



SEABRIDGE GOLD'S KSM Project
Risk Analysis

June 2015 — Issue 2

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Photo: Mike Fay

Overview

The Kerr-Sulphurets-Mitchell (KSM) mine project is a copper, gold, silver and molybdenum deposit in British Columbia proposed for development by Toronto-based Seabridge Gold (TSX:SEA) (NYSE:SA), a junior mining company which holds a 100% interest in it. The proposed mine would be 35 km (22 miles) from the international border, and just upstream from the Misty Fjords National Monument in Alaska. KSM is a massive project comprised of four deposits that would be mined as a combined open-pit and underground block-cave mine. The operation would be in two locations connected by twin 23-km (14 mile) long tunnels – extending under an active glacier – which would be used to transport miners and ore between the pits and the mill and tailings impoundment. It is expected to process between 120,000 to 180,000 tonnes of ore per day over a mine life of 55 years. Opposition to the project has increased, with some analysts comparing it to the proposed Pebble Project in southwest Alaska.¹

1. UNFAVORABLE ECONOMICS: COPPER PRICES LOW / COSTS HIGH

According to a new mining global outlook report by Price Waterhouse Coopers (PWC), things are not looking good for multi-billion mine projects like the KSM in B.C.² PWC's report, "Mining 2015: The gloves are off" concluded that smaller, leaner projects, may stand more of a chance of getting financed in a new era of prolonged low commodity prices and activist shareholders.³ The report examined the world's top 40 mining companies, which lost \$156 billion in 2014 – 16% of their combined market value.

KSM's low grade deposit, remote location and lack of infrastructure make the economics problematic, according to analysts.⁴ The project's economic evaluation is based on metal prices the market has not experienced in some time and remain highly uncertain.⁵ Since issuing the prefeasibility study, metal prices have suffered severe declines with current metal prices for copper, gold, silver and moly far below the metal price assumptions used by the company (see chart).

KSM requires substantial new infrastructure, bringing the project to its considerable 2012 pre-feasibility estimate of \$5.3-billion capex.⁶ Capital costs include a \$618-million tunnel system, \$309 million for the water treatment plants required for environmental mitigation, \$217 million to link the mine to power, \$112 million for two access roads, and \$46 million for avalanche control at the remote high-mountain mine.⁷

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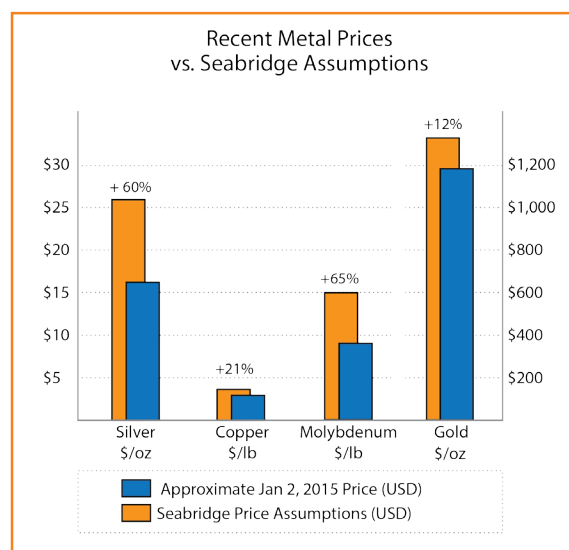
I'm unimpressed with KSM (not including Deep Kerr), as the ore body is very low grade and no major mining company has expressed much interest in the project”

— Seeking Alpha, April 13, 2015

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Things are not looking good for multi-billion mine projects like the KSM in B.C., according to a new mining global outlook from PWC.”

— Business Vancouver, June 15, 2015



Metal price assumptions used in the model include US\$1,330 per oz. gold, US\$3.45 per lb. copper, US\$25.20 per oz. silver, and US\$15 per lb. moly. Graph by Andrew Mattox

Although the company has been promoting KSM to the majors since 2006, Seabridge has been unable to attract a senior partner able and willing to develop this property. Senior mining companies are already overstretched with properties slated for development.

