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Ministère de la Justice
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Our File *Notre dossier*: 10238566
Your file *Votre dossier*: 80101

October 24, 2019

VIA ELECTRONIC MAIL: CEAA.GrassyMountain.ACEE@canada.ca

Joint Review Panel for the Grassy Mountain Coal Project
c/o Impact Assessment Agency
160 Elgin Street, 22nd Floor, Place Bell Canada
Ottawa, Ontario K1A 0H3

Attention: Alex Bolton, Chair

Dear Sir:

Re: Grassy Mountain Coal Project - Reference Number: 80101

We write in response to the Panel's invitation of September 9, 2019 to provide comments on the sufficiency and technical merit of the Ninth and Tenth Addendum to the Environmental Impact Assessment and to provide recommendations on additional information the Panel should receive before proceeding to a public hearing.

In response to this invitation, please find following responses from the following federal government departments:

- Environment and Climate Change Canada
- Health Canada;
- Fisheries and Oceans Canada; and
- Natural Resources Canada;

Indigenous Services Canada does not have any comments or recommendations for the Panel's consideration.

Yours truly,

<Original signed by>

Robert Drummond
Senior Counsel
Prairie Region
Department of Justice Canada

Encls.

Canada

Environmental Protection Operations Directorate
Prairie & Northern Region
9250 49 Street
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ECCC File: 4194-10-3/6188
IAAC Registry: 80101



October 24, 2019

via email at: CEAA.GrassyMountain.acee@canada.ca

Alex Bolton
Chair, Joint Review Panel for the Grassy Mountain Coal Project
c/o Impact Assessment Agency of Canada
160 Elgin Street, 22nd Floor, Ottawa, ON K1A 0H3

Dear Alex Bolton:

RE: 80101 – Environment and Climate Change Canada’s Sufficiency and Technical Review of Benga Mining Ltd’s Addenda 9 and 10 to the EIA for the Grassy Mountain Coal Mine Project

On September 9, 2019 the Joint Review Panel (the Panel) submitted a public notice inviting public comments on the Ninth and Tenth Addenda to Environmental Impact Assessment (EIA) for the Grassy Mountain Coal Project.

Environment and Climate Change Canada (ECCC) has reviewed the material and is providing comments for the Panel’s consideration (attached).

ECCC needs more information about the project so that we can provide relevant advice to the Panel. Specifically, we would like more information about:

- design considerations that address the effects related to probable maximum precipitation estimates;
- air quality and transportation-related emission predictions;
- management, assessment, predictions and mitigation of selenium; and
- a draft aquatic monitoring plan which addresses monitoring, adaptive management and mitigation.

ECCC’s advice is based on our mandate pursuant the *Canadian Environmental Protection Act* and the pollution prevention provisions of the *Fisheries Act*.



Please contact Eva Walker at <contact information removed>
information.

if you need more

Sincerely,

<Original signed by>

Andrea McLandress
Regional Director

Attachment(s): ECCC's Review of Benga Mining's Ninth and Tenth Addenda for the Grassy Mountain Coal Project

cc: Jody Small, A/Head, EA South, EPOD, ECCC
Eva Walker, A/Senior EA Coordinator, EA South, EPOD, ECCC

Environment and Climate Change Canada’s Proposed Information Requests on the Sufficiency and Technical Merit of the Ninth and Tenth Addendum to Benga Mining’s Grassy Mountain Coal Project’s Environmental Impact Assessment

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

Topic and Information Source	Rationale	Proposed Information Request
<p>1. <u>Mine Fleet Emissions</u></p> <p>Benga Mining, Joint Review Panel Request for Additional Information Response Package Addendum 10, Package 1: Air Quality and Noise; Information Request 1.4</p> <p>Joint Review Panel Information Request Package 1 (Reference #195) IR1.4</p>	<p>The EIS guidelines require the Proponent to describe mitigation measures that are specific to each environmental effect identified in their EIS. Measures are to be written in a manner that clearly describe how the proponent intends to implement the measure and what environmental outcome the measure is designed to address.</p> <p>At the Panel’s request, the Proponent provided a draft Air Quality Monitoring and Adaptive Management Plan. In section 5 of the plan, mitigation measures are provided to reduce NO_x and PM_{2.5} emissions from combustion sources, which include:</p> <ul style="list-style-type: none"> • Using Tier 4 compliant haul trucks. • Regularly upgrading the fleet. • Maintaining fleet to manufacturer’s specifications. • Optimizing mine plans to minimize haul distances. <p>The mitigation measures provided by the Proponent do not clearly indicate whether and when the entire mine fleet will meet Tier IV emission standards. ECCC requires this information to appropriately assess NO₂ emissions throughout the whole lifecycle of the project. This is especially important given the uncertainty in NO₂ predictions, as discussed in ECCC’s response to IR #1.6. ECCC recommends that all mobile off-road mining equipment comply with Tier IV final emission standards to maximize reductions of NO_x and PM_{2.5} emissions in all phases of the Project.</p>	<p>ECCC has identified the following Supplemental Information Request (SIR) for the Panel’s consideration for response by Benga Mining (the Proponent):</p> <ol style="list-style-type: none"> 1) Confirm what percentage of the mine fleet will meet Tier IV emission standards at commencement of the project and whether only the haul trucks or the haul trucks and the mining fleet will be compliant with the standard.

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Topic and Information Source	Rationale	Proposed Information Request
<p>2. <u>Nitrogen Dioxide Concentrations</u></p> <p>Benga Mining, Joint Review Panel Request for Additional Information Response Package Addendum 10, Package 1: Air Quality and Noise; Information Request 1.6</p> <p>Benga Mining, Grassy Mountain Coal Project Update, Consultant Report 1a</p> <p>Environment and Climate Change Canada, Technical Review of Addendum Eight – Benga Mining Ltd (Benga)’s Responses to the Federal Review Team’s Technical Supplementary Information Requests (SIRs) and Outstanding Conformity IRs</p> <p>Joint Review Panel Information Request Package 1 (Reference #195) IR1.6</p>	<p>The EIS Guidelines require the impact of the project’s nitrogen dioxide (NO₂) emissions on the region surrounding the project to be assessed. ECCC relies on the proponent’s predicted concentrations of NO₂ through dispersion modelling to assess project impacts.</p> <p><u>Assessment of predicted concentrations</u></p> <p>Predictions of nitrogen dioxide (NO₂) in the proponent’s cumulative assessment, and in their response to ECCC-IR2-6, showed concentrations above the Canadian Ambient Air Quality Standards (CAAQS) at numerous special receptors, for both the baseline and application cases. The Proponent’s modelled application case concentrations of NO₂ are unrealistically high for the town of Blairmore. The model applies 98th percentile daily maximum 1-hour concentrations as high as 121 µg/m³, a level which is greater than the densest urban areas in Canada.. In their response to JRP IR 1.6, the Proponent acknowledged various sources of uncertainties with their modelling results, which they state are “conservative” and “do not underestimate air quality concentrations of NO₂.” ECCC agrees that it is likely that predicted concentrations are overestimates. However, such predictions are too high to provide useful data in the assessment of the impacts of the project’s air emissions on the environment, and ECCC cannot adequately describe the project’s effects to the environment without useful data. As noted in ECCC’s Technical Review of Addendum Eight (CEAR#89), ECCC reiterates that these results obscure the true extent of guideline exceedances, and the relative contribution of air pollutants attributable to the project.</p> <p>In their response, the Proponent provided a summary of predicted NO₂ concentrations in Table 1.6-1, showing the project’s contribution in relative and absolute terms. They determined these values by calculating the difference (i.e. subtraction) between predicted concentrations for the baseline and application scenarios. However, this analysis is not valid for 98th</p>	<p>ECCC has identified the following Supplemental Information Request (SIR) for the Panel’s consideration for response by the Proponent:</p> <ol style="list-style-type: none"> 1) Provide revised predictions of NO₂ for all receptors within the regional study area, considering the following: <ol style="list-style-type: none"> a) Revised background concentrations which are representative of the emission profile of the Crowsnest communities and surrounding region. b) Revised CALPUFF modelling that configures community and highway emission sources so that resulting concentrations for receptors are not unrealistically high. 2) For the revised predictions, provide a statistically valid source contribution analysis showing the absolute and relative contribution of the major emission sources, including community emissions, Highway 3, and the project’s mine fleet on NO₂ concentrations for each receptor, based on both 1-hour and annual metrics.

