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October 31, 2019

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Our Matter Number: 1167150

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Grassy Mountain Coal Project Joint Review Panel
Impact Assessment Agency of Canada
160 Elgin Street, 22nd Floor
Place Bell Canada
Ottawa, ON K1A0H3

Attention: Tracy Utting, Acting Panel Manager

Dear Madam:

Re: Benga Mining Limited ("Benga")
CEAA Reference 80101
Grassy Mountain Coal Project ("Project")
Comments on Sufficiency

We are writing in connection with the public comment period initiated by the Joint Review Panel ("JRP") on September 9, 2019, which closed on October 24, 2019. Benga has reviewed all of the comments posted on the new Impact Assessment Agency Registry ("Registry") as of October 25, 2019.

We submit that a review of the comments submitted by the various parties clearly demonstrates that the information filed on the Registry is sufficient for the purposes of conducting a public hearing into the merits of the Project. Although several parties have requested that Benga redo modelling using different methodologies, provide further studies, use different assumptions, or update certain analyses, none of the parties have identified any information that is required by the JRP before it can make a determination as to whether the Project is in the public interest or whether it has the potential to result in significant adverse environmental effects.

Attached to this letter is a table wherein Benga responds to each of the comments submitted by the Government of Canada.[1] In addition to the specific responses provided in the attached table, we note the following:

1. Many of the Government of Canada's requests are new and are not based on previous requests for information and the responses already provided by Benga to those requests. This approach to developing information requests is contrary to principles of regulatory efficiency. For instance, Environment and Climate Change Canada ("ECCC") proposes that Benga provide estimates taking into account emissions generated by inbound vessels and also with a new assumption that engines operate at slower speeds for 2.3 hours (the "Marine Emissions IRs"). The Terms of Reference ("ToR") requiring that emissions from marine transporation be "taken into account" were issued in August of 2018 and nevertheless, this is the first time that ECCC has indicated it wants the

[1] Registry No. 283

estimates to be based on these new assumptions. ECCC could have made this request anytime after the ToR were issued or during the last comment period on sufficiency but did not. The JRP should not allow parties to use each comment period on sufficiency to be used to develop entirely new requests that could have been made much earlier. Otherwise, this process will never end.

2. Some of the Government of Canada's requests seek information that will not be helpful to the JRP when determining whether the Project is in the public interest or whether it has the potential to result in significant adverse environmental effects. The requests are made without any regard to the purpose of this assessment. The Marine Emissions IRs are an example of this. Benga has already demonstrated that these emissions are deminimus in comparison with existing Port of Vancouver traffic and with respect to total Project emissions and therefore not material to the JRP's mandate. Another example is Health Canada's request that Benga use the California Environmental Protection Agency (CalEPA) (1998) method to assess diesel particulate matter ("DPM"). As acknowledged by Health Canada, Benga has already assessed DPM and found that contributions are lower than acceptable exposure limits. Health Canada does not dispute these findings and has not identified other mine sites where unexpected issues have arisen in connection with DPM. There is therefore no justification for requesting an alternative method of assessment.[2] The information gathered in this assessment process should be relevant to the JRP's mandate as it pertains to the Project and not simply gathered to satisfy intellectual curiosity.

3. The Government of Canada fails to take into account that the federal regulatory process will result in further review of the Project's specific mitigation measures subsequent to the JRP's review. The requests for a further draft aquatic monitoring and adaptive management plan, contingency plan and groundwater management plan fail to take into account that these plans will all be required before the Project can proceed. In this regard we note that the draft conditions associated with the Teck Frontier Project require Teck to submit numerous management plans that are to be developed with Indigenous groups and relevant provincial and federal authorities after the Frontier Project is approved.[3]

As it pertains to the Tsuut'ina Nation,[4] we respectfully submit that Benga has provided all the information it can regarding potential impacts on the Tsuut'ina Nation's rights and culture. Any further perspectives or areas of disagreement are better presented to the JRP by the Tsuut'ina Nation itself and the hearing will afford an opportunity for this to happen.

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[2] In fact, Health Canada acknowledges that the California Environmental Protection Agency (CalEPA) (1998) method has been the subject of criticism.