With the decline in copper prices, global exploration spending dropped 26% last year and several juniors threw in the towel. Producing mines have slammed the brakes on capital and exploration expenditure to improve their margins.⁸ Mining analyst John Kaiser told the 2015 Prospectors and Developers Association Conference in Toronto, "We are now in the worst bear market in decades," and explained, "That's because a \$140 billion junior buyout binge in recent years has left seniors with ample development inventory."⁹

A recent article points to Seabridge's severely underperforming YTD compared with other gold stocks in the sector, and expresses caution about stock dilution.¹⁰ The analyst states, "[O]ver the years, Seabridge's market cap has declined, and now it's at C\$400 million. So dilution becomes more pronounced. While I don't believe that the company is in a major bind at the moment, it's imperative that shareholders of the company understand what's going on. Should this bear market in gold last a while longer, and no major recovery happens soon, then there is going to be a tremendous amount of downward pressure on Seabridge's stock price."¹¹



The proposed mine would be 35 km (22 miles) from the international border, and just upstream from Misty Fjords National Monument in Alaska.



2. MT. POLLEY TAILINGS DAM FAILURE RAISES QUESTIONS ABOUT RISKY OUT-DATED TAILINGS DAM TECHNOLOGY AT KSM

In January 2015, a panel of independent experts released the findings from its investigation of the Mount Polley tailings dam failure, a modern impoundment that breached on August 2014 and released 25 million cubic meters of tailings into the Fraser River watershed in British Columbia.¹² The expert panel concluded that the dam design was at fault because it failed to account for the unstable glacial till on which the dam was constructed. The panel estimated that two additional tailings dam failures could occur every 10 years in British Columbia if business continues as usual. The British Columbia Minister of Mines called for an immediate investigation of all tailings dams within the province.

The panel issued strong recommendations against the use of tailings storage facilities that store both water and tailings, particularly post closure. Criticizing construction of wet tailings ponds as “century-old technology,” the expert panel called for the province to eliminate such water impoundments across the province, in both new and closed mines.

The panel’s findings and recommendations highlight the risks associated with the proposed KSM tailings dam design that conflicts with the panel’s recommendations for dry tailings post-closure.¹³ Given the magnitude and volume of water in the KSM tailings pond design, BC and AK groups are raising serious questions and asking whether the company will implement the panel’s recommendations. The proposed KSM tailings dam will be 237 meters in height, which will be among the highest tailings dams in the world, and the tailings pond is expected to contain 2 billion tons of mine tailings submerged under water – more than 27 times the volume at Mount Polley.¹⁴

As the Union of B.C. Indian Chiefs Grand Chief Stewart Phillip told the press, “We urge the province of British Columbia not to cherry-pick the recommendations. This is not a smorgasbord.”¹⁵

Alaska’s United Tribal Transboundary Mining Working Group stated that it is “not only time to ban watered tailings dams, but to halt the opening and development of new mines in B.C., like Red Chris, until more is

Tailings Management

Risky outdated tailings dam technology.



Photo by NBC

Bloomberg Business

Canada Mine Probe Sees More Spills Unless Changes Made
by Christopher Donville
2:20 PM PST January 30, 2015

(Bloomberg) – Mining-waste spills like Imperial Metals Corp.’s catastrophic dam collapse will continue to occur in British Columbia unless government and industry enforce higher safety and design standards, an investigating panel said.

If the number of active tailings ponds in the Canadian province remains unchanged, and their performance in the future reflects the past, then on average there will be two dam failures every 10 years, the three-member, government-appointed panel said Friday in a 147-page report.

“In the face of these prospects, the panel firmly rejects any notion that business as usual can continue,” the investigators said in the report into the Aug. 4 dam breach at Imperial’s Mount Polley mine.

The accident released billions of gallons of water from the copper-and-gold mine’s tailings pond into local rivers and lakes and sparked debate across Canada about safety and environmental

JuneauEmpire.com

Mount Polley report: Two dams expected to fail every 10 years

Southeast Alaskans say report validated concerns
• Company responsible for mine with failed dam opens new mine in Stikine River watershed

Posted: February 5, 2015 - 2:37pm
By MARY CATHARINE MARTIN
JUNEAU EMPIRE

An independent review and panel established by British Columbia’s government through the Ministry of Energy and Mines, along with the “Yukon and Caribou First Nations, found that design flaws were to blame for British Columbia’s Mount Polley tailings dam breach on Aug. 4 of last year. Design flaws, however, weren’t the only Mine tailings dam breach on Aug. 4 of last year. Design flaws, however, weren’t the only Mine tailings dam breach (were) in progress” when the dam broke, the report said.

