

Comment Form – Draft Permitting Plan and Draft Tailored Impact Statement Guidelines– Federal Review Team

Upper Beaver Gold Project

Response requested by: March 7, 2022

All comments should be submitted via the Submit a Comment feature available on the Project’s Canadian Impact Assessment Registry page (Reference #82960 at <https://iaac-aeic.gc.ca/050/evaluations/proj/82960>). Documents can be uploaded using this feature. If you have any difficulties submitting this way, please contact the registry directly at iaac.registry-registre.aeic@canada.ca. All comments submitted using this table would be posted on the Project’s Canadian Impact Assessment Registry Internet site.

Please note that this will be your final opportunity to make changes to the Tailored Impact Statement Guidelines.

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| Department/Agency: | Natural Resources Canada | | |
| IA Contact: | Marie Eve Lenghan Laurence Davidson | Telephone: | |
| | | Email: | <Email address removed> <Email address removed> |

Section 1:

1. Confirm that all applicable legislative and regulatory oversight that may apply to the Project, under the authority of your department, is accurately listed in the Permitting Plan.

Insert response here:
Depending on the proponent’s final mine design and operational plans, Explosives Act licensing may be required.

2. Indicate whether your department has identified any power that it will be unable to exercise to allow the Project to proceed, in whole or in part. For more information, refer to subsection 17(1) of IAA.

Insert response here:
NRCan is not aware of any power that it will be unable to exercise to allow the Project to proceed

Section 2:

1. Please review the draft Tailored Impact Statement Guideline (TISG) sections that are applicable to your department’s mandate.
2. Using the table below, please describe any issues and include your recommendation for how the final Tailored Impact Statement Guidelines should be adapted to address each issue. Please indicate any recommended **additions or deletions** to the text.

| Department – Comment ID | Draft TISG Section | Context and Rationale (provide an explanation of your comments) | Recommendation: provide text to be inserted or deleted. Be specific on the location within the draft TISG that the text would be added/deleted. |
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| RCan-01 GSC | 8.5.1 Page 54 | <p>As the Upper Beaver mine will be developed at the site of previous mine operations, there may be data available on the response of groundwater flow to the mining operations during those historical phases. This information may not be captured under a baseline data collection effort, which focuses on the current conditions.</p> <p>Within the DPD the proponent has stated that groundwater levels and groundwater-surface water interaction “...are not expected to be material based on historical information” (Page 81). This information may be used in the development of the conceptual model, with potential for use in model calibration. The TISG has been updated to reflect the inclusion of this historical information.</p> | <p>See edited text in attached draft TISG as follows:</p> <p>...and anthropogenic controls (<i>including historical information related to previous mining periods; and dewatering information related to the advanced exploration program</i>)</p> <p>And</p> <p>...baseline hydrogeological conditions, <i>and historical mining conditions (as applicable)</i></p> |
| RCan-02 GSC | 8.5.1 8.5.2 | <p>Effects of mining on groundwater-surface water interaction have a direct link to the assessment of effects for Fish and Fish Habitat. Additions have been made to the TISG to ensure that this link is acknowledged in the development of the conceptual and numerical</p> | <p>See edited text in attached draft TISG where the following was added:</p> <p>8.5.1 ..state <i>the purpose</i>, limitations...</p> <p>..parameters such as recharge, <i>and describe uncertainty within the model as it relates to model assumptions;</i></p> |

