October 25, 2022

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Impact Assessment Agency of Canada
Prairie and Northern Region
Canada Place, Suite 1145-9700 Jasper Avenue,
Edmonton Alberta, T5J 4C3

Attention: Jennifer Dallaire, Project Manager, Prairie and Northern Region

Dear Ms. Dallaire:

RE: Summit Coal Inc. Mine 14 Project – AWN Designation Request – Additional Questions

Summit Coal Inc. (Summit) met with the Impact Assessment Agency of Canada (IAAC) on October 19, 2022 to discuss Summit's previous submission related to the Aseniwuche Winewak Nation of Canada (AWN) Designation Request. The IAAC indicated they had two additional questions related to selenium and indigenous consultation, and that the Minister of Environment had received four letters from other indigenous communities that supported the AWN's Designation Request. The IAAC provided the two questions and the four letters on October 19, 2022 and requested that Summit provide a response by October 25, 2022.

This submission provides Summit's response to the IAAC questions. If you have any questions or comments regarding this submission, please contact me by phone at (403) 750-9322 or by email at <Email address removed>

Regards,
Summit Coal Inc.

<Original signed by>

Shaun McNamara, Director, Environment and Safety

cc. Kyle Mitton, Summit

Dane McCoy, MEMS

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SUMMIT COAL INC. IS A SUBSIDIARY OF MAXIM POWER CORP.

Mine 14 Project

Impact Assessment Agency of Canada – Designation Request (AWN)
Additional Questions from October 19, 2022 - Responses

Prepared by:
Summit Coal Inc.

Prepared for:
Impact Assessment Agency of Canada

October 25, 2022

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1.0 IMPACT ASSESSMENT AGENCY OF CANADA REQUEST

On October 19, 2022 the Impact Assessment Agency of Canada (IAAC) provided Summit Coal Inc. (Summit) with two additional questions and copies of four additional letters from various indigenous communities supporting the Aseniwuche Winewak Nation (AWN) designation request.

The following questions were posed to Summit:

1. *The Agency understands that Summit Coal Inc. (Summit) expects that there is no risk of selenium liberation from the Mine 14 Project.*
    a. *The Agency is seeking further information, if any, to support this assertion, beyond the general context of the Project being an underground mine, for example any studies that have been carried out in relation to the Project or existing environment.*
    b. *The Agency is seeking clarification as to whether Summit is planning any monitoring to validate this expectation.*
        i. *What standards or triggers would be applied to any selenium monitoring?*
    a. *Is there any management or mitigation planned in the event selenium is liberated from the Mine 14 Project?*
2. *The Minister received four additional requests for designation of the Project from Duncan's First Nation, Cadotte Lake Métis Nation, Ermineskin Cree Nation, Whitefish Lake Nation #128 (attached), which set out potential adverse effects within federal jurisdiction.*
    a. *Are there any updates on discussions, or planned discussions, with these groups including the original requesters Aseniwuche Winewak Nation (AWN), on the potential effects within federal jurisdiction?*
    b. *Are there any updates on discussions, or planned discussions, with affected Indigenous groups regarding cumulative effects within federal jurisdiction?*

This document has been prepared in response to these questions.

2.0 SELENIUM GENERATION

To understand how an underground mine could possibly produce no meaningful selenium, one must first understand how selenium releases occur. Many case studies have been done on selenium releases as it relates to surface or open pit mining however no readily available case studies have been done on underground mines; the reason for this is clear once it is understood how selenium is released. The underground mining process provides natural mitigation for selenium release due to the inherent nature of the mining process, as compared to open pit mining process.

2.1 Mining Process and Selenium Release

In this section Summit has described the relationship between mining and selenium release. Several references are highlighted to provide a comprehensive understanding of how selenium is released, which inherently allows one to understand how to avoid it in the first place.

