved from COVID-19's impact on the mining industry in Canada (osler.com)

2020 deals in mining – uncertain outlook hindering deals

Why deals are down:

1. Shareholder concerns

- Current shareholders are practicing extreme caution around spending large sums of money in the current economic environment. Large deals could affect liquidity and companies' ability to weather further downturns if the pandemic continues or worsens.
- For new investors, capital certainty is difficult to provide given price instability and doubts about commodity prices/demand.

2. Travel restrictions

- Due to travel restrictions, miners are unable to conduct face-to-face negotiations and due diligence, such as site inspections.

3. M&A as a product in Gold

- Interest in M&A activity is declining as a result of the price of gold increasing. Because of this – gold deals are expected to be less frequent and smaller than usual in 2020 and 2021.
- In the first four months of 2020 deal activity fell by 33%, compared to the same period in 2019.

PWC. (2020). *Mine 2020: Resilient and Resourceful*. Retrieved from Mine 2020: <https://www.pwc.com/gx/en/energy-utilities-mining/publications/pdf/pwc-mine-2020.pdf>

“We anticipate that miners will prioritize production over expansionary capital spending in 2020, if for no other reason than it will be highly challenging to mobilize and procure labor and equipment to remote sites safely in the current environment. This, coupled with fiscal restraint, is expected to result in a lower capital spend overall of at least 20%.” (PWC, June 2020)

“We do not expect any significant new acquisitions that are not already in play during the year.” (PWC, June 2020)

Deal-making in the mining industry has declined globally nearly 71% since 2019

Top 3 deals globally – 2019 vs. 2020

	2019	2020	%
Deal 1	US\$13.1bn	US\$2.4bn	-81.7%
Deal 2	US\$3.8bn	US\$1.5bn	-60.5%
Deal 3	US\$1.3bn	US\$1.4bn	7.7%
Totals	US\$18.2bn	US\$5.3bn	-70.8%

Source: (2020). *Mine 2020: Resilient and Resourceful*. Retrieved from Mine 2020: <https://www.pwc.com/gx/en/energy-utilities-mining/publications/pdf/pwc-mine-2020.pdf>

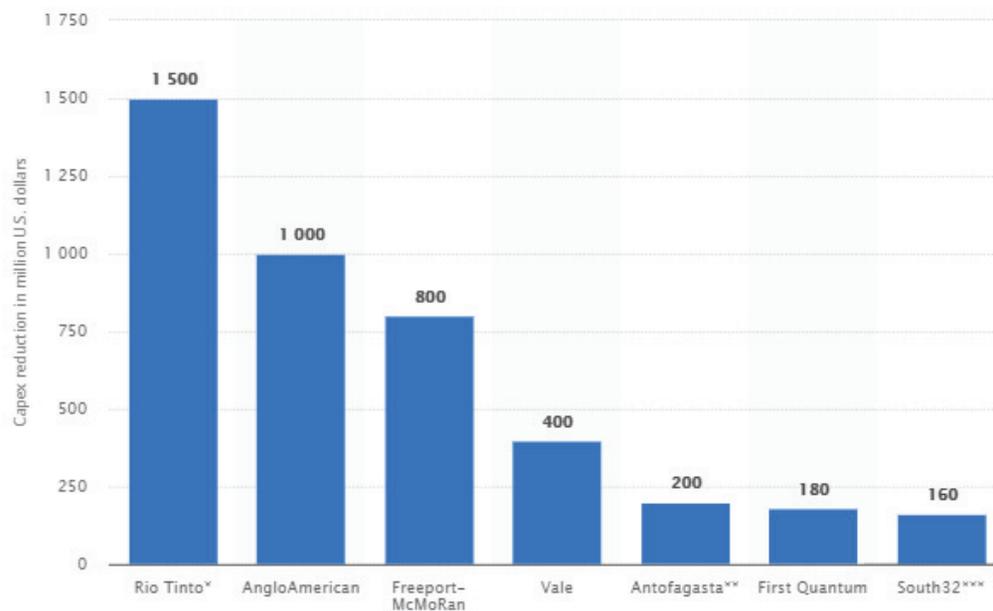
Canadian capital and repair expenditures, non-residential tangible assets, by industry and geography (x 1,000,000)

Capital expenditures

North American Industry Classification System (NAICS)	2019	2020	Change
All Industries	267,973.30	242,634.50	-9%
Mining, quarrying, and oil and gas extraction	44,376.40	32,324.10	-27%

Source: Statistics Canada. Table 34-10-0035-01
Capital and repair expenditures, non-residential tangible assets, by industry and geography (x 1,000,000):

Capital expenditures across a wide range of mining companies have seen significant reduction during the pandemic



Supplementary Notes

*Rio Tinto announced that their 2020 capex would be between \$5-6B USD rather than the previous amount of \$7B USD, due to COVID-19 as well as the strength of the U.S. dollar. The figure provided in this statistic is accordingly an average between the two reduced figures provided.

**Capex guidance for 2020. Capex guidance has been reduced to between \$1.3B USD and \$1.5B USD, rather than the \$1.5B USD announced prior to the crisis.

***Reduced capex over the next 15 months from April 2020. \$150M USD of this amount would be sustaining capex and \$10M USD would be exploration capex. This statistic was assembled using several editions of the report.

Statista. (2020). *Capital expenditure reduction of selected mining companies as a result of coronavirus (COVID-19) impacts as of May 2020*. Retrieved from <https://www.statista.com/statistics/1110672/mining-company-capex-reduction/>

Key external drivers behaved in 2020 as predicted with the exception of demand for copper, zinc, and lead refining

Key external drivers	2020 market outlook	2020 market actuals
World price of gold	The world price of gold significantly dictates the industry's performance. In 2020, the world price of gold IBIS expected the price of gold to increase.	Price of gold increased in 2020 as predicted.
World price of silver	The world price of silver affects the industry's revenue and profitability. In 2020, the world price of silver is forecast to increase.	Price of silver increased in 2020 as predicted.
Consumer confidence index (CCI)	The CCI measures consumers' levels of optimism about the current economic environment. In 2020, the CCI is anticipated to decrease, posing a potential threat to operators.	CCI decreased in 2020 as predicted.
Canadian effective exchange rate index (CEER)	The CEER index measures the Canadian dollar's relative strength against the currencies of its trading partners. In 2020, the CEER index is anticipated to decrease which may entice foreign buyers.	CEER decreased in 2020 as predicted.
Demand for computer and electronic product manufacturing	Gold is a primary input for many electronic component parts. In 2020, demand from computer and electronic product manufacturing is anticipated to increase.	Demand for computer and electronic product manufacturing increased in 2020 as predicted.
Demand from copper, zinc, and lead refining	Many products are sold to refineries in the Copper, Zinc and Lead Refining industry in Canada, which then sell refined bullion, concentrates and ore to downstream markets. In 2020, demand for copper, zinc and lead refining is expected to increase.	Demand for copper, zinc, and lead refining decreased in 2020 which was not predicted. As a result, mining of these materials has seen a significant decrease in 2020.

IBIS World (2020). *Gold & Silver Ore Mining in Canada*. Retrieved from <https://my.ibisworld.com/ca/en/industry/21222ca/about>

Risks for the mining industry grew significantly due to the pandemic – Shift to focus on human capital and operational risks on top of pre-pandemic growth-related risks

- The industry has experienced a significant growth in risks from pre to post pandemic onset.
- Pre COVID-19 risks were primarily growth-associated risks such as permitting, access to capital, and community relations.
- Post COVID-19 risks grew to also include human capital and safe operations risks such as, employee wellbeing, safe operations, and technology.

2020 (pre COVID-19)	2020 (post COVID-19)
1. Commodity Price Risk	1. Physical and mental health of workforce
2. Permitting risk	2. Operating and maintaining safe production
3. Access to capital, including liquidity	3. Clear, transparent and fast communication to internal and external stakeholders
4. Community relations and social license to operate	4. Managing key supplier risk
5. Political instability	5. Monitoring end to end supply chain risks and adapting as issues emerge
6. Economic downturn/uncertainty	6. Ensuring Cyber risk is managed as increasing numbers of people work remotely
7. Regulatory and compliance changes – Environmental risks, including new regulations	7. Managing liquidity risks and shocks
8. Global trade war	8. Global recessionary risk to commodity prices and currency volatilities
9. Ability to access and replace reserves	9. Shared service centers or outsourced functions in jurisdictions badly affected by COVID-19
10. Tailings management	10. Commodities that have seen significant and rapid decline in prices drive a need for rapid cost out to preserve resiliency of operation in declining price environment
<i>Source: 2020 KPMG Global Mining Survey (February 2020)</i>	<i>Source: KPMG Global Mining COVID-19 (April 2020)</i>

KPMG. (2020). *Global Mining Covid-19*. Retrieved from <https://assets.kpmg/content/dam/kpmg/au/pdf/2020/global-mining-survey-update-for-covid-19.pdf>

6) Concluding Remarks

Grant Thornton Concluding Remarks

The COVID-19 pandemic has brought about unprecedented levels of uncertainty and volatility – almost no industries have been unaffected. With the rollout of vaccines just beginning there can be no reasonable expectation that a ‘return to normal’ can be declared anytime soon.

Grant Thornton’s assessment of the mining industry’s financial indicators pertaining to spending guidance, M&A activity, capital expenditure activity, and industry trends all point to this conclusion – that until there is certainty that the global pandemic is under control and all restrictions are lifted, companies have been and will continue to exercise caution in how they spend their cash and prioritize the protection of their operational capabilities.

7) Appendix

Appendix A:

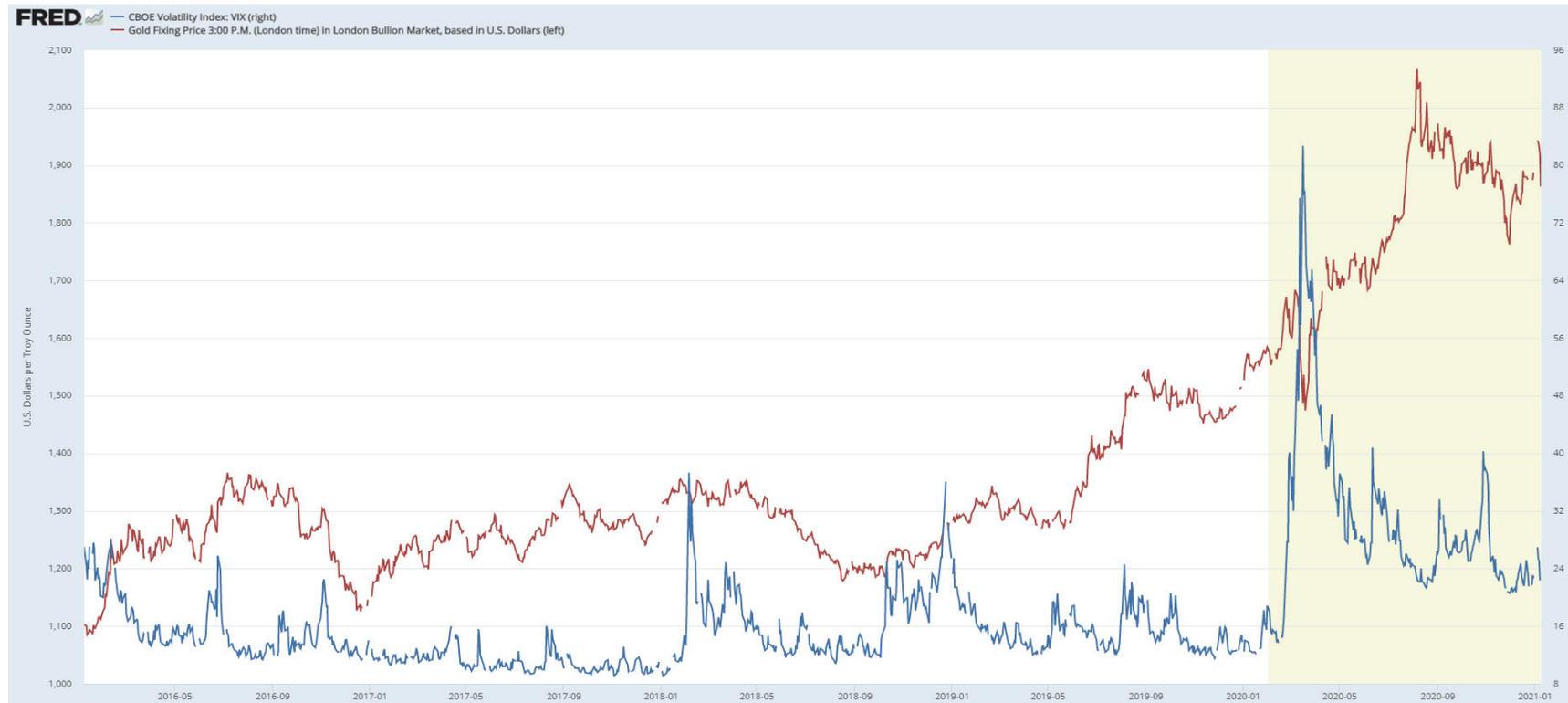
List of mining companies considered for analysis

Company	Market Cap (billions at January 5, 2021)	Total Annual Revenue	Commodities	Markets	Assets in Canada
Broken Hill Proprietary(BHP) Company Limited	172.46	42.9 billion (2020)	gold and base metals	North America, South America,Australia, Asia, Middle East	Yes
Rio Tinto Limited	98.06	13.2 billion (2019)	gold and base metals	North America, Asia, Australia,Africa	Yes
Newmont Corporation	50.57	9.74 B (2019)	gold	Africa, Australia, North America, South America	Yes
South 32 Mining Company	46.15	64.68 B (2019)	base metals	North America, South America,Africa, Asia, Australia	Head Office
Barrick Gold Corporation	43.46	9.717 B (2019)	gold and base metals	North America, South America,Africa, Indonesia	Yes
Freeport McMoRan	40.41	14.40 B (2019)	gold and base metals	North America, South America,Africa, Indonesia	No
Agnico Eagle Mines limited	17.96	2.49 B (2019)	gold and base metals	North America, Europe	Yes
Newcrest Mining	16.35	37.42 B (2019)	gold and base metals	North America, South America,Australia, Indonesia	Yes
Kirkland Lake Gold	15.18	1.38 B (2019)	gold	North America, Australia	Yes
Teck Resources Limited	10.21	11.39 B (2019)	base metals	North America, South America	Yes
Northern Star MiningCorporation	10.18	1.50 B (2019)	gold	North America, Australia	No
Kinross Gold Corporation	9.96	3.49 B (2019)	gold and base metals	North America, South America,Africa, Russia	Head Office
Coeur Mining, Inc.	2.615	7.11 B (2019)	gold and base metals	North America	Yes

Appendix B:**Project Approach – Mining companies grouped by market capitalization**

Market Capitalization	Companies within group
50+	BHP, Rio Tinto
40 - 49 billion	South 32, Newmont, Barrick or Freeport
15 - 20 billion	Newcrest, Agnico, Kirkland
10 billion	Kinross, Northern Star, Teck
2.5 billion	Coeur

Appendix C: Stock volatility and gold prices



**APPENDIX B4 COMPILATION OF NEWSPAPER ARTICLES REGARDING
COVID-19 IMPACTS ON NORTHWEST BC COMMUNITIES AND
THE MINING SECTOR**

SEABRIDGE GOLD

Research on COVID-19's Impact on Mining Industry

February 2, 2021

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First Nations COVID-19 Protocols and Their Effect on Seabridge Gold's Ability to Work at KSM

Tahltan Nation

COVID protocols for non-territory residents

- In early April the Tahltan Nation COVID-19 Emergency Management Team adopted measures to stop COVID-19 from reaching their Territory. Measures include –
 - Non-territory residents were asked not to travel to their territory
 - Cancelled the hunting, camping, or recreational activity in Tahltan Territory to protect the residents
 - Anyone returning to the Tahltan Territory must go directly to their home and self-isolate for no less than 14 days

Travel advisory issued by Tahltan Nation

- **April 23, 2020** - [Tahltan ask visitors to stay away from their territory during COVID-19](#)
 - Chad Day, president of the TCG - The Tahltan Nation is asserting title and rights and respectfully asking all hunters, wildlife enthusiasts and non-residents to refrain from travelling to Tahltan Territory during COVID-19. In order to protect our communities, the Tahltan Nation encourage everyone in British Columbia to engage in all recreational activities where they reside.
 - TCG noted its territory's remote location in the northwestern-most corner of the province, limited healthcare facilities, lack of adequate RCMP resources and large number of elders, makes the people there among the most vulnerable during the ongoing pandemic.
- **April 7, 2020** – [Non-Territory Residents are Currently Not Welcome in Tahltan Territory](#)
- **July 30, 2020** - [Visitors aren't welcome during COVID on Haida Gwaii, at Tahltan Nation](#)
 - On July 30, 2020, the Tahltan Nation [announced](#) that everyone, including hunters and wildlife enthusiasts, should avoid non essential travel to Tahltan Territory until the Province safely enters Stage 4 of the COVID-19 response. The consequence of spreading COVID-19 is too great given the limited access to acute medical care for residents along the remote Highway 37 corridor.
 - All non-essential travel to Dease Lake, Iskut and Telegraph Creek should be avoided
 - Non-territory residents are asked to assist the Tahltan Nation in our efforts to stay at home and to not travel to Tahltan Territory.
 - Everyone returning to Territory after essential travel is REQUIRED to self-isolate for 14 days.
- **August 26, 2020** - [Tahltan Nation stands behind road access closures to keep hunters, non-locals out](#)
 - The Tahltan Central Government (TCG) held true to their words in stepping up the enforcement of a non-essential travel ban by blocking access to more than a dozen roads over the past few weeks in an effort to keep non-residents out.
 - TCG president Chad Norman Day believes they had no choice but to block access to the roads and the Stikine River Bridge area commonly used by visitors and hunters on jet boats.
 - Day said he personally and the Tahltan Central Government have been the targets of racist and threatening messages on social media because of the blockades.

Nisga'a Nation

- **September 4, 2020 – Declared State of [Local Emergency in Nisga'a lands and all four Nisga'a villages](#)**
 - Due to known occurrences of the COVID-19 virus on Nisga'a Land and the threat of further infection through contact if the situation is not contained.
 - The declaration prohibits traveling to and from Nisga'a lands excepts as require for essential purposes.
- **November 29, 2020 - [COVID-19 Nisga'a Nation Declares State of Local Emergency & Villages Implement Temporary Lock Down Measures](#)**
- **January 4, 2021 - [COVID-19 case numbers continue to climb in Terrace area](#)**
 - The area had one of the highest rates in B.C. per 100,000 people
 - The Nisga'a Nation reported a resurgence of cases in a news release on Dec. 30. There are currently 31 active cases and 2 recovered associated with the current cluster of cases as of Jan. 3, according to the Nisga'a Valley Health Authority.
- **January 12, 2021 - Nisga'a Lisims Government Executive Declares [State of Local Emergency and Implements Measures to Prevent the Spread of COVID-19](#)**
 - 90 people tested positive for COVID -19 since 28-Dec-2020
- **January 20, 2021 - [NLG Executive Extends State of Local Emergency](#)**
 - NLG Executives decided to extend state of local emergency that was declared for a period of seven days Jan 12 – Jan 19
 - The local state of emergency restricts travel between Nisga'a villages, prohibits any gatherings, implements security monitoring and can result in fines for people found to be in contravention of provincial or Nisga'a orders.
 - The Nisga'a Valley Health Authority had been expecting to receive a shipment of the Pfizer-BioNTech COVID-19 vaccine around the start of the week, but was notified Monday morning that the delivery would be delayed due to a province-wide disruption in shipments.
 - As of Jan. 20, there are 21 active COVID-19 cases in the Nisga'a Valley Health Authority

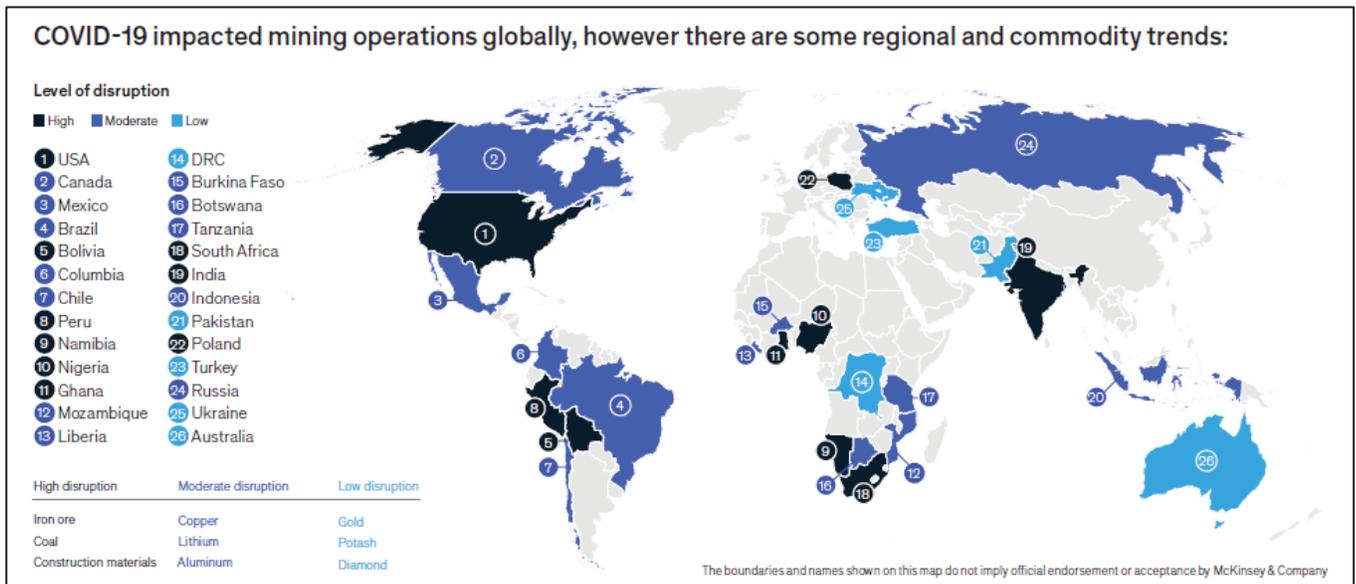
Seabridge Gold's Messaging

- Seabridge's highest priority has been the health, safety and wellness of our employees and the people living in surrounding Northern British Columbia communities
- Hence, despite the mining industry being declared an essential service by province, Seabridge paused all of the proposed activities on the KSM and Iskut Projects to prevent the spread of COVID-19
- Owing to the COVID-19 protocols, the KSM and Iskut Project camps opened in July versus the typical May opening
- The work programs were smaller than previous years and had fewer people due to social distancing requirements such as, rooms divided as per the guidelines, spacing in common areas and transportation to and from site.
- Scaling back from the original plans and permits allowing to drill 40 holes, Seabridge limited this summer's program on KSM Project to only one drill rig and 10 holes to reduce the load on camp facilities and protect employees, contractors and local Indigenous groups.

General News About Mining Industry Struggling With COVID-19

August 2020 - [MineLens survey confirms the significant impact of COVID-19 on mining operations](#)

- The insights gleaned from more than 60 senior mining executives show that 75 percent of them agree that COVID-19 has had a significant impact on mining operations, while 65 percent say they expect fundamental changes to their operational models.
- The survey also finds that the pandemic triggered a decrease in production by about 42 percent, on average, while the planned production reduction for 2020 was roughly 30 percent.
- The survey also indicates that the level of disruption triggered by the pandemic is moderate to high in many countries—including Brazil, Canada, Chile, South Africa, and the United States—with significant mining activity.



October 23, 2020 - [Gold Stocks Still Correcting](#)

- The gold miners' stocks are still correcting, continuing to rebalance both technicals and sentiment. This sector's huge surge into early August spawned extreme overboughtness and universal euphoria, which are gradually being bled away.
- This same necessary and healthy corrective process is underway in gold itself, which overwhelmingly drives gold-stock price levels. This is leading to great buying opportunities.

October 27, 2020 - [Teck Resources profit misses estimates as prices of steelmaking coal tumble](#)

- Canada's Teck Resources missed analysts' estimates for quarterly profit on Tuesday, hurt by a steep drop in the prices of steelmaking coal, sending it US-listed shares down 8.2% in pre-market trade
- Miners globally have been struggling after the Covid-19 pandemic wreaked havoc on commodity markets, forcing companies to shut mines, slash production and even wind down some operations.
- Teck said labor intensive activities such as maintenance, mine operations and projects continue to be impacted by Covid-19 safety protocols.

November 2, 2020 - [Top mining dealmaker says takeovers are all talk until recovery takes hold](#)

- Miners are engaging in plenty of takeover talks despite a tepid year for acquisitions, but few deals will get done without greater clarity on the economy and an ebbing of COVID-19, said the industry's top dealmaker.
- According to Dan Barclay, who heads Bank of Montreal's capital-markets division –
- There's lots of conversations going on, lots of people exploring new ways to think and new ways to operate.
- The probability of a lot of action is going to be conditional on that economic recovery. The inability of companies to undertake due diligence amid COVID-19 restrictions and "huge price volatility" in the metal markets have hampered this year's activity. "
- We don't think we're going to recover to a normal level next year unless we get great clarity on economic recovery or we get great clarity on dealing with COVID.

- another big theme next year, beyond deals, will be increased prominence around environmental, social and governance issues.
- Investors are starting to build a more robust tool kit to think about the overall ESG framework of the industry, and who is doing well and not
- According to Sean Boyd, Vice-Chairman and Chief Executive Officer
- The inability to get people that do your project evaluation work out to look at things is a big hindrance, you need to kick the tires
- Executives probably feel less pressure to push ahead with consolidation plays “given that the gold price has helped their operations
- According to Tom Palmer, CEO of Newmont Corp
- There is certainly a need for consolidation among explorers and developers.
- We have too many single-asset companies or projects and therefore too many management teams and overhead

January 3, 2021 – [B.C. health order restricts number of workers at large industrial work sites](#)

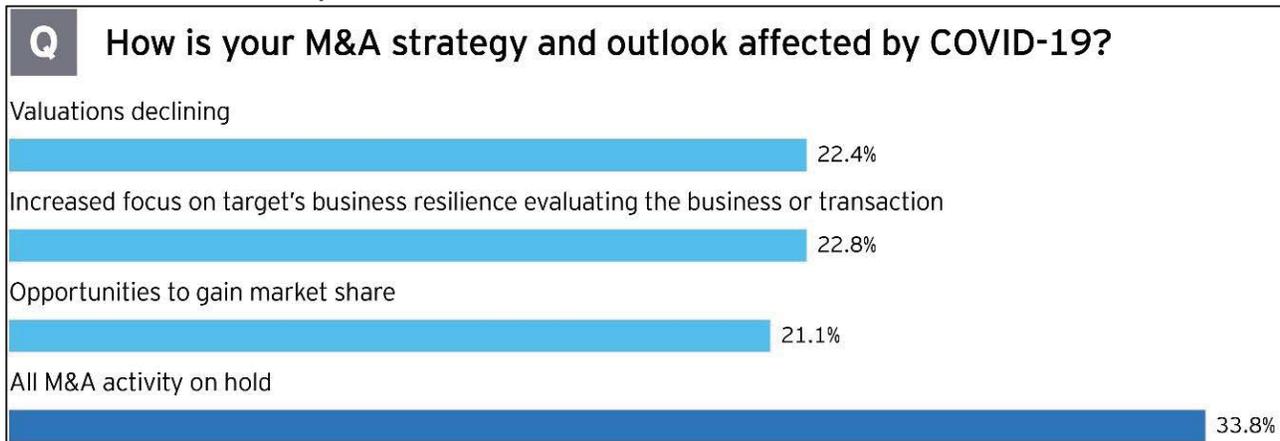
- Dr. Bonnie Henry, British Columbia's public health officer has ordered five major industrial projects in the north of the province to reduce the size of their workforces in an attempt to ensure the northern health region does not become overwhelmed with COVID-19 cases.
- Those sites include the Site C dam project near Fort St. John, the LNG Canada Project natural gas liquefaction and export facility in Kitimat, the Coastal GasLink natural gas pipeline being built from Dawson Creek to Kitimat, a tunnel being twinned near Kitimat for Rio Tinto's aluminum smelter, and the Trans Mountain Pipeline from Edmonton to Burnaby.

January 14, 2021 - [Barrick Gold's quarterly output falls due to pandemic-related disruptions](#)

- Barrick Gold's preliminary gold production fell 16.19 per cent in the fourth quarter, hurt by lower output from Nevada Gold mines in the United States and Pueblo Viejo mine in the Dominican Republic.
- While gold prices touched record highs in 2020, the COVID-19 pandemic-induced disruptions have hurt production at the company's mines.
- Barrick, which is scheduled to report fourth-quarter results on Feb. 18, said output from its Nevada gold mine fell 6.7 per cent, while that from its Pueblo Viejo mine fell 11.2 per cent.

General News About Mining M&A Deals in 2020-21

7 May, 2020 - [One-third of mining and metals executives surveyed](#) during a EY webcast said they have put all M&A on hold because of the impact of COVID-19



June 10, 2020 - [The results of a survey \(Statista\) of mining and metals executives](#) on April 9, 2020 showed that a **33.8 percent** share of the survey respondents stated that the COVID-19 pandemic had caused all merger and acquisitions activities for these industries to be on hold as of April 2020.

July 2020 - [High gold and share prices indicate it should be boom time for mergers and acquisitions.](#)

- Data from S&P Global Market Intelligence shows the market is heating up. So far this year, there has been an aggregate of US\$3.9 billion in gold transactions in eight deals representing about 31.9 million ounces of gold reserves, with buyers paying an average of \$123/oz.
- The deals so far this year are happening at much cheaper prices than the 10-year average of \$202/oz paid for reserves. It possibly would have been more had COVID-19 travel restrictions not grounded technical diligence teams.

August 11, 2020 - [Mining M&A deals over \\$8.8 billion in Q2 – report](#)

- According to GlobalData A total of \$8.86 billion worth of M&A deals were struck in the metals and mining industry globally during the second quarter of 2020
- This value represents an increase of 29.1% over the previous quarter and a decline of 14.4% when compared with the last four-quarter average, which stood at \$10.35 billion.
- Comparing deal values Canada topped the list with \$2.92 billion worth of M&A deals announced.
- In terms of volumes, North America emerged as the top region for M&A deals in the metals and mining industry, followed by Asia-Pacific and then Europe.
- The top country in terms of M&A deals activity in Q2 2020 was Canada with 151 deals, followed by Australia with 80 and the US with 42.

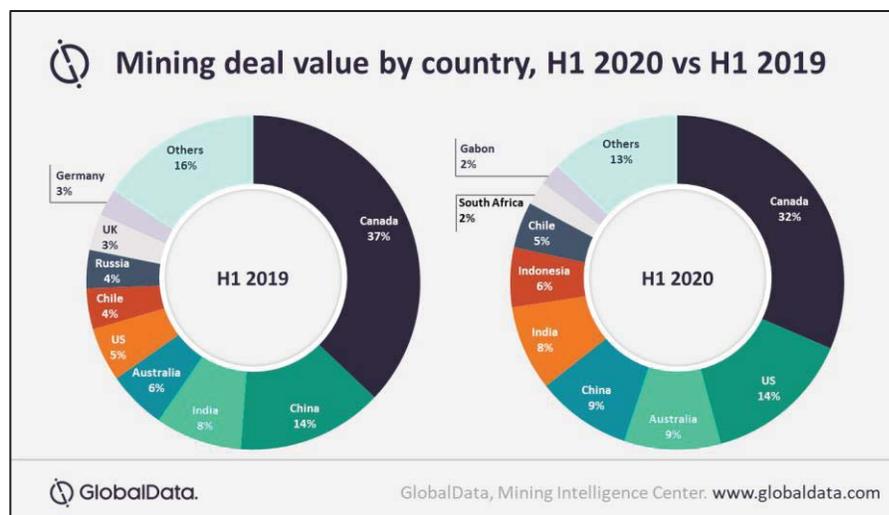
August 2020 - [Metals deals insights: Midyear 2020 – PWC](#)

- Highlights of deal activities
 - Largest deal in H1 2020 – 1
 - Megadeal (\$5B +) in H1 2020 - 0
- Industry suppliers continue to be faced with weakened demand from major downstream consumers in industrial manufacturing, aerospace, automotive, construction and others.
- This significant contraction in demand, along with a myriad of other challenges caused by the pandemic, resulted in decreased deal value, volume, and average deal size when compared to the first half of 2019. This impact is also evidenced by the decrease in deal volume from Q1 to Q2 2020, as many businesses, especially domestic, experienced their biggest disruptions from the pandemic to date.
- Total deal value in H1 2020 amounted to \$5.9 billion, a decrease of 81% compared to H1 2019. A similar trend was noted for deal volume in H1 2020, registering 271 deals compared to 309 deals in H1 2019, a 12% decline.

- Deal value in Q1 2020 and deal volume in Q2 2020 were the lowest in the last eight quarters. The drop in deal volume in the second quarter is likely attributed to the lower demand coupled with the emergence of the COVID-19 pandemic.
- The top ten deals totaled \$3.7 billion, accounting for approximately 63% of the total deal value in H1 2020.

September 7, 2020 - [Mining deal value fell by over \\$18bn in first half of 2020, as COVID-19 disrupts flow of capital \(Global Data\)](#)

- Global mining deal value, suffering from an unanticipated shock from the COVID-19 pandemic, fell by over US\$18bn when compared to the first half of 2019 to US\$46.6bn in the first half of 2020.
- An expected slump in the global economy, steered by a series of challenges, has kept investors away from long-term financial instruments, resulting in a 12.7% y-o-y fall in the capital raised by mining companies, according to GlobalData, a leading data and analytics company.
- Mining mergers and acquisitions (M&As), despite a decent first quarter owing to deals involving gold, fell by 51.6% during the first half of 2020. Overall, the majority of the impact was evident on the completion rate, as there was a 41.7% y-o-y fall in the completed deal value.



October 6, 2020 - [Northern Star and Saracen to merge in \\$4.1bn deal](#)

- Australian gold miner Northern Star Resources has agreed to combine with its smaller rival Saracen Mineral Holdings in a \$4.14bn deal that aims to create the country's second-largest gold miner.
- The two companies, who together own Australia's Super Pit mine, said the nil-premium merger would create a globally competitive miner that would be among the 10 biggest in the world with an equity market capitalisation of more than \$11bn.
- The deal is the latest sign of consolidation in the fragmented gold mining sector as companies look to improve operational efficiencies and access a wider pool of generalist investors.

October 23, 2020 - [The calls for gold miners to replace reserves are getting louder](#)

- With the gold price having closed above \$1800 over the past few quarters, M&A activity has been quiet despite miners generating billions of free cash flow.
- In recent years, shareholders and activist investors have become increasingly vocal about value destruction resulting from aggressive M&A strategies. Reserve replacement remains the key problem for the industry, but management teams have remained cautious about launching acquisitions to replenish depleted reserves.
- In 2019, sector deals ramped up considerably after the gold price broke out of a nearly 7-year base above \$1400. The deal total amounted to about \$26 billion, according to data compiled by Bloomberg. But 2020 has been decidedly lower thus far, amounting to only around \$9.8 billion either completed, or agreed upon heading into Q4.
- Since the global lockdowns began in March, most senior gold producers have been focused on becoming health and safety compliant and adopting remote working strategies. There have also been challenges

conducting due diligence with the ongoing travel restrictions, making it difficult for them to execute M&A this year.

October 26, 2020 - [North America's metals & mining industry sees a rise of 68.8% in deal activity in Q3 2020](#)

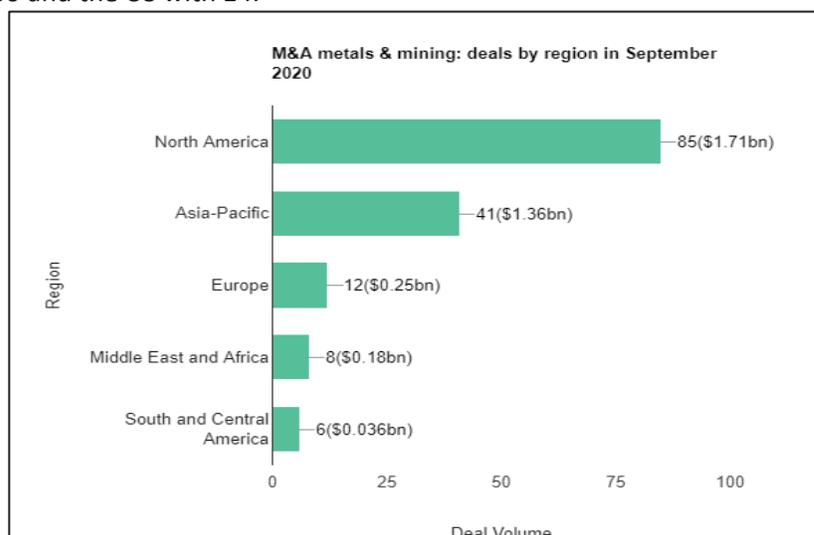
- North America's metals & mining industry saw a rise of 68.8% in overall deal activity during Q3 2020, when compared to the four-quarter average, according to GlobalData's deals database.
- A total of 292 deals worth \$2.41bn were announced for the region during Q3 2020, against the last four-quarter average of 173 deals.
- The combined value of the top five metals & mining deals stood at \$1.75bn, against the overall value of \$2.41bn recorded for the quarter.

October 26, 2020 - [Metals & mining industry deals in Q3 2020 total \\$7.95bn globally](#)

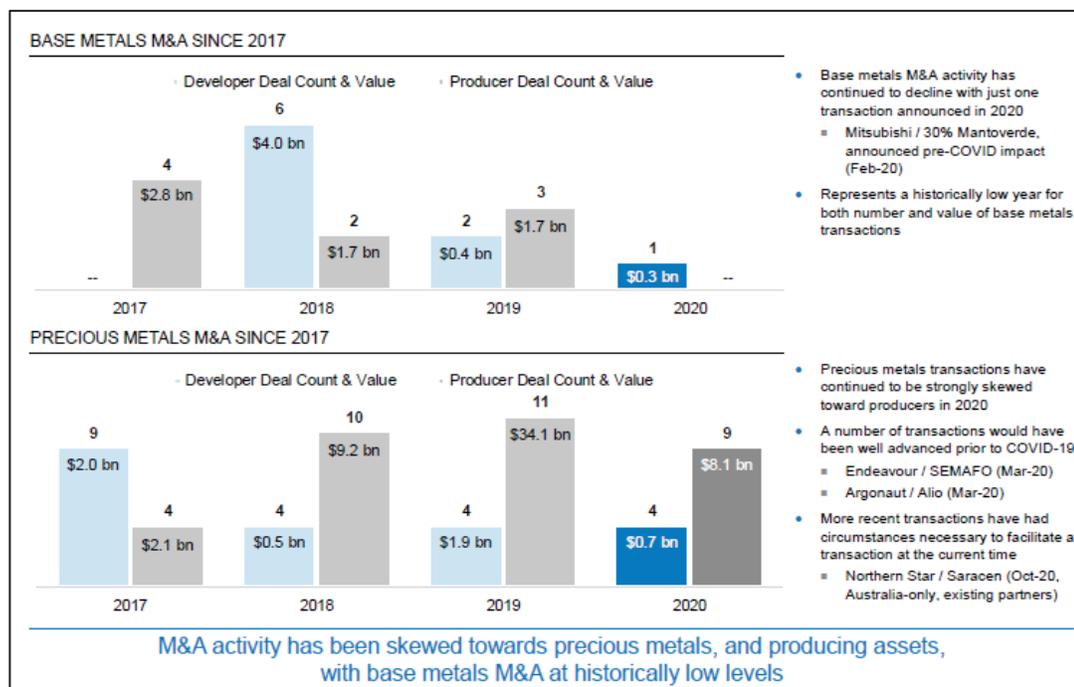
- Total metals & mining industry deals for Q3 2020 worth \$7.95bn were announced globally, according to GlobalData's deals database.
- The value marked a decrease of 35.2% over the previous quarter and a drop of 35.6% when compared with the last four-quarter average of \$12.4bn.
- In value terms, Asia-Pacific led the activity with deals worth \$3.78bn.
- The combined value of the top five metals & mining deals stood at \$4.18bn, against the overall value of \$7.95bn recorded for the month.

October 27, 2020 - [Metals & mining industry M&A deals in September 2020 total \\$3.53bn globally](#)

- According to GlobalData's deals database, total metals & mining industry M&A deals in September 2020 worth \$3.53bn were announced globally.
- The top country in terms of M&A deals activity in September 2020 was Canada with 67 deals, followed by Australia with 30 and the US with 14.

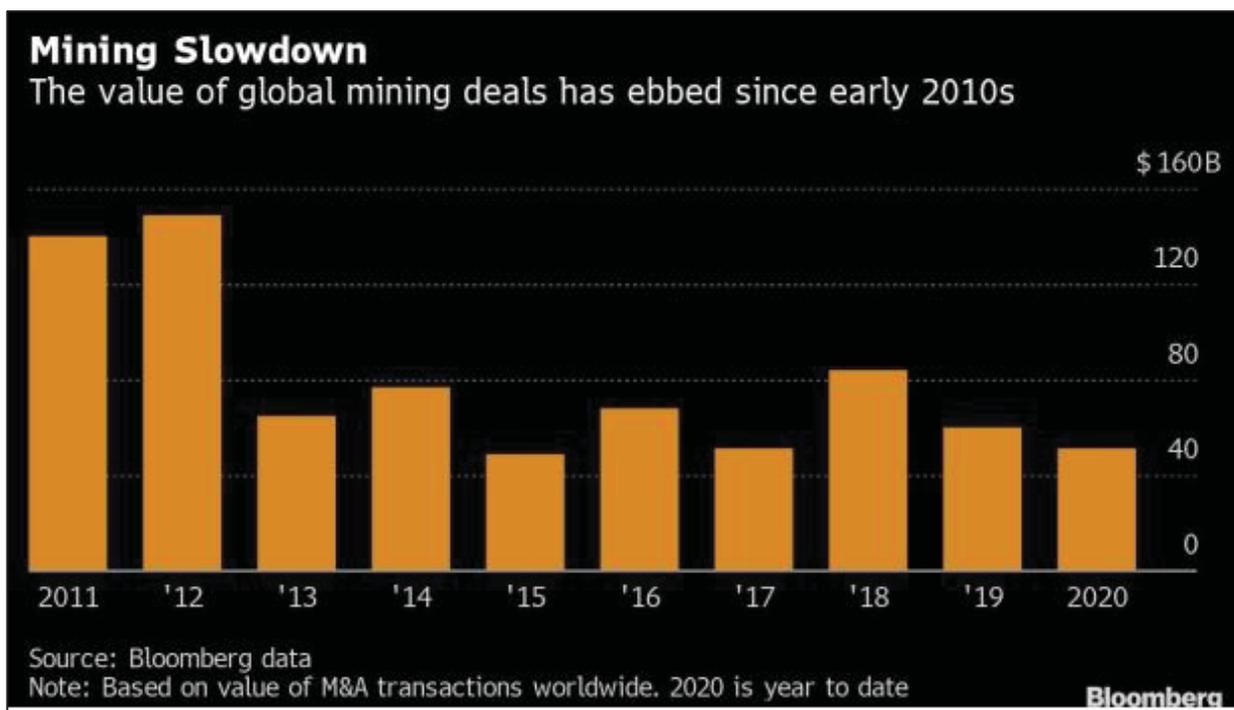


Bloomberg - M&A Activity in Context



November 2, 2020 - [Top Mining Dealmaker Says Takeovers All Talk Until Recovery](#)

- According to Dan Barclay (Head of Bank of Montreal’s capital-markets division) Miners are engaging in plenty of takeover talks despite a tepid year for acquisitions, but few deals will get done without greater clarity on the economy and an ebbing of Covid-19
- Mining companies have been involved in about \$52 billion of acquisitions this year, according to Bloomberg data. That’s less than half the value of deals seen during industry consolidation in the mid 2000s and following the end of the financial crisis.
- The inability of companies to undertake due diligence amid Covid-19 restrictions and “huge price volatility” in the metal markets have hampered this year’s activity. In the precious-metals sector, given the run-up of gold to record levels, there’s a “value gap between what people think is coming and what they think they’re worth



November 4, 2020 - [WATCH: How Covid-19 has affected M&A in the mining sector](#)

- Covid-19 has hampered merger activity in the mining sector.
- Industry players have cautioned that only a few deals may be completed due to the weak economic environment (South Africa)

November 13, 2020 - [Amid gold price whipsaw, M&A heats up in the mining space](#)

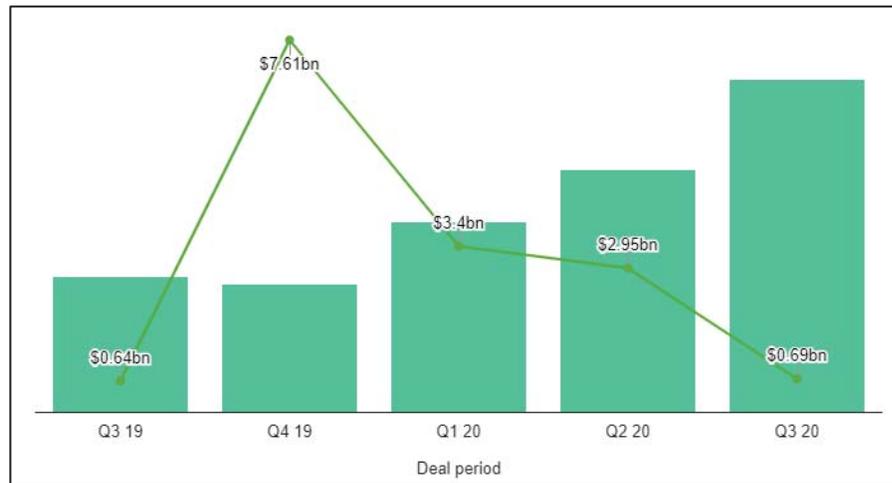
- **M&A deals**
 - Yamana Gold Inc. (AUY) and Monarch Gold Corp. (MQR.TO) announced in Nov that they had entered into a definitive agreement in which Yamana will purchase all of Monarch's shares that it does not already own for C\$152 million.
 - In mid-July 2020, Russian miner Nord Gold S.E. made a take-over offer of A\$0.66 per share for Australian developer Cardinal Resources (CDV.TO), which operates in a Tier 2 jurisdiction.
 - Canadian developer [Cross River Ventures \(CRVC.CSE\)](#) entered into a [definitive share purchase agreement with privately-held mineral exploration firm Northern Dominion Metals](#) (NDMC) to acquire all of the outstanding share capital of NDMC
- **General Mining News**
 - Underground gold reserves held by major mining firms continue to be low and falling. New reserves are becoming increasingly harder to find with resources being used up, and exploration is costly. Major mining companies have a few ways to remedy their shortages. They must either discover new underground resources through exploration, or acquire them via the takeover of junior development companies.
 - It is now cheaper for companies to [buy developing or developed projects](#) on Bay Street via acquisition, rather than to develop projects themselves given shortages of capable development teams and timeline pressures while the gold price consolidates.
 - As the healthy consolidation of recent out-sized gains in the gold space continues, this is a great time to consider accumulating a basket of junior developers controlling large projects being de-risked into the finance stage. With the gold price likely in the process of creating a new floor in the \$1800 region, global producers are beginning to concentrate on replacing depleting reserves.

November 16, 2020 - [Endeavour Mining to acquire rival Teranga Gold for \\$2.44 billion](#)

- The combined company will produce about 1.5 million ounces of gold a year across West Africa, making it one of the 10 largest producers. It also plans to seek a listing on the London Stock Exchange, a long-term goal of Endeavour Chief Executive Officer Sebastien de Montessus.
- The deal is expected to close in the first quarter of 2021.

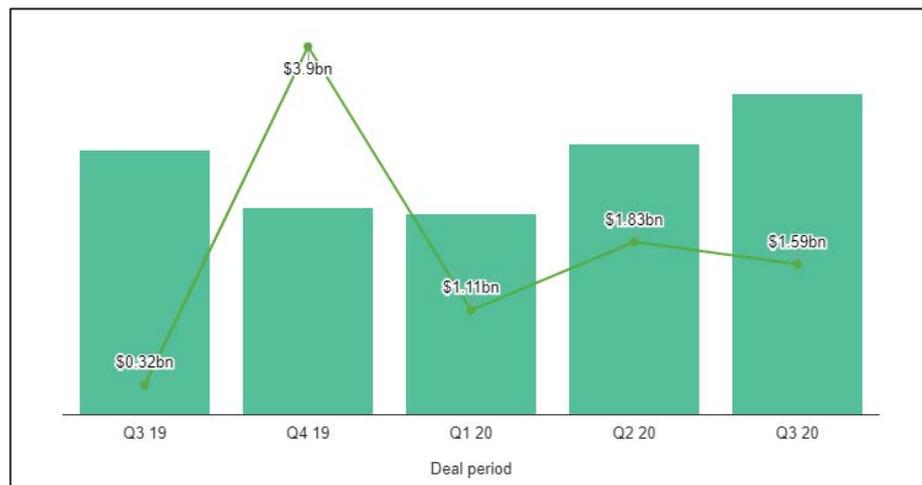
November 18, 2020 - [Metals & mining industry M&A deals in Q3 2020 total \\$686.45m in Canada](#)

- Total metals & mining industry M&A deals in Q3 2020 worth \$686.45m were announced in Canada, according to GlobalData's deals database.
- The value marked a decrease of 76.7% over the previous quarter and a drop of 81.2% when compared with the last four-quarter average of \$3.65bn.
- In terms of deal activity, Canada recorded 213 deals during Q3 2020, marking a rise of 37.4% over the previous quarter and a rise of 90.2% over the last four-quarter average.
- The top five metals & mining industry deals of Q3 2020 tracked by GlobalData were:
 - Auryn Resources' \$112.92m acquisition of Eastmain Resources
 - The \$75m asset transaction with Kirkland Lake Gold by Newmont
 - Kinross Gold's \$70.02m asset transaction with Contango ORE and Royal Gold
 - The \$45.8m acquisition of Coral Gold Resources by Guerrero Ventures
 - Southern Empire Resources' acquisition of MAS Gold for \$45.17m.



November 18, 2020 - [Metals & mining industry M&A deals in Q3 2020 total \\$1.59bn in US](#)

- Total metals & mining industry M&A deals in Q3 2020 worth \$1.59bn were announced in the US, according to GlobalData's deals database.
- The value marked a decrease of 13% over the previous quarter and a drop of 10.9% when compared with the last four-quarter average of \$1.79bn.
- In terms of deal activity, the US recorded 51 deals during Q3 2020, marking a rise of 18.6% over the previous quarter and a rise of 34.2% over the last four-quarter average.
- The top five metals & mining industry deals of Q3 2020 tracked by GlobalData were:
- The \$1.4bn merger of ArcelorMittal USA and Cleveland-Cliffs
- The \$90m asset transaction with Newmont by Maverix Metals
- Premier Gold Mines USA and Premier Gold Mines' \$50m acquisition of Osgood Mining LLC
- The \$16.8m asset transaction with Barrick Gold by Bullfrog Gold
- Altius Minerals' asset transaction with Liberty Metals & Mining Holdings for \$8.38m.



November 26, 2020 – [Australian M&A falls 49% in third quarter](#)

- Australia's top five mining and metal merger and acquisition (M&A) agreements in the third quarter of this year was valued at a combined \$335.35-million, accounting for 75.4% of the overall deal value in the same period.
- Analysts GlobalData's addition to the M&A transactions included Russian gold miner Nordgold's \$247.1-million offer for ASX-listed Cardinal Resources, the \$42.91-million acquisition of Millennium Minerals by Novo Resources, Auris Minerals' \$16.49-million acquisition of Sams Creek Gold, and Calidus Resources' asset transaction with Novo Resources for \$14.21-million.
- The value marked a decrease of 49% over the previous quarter and a drop of 68.4% when compared with the last four-quarter average of \$1.41-billion.

November 27, 2020 - [COVID-19 hinders big M&A in Canada](#)

- Canada's mining sector saw M&A activity ramp up in the September quarter, but increased caution in the wake of COVID-19 prevented big deals getting across the line.
- The volume of M&A deals struck rose 37% quarter-on-quarter to 213 in Q3, while the combined value of deals fell to \$686 million, down 77% quarter-on-quarter

December 2, 2020 - [Serengeti, Sun Metals merger to create BC-focused copper-gold developer](#)

- B.C.-focused juniors **Serengeti Resources** and **Sun Metals** plan to combine to create a "premier Canadian multi-asset copper-gold developer."
- The merger will bring together the companies' adjacent projects in north-central British Columbia – Serengeti's 67%-owned Kwanika project and Sun Metals' Stardust project. It will also bring together Sun Metals' Lorraine project, 40 km north of Stardust, with the neighbouring Top Cat project, which is under option to Serengeti.

