May 14, 2019

By email only

Mr. Martin Ignasiak
Partner, Osler, Hoskin & Harcourt LLP
450 – 1st Street S.W.
Calgary AB T2P 5H1

Subject: Additional Information Required from Benga Mining Ltd. For the Grassy Mountain Coal Project

Dear Mr. Ignasiak:

The Joint Review Panel (the Panel) has completed its review of the information submitted by Benga Mining Limited (Benga) for the Grassy Mountain Coal Project (the Project) and has considered all comments received in response to the public comment period which ended on January 21, 2019.

The purpose of the Panel's review was to determine whether the information provided by Benga is complete for the purposes of the Environmental Impact Assessment report and to determine whether the information provided is sufficient to proceed to the public hearing.

The Panel has determined that additional information is required to complete the environmental impact assessment, and in order to meet the requirements outlined in the Joint Review Panel Agreement for the Project and the Panel's Terms of Reference, before proceeding to a hearing.

The attachment to this letter contains requests for additional information related to surface water quality, hydrology, hydrogeology, fish and fish habitat, cumulative effects, geotechnical, reclamation, wildlife, and land use and EA methodology. In some cases, components of the requested information may be documented throughout several section of documents in the August 2016 Environmental Impact Assessment and nine addenda. It would be helpful to the Panel and the other participants, for Benga to present the information in a single, comprehensive, easily read response that compiles both the information presented to date and any newly requested information.

The Panel's review of the information currently on the record is now complete. The Panel will allow for the public review of, and comment on, any additional information it receives from Benga in response to the eighty-one information requests that have been issued in Packages 1-5. The length and timing of the public comment period on the additional information will be determined by the Panel at a future date.

To ensure the Panel is able to continue to provide meaningful opportunities for public participation, the Panel requests Benga provide an estimated timeline for submission of complete responses by May 29, 2019.

If you require clarification with respect to these information requests, you are encouraged to contact Tracy Utting, Acting Panel Manager at CEAA.GrassyMountain.ACEE@canada.ca.

Yours truly,

<Original signed by>

Alex Bolton
Chair, Joint Review Panel

cc: Mike Bartlett, Senior Project Manager, Millenium EMS Solutions Ltd.

Attachment: Joint Review Panel Information Request Package #5. May 14, 2019.

Joint Review Panel Information Request Package #5

May 14, 2019

Surface Water Quality

Information Request 5.1

References:

Grassy Mountain Coal Project - Updated Environmental Impact Assessment. Consultant Report #5 – Surface Water Quality. (CEAR #42).

Eighth Addendum to the Environmental Impact Assessment. Appendix C-3. (CEAR #89).

Comments from the Government of Canada - Environment and Climate Change Canada submission. IR#7 and IR#9. (CEAR #167).

Rationale:

In Consultant Report #5 (CEAR #42), Benga derived a site-specific guideline for selenium that reflects uptake of selenium in the receiving environment, and is linked to sulphate concentrations, on the basis that sulphate, at higher concentrations reduces selenium toxicity. This site-specific guideline is used as the basis upon which Benga assessed the potential effects of selenium on aquatic organisms in Blairmore Creek. In addition, Appendix C-3 in Addendum 8 (CEAR #89) presented a risk-based evaluation of selenium concentrations in Blairmore Creek.

In its submission to the Panel (CEAR #167), Environment and Climate Change Canada (ECCC) indicated that the pre-operation site-specific risk assessment and guidelines presented by Benga may not represent a relevant indicator of potential impacts to aquatic organisms exposed to selenium during and following mine operations.

With regard to the development of the site-specific guideline, ECCC indicated that it has concerns with the process used to derive the guideline, as well as the data used in its development. For example, ECCC indicated that the approach used for deriving the site-specific selenium guideline is based on DeForest (2017), noting that significant advances have occurred since the publication of the British Columbia (2014) and United States Environmental Protection Agency (EPA) (2016) guidelines. The DeForest et al. (2017) guideline relies on the fish egg selenium guideline of 20 µg/g dw of DeForest et al. (2012), which missed more sensitive toxicity endpoints and did not follow the Canadian protocol (CCME 2007) for deriving water quality guidelines. Furthermore, although the role of sulphate in ameliorating selenium toxicity is known, required data is lacking to enable incorporation of sulphate as a toxicity modifying factor in the US EPA and BC guidelines. In 2017, the Government of Canada published “Screening

Assessment of Selenium and its Compounds"[1] and based on available data did not recommend, sulphate-based site-specific predicted no-effects concentrations (PNECs). The Canadian PNECs (or Federal Water Quality Guidelines) for fish egg/ovary and fish tissue are 14.7 and 6.7 µg/g dry weight, respectively. Benga has not made reference to the Canadian screening assessment in the updated EIA or addenda.

ECCC indicated that, globally, there is no jurisdiction that uses sulphate-adjusted selenium guidelines or criteria. Furthermore, ECCC is of the view that Benga's site-specific approach is mainly based on modelling with little or no validation from empirical data. Experimental testing of the relationship between selenium toxicity and sulphate concentrations in water has not been consistently quantified. ECCC highlighted that these empirical relationships for toxicity modifying factors (e.g., hardness, pH, dissolved organic carbon) are the cornerstone of site-specific metal guidelines (e.g., Cd, Co, Mn and Zn).

More specifically, ECCC indicated that they had the following concerns regarding the proposed site-specific guideline and risk assessment:

- the speciation of selenium in the releases from the saturated backfill zones, and ultimately in the receiving waterbody (Blairmore Creek);
- the role of sulphate as a mitigating factor to justify higher water quality criteria for selenium; and
- the high uncertainty induced by the food-web calculation of the exposure and bioavailability to selenium, based on pre-mining conditions.

Benga's approach to the risk assessment presented in Appendix C-3 in Addendum 8 (CEAR #89) is based on three different models and sets of calculations. First, Benga used a food-web model (Presser et al. 2010) for accumulation of selenium with the objective of predicting selenium concentrations in upper trophic level organisms from a series of calculations of site-specific trophic transfer factors. Second, a mitigation factor is calculated to relate sulphate concentration to the bioavailability of selenate in the specific waterbody (DeForest et al. 2017). Finally, a species-specific estimate of fish egg selenium concentration is calculated from concentration of selenium in the fish whole body using United States Environmental Protection Agency data (US EPA, 2017).

ECCC stated that predictions regarding the tolerance of an ecosystem to selenium can be achieved using Presser and Luoma's approach only if initial conditions and, in particular, the speciation of selenium remain the same when the assessment is performed, during mine operations, and after closure.

ECCC noted however that following passage through the saturated backfill zone, selenate may be reduced to selenite and released as selenite. The bioavailability predicted by Presser and Luoma's set of calculations would differ if selenium is present in a significant proportion as selenite. ECCC stated that this is likely to be the case, since the effluent from the backfill zones will contain a significant proportion of selenite. ECCC stated that lotic conditions may eventually transform selenite back into selenate, but

[1] Available online: Screening assessment Selenium and its compounds: https://www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/screening-assessment-selenium.html

this is a slow kinetic process. Consequently over time, the enrichment factor calculated in Blairmore Creek will not remain the same as the one calculated pre-operations. The accumulation pattern would be predicted incorrectly by assuming all selenium is present as selenate, during mine operations and post closure, including bioavailability and accumulation in benthic organisms. ECCC cautioned that if the behaviour of selenium and its speciation have not been correctly characterized, the basis of the risk assessment presented by Benga is flawed.

The justification for a site-specific guideline for selenium, with consideration of the sulphate mitigating effect, is based on the Benga's assumption that selenate is the only species that would be present in Blairmore Creek. While lotic systems, in general, tend to hold a higher proportion of selenate over selenite, at equilibrium, the information provided does not verify this for Blairmore Creek. Furthermore, considering that the reduced form of selenium (i.e. selenite) is produced by the saturated backfill zones, selenite is likely the form that will be released and potentially organo-selenium species such as methylselenide or selenomethionine. Once released, selenium would remain as selenite for a long period of time, unless it is adsorbed onto creek sediments, since dissolved oxygen is not an effective oxidant for selenite. Therefore, ECCC recommends that the risk assessment should assume that the selenium present in the creek, during and after mine operations, is in the form of selenite or organo-selenium such as selenomethionine. Sulphate has a mitigating effect on bioavailability of selenate only, and not selenite or organo-selenium species. ECCC indicated that a pre-operation site-specific water quality guideline for selenium with sulphate as a mitigating factor should not be considered.

Finally, ECCC stated that although the numerous calculations underlying the principles explored in Presser and Luoma's paper are correct, the cumulative uncertainty as a result of the many calculations performed is substantial, resulting in the site-specific risk assessment being highly uncertain. For precautionary reasons, ECCC has recommended that an existing water quality guideline for selenium be used. This precludes the use of US EPA guidelines which are based on a food web-based approach developed primarily in warmer waters and the DeForest et al. (2017) paper, which utilizes a fish egg selenium guideline of 20 μg/g dry weight and excluded the more sensitive white sturgeon data (15.6 μg/g).

Information Request:

a) Conduct an alternative risk assessment using the existing Alberta selenium water quality guideline of 2 μg/L and the British Columbia guideline for fish tissue of 11 mg/kg in egg/ovary and 4 mg/kg in muscle tissue. The risk assessment must not include sulphate as a mitigating factor in selenium toxicity.

b) Provide a revised assessment of the potential effects of selenium on surface water quality and aquatic resources using the existing selenium guidelines outlined in part a) of this information request. This assessment should include:

    i. description of the potential effects of selenium on the surface water quality and aquatic resources valued components;

ii. 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 measures;

iii. characterization of any residual effects that remain after the implementation of mitigation (e.g. magnitude, extent, duration, frequency, etc.) and conclusions regarding the significance of any residual effect.

Information Request 5.2

Reference:

Eighth Addendum to the Environmental Impact Assessment. Figure AER-R2-17-1. (CEAR #89).

Rationale:

Figure AER-R2-17-1 in Addendum 8 (CEAR #89) indicated that discharge from the saturated backfill zones will be routed through the proposed metals treatment plant and subsequently discharged via three pipes into Blairmore Creek. However, there does not appear to be any capacity for holding water (i.e. post-treatment holding pond) to allow testing of water quality and receipt of results from an accredited laboratory to ensure the water meets regulatory limits prior to discharging to the environment. Further information is required on Benga's plans to prevent the discharge of water which does not meet criteria for discharge to receiving water bodies.

Information Request:

a) Confirm if a post-treatment holding pond downstream from the proposed metals treatment plant is planned. If it is, provide additional details (e.g. capacity, location) of the proposed pond.

b) Provide a list of parameters to be analysed in the holding pond water prior to discharge.

c) If a post-treatment holding pond is not planned, provide details on how water discharged from the metals treatment plant will be tested to ensure it meets regulatory limits. If treated water is non-compliant, and a post-treatment holding pond is not envisioned, indicate how Benga will avoid discharging non-compliant water.

Information Request 5.3

Reference:

Eighth Addendum to the Environmental Impact Assessment. AER-R2-23. (CEAR #89).

Rationale:

In response to AER-R2-23 in Addendum 8 (CEAR #89), Benga described an aeration process for saturated backfill treated water followed by application of hydrated lime (to precipitate solids before discharging to Blairmore Creek) or acid (to scavenge hydroxides and prevent formation of calcium carbonate solids).

However, the addition of lime or acid will shift the pH of the water which will then need to be corrected prior to discharging to Blairmore Creek. In this climate, the process for precipitation of calcium carbonate is kinetically slow. Further details are required to determine how Benga will ensure sufficient mitigation of potential calcite precipitation has occurred prior to discharging to Blairmore Creek.

Information Request:

a) Given that precipitation of calcite solids is a kinetically slow reaction, provide details on how mitigation by hydrated lime would occur to ensure sufficient precipitation of solids prior to discharging to Blairmore Creek (e.g. use of aerated ponds, holding tanks, etc.).

b) Describe how Benga proposes to address shifts in pH as a result of adding lime or acid to treat water prior to discharging to Blairmore Creek.

c) Describe:

   i. the water quality monitoring to be conducted on post-treated water to ensure adequate mitigation of calcite has occurred;
   ii. proposed post-calcite treatment targets for calcium carbonate concentrations; and
   iii. how water not meeting proposed targets would be handled.

d) Describe the types of facilities envisioned by Benga for the addition of hydrated lime or acid should these facilities be required. Include details on storage of commodities (i.e. lime and acid), the surface area and volume of ponds or tanks required for hydrated lime or acid treatment and where these would be located, how the storage facilities would be managed, how secondary containment would be addressed, how any vapour emissions would be managed, and how the commodities would be added to the water.

e) Describe how the proposed treatment will be responsive to fluctuations in flows and in chemical composition of mine water saturated with calcium carbonate.

Information Request 5.4

References:

Eighth Addendum to the Environmental Impact Assessment. AER-R2-24, DFO-R2-4, DFO-R2-5, DFO-R2-6, and DFO-R2-7. (CEAR #89).

Comments from the Government of Canada - Environment and Climate Change Canada and Fisheries and Oceans Canada submissions. (CEAR # 167).

Comments from Canadian Parks and Wilderness Society Southern Alberta. (CEAR #176).