Mining and selenium are discussed in Antweiler, 2015, which states: "*Open-pit and surface mining of coal produces large amounts of waste rock—also known as overburden. Runoff from this waste rock can release large amounts of selenium that eventually reaches rivers and lakes. Selenium tends to concentrate with the sulfur-containing minerals. Once exposed to air, it tends to oxidize into selenite or selenate. When selenite and selenate are exposed to water, these species of selenium will leach out from the rock.*

In Teck, 2022, they state: "*The mining process generates large quantities of leftover rock that contains naturally-occurring substances such as selenium, an element that is essential for human and animal health in small amounts. Water from both precipitation and runoff flows through these rock piles and carries selenium and other substances, such as nitrate, into the local watershed. If present in high enough concentrations in the watershed, these substances can adversely affect aquatic health"*).

The following is an excerpt from a document submitted by the Cabin Ridge Project (June 2021 to the Alberta Coal Policy Committee) that was prepared by Borealis Consulting Inc. and McKenna Geotechnical (Cabin Ridge Project 2021) that speaks to the process of selenium release from mining:

"*Water quality concerns have focussed on elevated selenium in water courses downstream of metallurgical coal mines. Selenium management, an important environmental consideration for Alberta's Rocky Mountain metallurgical coal mining sector, is the topic of this state of practice review.*

Selenium is a naturally-occurring metalloid in bedrock, with properties similar to those of sulphur. When oxidized, it can be leached by precipitation and groundwater, seeping through rockpiles from both coal

and metal mines, notably from those in the Canadian Rockies. In certain chemical forms, selenium can be biomagnified in receiving waters, where it has the potential to affect reproduction and development of aquatic birds and fish. Elevated selenium in drinking water can also affect humans directly and through water used for agriculture, however, this is less of a concern relative to ecological risk. In Canada, coal-mining effluents, and their environmental effects, are regulated stringently, both provincially and federally.

Since 1995, selenium has been identified as a significant chemical of concern in water exiting coal mines in British Columbia and Alberta. Guidelines for water quality have been developed and significant effort has been devoted to understanding the impacts of selenium, with a focus on measures to limit its loading in receiving waters downstream of mines. Background concentrations of 1–2 µg/L are common in the region, and – depending on the level of mitigation - concentrations are often one to two orders of magnitude higher downstream of existing mine rockpiles. The vast majority of the selenium is released from mine rockpiles (mining landforms built by drilling and blasting the bedrock above and between coal seams). The volume of mine rock is typically 10 times the volume of mined coal. The mine rock is loaded and hauled into permanent rockpiles that are typically 50 to 400 m high and can cover many square kilometres. Mine rock is also used to backfill mined-out pits."

Surface, or open pit mining, involves the blasting and removal of overburden strata overlying the coal seams along with the subsequent removal of those underlying coal seams for shipment to markets. This process breaks these overlying rocks that may have been considered in their natural condition as "solid" into fragments that can be handled by earth-moving equipment. These sizes would range from several metres in diameter, down to silt- or clay-sized particles. This increases the surface area of the material by orders of magnitude compared to their natural state. These orders of magnitude increases in surface area exposes minerals to weathering process (i.e. oxidation) that had not been active in their intact "solid" state. Runoff (rain/snow melt) from this waste rock has the potential to release selenium that can potentially reach waterways.

In summary:

- Blasting of overburden overlying the coal breaks it into small pieces, exposing much more surface area of the rock to weathering than had been the case with intact "solid" rock;
- Although the overburden has contained natural selenium-bearing minerals since it was originally deposited, the general absence of oxygen and water has prevented any "natural" oxidation and transport from occurring;

- Placing the overburden in rock dumps where it is subject to oxidation and weathering processes, allows for the mobilization of selenium; and
- Movement of precipitation through the rock dump provides the mechanism to move the oxidized selenium out of the rock dump and into surface waterways.

It is clear that the key to avoiding selenium releases from mining requires avoiding or minimizing waste rock and preventing oxidation of said waste rock.

2.2 Typical Open Pit Compared to Underground Mine

2.2.1 Open Pit Mine Scenario

In a typical open pit mine, it is common for the mine to move 10 parts/tonnes of waste rock for each part/tonne of coal that is mined (referred to as a 10:1 strip ratio). Mine 14 is proposing to mine 1.3 million raw metric tonnes (RMT) of coal per year, so in this example, ***if Mine 14 was an open pit mine*** it would need to remove 13,000,000 tonnes of waste rock. Mine 14 has an estimated 9- year production life, so in this example whereby Mine 14 is a surface mine, a 9-year mine life would result in the removal of 117,000,000 tonnes of waste rock over the life of the project. This waste rock would need to be permanently stored on the surface and be therefore subject to weathering and selenium generation processes.