December 3, 2020 – [US metals and mining industry M&A deals total US\\$1.59 billion in Q3](#)

- According to GlobalData's latest report, M&A deals in the U.S. metals and mining industry for the third quarter of 2020 totaled US\$1.59 billion.
- The valuation is a decrease of 13% from the previous quarter, and also marks a drop of 10.9% in comparison to the last four-quarter average of US\$1.79 billion.
- Globally, third quarter metals and mining industry M&A deal values totalled US\$7.21 billion, of which U.S. deals comprised 22.1%.
- Top five deals in the third quarter were:
 - **ArcelorMittal USA** (NYSE: MT) and **Cleveland-Cliffs'** (NYSE: CLF) US\$1.4 billion merger;
 - US\$90 million asset transaction with **Newmont** (TSX: NGT; NYSE: NEM) by **Maverix Metals** (TSX: MMX; NYSE: MMX);
 - US\$50 million acquisition of OsgoodMiningLLC by **Premier Gold Mines** (TSX: PG; US-OTC: PIRGF) and their subsidiary Premier Gold Mines USA;
 - US\$16.8 million asset transaction by Bullfrog Gold with **Barrick Gold** (TSX: ABX; NYSE: GOLD); and **Altius Minerals'** (TSE: ALS) US\$8.38 million asset transaction with Liberty Metals & Mining Holdings.

December 4, 2020 - [Aluminum sector deal tops metals, mining transactions in week ended Dec. 4](#)

- Kaiser Aluminum Corp. signed a definitive agreement to buy Alcoa Corp. subsidiary Alcoa Warrick LLC in a \$670 million transaction
- Moscow-based A-Property OOO bought the remaining 49% interest in the Elga coking coal mine in Russia from AO Gazprombank in a \$594.8 million deal.
- Seabridge Gold Inc. unit KSM Mining ULC agreed to buy the Snowfield gold property in British Columbia from Pretium Resources Inc. in a \$120 million transaction

December 10, 2020 - [Ascot secures US\\$105M finance package for Premier construction](#)

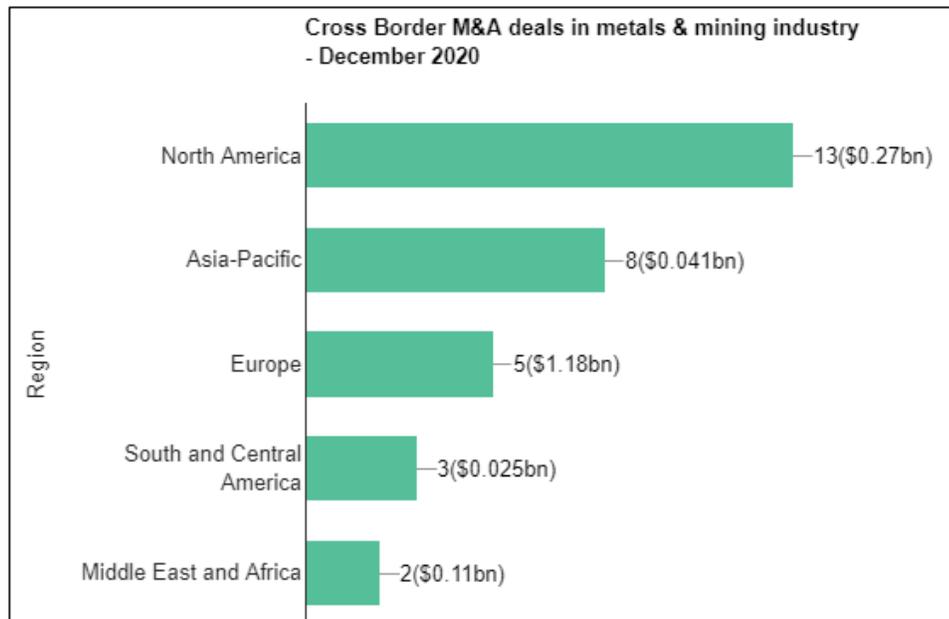
- Developer **Ascot Resources** has closed a US\$105-million project financing package with Sprott Private Resource Lending and Beedie Investments for development of its past-producing Premier gold project in B.C. and to repay existing outstanding convertible notes.
- The financing includes a US\$80-million senior credit facility, provided by Sprott, and a US\$25-million subordinated convertible facility, provided by both Beedie and Sprott.

December 2020 - [Metals deals insights: 2021 outlook \(PWC\)](#)

- Metals deal value and volume also saw increases from Q2-20 to Q3-20, the industry may have a longer road to recovery relative to other sectors.
- Despite the resurgence in deals activity in Q3-20, much of the uncertainty prompted by Covid-19 persists into Q4 and 2021.

January 19, 2021 - [Metals & Mining industry cross border M&A deals total \\$1.63bn globally in December 2020](#)

- Total metals & mining industry cross border M&A deals worth \$1.63bn were announced globally in December 2020, led by Sandvik's \$1.15bn acquisition of DSI Underground, according to GlobalData's deals database.
- The value marked a decrease of 20.1% over the previous month of \$2.04bn and a drop of 6.3% when compared with the last 12-month average, which stood at \$1.74bn.
- In terms of volumes, North America emerged as the top region for metals & mining industry cross border M&A deals globally, followed by Asia-Pacific and then Europe.
- The top country in terms of cross border M&A deals activity in December 2020 was Canada with five deals, followed by the US with five and Australia with three.



Appendix A - News Articles and Press Releases - Tahltan Nation

Interior News - [Tahltan ask visitors to stay away from their territory during COVID-19](#)
April 23, 2020

Tahltan ask visitors to stay away from their territory during COVID-19

Both Red Chris and Brucejack mines continue to operate under strict pandemic measures

THOM BARKER / Apr. 23, 2020 9:45 a.m. / LOCAL NEWS / NEWS



Map of B.C. showing Tahltan traditional territory in red. (File photo)

The Tahltan Central Government (TCG) is asking visitors to stay away from Tahltan territory during COVID-19.

"The Tahltan Nation is asserting our title and rights and respectfully asking all hunters, wildlife enthusiasts and non-residents to refrain from travelling to Tahltan Territory during COVID-19," said Chad Day, president of the TCG. In order to protect our communities, the Tahltan Nation encourage everyone in British Columbia to engage in all recreational activities where they reside."

In a press release issued this morning, the TCG noted its territory's remote location in the northwestern-most corner of the province, limited healthcare facilities, lack of adequate RCMP resources and large number of elders, makes the people there among the most vulnerable during the ongoing pandemic.

"The closest hospital from Tahltan Territory is approximately 600 kms away," the release stated. "We have a limited amount of aircraft, airport infrastructure, and pilots available for any emergency medical evacuations. Our clinics have very limited staff, that we desperately need for our local communities and Tahltan people. In fact, there is no longer a functional pharmacy in Tahltan Territory during this time."

It said the TCG Wildlife Department and wildlife guardians will be patrolling asking visitors to either follow provincial guidelines or leave if they are not.

"Only those providing essential services or strictly following approved COVID-19 prevention measures should be going to Tahltan Territory and only if they have no other option," it said.

The two operating mines in the territory, Red Chris and Brucejack, continue to produce.

Newcrest, the majority owner and operator at Red Chris, in its latest press release announced it has a \$20 million community support fund,

"The health and safety of our employees, contractors and surrounding communities is paramount in our planning and actions, with the primary focus being to minimise the risk of the virus reaching our sites and having effective plans in place to manage the implications should that occur," said Sandeep Biswas, Newcrest managing director and chief executive officer.

A spokesperson for the Tahltan said Newcrest has gone above and beyond their expectations to manage the risk.

Both mines have implemented numerous measures, as per provincial directives, to keep the mining operations, which were designated essential by the province, going.

These include, but are not limited to: restricted access for essential personnel only, suspension of non-essential mine activities; health screening of all personnel entering the mine sites; extension of rotation schedule to three weeks on, three weeks off; social distancing measures, both for travel and onsite; enhanced sanitation regimes; onsite self-isolation capacity; and onsite medical services.



TAHLTAN
Central Government



April 7, 2020

TAHLTAN NATION COVID-19 EMERGENCY MANAGEMENT UPDATE

Yesterday afternoon, the Tahltan Nation COVID-19 Emergency Management Team (TNCEMT) met again to discuss the ongoing COVID-19 pandemic and the threat to our Territory.

Important Message from Tahltan Leadership:

NON-TERRITORY RESIDENTS ARE CURRENTLY NOT WELCOME IN TAHLTAN TERRITORY

COVID-19 is not just a danger to our **ELDERS**. More and more, **ADULTS** and **CHILDREN** are starting to die because of this virus. **NONE OF US ARE IMMUNE.**

It cannot be stressed enough: **WE CANNOT AFFORD TO ALLOW FOR COVID-19 TO GET INTO OUR COMMUNITIES.**

By the time a person tests positive for COVID-19 in a Tahltan community, 50% of the community will likely have already been exposed. That means we will **LIKELY LOSE MOST OF OUR ELDERS** in that community. This virus will devastate our communities if we allow it to reach our Territory.

Right now, our communities are at a **CRITICAL STAGE**. Right now, we are **MOST VULNERABLE** because confirmed COVID-19 cases are both to the North and South of us.

Prevention is the only thing that stops this virus from reaching our communities and the only thing that will save Tahltan lives.

Please ensure you do the following:

STAY HOME: Unless you must go to work, or you are going onto the land to exercise with those in your household (people you live with).

AVOID ALL NON-ESSENTIAL TRIPS IN YOUR COMMUNITY: Stop going to other communities. Limit the number of times you to high traffic areas such as the store and post office.

SOCIAL DISTANCING: Do not gather in groups. Ensure you stay a minimum of 6 feet away from other people.

WASH YOUR HANDS REGULARLY: Wash your hands with soap for 20 seconds or more. Soap is the best-known remedy for killing this virus so wash frequently.

COUGH OR SNEEZE INTO ELBOW OR TISSUE: Cover your mouth and nose with a tissue when you cough or sneeze. Put your tissue in a waste basket. If you don't have a tissue, cough or sneeze into your upper sleeve, not your hands.

DON'T TOUCH FACE: Don't transfer the virus into your body by touching your face.

SELF ISOLATION: Anyone returning to the Territory must go directly to their home and self-isolate for no less than 14 days – so bring supplies with you. YOU MUST avoid all situations where you can accidentally or unknowingly pass the virus to our community members. Importantly, anyone can be a carrier, not have symptoms, and pass the virus to others. It is strongly recommended that those at higher risk, with compromised immunity including Elders, self-isolate. In other words, stay away from people outside your household. Overall, we ask that people stay at home as much as possible until we get through this severe threat we are faced with for the immediate future.

WEARING A NON-MEDICAL MASK: Wearing a homemade cloth mask in the community has not been proven to protect the person wearing it. Strict hygiene and public health measures, including frequent hand washing and physical (social) distancing, will reduce your chance of being exposed to the virus.

Wearing a non-medical mask is an additional measure you can take to protect others around you. Wearing a non-medical mask is another way to cover your mouth and nose to prevent your respiratory droplets from contaminating others or landing on surfaces. Just like our recommendation not to cough into your hands (instead, cover your cough with tissues or your sleeve), a mask can reduce the chance that others are coming into contact with your respiratory droplets.

If wearing a non-medical mask makes you feel safer and stops you from touching your nose and mouth, that is also good. But remember not to touch or rub your eyes.

It is important to understand that **non-medical masks have limitations and need to be used safely.**

DRINKING ALCOHOL: Alcohol damages your immune system, increasing your risk of catching COVID-19.

EASTER LONG WEEKEND

The Easter long weekend is almost upon us. Thankfully, the Easter Bunny has been deemed an essential service and will be arriving in Tahltan Territory next week.

Despite this, Tahltan Leadership implores everyone to respect the rules and regulations surrounding social distancing and refrain from getting together with family over Easter, outside of those you are currently living with.

We have yet to record a positive COVID-19 case. Please continue to do what you are doing.

Tahltan Nation COVID Website

TNCEMT understand that our members want to be informed, especially during times of crisis. That is why we have set up a Tahltan Nation COVID-19 Emergency Management webpage - <https://tahtlan.org/covid-19/> - where all of our members can inform themselves about COVID-19 and our response.

Red Chris (Newcrest)

If you have any questions or concerns regarding the new measures put in place at Red Chris please contact either:

Lorraine Callbreath

Email: lcallbreath@redchrismine.ca

Phone: 250-771-4200

Shannon Wilson

Email: swilson@redchrismine.ca

Phone: 604-800-9200 ext 162

Dease Lake Update

Last week the staff at People's Haven contacted every household in Dease Lake to request that a Dease Lake EMC questionnaire be completed. If your household was not contacted, please call the People's Haven at 250-771-5577. The information collected is very important and will help us determine which households and individuals may require support during this pandemic.

We know that Easter is just around the corner and many Dease Lake residents may not have all the Easter treats they usually do. The People's Haven has brought in Easter treats and will be delivering to families later this week. To make sure your children are on the list, please contact the People's Haven or message Tamara Dennis or Elizabeth Melia.

If you would like a sign to post on your door, to let people know whether you are allowing visitors, there are three available to choose from. Please pick them up at the Post Office or the Super A, located on the bulletin board in both locations.

On Tuesday's there will children's crafts delivered to families in Dease Lake. On Thursday's, staff will be doing deliveries and errands for those that are at high risk and do

not have a friend or family member who can do this for them. Arrangements must be made with the People's Haven before noon on Wednesday for your request to be done on Thursday. Please keep in mind that the purpose of this is to assist those who are at high risk to remain safe at home.

Canada Post is allowing only one person at a time in the facility as there is not enough room to allow for two meters distance between people. Please call ahead to see if you have mail to pick up: 250-771-5013. If you would like someone else to pickup your mail, please fill out an authorization form at the post office as CJ is not allowed to do so without this form filled out in advance.

Your Dease Lake EMC understands that it is hard to self-isolate and stay home, especially now that the sun is coming out and spring is arriving. It is ok to go outside, for a walk, fishing, snowmobiling, snowshoeing etc.; however, please get out and enjoy the spring weather with only those who reside in your household and always practice social/physical distancing.

Starting Monday April 6th your Dease Lake EMC is requesting that if you are leaving Dease Lake, if you have been out of town and are returning to Dease Lake, or if you have someone who is new to your home to please contact:

Kallene Louie at the Peoples Haven: 8:30 am to 4:30 pm Monday to Friday at 250-771-5577 alternate number is 250-771-3442

After hours please contact Andrea Louie at 250-771-3032

It is essential that as a community we do not travel unless necessary. Also, if you are returning to Dease Lake or are new to Dease Lake please follow the Self-isolation guidelines which have been provided via Facebook and Mailouts.

EMC Coordinator is Tina Etzerza - 250-771-3405 or 250-631-2442 - EMCDL@tahltan.org

Iskut Update

The Kluachon store is open Monday to Sunday from 11am to 12pm for Elders, those who are prenatal, families with newborn babies, and those with compromised health and from 12pm to 6pm for the remainder of community members. Only four carts have been placed outside the store to make sure there is only four people in the store at a time. After each person leaves the store the carts are completely disinfected. In addition, gas jockeys have been hired to pump fuel. Thank you to our Kluachon Staff for working so hard to ensure the health and well-being our community members.

The Klappan School staff went back to work last week. They have assigned shifts for employees to ensure social distancing guidelines are being complied with. Staff have been busy working on schoolwork packages and adjusting to online learning programs. Meduh Klappan School for adapting and rolling with these challenging times.

We now have a Supply Runner Team to help shop for people who are in self isolation or quarantine. This also applies to members who do not want to go to the store. Please refer to our Iskut page for the name and numbers of our Supply Runners. We are thankful and grateful that our Headstart has been handing out craft packages to households.

Telegraph Creek Update

We continue to prudently update our community members with critical information, including educating our community members about the importance of social distancing and how deadly this virus is. Our gate monitoring is going well as we continue to monitor who is coming in and out of our community. Bingo is a hit with the locals, and we are working on finding more things for people to do at home during this challenging time.

Employment, Contracting and Tahltan Businesses Update

TNCEMT understands that many of you will be negatively affected - employment wise - by what is happening. If you or a family members employment has been negatively impacted due to the virus, please reach out to the TCG's Employment Director Kody Penner employmentdirector@tahtlan.org. The Tahltan Nation is here to help assist you and your family through these trying times.

Please continue to check the Tahltan Nation COVID-19 Emergency Management webpage regularly - <https://tahtlan.org/covid-19/> - to inform yourself of the services and benefits that are available to you.

ENDS

Visitors aren't welcome during COVID on Haida Gwaii, at Tahltan Nation

Jul 30, 2020 5:19 PM By: Canadian Press



DEASE LAKE, B.C. — The Tahltan Nation has issued a notice that the public should avoid its territory in northwest British Columbia until there's a vaccine or community immunity for COVID-19.

The notice was issued Thursday, when the public safety minister also announced the restriction of visitors to Haida Gwaii, where 20 people have tested positive for the virus.

The Tahltan said in a statement that the consequences of spreading COVID-19 are too great, given the limited access to acute medical care for residents.

The nation's territory spans almost 96,000 square kilometres of land or about 11 per cent of the

x

2/1/2021

Visitors aren't welcome during COVID on Haida Gwaii, at Tahltan Nation - PrinceGeorgeMatters.com

All non-essential travel to Dease Lake, Iskut and Telegraph Creek should be avoided, and all recreational activity access points will be blocked with gates and monitored, the statement says.

It adds the RCMP is working with the province to get additional police and conservation officer support.

Indigenous communities in the Tahltan Territory are particularly vulnerable to a COVID-19 outbreak due to their highly social culture and limited access to timely testing and medical services, the statement says.

The Haida Nation has also called on visitors to stay away, particularly as local fishing lodges draw large numbers of people every summer.

Public Safety Minister Mike Farnworth announced Thursday the use of extraordinary powers to restrict non-resident travel to the archipelago of Haida Gwaii.

"Our foremost concern is the health and safety of all residents of Haida Gwaii, and we're working together to limit further spread of COVID-19," Farnworth said in a statement.

All cases in Haida Gwaii are believed to be linked to off-island residents or those who had contact with a local who travelled elsewhere.

Farnworth's ministry said testing for the islands has been prioritized and results are being received within 36 hours. Accommodations for those who must self-isolate are available if needed for anyone who has tested positive.

Health officials announced 29 new cases in the province, with five people in hospital, two of them in critical care.

Provincial health officer Dr. Bonnie Henry said an investigation is ongoing into an outbreak at Fraser Valley Packers in Abbotsford, where 59 cases have now been linked, up from 31 reported on Wednesday.

Henry suggested a surge in COVID-19 from crowds gathering in the central Okanagan on Canada Day should serve as a lesson for those getting together for the B.C. Day long weekend.

However, she said British Columbians have listened to concerns about the potential for widespread transmission of the virus and she's grateful to many residents who rejoined the collective effort to keep COVID-19 rates manageable.

"I want especially to thank young people who have taken this to heart," Henry said. "I know this is an anxiety-provoking time. It has been a challenge for young people, whether it's teens or people in their 20s and 30s when we don't know how long this is going to last."

An outbreak is currently underway in one care home in Vancouver.

X

2/1/2021

Visitors aren't welcome during COVID on Haida Gwaii, at Tahltan Nation - PrinceGeorgeMatters.com

Health Minister Adrian Dix said all care homes and assisted living facilities are expected to submit safety plans to their local health authority by next Thursday so one designated family member can visit a resident once a week.

"People have had three visits or more at certain care homes," Dix said.

"It's our expectation, in the coming months, to have the possibility of more visits."

— By Camille Bains in Vancouver.

This report by The Canadian Press was first published July 30, 2020.

The Canadian Press



Hunters and recreationists are being asked to turn around at numerous access roads in Tahltan Territory. (Tahltan Central Government photo)

Tahltan Nation stands behind road access closures to keep hunters, non-locals out

"We're going to continue to do that for as long as we have to."

REBECCA DYOK, LOCAL JOURNALISM INITIATIVE REPORTER / Aug. 26, 2020 10:00 a.m. / LOCAL NEWS / NEWS

Land guardians in a remote territory more than 1,700 kilometres north of Vancouver not only patrol Tahltan Territory but continue to blockade access points.

The Tahltan Central Government (TCG) held true to their words in stepping up the enforcement of a non-essential travel ban by blocking access to more than a dozen roads over the past few weeks in an effort to keep non-residents out.

TCG president Chad Norman Day believes they had no choice but to block access to the roads and the Stikine River Bridge area commonly used by visitors and hunters on jet boats.

He said despite industrial development occurring within the territory which has greatly contributed to B.C.'s economic growth, medical services and infrastructure remains critically limited.



Tahltan Central Government

about 5 months ago



TAHLTAN NATION TRAVEL ADVISORY

Thank you to all those resident hunters who have respected our Travel Advisory and have chosen not to come to Tahltan Territory this summer.

For those resident hunters who disrespect our Travel Advisory, the Tahltan Central Government's Wildlife Department and our Guardians will continue to blockade access points and patrol Tahltan Territory.... [See More](#)



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Read More: B.C. adds another 58 COVID-19 cases, one at Langley hospital

"I wish it was never necessary in the first place, and we certainly gave the province, the BC Wildlife Federation and other stakeholders plenty of notice that our position had

always been consistent—that we didn't want an influx of further visitors to Tahltan Territory and I'm still very disappointed in the response," Day said.

Hunting and fishing were declared an essential service by the B.C. government in late April—a move that the BC Wildlife Federation (BCWF) considers 'great news.'

The BCWF said while they support the request for hunters to stay away from small communities, they believe that hunting can be conducted in a safe manner in remote parts of the province where little or no contact will be made with people outside of the hunters' immediate group or bubble.

Read More: [Tahltan Nation closes hunting and recreational activity access points](#)

"We do not support restrictions for entire "traditional territories," especially restrictions that specifically target hunters," stated BCWF wildlife committee chair Gerry Paille in an emailed statement, adding the BCWF has a record of working with First Nations on improving wildlife and habitat for wildlife in Tahltan, Tsilhqot'in and other First Nations' traditional territories.

Day estimates the TGC has spent more than \$200,000 for better medevac support and ensuring the closure of the access roads which will be monitored by Tahltan guardians and gatekeepers as well as video surveillance.

"Our leadership understands now more than ever that these lack of services and infrastructure and resources put our people at risk, and I think the COVID-19 circumstances have really emphasized some of the structural problems that we've had for way too long, and the province's response to things

around the hunting season, the medevac issues, and other problems like the lack of a pharmacy for example — we're not going to tolerate it anymore," he said.

Day said he personally and the Tahltan Central Government have been the targets of racist and threatening messages on social media because of the blockades.

The BCWF said they have received some emails and phone calls expressing concerns about the situation in Region 6.

Read More: [BCWF: Hunting, fishing listed as essential service during COVID-19 pandemic](#)

"The BC Wildlife Federation does not entertain or condone racist actions and promotes respectful and well-informed dialogue with all," Paille said.

A spokesperson with the Ministry of Forests, Lands and Natural Resource Operations said they ask anyone who is looking to recreate, including hunting and fishing, to do their research before they leave home, respect the wishes of local communities and follow local travel advisories and guidance.

"While hunting was declared an essential service, this in practice refers to hunting locally for food cultivation to support sustenance harvest opportunities," the spokesperson said.

"Travelling to hunt is considered recreational and therefore is non-essential."

Appendix B - News Articles and Press Releases - Nisga'a Nation

Press Release – [Nisga'a Lisims Government declares a state of local emergency on Nisga'a Lands](#)
September 4, 2020

21 FOR IMMEDIATE RELEASE: Nisga'a Lisims Government declares a state of local emergency on Nisga'a Lands | Nisga'a Lisims Gover



Nisga'a Lisims Government

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NISGAANATION.CA

FOR IMMEDIATE RELEASE

Nisga'a Lisims Government declares a state of local emergency on Nisga'a Lands

September 4, 2020 – Gitlaxt'aamiks, B.C. – Today, the Nisga'a Lisims Government Executive (the "Executive") exercised its authority under the *Nisga'a Emergency Program Act* (the "Act") to declare that a state of local emergency exists on Nisga'a Lands and in all four Nisga'a Villages, due to known occurrences of the COVID-19 virus on Nisga'a Land and the threat of further infection through contact if the situation is not contained (the "Declaration"). This Declaration allows NLG to use extraordinary powers under the Act to support the COVID-19 pandemic response on Nisga'a Lands. The state of local emergency will be in effect for 7 days, but may be extended or rescinded as necessary.

The Declaration was made by the Executive on the advice of the Nisga'a Valley Health Authority ("NVHA"), the designated health services provider of the Nisga'a Nation, following the recent confirmation that individuals residing on Nisga'a Lands had tested positive for the COVID-19 virus. NVHA and the NLG Emergency Preparedness Committee recommended that certain temporary emergency measures be taken to limit the risk of the further spread of the COVID-19 virus.

"The presence of the virus on Nisga'a Lands creates an imminent and serious threat to the health of Nisga'a citizens and other residents of Nisga'a Lands" said Eva Clayton, President of the Nisga'a Nation. "The Executive has determined that prompt coordination of action and special regulation of persons was necessary to protect the health and welfare of Nisga'a citizens and surrounding residents. The Declaration and the orders made under it set out the procedures that must be followed to prevent, respond to and alleviate the effects of the known occurrences of the COVID-19 virus on Nisga'a Lands", President Clayton added.

The orders made under the Declaration: (1) prohibit travel to and from Nisga'a Lands except as required for an essential purpose; (2) require residents of Nisga'a Lands and individuals permitted to enter or exit Nisga'a Lands for an essential purposes to provide information for the purposes of contact tracing and to self-isolate if those persons have come into contact with an individual who tested positive for COVID-19; and (3) prohibits gatherings on Nisga'a Lands unless authorized by NLG and, if authorized, limits gatherings to only 20 people or less for cultural or ceremonial purposes.

NLG is coordinating the measures to be taken in respect of the Declaration with the province, and will continue to work with the province to minimize the risks to the health of Nisga'a citizens, residents of Nisga'a Lands and all British Columbians.

"The declaration of the state of local emergency will allow our government to take the actions that are required to keep residents of Nisga'a Lands safe", said President Clayton. "The orders are necessary to

{00061706;3} -30-

ensure public safety and are not optional, and are made today for the safety and well-being of our people and all British Columbians."

Media Inquiries:

Communications & Intergovernmental Relations

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Nisga’a Nation Declares State of Local Emergency & Villages Implement Temporary Lock Down Measures

November 26, 2020 - New Aiyansh, B.C., In light of rising numbers of COVID-19 in the Nass Valley, the NLG Executive on the recommendation of the Nisga’a Emergency Preparedness Committee has declared a state of local emergency.

The positive cases are linked to two family events that took place in the Nisga’a Village of New Aiyansh. The Gitlaxt’aamiks Village Government took immediate steps to implement lock down measures (Communique attached), including the closure of all offices, a curfew for residents and access monitoring in and out of the community.

“We are all in this together,” said President Eva Clayton. “We must follow all Provincial and Nisga’a Health Orders to ensure we stop further spread of this serious virus.”

Nisga’a Valley Health continues to conduct COVID-19 testing and as of today’s date 21 positive laboratory COVID-19 tests have been confirmed.

“NVHA is working closely with our partners, NLG EPC, Northern Health Authority and First Nations health authority in ensuring we are all working together to protect our community members.” said NVHA Chief Executive Officer Brandi Trudell-Davis. “We are meeting regularly and, undertaking comprehensive COVID-19 management action. However health management is a reactive process, we look to our Nation, communities, families and individuals to actively take precautionary measures to stop the spread. We are all in this together and it is the only way we will all get through this.”

Nisga’a Valley Health Authority is working collaboratively with Northern Health to monitor the active cases and ensure appropriate contact tracing measures are taking place.



Tests Conducted Since November 20, 2020:

This table show tests conducted since the first confirmed cases on November 20th

Tests Conducted To Date:	Tested Negative for COVID-19	Tested Positive for COVID-19:	Pending Results	Recovered
136	57	21	58	-

Total Tests Conducted to Date:

This table shows total cumulative testing results since Nisga'a Valley Health began testing at the beginning of the pandemic:

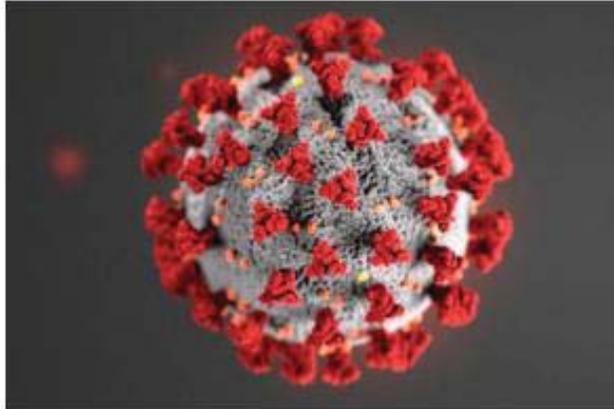
Tests Conducted To Date:	Tested Negative for COVID-19	Tested Positive for COVID-19:	Pending Results	Recovered
722	638	24	60	3

Nisga'a Valley Health Authority's COVID-19 Hotline is now active, and any member of the public may contact them for any COVID-19 related questions: 250 633 5048, and afterhours call 8-1-1.

The Nisga'a Emergency Preparedness Committee will continue to provide updates as new information is available.

Please check www.nisgaanation.ca/covid-19 for all information in relation to the Nation's COVID-19 response.





COVID-19. (Image courtesy CDC)

COVID-19 case numbers continue to climb in Terrace area

Area had one of highest rates in B.C. per 100,000
people

JAKE WRAY / Jan. 4, 2021 3:30 p.m. / LOCAL NEWS / NEWS

COVID-19 cases continued to climb in the Terrace area
during the holidays.

Kitselas First Nation is experiencing a cluster of cases, the
Nisga'a Nation has seen cases increase since mid-
December and Kitsumkalum First Nation is on high alert. The
situation for Terrace itself is not as clear — Northern Health
and the BC Centre for Disease Control (BCCDC) have not
provided updated case numbers for Terrace since Dec. 26.

There are 10 active cases in the Kitselas cluster, according to
a video update posted on the Kitselas Emergency Response
Division Facebook page Dec. 31. All Kitselas offices are

closed until further notice, according to an information bulletin
issued by Kitselas Band Council on Jan. 3, and some
Kitselas office workers were affected by the cluster of cases.

Don Roberts, chief councillor of Kitsumkalum First Nation, released a letter Dec. 31 noting the cluster in Kitselas and asking all Kitsumkalum members to follow provincial health orders, and, particularly, to avoid social gatherings.

The Nisga'a Nation reported a resurgence of cases in a news release on Dec. 30. There are currently 31 active cases and 2 recovered associated with the current cluster of cases as of Jan. 3, according to the Nisga'a Valley Health Authority. The nation had previously eased pandemic safety restrictions on Dec. 11, when cases in the valley seemed to be declining following a spike in cases late November.

The most recent information on COVID-19 cases for Terrace itself comes from the BCCDC and Northern Health. That data shows 31 cases among residents of the Terrace area (which includes Kitselas and Kitsumkalum) between Dec. 20 and Dec. 26. For that time period, Terrace had one of the highest average daily rate of cases per 100,000 people, rivalling only Surrey, Abbotsford, Burns Lake and Revelstoke.

The BCCDC published more recent COVID-19 case numbers for the northwest district of Northern Health's coverage area. That data shows 55 new cases reported between Dec. 25 and Dec. 31 for the northwest district, which stretches from Kitimat to Haida Gwaii to the B.C./Yukon border. However, that data may be inaccurate, according to a note posted next to the data on the BCCDC website.

"A data discrepancy has been identified in Northern Health case counts. The data will be corrected and updated in the next refresh on Jan. 7," the note reads.



NLG Executive Declares State of Local Emergency and Implements Measures To Prevent The Spread of COVID-19

New Alyansh, B.C. – January 12, 2021: Given the alarming rise in COVID-19 cases in the Nass Valley, the NLG Executive held an extraordinary meeting to consider declaring a State of Local Emergency. The decision was unanimous and the State of Local Emergency will be in effect **Tuesday January 12, 2021 to Tuesday January 19, 2021**, with the possibility for extension if required.

What does this mean?

- There is an imminent threat of transmission when people gather outside of their immediate household bubbles
- The Executive has implemented specific Orders (attached) that include prohibiting travel between Nisga'a Villages, implementing security monitoring, in addition to the existing province-wide prohibition of social gatherings and events.
- Nisga'a Enforcement Officers will have the power and authority to issue fines to individuals who are in contravention of the Orders, which are in addition to the RCMP's powers to issue fines for contravening the current province-wide prohibition on social gatherings and events and other provincial orders.

Further detailed information with respect to the Orders is contained in the attached Plan.

"We have heard from our medical health professionals that the virus is not moving, people are moving", said President Eva Clayton. "We need to remain still to stop the spread of COVID-19 in our communities."

During the state of local emergency, each Nisga'a Village Government will provide support to residents as required, including those households who have tested positive for COVID-19.

NVHA COVID-19 Test Results:

NVHA's Medical Director has provided daily updates on COVID-19 testing, and between December 28 to today, 68 individuals who have tested positive.



{00065823;2}



This table show tests conducted since the first confirmed cases on December 28th:

Tests Conducted To Date:	Tested Negative for COVID-19	Tested Positive for COVID-19:	Pending Results	Recovered	Active
202	114	68	20	39	28

Other important orders include:

- Wear your masks in all public places and anytime you leave your home.
- Remain in your core bubble. Please do not visit family or other people's homes.
- Social distance from anyone outside your immediate home and core bubble.
- Wash your hands regularly. Use hand sanitizer when you can't.
- Essential travel only (work, medical appointments, and essential needs)
- Avoid large public, and all small house gatherings

Please check www.nisgaanation.ca/covid-19 for all information in relation to the Nation's COVID-19 response.

Continue to stay safe!



(00065423;2)



NLG Executive Extends State of Local Emergency

New Aiyansh, B.C. – January 20, 2021: The NLG Executive met and decided unanimously to extend the State of Local Emergency (“SOLE”) that was declared for a seven-day period from January 12 – January 19. The Minister of Public Safety & Attorney General has been notified of the Executive’s decision to extend the SOLE. Following updates will provide information on timelines of the SOLE.

State of Local Emergency – What does this mean?

In order to control the spread of COVID-19, we need to remain at home in our own household bubbles. We should **not** visit other homes for any reason. Doing so jeopardizes the health and well-being of all – especially our elderly population and those that are vulnerable due to other health conditions.

The SOLE implements the attached plan, that among other things will:

- **Prohibit travel between Nisga’a Villages,**
- **Implement security monitoring in each Nisga’a Village**
- **Prohibit gatherings and events of any sort, and**
- **Issue fines to individuals who are in contravention of the orders**

If you know of individuals contravening Provincial or Nisga’a Orders, you are encouraged to report the situation to the RCMP or through NLG Compliance & Enforcement’s online reporting tool at <http://reportviolation.nisgaanation.ca/>

Vaccination Roll Out Plan:

Vaccinations are coming.

Nisga’a Valley Health Authority has been working in collaboration with Northern Health Authority and First Nations Health Authority and had expected to receive the first shipment of the Pfizer vaccine for elders 65+ Tuesday, January 19, 2021. However, Monday morning NVHA received unfortunate notification from Northern Health Authority that there is a Province-wide delay in shipments which affected the Nisga’a Nation’s allocation of the vaccination.



NVHA administration and nursing, in collaboration with FNHA and NHA, have a comprehensive Vaccine Roll out plan that is ready for implementation as soon as vaccines arrive. NVHA staff will be contacting elders 65+ directly to book appointments as soon as they receive notification of the vaccine shipments. As NVHA is following all COVID restrictions, all vaccine appointments will be pre-booked. Staff have up to date contacts from each Nisga'a Village Government. Please do not contact health offices for information on vaccine appointments as this greatly affects our ability to ensure we are getting through call out lists quickly.

If you have general concerns about the COVID-19 vaccines please refer to BCDC website: [Vaccines for COVID-19 \(bccdc.ca\)](https://www.bccdc.ca), FNHA: [COVID-19 \(Novel Coronavirus\) \(fnha.ca\)](https://www.fnha.ca). For specific information on if you should receive that vaccine, please make an appointment with NVHA physicians or contact FNHA Dr of the Day: **Phone** (toll-free, 7 days a week, 8:30 am to 4:30 pm): **1-855-344-3800**.

The NLG Executive Officers have urgently reached out to Provincial and Federal Health Ministers to prioritize the Nisga'a Nation's receipt of the vaccine and will keep Nass Valley residents updated on the status of those discussions.

NVHA COVID-19 Testing:

Since yesterday's report we have received two additional positive test results and three more people have recovered, so we now have **21 people with "active" infections**; 4 COVID tests were performed yesterday and we have 19 results pending.

COVID testing since 28-Dec-2020:

Tests Conducted To Date:	Tested Negative for COVID-19	Tested Positive for COVID-19:	Pending Results	Recovered	Active
268	159	90	19	68	21

Please continue to stay safe, stay within your household bubbles and check www.nisgaanation.ca/covid-19 for updates.



Appendix C - News Articles About Mining Industry Struggling With COVID-19

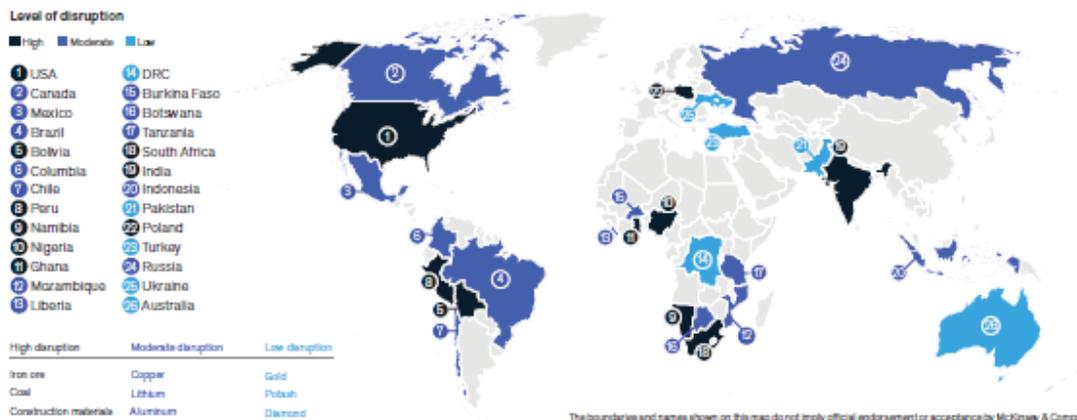
McKinsey & Company - [MineLens survey confirms the significant impact of COVID-19 on mining operations](#)
August 2020

MineLens survey confirms the significant impact of COVID-19 on mining operations

COVID-19 is affecting every type of business, including mining and metals industry, and so we've taken a closer look into how it has impacted mining operations specifically. Launching the MineLens Industry Survey in early July has allowed us to collect insights from >60 senior executives, mine managers, and owners to investigate the current state of the industry. (To get a more granular perspective on the impact of COVID-19 on selected commodities, read our latest article on [McKinsey.com](#), "Lessons from the past: Informing the mining industry's trajectory to the next normal.")
The survey revealed that:



COVID-19 impacted mining operations globally, however there are some regional and commodity trends:



Production

Has decreased by ~42%. Planned production reduction for 2020 was ~30%. The main reasons for this decrease are a reduction in demand and limited workforce.



Has production increased/decreased/remained the same?

Decreased (Black)
Remained the same (Dark Blue)
Increased (Light Blue)

Operating costs

Most operating costs have increased by ~16%. The main reasons for this are additional infrastructure and transportation costs.



Was there any change in operating costs observed?

Decreased (Black)
Remained the same (Dark Blue)
Increased (Light Blue)

Supply and demand

Half of the respondents have experienced major disruptions in final product delivery, which is mainly due to reduction in demand and downstream consumption.

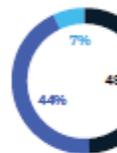


Was a disruption in supply & demand observed?

No disruption, and none expected (Black)
No disruption yet, but expecting disruption in 4-6 weeks (Dark Blue)
Already experiencing disruption (Light Blue)

Capital costs

Half of all operations have decreased their 2020 budgets. The main reasons cited were "cancellations" and "pause of expansions".



Has the capital budget been impacted?

Decreased (Black)
Remained the same (Dark Blue)
Increased (Light Blue)

Most respondents mentioned that their highest priority is workforce and mine planning



You can find more information on MineLens at <https://www.mckinsey.com/industries/mining-and-metals/how-we-help-clients/mine-lens/survey> or by e-mailing us at mine-lens@mckinsey.com
Copyright © McKinsey & Company, August 2020
Source: MineLens COVID-19 impact survey on mining operations, July 2020



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Gold Stocks Still Correcting

October 23, 2020



Adam Hamilton
Zeal Research, Zeal LLC

31
Shares



The gold miners' stocks are still correcting, continuing to rebalance both technicals and sentiment. This sector's huge surge into early August spawned extreme overboughtness and universal euphoria, which are gradually being bled away. This same necessary and healthy corrective process is underway in gold itself, which overwhelmingly drives gold-stock price levels. This is leading to great buying opportunities.

Gold-stock speculators and investors are growing weary, wondering when miners' next upleg will finally get running. *Fully 2.5 months* have passed since the gold stocks were rocketing higher with gold last summer, generating great excitement. Since then this sector has gradually ground sideways to lower, leaving traders increasingly discouraged. More are abandoning gold stocks as weeks drag on into months.

Corrections certainly aren't easy to weather psychologically. Their mission is to eradicate the universal greed at preceding upleg topplings. That means gutting traders' enthusiasm for a hot sector that has just soared. Losses unfolding and deepening over time are the only way to swing

the sentiment pendulum back from euphoria to apathy to despair. That requires the great majority of traders to be *forced to capitulate*.

While much progress has been made in this hard process, it doesn't look over yet. Corrections generally don't end until the opposite extremes that spawned them are seen. Upleg topplings' overboughtness must yield to *proportional oversoldness*, and popular greed must be displaced by

fear. Only then is this sector reset and ready to start marching higher in its next major bull-market upleg. That opportune time is nearing.

Gold stocks' correction progress can be evaluated in this sector's leading benchmark and trading vehicle, the GDX VanEck Vectors Gold Miners ETF. GDX's recent technical action considered in the essential context of its bull-market precedent offers lots of clues about how close this correction likely is to giving up its ghost. This first chart looks at this secular gold-stock bull through this GDX lens, offering crucial perspective.

It includes a construct called the Relative GDX, or rGDX. That simply divides this gold-stock ETF's daily closes by their 200-day moving average, and charts the resulting multiples over time. These tend to form *horizontal trading ranges* that flag when this sector is really overbought or oversold, the times to sell and buy. This is based on my effective and very-profitable [Relativity Trading](#) system if you want more background.





Gold stocks' last upleg was massive, rocketing 134.1% higher in just 4.8 months per GDX! Those huge gains erupted from gold stocks being battered to [fundamentally-absurd lows](#) during March 2020's pandemic-lockdown-spawned stock panic. Such a big-and-fast jump left this sector

extremely overbought and generated universal euphoria. By early August nearly everyone expected that surge to persist indefinitely.

But big-and-fast gains leading to major highs are never sustainable for long. They fuel great excitement for the rallying sector, attracting in lots of new capital from speculators and investors chasing that upside momentum. But since traders' capital is finite, soon their aggressive buying *exhausts itself*. As everyone interested in buying in to gold stocks anytime in the near future gets fully deployed, capital inflows peter out.

GDX hit that terminal upleg-slaying phase over several weeks leading into early August, where this ETF blasted 19.8% higher. That didn't feel excessive to many, but annualized to a nearly-300% pace of gains that is wildly unsustainable! That Relative GDX multiple traded at 1.448x the day this ETF peaked, or in other words GDX was stretched *nearly 45% above* its 200dma. Mighty past uplegs failed near those levels.

While this year's blistering post-panic gold-stock upleg was this secular bull's fourth, the only other big-and-fast comparable one was its maiden upleg. In largely the first half of 2016, GDX rocketed 151.2% higher in 6.4 months! The rGDX was trading way up at 1.567x when that peaked, well into the historical extreme-overboughtness levels exceeding 1.50x. Anything around there is the danger zone *for major toppings*.

I warned about gold, silver, and their miners' stocks [getting very overbought](#) in late July. When that starts to happen after uplegs see big-and-fast gains to major new highs, the prudent strategy is to ratchet up the trailing-stop-loss percentages on open gold-stock trades. That helps traders ride uplegs' gains for as long as possible, while also locking in more of their profits when those uplegs inevitably roll over into corrections.

Indeed the red-hot gold stocks soon started correcting, and those tighter trailing stops *realized big gains* for those who wisely ran them. GDX's initial selloff out of its lofty early-August peak was fast, as this key ETF plummeted 12.2% in just four trading days! That sharp plunge exceeding the 10% correction threshold confirmed one of those major selloffs was underway, a big warning to traders still bullish on gold stocks.

But GDX bounced sharply out of those initial lows, and spent the next 5 weeks or so consolidating

high. As usual the gold stocks were just mirroring and amplifying what was happening in gold. The major gold stocks of GDX tend to leverage material gold moves *by 2x to 3x*. Gold-stock prices amplify gold's price action because that metal's fortunes overwhelmingly drive their profits. So as goes gold, so go the miners.

This sector's high consolidation from mid-August to mid-September really retarded this correction's critical rebalancing work. Over 5 weeks or so GDX rebounded 9.7% to claw back up to just 3.7%

under early August's peak levels. I tried to warn traders not to be lulled into complacency, writing an essay in early September arguing gold stocks were [still in correction mode](#). I got a lot of flak for that contrarian stance.

But sure enough since overboughtness hadn't been worked off and greed remained high, that corrective selloff soon reasserted itself in late September. GDX plunged another 12.2% in a week, extending its total selloff since early August's peak to *15.4% in 1.6 months*. The rGDX hit a new correction low of 1.135x that day. While that was no longer extremely overbought, it still remained far above oversold levels.

And that mounting gold-stock correction still looked really anemic based on bull-to-date precedent. It is always important to compare recent gold-stock price action with what has come before it. That context offers a hard empirical framework from which to game this sector's near-term outlook. While uplegs and corrections never repeat exactly throughout bulls, they often rhyme clocking in at similar sizes and durations.

During this gold-stock bull's first three corrections, GDX plunged 39.4% over 4.4 months, 31.3% over 19.1 months, and 38.8% over 0.6 months. That averages out to *36.5% over 8.0 months!* Gold stocks' volatile reputation is well-deserved, and a big reason this sector is so appealing to trade. This fourth correction's 15.4% over 1.6 months at worst is still way short of bull precedent, even after this bull's second-biggest upleg.

And the rGDX reads at earlier correction bottoms show how far gold stocks would still need to fall to hit similar deeply-oversold levels. The major gold stocks were blasted to an average of only 0.754x their 200dma in GDX terms before new uplegs were born! That's a long way down from both that 1.135x seen in late September and this correction-to-date's nadir of 1.132x in early October. *This selloff isn't over!*

That doesn't mean GDX has to collapse 35%+ again before gold stocks' next major upleg can get underway. Each of those three prior corrections had extenuating circumstances deepening them beyond normal levels. They were exacerbated by gold getting crushed after Trump's surprise victory in 2016, cascading gold-futures selling in mid-2018, and this year's rare stock panic in March. Those were all exceptional events.

But it's hard to imagine GDX not *at least correcting 20% to 25%* to rebalance sentiment after such great euphoria in early August. GDX peaked at \$44.48 on August 5th, a 7.5-year secular high. At worst on September 23rd, it closed at \$37.63 which was down that mild 15.4% in just 1.6 months. And this week GDX is back up to \$39.90. Gold stocks would have to fall much farther to extend this correction to 20% to 25%.

That's still *another 10.8% to 16.4% lower* from here! And that's just in the major gold stocks dominating GDX. The smaller [mid-tier producers](#) with superior fundamentals and better upside potential during gold uplegs see gains and losses exceeding GDX's. So for speculators and investors looking to buy back in to gold stocks to ride their next upleg, much-better entry opportunities are likely still coming in the near future.

The ultimate depth and length of this necessary and healthy gold-stock correction is totally dependent on *gold's own*. Given the major gold stocks' strong 2x-to-3x leverage to gold, its fortunes offer better angles on gaming GDX correction bottomings. This next chart applies this same Relativity analysis to gold itself, looking at it as a multiple of its 200dma technical baseline. Gold hasn't revisited that key support yet either.



The parallel gold correction forcing this gold-stock one has only extended to 9.8% over 1.6 months at worst so far, hitting an rGold level of 1.085x. Like gold stocks, that's all on the light side compared to this bull's prior corrections. They averaged 14.3% gold losses over 4.1 months, bottoming at 0.926x gold's 200-day moving average. Gold too *needs to correct more* before getting oversold and eradicating greed.

The strongest support zones for major corrections are these 200dmas. This week gold's is way down near \$1754, another 8.8% lower from current levels! And GDX's is down at \$34.27, another 14.1% lower from here. That makes for *considerable downside risks* for both this metal and the stocks of its miners. 200dma approaches are almost always seen before bull-market corrections finally give up their ghosts.

Because gold and GDX soared so fast in such massive uplegs into early August, their 200dmas are still rapidly climbing as well. Corrections work through both the size of their losses and the time they take to unfold. Deeper faster corrections return prices to their 200dmas more rapidly, compressing the pain into a shorter timeframe finishing the necessary rebalancing work sooner. These are more beneficial to traders.

Corrections can also stretch out into shallower *high consolidations*, giving rising 200dmas more time to catch up with relatively-high prices. These are slower to unfold, as the rebalancing of technicals and sentiment take considerably longer to accomplish in a grinding-sideways environment. The possibility remains that gold and thus gold stocks simply drift horizontal long enough to evade rolling over into deeper selloffs.

This is the preferred outcome for longer-term investors, who don't cash out before corrections and don't want the psychological angst of watching them unfold. But one key factor is really ramping the odds for a more-serious gold correction rather than the milder drift. That is the *fortunes of the US dollar*, which gold-futures speculators look to for trading cues. Their super-leveraged bets wield outsized gold-price influence.

I wrote an entire essay last week analyzing why today's [low dollar is risky for gold](#). The US dollar *remains really oversold* after being heavily shorted this past summer, which was a big reason why gold and miners' stocks shot parabolic into early August. Thus this world reserve currency is overdue for a mean-reversion rebound rally to rebalance its own technicals and sentiment. That implies considerable dollar upside from here.

As of the middle of this week, the leading US Dollar Index benchmark remained 4.3% under its 200dma. As major currencies usually move with glacial slowness, a 4%ish dollar rally would *wreak havoc on gold prices* that haven't fully corrected yet. And a US-dollar rally is increasingly likely with

the improving US economic outlook reducing Congress's motivation to pass another massive pandemic-stimulus-spending bill.

This gold correction so far since early August has seen eight major down days exceeding 1% losses. Every single one of them happened on a USD \times up day. During those gold averaged ugly 2.4% daily plunges on mere 0.5% average USD \times rallies! That's because a stronger dollar unleashes *leveraged gold-futures selling* which quickly hammers gold lower. If 0.5% does that kind of damage, imagine what 4%+ would do!

And if the overdue US-dollar rebound forces gold lower, rest assured the major gold stocks of GDX will follow it down amplifying its losses by 2x to 3x. Since neither gold nor gold stocks have come anywhere close to revisiting their 200dmas yet which are major correction support, odds are these selloffs haven't run their courses. So it remains prudent to *expect more selling* before these bulls' next major uplegs start marching.

There's another way to gauge gold stocks' correction progress. At worst so far gold is down about 10% compared to about 15% for GDX. That is just 1.5x downside leverage for the major gold stocks, really lagging their 2x to 3x precedent. These bulls' prior-correction averages of 14.3% for gold and 36.5% for GDX work out to 2.5x leverage right in the middle of that historic range. That's likely again in today's selloff.

That implies a 25% GDX correction even if gold doesn't fall much farther than 10%. And if gold retreats all the way back to its 200dma today which would make for 15% total, that major-gold-stock correction would exceed 37% at 2.5x! I don't expect it to go that deep, as gold stocks didn't hit the *extraordinarily-overbought levels* gold did in early August. But GDX falling another 10% to 15% from here wouldn't surprise.

Successful speculation and investment demand buying relatively low before later selling relatively high. Waiting for those optimal buy and sell points defined by correction bottomings and upleg topplings sure requires lots of patience. But that's the surest way to multiply your wealth in the stock markets, only trading when probabilities for success *are wildly in your favor*. Those are the best times to bet big to win big!

And right now is not one of them. Both gold stocks and gold are in confirmed corrections after soaring in enormous uplegs. And neither the miners nor their driving metal have yet given the important technical green lights to confirm likely correction bottomings. So we have to assume these corrections are ongoing until evidence to the contrary. Thus weathering these necessary selloffs in cash remains the best option for now.

Both speculators and investors should embrace these inevitable rebalancing corrections, as they yield the *best mid-bull buying opportunities* within ongoing bull markets. That is when to aggressively redeploy in gold, gold ETFs, gold-stock ETFs, and individual gold stocks with superior

tundamentals. Bulls' inexorable upleg-correction cycles are great boons for traders, greatly expanding their potential gains to be won!

At Zeal we started aggressively buying and recommending fundamentally-superior gold and silver miners in our [weekly](#) and [monthly](#) subscription newsletters *back in mid-March* right after the stock-panic lows. We layered into dozens of new positions before gold stocks grew too overbought, which were stopped out later at huge realized gains running as high as +199%! Our subscribers multiplied their wealth within months.

To profitably trade high-potential gold stocks, you need to stay informed about what's driving gold. Our popular newsletters are a great way, easy to read and affordable. They draw on my vast experience, knowledge, wisdom, and ongoing research to explain what's going on in the markets, why, and how to trade them with specific stocks. [Subscribe today](#) and take advantage of our *20%-off sale!* Corrections are the time to do your gold-stock homework, preparing to redeploy as they pass.