[3] https://iaac-aeic.gc.ca/050/evaluations/document/132957?culture=en-CA

[4] Registry No. 286

With respect to CPAWS,[5] we note that a number of procedural issues are raised. We will provide separate submissions on these procedural issues during the first week of November.

In conclusion, we submit that the JRP currently has more than sufficient information to proceed to a hearing.

Yours truly,

<Original signed by>

Martin Ignasiak

c. Gary Houston
Mike Bartlett

Attachment

[5] Registry No. 284

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	Benga's Response
1. Mine Fleet Emissions Benga Mining, Joint Review Panel Request for Additional Information Response Package Addendum 10, Package 1: Air Quality and Noise; Information Request 1.4 Joint Review Panel Information Request Package 1 (Reference #195) IR1.4	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. 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: Using Tier 4 compliant haul trucks. Regularly upgrading the fleet. Maintaining fleet to manufacturer's specifications. Optimizing mine plans to minimize haul distances. 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 NO_2 emissions throughout the whole	ECCC has identified the following Supplemental Information Request (SIR) for the Panel's consideration for response by Benga Mining (the Proponent): 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.	All major mining equipment will be Tier 4 compliant for the commencement of operations in late 2022. The Air Quality Assessment (Consultant Report #1, Appendix A, Table A3-3) of the EIA filed in 2016 contains a list of all diesel equipment for the Project. The EIA also states in Paragraph A3.4 that all heavy-duty equipment will meet Tier 4 final engine emission standards. The Draft Discipline Monitoring and Adaptive Management Plans are intended to provide the JRP assurance of Benga's commitment to ensuring all appropriate plans are in place as part of the Project. As per standard industry practice, all Draft plans would be finalized in consultation with the appropriate regulatory agencies, Indigenous group, and community stakeholders upon Project approval.

Topic and Information Source	Rationale	Proposed Information Request	Benga's Response
	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.		
2. <u>Nitrogen Dioxide Concentrations</u> Benga Mining, Joint Review Panel Request for Additional Information Response Package Addendum 10, Package 1: Air Quality and Noise; Information Request 1.6 Benga Mining, Grassy Mountain Coal Project Update, Consultant Report 1a 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	The EIS Guidelines require the impact of the project's nitrogen dioxide (NO_2) emissions on the region surrounding the project to be assessed. ECCC relies on the proponent's predicted concentrations of NO_2 through dispersion modelling to assess project impacts. <u>Assessment of predicted concentrations</u> Predictions of nitrogen dioxide (NO_2) 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 $\mu g/m^3$, 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 NO_2." ECCC agrees that it	ECCC has identified the following Supplemental Information Request (SIR) for the Panel's consideration for response by the Proponent: 1) Provide revised predictions of NO2 for all receptors within the regional study area, considering the following: a) Revised background concentrations which are representative of the emission profile of the Crowsnest	For this topic, Benga and ECCC agree that the background NO_2 data used for the analysis, as well as the modelling approach for community and transportation sources, are conservative and do not underestimate air quality concentrations of NO_2 at receptor sites. Based on these conservative estimates, Benga has conducted a Human Health Risk Analysis and concluded that the risk to human health is not significant due to the Project together with other NO_2 sources. No concerns have been raised with respect to predicted emissions from the Project in the study area – upon which the HHRA was based – which reflect reasonably worst-case Project conditions. Benga agrees that remodeling of community and transport emissions, and

Topic and Information Source	Rationale	Proposed Information Request	Benga's Response
(SIRs) and Outstanding Conformity IRs	is likely that predicted concentrations are overestimates. However, such predictions are too high to provide 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. <u>Background Concentrations</u> 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. <u>Community and Highway Modelling</u> ECCC's previous round of Technical Review noted that the primary explanation for high background community sources were configured as area sources, which may have also biased predictions as many	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.	a reassessment of predictions near these sources, may result in less conservative predictions and lead to an understanding of source contribution. To this end, , Benga has installed an air monitoring station in Blairmore near Highway 3; however, the period of record is currently limited. However, it is important to note that Project predictions will not change as a result of this additional data, and it is not expected to change the results of the submitted Air Quality Assessment. The exercise would only result in a more refined assessment, which Benga has committed to doing once sufficient baseline data is available from Benga monitoring station.