If this project was conceptualized as an open-pit operation, this is a substantial volume waste rock that would need to be stored/disposed of in waste rock dumps. As discussed in Section 2.1, the waste rock would be subject to the weathering processes, where precipitation would infiltrate the dump and eventually exit, and over time might contain elevated levels of selenium. In this scenario, a selenium management process would be required from the initial dump construction to the collection and management of the seepage from the dumps.

The geological formations found in the vicinity of Grande Cache area are known to contain selenium and, in this example, elevated levels of selenium in surface water would likely be expected and subsequent management would need to be implemented.

2.2.2 Underground Mine – Planned Scenario

Mine 14 is expected to produce approximately 1.3 million RMT per year for the 9-year life of the mine. It is expected the mine will remove from 0.5 to 3% waste rock from the underground workings. By comparison to the surface mining example, this means that approximately 6,500 to 39,000 tonnes of non-coal rock annually will be brought to surface that could contain selenium-bearing minerals. While this sounds like considerable volume of material, it represents between 330 to 2000 times less waste rock as compared to an equivalent open pit

surface mine. Furthermore, this waste rock will be subsequently returned underground for disposal and will only be stored on the surface for a short period of time while the underground mining advances sufficiently to allow for room to move it back into the underground. Additionally, when returned underground for disposal, the waste rock can intentionally be placed at lower levels of the mine where groundwater will once again saturate it to inhibit oxidation of selenium-bearing minerals. Neither the volume of rock handled, nor the time exposed on the surface would allow for sufficient weathering to occur to the extent that harmful selenium levels would be observed.

With the underground development of Mine 14, no external rock dumps are planned. This means that there is no waste rock materials permanently stored on the surface which could lead to harmful selenium levels. To be specific, an underground mine significantly reduces the possibility that a selenium problem will occur from within the mine for the following reasons:

- There is no breaking and pulverization of the overlying rock column to produce new surfaces for oxidation of selenium-bearing minerals, as is the case with open-pit mining;
- Although groundwater may drain from the overlying strata and into the mine, there is almost no enhancement of the fractures and joints to allow advanced oxidation to occur within the overburden column; and
- There is no reasonable expectation that water from within the mine will contain harmful concentrations of selenium.

2.2.3 Comparison

In summary, the underground mine scenario will only produce 39,000 tonnes per year of waste rock that would have potential to generate selenium, compared to 13,000,000 tonnes generated by a similar size open pit mine. The two operations generate completely different volume of mine waste rock and the material from Mine 14 will be permanently disposed of underground back into the mine where weathering will not occur. Summit is confident in stating that harmful levels of selenium generation from Mine 14 will not occur but is committed to monitoring for elevated selenium at the mine site and nearby waterways with a commitment to mitigate if elevated selenium levels are found to be from the Mine 14 project.

2.3 Water Management and Monitoring

While Summit is confident that Mine 14 will not generate increased levels of selenium, a robust water management and monitoring program will be conducted. It is expected that provincial regulators will require selenium monitoring and management and Summit will commit to a selenium monitoring and management program.

2.3.1 Water Management

The portal site is located within the drainage area of Carconte Creek, a tributary to Grande Cache Lake. Clean water runoff from the upstream watershed will be diverted around the active site while on-site measures will control site drainage. The drainage strategy for the portal site consists of:

- Construction of drainage berm/ditches systems intercepting flows from external areas upslope of the portal and diverting clean flows to bypass the portal site;
- Construction of internal drainage ditches and road swales conveying all stormwater runoff towards the sedimentation ponds;
- Construction of sedimentation ponds to store all surface runoff/stormwater from the disturbed lands and is designed to settle suspended particles;
- Construction of mine water pond to store groundwater that will be pumped from the underground mine. This pond will be used to store water for use in the underground mine and on the surface and also acts as a sedimentation pond; and
- Use of the proposed treated wastewater pond to complete water demand at the portal site.