The bottom line is gold stocks are still correcting. Their necessary selloff to work off overboughtness and rebalance sentiment after their latest upleg peak hasn't finished its mission. The major gold stocks per GDX have yet to revisit oversold levels and eradicate early August's universal greed. And they haven't yet fallen far enough to leverage gold's own correction by their normal 2x to 3x, arguing more selling is coming.

Like usual the depth and duration of this gold-stock correction is fully dependent on gold's own. And that doesn't look over yet either since gold remains so far above its key 200-day-moving-average correction-bottoming support zone. Gold is at risk of serious gold-futures selling as the oversold US dollar inevitably mean reverts higher. That will likely really accelerate this gold-stock correction, forcing it closer to climaxing.

Adam Hamilton, CPA

October 23, 2020

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About the author



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Teck Resources profit misses estimates as prices of steelmaking coal tumble

27TH OCTOBER 2020 BY: REUTERS



Canada's Teck Resources missed analysts' estimates for quarterly profit on Tuesday, hurt by a steep drop in the prices of steelmaking

coal, sending it US-listed shares down 8.2% in pre-market trade.

Miners globally have been struggling after the Covid-19 pandemic wreaked havoc on commodity markets, forcing companies to shut mines, slash production and even wind down some operations.

Teck said labor intensive activities such as maintenance, mine operations and projects continue to be impacted by Covid-19 safety

protocols.

The company, however, said construction work at its Quebrada Blanca Phase 2 copper mine in Chile was being ramped up and it was expecting the project to be about 40% complete by year end.

Work at the site was suspended in March and remains partially on hold to limit the transmission of Covid-19.

Average price realized for steelmaking coal dropped 34.6% to \$102 per tonne in the third quarter, while sales stood at 5.1-million tonnes compared with 6.1-million tonnes a year earlier.

The Vancouver-based miner also cut its forecast for copper production for the second half of the year by 5 000 t and now expects it to be between 14 000 t and 155 000 t.

Copper sales in the quarter fell to 69 000 t from 75 000 t.

Teck said profit attributable to shareholders was C\$61-million (\$46.26-million), or 11 Canadian cents per share, in the quarter ended September 30, compared with C\$369-million, or 66 Canadian cents per share, a year earlier.

Excluding items, it posted a profit of 24 Canadian cents per share, missing analysts' average estimate of 27 Canadian cents, according to IBES data from Refinitiv. ■

Top mining dealmaker says takeovers all talk until recovery

Bloomberg News | November 2, 2020 | 8:24 am [Intelligence: Top Companies](#) [Gold](#)



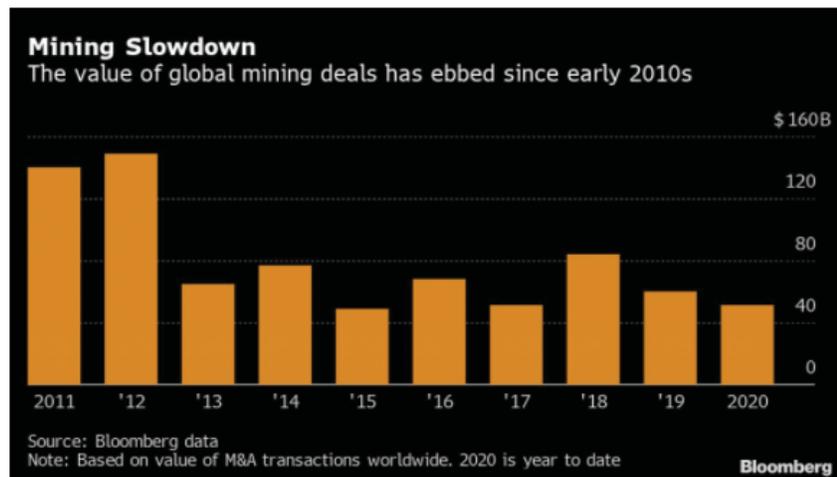
Top mining dealmaker says takeovers

Stock image.

Miners are engaging in plenty of takeover talks despite a tepid year for acquisitions, but few deals will get done without greater clarity on the economy and an ebbing of covid-19, said the industry's top dealmaker.

"There's lots of conversations going on, lots of people exploring new ways to think and new ways to operate," Dan Barclay, who heads Bank of Montreal's capital-markets division, said in an interview last week. "The probability of a lot of action is going to be conditional on that economic recovery."

For years, mining executives including Barrick Gold Corp.'s Mark Bristow have been saying that [consolidation](#) in the industry is inevitable given the abundance of companies and increasing difficulty of finding new high-grade deposits. That could be a boon for investment banks including BMO Capital Markets, among the most active dealmakers in mining and the No. 1 adviser for acquisitions last year.



Mining companies have been involved in about \$52 billion of acquisitions this year, according to Bloomberg data. That's less than half the value of deals seen during industry consolidation in the mid 2000s and following the end of the financial crisis.

The inability of companies to undertake due diligence amid Covid-19 restrictions and "huge price volatility" in the metal markets have hampered this year's activity, Barclay said. In the precious-metals sector, given the run-up of gold to record levels, there's a "value gap between what people think is coming and what they think they're worth," he said.

If an economic recovery takes hold and strengthens demand for commodities, Barclay anticipates "a very busy year" ahead for BMO Capital Markets for financings and other transactions. Without that, acquisition activity among miners will echo the relatively slow year seen in 2020.

"We don't think we're going to recover to a normal level next year," he said, "unless we get great clarity on economic recovery or we get great clarity on dealing with Covid."

'Kick the tires'

The tentativeness of doing deals is not lost on Sean Boyd, who leads top-10 gold miner Agnico Eagle Mines Ltd.

"The inability to get people that do your project evaluation work out to look at things is a big hindrance," Boyd said by phone. "You need to kick the tires."

Executives probably feel less pressure to push ahead with consolidation plays "given that the gold price has helped their operations," Boyd said.

Tom Palmer, CEO of No. 1 gold producer Newmont Corp., said there is certainly a need for consolidation among explorers and developers.

"We have too many single-asset companies or projects and therefore too many management teams and overhead," Palmer said in a phone interview.

Barclay says another big theme next year, beyond deals, will be increased prominence around environmental, social and governance issues.

"Investors are starting to build a more robust tool kit to think about the overall ESG framework of the industry, and who is doing well and not," Barclay said.

(By Steven Frank)

January 3, 2021

British Columbia

B.C. health order restricts number of workers at large industrial work sites

Dr. Bonnie Henry says projects such as Site C threaten rapid spread of COVID-19 in northern B.C.

[Chad Pawson](#) · CBC News · Posted: Jan 03, 2021 8:49 PM PT | Last Updated: January 4



Coastal GasLink's Sukunka Lodge near Chetwynd was built for 700 workers on the pipeline project. An outbreak was declared at the 7 Mile Lodge in Burns Lake and the Little Rock Lake Lodge in Nechako. (Coastal

<https://www.cbc.ca/news/canada/british-columbia/bc-health-order-workers-1.5860331>

1/4

[comments](#) 

British Columbia's public health officer has ordered five major industrial projects in the north of the province to reduce the size of their workforces in an attempt to ensure the northern health region does not become overwhelmed with COVID-19 cases.

Dr. Bonnie Henry issued the [Dec. 29](#) health order, which limits the number of workers at the work sites as they look to ramp up work this month. Henry's order says there has been an increase in the number of people infected with COVID-19 associated with the projects, which employ hundreds of workers.

Those sites include the Site C dam project near Fort St. John, the LNG Canada Project natural gas liquefaction and export facility in Kitimat, the Coastal GasLink natural gas pipeline being built from Dawson Creek to Kitimat, a tunnel being twinned near Kitimat for Rio Tinto's aluminum smelter, and the Trans Mountain Pipeline from Edmonton to Burnaby.

According to Henry, the order is needed to try to prevent that spread, which could also result in transmission in surrounding communities.





An aerial photo captures a view of the construction of river diversion tunnels at Site C's north bank. (BC Hydro/Contributed)

"Increasing the risk of hospitalizations, intensive care admissions, and deaths in the Northern Health Authority region," reads the order.

On Dec. 23, [Henry spoke of the need to put in a new public health order](#) that would limit the number of workers in the new year at large industrial camps, where there have been COVID-19 outbreaks.

584 cases, 27 deaths in region

The order says that COVID-19 cases at the sites are "challenging" for public health officials to respond to and could burden the Northern Health Authority's capacity to manage the pandemic and provide care.

There are currently 584 active COVID-19 cases in the Northern Health Authority. Since the start of the pandemic, there have been 27 deaths in the region, according to the B.C. Centre for Disease Control.

Henry hoped the current seasonal slow-down would help break any cycles of transmission at the sites.

- [Multiple Site C workers in isolation following positive case of COVID-19](#)
- [COVID-19 outbreak declared at LNG Canada worksite in Kitimat, as 14 test positive](#)

But now as work ramps up, and more workers return, the order will limit their numbers at each site and only allow for additional workers if the projects show they can manage additional workers without increasing infections through plans submitted to the Ministry of Health.

For example, Coastal GasLink can have a baseline of 400 workers by Jan. 8, increase by 600 after Feb. 1, and go up to 1,000 by mid-February.

2/1/2021

B.C. health order restricts number of workers at large industrial work sites | CBC News

The baseline number of workers for all five projects is 1,460 now, rising to 4,080 by mid-February.

The order also limits the movement of workers between sites.

- [**COVID-19 outbreak declared at Coastal GasLink accommodation sites in northern B.C.**](#)

Northern Health says, currently, [there are three COVID-19 outbreaks related to work sites in the region.](#)

Two at two Coastal GasLink sites, 7 Mile Lodge and Little Rock Lake Lodge, and one at an LNG Canada Project site near Kitimat.

A separate outbreak at a LNG Canada Project site was declared over on Christmas Day.

- [**Trans Mountain expansion project has been a COVID-free zone, says CEO**](#)

The government-owned Trans Mountain pipeline said in November that it has managed to keep its workforce COVID-free — at a cost of more than \$1 million in pandemic safety measures.

Mining / Commodities

Barrick Gold's quarterly output falls due to pandemic-related disruptions

Preliminary gold production fell 16.19 per cent in the fourth quarter



Reuters

Total preliminary gold production fell to 1.21 million ounces in the quarter ended Dec. 31 from 1.44 million ounces, a year earlier.

Canadian miner Barrick Gold Corp. said on Thursday preliminary gold production fell 16.19 per cent in the fourth quarter, hurt by lower output from Nevada Gold mines in the United States and Pueblo Viejo mine in the Dominican Republic.

While gold prices touched record highs in 2020, the COVID-19 pandemic-induced disruptions have hurt production at the company's mines.

Barrick, which is scheduled to report fourth-quarter results on Feb. 18, said output from its Nevada gold mine fell 6.7 per cent, while that from its Pueblo Viejo mine fell 11.2 per cent.

The world's second largest gold miner by reserves said it expects all-in sustaining costs, a key industry metric, to decrease by 3-5 per cent compared to the third quarter.

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Appendix D - News Articles About Mining M&A Deals in 2020

EY.com - [One-third of mining and metals executives surveyed](#) during a EY webcast said they have put all M&A on hold because of the impact of COVID-19

7 May, 2020

2/1/2021

2020 Mining and metals M&A report | EY - Global

Strong capital discipline is helping miners weather volatility, but bolder investment decisions may maximize returns in recovery.

*This is part of a series of articles relating to the impact of COVID-19 on the mining and metals value chain, supplemented by results from the latest EY **Global Capital Confidence Barometer**.*

Increased volatility in commodity prices and weakened supply and demand for some commodities has challenged companies across the world, although the degree of impact has varied across markets. We've seen a sharp drop in the prices of base metals, such as copper, and a surge in gold as investors seek a safe haven from global uncertainty. Across the sector, the impact on capital and liquidity is significant and requires companies to think carefully about navigating immediate pressures while preparing for the future.

Now: strengthen liquidity and reduce costs

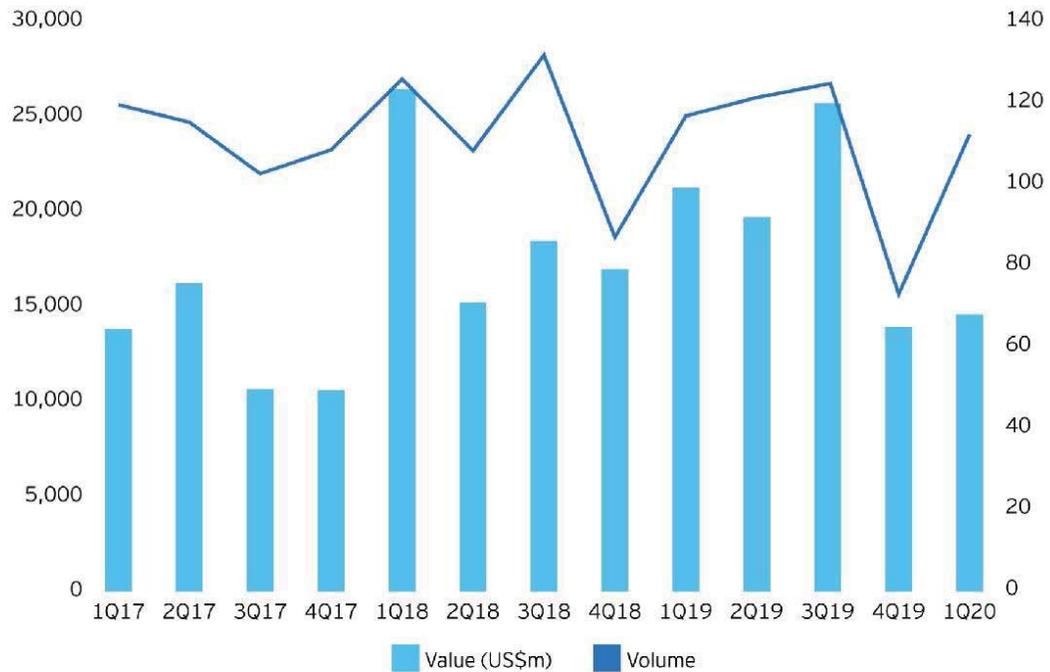
Throughout this crisis, the priority of mining and metals companies has been to protect their people. But they also acted fast to maximize liquidity by preserving capital, reducing costs and prioritizing the operation of lower-cost assets. These moves reinforce several years of focused effort across the industry to strengthen balance sheets by reducing debt, extending debt profiles and instilling capital discipline. These are now paying off and will continue to yield benefits through what we expect to be a prolonged decline in commodity prices and lower demand over the next 12 to 18 months. The impact of country-specific stimulus packages and their focus on infrastructure spend vs. general economic spend will have a direct impact on many parts of the sector.

With this in mind, companies are taking a cautious approach to capital spending, delaying investment decisions, reducing capex guidance and deferring dividend payouts. We expect to see declining exploration budgets and preproduction assets put on hold, as well as a deferral of sustaining capital and nonessential maintenance.

As companies reduce costs, they still need to be mindful of managing contractual obligations to spend and take a long-term view. Disputes may arise, but these are more likely to be resolved through penalties and renegotiation than default.

Next: consider opportunistic M&A

Quarterly M&A deal value and volume 2017-1Q 2020 (US\$m)



ThomsonOne, EY analysis

M&A in mining and metals was down in the first quarter of 2020, with deal value and volume declining 31.6% and 3.8% year-on-year, respectively. Major deals that were already in progress continue to close. Now, however, as the pandemic continues to unfold, one-third of mining and metals executives surveyed during a recent EY **webcast** say they have put all M&A on hold because of the impact of COVID-19. The effect of declining commodity prices on valuations is a big reason why companies may postpone selling at this time. Distressed companies and assets are likely to receive support from banks, governments or suppliers to survive the crisis.

Q How is your M&A strategy and outlook affected by COVID-19?

Valuations declining



Increased focus on target's business resilience evaluating the business or transaction



Opportunities to gain market share



All M&A activity on hold



While capital available for acquisitions will be limited, we are likely to see miners with strong balance sheets seize the opportunity to grow their market share. Companies may expand exploration potential by acquiring junior players or diversifying into new minerals, and we would expect to see further consolidation in the coal, gold and steel markets as well as investment in gold projects that have already started development.

Some miners will also seize the opportunities of M&A to rethink supply chains in the wake of COVID-19. Companies may pursue deals to diversify their sources of raw materials, sell off infrastructure assets or shift to share costs through a collaborative approach of multiuser open access. As well as dealmaking, we may see some strategic alliances with mining service companies.

Beyond: rethink risk and invest in innovation

In a sector where volatility is often the norm, strategies beyond COVID-19 are likely to return to a focus on maximizing returns. But in a post-pandemic world, approaches to achieve this may be radically different from those deployed in the past. It may be time for mining companies to re-evaluate their appetite for risk — as we move beyond COVID-19, it is not the time to miss out on new opportunities because of a complacent or conservative approach to capital allocation.

Miners can strengthen their recovery and ability to navigate future volatility by focusing on the following:

1. Lower valuations and potentially more risk-averse funders will make it more difficult to access capital, particularly for mid-tier and junior companies. Alternative financing methods, such as commodity traders, royalty deals, joint ventures and customer offtake arrangements, may become more popular.
2. Rethinking portfolios around decarbonization: As companies reorganize portfolios to maximize returns, they are likely to be driven by the outlook for commodities. In particular, the global agenda for decarbonization is expected to drive more investment in minerals that are critical to renewable energy, electric vehicles and batteries, including cobalt and lithium. This creates a significant opportunity for mining and metals companies to play an important role in building a sustainable energy system that rewards both investors and the planet.
3. Investing in innovation: According to the EY **Global Capital Confidence Barometer**, 66% of mining and metals companies were already in the midst of significant business and technology transformation. The impact of COVID-19 on workforces, supply chains and operations has underlined the case for innovative technologies such as automation and artificial intelligence. Companies more advanced in their digital transformation are faring better during the pandemic and will continue to enjoy a significant competitive edge going forward. We expect more miners to accelerate their digital programs and to keep investing in technologies, especially those that focus on worker safety and lowering operating costs. Miners may also collaborate with or invest in mining services companies to fast-track access to advanced technology.

Prepare for the new normal

Continued focus on capital discipline will help guide the sector through an extended period of disruption and ensure a stronger recovery. But miners should also prepare for changed conditions in a post-pandemic world, where accessing capital and driving growth may require new, bolder approaches, including a greater risk appetite and a need to be more carbon neutral.

Summary

The impact of COVID-19 on pricing volatility and supply and demand has created significant capital and liquidity challenges. So far, the sector has responded well, preserving capital through a range of measures and benefitting from existing capital discipline initiatives. In recovery, continued caution will see most M&A on hold, though opportunistic deals could help some companies gain market share and diversify their geographic portfolio. Going forward, the legacy of COVID-19 will require companies to employ more digital and transformational technologies and find new approaches to access and deploy capital more efficiently if miners are to maximize returns and recover strongly.

About this article

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Transaction advisory lead in mining and metals, solving acquisition, divestiture and capital allocation challenges in a time of disruption. Avid outdoorsman, cook, wine enthusiast and father.

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Gold M&A is heating up

M&A is a topic that sends a frisson down the spines of mining investors, a warm expectation of enriching premiums to reward their shrewd stock choices. With the gold price in the ascendancy, M&A in the gold space has started to reactivate as balance sheets of many companies have been restored and the chorus of juniors singing the refrain that fewer discoveries are being made, and that major miners will have to acquire to maintain or grow their business, increases.



Finance > M-a

High gold and share prices indicate it should be boom time for mergers and acquisitions.

Comments

Data from S&P Global Market Intelligence shows the market is heating up. So far this year, there has been an aggregate of US\$3.9 billion in gold transactions in eight deals representing about 31.9 million ounces of gold reserves, with buyers paying an average of \$123/oz.

Paul Harris

In 2019, the firm recorded 12 gold deals for an aggregate \$18.7 billion representing about 98Moz of reserves, at an average of \$191/oz, although these figures are distorted by the \$10 billion Newmont-Goldcorp deal.

Tellingly, the deals so far this year are happening at much cheaper prices than the 10-year average of \$202/oz paid for reserves. It possibly would have been more had COVID-19 travel restrictions not grounded technical diligence teams. "There has been a noticeable uptick in behind the scenes activity and as the COVID-19 travel restrictions ease off, we will see an even greater number of transactions being announced. The increase in the gold price and company share prices has given both for buyers and sellers the confidence to transact," a Canadian investment banker told *Mining Journal* on condition of anonymity.

"The Barrick and Newmont deals precipitated a suite of M&A transactions," S&P director metals & mining research, Mark Ferguson, told *Mining Journal*.

"They have spurred other companies to interrogate the M&A market to see what is strategic. A lot of smaller companies are moving in that vein with a lot of activity this year in the mid-tier range. We are going to see more deals this year but it is hard to surpass the total amount acquired last year unless there were mergers of other top producers."

Things have changed though since the last bull cycle for gold a decade ago, which means the drivers for transactions have changed. Today, there are fewer specialist natural resource investors and there has been dramatic growth in passive index-linked or exchange traded funds, which give investors exposure to gold and/or gold miners without having the trouble of evaluating specific companies. It is thus increasingly important for miners to get into ETFs and indices to generate buying demand. Increasingly, that means bulking up. "The main goal of companies is to attract generalist investment capital, which has been out of the sector for almost a decade. This has started coming back but into the ETFs and GLD," David Erfle of Junior Miner Junky told *Mining Journal*.

Frank Holmes, CEO and chief investment officer at US Global Investors, has been preaching for several years the gospel of what he calls *quantamentals*, how investment algorithms are changing the investment landscape, a message he believes largely falls on deaf ears. "Ten years ago, the narrative was about NAV [net asset value]. The quant world does not buy NAV because there is no consistency. What moves stocks is building revenue and cash per share.

"If a transaction is not immediately accretive in revenue per share it does not mean anything, and the market punishes you. Buying resources to have optionality in the future is not where it's at," Holmes told *Mining Journal*.

For evidence, Holmes says people need look no further than Australian gold miners. "The Australians showed it was smarter and better to sweat the income statement to get as much cash flow as fast as you can from deposits and don't

worry about proving you have a 10-year mine life. Make sure that you have five years of resources and three years of production, which means you can tackle smaller deposits and can get those returns on capital. The market will reward you for higher cash flow returns on invested capital.

"Many seniors are still listening to the old [NAV] narrative. They don't want to believe it has changed," he said.

John DeCooman, SVP business development and strategy at SSR Mining, has seen this change over almost a decade of M&A activity by the company, during which it has transacted an aggregate value of more than US\$4.5 billion in four transactions, which have propelled it from a small silver producer to a senior precious metals producer.

"It has been a consideration of ours over a number of years or the need to get to senior producer size with profitability to attract investors through quant funds and indices," DeCooman said. "Fewer active and retail investors are seeking mining exposure now compared to ten years ago. Our retail-institutional shareholding percentage relevance has flip-flopped from 65-35% to 35-65% over that period. However, it remains the case that the better you run the business, the more investors will want the product. Making a more appealing product is always a good thing."

How has the rise of passive investing manifested itself in the market? 2018-2019 saw two mega mergers with Barrick Gold and Randgold getting together via a zero-premium merger of equals, which arguably forced rival Newmont to hook up with Goldcorp to keep pace. In *Spinal Tap* parlance, Barrick and CEO Mark Bristow turned the dial up to 11 and raised a tower above the other senior gold producers, with a market cap more than three times those of other seniors, elevating the company to the ranks of diversified miners such as Glencore and Anglo American, although still paling next to diversified mining behemoths, BHP, Rio Tinto and Vale. "The mega mergers of Barrick and Newmont puts them in a different league as they are now trying to compete directly with the ETFs. They have diversified asset portfolios which mitigates some of the operational risk, and with high liquidity, so not unlike an ETF, but with sustainable dividends that sets them apart. Their balance sheets are stronger than the last cycle as the focus is on free cash flow rather than growth," Joe Mazumdar of *Exploration Insights* told *Mining Journal*.

If this is the future, one would expect the actions of Barrick and Newmont to pull others in their wake, yet in two years no third company has climbed the stairs of that tower.

The strong cash flows companies are now generating may provide the ammunition for that to change.

A handful of seniors had cash positions above \$1 billion at the end of the first quarter: Agnico Eagle mines, Kinross Gold and AngloGold Ashanti, so they have plenty of dry powder. Kirkland Lake Gold is also stuffing away cash and would soon have had a billion in the bank had it not spent \$380 million on share repurchases this year. But will growing treasuries be spent on M&A? "It is almost impossible for any of the seniors to do a transaction to join Barrick and Newmont as they are so big. Agnico is perhaps in the best position but is unlikely to do so as it trades at such a high multiple that they do not want to lose that, so they are not going to do a deal. There is a lot of hair on the other dogs so putting two of them together will make bigger not better," said the Toronto analyst.

Agnico Eagle SVP finance and CFO David Smith said during a Red Cloud Financial webinar on July 7 the company could be "busy for the next 10 years without having to do any M&A".

"There is no production cliff facing us in the near term. If we can't find any M&A so be it, we will be busy with brownfield opportunities we have," he said.

"There is a still a broadly conservative trend regarding premiums and valuation as the industry was badly burned by getting carried away in the last boom. There is still pressure to ensure valuations and premiums are constrained and are reflective of the fundamental value," Sander Grieve, a partner at lawyer's Bennet Jones, told *Mining Journal*.

"If a bigger company makes a move, it may be more to leverage their premium as a gold producer to buy a copper-gold asset from a struggling producer," said Mazumdar.

A more likely scenario is for a senior company to acquire a development stage junior with stock. "Producers switched off the drills seven years ago so some of them face an existential crisis of having to buy or eventually stop being a going concern. Kinross has had a billion in cash for quite a while and the thinking is they need to acquire a large development project. Producers have way better paper than developers so they can do a paper deal and use their cash to build a project to get cash flow," said the Toronto analyst.

"I am surprised [at market mergers between senior companies] have not happened more but the majors have shored up their balance sheet and have a lot of cash to spend and they are taking strategic positions in juniors," said Erfle.

"Majors have to replenish their reserves, and I assume the cashed-up majors are

looking for acquisitions. In addition, many companies have large bulk tonnage assets on their books for which they overpaid in 2009-2010 and have written down in recent years that are now economic at current gold prices."

The gravitational pull of the Barrick and Newmont deals has been more visible among the mid-tiers, with B2Gold, Yamana Gold and Kirkland Lake Gold graduating to the senior group, recently joined by SSR Mining through its merger with Alacer Gold and Endeavour Mining through hooking up with Semafo. Equinox Gold is not far behind merging and building its way there. So, are we witnessing the hollowing-out of the mid-tier? "There is a dearth of companies between the 200,000-800,000oz production level, which previously happened in Australia as Newcrest Mining bought its rivals. There is every opportunity for some of the smaller companies to move up into this space," said the Toronto analyst.

For Michael Amm at law firm Torys, the need for consolidation will incentivise smaller companies to band together.

"Smaller single-asset companies are not big enough to get attention as index admission becomes more important," he said. "There are many opportunities in the small- and medium-cap space and I think there will be a surge in those types of deals as there are too many companies at the 50,000-500,000oz/y level. Buy-side mining focused investment funds say there is too much product out there and they are clamouring for more M&A. The precedents are supportive. Look at how Equinox, Endeavour and SSR have traded since their merger announcements," said the investment banker.

S&P data show the majority of transactions so far this year are for single assets or single-asset companies. For Ferguson, this is partly explained by the reduced level of exploration in the sector as a key driver. "The lack of significant gold discoveries over the past decade or two might play into a lot of these companies looking to acquire supplemental projects or production. Gold exploration budgets will be less impacted [this year] given the gold price but they are probably still going to go down," he said.

"Most M&A will come from smaller companies seeking to grow into bigger, more diversified, free cash flow generating companies, with the potential to pay dividends," said Mazumdar. "Smaller companies like Argonaut Gold are trying to get another rung up the ladder with respect to trading liquidity to be able to talk with new investors, so we should continue to see deals involving juniors with smaller assets that could be rolled-up like Equinox did."

Argonaut is moving into the mid-tier after completing its merger with Alio Gold earlier this month, adding Nevada production at Florida Canyon to its Mexico production. It also improved its development pipeline. "Ana Paula is an interesting project for them as Cerro de Gallo is not easy from a metallurgical point of view and Magino is a white elephant," the Toronto analyst said.

Building a multi-asset company via mergers continues to be a successful model for creating value. SSR Mining has become a senior producer via this route adding Marigold, Claude Resources, Puna and now Alacer Mining. Equinox Gold is replicating that success having added Trek Mining, Newcastle Gold, Anfield Gold and most recently Leagold Mining, while the Endeavour-Semafo deal creates the largest gold miner in Africa. Yamana and B2Gold both grew in similar fashion.



Liberty Gold's Black Pine project in Idaho, USA

Who are potential targets?

In North America, Integra Resources believes its Delamar project in Idaho, USA, is a standout, one of four projects it has identified with an economic study, less than a \$500 million capex, with a mine life of more than 10 years and with annual production in excess of 100,000oz of gold-equivalent. The others are Marathon Gold's Valentine Lake, Sabina Gold and Silver's Back River and Monarch Gold's Wasamac, all in Canada. Also in Idaho is Liberty Gold, which has an open-pit leach heap leach oxide gold project with a scale which could be of interest to the majors.

However, a rising gold price environment may change seller motivation. "Recent M&A [TMAC Resources, Guyana Goldfields and Cardinal Resources] has seen capitulation from the seller who did not want to run the business anymore. Valuations are starting to pick up, so it is not as cheap to pick-up companies with resources as it was six months ago. Many companies can now raise money to

generate catalysts such as drilling. They think their valuation can only go up in the current market environment so may sit and wait for a higher bid price," said Mazumdar.

Additionally, some developers, such as Orla Resources and Bluestone Resources, are intent on going into production, which is anathema for many North American juniors. Even Corvus Gold, which for years has been open about a sale being its end game, is working on production scenarios for its North Bullfrog and Mother Lode deposits in Nevada. Other projects require buyers with specific skillsets to bring them into production. "Sabina is landlocked in the Arctic and Valentine Lake is still semi-remote in Newfoundland, so the potential number of suitors who can cope with that may be less. People have been looking at single-asset companies such as Pretium Resources and Torex Gold for a long time but who wants to take on Pretium's resource uncertainty or is comfortable handling the security of operating a large operation in Guerrero, Mexico?" said Mazumdar.

Deal hesitation may also be influenced by the expectation that large companies will continue shedding assets as they pursue being fitter, leaner and focused on cash flow generation. The market has responded positively to companies it perceives as successfully executing divestment strategies such as Yamana Gold and New Gold. "Yamana has done a great job rationalising its portfolio and they are probably not done yet. New Gold, by selling Blackwater to Artemis, will realise about \$300 million in value when most analysts carried the project at near zero value. They also won't have to spend hundreds of millions to bring it into production. There are a lot of asset level deals to come. Most of the bigger companies have at least one asset which we are very confident they are looking to sell in the near term," said the investment banker.

While M&A expectation is growing, COVID-19 has strangled the conference circuit where corporate business development teams kick the tyres of potential targets in face-to-face meetings with the management of juniors, as well as having serendipitous encounters in the corridors. "This will bring to bear the value of some individuals in our business with great reputations and great networks. People are more induced to engage if they know one another as there is the question of trust which develops from being in the business and knowing people. We were rarely more than one person away from making a call and having a conversation," said DeCooman.

"The lack of conferences has removed a source of ideas and meetings that get the ball rolling. But CEOs have been at home and not running around and so have had time to reflect, read more and listen to advice. There has been a new source of ideas that is more introspective. However, companies cannot do due diligence and that is really problematic for mining," said the Toronto analyst.

In this context, management teams who have previously completed transactions are coming to the fore. The former management team of Newmarket Gold resurfaced in Calibre Mining in 2019 with the Nicaragua mines it bought from B2Gold, while the former team at Atlantic Gold formed Artemis Gold and recently picked up the Blackwater project from New Gold. Investor-management groups such as the Augusta Group, Discovery Group and Oxygen Capital have a similar attraction due to their track records of growing and selling the companies under their wings. Their current wards include Bluestone Resources, Great Bear Resources, K2 Gold, Pure Gold, Liberty Gold and Solaris Resources.

China Australia penetration

The apparent reticence of senior North American companies to do deals has created space for Australian companies to make notable acquisitions.

Australian miner Northern Star Resources acquired the Pogo mine in Alaska, USA in August 2018, St Barbara bought Atlantic Gold in Newfoundland, Canada, in July 2019 and Evolution Mining acquired the Red Lake mine in Ontario, Canada, in November 2019. "Australian miners have really done well improving the quality of their mines and getting their costs down and because of the strong gold price in Australian dollars, investors have rewarded them which has strengthened their share prices. This set up a nice arbitrage for them to come for North American companies which had underperformed them. However, it is tough for them to find assets that are transformative enough for them to set up an Americas division; the juice has to be worth the squeeze," said the investment banker.



TMAC's Hope Bay project in Nunavut, Canada

The past year has seen Chinese companies get more aggressive on the acquisition front: Zijin Mining bought Continental Gold for its Buritica project in Colombia in March and then beat out competing bids for Guyana Goldfields and its Aurora mine in Guyana. Compatriot Shandong Gold is looking to buy TMAC Resources and its Hope Bay project in Canada, and in Africa, it outbid private Russian company Nordgold for Cardinal Resources and its Namdini project in Ghana. This defeat may spur Nordgold to seek full ownership of the 2.75 million-ounce Montagne d'Or gold project in French Guiana by buying out the 45% stake held by Orea Mining.

For German newsletter writer Markus Bussler of *Der Aktionar*, the trend is for M&A heading for the southern hemisphere. "There are not many good projects in North America, so South America will hit the spotlight in the next five years, as will West Africa," he said during a Soar Financial webinar. Chinese companies are already executing on this.

"China got the jump on North American and Australian companies by making all cash deals for juniors and picking them up while they were still cheap. Chinese companies are looking to grow rapidly and if they see an asset that is on sale they are going to acquire it," said Erfle.

Holmes said: "China will continue to get a foothold in gold supply and production as it wants the renminbi to replace the US dollar, so it needs to get gold behind it and beef up its military."

"Chinese companies are trying to ramp up their production, size and profile in the industry although it is becoming harder as they are under more scrutiny from the regulatory perspective in the US, Canada and Australia. Given the geopolitical situation, the degree of focus and weight on bilateral issues will be greater than a year or two ago," said Amm from Torys. "China has developed semi-hostile relationships with many countries. Does Canada want to give them a foothold in the Arctic and access to the Northwest Passage through the acquisition of TMAC?" said Mazumdar.

Both Australian and Chinese companies have focused on producing or development stage assets although Chinese companies seem to prefer troubled assets they can pick-up cheaply. Both TMAC's Hope Bay and Guyana's Aurora have struggled, resulting in the companies' share prices sliding about 95% in the year prior to the bids being announced. "China will look at assets others will not in places some may fear to tread," said Mazumdar. "For TMAC, you need to add another \$500 million to the price to build a new 4,000 tonnes per day plant at Hope Bay. Cardinal's Namdini requires \$350-400 million in up front capital and the modest gold recovery of 83% over the life of mine requires a lot of power for very fine grinding. Economics plays less of a role in what they are thinking as they are

looking for gold production. China can pay \$1,800/oz in the market for gold or dollars on the ounce for an asset operated by a company and then bring it home. Their strategy may be to add gold to the government's reserves."

This is part of the thesis Kerry Smith, gold mining analyst at Haywood, outlined in a June research note. "China has significant political power in many under-developed countries and this political power is a significant advantage to Chinese mining companies who purchase undervalued international assets," he said. Smith listed 12 producers which may appeal to Chinese miners of which five have operations in Africa, three in South America, two in North America and two in Asia. Smith also listed 12 development stage projects of which eight are in South America and three in Africa.

Development stage assets which may appeal to Chinese companies include Gold X Mining and its Toroparu project in Guyana, INV Metals' Loma Larga and Lumina Gold's Cangrejos projects in Ecuador, Jaguar Mining in Brazil and Orezone Gold in Burkina Faso. Gold X was included in an unsuccessful bid by Gran Colombia Gold to acquire Guyana Goldfields earlier this year, the logic being that its Aurora mine infrastructure could shave some \$200 million off the capital development costs of its Toroparu project, making a marginal deposit much more attractive. That part of the thesis seems to still be in play as soon after the Gran Colombia bid failed, Gold X appointed Robert Friedland as non-executive chair. Jinghe Chen is a director of Friedland's Ivanhoe Mines and also happens to be founder and chair of Zijin Mining. "The appointment of Friedland means Gold X is for sale," said Holmes.

For Amm, an indication that the M&A space is only just starting to heat up is the almost total absence of post-announcement competing bids. "It is strange that we haven't seen a lot of contested deals. There would normally be more contested transactions in a hot market like this. The strong push for M&A is tinged with caution as everyone has taken the message that gone are the days of huge premiums and risky deals where people overpay. Even when the best assets come into play there will be more discipline than in the past," he said.

For Grieve, history tends to not be on the side of hostile transactions. "The challenge for hostile bids is that it means a much longer bid time, so there is pressure to come in the front door. The number of hostile launched deals completed by an alternative bidder is quite high. The rules in Canada allow for a long enough bid period for the market to get smart and so there is less opportunity for a hostile to complete a surprise bid," said Sander Grieve of Bennet Jones.

Mining M&A deals over \$8.8 billion in Q2 – report

[MINING.com Editor](#) | August 11, 2020 | 10:40 am [Careers](#) [Education](#) [Intelligence](#) [Top Companies](#) [Asia](#) [Australia](#) [Canada](#) [Europe](#) [USA](#)



Pit operations at SSR Mining's Marigold gold mine in Nevada. Image from SSR Mining.

A total of \$8.86 billion worth of M&A deals were struck in the metals and mining industry globally during the second quarter of 2020, according to the [latest report from GlobalData](#).

This value represents an increase of 29.1% over the previous quarter and a decline of 14.4% when compared with the last four-quarter average, which stood at \$10.35 billion.

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Comparing deal values across different regions of the world, Asia-Pacific held the top position with total reported deals in the period worth \$4.27 billion. At the country level, Canada topped the list with \$2.92 billion worth of M&A deals announced.

In terms of volumes, North America emerged as the top region for M&A deals in the metals and mining industry, followed by Asia-Pacific and then Europe. The top country in terms of M&A deals activity in Q2 2020 was Canada with 151 deals, followed by Australia with 80 and the US with 42.

As of quarter-end, M&A deals totalling \$17.16 billion in value were announced globally, marking a decrease of 39.6% year-on-year.

Q2 2020 top deals

The top five metals and mining M&A deals accounted for 59.2% of the overall value during Q2 2020. The combined value of these deals stood at \$5.24 billion, against the overall value of \$8.86 billion recorded for the period.

The top five metals and mining industry deals tracked by GlobalData were:

- Vedanta Resources' \$2.15 billion acquisition of Vedanta Ltd.
- The merger of Alacer Gold and SSR Mining for \$1.78 billion
- Tibet Zijin Industrial's \$548 million acquisition of Tibet Julong Copper Industry
- The \$460 million asset transaction with Blackstone Tactical Opportunities Fund, Lundin Gold and Orion Resource Partners (USA) by Newcrest Mining
- Tronox's asset transaction with Eramet for \$300 million.



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**AT THE COUNTRY LEVEL,
CANADA TOPPED THE LIST
WITH \$2.92 BILLION
WORTH OF M&A DEALS
ANNOUNCED**

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Metals deals insights: 2021 outlook

Executive summary

2020 has undoubtedly been upended by Covid-19, and its disruption has touched nearly every facet of life. M&A markets were no exception, and deal activity in the metals sector dampened in H1-20. Amidst this global uncertainty, some companies and firms have proven resilient, and Q3-20 has already shown signs of fairly dramatic M&A recovery, as deals that were either delayed or postponed from Q2-20 were restarted, jumpstarting new deal activity. While Metals deal value and volume also saw increases from Q2-20 to Q3-20, the industry may have a longer road to recovery relative to other sectors.

Deals 2021 outlook: M&A leads t

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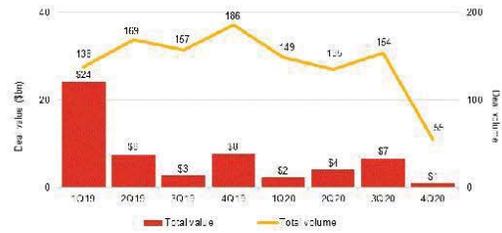


PwC's Deals Sector Leader John Potter discusses the trends driving deals and outlook for 2021. [Explore national deals trends](#)

Metals deals outlook

Despite the resurgence in deals activity in Q3-20, much of the uncertainty prompted by Covid-19 persists into Q4 and 2021. As some major European countries impose lockdowns and COVID-19 cases in the US rise, vaccine trials and treatments are gaining momentum and promise. Given the conflicting developments, the question of how long the pandemic will last still remains unanswered. Deal makers will also have to contend with uncertainty surrounding a new president and administration and the potential for policy change. Even with this uncertainty, we anticipate M&A activity in the metals industry to continue to recover from the lows in the first half of 2020. However, while the industry as a whole may begin to recover, there is the potential for clear winners to emerge, and other players in the industry to suffer based on their ability -- or lack thereof -- to take advantage of opportunities as they present themselves and adapt to the evolving economic landscape.

Total deal value and volume, last eight quarters



Note: Deals included in this graphic are total announced deals (with disclosed and undisclosed values). There were 268 deals in H2 2020, with disclosed values totaling \$11.2 billion.

Source: PwC

“The world faced unforeseen challenges and uncertainty in 2020, and the metals industry was no exception. The M&A decisions businesses make now, and into 2021, can determine their trajectory far into a post-pandemic landscape.”

Brian Kelly, US Metals Deals Leader

Key deal drivers

Shifting industry paths

Potential policy changes

Shifting industry paths

Shifting industry paths

The Covid-19 pandemic has not impacted all industries equally. While certain industries and companies experienced a severe negative impact, others saw only moderate impacts. Some even thrived during the pandemic. The metals industry was negatively impacted from the pandemic as many downstream users of materials in the automotive, aerospace, and heavy equipment industries saw decreased demand. As some struggling companies may look to shed non-core assets, reduce debt loads, and streamline operations, others with healthy balance sheets and access to capital can be expected to make opportunistic buys and further integrate their supply

chains leading to increased M&A activity. The decisions metals firms make now and into 2021, may determine their recovery timeline and/or success far into a post-pandemic world as demand ultimately rebounds.

Potential policy changes

Potential policy changes

The anticipated changeover of the US Presidential administration ushers in the potential for new policymaking and the reversal of current policy. The metals sector was acutely aware of policy changes in the last four years, as industry players adapted to shifting tariffs on steel and aluminum and the enactment of new trade policies between foreign counterparties. How the Biden administration will use tariffs and revisit trade policy likely will weigh heavily on the minds of leaders in the metals sector as we wade into 2021. Though US companies may be anticipating higher corporate tax rates in the future, firms in the metals sector may benefit from the adoption of policies that are aimed at promoting domestic manufacturing and the overhaul of aging infrastructure.

Contact us

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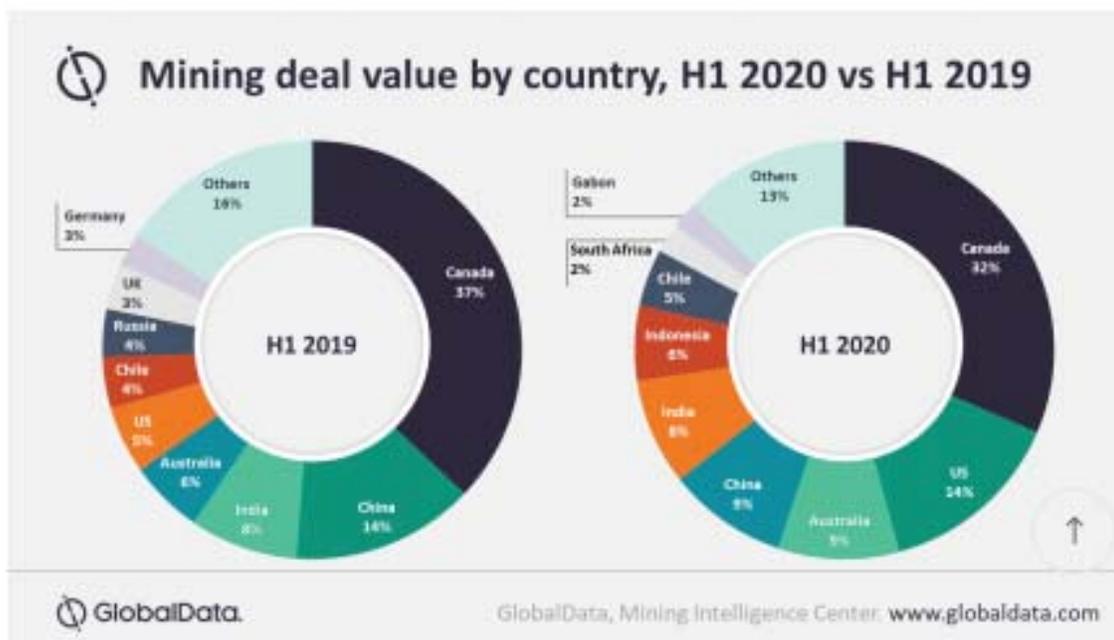
07 Sep 2020

Mining deal value fell by over \$18bn in first half of 2020, as COVID-19 disrupts flow of capital

Posted in [Coronavirus](#)

Global mining deal value, suffering from an unanticipated shock from the COVID-19 pandemic, fell by over US\$18bn when compared to the first half of 2019 to US\$46.6bn in the first half of 2020. An expected slump in the global economy, steered by a series of challenges, has kept investors away from long-term financial instruments, resulting in a 12.7% y-o-y fall in the capital raised by mining companies, according to GlobalData, a leading data and analytics company.

Mining mergers and acquisitions (M&As), despite a decent first quarter owing to deals involving gold, fell by 51.6% during the first half of 2020. Overall, the majority of the impact was evident on the completion rate, as there was a 41.7% y-o-y fall in the completed deal value.



Vinneth Bajaj, Senior Mining Analyst at GlobalData, comments: "The largest of the completed deals was the acquisition of Detour Gold by Kirkland Lake Gold Ltd for US\$3.79bn. By including the Detour Lake mine to its production assets, the company aims to produce up to 1.5moz of gold in 2020. With this acquisition, Kirkland also added US\$173.9m in cash and repaid Detour's debt of around US\$98.6m. Furthermore, with strong liquidity, the company is well-positioned to cope with COVID-19 challenges. Kirkland also raised US\$1m in a private placement of shares primarily to complete phase 2 permitting of its Hasbrouck project in the US."

Alongside that, PT Indonesia Asahan Aluminium's raised US\$2.5bn by offering three sets of bonds at 4.75% (due in 2025), 5.45% (due in 2030) and 5.8% (due in 2050). Of the total, 60% will be used to pay debts and to acquire 20% of PT Vale Indonesia, while the remaining 40% will be used to refinance the company's older bonds. Moreover, Freeport-McMoRan raised a collective US\$1.3bn, which will be used to fund its purchase of certain outstanding senior notes due in 2021 and 2022.

Bajaj adds: "The total volume of deals increased from 1,811 in H1 2019 to 2,271 in H1 2020 owing to a 79.7% increase in the total number of announced capital raising deals in that period. This was accompanied by a 28.4% increase in the volume of completed M&A deals. Canada, US, Australia, China and India accounted for nearly 87% of the total deal volume and over 72% of the total deal value."

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The calls for gold miners to replace reserves are getting louder

Kitco Commentaries | Opinions, Ideas and Markets Talk

Featuring views and opinions written by market professionals, not staff journalists.

With the gold price having closed above \$1800 over the past few quarters, M&A activity has been quiet despite miners generating billions of free cash flow. After a period of impairments, write-downs, and value destruction following the M&A frenzy of the last gold price boom that ended in 2011, global miners have shifted away from growth strategies to margin preservation.

During the last boom, gold companies sought to bolster reserves with annual acquisitions that peaked at US\$38 billion in 2011. The average price paid per gold reserve ounce during this peak period was often more than 300 percent higher than deals executed a decade earlier.

In recent years, shareholders and activist investors have become increasingly vocal about value destruction resulting from aggressive M&A strategies. Reserve replacement remains the key problem for the industry, but management teams have remained cautious about launching acquisitions to replenish depleted reserves.

In 2019, sector deals ramped up considerably after the gold price broke out of a nearly 7-year base above \$1400. The deal total amounted to about \$26 billion, according to data compiled by Bloomberg. But 2020 has been decidedly lower thus far, amounting to only around \$9.8 billion either completed, or agreed upon heading into Q4.

Since the global lockdowns began in March, most senior gold producers have been focused on becoming health and safety compliant and adopting remote working strategies. There have also been challenges conducting due diligence with the ongoing travel restrictions, making it difficult for them to execute M&A this year.

However, the tide appears to be turning as industry sentiment has recently been more vocal about the need to replace the value that global miners are taking out of the ground. During the virtual Joburg Indaba mining conference this week, South African mining luminary Sir Mick Davis said on Thursday, "Every single day that they take something out of the ground, that value disappears forever, and unless you do something to replace that value, you are going to end up withering and dying."

Additionally, [Barrick Gold CEO Mark Bristow](#) on Wednesday said the gold industry in Africa should consolidate further, as he warned of a "serious reserve crisis" looming for the sector. A dearth of exploration has seen average mine life across the gold mining sector fall from 20 years to closer to 10 years, he added, speaking at the Joburg Indaba mining conference.

"The prospect of a serious reserve crisis is looming," said Bristow. Gold production across the industry has only increased by 1.6% every year for the past two decades, he said. The Barrick CEO then said [this week's deal between Northern Star Resources and Saracen Mineral Holdings](#) was a "great example" of industry consolidation that should be celebrated.

While underground gold reserves held by major mining firms continue to be low and falling, new reserves are becoming increasingly harder to find as resources are used up, and exploration is costly. Major mining companies have a few ways to remedy their shortages. They must either discover new underground resources through exploration, or acquire them via the takeover of junior development companies.

According to [S&P Global Market Intelligence](#), the 20 top gold producers spent on average \$51.3 billion on acquisitions over the past decade. But in the same period, they spent less than a third, just \$18.2 billion, on exploration. Despite the high gold price, currently S&P is citing a 29% drop in global miner exploration budgets this year.

Since the industry acquisition wave during the previous gold boom left a legacy of over \$80 billion of write-downs when gold prices crashed, I expect the coming M&A activity will be driven by the need for value-added reserves. The industry has returned to fundamentals and balance sheet health, over adding ounces at any price.

After years of underinvestment during the previous bear market, global miner production profiles are under pressure which makes further M&A inevitable during the next few years. If you require assistance in choosing quality take-over candidates in the junior space to invest and would like to receive my research, newsletter, portfolio, and trade alerts, please [click here](#) for instant access.

By David Erfle
Contributing to [kitco.com](#)

 newsfeedback@kitco.com
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Deals Analysis

North America's metals & mining industry sees a rise of 68.8% in deal activity in Q3 2020

26 October 2020 (Last Updated October 26th, 2020 12:07)

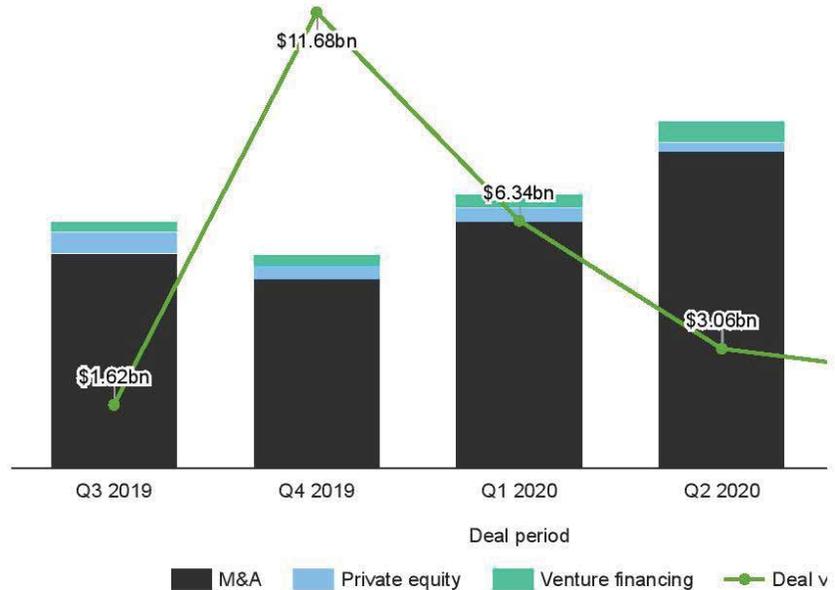


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the four-quarter average, according to GlobalData's deals database.

North America metals & mining: deal value and volume trend - Q3 2019 to Q3 2020



Embed this chart

A total of 292 deals worth \$2.41bn were announced for the region during Q3 2020, against the last four-quarter average of 173 deals.

Of all the deal types, M&A saw most activity in Q3 2020 with 280, representing a 95.9% share for the region.

In second place was private equity with ten deals, followed by

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North America metals & mining industry deals in Q3 2020: Top and total deals revealed

In terms of value of deals, M&A was the leading category in North America's metals & mining industry with \$2.35bn, while private equity and venture financing deals totalled \$53.26m and \$0.43m, respectively.

