



Final Report

Kerr-Sulphurets-Mitchell Project

By Team 9:
Haily Gada
Manish Mehra
Amy Zhou
Advait Saravade



Table of Contents

1 Introduction	2
1.1 Background	2
1.2 History	3
1.3 Geology	4
2 Proposed Project Design	5
3 Environmental Impacts and Consequences	9
3.1 Surface and Underground Water Quality	10
3.1.a Surface Water	10
3.1.b Groundwater	11
3.2 Aquatic Habitats	12
3.3 Wildlife Habitats	12
3.4 Geohazards	13
4 Financial Aspects of the Kerr Sulphurets Mitchell Project	14
4.1 Capital and Operating Costs	14
4.1.a Capital Costs	15
4.1.b Operating Costs	16
5 Economic Analysis	17
5.1 Introduction and Pre-Tax Model	18
5.2 Metal Price Scenarios and Sensitivity Analysis	18
5.3 Seabridge Gold and Current Status	20
5.4 Economic Summary	22
6 Social Impact and Cultural Consequences	22
6.1 Aboriginal Relations	23
6.1.1 Issues Raised and Mitigation Measures	24
6.2 Public Consultation	25
6.2.1 Project Design Changes After Consultation	26
7 Recommendations	28
Citations	29



Overview

1 Introduction

1.1 Background

Kerr-Sulphurets-Mitchell (KSM) is an active mine exploration project which is a part of the British Columbia Golden Triangle. It is located 65 km Northwest of Stewart, British Columbia and approximately 35km Northeast of the Alaska border. It is located near the headwaters of a tributary of the Unuk River, which flows into Behm Canal near Ketchikan.

The project is one of the largest underdeveloped gold resources in the world, with proven and probable reserves totalling 38.2 million ounces, as well as 9.9 billion pounds of copper, 191 million ounces of silver and 213 million pounds of molybdenum. These are contained in 2.16 billion tonnes of resources with an average grade of 0.55 g/t Au, 0.21% Cu, 2.74 g/t Ag and 44.7 ppm Mo. The property is 100% owned by Toronto based Seabridge Gold. A Denver-based royalty company Royal Gold owns 2% net smelter return royalty on the mine.

The purpose of the project is to undertake sustainable mineral extraction activities in alignment with the goals of responsible resource development, and to foster economic growth and property in British Columbia. The project is being developed under strict regulations and best practices guidelines, where performance measures and environmental indicators - such as those relating to wildlife, fisheries, heritage and water quality - measure and report on the sustainability of the project. The implementation of standards and objectives is aimed toward maximizing the benefits of the project while minimizing the expenditure to environmental and socio-economic systems to ensure responsible resource development.



The mine has a timeline of 52 years. The estimated initial capital cost is approximately CAD\$ 5.256 Billion. BC Environmental Assessment gave it approval on July 30, 2014. Federal Approval was received on December 2014. The Key Treaty Nation signed a Benefit Agreement.

1.2 History

The KSM project area has a long history of mining. There is sparse evidence which suggests that the exploration was undertaken in the area of the project by prospectors looking for placer gold back in the 1800s. The Cassier Gold Rush of the 1870s led to a report of placer gold on the Unuk River, but this did not garner much attention due to the lack of technology and equipment. (Mertie Jr. 1921). Then, in the early 1880s, prospectors spent several years extracting gold from the gravels of Sulphide (Sulphurets) Creek. The *Minister of Mines Annual Report, 1935* states that a prospector named O'Hara was the first to find Placer Gold in 1983. He was followed by Ketchikan (Alaskan city) - based prospectors during the 1890s. Modern exploration began in the 1960s. In 1989, a 100% interest in the Kerr deposit was acquired from Western Canadian Mines by Placer Dome (Placer) and in the following year Placer also acquired the adjacent Sulphurets property from Newhawk. Seabridge Gold, a Toronto based North American resource exploration company acquired 100% of the Kerr and Sulphurets Properties in 2000. Noranda Inc. optioned the property in 2002 and carried out further exploration between 2003 and 2005. Noranda subsequently merged with Falconbridge Ltd., and was acquired by Xstrata. Thus, the property was reacquired by Seabridge Gold in 2006 after the option agreement expired. Exploration efforts on the property continued to focus on further delineating the Mitchell deposit,



expansion of the Sulphurets deposit, re-evaluating the Kerr deposit, and defining the mineral resources at the Iron Cap deposit.

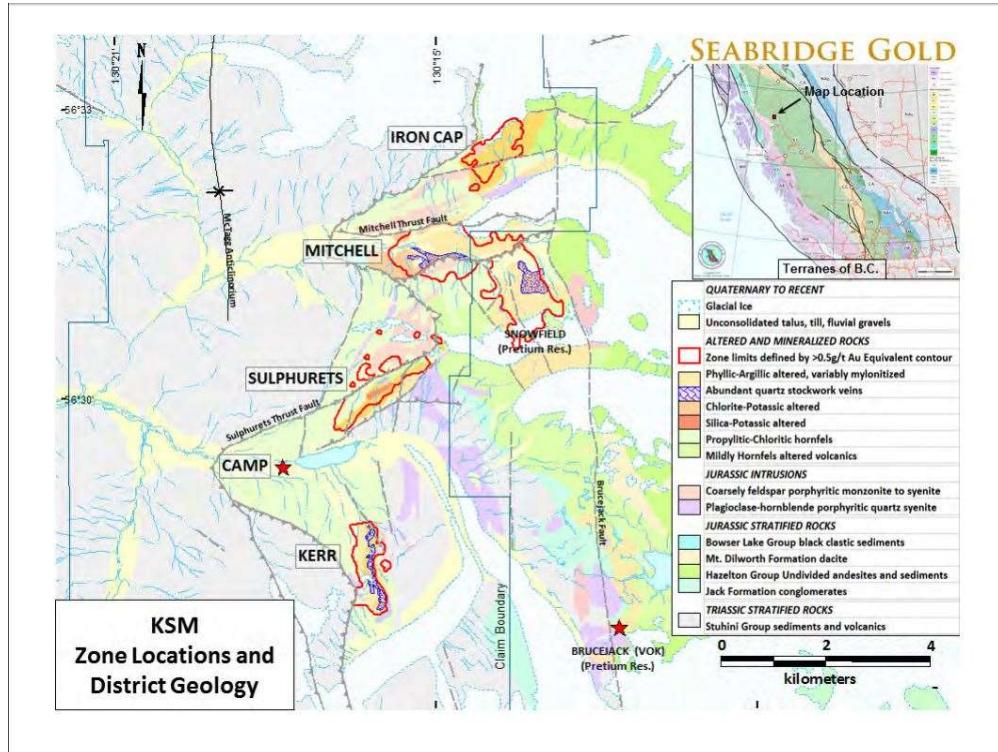
Seabridge has drilled over 126,000 m of the Sulphurets and Mitchell properties since 2006. Seabridge continued to focus on further exploration and development of the four deposits at the KSM Project between 2008-2011. In 2012, Seabridge changed its focus at KSM to search for higher temperature core zone with high-grade metals within very large porphyry systems.