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	<p>percentile daily peak 1-hour concentrations. The “98th percentile” statistical metric is based on specific high-percentile hours throughout the year. When this metric is calculated for different modelling scenarios, they are based on different individual hours, and thus they should not be subtracted arithmetically.</p> <p><u>Background Concentrations</u></p> <p>As noted in ECCC’s Technical Review of Addendum Eight (IR#2), high baseline concentrations can be partially explained by the Proponent’s estimation of the Crowsnest community’s baseline conditions, in which they employed monitoring data from Lethbridge, a much larger community with greater expected emissions. The Proponent noted that this approach is conservative and therefore appropriate for their modelling. However, in light of the unrealistic predictions noted above, ECCC recommends that background levels be based on data from a community of similar population and industrial activity to that of Crowsnest, which would be expected to have similar emissions, rather than a city the size of Lethbridge that has higher emissions.</p> <p><u>Community and Highway Modelling</u></p> <p>ECCC’s previous round of Technical Review noted that the primary explanation for high background predictions may be the proponent’s modelling of Highway 3 as long narrow area sources, which yield inaccurate predictions close to the source (Popovic, 2009). In the Proponent’s response, they acknowledge that modelling near roadway and rail lines can cause uncertainty in predicted concentration, citing Staniaszek et al. (2019). As described by Popovic (2009), this problem can be resolved by modelling roads with numerous sources with aspect ratios close to 1:1. For long roads, such as Highway 3 in the Proponent’s assessment, this is impractical. However, the CALPUFF model has the capability to model roads using a specialized “road source,” which can resolve this issue. The Proponent also noted that</p>	

Environment and Climate Change Canada’s Proposed Information Requests on the Sufficiency and Technical Merit of the Ninth and Tenth Addendum to Benga Mining’s Grassy Mountain Coal Project’s Environmental Impact Assessment

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	<p>community sources were configured as area sources, which may have also biased predictions as many receptors were inside these sources within the model. ECCC notes that these sources may be configured in a more precise manner (i.e. configuring individual point sources within the community rather than all sources amalgamated into large area sources). ECCC recommends that the CALPUFF model be run with highway and community sources configured to ensure that receptors within the Crowsnest community, including those close to Highway 3, have realistically high predicted concentrations.</p> <p><u>References</u></p> <p>Exponent. CALPUFF (2017) Version 7 Users Guide Addendum.</p> <p>Popovic, J. 2009. Recommendations for Source Characterization, Proceedings for the 19th International Clean Air and Environment Conference, Perth, Australia</p> <p>Staniaszek, Piotr, Chenxing (Ann) Teng, Randy Rudolph. 2019. Modelling Emission Sources at Canadian Mines Using CALPUFF and AERMOD. A&WMA’s 112th Annual Conference & Exhibition, Québec City, Québec, June 25-28, 2019.</p>	
<p>3. <u>Marine Vessel Emission Estimates</u></p> <p>Benga Mining, Joint Review Panel Request for Additional Information Response Package Addendum 10, Package 1: Air</p>	<p>In response to Joint Review Panel (JRP) IR1.7, Table 1.7-4 and 1.7-5, the Proponent provided nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and greenhouse gas (GHG) emissions per one way trip in national waters. This table assumes that the main engines are operating at one speed and that the auxiliary engines are operating for only a portion of the trip. Further, the emission estimates provided in Table 1.7-4 and 1.7-5 assume one way trips and do not account for the inbound trip of the vessel.</p>	<p>ECCC has identified the following Supplemental Information Request (SIR) for the Panel’s consideration for response by the Proponent:</p> <ol style="list-style-type: none"> 1) Update the marine vessel emission estimates to include the following additional marine activities in Tables 1.7-4 and 1.7-5, accounting for:

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<p>Quality and Noise; Information Request 1.7</p> <p>Joint Review Panel Information Request Package 1 (Reference #195) IR1.7</p>	<p>Typically, marine vessel main engines operate at different speeds throughout their journey in national waters and therefore two different main engine emission factors would account for those two speeds. Similarly, auxiliary engines are would also operate for the entire duration of the trip.</p> <p>The Proponent’s assumptions have not included all types of ship activities nor the inbound trip, each of which would result in increased emissions of NO₂, SO₂, and GHGs.</p> <p>In order to fully account for emissions from marine vessels, ECCC suggests that emissions from the main engines operating at slower speeds for 2.3 hours and the emissions from the auxiliary engines operating for the duration of the trip (an additional 6.2 hours for a total of 8.5 hours) be included in the assessment. This would include adding two rows in Tables 1.7-4 and 1.7-5 (one for the main engines operating at slower speeds for 2.3 hours, and one for the auxiliary engines operating for 6.2 hours) and then updating the total emissions over the duration of the project. Further, ECCC suggests that the inbound vessel emissions be added to both Tables 1.7-4 and 1.7-5.</p>	<p>a) Emissions generated by inbound vessels</p> <p>b) Main engines operating at slower speeds for 2.3 hours</p> <p>c) Auxiliary engines operating for the entire duration of the outbound and return trip</p> <p>2) Using the above added marine vessel emissions, ECCC requests the Proponent update the total annual and life of project NO₂, SO₂, and GHG emission totals.</p>
<p>4. <u>Greenhouse Gas Management Plan</u></p> <p>Benga Mining, Joint Review Panel Request for Additional Information Response Package Addendum 10, Package 1: Air Quality and Noise; Information Request 1.8</p>	<p>The Proponent provided a draft Greenhouse Gas Management Plan as Appendix 1.8-1 to the Joint Review Panel’s Request 1.8 for Additional Information Response Package Addendum 10: Package 1 : Air Quality and Noise. In Section 3.0 of the draft plan (Plan Goals and Objectives), the Proponent stated that their objective with respect to methane emissions was to “understand the potential for project-specific fugitive methane emissions from exposed coal.” The Proponent did not provide further details on what activities this would entail, or how such activities would lead to management and reduction of fugitive methane emissions.</p>	<p>ECCC has identified the following Supplemental Information Request (SIR) for the Panel’s consideration for response by the Proponent:</p> <p>1) Describe one or more specific activities that the Proponent plans to undertake to achieve the objective of understanding the potential for project-specific fugitive methane emissions from exposed coal.</p>

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<p>Joint Review Panel Information Request Package 1 (Reference #89) IR 1.8</p>		<p>Include a general timeframe for each of the activities.</p> <p>2) Provide an explanation of how these mitigation activities may lead to reduction of fugitive methane emissions.</p>
<p>5. <u>Design Values for Extreme Precipitation</u></p> <p>Environment and Climate Change Canada. Supplementary Request #11. Design Values for Extreme Precipitation (CEAR#167)</p> <p>Benga Mining, Addendum 10 to the EIS, Package 3: Geotechnical and Dam Safety, Land Use and Land Management. IR 3.2</p> <p>Joint Review Panel Information Request Package 3 (Reference #89) IR 3.2</p>	<p>In JRP information request, package 3, IR 3.2 the Panel requested Benga provide 1-, 6- and 24-hour Significant and Very High design precipitation depths based on historical data and adjusted for future climate change to circa 2050 and to describe how the projected increases in short duration extreme precipitation can be accommodated by current project design.</p> <p>In Table 3.2-1, Addendum 10 to the EIS, Package 3, the Proponent has provided design precipitation depths for three different rainfall durations for historical and future conditions (200-yr, 1000-yr and Probable Maximum Precipitation). Although not specified in the table, the text on page 9 of Addendum 10 Package 3, indicates that the future climate conditions are for the intermediate Representative Concentration Pathway 4.5 (RCP4.5) scenario. In their description of these data the Proponent notes the following:</p> <p><i>“Climate change rainfall depths were bias corrected by calculating the incremental rate of change from baseline conditions to the RCP 4.5 scenario rainfall depths, where the rate is calculated as the projected depth minus the baseline depth. The 200-year and 1000-year rates of change were extrapolated from other return periods for each duration. The rates of change for the PMP were considered to be equal to the 1000-year rates. Rates of change were then applied to the Project rainfall depths, producing a range of storm event depths for return periods up to the PMP and durations up to the 24-hour event.”</i> page 9 (emphasis added)</p>	<p>ECCC has identified the following Supplemental Information Request (SIR) for the Panel’s consideration for response by Benga Mining.</p> <p>1) The Rationale provided by ECCC describes challenges with the Proponent’s approach used to estimate return values for design. ECCC recommends that the proponent utilize appropriate methodologies to estimate return values for design. The Canadian Standards Association technical guidance (2019) provides some good examples of such methods.</p>

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	<p>The Proponent has applied the same fixed value (44.8mm for 24-hours) and added it to the 1000-yr return period and the Probable Maximum Precipitation (PMP). This approach is not supported as the water holding capacity of the atmosphere increases with temperature at an exponential rate, and atmospheric moisture also increases proportionally to temperature increase. The approach taken by the Proponent therefore significantly underestimates the increases in return values for higher return periods, leading to an inaccurate estimate of precipitation for future conditions.</p> <p>Furthermore, estimates of future short duration precipitation extremes that are based on statistical relationships fitted between local-scale observed extreme precipitation and modelled simulations are unlikely to be robust. This is because the changes in local observed extreme precipitation are small compared with the natural variability of extreme precipitation. This lack of information on observed extremes means that the statistical model like the intensity-duration-frequency (IDF) climate change tool (e.g., IFDC_CC tool) is unlikely to be well constrained (Li et al., 2019).</p> <p>The recent Canadian Standards Association guidance on IDF for Canadian Water Resources practitioners outlines the use of a simple scaling technique to adjust precipitation, as a percentage, based on projected temperatures. This method should be used in order to provide a more robust and accurate analysis of predicted rates of change for PMP.</p> <p><u>References</u></p>	