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| | | models of groundwater flow, and that the assessment results will be well suited to support the assessment of fish and fish habitat. | 8.5.2 ... effects on wetlands, <i>effects on groundwater-surface water interaction as they relate to fish habitat,</i> |
| NRCan-03 CFS | 8.3.2 Effects to Topography, soil and sediment | Edit requirement for clarity | Delete strikethrough text and add underlined text: “potential for changes to soil quality, soil loss, <u>fertility</u> , compaction, or <u>and</u> erosion due to vegetation clearing” |
| NRCan-04 CFS | 8.6.1. Baseline conditions | Remove requirement that is not applicable | Delete strikethrough text: “ old growth forests ” |
| NRCan-05 CFS | 8.6.3 Mitigation and enhancement measures | Edit requirement for clarity | Add new underlined text to following requirement: “ <u>revegetation techniques, timing, and the locations where they would be implemented</u> ”. |
| NRCan-06 Canmet | Abbreviation and Short Forms | Include ARD, NMD, and ML in table | p. 1-2 add the following to the table: ARD – Acid Rock Drainage NMD – Neutral Mine Drainage ML – metal(loid) leaching |
| NRCan-07 Canmet | Section 4.4 Alternative means of carrying out the Project | The proposed project will include an open pit. | p. 18 tailings storage facility modify the first sub-bullet as follows: - <i>alternative types (e.g. dry stack facility or conventional slurry facility, co-deposition, re-use as backfill underground, in-pit disposal, etc.);</i> |
| NRCan-08 Canmet | Section 4.4 Alternative means of carrying out the Project | There are cottagers on Boathouse Lake which is adjacent to the tailings management facility. The company should clearly justify the location as post-closure impacts to this lake is possible. | p. 18 tailings storage facility modify second sub-bullet as follows: - <i>location of the tailings storage facility in consideration of groundwater flow directions and local groundwater users as well as groundwater and nearby rivers, lakes and wetlands water and sediment quality;</i> |
| NRCan-09 Canmet | Section 4.4 Alternative means of carrying out the Project | For consistent use of nomenclature and reference to the potential for neutral mine drainage in addition to acid rock drainage and metal leaching. Recommend this modification be applied throughout the document. | p. 18 tailings storage facility add sub-bullet as follows: - <i>acid rock drainage, neutral mine drainage, and/or metal(loid) leaching potential, including cyanide and its degradation products</i> |
| NRCan-10 Canmet | Section 4.4 Alternative means of carrying out the Project | See above | p.18 Waste rock management indent all three sub-bullets and modify second sub-bullet to: - <i>acid mine rock drainage, neutral metal mine drainage, and/or metal(loid)</i> |

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| | | | <i>leaching potential of all excavated materials;</i> |
| NRCan-11 Canmet | Section 4.4 Alternative means of carrying out the Project | To reduce redundancy, as this bullet is captured in the edits listed above. | p. 18 delete the following bullet: <i>- management of excavated materials, including those that are potentially acid generating or leachable;</i> |
| NRCan-12 Canmet | Section 8.2 Geology, geochemistry, and geological hazards | Changes in bullet order for improved logical flow, recommend with geochemistry at the end (baseline first, then mine site). Section title should be modified to reflect this order. | p. 43-44 Change section titles to “Geology, geological hazards, and geochemistry” And Move second to last bullet (“-provide baseline concentrations...”) after the bullet “-provide a characterization of instabilities...” |
| NRCan-13 Canmet | Section 8.2.1 Baseline Conditions | As part of updates to provide clarity on the geochemical characterization program for acid rock drainage, the request in these bullets is incorporated into new bullets provided below. | p.43-44 Section 8.2.1 delete the following three bullets: <i>- identify areas with potential for...</i> <i>-provide a characterization of the geochemical composition of materials to be excavated...</i> <i>- provide a geochemical characterization of leaching potential.</i> |
| NRCan-14 Canmet | Section 8.2.1 Baseline Conditions | The current guidelines for the geochemical characterization program to evaluate ARD/ML potential are high level and have resulted in significant information requests for past projects. The recommended edits and additions are intended to provide more direction to the proponent on the development of their study for the IA and identifying gaps that will be addressed to support engineering design and permitting. | p. 44 Section 8.2.1 Modify the third bullet to: <i>- provide a geochemical characterization of expected mined materials, such as waste rock, ore (including off-site), low grade ore, pit wall materials, underground development ramps, tailings, overburden and potential construction material (i.e., mine rock, quarries, unconsolidated material),</i> And add the following sub bullets: <i>-provide a detailed summary of analytical methods used to evaluate mineralogy, major and trace elements, acid base accounting, and leach testing to evaluate the potential for acid rock drainage, neutral mine drainage, and/or metal(loid) leaching. The Mine Environment Neutral Drainage (MEND) report 1.20.1 is recommended as guidance to support study design;</i> <i>-provide information to support the spatial and compositional representativeness of all mine rock</i> |