From Osler, Hoskin & Harcourt LLP on behalf of Benga Mining Limited - Response to Sufficiency Comments from Non-Indigenous Parties. (CEAR #191).

Rationale:

In response to a request for submission of a draft aquatic monitoring, mitigation and adaptive management plan in AER-R2-24 in Addendum 8 (CEAR #89), Benga outlined what the contents of such a plan would contain and referenced the draft Fisheries Offset Plan, but did not provide the requested draft aquatic monitoring plan. In CEAR #191, Benga indicated that details such as final locations and endpoints were not provided in Addendum 8 since they are typically finalized with appropriate regulatory bodies as part of Project conditions. While the Panel does not expect that the aquatic monitoring plan would be finalized at this stage, the draft should demonstrate:

- a thorough comprehension of potential project effects including potential locations or gradients of effects on water quality and/or aquatic biota, particularly in relation to seasonal patterns of water flow;
- the most appropriate and rigorous approach for timely detection and response to potential adverse changes in the aquatic environment, including but not limited to the selection of early warning indicators and the anticipated method(s) for derivation of data quality objectives; and
- planning for and availability of alternative mitigation measures to adaptively manage potential adverse effects.

Furthermore, in its submission to the Panel (CEAR #167), ECCC reiterated, having a draft aquatic monitoring plan would allow the Panel to evaluate Benga's ability to: detect potential changes in water quality, validate assessment predictions, and evaluate adaptive management measures to mitigate potential effects. Canadian Parks and Wilderness Society Southern Alberta (CEAR #176) also indicated that the draft aquatic monitoring plan should be available to evaluate potential effects. Finally, Fisheries and Oceans Canada requested (CEAR #167), in consideration of the responses to information request DFO-R2-4 through DFO-R2-7 in Addendum 8 (CEAR #89) and Benga's commitment to produce monitoring plans in each of these responses, a draft monitoring plan that considers potential effects of changes to fluvial geomorphology on fish and fish habitat be prepared.

Information Request:

a) Provide a draft aquatic monitoring, mitigation and adaptive management plan specifically addressing the following points:

    i. potential effects of the project that require mitigation;

    ii. uncertainties that necessitate the use of adaptive management including, supporting evidence on the efficacy of proposed adaptive management measures;

    iii. proposed mitigation measures, mitigation objectives and associated pre-discharge mitigation performance indicators to be used in order to confirm the effectiveness of mitigation;

    iv. details on receiving environment monitoring stressor indicators and effects indicators, including sampling location, frequency, and supporting information;

v. supporting evidence, including reference to relevant examples, on the efficacy of the proposed mitigation measures described in (iii), along with contingency measures that are technically and economically feasible should the mitigations implemented in (iii) prove to be ineffective; and

vi. methods to be used to develop thresholds that would trigger implementation of mitigation measures or adaptive management measures (e.g., a series of risk-based thresholds ranging from triggering confirmation of exceedance of guidelines, to confirming cause/effect, to triggering deployment of alternate or additional mitigation).

b) As part of this plan, indicate how monitoring of fish eggs and fish ovaries will be conducted in a manner that is consistent with the objectives of the Recovery Strategy for the Westslope Cutthroat Trout and that considers any potential sampling limitations to a species at risk.

c) Identify how existing baseline data and/or reference sites will be used as a basis for determining whether changes in surface water quality or aquatic biota have occurred.

d) Describe how long-term trends will be identified and mitigated, as compared to year-to-year variability.

Information Request 5.5

References:

Grassy Mountain Coal Project - Updated Environmental Impact Assessment. Section 3.3.2 in Appendix 10C, Section C.8. (CEAR #42).

Eighth Addendum to the Environmental Impact Assessment. AER-R2-13. Appendix C-2. (CEAR #89).

Comments from Timberwolf Wilderness Association. (CEAR #156).

Comments from the Coalition of Alberta Wilderness Association and Grassy Mountain Group, and Shirley Kirby. (CEAR #164).

Comments from the Government of Canada - Environment and Climate Change Canada. IR#6. (CEAR #167).

Comments from Ktunaxa Nation Council. (CEAR #178).

From Osler, Hoskin & Harcourt LLP on behalf of Benga Mining Limited - Response to Sufficiency Comments from Non-Indigenous Parties. (CEAR #191).

Rationale:

Appendix C-2 in Addendum 8 (CEAR #89) contains the results of a pilot-scale trial to simulate selenium and nitrate attenuation in saturated backfill zones. Benga indicated that the pilot-scale trial would allow

for a preliminary evaluation of the process kinetics (time required for the selenium and nitrate attenuation reactions to occur) and reaction stoichiometry (how much carbon is required for the attenuation reaction) associated with the development of reducing conditions and selenium attenuation. In Section 1.2 in Appendix C-2 in Addendum 8, Benga acknowledged that the trial was limited in scale and was not intended to evaluate the hydraulics of full-scale backfill zones. In the response to AER-R2-13 in Addendum 8 (CEAR #89), Benga indicated that they plan to conduct an on-site, field-scale test in parallel with construction of the mine facilities, however, Benga indicated it is not feasible to conduct large-scale field trials in time to make the results available for the Panel's consideration (CEAR #191).

Several limitations and uncertainties of the barrel test were identified including, but not limited to:

- Waste rock source: the barrel study used weathered rocks, which could result in different processes for selenium removal compared fresh waste rock. Consequently, the study conclusions may not be applicable to the proposed saturated backfill zone system.
- Poor selenium removal: the poor selenium and nitrate removal between Week 3 and 4 of the study could have been due to inherent limitations of selenium removal in this system. The explanation given in the conclusion in Appendix C-2 for their poor removal is inconsistent with data presented in Figure 9 in Appendix C-2 (CEAR #89).

In its submission to the Panel (CEAR #167), Environment and Climate Change Canada identified other limitations related to exposure of waste rock to air, location of effluent pipe, feed concentration, retention time, and proliferation of micro-organisms in the tubing.

In Section 3.3.2 in Appendix 10C of the updated EIA (CEAR #42), Benga provided a list of case studies to inform the proposed selenium mitigation method and that examined the attenuation process as an engineered system. However, there is very little detail provided in the updated EIA and Benga did not demonstrate that these case studies are directly relevant to the Project with respect to geochemical, climactic or other pertinent conditions.

In Section C.8.3.1 of the revised EIA (CEAR #42), Benga indicated that the Project will use comparable mining and processing methods as those employed by Teck Resources in the Elk Valley, British Columbia. Benga further indicated that Teck Resources is currently managing selenium leaching at its operations in Elk Valley as a result of increasing selenium concentrations in the Elk River, and provided a list of both passive and active measures being undertaken by Teck Resources as described in the "2014 Elk Valley Water Quality Plan". However, Benga does not demonstrate that the conditions in the Elk Valley correspond directly to those at the Project, or that the results in the Elk Valley are broadly applicable.

In CEAR #191, Benga provided a news release from Teck Resources, but the content of this document does not reduce the uncertainty associated with the use of saturated backfill zones as mitigation.

Numerous participants in the environmental assessment (CEAR #156, #164, #176 and #178) also requested further information regarding the use of saturated backfill zones given the experience of Teck Resources in the Elk Valley.

Environment and Climate Change Canada also indicated that they had concerns with the efficiency of the proposed treatment to attenuate selenium and has noted some inconsistencies in the materials filed by Benga (CEAR #167). According to Figure 6 in Appendix C-2 (CEAR #89), the rate of attenuation of selenium in optimal conditions tested is around 90%. In contrast, the project description predicts selenium attenuation above 99%, which would result in selenium concentrations in effluent of 15 μg/L. Under conditions of 90% attenuation of selenium, the resulting concentration of selenium in the effluent would be 150 μg/L. This effluent concentration would result in approximately 70 μg/L of selenium after dilution in Blairmore Creek, which is 34 times higher than the Alberta and British Columbia guideline of 2 μg/L in surface water.

Furthermore, selenium speciation was not completed as part of the trial. Environment and Climate Change Canada (CEAR #167) and Ktunaxa Nation Council (CEAR # 178) indicated that speciation of selenium is essential to determine the form of selenium in the effluent, which is the form of selenium that will be released to the environment. To propose an appropriate water quality criterion for selenium, it is necessary to know if the soluble form of selenium released is selenate or selenite. In addition, identifying the speciation of selenium would provide information on reducing conditions efficiency (i.e. to reduce selenium to its elemental form), and allow quantification of the proportion of selenium partially reduced to selenite and to methyl selenium.

The Panel requires further information in order to reduce uncertainty associated with the proposed selenium treatment method for the Project, and to ensure Benga has a thorough understanding of all scientific and engineering aspects of this technology, as applied to this site, including how examples from other sites are relevant to the Grassy Mountain project.

Information Request:

a) Describe additional tests and modelling studies planned to demonstrate the effectiveness of the saturated backfill zone concept at field scales. Provide details and approximate timelines for development, implementation, evaluation and reporting as well as modelling of mitigation alternatives. Include details that address the following key areas:

    i. how the information necessary for engineering a full-scale system will be obtained;

    ii. how the limitations identified by Environment and Climate Change Canada in IR6 (CEAR #167) would be addressed;

    iii. how full-scale operating parameters will be determined, including feed rates, carbon dosing and any other relevant operating parameter;

    iv. how treatment performance will be monitored so that system operation can be adjusted to maintain acceptable selenium removal rates and compliant discharges;

    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;

vi. how these studies ensure that treatment performance will mitigate exceedances and ensure discharge criteria are achieved over the long term;

vii. the fate of selenium retained in the saturated backfill and risks of future remobilization;

viii. how the supply of organic carbon will respond to fluctuations in flows or chemical loadings and how this will be controlled so that it is neither excessive nor insufficient;

ix. how the system will be maintained to prevent impairment of treatment performance, potentially due to biological fouling, siltation or development of preferential flow paths;

x. what the long-term maintenance requirements will be for a full-scale system; and

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.

b) Provide a detailed summary of case studies (including small-scale laboratory tests or other large-scale pilot projects) that have been completed and that investigate selenium attenuation in saturated backfill zones in British Columbia and elsewhere. The summary should include, at a minimum, the following information:

i. description of the test or pilot study and objectives;

ii. engineering details;

iii. study duration;

iv. inflow selenium concentrations, minimum and maximum selenium effluent concentrations, changes in selenium speciation, if any;

v. process kinetics;

vi. lag time anticipated between start up and consistent selenium removal rates;

vii. fluctuations in flow rates or mass loadings and their effects on treatment performance;

viii. reaction stoichiometry (if available), imputed or demonstrated removal mechanisms;

ix. required chemical inputs;

x. selenium capture rate;

xi. selenium attenuation rate;

xii. any details on seasonal variations in performance;

xiii. system treatment capacity;

xiv. description of case study outcomes;

xv. monitoring methodology;

xvi. operation and maintenance requirements; and

xvii. risk evaluation and proposed mitigation measures.

c) Identify which of the above measures described in b) xvii are technically and economically feasible and provide details on how they could be incorporated in the design, construction and operation of the proposed systems for the Project, including details on time required to construct and implement measures, and feasibility of scaling up for any measures identified as pilots.

d) Provide a copy of the most recent Elk Valley Water Quality Plan produced by Teck Resources.

Information Request 5.6

References:

Fifth Addendum to the Environmental Impact Assessment. AER-R1-86. (CEAR #69).

Eighth Addendum to the Environmental Impact Assessment. AER-R2-11. (CEAR #89).

Comments from the Livingstone Landowners Group to the Joint Review Panel. (CEAR #160).

Comments from the Government of Canada - Environment and Climate Change Canada submission. (CEAR #167).

Comments from Sierra Dakin Kuiper. (CEAR #170).

Comments from the Canadian Parks and Wilderness Society Southern Alberta. (CEAR #176).

Rationale:

In the response to AER-R2-11 in Addendum 8 (CEAR #89) that requested Benga confirm whether a selenium treatment plant would be incorporated within the metals treatment plant, or would require a separate plant, Benga indicated that they do not anticipate being required to treat selenium separately within the metals treatment plant. Further, Benga indicated in the response that an active water treatment plant facility is considered to be a contingency measure only. The purpose of information request AER-R2-11 regarding the selenium treatment process and location was to obtain information for consideration should there be need to implement this contingency measure. Several participants expressed concern with a lack of information and clarity regarding contingency measures to treat selenium (CEAR #160, #170, #176), including Environment and Climate Change Canada (CEAR #167).

In the response to AER-R1-86 in Addendum 5 (CEAR #69), the Alberta Energy Regulator requested information on how water with selenium concentrations that did not meet targets would be handled while further treatment facilities were being developed. In response to this request, Benga indicated that a secondary treatment system employing gravel beds could be installed if selenium levels did not meet guidelines while a full treatment plant was being constructed. However, Benga did not provide further details on the secondary gravel bed system. Given the uncertainties with the effectiveness of the

full scale saturated backfill zone for treating selenium and the potential implications for cost and complexity of the proposed Project, additional details on contingency treatment of selenium are needed.

Information Request:

a) In a situation where the saturated backfill zones fail to reduce selenium to levels required to meet regulatory limits, confirm whether additional selenium removal would occur within the proposed metals treatment process, or whether a separate treatment process would be constructed. In addition:

If selenium removal is to occur as part of the metals treatment process:

i. provide case studies of treatment plants that remove dissolved metals and selenium from mine water and demonstrate that their operating conditions are comparable and relevant to those expected at Grassy Mountain.