North America metals & mining industry deals in Q3 2020: Top deals

The top five metals & mining deals accounted for 72.6% of the overall value during Q3 2020.

The combined value of the top five metals & mining deals stood at \$1.75bn, against the overall value of \$2.41bn recorded for the quarter.

The top five metals & mining industry deals of Q3 2020 tracked by GlobalData were:

1) The \$1.4bn asset transaction of ArcelorMittal USA by

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<https://www.mining-technology.com/deals-analysis/north-america-metals-mining-industry-deals-in-q3-2020/>

4/7

2/1/2021

North America metals & mining industry deals in Q3 2020: Top and total deals revealed

2) The \$112.92m acquisition of Eastmain Resources by Auryn Resources

3) Maverix Metals' \$90m asset transaction with Newmont

4) The \$75m asset transaction with Kirkland Lake Gold by Newmont

5) Kinross Gold's asset transaction with Contango ORE and Royal Gold for \$70.02m.

Verdict deals analysis methodology

This analysis considers only announced and completed deals from the GlobalData financial deals database and excludes all terminated and rumoured deals. Country and industry are defined according to the headquarters and dominant industry of the target firm. The term 'acquisition' refers to both completed deals and those in the bidding stage.

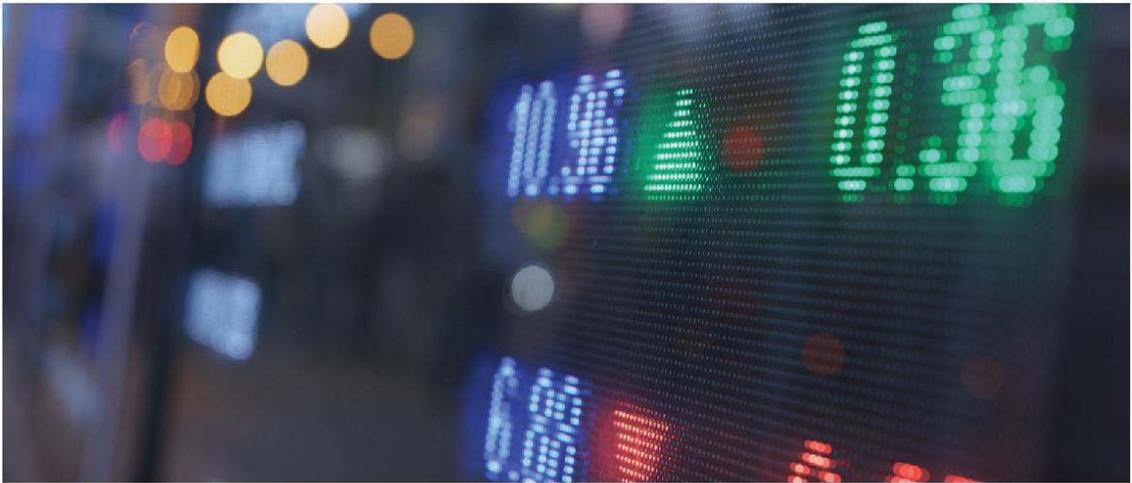
GlobalData tracks real-time data concerning all merger and acquisition, private equity/venture capital and asset transaction activity around the world from thousands of company websites and other reliable sources.

More in-depth reports and analysis on all reported deals are available for subscribers to [GlobalData's deals database](#).

Deals Analysis

Metals & mining industry deals in Q3 2020 total \$7.95bn globally

26 October 2020 (Last Updated October 26th, 2020 12:06)

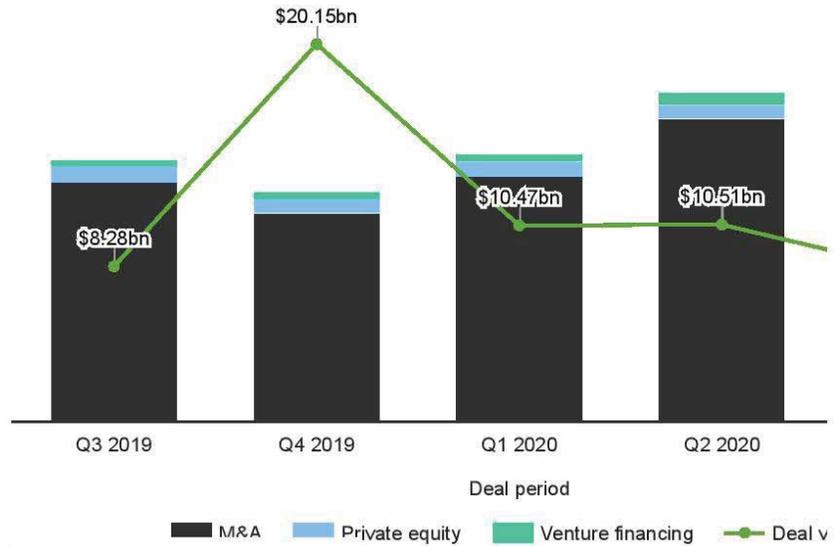


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Total metals & mining industry deals for Q3 2020 worth \$7.95bn were announced globally, according to GlobalData's

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Metals & mining: deal value and volume trend - Q3 2019 to Q3 2020

Embed this chart

The value marked a decrease of 35.2% over the previous quarter and a drop of 35.6% when compared with the last four-quarter average of \$12.4bn.

In terms of number of deals, the sector saw a rise of 51.3% over the last four-quarter average with 528 deals against the average of 349 deals.

In value terms, Asia-Pacific led the activity with deals worth \$3.78bn.

2/1/2021

Metals & mining industry deals in Q3 2020: Top and total deals revealed

The top five metals & mining deals accounted for 52.6% of the overall value during Q3 2020.

The combined value of the top five metals & mining deals stood at \$4.18bn, against the overall value of \$7.95bn recorded for the month.

The top five metals & mining industry deals of Q3 2020 tracked by GlobalData were:

2/1/2021

Metals & mining industry deals in Q3 2020: Top and total deals revealed

- 1) The \$1.4bn asset transaction of ArcelorMittal USA by Cleveland-Cliffs
- 2) The \$819.43m acquisition of Shougang Jingtang Iron and Steel United by Beijing Shougang
- 3) QT Vascular's \$732.03m acquisition of Tengri Coal and Energy
- 4) The \$659.75m private equity deal with Doosan Solus by SkyLake Investment
- 5) Fortiana's acquisition of Highland Gold Mining for \$569.56m.

Verdict deals analysis methodology

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Deals Analysis

Metals & mining industry M&A deals in September 2020 total \$3.53bn globally

27 October 2020 (Last Updated October 27th, 2020 20:55)

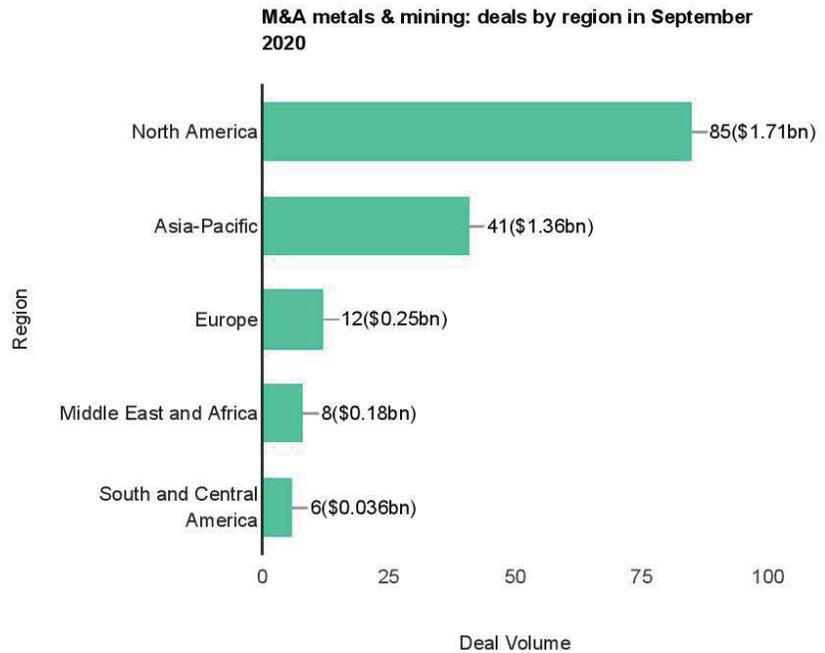


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Total metals & mining industry M&A deals in September 2020 worth \$3.53bn were announced globally, according to

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Embed this chart

The value marked an increase of 122.3% over the previous month and a drop of 0.4% when compared with the last 12-month average, which stood at \$3.55bn.

Comparing deals value in different regions of the globe, North America held the top position, with total announced deals in the period worth \$1.71bn. At the country level, the US topped the list in terms of deal value at \$1.51bn.

In terms of volumes, North America emerged as the top region for metals & mining industry M&A deals globally, followed by Asia-Pacific and then Europe.

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Metals & mining industry M&A deals in September 2020: Top and total deals revealed

In 2020, as of the end of September 2020, metals & mining M&A deals worth \$24.57bn were announced globally, marking a decrease of 29.4% year on year.

Metals & mining industry M&A deals in September 2020: Top deals

The top five metals & mining industry M&A deals accounted for 83.4% of the overall value during September 2020.

2/1/2021

Metals & mining industry M&A deals in September 2020: Top and total deals revealed

The combined value of the top five metals & mining M&A deals stood at \$2.95bn, against the overall value of \$3.53bn recorded for the month.

The top five metals & mining industry deals of September 2020 tracked by GlobalData were:

- 1) The \$1.4bn merger of ArcelorMittal USA and Cleveland-Cliffs
- 2) The \$819.43m acquisition of Shougang Jingtang Iron and Steel United by Beijing Shougang
- 3) Shandong Gold Mining's \$442.81m acquisition of Hengxing Gold Holding Limited
- 4) The \$156m asset transaction with Standard Metallurgical Limited by KAM Steel Integrated Limited
- 5) JSC Polyus Krasnoyarsk's acquisition of SL Gold Limited Liability for \$128.2m.

Verdict deals analysis methodology

This analysis considers only announced and completed deals from the GlobalData financial deals database and excludes all terminated and rumoured deals. Country and industry are defined according to the headquarters and dominant industry of the target firm. The term 'acquisition' refers to both completed deals and those in the bidding stage.

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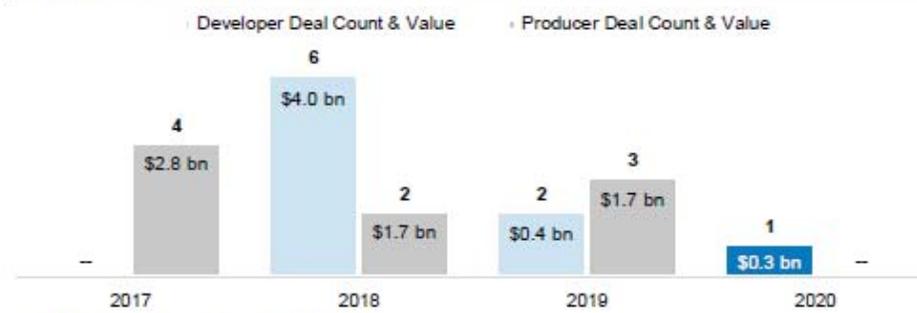
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Bloomberg - M&A Activity in Context

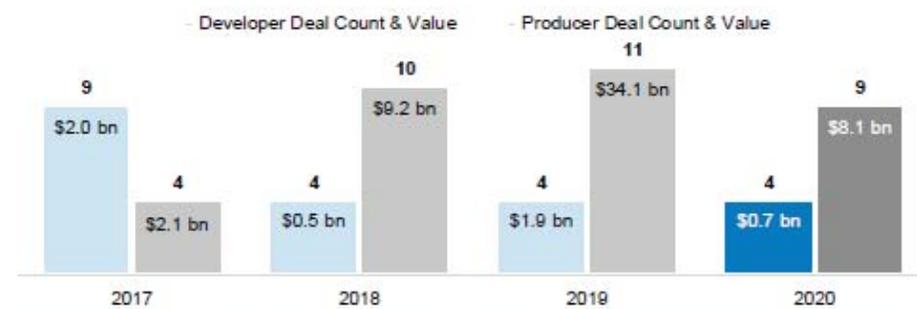
M&A Activity in Context

BASE METALS M&A SINCE 2017



- Base metals M&A activity has continued to decline with just one transaction announced in 2020
 - Mitsubishi / 30% Mantoverde, announced pre-COVID impact (Feb-20)
- Represents a historically low year for both number and value of base metals transactions

PRECIOUS METALS M&A SINCE 2017



- Precious metals transactions have continued to be strongly skewed toward producers in 2020
- A number of transactions would have been well advanced prior to COVID-19
 - Endeavour / SEMAFO (Mar-20)
 - Argonaut / Alio (Mar-20)
- More recent transactions have had circumstances necessary to facilitate a transaction at the current time
 - Northern Star / Saracen (Oct-20, Australia-only, existing partners)

M&A activity has been skewed towards precious metals, and producing assets, with base metals M&A at historically low levels

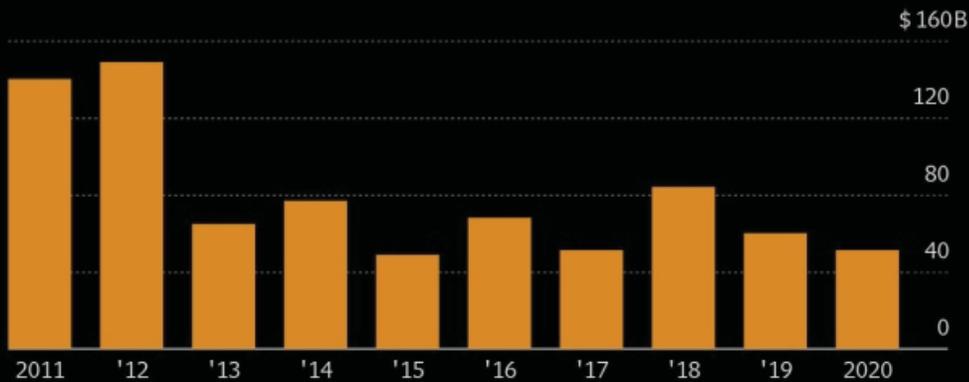
Top Mining Dealmaker Says Takeovers All Talk Until Recovery

Steven Frank, Bloomberg News



Mining Slowdown

The value of global mining deals has ebbed since early 2010s



Source: Bloomberg data

Note: Based on value of M&A transactions worldwide. 2020 is year to date

Bloomberg

Daniel Barclay, chief executive officer of BMO Capital Markets Corp., speaks during the Milken Institute Global Conference in Beverly Hills, California, U.S., on Tuesday, April 30, 2019. The conference brings together leaders in business, government, technology, philanthropy, academia, and the media to discuss actionable and collaborative solutions to some of the most important questions of our time. . Bloomberg

(Bloomberg) -- Miners are engaging in plenty of takeover talks despite a tepid year for acquisitions, but few deals will get done without greater clarity on the economy and an ebbing of Covid-19, said the industry's top dealmaker.

"There's lots of conversations going on, lots of people exploring new ways to think and new ways to operate," Dan Barclay, who heads Bank of Montreal's capital-markets division, said in an interview last week. "The probability of a lot of action is going to be conditional on that economic recovery."

For years, mining executives including Barrick Gold Corp.'s Mark Bristow have been saying that consolidation in the industry is inevitable given the abundance of companies and increasing difficulty of finding new high-grade deposits. That could be a boon for investment banks including BMO Capital Markets, among the most active dealmakers in mining and the No. 1 adviser for acquisitions last year.

Mining companies have been involved in about \$52 billion of acquisitions this year, according to Bloomberg data. That's less than half the value of deals seen during industry consolidation in the mid 2000s and following the end of the financial crisis.

The inability of companies to undertake due diligence amid Covid-19 restrictions and "huge price volatility" in the metal markets have hampered this year's activity, Barclay said. In the precious-metals sector, given the run-up of gold to record levels, there's a "value gap between what people think is coming and what they think they're worth," he said.

If an economic recovery takes hold and strengthens demand for commodities, Barclay anticipates “a very busy year” ahead for BMO Capital Markets for financings and other transactions. Without that, acquisition activity among miners will echo the relatively slow year seen in 2020.

“We don’t think we’re going to recover to a normal level next year,” he said, “unless we get great clarity on economic recovery or we get great clarity on dealing with Covid.”

‘Kick the Tires’

The tentativeness of doing deals is not lost on Sean Boyd, who leads top-10 gold miner Agnico Eagle Mines Ltd.

“The inability to get people that do your project evaluation work out to look at things is a big hindrance,” Boyd said by phone. “You need to kick the tires.”

Executives probably feel less pressure to push ahead with consolidation plays “given that the gold price has helped their operations,” Boyd said.

Another big theme next year, beyond deals, is increased prominence around environmental, social and governance issues.

“Investors are starting to build a more robust tool kit to think about the overall ESG framework of the industry, and who is doing well and not,” Barclay said.

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NEWS LEADER

WATCH: How Covid-19 has affected M&A in the mining sector

RMB's Henk de Hoop talks to Business Day TV about consolidation in the mining industry

04 NOVEMBER 2020 - 09:40 by BUSINESS DAY TV

Covid-19 has hampered merger activity in the mining sector. Industry players have cautioned that only a few deals may be completed due to the weak economic environment.

Business Day TV spoke to [RMB's Henk de Hoop](#) for his views on consolidation in the industry.



Amid gold price whipsaw, M&A heats up in the mining space

Kitco Commentaries | Opinions, Ideas and Markets Talk
Featuring views and opinions written by market professionals, not staff journalists.

News of a vaccine with a 90% success rate caused stocks to soar on Monday with the Dow and S&P 500 setting new records, while gold whipsawed \$118 lower intraday. The largest single day gold move lower in over seven years nullified its breakout from a 3-month descending wedge last Friday, and since then has created a bearish flagging pattern on the daily chart.

With gold futures closing below \$1865 on the Comex this week, the sharp selloff below this support level brings back the possibility of the \$1750-\$1800 region being tested before the correction of over-sized gains in the safe-haven metal finds a significant bottom. Gold futures basis \$1800 has technically become a critical support level, being an area where we have seen plenty of resistance going back to the 2008 gold bull.

Meanwhile, M&A began to heat up in the sector last week, as Yamana Gold Inc. (AUY) and Monarch Gold Corp. (MQR.TO) announced that they had entered into a definitive agreement in which Yamana will purchase all of Monarch's shares that it does not already own for C\$152 million.

Under the agreement, Monarch will first spin out some of its assets and liabilities into a new company, and Yamana will acquire the remaining properties, including the Wasamac gold project in Quebec's Abitibi region and the Camflo property near Val-d'Or, Quebec. The takeover is expected to be completed by January 2021.

According to the Monarch Gold press release announcing this proposed deal, boards of both companies and certain larger shareholders of Monarch have entered into support agreements. The agreed parties together, along with shares already owned or held by Yamana, equal approximately 28% of Monarch's issued and outstanding stock.

But the acquisition will need regulatory, court and stock exchange approvals, along with a two-thirds majority approval by Monarch stakeholders and other closing conditions.

This proposed offer by Yamana equals just \$40 an ounce for the 2.88 million-ounce Wasamac

gold resource. The industry average is twice that at \$80 per ounce when comparing similar past acquisition deals in the gold space.

Yamana rival Alamos Gold (AGI), who also has operations near the Wasamac Gold Project, controls 16% of Monarch stock. Both Hecla Mining (HL) and Agnico Eagle Mines (AEM) also hold positions of 4% and 3%, respectively.

Being a Monarch Gold shareholder, I am hoping for a bidding war to take place for this quality asset that is being offered at a significant discount to previous sector deals, while located in a Tier 1 jurisdiction.

In mid-July 2020, Russian miner Nord Gold S.E. made a take-over offer of A\$0.66 per share for Australian developer Cardinal Resources (CDV.TO), which operates in a Tier 2 jurisdiction. Chinese miner Shondong Gold, who had purchased Cardinal shares a week prior to Nord Gold's offer, began a bidding war shortly thereafter and made a A\$1.00 offer last week for the junior.

Earlier this week, there was another [acquisition deal announced](#). Canadian developer Cross River Ventures (CRVC.CSE) entered into a definitive share purchase agreement with privately-held mineral exploration firm Northern Dominion Metals (NDMC) to acquire all of the outstanding share capital of NDMC.

Then, in response to a Bloomberg press report, Endeavour Mining (EDV.TO) confirmed in a [statement](#) on Tuesday that it is "in discussions" with Teranga Gold Corp (TGZ.TO) regarding a "potential merger of equals style combination".

It added, "These discussions may or may not result in an agreement in respect of a potential transaction and any transaction would only be pursued if the board of Endeavour believed that it represented a compelling value creation opportunity for its shareholders".

Also, Quebec explorer Bonterra Resources (BTR.V) received a nonbinding letter of intent from a large third party regarding an all-share acquisition of the company at about C\$1.60 a share based on prices on November 6th. The [company said on Tuesday](#) that the offer was opportunistic, unsolicited and that it had since expired.

Meanwhile, underground gold reserves held by major mining firms continue to be low and falling. New reserves are [becoming increasingly harder to find](#) with resources being used up, and exploration is costly. Major mining companies have a few ways to remedy their shortages. They must either discover new underground resources through exploration, or acquire them via the takeover of junior development companies.

It is now cheaper for companies to [buy developing or developed projects](#) on Bay Street via acquisition, rather than to develop projects themselves given shortages of capable development teams and timeline pressures while the gold price consolidating.

As the healthy consolidation of recent out-sized gains in the gold space continues, this is a great time to consider accumulating a basket of junior developers controlling large projects being de-risked into the finance stage. With the gold price likely in the process of [creating a new floor in the \\$1800 region](#), global producers are beginning to concentrate on replacing depleting reserves.

As senior gold producers face declining production profiles, shrinking reserves, and a return to rising production costs, I expect more news of miners targeting acquisitions to supplement their depleted pipelines going into 2021.

If you require assistance in choosing which quality take-over candidates in the junior space to invest and would like to receive my research, newsletter, portfolio, and trade alerts, [please click here for instant access](#).

Full Disclosure: I purchased shares of MQR.TO and TGZ.TO in the open market earlier this year, and have also recommend both to my subscribers. Please do your own due diligence before considering the purchase of any junior resource stock.

By David Erfle
Contributing to [kitco.com](#)

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Endeavour Mining to acquire rival Teranga Gold for \$2.44 billion

Dylan Griffiths, Bloomberg News



Endeavour Mining Corp., the acquisitive gold producer backed by Egyptian billionaire Naguib Sawiris, agreed to buy Teranga Gold Corp. in the latest deal to reshape the sector.

After Barrick Gold Corp. and Newmont Corp. two years ago created behemoths that dwarf the rest of the industry, other gold miners are trying to consolidate to remain relevant to shareholders. Helped by record gold prices, that's led to a flurry of deals across the sector as smaller producers beef up their scale.

Endeavour said last week it was discussing a "merger of equals style" deal with Teranga after the talks were first reported by Bloomberg. Endeavour is offering 5.1 per cent premium to Teranga's closing price on Friday, valuing its equity at C\$2.44 billion (US\$1.86 billion), according to Bloomberg calculations.

The combined company will produce about 1.5 million ounces of gold a year across West Africa, making it one of the 10 largest producers. It also plans to seek a listing on the London Stock Exchange, a long-term goal of Endeavour Chief Executive Officer Sebastien de Montessus.

London has become a go-to destination for gold-miners in the past year as companies seek to fill the gap left by Randgold Resources Ltd., a former investor favorite that delisted when it was bought by Barrick in a deal that set the tone for low or zero premium combinations in the industry.

Since Randgold left, Yamana Gold Inc. and Wheaton Precious Metals Corp. have both secured listings in London, though unlike Endeavour they have not sought premium listings that make them eligible for the FTSE 100 index.

"The combined entity will become a new senior gold producer and enjoy an improved capital markets profile, underpinned by a healthy balance sheet and strong cash flow capabilities to support a sustainable dividend," de Montessus said in Monday's statement.

Endeavour is offering 0.47 of its own shares per Teranga share. That means existing Endeavour and Teranga shareholders will own approximately 66 per cent and 34 per cent, respectively, of the combined company.

La Mancha, the vehicle which Sawiris holds his stake in Endeavour, will invest a further US\$200 million into the combined company, leaving it with a 19 per cent stake. Teranga's biggest shareholders, including Barrick, support the deal.

A successful deal would extend a years-long transformation by Endeavour, which has replaced high-cost mines with two new flagship projects that produce more gold and will operate for much longer. Teranga has assets in Senegal, Burkina Faso and Ivory Coast, including the Massawa project it bought from Barrick.

EDV:CT, TGZ:CT (EDV:CT)

27.68 0.52 (1.91%)

As of: 02/11/21 7:21:46 pm

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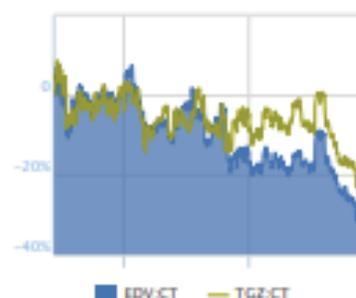


Chart Type - 6month, Comparative

[See Full Stock Page > /stock/EDV:CT](#)

Deals Analysis

Metals & mining industry M&A deals in Q3 2020 total \$686.45m in Canada

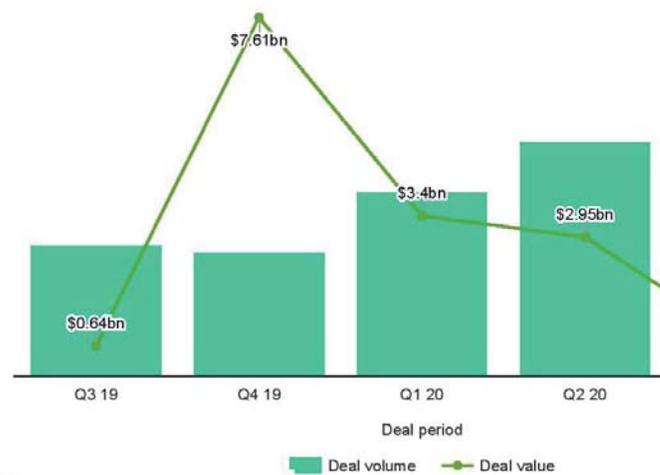
18 November 2020 (Last Updated November 18th, 2020 19:24)



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Total metals & mining industry M&A deals in Q3 2020 worth \$686.45m were announced in Canada, according to

Canada M&A metals & mining : deal value and volume trend - C 2020



The value marked a decrease of 76.7% over the previous quarter and a drop of 81.2% when compared with the last four-quarter average of \$3.65bn.

Canada held a 9.5% share of the global metals & mining industry M&A deal value that totalled \$7.21bn in Q3 2020.

In terms of deal activity, Canada recorded 213 deals during Q3 2020, marking a rise of 37.4% over the previous quarter and a rise of 90.2% over the last four-quarter average.

Canada metals & mining industry M&A deals in Q3 2020: Top and total deals revealed

The top five metals & mining industry M&A deals accounted for 50.8% of the overall value during Q3 2020.

The combined value of the top five metals & mining M&A deals stood at \$348.91m, against the overall value of \$686.45m recorded for the month.

The top five metals & mining industry deals of Q3 2020 tracked by GlobalData were:

Canada metals & mining industry M&A deals in Q3 2020: Top and total deals revealed

- 1) Auryn Resources' \$112.92m acquisition of Eastmain Resources
- 2) The \$75m asset transaction with Kirkland Lake Gold by Newmont
- 3) Kinross Gold's \$70.02m asset transaction with Contango ORE and Royal Gold
- 4) The \$45.8m acquisition of Coral Gold Resources by Guerrero Ventures
- 5) Southern Empire Resources' acquisition of MAS Gold for \$45.17m.

Verdict deals analysis methodology

This analysis considers only announced and completed deals from the GlobalData financial deals database and excludes all terminated and rumoured deals. Country and industry are defined according to the headquarters and dominant industry of the target firm. The term 'acquisition' refers to both completed deals and those in the bidding stage.

GlobalData tracks real-time data concerning all merger and acquisition, private equity/venture capital and asset transaction activity around the world from thousands of company websites and other reliable sources.

More in-depth reports and analysis on all reported deals are available for subscribers to [GlobalData's deals database](#).

Deals Analysis

Metals & mining industry M&A deals in Q3 2020 total \$1.59bn in US

18 November 2020 (Last Updated November 18th, 2020 03:14)



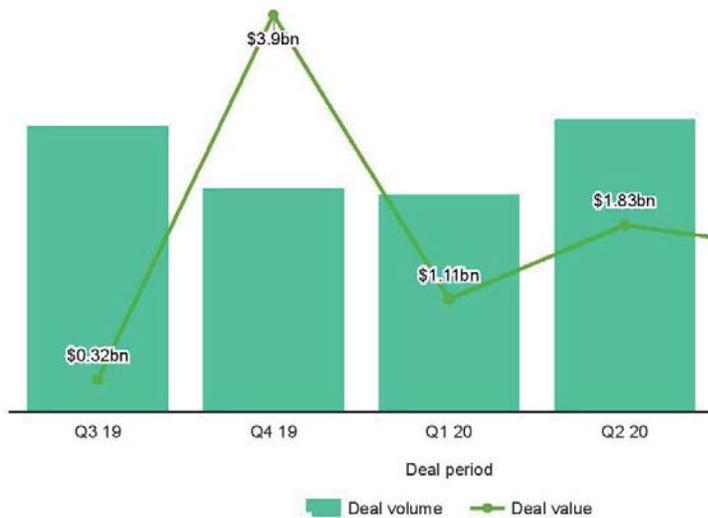
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Total metals & mining industry M&A deals in Q3 2020 worth \$1.59bn were announced in the US, according to GlobalData's

2/1/2021

US metals & mining industry M&A deals in Q3 2020: Top and total deals revealed

United States M&A metals & mining : deal value and volume tr to Q3 2020



The value marked a decrease of 13% over the previous quarter and a drop of 10.9% when compared with the last four-quarter average of \$1.79bn.

The US held a 22.1% share of the global metals & mining industry M&A deal value that totalled \$7.21bn in Q3 2020.

In terms of deal activity, the US recorded 51 deals during Q3 2020, marking a rise of 18.6% over the previous quarter and a rise of 34.2% over the last four-quarter average.

US metals & mining industry M&A deals in Q3 2020: Top and total deals revealed

The top five metals & mining industry M&A deals accounted for 98.2% of the overall value during Q3 2020.

The combined value of the top five metals & mining M&A deals stood at \$1.57bn, against the overall value of \$1.59bn recorded for the month.

The top five metals & mining industry deals of Q3 2020 tracked by GlobalData were:

US metals & mining industry M&A deals in Q3 2020: Top and total deals revealed

- 1) The \$1.4bn merger of ArcelorMittal USA and Cleveland-Cliffs
- 2) The \$90m asset transaction with Newmont by Maverix Metals
- 3) Premier Gold Mines USA and Premier Gold Mines' \$50m acquisition of Osgood MiningLLC
- 4) The \$16.8m asset transaction with Barrick Gold by Bullfrog Gold
- 5) Altius Minerals' asset transaction with Liberty Metals & Mining Holdings for \$8.38m.

Verdict deals analysis methodology

This analysis considers only announced and completed deals from the GlobalData financial deals database and excludes all terminated and rumoured deals. Country and industry are defined according to the headquarters and dominant industry of the target firm. The term 'acquisition' refers to both completed deals and those in the bidding stage.

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Australian M&A falls 49% in third quarter

26TH NOVEMBER 2020

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CREAMER MEDIA SENIOR DEPUTY
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PERTH (miningweekly.com) – Australia's top five mining and metal merger and acquisition (M&A) agreements in the third quarter of this year was valued at a combined \$335.35-million, accounting for 75.4% of the overall deal value in the same period.

Analysts GlobalData's addition to the M&A transactions included Russian gold miner Nordgold's \$247.1-million offer for ASX-listed Cardinal Resources, the \$42.91-million acquisition of Millennium Minerals by Novo Resources, Auris Minerals' \$16.49-million acquisition of Sams Creek Gold, and Calidus Resources' asset transaction with Novo Resources for \$14.21-million.

Total metals & mining industry M&A deals in the third quarter was worth \$444.85-million in Australia, GlobalData's deals database has shown.

The value marked a decrease of 49% over the previous quarter and a drop of 68.4% when compared with the last four-quarter average of \$1.41-billion.

Australia held a 6.2% share of the global metals & mining industry M&A deal value that totalled \$7.21-billion in the third quarter of 2020.

In terms of deal activity, Australia recorded 108 deals during the third quarter, marking a rise of 33.3% over the previous quarter and a rise of 74.2% over the last four-quarter average. ■■

November 27, 2020

COVID-19 hinders big M&A in Canada

Canada's mining sector saw M&A activity ramp up in the September quarter, but increased caution in the wake of COVID-19 prevented big deals getting across the line.



Finance > M-a

27 November 2020

Comments 

Share 

The volume of M&A deals struck rose 37% quarter-on-quarter to 213 in Q3, while the combined value of deals fell to \$686 million, down 77% quarter-on-quarter and 81% lower than the average of the

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News

Serengeti, Sun Metals merger to create BC-focused copper-gold developer



Sun Metals' Stardust project in B.C. Credit: Sun Metals

B.C.-focused juniors **Serengeti Resources** and **Sun Metals** plan to combine to create a "premier Canadian multi-asset copper-gold developer."

The merger will bring together the companies' adjacent projects in north-central British Columbia – Serengeti's 67%-owned Kwanika project and Sun Metals' Stardust project. It will also bring together Sun Metals' Lorraine project, 40 km north of Stardust, with the neighbouring Top Cat project, which is under

option to Serengeti.

"Against the backdrop of a resurgent copper market, this transaction consolidates the ownership of a robust copper-gold portfolio, with near-term development synergy at Kwanika-Stardust and several high priority exploration targets," said Serengeti's interim president and CEO David Moore, in a release.

"This unique corporate combination creates an exciting, diversified copper-gold developer with a large pipeline of projects, in one of Canada's most prolific porphyry mining camps," added Mark O'Dea, a director of Sun Metals who will also be executive chairman of the combined company. "We are bringing together exploration, development and operational synergies at multiple projects along with ongoing resource expansion opportunities and new discovery potential."

Before the all-share transaction takes place, Serengeti will complete a two-for-one share consolidation.

Under the deal, Serengeti will acquire all shares of Sun Metals, with each share of Sun Metals exchanged for 0.43 of a share in Serengeti (on a pre-consolidation basis).

As part of the transaction, Sun Metals is concurrently raising \$9 million (up from \$8 million originally) in a bought-deal private placement financing consisting of 72 million subscription receipts priced at 12.5¢ apiece. Each subscription receipt, for a share and half a warrant, will be exchangeable for securities of Serengeti (on a post-consolidation basis) when the transaction closes. The underwriters may offer an additional 10.8 million subscription receipts for up to \$1.35 million.

A shareholder vote on the merger is expected to take place in February.

Once the deal closes, Sun Metals will be entitled to appoint three directors to the combined company's board, including O'Dea. Serengeti's interim CEO David Moore will stay in the role until a permanent CEO is appointed.

The 259.3-sq.-km Kwanika project, located in the northern Quesnel Trough, holds measured and indicated resources (open pit and underground) totalling 1.3 billion lb. copper and 1.8 million oz. gold and 6.3 million oz. silver in 223.6 million tonnes grading 0.27% copper, 0.25 g/t gold and 0.87 g/t silver. It is 33% held by Posco International Corp.

Sun Metals' 96-sq.-km Stardust project contains indicated resources in the Canyon Creek zone of 985,000 tonnes grading 1.34% copper, 1.59 g/t gold and 36.8 g/t silver. Inferred resources add 2 million tonnes grading 1.24% copper, 1.72 g/t gold and 30.5 g/t silver.

2/1/2021

Serengeti, Sun Metals merger to create BC-focused copper-gold developer - Canadian Mining JournalCanadian Mining Journal

The combined company will also hold Serengeti's 207.5-sq.-km East Niv grassroots exploration project, plus several other exploration properties in B.C.

For more information, visit www.serengetiresources.com or www.sunmetals.ca.

US metals and mining industry M&A deals total US\$1.59 billion in Q3

According to GlobalData's latest report, M&A deals in the U.S. metals and mining industry for the third quarter of 2020 totalled US\$1.59 billion. The valuation is a decrease of 13% from the previous quarter, and also marks a drop of 10.9% in comparison to the last four-quarter average of US\$1.79 billion.

Globally, third quarter metals and mining industry M&A deal values totalled US\$7.21 billion, of which U.S. deals comprised 22.1%.

The firm's deals database shows that the U.S. industry saw 51 deals in the third quarter, which was an increase of 18.6% from the second quarter, and was up 34.2% over the last four-quarter average in the country. The top five U.S. M&A deals made up 98.2% of the overall value in the region's third quarter, amounting to US\$1.57 billion of the US\$1.59 billion total.

According to GlobalData, those top five deals in the third quarter were: **ArcelorMittal USA** (NYSE: MT) and **Cleveland-Cliffs'** (NYSE: CLF) US\$1.4 billion merger; the US\$90 million asset transaction with **Newmont** (TSX: NGT; NYSE: NEM) by **Maverix Metals** (TSX: MMX; NYSE: MMX); the US\$50 million acquisition of OsgoodMiningLLC by **Premier Gold Mines** (TSX: PG; US-OTC: PIRGF) and their subsidiary Premier Gold Mines USA; the US\$16.8 million asset transaction by Bullfrog Gold with **Barrick Gold** (TSX: ABX; NYSE: GOLD); and **Altius Minerals'** (TSE: ALS) US\$8.38 million asset transaction with Liberty Metals & Mining Holdings.

Aluminum sector deal tops metals, mining transactions in week ended Dec. 4

An aluminum industry acquisition emerged as the highest-valued transaction in the metals and mining sector for the week ended Dec. 4, according to a screener of the top five mergers and acquisitions on S&P Global Market Intelligence's online platform.

Kaiser Aluminum Corp. signed a definitive agreement to buy Alcoa Corp. subsidiary Alcoa Warrick LLC in a \$670 million transaction. Kaiser agreed to pay \$587 million in cash and assume \$83 million in liabilities to acquire the Indiana-based rolling mill business, including about 1,170 employees. The deal is expected to close by the end of the first quarter of 2021.

In the coal sector, Moscow-based A-Property OOO bought the remaining 49% interest in the Elga coking coal mine in Russia from AO Gazprombank in a \$594.8 million deal. A-Property acquired a 51% stake in the property earlier in the year, after outlining plans in January to revive the acquisition.

Seabridge Gold Inc. unit KSM Mining ULC agreed to buy the Snowfield gold property in British Columbia from Pretium Resources Inc. in a \$120 million transaction. The deal comprises \$100 million in an up-front payment, a \$20 million contingent cash payment and a 1.5% net smelter return royalty. Closing is scheduled for the fourth quarter.

In mergers, Serengeti Resources Inc. said it would acquire Sun Metals Corp., planning to exchange 0.43 of a Serengeti share for each Sun Metals share in a \$17.8 million transaction. Sun Metals owns the Stardust and Lorraine copper-gold projects in British Columbia and recently consolidated its interest in the latter.

To round out the top five deals of the week, Clarity Gold Corp. entered into an option agreement to earn up to a 100% interest in the Destiny project in Quebec from Big Ridge Gold Corp. in a \$6.6 million transaction comprising three years of cash and share payments.

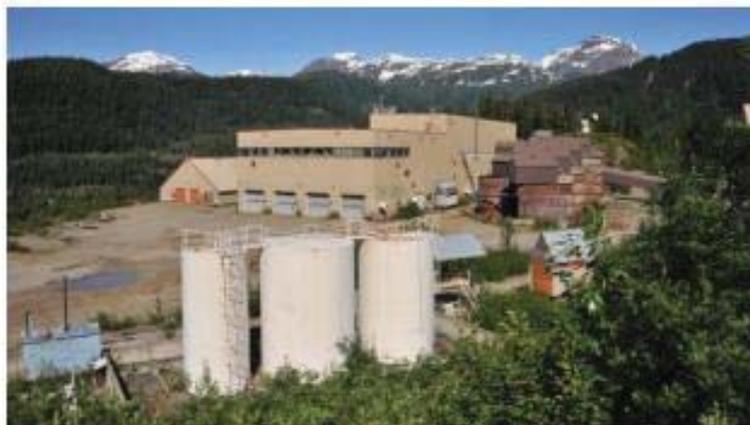
Top 5 M&A transactions for week ended Dec. 4

Target or issuer	Buyer	Announcement	Sector	Country	Status	Value (\$M)
Alcoa Warrick LLC	Kaiser Aluminum Corp.	11/30/20	Aluminum	U.S.	Announced	670.00
Elga project	A-Property OOO	12/02/20	Coal and consumable fuels	Russia	Completed	594.81
Snowfield property	KSM Mining ULC	12/04/20	Gold	Canada	Announced	120.00
Sun Metals Corp.	Serengeti Resources Inc.	11/30/20	Diversified metals and mining	Canada	Announced	17.80
Destiny project	Clarity Gold Corp.	11/30/20	Gold	Canada	Announced	6.55

Data as of Dec. 6, 2020.
 M&A transactions comprise announced and completed deals from Nov. 28-Dec. 4, 2020, including streaming, royalty, off-take and private equity deals related to metals and mining, coal and consumable fuels, and fertilizer and agricultural chemical industries.
 Source: S&P Global Market Intelligence

News

Ascot secures US\$105M finance package for Premier construction



Historic mill at Premier gold project Credit: Ascot Resources

Developer **Ascot Resources** has closed a US\$105-million project financing package with Sprott Private Resource Lending and Beedie Investments for development of its past-producing Premier gold project in B.C. and to repay existing outstanding convertible notes.

The financing includes a US\$80-million senior credit facility, provided by Sprott, and a US\$25-million subordinated convertible facility, provided by both Beedie and Sprott.

The senior, five-year facility includes a US\$20-million tranche advanced at closing, with additional tranches available to the company once certain conditions are met. Interest rates are the greater of either the three-month LIBOR rate and 1.5% plus 7% and 5.75% annually.

All of the interest costs are capitalized till June 2022, with principal payable in 10 quarterly installments starting in September 2023. A fixed, US\$13 per ounce production payment is due on the first 450,000 oz. generated from the project – these payments may be stopped early by paying a termination fee. After December 2023, the company may start prepaying the outstanding principal and interest amounts.

The facility may be drawn until the end of June 2022, for a project completion no later than September 2023.

This second facility may be converted into Ascot common shares on pre-specified terms.

"We are very pleased with the financial commitments that Sprott and Beedie Capital have made towards the development of the project," Derek White, the company's president and CEO, said in a release. "We have achieved our objective of securing a flexible financing package on terms that are competitive and protect the upside for our shareholders. The optionality of repayment of both the Senior Facility and the Convertible Facility in a rising gold price environment provides the company financing flexibility. Combined with the equity financing completed in June, this package secures approximately US\$45 million of immediate funding enabling us to order long lead-time equipment, undertake pre-construction activities, advance permitting and refinance our existing convertible note."

The definitive documentation for the financing has been signed, with the first US\$20 million from the senior facility expected on Dec. 10.

A feasibility study from April 2020 on a development of both the Premier and Red Mountain projects outlined an eight-year mining operation producing an average of 132,375 oz. of gold and 370,500 oz. of silver annually at all-in sustaining costs of US\$769 per oz. With an initial capital cost estimate of \$146.6 million, the net present value for the project, at a 5% discount rate, stands at \$341 million with a 51% internal rate of return.

For more information, visit www.AscotGold.com.

Metals deals insights: 2021 outlook

Executive summary

2020 has undoubtedly been upended by Covid-19, and its disruption has touched nearly every facet of life. M&A markets were no exception, and deal activity in the metals sector dampened in H1-20. Amidst this global uncertainty, some companies and firms have proven resilient, and Q3-20 has already shown signs of fairly dramatic M&A recovery, as deals that were either delayed or postponed from Q2-20 were restarted, jumpstarting new deal activity. While Metals deal value and volume also saw increases from Q2-20 to Q3-20, the industry may have a longer road to recovery relative to other sectors.

Metals deals outlook

Deals 2021 outlook: M&A leads t

2:27



PwC's Deals Sector Leader John Potter discusses the trends driving deals and outlook for 2021. [Explore national deals trends](#)

Despite the resurgence in deals activity in Q3-20, much of the uncertainty prompted by Covid-19 persists into Q4 and 2021. As some major European countries impose lockdowns and COVID-19 cases in the US rise, vaccine trials and treatments are gaining momentum and promise. Given the conflicting developments, the question of how long the pandemic will last still remains unanswered. Deal makers will also have to contend with uncertainty surrounding a new president and administration and the potential for policy change. Even with this uncertainty, we anticipate M&A activity in the metals industry to continue to recover from the lows in the first half of 2020. However, while the industry as a whole may begin to recover, there is the potential for clear winners to emerge, and other players in the industry to suffer based on their ability – or lack thereof – to take advantage of opportunities as they present themselves and adapt to the evolving economic landscape.

Total deal value and volume, last eight quarters



Note: Deals included in this graphic are total announced deals (with disclosed and undisclosed values). There were 260 deals in 4Q 2020 with disclosed values totaling \$14.2 billion.

Source: PwC

“The world faced unforeseen challenges and uncertainty in 2020, and the metals industry was no exception. The M&A decisions businesses make now, and into 2021, can determine their trajectory far into a post-pandemic landscape.”

Brian Kelly, US Metals Deals Leader

Key deal drivers

Shifting industry paths

Potential policy changes

Shifting industry paths

Shifting industry paths

The Covid-19 pandemic has not impacted all industries equally. While certain industries and companies experienced a severe negative impact, others saw only moderate impacts. Some even thrived during the pandemic. The metals industry was negatively impacted from the pandemic as many downstream users of materials in the automotive, aerospace, and heavy equipment industries saw decreased demand. As some struggling companies may look to shed non-core assets, reduce debt loads, and streamline operations, others with healthy balance sheets and access to capital can be expected to make opportunistic buys and further integrate their supply

chains leading to increased M&A activity. The decisions metals firms make now and into 2021, may determine their recovery timeline and/or success far into a post-pandemic world as demand ultimately rebounds.

Potential policy changes **Potential policy changes**

The anticipated changeover of the US Presidential administration ushers in the potential for new policymaking and the reversal of current policy. The metals sector was acutely aware of policy changes in the last four years, as industry players adapted to shifting tariffs on steel and aluminum and the enactment of new trade policies between foreign counterparties. How the Biden administration will use tariffs and revisit trade policy likely will weigh heavily on the minds of leaders in the metals sector as we wade into 2021. Though US companies may be anticipating higher corporate tax rates in the future, firms in the metals sector may benefit from the adoption of policies that are aimed at promoting domestic manufacturing and the overhaul of aging infrastructure.

Contact us

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Metals Deals Leader, PwC US

 [Email](#)

Deals Analysis

Metals & Mining industry cross border M&A deals total \$1.63bn globally in December 2020

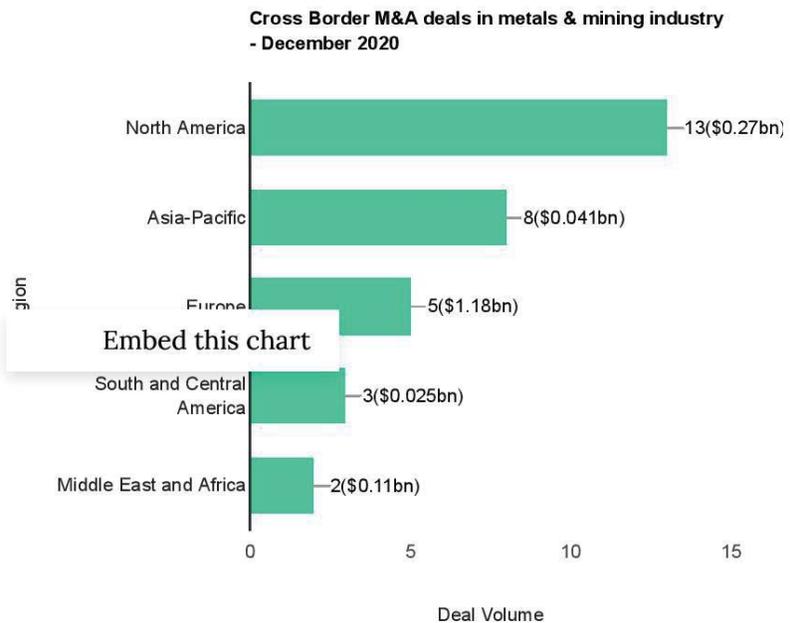
19 January 2021 (Last Updated January 19th, 2021 05:12)

Share Article 

Total metals & mining industry cross border M&A deals worth \$1.63bn were announced globally in December 2020, led by Sandvik's \$1.15bn acquisition of DSI Underground, according to GlobalData's deals database.

2/1/2021

Metals & Mining industry cross border M&A deals in December 2020



announced deals in the period worth \$1.15bn. At the country level, the Germany topped the list in terms of deal value at \$1.15bn.

In terms of volumes, North America emerged as the top region for metals & mining industry cross border M&A deals globally, followed by Asia-Pacific and then Europe.

The top country in terms of cross border M&A deals activity in December 2020 was Canada with five deals, followed by the US with five and Australia with three.

In 2020, as of December, metals & mining cross border M&A deals worth \$20.02bn were announced globally, marking an increase of 28.8% year on year.

The top five cross border M&A deals accounted for 95.2% of the overall value during December 2020.

The combined value of the top five metals & mining cross border M&A deals stood at \$1.55bn. against the overall value

2/1/2021

Metals & Mining industry cross border M&A deals in December 2020

The top five metals & mining industry cross border M&A deals of December 2020 tracked by GlobalData were:

- 1) Sandvik's \$1.15bn acquisition of DSI Underground
- 2) The \$225m acquisition of Greenstone Gold Mines GP by Orion Mine Finance
- 3) Chijin International (HK)'s \$105m asset transaction with Resolute Mining
- 4) The \$36.69m acquisition of SBQ Steels by Liberty House Group
- 5) Hargreaves Raw Material Services' asset transaction with Hargreaves Services for \$32.28m.

Verdict deals analysis methodology

This analysis considers only announced and completed cross border deals from the GlobalData financial deals database and excludes all terminated and rumoured deals. Country and industry are defined according to the headquarters and dominant industry of the target firm. The term 'acquisition' refers to both completed deals and those in the bidding stage.

GlobalData tracks real-time data concerning all merger and acquisition, private equity/venture capital and asset transaction activity around the world from thousands of company websites and other reliable sources.

More in-depth reports and analysis on all reported deals are available for subscribers to GlobalData's deals database.

**APPENDIX B5 BIOTEQ ENVIRONMENTAL TECHNOLOGIES FINAL DATA
REPORT – PILOT DEMONSTRATION OF SELENIUM REMOVAL
FROM KSM SEEPAGE USING SELEN-IX™**

Final Data Report: 'Pilot Demonstration of Selenium Removal from KSM Seepage Using Selen-IX™' authored by BioteQ Environmental Technologies, dated June 22, 2015.



Pilot Demonstration of Selenium Removal from KSM Seepage Using Selen-IX™

PROJECT SUMMARY REPORT

June 22, 2015

Prepared For

R. Brent Murphy

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Seabridge Gold

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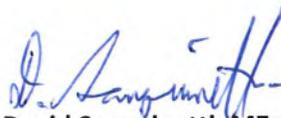
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David Kratochvil, PhD, PEng
President and CEO



JUNE 22/2015



David Sanguinetti, MEng, PEng
Director of Engineering



JUNE 22/15

Confidentiality

This Project Summary Report has been prepared by BioteQ with the full knowledge that the report will be shared with many parties without confidentiality agreements.

BioteQ Environmental Technologies Inc.

Vancouver BC Canada

June 22, 2015



Project Summary Report

In the Environmental Impact Statement submitted for the KSM project, the control of selenium loading into the Water Storage Facility (WSF) was identified as the key element of the overall selenium management plan. The two pillars of the plan include the following:

- Collection of wastewater with the highest concentration and overall mass load of selenium at the source, i.e. prior to dilution by water coming from other sources reporting to WSF
- Treatment of this selenium-rich stream in a plant designed to remove selenium down to below 1 ppb and discharging the treated water into the WSF

The stream with the highest concentration and mass load of selenium was identified as the seepage from the Mitchell/McTagg rock storage facility (RSF) with the predicted flow of up to 500 L/s and selenium concentration over 100 ppb. The discharge limit of 1 ppb was determined such that no further or additional selenium removal would be required downstream of the plant dedicated to selenium removal other than the removal achievable in the lime neutralization plant prior to discharge into the environment.

The requirement to remove selenium from levels in excess of 100 ppb down to less than 1 ppb from waste rock seepage flowing at up to 500 L/s and subject to seasonal variability necessitates that special attention and considerations be given to the selection of the treatment process.

This report summarizes a pilot demonstration of the capability of the Selen-IX™ process to remove selenium to below 1 ppb, which was successfully completed in accordance with the requirements of the Environmental Assessment (EA) Certificate (#M14-01), issued by the British Columbia Minister of Environment and the Minister of Energy and Mines to Seabridge Gold for the KSM project on July 29, 2014.