Topic and Information Source	Rationale	Proposed Information Request	Benga's Response
	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. <u>References</u> Exponent. CALPUFF (2017) Version 7 Users Guide Addendum. Popovic, J. 2009. Recommendations for Source Characterization, Proceedings for the 19th International Clean Air and Environment Conference, Perth, Australia 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.		
3. <u>Marine Vessel Emission Estimates</u> Benga Mining, Joint Review Panel Request for Additional Information Response Package	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	ECCC has identified the following Supplemental Information Request (SIR) for the Panel's consideration for	Benga agrees that air emissions from shipping may be recalculated based on the specifications supplied by ECCC. However, Benga does not consider these issues to be significant to the determination of EIA sufficiency.

Topic and Information Source	Rationale	Proposed Information Request	Benga's Response
Addendum 10, Package 1: Air Quality and Noise; Information Request 1.7 Joint Review Panel Information Request Package 1 (Reference#195) IR1.7	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. 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. 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. 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.	response by the Proponent: 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: a) Emissions generated by inbound vessels b) Main engines operating at slower speeds for 2.3 hours c) Auxiliary engines operating for the entire duration of the outbound and return trip 2) Using the above added marine vessel emissions, ECCC requests the Proponent update the total annual and life of project NO2, SO2,	For perspective, Benga has submitted in its response that the ship traffic required for the Project will amount to 19 ship visits to Vancouver annually compared to the 3100 ship visits currently. This is an increase of 0.6% in ship traffic. Similarly, the GHG emissions from shipping has been calculated by Benga to be 44.4 kt CO2e over the life of the Project. This is 0.5 % of the estimated GHG emissions for the Project. Clearly the refinement of the calculations requested by ECCC will not significantly impact the Project.

Topic and Information Source	Rationale	Proposed Information Request	Benga's Response
		and GHG emission totals.	
4. <u>Greenhouse Gas Management Plan</u> Benga Mining, Joint Review Panel Request for Additional Information Response Package Addendum 10, Package 1: Air Quality and Noise; Information Request 1.8 Joint Review Panel Information Request Package 1 (Reference #89) IR 1.8	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.	ECCC has identified the following Supplemental Information Request (SIR) for the Panel's consideration for response by the Proponent: 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. Include a general timeframe for each of the activities. 2) Provide an explanation of how these mitigation activities may lead to reduction of fugitive methane emissions.	The Draft Discipline Monitoring and Adaptive Management Plans are intended to provide the JRP assurance of Benga's commitment to ensuring all appropriate plans are in place as part of the Project. As per standard industry practice, all Draft plans would be Finalized in consultation with the appropriate regulatory agencies, Indigenous Group, and community stakeholders upon Project approval.

Topic and Information Source	Rationale	Proposed Information Request	Benga's Response
5. <u>Design Values for Extreme Precipitation</u> Environment and Climate Change Canada. Supplementary Request #11. Design Values for Extreme Precipitation (CEAR#167) Benga Mining, Addendum 10 to the EIS, Package 3: Geotechnical and Dam Safety, Land Use and Land Management. IR 3.2 Joint Review Panel Information Request Package 3 (Reference #89) IR 3.2	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. 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: *"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."* page 9 (emphasis added)	ECCC has identified the following Supplemental Information Request (SIR) for the Panel's consideration for response by Benga Mining. 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.	ECCC is requesting that Benga revise calculations that were first performed in 2016 based on a new methodology that was recently published in 2019. While Benga considers it best practice to adopt newer methodologies as they become available and accepted, Benga considers this to be a refinement of the Project that would be implemented during the detailed engineering design phase. If through the more detailed engineering design process it is determined that any calculations through the new CSA (2019) technical guidance results in any material design changes, these would be communicated with the regulator.