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| | | <p><i>samples collected. Provide a comparison of sample distribution and anticipated tonnage for each lithology. Present cross sections or block model images at an appropriate scale that include all mine rock samples, geology, mineralized zones, the approximate location of all open pit and underground mine development, borehole traces and identification numbers, and a scale and legend.</i></p> <p><i>-provide information on the representativeness of tailings solids and process water from available metallurgical testing (i.e. bulk sample) for the tailings streams that require management. Provide a schematic process flow chart including the location that each tested sample represents if various processing streams are tested. In addition to considerations listed for mine rock, consider cyanide and its degradation products in the analytical testing program.</i></p> <p><i>-Provide all laboratory certificates of analysis that include information related to analytical methodology and quality assurance / quality control.</i></p> <p><i>-provide a detailed approach to the evaluation of metal(loid) leaching potential of mine rock and tailings. Provide initial leaching potential results based on short term leach tests and a description of the representativeness of laboratory and field kinetic tests based on static tests results. Kinetic testing should include both average and upper quartile potential for parameters of concern; and</i></p> <p><i>-describe plans for the continuation of the geochemical characterization testing program to support project planning and permitting, including additional testing to address data gaps, ongoing kinetic testing including field testing, and the development of an environmental geochemistry block model, if applicable.</i></p> <p><i>-describe the conceptual approach to the identification and management of potentially acid generating and/or metal(loid) leaching mine rock during mine construction and operations.</i></p> <p><i>Describe methods for operational testing</i></p> |
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| | | | <i>to support segregation, if applicable. Consider the use of exploration assay data and advanced statistical methods to support the development of an environmental geochemistry block model.</i> |
| NRCan-15 Canmet | Section 8.2.2 Effects to geology, geochemistry, and geological hazards | To improve linkage to Section 8.5 | p. 44 Section 8.2.2 move the following bullet from Section 8.5.2 to Section 8.2.2 and modify as follows: - <i>assess different methods of segregating potentially-acid generating and/or metal(loid) leaching and non-potentially acid generating waste materials during the Project's life cycle, if required for construction materials or separate waste management.</i> And add the following bullet: - <i>describe potential effects to groundwater and surface water quality from acid rock drainage, neutral mine drainage, and/or metal(loid) leaching, as described in Section 8.5.2</i> |
| NRCan-16 Canmet | Section 8.3. Topography, soil and sediment | It is important to test overburden for Acid rock drainage and it is often not completed and result in information requests. | p. 45 modify first bullet to: - <i>describe the suitability of topsoil and overburden for use in the reclamation of disturbed areas including an assessment of the acid generating potential and metal(loid) leaching potential of overburden to be used</i> |
| NRCan-17 Canmet | Section 8.5 Groundwater and surface water | Groundwater typically flows into surface water which affect aquatic sediments. As such, we recommend a title change. | p. 51 and 54 Change section titles to " <i>groundwater, surface water, and aquatic sediment</i> " and p. 56 modify last primary bullet to " <i>...groundwater, surface water and sediment quality...</i> " |
| NRCan-18 Canmet | Section 8.5.1 Baseline Conditions | Metal speciation and their potential exposure to aquatic organisms depends on several exposure modifying parameters | p. 53 first sub-bullet modify to - <i>physicochemical parameters may include temperature, pH, electrical conductivity, dissolved oxygen, turbidity, total suspended solids, total hardness, total, particulate, and dissolved organic and inorganic carbon, total dissolved solids;</i> |
| NRCan-19 Canmet | Section 8.5.2 Effects to groundwater | First bullet. We propose changes to improve readability and logical flow as | First bullet change to: <i>describe the potential changes to groundwater, surface water and</i> |

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| | and surface water | <p>well as some wording changes.</p> <p>Mine dust can be a source not only of metals and mercury but also to metalloids (i.e. selenium)</p> | <p><i>sediment quality related to the Project including</i></p> <p>Second sub-bullet:</p> <p><i>Potential changes to surface water quality due to the generation and deposition of dust and particulate matter and any contaminants they contain (such as heavy metals, metal(loid)s, mercury, methylmercury);</i></p> <p>Move the third sub-bullet to last sub-bullet of the last bullet and modify to:</p> <p><i>- predicted (worst, base, and sensitivity case scenarios) changes to surface water, sediment and groundwater quality due to all discharges and effluents from the Project, including changes to physicochemical parameters (temperature, pH, salinity, dissolved oxygen), and relevant chemical constituents (major and minor ions, trace metal(loid)s, radionuclides, nutrients, organic compounds</i></p> <p>Move the fifth sub-bullet:</p> <p>-provide an assessment of potential contamination to surface waters and groundwater as a result of the geochemistry of the pit walls, and the reconnection of the pit lake to the Misema River system during reclamation and decommissioning; after the describe tailings management strategies</p> |
| NRCan-20 Canmet | Section 8.5.2 Effects to groundwater and surface water | Modification to help readability and logical flow of the text | <p>Move the Second bullet:</p> <p>compare the predicted worst, base, and sensitivity case scenario changes to groundwater, surface and sediment quality to baseline and applicable guidelines, objectives or standards as the last sub-bullet of the last bullet</p> |
| NRCan-21 Canmet | Section 8.5.2 Effects to groundwater and surface water | Modification to help readability and logical flow of the text | <p><i>Move the third bullet and its sub-bullet:</i></p> <p>describe the quantity and quality of all effluent streams released from the site to the receiving environment, including effluent from treatment facilities, dewatering activities, seepage and surface run off from project components</p> |