BioteQ's Selen-IX™ process, combined with a pre-treatment by partial lime neutralization and ferric iron removal, was selected by Seabridge over biological systems because it provides a number of advantages to the KSM project that are not possible with biological systems. These advantages include:

- Ability to remove selenium to < 1 ppb in the effluent (biological systems typically can't achieve less than 3-5 ppb)
- Deportment of selenium removed from water into a well characterized, inorganic solid residue composed of elemental selenium and iron oxides that passes TCLP tests and is not subject to biological aging uncertainties associated with the selenium laden biomass waste
- No introduction of BOD, COD or phosphorous into the treated water, which may cause risks of environmental incidents during plant operation and/or potential long term impacts
- Not sensitive to water temperature
- Responsive to feed fluctuations and plant upsets

To prepare the pilot plant feed, water was collected from Mitchell Creek, which was then chemically modified by ERM Rescan to meet the expected composition of the Mitchell/McTagg rock storage facility seepage. Two types of feed water were prepared:

- Low-selenium, 120 ppb selenium (100 ppb selenate - Se(VI), 20 ppb selenite - Se(IV))
- High-selenium, 320 ppb selenium (300 ppb selenate - Se(VI), 20 ppb selenite - Se(IV))

Both types of feed water were stored in large HDPE storage tanks placed in a secondary containment for safety and spill prevention.



Figure 1-1: HDPE Feed Tanks

The process flow sheet included the following main unit processes:

- A ferric removal step, which removed iron and other dissolved metals (including selenite) from the feed water by lime precipitation
- An ion exchange step, which removed selenate from the water to less than 1 ppb in the plant effluent and produced a high-selenium brine eluate solution
- An eluate treatment step, which removed selenium from the eluate via an electro-reduction process using electrocells equipped with iron anodes. The removed selenium was fixed into a filterable iron-selenium product. Once the selenium was removed, the eluate was recycled back to the ion exchange step to be used as regenerant solution.

A block flow diagram of the process is shown below.

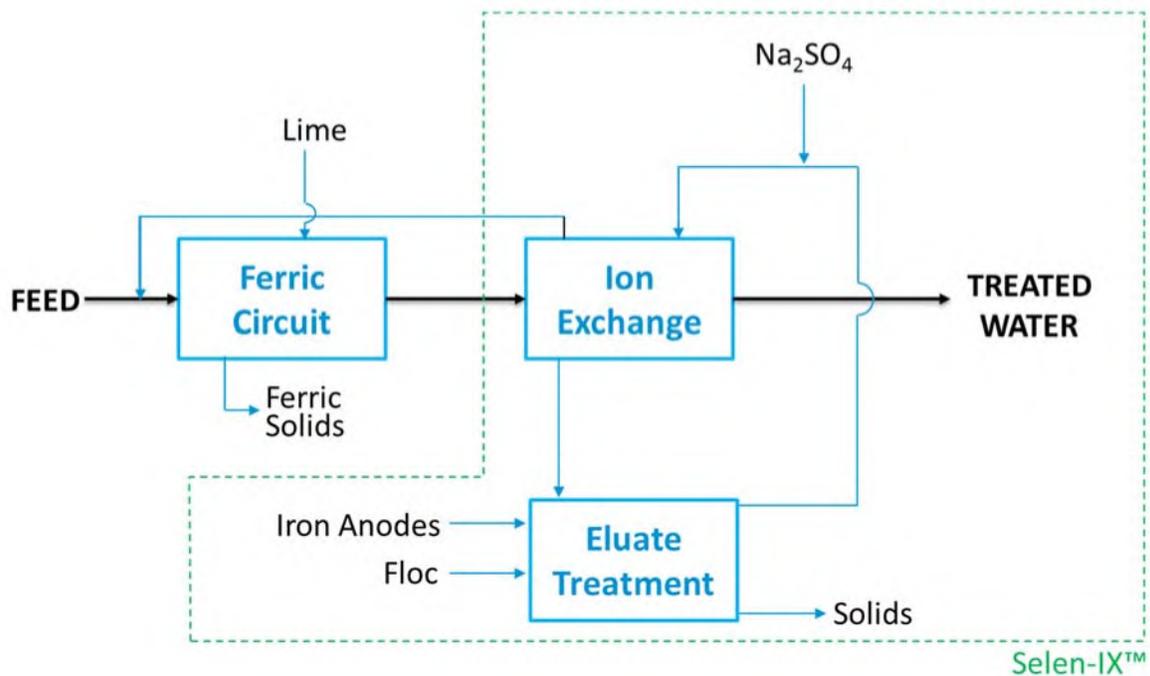


Figure 1-2: Seabridge Selen-IX™ Pilot Block Flow Diagram



Figure 1-3: Ferric Circuit Module



Figure 1-4: Selen-IX™ Pilot Plant Exterior



Figure 1-5: Selen-IX™ Pilot Plant Control Panel and Interior

There are several interdependencies between the individual unit processes within the overall treatment flowsheet including:

- Ferric circuit performance
 - » Ion exchange resin does not have a strong affinity for selenite, therefore, in order to meet the 1 ppb selenium discharge target in the plant effluent, selenite must be nearly completely removed in the ferric step
 - » Ion exchange resin can be subject to fouling/plugging if the feed solution is high in TSS. The ferric circuit plays an important role by also removing TSS from the feed solution.
- Eluate treatment circuit performance - selenium concentration in the eluate must be < 15 ppb in order to meet the IX effluent target of <1 ppb (this is specific to the feed water composition and effluent selenium concentration requirement)

The Selen-IX™ process was operated in two different modes during the campaign including open and closed loop modes. In both modes, the IX portion of the Selen-IX™ process treats the discharge from the ferric circuit and produces the final plant effluent that is expected to meet the less than 1 ppb discharge limit. Furthermore, in both operating modes, selenium is removed from the spent regenerant and fixed into iron solids produced in the eluate treatment circuit. However, during “open loop” operation freshly prepared regenerant solution is used every time an IX column is regenerated and the eluate solution processed through the eluate treatment circuit is discarded. During “closed loop” operation no eluate is discarded and the eluate processed through the eluate treatment circuit is recycled back to the IX process where it is used for resin regeneration.

Over the course of the pilot campaign, approximately 95 m³ of selenium-laden water was treated in the Selen-IX™ plant. Part of the campaign focused on determining process parameter settings required to reach the target of less than 1 ppb. Another part of the campaign focused on the demonstration of the Selen-IX™ process' capability to reach the target in a continuous around-the-clock operation. The pilot plant treated approximately 32 m³ of selenium-laden water during the demonstration part of the campaign.

Given the background matrix of constituents in the pilot plant feed water, the 1 ppb selenium target is very near to the detection limit of the analytical equipment used to measure selenium concentrations in the samples. In addition to strong field QA/QC protocols, additional work was done on verifying the reporting limits and uncertainty of measurement of extremely low selenium concentrations in samples in order to increase confidence in the reported results. The measurement uncertainty in effluent samples close to the detection limit was on the order of 0.1 ppb. Over 2,600 samples were analyzed by ALS Environmental and other certified laboratories as part of this campaign. Certificates of analysis for all the data presented in this report are available upon request.

Figure 1-6 summarizes the selenium removal achieved during the closed loop demonstration part of the campaign conducted on both feed waters (120ppb, 320ppb), with a switch between the two feed waters in the middle of the campaign while keeping the hydraulic flowrate constant in order to test the response of the Selen-IX™ process to sudden changes in the selenium loading reporting to the treatment plant. As can be seen in Figure 1-6, the pilot campaign demonstrated that the Selen-IX™ process has the capability to adapt quickly and maintain the effluent target of < 1 ppb even in the event of sudden changes in selenium concentration in plant feed.

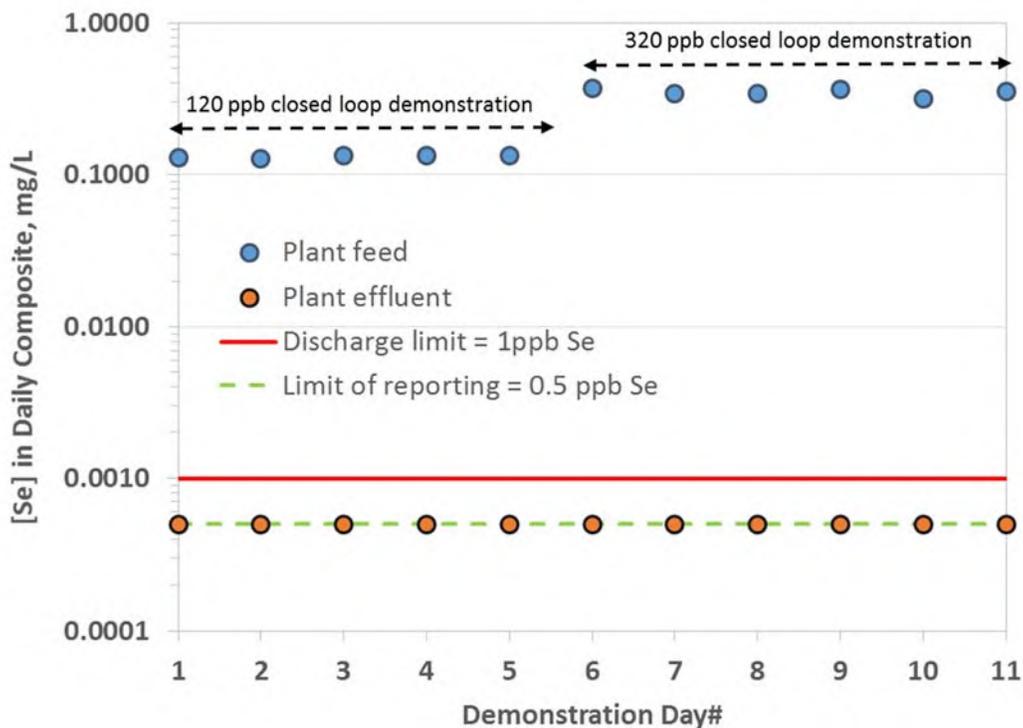


Figure 1-6: Closed Loop Pilot Demonstration Feed and Discharge Selenium Concentrations (Log Scale)

Table 1-1 summarizes the average feed and discharge composition for all major constituents based on 24 hour composite samples taken during the demonstration campaign.

Table 1-1: Plant Feed & Discharge During Demonstration

	120 ppb		320 ppb	
	IX Feed (mg/L)	IX Effluent (mg/L)	IX Feed (mg/L)	IX Effluent (mg/L)
Ammonia (as N)	6.34	6.6	5.44	5.52
Nitrate (as N)	29.6	23.6	27.9	29.4
Sulphate (SO4)	1950	1890	1900	1810
Aluminum (Al)	9.4	10.2	12.0	12.1
Calcium (Ca)	661	655	615	628
Copper (Cu)	14.5	15.5	16.9	17.5
Nickel (Ni)	0.135	0.138	0.064	0.068
Selenium (Se) – Se6	0.097	<0.0005	0.277	0.0005
Silicon (Si)	18.1	18.4	18.2	18.7
Uranium (U)	0.0013	0.0002	0.0012	0.0002
Zinc (Zn)	4.74	4.79	4.56	4.73

Solids generated from the pilot were characterized using a number of analytical techniques including: elemental analysis, particle size distribution, X-ray diffraction, elemental mapping and TCLP. In addition, dewatering properties of solids were assessed during testing completed by Tenova, vendor of large scale dewatering equipment and systems. Results showed that the iron-selenium solids residue produced by Selen-IX™ passes the TCLP test criteria for non-hazardous solids, and that the main constituents are the following:

Table 1-2: Solids TCLP Analysis

Main Constituent	Unit	Content in solids produced during 120 ppb closed loop campaign
Fe	% dwb	43.8
S	% dwb	4.3
Na	% dwb	2.0
Se	% dwb	< 0.1



Although the current plan for the disposal of the solids residue includes shipping solids off site for disposal in a non-hazardous landfill, an interest in the solids off-take by steel mills as feed for steel making process was received based on the composition of the solids determined during the pilot.

Scoping-level estimates of capital and operating costs were prepared for a full-scale plant treating up to 500 L/s (43,200 m³/d) of waste rock seepage containing a predicted 120 ppb selenium and removing selenium below the 1 ppb discharge target. The cost estimates were based on the results of lab and pilot testing and several assumptions about the process scale-up parameters and their optimization that BioteQ believes are achievable with further process development work, which fell outside of the scope of this pilot demonstration project. The results of the scoping-level cost assessment can be summarized as follows (\$CAD):

- Plant equipment cost (uninstalled)
 - » \$32.0M - \$38.6M
- Annualized average flow rate (300 L/s) operating cost
 - » \$17.7 M/a-\$27.2 M/a
 - » \$2.02/m³-\$3.11/m³
- Design flow rate (500 L/s) operating cost
 - » \$28.4 M/a-\$44.0 M/a
 - » \$1.94/m³-\$3.03/m³

Scoping level estimates of total capital cost are usually prepared by employing factors derived from historical data which enable estimators to convert the cost of plant equipment into total capital costs. Based on of the most reliable sources of these factors, Perry's Chemical Engineering Handbook (Perry and Green, 1997), the purchase cost of equipment typically accounts for 23% to 25% of the total capital cost. However, this does not take into account project specifics which influence the total capital cost including:

- Modularity of plant equipment and pre-fabricated and/or pre-assembled components which reduces the site installation costs
- Higher than usual costs of construction due to the remoteness of the site
- Site specificity in terms of geotechnical stability and seismic rating for the design of foundations, drainage, and grounding
- Owner design/construction standards

The cost assessment identified several opportunities for significant reduction in the overall cost of treatment, including:

- Process equipment modularization unique to the Selen-IX™ process
- Optimization of the process through further development work to reduce capital and operating costs
- A gradual expansion of the IX and eluate treatment circuits in the full scale installation including electrocells and solids handling equipment to reflect a gradual increase in the seepage flow and mass load of selenium reporting to the treatment plant

**APPENDIX B6 BLAKES MEMORANDUM RELATED TO THE JURISDICTION OF
BRITISH COLUMBIA MINISTER OF ENVIRONMENT TO ISSUE
EMERGENCY VARIATION ORDER TO ALLOW THE CEAO TO
EXTEND DEADLINE IN ENVIRONMENTAL ASSESSMENT
CERTIFICATE (FEBRUARY 2, 2021)**



Blake, Cassels & Graydon LLP
Barristers & Solicitors
Patent & Trademark Agents
595 Burrard Street, P.O. Box 49314
Suite 2600, Three Bentall Centre
Vancouver BC V7X 1L3 Canada
Tel: 604-631-3300 Fax: 604-631-3309

MEMORANDUM

Reference: 97414/2

VIA E-MAIL

February 2, 2021

To: Seabridge Gold Inc. & KSM Mining ULC

From: Blake, Cassels & Graydon LLP

RE: Jurisdiction of British Columbia Minister of Environment to issue emergency variation order to allow the CEAO to extend deadline in environmental assessment certificate

The Kerr-Sulpherets-Mitchell Project (the “**Project**”) owned by KSM Mining ULC, a subsidiary of Seabridge Gold Inc. (“**KSM**”), is authorized pursuant to an environmental assessment certificate (“**Certificate**”). The Certificate deadline originally expired July 2019, but was extended in March 2019. Together, the Certificate and the *Environmental Assessment Act*¹ (the “**2018 Act**”) currently require that the Project be “substantially started” by July 2024.

KSM has applied for a second extension to the Certificate deadline pursuant to the emergency provision of the 2018 Act. Ecojustice² has suggested that the provincial Minister of Environment and Climate Change (the “**Minister**”) does not have jurisdiction under that provision to authorize a second extension to the Certificate deadline. You have asked us to provide our view on the scope of the Minister’s jurisdiction to issue an emergency variation order.

A. Summary

In our view, section 46 of the 2018 Act gives the Minister discretion to vary the 2018 Act in an “emergency or other comparable circumstance,” in a manner which would allow the Chief Executive Assessment Officer (“**CEAO**”) to consider extending the Certificate deadline a second time.

Section 46 of the 2018 Act provides that the Minister has the power to vary any provision of the 2018 Act or the regulations if the Minister considers that an “emergency or other comparable circumstance” exists and where the variation is in the public interest.

¹ *Environmental Assessment Act*, S.B.C. 2018, c. 51 [2018 Act].

² Letter from Ecojustice to Gitanyow Hereditary Chiefs Office dated 15 October 2020, online: <<https://projects.eao.gov.bc.ca/>> (“Ecojustice Letter”).

In our view, this phrase permits the Minister to act in the event of unforeseeable or unpreventable circumstances which have or will have a significant impact on a party's ability to comply with the legislation. This interpretation accords with the overall context and object of the 2018 Act, and the circumstances in which an emergency variation order might be necessary.

Several factors lead us to adopt this interpretation, and reject the narrow interpretation suggested by Ecojustice:

1. The ordinary meaning of the phrase “emergency and other comparable circumstance” suggests that a narrow definition of “emergency” which is limited to urgent or imminent risk of harm, as argued by Ecojustice, was not intended by the Legislature. Moreover, the leading court decision on the definition of “emergency” recognizes that the phrase may have different meanings in different contexts.
2. The definition of “emergency” in the *Emergency Program Act* is not limited to an imminent risk of immediate harm. This is evidenced by the fact that the current state of emergency in British Columbia has lasted for nearly 11 months.
3. The Environmental Assessment Office (“**EAO**”) has not issued any guidance documents which would suggest the Minister’s emergency powers are limited in any way beyond the express terms of the statute.
4. The emergency power is broader than the general power to extend time limits, which was considered by the BC Court of Appeal in the *Taseko* decision (relied on by Ecojustice and described below). An emergency order can be made where the Minister considers it to be “in the public interest.” That broad grant of power does not appear in the general power to extend time limits. Moreover, the Legislature expressly narrowed the general power to extend time limits in the 2018 Act by comparison with the former *Environmental Assessment Act* (“**2002 Act**”),³ but did not narrow the Minister’s emergency power.
5. The emergency power enables the Minister to balance proponents’ desire to build infrastructure with the public interest in protecting the environment—being the object of the 2018 Act. It is within the Minister’s jurisdiction to balance these competing aspects of the legislation. The Minister’s decision in this regard is entitled to significant deference by any reviewing court. This is especially so given that the Legislature has chosen broad, open-ended, and highly qualitative language, and any ministerial orders made under the emergency provision are “final and binding.”
6. The 2018 Act provides proponents with up to 15 years to substantially start their project, rather than the 10 years under the 2002 Act. An extension of the Certificate deadline for up to 5 years beyond the initial 10-year time period respects this legislative intent.

³ *Environmental Assessment Act*, S.B.C. 2002, c. 43 (repealed) [2002 Act].

7. Cabinet has facilitated and the CEAO has ordered an extension beyond the 10-year certificate deadline in other circumstances. While KSM is seeking an extension pursuant to a different statutory provision, the existence of a further extension in respect of another project demonstrates the invalidity of the view espoused by Ecojustice that the 2018 Act “does not permit the extension of the deadline to substantially start a project more than once, regardless of extenuating factors.”⁴

The COVID-19 pandemic is clearly an exceptional and unforeseeable circumstance. It is widely recognized that the pandemic has had significant impacts on all aspects of the global economy and society more generally. However, we have not provided an opinion on the scope or significance of this impact, as that is outside our expertise and beyond the scope of the legal analysis. We understand that KSM has obtained separate opinions from BMO Capital Markets and Grant Thornton LLP regarding the impact of COVID-19 on the global economy and mining markets generally and KSM specifically.

Nonetheless, we understand that the restrictions necessarily implemented in response to the pandemic have significantly impacted KSM’s ability to satisfy the substantial start requirement under the Certificate and the 2018 Act. In our view, these circumstances satisfy the definition of an “emergency or other comparable circumstance” under section 46 of the 2018 Act. Whether an emergency variation order is in the “public interest” is a matter to be determined by the Minister.

B. Factual Background

The Minister and the provincial Minister of Energy and Mines approved the Project and issued the Certificate on July 29, 2014. The federal government approved the Project on December 19, 2014.⁵

The Certificate originally required KSM to substantially start the Project by July 2019.⁶ The Executive Director of the EAO (now titled the CEAO) granted an extension to that deadline in March 2019, such that the Project must be substantially started by July 2024.⁷ Both the Certificate and the extension were authorized pursuant to the 2002 Act.⁸

The 2018 Act came into force on December 16, 2019.⁹ The Certificate continues as an environmental assessment certificate under the 2018 Act,¹⁰ and any extensions must be determined in accordance with the 2018 Act.

⁴ Ecojustice Letter at pp. 2, 3.

⁵ Minister of Environment, “Environmental Assessment Decision Statement” (19 December 2014), online: <<http://www.ceaa-acee.gc.ca/050/document-eng.cfm?document=100529>>.

⁶ BC Environmental Assessment Office, “KSM Project – Environmental Assessment Certificate #M14-01” (29 July 2014), online: <<https://projects.eao.gov.bc.ca/api/document/5888e5c5817b85ae43cf7c41/fetch>>.

⁷ BC Environmental Assessment Office, “KSM Project – Extension under Section 18” (21 March 2019), online: <<https://projects.eao.gov.bc.ca/api/document/5c95067941e20f0024bc89fd/fetch/KSM%20Extension%20Order.pdf>>.

⁸ 2002 Act, s. 18.

⁹ BC Reg 242/2019.

¹⁰ 2018 Act, s. 78(3).

On March 18, 2020, the Province declared a provincial state of emergency as a result of the COVID-19 pandemic.¹¹ The state of emergency has been extended in two week increments since that time, “to allow staff to continue to take the necessary actions to keep British Columbians safe and manage immediate concerns and COVID-19 outbreaks.”¹² The state of emergency has now been in place for nearly 11 months. While other jurisdictions have not necessarily maintained a state of emergency throughout this period, all jurisdictions have been affected by the impact of COVID-19, some much more than British Columbia.

In correspondence dated March 30,¹³ April 29,¹⁴ and July 3, 2020,¹⁵ KSM notified the Province that the COVID-19 pandemic and provincial state of emergency would delay work on the Project, and that this delay would impact its ability to substantially start the Project by July 2024. KSM requested an opportunity to discuss the possibility of an extension to the Certificate.

On May 25, 2020, the CEAO requested further information from KSM and advised that the EAO would determine whether it was “appropriate to recommend to the Minister to use Section 46 to vary the requirements of the Act.”¹⁶ If so recommended, KSM would need to formally apply for a Certificate extension.

On August 6, 2020, KSM formally applied for a two-year extension to the Certificate under section 46 of the 2018 Act (the “**Application**”). The Application addressed the rationale for the extension, the public interest in granting an extension, and the factors set out in the EAO Certificate Extension Policy.¹⁷

The Application states the pandemic will impact KSM's ability to substantially start the Project in the following ways:

(1) Reduced and Delayed Field & Consultation Work

- KSM has substantially reduced important field work (exploration and data collection) necessary to fulfill Certificate requirements (such as baseline data and management plans), and to begin construction of essential Project components. A reduction in work was necessary to ensure

¹¹ *Emergency Program Act*, R.S.B.C. 1996, c. 111, s. 9 [EPA].

¹² BC Public Safety and Solicitor General, News Release, “State of emergency extended to continue B.C.’s COVID-19 response” (13 October 2020), online: <<https://news.gov.bc.ca/releases/2020PSSG0053-001874>>.

¹³ Letter from KSM Mining ULC to Deputy Minister, Ministry of Energy, Mines, and Petroleum Resources re: Impact of COVID-19 pandemic on Certificate M14-01 and KSM Project dated 30 March 2020, online: <<https://projects.eao.gov.bc.ca/>>.

¹⁴ Letter from KSM Mining ULC to Minister of Forests, Lands, Natural Resources, and Rural Development re: KSM Environmental Assessment Certificate Extension dated 29 April 2020, online: <<https://projects.eao.gov.bc.ca/>>.

¹⁵ Letter from KSM Mining ULC to Acting Chief Executive Assessment Officer and Associate Deputy Minister re: Response to EAO’s Letter of May 25, 2020: Impact of COVID-19 pandemic on Environmental Assessment Certificate M14-01 (the “Certificate”) and the KSM Project dated 3 July 2020, online: <<https://projects.eao.gov.bc.ca/>>.

¹⁶ Letter from Acting Chief Executive Assessment Officer and Associate Deputy Minister to KSM Mining ULC dated 25 May 2020, online: <<https://projects.eao.gov.bc.ca/>>.

¹⁷ BC Environmental Assessment Office, “Certificate Extension Policy” (24 April 2020), online: <https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/environmental-assessments/guidance-documents/2018-act/certificate_extension_policy_final_22apr2020.pdf>.

compliance with pandemic restrictions and to safeguard the health and well-being of contractors, employees, and the communities in which KSM works.

- It has substantially reduced KSM's drilling and environmental programs, and delayed the archaeological mitigation program. These changes have delayed the construction of a road from the existing KSM camp site to the Mitchell Valley, which was intended to be part of the work necessary to achieve and facilitate a substantial start. Collectively, these changes have delayed or will delay KSM's ability to undertake a final feasibility study, which is necessary to justify the next stage of Project investment.
- The pandemic has made engaging with and consulting Indigenous groups very challenging. Most communities are understandably unwilling to allow visitors, and adequate digital infrastructure is not always available to conduct these processes remotely. Most Indigenous communities have also requested more time to review draft permit applications and other regulatory materials due to the challenges caused by the pandemic. As a result, KSM has not been able to undertake the engagement necessary to obtain key permits, such as *Fisheries Act* authorizations and compensation plans, which are needed to complete project access corridors. This work was also on the critical path to substantially starting the Project.

(2) Ability to Secure Joint Venture Partner

- The Project's significant size requires a joint venture partner with the financial and technical capacity to finance, construct, and operate the Project. The pandemic has temporarily interrupted all of KSM's negotiations with prospective partners.
- Two potential partners planned to make a joint venture proposal in March 2020. No proposal was made as a result of the pandemic. Each of the prospective partners have indicated that they cannot continue their negotiations with KSM until the global economy has stabilized. Although gold prices have done well, base metals such as copper (which is particularly important to KSM) have suffered from slow demand and reduced prices.
- Investors have expressed concern that a timely construction decision for the Project is uncertain given the Certificate deadline and the pandemic restrictions. The second wave of the pandemic has begun, and pandemic restrictions are expected to last another 18-24 months. A third wave of the pandemic is appearing likely.

On October 16, 2020, the Gitanyow Hereditary Chiefs ("**Gitanyow**") advised the CEO that they oppose the Application. Gitanyow's opposition is based on the same concerns which it raised in November 2018, when the Executive Director considered the first five-year extension. The Ecojustice Letter questioned the jurisdiction of the Minister to further extend the Certificate under the 2018 Act.

On October 23, 2020, the CEO decided that a public comment period will be part of the Application review process because an order under section 46 "must be in the public interest and having a public comment

period would help to inform considerations related to public interest.”¹⁸ The public comment period took place from November 19 to December 3, 2020.

On November 24, 2020, Gitanyow again advised the CEAO that they opposed the Application due to risks associated with a potential tailings dam failure. We understand that KSM has obtained a separate opinion from Klohn Crippen Berger to address this correspondence.

C. Environmental Assessment in British Columbia

(a) Environmental Assessment Act

The environmental assessment regime in British Columbia is intended to ensure that designated projects are subject to a comprehensive assessment of their environmental, economic, social, cultural and health effects.¹⁹ Environmental assessment certificates include an order, a project description, and the specific project conditions which must be implemented to ensure potential adverse impacts are mitigated or compensated for.²⁰ Certificates do not include every detail of a project, since more detailed project design is often undertaken after the certificate is issued and authorized as part of the remaining permitting processes.²¹

All environmental assessment certificates must specify a deadline by which time the certificate holder must have substantially started the project. If a project will not be substantially started by the certificate deadline, a certificate holder may apply for an extension of the certificate “on one occasion only” for a period of up to five years.²² If the project still has not been substantially started by the end of the extended certificate deadline, the certificate expires. Accordingly, meeting the substantially started threshold by the deadline is critical to the development of any project with a certificate. After a reviewable project is substantially started, the certificate remains in effect for the life of the project.

These requirements are set out in section 18 of the 2002 Act and section 31 of the 2018 Act. The relevant provisions are identical, except that certificates issued under the 2002 Act were given an initial certificate deadline of up to five years (meaning a maximum of 10 years), while those issued under the 2018 Act have an initial certificate deadline of up to 10 years (meaning a maximum of 15 years).

¹⁸ Letter from Chief Executive Assessment Officer and Associate Deputy Minister to KSM Mining ULC dated 23 October 2020, online: <<https://projects.eao.gov.bc.ca/>>.

¹⁹ 2018 Act, s. 25(2).

²⁰ 2018 Act, ss. 28(2)(a)(ii), 29.

²¹ BC Environmental Assessment Office, “EAO User Guide: Introduction to Environmental Assessment under the Provincial Environmental Assessment Act (2018)” (30 March 2020), online: <https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/environmental-assessments/guidance-documents/2018-act/eao_user_guide_v101.pdf> at pp. 4, 34. See for examples Certificate, Conditions 6, 25.

²² 2018 Act, ss. 31, 32, 56. 2002 Act, ss. 18, 19, 37.

The 2018 Act permits the Minister to vary one or more provisions of the Act where such variation is warranted as a result of an “emergency or other comparable circumstance” and is in the public interest:

46(1) If the minister considers that

(a) there is or will be an emergency or other comparable circumstance that warrants or will warrant the variation of one or more provisions of this Act or the regulations, as the provisions apply to or in respect of a specified reviewable project or a specified category of reviewable projects, and

(b) the variation is in the public interest,

the minister may order a variation that the minister considers necessary to respond to the emergency or other circumstance.

(2) The minister may

(a) attach conditions to an order made under subsection (1),

(b) categorize reviewable projects for the purpose of an order made under this section, including into categories that may differ from the categories of reviewable projects prescribed under section 9, and

(c) provide differently in an order under this section for different reviewable projects or for different categories of reviewable projects.

(3) An order under subsection (1) is final and binding.

(4) In an order under subsection (1), the minister must identify the nature of the emergency or other circumstance.²³

[Emphasis added.]

Section 31 of the 2002 Act granted the Minister the same power, except that subsection (1) referred to an “emergency or other circumstance.”

It does not appear that section 46 was discussed by the Legislature at the time the 2018 Act was considered and passed.

²³ 2018 Act, s. 46.

(b) Guidelines & Policies

The EAO publishes user guides, guidance documents, and policies to provide direction to proponents, Indigenous communities, and the public about the environmental assessment process.

We have identified only one EAO document which describes the emergency powers of the Minister. The User Guide issued under the 2002 Act²⁴ (since replaced) stated:

Section 31 of the *Environmental Assessment Act* provides the opportunity to vary the Act or Regulations. An order under section 31 is an extraordinary remedy, requiring compelling information concerning the existence of the “emergency or other circumstance,” and the public interest in the order. Section 31 does not set out the criteria for making an order under it, but the kind of information that would be required would include, but not necessarily be limited to, the following:

- That the situation constituting the “emergency or other circumstance” is real and imminent;
- That all alternative avenues to address the situation have been explored and exhausted;
- The seriousness of the consequences, should the situation arise;
- That there are no other available options to address the consequences, should they occur; and,
- That the nature and extent of the effects that may arise from the actions being requested to address the situation will not be adverse, or at least will be less than the impact of the situation occurring.

Although the EAO has issued a new User Guide and other policies since the 2018 Act came into force, to our knowledge it has not released any guidance with respect to the emergency powers of the Minister.

(c) Relevant Jurisprudence & Decisions

No court or tribunal decisions have considered the scope of the Minister’s emergency powers under the 2002 Act or the 2018 Act. However, two cases have considered certificate deadlines.

²⁴ BC Environmental Assessment Office, “User Guide: An Overview of Environmental Assessment in British Columbia” (23 January 2018), online: <<https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/environmental-assessments/guidance-documents/eao-guidance-eao-user-guide.pdf>>.

(i) *Jumbo Glacier Resort – Purpose of the Act*

Jumbo Glacier Resort (“**Jumbo Resort**”) is a proposed ski resort development in southeastern British Columbia. The project received an environmental assessment certificate which was originally set to expire on October 12, 2009, and which was later extended to October 12, 2014. In June 2015, the Minister determined the Jumbo Resort had *not* been substantially started by this deadline.²⁵ As a result, the certificate expired.

The BC Court of Appeal upheld the Minister’s decision and commented on the purpose of environmental assessment legislation.²⁶ It stated:

[51] The legislation itself balances proponents’ desires to build infrastructure and developments with the broader interests of the public in protecting the environment. It provides for intensive study of projects before a certificate is issued allowing them to go ahead. It protects proponents by allowing them to proceed with projects that have been “substantially started” within the deadline set by the certificate. [*Emphasis added.*]

(ii) *Taseko Mines – Power to Vary Time Limits ≠ Deadlines*

Taseko Mines Limited (“**Taseko**”) holds an environmental assessment certificate for the New Prosperity Mine project. In anticipation of being unable to substantially start the project by the certificate deadline, Taseko requested a second extension from the Minister, pursuant to the general power to extend time limits under section 31 of the 2002 Act.²⁷ The Minister denied Taseko’s extension request, finding that he lacked jurisdiction to do so. The Court of Appeal upheld the Minister’s decision.²⁸

The Minister’s and the Court’s decision focused on the general power to extend time limits, concluding it could not be used to extend a certificate deadline. However, any ambiguity which may have existed with respect to the general power to extend time limits has been resolved by the 2018 Act, which expressly states that this power “does not apply with respect to” certificate deadlines.²⁹ The Court’s decision is therefore not of significant value in interpreting or considering the Minister’s power to issue emergency variation orders, which is not restricted in application and is specifically dependent on a Ministerial determination of the “public interest.”

²⁵ BC Environmental Assessment Office, “Reasons for Minister’s Determination—Jumbo Glacier Resort Project” (18 June 2015), online: <<https://projects.eao.gov.bc.ca/api/document/5886a67feed3c0016f855c6d/fetch>>.

²⁶ *Glacier Resorts Ltd. v British Columbia (Minister of Environment)*, 2019 BCCA 289, rev’g 2018 BCSC 1389 [*Glacier Resorts*]. Leave to appeal to the Supreme Court of Canada was initially sought in respect of this decision, but Glacier Resorts Ltd. abandoned its application on November 15, 2019.

²⁷ 2002 Act, s. 24(4). See also 2018 Act, s. 38.

²⁸ *Taseko Mines Limited v. British Columbia (Minister of Environment and Climate Change Strategy)*, 2019 BCCA 452 at paras. 30-37 [*Taseko Mines*].

²⁹ 2018 Act, s. 38(2).

(iii) *Taseko Mines – Cabinet and CEAO Exercised Powers to Extend*

Shortly after the release of the *Taseko* court decision, the Lieutenant Governor-in-Council (“**Cabinet**”) and the CEAO extended the New Prosperity Mine certificate deadline by one further year.

On December 12, 2019, Taseko and Tsilhqot’in Nation jointly wrote to the Minister requesting a 12-month extension to the certificate.³⁰ The parties requested that the Minister extend the term of the certificate for 12 months, without penalty to Taseko, so that the parties could engage in a facilitated process aimed at exploring a long-term resolution of the issues between them relating to the New Prosperity Mine. On January 13, 2020, the CEAO extended Taseko’s certificate deadline to January 14, 2021.³¹

On December 9, 2020, Taseko and Tsilhqot’in Nation submitted a further joint request to extend on the same terms, in part as a result of delays caused by the pandemic. On January 13, 2021, the CEAO again extended Taseko’s certificate deadline for one year to January 14, 2022.³²

Cabinet facilitated the extensions to Taseko’s certificate deadline by depositing and amending *Exemption Regulation (No. 2)*.³³ Currently, that regulation provides that the “one occasion only” limitation set out in section 31(4)(a) of the 2018 Act does not apply to the New Prosperity Mine certificate if the deadline is not extended beyond January 14, 2022.

Neither the joint requests nor the CEAO’s decisions considered the Minister’s emergency powers—indeed, there does not appear to have been any emergency or other comparable circumstance in existence at the time of the first one-year extension. Nonetheless, the decisions to extend the Taseko certificate deadline demonstrate that Cabinet and the CEAO have, in appropriate circumstances, twice extended a certificate deadline beyond the extension permitted “on one occasion only” by section 31 of the 2018 Act.

D. Analysis

In our view, the emergency power in section 46 of the 2018 Act ought to be broadly interpreted to include the jurisdiction to allow the Minister to vary the 2018 Act in response to an “emergency or other comparable circumstance” in a manner which permits the CEAO to consider an extension application to extend the Certificate deadline beyond the initial extension.

³⁰ Letter from Taseko Mines Limited and Tsilhqot’in Nation re: Joint Request of the Tsilhqot’in Nation and Taseko Mines Limited dated 12 December 2019, online: <<https://projects.eao.gov.bc.ca>>.

³¹ Order of the Chief Executive Assessment Officer, “Extension under Section 31” (13 January 2020), online: <<https://projects.eao.gov.bc.ca>>.

³² Order of the Chief Executive Assessment Officer, “Extension under Section 31” (13 January 2021), online: <<https://projects.eao.gov.bc.ca>>. See also Letter from Taseko Mines Limited and Tsilhqot’in Nation re: Joint Request of the Tsilhqot’in Nation and Taseko Mines Limited to Extend Environmental Assessment Certificate #M09-02 dated 9 December 2020, online: <<https://projects.eao.gov.bc.ca>>.

³³ *Exemption Regulation (No. 2)*, B.C. Reg. 285/2019, s. 1.

(a) Principles of statutory interpretation

The modern approach to statutory interpretation requires that the words of a statute be interpreted “in their entire context and in their grammatical and ordinary sense, harmoniously with the scheme of the Act, the object of the Act, and the intention of” the Legislature.³⁴ Section 8 of the *Interpretation Act* also requires enactments to be construed as being remedial and given such fair, large and liberal construction and interpretation as best ensures the attainment of the objects.³⁵

The Minister is therefore tasked with interpreting section 46 in a manner consistent with the text, context, and purpose of the provision and statutory scheme. In addition, any reviewing court must give the Minister’s interpretation significant deference.³⁶ This is especially so “where the legislature chooses to use broad, open-ended or highly qualitative language” such as “in the public interest,”³⁷ and where the Legislature has expressly stated any order is “final and binding.”

(b) Plain language meaning

On a plain reading of section 46, the Minister has a broad power to vary one or more provisions of the 2018 Act or the regulations. Section 46 requires only that:

1. the Minister considers there to be an emergency or other comparable circumstance that warrants or will warrant the variation of one or more provisions of the 2018 Act or the regulations; and
2. the Minister considers the variation to be in the public interest.³⁸

Neither the Minister nor the EAO have issued any guidance documents which would suggest this power is limited in any way beyond the express terms of the statute.

(c) An emergency can be unexpected and continuous

The scope of the Minister’s power under section 46 is largely dependent on the definition of “emergency or other comparable circumstance.” This phrase is not defined in the 2018 Act. As a result, we have looked to related statutes and relevant jurisprudence to define the term “emergency.”

³⁴ *Rizzo & Rizzo Shoes Ltd. (Re)*, [1998] 1 S.C.R. 27 at para. 21.

³⁵ *Interpretation Act*, R.S.B.C. 1996, c. 238, s. 8.

³⁶ *Canada (Minister of Citizenship and Immigration) v. Vavilov*, 2019 SCC 65 at paras. 24, 117, 118, 120 [*Vavilov*].

³⁷ *Vavilov* at para. 110.

³⁸ 2018 Act, s. 46.

(i) *Emergency legislation*

The current state of emergency in British Columbia was first declared on March 17, 2020 and as of the date of writing will be continued to February 16, 2021. The *Emergency Program Act* statute defines an emergency as follows:

“Emergency” means a present or imminent event or circumstance that

- (a) is caused by accident, fire, explosion, technical failure or the forces of nature, and
- (b) requires prompt coordination of action or special regulation of persons or property to protect the health, safety or welfare of a person or to limit damage to property.

If satisfied that an emergency exists, Cabinet may, by order, declare a “state of emergency.” Given the extraordinary scope of powers triggered by a declaration of a state of emergency, this power can only be exercised in 14 day increments.³⁹ However, an “emergency” under the *Emergency Program Act* does not necessarily require a single and urgent circumstance. During the 2017 wildfire season, the province was in a provincial state of emergency for 10 weeks. As a result of the current pandemic, the Province has been in a state of emergency for nearly 11 months.

By way of contrast, other environmental legislation uses far narrower definitions of “emergency.” For example:

- The *Environmental Management Act* defines an “environmental emergency” as an occurrence or natural disaster that affects the environment and includes a flood, a landslide, or a spill or leakage of oil or of a poisonous or dangerous substance.⁴⁰
- The *Emergency Management Regulation*⁴¹ under the *Oil and Gas Activities Act*,⁴² defines an “emergency” as an incident classified as levels 1, 2 or 3 under the Incident Classification Matrix and which requires action by a permit holder to protect persons, property, or the environment. This includes, among other things, major on-site equipment loss or failure, earthquakes, and spills or gas releases.

³⁹ *EPA*, ss. 9(4), 10.1. During a state of emergency, Cabinet may make regulations to prevent, respond to or alleviate the effects of an emergency or disaster. The powers under this provision are very broad, and include “making an exception to an enactment,” suspending and replacing a period of time “within which a proceeding or process must be commenced or a step must be taken in a proceeding or process,” and “authorizing an issuer of a permit, licence or other authorization to modify the conditions of a permit, licence or other authorization or to add or remove conditions of a permit, licence or other authorization.” Such regulations may be made if Cabinet is “satisfied that the benefit of making the regulation is proportionate to the benefit of the continued application of the enactment as it is before the making of the regulation.”

⁴⁰ *Environmental Management Act*, S.B.C. 2003, c. 53, s. 87(1). See also *Canadian Environmental Protection Act*, s. 193.

⁴¹ *Emergency Management Regulation*, B.C. Reg. 217/2017, s. 1.

⁴² *Oil and Gas Activities Act*, S.B.C. 2008, c. 36, ss. 106, 112.

Given these definitions in other British Columbia legislation, it can be inferred that the definition of “emergency or other comparable circumstance” in the 2018 Act is intended to have a broader meaning akin to the *Emergency Program Act*, rather than the narrower definitions adopted in other British Columbia environmental legislation.⁴³

(ii) *Jurisprudence suggests a flexible meaning*

The definition of “emergency” is often fact and situation specific. In the context of healthcare, for example, the definition of an emergency has been defined as a “a serious, unexpected, and often dangerous situation requiring immediate action.”⁴⁴ In the context of an easement agreement, the Alberta Queen’s Bench defined the term as “a reasonable apprehension of danger with regards to the condition of land.”⁴⁵ In the context of a labour dispute, an arbitrator found that suddenness is not always an essential component of an emergency. The term “emergencies or unforeseeable or unpreventable circumstances” can include an impact on the service provided by the company, not just a public emergency.⁴⁶

In short, the term “emergency” is given different meanings in different circumstances and its application can range from dangerous accidents to “unusual or sudden happenings which are not anticipated.” One labour arbitrator noted that:⁴⁷

Without a doubt the word “emergency” is one of those delightful words in the English language with a very elastic meaning. In modern parlance its use can range from a) the suddenness of a thunderstorm causing a brief street flooding emergency, to b) a long suffering person requiring emergency treatment for a nagging toothache which ought to have been treated sooner, to c) a distant war causing an oil supply emergency lasting, as in 1991, months on end. Thus, emergency can be sudden or anticipated, briefly over or continuous.

This commentary aligns with the commonly cited House of Lords decision of *Larchbank v. British Petrol*,⁴⁸ in which Lord Atkin rejected the dictionary definition of emergency put before him, and opted for a broader meaning. He said:

“Emergency” can be used to describe a state of things which is not the result of a sudden occurrence. A condition of things causing a reasonable apprehension of the near approach of danger would, I think, constitute an emergency. The gradual approach of a hostile invader

⁴³ We note that the Ecojustice opinion did not consider other legislative definitions.

⁴⁴ *AH v. Fraser Health Authority*, 2019 BCSC 227 at para. 117. Similarly, the case cited by the Ecojustice Letter, *College of Midwives of British Columbia v. Lemay*, 2003 BCCA 583 considered the term “emergency” under s. 14(b) of the *Health Professions Act*, which exempts persons who are “providing or giving first aid or temporary assistance to another person in case of emergency” from registration under the statute. The Court concluded that a “traditional birth attendant” could not rely on this provision given that her attendances at labours and deliveries were planned in advance.

⁴⁵ *Alliance Pipeline Ltd. v. Seibert*, 2003 ABQB 872 at para. 33.

⁴⁶ *Telus Communications Inc. v. Telecommunications Workers Union*, [2008] C.L.A.D. No. 164 at paras. 118-120.

⁴⁷ *Ball Packaging Products Canada Inc. v. United Food and Commercial Workers Union, Local 175 (Crisp Grievance)*, [1997] O.L.A.A. No. 1060 at para. 23.

⁴⁸ *Larchbank v. British Petrol*, [1943] AC 299 at 304 (HL).

might well at some time or other constitute an emergency. So might the position arising from the presence of a large hostile force encamped near the frontier and only awaiting favourable conditions for an advance. Indeed, the phrase "state of emergency" seems to indicate the absence of suddenness.

In our view, the phrase "emergency and other comparable circumstance" ought to be given a meaning which includes unforeseeable or unpreventable circumstances which have a significant impact on a party's ability to comply with the legislation. This definition gives meaning to the term "other comparable circumstance."

(iii) *Context suggests broader meaning*

This definition is further justified when one considers the context of environmental assessment legislation.

First, the environmental assessment *process* involves the assessment of overall project impacts.⁴⁹ It is not focused on one-time or short-term events or factors. The *outcome* of that process is a certificate which lasts the life of the project.⁵⁰ Given this scope, certificate conditions do not address every detail of a project and do not regulate the day-to-day construction or operation of a project.⁵¹ Those details are left to the permitting stage of project development.

Second, the permits/approvals which authorize project activities and the other environmental legislation which apply to a project's operations, such as the *Fisheries Act*,⁵² frequently contain provisions which permit persons to act in a manner contrary to existing authorizations in the event of an emergency. Such provisions permit (or require) a proponent to take all steps necessary to address urgent and imminent situations, such as a sudden oil spill or dam failure.

With this context in mind, it is clear that an emergency is not necessarily "an unexpected situation" which requires "immediate action" or "urgent relief," as the Ecojustice Letter suggests.⁵³ Short term or imminent situations are unlikely to impact the ability of a proponent to comply with its certificate, which sets out a limited number of "high level" project conditions, or to warrant the Minister varying some aspect of the statute or regulations. Rather, short term or imminent emergencies are more likely addressed in detailed permits or to fall within the CEO's power to vary the environmental assessment process. If the scope of section 46 were limited to short-term events or imminent impacts, it would likely have no application at all.

With this context in mind, an emergency which requires a variation of the 2018 Act or the regulations is likely to be more significant and of longer lasting impact (*i.e.* continuous), one which requires a variation to

⁴⁹ 2018 Act, s. 25.

⁵⁰ 2018 Act, s. 31(7).

⁵¹ BC Environmental Assessment Office, "EAO User Guide: Introduction to Environmental Assessment under the Provincial Environmental Assessment Act (2018)" (30 March 2020), online: <https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/environmental-assessments/guidance-documents/2018-act/eao_user_guide_v101.pdf> at pp. 4, 34. See for examples Certificate, Conditions 6, 25.

⁵² See for example *Authorizations Concerning Fish and Fish Habitat Protection Regulations*, SOR/2019-286, s. 3.

⁵³ Ecojustice Letter at pp. 7, 9.

the 2018 Act (*i.e.* a significant provision of the statute), and one which is not otherwise captured by the legislation (*i.e.* something more than a suspension of a time limit). Challenges created by the COVID-19 pandemic satisfy all of these factors.

(d) Emergency power broader than power to extend time limits

The Minister's emergency power is broader than the Minister/Executive Director's general power to extend time limits found in section 24 of the 2002 Act and considered in the *Taseko* decision. Unlike those provisions, the emergency power:

- can be invoked "in the public interest" – whereas this phrase does not appear in the general power;
- is *not* restricted to "time limits" – it can be used to vary *any* provision of the 2018 Act; and
- was *not* substantially modified in the 2018 Act.

In the 2018 Act, the Legislature narrowed the general power under section 38 (time limits) to make clear that the Minister and the CEO could *not* use that power to extend the certificate deadline. The Legislature was therefore alive to the scope of the general powers granted under the statute. The Legislature was also alive to the interaction between section 31 of the 2018 Act, which enables a certificate holder to apply for an extension of the certificate deadline, and other provisions of the Act. If the Legislature had intended to narrow the emergency power contained in section 46, or prohibit it from applying to a certificate deadline (like the general power), one would expect the Legislature to have made that clear. It did not. In the absence of such a limitation in the emergency provision, it would be inappropriate to assume that the Legislature intended one to be read in.

We do not agree that the "implied exception rule", which was applied to the general power to extend time limits in the *Taseko* decision, is of any relevance in the present context, as suggested by Ecojustice. The implied exception rule applies "only if applying the general provision would render the specific one superfluous."⁵⁴ In *Taseko*, the Minister concluded that interpreting the general power to extend time limits as a general power to extend a certificate deadline without any statutory limiting criteria would have rendered section 18(4) of the 2002 Act "meaningless."⁵⁵ However, that is not the case here. The emergency variation power is limited in scope and application—it can only be used in an "emergency or other comparable circumstance" and where an order is in the public interest. In non-emergent circumstances, the 10 to 15 year certificate deadline continues to apply.

(e) Power to extend consistent with legislative scheme

This interpretation of section 46 of the 2018 Act is consistent with the overall legislative scheme. As articulated by the Supreme Court of Canada, a fundamental purpose of environmental assessment

⁵⁴ *Sullivan on the Construction of Statutes*, 6th ed. (Markham, Ont.: LexisNexis, 2014) at §11.58.

⁵⁵ *Taseko Mines* at para. 26.

legislation is to “reconcile, to the greatest extent possible, the proponent’s development desires with environmental protection and preservation.”⁵⁶

The emergency power enables the Minister to balance proponents’ desire to build infrastructure with the public interest in protecting the environment, while also considering the impacts of emergency or comparable circumstances. It is the Minister’s role to balance these competing aspects of the legislation in deciding whether to exercise his or her powers under section 46.

It is relevant that the Legislature recently modified this balance. The 2018 Act now provides proponents with up to 15 years to substantially start their project (rather than the 10 years provided under the 2002 Act). This change arises because the 2018 Act permits an initial certificate deadline to be up to 10 years (rather than the 5 years permitted under the 2002 Act). The EAO has cited this change as one of the benefits of proceeding with an assessment under the 2018 Act,⁵⁷ and it was discussed by the Minister when he introduced the bill:

S. Furstenau: Could the minister please explain: how does this section compare to the existing *Environmental Assessment Act*, and why the changes?

Hon. G. Heyman: Thank you to the member for the question. The member is correct that this provision extends the certificate to not more than ten years after the issue date of the certificate, as opposed to the current five. But the current five allowed for an extension. The experience of the office has been that there often were applications for extension to ten years. They usually had merit, and they were therefore granted. So we’re simply reflecting the experience and practice of the office.⁵⁸

[*Emphasis added.*]

As a result of this change, project proponents may now have up to 15 years to substantially start their project. The Legislature has expressly acknowledged that additional time may be needed to move a project forward in a real and tangible way. It would be absurd if a project certified under the more recent and more stringent 2018 Act were entitled to 15 years to substantially start, but a project certified under the 2002 Act could not utilize that same time period even in emergency circumstances. It would not “set a dangerous precedent” or undermine the purpose of the 2018 Act, as Ecojustice asserts.⁵⁹ Although KSM is seeking an extension of only two years, an extension of up to five years would still respect the current legislative intent.

⁵⁶ *Friends of the Oldman River Society v. Canada (Minister of Transport)*, [1992] 1 S.C.R. 3 at 71. *Glacier Resorts* at para. 51.

⁵⁷ BC Environmental Assessment Office, “Frequently Asked Questions about Environmental Assessments” (undated), online: <<https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/environmental-assessments/frequently-asked-questions>>.

⁵⁸ British Columbia, Legislative Assembly, *Office Reports of Debates (Hansard)*, 41st Parl, 3rd Sess, Issue No 189 (22 November 2018) at 19.

⁵⁹ Ecojustice Letter at p. 3.

Ecojustice relies on para. 52 of the *Glacier Resorts* decision to suggest that a further extension creates a risk that the Project will proceed using “reports and conditions that have become outdated.”⁶⁰ With respect, no such risk exists. KSM still requires many permits and approvals for the Project. Those permit applications will be evaluated against current data, science, and technology. In addition, the 2018 Act introduced an additional project deadline. If a project is not *operational* within 20 years of the issuance of the certificate, the Minister is permitted to suspend, cancel, amend, or attach new conditions to a certificate.⁶¹ This allows the Minister to amend a project’s certificate to align with current scientific evidence where construction has been substantially started, but there has been a significant delay in the commencement of operations. This power applies to the Project.⁶²

Relatedly, Ecojustice suggests it is inappropriate for the Minister to rely on the process or considerations set out in the EAO Certificate Extension Policy⁶³ in considering an application under section 46. In our view, that objection has no merit. There is nothing in the regulations or guidance documents issued by the EAO which prescribes the process which must be followed by the Minister in making his determination. The Minister is entitled to set his own process, as long as he considers the required statutory factors.⁶⁴ Indeed, the Minister has carried out a public comment period to ensure he can consider whether an emergency variation order is “in the public interest.” Moreover, if the Minister varies the 2018 Act, it is expected the CEAO will refer to aspects of the EAO Certificate Extension Policy when considering the application for the extension. It is logical and reasonable to collect this information in parallel. The EAO Certificate Extension Policy is not binding on either the Minister or the CEAO, but merely offers administrative guidance to them, proponents and the public. This is simply good practice, not objectionable.