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	<p>Canadian Standards Association. 2019. TECHNICAL GUIDE. CSA PLUS 4013-12: Development, interpretation, and use of rainfall intensity-duration-frequency (IDF) information: Guideline for Canadian water resources practitioners.</p> <p>Li, C., Zwiers, F., Zhang, X., & Li, G. 2019. How much information is required to well constrain local estimates of future precipitation extremes? <i>Earth’s Future</i>, 7, 11–24. https://doi.org/10.1029/2018EF001001</p>	
<p>6. <u>Selenium Treatment Predictions</u></p> <p>Joint Review Panel Request for Additional Information Response Package Addendum 10: Package 5: Surface Water Quality, Hydrology, Hydrogeology, Fish and Fish Habitat, Cumulative Effects, Geotechnical, Reclamation, Wildlife, Land Use and EA Methodology IR 5.1</p> <p>Comments from the Government of Canada - Environment and Climate Change Canada. IR#6. (CEAR #167).</p> <p>Eighth Addendum to the Environmental Impact</p>	<p>ECCC requested in IR 5.1 b) ii. that, amongst other things, the Proponent provide “a description of any technically and economically feasible mitigation measures required to meet the existing selenium guidelines presented in part a), with process details. This must include supporting evidence on the efficacy of proposed mitigation measure”. However, the Proponent has not provided the requested supporting evidence on the efficacy of the Saturated Backfill Zones.</p> <p>The role of sulphate in ameliorating the toxicity of selenium may vary depending on the chemical species of selenium that is present (i.e. selenite vs selenate). Sulphate has an antagonist effect on selenate’s bioavailability, and consequent toxicity, under certain conditions. However, sulphate impact on the bioavailability of other forms of selenium has not been demonstrated. The Proponent has not demonstrated that the predicted selenium concentration during and following mine operations would be composed only of selenate. Therefore, a site-specific selenium objective based on the premise that all anticipated selenium releases would be selenate is not acceptable.</p> <p>ECCC notes that during passage through the Saturated Backfill Zones (SBZ), selenate may be reduced to selenite, and the effluent from the backfill zones would contain a significant proportion of selenite. In their response to IR 5.1 the Proponent responded that the selenite would be removed by adhesion,</p>	<p>ECCC has identified the following SIR for the Panel’s consideration for response by the Proponent:</p> <ol style="list-style-type: none"> 1. Provide additional information on the efficacy of the proposed oxidation step through a large-scale pilot test / field trial, or through documented case studies in the primary literature along with appropriate justification for the particular case study.

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<p>Assessment. AER-R2-13. Appendix C-2. (CEAR #89).</p>	<p>with low concentrations leaving the SBZ. The Proponent acknowledged that residual selenium would be in the form of selenite, and proposed to add a step to encourage the oxidation of selenite to selenate:</p> <p>“Benga proposes to construct a cascade from the discharge point of the Saturated Backfill Zone (SBZ) that will ensure oxygen levels of the effluent are compatible with the natural environment in Blairmore Creek. The water would then pass through a coarse gravel ditch line, before entering into the SBZ holding pond where water would be allowed to further equilibrate”.</p> <p>A trial test of this proposed solution should be performed to demonstrate the efficiency of this additional treatment to change the speciation of selenium, or appropriate literature, based on case studies elsewhere, should be provided.</p>	
<p>7. <u>Aquatic Monitoring Plan</u></p> <p>Joint Review Panel Request for Additional Information Response Package Addendum 10: Package 5: Surface Water Quality, Hydrology, Hydrogeology, Fish and Fish Habitat, Cumulative Effects, Geotechnical, Reclamation, Wildlife, Land Use and EA Methodology IR 5.4, 5.23</p> <p>Draft Fisheries and Aquatics Monitoring Program</p>	<p>IR 5.4 outlines requirements for a draft aquatic monitoring plan relating to monitoring, mitigation, adaptive management, and overall study design and analysis. The IR specifically requested that the draft aquatic monitoring, mitigation and adaptive management plan include information on six key points related to mitigation as adaptive management (5.4a, i-vi), as well as to provide details on fish egg and ovary monitoring (5.4b), baseline and reference data (5.4c), and an evaluation of long term trends (5.4d).</p> <p>The information responses are incomplete for the following reasons: Related to mitigation and adaptive management, the Proponent has not responded to all points requested in 5.4a i-vi. Overall, the adaptive management portion of the plan does not provide details specific to the Project, and instead, outlines the general concepts that are used within an adaptive management design. Specifically, the Proponent has not identified project-specific uncertainties that may necessitate adaptive management, proposed mitigation measures, mitigation objectives and pre-discharge mitigation performance indicators, commented on the efficacy of proposed mitigation measures, or contingency</p>	<p>ECCC has identified the following SIR for the Panel’s consideration for the response by Benga Mining:</p> <ol style="list-style-type: none"> 1. Provide Project-specific details on adaptive management and mitigation, as requested by the Joint Review Panel in IR 5.4a i-vi 2. Provide details on sampling design, including how the baseline dataset will be established and used during monitoring 3. Provide a description of how long term trends will be identified and mitigated, as compared to year to year variability

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	<p>measures that are technically and economically feasible if mitigation proves ineffective. Given these gaps in information there is uncertainty that potential effects can be adequately captured via monitoring, and mitigated via adaptive management.</p> <p>In response to IR 5.4c related baseline data and reference sites, the Proponent has identified two potential reference areas (upper Blairmore Creek and Cauldron Creek) with the caveat that “if upper Blairmore and/or Caudron Creek are not sufficient, a reference area within the LSA or RSA can be explored.” However, although some information has been provided on potential reference sites, no information on baseline monitoring has been provided. In a connected IR (5.23d) where information was requested on the Proponent’s plans to establish an accurate baseline assessment prior to mining such that impacts to water quality could be detected, the Proponent referred the reader to the Aquatic Monitoring Program (section 6.5). Upon review, no such details on the establishment of an accurate baseline assessment for water quality are provided in the Aquatic Monitoring Program. Given the lack of definitive reference areas and lack of details on how baseline data will be incorporated into the Aquatic Monitoring Plan, it is unclear how effective the monitoring program will be at detecting potential changes in the receiving environment.</p> <p>Finally, with regards to the evaluation of long term trends (5.4d), while mention is made of monitoring the population trends in Westslope Cutthroat Trout (Section 6.6) there is no discussion provided on how long term trends vs. year to year variability will be evaluated and mitigated for other aquatic components (water quality, algae, benthic invertebrates, and fish health).</p> <p>ECCC reiterates that requiring the Proponent to provide a draft Aquatic Monitoring Plan would allow the Panel to evaluate the Proponent’s ability to</p>	

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	<p>detect potential changes in water quality, validate assessment predictions, and evaluate management measures to mitigate potential effects.</p>	
<p>8. <u>Selenium Treatment Predictions</u></p> <p>Joint Review Panel Request for Additional Information Response Package Addendum 10: Package 5: Surface Water Quality, Hydrology, Hydrogeology, Fish and Fish Habitat, Cumulative Effects, Geotechnical, Reclamation, Wildlife, Land Use and EA Methodology IR 5.5</p>	<p>IR 5.5 identified uncertainties associated with the use of Saturated Backfill Zones (SBZ) to attenuate selenium and nitrate. ECCC indicated in ECCC IR 6, (CEAR #67) a high level of uncertainty regarding the ability of the SBZ to attenuate selenium and nitrate. Among the issues noted by ECCC variables of the proposed SBZ that introduce uncertainty to its efficacy include the exposure of waste rock to air, location of effluent pipe, variability in feed concentrations, retention time, and proliferation of micro-organisms in the tubing, as well as a significant inconsistency in the attenuation rates predicted by Benga, and a lack of information on speciation in the pilot trial of the SPZ (CEAR #167).</p> <p>The proponent did not provide a sufficient answer to requests 5.5 a) ii), v), vii), xi):</p> <ul style="list-style-type: none"> ii) How the limitations identified by Environment and Climate Change Canada in IR6 (CEAR #167) would be addressed; v) What selenium removal rates can be consistently attained at full-scale despite seasonal changes in temperature, flows and selenium loadings, as well as long-term changes in climate; vii) The fate of selenium retained in the saturated backfill and risks of future remobilization; xi) How speciation of the predicted selenium releases from the Project will be conducted in order to provide information on efficacy 	<p>ECCC has identified the following SIRs for the Panel’s consideration for response by the Proponent:</p> <ol style="list-style-type: none"> 1. Confirm whether the concentration of selenium from the field trials was reduced to 0.015 mg/L or 0.15 mg/L; 2. Provide detailed contingency plans for the components of the treatment system, which would be implemented when specified triggers are reached.