If selenium removal is to occur as a separate treatment process step:

ii. provide case studies of treatment plants and/or treatment approaches that remove selenium from mine water and demonstrate that their operating conditions are comparable and relevant to those expected at Grassy Mountain.

iii. confirm if separate treatment would be incorporated within existing infrastructure anticipated for the metals treatment plant, or if a separate treatment plant for selenium would need to be constructed. Provide an updated site map indicating the location of a selenium treatment plant or any expansions required to the metals treatment plant to incorporate selenium removal.

b) For both the metals treatment process and the selenium treatment process, provide the following details:

i. the type of treatment processes to be employed (for metals and selenium);

ii. the expected effectiveness of the treatment process (i.e. the treatment efficacy to reduce selenium levels and metals levels by a certain percentage). The effectiveness should be supported by case studies and/or technical data from historical or existing operations;

iii. discussion of advances of the technology for selenium removal, including information on existing operating treatment facilities, their performance and relevance or applicability to this project;

iv. any required process aids, treatment chemicals, additives and substances that are used in the processes and how these would be managed, stored, how secondary containment issues would be addressed and how any vapours and potential odour issues would be managed;

v. waste streams, waste products and waste residuals (i.e. sludge) and how these wastes will be handled and information on how the metal and selenium precipitates are immobilized and stabilized;

vi. discharge temperature of effluent streams discharged to receiving waters and measures that will be implemented to mitigate environmental effects associated with the discharge of higher temperature effluent;

vii. anticipated dissolved oxygen content in the effluent streams and mitigation measures will be implemented to mitigate environmental effects in the receiving environment;

c) Discuss what processing equipment would remain at the site after mine closure to address legacy water treatment including:

i. metals treatment plant;

ii. selenium treatment plant;

iii. forecast of how long the plant(s) would need to be in operation;

iv. forecast of capital, operating and reclamation expenditures for the treatment plants for the expected duration of their operation.

d) Provide information and design details that indicate how temporary gravel beds will effectively remove selenium. Provide case studies and supporting data for such systems operating under similar climactic conditions, at a scale and for a duration (up to four years) that are applicable to the Project.

Information Request 5.7

Reference:

Eighth Addendum to the Environmental Impact Assessment. Appendix C-3. (CEAR #89).

Rationale:

In Appendix C-3 in Addendum 8 (CEAR #89), Benga used a number of regression models based on toxicity literature and concentrations-response data to derive predicted Westslope Cutthroat Trout (WSCT) egg selenium concentrations of 11.0 to 20.1 µg/g dw, below the egg selenium EC10[2] value of 24.8 µg/g dw derived for WSCT by Golder at Elk Valley. In addition to inherent uncertainties in predictive models, Benga notes a number of uncertainties in Section 4.5 in Appendix C-3. The Golder-derived selenium benchmarks use a combination of both literature data and field data from the Elk Valley, however there are substantially fewer site-specific field data for Grassy Mountain. When site-specific data is limited, uncertainty factors (UFs) are applied to guidelines to address these limitations

[2] The EC10 is the sublethal concentration causing a 10% reduction in growth.

and ensure protection of the receptor. This is the case with the Alberta selenium egg/ovary tissue guidelines (11 µg/g dw with an UF of 2 applied).

The proposed site-specific water quality guideline of 10.6 µg/L is dependent upon elevated sulphate concentrations (predicted to be 529 mg/L), as are modeled concentrations for selenium uptake in periphyton (and hence WSCT tissues). In the absence of increases in sulphate concentration or presence of selenium species for which sulphate does not provide an ameliorating effect, selenium concentrations in periphyton, benthic macroinvertebrate, and WSCT tissues would be expected to be higher.

Information Request:

a) Given the identified uncertainties in the models and assumptions used, provide calculated probabilities for measured WSCT egg selenium concentrations within the predicted range of concentrations (11.0 to 20.1 µg/g dw).

b) Provide justification for not applying an uncertainty factor to the Golder-derived benchmarks for selenium at Elk Valley, given that Elk Valley site conditions may not be applicable to site-specific conditions at Blairmore Creek.

Information Request 5.8

Reference:

Environment and Climate Change Canada. (November 2017). Proposed Approach for Coal Mining Effluent Regulations. Consultation Document.[3]

Rationale:

Draft federal Coal Mining Effluent Regulations have proposed a maximum mean-monthly aqueous selenium limit of 10 µg/L or 5 µg/L depending on whether the mine is considered existing or new. For the Grassy Mountain Coal Mine, the limit applied will depend on the timing of start-up of mine operations and publication of the new federal regulations in the Canada Gazette, Part II. While the exact timing for both the mine operations and publication of new federal regulations remain unknown, given that the Project is a new site and the 10 µg/L limit is intended to recognize challenges faced by mines with pre-existing elevated selenium concentrations, which is not the case at Grassy Mountain, there is reasonable likelihood that the Project would face a 5 µg/L limit under the proposed regulation.

Information Request:

a) Provide the estimated selenium concentrations at discharge points (before mixing) to Blairmore Creek over the project life.

[3] The Proposed Approach for Coal Mining Effluent Regulations Consultation Document is publically available from: http://www.coal.ca/wp-content/uploads/2017/12/Proposed-Approach-for-Coal-Mining-Effluent-Regulations-November-2017.pdf

b) Indicate whether a potential limit of 5 µg/L for aqueous selenium concentrations at the point of discharge (before mixing) is achievable using the proposed treatment technology, assuming the proposed federal Coal Mining Effluent Regulations come into force in the future.

Information Request 5.9

References:

Canadian Environmental Assessment Agency Interim Technical Guidance "Assessing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act, 2012*". (March 2018).

Eighth Addendum to the Environmental Impact Assessment. AER-R2-23, Appendix C-3. (CEAR #89).

Grassy Mountain Coal Project - Updated Environmental Impact Assessment. Consultant Report #5 – Water Quality. (CEAR #42).

Ministry of Environment, Province of British Columbia. April 2013. Ambient Water Quality Guidelines for Sulphate Technical Appendix Update. Prepared by C. Meays and R. Nordin, Water Protection and Sustainability Branch, Environmental Sustainability and Strategic Policy Division, BC Ministry of Environment. 55pp.

Rationale:

In Appendix C-3 in Addendum 8 (CEAR #89), Benga provided additional data supporting the use of a site-specific derived sulphate guideline based on increased hardness. Additional evidence provided included a species sensitivity distribution (SSD) curve for sulphate at 100 mg/L hardness based on EC20s[4], EC25s or no-observed-effect-concentrations (NOECs) which indicate a HC5[5] of 593 mg/L, and results for sulphate toxicity tests on three organisms in varying hardness water at Elk Valley indicating ameliorating effects of hardness on sulphate toxicity up to 485 mg/L hardness. This differs from the established B.C. sulphate guideline technical appendix (used by Alberta) which suggests potential osmotic stress effects at hardness >250 mg/L[5].

Furthermore, in the response to information request AER-R2-23 in Addendum 8 (CEAR #89), Benga indicated aeration and possible chemical treatment would be used on water prior to discharge to Blairmore Creek to address potential calcite deposition issues. Lowering hardness through this process could result in a potential reduction in calcium carbonate concentrations within Blairmore Creek. In turn, this may result in a reduction of the site-specific derived sulphate guideline which relies in part on the ameliorating effects of elevated calcium carbonate concentrations.

[4] The EC20 and EC25 is the sublethal concentration causing 20% or 25% reduction in growth.
[5] The HC5 is the concentration at which five percent of the species in the species sensitivity distribution exhibit an effect.
[5] The Ministry of Environment Province of British Columbia Ambient Water Quality Guidelines for Sulphate – Technical Appendix is publically available from https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/wqgs-wqos/approved-wqgs/bc_moe_wqg_sulphate.pdf.

The interactions between sulphate, hardness and calcite discussed above illustrate the complexity and potential uncertainty associated with the assessment of effects of multiple stressors. Complexity is increased further because sulphate and hardness affect the toxicity of selenium and other trace elements such as cadmium, cobalt and zinc (see rationale for IR 5.10). In addition, Consultant Report #5 (CEAR #42) reported that baseline concentrations of several trace elements were above guidelines in water and/or sediment of Blairmore Creek. Thus, consideration of sulphate toxicity should not be in isolation, but should include the cumulative effects of multiple stressors such as selenium and other trace elements predicted to be present in Blairmore Creek as a result of the combination of baseline concentrations, the Project, past and current projects and other activities.

Information Request:

a) Provide publication references for each of the 11 species used to derive the SSD in Figure 11 in Appendix C-3 in Addendum 8.

b) Confirm if the predicted hardness concentrations in Blairmore Creek in the updated EIA considered the effects of proposed mitigation to prevent calcite precipitation described in the response to information request AER-R2-23 in Addendum 8. If not, provide updated predicted hardness concentrations for Blairmore Creek.

c) Given that the BC Ambient Water Quality Guidelines for Sulphate Technical Appendix observed potential osmotic stress effects on *C. dubia* at elevated hardness concentrations which were not observed in the Golder Elk Valley study, provide an overview of planned tests which would address this uncertainty for Blairmore Creek and provide more site-specific information for the Project.

d) 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, organo-selenium; 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. To undertake this assessment, Benga is encouraged to consult the Technical Guidance entitled "Assessing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act, 2012*".[6]

[6] Available online: Interim Technical Guidance "Assessing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act, 2012*". https://www.canada.ca/en/environmental-assessment-agency/services/policy-guidance/assessing-cumulative-environmental-effects-ceaa2012.html.

Information Request 5.10

References:

Grassy Mountain Coal Project - Updated Environmental Impact Assessment. Consultant Report #5 – Surface Water Quality. (CEAR #42).

Comments from the Government of Canada - Environment and Climate Change Canada submission. IR#10. (CEAR #167).

Comments from Ktunaxa Nation Council. (CEAR #178).

Rationale:

In its submission to the Panel (CEAR #167), Environment and Climate Change Canada highlighted that sulphate concentrations in Blairmore Creek are predicted to increase from pre-mining levels of about 20 mg/L to levels of 650 mg/L during late operations, remaining above 500 mg/L in closure and post-closure (Figure 6 of Consultant Report #5, CEAR #42). The predicted values are above the BC sulphate guideline of 429 mg/L at 250 mg/L hardness (noting that sulphate toxicity is attenuated by hardness). Project-area streams have very high hardness; for example, hardness in Gold Creek exceeds 300 mg/L seasonally, and hardness is predicted to increase to approximately 350 mg/L. The effect of this high hardness level on the toxicity of sulphate has not been documented through toxicity testing.

A conservative approach would be for Benga to rely on BC's sulphate guidelines (adopted by Alberta) of 309 and 429 mg/L for the moderately hard to hard or very hard water hardness, respectively.

Benga continues to support the use of a higher sulphate guideline while recognizing that sulphate concentrations are expected to exceed the guideline of 429 mg/L by the mid-2030s.

The upper limit of BC's sulphate guideline is set at 429 mg/L for very hard waters (181-250 mg/L hardness) because the toxicity tests on the early stage rainbow trout were only conducted up to the water hardness of 250 mg/L. BC also recommends additional toxicity tests on several species for waters of hardness of greater than 250 mg/L. Setting the lower and upper bounds for toxicity modifying factors (hardness in this case) corresponding to the range of concentrations at which toxicity tests are conducted is a standard practice in developing guidelines.

In Section 4.1.1.3 of Consultant Report #5 (CEAR #42), Benga acknowledged the need for additional work on a sulphate guideline: "[…] development of a site-specific sulphate objective reflective of predicted hardness (i.e., ~350 mg/L) and ionic composition of Blairmore Creek at a future time is recommended for Blairmore Creek, using site waters for test dilution to reflect the specific ionic composition of Blairmore Creek waters."

Benga proposes to defer development of a site-specific sulphate guideline to a future time; however, both Environment and Climate Change Canada (CEAR #167) and Ktunaxa Nation Council (CEAR #178) noted that this will not allow for the evaluation of the effects of the high sulphate/high hardness conditions associated with the Project. Further testing should be carried out in support of an

appropriate sulphate guideline, with additional testing which expands the hardness range for the toxicity tests considered in the BC guideline.

Information Request:

a) Using provincial and/or federal guidance on deriving site-specific guidelines, provide additional site-specific information (including chemistry and ecosystem receptors) supporting the development of a site-specific sulphate guideline for waters with hardness exceeding the hardness range for toxicity data considered in developing the BC sulphate guideline.

b) If no additional supporting information is available, describe the plan to undertake further studies in support of developing a site-specific guideline, including the timeline and desired outcomes of the studies.

Information Request 5.11

References:

Eighth Addendum to the Environmental Impact Assessment. Appendix C-3. (CEAR #89).