1.3 Geology

The sulphurets zone is at the lowest elevations while the highest elevations of the entire valley are covered by glaciers. Pyrite and Chalcopyrite are among the main sulfides and all mineralization came from processes occurring deep below the surface (hypogene). Quartz stockwork is the main mineralization type. The deposits are in arc related Triassic and Jurassic volcanic and sedimentary assemblages of the Stikine Terrane, which lies between the crystalline intrusive and metamorphic rocks of the Coast Plutonic Complex and the sedimentary prism of the North American margin.¹ The KSM and adjacent deposits exhibit clear vertical zoning from deeper, magmatic source ores upwards through transitional volcanic-hosted porphyry and skarn zones to shallow vein systems. All the deposits are open at depth and recent exploration drilling has indicated potential for discovery for blind zones beneath thrust faults.

¹ http://seabridgegold.net/pdf/geology/KSM_Geology_update_Sep_2013.pdf





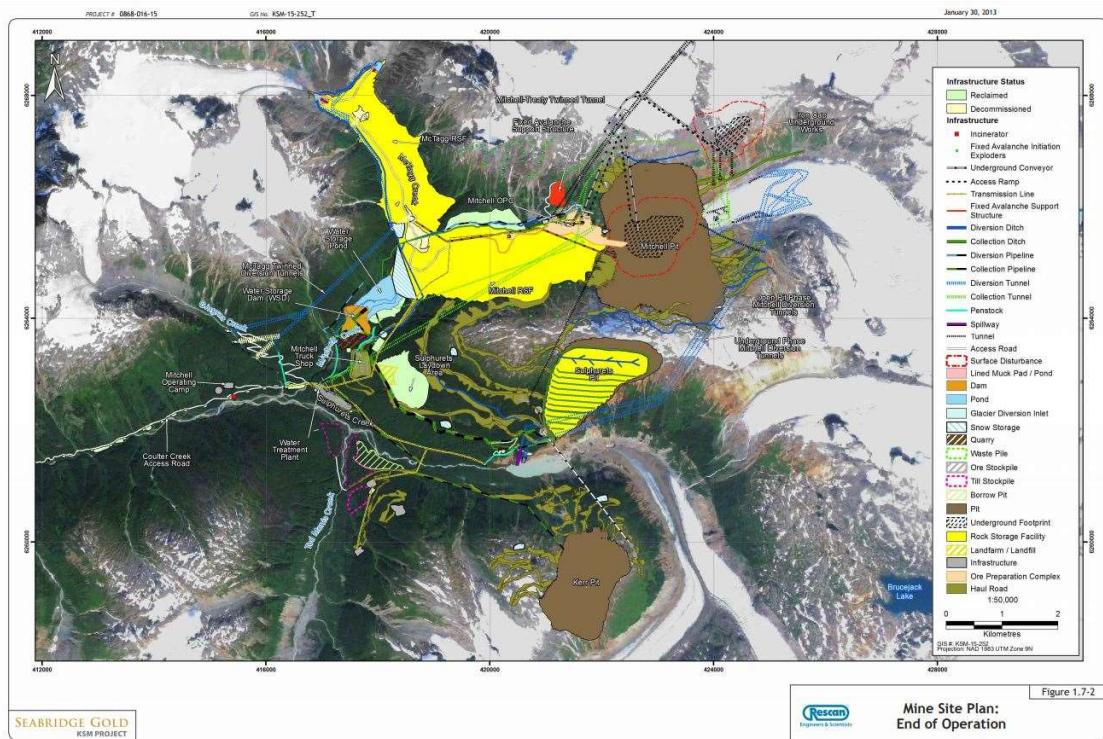
2 Proposed Project Design

The construction of the mine is estimated to take up to 5 years. It will be developed in two geographical areas: the Mine Site and the Processing and Tailing Management Area (PTMA). When operational, it will feature 3 open pit mines, 1 underground mine, a processing plant and a tailings facility. The Kerr, Sulphurets and part of the Mitchell deposit will be open pit mines. The remainder of the Mitchell deposit and the Iron Cap deposit will be mined using block cave mining method. Conventional drilling and blasting followed by shovelling and trucking will be applied at the open-pit deposits while the underground deposits will be mined using block cave mining with the help of mobile and fixed equipment, including crushers and conveyors. Ore from the mine will be crushed and conveyed through the Mitchell-Treaty Twinned Tunnels (MTT) - 2

parallel, 23 km long tunnels to the PTMA, for processing in the Treaty Ore Preparation Complex. The mine site also includes the Mitchell Pre Preparation complex, water treatment plant, rock storage areas, employee housing ranging from 40-800 person capacity, an operation camp with minimum 350 person capacity, administration facilities and storage. The PTMA is located near the upper tributaries of Teigen and Treaty creeks, in the Bell-Irving watershed. The PTMA include the Treaty Ore Preparation Complex which consists of mill and the crushing facilities, the Treaty Process Plant and carbon-in-leach (CIL) Plant and the Tailing Management Facility (TMF). The Treaty Process Plant will process an average of 130,000 tonnes per day (tpd) of ore, to produce an average of 800 to 1000 tpd of gold-copper concentrate. Ore concentrate will be transported from the PTMA for a distance of 140 km on highways 37 & 37A to the Port of Stewart, BC. Tailings will be pumped to the TMF for storage. Along with the construction of the mine site, two access road will also be constructed as the site is only accessible va helicopter:

- The Coulter Creek Access Road which will follow Coulter Creek and Sulphurets Creek to the mine site before joining the existing Eskay Creek Mine Access Road which connects to Highway 37 at Bob Quinn Lake; and
- The Treaty Creek Access Road which will provide access to the PTMA from Highway 37 via a three km segment of Forest Service Road off Highway 37, which will be parallel to the Treaty Creek.





The project will require about 177 megawatts of electricity which will be provided by the Northwest Transmission Line. The development of the project and related activities will occur over four phases:

- Construction - 5 years
 - Constructing mine site infrastructure
 - Constructing waste and water management infrastructure
 - Constructing ancillary infrastructure
- Operation - 51.5 years
 - Mining
 - Ore Processing and Transporting
 - Managing waste, water and site
- Closure - 3 years

- Site decommissioning
- Site reclamation
- Post-closure - 250 years
 - Long term site reclamation

The Influence of the Kerr Sulphurets Mitchell Project

As the development of the KSM project progresses, there are impacts that will potentially influence the environment, economy and communities on a small and larger scale. These impacts of the project are evaluated from the perspectives of the environment, economy and social influences. To evaluate the approachability of the project, both the positive development the project will bring and the potential threat are required to be considered.

As an requirement for mine development in Canada, according to the Comprehensive Study List Regulations from the federal government, the KSM project is a subject of a comprehensive study, which is conducted through the form of the Environmental Assessment. The Environmental Assessment requires approval from the British Columbia Environmental Assessment Office due to the location, and approval from the Canadian Environmental Assessment Agency from the ore production capacity. The environmental assessment is a method for numerous parties of stakeholder express their perspective on the solutions for the issues associated with the environment, economic, social factors, heritage and health effects of the industrial development of the mine. The process of the evaluation will be able to provide



opportunities for the associated stakeholders to share their input and address any concerns regarding the preceding project. Upon approval, the result will minimize the risk of detrimental effects on the local environment, communities and the economy.

3 Environmental Impacts and Consequences

The environmental impacts of any mining project are often disruptive in terms of the biodiversity, water and soil contamination. With no exception, the KSM gold mine project has a certain degree of environmental risk towards surrounding ecosystem and nature environment. With these hazards in consideration, the company may minimize the unfavorable effects through alternatives, protections or a developed compensation plan.

Through studies and surveys conducted related to the geological setting and ecosystem, there are some hazards predicted to have a great potential of affecting the nearby environment. According to the *Application for an Environmental Assessment Certificate*, these key effects can be categorized into the following²:

1. Potential effects on surface and underground water quality
2. Potential effects on fish and aquatic habits
3. Potential effects on wildlife
4. Potential effects of geohazards on the KSM project

² *Application for an Environmental Assessment Certificate* (May 2012), 32



3.1 Surface and Underground Water Quality

3.1.a Surface Water

The quality and the quality of surface and groundwater is crucial for the prosperity of the wildlifes and the local communities. As mining activities increases in the local area, the potential for metal leaching hazards may also increase with the exposure to sulphide-rich ore minerals. This is majorly a threat for the quality of surface water around the KSM project, such as the Unuk river watershed, Mitchell and Sulphurets creeks. In this case, the Unuk River is a river that will flow across the border through Alaska, and into the Pacific Ocean. Similarly, the Mitchell and Sulphurets creeks will combine with the Nass River, which has heritage values for the aboriginal communities. Therefore, the Aboriginal groups such as NLG and Tahltan and stakeholder groups such as the Alaskan communities are exceptionally concerned about the result from the degrading water quality.

Apart from the poor quality water from the impacts of the mine site, due to the acid and metal rich soil content of the area, the natural water quality is not at an excellent condition. Seabridge company will take on the responsibility to treat the current water quality, and also prevent the mining activities to further affect the surface water.

As the consequence of the potential threat, Seabridge has developed a water treatment and storage system to divert clean water away from contaminants and collect water for treatment. At the same time, within the design of the Tailing treatment Facility, the lined-walls center cell is the storage space for Carbon-leaching tailing, which prevents cyanide seepage into the environment.



Although, even with caution and prevention initiatives, the KSM project does not eliminate all possible effects on surface water. However, with close observation and developed prevention plans prior to the progress of the project, the KSM project does not expect to have residual effects on the water bodies nearby.

3.1.b Groundwater

The quality of groundwater is closely related to the quality of surface water. The current quality of the groundwater near the mine site is impacted by the naturally existing metals ores, which resulting the groundwater to be high in concentration of aluminium, arsenic, cadmium, copper, iron and selenium. Therefore, the groundwater quality pre-development of KSM project is determined to be not suitable for human consumption or the sustenance of freshwater aquatic life. However, in the nearby area, such as the processing and tailing management area, the baseline metal concentration is relatively low.

The disturbance such as mining and construction activities may cause seepage of the high baseline metal concentration into the local streams, resulting in permanent detrimental impact on the ecosystem. As an initiative to reduce groundwater seepage, preventive methods such as seepage collection dams, seepage cut-off grout curtains, seepage collection tunnels can be implemented to control the impact on the areas nearby.