⁶⁰ *Glacier Resorts* at para. 52.

⁶¹ 2018 Act, ss. 56(1), 56(2)(b), 78(5).

⁶² 2018 Act, s. 78(5).

⁶³ BC Environmental Assessment Office, “Certificate Extension Policy” (24 April 2020), online: <https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/environmental-assessments/guidance-documents/2018-act/certificate_extension_policy_final_22apr2020.pdf>.

⁶⁴ See for example Donald J. M. Brown and John M. Evans, *Judicial Review of Administrative Action in Canada* (Toronto: Thomson Reuters, 2013) (loose-leaf) at §14:4212, §14:4524.

**APPENDIX C 2019 JOINT INFORMATION REQUIREMENT FOR *MINES ACT*
AND *ENVIRONMENTAL MANAGEMENT ACT* PERMITS**

Joint Application Information Requirements
for
Mines Act and Environmental Management Act Permits

Prepared by:

British Columbia Ministry of Energy, Mines and Petroleum Resources
&
British Columbia Ministry of Environment and Climate Change Strategy

September 2019

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Abbreviations

AIA	Archaeological Impact Assessment
AID	Application Instruction Document
BACI	Before-After-Control-Impact
BAT	Best Achievable/Available Technology
CABIN	Canadian Aquatic Biomonitoring Network
CEMP	Construction Environmental Management Plan
CIH	Certified Industrial Hygienist
Code	Health, Safety and Reclamation Code for Mines in British Columbia
CSM	Conceptual Site Model
EA	Environmental Assessment
EAC	Environmental Assessment Certificate
EDF	Environmental Design Flood
EEM	Environmental Effects Monitoring
EGBC	Engineers and Geoscientists British Columbia
EIA	Environmental Impact Assessment
<i>EMA</i>	<i>Environmental Management Act</i>
EMS	Environmental Management System
EMPR	Ministry of Energy, Mines & Petroleum Resources
ENV	Ministry of Environment and Climate Change Strategy
EPD	Environmental Protection Division
FLNRD	Ministry of Forests, Lands, Natural Resource Operations, and Rural Development
GCMP	Ground Control Management Plan
<i>HCA</i>	<i>Heritage Conservation Act</i>
HVAC	Heating, Ventilation, and Air Conditioning
IDF	Inflow Design Flood
IDZ	Initial Dilution Zone
IFC	Issued for Construction
IPMP	Invasive Plant Management Plan
IRT	Information Requirements Table
<i>MA</i>	<i>Mines Act</i>
MSD	Musculoskeletal Disorder
MERP	Mine Emergency Response Plan
ML/ARD	Metal Leaching and Acid Rock Drainage
MRC	Mine Review Committee
NPV	Net Present Value
OHS	Occupational Health and Safety
OHSC	Occupational Health and Safety Committee
POC	Parameter of Concern
QA/QC	Quality Assurance/Quality Control

QPO	Quantitative Performance Objective
ROH	Registered Occupational Hygienist
SBEB	Science-Based Environmental Benchmark
SOP	Standard Operating Procedure
SPO	Site Performance Objective
TAR	Technical Assessment Report
TRP	Trigger Response Plan
TSF	Tailings Storage Facility
WHMIS	Workplace Hazardous Materials Information System
WOE	Weight of Evidence
WQG	Water Quality Guideline
WQO	Water Quality Objective

Preface

This Application Information Requirements document provides guidance on the technical information requirements expected to be submitted in support of a joint application for a *Mines Act* (MA) permit issued by the Ministry of Energy, Mines and Petroleum Resources (EMPR) and an effluent discharge permit issued under the *Environmental Management Act* (EMA) by the Ministry of Environment and Climate Change Strategy (ENV).

The information requirements presented in this document will be further developed through pre-application discussions with EMPR and ENV technical staff. This document is intended for both new and existing major mines, including proposed amendment applications or major expansions/extensions of mining projects. Combining the technical information requirements for the MA and EMA permit applications reduces the overlap of information required by EMPR and ENV and results in a single set of information requirements that supports both applications.

Mining project proponents will receive additional guidance from EMPR and ENV technical staff, EMPR's Major Mines Office, or Regional Operations with respect to more specific information requirements for their project as early as possible prior to submitting applications. ENV and EMPR require "pre-application" meetings with proponents, Indigenous Nations, applicable provincial permitting agencies, and technical staff to discuss and confirm the scope and detail of information requirements prior to application submission.

When developing the application that presents the information requirements outlined in this document, proponents are advised to present the information in the order listed in the table of contents. Additionally, proponents should reference the location of materials in the Information Requirements Table (IRT) in the right-hand column related to each line of the IRT.

Mines Act Permitting

Applications for MA permits must demonstrate compliance with the Health, Safety and Reclamation Code for Mines in British¹ (hereafter "the Code"). Depending on project-specific considerations, information requirements in addition to those listed herein may be required.

Applications must include detailed designs for all project components and phases of mine life. Proponents are expected to provide detailed engineering designs, management plans, and monitoring programs. Planning needs to be sufficiently detailed to ensure the health and safety of mine personnel and the public as well as the protection and reclamation of the land and watercourses affected by mining activities.

¹ <https://www2.gov.bc.ca/gov/content/industry/mineral-exploration-mining/health-safety/health-safety-and-reclamation-code-for-mines-in-british-columbia>

In addition to providing the technical information described in this document, proponents must ensure that [Mines Act permit fees](#)² are provided with the submission of an application, as applicable.

Environmental Management Act Permitting

This document includes the information requirements of a Technical Assessment Report (TAR) with particular emphasis on the Environmental Impact Assessment (EIA) normally required as part of the application (found in [Technical Guidance 1 – Environmental Management Act Applications TERMS OF REFERENCE Environmental Impact and Technical Assessment Report](#)³) and builds upon the generic guidance related to TAR preparation found in [Guidance on Applications for Permits under the Environmental Management Act – Technical Assessment](#)⁴ (under the *Guidance for a Technical Assessment Report* pulldown menu).

In cases where construction significantly precedes operation, a proponent may submit [an application for an EMA permit](#)⁵ (under the *New Permit, Approval or Operational Certificate: Forms, Templates, Fees & IRTs* pulldown menu) associated with construction effluent discharges prior to an application for operational effluent discharge permits. The application information requirements outlined in this document should be modified specifically for each project (single- or two-phase application) after discussion with and advice from the project-specific Mine Review Committee (MRC), specifically the ENV representatives.

In addition to providing the technical information described in this document, proponents must ensure that [EMA permit fees](#)⁶ are provided with the submission of an [initial application and all other relevant forms](#)⁷ to the Vic Admin mailbox: PermitAdministration.VictoriaEPD@gov.bc.ca. All permits, registrations, and authorizations under the *EMA* require the same initial application to Vic Admin and payment of fees to initiate the review process.

The [Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators](#)⁸ must also be followed in the development of an application for an *EMA* permit. This document provides detailed direction regarding collecting and presenting baseline data as well as assessing and predicting the potential effects of a project on the aquatic environment. Prior

² <https://www2.gov.bc.ca/gov/content/industry/mineral-exploration-mining/permitting/mines-act-permit-inspection-fees>

³ www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/eia__ta_tor.pdf

⁴ <https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/guidance-forms-and-fees>

⁵ <https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/guidance-forms-and-fees>

⁶ <https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/guidance-forms-and-fees>

⁷ <https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/guidance-forms-and-fees>

⁸ http://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/water_air_baseline_monitoring.pdf

to intake of an application, proponents may contact ENV regarding advice on proposed baseline data collection programs.

Each qualified professional must provide signed Conflict of Interest Disclosure and Declaration of Competency forms, which will be provided by ENV with the Application Instruction Document (AID) at the end of the pre-application stage.

Prior to initiating the development of the Information Requirements Table (IRT), proponents must complete the intake step. This step involves submission of an initial project description, site map, draft application form, and payment of the application fees. Tracking of the application progress by ENV only occurs once intake is complete. Note that the proponent must also submit a final application form for authorization to discharge [waste](#)⁹ under the *EMA*, in addition to providing the technical information described in this document when the final application is submitted.

These information requirements address effluent-related discharges only. For other waste discharges related to project activities, such as air emissions or solid waste or hazardous waste disposal, separate applications may be required. The Environmental Protection Division (EPD)'s [fact sheet on waste authorizations and best practices for industrial camps](#)¹⁰ identifies the requirements for disposal of putrescible wastes (food wastes), solid waste, and hazardous waste for exploration, construction, and industrial camps.

Once an *EMA* authorization is issued, mine proponents are responsible for understanding and following the terms and conditions of their authorization. Ministry of Environment inspectors verify compliance with authorizations to ensure proponents are following requirements designed to protect the environment and human health. More information and guidance can be found on the [Environmental Compliance in BC website](#)¹¹.

Joint Information Requirements

The information requirements presented in this document are those relevant for a joint application for *MA* and *EMA* permits. The information requirements will be referenced and reviewed in the IRT discussions. Where an application refers to previously submitted information, a summary of that information should be provided under the appropriate section or subsection of the application, with hyperlinks to the corresponding sections of the previously submitted document(s) provided.

⁹ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/mining_operations_fs.pdf

¹⁰ www2.gov.bc.ca/assets/gov/environment/waste-management/sewage/mwr/workcampsfs.pdf

¹¹ <https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/natural-resource-law-enforcement/environmental-compliance>

From this point forward, the sections of this document provide a template for joint MA/EMA applications.

Executive Summary

Provide an executive summary that briefly describes the proposed project, identifies the authorizations being applied for, and identifies how the application information requirements developed with advice from the project-specific MRC and any additional input from technical agencies and First Nations is addressed in the application, and provide instruction for reviewers on where to find the specified information. If the application is for an expansion or amendment to an existing mine, clearly identify the new components (i.e., those not already permitted).

1 Introduction and Project Overview

Provide contextual background information on the mining project, including proponent identification, application background, mine overview and development proposal, regulatory framework, and the mine design and assessment team.

1.1 *Application Background*

Provide a general introduction to the application, including the purpose and scope. Provide an overview of the application structure.

1.2 *Proponent Information*

Include the following information for the operating company:

- overview, including the name, organization, and structure;
- the registered legal name and registered address;
- the name of the company representative managing the project;
- the head office address and applicable contact names, phone and fax numbers, and email addresses; and
- contact information for key staff related to corporate health and safety, environmental management, community relations, etc.

1.3 *Project Overview*

1.3.1 Project History

Describe the project history leading up to the application, including activities at the mine site and a list of previous related reports, studies, designs, etc.

1.3.2 Overview of Products, Markets, and Projected Project Benefits

Describe the product(s) that would be mined, market need, production volume and rate, projected mine life, number of new direct and indirect jobs created, and estimated capital investment.

1.3.3 Location, Access, and Land Use

Provide a description and figure of the site showing all mining tenures, project location, and site access. Reference latitude/longitude or UTM coordinates (noting coordinate reference system used and means of obtaining data). Provide an overview of current land uses, surrounding land uses, and downstream water use and users.

1.3.4 Mine Components and Off-Site Infrastructure

Include introductory descriptions and associated detailed maps of the key mine components and on-site infrastructure. Ensure current conditions and any new project components are readily identifiable. Key components could include, but are not necessarily limited to, the following:

- open pits;
- underground workings;
- processing facilities, including crushing and conveying systems and concentrate handling;
- tailings storage facilities (TSFs);
- waste rock dumps;
- site water management facilities;
- water treatment facilities;
- ore stockpiles;
- overburden, soil, and construction stockpiles;
- borrow areas;
- haul roads;
- access and mine site roads;
- power supply and distribution;
- explosives facilities;
- ancillary buildings and other infrastructure (camps, loadout facilities, laydowns, offices, maintenance shops, etc.); and
- any other relevant facilities.

1.3.5 Mine Development and Operations

Include a brief outline of the stages of mine development and operations, including proposed discharges and discharge locations, and stages of development.

1.3.6 Mine Design and Assessment Team

Identify the consultants and individuals comprising the design and assessment team, and their responsibilities and application contributions. Ensure all technical assessments included in the application are signed and stamped by a qualified licensed professional registered in British Columbia.

1.3.7 Spatial Data

Spatial data requirements include the:

- proposed permitted mine area, including a reasonable buffer around proposed disturbances;
- physical disturbance proposed annually over the next 5 years;

- reclamation proposed annually over the next 5 years;
- proposed life of mine disturbance (Mine Plan) and reclamation program, may be presented in regular interval segments (e.g. every five years) and/or milestones;
- environmental sampling stations (on and off the mine site);
- site infrastructure (TSFs, waste rock dumps, ore stockpiles, soil stockpiles, water management structures, etc.); and
- any other relevant project specific attributes.

1.3.8 Concordance with Environmental Assessment Conditions

If an Environmental Assessment Certificate (EAC) exists for the project, include the following information:

- a summary table of permitting level issues raised, or commitments identified during the Environmental Assessment (EA) process and where they are incorporated in the application;
- a summary table of all applicable EAC conditions and where they are incorporated into the application; and
- confirmation that the mine plan is consistent with the EAC project description.

1.4 Regulatory Framework

In this section, include:

- a description of currently licenced/permitted/authorized works associated with the mine;
- an outline of required licences/permits/authorizations needed for development and/or operation, and any applicable regulations; and
- reference to a generic list of licences, permits, authorizations, and regulations that may be applicable to the mining project.

1.5 Indigenous Engagement

1.5.1 Background

In this section:

- identify the Aboriginal groups potentially affected by the mine;
- provide maps of established and/or asserted traditional territories of potentially affected Aboriginal groups; and
- provide background information for each potentially affected Aboriginal group including, but not limited to, ethnography, language, land use setting and planning, governance, economy, and reserves.

1.5.2 Asserted and Established Rights and Interests

In this section:

- make reference to the current use of lands and resources for traditional purposes assessment and identify uses of the project area by Indigenous Nations;
- identify any specific asserted Aboriginal rights about which the proponent has received information from Indigenous Nations or other sources;
- identify potential effects of the project on asserted or established Aboriginal rights;
- identify treaty rights that could be affected by the project;
- identify Aboriginal interests with respect to potential effects of the project; and
- describe mitigation measures, including design considerations, to avoid or accommodate for potential effects on asserted or established Aboriginal rights.

1.5.3 Engagement Efforts

In this section:

- summarize engagement undertaken with Indigenous Nations during the pre-application stage and identify engagement planned during application review;
- summarize key issues raised during engagement and the responses provided to Indigenous Nations (summarized in an issues tracking table); and
- identify potential adverse impacts of the project on potential or established Aboriginal and treaty rights as identified by affected Indigenous Nations.

2 Baseline Information

Characterization and presentation of baseline environmental conditions is a critical element in applying for permits under the *MA* and *EMA*.

For the baseline program, collect and assess sufficient physical, chemical, and biological information to:

- describe geology, geochemistry, and topography;
- describe meteorological and climatic conditions;
- characterize surface water hydrology and groundwater hydrogeology;
- establish a water balance for the drainage area;
- document surface and groundwater use within and downstream of the project area;
- determine surface water, groundwater, and sediment quality prior to disturbance; and
- describe aquatic ecosystem attributes such as fish and fish habitat, tissue residues, and periphyton and benthic invertebrate communities.

For the proposed surface water and groundwater monitoring stations, identify those that will serve as reference or control sites throughout the mine life. For baseline monitoring data, a minimum of 24 consecutive months must be provided. If fewer than 24 consecutive months of data are proposed, it must be demonstrated, to the satisfaction of ENV technical staff, that sufficient data are available to adequately characterize the baseline conditions and support the development of predictive models and the effects assessment.

Comparison of sites that are impacted by the project with sites that are not impacted and to the baseline data will be required to determine if an unacceptable impact or change has occurred.

Follow the detailed guidance provided in the [Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators](#)¹² and in the [British Columbia Field Sampling Manual](#)¹³.

In the sections below, describe in detail:

- sampling methods;
- sample preparation and hold times;
- analytical methods;
- analytical detection limits;
- quality assurance/quality control (QA/QC) procedures;
- data analysis methods; and
- any assumptions.

¹² http://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/water_air_baseline_monitoring.pdf

¹³ <https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/laboratory-standards-quality-assurance/bc-field-sampling-manual>

Distribute a draft of the mine baseline monitoring program to the relevant technical agencies early in the development process to ensure that the program will meet permitting requirements.

While the type and quantity of baseline data collected will vary by site, the application must include the information outlined below.

2.1 Summary

Provide an overview of the existing baseline data. Highlight key physical, chemical, and biological characteristics of the receiving environment that the baseline data relates to. Identify sensitive receptors (including humans), valued components, or conditions relevant to potential impacts during the construction, operation, closure, and post-closure phases of the mine that determined the baseline data needs. Identify how baseline sampling locations have been coordinated and documents among the various media types (air, water quality and quantity, benthic invertebrates, fish, etc.).

Include raw data, including field notes, in appendices, in electronic format (such as a USB memory stick) with the application, and, if applicable, upload for storage in ENV's Environmental Monitoring System database.

2.2 Meteorology and Climate

Describe how weather and climate will affect all aspects of the project. Summarize all available and relevant meteorological and climate information and develop estimates of long-term baseline conditions at the mine property. Refer to detailed guidance provided in the [Water and Air Baseline Monitoring Guidance Document](#)¹⁴.

Include the following information:

- a detailed map showing the location of all site-specific and regional climate stations in relation to project facilities;
- a description of all relevant local and regional meteorology and climate information sources;
- base line data of normal and extreme ranges of the following climatic parameters at both monthly and annual intervals, including descriptions of the techniques used to determine them:
 - temperature,
 - precipitation (snowfall and rainfall),
 - snowpack,
 - evaporation,
 - solar radiation, and

¹⁴ http://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/water_air_baseline_monitoring.pdf

- wind speed and direction;
- recurrence interval analysis of extreme, short-duration events including rainfall, snowmelt, and wind speed;
- a minimum of two years of continuous site meteorological data, recorded at an appropriate sampling interval and directly incorporated into the above analyses;
- a quality control analysis of all site-specific data to document and correct for erroneous measurements as well as detail quality control and correction procedures;
- all climate data, in an appendix, including site photos;
- an assessment of information gaps and a description of additional site-specific meteorological data collection proposed to augment existing data; and
- any other relevant information

2.3 *Geology*

2.3.1 Regional Geology

In this section:

- describe the regional bedrock geological setting, with emphasis on the regional framework and including a description of the tectonic belt(s), terrain(s), physiography, and regional metamorphism and structure;
- describe the surficial geological setting, with emphasis on the nature and developmental history of surficial geological units;
- characterize the bedrock structures from the viewpoint of their potential to act as pathways or barriers for groundwater (both contact and non-contact);
- characterize the respective bedrock lithologies from the viewpoint of their relative capability to store and transmit groundwater;
- provide appropriate maps, figures, and cross-sections to illustrate the geologic setting at the appropriate scale, with legends, north arrow, and the project location clearly identified; and
- provide any other relevant information.

2.3.2 Deposit (Ore) Geology

Summarize the mine site geology, including descriptions of major rock units, stratigraphy, structure, metamorphism, paleontology, and geochemistry. Additionally, provide a detailed summary of the stratigraphy and describe the ore deposit, including:

- ore mineralogy including alteration type, deposit character, deposit classification, and age of mineralization;
- general ore controls; and
- average assay values and reserve information (proven, probable, and possible).

2.3.3 Surficial Geology, Terrain, and Geohazard Mapping

Provide a summary of the surficial geology, terrain, and geohazard mapping for the mine site completed at a scale of 1:5,000 or as appropriate using the [Terrain Classification System for British Columbia](#)¹⁵. Show the resulting map polygons on appropriately scaled maps with the existing and proposed site infrastructure locations indicated. Encompass the footprints and upslope areas of all project infrastructure, including the mine site, access roads, TSFs, etc. Discuss the potential for the respective surficial deposits to act as groundwater pathways or barriers for contact water. Include any relevant hazards identified in Section 2.3.4 on the maps.

The level of investigation and mapping associated with the surficial geology, terrain stability, and geohazards should be commensurate with the complexity of the geology and the site infrastructure.

2.3.4 Natural and Seismic Hazards Assessments

In this section:

- discuss natural hazards such as snow avalanches, landslides, geohazards, and earthquakes specific to the mine, with reference to the mapping completed in Section 2.3.3;
- provide a seismic hazard assessment of the site; and
- discuss the potential impacts of natural hazards to proposed project infrastructure and refer to appropriate sections/documents containing a detailed assessment of risk and mitigation measures, where relevant.

2.3.5 Soil Survey and Soil Characterization for Reclamation

Provide a summary of the soil survey for the mine footprint. Include supportive technical data, such as soil classification and soil profile descriptions. Include the following soil survey information:

- identification and mapping of soil units;
- the location, depth, and volumes of soil types;
- potential soil and subsoil salvage locations;
- characterization of topsoil and subsoil for suitability as growth media for reclamation;
- characterization of soil hydraulic conductivity and potential for water infiltration;
- a discussion of the potential for erosion;
- baseline soil metal concentrations;
- baseline soil nutrient information; and
- any other relevant information.

¹⁵ https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/nr-laws-policy/risc/terclass_system_1997.pdf

2.4 Geochemical Characterization and Source Terms

Characterize the geochemistry of all geologic materials to be disturbed during each phase of the life of the mine (construction, operation, closure, and post-closure) and evaluate the metal leaching and acid rock drainage (ML/ARD) potential of each material.

Ensure the geochemical characterization program is sufficiently robust to support appropriate source term development, materials handling, mitigation, and contingency plans for the protection of land and watercourses. Develop the program in accordance with the following documents:

- [Policy for Metal Leaching and Acid Rock Drainage at British Columbia Mine Sites](#)¹⁶ (July 1998);
- [Guidelines for Metal Leaching and Acid Rock Drainage at Mine Sites in British Columbia](#)¹⁷ (August 1998); and
- [Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials](#)¹⁸, MEND Report 1.20.1 (December 2009).

Include a characterization program that considers all geologic materials, including:

- overburden;
- soils;
- construction materials;
- tailings;
- waste rock;
- ore and low-grade ore;
- coal and coal by-products (fine and coarse coal rejects, etc.);
- water treatment by-products; and
- any other relevant geologic materials.

At a minimum, assess the following mine components as part of the characterization program:

- open pit walls;
- underground workings (roof, floor, walls, gob, backfilled materials, etc.);
- TSFs
- waste rock dumps;
- water management structures;
- ore, overburden, soil, and construction stockpiles;
- coal and coal by-product stockpiles;
- borrow areas;
- haul roads;
- road cuts;

¹⁶ www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/permitting/ml-ard_policy.pdf

¹⁷ www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/permitting/ml-ard_guidelines.pdf

¹⁸ mend-nedem.org/mend-report/prediction-manual-for-drainage-chemistry-from-sulphidic-geologic-materials

- plant/mill, ancillary buildings, and laydown areas; and
- any other relevant mine components.

2.4.1 Geochemical Characterization

Provide in this section:

- a description of the sample collection and analytical methods (static and kinetic) to demonstrate their appropriateness for the site-specific conditions and geologic materials, as well as relevance to the proposed storage environments;
- a description of the distribution of samples collected from the mine site for each geologic material and for each mine component, including maps, figures, plots, and tabulated data summaries, where appropriate, to demonstrate that geochemical and spatial variability are captured and spatial and/or temporal gaps in the datasets have been identified;
- results of static testing including, but not limited to, trace element content, acid base accounting, and mineralogical analyses;
- results of kinetic testing, including designs relevant to the storage environment that conservatively simulate the expected field conditions and can be utilized to predict reaction rates and drainage chemistry;
- an assessment of the lag times to ARD onset for all potentially acid-generating materials and of metal-leaching potential/behaviour for all materials to be generated;
- an assessment of the loading contribution of blasting agents;
- development of site-specific geochemical criteria defining potentially acid-generating and/or metal-leaching materials, as required, to support waste management and handling;
- all raw datasets; and
- any other relevant information and analyses.

2.4.2 Geochemical Source Terms

In this section:

- provide a detailed materials balance for each mine component by geologic material type; and
- develop conservative geochemical source terms to reflect all geologic materials and secondary wastes. Specifically:
 - integrate source terms with the proposed mine plan for each phase of mine life (i.e., construction, operation, closure, and post-closure);
 - incorporate appropriate static and kinetic testing results;
 - provide a detailed description of all constraints, limitations, and assumptions (e.g., scaling factors, temperature corrections, flow rates, etc.);
 - provide a detailed description and summary of all calculations;
 - identify and discuss data gaps associated with the source terms;
 - provide all input data used in the development of source terms;

- provide all raw datasets; and
- include any other relevant information and analyses.

2.5 *Topography and Surface Drainage Features*

Provide a description of the pre-mine topography and surface drainage features of the mine site and surrounding area. Supplement this description with maps, produced at a suitable scale, that demonstrate:

- drainage divides, areas of groundwater discharge, locations of groundwater seeps, wetlands, and notable topographic features;
- the range of pre-mine slope configurations and typical slope cross-sections (include accompanying descriptions); and
- the entire drainage basin(s) in which the mine is located.

2.6 *Water Quantity*

For surface water, a minimum of 24 consecutive months of monitoring data is required, and more is preferred to assess trends and seasonal variation. For groundwater, collecting a minimum of quarterly water level measurements (i.e., within each of the four seasons) over 24 consecutive months (eight samples total) is required before submitting a permit application. More frequent monitoring (e.g., bi-monthly or monthly) is preferred in wells where groundwater level fluctuations are closely correlated with streamflow, which indicates high stream-aquifer hydraulic connection. Measurements are required for each water bearing strata intercepted by the monitoring wells. The linkages between surface water and groundwater quantity must be clearly identified.

2.6.1 Surface Water Quantity

Describe the existing hydrologic regime at the project location. Summarize all available hydrological information relevant to the mine property and downstream receiving environment. Refer to detailed guidance provided in the [Water and Air Baseline Monitoring Guidance Document](#)¹⁹.

Include the following information:

- a description of pre-mine topography and surface drainage features;
- detailed maps showing all drainage basins (local and regional) that will be affected by the mine, areas of groundwater discharge, wetlands, licensed surface water extraction locations, and notable hydrologic features (e.g., glaciers, lakes, etc.);
- a detailed map showing the location of all relevant site-specific and regional hydrology stations in relation to project facilities, and a summary of relevant station metadata

¹⁹ http://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/water_air_baseline_monitoring.pdf

including period of record, drainage area, median basin elevation, and % area of notable hydrologic features (e.g., glaciers, lakes, etc.);

- evidence of continuous hydrometric data collection for drainages potentially affected by effluent discharge, water diversions, and seepages from waste rock and TSFs;
- a description and justification of baseline study design, methods of hydrometric station installation, sampling methods, QA/QC procedures, and assignment of data grades as described in the [Manual of British Columbia Hydrometric Standards](#)²⁰;
- identification of spatial or temporal gaps in the database and a description of additional site-specific data collection proposed to augment existing data;
- continuous site hydrology data directly incorporated into the following analyses:
 - a detailed hydrologic analysis of key surface drainages within and downstream of the project area to estimate long-term seasonal flow regimes;
 - a definition of monthly and annual streamflow normals and variability and critical low flow metrics; and
 - recurrence interval analyses of peak and low-flow events (instantaneous, annual, etc., as appropriate);
- demonstration of a reasonable balance between precipitation, snowpack, evapotranspiration, sublimation, and total runoff (surface and sub-surface flow) on an average annual basis;
- all hydrological datasets, including rating curves, manual measurements, plots of site-specific discharge, site photos, etc.;
- a summary of the predicted effects of climate change on the future climate and hydrology of the project area; and
- any other relevant information.

2.6.2 Groundwater Quantity

Describe the existing hydrogeological regime at the project location. Summarize all available hydrogeological information relevant to the mine property and the receiving environment. A minimum of two years of monthly groundwater level data is required in the baseline assessment. Refer to guidance on groundwater baseline monitoring provided in the [Water and Air Baseline Monitoring Guidance Document](#)²¹.

Include the following information:

- a description of the groundwater monitoring network, including the following:
 - plan-view map showing the groundwater monitoring well locations,
 - borehole and well logs, and
 - tabulated monitoring well completion details including location, elevation, depth and well screen intervals, lithologic log, and hydraulic parameter estimates;

²⁰ https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/science-data/man_bc_hydrometric_stand_v10.pdf

²¹ http://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/water_air_baseline_monitoring.pdf

- a description of the groundwater monitoring program, including the following:
 - frequency of water level monitoring and groundwater sampling,
 - groundwater level monitoring methods (e.g., manual or automated),
 - sampling methods (including methods to achieve low sample turbidity),
 - analytical parameters being measured, and
 - QA/QC procedures;
- a description of the aquifers and aquitards surrounding the mine, including areas downstream of the mine property, with a description of the geometry (boundaries, lateral extent, and thickness) and hydraulic properties (hydraulic conductivity, transmissivity, anisotropy, specific yield, storativity, and effective porosity);
- a characterization of bedrock structures that could influence infiltration, flow directions, and seepage rates;
- a quantitative description of historical, existing, and planned groundwater extraction, including a reference to existing water licenses associated with the aquifers and surface watercourses that could be affected by mine water management activities (e.g., dewatering);
- a description of the water balance for the mine area that considers inputs and outputs of meteoric water, surface water, and groundwater;
- an evaluation of horizontal and vertical hydraulic gradients for each hydrostratigraphic unit;
- a characterization of the baseline groundwater flow conditions that includes plan-view maps of interpreted groundwater level contours and flow directions and hydrogeological cross-sections showing aquifers and aquitards, areas of recharge and discharge, groundwater elevation measurements, time-series plots of measured groundwater elevations, and interpreted groundwater flow directions;
- an evaluation of groundwater and surface water interaction for important watercourses, including a plan map illustrating gaining and losing stream reaches;
- an evaluation of seasonal variability in groundwater levels between high and low water conditions, including groundwater hydrographs with precipitation to evaluate typical seasonal changes in groundwater levels for each hydrostratigraphic unit; and
- any other relevant information.

2.7 *Water Quality*

Include a detailed summary of the baseline water quality conditions present before project development. The linkages between surface water and groundwater quality must be clearly identified.

2.7.1 Surface Water Quality

Determine if water quality guidelines (WQGs) or water quality objectives (WQOs) have been attained by collecting five samples in 30 days during critical flows (high and low) and/or biologically relevant periods. Assess inter-annual variation or prepare science-based

environmental benchmarks (SBEBs) based on multiple years of water quality data. Refer to detailed guidance provided in the [Water and Air Baseline Monitoring Guidance Document](#)²² and in [Guidance for the Derivation and Application of Water Quality Objectives in British Columbia](#)²³. For SBEB development, contact ENV for further information and requirements on SBEBs and/or WQOs. Please review [Technical Guidance 8 Environmental Management Act Applications - A Framework for the Development and Use of Freshwater Science-Based Environmental Benchmarks for Aquatic Life in Environmental Management Act Permitting for Mines](#)²⁴.

In this section:

- identify downstream surface water uses (e.g., aquatic life, drinking, irrigation, livestock watering, industrial, etc.) and water licenses;
- document and describe the rationale for baseline study design, including:
 - collection methods,
 - parameters analyzed (for a recommended list, refer to the [Water and Air Baseline Monitoring Guidance Document](#)²⁵),
 - field instrumentation,
 - sampling frequency and period, including high-, medium-, and low-flow periods,
 - site locations,
 - statistical considerations, and
 - QA/QC protocols;
- provide a detailed map showing water quality sampling locations, including proposed or existing discharge locations and areas of disturbance;
- name the certified laboratories used to analyze samples;
- identify sample locations and time windows or seasonality when baseline surface water quality may exceed [provincial WQGs](#)²⁶ for each Parameter of Concern (POC)²⁷;
- provide a summary of groundwater chemistry, including summary tables organized by POC, sample location, and date;
- provide a summary of the QA/QC results;
- indicate those samples with values that would classify them as POCs;
- clearly document the frequency and magnitude of exceedances;
- identify which data reflect un-impacted baseline versus conditions affected by previous development (e.g., exploration activities, historical mining activities);

²² http://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/water_air_baseline_monitoring.pdf

²³ https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-objectives/wqo_proc_guidance.pdf

²⁴ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/tg8_framework_for_sbebs.pdf

²⁵ http://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/water_air_baseline_monitoring.pdf

²⁶ <https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines>

²⁷ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/parameter_of_concern_fs.pdf

- use the principles of mass balance, as required, to establish the degree to which groundwater quality influences the surface water quality throughout the range of flow rates, and the degree to which groundwater contributes to streamflow, as supported by the data, methods, analysis, and conclusions;
- illustrate spatial and temporal variation(s) in key parameters among sites using graphs that show variability in data (e.g., box plots);
- conduct surface water toxicity tests, if required (this may be needed if WQGs are exceeded due to historic mining or site disturbance and should be discussed with ENV staff);
- identify spatial and/or temporal gaps in the database; and
- provide any other relevant information.

2.7.2 Groundwater Quality

Describe the existing groundwater chemistry regime across the mine site and in the identified water bearing strata. Include a description of well installation and development methods, and steps taken to ensure samples collected are representative and equilibrated with the surrounding groundwater system.

In this section:

- summarize and describe the rationale for baseline study design, including:
 - parameters analyzed,
 - collection methods,
 - field instrumentation,
 - sampling frequency and period,
 - site locations,
 - depth of screen completions and associated hydrostratigraphic unit,
 - sample dates and size,
 - statistical considerations, and
 - QA/QC protocols;
- provide a detailed map of groundwater quality sampling locations, proposed or existing effluent discharge points to surface water, areas of contact water recharge to groundwater, and the arrangement of mine elements;
- name the certified laboratories used to analyze samples;
- provide a summary of groundwater chemistry, including summary tables organized by parameter, site, date, and hydrstratigraphic unit;
- provide a summary of QA/QC results;
- indicate those samples with values that would classify them as POCs²⁸;
- indicate those samples with turbidity values greater than 200 NTU and discuss the influence of turbidity on concentrations of POCs in any interpretative discussions;

²⁸ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/parameter_of_concern_fs.pdf

- identify which data reflect un-impacted baseline versus conditions affected by previous development (e.g., exploration activities, historical mining activities);
- illustrate spatial and temporal variation(s) in key parameters and among sites using maps, cross-sections, and graphs that illustrate data variability (e.g., box and whisker, time series, Piper plot, etc.);
- identify sample locations and time windows or seasonality when baseline groundwater quality may exceed [WQGs](#)²⁹ for each POC;
- assess the degree to which surface water quality is influenced by groundwater quality during periods of low flow, and the amount of flow that is contributed by groundwater discharge;
- prioritize the environmental receptors according to their potential sensitivity to groundwater discharge that could potentially include contact water;
- identify spatial and/or temporal gaps in the database; and
- provide any other relevant information.

2.8 Sediment Quality

Sediments must be sampled a minimum of once per year during summer low-flow periods. Refer to detailed guidance provided in the [Water and Air Baseline Monitoring Guidance Document](#)³⁰.

For situations where baseline sediment conditions exceed guidelines, or when historic mining or other disturbances are potentially contributing to baseline sediment toxicity, discuss with ENV the need to simultaneously conduct extracted metals/acid volatile sulfides analyses and sediment toxicity testing.

In this section:

- document and describe the rationale for the baseline study design, including:
 - parameters analyzed (refer to the [Water and Air Baseline Monitoring Guidance Document](#)³¹ for a recommended list),
 - field instrumentation,
 - sampling frequency and period,
 - site locations,
 - statistical considerations,
 - collection methods, including a rationale for the size fractions and the collection of samples from lotic and lentic environments, and
 - QA/QC protocols;

²⁹ <https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines>

³⁰ http://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/water_air_baseline_monitoring.pdf

³¹ http://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/water_air_baseline_monitoring.pdf

- identify those sample sites that appear to be influenced by groundwater discharge and/or could potentially receive contact water via groundwater discharge in the future;
- name the certified laboratories used to analyze samples;
- provide a summary table listing sample site locations, sample dates, sample size, and rationale/purpose of each site;
- identify which data reflect un-impacted baseline versus conditions affected by previous development (e.g., exploration activities, historical mining activities);
- include a detailed map of sampling locations as well as proposed or existing discharge locations and areas of disturbance;
- illustrate spatial and temporal variation in key parameters among sites using graphs or other appropriate tables or figures;
- compare, tabulate, and map existing sediment quality conditions relative to [provincial WQGs](#)³² or the [Canadian Council of Ministers of the Environment \(CCME\) Ministers Sediment Quality Guidelines for the Protection of Aquatic Life](#)³³ (threshold or probable effect levels);
- identify spatial and/or temporal gaps in the database; and
- provide any other relevant information.

2.9 Fisheries and Aquatic Resources

Assess the potential impacts of discharges to the receiving environment during each phase of mine life using aquatic life baseline studies to determine ecosystem health and contribute to a weight of evidence (WOE) approach.

Ensure the study includes components such as, but not necessarily limited to, plankton, periphyton, benthic invertebrates, shellfish, fish and fish habitat, macrophytes, and biological tissues. The complexity and types of aquatic and marine habitats potentially impacted, and the nature of the mine operation will inform which aquatic organisms are identified for study.

Use appropriate biological monitoring tools to collect and present sufficient data to demonstrate that the program will be able to detect pre-determined changes considered to be biologically significant. A minimum of 24 consecutive months of data is required to determine the inter-annual variability and provide a suitable characterization of biological communities prior to development. If fewer than 24 consecutive months of data are proposed, it must be demonstrated, to the satisfaction of ENV technical staff, that sufficient data are available to adequately characterize the baseline conditions. Refer to detailed guidance provided in the [Water and Air Baseline Monitoring Guidance Document](#)³⁴.

³² <https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines>

³³ <http://ceqg-rcqe.ccme.ca/en/index.html>

³⁴ http://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/water_air_baseline_monitoring.pdf

For applications for discharges to streams, include the information outlined in the subsections below; lake and marine environments will require additional data collection. Discuss this further with ENV during the IRT discussions.

2.9.1 Periphyton and Benthic Invertebrate Community Measures

Use natural or artificial substrates for periphyton sampling; in either case, collect sufficient replicates to characterize variability of the site.

For benthic invertebrates, ENV recommends using the Reference Condition Approach sampling design using Canadian Aquatic Biomonitoring Network (CABIN) protocols, outlined in the [CABIN field manual](#)³⁵. Most regions of the province have a predictive model within the CABIN database that can be used for data assessment. A Before After Control Impact (BACI) design using replicate samples (e.g., using a Hess sampler) is also a common approach.

In this section:

- document and describe the rationale for study design, including
 - collection methods,
 - organisms or communities analyzed,
 - sampling frequency and period,
 - site locations,
 - statistical considerations, and
 - QA/QC protocols;
- name the certified laboratories used to analyze samples;
- provide maps of sampling sites relative to disturbance areas, seepage and discharge locations, and water quality and quantity sampling locations;
- summarize periphyton and benthic invertebrate community data;
- identify which data reflect un-impacted baseline versus conditions affected by previous development (e.g., exploration activities, historical mining activities); and
- identify spatial and/or temporal gaps in the database.

For BACI designs, demonstrate that sufficient data have been collected to enable detection of biologically significant changes post project development. Report the *a priori* statistical power of the sampling plan to provide an understanding of the program's strengths and weaknesses.

2.9.2 Fish and Fish Habitat

Resident fish populations and habitat are under the provincial jurisdiction of the Ministry of Forests, Lands, Natural Resource Operations, and Rural Development (FLNR).

³⁵ http://publications.gc.ca/collections/collection_2012/ec/En84-87-2012-eng.pdf

Contact regional FLNR fisheries staff for scientific collection permits and ensure study methods are consistent with regional and provincial protocols. In addition to information requested by FLNR:

- document and describe the rationale for study design, including
 - collection methods,
 - organisms or communities analyzed,
 - sampling frequency and period,
 - site locations,
 - statistical considerations, and
 - QA/QC protocols;
- provide maps of sampling and stream reach survey locations;
- identify the areas, if any, where groundwater discharge is higher than normal and whether this groundwater discharge is potentially influencing fish habitat;
- describe fish populations and determine the presence of [provincially listed species and ecological communities](#)³⁶ (red or blue listed), federally listed species ([Committee on the Status of Endangered Wildlife in Canada](#)³⁷, and [Species at Risk Act](#)³⁸), and populations that are genetically distinct;
- describe the current and potential use of fish resources by Indigenous, sport, or commercial fisheries;
- assess and describe fish habitat (spawning, over-wintering, rearing, etc.) relative to access roads and utility corridors, waste rock piles, and effluent discharge or seepage locations;
- identify which data reflect un-impacted baseline versus conditions affected by previous development (e.g., exploration activities, historical mining activities);
- provide a brief description and rationale for a conceptual Fish Habitat Compensation Plan, if applicable;
- identify spatial and/or temporal gaps in the database; and
- provide any other relevant information.

2.9.3 Tissue Residues

Include a baseline study that develops a tissue residue database for fish and/or other organisms for metals and metalloids and, if appropriate, organic contaminants. Consider the animal's life history when selecting a fish species (or other organisms) for tissue residue analyses. Species with high site fidelity are preferred for environmental impact assessment. Analyze species and tissues humans consume if human health risk assessments are the focus.

Specifically:

- document and describe the rationale for the study design, including:

³⁶ <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/conservation-data-centre/explore-cdc-data/red-blue-yellow-lists>

³⁷ <https://www.canada.ca/en/environment-climate-change/services/committee-status-endangered-wildlife.html>

³⁸ <https://laws-lois.justice.gc.ca/eng/acts/s-15.3/>

- species and tissue types analyzed,
- collection methods and frequency,
- site locations,
- statistical considerations, and
- QA/QC protocols;
- identify which data reflect un-impacted baseline versus conditions affected by previous development (e.g., exploration activities, historical mining activities);
- provide maps illustrating sampling sites relative to disturbance areas, seepage, and discharge locations;
- provide a summary table of the concentrations of contaminants in fish tissues, and compare baseline conditions relative to [provincial WQGs](#)³⁹ or [Canadian Tissue Residue Guidelines](#)⁴⁰;
- illustrate graphically the spatial and/or temporal variance(s) in key parameters among sites;
- identify spatial and/or temporal gaps in the database; and
- provide any other relevant.

2.10 *Ecosystems and Wildlife*

In this section, include:

- a summary of Terrestrial Ecosystem Mapping, Predictive Ecosystem Mapping, and the location of rare plants and ecosystems as well as invasive plants;
- wildlife habitat suitability mapping, results of aerial wildlife surveys, and a description and location of any key wildlife features or habitats, including any species or ecological communities at risk;
- bio-terrain mapping and vegetation metals analyses;
- a description of on-site and adjacent terrestrial and aquatic ecosystems;
- an inventory of potential biological receptors, including human populations;
- evidence of consultation with Indigenous Nations with regard to land use, wildlife, and vegetation; and
- other relevant information, as appropriate.

2.11 *Land Status and Use*

In this section, include:

- mapping and a summary of pre-mine land surface and mineral rights, and licensed or permitted users such as forestry, guides, outfitters, and trappers;
- descriptions of:
 - existing transportation routes (e.g., roads or waterways) within or adjacent to the mine site (also show these on maps/figures),

³⁹ <https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines>

⁴⁰ <http://ceqg-rcqe.ccm.ca/download/en/290/>

- any known use or interest by Indigenous Nations,
- any informal users who are not necessarily licensed (e.g., recreational users),
- any known local land use and settlement patterns, and
- on-site and adjacent terrestrial and aquatic ecosystems;
- an inventory of potential biological receptors, including human populations; and
- any other relevant information.

2.12 *Archaeology*

Provide maps and descriptions for all identified archaeological sites in the project impact zone. Maps based on those provided in the final Archaeological Impact Assessment (AIA) report may be adequate as overview maps. Provide detailed maps at a 1:500 scale for any sites that will be subject to additional systematic data collection under [Heritage Conservation Act \(HCA\) Section 12 permits](#)⁴¹.

Provide the site descriptions in table form, including the Borden number, general location, previous work (whether an AIA was completed, site collected completely, or site avoided), and proposed mitigation (no further work, alteration under HCA Section 12, or mitigation under Section 14).

Provide a description of the required HCA permitting and concurrent archaeological activity, including (where applicable) the main terms and conditions of HCA Section 14 investigation permit(s) and the methodologies for HCA Section 14 inspection permit(s), the proposed HCA Section 12 Alteration Permit(s), and the Section 14 inspection permit for incidental finds during construction.

Provide a description of (and a commitment to) a chance-finds procedure and education of the construction crew. Terms of Section 12 site alteration permits and Section 14 inspection permits, for incidental finds during construction, state that no land alteration may occur without an archaeologist on site to monitor, who has the authority to stop excavation as deemed necessary, so that any archaeological resources can be handled under the terms of the permit.

2.13 *Cultural Use*

Provide a brief summary of the cultural use of the area. Provide maps and descriptions for all identified cultural sites (if known) in the project impact zone.

⁴¹ http://www.bclaws.ca/civix/document/id/complete/statreg/96187_01

3 Mine Plan

3.1 *Mine Plan Overview*

Provide a brief overview of the mine plan including:

- mining methods;
- mining rates;
- projected mine life;
- processing methods;
- infrastructure requirements;
- supporting maps (as described in Section 10.1.3.d.i of the Code); and
- any other relevant information.

3.2 *Existing Development*

Detail the present use and condition of the land and watercourses, including any previous or existing disturbance, developments, or infrastructure currently in place within the mine area.

3.3 *Life of Mine Plan*

Provide an overview of the life of mine plan, including (as applicable):

- the mine development sequence and schedule for all mine components for all phases of mine life (construction, operation, closure, and post-closure);
- an inventory of all mining waste materials (waste rock, tailings, overburden, rejects, etc.), including type, volume, and storage location;
- dimensions for each waste rock dump, TSF, stockpile, etc.;
- ongoing and completed reclamation areas;
- road and haul route construction and significant transportation or utilities infrastructure;
- water management and treatment infrastructure;
- planned investigation works;
- anticipated permit amendments/expansions;
- maps showing the location and extent of the above activities at a frequency no less than every 5 years; and
- any other relevant information.

3.4 *Detailed Five Year Mine Plan*

Provide a detailed, year-by-year, five year mine plan, including the following, as applicable:

- a development schedule for construction and mine sequencing for all mine components;
- an inventory of all mining waste materials (waste rock, tailings, overburden, rejects, etc.), including type, volume, storage locations, and scheduled sequencing;
- dimensions for each waste rock dump, TSF, stockpile, etc.;
- ongoing and completed reclamation areas;

- road and haul route construction and significant transportation or utilities infrastructure;
- water management and treatment infrastructure;
- planned investigation works;
- anticipated permit amendments/expansions;
- maps showing the location and extent of the above activities at no less than an annual frequency; and
- any other relevant information.

3.5 *Mine Facility Designs and Development*

Provide detailed designs for mine facilities, including, but not limited to:

- open pits;
- underground workings;
- processing plant (mill) and associated facilities (crushers, conveyors, etc.);
- TSFs and associated infrastructure;
- waste rock dumps;
- water management structures;
- ore, overburden, soil, and construction stockpiles;
- mine access and mine haulage roads;
- power supply and distribution infrastructure;
- explosives storage facilities;
- ancillary buildings and support infrastructure (camps, loadout facilities, laydowns, offices, maintenance shops, etc.); and
- any other relevant facilities.

Detailed design means that the submitted design is final and represents what will actually be constructed. It requires that the site has been adequately characterized, design criteria are clearly stated, analyses that support the design decisions are complete and all drawings and supporting reports are signed and stamped by a Professional Engineer as '*Detailed Design*'.

Show the locations and configurations of these facilities, describe proposed construction materials and methods, and provide the design basis and supporting analyses; this may require supplemental reporting from specialty consultants. Detailed design reports and supporting data should be provided in appendices. All buildings must meet BC Building Code requirements.

Provide the results and an assessment of condemnation drilling for permanent mine facilities (e.g., TSFs, waste rock dumps) to ensure that mineral resources will not be sterilized.

3.5.1 Open Pits

Provide an open pit detailed design report, signed and stamped by a Professional Engineer (or multiple professionals as required), that includes the following:

- site investigation information, including detailed geological and geotechnical information obtained from existing pit slopes, rock outcrops, drilling, and other investigations;
- details on pit limits, pit slope geometry, and pit slope design criteria (e.g., per Read & Stacey's *Guidelines for Open Pit Slope Design*⁴²);
- pit slope designs based on stability analyses, including sensitivity analyses (overall slope, bench face angles, inter-ramp angles, bench heights, berm widths, etc.);
- a comprehensive analysis of relevant failure mechanisms (including kinematic and rock mass failure) for all critical slopes, including critical temporary slopes (slopes exposed for more than 12 months);
- designs for all phased open pit expansions based on:
 - a geological model,
 - a structural model,
 - a hydrogeological model,
 - a geotechnical (rock mechanics) model including structure and rock mass, and
 - historical experience;
- a description of pit water management, including surface water diversions and groundwater dewatering and slope depressurization methods, with the following information, as applicable:
 - surface water diversion design criteria,
 - the number, location, spacing, and design of dewatering wells,
 - the construction, operation, and closure of dewatering wells,
 - predicted drawdown zone,
 - slope depressurization requirements and recommendations,
 - estimated dewatering volumes from wells and in-pit sumps,
 - predicted lateral and vertical extents,
 - predicted quality of the pumped water,
 - discharge locations for water discharge location,
 - expected impacts on existing groundwater and surface water users, groundwater and surface water quantity and quality, and aquatic and terrestrial ecosystems, and
 - proposed mitigations for any impacts;
- a description of potential risks to the pit and mitigation measures posed by geohazards;
- a conceptual design for controlled blasting;
- a list and description of mobile equipment to be used;
- monitoring requirements for the pit walls, including instrumentation, movement thresholds, and response plan;
- drawings, plans, sections, and figures as required to illustrate the detailed pit design and the design basis; and
- any other relevant information.

⁴² Read, J. and Stacey, P. 2009. *Guidelines for Open Pit Slope Design*. CRC Press: Boca Raton, FL.

3.5.2 Underground Workings

Provide an underground workings detailed design report, signed and stamped by a Professional Engineer (or multiple professionals as required), that includes the following:

- plans and sections showing all existing underground workings, including locations of all existing portals, shafts, stopes that break through to surface and areas of subsidence;
- details of the mine design and method of underground development;
- plans and sections showing proposed underground workings, including portals and shafts, crown pillars, stopes that break through to surface, extent of surface subsidence, areas of enhanced hydraulic connectivity between surface and underground, etc.;
- assessment of risk posed by geohazards and any planned mitigation;
- locations and designs for any bulkheads, tunnel plugs, dams storing water and saturated material, including those required for closure;
- locations and description of any ancillary infrastructure, including shops, lunchrooms, toilet facilities, fuel bays, etc.;
- a list and descriptions of mobile underground equipment;
- outline of the hazard associated with operating equipment in gassy environments (if required);
- ventilation requirements and plans for all underground workings;
- a Ground Control Management Plan (GCMP), consistent with industry standards, that includes the following components, as applicable:
 - design details specific to the method of underground development;
 - details of the ground control program including roles, responsibilities, accountabilities, implementation, records and communications, and a schedule for reviews and updates;
 - mining methods to be employed including dimensions of excavations and pillars as well as criteria used in their dimensioning;
 - predicted extent and magnitude of surface subsidence and hydraulic connectivity between the surface and underground;
 - design basis information and assumptions used to develop the mine design and the ground control program, including:
 - a geological model for the mine,
 - a structural model for the mine,
 - a hydrogeological model for the mine,
 - a geotechnical (rock mechanics) model for the mine including stress, structure, and rock mass, and
 - historical experience;
 - water control measures to be employed, including specific precautions to be taken where bodies of water, water bearing structures, overburden, tailings, etc., may inundate the mine workings;
 - ground support systems and materials to be employed, including criteria used in selection, dimensioning, spacing, and extent;

- standards and procedures to ensure worker safety including:
 - minimum ground support standards to be employed at the mine,
 - blasting methods, and
 - employee procedures and training;
- instrumentation and monitoring program to verify acceptable performance, detect early signs of instability, and confirm design basis information and assumptions;
- a QA/QC program; and
- risk management;
- a table of exploration boreholes and abandonment method (e.g., grouting, etc.) implemented for boreholes that intersect the underground mine workings and their anticipated influence on mine flooding and the post-closure water balance for the underground mine;
- predicted extent and magnitude of groundwater drawdown surrounding the mine workings; and
- any other relevant information.

3.5.3 Processing Plant (Mill) and Associated Facilities

Provide a geotechnical design report, signed and stamped by a Professional Engineer, that includes the following information:

- a mill process description including inputs, products, and non-product outputs for all stages of operations;
- process design criteria;
- flow sheets showing process streams, quantities, and significant equipment;
- description of all process reagents;
- descriptions of hazardous products, with reference to relevant sections of the Construction Environmental Management Plan (Section 7.6) that address the safe handling and storage of these products;
- supporting information obtained from geotechnical site investigations;
- foundation design criteria and rationale;
- required parameters and designs for ventilation systems including heating, ventilation, and air conditioning (HVAC) systems and local exhaust ventilation;
- an assessment of bearing capacity, expected settlement, and a comparison with allowable settlements for the structure involved;
- a facility location drawing and description;
- a description of potential risks posed by geohazards and mitigation measures; and
- any other relevant information.