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	<p style="text-align: center;">of treatment conditions and inform appropriate water quality objectives for selenium.</p> <p>IR 5.5 b) includes a point requiring clarification. Example A states that from the field trial reported in Jensen et al., (2018), a concentration of selenium treated in barrels dosed with varying amounts of carbon was reduced to less than 15 ug/L after two weeks. However, in Figure 2 of the referenced article, and in Figure 6 in Appendix C-2 (CEAR #89), the results indicate that achieving 0.15 mg/L of selenium occurs only under the best conditions tested (i.e. Methanol and Molasses (Low)).</p> <p>IR 5.5 c) The contingency plan presented by the Proponent in the case of a selenium exceedance is simply a list of potential actions to be taken, which is considered inadequate by ECCC. A suitable contingency plan in case of exceedance of selenium compared to guidelines is more detailed than a listing of potential actions to be taken. The contingency plan should contain details on each action, conditions, monitoring plan and triggers. This should be done for all proposed actions to decrease the concentration of selenium in the effluent reaching the waterbodies, including, but not limited to, contingency plans for the SBZ treatment, the water treatment plant for selenium removal, and the cascade to change speciation. A contingency plan with sufficient detail is required to demonstrate the Proponent has anticipated possible potential outcomes and has an understanding of the mitigations available in order to reduce overall risk.</p>	

Environment and Climate Change Canada’s Proposed Information Requests on the Sufficiency and Technical Merit of the Ninth and Tenth Addendum to Benga Mining’s Grassy Mountain Coal Project’s Environmental Impact Assessment

Topic and Information Source	Rationale	Proposed Information Request
<p>9. <u>Selenium Effects and Loading Predictions</u></p> <p>Joint Review Panel Request for Additional Information Response Package Addendum 10: Package 5: Surface Water Quality, Hydrology,</p> <p>Hydrogeology, Fish and Fish Habitat, Cumulative Effects, Geotechnical, Reclamation, Wildlife, Land Use and EA Methodology IR 5.9 (d), IR 5.29.</p>	<p><u>IR 5.9 (d)</u></p> <p>IR 5.9 asks Benga to “<i>Evaluate the potential for combined, multiple stressor effects (antagonistic, additive or synergistic) on periphyton and benthic community composition, fish reproduction and growth from combined chronic effects of the estimated elevated levels of sulphate and hardness, alone and in combination with: selenate, selenite, organoselenium; trace elements with baseline water or sediment concentrations which exceed guidelines in at least one season (total copper, chromium, lead, mercury, silver, and zinc in water, dissolved aluminum in water); and, trace elements which are predicted to exceed guidelines due to the Project (cadmium, cobalt and zinc). The assessment should also consider the effects of nitrogen compounds (particularly ammonia), total suspended solids, dissolved organic carbon, pH, and temperature.</i>”</p> <p>The information responses provided by the Proponent to this request are incomplete. The requirement specifies that the effects of mitigating factors should be evaluated on selenate, selenite and organo-selenium. The interaction of sulphate with selenate was discussed, as was the impact on westslope cutthroat trout (WSCT). However, no other tests have been performed or discussed on the impact of mitigating factors on other selenium species.</p> <p><u>IR 5.29 e) & f)</u></p> <p>IR 5.29 e) & f) request characterization of residual effects of elevated selenium in the Oldman Reservoir, and of cumulative effects of selenium on aquatic and wildlife receptors.</p>	<p>ECCC has identified the following SIRs for the Panel’s consideration for response by the Proponent:</p> <ol style="list-style-type: none"> 1) Provide information on the interactions and combined effects and mitigating effects, as outlined in IR 5.9 d) for the selenium species listed. 2) Recalculate selenium loadings to the Oldman Reservoir using predicted selenium concentrations which will occur during mining operations, and provide and assessment of effects associated with this loading.

Environment and Climate Change Canada’s Proposed Information Requests on the Sufficiency and Technical Merit of the Ninth and Tenth Addendum to Benga Mining’s Grassy Mountain Coal Project’s Environmental Impact Assessment

Topic and Information Source	Rationale	Proposed Information Request
	<p>ECCC notes that the calculation of selenium accumulation in the Oldman Reservoir is erroneous. It is inadequate to simply multiply the concentration of selenium in the river by loading volume to estimate selenium loading in the reservoir.</p> <p>The selenium loading should be calculated using the modelled water selenium concentration during mining operations, rather than the background concentration. Predicted modelled concentration of selenium in monitoring station BC-01 (downstream mine operations) is 4.9 ug/L. Please use this value to predict impacts of selenium in the Oldman Reservoir.</p>	
<p>10. <u>Groundwater Monitoring</u></p> <p>Grassy Mountain Coal Project – Updated Environmental Impact Assessment. Appendix 10C, Consultant Report #3 – Hydrogeology. (CEAR #42)</p> <p>From the Tsuut’ina Nation to the Joint Review Panel re: Grassy Mountain Coal Project - Comments on Environmental Impact Statement. (CEAR #192).</p> <p>Benga Mining Addendum 10 to the EIS, Package 5: Surface Water Quality, Hydrology, Hydrogeology, Fish and Fish Habitat, Cumulative Effects, Geotechnical, Reclamation,</p>	<p>The Proponent states on page 110 of Addendum 10 Package 5 that “despite the effort of the regional study to collect all available data and supplement them with additional drilling, the study concludes that the scarcity of water level data, coupled with the significant topographic relief, and the complexity of the flow system makes it impossible to create regional potentiometric contour maps with any degree of accuracy.”</p> <p>Tsuut’ina Nation noted that due to the complexity of the groundwater regime, it seems unlikely that an extraction system could be adequately designed to collect all potentially contaminated seepage” water (CEAR #192).</p> <p>The Proponent has committed to doing the following to control surface waters mitigate infiltration to ground water:</p> <p>End Dumping Techniques: The Proponent proposes to construct all waste rock dumps using industry accepted methods of end-dumping to develop sufficient angular momentum across the tipping face to develop the required gradation. This process results in the development of a permeable, coarse-grained layer</p>	<p>ECCC has identified the following SIR for the Panel’s consideration for the response by the Proponent:</p> <ol style="list-style-type: none"> 1. In the absence of an accurate regional potentiometric contour map, ECCC requests the proponent <ol style="list-style-type: none"> a) Provide a rationale for the location of the seepage wells. b) Develop a monitoring and adaptive management plan that would ensure that the groundwater is not contaminated.

Environment and Climate Change Canada’s Proposed Information Requests on the Sufficiency and Technical Merit of the Ninth and Tenth Addendum to Benga Mining’s Grassy Mountain Coal Project’s Environmental Impact Assessment

Topic and Information Source	Rationale	Proposed Information Request
Wildlife, Land Use and EA Methodology. IR 5.19	<p>of rock at the base of the pile (rock drain) for conveyance of surface water as well as infiltration from the pile above.</p> <p>Drainage Ditches: Drainage ditches are relatively easy to construct, given the equipment and materials on-site, making them technically feasible. The proponent proposes to implement these ditches at the toes of waste rock dumps for the Project.</p> <p>Seepage Wells: Seepage capture wells installed into deeper groundwater formations address the potential for vertical seepage of contact water. The cost of installation of these wells is anticipated to be an order of magnitude lower than constructing a liner beneath the ex-pit waste rock dumps. The intention of the seepage wells is to create enough draw down to capture all vertical seepage from the overlying waste rock. Three areas for seepage capture were identified: southwest of the north ex-pit waste rock dump; west of the south and central waste rock dumps; and southeast of the central waste rock dump. Installation of these seepage capture wells a minimum of 250 m from the toe of the waste rock piles ensures safe, reliable access to the wells.</p> <p>The proponent’s claim that <i>“despite the effort of the regional study to collect all available data and supplement them with additional drilling, the study concludes that the scarcity of water level data, coupled with the significant topographic relief, and the complexity of the flow system makes it impossible to create regional potentiometric contour maps with any degree of accuracy.”</i>, does not provide any degree of assurance that the placement of the seepage wells are in the appropriate locations to be able to capture vertical seepage. It is understood that the drainage ditches at the toe of the waste rock dump are intended to intercept shallow seepage from the dump. However, there is no</p>	

Environment and Climate Change Canada's Proposed Information Requests on the Sufficiency and Technical Merit of the Ninth and Tenth Addendum to Benga Mining's Grassy Mountain Coal Project's Environmental Impact Assessment