At the same time, the flow of the underground is also expected to be impacted through the KSM project. This can be affected through excavation of ores during the mining process in both the open pit mine and the underground mine. Although this will likely change the flow pattern of the water stream significantly, the water level for the groundwater and watersheds is



not expected to vary. This change is confined within the nearby location of the mine, which will not affect the downstream groundwater quantity, nor quality.

3.2 Aquatic Habitats

To analyse the potential influences the KSM project may have the aquatic habitats in the nearby water bodies, a study has been done since 2007. From the assessment, the fish population in the nearby creeks and river majorly consisted of pacific salmon, Dolly Varden, bull trout, rainbow trout and steelhead. However, there is no sign of fish species within the mine area, where the water is heavily polluted by the high concentration of metal.

The previously mentioned initiative for preventing the impact of the mine on the surrounding surface and groundwater will be able to contribute to better the fish species and better the naturally occurring environment. At the same time the proponent has developed a compensation plan, where a facility will constructed as new habitats for the fish species relocated. As a result approximately 27.1 hectares of fish habitats is proposed³ to make up for the loss of aquatic habitats from the KSM project.

3.3 Wildlife Habitats

Some of the key wildlife species in the local area are mooses, mountain goats, grizzly bears and wetland birds. These species does not only play a crucial part on the balance of the ecosystem, but the local aboriginal communities rely on the local animals species for food, ceremonial and social purposes. Apart from the common local species, western toad population

³ Application for an Environmental Assessment Certificate (May 2012), 38



is found near the mine site, where western toad is listed as a species at risk according to section 79(2) of the *Species at Risk Act*.⁴ These wildlife may be impacted through the process of construction with increased human population, traffic accidents and deforestation.

As a precaution of this issue, the conveyer system of the mine is designed underground to avoid increasing human activities in the area and mitigate the effects on the moose population. At the same time, heavily populated forest areas are avoided during the process of site selection to minimize the population of forest species impacted by the project. For the area lost, such as the deforested area where the tailing management area is located, Seabridge will be able to reclaim these locations. At the same time, to minimize the impact of traffic for the wildlife species, access road will be constructed, and signs will be displayed for drivers to stay alert while driving.

3.4 Geohazards

As stated earlier in the report, the KSM gold mine is located near the town of Stewart, on the northwestern part of British Columbia. The location of the mine is situated near the border of Alaska, in a geological setting called “Stikinia”. In this particular form of geological setting, the location is mountainous with steep and rugged hills, high sea elevations and receding glaciers. This geological setting has a high exposure to avalanches and snowfield landslides, especially throughout the month of October. These naturally occurring events will cause damage for the mine sites, mineral ores and death for the workers.

Although most of the geohazards cannot be prevented, mining activities such as construction and large operations may also cause geohazards. To prevent causing any additional

⁴ Application for an Environmental Assessment Certificate (May 2012), 43



geohazards near the mine site, the construction activities should be planned based on the geological material of the location, the time of the operation and most importantly the usage of the appropriate techniques for different circumstances.

At the high altitude and the unstable geography at the mine site location, geohazards such as avalanches and snow slides are unavoidable. As a part of the design for the mine site, there are emergency evacuations in case for any emergency events that may occur. The management plan includes monitor and predicting the future disasters, and make preparations. With appropriate management plan, the mine is able to accept a certain level of impacts.

4 Financial Aspects of the Kerr Sulphurets Mitchell Project

There are several aspects from which this project can be viewed from. Seabridge Gold has made plenty of estimations and analysed several aspects of the economics to ensure and keep the Federal and Provincial governments' trust and funding. Since construction and work on the mines hasn't started yet, the calculations for the costs and are just very accurate, thorough estimations.

The finance of the project can be summarized briefly into the capital and operating costs.

4.1 Capital and Operating Costs

For a project of this size, with some of the largest deposits you can find, estimating the costs and returns can be challenging. To get a more accurate estimation, Seabridge Gold consulted with several consulting companies and based all numbers on the Bank of Canada three-year average of CDN\$1.00 to US\$0.96.



4.1.a Capital Costs

With the help of the following consultants:

- MMTS - mine capita costs, rock RSF and pit area pioneering
- Allnorth - WSD, tailing starter dams, and surface water management earthworks based on KCB designs and quantities
- Stantec and KCB - tunnelling
- Tetra Tech - process plant and associated infrastructure costs including plant site preparation, conveying, tailing and reclaim water piping, and pumping
- Brazier - permanent power supply, MTT conveyor electrical and fire detection, mini hydro plant, and energy recovery systems
- McElhanney - permanent access roads
- EBA - winter access roads

Seabridge was able to get an accurate value for the initial capital cost of US\$5.256 B with an expected accuracy range of +25/-10%.⁵ With initial costs this high, and 4770 jobs created for during the 5 year mine construction, the KSM mines would help boost local economies and the provincial economy. During the construction period, the project will also generate close to CDN\$6 B for canada.

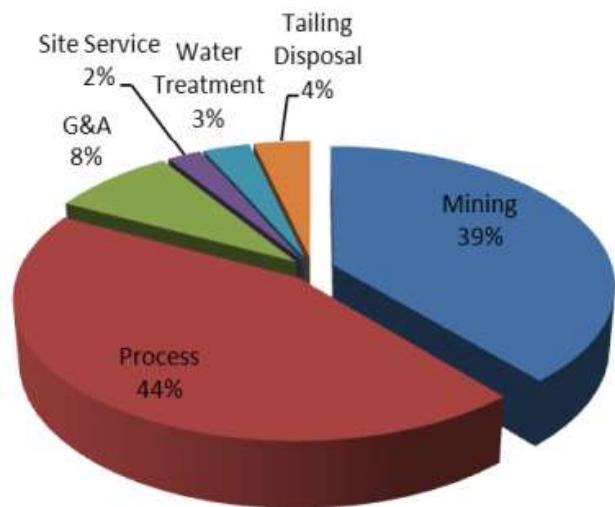
⁵ <http://www.sedar.com/CheckCode.do> section 21.1