Topic and Information Source	Rationale	Proposed Information Request	Benga's Response
	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. 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). 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 to in order to provide a more robust		

Topic and Information Source	Rationale	Proposed Information Request	Benga's Response
	and accurate analysis of predicted rates of change for PMP. References 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. Li, C., Zwiers, F., Zhang, X., & Li, G. 2019. How much information is required to well constrain local estimates of future precipitation extremes? Earth's Future, 7, 11–24. https://doi.org/10.1029/2018EF001001		
6. <u>Selenium Treatment Predictions</u> 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	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. 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	ECCC has identified the following SIR for the Panel's consideration for response by the Proponent: 1. Provide additional information on the efficacy of the proposed oxidation step through a large-scale pilot test / field trial, or through documented case	Benga provided a response to the JRP in Addendum 10, Package 5, IR 5.5 regarding Benga's confidence in the selenium removal mitigation using a saturated backfill zone, along with their commitment to ensure this mitigation is implemented well to achieve optimal results. To assure the JRP of this commitment, Benga provided a draft plan outlining how Benga has and will continue to implement testing and other research and development initiatives to progressively develop the detailed engineering parameters for the SBZ. Benga expects that reporting on the

Topic and Information Source	Rationale	Proposed Information Request	Benga's Response
Comments from the Government of Canada - Environment and Climate Change Canada. IR#6. (CEAR #167). Eighth Addendum to the Environmental 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. 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,	studies in the primary literature along with appropriate justification for the particular case study.	results of the research and development would be condition of a Project approval.
7. <u>Aquatic Monitoring Plan</u> 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	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). 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	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	As requested in the IR 5.4, Benga has provided a draft aquatic monitoring plan. Benga anticipates working with the relevant regulatory agencies such as DFO to finalize details of the monitoring plan prior to implementation of the plan. The Draft Discipline Monitoring and Adaptive Management Plans are intended to provide the JRP assurance of Benga's commitment to ensuring all appropriate plans are in place as part of the Project. As per standard industry practice, all draft plans would be finalized in consultation with the

Topic and Information Source	Rationale	Proposed Information Request	Benga's Response
Draft Fisheries and Aquatics Monitoring Program	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	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). 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	appropriate regulatory agencies, Indigenous group, and community stakeholders upon Project approval.

Topic and Information Source	Rationale	Proposed Information Request	Benga's Response
		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	
8. <u>Selenium Treatment Predictions</u> Joint Review Panel Request for Additional Information Response Package Addendum 10: Package 5: Surface Water Quality, Hydrology, Hydrogeology, Fish and Fish Habitat, Cumulative	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	ECCC has identified the following SIRs for the Panel's consideration for response by the Proponent: 1. Confirm whether the concentration of selenium from the field trials was	For comment #1, Benga confirms that selenium from the field trials was reduced to 0.015 mg/l. As indicated in the commentary that accompanied the Figure 6 in Appendix C-2 (CEAR #89), which indicated that "… almost all selenium and nitrate was attenuated inside the barrels over the first two weeks of the trial." and "The absence of attenuation in week 3 and 4 are likely due to a lack of carbon in the barrels."

Topic and Information Source	Rationale	Proposed Information Request	Benga's Response
Effects, Geotechnical, Reclamation, Wildlife, Land Use and EA Methodology IR 5.5	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). The proponent did not provide a sufficient answer to requests 5.5 a) ii), v), vii), xi): 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 of treatment conditions and inform appropriate water quality objectives for selenium. 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	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.	This explains the higher numbers in the Figure in the later weeks. For comment #2, regarding a contingency plan for higher than acceptable levels of selenium in the effluent from the SBZ, Benga has clearly stated in IR 5.5 that: "In the event that short term results from the SBZ do not meet the required regulatory standards for selenium or nitrate removal, provision will be made for redirecting any off-spec water to the raw water pond and from there to recirculate through the SBZ. This will allow some time for Benga to make the necessary adjustments to the SBZ operation to achieve acceptable results." Therefore, there will be no effluent reaching the waterbodies with unacceptable selenium levels while operational adjustments are made to bring the operation within specifications.