Federal Environmental Quality Guidelines – Cobalt. Environment Canada. May 2017.[7]

Rationale:

In Appendix C-2 in Addendum 8 (CEAR #89), Benga used a cobalt biotic ligand model (BLM) to derive a site specific HC5[8] of 2.7 µg/L. It is unclear if the model accounted for other competing metals for the same ligands, but Benga stated that the derived HC5 includes the use of predicted, elevated concentrations of hardness and sulphate. While there may be other factors that influence cobalt toxicity in addition to hardness, the BLM for cobalt has not been accepted for use in Alberta or other Canadian jurisdictions. Until such time that the BLM for cobalt is accepted for broader use this method cannot be used to derive site specific objectives for projects trying to predict future risk.

Information Request:

a) Using the 2017 Environment Canada derived cobalt guideline based on the current baseline hardness value measured in Blairmore Creek (not the predicted concentration of 372 mg/L), provide an alternative risk assessment for cobalt on the most sensitive aquatic receptors (plant, invertebrate and vertebrate species) in Blairmore Creek. The guideline should be calculated based on the baseline water hardness value in a Blairmore Creek as per the relationship described in the Environment Canada (2017) Federal Environmental Quality Guidelines for cobalt.

[7] The Federal Environmental Quality Guidelines for Cobalt are publically available from: https://www.ec.gc.ca/ese-ees/default.asp?lang=En&n=92F47C5D-1

[8] The HC5 is the concentration at which five percent of the species in the species sensitivity distribution exhibit an effect.

Information Request 5.12

References:

Eighth Addendum to the Environmental Impact Assessment. Appendix B-1, Appendix C-4. (CEAR #89).

Comments from Jim Rennie to the Joint Review Panel. (CEAR #133).

Comments from Allan Garbutt to the Joint Review Panel. (CEAR #158).

Comments from David McIntyre to the Joint Review Panel. (CEAR #159).

Comments from Ron and Monelle Fraser to the Joint Review Panel. (CEAR #166).

Comments from Kevin Turner to the Joint Review Panel. (CEAR #177).

Rationale:

Several participants (CEAR #133, #158, #159, #166, and #177) expressed concerns regarding the 2015 release of contaminants into Gold Creek from existing legacy coal piles during a heavy rainfall event. In response to Káínai Nation (Blood Tribe's) January 4, 2016 statement of concern in Appendix C-4 in Addendum 8 (CEAR #89), Benga indicated that as part of the Project mine plan, it was their intention to clean up and reclaim the environment affected by legacy mining activities.

In Appendix B-1 in Addendum 8 (CEAR #89), Benga identified the existence of legacy coal piles in proximity to Gold Creek near the historic town of Lille. Benga indicated that the area adjacent to the legacy coal piles is a candidate site for habitat enhancement on Gold Creek, and that this area would be part of offsetting measures focusing on the re-establishment of critical habitat connectivity for Westslope Cutthroat Trout. However, it is unclear whether there are additional legacy coal piles adjacent to Gold and Blairmore Creeks, and whether any Project activities could interact with these legacy coal piles and result in potential adverse environmental effects.

Information Request:

a) Provide a map that indicates the locations of the existing legacy coal piles within the mine permit boundary. Indicate which piles are within a 100 m buffer of Gold and Blairmore creeks.

b) Provide a description of Project activities that could potentially interact with the existing legacy coal piles, and describe any resultant potential effects to valued components. Include any interactions resulting from potential accidents and malfunctions associated with the Project.

Information Request 5.13

Reference:

Eighth Addendum to the Environmental Impact Assessment. Appendix C-2. (CEAR #89).

Rationale:

In the EIA and its addenda, Benga makes reference to the use of a carbon source to create reducing conditions so that selenium attenuation can take place in the saturated backfill zones. In Appendix C-2 in Addendum 8 (CEAR #89), Benga indicated that methanol and molasses were selected in the barrel selenium attenuation trial because they are known to be suitable carbon sources and they can be readily sourced in large quantities at low cost. Benga also highlighted that coal reject is another potential source of carbon. However, there are no details regarding the storage of the carbon source that would be used in the saturated backfill zones for the Project, and whether there are any potential environmental effects that could result from storage of the carbon source on the Project site.

Information Request:

a) Indicate the anticipated volume of methanol, or any other carbon source under consideration, that would be required annually for use in the saturated backfill zones.

b) Provide a map depicting where methanol, or any other carbon source would be stored on the Project site, and provide a description of how it would be supplied to and stored on the Project site, in a manner that prevents attraction by wildlife.

c) Provide details on the storage facilities for methanol, or any other carbon source, including the size of structures and/or facilities, any leak detection and monitoring equipment provided, considerations for secondary containment, and management of any vapour emissions.

d) Provide a description of the following:

    i. potential accidents and malfunctions that could result from the transportation and storage of the carbon source;

    ii. potential environmental effects that could result from such an accident, and the valued components that could, potentially be affected; and

    iii. mitigation measures proposed to reduce the probability of such an accident or to mitigate potential environmental effects.

e) If there is still uncertainty in the carbon source that would be used, Benga should provide a comparative table for each technically and economically feasible source of carbon that could be used in the saturated backfill zones to respond to the above questions.

Information Request 5.14

Reference:

Eighth Addendum to the Environmental Impact Assessment. AER-R2-3. (CEAR #89).

Rationale:

The management of runoff water, including potential release, are important to ensure that potential impacts on watersheds in the area are understood. In the response provided to information request AER-R2-3 in Addendum 8 (CEAR #89), Benga provided a general discussion regarding the management of wastes and storm water associated with the Grassy Mountain Explosives Magazine (GMEM). However, specific details related to the materials to be stored at the GMEM and management of runoff water from the GMEM are required.

Information Request:

Provide the following with respect to the Grassy Mountain Explosives Magazine:

a) Describe the oils and fuels to be stored at the GMEM; including the types of storage and secondary containment that will be provided, and the volumes of materials to be stored.

b) Describe the anticipated design and configuration of the GMEM including:

    i. the location of berms and the location of any industrial wastewater ponds where water from the GMEM can be stored; and

    ii. how water quality for water originating from the GMEM would be tested and monitored.

c) Identify the plans for water management from the GMEM area including:

    i. how runoff water at the GMEM will be collected, managed, and released;

    ii. details on when, during the preparation of ammonium nitrate fuel oil (ANFO) explosives, elevated levels of nitrates (and other contaminants) are anticipated in runoff water;

    iii. provision of surge ponds and potential release points to the environment for water from the GMEM;

    iv. re-use of water from the GMEM and where this water would be re-used;

    v. considerations for off-site disposal and treatment of water from the GMEM area; and

    vi. other release, treatment or disposal options considered.

Hydrology

Information Request 5.15

References

Grassy Mountain Coal Project - Updated Environmental Impact Assessment. Consultant Report #4 – Hydrology, Appendix 10b – Water and Load Balance Model Report; Section 8.2. (CEAR #42).

First Addendum to the Environmental Impact Assessment. Consultant Report #6 - Appendix A3 – Instream Flow Assessment; Section 4.1.2.3 and Figure 4-2. (CEAR #44).

Fifth Addendum to the Environmental Impact Assessment. Supplemental Information Request (SIR) 84. (CEAR #69).

Seventh Addendum to the Environmental Impact Assessment. SIR 84. (CEAR #72).

Eighth Addendum to the Environmental Impact Assessment. AER-R2-4; Table AER-R2-4-1, Appendix B-1. (CEAR #89).

Rationale

Benga was asked to provide information with respect to potential stream flow changes in a series of previous information requests. However, Benga did not provide the information requested in SIR 84 in Addendum 5 (CEAR #69), SIR 84 in Addendum 7 (CEAR #72), and AER-R2-4 in Addendum 8 (CEAR #89). Instead, Benga provided a rationale for why the information was not required.

In the response to AER-R2-4 in Addendum 8 (CEAR #89), Benga stated it has "demonstrated that the hydrology assessment estimated an average watershed yield of 323 mm, as the Mean Annual Runoff (MAR) of 154 mm/year is not representative of overall runoff from the upstream catchments but is an unusually low MAR inferred for that specific location due to pronounced interflow or bypass characteristic of reaches along Blairmore Creek". Benga has hypothesized that the apparent differences in MAR for various sub-watersheds can be completely explained by water flowing within gravel channels. While this may explain some of the variation, Benga has not demonstrated that this phenomenon explains all the observed variation. Furthermore, data provided by Benga in Section 4.1.2.3 and Figure 4-2 of the Instream Flow Assessment (CEAR #44) clearly demonstrates that a disproportionally large fraction of the flow in Gold Creek arises in Morin Creek and especially Caudron Creek. Given that the observed MAR of the entire Gold Creek watershed at the Water Survey of Canada Station is 334 mm (Table AER-R2-4-1 in CEAR #89), this suggests that the MAR in the remainder of the Gold Creek watershed, which includes a large portion of the Grassy Mountain mine site, is significantly less than 323 mm. The information previously requested in AER-R2-4 and SIR 84 is therefore still required.

Information Request

a) Reassess the streamflow changes provided in Section 5.2 of Consultant Report #4 (CEAR #42) using a runoff coefficient for undisturbed and reclaimed areas based on the mean annual discharge of Blairmore Creek.

    i. Update Table 19 and Figures 41, and 43 to 48 accordingly.

    ii. Provide, in table form, all of the monthly flows used to generate Figures 41, and 43 to 48 including the following flow components at each location. Include the information detailed below for the original Figures in Consultant Report #4 and for any updated figures provided in response to the above request.

        I. Stream base flow;
        II. Stream surface runoff (i.e non-base flow stream flow);
        III. Project release rate;
        IV. Change in base flow due to project; and
        V. Change in surface runoff due to project.

b) Reassess project impacts on fish habitat in Gold Creek and Blairmore Creek based on the updated project impacts on stream flows discussed in a).

    i. If project impacts on fish habitat change as a result of revised stream flows discussed in a), discuss potential changes to fish habitat availability and suitability, provide an updated assessment of Area Weighted Suitability for each bioperiod in Gold and Blairmore Creeks, and provide an updated Fisheries Offsetting Plan presented in Appendix B-1 in Addendum 8 (CEAR #89).

c) Provide the Gold Creek and Blairmore Creek flows and release volumes used in the Water and Load Balance Model to calculate instream concentrations of water quality parameters.

d) Present the results of sensitivity tests of the Water and Load Balance Model in the same manner presented in Section 8.2 of the Water and Load Balance Model report for a range of potential runoff coefficients for undisturbed and reclaimed areas, specifically:

    i. the 0.51 value used in the report;

    ii. a value based on the runoff coefficient derived from runoff and precipitation data in the Blairmore Creek watershed (that is, the value derived above).

Information Request 5.16

References

Eighth Addendum to the Environmental Impact Assessment. AER-R2-6 and AER-R2-7. (CEAR #89).

Rationale

Benga has provided some return flow information through responses to AER-R2-6 and AER-R2-7 in Addendum 8 (CEAR #89). However, there is still an information gap with respect to how return flows will help meet Water Conservation Objectives (WCO) in the Crowsnest River and probable Instream Objectives (IOs) in Blairmore and Gold Creeks. Benga should not assume that Instream Objectives and/or Water Conservation Objectives would not apply to the new licences resulting from the transfers; as these may be necessary as mitigation measures. In the response to AER-R2-7 in Addendum 8 (CEAR #89), Benga noted that "within the surface water management plan, Benga will store significant volumes of water on site and will be able to [release], and plan to release water to Blairmore and Gold Creeks". In addition, Benga stated that "achieving the WCO will be possible as a result of this excess storage of water and ability to release it to either creek". The Panel requires additional details in order to better understand how the Proponent intends to meet the Water Conservation Objectives and Instream Objectives.

With respect to part c of information request AER-R2-7 in Addendum 8 (CEAR #89), the response is in a format (monthly baseline flows) that is not usable by the Panel to recommend minimum flow requirements on Blairmore and Gold Creeks. Determining the Instream Flow Needs (IFN) by calculating weekly Q80 flows using the Alberta Desktop Method will allow the weekly Q80 flow to be used as a minimum flow requirement (cut-off) in service of the instream flow needs.

Information Request

a) Provide weekly Q80 (IFN) cut-off flows for both Blairmore and Gold Creeks, as per the Alberta Desktop Method.

b) Provide a comprehensive and detailed water return strategy that describes how water will be returned to both Blairmore and Gold Creeks in order to:

    i. achieve the WCO requirement on the Crowsnest River. Include details of return timing, volume and rates that will address the reduction in natural flows due to operations. Benga should use the historical WCO performance of the Crowsnest River to demonstrate when shortfalls are expected.

    ii. achieve the Instream Objectives (IO) based on the Alberta Desktop method. Describe how much water is expected to be returned at times when the IO is not being met at either Blairmore or Gold Creek. Note that return flows are based on the amount of water that would have been expected to flow to the creeks in the absence of a mine development/operation. The response should include the volumes and rates of return as

well as the locations where the returns are expected. The location of the return is vital to not only meet the IO at a specific location but to benefit reaches within the creeks.

iii. meet expected return conditions as a result of transferring licences that may not have been utilized fully in the past or that have return flow requirements such as the municipal licence. Benga should present the best strategy to meet the expected return from licences while helping to meet WCOs and/or IOs.

Information Request 5.17

References

Grassy Mountain Coal Project - Updated Environmental Impact Assessment. Consultant Report #3 – Hydrogeology. (CEAR #42).

Second Addendum to the Environmental Impact Assessment. (CEAR #53).