4.1.b Operating Costs

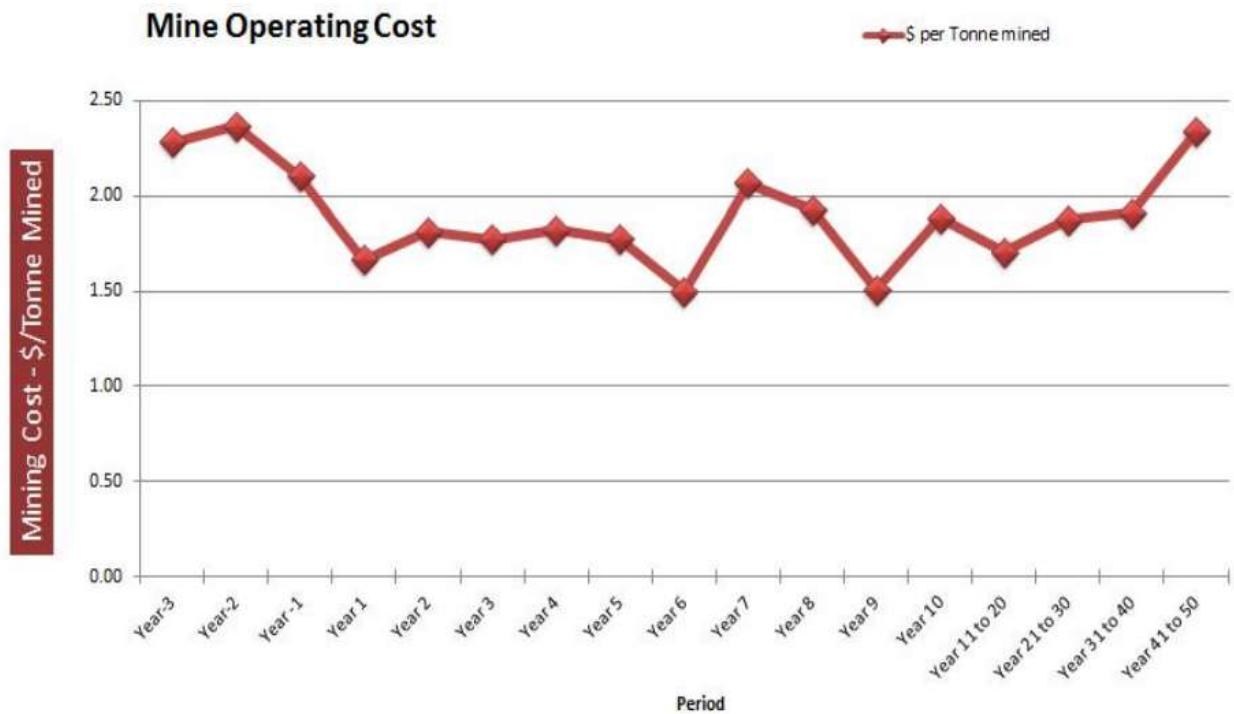
KSM, for the first 25 years, is an open pit mining operation, for which the operating cost is higher than an underground operation of this scale. The operating cost for this project was estimated at around US\$13.72/t milled and the estimate for an average daily processing rate is 130,000 tonnes. Here you can see the summary of the costs and its distribution:

	\$US/t milled
Mine	5.31
Milled	6.03
G&A and Site Service	1.45
Tailing and Water Treatment	0.95
Total Operating Costs	13.72



These values are excluding the operating costs for when the mines are in construction, and the operating cost per tonne milled has an accuracy range of +25/-10%.

For the Mine and the open pit operations, the costs are derived from labour, maintenance, major repairs, fuel, as well as blasting costs. The number values obtained for these are from several similar projects, combination of supplier quotes and historical data that has been collected. The following graph shows the costs for the mine operations and its stability over the life of the mine.



For when the Mitchell mine goes underground, its operating cost decreases since the method being used is block caving, which boasts a higher mining efficiency and less use of power and labour.

5 Economic Analysis

As for the economics, for a project of this scale, there are many ways you can look at the collected data. Consulting companies all have their own way to collect and use data and all are valid, but Seabridge Gold went with the following methods of analysis.

5.1 Introduction and Pre-Tax Model

The economic evaluation for Seabridge for this project was done by Tetra Tech and is based on a pre-tax financial model. The parameters used were:

- 11.5% Internal Rate of Return
- 6.2-year payback on the US\$5.256 M capital
- US\$4,511 M Net Present Value at 5% discount rate and US\$1,614 M at 8% discount rate.

The production revenues were calculated with the average grades of each metal, the total production and the base case prices using a three-year trailing average for each metal, which is illustrated by:

	Years 1-7	Years 1-20	LOM
Total Tonnes to Mill (000s)	310,062	926,916	2,164,419
Annual Tonnes to Mill (000s)	44,295	46,346	39,353
Average Grades			
Gold (g/t)	0.79	0.67	0.549
Copper (%)	0.234	0.180	0.207
Silver (g/t)	2.385	2.737	2.740
Molybdenum (ppm)	46.2	61.4	44.8
Total Production			
Gold (000s oz)	5,959	15,003	27,959
Copper (000s lb)	1,364,880	3,024,655	8,075,101
Silver (000s oz)	14,712	50,154	120,826
Molybdenum (000s lb)	9,067	41,477	62,679
Average Annual Production			
Gold (000s oz)	851	750	508
Copper (000s lb)	194,983	151,233	146,820
Silver (000s oz)	2,102	2,508	2,197
Molybdenum (000s lb)	1,295	2,074	1,140

Base case prices (as of April 15, 2012):

- Gold - US\$1,330/oz
- Copper - US\$3.45/lb
- Silver - US\$25.20/oz
- Molybdenum - US\$15.00/lb