The dam breach released billions of gallons of water and tailings into the Fraser River watershed, which is an important salmon river flowing past Vancouver.

The dam failure at Mount Polley, and the problems so which the panel review points, seems to validate the concerns of many Southeast Alaskan tribal organizations, fishermen, tourism operators and environmental groups. The report also says that the odds of a tailings dam breach in British Columbia are “unacceptably high, and that the panel firmly rejects any notion that business as usual can continue.”

British Columbia is pushing heavy development of its natural resources, many of which lie in watersheds that flow into

“The panel recognizes that we can’t continue business as usual,” said panelist Steven Vick. “We can’t continue to use technology that’s fundamentally 100 years old.”

— Business Vancouver, February 15, 2015

THE VANCOUVER SUN

Canadian, American groups call on B.C. to end underwater storage of mine tailings

Mines ministry says that is not going happen in the province, or likely anywhere in Canada

By Gurdita Bhambra, Vancouver Sun April 26, 2015

The Crown Creek underground gold mine in Alaska has filtered its tailings and dry stacked them for more than two decades, a method recommended by a B.C. government-appointed expert panel following its investigation into the Mount Polley tailings dam failure last summer.

Deputy Chief and American environmental groups, First Nations and businesses, as well as scientists and individuals have called the B.C. government to end the use of existing water, waste, water, water and rock dams.

The Energy and Mines Minister Bill Blaney said this is not going to happen in British Columbia. “It isn’t about the B.C. or the world for B.C. — it’s any other province or country — to adopt a policy where all you can see is storage tanks or dry stack tailings.” Blaney said in an interview.

understood about safe mining practices and how to prevent incidents like the Mount Polley breach from ever happening again.”¹⁶

According to the Mount Polley expert panel, “The Mount Polley case underscores the magnitude of direct costs for cleanup, but indirect losses – notably in market capitalization – can be even larger.”¹⁷ Repairs and cleanup costs at Mount Polley have been estimated at up to \$400 million.¹⁸

Tailings dam failures present a considerable economic challenge for mining companies due to the enormous remediation costs, lost revenue, and risk of litigation. In response to the tailings dam failure at the Mount Polley Mine, Imperial Metals continues to “bleed red ink” as the mine remains closed.¹⁹ The company has reported a net loss of \$33.4 million and revenues of \$1.5 million in the first three months of 2015, and its share price has dropped from \$16.50²⁰ before the tailings dam collapse to \$10.52 as of May 22, 2015.²¹