3.5.4 Tailings Storage Facility and Associated Infrastructure

Provide a TSF detailed design report, signed and stamped by a Professional Engineer (or multiple professionals as required), that includes the following information:

- an alternatives assessment for the TSF that assesses best available technology (BAT) (see [Guidelines for the Assessment of Alternatives for Mine Waste Disposal](#))⁴³;
- foundation characterization, including data from geotechnical site investigations and laboratory testing, noting that foundation site investigations should be completed as per [Engineers and Geoscientists British Columbia \(EGBC\) guidelines](#)⁴⁴,
- an assessment of geohazards that could influence the TSF throughout its design lifetime and an explanation of how geohazards are managed in the design, including detailed designs for any geohazard mitigation structures;
- the consequence classification of the facility supported by a dam break and inundation study;
- a statement of the TSF design criteria, including, but not limited to:
 - the inflow design flood (IDF),
 - the environmental design flood (EDF) and justification for its selection,
 - seismic criteria (deterministic and probabilistic),
 - factors of safety, and
 - freeboard;
- foundation conditions, construction material, and tailings properties, including discussion of expected behavior under the range of stress conditions predicted for the TSF lifetime;
- an assessment of potential for static and seismic liquefaction for tailings, construction materials, and foundation materials;
- stability analyses, demonstrating compliance with the target factors of safety, that:
 - identify and justify all input parameters and phreatic conditions,
 - assess sensitivity to critical assumptions and provide results of sensitivity analyses, and
 - include figures showing the analysis model and critical slip surfaces;
- detailed designs for any water diversion structures and spillways associated with the TSF;
- a risk assessment as well as risk mitigation and management measures;
- predicted seepage rates and seepage management, addressing any potential for groundwater contamination and plans to monitor and mitigate;
- an assessment of potential effects and interactions with underground workings;
- plans and sections showing the TSF (heights, slopes, profiles, foundation, construction materials, tailings levels, contours, etc.) projected over the life of the mine;
- detailed closure plan and objectives for the facility; and
- any other relevant information.

Include the following TSF operational and water management information:

- a volume-elevation curve;

⁴³ <https://www.canada.ca/en/environment-climate-change/services/managing-pollution/publications/guidelines-alternatives-mine-waste-disposal/chapter-1.html>

⁴⁴ https://www.egbc.ca/getmedia/13381165-a596-48c2-bc31-2c7f89966d0d/2016_Site-Characterization-for-Dam-Foundations_WEB_V1-2.aspx

- a filling curve;
- a raising schedule;
- a tailings deposition plan;
- a TSF-specific water balance and water management plan that is integrated into the Site-wide Water Balance Model (Section 5.3) and Mine Site Water Management Plan (Section 7.10);
- monitoring requirements, including the number, type, and location of instrumentation;
- operational requirements, including threshold conditions or observations requiring actions, in the form of quantitative performance objectives (QPOs) and associated trigger response plans (TRPs); and
- any other relevant information.

3.5.5 Waste Rock Dumps

Provide a waste rock dump detailed design report, signed and stamped by a Professional Engineer (or multiple professionals as required), that includes the following:

- foundation characterization, including data from geotechnical site investigations and laboratory testing;
- an assessment of geohazards that could influence the waste rock dumps, and mitigation measures;
- a statement of the design criteria;
- foundation conditions as well as waste materials and properties;
- identification of the organics, soil, and overburden stripping requirements to enhance the stability of each facility and accommodate reclamation efforts;
 - for designs that do not require stripping, provide a rationale for the design decision and include representative foundation conditions in the stability analysis;
- an assessment of the potential for static and seismic liquefaction for foundation and waste materials;
- stability analyses, demonstrating compliance with the target factors of safety for both interim and final configurations:
 - identify and justify all input parameters and phreatic conditions,
 - assess sensitivity to critical assumptions and provide results of sensitivity analyses, and
 - provide figures showing the analysis model and critical slip surfaces;
- a water balance for waste piles that considers inputs and outputs of meteoric water, surface water, and groundwater;
- an assessment of the impact to surface water drainage, with detailed designs for water management structures associated with the waste rock dump (e.g., rock drains, diversion channels, sediment ponds);
- the configuration and design of each waste rock dump at closure;
- an assessment of potential run-out zones for all dumps;
- a risk assessment for all dumps and identification of all high-risk dumps;

- a description of how each facility will be constructed, including:
 - methods of disposal,
 - construction specifications,
 - cover system,
 - drainage collection system, and
 - discussion and reference to relevant sections of the application that address these requirements in greater detail;
- monitoring requirements for each facility, including instrumentation, movement thresholds, and response;
- a description of operating practices, including any special handling related to ML/ARD management required as a result of characterization results outlined in Section 2.4, if applicable;
- appropriately scaled plans and sections of the facilities that are projected over the life of mine and include lift heights, maximum dump heights, storage capacity, slope angles, and foundation angles;
- an assessment of the potential for groundwater contamination and, if applicable, plans to monitor and mitigate groundwater contamination;
- a detailed closure plan and objectives for the facility; and
- any other relevant information.

3.5.6 Water Management Structures

For the purposes of the application, water management structures include dams, ponds, diversion structures/channels, etc.

Provide a water management structure detailed design report, signed and stamped by a Professional Engineer (or multiple professionals as required), that includes the following:

- the consequence classification of any dams;
- descriptions of the facilities, including embankment heights/excavation depths, slope angles, storage capacity, etc.;
- foundation characterization, including data from geotechnical site investigations and laboratory testing, noting that foundation site investigations must be completed as per [EGBC guidelines](#)⁴⁵;
- an assessment of geohazards that could influence the water management structures and an explanation of how geohazards are managed in the design;
- a statement of the design criteria, including, but not limited to:
 - the design flood,
 - seismic criteria (deterministic and probabilistic),
 - factors of safety, and
 - freeboard;

⁴⁵ https://www.egbc.ca/getmedia/13381165-a596-48c2-bc31-2c7f89966d0d/2016_Site-Characterization-for-Dam-Foundations_WEB_V1-2.aspx

- foundation conditions as well as construction materials and properties;
- an assessment of the potential for static and seismic liquefaction for foundation and construction materials;
- stability analyses, demonstrating compliance with the target factors of safety, that:
 - identify and justify all input parameters and phreatic conditions,
 - assess sensitivity to critical assumptions and provide results of sensitivity analyses, and
 - include figures showing the analysis model and critical slip surfaces;
- designs for water diversion structures and spillways;
- an assessment of the hydraulic capacity of each ditch and channel and confirmation that they can safely convey the design flood without overtopping, side slope failure, or significant erosion;
- appropriately scaled plans and sections showing the facilities (e.g., heights, slopes, profiles, foundations, construction materials, contours, etc.) projected over the life of the mine;
- the detailed closure plan and objectives for the structures;
- any other relevant information.

Include the following operational water management information, as applicable:

- a water balance and water management plan that is integrated into the site-wide water balance;
- monitoring requirements, including the number, type, and location of instrumentation;
- a description of quantitative surface water flow monitoring locations;
- operational requirements, including threshold conditions or observations requiring actions, which should take the form of QPOs and associated TRPs; and
- any other relevant information.

Water management structures that convey contact water on the mine site should be designed to withstand a 1-in-200 year return period storm event. Sediment pond design should be consistent with the technical guidance on [Assessing the Design, Size, and Operation of Sediment Ponds Used in Mining](#)⁴⁶.

A [memorandum of understanding](#)⁴⁷ between EMPR and FLNRD exists regarding the regulation of impoundments and diversion structures at mine sites. This document provides clarification about which agency is responsible for the various types of impoundments, ponds, and diversion structures that may be required on a mine site and when a licence under the Water Act may be required.

⁴⁶ http://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/assessing_design_size_and_operation_of_sediment_ponds.pdf

⁴⁷ http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/developing-a-mine/mou_impoundments_diversions.pdf

3.5.7 Ore, Overburden, Soil, and Construction Stockpiles

Include the following information for any ore, overburden, soil, or construction stockpile:

- lift height, maximum stockpile height, storage capacity, slope angle, and foundation angle;
- expected volume and materials to be contained within the stockpile over time;
- geotechnical assessments and stability analyses by a Professional Engineer (for stockpiles over 6 m high);
- plans and sections showing the location and dimensions of the stockpile, projected over the life of mine; and
- any other relevant information.

Note that stockpiles meeting the definition of a major dump⁴⁸ must meet all of the requirements listed in Section 3.5.5 for waste rock dumps.

3.5.8 Mine Access and Mine Haulage Roads

Include:

- descriptions of mine access and haulage roads;
- drawings and sections showing road designs⁴⁹, including cut and fill slope angles, road widths, drainage measures, berm heights, and runaway lanes;
- construction methodology and specifications;
- anticipated foundation conditions;
- geotechnical assessments and stability analyses by a Professional Engineer (for cuts/fills over 6 m high);
- construction material selection criteria, referencing the appropriate ML/ARD characterization results used to develop selection criteria;
- a description of potential risks posed by geohazards and mitigation measures; and
- any other relevant information.

3.5.9 Power Supply and Distribution Infrastructure

Include the following information for power supply and distribution infrastructure:

- descriptions of any powerline(s) to the mine site;
- descriptions and mapping of utility corridors;
- descriptions and mapping of the on-site substation;
- descriptions of the on-site power distribution system;
- plans and drawings for each facility; and
- any other relevant information.

⁴⁸ As defined in the Code

⁴⁹ Roads should be designed, at a minimum, according to FLNRD's Engineering Manual (<https://www2.gov.bc.ca/gov/content/industry/natural-resource-use/resource-roads/engineering-publications-permits/engineering-manual>)

Accompany the electrical plans and drawings by a letter of assurance from a Professional Engineer indicating that they comply with the Canadian Electrical Code and M421-16 (Use of electricity in mines).

3.5.10 Explosives Storage Facilities

Include:

- a description of any on-site operational explosives storage and/or manufacturing facilities;
- a description of all plans to retain a licensed explosives contractor;
- a description of all plans for explosives use during mine construction;
- a description of all plans for explosive use during mine operation;
- an evaluation of explosives residuals in the discharge(s) from the site; and
- any other relevant information.

3.5.11 Ancillary Facilities and Support Infrastructure

This section includes all other ancillary facilities and support infrastructure such as shops, warehousing, laboratories, fueling stations, camps, offices, lunchrooms, sanitary conveniences, etc., not already listed in Sections 3.5.1 through 3.5.10. All buildings, as defined by the BC Building Code, shall meet BC Building Code requirements.

When designing fuel handling, transfer, and storage locations, pay attention to other relevant regulations and codes. For further guidance, also see [A Field Guide to Fuel Handling, Transportation and Storage](#)⁵⁰.

Include the following information for each ancillary facility and support infrastructure:

- a description of the location and a location map;
- appropriately scaled, detailed design drawings;
- a discussion of the foundation rationale and design;
- required parameters and design for ventilation systems, including HVAC systems and local exhaust ventilation;
- a description of the potential risks posed by geohazards and proposed mitigation measures;
- descriptions of items of particular relevance to the reclamation plan regarding locations, foundations, and nature of construction (e.g., movable modular units or “permanent” structures); and
- any other relevant information.

⁵⁰ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/oilandgas/fuel_handle_guide.pdf

4 Reclamation and Closure Plan

4.1 End Land Use and Capability Objectives

Clearly identify and map end land use and land capability objectives for the mine disturbance. Ensure the map is overlain by the pit, tailings impoundment, waste rock dumps, and any other permanent facilities/disturbances that are to remain following closure. Provide a detailed description of how the proposed Reclamation and Closure Plan will achieve the end land use and land capability objectives. Clearly identify target eco-sites, biodiversity elements, and habitats for relevant wildlife species.

Develop reclamation objectives based on scientific understanding of the structural and functional characteristics and recovery trajectories of natural ecosystems (i.e., ecohydrological modelling). Based on the overarching principle of equivalent capability, define predicted changes to land capability (e.g., ecosystems and habitats) resulting from mining operations and provide detailed plans to restore what is disturbed. Present contingencies to address predicted challenges to achieving this objective.

Provide the following information, at a minimum:

- pre-disturbance ecosystems, habitats (terrestrial and aquatic), and other land uses for the mine disturbance footprint, classified in a manner that allows for the information to be presented in maps and tabulated inventories (e.g., biogeoclimatic site series, habitat mapping by wildlife species for the relevant life requisites);
- post-closure ecosystems, habitats, and other land uses for the post-mining landscape, presented in maps and tabulated inventories;
- a discussion of the changes to land capability that could result due to mining operations;
- a discussion of ecological succession for the site, identifying limiting factors that must be overcome to facilitate the desired recovery trajectory; and
- a discussion of challenges in terms of achieving the target of equivalent land capability that may be relevant depending on the nature of the proposed mining disturbance, providing substantial supporting rationale as well as research plans toward addressing the challenges if proposed post-mining land uses differ from pre-mining conditions.

The above information will inform the End Land Use Plan for the post-mining landscape. The End Land Use Plan will act as a blueprint to guide reclamation planning, research, and monitoring throughout the life of the mine. Clearly tie reclamation prescriptions to the targets identified in the End Land Use Plan, which is expected to inform all updates to the Reclamation and Closure Plan and may require adjustment throughout the life of the mine due to changes to the mine plan or adaptive management learnings.

Describe Valued Components that have been considered through the EA process, as described in Section 6, and in relevant provincial policies (e.g., [Environmental Mitigation Policy](#)⁵¹), for which activities related to reclamation have been proposed for mitigation. Clearly highlight these Valued Components in the End Land Use Plan, land capability mapping, and reclamation strategies and prescriptions.

4.2 *Reclamation Approaches*

Use general reclamation approaches that are well established in the early stages of mine design to proactively anticipate opportunities to incorporate reclamation requirements into mine planning. The approaches required will depend on the site-specific limiting factors to ecosystem recovery and re-establishment of natural successional processes and closure objectives of specific mine components. The challenges to reclamation could include (among many others) sensitive plant species, terrain stability, and/or growth medium quality and quantity. Identify challenges and address them with proposed approaches and prescriptions.

Describe how site preparation (i.e., decompaction, land-forming, surface preparation, etc.) is a critical component for reclamation success and is an overarching focus of the proposed reclamation prescriptions.

4.2.1 Soil Resources

Using natural soils for reclamation purposes is a well-established and key component of successful ecosystem restoration or revegetation in general. Ideally, all soil materials that exist in the pre-mining disturbance footprint are salvaged and stored for use in reclamation; however, it may not be feasible to safely and cost-effectively salvage all soils. Describe site-specific limitations related to soil salvage and provide a substantive supporting rationale if not all soils from the disturbance footprint will be salvaged. Generally, soil materials removed for mining purposes must not be buried or used as fill unless approval for such activities is granted.

Provide an inventory of estimated salvageable soils, classified by suitability if appropriate, keeping in mind that suitability of soil resources for reclamation may be relative to the intended use (i.e., suitability will depend on the physical and chemical characteristics of the mine components that require revegetation). Model the soil characteristics required to restore the target ecosystems to inform the soil replacement requirements. Compare salvage and replacement inventories to identify any potential shortfalls in volumes or soil characteristics that will need to be reconciled.

Identify alternative soil sources or plans to create a growth medium with similar physical characteristics (i.e., specific soil textures to achieve a target soil moisture regime) to natural soil that is known to support particular ecosystems. Ensure the overall basis of the soil replacement

⁵¹ <https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/laws-policies-standards-guidance/environmental-guidance-and-policy/environmental-mitigation-policy>

plan is site specific and clearly tied to the end land use and land capability targets. Uniform soil depths projected over the mine disturbance footprint may not achieve this requirement.

Reconcile any projected shortfalls in soil quality. Address these by incorporating plans to apply soil amendments/fertilizers and selecting plant species for reclamation that enhance nutrient cycling processes in soil, all of which should be based on measured parameters in the site soil resources. Consider WQOs in regards to runoff depending on the soil chemistry and proposed amendments/fertilizers. Proposed use of biosolids or other organic matter residuals requires approval from both ENV and EMPR to import these materials to site. A separate biosolids management and monitoring plan may be required

If reclamation suitability of physical characteristics, such as high coarse fragment content, was used as a determinant of estimated volumes, it may be possible to review the suitability classifications to find further soil resources. For example, if a soil has a high coarse fragment content and is classified as poor or unsuitable for salvage, but is observed to support vegetation, it should be considered for salvage and use in reclamation.

Address the following in the proposed soil replacement strategy:

- timing, sequencing, and methods of soil replacement, including equipment to be used and materials and depths to be replaced on a facility-specific basis;
- requirements for amendments such as fertilizer and limestone;
- methods to monitor/alleviate compaction during and following re-application; and
- volumes of materials required based on end land use and land capability targets, estimated salvage volumes available for replacement, and methods to address any material shortfalls.

In addition to the soil replacement plan, provide a separate operational soil management plan that describes the operational controls and monitoring requirements that will be implemented to protect soil resources from loss, contamination, and degradation throughout mine life (Section 7.8).

4.2.2 Landform Design and Erosion Control

Develop plans for landform design (i.e., landforming) and watershed mapping (pre-mining and post-closure), including consideration of future erosion, creep, mass wasting, drainage control planning, and compatibility of final landforms with the surrounding landscape.

Explain how the post-closure landscape will be designed to meet the site-specific reclamation and closure objectives for long-term stability and erosion control, end land use and capability, and water quality/source control. Conduct run-off/infiltration modeling and use the results to describe how water will be directed over all of the post-closure landscapes to achieve the

reclamation objectives. Discuss the integration of mine planning, materials management, and reclamation landscape design (i.e., how is closure considered in operational mine planning).

4.2.3 Revegetation Strategy

Propose a revegetation strategy that clearly connects the target end land uses and land capability to the species selection process. Provide the specific species proposed and the rationale for selection. Describe the concepts of self-sustaining vegetation/ecosystems and basis for choosing appropriate species. Ultimate goals include self-sustaining revegetation, species appropriate for the local climate and site characteristics, and restoration of the structural and functional values in the landscape.

Develop re-vegetation strategies based on the following information sources:

- a baseline vegetation assessment, including [Predictive Ecosystem Mapping and/or Terrestrial Ecosystem Mapping](#)⁵² for the mine footprint;
- site characteristics and plant succession patterns;
- species selection and densities tied to habitat/ecosystem targets; and
- end land use objectives.

Provide as much detail as possible in the revegetation plans based on the information known at the time. Present seeding rates and planting densities with the condition that they may be adjusted based on the findings of reclamation research and other assessments. Discuss how the plants will be sourced and any unknowns that need to be clarified.

4.2.4 Progressive Reclamation/Sequencing

Reclamation is an ongoing and progressive activity that occurs throughout all phases of the life of a mine. Progressive reclamation includes activities that are intended to result in incremental achievement of final reclamation and closure of the site. This differs from temporary revegetation or other activities that are intended to provide erosion control or visual aesthetics for an interim period.

Conducting progressive reclamation allows mine proponents to test the proposed reclamation approaches and prescriptions and fine tune them over time. The many other benefits to conducting progressive reclamation include incremental reduction of site liabilities, reduction in the post-closure period and related monitoring costs, and offsetting of closure costs through coordination of operational resources.

⁵² <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/conservation-data-centre/explore-cdc-data/known-locations-of-species-and-ecosystems-at-risk/mapping-methods/ecosystems>

Pro-actively seek opportunities to implement progressive reclamation in coordination with mine planning. Outline proposed sequencing and provide the key milestones that need to be considered.

4.2.5 Reclamation Research

The life of mine of any given project is based on several assumptions. In the early stages of mine planning, all necessary details are not always known. As the Reclamation and Closure Plan is intimately tied to the mine plan, some details may also be unknown, or prescriptions and approaches may be proposed based on other projects with different site conditions. It may also not be clear how gaps in knowledge and information can be resolved.

Given these uncertainties, develop a reclamation research program that is intended to a) test all approaches proposed in the Reclamation and Closure Plan based on the challenges and limitations identified and b) clarify all the gaps in information, identified to date, for the project.

Describe how the program is strategic and provide specific plans intended to answer the “what, where, how, when, and whys” related to the reclamation approach being tested and/or the gap in the Reclamation and Closure Plan being researched. Identify the methodology proposed for researching each topic and the study locations. Provide a tentative schedule for implementation of the research plans. For the implementation schedule, include key dates or milestones that are chosen to ensure that data are available in a timely manner to inform reclamation and closure plans when they are required. Propose contingencies if research findings do not conform to the assumptions and hypotheses.

Provide a plan for documenting research results and reporting annually, as well as how results will be used to inform updated reclamation and closure plans throughout life of mine.

Consider opportunities for collaboration with industry, government, and academia as they may create operational efficiencies and will enhance the knowledge base through information sharing and publication.

4.2.6 Reclamation Monitoring

Clearly establish goals, objectives, and measurable criteria to evaluate the Reclamation and Closure Plan with respect to appropriateness, implementation effectiveness, and success with respect to reclamation of mine disturbances. Include a detailed description of how environmental protection and quality control will be achieved during implementation of the reclamation and closure plan, particularly soils salvage, soil replacement, and any requirements pertaining to ML/ARD.

Clearly tie the performance objectives established to the long-term reclamation targets and mine component specific closure objectives. Provide defensible thresholds that will indicate when

targets have been achieved; this is best accomplished by establishing ecological/scientific benchmarks based on the characteristics of the target ecosystems and habitats. The process of establishing benchmarks will likely require data collection (e.g., plots) from reference or pre-mining ecosystems.

Test monitoring methodologies and calibrate with the performance objectives.

Include in the monitoring plan details of the authority and reporting sequence of any environmental staff and the procedure for providing reports and updates to government agency representatives, including those from EMPR's Health, Safety and Permitting Branch and ENV.

4.2.7 Habitat Compensation Works

Include a general description of all compensation works related to fish habitat, wetlands, caribou, or other compensation plans that may be required by provincial or federal agencies to address project impacts that have been identified or are projected to occur.

4.3 Trace Element Uptake in Soils and Vegetation

Outline in the reclamation plan the proposed program to assess trace element uptake in soils and vegetation that may be exposed to mining-related contaminants and the potential for food chain amplification, during both life of mine and closure/post-closure.

Include the following in the plan:

- relevant baseline and/or reference data collected in vegetation and soils;
- potential sources of metals and other contaminants that exist, or will exist, in the mine disturbance footprint;
- a description of data and research regarding bioaccumulation of the relevant POCs⁵³;
- a monitoring program that will be implemented throughout life of mine (sampling locations, approaches, etc.);
- a discussion of contingencies that may be implemented if the monitoring results indicate that metal uptake could compromise end land uses; and
- a description of how the metal uptake monitoring program may inform the reclamation research program.

4.4 Contaminated Sites and Human Health and Ecological Risk Assessment

Describe site investigations to be conducted according to the [Contaminated Sites Regulation](#)⁵⁴ (EMA) that will inform closure plans for particular mine components or areas where there are existing known or suspected areas of contamination.

⁵³ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/parameter_of_concern_fs.pdf

⁵⁴ http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/375_96_00

For existing operations or sites with historical workings:

- provide an inventory of known or suspected site contamination and the potential for further soil or groundwater contamination on or near the site;
- provide water use determination as per [Technical Guidance 6 on Contaminated Sites](#)⁵⁵ and the [Contaminated Sites Regulation](#)⁵⁶ (EMA);
- identify remedial strategies to be used to mitigate and/or remediate contamination; and
- propose site decommissioning or planned site remedial activities, including information required for the completion of a site profile as described in the [Contaminated Sites Regulation](#)⁵⁷.

Undertake a human health and ecological risk assessment to evaluate mitigation measures proposed as part of the reclamation and closure plan; this may be required to inform the reclamation and closure planning for the site to ensure that reclamation and closure objectives will be achieved.

Use the Conceptual Site Model (CSM; see Section 5.2 Conceptual Site Model) to identify sources of contaminants and pathways to receptors, and to assist in mitigation planning. A CSM will assist in providing supporting rationale for the reclamation and closure plans proposed and will help identify data collection programs (such as metal uptake monitoring, materials characterization, groundwater/surface water monitoring) that are required to reduce uncertainties in the planning process.

4.5 *Disposal of Chemicals, Reagents, Hazardous Materials, and Contaminated Materials*

Provide a list of chemicals or reagents to be used on site and information on how these will be managed at closure. Provide a process for identification of contaminated soil and plans for remediation. Removal, treatment, and/or disposal options should be evaluated and proposed.

If treatment of contaminated soils is proposed on site, land treatment facility designs and management plans are required by both ENV and EMPR.

4.6 *Groundwater Well Decommissioning*

Provide an inventory of geotechnical and groundwater monitoring and water supply wells and address how and when wells will be closed (e.g., water supply, monitoring, remediation, dewatering, geotechnical boreholes, test pits). Ensure closure is done in accordance with

⁵⁵ <https://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-remediation/docs/technical-guidance/tg06.pdf>

⁵⁶ www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/375_96_00

⁵⁷ http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/375_96_00

requirements under the [Water Sustainability Act](#)⁵⁸ and minimum requirements in the [Groundwater Protection Regulation \(Parts 12, 12.1-12.2\)](#)⁵⁹.

4.7 Reclamation and Closure Prescriptions

Provide a life of mine reclamation plan for the closure or abandonment of the mining operation in reference to, and consistent with, Section 10 of the Code. Clearly demonstrate how all of the applicable reclamation standards outlined in the Code will be achieved for the mine disturbance footprint and proposed post-closure landscape.

Include the general reclamation approach and prescriptions (including landforming, soil placement, surface preparation and revegetation) for each site-specific component. For example, include comprehensive prescriptions for each individual dump as opposed to a general description of the treatment of all waste dumps on site.

Address the minimum requirements outlined in the following subsections.

4.7.1 Structures and Equipment

Provide a description of decommissioning activities for site infrastructure and utilities, including identification of structures and/or equipment to remain in place following mine decommissioning and proposed reclamation prescriptions for each area/feature. Include prescriptions for reclamation of building foundations and plans for decommissioning waste streams.

4.7.2 Waste Rock Dump Reclamation

In this section:

- describe in detail reclamation plans for each individual waste rock dump, including:
 - anticipated final configurations,
 - proposed re-sloping,
 - post-closure water management,
 - surface preparation to alleviate compaction and erosion control,
 - details of soil replacement, and
 - a description of proposed re-vegetation methods;
- provide contour/topographic maps/drawings of the final landform configuration;
- provide flow directions and post-closure watersheds; and
- provide post-mine cross-sections along with a map illustrating section locations.

Consider the following, at a minimum, for prescriptions:

⁵⁸ <https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/laws-rules/water-sustainability-act>

⁵⁹ <https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/laws-rules/groundwater-protection-regulation>

- end land use and capability targets appropriate for the waste dump topography;
- snow/water retention (where appropriate), habitat diversity, and aesthetic consistency with the adjacent landscape;
- long-term water management features if required;
- waste rock characteristics and mitigation of ML/ARD if appropriate;
- trace element uptake in vegetation; and
- long-term stability of exposed slopes of all major dumps.

4.7.3 Tailings Storage Facility Reclamation

In this section:

- describe in detail reclamation plans proposed for each TSF, including
 - anticipated final TSF configuration,
 - any proposed re-sloping, and
 - post-closure water management requirements and criteria, including spillways, diversion channels, and collection structures;
- describe methods of soil replacement and proposed revegetation methods on tailings dam faces and beaches;
- address concerns related to trace element uptake in vegetation; and
- demonstrate the long-term stability of exposed slopes.

Consider the following, at a minimum, for prescriptions:

- end land use and capability targets appropriate for the tailings storage facility topography;
- snow/water retention (where appropriate), habitat diversity, and aesthetic consistency with the adjacent landscape;
- long-term water management features if required;
- tailings characteristics and mitigation of ML/ARD if appropriate;
- trace element uptake in vegetation; and
- long-term stability of exposed slopes of embankments and tailings beaches.

4.7.4 Open Pit Reclamation Prescriptions

Describe whether open pits will be flooded at closure and, if so, provide details of discharges, and the associated water quality, to the receiving environment. Include details of habitat creation to be undertaken within pit areas, including riparian and beaches, to meet productivity requirements. Finally, consider trace element uptake in vegetation.

4.7.5 Watercourse Reclamation Prescriptions

Provide details on mine site water management and the re-establishment of watercourses post-mining. Detail the water sources that will potentially be affected by ML/ARD and/or other mine effluents, and how contact water will be collected and treated to meet discharge water quality

criteria. Provide similar details for diversion systems of non-contact water that does not require collection and treatment. Include long-term operational and maintenance requirements.

Provide details of habitat creation and watercourse/riparian/wetland restoration and tie to the end land use and land capability requirements.

Provide the design basis for the prescriptions (e.g., flood return, flow rates, habitat elements, trace element uptake considerations, etc.).

4.7.6 Road Reclamation

Address road reclamation based on end land use and land capability targets as well as long-term stability. Provide detailed prescriptions for contouring, de-compaction, soil replacement, surface preparation, and revegetation. Identify (and map) roads required for implementation of post-closure monitoring and maintenance activities.

4.7.7 Schedule

Reclamation and closure plans are understood to be living documents that may undergo revisions as new data, methods, technologies, and information become available and therefore must be flexible. The Reclamation and Closure Plan is expected to be based on the best available information in place and implementable at any given time.

Include plans in timelines/schedules for action/follow up, specifically:

- mapping at key and/or regular intervals through life of mine; and
- a tabulated schedule by mine component and activity.

4.8 Detailed Five Year Mine Reclamation Plan

Provide a reclamation plan for the next five years of mine development, with a detailed schedule and specific milestones for implementing progressive reclamation plans and developing reclamation research programs. Content requirements of the reclamation plan may be determined on a project-specific basis between technical reviewers and project proponents.

Describe in the detailed five year reclamation and closure plan the activities needed to close the site at the end of the five years under an early closure scenario.

4.9 Temporary Shutdown

Describe potential temporary or short-term closure care and maintenance and monitoring that may be required for surface water quality and quantity, groundwater quality and quantity, geotechnical, ML/ARD, reclamation, erosion and sediment control, site security, or other requirements, depending on the site and closure scenario. Include a process for development of

a care and maintenance plan that will be implemented during this time. Outline in the care and maintenance plan any outstanding reclamation obligations at the time of shutdown and describe any circumstances that would trigger implementation of any part of the life of mine reclamation and closure plan.

Include a rationale for any changes to the regular monitoring program, including any ramp-down period following temporary closure and any ramp-up period prior to reopening.

Include a description of what actions would need to be taken if unplanned temporary shutdown were to occur at key times during life of mine based on an assessment of risk.

4.10 Post-Closure Monitoring and Maintenance

Describe potential long-term monitoring that may be required for surface water quality and quantity, groundwater quality and quantity, geotechnical, ML/ARD, reclamation, erosion and sediment control, site security, or other requirements. Stipulate periodic reporting of inspections and environmental monitoring, including annual dam safety inspections, dam safety reviews, water quality monitoring, vegetation monitoring, etc. Include a thorough set of criteria and associated rationale for any changes relative to operational monitoring, as follows:

- inspection/monitoring locations;
- inspection/monitoring frequency;
- personnel required;
- sample processing and analytical specifications;
- access requirements; and
- reporting requirements.

Include in the post-closure monitoring program a reassessment of effects predictions in light of the data collected post-closure. Use the results of the reassessment to conclude whether or not the design of the post-closure monitoring program needs to be modified. Include in the reassessment the data, methods, and analysis used to support the conclusions.

Provide a brief description of the requirements for post-closure maintenance, including but not necessarily limited to:

- supplemental planting and fertilizing applications;
- soil/engineered cover maintenance;
- spillway maintenance;
- periodic road maintenance;
- diversion ditch maintenance;
- slope remediation on dams and waste dumps;
- geotechnical instrumentation repair or replacement; and
- well closures.

Include a brief summary of the monitoring and maintenance required for water treatment facilities proposed to mitigate water quality issues after operations end. A more detailed description must be included in Section 5.6.3.

4.11 *Reclamation Cost Estimate*

Describe methods to be used to determine the estimated cost to implement the reclamation and closure plans, addressing all liabilities resulting from mining operations. These cost estimates will form the basis of the timing and amounts of securities required as conditions of MA permits. When calculating costs:

- base all costs on third-party blue-book costs;
- apply contingencies to all costs and clearly indicate their use in the calculations;
- provide decommissioning and removal costs for all equipment, buildings, the mill, etc. (do not incorporate salvage value for offsetting costs);
- include present costing in an electronic spreadsheet, with annual costs incurred throughout the mine life;
- clearly lay out the detailed rationale and assumptions of analyses in the cost estimates;
- if the mine site will require long-term monitoring and maintenance, run a net-present-value (NPV) model for 100 years using discount rates provided by the Chief Inspector (note: short-term costs are not discounted, and long-term costs are discounted); and
- provide liability cost estimates signed by a qualified professional with expertise in liability costing estimation.

Costs may be submitted, with the approval of the Chief Inspector, in a separate confidential report as per Section 10.1.4.8 of the Code.

4.11.1 Conventional Reclamation and Closure

Provide cost estimates to address all of the conventional reclamation and closure prescriptions described in the plan. Typically, these costs are provided by type of mine component or disturbance; site-wide activities are required to achieve successful reclamation and closure of the site. Detailing costs for each individual mine component may provide greater clarity for reviewers compared to detailed prescriptions. Site-wide costs may include plans for contaminated sites investigations and remediation, maintenance costs to address revegetation application/ germination issues, dispersed infrastructure and monitoring wells, etc.

Provide a liability estimate to address the detailed five year reclamation and closure plan that would need to be implemented in the early closure scenario as well as the full life of mine build out as proposed. Provide the details as an annual build out to clarify the differences between these two versions.

4.11.2 Post-Closure Monitoring

Provide cost estimates for the long-term and post-closure monitoring programs. Including, but not limited to:

- reclamation monitoring;
- water quantity/quality sampling of groundwater and surface water;
- geotechnical monitoring (Dam Safety Investigation, Dam Safety Review, etc.);
- air quality;
- meteorology; and
- any additional requirements associated with the project.

4.11.3 Post-Closure Maintenance (excluding Water Treatment)

Provide cost estimates for the long-term and post-closure, capital and operating, maintenance requirements.

4.11.4 Life of Mine Water Treatment

Provide cost estimates for the capital and operating water treatment requirements for all phases of mine life. Refer to Section 5.6.3.12 for the required costing details.

5 Modelling, Mitigation, and Discharges

5.1 Summary

Provide an overview of each project component and the expected contaminant sources, as well as the planned water management and pollution control works or best management practices requirements for each. Include:

- open pits;
- underground workings;
- TSFs and associated infrastructure (including characterization of tailings quantity and quality);
- waste rock dumps;
- water management structures;
- ore, overburden, soil, and construction stockpiles;
- processing plant (mill) and associated facilities (crushers, conveyors, etc.);
- mine access and mine haulage roads; and
- any other relevant components.

Illustrate locations and zones of concern using tables and maps or other graphics. Include raw data in appendices, in electronic format (e.g. spreadsheet on a USB memory stick) with the application, and, if applicable, upload for storage in ENV's Environmental Monitoring System database.

5.2 Conceptual Site Model

To be most effective, a CSM should be developed in the beginning stages of an assessment or design of a project and be updated regularly as additional data are gathered. A CSM should be a stand-alone document, ideally in a format accessible to a general audience and submitted or included with the TAR for an application, ensuring that regulators and stakeholders all have a similar context for communicating concerns and approvals.

The CSM is used in the application to:

- determine how significant sources of POCs⁶⁰ from the mine site have been considered and evaluated;
- assess all major exposure routes or pathways via which POCs can reach the receiving environment and receptors, including consideration of surface water and groundwater transport mechanisms;
- identify all receptors that may be adversely affected by POCs released from the mine site;

⁶⁰ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/parameter_of_concern_fs.pdf

- determine the data collection requirements to validate and refine the CSM in relation to the 'completion' of pathways from sources to receptors;
- provide an overview of the potential source (Section 1.3.4) and pathway(s) for each POC originating from the mine site and being transported to the receiving environment; and
- indicate how POC loadings will be contained, collected, stored, and/or mitigated.

Please refer to the guidance document regarding the [Use of Conceptual Site Models to Support EMA Effluent Permit Applications](#)⁶¹.

5.3 Site-Wide Water Balance Model

Develop a quantitative site-wide water balance model to predict the impacts of mine site water management (e.g., withdrawals and inputs) on surface water and groundwater quantity, both on the mine site and in the receiving environment. The site-wide water balance model must consider drainage diversions, dewatering, erosion control, TSF, open pits, underground mine workings, waste rock seepage, groundwater interactions, effluent and contaminated seepage dilution ratios, etc. The TSF water balance (Section 3.5.4) is one component of the site-wide water balance model and must be appropriately integrated.

Include the following information in the site-wide water balance model:

- the mine plans for each phase of mine life, including baseline conditions (construction, operation, closure, and post-closure);
- baseline climate, hydrometric, and hydrogeological data collected under Sections 2.2, 2.6.1, and 2.6.2;
- estimates of recharge and discharge rates that are consistent with the precipitation records, topography, and surficial cover of the proposed project area, low-flow streamflow and spring flow records, inferred diffused seepage flows, and groundwater extraction;
- all drainage areas and runoff coefficients;
- estimated groundwater inflows and seepage rates (see Section 5.5);
- estimates of upper and lower bounds, and expected groundwater recharge;
- a summary of all components contributing to the model;
- a description of all prediction nodes and justification that they are suitably located to predict impacts on all water users and the aquatic environment;
- a summary of data sources utilized in developing the model;
- a justification of all water balance components that have been included and excluded, and the method used to estimate each of these components;
- a summary of all sources and uses for any water required in the mine site operation;
- a demonstration that the model is sufficiently calibrated to available measured and synthetic datasets;

⁶¹ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/csm_to_support_ema_permit_app.pdf

- a base case for each phase of mine life (i.e., construction, operation, closure, and post-closure); and
- any other relevant information.

Use the site-wide water balance model to present the following information, for each phase of mine life (construction, operation, closure, and post-closure), and include a detailed summary of the results:

- a demonstration that the model is sufficiently calibrated to available measured and synthetic datasets;
- an assessment of how the mine operation will affect in-stream flow and any surface or groundwater licensees, during each phase of mine life, including throughout the range of in-stream flows because of withdrawals, diversions, induced losses to groundwater, and effluent discharge in consideration of climate, land use, and water allocation and withdrawal;
- an assessment of the impact of climate change;
- the uncertainties with the assessment, and how the uncertainties will be addressed;
- a summary of model results for the base case and sensitivity analysis scenarios, including but not limited to predicted stream flows, predicted changes in groundwater/surface water interaction, and predicted inflows/outflows for key mine site facilities;
- figures that illustrate the site-wide water balance model during each phase of mine life (construction, operation, closure, and post-closure); this should include schematics of all relevant processes and flow paths in the model;
- sensitivity analyses to evaluate conservative scenarios that may affect the base case for each phase of mine life, such as high-flow, low-flow, and operational uncertainties;
- a summary of how the results of sensitivity analysis scenarios have informed the water management plans for each phase of mine life; and
- any other relevant information.

5.4 *Surface Water Quality Model*

Develop a quantitative model for the study area that assesses the potential changes to water quality for key locations and receptors on the mine site in the receiving environment and provide a summary of the model and the assumptions used in a detailed report.

Develop a surface water quality model that is integrated with the site-wide water balance model (Section 5.3) and is representative of each phase of mine life (construction, operations, closure and post-closure). The model should include:

- the proposed mine plan;
- baseline water quality and water quantity conditions;
- a description of receptors within and downstream of the mine site;
- seasonal variability of baseline data and predicted changes with time;

- the baseline surface water and groundwater quality (Section 2.7);
- geochemical source terms stating assumed geochemical attenuation processes in the derivation of source terms or within the surface water quality model (Section 2.4.2);
- a comparison of source terms to measured conditions (observed water chemistry, loads or analogue sources);
- the mitigation methods proposed and evaluated in Section 5.6;
- the discharge of contact water to groundwater pathways, if applicable;
- contact water discharge to surface water pathways, if applicable;
- figures that illustrate the source terms, flow paths and active and passive discharge locations during each phase of mine life (construction, operation, closure and post-closure), this should include schematics of all relevant processes and flow paths in the model; and
- sensitivity scenarios to evaluate conservative scenarios that may affect the model for each phase of mine life.

Include the following information about the surface water quality model in the report:

- a description and rationale of all model sensitivity scenarios;
- a description of all model inputs, assumptions, and methods;
- a description of any model mechanisms that reduce loadings (e.g., attenuation, sorption, precipitation, loss to groundwater, etc.), including supporting observations and data;
- a description of all included and excluded parameters;
- a description of all prediction nodes and justification that they are suitably located to predict impacts on all water users and the aquatic environment;
- a description of data sources utilized in developing the model;
- a justification of all mine site components that have been included and excluded, and the method used to estimate each of these components;
- a description of the model inputs and assumptions regarding water treatment (if applicable); and
- any other relevant information.

In addition,

- demonstrate that the model is sufficiently calibrated to available measured datasets;
- evaluate the contribution of disturbances upstream of the mine site and resulting cumulative effects on surface water quality within the project area and further downstream during all stages of mine life;
- evaluate worst-case water quality scenarios, such as base flow and low dilution (7dQ10 flow) and high runoff conditions, that may lead to increased contaminant concentrations;
- consider the potential effects of contact water discharge via groundwater pathways, if any;
- summarize results for the model and sensitivity scenarios for predicted loadings at key mine site and receiving environment receptors;

- compare proposed discharge quality to known discharge criteria, guidelines, and/or industry practices;
- evaluate effluent characteristics relative to WQGs, WQOs, or SBEBs in the receiving environment throughout the year and determine the most sensitive times of the year;
- provide full characterization and predictions of all treated and untreated effluent sources (quality and quantity);
- describe the timing (e.g., seasonal, continuous, intermittent) of discharges to the environment;
- if an initial dilution zone (IDZ) is proposed, provide predicted water quality within and at the edge of the IDZ (see Section 5.9) and refer to [Development and Use of Initial Dilution Zones in Effluent Discharge Authorizations](#)⁶²;
- identify the times of year when effluent or seepage quality is expected to exceed water quality guidelines; and
- provide a gap analysis that identifies limitations and uncertainties in the model and provides recommendations for future assessment.

5.5 *Groundwater Model*

5.5.1 Conceptual Hydrogeologic Model

Develop a conceptual hydrogeologic model for the study area that integrates the baseline surface water and groundwater quantity and quality monitoring data and describes the controls on groundwater recharge, levels, flow directions, and discharges within the study area. Include in the model domain the project location and areas both upgradient and downgradient of the mine where the mine may impact groundwater quantity or quality.

Include in the conceptual model:

- the mine plans for each phase of mine life (i.e., construction, operation, closure, and post-closure);
- integration of the site-wide water balance model (Section 5.3);
- integration of the surface water quality model (Section 5.4);
- boundaries associated with observed and inferred groundwater divides, spatially distributed groundwater recharge and discharge areas, and areas where groundwater is interpreted to interact with surface water;
- geometry, lithology, hydraulic properties, and inferred confined/unconfined conditions of all hydrostratigraphic units (i.e., aquifers and aquitards);
- groundwater elevations, lateral and vertical hydraulic gradients, flow directions, and seasonality of the groundwater flow regime;

⁶² https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/tg11_development_and_use_of_idz.pdf

- groundwater flow velocities and travel times between sources of contact water (e.g., underground workings, open pit, tailings pond, waste rock piles, etc.) and downgradient surface watercourses;
- identification of main groundwater recharge and discharge zones;
- identification of areas of groundwater that are under the direct influence of surface water (e.g., zones of precipitation recharge and losing stream reaches), and the surface water features that depend on groundwater discharge (e.g., stream base flow, springs, wetlands);
- the degree to which surface water quality is influenced by groundwater quality during periods of low flow (e.g., by comparing surface water and groundwater chemistry), and a description of the contribution of groundwater base flow to total streamflow throughout the year;
- hydrogeochemical signature(s) of groundwater in the project area and correlation with other aspects of the hydrogeologic model (e.g., lithology, surface-groundwater interaction);
- spatial and temporal variation(s) in key chemical parameters and among sampling sites;
- potential groundwater flow pathways for contact water from contaminant sources to groundwater discharge areas, with consideration of groundwater-surface water interactions; and
- any other relevant information.

Additionally, identify and justify all assumptions incorporated in the conceptual hydrogeological model and include figures that clearly summarize the geological and hydrostratigraphic data.

5.5.2 Numerical Hydrogeologic Model

Develop a numerical groundwater model capable of representing the current hydrogeological understanding for the study area by following the [Guidelines for Groundwater Modelling to Assess Impacts of Proposed Natural Resource Development Activities](#)⁶³. Apply the numerical model to predict changes in groundwater flows and levels and estimate the groundwater input rates at key surface water receptors that will potentially occur within the study area because of the project. Include in the numerical groundwater model:

- a summary of the model objectives;
- the mine plans, including all underground workings, for each phase of mine life (construction, operation, closure, and post-closure);
- integration of the conceptual hydrogeological model (Section 5.5.1);
- integration of the regional and local climate data (Section 2.2);
- boundaries of the study area and receiving environment assessment points (e.g., surface and groundwater users, drinking water aquifers, fish-bearing streams, etc.);

⁶³ http://www.env.gov.bc.ca/wsd/plan_protect_sustain/groundwater/groundwater_modelling_guidelines_final-2012.pdf

- the modelling framework, including the software, spatial and temporal discretization of the study area, the required input and the output generated by the model, and all supporting input/output processing tools (e.g., spreadsheets, GIS files, etc.);
- calibration statistics (e.g., mean, maximum, and minimum groundwater head residual, and normalized root mean square error) and supporting calibration plots (e.g., observed versus modelled groundwater levels, time plots of observed and modelled groundwater hydrographs);
- identification of key elements of uncertainty in the assumptions, boundary conditions, and parameters used in the model as well as approaches to reduce the model uncertainty;
- a sensitivity analysis, where the effects of changes in the main elements of model uncertainty (e.g., precipitation recharge, groundwater inflows and outflows along the boundaries of the study area, hydraulic conductivity) are assessed to quantify the accuracy of model predictions;
- a description of the predicted changes in groundwater flow (recharge/discharge) and key contaminant concentrations and loads in near- and far-field locations from the groundwater contamination sources and in groundwater discharge areas, in high- and low-flow conditions, and for each phase of the mine;
- an evaluation of potential cumulative effects resulting from the mining operations and other anthropogenic activities;
- an uncertainty analysis for each aspect of the estimated effects, including identification of data gaps, sources of uncertainty in data and models, range of uncertainty, and sensitivity of the effects on the groundwater system to uncertain variables and parameters as well as a description of how data gaps and uncertainties would be addressed; and
- any other relevant information.

5.6 *Mitigation Methods*

Describe proposed effluent mitigation methods including source control, management, containment, or treatment methods. These can include, but are not limited to:

- source control methods to mitigate the production of POCs⁶⁴ (explosives best management, water covers, waste rock blending, etc.)
- management control methods to reduce the volume of contaminated water (non-contact water diversion, seepage collection, waste rock segregation, cover systems, etc.);
- incorporation of assumed geochemical attenuation processes in the derivation of source terms or within the surface water quality model;
- retention of contaminated water in surface ponds, TSF, open pits, etc.;
- passive effluent treatment technologies (wetlands, bioreactors, saturated backfills, etc.);
- active effluent treatment technologies;

⁶⁴ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/parameter_of_concern_fs.pdf

- recycling, re-use and reduction strategies; and
- adaptive management strategies and how they will be implemented to ensure human health and the environment are protected.

In addition,

- discuss options for contaminant source control, containment, or mitigation methods and describe how best management practices and ENV's Best Achievable Technology (BAT)⁶⁵ (Section 5.6.1) have been applied;
- describe the design and use of proposed source control methods and management practices, and include detailed designs of all proposed discharge works (e.g., outfalls, spillways, channels, etc.);
- propose effluent discharge limits for POCs⁶⁶ that can be shown to be protective of the receiving environment and its receptors; and
- describe the timing (e.g., seasonal, continuous, intermittent) of discharges to the environment.

5.6.1 Best Achievable Technology Evaluation

Undertake and submit an ENV [BAT](#)⁶⁷ review if untreated effluent concentrations at the source are predicted to exceed acute WQGs.

The BAT provides ENV staff with the information to support the consideration of SBEB's, IDZ's and waste discharge standards. The outcome of the BAT is one of the many aspects considered when developing waste discharge standards and permit conditions.

5.6.2 Volume and Quantity Control Methods

Clearly describe and summarize the incorporation of management and quality control methods to reduce the amount and volume of contaminants being generated by the project.

5.6.3 Geochemical Attenuation Processes

Clearly describe and summarize the geochemical and physical processes incorporated into the Surface Water Quality Model (Section 5.4) or Numerical Groundwater Model (Section 5.5.2), including, but not limited to, mechanisms such as sorption, precipitation, or other attenuating mechanisms. Provide supporting documentation demonstrating the feasibility and viability of these mechanisms under the expected site conditions, including but not limited to direct field observations, laboratory experiment results, analogue site results, or scientific literature reviews.

⁶⁵ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/pulp-paper-wood/best_achievable_control_tech.pdf

⁶⁶ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/parameter_of_concern_fs.pdf

⁶⁷ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/pulp-paper-wood/best_achievable_control_tech.pdf

5.6.4 Water Treatment

Water treatment should only be proposed when best management practices are demonstrated to be insufficient to fully mitigate water quality concerns. When water treatment is proposed as a mitigation method for water quality, the application must provide sufficient information demonstrating the ability of the proposed technology to perform under the range of predicted site-specific conditions, over all phases of mine life, that it will be employed. Methods for water treatment include both active and semi-passive water treatment processes.

5.6.4.1 Description

Provide a description of the water treatment facility that includes detailed information on:

- proposed treatment method(s);
- process flow sheets;
- treatment capacity;
- retention times;
- materials and reagents used;
- reagent sourcing and transport;
- power requirements;
- pumping requirements;
- personnel requirements; and
- any other relevant information.

5.6.4.2 Location

Provide a location map and relevant diagrams that indicate the location of the water treatment facility being proposed.

5.6.4.3 Detailed Design

Provide detailed design aspects of the proposed water treatment facility, including:

- effective drainage collection, conveyance, and storage systems that can handle peak climatic and hydrological events;
- support for designs by site hydrology and geotechnical information (see Section 3.5.3 Processing Plant and Associated Facilities);
- engineering of the facility and supporting infrastructure, including geotechnical, electrical and mechanical information;
- information on treatment methods, process flow sheets treatment capacity, retention times, materials and reagents used, reagent sourcing and transport, etc.;
- assessment of potential health and safety risks and management plans/safe work procedures; and
- any other relevant information.

5.6.4.4 Treatment Effectiveness

Assess the effectiveness of the proposed water treatment facility in mitigating POCs⁶⁸ under a range of conditions reasonably expected for the mine site. This includes, but is not limited to, performance of the collection and treatment systems under the expected variable influent chemistry, flow rates, operating temperatures, and hydraulic retention times.

The proposed water treatment method(s) effectiveness must be demonstrated through site-specific piloting. Detailed analogue site or treatment method data may be acceptable if it can be demonstrated that they provide a reasonable comparison to the conditions expected for the proposed project. Consult with EMPR and ENV on the specific requirements for the project well in advance of application submission.

5.6.4.5 Performance Risks

Assess performance risks collection and treatment (i.e., extreme weather [icing, snow loading, flows, etc.], power outage, wearing of parts, scaling, reagent supply interruption, plugging, by-passing/short circuiting, etc.) and provide appropriate contingency plans.

5.6.4.6 Influent and Effluent Water Quality

Provide an estimate of influent and effluent water quality and flow rates from all sources reporting to the water treatment facility, including but not limited to:

- estimates and trends for each phase of mine life;
- statistical evaluation of the results;
- a comparison of proposed water quality to known discharge criteria, guidelines, and/or industry practices;
- an evaluation of end-of-pipe effluent POC⁶⁹ concentrations, based on meeting or exceeding WQGs in the receiving environment during the most sensitive times of the year; and
- propose effluent discharge limits and demonstrate how they are protective of the receiving environment and its receptors.

5.6.4.7 Waste and By-Products

Handling and disposal practices for water treatment wastes and by-products are an important consideration for understanding the potential long-term effects of on-site disposal methods.

⁶⁸ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/parameter_of_concern_fs.pdf

⁶⁹ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/parameter_of_concern_fs.pdf

Provide the following detailed information for all waste and by-products anticipated to be produced from the proposed water treatment facility:

- production rate and total volumes to be generated on a year-by-year basis for each phase of mine life; and
- detailed geochemical and physical characterization results.

If disposal of any of the water treatment waste and by-products are proposed to be managed on the mine site, provide the following detailed information:

- detailed geochemical and physical testing to assess the long-term geochemical stability of the proposed disposal method;
- long-term disposal plans that address long-term geochemical and physical stability, as well as reclamation and closure;
- development of conservative source terms;
- incorporation of the disposal scenario into the site-wide water balance model, surface water quality model, and numerical hydrogeological model, as required;
- assessment of environmental effects and risks and mitigation/management plans;
- assessment of potential health and safety risks and management plans/safe work procedures; and
- any other relevant information.