Topic and Information Source	Rationale	Proposed Information Request	Benga's Response
	under the best conditions tested (*i.e.,* Methanol and Molasses (Low)). 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.		
9. <u>Selenium Effects and Loading Predictions</u> Joint Review Panel Request for Additional Information	<u>IR 5.9 (d)</u> IR 5.9 asks Benga to "*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*	ECCC has identified the following SIRs for the Panel's consideration for response by the Proponent: 1) Provide information on the	Benga provided a response to the JRP in Addendum 10, Package 5, IR 5.5 regarding Benga's confidence in the selenium removal mitigation using a saturated backfill zone, along with their commitment to ensure this mitigation is implemented well to achieve optimal results. To assure the JRP of this

Topic and Information Source	Rationale	Proposed Information Request	Benga's Response
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 5.9 (d), IR 5.29.	*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."* 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. <u>IR 5.29 e) & f)</u> 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. 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	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.	commitment, Benga provided a draft plan outlining how Benga has and will continue to implement testing and other research and development initiatives to progressively develop the detailed engineering parameters for the SBZ, which includes additional information on various selenium speciation. Benga would expect that reporting on the results of the research and development would be condition of a Project approval. One of the Project's primary mitigations and commitments is to collect, capture, and treat water using appropriate measures to ensure water meets appropriate provincial or federal guidelines and/or thresholds to ensure the protection of the downstream receiving environment and users. The identification of potential impacts, the application of appropriate mitigations, continuing refinement of plans through detailed engineering, and the development of long-term monitoring plans should be taken into consideration when determining EIA sufficiency. With respect to the question about the Oldman Reservoir, Benga submits that

Topic and Information Source	Rationale	Proposed Information Request	Benga's Response
	predict impacts of selenium in the Oldman Reservoir. 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.		its calculations in IR 5.29 are based on a concentration of 5.0 ug/L at BC-01 as requested. No revision is necessary.
10. <u>Groundwater Monitoring</u> Grassy Mountain Coal Project – Updated Environmental Impact Assessment. Appendix 10C, Consultant Report #3 – Hydrogeology. (CEAR #42) From the Tsuut'ina Nation to the Joint Review Panel re: Grassy Mountain Coal Project - Comments on Environmental Impact Statement. (CEAR #192). Benga Mining Addendum 10 to the EIS, Package 5: Surface Water Quality, Hydrology, Hydrogeology, Fish and Fish Habitat, Cumulative Effects, Geotechnical, Reclamation, Wildlife,	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." 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). The Proponent has committed to doing the following to control surface waters mitigate infiltration to ground water: 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 of rock at the base of the pile (rock	ECCC has identified the following SIR for the Panel's consideration for the response by the Proponent: 1. In the absence of an accurate regional potentiometric contour map, ECCC requests the proponent 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	The rationale for the location of seepage wells is based on groundwater flow paths, location of mine infrastructure (i.e., external waste rock dumps, and surge water ponds), and areas that would be deemed intersection areas to downstream receiving receptors. A full groundwater seepage capture plan will require multiple phases based on the size of the mine and would be implemented during construction and operations of the mine. Benga expects to work with regulatory bodies as more precise the information about groundwater flow becomes available during construction and operations to update the groundwater monitoring and adaptive management plan.

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Land Use and EA Methodology. IR 5.19	drain) for conveyance of surface water as well as infiltration from the pile above. **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. **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. The proponent's claim 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*	not contaminated.	

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	accuracy.", 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 explanation of how the seepage collected by the drainage ditches and the seepage well will be managed. 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.		

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 *(section or page# of EIS, Addenda, Responses to Requests for Information, etc.)*	Rationale	Proposed Information Request	Benga's Response
HC-01	Addendum 8, HC-R2-1 – Response to Government of Canada, Question#1, Pages 81 – 84 Addendum 10, Appendix 4.9-1 (Human Health Risk Assessment), Section 5.2.1.1, Pages 21-23	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	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.	Benga is confident that the provided HHRA is defensible and a conservative assessment that effectively captures the potential impact to human health risk associated with DPM. Benga has not submitted any information to dispute the associated work conducted by Health Canada, WHO, US EPA, or CalEPA as it relates to the potential impacts of DPM or DE; however, Benga respectfully declines Health Canada's suggestion to apply the CalEPA approach as it will not add any further value to determining the impact to human health, that already isn't captured in the HHRA report. Benga notes that there is sufficient information presented by Benga on this topic for the regulatory and hearing phase to make a

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		human health effects of DPM as a mixture. 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: 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 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. 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		determination of whether potential impacts have been identified, appropriate mitigations have been applied, and follow up monitoring plans are in place.