Topic and Information Source	Rationale	Proposed Information Request
	<p>explanation of how the seepage collected by the drainage ditches and the seepage well will be managed.</p> <p>It is also unclear if these measures will ensure that groundwater is not contaminated. An engineered liner may not be necessary if the sloped design enhances drainage/flow towards the collections ditches and the seepage wells are able to collect seepage to be treated if necessary before discharge.</p>	
<p><i>Please use as many pages as necessary.</i></p>		



Health
Canada Santé
Canada

Director General, Environmental Health and Pesticides Directorate (EHPD)
Regulatory Operations and Enforcement Branch (ROEB)
Health Canada / Government of Canada

October 24, 2019

Alex Bolton
Panel Chair
Grassy Mountain Coal Project Joint Review Panel

c/o Impact Assessment Agency of Canada
160 Elgin Street, 22nd Floor, Place Bell Canada
Ottawa, Ontario
K1A 0H3

**Subject: Health Canada's Review of the Ninth and Tenth Addendum to the
Environmental Impact Assessment (Reference Number: 80101)**

Dear Mr. Bolton,

In response to the Joint Review Panel (JRP) public notice invitation dated September 9, 2019 for the Grassy Mountain Coal Project (the Project), Health Canada (HC) is providing comments on the sufficiency and technical merit of the Ninth and Tenth Addendum to the Environmental Impact Assessment provided by Benga Mining Limited. These comments are provided with respect to HC's mandate and areas of expertise. HC is participating in the environmental assessment review of the Project as a Federal Authority under Section 20 of the *Canadian Environmental Assessment Act, 2012*.

HC is of the opinion that the information provided is not sufficient to proceed to a hearing and therefore provides information requests to the JRP (attached). These information requests are related to the specialist or expert information or knowledge that HC possesses. Specific to this Project, the information requests are related to air quality, human health risk assessment and noise.

Should you have any questions, please contact Chantal Roberge, Director of the Environmental Health Program and Internationally Protected Persons Program at (514) <contact information removed> Please copy Robert Drummond, counsel with Justice Canada, at <contact information removed> on any correspondence with HC.

We appreciate the opportunity to provide comments to the JRP.

Canada 



Health
Canada

Santé
Canada

Sincerely,

<Original signed by>


Denise MacGillivray

Director General, Environmental Health and Pesticides Directorate (EHPD)
Regulatory Operations and Enforcement Branch (ROEB)
Health Canada / Government of Canada

cc: David Morin, Director General, Safe Environments Directorate, Healthy
Environments and Consumer Safety Branch (HECSB), HC
Chantal Roberge, Director, Environmental Health Program, EHPD, ROEB, HC
Suzanne Leppinen, Director, Chemicals and Environmental Health Management
Bureau, HECSB, HC
Brenda Woo, Regional Manager, Environmental Health Program, EHPD, ROEB,
HC
Kathleen Buset, Manager, Chemicals and Environmental Health Management
Bureau, HECSB, HC

Attachment: Proposed Information Requests on the Sufficiency and Technical Merit of
the Environmental Assessment

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

Participant: Health Canada

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

Information Request #	Information Source <i>(section or page# of EIS, Addenda, Responses to Requests for Information, etc.)</i>	Rationale	Proposed Information Request
HC-01	<p>Addendum 8, HC-R2-1 – Response to Government of Canada, Question#1, Pages 81 – 84</p> <p>Addendum 10, Appendix 4.9-1 (Human Health Risk Assessment), Section 5.2.1.1, Pages 21-23</p>	<p>The proponent assessed known carcinogenic chemicals of potential concern (COPCs) in diesel particulate matter (DPM) and found that project contributions are less than acceptable exposure limits. However, Health Canada does not agree that this is an adequate approach in determining human health risk from DPM. Assessing only known carcinogenic COPCs does not acknowledge the current science that considers DPM as a mixture when determining impacts to human health. While Health Canada acknowledges the criticisms of the California Environmental Protection Agency (CalEPA) (1998) method and the possible uncertainties that arise from it, Health Canada is still supportive of the CalEPA method as it is currently the only quantitative method available that can provide insight to the human health effects of DPM as a mixture.</p> <p>Health Canada supports the findings of a number of governmental/scientific organizations including those of Health Canada, the WHO (IARC), US EPA and California EPA, which conclude:</p> <ol style="list-style-type: none"> 1. Health Canada (2016): The overall literature, including studies pertaining to in vitro, experimental animal and human exposures to diesel exhaust (DE), presents a coherent body of evidence indicating that DE is carcinogenic to humans. Based on sufficient evidence 	<p>The proponent should utilize the CalEPA approach for a quantitative assessment of DPM or alternatively, provide a qualitative assessment that adequately reflects the conclusions of a number of governmental/scientific organizations including those of Health Canada, the WHO (IARC), US EPA and California EPA.</p>

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

Information Request #	Information Source <i>(section or page# of EIS, Addenda, Responses to Requests for Information, etc.)</i>	Rationale	Proposed Information Request
		<p>of a causal relationship between DE exposure and lung cancer in occupational studies, substantial supporting evidence from toxicological studies establishing the mutagenicity and genotoxicity of DE and the fact that DE contains known human carcinogens, it is concluded that there is sufficient evidence of a causal relationship between DE exposure and lung cancer.</p> <p>2. International Agency for Research on Cancer (IARC) (2014): Carcinogenic to humans (Group 1), based on sufficient evidence of lung cancer in humans, sufficient evidence of lung cancer in animals and strong evidence of ability to induce cancer in humans.</p> <p>3. United States Environmental Protection Agency (US EPA) (2002 and 2003): Likely to be carcinogenic to humans by inhalation, based on strong but less than sufficient evidence of lung cancer in humans, carcinogenicity in animals, and extensive supporting data.</p> <p>4. California Environmental Protection Agency (California EPA 1998): Consistent with a causal relationship between occupational DE exposure and lung cancer. Additionally, this assessment includes a quantitative method that can provide insight to the human health effects of DPM as a mixture.</p> <p>References:</p>	

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

Information Request #	Information Source <i>(section or page# of EIS, Addenda, Responses to Requests for Information, etc.)</i>	Rationale	Proposed Information Request
		<p>Cal EPA. 1998. Part B: Health Risk Assessment for Diesel Exhaust. Office of Environmental Health Hazard Assessment, Air Resources Board, California Environmental Protection Agency, Sacramento, Ca.</p> <p>Health Canada. 2016. Human Health Risk Assessment for Diesel Exhaust. Fuels Assessment Section, Water and Air Quality Bureau, Health Environments and Consumer Safety Branch.</p> <p>IARC. 2014. Diesel and gasoline engine exhausts and some nitroarenes. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Vol. 105. Lyon, France. Volume 5.</p> <p>US EPA. 2002. Health Assessment Document for Diesel Engine Exhaust (Final). PA/600/8-90/057F. National Center for Environmental Assessment, Office of Research and Development, US Environmental Protection Agency, Washington, DC</p> <p>US EPA. 2003. Integrated Risk Information System (IRIS) Chemical Assessment Summary – Diesel Engine Exhaust. National Center for Environmental Assessment.</p>	
HC-02	<p>Addendum 10, Package 1 (Air Quality and Noise), Information Request 1.6, Pages 22-27</p> <p>Addendum 10, Package 4 (Human Health), Appendix 4.9-1 (Human Health Risk Assessment), Section 6.0, Pages 38-83</p>	<p>The Proponent states that it used monitoring data from Lethbridge for its baseline NO₂ values to ensure that predicted NO₂ concentrations are not underestimated. However, the use of the Lethbridge monitoring station may lead to a misleading result, as it is a community with greater emissions than the Project area. Health Canada recommends the use of monitoring data for NO₂ background concentrations that would be more representative (i.e. a less populated or developed area), rather than the City of Lethbridge. This may provide a more accurate picture of the Project’s contribution to the NO₂ ambient air concentrations in the project study area.</p>	<p>Revise the NO₂ predictions at all receptor locations using baseline monitoring data that is more representative of the Project area.</p>