Rationale

In the review of allocations in Benga's hydrogeological Local Study Area and Regional Study Area (RSA), Table B15 of Consultant Report #3 (CEAR #42) showed that there are numerous Traditional Agricultural Registrations in the area. The Traditional Agricultural Registrations are held by Public Land Management. Although Benga provided a list of the Traditional Agricultural Registrations in Consultant Report #3, there is no assessment of effects from the Project on traditional agricultural users.

In Consultant Report #3 Benga stated: "In addition to the 11 groundwater licenses, there are 101 surface water licenses, withdrawing from the Crowsnest River, Gold Creek, Blairmore Creek, Morin Creek, Caudron Creek, York Creek, Pelletier Creek, unnamed tributaries and unnamed lake, within the RSA. The licensed groundwater and surface water user locations are shown in Figure 4.6-3 and details are summarized in Table B15" (CEAR #42).

However, there is no assessment of impact on the surface water licenses (traditional agricultural registrations) along Blairmore Creek, Gold Creek and other surface water creeks and tributaries within the RSA presented in either Section 5.3.2 of Consultant Report #3 or in the Water Act application in Addendum 2 (CEAR #53).

Information Request

a) Provide an assessment of the Project's effects on the traditional agricultural registrations within the hydrogeological Regional Study Area and propose mitigation measures that take into account the senior right (priority in time) of the traditional agricultural registrations.

b) Describe how these senior priority registrations would affect Benga's water needs and usage.

c) Describe how Benga will ensure protection of "Traditional Agriculture User" rights, especially those rights to water from Blairmore Creek, Gold Creek and associated tributaries.

Hydrogeology

Information Request 5.18

References:

Grassy Mountain Coal Project – Updated Environmental Impact Assessment. Section E – Project Description. (CEAR #42).

Grassy Mountain Coal Project – Updated Environmental Impact Assessment. Consultant Report #3 – Hydrogeology. (CEAR #42).

Fifth Addendum to the Environmental Impact Assessment. Appendix A-3. (CEAR #69).

From the Tsuut'ina Nation to the Joint Review Panel re: Grassy Mountain Coal Project - Comments on Environmental Impact Statement. (CEAR #192).

Rationale:

As stated by Benga in Consultant Report #3 (CEAR #42), rainwater and snow melt will leach minerals (such as selenium) from the fresh surfaces of the rocks stored in the rock pile areas. There are two pathways this leachate can take to reach receptors: surface water run-off and groundwater. For the groundwater pathway, the resulting leachate can infiltrate into the soil and become part of the groundwater beneath the rock pile areas. Depending on the topography and existing groundwater gradients, pathways and travel-times for contaminated groundwater to reach receptors will vary.

Identifying contaminated groundwater is key in being able to mitigate potential effects to receptors. Groundwater monitoring is commonly implemented immediately downgradient from potential contamination sources, in order to have an “early warning” that contamination exists and has entered a pathway to receptor(s). Once groundwater contamination has been identified, remediation measures can be implemented to remove the contamination, and additional monitoring will be needed to assess the success and efficiency of the remediation measures.

Consultant Report #3 (Section 4.6, CEAR #42) notes that the groundwater flow system in the area is not simplistic as a result of the complex geology, as illustrated by Figures 4.2-1 to 4.2-9. While Benga indicates that major thrust faults are expected to be a control mechanism for lateral groundwater flow and local fractures appear to enhance flow within geological units, rather than across bedding planes, ultimately the consultant report states “the actual behavior of each fault is uncertain, as some may act as barriers, while others may act as conduits likely depending in part on the rock type at a particular location”. The complex geology, and potentially groundwater flow system, is further confounded by the presence of historical mine workings (Figure 4.3-1).

In Appendix A-3 in Addendum 5, Benga presented a conceptual groundwater seepage monitoring plan. Although Benga has committed to installing monitoring wells as part of the groundwater monitoring program (Section E in CEAR #42, CEAR #69), the groundwater monitoring plan presented in the updated EIA lacks actual field characterization and may prove inadequate should fractures and/or existing mine tunnels or adits prove to be paths for contaminated groundwater. The potential would then exist for

contaminated groundwater to by-pass the downgradient monitoring proposed by Benga. While the existence of specific fractures is unknown, monitoring of water within historical mine tunnels may provide useful data. Protecting receptors is the main goal and monitoring at specific locations upstream of the receptors is necessary in case contamination finds a pathway around the monitoring immediately downgradient to the sources.

Information Request:

a) Update the groundwater transport model and provide detailed information on rock structures, groundwater and a Groundwater Monitoring Plan that addresses the following points:

   i. identify and plot structures (using existing drill logs and rock core) to create a 3D model of water pathways;

   ii. show modeled pathways and travel-times to receptors, acknowledging that there could be shallow and deep pathways, and accounting for historical mine tunnels;

   iii. identify groundwater transport pathways, and any gaps in data, from the sources to the different receptors;

   iv. describe any uncertainty associated with the model and the predicted groundwater transport pathways.

   v. identify all planned source locations, i.e. rock pile areas, and any other potential sources of contamination including sources that may arise due to extreme flood events;

   vi. identify potential receptors;

   vii. provide an assessment of where monitoring wells should be placed to protect the receptors should monitoring immediately downgradient from the sources fail to capture impacts due to fractures, and/or existing historical mine tunnels, etc.;

   viii. predict, using modelling, the concentrations of contaminants at the receptors based on nominal source inputs;

   ix. describe the proposed monitoring and sampling plan (sampling frequency, analytes, triggers, thresholds, etc.);

   x. discuss how the Groundwater Monitoring Plan will address any uncertainty identified in the model or predicted groundwater pathways. Discuss how the location of additional monitoring wells will result in an improved understanding of the location of faults, fractures, rock quality, and groundwater and improve confidence in groundwater transport pathways.

   xi. identify adaptive management actions that could be implemented in the event that concentrations of contaminants in groundwater are found to exceed triggers or guideline values.

Information Request 5.19

References:

Canadian Environmental Assessment Agency Operational Policy Statement: "Addressing "Purpose of" and "Alternative Means" under the *Canadian Environmental Assessment Act, 2012*". (March 2015).

Grassy Mountain Coal Project – Updated Environmental Impact Assessment. Appendix 10C, Consultant Report #3 – Hydrogeology. (CEAR #42)

Fifth Addendum to the Environmental Impact Assessment. Supplemental Information Request Responses #105, Appendix A-3. (CEAR #69).

From the Tsuut'ina Nation to the Joint Review Panel re: Grassy Mountain Coal Project - Comments on Environmental Impact Statement. (CEAR #192).

Rationale:

In Appendix 10C in the updated EIA (CEAR #42), Benga proposed that seepage capture wells could be 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.

Benga stated in Consultant Report #3 (CEAR #42) 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 has 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).

In the response to SIR 103 in Addendum 5 (CEAR #69), Benga stated that the most suitable methods for intercepting seepage will be determined based on a field assessment, which includes a drilling program. While the use of seepage capture wells may be potentially feasible, it will depend on the location and screened depth of the wells, the removal rate, as well as the hydrogeological regime, including whether the groundwater flow is mainly porous media flow, influenced by fracture flow, or shunted by historical mine tunnels. However, Benga has not carried out a detailed field assessment, and has not yet resolved the uncertainty associated with the effectiveness of the use of seepage capture wells to mitigate potential effects to groundwater quality. Furthermore, in Appendix 10C in the EIA (CEAR #42), Benga stated that capture of seepage is expected to be necessary for many years after the end of operation, which represents a long-term liability.

Tsuut'ina Nation (CEAR #192) proposed lining the dump site with impermeable, engineered liners or use coarse rock underdrains to convey contact water to a drainage system as another solution to groundwater seepage from the waste rock dumps. In Section 1.2.2 in Appendix A-3, Addendum 5 (CEAR #69), Benga provided a brief summary of the use of lining and enhanced foundation drainage at the base of rock coal dumps. However, Benga did not present an alternative means analysis that compares the use of seepage capture wells with the use of impermeable liners and underdrains.

Information Request:

a) Benga is to carry out an alternative means analysis that investigates the technical and economic feasibility of the use of impermeable, engineered liners for the waste rock disposal areas and the use of coarse rock underdrains as an alternative to the use of seepage capture wells to mitigate potential contamination resulting from selenium-enriched groundwater. Benga is encouraged to follow the methodology presented in the Canadian Environmental Assessment Agency guidance entitled "Addressing "Purpose of" and "Alternative Means" under the *Canadian Environmental Assessment Act, 2012*"[9] to carry out its analysis. The alternative means analysis should be substantiated with case studies based on other mines with similar characteristics to the Grassy Mountain Coal Project.

Fish and fish habitat

Information Request 5.20

References:

Grassy Mountain Coal Project - Updated Environmental Impact Assessment. Appendix 10b. (CEAR #42).

First Addendum to the Environmental Impact Assessment. Aquatic Ecology Addendum to Consultant Report #6, Appendix A3 – Instream Flow Assessment; Appendix A4 – Water Temperature Modelling. (CEAR #44).

Eighth Addendum to the Environmental Impact Assessment, AER-R2-36 (CEAR #89).

Comments from Jim Rennie. (CEAR #133).

Comments from the Coalition of Alberta Wilderness Association and Grassy Mountain Group, and Shirley Kirby. ("the Coalition") (CEAR #164).

Comments from the Ktunaxa Nation Council. (CEAR #178).

Comments from Tsuut'ina Nation. (CEAR #192).

Rationale:

In the response to AER-R2-36 in Addendum 8 (CEAR #89), Benga confirmed that discharge from sedimentation ponds was modeled to account for 0.1% of base flow in Blairmore Creek at BL-01, and 0.2% of base flow in Gold Creek at GC-02. Benga does not indicate the percentage of base flow sedimentation that pond discharge will account for at the outlet of the ponds, as the referenced

[9] Available online: Operational Policy Statement "Address the "Purpose of" and "Alternative Means" under the *Canadian Environmental Assessment Act, 2012*". https://www.ceaa-acee.gc.ca/default.asp?lang=En&n=1B095C22-1&pedisable=true

modeled node represents the confluence of both Gold and Blairmore Creeks with the Crowsnest River. Given that the proposed sediment ponds are located higher in the watershed of Blairmore Creek and Gold Creek, discharge from these ponds would represent a higher proportion of baseflow at nodes established at the confluence of these ponds and the receiving creek, as compared with the nodes located at the discharge point of the watershed.

In Addendum 1, Appendix A4 in Appendix A3 (CEAR #44), flows in Blairmore Creek are predicted to increase between 6%-35% through the operations, final reclamation and closure phases of the project as a result of discharges from sediment ponds, surge ponds, seepage, and the saturated backfills. While saturated backfills are intended to impound water for prolonged periods of time to allow for treatment of constituents of concern, no analysis of the importance of thermal loading to water impounded within the saturated backfills has been provided to determine the range of temperatures predicted for discharged water prior to entering Blairmore Creek.

In Addendum 1, Appendix A4 in Appendix A3, Benga indicated that the temperature regime in Blairmore Creek was monitored to determine potential thermal changes as a result of the project. Given that the background thermal regime in Blairmore Creek had an observed maximum temperature of 18.52°C prior to any disturbances from the proposed Project, and the established upper incipient lethal temperature for WSCT is 19.6 °C as referenced by Benga in Section 3.1.1 of the Aquatic Ecology Addendum (CEAR #44), any thermal loadings to Blairmore Creek as a result of the Water Management Plan potentially risk increasing water temperatures beyond the upper incipient lethal temperature. In their submission to the Panel, the Coalition (CEAR #164) stated that water temperature modelling is dependent on the amount of baseline data available and field validation of the model. The participants indicated that Alberta Environment and Parks collected water temperature data for Blairmore Creek mainstem and tributary and noted the water temperature model could benefit from the incorporation of this data.

In Appendix 10b of the updated EIA (CEAR #42), Benga indicated that a pit lake will be permitted to form at the end of mining operations, and that the pit lake will eventually begin to discharge to Gold Creek via the Northeast Sediment pond once the flood elevation is exceeded. Given that the pit lake and the Northeast Sediment pond will impound water and act as a lentic system, water within these structures will undergo prolonged periods of thermal inputs, increasing in situ water temperatures and increasing the importance of thermal impacts to Gold Creek.

Neither the Water and Load Balance Model or modeling within the System for Environmental Flow Analysis (SEFA) determined potential spatial or temporal variability of water temperature along Gold and Blairmore Creeks in response to individual water management activities (e.g. the detention of groundwater in the saturated backfill zones or sedimentation pond releases). Several participants in the environmental assessment (CEAR #133, #178 and #192) noted that discharge from the sedimentation ponds has the potential to affect the thermal regime of Gold and Blairmore Creeks and could result in subsequent effects to Westslope Cutthroat Trout (WSCT).