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		lung cancer in animals and strong evidence of ability to induce cancer in humans. 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. 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. References: 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. Health Canada. 2016. Human Health Risk Assessment for Diesel Exhaust. Fuels Assessment Section, Water and Air		

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		Quality Bureau, Health Environments and Consumer Safety Branch. 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. 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 US EPA. 2003. Integrated Risk Information System (IRIS) Chemical Assessment Summary – Diesel Engine Exhaust. National Center for Environmental Assessment.		
HC-02	Addendum 10, Package 1 (Air Quality and Noise), Information Request 1.6, Pages 22-27 Addendum 10, Package 4 (Human Health), Appendix 4.9-1 (Human Health Risk	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	Revise the NO_2 predictions at all receptor locations using baseline monitoring data that is more representative of the Project area.	A similar comment was provided by ECCC. Please refer to ECCC#2 comment response provided by Benga.

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	Assessment), Section 6.0, Pages 38-83	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.		
HC-03	Addendum 10 – Package 1 (Air Quality) Appendix 1.3-1 (Draft Air Quality Monitoring and Adaptive Management Plan), PDF page 87 – 107.	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. Furthermore, Health Canada notes additional mitigation measures may need to be considered in the Draft Air Quality Monitoring and Adaptive Management Plan.	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. Indicate whether dust collectors and other pollution control devices will be used at the coal handling and processing plant.	Benga will utilize Tier 4 vehicles at start of operations. The Draft Discipline Monitoring and Adaptive Management Plans are intended to provide the JRP assurance of Benga's commitment to ensuring all appropriate plans are in place as part of the Project. As per standard industry practice, all Draft plans would be Finalized in consultation with the appropriate regulatory agencies, Indigenous Group, and community stakeholders upon Project approval.

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HC-04	Addendum 10 – Package 4 (Human Health), Appendix 4.9-1 - Human Health Risk Assessment	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.	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.	Details on the locations of MPOI's have been previously provided in the Air Quality Assessment Consultant Report #1 (EIA 2016) (e.g., Figure 5.2-2, 5.5-2, 5.8-2). Additional information on other parameter MPOI were provided in Addendum 10, Package 1, Air Quality and Noise (e.g., Figures 1.4-2, 1.4-5, 1.4-8).
HC-05	Addendum 10 - Package 4 (Human Health), Appendix 4.9-1 - Human Health Risk Assessment, Section 5.1, Pages 10-19	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	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	For part a), the HHRA assessed exposure from COPC in air and deposited onto soil, water and vegetation (Addendum 10, Package 4, Appendix 4.9-1, Sections 5.1.1 and 5.1.3). The conceptual site model illustrates all exposure pathways (Appendix A, Figure A-3). For part b), a complete list of COPC are included in the HHRA - Tables 5.1-1 and 5.2-1 for inhalation of air and Tables 5.1-2 and 5.2-4 for the

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		screening criteria used and the results of contaminant screening. 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.	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.	multimedia assessment (Addendum 10, Package 4, Appendix 4.9-1). For part c), soil and vegetative concentrations used in the HHRA are provided in Appendix G. COPC screening was conducted to identify contaminants for assessment in the multimedia model as per Environment Canada. The methods used and a screening table with physical/chemical data used are provided in Section 5.1.1, Table 5.1-2. A worked example of all in input parameters was provided in Appendix E (Addendum 10, Package 4, Appendix 4.9-1). For part d), no exposure media were excluded from the multimedia assessment. HHRA include deposition from air to: dust/soil, water, veg, fish, wild game. The conceptual site model illustrates all exposure pathways assessed in the multimedia assessment (Appendix A, Figure A-3) (Addendum 10, Package 4, Appendix 4.9-1). For part e), receptor types were described in Section 5.1.2. Section 5.1.2.1 lists all receptor types considered and the receptor locations