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

Information Request #	Information Source <i>(section or page# of EIS, Addenda, Responses to Requests for Information, etc.)</i>	Rationale	Proposed Information Request
HC-03	Addendum 10 – Package 1 (Air Quality) Appendix 1.3-1 (Draft Air Quality Monitoring and Adaptive Management Plan), PDF page 87 – 107.	<p>There appears to be contradictions in the information provided in Addendum 10 (Package 1) and the Draft Air Quality Monitoring and Adaptive Management Plan (Appendix 1.3-1). Table 5.01 of the Draft Air Quality Management Plan lists the use of Tier 4 compliant haul trucks as a mitigation measure. However, several responses to the Panel’s information requests (Package 1) use broader language and indicate that all heavy duty mine equipment will meet Tier IV emission standards.</p> <p>Furthermore, Health Canada notes additional mitigation measures may need to be considered in the Draft Air Quality Monitoring and Adaptive Management Plan.</p>	<ul style="list-style-type: none"> a) Clarify whether all mine fleet will meet Tier IV emissions prior to the operation of the mine. b) Indicate if there will be a retrofit and replacement schedule demonstrating off-road equipment conversion to best-in-class technology, starting with Tier IV engines as they become available. c) Indicate whether dust collectors and other pollution control devices will be used at the coal handling and processing plant.
HC-04	Addendum 10 – Package 4 (Human Health), Appendix 4.9-1 - Human Health Risk Assessment	<p>The Local Study Area – Maximum Point of Impingement (LSA-MPOI) and Regional Study Area – Maximum Point of Impingement (RSA-MPOI) were included in the Human Health Risk Assessment (HHRA) as a hypothetical worst-case receptor location. However, in the HHRA, there is no indication as to where the MPOI is located, aside from stating that it is located within the mine permit boundary and will be prohibited from the public. The HHRA lacks necessary information on the sources/activities contributing to the contaminants modelled as well as the locations of the MPOI for each contaminant.</p>	<ul style="list-style-type: none"> a) Provide details on the locations of the LSA-MPOI and RSA-MPOI for each contaminant of potential concern (preferably in a map). b) Indicate what activity at the site is contributing contaminants to create the MPOI.

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

Information Request #	Information Source <i>(section or page# of EIS, Addenda, Responses to Requests for Information, etc.)</i>	Rationale	Proposed Information Request
HC-05	Addendum 10 - Package 4 (Human Health), Appendix 4.9-1 - Human Health Risk Assessment, Section 5.1, Pages 10-19	<p>The problem formulation section of the HHRA does not clearly state what pathways are included, as it is scattered throughout the HHRA, thus leading the reader to find this information. It is suggested that the problem formulation be expanded to clearly indicate the exposure media considered in the HHRA, along with a full listing of the contaminants of potential concern (COPC), concentrations of COPCs (and metric, if applicable – e.g. range, upper confidence limit of the mean (UCLM), etc.) in each medium, the screening criteria used and the results of contaminant screening.</p> <p>Furthermore, Health Canada recommends that the most impacted receptor be assessed in the HHRA. Should it be possible that local residents may use the site more frequently or consume more fish from the site, it is recommended that they also be assessed in the HHRA. Health Canada recommends that the HHRA clearly identify the site use patterns of all potential receptors in the problem formulation.</p>	<ul style="list-style-type: none"> a) Indicate the exposure media considered in the HHRA. b) Provide a full listing of the COPCs. c) Provide the concentrations of the COPCs in each medium, including a metric if applicable (for example, range, UCLM etc.), the screening criteria used and the results of the contaminant screening (including whether contaminants with no relevant screening criteria were carried forward into the HHRA). d) Include a full rationale for exclusion of any exposure medium from the multi-media assessment. e) Identify the assumptions (site use patterns) underlying each receptor type identified in the HHRA.
HC-06	<p>Addendum 10 – Package 4 (Human Health), IR 4.10, Pages 84-93</p> <p>Addendum 10 - Package 4 (Human Health), Appendix 4.9-1 - Human Health Risk Assessment, Pages 21-83</p> <p>Addendum 10 – Package 4 (Human Health), Appendix E</p>	<p>Coal contains numerous metals and organic compounds, some known to be toxic and others that are potentially toxic. Toxic substances found in coal include polycyclic aromatic hydrocarbons (PAHs) which can act as mutagens, cancer promoters, and endocrine disrupters.</p> <p>Coal dust, which includes fine particulates, can serve as a vector for PAHs to enter deep into the lungs and into the blood circulation. Hence, toxic chemicals like PAHs that are attached to these fine particles can then be delivered to the organs and tissues and cause deleterious effects. Thus, the assessment of</p>	<ul style="list-style-type: none"> a) Provide supporting information to address the bioavailability of coal dust PAHs to humans from all exposure routes and update the exposure and risk estimated in the HHRA accordingly. b) Provide rationale to explain why no analysis of the coal from the Grassy Coal Mine Project was undertaken and not available for inclusion in the HHRA.

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

Information Request #	Information Source <i>(section or page# of EIS, Addenda, Responses to Requests for Information, etc.)</i>	Rationale	Proposed Information Request
		<p>the bioavailability potential of coal dust is not adequately characterized. Nor was there any analyses of the coal from the Grassy Coal Mine Project site undertaken. Instead, surrogate values were used.</p> <p>Health Canada notes that the three mines selected for metals analysis in coal dust (Table 4.10-1) are associated with thermal coal instead of the metallurgical coal that characterizes this project. Metal emissions profiles from thermal coal may be different from those of metallurgical coal.</p> <p>The Proponent also uses a default dust level value of 0.76 µg/m³ (Health Canada, 2010) in its sample calculations presented in Appendix E. It is Health Canada’s opinion that a reasonable dust level created by vehicle traffic on unpaved roads is 250 µg/m³ (Claiborn et al., 1995 as cited by Health Canada 2010). The value of 0.76 µg/m³ may significantly underestimate the potential dust generation associated with this exposure scenario. It may also underestimate all risk estimates presented in the HHRA using this default dust level value.</p> <p>It is also not clear whether this value is intended to address primary dust emissions from the mine or only dust originating from suspension of soils (onto which the primary dust has deposited).</p> <p>Additionally, crystalline silica is a Class 1 carcinogen (IARC 2012), but was not included in the lung tumours mixture. Currently, silica is included only in the respiratory irritant toxicity endpoint group. Consider using the ambient air quality criterion for</p>	<p>c) Use a metal profile from projects that are analogous to metallurgical coal mines or provide additional justification for why the mines selected for metal analysis were used for comparison with the Project.</p> <p>d) With respect to the default dust level value (0.76 µg/m³) used in the HHRA:</p> <p>i) Provide rationale for its use for ambient particulate matter generated from soils that would be relevant to dust generated by mining activity. Include an explanation as to why this assumption is applicable to site-related mining activity.</p> <p>ii) Clarify whether this value is intended to address primary dust emissions from the mine or only dust originating from the suspension of soils.</p> <p>iii) Revise all risk estimates in the HHRA using a dust level value that is more representative of a mine site (for example, 250 µg/m³ (Claiborn et al. 1995) or use site-specific PM2.5 and</p>

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

Information Request #	Information Source <i>(section or page# of EIS, Addenda, Responses to Requests for Information, etc.)</i>	Rationale	Proposed Information Request
		<p>respirable silica of 5 µg/m³ from the Ontario Ministry of the Environment and Climate Change (MOECC 2016).</p> <p>References: Claiborn, C., A. Mitra, G. Adams, L. Bamesberger, G. Allwine, R. Kantamaneni, R. Lamb, and H. Westberg. 1995. Evaluation of PM10 emission rates from paved and unpaved roads using tracer techniques. <i>Atmos. Environ.</i> 29(10): 1075–1089.</p> <p>Health Canada (HC). 2010. <i>Federal Contaminated Site Risk Assessment in Canada, Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA)</i>, Version 2.0. Contaminated Sites Division, Safe Environments Directorate, Ottawa.</p> <p>International Agency for Research on Cancer (IARC). 2012. Silica Dust, Crystalline, in the form of quartz or cristobalite, IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 100C. Available online at: https://monographs.iarc.fr/wp-content/uploads/2018/06/mono100C-14.pdf</p> <p>Ontario Ministry of Environment and Climate Change. 2016. Ontario's Ambient Air Quality Criteria. Accessed October 7, 2019 at: https://www.ontario.ca/page/ontarios-ambient-air-quality-criteria-sorted-contaminant-name</p>	<p>PM10 concentrations (which may vary by location).</p> <p>e) Include silica in the lung tumors mixture and revise the predicted incremental lifetime cancer risk. The Ontario MOECC value for respirable silica should be used as the appropriate standard.</p>
HC-07	Addendum 10 – Package 4 (Human Health), Appendix 4.9-1 - Human Health Risk Assessment, Section 6.3.1.5, Page 72	The HHRA indicates that some COPCs were elevated as compared to target hazard quotients (HQ) for both the Baseline and Application cases. However, the exceedance of the lead HQ is unexpected for the baseline scenario, given that soil lead concentrations are stated in the HHRA to be 16 mg/kg on average. The results indicate that there may be other potentially important (non-soil) source(s) of lead assumed in the background exposure calculations that is not currently identified. However, as there was no background monitoring completed and no inputs into the background exposure modelling are provided, this cannot be verified. Thus, Health	Clearly identify in the HHRA the assumptions underlying the calculations of the background exposures (including whether exposure occurring while indoors were addressed).