Information request:

a) Provide an updated assessment discussing the proportion of base flow that each sediment pond, surge pond, and discharge point from the saturated backfill zone represents at the confluence of the water management structure's discharge outlet in both Gold Creek or Blairmore Creek (depending on which stream is receiving the discharge) in order to accurately assess the zone of influence of these water management structures on changes in stream temperatures.

b) Discuss the zone of influence that these water management structures have on stream temperatures using the maximum predicted monthly water temperatures in each water management structure, extending downstream from the confluence of the water management structures' discharge outlets, to the point where stream temperatures return to background levels after mixing with water discharged from these water management structures.

c) Clarify how, or if, pit lake water temperatures were calculated and incorporated into the water temperature model during closure/reclamation. Provide an assessment of the proportion of base flow that the pit lake represents to Gold Creek base flows once the flood elevation is exceeded, measured at the confluence of the discharge outlet from the pit lake through the Northeast sediment pond, in order to accurately assess the zone of influence this discharge will have on stream temperatures within Gold Creek.

d) Discuss the zone of influence that the discharge from the pit lake via the Northeast sediment pond will have on stream temperatures in Gold Creek using the maximum predicted monthly water temperatures discharging from the Northeast sediment pond, extending downstream from the confluence of the Northeast sediment pond discharge outlet into Gold Creek to the point where stream temperatures return to background levels after mixing with the discharged water.

e) Discuss the effects on habitat suitability for WSCT within these zones of influence described in b) and d), and how changes in stream temperatures will impact each biological stanza of WSCT described in the EIA.

f) Discuss technically and economically feasible mitigation and adaptive management measures that can be implemented to prevent and/or minimize changes in stream temperatures in Gold Creek and Blairmore Creek as a result of discharges from the water management structures discussed above.

g) Incorporate any additional field temperature data collected by Alberta Environment and Parks from the mainstems of Gold Creek and Blairmore Creek and their respective tributaries in order to provide added precision to the assessment requested above.

Information Request 5.21

References:

First Addendum to the Environmental Impact Assessment, Appendix A1; Table A2.1, Appendix A3 – Instream Flow Assessment; Appendix A4 Stream Temperature Memo. (CEAR #44).

Comments from the Coalition of Alberta Wilderness Association and Grassy Mountain Group, and Shirley Kirby ("the Coalition"). (CEAR #164).

From Osler, Hoskin & Harcourt LLP on behalf of Benga Mining Limited - Response to Sufficiency Comments from Non-Indigenous Parties. (CEAR #191).

Rationale:

The Coalition (CEAR #164), identified that temperature and dissolved oxygen are not discussed in the Instream Flow Assessment report in Addendum 1 (CEAR #44); however they are noted in other reports. The Coalition indicated that, changes to temperature and dissolved oxygen as a result of changes in flows should be assessed. Showing how these two parameters change, from baseline through the lifecycle of the project related to flows, in summary format is necessary.

In response to the Coalition's concerns, Benga indicated that (CEAR #191):

- Stream temperature data were provided in Appendix A4 of the Instream Flow Assessment document, including measured data from available stations, and predicted stream temperatures for each project phase as affected by impacted flow levels.
- Dissolved Oxygen data, where measured, were tabulated in raw datasets as presented in the wider EIA document (e.g., Table A2.1 in Appendix A1 in Addendum 1).

Based on Benga's response, it appears that dissolved oxygen predictions during the various phases of the Project have not been quantified. Given the potential influence of dissolved oxygen and temperature on fish and fish habitat suitability, this information is required.

Information Request:

a) Provide for each month, temperature and dissolved oxygen duration curves and tables that compare baseline, construction, operation, final reclamation, and closure flow regimes at reference sites upstream of the project, and at the confluence of each water management structure's discharge outlet within Blairmore Creek and Gold Creek.

b) Provide an assessment of the predicted dissolved oxygen concentrations of the water contained in each of the water management structures, including sediment ponds, surge ponds, and the saturated backfill zones.

c) Discuss mitigation measures or adaptive management actions that will be undertaken to address water with low dissolved oxygen concentrations, prior to being discharged to Gold Creek or Blairmore Creek.

d) Provide a discussion of the assessment results and describe the potential effects of each phase of the Project on fish and fish habitat suitability within the zone of influence extending downstream from the discharge outlet of each water management structure to the point where dissolved oxygen concentrations return to background levels.

Information Request 5.22

References:

First Addendum to the Environmental Impact Assessment, Aquatic Ecology Assessment Addendum to Consultant Report #6; Section 4.2.2.1. (CEAR #44).

Comments from Ktunaxa Nation Council. (CEAR #178).

Rationale:

In the Aquatic Ecology Addendum in Addendum 1 (CEAR #44), Benga stated that "Stream temperatures during overwintering already reach near-freezing temperatures. A further decrease in temperature could be problematic in Gold and Blairmore Creeks given groundwater discharge to surface waterbodies are projected to decrease, which could accentuate the freeze-up of overwintering habitat. Frozen conditions can further exacerbate already stressful conditions with the potential of frazil ice, which can damage gill tissues, and the availability of invertebrate food sources could be compromised (Bradford and Heinonen 2008). The potential effects to overwintering will ultimately be manipulated by the contribution(s) of groundwater influx during mine operations once water management features are implemented on site as the ongoing maintenance of WSCT overwintering habitat may be largely determined by this factor (Brown and MacKay 1995)."

Ktunaxa Nation Council (CEAR #178) indicated that the above paragraph suggests a Project-related effect with a level of uncertainty as to exactly how the mine will manipulate groundwater in Gold and Blairmore Creeks. Furthermore, it does not align with Benga's conclusion that there is no detectable residual effect on fish habitat due to modifications in stream temperature predicted throughout the mine life.

Information Request:

a) Clarify the quoted paragraph in relation to the residual effects conclusion with respect to WSCT habitat.

b) Discuss how the reduction in groundwater discharge to surface waterbodies will affect overwintering habitat suitability and availability.

c) Where reductions in overwintering habitat suitability and availability are determined, update the existing Area Weighted Suitability assessment and refine the associated offsetting calculations.

Information Request 5.23

References:

First Addendum to the Environmental Impact Assessment. Appendix A1 – Fisheries and Aquatics Technical Baseline Report; Section 3.1.6. (CEAR #44).

Comments from Ktunaxa Nation Council. (CEAR #178).

Rationale:

Ktunaxa Nation Council's submission to the Panel (CEAR #178) identified numerous deficiencies regarding the sampling methodology used for the collection of fish tissue samples in Gold and Blairmore Creeks, as well as the information reported on fish tissue contaminant levels presented in Appendix A1 in Addendum 1 (CEAR #44). The following deficiencies and information gaps were identified by Ktunaxa Nation:

- Appendix A1 does not provide any rationale for how sites utilized for tissue sampling were selected;
- The proponent sampled multiple different species of fish in Blairmore Creek, below the waterfall that is a barrier to upstream migration, to form a composite sample of fish for tissue analysis. Using different species of fish in a composite sample may introduce variation in results due to differences in life histories between the species sampled. By sampling species located below the waterfall barrier on Blairmore Creek, the proponent also introduced uncertainty into the analysis as these individuals were capable of migrating between Blairmore Creek and the Crowsnest River, which may have limited their exposure time to the water chemistry parameters of Blairmore Creek. Sampling of individuals should be conducted in a reach of Blairmore Creek upstream of migratory barriers, and upstream and downstream of the project;
- Fish tissue, periphyton tissue, benthic macroinvertebrate, and periphyton biomass sites were not co-located. The sampling sites were spread through the watershed(s) in different locations making it difficult to understand the relationship between sites, between trophic levels, and trophic transfer up the food chain;
- Fish tissue (2016), periphyton tissue (2016), periphyton biomass (2014), and benthic macroinvertebrates (2014) were each collected within the course of a single year. As a result the data does not account for annual variability;
- No benthic macroinvertebrate tissue samples were collected; and
- Lack of baseline data and reference sites to support Before-after-control-impact (BACI) monitoring design.

An appropriate monitoring and follow-up program is important in the evaluation of potential effects to WSCT, therefore further information is needed to ensure an effective response to any changes that are identified throughout the mine life cycle. Combining sampling locations that enable data collection which supports multiple parameters of interest while also allowing comparison between results, is important in determining how changes in water quality parameters may be impacting the aquatic biota and how biota are responding to changes in their environment. Where possible, spatially and temporally concurrent water, sediment, periphyton, benthic invertebrate and fish tissue sampling is preferred, although it is recognized that fish tissue sampling will be restricted and will also be dependent upon seasonal fish presence. Concurrent sample results allow site-specific monitoring of the uptake of selenium and other trace elements of concern from water and sediment into periphyton, benthic invertebrates and fish. This information can be used to verify food chain modelling assumptions. Furthermore, concurrent data on periphyton and benthic community composition and abundance as well as fish health can be compared and examined for correlations with water and sediment concentrations in order to evaluate cause/effect relationships between Project-related changes versus natural variability. If Project-related uptake or effects exceed adaptive management targets or thresholds, mitigation measures would be triggered.

Given the sensitivity of WSCT, alternatives to fish tissue sampling should be sought to allow sampling of biota within Gold Creek specifically, as all Brook Trout (BKTR) captured in the Gold Creek watershed were sourced from Green Creek, which is not expected to undergo any changes due to the Project. An effective proxy for fish tissue analysis, when the species in question are deemed too sensitive for direct sampling, is to sample dietary sources of Se to infer toxicity thresholds. While not a direct measure of toxicity, dietary Se measurements in prey organisms can provide an alternative to direct monitoring efforts. The BC Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators[10] referenced in Addendum A1 (CEAR #44) recommends targeting macroinvertebrates because 1) they can be frequently sampled with less environmental impact than is associated with gathering fish or bird egg tissues; 2) are not considered charismatic fauna; and, 3) concentrations are a direct reflection of dietary Se levels providing a better indication of localised changes in food web Se, than can be provided by monitoring fish species with large foraging areas.

Information Request:

a) Provide updated information on any additional tissue samples that have been collected since Addendum 1 was submitted to address annual variability. Include tissue samples that were obtained from fish tissue, macroinvertebrate tissue sampling, and periphyton tissue sampling.

b) Discuss the methodology used to determine the sampling locations for the collection of fish tissue samples, periphyton tissue, benthic macroinvertebrates and periphyton biomass. Explain why these

[10] The BC Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operations is publically available from: http://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/water_air_baseline_monitoring.pdf

sampling locations were not located in the same locations in each watershed to allow comparisons between results.

c) Discuss how using multiple species of trout with different life histories to characterize tissue contamination within Blairmore Creek provides an accurate assessment of baseline tissue contamination levels. Discuss any biases introduced by using this approach.

d) Discuss Benga's plans to establish an accurate baseline assessment prior to mining operations to ensure monitoring is sufficiently sensitive to detect impacts to water quality that may result in changes to fish health.

e) Explain why fish tissue sampling in Blairmore Creek was conducted downstream of the waterfall barrier. Discuss whether tissue samples are representative of water quality conditions in Blairmore Creek given that fish collected for tissue samples were not permanent residents of Blairmore Creek for their entire life cycle.

f) Explain why Brook Trout were sourced from Green Creek to conduct tissue analysis for Gold Creek, as Green Creek will not be affected by the Project. Discuss whether tissue samples are representative of baseline water quality conditions in Gold Creek given the limited abundance and distribution of Brook Trout captured in Gold Creek during baseline fisheries assessments.

g) Discuss the feasibility, methodology used, assumptions and possible limitations if macroinvertebrate tissue sampling was to replace fish tissue sampling in watersheds where lethal fish sampling is discouraged, as discussed in the BC Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators.

h) Discuss how the results from macroinvertebrate tissue samples would be extrapolated to represent concentrations of contaminants of potential concern (COPCs) in fish tissue and fish ovaries, the expected accuracy of such extrapolations, and the potential risks with extrapolating macroinvertebrate tissue data to an estimate of fish tissue contamination by the COPC associated with all phases of the mine life cycle, and how any risks would be mitigated.

i) Discuss how any proposed baseline sampling program undertaken by Benga will be used to detect potential changes to WSCT during the various phases of the Project, and how the baseline sampling conducted to date would support a defensible before-after-control-impact (BACI) monitoring program.

Information Request 5.24

References:

Grassy Mountain Coal Project - Updated Environmental Impact Assessment. Consultant Report #3; Appendix C, Figure 3-22 and Figure 3-25. (CEAR #42).

First Addendum to the Environmental Impact Assessment, Appendix A3 – Instream Flow Assessment. (CEAR #44).

Eighth Addendum to the Environmental Impact Assessment, response to DFO-R2-20; Figures DFO-R2-20-3 to DFO-R2-20-5. (CEAR #89).

Comments from the Government of Canada - Fisheries and Oceans Canada submission. (CEAR #167).

From Osler, Hoskin & Harcourt LLP on behalf of Benga Mining Limited - Response to Sufficiency Comments from Non-Indigenous Parties. (CEAR #191).

Rationale:

In their submission to the Panel (CEAR #167), Fisheries and Oceans Canada (DFO) indicated that their information request on groundwater flux and WSCT critical habitat was only partially addressed in Benga's response to DFO-R2-20 in Addendum 8 (CEAR #89) .

The response provided the requested groundwater flux and critical habitat overlay in a series of figures. Both Figures DFO-R2-20-4 and DFO-R2-20-5 indicate that for Gold Creek, the impacts (reductions) to groundwater flux to the stream are realized primarily within the headwater reaches adjacent to the mine site, with only a few instances of reduced flux from groundwater system to the streams are predicted to occur along the main branch. This is consistent with the drawdowns in this area identified in Figure 3-22 and Figure 3-25 in Appendix C of Consultant Report #3 (CEAR #42). DFO indicated that based on the overlay of WSCT critical habitat (darker yellow shaded creeks), the impacted headwaters of Gold Creek do not appear to coincide with WSCT critical habitat.