The total storage capacity of the three proposed ponds will be approximately 30,000 m^3. Stored water is to be re-used within the portal site according to operational water demand of the mine operation. Release of water into the natural drainage courses may be required after rainfall events depending on the water levels in the containment ponds. Controlled release will occur only when meeting water quality requirements as specified by the site Alberta *Environmental Protection and Enhancement Act* (EPEA) and Water Act Approvals.

With the diversion of freshwater around the mine portal area, flows in the local tributaries will be maintained. Only precipitation that falls on the mine portal area (53.5 ha) and groundwater removed from the mine workings will need to be managed. There are no other sources of wastewater associated with the Project.

2.3.2 Monitoring

Summit will implement a program for monitoring discharges from the mine portal area to ensure that it meets water quality standards before discharge as per any Approval conditions. All site water that will be released to the adjacent environment will be monitored and tested prior to release. Summit will also monitor downstream sampling locations. Selenium will be monitored as part of the program.

All monitoring will be reported as required by the site EPEA and Water Act Approvals.

2.4 Upset Limits and Conceptual Mitigation

In the unlikely event that selenium levels in the mine wastewater show trends of increasing, Summit will use adaptive management and develop an appropriate plan.

2.4.1 Upset Limits

Alberta has adopted the BC limit for total selenium of 2 µg/l for the protection of aquatic life. Open pit mines are generally not able to achieve the 2 µg/L water quality guidelines in downstream receiving environments, and consequently have developed (or are developing) site-specific water quality objectives. Site specific guidelines can vary substantially from mine to mine, typically varying from 5 to 20 µg/l.

Recent (2022) background samples taken from the Mine Portal area and Carconte Creek show levels of total selenium up to 1.3 µg/l.

In the United States, the Environmental Protection Agency (EPA) regulates selenium levels under the Clean Water Act. It has set a recommended maximum total selenium level of 5 micrograms per litre (µg/L) (Antweiler, 2015). For this reason, Summit would propose to use 5 µg/l as an upset trigger. This is appropriate as water releases from the site are expected to be infrequent in nature. Water monitoring would provide indications if there is an increasing trend in selenium values, which would involve developing an appropriate mitigation plan.

2.4.2 Conceptual Mitigation

An actual mitigation measure to manage selenium levels is keeping clean water clean, which will be done by diverting all clean water upslope of the mine portal area around/away from the portal area. Other potential mitigation measures that could be incorporated, as part of the adaptive management program, could include:

- Pass impacted water through a wetland prior to release;
- Handle waste rock differently; or
- Design and implement a passive or active treatment system (e.g. gravel bed reactor).

3.0 INDIGENOUS CONSULTATION

Summit is aware the Minister received four requests that support the AWN's request for designation of the Project, from Duncan's First Nation, Cadotte Lake Métis Nation, Ermineskin

Cree Nation, and Whitefish Lake Nation #128. The IAAC has asked the following two questions of Summit.

a. *Are there any updates on discussions, or planned discussions, with these groups including the original requesters Aseniwuche Winewak Nation (AWN), on the potential effects within federal jurisdiction?*
b. *Are there any updates on discussions, or planned discussions, with affected Indigenous groups regarding cumulative effects within federal jurisdiction?*

Summit has reviewed the additional submissions that support the AWN request to have the Project Federally Designated. As a pro-active measure, Summit plans to prepare individual responses to each of the Indigenous groups (including the original requesters AWN) that made submissions. The responses will provide information on the Project to address their concerns regarding the potential effects, and cumulative effects, within federal jurisdiction. Additionally, Summit is open to meetings with each Indigenous group should they wish to discuss further about the Project.

4.0 REFERENCES

Werner Antweiler: Coal Mining and Selenium. Blog posted February 7, 2015. https://wernerantweiler.ca/blog.php?item=2015-02-07.

Teck Website 2022, Sustainability/Water/Water in the Elk Valley. https://www.teck.com/sustainability/sustainability-topics/water/water-quality-in-the-elk-valley/

Cabin Ridge Project 2021. Selenium management for Alberta coal mines: state of practice review. Prepared by Borealis Environmental Consulting Inc. and McKenna Geotechnical. Submission to the Alberta Coal Policy Committee.