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

Information Request #	Information Source <i>(section or page# of EIS, Addenda, Responses to Requests for Information, etc.)</i>	Rationale	Proposed Information Request
		Canada recommends that there be a clear identification of the assumptions underlying the calculations of background exposures (including whether exposure while indoors was addressed).	
HC-08	Addendum 10 – Package 4 (Human Health), Appendix 4.9-1 - Human Health Risk Assessment, Section 5.1.3, Pages 18-19 and Section 6.5, Pages 80-82	<p>Water quality from three historic end-pit lake stations was used as a surrogate for the anticipated water quality of the Project end-pit lake. However, there is no description provided on the surrogates used in the HHRA. It is not clear if the surrogate end-pit lakes are from open-pit coal mines and therefore similar to the Grassy Mountain Coal Project.</p> <p>Furthermore, the Proponent states that contact with surface water while swimming is not expected as the lake will be for visual appeal and that fish ingestion is not expected to occur as local fish species do not thrive in benthic environments. The information provided is not clear as to what reclamation for “visual appeal” will entail with respect to the protection of human health.</p> <p>Additionally, water fowl may have access to the end-pit lake, but neither hunting of water fowl or the gathering of their eggs was scoped into the HHRA or rationale for their exclusion.</p>	<ul style="list-style-type: none"> a) Provide a description of the surrogate end-pit lake stations used in the HHRA. b) Indicate if monitoring of pit lake water quality will be completed. c) Indicate if there will be risk management measures in place to ensure that people do not use the lake for swimming or fishing. d) Identify whether there may be increased COPCs in edible animal tissue (and eggs) from consumption of this water source. Revise the HHRA accordingly.
HC-09	Addendum 10 – Package 4 (Human Health), Appendix 4.9-1 - Human Health Risk Assessment, Section 6.3.1.7, Pages 74-78	The assessment states it used Health Canada’s Tolerable Daily Intake (TDI) for methylmercury of 0.2 µg/mg/day for all age groups in its assessment. However, the TDI for methylmercury is 0.2 µg/kg/day.	Clarify the TDI used in the HHRA for methylmercury.

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

Information Request #	Information Source <i>(section or page# of EIS, Addenda, Responses to Requests for Information, etc.)</i>	Rationale	Proposed Information Request
HC-10	<p>Addendum 10 – Package 1 (Air Quality and Noise), IR 1.9, Page 41</p> <p>Addendum 10 – Package 1 (Air Quality and Noise), Figure 1.9-1</p>	<p>As indicated in the response to IR 1.9, the noise from the loading of coal into train cars has been included in the noise modelling, but it is not characterized as an impulsive noise source. It is Health Canada’s opinion that even with the potential low drop height of the train loadout, it is possible that the initial loading of rail cars could be impulsive noise. Therefore, Health Canada recommends that the loading of coal into rail cars should be characterized as an impulsive noise source.</p> <p>Additionally, Figure 1.9-1 in Addendum 10 shows a proposed helipad. However, there is no information associated with the helipad with respect to noise and it is unclear what is its intended use or frequency of use. Furthermore, it is not known if a heliport will be associated with the project.</p>	<ul style="list-style-type: none"> a) Revise the noise impact assessment to consider the loading of rail cars as impulsive noise. b) Revise the determination of percent highly annoyed (%HA) for each noise receptor based on the changes made in part (a). c) Provide details on how %HA was calculated at all receptors. Include a rationale for applying or not applying any decibel adjustments. d) Provide information on the intended use of the helipad and whether it will be associated with a heliport. e) Provide information on the potential noise from the helipad and revise the noise impact assessment as appropriate.



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October 24, 2019

Your file *Votre référence*

80101

Our file *Notre référence*

14-HCAA-00788

Alex Bolton, Chair
Joint Review Panel – Grassy Mountain Coal Project
c/o Canadian Environmental Assessment Agency
160 Elgin Street, 22nd floor
Ottawa, ON K1A0H3

Subject: Fisheries and Oceans Canada's comments regarding the sufficiency of additional information on the Grassy Mountain Coal Project (the Project), Reference Number: 80101

Dear Mr. Bolton,

In response to the Joint Review Panel (JRP) public notice invitation dated September 9th, 2019, Fisheries and Oceans Canada is providing comments to the JRP in relation to its mandate and area of expertise on the adequacy of the additional information that Benga Mining Limited (the proponent) issued in response to the JRP's supplemental information request.

For matters relating to our mandate and area of expertise, Fisheries and Oceans Canada has reviewed and evaluated the Proponent's responses to the panel's information requests and has provided a table detailing rationale and proposed additional information requests, where the information provided was not sufficient. These proposed information requests have been incorporated into the Government of Canada Federal Review Team submission.

Thank you for the opportunity to comment on the sufficiency of information available on the Grassy Mountain Coal Project. If there are questions regarding DFO's sufficiency review, please contact Laura Phalen at <contact information removed>

<contact information removed> Please copy Robert Drummond, counsel with Justice Canada, at <contact information removed> on correspondence to the department.

Sincerely,
<Original signed by>

Stephanie Martens
A/Regional Manager, Regulatory Reviews
Fish and Fish Habitat Protection Program
Fisheries and Oceans Canada

CC:
Laura Phalen – Fisheries and Oceans Canada
Brandi Mogge - Fisheries and Oceans Canada

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

Participant: Laura Phalen

Organization (if applicable): Fisheries and Oceans Canada, Fish and Fish Habitat Protection Program

General Comments: On August 28, 2019, strengthened fish and fish habitat protection provisions under the modernized *Fisheries Act*, as well as regulations that support these provisions officially come into force. Proponent submissions should be updated to reflect that during the regulatory phase, the prohibition against the harmful alteration, disruption, or destruction of fish habitat will be applied.

Proposed Information Requests on the Sufficiency and Technical Merit of the Environmental Assessment

Information Source <i>(section or page# of EIS, Addenda, Responses to Requests for Information, etc.)</i>	Rationale	Proposed Information Request
<p><i>Addendum 10: Information Request 5.4, Appendix 5.4-1: Draft Fisheries and Aquatic Monitoring Plan</i></p>	<p>Question 5.4 explicitly asked that a number of features be included in a draft aquatic monitoring plan. Many of these specific items are not included in the plan provided in Appendix 5.4-1.</p> <p>Lacking information appears to be consistent throughout the document, but DFO reviewed the following sections in detail: 5.0 – Mitigation Program 6.1.3 – Instream Flow Assessment Verification 6.6 - Westslope Cutthroat Trout Population Monitoring Plan</p> <p>Specifically, the following portions of the questions were addressed: a) i a) iii “proposed mitigation measures, mitigation objectives” a) iv “sampling location, frequency, and supporting information”</p> <p>The remaining portion of these bullets, and all other bullets, were not addressed in the above listed sections of the report.</p>	<p>Re-state the existing question.</p>

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<p><i>Addendum 10: Information request 5.22 a, b, c Responses to information requests a, b, c</i></p>	<p>The response to 5.22 b) indicates that “...Instream Flow Assessment predicted that Project-related hydrology alterations would result in changes of less than 10% in habitat area (area weighted suitability)relative to long-term baseline conditions during the WSCT overwintering period, thus no significant effects are anticipated.”</p> <p>It is unclear what the determination of no impacts in the area weighted suitability assessment is based on. If there are any habitat losses, even below 10% total area due to project impacts, they should be accounted for in the offsetting plan.</p> <p>Further, given that these habitat impacts are due to alterations in flow, it is unclear whether those areas which do not experience complete habitat loss still experience loss of functionality due to decreased flow.</p>	<p>Where reductions in overwintering habitat suitability and availability are determined – due to either a loss in habitat area or an alteration in flow that has the potential to decrease habitat functionality - update the existing Area Weighted Suitability assessment and refine the associated offsetting calculations. Assessment of impacts due to flow alterations should reference Science Advisory Report 2013/017 “Framework for Assessing the Ecological Flow Requirements to Support Fisheries in Canada.”</p>
<p><i>Addendum 10: Response to information request 5.24 b Information request 5.25 b</i></p>	<p>Response to 5.24 b includes the statement “The numerical model does not recognize that some of the water would be released [from sediment ponds] back to the creeks and contributes to their base flows.”</p> <p>Response to 5.25 b) includes the statement “If required, an assessment will be made to determine the best route for piping water from the sedimentation ponds associated with Blairmore Creek to appropriate discharge points (to be determined through results of the Monitoring Plan) into Gold Creek.”</p> <p>It is unclear whether future adaptive management efforts to supplement flows through the use of water from these sedimentation ponds might be limited by the ongoing plan to release water from the sedimentation ponds into Gold Creek.</p>	<p>Clarify whether the sedimentation ponds will contain enough water on an ongoing basis to be used for supplementation in a situation where impacts to Gold Creek are greater than predicted.</p>