5.2 Metal Price Scenarios and Sensitivity Analysis

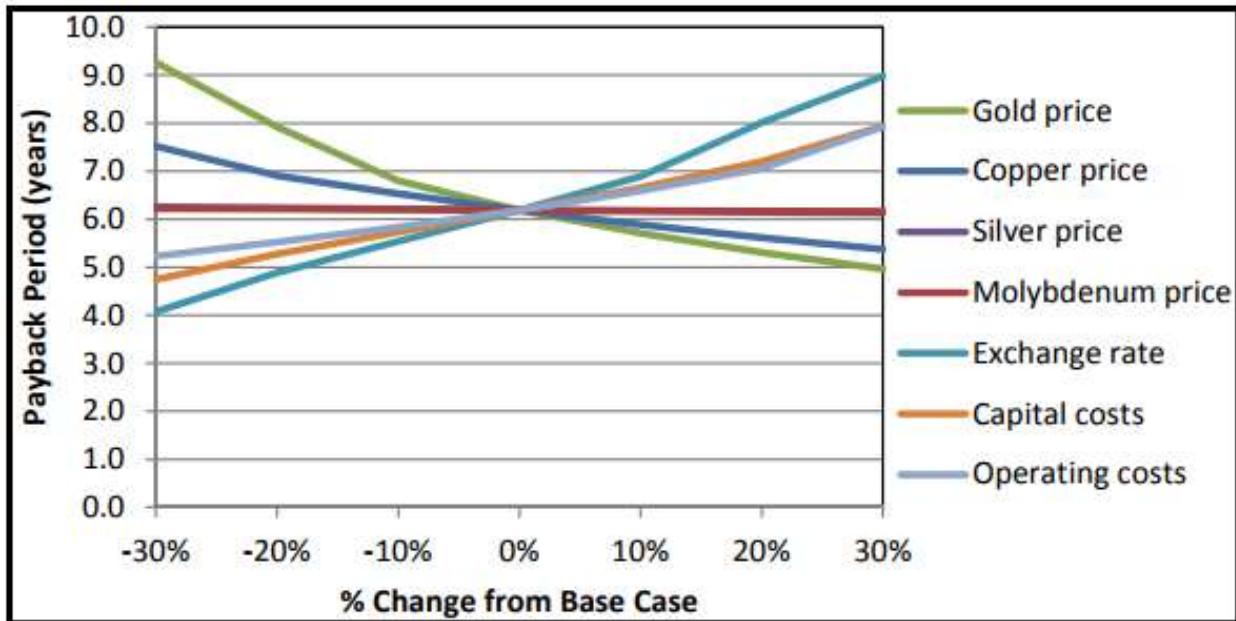
In addition to the base case prices of the metals, two other metal price scenarios were developed for the KSM project. One of them considered the closing rate of the same day (April

15, 2017) and the other did the calculations based on a price for the metals that was 20% lower than the base case rates.

	Unit	Base Case	Spot Price Case	Alternate Case
Metal Price				
Gold	US\$/oz	1,330.00	1,650.00	1,320.00
Copper	US\$/lb	3.45	3.75	3.00
Silver	US\$/oz	25.20	32.00	25.60
Molybdenum	US\$/lb	15.00	15.00	15.00
Exchange Rate	US:Cdn	0.96	1.00	0.96
Pre-tax Economic Results				
NPV (at 0%)	US\$ M	20,473	31,160	16,776
NPV (at 3%)	US\$ M	8,196	13,137	6,612
NPV (at 5%)	US\$ M	4,511	7,748	3,503
NPV (at 8%)	US\$ M	1,614	3,503	1,031
IRR	%	11.53	14.73	10.35
Payback	Years	6.19	5.16	6.68
Cash Cost/oz Au	US\$/oz	141.30	60.04	263.54
Total Cost/oz Au	US\$/oz	597.60	535.35	719.84

As the results depend on parameters including the metal prices, the exchange rates, capital expenditure and the operating costs, sensitivity analyses were carried out for them. This helped calculate an accuracy range for all and point out any inconsistencies that stood out.

Table showing the Sensitivity Analysis of the Pre-Tax Payback Period:



5.3 Seabridge Gold and Current Status

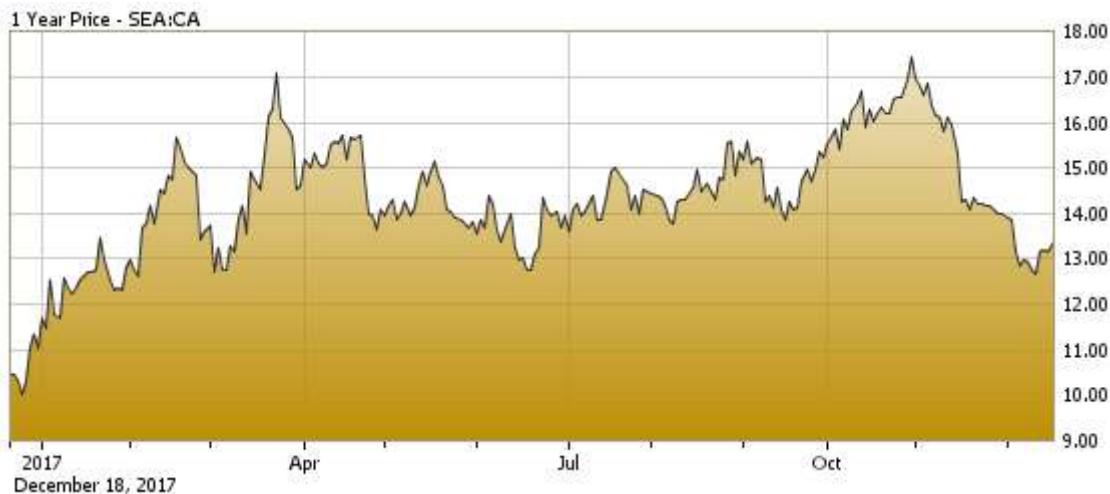
Currently, over 30% of the common shares are owned by the employees and members of Seabridge Gold. The major shareholders in this project include:

- National Bank
- Century Management
- Van Eck Associates
- Weiss Asset Management
- Toronto Dominion Bank
- Sprott Asset Management
- Fidelity
- Friedberg Mercantile Group

- Royal Gold Inc.
- Paulson & Co

KSM is also subject to a royalty of 1% of the NSR payable to Barrick Gold Corp. and it is capped at CDN4.5 M. The full amount has to be paid in year 1. As of November 2017, Seabridge Gold have no outstanding debts or hedges and have a current market capitalization of CDN\$850 M.