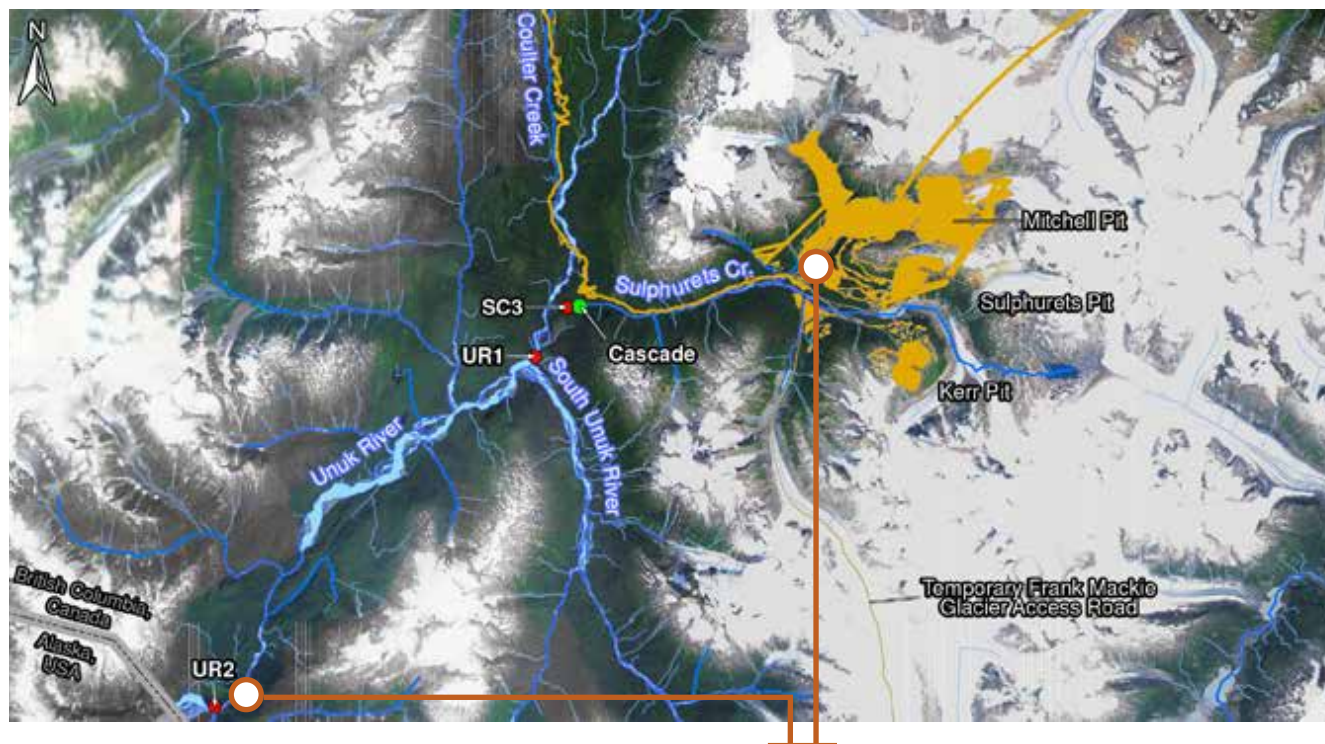
3. HIGH CLOSURE COSTS; UNPRECEDENTED WATER MANAGEMENT

The actual high closure costs at the Bloom Lake Mine in Quebec recently stunned analysts, yet closure costs at KSM are predicted to be even higher, pointed out Jack Caldwell, a geotechnical engineer at Robertson GeoConsultants Inc.²² Seabridge proposes a water management regime that involves the movement and treatment of approximately 20.8 billion gallons of water per year.²³ The requirement for such unprecedented levels of water management at the mine that includes highly acidic wastewater, translates into significant operational challenges and closure costs. According to Dr. David Chambers, professional geophysicist, “The amount of water projected for water treatment is the largest of any mine that I have seen. Based on the estimated treatment costs in the EIS, the trust fund for post-closure water treatment alone would need to be approximately \$1 billion.” Water management at the

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— Dr. David Chambers,
Professional Geophysicist



KSM (Kerr-Sulphurets-Mitchell) Project, Canadian Environmental Assessment Agency, Comprehensive Study Report, July 2014.

The Environmental Impact Statement predicts that Alaska water quality standards for iron, copper and lead could be exceeded in the Unuk River at the Alaska border – 24 kilometers from the mine (station UR2).¹

mine will be required in perpetuity.²⁴ Despite these unprecedented water management requirements, the Environmental Impact Statement still predicts that Alaska water quality standards for iron, copper and lead could be exceeded in the Unuk River at the Alaska border – 24 kilometers from the mine.²⁵ This has generated considerable opposition from Alaska residents, who are concerned about the adverse effects on Alaska’s valuable commercial fisheries. The Governor of Alaska has formed a working group of state agencies to respond directly to BC about this issue.

4. POLITICAL OPPOSITION HEATS UP: CALLS FOR INTERNATIONAL JOINT COMMISSION INCREASE

U.S. Senator Murkowski (AK-R) and Rep. Young (AK-R) have raised serious concerns regarding KSM, asking the Secretary of State to conduct bilateral discussions with the Canadian government about the project due to concerns about impacts to the state’s tourism and salmon fishing.²⁶ In the aftermath of the Mount Polley tailings pond failure in B.C., U.S. Senator Murkowski has continued to escalate concerns over KSM.

“We wanted it (KSM) to be taken up a notch before British Columbia signed off on this mine because of the similarity between KSM... and Mount Polley.”²⁷

– Senator Lisa Murkowski (AK-R) in an interview in the Alaska Journal of Commerce, February 26, 2015.

“The tailings pond breach at the Mount Polley Mine on August 4th has renewed the specter of environmental impacts from large-scale mineral development in Canada that are located near transboundary rivers. This incident should compel the State Department to evaluate additional steps that may be warranted to safeguard U.S. interests.”²⁸

– Senator Lisa Murkowski (AK-R), August 8, 2014 letter to the U.S. Secretary of State John Kerry.