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<p><i>Addendum 10: Information Request 5.28 Response to information request 5.28</i></p>	<p>The question states “Given the limited distribution of habitats critical to WSCT life processes, any avoidance response resulting from blasting activities can impact the survivability of fish populations in Gold and Blairmore Creeks, and would therefore result in a linkage to effects on fish which needs to be assessed.”</p> <p>The response states “...indicate that no scientifically supported threshold for the onset of behavioural effects from anthropogenic noise can currently be established.”</p> <p>Given the potential risk of behavioural changes of WSCT within their limited habitat, and the developing scientific knowledge base associated with avoidance behaviour of freshwater fish as it relates to sound, a site and scenario specific pathway of effect should be developed to aid in the generation of impact predictions on the local WSCT populations, and associated mitigation and monitoring should be developed. Given the proponent’s familiarity with the site and habitat characteristics, this should be possible based on existing information.</p>	<p>Re-state the existing question.</p>



October 24, 2019

Review Panel Manager
Grassy Mountain Coal Project
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Subject: Natural Resources Canada comments on the sufficiency and technical merit of information for the Grassy Mountain Coal Project Environmental Assessment

On September 9, 2019, the Joint Review Panel (the Panel) for the Grassy Mountain Coal Project (the Project) invited participants to provide comments on the sufficiency and technical merit of the Ninth and Tenth Addendums to the Environmental Impact Assessment provided by the Proponent, Benga Mining Limited. The Panel also invited participants to make recommendations on additional information that it should receive prior to proceeding to the public hearing phase of the process.

Natural Resources Canada's role in the Environmental Assessment:

Natural Resources Canada (NRCan) is participating in the environmental assessment as a Federal Authority in possession of specialist or expert information or knowledge with respect to the Project pursuant to the *Canadian Environmental Assessment Act, 2012*. To date, NRCan has provided expertise to the Impact Assessment Agency (formerly the Canadian Environmental Assessment Agency) in the following areas:

- Surficial geology and terrain hazards;
- Seismicity; and
- Hydrogeology and groundwater.

In addition, through its role in the administration of the *Explosives Act* and its regulations, NRCan has confirmed that it may issue a licence for the manufacture and storage of explosives for the Project and has been reviewing information pertaining to this role throughout the process.

NRCan's January 2019 Information Requests:

In our January 2019 submission to the Panel (Registry #167), NRCan concluded that the Proponent's information provided to date in the areas of surficial geology and terrain hazards (including landslides) and seismicity (including induced seismicity) were sufficient to proceed to the public hearing stage of the process.

NRCan did not reach the same conclusion in January 2019 with respect to hydrogeology and groundwater, and recommended that the Panel request additional information on mine pit dewatering, base flow rates and the groundwater numerical model. NRCan also recommended that the Panel request the Proponent provide an update on their baseline groundwater monitoring and analysis program.



In May 2019, the Panel determined that additional information was required in a number of areas, including hydrogeology, in order to complete the environmental assessment and proceed to the public hearing phase of the process. NRCan's January 2019 requests were not included in the Panel's May 2019 submission. However, the Proponent responded to NRCan in their sufficiency letter of January 31, 2019 (Registry #191) that "*no further information is required regarding hydrogeology and groundwater*", and "*all groundwater models contain some uncertainty*". They also referred to the role of the Alberta Energy Regulator with jurisdiction over groundwater in Alberta who will require that "*Benga develop for approval a comprehensive and robust groundwater monitoring plan as part of its EPEA approval*". In this response, the Proponent also committed to sharing information obtained through the Groundwater Monitoring Plan with NRCan.

In regards to the groundwater modeling undertaken by the Proponent, and the previous requests submitted by NRCan on this subject, it is NRCan's view that any uncertainties or issues related to the modeling can be addressed through effective adaptive management and the use of a well designed Groundwater Monitoring Plan.

NRCan's review of the August 2019 Addendum:

In regards to the Proponent's tenth Addendum provided in August 2019, NRCan has reviewed the Proponent responses to IRs # 5.18 and 5.19 in the areas of hydrogeology and IR #5.14 related to explosives.

IR #5.18 (Proponent's response: Tenth Addendum pdf. pp.109-116):

NRCan notes the Panel and Tsuut'ina Nation concerns over the potential for leaching of minerals such as selenium to reach receptors including groundwater. As detailed in IR 5.18, concern was noted related to the groundwater transport model's consideration of potential fractures and / or existing mine tunnels which potentially could be pathways for contaminated groundwater.

As presented in Addendum 10, it is the Proponent's view that the groundwater transport model developed for the Project is based on a reasonable, though limited, dataset and acceptable calibration. With regards to the complete identification and 3D modeling of the groundwater pathways, including the historical mine tunnels, the Proponent confirmed that attempts have been made to locate and identify the historical mines without success. The Proponent confirmed that uncertainties within the model and the modelled predictions will be addressed through the use of their proposed Adaptive Monitoring and Management Plan. Results from the monitoring will be compared with the modelling predictions, and in context with the mining operations and the need for additional monitoring or the implementation of adaptive management will be re-assessed regularly.

In NRCan's view, the Proponent's response to IR 5.18 is sufficient and the groundwater modelling conducted to date is reasonable for the purposes of identifying potential effects on receptors during the environmental assessment phase of the process. The numerical model and its calibration process were based on field investigations and reasonable assumptions found in the literature for the standard input parameters (hydrogeological units, hydraulic conductivity, recharge, etc.). Supplementary knowledge has been acquired based on data obtained from the additional borehole drillings conducted by the proponent. This additional information confirmed that the model is consistent with the hydrogeological settings interpreted and used in the model construction. In addition, adaptive management can be an effective way to address uncertainties with model predictions.



IR #5.19 (Proponent response: Tenth Addendum pdf. pp.116-119):

The Proponent has proposed seepage capture wells constructed across groundwater flow paths as a means to mitigate contamination of groundwater by capturing seepage from potential contaminant source areas with water being pumped to the surge ponds. There have been concerns raised by interested parties (including the Tsuut'ina Nation) that due to the complexity of the groundwater regime, it seems unlikely that an extraction system could be adequately designed to collect all potentially contaminated seepage water. As outlined in IR #5.19, the Panel requested that the Proponent conduct an alternative means analysis that investigated mitigation measures (impermeable, engineered liners) as an alternative to the proposed seepage capture wells.

The Proponent did not conduct a formal alternative means analysis however did provide clarification on the mitigations proposed as part of the external rock dump design and Selenium Management Plan that included several means for seepage capture. The Proponent considered the use of impermeable, synthetic liners, but determined that they were not technically and economically feasible for the Project.

NRCan does not have the expertise to comment on the sufficiency of the Proponent's response regarding the use of impermeable engineered liners to mitigate contamination into groundwater. However, in NRCan's view, the measures proposed by the Proponent for seepage collection, including seepage capture wells, are reasonable and technically feasible given the hydrogeological setting.

NRCan recommends that the Groundwater Monitoring Plan, when updated, include metrics to evaluate the performance of the drainage ditches and seepage wells, however NRCan does not expect to receive this update prior to proceeding to the public hearing phase.

IR 5.14 (Proponent response: Tenth Addendum pdf. pp.81)

NRCan notes the concern raised by parties related to the management of runoff water, including potential release, to ensure that potential impacts on watersheds in the area are understood. In the response to IR AER-R2-3 in Addendum 8 (Registry #89), the Proponent provided a general discussion regarding the management of wastes and storm water associated with the Grassy Mountain Explosives Magazine (GMEM). In IR 5.14, specific details were requested related to the materials to be stored at the GMEM.

NRCan notes that the Proponent has not been precise in describing the project components inferred in the term "Grassy Mountain Explosives Magazine". An explosives factory is a facility for emulsion and ammonium nitrate storage and transfer with a Mobile Process Unit (MPU) garage wash bay. Further details will need to be provided to NRCan during the process to issue a factory licence for operation. Additionally, in the response for 5.14 (iv), the description of water use in the delivery of explosives at bore holes is not clear. Water is used in the final step of borehole loading but it is not used for the manufacture of trace ingredients for the mixing of the bulk explosives. The Proponent should clarify how the water will be used at the MPUs or mix trucks.



Closing

If you require any clarification on this information, please contact Jessica Coulson, Team Leader, Office of the Chief Scientist at <contact information removed> We also request that you please copy our Justice Canada representative at <contact information removed> on any future correspondence to NRCan.

We appreciate the opportunity to provide comments to the Panel and look forward to the next steps of the process.

Sincerely, 

<Original signed by>

 John Clarke,
Director, Environmental Assessment Division
Office of the Chief Scientist

cc:

Laura Phelan - Fisheries and Oceans

Eva Walker - Environment and Climate Change Canada

Melissa Gorman - Health Canada