The current stock quotes for both Toronto Stock Exchange (TSX) and New York Stock Exchange (NYSE) show a steady increase over the last week (as of December 18th). Here is the quote for the one year (DEC 18th, 2017-DEC 18th 2018) for the TSX:



Here is the quote for the one year (DEC 18th, 2017-DEC 18th 2018) for the NYSE:



5.4 Economic Summary

Seabridge Gold has a 100% stake in the KSM project, and once production has started, the profits can be significant, with an estimate of CDN\$42 B generated GDP for Canada. The average annual GDP estimates are around CDN\$400 M and that value doubles if the mine is at full production. Since 2006, Seabridge Gold has spent a total of CDN\$200 M in exploration, and both engineering and environmental work towards moving the mine into production. With having both Provincial and Federal governments' approvals, as well as permits for early stage construction, KSM can be up and running very shortly. The one main issue is the required funding.

6 Social Impact and Cultural Consequences

Mines often have a large impact on the local community, the provincial community, and the national community in which they operate. The impact can be greatly positive, or greatly negative depending on factors that are *unique to each mine*. Mines must identify the factors that lead to the improved well-being of all stakeholders. Listening to and working on the concerns of local, national, and sometimes international stakeholders, is a crucial part of a mine's development in an area.

The Seabridge Gold Kerr Sulphurets Mine is an excellent example of how the local community can be included in the mine's overall development. Since the discovery of the Mitchell deposit in 2006, Seabridge Gold has been proactive in providing opportunities for the public to comment

on its KSM project in northwestern British Columbia. Local feedback has led to the development of programs and initiatives to facilitate community readiness for mineral development. Active consultation led to the First Nations stakeholders agreeing to many of the mine's projected decisions.

6.1 Aboriginal Relations

There are over 6 aboriginal groups that are directly affected by the KSM mine:

- Nisga'a Nation
- Tahltan
- Gitxsan
- Gitanyow
- Skii km Lax Ha
- Métis Nation British Columbia

The management led the participation throughout the process by sharing project information, participating in working group meetings, hosting site visits, community meetings and open houses. The engagement included sharing reports before submitting to national agencies, providing funding for aboriginal groups, and listening to representatives and technical experts of aboriginal groups. These activities helped identify community concerns about the potential adverse impacts on Aboriginal Rights. The learning from these interactions was the leading ideology while preparing the proposed mitigation measures for the National Instrument 43-101.



6.1.1 Issues Raised and Mitigation Measures

Following is an executive summary of the list of issues that were raised by the Aboriginal communities, and the respective mitigation measures that were presented by KSM.

Concerns	Mitigation Measure
<p>Location of Mine Site</p> <p>The Tahltan and Skii km Lax Ha indicated that direct changes to wildlife and loss of habitat at the Mine Site could affect the availability of wildlife resources.</p> <p>The Tahltan also expressed concern that impacts from the Mine Site on water quality in the Unuk River could adversely affect Pacific Salmon, a species of great cultural importance to the Tahltan and other Aboriginal groups.</p>	<p>Mitigation of Mine Site Impact</p> <p>Diverting non-contact surface water away from the Mine Site</p> <p>Treating all contact water to reduce contamination in downstream water bodies such as the Unuk River below the naturally occurring fish barrier</p> <p>Maintaining baseline levels to the extent possible in areas of the Unuk River where Pacific Salmon are found.</p>
<p>Process and Tailing Management Area</p> <p>PTMA would reduce the availability of wildlife habitat for moose, mountain goats, grizzly bear, and other culturally important fur-bearing species.</p> <p>The Skii km Lax Ha and Tahltan indicated that their peoples' ability to practice potential Aboriginal rights to harvest these species would be diminished due to these habitat changes.</p>	<p>Mitigation of PTMA Impact</p> <p>Implement habitat compensation plans for fish and wetlands displaced by PTMA infrastructure.</p> <p>Effects on creeks and rivers downstream from the PTMA will be prevented through measures to control seepage and prevent downstream contamination while meeting provincial and federal standards for water quality and the protection of aquatic life.</p>
<p>Transportation Route</p> <p>Project-related traffic will travel along Highway 37 from the Treaty Creek Access Road.</p> <p>All groups were concerned that the rise in</p>	<p>Mitigation of Transportation Route Impact</p> <ul style="list-style-type: none"> ● Implement a Traffic and Access Management Plan, which includes: noise suppression technologies, and providing safety training to truck drivers to minimize hazards to both



<p>truck traffic will adversely affect the moose population by hindering movement of moose across the highway and increasing moose mortality due to collisions with vehicles, consequently impacting the availability of moose for these groups to hunt.</p>	<p>humans and animals along the transportation route.</p> <ul style="list-style-type: none"> ● Requiring drivers to document collisions with wildlife.
--	---

6.2 Public Consultation

KSM has been engaging public stakeholders since 2008, including holding public open houses in several BC and Alaskan communities. Activities included information sharing, general face-to-face consultation with community members, and key stakeholder meetings.

Specifically, the management:

- Created public notices to share information with the public as well as advertise for community meetings.
- Created the KSM Project website to provide project information, EA documentation, and notifications.
- Held several public information sessions to provide information to the general public and other interested stakeholders and to offer the opportunity to provide comments on the project.
- Held meetings with specific stakeholders, including Rivers without Borders, Rivers West, Ketchikan business leaders, Tlingit-Haida Central Council of Alaska, and the Southeast Alaskan Tribal Council to provide information on project design and to identify concerns of the public.