However, there is no discussion regarding Blairmore Creek which, based on the figures provided, appears to show a reduction in groundwater flux both in its tributaries and within the main stem. Figure DFO-R2-20-3 in Addendum 8 shows that within Blairmore Creek there are many nodes which have an absolute flux reduction up to 9 m^3/day within habitat for WSCT, with a provincial conservation designation. Furthermore, DFO indicated that Figure DFO-R2-20-4 shows the same trend for the long term mine closure scenario. The figures for the end of mine (DFO-R2-20-4) and long term closure (DFO-R2-20-5) scenario both show reductions in groundwater flux to streams along the main branch of Blairmore Creek.

Although difficult to determine from the figure, it appears that there is an approximately 4 km stretch of Blairmore Creek (running the length of the proposed mine) along which these reductions appear to consistently fall within the 10 to 50% range for the end of mine and long term closure scenarios. As with Gold Creek, the headwater streams are considerably more impacted with reductions consistently between 75 to 100% of baseline conditions. These portions of the main branch of Blairmore Creek are

assigned “Near Pure westslope cutthroat trout Provincial Conservation Designation”. DFO indicated that the response does not discuss the reduction of groundwater flux within Blairmore Creek and whether this reduction will impact WSCT and the critical habitat identified within Blairmore Creek

In response to these concerns (CEAR #191), Benga indicated that they did not include Blairmore Creek for the following reasons:

- Blairmore Creek mainstem is currently not designated Critical Habitat for WSCT as per the *Species at Risk Act*. The mid- and upper reaches of Blairmore Creek (adjacent to the Project area) are assigned a provincial Conservation designation.
- The Instream Flow Assessment (First Addendum, Consultant Report #6, Appendix A3) executed for the project, and modelled for the life of the mine, predicted an increase in Area Weighted Suitability (i.e., improvement in overall habitat conditions) for key WSCT bioperiods (overwintering, spawning/incubation, fry/juvenile rearing, adult holding) in key reaches with Blairmore Creek expected to interact with the mine (Reaches 3, 4).

However, regardless of federal designation, provincially WSCT populations within Blairmore Creek are considered crucial to the recovery of the species. Given the provincial conservation designation and the predicted impacts to groundwater discharge to the Blairmore Creek mainstem and its tributaries in the vicinity of the mine, further information on the effects of the reduction in groundwater discharge is required.

Information Request:

a) Provide an assessment and an updated area weighted suitability calculation to determine the effects of the reduction in groundwater discharge to all bioperiods of WSCT and how this reduction will influence stream temperatures and habitat suitability within Blairmore Creek.

b) Discuss technically and economically feasible mitigation and adaptive management measures that can be implemented to prevent and/or minimize changes in groundwater flux to Blairmore Creek as a result of developing the mine and reducing groundwater discharge to Blairmore Creek and its tributaries.

Information Request 5.25

References:

First Addendum to the Environmental Impact Assessment, Appendix A3 - Instream Flow Assessment; Section 5. (CEAR #44).

Comments from the Coalition of Alberta Wilderness Association and Grassy Mountain Group, and Shirley Kirby (“the Coalition”). (CEAR #164).

From Osler, Hoskin & Harcourt LLP on behalf of Benga Mining Limited - Response to Sufficiency Comments from Non-Indigenous Parties. (CEAR #191).

Rationale:

In Section 5 of the Instream Flow Assessment in Appendix A3 in Addendum 1 (CEAR #44), Benga stated that short-term mitigation measures have been proposed for supplementing flows during dry years, which are intended to alleviate any elevated risk of causing incremental residual effects to critical habitat. In response to concerns outlined by the Coalition (CEAR #191), Benga stated that flow supplementation, and other adaptive water management techniques, would be considered as part of the Water Management Plans developed during the permitting stage. Details regarding how flow augmentation of Gold Creek during periods of reduced flows will be implemented were not provided for consideration. Given the threatened status of WSCT, details regarding the proposed mitigation must be provided for the Panel's consideration, and not at a later time.

Information Request:

a) Discuss the flow thresholds that will trigger initiation of flow augmentation and who would be involved in making the decision to augment flows. Provide the operational procedures that will be followed, along with the periodicity of flow measurements that will be used in making decisions on whether to augment flows in Gold Creek and for what period of time flows will be augmented;

b) Describe the operational requirements for conducting flow augmentation, including where the water would be sourced from, how it would be moved, and the location of discharge points in Gold Creek throughout all stages of mine development and closure.

c) Provide a discussion on whether flows will need to be augmented post mine closure, and the operational requirements for conducting flow augmentation post mine closure, including the costs to operate the machinery and the staff required to conduct instream flow monitoring and implement flow augmentation.

d) Provide a discussion of how water quality parameters from the source location will be analyzed and treated, as necessary, prior to discharging augmented flows into Gold Creek. Include an analysis of all Chemicals Of Potential Concern from the source location, temperature of the source water and sediment load, and proposed mitigation measures and adaptive management actions that are economically and technically feasible to address issues with water quality, temperature or sediment prior to discharging augmented flows to Gold Creek.

Information Request 5.26

References:

Recovery Strategy for the Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*), Alberta Populations in Canada. (CEAR #101).

Comments from the Government of Canada - Fisheries and Oceans Canada submission. (CEAR #167).

Comments from the Government of Canada – Fisheries and Oceans Canada submission. (CEAR #204).

Rationale:

According to the Recovery Strategy for the Westlope Cutthroat Trout (WSCT) (CEAR #101), identified critical habitat is located within the fisheries and aquatics Local Study Area for the Project with portions in Gold Creek and its tributaries, Morin and Caudron Creeks, and an unnamed tributary to Blairmore Creek. In their submission to the Panel (CEAR #167), Fisheries and Oceans Canada (DFO) indicated that although the existing Recovery Strategy includes the locations described above, an amended list of critical habitats is likely forthcoming within the life of the Project. DFO stated that Benga is encouraged to consider potential additions to critical habitat in their plans.

Further, in response to the Panel's request for clarification with respect to DFO's views on the sufficiency and technical merit of information in relation to the potential for an amended list of waterbodies identified as critical habitat within the life of the Project (CEAR #204), DFO stated that, in recent collaboration with the Province of Alberta (February 2019), scientific information with respect to the genetic status of WSCT has been attained and is the basis for a potential expansion of aquatic critical habitat in Gold Creek and its tributaries. DFO also stated that they have been working actively and cooperatively with Alberta to identify additional critical habitat, including a primary riparian zone around water bodies. Given that WSCT is listed as threatened under the *Species at Risk Act* and the Project has the potential to affect its designated critical habitat, further clarity on Benga's plan to address any future, potential designations of additional critical habitat in the fisheries and aquatics Local Study Area (LSA) is required.

Information Request:

a) Provide a description of how Benga plans to address the potential project effects and cumulative effects on any future additions to WSCT critical habitat within the fisheries and aquatics LSA.

b) Discuss how the future addition of critical habitat within the fisheries and aquatics LSA may affect the operational plans of the mine, placement of mine infrastructure, utilization of water treatment facilities, management of site water, flow augmentation plans, and/or the closure plans of the mine to achieve reclamation certification.

c) Provide a list of studies that Benga anticipates will need to be updated and submitted for the Panel's consideration to address any potential additions of WSCT critical habitat within the fisheries and aquatics LSA.

Information Request 5.27

References:

Fourth Addendum to the Environmental Impact Assessment. IR 4. (CEAR #55).

Eighth Addendum to the Environmental Impact Assessment. Appendix B-1. (CEAR #89).

Recovery Strategy for the Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*), Alberta Populations in Canada. (CEAR #101).

Comments from the Government of Canada – Fisheries and Oceans Canada submission. (CEAR #204).

Rationale:

Fisheries and Oceans Canada (DFO) submission to the Panel (CEAR #204) highlighted that Benga's proposed approach to fisheries offsetting presented in Appendix B-1 in Addendum 8 (CEAR #89) involves the use of an equivalency approach to determine the amount and nature of offsets to achieve a fair exchange between Project effects and gains associated with offsetting activities. DFO stated that equivalencies are used to describe the Project's residual effects and the benefits from offsetting activities, and ultimately determine the amount of offsetting required to counterbalance the Project effects.

In the response to IR4 in Addendum 4 (CEAR #55), Benga described how the population and recovery objectives of the Recovery Strategy would be achieved by proposed offsetting for the Project, however at that time the offsetting measures were in the early stages of development.

Benga presented the Detailed Fisheries Offsetting Plan in Appendix B-1 in Addendum 8 (CEAR #89). However, in CEAR #204, DFO indicated that the Detailed Fisheries Offsetting Plan does not demonstrate how the proposed offsetting, which uses loss-creation scenarios based on the equivalency approach, will (a) meet the population and distribution objectives for WSCT specified in the Recovery Strategy, and (b) not jeopardize the survival and recovery of this species.

Benga has still not provided adequate justification for how, specifically, the offsetting approach for the Project meets the population and distribution objectives for WSCT.

Information Request:

a) Having regard for the precautionary approach and the equivalency approach, demonstrate how the proposed offsetting:

    i. meets, at a minimum, the population and distribution objectives for Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*), Alberta Populations in Canada as specified in the Recovery Strategy; and,

    ii. ensures the predicted effects of the Project will not jeopardize the survival and recovery of this species.

b) Provide an updated offsetting plan incorporating any additional data collected that is relevant to proposed or new offsetting options.

Information Request 5.28

References:

First Addendum to the Environmental Impact Assessment. Aquatic Ecology Assessment Addendum to Consultant Report #6; Section 4.2.1.3. (CEAR #44).

Rationale:

In Section 4.2.1.3 of the Aquatic Ecology Addendum (Addendum 1, CEAR #44), Benga indicated that the Project will require the use of explosives during mining which has the potential for creating instantaneous pressure changes greater than 100 kPa (14.5 psi) in swim bladder of a fish (Wright and Hopky 1998). In addition, vibrations from the detonation of explosives may cause damage to incubating eggs. As well, blasts generate both seismic and surface waves (Rayleigh waves).

In Addendum 1 (CEAR #44), Benga stated they are committed to developing and using a blasting regime that will meet the blasting guidelines contained in Wright and Hopky (1998). In addition, as a standard operating procedure for the Project, delays will be used in all blasts to 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.

Benga stated that implementation of the above-mentioned mitigation actions is expected to effectively manage and reduce the likelihood and extent of direct mortality to WSCT that inhabit both Gold Creek and Blairmore Creek watersheds. Thus, Benga concluded that no detectable changes in WSCT relative abundance due to blasting activities, proportional to baseline conditions, is expected, further determining that this pathway will have no linkage to effects on WSCT.

Benga has indicated that no direct effects are predicted to occur from the proposed use of explosives at the mine site. However, the assessment of impacts regarding the use of explosives only considered the direct effects on fish relating to mortality or internal injury sustained to the swim bladder or damage to incubating eggs, and did not consider the indirect effects of blasting on fish behaviour or their use of habitats as a result of vibrations and noise produced by blasting. 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.

Information Request:

a) Assess and discuss the pathways of effects on fish behaviour and utilization of habitats within the zone of influence of blasting activities that could result in fish displaying an avoidance response as a result of vibrations and/or noise produced by the use of explosives.

b) Discuss technically and economically feasible mitigation and adaptive management measures that can be implemented to prevent and/or minimize avoidance responses of fish in Gold Creek and

Blairmore Creek as a result of blasting activities, to prevent any impacts on fish populations, and to ensure fish have year round access to all habitats throughout Gold and Blairmore Creeks.

Information Request 5.29

References:

Grassy Mountain Coal Project - Updated Environmental Impact Assessment. Section G, Consultant Report #5 – Surface Water Quality; Figure 3. (CEAR #42).

Joint Review Panel Information Request Package #4. Information Request 4.12 (CEAR #210).

Comments from the Timberwolf Wilderness Society. (CEAR #156).

Comments from Allan Garbutt. (CEAR #158).

Comments from Sierra Dakin Kuiper. (CEAR #170).

Comments from the Canadian Parks and Wilderness Society - Southern Alberta Chapter. (CEAR #176).

Ktunaxa Nation Rights and Interests Study in relation to the Grassy Mountain Coal Project. (CEAR #189).

Rationale:

As stated in the Panel's Information Request 4.12 in Package 4 (CEAR #210), participants have noted contamination of the Koocanusa reservoir in Montana, which lies more than 100 km downstream of the discharge from the five Teck metallurgical coal mines in the Elk Valley (CEAR #156, #158, #170, #176). Participants have also expressed concerns with respect to potential downstream contamination of the Crowsnest River and Oldman reservoir (CEAR #42 Section G, CEAR #170, CEAR #189). Selenium behaves differently in lentic (lake, reservoir, wetland) habitats and even if water concentrations are very low entering lentic systems, long-term selenium loading can result in increased bioaccumulation in aquatic food chains. Benga's risk assessment of selenium does not however consider the potential transport of selenium downstream to, and accumulation within, the Oldman Reservoir. This is further demonstrated by the omission of the Oldman Reservoir from both the aquatics Local Study Area (LSA) and the Regional Study Area (RSA) presented in Figure 3 of Consultant Report #5 (CEAR #42).