5.6.4.8 Maintenance

Describe maintenance and replacement plans for water collection infrastructure and water treatment facilities over the period the water treatment facility is required.

5.6.4.9 Emergency Response Plans

Include in this section emergency procedures and contingencies for malfunctions and upsets to the water collection infrastructure and water treatment facilities.

5.6.4.10 Monitoring Plans

Include in this section:

- proposed monitoring programs for water collection and water treatment (water quality, flow, other aspects of system performance, etc.); and
- reporting plans.

5.6.4.11 Schedule

Provide time schedules for construction, commissioning, operation, and closure of all water collection and water treatment facilities to be employed during each phase of mine life (construction, operation, closure, and post-closure).

5.6.4.12 Cost Estimate

Include a detailed summary of the capital and operating costs associated with the proposed water treatment facilities, for all phases of mine life in the Reclamation Cost Estimate (Section 4.11). Clearly outline and describe all assumptions and calculations employed to determine individual parameters. Include appropriate contingency factors for all calculated costs.

Capital costs include, but are not limited to:

- design and construction of the water treatment facilities and associated infrastructure; and
- required infrastructure maintenance and upgrades.

Operating costs include, but are not limited to:

- reagent usage rates and amounts (delivered cost);
- power requirements (including plant operation, pumping of seepage, heating of buildings, etc.);
- personnel requirements (include information on how many people are needed to operate water treatment plants and conduct monitoring programs);
- water quantity and quality monitoring, sampling, and analyses; and
- handling and disposal of wastes and by-products.

If the mine site will require long-term water treatment, include an NPV model run for 100 years using discount rates provided by the Chief Inspector (note: short-term costs are not discounted, and long-term costs are discounted). Provide a water treatment cost estimate signed by a qualified professional with expertise in costing estimation.

5.7 Domestic Water/Sewage Treatment

Although these application requirements primarily address the main effluent discharge, sewage and solid waste disposal also require authorizations under the EMA and may require separate applications.

For sewage discharges greater than 100 persons, or where discharge is to surface waters, registration under the [Municipal Wastewater Regulation \(MWR\)](https://www2.gov.bc.ca/gov/content/environment/waste-management/sewage/municipal-wastewater-regulation)⁷⁰ is desirable. Alternatively, the sewage discharges may be included with the overall effluent permit for the site.

For more information on registering under the MWR, see the [ENV website](#)⁷¹. Additional direction on how best to include sewage disposal information in the application package should be sought from ENV EPD staff.

⁷⁰ <https://www2.gov.bc.ca/gov/content/environment/waste-management/sewage/municipal-wastewater-regulation>

⁷¹ <https://www2.gov.bc.ca/gov/content/environment/waste-management/sewage/municipal-wastewater-regulation>

5.8 Effluent Discharge

In this section:

- provide detailed designs of all proposed discharge works (e.g., outfalls, spillways, channels, diffusers);
- describe the timing (e.g., seasonal, continuous, intermittent) of discharges to the environment; and
- discuss options for contaminant source control, containment, or mitigation methods and describe how best management practices and ENV's [BAT](#)⁷² have been applied.

5.9 Initial Dilution Zone

The IDZ is a three-dimensional zone around a point of discharge where mixing of the effluent and receiving waters occurs. Detailed guidance on where and when IDZs are appropriate and how they should be developed in the environment for authorized effluent discharges under the EMA is provided in the [Development and Use of Initial Dilution Zones in Effluent Discharge Authorizations](#)⁷³.

Provide all information necessary to support the proposed IDZ based on best professional judgement. Include the following at a minimum:

- a description of why an IDZ is necessary and how best management practices and the [BAT](#)⁷⁴ (Section 5.6.1) are applied prior to consideration of an IDZ;
- proposed dimensions of the IDZ;
- a CSM;
- receiving water characteristics;
- effluent discharge characteristics;
- physical and aquatic life receptors of effluent discharge to receiving waters;
- an environmental impact assessment of effluent discharge to the receiving environment;
- methods for physical mixing analyses;
- results of physical mixing analyses; and
- a proposed monitoring program.

Review the checklist with ENV prior to beginning the application process. Please refer to the [ENV Guidance on IDZ](#)⁷⁵.

⁷² https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/pulp-paper-wood/best_achievable_control_tech.pdf

⁷³ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/tg11_development_and_use_of_idz.pdf

⁷⁴ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/pulp-paper-wood/best_achievable_control_tech.pdf

⁷⁵ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/tg11_development_and_use_of_idz.pdf

6 Environmental Assessment Predictions

Assess potential residual environmental effects and evaluate the risks of the mine project in the context of human health, water users, and aquatic and terrestrial resources. In this predictive work, consider the mine plan and proposed mitigation techniques, and build on available baseline environmental data and waste discharge characteristics anticipated over the life of the mine. In the environmental effects assessment, also consider cumulative effects within the watershed. Note the following definitions:

- **Context:** the ability of the environment to accept change. The effects of a project may have a greater impact if they occur in areas that are ecologically sensitive or significant and/or have little resilience to imposed stresses. Will the effect threaten the existence of a rare species or an isolated population of a particularly valued species? Do environmental factors increase the potential for bioaccumulation of any contaminants?
- **Magnitude:** the expected size or severity of the effect. A comparison to water quality guidelines or existing water quality objectives and SBEs are initial tools to help determine magnitude. Risk increases with the number of parameters that are predicted to approach or exceed guidelines and the frequency and the size of the exceedances.
- **Extent:** the spatial scale over which the effect is expected. Impacts could extend beyond the direct disturbance footprint.
- **Duration:** the length of time the effect is expected to persist. This could be related to the length of time organisms are exposed to a toxicant or stressor combined with reversibility or the length of time habitat conditions will be altered until habitat functions are restored.
- **Frequency:** how often the residual effect occurs. Episodic or infrequent effects or exposure may have a lower impact than continuous long-term and/or frequent effects. Seasonality/time of year and time of day may also be factors depending on the receptor.
- **Reversibility:** whether an effect can be reversed once the physical work or activity causing the disturbance ceases. The definition of reversibility may need to be constrained to timeframes (e.g., habitat alterations may not be reversible for decades or even centuries).

Ensure that environmental effects predictions:

- identify spatial and temporal boundaries for effects prediction (note these could vary depending on the environmental value being considered);
- identify POCs⁷⁶;
- identify risk and endangered/rare ecosystems and associated components and indicators (measurable metrics) as outlined in [Procedures for Mitigating Impacts on Environmental Values](#)⁷⁷;

⁷⁶ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/parameter_of_concern_fs.pdf

⁷⁷ https://www2.gov.bc.ca/assets/gov/environment/natural-resource-policy-legislation/environmental-mitigation-policy/em_procedures_may27_2014.pdf

- describe the current condition of environmental components and indicators for each value identified and predicted changes from current (baseline) condition;
- identify risk(s) to environmental values compared to baseline and assess mitigation options to avoid, minimize, and restore on site;
- develop or refine the CSM, conceptual ecological models, or frameworks to define and illustrate all exposure pathways or mechanisms linking contaminants or conditions of potential concern to the assessment endpoints (receptors). The models aid in the design of monitoring programs and facilitate the establishment and testing of hypotheses regarding the predicted relationships between stressors and assessment endpoints;
- propose site-specific assessment endpoints (e.g., drinking water quality, fish health/survival, etc.). Assessment endpoints are similar to Valued Components as described in the [Guideline for the Selection of Valued Components and Assessment of Potential Effects](#)⁷⁸ and in the [Environmental Mitigation Policy](#)⁷⁹;
- propose measurement endpoints for each assessment endpoint (chemical, toxicological, or biological), for example:
 - for fish survival, this might be toxicity as measured in lab toxicity tests or based on existing WQGs,
 - for water quality, this might be chemical concentrations of particular contaminants, and
 - for benthic invertebrates, this might be community metrics or indices, etc.;
- predict the incremental changes in parameters or measurement endpoints over existing receiving environment conditions using mass balance modelling or other techniques;
- compare predicted quality of ambient water and sediment, tailings water, effluent, and seepage concentrations to [provincial WQGs](#)⁸⁰ or existing WQOs to estimate the potential severity of impact(s). In some cases, it may be necessary to develop SBEBs (for specific sites associated with a permit decision) to complete an effects assessment;
- consider the potential for synergistic effects of mine disturbance and cumulative effects of other environmental stressors external to the mine or from previous exploration and/or mining activities;
- identify risk(s) to aquatic and terrestrial resources compared to baseline and evaluate risk reduction options;
- use scientifically defensible monitoring and impact assessment tools in a weight of evidence (WOE) approach, where the range of tools is commensurate with the level of risk;
- acknowledge uncertainties in the assessment due to data gaps or model assumptions; and
- develop a discharge plan.

⁷⁸ <https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/environmental-assessments/guidance-documents/eao-guidance-selection-of-valued-components.pdf>

⁷⁹ <https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/laws-policies-standards-guidance/environmental-guidance-and-policy/environmental-mitigation-policy>

⁸⁰ www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines

Describe the predicted residual effects on aquatic and terrestrial resources in the receiving environment. Residual effects are those effects remaining after implementation of all mitigation techniques evaluated and proposed in a joint MA/EMA application. Describe the predicted effects that would occur if the mitigation measures proved to be ineffective. Summarize potential impacts by environmental value and location using tables and graphically illustrate the pathways from contaminant sources to receptors (CSM). Summarize risks to environmental values, including surface and groundwater and aquatic and terrestrial resources.

Include raw data in appendices, in electronic format (such as a USB memory stick) with the application, and, if applicable, upload data for storage in ENV's Environmental Monitoring System database.

6.1 *Aquatic Resources*

In this section:

- describe study boundaries and assessment endpoints (e.g., loss of habitat, fish or invertebrate tissue concentrations, abnormalities, benthic invertebrate, periphyton, or fish community metrics, etc.);
- use the CSM (Section 5.2) to describe the contaminant transport or mine disturbance factors linking sources to receptors, and establish a risk assessment process;
- describe and discuss the potential for bio-accumulation or bio-concentration of contaminants, and the associated risk to assessment endpoints (e.g., fish health, consumers of fish flesh, etc.);
- predict changes in aquatic resources and other receptors at species, community, and/or ecosystem levels as appropriate;
- propose measurement endpoints and discuss the relevance of these measures in a WOE approach to increase confidence in impact prediction for the site;
- consider the contribution of cumulative effects on the aquatic resources and other receptors (where appropriate) from disturbances outside the project area and further downstream during mine operation and following mine closure;
- identify data gaps and uncertainties in models, and describe how they would be addressed in adaptive management and environmental monitoring plans; and
- assess potential human health risks.

6.2 *Terrestrial Resources*

In this section:

- describe study boundaries and assessment endpoints (e.g., loss of habitat, vegetation tissue concentrations, vegetation community metrics, exposure limits for relevant wildlife species);

- utilize the process detailed in [Procedures for Mitigating Impacts on Environmental Values](#)⁸¹ to evaluate the potential effects on terrestrial values for the appropriate area of influence;
- use the CSM (Section 5.2) to describe the contaminant transport or mine disturbance factors linking sources to receptors, and establish a risk-assessment process;
- describe and discuss the potential for bio-accumulation or bio-concentration of contaminants, and the associated risk to assessment endpoints (e.g., ecosystem and habitat function, wildlife health);
- consider the potential effects of relevant exposure pathways, if any;
- consider the contribution of cumulative effects on the terrestrial resources (where appropriate) from disturbances outside the project area and further downstream during mine operation and following mine closure;
- identify data gaps and uncertainties in models, and describe how they would be addressed in adaptive management and environmental monitoring plans and reclamation research programs (in Section 4.2.5); and
- assess potential human health risks.

⁸¹ https://www2.gov.bc.ca/assets/gov/environment/natural-resource-policy-legislation/environmental-mitigation-policy/em_procedures_may27_2014.pdf

7 Environmental Monitoring

Include proposed monitoring and reporting programs that enable ongoing evaluation of waste management performance and receiving environment condition, as well as evaluation of predictions proposed in the application. Ensure monitoring programs are initially spatially comprehensive, including monitoring sites at reference or control locations, end-of-pipe locations, and exposure sites, such as edges of IDZs and far-field locations. Increased sampling frequency and a WOE approach to the monitoring program are necessary early in mine life to support adaptive management. Over the different phases of mine life (construction, operation, closure, post-closure), monitoring requirements may be adjusted to reflect the results of ongoing assessment work.

Where applicable, integrate the requirements of the federal Environmental Effects Monitoring (EEM) program under the [Metal and Diamond Mining Effluent Regulations](#)⁸² into the monitoring program design. However, be aware that the federal EEM program is generic and not normally sufficient to address provincial regulatory requirements.

7.1 Environmental Monitoring Program Design

Discuss monitoring program requirements with EMPR and ENV technical staff early in the mine planning stage. At a minimum, the proposed project will require comprehensive monitoring programs for the mine site, proposed discharges, immediate receiving environments, and a broader Aquatic Effects Monitoring Program. In each case, the following must be included in the monitoring programs:

- proposed study design;
- objectives;
- incorporation of the CSM;
- a description of POCs⁸³ and their known effects to local biota or related species;
- established methods for detecting changes in sensitive receptors (may include a combination of toxicity testing, tissue sampling, and community/abundance data);
- site locations (should be mapped, with coordinates provided);
- sampling frequency;
- parameters for assessment;
- sampling and analytical lab methodology;
- rationale for proposed sampling program;
- proposed assessment techniques;
- comparisons to relevant guidelines and objectives;
- proposed QA/QC programs;
- reporting schedule; and

⁸² <http://laws-lois.justice.gc.ca/eng/regulations/SOR-2002-222/index.html>

⁸³ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/parameter_of_concern_fs.pdf

- any other relevant information.

The monitoring programs must:

- be based on guidance provided in the [Water and Air Baseline Monitoring Guidance Document](#)⁸⁴;
- conform to methods and QA/QC procedures specified in the [British Columbia Field Sampling Manual](#)⁸⁵ and the [Environmental Data Quality Assurance Regulation \(EMA\)](#)⁸⁶;
- use analyses that follow standard analytical methods as specified in the most recent edition of the [British Columbia Environmental Laboratory Manual](#)⁸⁷ and associated supplements; and
- other information, as required by EMPR and ENV technical staff.

Note: Aquatic Effects Monitoring Programs should be linked closely to baseline monitoring programs, particularly if a BACI study design is proposed.

Describe quality assurance protocols in monitoring programs, including but not limited to the following:

- equipment checks and calibration;
- field procedures to minimize data-collection errors;
- sampling equipment de-contamination;
- blank sampling;
- replicate sampling;
- assessment of replicate samples;
- assessment of ion balance (where applicable);
- assessment of the influence of suspended solids on dissolved concentrations in groundwater samples;
- comparison of aggregate parameters with analytical parameters (e.g., conductivity with total dissolved solids, total dissolved solids with the sum of analyzed concentrations);
- flagging of outlier data points that do not represent actual conditions; and
- identification of the laboratories used to complete analytical tests.

Consult Part A of the [British Columbia Field Sampling Manual](#)⁸⁸ for detailed guidance on QA/QC.

⁸⁴ http://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/water_air_baseline_monitoring.pdf

⁸⁵ <https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/laboratory-standards-quality-assurance/bc-field-sampling-manual>

⁸⁶ http://www.bclaws.ca/Recon/document/ID/freeside/22_301_90

⁸⁷ <https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/laboratory-standards-quality-assurance/bc-environmental-laboratory-manual>

⁸⁸ <https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/laboratory-standards-quality-assurance/bc-field-sampling-manual>

7.2 Mine Site Water Monitoring Program

Develop a comprehensive monitoring program for surface water, groundwater and seepage water quantity and quality within the proposed permitted mine area (e.g. tailings storage facilities, waste rock dumps, stockpiles, water management structures, etc.) that includes each phase of mine life (construction, operation, closure, post-closure). The monitoring program should be designed to support the on-going evaluation and refinement of predictions proposed in Section 5. The monitoring program should include the following information:

- objectives;
- monitoring methods;
- monitoring locations, including a detailed map showing each location;
- rationale for the distribution of monitoring locations (including depths, where relevant), and how they relate to the maintenance and improvement of the site-wide water balance model (Section 5.3), surface water quality model (Section 5.4), and groundwater model (Section 5.5);
- for groundwater, information must be provided on the range of monitoring depths that will be included for each individual monitoring location; and
- POCs⁸⁹ to be measured at each location;
- sampling frequency and period, including high-, medium-, and low-flow periods;
- analytical testing procedures to be used;
- QA/QC protocols;
- name of the certified laboratories used to analyze samples;
- comparisons to relevant guidelines and objectives;
- methods for data analyses;
- reporting schedule; and
- any other relevant information.

The Mine Site Water Monitoring Program should be combined with the Environmental Monitoring Program (Section 7.4) and Post-Closure Environmental Monitoring Program (Section 7.5) and incorporated into the Mine Site Water Management Plan (Section 9.6)

7.3 Discharge Monitoring Program

Describe monitoring programs specific to mine discharge effluent, seepage, and solid waste. In these monitoring programs, use appropriate physical (e.g., volume), chemical (e.g., concentrations), or short- and long-term toxicological measures, as these limits will form the basis for terms and conditions incorporated into the *EMA* effluent discharge permit. Compare data to permitted effluent discharge limits.

⁸⁹ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/parameter_of_concern_fs.pdf

7.4 Environment Monitoring Program

Develop an Environmental Monitoring Program that includes physical, chemical, and biological measurements to evaluate the efficacy of the permit for protecting the near-field (proximate to the IDZ, if proposed) and far-field receiving environment. EMA permits with air emissions may require additional monitoring of the ambient air conditions and associated terrestrial receptors (e.g., plant tissue chemistry).

Samples for the Environmental Monitoring Program often include surface water, groundwater, sediment, air, and other media that may be influenced by the mine and may result in potential impacts to receptors (e.g., aquatic or terrestrial plants, fish, benthic invertebrates, periphyton, zooplankton, amphibians, mollusks, or bird eggs). Biotic components may be monitored in a separate, or associated, Aquatic Effects Program (Section 7.6). Environmental monitoring is recommended at representative reference sites, in addition to exposure sites, to control for changes that are not related to permitted activities.

The Environmental Monitoring Program must:

- maintain consistent, long-term monitoring stations that will be active over the life of the project to facilitate long-term trend analysis;
- make a commitment to add monitoring stations, if needed, during the life of the project as the understanding of site conditions evolves;
- ensure sampling is concurrent with effluent discharge monitoring to understand the relationship between effluent quality and receiving environment water quality;
- estimate flows in the receiving environment to understand seasonal variability in water quality and calculate receiving environment loading and effluent dilution;
- use groundwater testing to complement surface water monitoring efforts, if groundwater–surface water interactions are important;
- include comparisons to the relevant WQG, WQO, SBEB, or Site Performance Objective (SPO) thresholds;
- summarize the assessment of the potential environmental effects, risks, and mitigation/management plans to be followed during emergencies and unexpected shutdown events for the pollution control systems; and
- clearly link predicted effects to the associated components of the environmental monitoring program and show linkages in a table.

The proposed monitoring of surface water and groundwater quantity and quality in the receiving environment should be combined with the Mine Site Water Monitoring Program (Section 7.2 and included in the Mine Site Water Management Plan (Section 9.6).

7.5 Post-Closure Environmental Monitoring Program

Post-closure monitoring may be less intensive than operational environmental monitoring if closure activities have effectively mitigated or removed environmental liabilities; however,

permitted waste discharges frequently remain in the post-closure phase, and environmental monitoring over the long term may be required.

Provide a thorough rationale for changes to the following components of the operational Environmental Monitoring Program (Section 7.4) when transitioning to the post-closure phase:

- monitoring locations;
- monitoring frequency; and
- measurement parameters.

Ensure the Post-closure Monitoring Program has the same fundamental components as the operational Environment Monitoring Program (i.e., clearly stated objectives, methods, etc.).

Include a comparison of predicted contaminant concentrations and environmental effects from the most recent and relevant *EMA* Permit or Permit Amendment Application or Closure Plan to the results from Post-closure Monitoring. Provide explanations if monitoring results meaningfully differ from impact assessment predictions. Use the results of the comparison to inform the design of the Post-closure Monitoring Program and, where applicable, update the predictive models (Section 5).

The proposed monitoring of surface water and groundwater quantity and quality in the receiving environment should be combined with the Mine Site Water Monitoring Program (Section 7.2) and included in the Mine Site Water Management Plan (Section 9.6).

7.6 Aquatic Effects Monitoring Program

An Aquatic Effects Monitoring Program evaluates the effectiveness of the permit for protecting receiving environment biota. When required by the permit, permittees must design and implement an Aquatic Effects Monitoring Program that is capable of detecting the potential effects of receiving water quality changes due to effluent discharges, seepages, and mining-related activities, on biota, separately and cumulatively. The size and scope of the Aquatic Effects Monitoring Program is commensurate with the risk posed by the project. Owing to the inherent variability of biological systems, results from Aquatic Effects Monitoring Programs may be incorporated into a WOE matrix that combines a set of chemical parameters, toxicity results, tissue concentrations, and/or community composition data. A WOE matrix is one tool for evaluating if observed changes in receiving environment biota are linked to contaminant concentrations in effluent. Such a matrix can support other tools, such as toxicity identification evaluation (TIE) in identifying toxicants that cause observed effects.

Prepare the Aquatic Effects Monitoring Program study design in consultation with ENV staff; approval from the Director may be required. The Aquatic Effects Monitoring Program will likely include measurements related to water, sediment, benthic invertebrates, and fish. Other valued ecosystem components or assessment endpoints (e.g., periphyton, fish tissue, etc.) may also be appropriate as identified in the baseline or impact assessment studies. Planning,

implementation, and reporting of Aquatic Effects Monitoring Program studies may cycle on an annual or multi-year basis.

8 Health and Safety

Health and safety programs and plans submitted in the permit application are considered living documents and are expected to be kept up to date, reviewed routinely, and be made available at the mine site at all times. The expectation is that these programs and plans will be implemented by site personnel and possibly contractors. With that objective in mind, the information provided in this section should be of a level of detail that is executable by those responsible to do so. The information provided will be subject to technical review during the permitting process and revised program and plan components are to be developed based on feedback provided by technical reviewers.

8.1 Occupational Health and Safety Program

Describe the Occupational Health and Safety (OHS) Program for the project. Identify how the program will work to protect employees and all other persons from undue risks to their health and safety arising out of or in connection with activities of the project. Address all phases of the project, including exploration, development, construction, operation, reclamation, and closure. Ensure the OHS Program is developed by persons qualified to do so based on their knowledge, training, and experience. Please see Section 1.6.9 of the Code when developing this portion of the application and refer to the [OHS page of EMPR's website](#)⁹⁰ for further information.

Provide the components of the OHS Program, including but not limited to:

- management of and responsibilities for health and safety;
- promotion of a positive health and safety culture;
- prevention of injury and disease;
- Occupational Health and Safety Committee (OHSC) requirements;
- provisions for regular health and safety meetings;
- workplace inspections, investigations, and dangerous occurrence reporting;
- general safety rules;
- identification and control of hazards;
- safe work procedures;
- tracking and trending of OHS records and stats;
- if applicable, health and safety management of contractors; and
- relevant health and safety sub-programs (see section below for more detail).

Depending on the project, it may not be possible to develop all elements of the OHS Program in detail during the permitting phase.

⁹⁰ <https://www2.gov.bc.ca/gov/content/industry/mineral-exploration-mining/health-safety/occupational-health>

8.1.1 Occupational Health Risk Assessment

Include an initial occupational health risk assessment, developed by a qualified person in the field of occupational hygiene (e.g., Certified Industrial Hygienist (CIH), Registered Occupational Hygienist (ROH), or person with equivalent experience acceptable to the Chief Inspector).

Provide the components of the assessment, including but not limited to:

- all anticipated physical, chemical, biological, and ergonomic hazards;
- strategies to minimize and control those hazards in the design of project components;
- drawings and detailed plans for HVAC and local exhaust ventilation; and
- exposure control plans and safe work procedures.

Identify information sources used to inform this assessment. Outline in greater detail the exposure control plans and/or safe work procedures for occupational health hazards that will require consideration during permitting due to a project-specific hazard or require immediate implementation after permit issuance to begin activity under the permit.

The information provided in this section is expected to inform the Workplace Monitoring Program required by Section 2.1.3 of the Code. Additional guidance is available on the [Occupational Health website](#)⁹¹ and in the Workplace Monitoring Procedures Manual.

8.1.2 Ergonomics

Assess the potential for musculoskeletal disorders (MSDs). As per Section 3.3.5 of the Code, when a material's handling task endangers the safety of the persons doing the work, the mine shall either redesign the work area, provide mechanical lifting aids, and/or redesign the physical parameters of the task. Further, as per Section 2.9.1 of the Code, where the equipment, work procedure, or working condition in a work area causes an MSD to the upper limbs of a worker due to repetition or force, preventative measures must be implemented. These include modification of equipment, work procedures, or the rescheduling of work to reduce physical demands.

Consider ergonomics throughout the mine design planning process where workers are performing tasks to meet or exceed Code requirements. Many materials handling tasks, work procedures, working conditions, and/or equipment that contribute to MSDs can be eliminated or reduced through workplace system design that considers the physical and cognitive needs and capabilities of the worker population. Proactively applying ergonomic principles can optimize system functioning to prevent occupational injury or reduce the severity of harm as well as improve work efficiency, productivity, and product quality.

Include ergonomic considerations for:

- work environment;

⁹¹ <https://www2.gov.bc.ca/gov/content/industry/mineral-exploration-mining/health-safety/occupational-health>

- workstations and machinery;
- work equipment and tools;
- manual materials handling; and
- work processes and procedures.

Where applicable, end-user (e.g., workers, supervisors) and OHSC stakeholder participation is an essential part of a design process that considers ergonomics to gain detailed knowledge of operations, performance of tasks, and identification of training and orientation requirements.

8.1.3 Emergency Wash Facilities

List the planned or existing emergency wash facilities that will be available to meet the requirements of Section 2.4.1 of the Code. Provide details that clearly identify how the facilities will meet the Code requirements, including information on the potable water source.

Identify facilities in detailed facility drawings (as required in Section 3.5). Clearly reference information regarding facility locations that are included elsewhere in the application. Utilize best practice standards when determining emergency wash facility type and location. Reference the standard(s) utilized to inform this section.

8.1.4 Hazardous Dust

Assess the potential for fugitive dusts or other materials to be released and accumulate in a building or enclosed space where they could cause a fire or explosion or be potentially hazardous if inhaled or ingested. Develop a contingency plan for cleanup of these dusts or materials early in the design phase of a project to ensure cleanup can be facilitated in a manner that is timely and does not introduce a secondary hazard to health and safety (see Section 2.3.5 of the Code). Describe contingency measures, which may include, but not be limited to, establishment of wash down capabilities and sump collection or engineered vacuum system with connection to a dust collector. Ensure that locations considered for this assessment include, but are not limited to, surface and underground crushing, grinding and conveying facilities, operator control rooms, laboratories, and QA/QC facilities.

The information provided in this section must be incorporated into the Combustible Dust Management Plan (Section 9.15), if required for the proposed project.

8.1.5 Lunchrooms, Mine Dry, and Sanitary Conveniences

List the planned or existing facilities that will be utilized to meet the relevant requirements of Sections 2.4.2 and 2.11.1 through 2.11.15 of the Code during all project phases, for both surface and underground operations. Include the facilities on a general site layout and detailed facility drawings (as required in Section 3.5). Clearly reference in this section information regarding facility locations that are included elsewhere in the application. Include a contingency

plan for facilities to accommodate potential increases in the number of workers on site, including contractors, during the life of the mine to ensure the permitted mine plan is capable of accommodating such increases.

8.2 *Post-Permitting Requirements*

During the permitting phase of a project, not all information may be available at the level of detail that will be required for construction or operation phases. This information is typically identified during the permit review process and captured in *MA* permit conditions. Information identified for review and submission to the Chief Inspector of Mines is required to be submitted 60 days prior to commencement of the initial construction phase. The following outlines information that is commonly required in the post-permitting, pre-construction phase of the project.

8.2.1 Issued for Construction Plans

Ensure that Issued for Construction (IFC) plans are prepared by qualified professionals or persons who, in the opinion of the Chief Inspector of Mines, are qualified to perform the work. At a minimum, include the following information:

- designs and details for processing facilities, mine buildings and other infrastructure, water treatment facilities, and significant utilities infrastructure, including:
 - general HVAC systems and local exhaust ventilation (in particular for locations such as reagent storage and handling, crushing, screening and conveying circuits, laboratories, weld bays, and shops). Information provided must indicate what contaminants the system was designed to capture, hoods, fans, duct sizes/lengths, air flows, and discharge,
 - plumbing,
 - emergency wash station type and locations,
 - mechanical, and
 - locations of emergency exits, signage, and lighting;
- process flow sheets;
- designs and details for hazardous material storage and handling areas including information on storage containers, secondary containment, flammability/explosive risk, incompatibilities, and individual chemical requirements such as temperature and moisture;
- designs and details that address areas where combustible dust management will be required (if applicable); and
- electrical drawings, including power generation, power transmission lines, and location of substations. Electrical equipment must be approved for use in Canada as defined by CSA Standard M421.

8.2.2 Letters of Assurance

Prior to building occupancy, submit to the Chief Inspector of Mines schedules as per the “Letters of Assurance” section of the [B.C. Building Code](#)⁹² that are prepared, sealed, and signed by qualified professionals. In addition, provide the following:

- confirmation of compliance with the B.C Building Code and [BC Fire Code](#)⁹³ for non-permanent infrastructure; and
- buried services drawings.

Prior to the introduction of electricity at the mine site and use of the electrical distribution system, submit to the Chief Inspector of Mines a letter of assurance from a Professional Engineer ensuring that as-built installations comply with the Canadian Electrical Code and CSA Standard M421-16, as described by Sections 5.1 and 5.2 of the Code.

Ensure that the permit application considers these compliance requirements accordingly in the designs of project infrastructure at the permit application phase.

8.2.3 Occupational Health Programs

Provide programs, plans, and procedures related to occupational health prior to the start of activities occurring under the permit. These include, but are not limited to: Workplace Monitoring Program, Medical Surveillance Program, Hearing Conservation Program, Respiratory Protection Program, and Musculoskeletal Disorder Prevention Training Program. Information provided in other sections of the application will be used to inform the development of these programs.

Ensure these programs are prepared by a qualified professional in occupational hygiene (e.g., CIH, ROH, or person with equivalent experience acceptable to the Chief Inspector).

8.2.4 Workplace Hazardous Materials Information System (WHMIS)

Submit documentation demonstrating how WHMIS requirements in the Code will be met prior to activities involving the use, storage, and handling of hazardous products conducted under the permit. Include procedures for the safe use, storage, handling, and disposal of a hazardous product, prepared by persons qualified to do so based on the person’s knowledge, training, and experience.

8.2.5 Additional Information and Certifications

Provide the following additional information and/or certifications post-permitting and prior to use, commissioning, or commencement of the following as applicable:

⁹² <http://www.bccodes.ca/building-code.html>

⁹³ <http://www.bccodes.ca/fire-code.html>

- documentation of commissioning and load testing of any cranes to be installed for the project prior to these devices being put into service;
- approval for boilers and elevators from the Chief Inspector of Mines prior to installation and commissioning of these devices;
- certification of pressure vessels⁹⁴ as per the Boiler and Pressure Vessels Act and CSA B-51;
- details of any underground mine air heaters and details of the required safety devices that will be installed with these heaters; and
- details of carbon monoxide monitoring, shutdown, and alarm devices that will be installed on any compressors delivering compressed air to the underground workings

⁹⁴ <https://pveng.com/home/canadian-registration-number-crn/>

9 Management Plans

Describe the key mine management plans required to address environmental, operational, and health and safety issues noted throughout the application. Present these plans in a manner that reflects site-specific operational management and monitoring requirements. Note that additional plans may be required to reflect site-specific management objectives.

Mine management plans are considered living documents and are expected to be kept up to date, reviewed routinely, and be made available at the mine site at all times. These plans shall reference relevant policies and establish proactive procedures and standard operating procedures (SOPs) to provide direction for management, mine site employees, and contractors. These plans shall also include provisions for training requirements to ensure that all personnel involved in implementing the respective management plans are competent to fulfill their roles.

Ultimately, the management plans developed should reflect what will occur operationally on the mine site and be as detailed as possible, including maps and drawings. The expectation is that these will be the plans implemented by site personnel and possibly contractors. With that objective in mind, the versions provided in the application should not represent high-level framework documents. Rather they should be executable by those responsible to do so. The plans will be subject to technical review during the permitting process and revised plans are to be developed based on feedback provided. They will be required to be reviewed and revised regularly throughout life of mine (or other period of time in which they are to be implemented).

The environmental aspects of all mining projects include considerable uncertainty. Incorporate, as necessary, an adaptive management approach into the development of key Management Plans and Adaptive Management Plans. In doing this, demonstrate how the environmental uncertainties will be dealt with and how predictions will be tracked. Additionally, Trigger-Response Plans (TRP) ensure the implementation of planned contingency measures in the event that identified environmental conditions (triggers) occur. They are not considered adaptive management. A description of Adaptive Management Plans and TRPs are provided in the [IDZ Guidance](#)⁹⁵.

Consider the following guiding principles for adaptive management and incorporate them into plans as appropriate:

- measurable objectives for each of the potential environmental effects;
- management alternatives (i.e., specific actions that could be taken, if necessary);
- predictive models that will be used to inform the decision-making process; and
- monitoring protocols for collecting the data required to determine whether the objectives are being met.

⁹⁵ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/tg11_development_and_use_of_idz.pdf

Describe the implementation of the iterative phase of adaptive management, including the following components:

- the decision-making process;
- follow-up monitoring after any adaptive management decision, particularly the rationale for whether to implement new monitoring and/or to discontinue existing monitoring;
- provision for any additional site characterization that might be required;
- the nature and timing of the assessment and analysis (e.g., water quality model, site-wide water balance, groundwater model, etc.) that will be done after follow-up monitoring and/or site characterization has been completed; and
- how the assessment will be used to inform the understanding of present and future environmental effects, and the implementation of pragmatic management strategies.

9.1 *Environmental Management System*

Provide a brief summary of an overall Environmental Management System (EMS) that will be applicable during all phases of mine life (construction, operation, closure, and post-closure). The detailed environmental management plans that comprise the EMS are living documents and should be updated as appropriate during mine life.

In this section, provide:

- an environmental policy statement;
- context on environmental management roles and responsibilities;
- information on statutory requirements, including applicable local, provincial, or federal environmental standards and guidelines, permit requirements, regulations, and orders;
- information on environmental standards and procedures, including all applicable sector-specific standards, guidelines, best management practices, and codes of practice (e.g., Responsible Care, CSA, ASTM, RISC, GWPR);
- a description of the mine's organizational structure; and
- a description of proposed training programs.

9.2 *Surface Erosion Prevention and Sediment Control Plan*

Provide conceptual methods for prevention of erosion and sediment discharge during all phases of mine life (construction, operation, closure, and post-closure). A more detailed, site-specific, stand-alone plan will need to be submitted to the Chief Inspector prior to the commencement of construction activities.

Include the following specific areas:

- the mine site (plant sites, pits, waste dumps, TSFs, etc.);
- all access roads; and
- any utility corridors.

Provide:

- information on roles, responsibilities, and training requirements;
- an assessment of erosion potential (i.e., risk) and consequence;
- a description of how erosion and sediment control will be managed during construction and throughout the mine life;
- descriptions of methods to be used;
- drawings and/or maps of where prescriptions will be applied;
- erosion control/sediment control plans for disturbed surfaces and soil stockpiles;
- a detailed event-based effectiveness monitoring program including locations and frequencies; and
- a response plan including specific triggers, actions to be taken, and reporting protocols.

Address the potential for sediment release from internal sloped structures such as waste rock dumps and any segments of pit walls through the Water Management Plan.

For further guidance on developing sediment and erosion control plans, consult [Technical Guidance 3 – Environmental Management Act: Developing a Mining Erosion and Sediment Control Plan](#)⁹⁶.

9.3 Soil Management Plan

The Soil Management Plan will direct implementation of best management practices during soil salvage, stockpiling, and application operations, and guide salvage monitoring and stockpile maintenance provisions, training, supervision, and QA/QC.

Include the soil salvage and stockpiling approaches that will be utilized on a site-specific basis. Describe in detail the soil handling practices for all activities related to salvage, stockpiling, and application in reclamation, based on information collected in accordance with baseline data. Provide a map showing soil ratings and proposed salvage depths.

Include the following information related to soil salvage:

- descriptions, including relative physical and chemical suitability, of soils (or suitable overburden) to be salvaged;
- identification of materials or layers to be stripped separately and how to operationally distinguish them;
- total depth to be salvaged and anticipated volumes of each soil type;
- equipment to be used and constraints (e.g., slopes, etc.) on stripping;
- erosion control and sediment retention measures required for exposed surfaces; and
- proposed training or supervision of operators by a qualified professional.

Include the following information related to soil storage/stockpiling:

⁹⁶ www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/erosion_sediment_control_plan_guide.pdf

- description of soil stockpile locations (and maps), volumes, dimensions, and anticipated storage durations;
- identification of layers or materials to be stored separately, and justification for doing so;
- storage requirements, including erosion and sediment control, and marking/identification of stockpiles according to the soil handling plan; and
- descriptions of stockpile protection activities that will be implemented during the storage period.

For further guidance on developing sediment and erosion control plans, consult [Technical Guidance 3 – Environmental Management Act: Developing a Mining Erosion and Sediment Control Plan](#)⁹⁷.

9.4 Construction Environmental Management Plan

It is understood that construction may not be a discrete activity that happens once throughout mine life. Over the life of mine, a separate Construction Environmental Management Plan (CEMP) may need to be developed for each independent construction project on the mine footprint to ensure the plans are site specific and executable on the ground.

The CEMP should describe:

- the project schedule;
- a plan for the co-ordination and management of the construction workforce; and
- proposed phases of the project, including site preparation and construction.

At a minimum, address the following, tailored to the construction activities/locations proposed:

- vegetation management, including buffer setbacks, rare and sensitive plant protection, seed/plant material collection, and invasive plant prevention;
- drainage control and water management;
- soil management, including salvage and stockpiling procedures for soil and large woody debris;
- site-specific erosion and sediment control;
- wildlife protection, such as timing windows, wildlife-human interaction management, and pre-construction surveys;
- a fuel management and spill response strategy;
- event-based effectiveness monitoring for all of the above; and
- reporting.

⁹⁷ www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/erosion_sediment_control_plan_guide.pdf

9.5 *ML/ARD Management Plan*

Provide day-to-day operational management and handling procedures for materials based on the integration of the ML/ARD geochemistry (Section 2.4) and water quality baseline studies (Section 2.7) with the scheduling and sequencing defined in the Mine Plan (Section 3).

Describe the material characteristics and operational characterization methods with reference to the relevant regulatory requirements, proposed handling and storage plan, proposed monitoring plan, and contingency plans for all materials produced or exposed during mining activities, which may include, but is not limited to, the following:

- waste rock;
- tailings;
- ore;
- coal and coal waste;
- pit walls;
- underground workings;
- quarry and borrow material;
- construction material;
- overburden and soil;
- water treatment plant secondary wastes and spent substrates; and
- any other relevant materials.

Describe aspects of the plan, including but not limited to, the following:

- the management purpose and objectives;
- a site setting section that includes the location, climate, and geology of the project and provides references to documents where additional detail can be found;
- definitions and classification criteria for potentially metal-leaching and acid-generating materials;
- a site map clearly indicating storage facilities and stockpiles for all materials;
- a summary table of capacities for each storage facility and/or stockpile, dates active, and timeline for reclamation;
- a flow chart or conceptual diagram that illustrates the material processing and/or movement (e.g., hauling) of materials on site;
- a detailed monitoring program that includes sampling frequencies, precise sampling locations, and analysis for each material type;
- detail sampling and analysis procedures or SOPs, including QA/QC programs;
- data management protocols and reporting requirements;
- roles and responsibilities associated with the plan, including persons accountable, connections to other departments, and process for change management;
- relationship to other management plans and documents;
- a clear presentation of contingency plans and relevant TRPs; and
- any other relevant information.

9.6 *Mine Site Water Management Plan*

Provide the operational management and monitoring procedures for each phase of mine life, as well as contingency measures, for the effective interception, conveyance, diversion, storage, and discharge of water (contact and non-contact) on the mine site.

Develop the plan based on the integration of meteorology and climate studies (Section 2.2), water quantity (Section 2.6) and quality (Section 2.7) baseline studies, the site-wide water balance model (Section 5.3), surface water quality model (Section 5.4), numerical groundwater model (Section 5.5), treatment requirements (Section 5.6), discharge requirements (Section 5.8), and the mine plan (Section 3).

For each phase of mine life, include details on the following:

- objectives of the plan, and relationship to other management plans;
- mine site staff roles and responsibilities;
- regulatory requirements and relevant authorizations;
- site overview including environmental and climatic conditions;
- details on use(s) of existing drainages;
- proposed water usage and water sources for the mine, detailing the watershed or source area boundary for the water supply;
- the layout of all water management infrastructure;
- a description of sources, flow paths, storage facilities, and discharges for all surface water;
- figures that illustrate the site-wide water balance, including flow rates;
- risks and potential impacts of mining and waste discharges to water quality and quantity;
- monitoring locations for surface water and groundwater quality and quantity;
- monitoring program details including the rationale for each monitoring location, coordinates, frequencies, analyzed and/or measured parameters, SOPs, QA/QC program, and reporting details;
- integration of any water quality or quantity mitigation measures required during the mine life (e.g., water treatment, groundwater interception, flow augmentation, etc.);
- assessment of upset conditions (e.g., extreme flow conditions, icing, etc.) and impacts on the performance of relevant infrastructure;
- TRPs for upset conditions, and contingency plans for mitigating potential impacts related to failure of any component(s) of the plan;
- analysis of potential impacts if contingencies fail; and
- any other relevant information.

The plan should be developed based on the following detailed information:

- water balance for each relevant structure;
- site-wide water balance;
- tailings management and supernatant recovery systems (if required);

- geotechnical, hydrologic, hydrogeologic, and hydraulic stability assessments for all water storage structures, water diversions, interceptors, and sediment retention structures, including key mine elements (e.g., open pits, underground workings, waste rock storage, stockpile areas);
- preliminary designs of water and sediment control ponds as well as water diversion, interception, and conveyance structures (consistent with the geotechnical, hydrologic, hydrogeological, and hydraulic stability assessments, and based on relevant water balance information) in accordance with the technical guidance on [Assessing the Design, Size, and Operation of Sediment Ponds Used in Mining](#)⁹⁸;
- proposed water sources for the mine, detailing the watershed or source area boundary for the water intake (if surface water, include any springs and hydrologic assessments) and providing hydrogeologic information (location, capture zone, yield, water quality, groundwater source in relation to geological units, well construction details, etc.) for all groundwater sources to be utilized (including seepage);
- any relevant conditions in the permits from the regional health authority for the construction of wells and operation of the water system;
- design of the conveyance system for the water treatment plant;
- design of any groundwater seepage mitigation or interception structures (dewatering wells, underground drains, etc.); and,
- description of any flow augmentation measures that might be required during low-flow periods to compensate for any induced streamflow losses to groundwater.

The plan should also include a detailed summary of all surface water and groundwater monitoring that will occur within the mine site boundary and in the receiving environment for each phase of mine life. The plan should include the following information for both surface water and groundwater monitoring:

- objectives;
- monitoring methods;
- monitoring locations, including a detailed map showing each location;
- rationale for the distribution of monitoring locations (including depths, where relevant), and how they relate to the maintenance and improvement of the site-wide water balance model (Section 5.3), surface water quality model (Section 5.4), and groundwater model (Section 5.5);
- for groundwater, information must be provided on the range of monitoring depths that will be included for each individual monitoring location; and
- POCs⁹⁹ to be measured at each location;
- sampling frequency and period, including high-, medium-, and low-flow periods;
- analytical testing procedures to be used;

⁹⁸ http://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/assessing_design_size_and_operation_of_sediment_ponds.pdf

⁹⁹ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/parameter_of_concern_fs.pdf

- QA/QC protocols;
- name of the certified laboratories used to analyze samples;
- comparisons to relevant guidelines and objectives;
- methods for data analyses;
- reporting schedule; and
- any other relevant information.

9.7 *Discharge Management Plan*

Provide operational plans for all discharges to surface water or groundwater. Include the following information:

- discharge limits (volumes and concentrations) that ensure no acute toxicity to aquatic organisms at the point of discharge and no chronic toxicity beyond the edge of the IDZ. Achieve this by back-calculating discharge concentration and volume limits using contaminant-specific WQGs, WQOs, or SBEs as values in the mass balance model;
- ensure groundwater use downstream is not compromised and no chronic toxicity occurs in surface waters as surface water recharge occurs. Note: This information may form the basis for terms or conditions incorporated into the EMA effluent discharge permit;
- incorporation of the CSM (Section 5.2);
- describe emergency procedures for pollution control system malfunctions/upsets, and include contingency plans (e.g., contingency storage for water requiring treatment) for chemical and fuel storage areas; and
- propose effluent quality limits (or other appropriate limits) and trigger levels/conditions (as per the TRP¹⁰⁰) that will trigger an action to address and mitigate unexpected or deteriorating effluent quality. This TRP should be in place to proactively ensure permit limits are being met and discharges are not negatively impacting the receiving environment.

9.8 *Vegetation Management Plan*

The objectives of the Vegetation Management Plan are to ensure that disturbance is limited to permitted boundaries and that effects of disturbance are mitigated in a timely manner.

Provide details on proposed activities for achieving the objectives, including:

- best management practices during construction and operation;
- training requirements;
- detailed monitoring and reporting plans;
- provisions for adaptive mitigation;
- ongoing consultation with stakeholders; and
- considerations for reclamation planning.

¹⁰⁰ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/tg11_development_and_use_of_idz.pdf

Include SOPs for addressing, if applicable, riparian areas, old growth and mature forests, rare and at-risk species and ecosystems, metal uptake, large/coarse woody debris, and invasive plant species. If prudent, develop a separate invasive plant management plan to highlight the key considerations for early identification and effective management of invasive plants to facilitate successful site reclamation.

9.9 *Invasive Plant Management Plan*

The objectives of the Invasive Plant Management Plan (IPMP) are to ensure that measures are implemented to prevent ingress of invasive plants to mine sites and that early detection systems are in place to ensure required management activities are conducted as soon as possible. Effective management of invasive plants is key for successful reclamation of mine disturbances.

Provide details on proposed activities for achieving the objectives, including:

- best management practices throughout life of mine;
- training requirements;
- site inventory/potential invasive plants;
- treatment options for different species;
- detailed monitoring and reporting plans;
- provisions for adaptive management; and
- ongoing consultation with stakeholders.

Include SOPs for addressing invasive plant species. When appropriate, cross-reference the IPMP to other management plans, such as the soil management plan, erosion and sediment control plans, etc.

9.10 *Wildlife Management Plan*

The objective of the Wildlife Management Plan is to minimize impacts on wildlife in the project area, with particular reference to focal species of interest and species at risk.

Provide details on proposed activities for achieving the objective, including:

- best management practices throughout life of mine;
- employee education requirements and programs as related to those practices;
- detailed monitoring and reporting plans;
- provision for adaptive mitigation;
- ongoing consultation with stakeholders; and
- preliminary recommendations for consideration during reclamation planning.

Specific plans to address individual wildlife species, in particular species at risk, may be required (e.g., bats and caribou).

Ensure that wildlife monitoring programs address requirements outlined and regulated by FLNR.

9.11 *Archaeological Management and Impact Mitigation Plan*

Address the following:

- archaeological and cultural heritage resources awareness training;
- training for archaeological monitoring;
- detailed chance-find procedures, including obtaining required permits;
- applicable legislation, regulations, and guidelines;
- Heritage Inspection and Alteration Permits; and
- protection of existing sites.

9.12 *Mine Emergency Response Plan*

The Code requires all mines in British Columbia to have a Mine Emergency Response Plan (MERP). Consider all phases of the mine's activity in the preparation of the MERP, including exploration, development, construction, operation, and reclamation. Adapt and update the MERP as required as it progresses through each phase. The Province has developed a MERP Guidelines document that suggests approaches for preparing, training, and organizing personnel for managing a mine emergency. In accordance with Section 10.4.2.1.e of the Code, integrate the TSF emergency preparedness and response plan into the MERP.

9.13 *Mine Site Traffic Control Plan*

Provide a general description of the Mine Site Traffic Control Plan, which should include information on the following:

- radio frequencies;
- maximum allowable speeds for the vehicles in use;
- rules for passing;
- "stop" and "yield" locations;
- priority rules for various vehicles;
- rules for night operation;
- maximum operating grades;
- emergency run-off protection;
- shoulder barriers;
- access roads to the mine site, including:
 - access restrictions,
 - load restrictions (if any),
 - radio frequencies to be used by local traffic, and
 - route maps showing key locations or turns for access roads to the mine site; and
- other relevant information, as required.

9.14 *Fuel Management and Spill Control Plan*

Outline the following:

- fuel handling and transportation;
- dispensing and storage facilities and related equipment; and
- procedures regarding fuel management and spill control to be followed at the mine site during construction and operation.

Use the following regulations and codes when developing the Fuel Management and Spill Control Plan:

- B.C. Building and Fire Codes;
- Environmental Management Act;
- Petroleum Storage Facilities; and
- Storm Water Regulation.

This is not intended to be an exhaustive list. For further guidance, refer to [A Field Guide to Fuel Handling, Transportation and Storage](#)¹⁰¹.

Include an Emergency Response Plan in accordance with regulatory requirements, including a Spill Response Plan for prevention and management of spills and fugitive emissions on site and on product transportation routes.

Develop a contingency plan for preventing, minimizing, and containing spills. Include plans for process upsets and non-compliant discharges (e.g., collection ponds with pump-back systems, back-up treatment systems). A number of guidance documents^{102 103 104 105} can be used to inform contingency plans.

9.15 *Combustible Dust Management Plan*

Where combustible dust may be a hazard, a Combustible Dust Management Plan must be provided. The plan must be prepared by professionals or persons who, in the opinion of the Chief Inspector, are qualified to perform the work. The plan must include the following:

- include both surface and underground operations;
- the mining and processing methods being proposed;
- building designs required for dust management; and
- reference the best practises used to develop the plan.

¹⁰¹ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/oilandgas/fuel_handle_guide.pdf

¹⁰² www2.gov.bc.ca/gov/content/environment/air-land-water/spills-environmental-emergencies/planning-prevention-response/industry-emergency-response-plans

¹⁰³ <http://www.scc.ca/en/standardsdb/standards/18899>

¹⁰⁴ http://www.bclaws.ca/civix/document/id/complete/statreg/263_90

¹⁰⁵ <http://www.ec.gc.ca/lcpe-cepa/D6ADAD2D-2E02-4885-81AE-788168284720/guide-eng.pdf>

9.16 *Chemicals and Materials Storage, Transfer, and Handling Plan*

List and provide descriptions of potential chemicals and substances classified as or deemed to be potentially hazardous (including toxic chemicals/substances) and that will be used and produced during any mine/project phase (e.g., construction, development, operation). Describe storage, transfer, and handling plans and procedures for the identified chemicals and substances. Clearly indicate how compliance with Sections 2.3.3, 2.3.4, 2.3.6, 2.3.8, and 2.13.1 through 2.13.20 of the Code will be achieved.

Given that the hazardous products utilized during construction and operation are likely to be adjusted over the life of the project, outline a policy or procedure for product procurement that identifies and assigns responsibility and a process for assessing storage, emergency/spill response, potential worker exposure, and general health and safety considerations, prior to bringing a new product on site.

Refer to the [Hazardous Waste Regulation](#)¹⁰⁶ of the *EMA* for further information on hazardous materials.

9.17 *Waste (Refuse and Emissions) Management Plan*

Briefly describe waste management strategies to be followed during construction, operation, closure, and post-closure. Clearly outline all discharges through the various construction and operation phases of the project, including the following:

- air contaminants:
 - list potential sources, including open burning, incineration, spills, dust, fugitive emissions from all processes (including cooling), emissions from ponds and yards, and emissions from electrical generation (depending on the mining process, an air discharge permit may be required);
- effluents:
 - list sources, including spills, exfiltration, spray irrigation, other losses from processes (including cooling), and sewage and stormwater discharges;
- refuse:
 - list sources, including spills and other losses of materials such as leachate, materials from landfilling or land-farming, or recyclable materials;
- contaminated soil management:
 - provide plans to remediate or manage soils impacted by spills on the site¹⁰⁷;
 - provide detailed descriptions of any proposed pollution control and/or water management necessary during construction and operations to manage existing contamination;

¹⁰⁶ http://www.bclaws.ca/Recon/document/ID/freeside/63_88_01

¹⁰⁷ https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/guidance-documents/guidance_for_hc_impacted_soils_at_mines.pdf

- identify remedial strategies to be used to mitigate and/or remediate contamination;
- identify a monitoring proposal to aid in characterizing potential groundwater contamination; and
- provide information on proposed site decommissioning or planned site remedial activities, including information required for the completion of a site profile as described in the *EMA*¹⁰⁸.

¹⁰⁸ http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/375_96_00