Alaska’s new governor is also turning up the heat. In May 2015, Lt. Governor Mallott travelled to B.C. to meet with cabinet ministers and highlight concerns over transboundary mining issues in the aftermath of the Mount Polley catastrophe. In response, the BC Minister of Mines, Bill Bennett, has suggested that the Canadian government will open up more of the mine permitting process to Alaska officials: “We would propose to have Alaska also have access into the second part of a development of a mine, which involves my ministry and the Mines Act here in British Columbia and the permitting for the actual construction of the mine and how water treatment is built.”²⁹ This raises uncertainty about the potential for additional regulatory requirements, such as supplemental water treatment or other mitigation measures.

Alaskan stakeholders, including 13 federally recognized Tribes and Alaska’s capitol City of Juneau, are calling for a referral to the International Joint Commission for a review under the Boundary Waters Treaty.³⁰



5. LEGAL UNCERTAINTY CONTINUES OVER MITCHELL TREATY TUNNEL

The proposed Mitchell Treaty Tunnel, which is necessary to connect the mine site with the mill and tailings facility, passes through ground subject to mineral claims held by a third party.³¹ Pursuant to the judgment of the British Columbia Supreme Court, ownership of the claims has been transferred to American Creek Resources.³² American Creek asserts that Seabridge has not been granted access to construct the Mitchell Treaty Tunnel through the Treaty Creek property.³³ American Creek believes that Seabridge must first address the prior rights of the claimholders of the Treaty Creek property before construction can begin, and expects these terms to include provisions for condemnation drilling and independent, third-party pre-construction assessment of the mineral potential along the tunnel route as well as appropriate compensation to the mineral tenure owner.³⁴

6. SUPREME COURT DECISION BOOSTS UNCERTAINTY

The recent decision of the Supreme Court of Canada in *Tsilhqot'in v. BC* 2014 SCC 44 raises uncertainty about legal title to mineral rights in unceded areas, and the potential for increased requirements for consultation and consent from First Nations for large development projects like KSM.³⁵

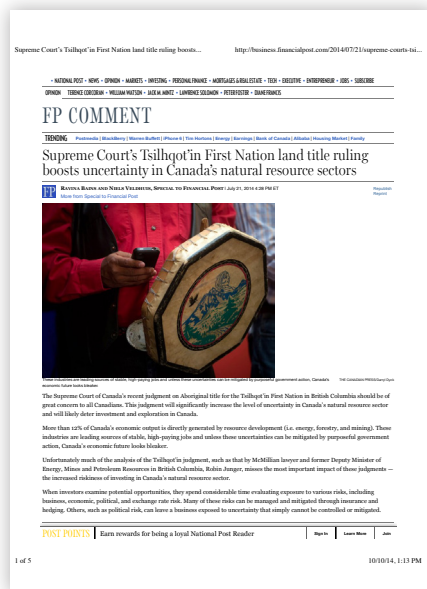
This is the first decision in Canada granting Aboriginal title, and it states that Aboriginal title can extend to all traditional territories. The court's unanimous decision allows for retroactive action. If there is a project on Aboriginal title land not supported by the First Nation, even if it has been in operation, then the government "may be required to cancel the project...if continuation of the project would be unjustifiable infringing."³⁶

In essence, this appears to provide to the Aboriginal title holding group a retroactive "veto" which may pose significant increased risk for companies who wish to develop a mining project on lands where Aboriginal title is, or may be, claimed.

“Needless to say, this judgment is a real game changer.”

— Fraser Institute, July 2014

The judgment clearly states that the application of consent from First Nations is applicable to all future Aboriginal title lands. In provinces such as British Columbia, where over 100 percent of the land is under claim by First Nations, there is a possibility that already existing economic development projects may be suspended or shut down.³⁷ According to the Fraser Institute, "Over the longer term, it will result in an environment of uncertainty for all current and future economic development projects that may end up being recognized as on Aboriginal title lands. Needless to say, this judgment is a real game changer."³⁸



Disclaimer

While this document discusses financial issues, it does not provide specific recommendations for any particular situation or circumstances, and it should not be used as a basis for investment decisions. Such recommendations can only be provided by a qualified professional advisor. This document is for informational/educational purposes only. It is not a solicitation to buy or sell anything.

ENDNOTES

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Front and back cover photos by Mike Fay