Comment type	Summary of Issues Raised
General Process	<ul style="list-style-type: none"> • Inadequate timelines associated with the public comment period for the EIS and KSM EA review • Lack of federal / provincial lead public meetings in Alaska • Lack of consultation with the Tlingit, Haida, and Tsimshian tribes of Alaska • Insufficient bonding requirements to safeguard for accidents and malfunctions and remediation
Transboundary Concerns	<ul style="list-style-type: none"> • Risk to commercial and recreational fisheries in Alaska • KSM study area does not include Alaska
Impacts to fish and fisheries	<ul style="list-style-type: none"> • Risk to commercial Aboriginal and recreational fisheries in the Nass watershed • Potential eutrophication in system downstream of the TMF from nitrogen and phosphorous loading • Uncertainties in impacts to fish habitat and the proposed compensation plan
Socio Economic	<ul style="list-style-type: none"> • Project will produce jobs and other economic opportunities in northern BC • Social impacts to northern BC
Human Health	<ul style="list-style-type: none"> • Risks to human health from water quality degradation
Wildlife	<ul style="list-style-type: none"> • Impacts to wildlife from additional roads and road use • Risk to the moose population in the Nass watershed
Project Design	<ul style="list-style-type: none"> • Uncertainties with the treatment of selenium on the Mine Site • Uncertainties with the geomembrane liner for the CIL cell of the TMF and its ability to contain contaminants of special concern • Risks to project components as a result of extreme weather events or earthquakes • Closure period (250 years) is too short • Uncertainty in the extent of groundwater seepage
Cumulative Effects	<ul style="list-style-type: none"> • Cumulative impacts from excess mining activity

A summary of the Public Comments received during the period of consultation.

6.2.1 Project Design Changes After Consultation

After multiple consultation rounds, the mine management had a better idea of the expectations and concerns of public, specifically the potential effects and consequences of the mine project on key stakeholders. Project design specifications were modified in response to the comments submitted by both national and international parties. Key decisions by mine management and their reasonings include:

- **Relocating the tailings management access road from Teigen Creek Valley to Treaty Creek Valley** - In an effort to reduce stream crossings and potential impacts of discharge

on salmon population, mountain goat and western toad habitat, wetlands, and eleven archaeological sites.

- **Eliminating the Sulphurets Rock Storage Facility** - In an effort to reduce the potential metal leaching into Sulphurets Creek.
- **Modifying the mining method of Mitchell Pit and Iron Cap Pit by replacing open pit mining with a partially underground method** - In an effort to improve safety and reduce waste rock generation by 21 percent for the Mitchell Pit and 99 percent for the Iron Cap Pit.
- **Moving the transmission line to the Treaty Creak Access Corridor** - In an effort to minimize vegetation loss and wildlife impacts associated with the creation of another linear corridor.
- **Backfilling the mined-out Sulphurets Pit with Kerr Pit waste rock, installing an impermeable liner, and a selenium treatment plant** - In an effort to reduce selenium impacts and decrease the amount of discharge that is added into the Sulphurets Creek watershed.



7 Recommendations

The KSM mine management took the documentation submitted by the technical advisors, including the EIS and associated amendments, and the views of the public, government agencies, and Aboriginal groups into account in determining whether or not the mine is likely to cause significant adverse environmental effects. All of which led to the creation of strong mitigation and prevention proposals for environmental and social impacts, along with comprehensive mining strategies, allowing us to conclude that the KSM Project is not likely to cause significant adverse environmental or social effects. Employment of First Nations communities in the project is expected to provide multi-generational jobs over the 50-55 year lifespan of the mine. The significant financial influx is also expected to aid local infrastructure development, and have a highly positive influence on the ability of the local peoples to develop a better, more vibrant future by relieving geographical dependencies and introducing highly skilled technical knowledge.



Citations

- *Application for an Environmental Assessment Certificate*, May 2012, ksmproject.com/wp-content/uploads/2012/05/KSM-Executive-Summary-lores3.pdf.
- Savell, Mike , and Bill Threlkeld. *The KSM Project – A Cluster of Porphyry Related, Deformed and Dismembered Au-Cu-Mo Deposits Displaying a Transition from Deep Porphyry to Shallow Vein Environments*, Seabridge Gold Inc, seabridgegold.net/pdf/geology/KSM_Geology_update_Sep_2013.pdf.
- *Kerr-Sulphurets-Mitchell Mine Proposal*. Rivers without borders, 2011, riverswithoutborders.org/wp-content/uploads/2011/11/KSM-Briefing-2011_10.pdf.
- *KSM Project - Comprehensive Study Report*. Canadian Environmental Assessment Agency, July 2014, www.ceaa-acee.gc.ca/050/documents/p49262/99565E.pdf.
- Seabridge Gold, seabridgegold.net/quotes.php.
- *Seabridge Infographic 2017*. Seabridge Gold Inc, ksmproject.com/wp-content/uploads/downloads/2017/01/Seabridge-Infographic_2017_PRESS_no_bleed.pdf.
- *Seabridge Gold*. en.wikipedia.org/wiki/Seabridge_Gold.
- *Kerr Sulphurets Mitchell*. en.wikipedia.org/wiki/Kerr_Sulphurets_Mitchell.
- “Seabridge Gold files KSM Project Technical Report.” *Nasdaq*, Seabridge Gold Inc, 7 Nov. 2016, globenewswire.com/news-release/2016/11/07/887263/0/en/Seabridge-Gold-Files-KSM-Project-Technical-Report.html.
- “2012 KSM Prefeasibility Study.” *Tetra Tech*, Seabridge Gold, 22 June 2012, drive.google.com/file/d/1NxvR0Is63mVQ3HFPTP-PpAsCCBnyRCOt/view.