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				assessed. The chronic assessment assumed a person lived at the location for a lifetime. Section 5.1.2.2 describes the receptor characteristics assumed. All foods consumed were assumed to be sourced locally (based on each receptor location). The HHRA conservatively assumed a receptor lived each location for a lifetime and that all food consumed was locally grown, harvested hunted or fished (Addendum 10, Package 4, Appendix 4.9-1).
HC-06	Addendum 10 – Package 4 (Human Health), IR 4.10, Pages 84-93 Addendum 10 - Package 4 (Human Health), Appendix 4.9-1 - Human Health Risk Assessment, Pages 21-83 Addendum 10 – Package 4 (Human Health), Appendix E	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. 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 the bioavailability potential of coal dust is not adequately characterized. Nor was	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	For comment a), bioavailability of coal dust PAHs are discussed in response to JRP IR 4.10 Subsection C (Page 88 of the Addendum 10 package) as well as within Section 5.2.2.1 of the updated HHRA provided in response to JRP IR 4.9-1. It was conservatively assumed that all PAHs were 100% bioavailable via inhalation and ingestion. Consistent with Health Canada's recommendations as provided within the "Federal Contaminated Site Risk Assessment in Canada, Part II: Health Canada Toxicological Reference Values (TRVs) and Chemical-Specific Factors, Version 2.0" the default

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		there any analyses of the coal from the Grassy Coal Mine Project site undertaken. Instead, surrogate values were used. 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. 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. It is also not clear whether this value is intended to address primary dust emissions from the mine or only dust	was undertaken and not available for inclusion in the HHRA. 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. d) With respect to the default dust level value (0.76 µg/m3) used in the HHRA: 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	relative dermal adsorption factor (RAFDERM) was set to 15%. For comment b), core samples collected from the Grassy coal mine were used to estimate potential for human exposure. The core samples contained within them various coal seams as well as overburden to be used for a variety of purposes at the mine (e.g., road creation). The analytical results used in the air modeling are considered an accurate reflection of the Project contribution to airborne particulate and the chemical constituents therein. For comment c), the information contained within Table 4.10-1 was provided in response to IR 4.10 Subsection C which specifically asked for the constituent metal concentrations within coal. These concentrations were not used in the HHRA as more relevant analytical data was available from core samples taken from the Project. The provision of other coal constituent concentration ranges would not impart a material effect on the outcome of the HHRA and we respectfully decline to provide

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		originating from suspension of soils (onto which the primary dust has deposited). 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 respirable silica of 5 µg/m3 from the Ontario Ministry of the Environment and Climate Change (MOECC 2016). 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. Atmos. Environ. 29(10): 1075–1089. Health Canada (HC). 2010. *Federal Contaminated Site Risk Assessment in Canada, Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment* (PQRA), Version 2.0. Contaminated Sites Division, Safe Environments Directorate, Ottawa. International Agency for Research on Cancer (IARC). 2012. Silica Dust,	explanation as to why this assumption is applicable to site-related mining activity. ii) Clarify whether this value is intended to address primary dust emissions from the mine or only dust originating from the suspension of soils. 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 PM10 concentrations	further literature review on the constituent range of metals in coal. For comment d), The default dust level contribution is specific to the resuspension of soil as part of the multi-media model. Inhalation of airborne particulate at receptor locations are based on the air modeled data and not a default parameter assumption. No revision is required. Health Canada suggests the use of the Ontario Ministry of the Environment and Climate Change (MOECC 2016) guideline for silica of 5 µg/m3. This value is less conservative than the TRV available from two other source agencies (Office of Environmental Health Hazard Assessment [OEHHA] and the Texas Commission on Environmental Quality [TCEQ]) and is not supported with any literature from which to evaluate the merit of the guidelines derivation. A revision has not been made. For comment e), Benga can revise the predicted lifetime cancer risk

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		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 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	(which may vary by location). 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.	calculation including the addition of Silica to the Lung Tumor Mixture. Benga does not consider that this revised calculation will materially affect the outcome or conclusions of the HHRA study.
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	Clearly identify in the HHRA the assumptions underlying the calculations of the background exposures (including whether exposure occurring while indoors were addressed).	The multi-media model prediction for baseline is driven by the measured soil concentration in background. As documented in Section 6.3.1.5 of the HHRA "…measured concentrations in background are below [sic] the AEP 2019 Soil Quality guideline for lead and therefore the elevated HQs are considered a result of the conservative assumptions built into the multimedia model and lead is not considered to be a human health risk". The baseline prediction is primarily driven by the underlying assumptions of bioaccumulation into

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		provided, this cannot be verified. Thus, Health Canada recommends that there be a clear identification of the assumptions underlying the calculations of background exposures (including whether exposure while indoors was addressed).		edible plants (root vegetables and berries).
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	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. 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. Additionally, water fowl may have access to the end-pit lake, but neither hunting of water fowl or the gathering of their eggs	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	Benga has provided information pertaining to these types of questions in the Water Quality assessment, the Conservation and Reclamation Plan (and associated information request), and in the Draft Aquatic Resources Monitoring and Adaptive Management Plan.