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| | | | and site; sub-bullet compare the quality of all effluent streams to federal and provincial release limits to determine if worst, base, and sensitivity site predictions require mitigation measures (i.e. BATEA); to after the newly placed bullet -provide an assessment of potential contamination to surface waters and groundwater as a result of the geochemistry of the pit walls, and the reconnection of the pit lake to the Misema River system during reclamation and decommissioning, which is now after the describe tailings management strategies bullet |
| NRCan-22 Canmet | Section 8.5.2 Effects to groundwater and surface water | Worst case scenarios based on 99 th percentile can capture outliers that can result in overly conservative predictions. | p. 57 second sub-bullet under third primary bullet, modify to: <i>-base case (i.e. most likely, mean, median) and worst case (e.g. 75th to 90th percentile) scenarios, plus applicable sensitivity scenarios;</i> And Fourth primary bullet, modify to: <i>-using the integrated chemical mass balance model, describe predicted worst, base, and sensitivity case changes caused by project activities...</i> |
| NRCan-23 Canmet | Section 8.5.2 Effects to groundwater and surface water | Modification to help readability and logical flow of the text | Move the fifth primary bullet: provide an assessment for off-site migration pathways for impacted groundwater, and an analysis of contaminant attenuation capacities within the hydrogeological units of the project study area; and to after the sixth primary bullet related to effluent quality and BATEA |
| NRCan-24 Canmet | Section 8.5.2 Effects to groundwater and surface water | To improve clarity for the tests recommended to support evaluation of tailings management strategies. | p.57 modify first sub-bullet under last primary bullet to: <i>- the solid and liquid composition and volume of specific waste streams including results of geochemical testing described in Section 8.2 including cyanide and its degradation products, total organic carbon, dissolved inorganic carbon, organic carbon, isotopic composition of water, and potential tracers of groundwater contamination for liquid streams;</i> |

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| <p>NRCan -25 Canmet</p> | <p>Section 8.5.2 Effects to groundwater and surface water</p> | <p>Provide more quality in terms of using waste characterisation and making release predictions to the water management system and later to the receiving environment.</p> | <p>p. 58 modify first primary bullet to: <i>-describe the worst, base, and sensitivity case changes to surface water, groundwater and sediment quality resulting from acid rock drainage, neutral mine drainage, and/or metal(loid) leaching:</i></p> <p>And modify its sub-bullets to: <i>-provide potentially acid-generating rock volumes and tonnage for the life cycle of the Project, and disposal methods;</i> <i>-consider the results of the geochemical characterization study that evaluated the potential for acid rock drainage, neutral mine drainage, and/or metal(loid) leaching for mined materials, tailings, and construction materials (Section 8.2);</i> <i>-provide estimates of the potential for mined materials, tailings and construction material to be sources of acid rock drainage, neutral mine drainage, and/or metal(loid) leaching, timing to its onset, and short- and long-term loading rates calculated from kinetic testing for both neutral and acidic conditions, with consideration for the use of a proxy (i.e. historical mine waste, analytical tests replicating acidic conditions) if kinetic tests have not produced acidic leachate, if applicable;</i> <i>-predicted (worst, base, and sensitivity case scenarios) changes to groundwater, surface water, and sediment quality due to all discharges and effluents from the Project entire life-cycle, including changes to physicochemical parameters (temperature, pH, salinity, dissolved oxygen), and relevant chemical constituents (major and minor ions, inorganic and organic carbon, heavy metals, metal(loid)s, radionuclides, nutrients, organic compounds); and</i> <i>-compare the predicted worst, base, and sensitivity case scenario changes to groundwater, surface and sediment quality to baseline and applicable guidelines, objectives or standards</i></p> |
| <p>NRCan-26 Canmet</p> | <p>Section 8.5.3 Mitigation and</p> | | <p>p. 59 modify second bullet to:</p> |

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| | enhancement measures | | <i>-describe any applicable water quality treatment measures and provide evidence supporting the effectiveness of these measures (Refer to MEND 3.50.1), including predicted inflow and outflow concentrations for relevant water quality parameters;</i> |
| NRCan-27 Canmet | Section 8.5.3 Mitigation and enhancement measures | To be consistent with Section 8.2 | p. 60 modify the second last bullet to: <i>- describe methods for the prevention, management and control of acid rock drainage, neutral mine drainage, and/or metal(loid) leaching during all project phases; and</i> and p. 60 delete the last bullet (“-assess different methods of segregating...”) |
| NRCan-28 Canmet | Section 17 Appendix 1 – Additional Guidance | | p. 131 modify fourth bullet under “Site preparation and construction” to: <i>-excavation and salvage of topsoil, soil and bedrock, and rocky substrates including potentially acid-generating and metal(loid)-leaching materials;</i> |

page numbers come from the draft TISG PDF and represent document page number and not the PDF page number