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		was scoped into the HHRA or rationale for their exclusion.	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.	This is a typo in the report and should read as 0.2 µg/**kg**/day.
HC-10	Addendum 10 – Package 1 (Air Quality and Noise), IR 1.9, Page 41 Addendum 10 – Package 1 (Air Quality and Noise), Figure 1.9-1	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. Additionally, Figure 1.9-1 in Addendum 10 shows a proposed helipad. However,	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	Benga respectfully disagrees with Health Canada's opinion that the loading of rail cars is an impulsive noise. Benga has provided a defensible noise impact assessment that meets the stringent provincial AER Directive 038 noise regulations. Benga has also addressed and provided additional information on percent highly annoyed as per previous Health Canada information requests. The helipad is an existing provincial Alberta Environment and Parks (AEP) emergency helipad (e.g., for

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		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.	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.	forest fire fighting, etc.) that currently exists on site. The helipad is not part of the Project.

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 (section or page# of EIS, Addenda, Responses to Requests for Information, etc.)	Rationale	Proposed Information Request	Benga's Response
Addendum 10: Information Request 5.4, Appendix 5.4-1: Draft Fisheries and Aquatic Monitoring Plan	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. 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	Re-state the existing question.	The Draft Discipline Monitoring and Adaptive Management Plans are intended to provide the JRP assurance of Benga's commitment to ensuring all appropriate plans are in place as part of the Project. As per standard industry practice, all Draft plans would be Finalized in consultation with the appropriate regulatory agencies, Indigenous Group, and community stakeholders upon Project approval and subsequent permitting requirements (e.g., Application for

Information Source (section or page# of EIS, Addenda, Responses to Requests for Information, etc.)	Rationale	Proposed Information Request	Benga's Response
	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" The remaining portion of these bullets, and all other bullets, were not addressed in the above listed sections of the report.		Fisheries Act Authorization/Species at Risk Act Approval).
Addendum 10: *Information request 5.22 a, b, c Responses to information requests a, b, c*	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." 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. 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.	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."	The use of the 10% flow threshold for no effects has been described clearly in the Instream Flow Assessment (Addendum 1, CEAR 44) Appendix A3, Section 3.6.4, pdf pg 7462, January 2017), response to JRP IR 5.25 (Addendum 10, CEAR 251) and was accepted by previous reviews by DFO and others.

Information Source (section or page# of EIS, Addenda, Responses to Requests for Information, etc.)	Rationale	Proposed Information Request	Benga's Response
Addendum 10: *Response to information request* *5.24 b* *Information request 5.25 b*	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." 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." 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.	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.	The contribution of sediment pond surface flow to Gold Creek has been discussed previously in responses to AER IRs 16, 19 (Addendum 8, Part C, CEAR 89), JRP IRs 5.15, 5.20 (Addendum 10, CEAR 251).
Addendum 10: *Information Request 5.28 Response to information request 5.28*	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." The response states "…indicate that no scientifically supported threshold for the onset of	Re-state the existing question.	As described in Consultant Report #6 (Addendum 1, CEAR 44, January 2017), Benga committed to developing and using a blasting regime that will meet DFO's blasting criteria contained in Wright and Hopky (1998). Additionally, as a standard operating procedure for the Project, delays will be used in all blasts to

Information Source (section or page# of EIS, Addenda, Responses to Requests for Information, etc.)	Rationale	Proposed Information Request	Benga's Response
	behavioural effects from anthropogenic noise can currently be established." 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.		limit the explosive weight charge to one hole within any eight-millisecond timeframe so as to eliminate any additive effects from blasting due to constructive interference.