Based on the potential for selenium accumulation in lentic environments, and its potential to bioaccumulate, further information is required to determine the potential effects of the Project on surface water quality, aquatic species (including periphyton invertebrates, and fish), birds, amphibians and mammals that may reside in or use the Oldman Reservoir for feeding, breeding or other important life functions.

Information Request:

a) Provide a summary of recent literature based on case studies, peer-reviewed literature, technical reports, environmental assessments, monitoring reports and published third party reports that describe the potential effects of selenium toxicity in lentic environments and bioaccumulation in

aquatic food chains (including algae, invertebrates and fish), birds, amphibians, and mammals, such as Lake Koocanusa.

b) Provide the following baseline information for the Oldman Reservoir:

   i. a characterization of seasonal surface water quality, including analytical results (e.g. water temperature, turbidity, pH, dissolved oxygen profiles, and contaminants of potential concern (COPC) in comparison with established water quality guidelines). Benga is encouraged to use existing data, where available;

   ii. a characterization of fish populations and the fish community on the basis of species and life stages, including information on the surveys carried out and the sources of data available;

   iii. a characterization of other species that could potentially be affected by bioaccumulation of selenium, including algae, invertebrates, birds, amphibians, and mammals that may use the Oldman Reservoir;

   iv. a list of any species listed as “at risk”, “may be at risk”, or “sensitive” in the General Status of Alberta Wild Species, and/or listed in Schedule 1 of the federal *Species at Risk Act*, and/or listed as “at risk” by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) that are known to be present in the Oldman Reservoir.

c) Provide an assessment of the potential effects of selenium bioaccumulation due to the Project on aquatic receptors (algae, invertebrates and fish), birds, amphibians, and mammals in the Oldman Reservoir.

d) Describe any technically and economically feasible mitigation measures required to ensure that selenium concentrations would not result in exceedances of existing selenium tissue guidelines in the Oldman Reservoir. This must include supporting evidence on the efficacy of proposed mitigation measures. Predicted increases in sulphate must not be included as a mitigating factor in this discussion.

e) Characterize any residual effects of elevated selenium in the Oldman Reservoir on all potentially affected aquatic and wildlife receptors (i.e. algae, invertebrates, fish, birds, amphibians and mammals) that remain after the implementation of mitigation measures (e.g. magnitude, extent, duration, frequency, etc.) and present a conclusion regarding the significance of any residual effect.

f) Provide a characterization of any cumulative effects on all potentially affected aquatic and wildlife receptors (i.e. algae, invertebrates, fish, birds, amphibians and mammals), and conclusions regarding the significance of any cumulative effect.

Cumulative Effects

Information Request 5.30

References:

Canadian Environmental Assessment Agency Interim Technical Guidance "Assessing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act, 2012*". (March 2018).

Eighth Addendum to the Environmental Impact Assessment. Appendix A-1, Table 2-1. (CEAR #89).

Comments from the Ktunaxa Nation Council. (CEAR #178).

Rationale:

As explained in the Canadian Environmental Assessment Agency's Interim Technical Guidance, "Assessing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act, 2012"* the environmental assessment should consider cumulative effects from past, existing and future activities that may occur in relation to the Project, including activities such as Crown and private logging operations where the effects of such activities have the potential to combine with residual effects of the Project.

In Table 2-1 in Appendix A-1 in Addendum 8 (CEAR #89), Benga considered Crown Timber Operations in its list of past, existing and future activities. However, the Ktunaxa Nation Council (CEAR #178) expressed concern in their submissions that past, existing and future timber operations due to private logging operations had not been adequately scoped in to the cumulative effects assessment. The submission noted that private logging activities are occurring, and planned, in the Elk Valley, raising concern as to whether such activities, in both Alberta and British Columbia, were considered in the assessment.

Potential effects from past, existing and future timber operations have the potential to affect Project VCs, such as vegetation, surface water quality, aquatic resources, wildlife and current use of lands and resources for traditional purposes. The pathway of effects may include increased sedimentation in watersheds, increased water temperatures, and habitat loss.

Benga did not justify the omission of private logging operations from its cumulative effects assessment. It remains unclear to the Panel whether private logging operations were adequately considered in the cumulative effects assessment for potentially affected VCs.

Information Request:

a) Describe whether or how Benga has accounted for private logging activities in its cumulative effects assessment.

b) If Benga has not accounted for private logging activities in the cumulative effects assessment and private logging does, or may occur in the Project area, revise the cumulative effects assessment using available information on past, existing and future private logging operations.

Information Request 5.31

References:

Canadian Environmental Assessment Agency Interim Technical Guidance "Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012". (March 2018).

Eighth Addendum to the Environmental Impact Assessment. Appendix A-1, Table A-1-4 to A-1-6. Appendix B-1. (CEAR #89).

Comments from the Coalition of Alberta Wilderness Association and Grassy Mountain Group, and Shirley Kirby ("the Coalition"). (CEAR #164).

Comments from the Ktunaxa Nation Council. (CEAR #178).

Rationale:

The Canadian Environmental Assessment Agency's Interim Technical Guidance,"Assessing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act, 2012"* stipulates that projects and activities do not need to have a significant effect to warrant inclusion in a cumulative effects assessment. All residual effects on VCs should be carried forward to a cumulative effects assessment, irrespective of significance.

In its submission to the Panel (CEAR #164), the Coalition noted a discrepancy between Benga's conclusions and other statements made in Addendum 8. For example, in Appendix B-1, Section 6.1.3.1 of the Detailed Fisheries Offsetting Plan (CEAR #89), Benga states that a number of recreational trails traverse Blairmore Creek and Gold Creek contributing to the alteration of the physical features of the beds and banks. Benga also indicates in Section 8.1.3.1.3 in Appendix A-1 that logging activities are associated with changes in flow and sedimentation (CEAR #89).

In Tables A-1-4 and A-1-5 of the Cumulative Effects Assessment in Addendum 8 (CEAR #89), Benga indicates that past and existing timber operations and recreational activities have no effect on hydrology and surface water quality, and similarly that certain and reasonably foreseeable timber operations had no expected effect on hydrology and surface water quality. In support of these statements, Benga states in Sections 6.1.3.2 and 7.1.3.2 of the Cumulative Effects Assessment (CEAR #89) that future timber operations are assumed to proceed at the same rate as they are currently, and generally do not affect hydrology and surface water.

In addition, Benga also notes a number of past and existing activities in Table A-1-6 in Addendum 8 as having 'no significant effect on the watershed' and therefore no potential to interact with aquatic resources.

Information Request:

For the aquatic resources, hydrology, and surface water quality VCs:

a) Describe the past, present, and future recreational activities and timber operations (Crown and private) that may interact with residual effects from the Project.

b) Following Agency guidance on cumulative effects, revise the rationales presented in Table A-1-6 in Appendix A-1 in Addendum 8 for the cumulative effects assessments.

c) Where the previously excluded activities or projects may have potential interactions with residual effects from the Project, provide a revised assessment and conclusions regarding the characterization of the potential cumulative effects on VCs, and the significance of these cumulative effects.

Geotechnical

Information Request 5.32

References:

Grassy Mountain Coal Project - Updated Environmental Impact Assessment. Section B – Geology and Geotechnical (CEAR #42).

Grassy Mountain Coal Project - Updated Environmental Impact Assessment. Section E – Environmental Assessment (CEAR #42).

Statements of Concern – Comments from Barbara and Siegfried Sajitz. (CEAR #68).

Sixth Addendum to the Environmental Impact Assessment. (CEAR #70).

Comments from Barbara and Siegfried Sajitz. (CEAR #130).

Comments from Monica Field. (CEAR #105).

Rationale:

Participants have expressed concern over the potential for blasting activities during construction and operation of the Project to affect the geotechnical stability of Turtle Mountain, location of the 1903 Frank Slide event (CEAR #68, #105, #130). Participant submissions noted that the Alberta Geological Survey (AGS) seismic monitoring program on Turtle Mountain has previously detected blasting from operations at the Sparwood and Elkford mines, which are located a greater distance from Turtle Mountain than the proposed Project.

Participants also noted that blasting technologies proposed to be used during operation phase of the Project are likely to be more powerful than blasting used during previous mining operations in the Crowsnest Pass region (CEAR # 105).

In response to the Panel's request of April 2, 2019, the AGS (CEAR #208) confirmed that in 2003 the organization was tasked with understanding potential movements on Turtle Mountain and establishing a monitoring system that would support early warning of a potential large rock mass movement on the mountain. In 2013, the Turtle Mountain Monitoring Program transitioned to near-real-time remote evaluation of movements, including rate of movement, and response. While the AGS has indicated the

mountain is in a low-risk (green) state with a low-risk of imminent failure, they have also noted that there have been no studies completed or identified by the AGS that evaluate or quantify the effects of seismic loading (i.e. earthquakes or shaking from nearby blasts or noise) on the slow-moving rock blocks perched on the cliff face, or the stable parts of the mountain (CEAR #208).

In the updated EIA, Benga identified the Turtle Mountain Fault as a major fault present within the RSA and provided a Terrain Assessment and discussion of landslide risk in the Local Study Area (Appendix E-1 in Addendum 6, CEAR #70). There is no discussion of the risk of landslide or slope failure beyond the LSA, in potentially susceptible areas such as Turtle Mountain.

Information Request:

a) Provide a summary of how concerns related to the geotechnical stability of the Crowsnest area including area beyond/outside the LSA were considered in the EIA and Addenda. Include a discussion specifically on Turtle Mountain.

b) Clarify whether and how blasting technologies proposed for the Project may result in different risks to geotechnical stability as compared to any former or ongoing blasting operations in Crowsnest Pass.

c) Describe the potential risk to the geotechnical stability of Turtle Mountain from blasting operations associated with the proposed Project, as well as cumulative risk to Turtle Mountain posed by project-effects from blasting or noise in combination with other current and proposed mining operations or other activities in the RSA.

d) Identify mitigation measures, which are technically and economically feasible, proposed by Benga to prevent any future project-triggered occurrence of slope failure at Turtle Mountain throughout project construction and operation.

Reclamation

Information Request 5.33

References:

Grassy Mountain Coal Project – Updated Environmental Impact Assessment. Section B – Geology and Geotechnical. (CEAR #42)

Eighth Addendum to the Environmental Impact Assessment. AER-R2-14. (CEAR #89).

Rationale:

The Mine Financial Security Program provides liability coverage for coal mines in Alberta. The fundamental principle of the program is that the approval holder is responsible to carry out suspension, abandonment, remediation and surface reclamation to the standards established by the Province of

Alberta until a reclamation certificate has been issued. Benga has provided information on mineral reserves in the updated EIA, Section B Geology and Geotechnical (CEAR #42), however has not differentiated information between proven and probable reserves. Benga has also indicated potential, long-term active management of water is required (see response AER-R2-14 in Addendum 8 (CEAR #89)), which could represent a significant liability. The Panel is requesting additional information to determine the asset value as well as the potential liability associated with required suspension, abandonment, remediation and reclamation of the proposed mine.

Information Request:

a) In the updated EIA, Section B, Table 7.5-1 (CEAR #42) Benga has reported a mineral reserve summary by phase. Provide an updated table that includes the Project's mineral reserve summary by phase in terms of proven and probable reserves. Include a list of the modifying factors used to convert the Project's mineral resources to mineral reserves and explain the rationale.

b) Provide a detailed cost estimate to suspend, abandon, remediate and reclaim the mine from a point of maximum disturbance to the point of certification for the following categories:

   i. project management;

   ii. care and custody (include site security, suspension costs);

   iii. re-contouring;

   iv. topsoil placement;

   v. subsoil placement;

   vi. seeding;

   vii. reforestation;

   viii. reclamation and groundwater monitoring prior to certification

   ix. decommissioning of the mine and plant site (including water treatment infrastructure and plant(s) construction, maintenance, operation and surface water monitoring for the years until reclamation certification);

   x. reclamation and removal of water treatment infrastructure (before reclamation certification); and

   xi. contingency.

Wildlife

Information Request 5.34

References:

Final Environmental Impact Statement Guidelines. (CEAR #11).

Grassy Mountain Coal Project - Updated Environmental Impact Assessment. Consultant Report #9 – Wildlife. (CEAR #42).

Rationale:

In Consultant Report #9 (CEAR #42), Benga confirmed the presence of four species at risk in the Grizzly Bear Regional Study Area (GBRSA) all of which are listed on the *Species at Risk Act* (SARA) Schedule 1. These four species are the Common nighthawk, the Olive-sided flycatcher, the Little brown myotis and the Short-eared owl.

Since the updated EIA was submitted in 2016, additional species have been listed on the SARA Schedule 1. The Panel understands that Benga has not identified all the species at risk from Schedule 1 as VCs, but rather has provided a high-level assessment of 'special status' species which encompasses those species at risk that were not identified as VCs. Based on this assessment and the recently listed species at risk, information on the following species at risk needs to be included the EIA:

- Baird's sparrow – listed on Schedule 1 as of February 3, 2017.
- American badger (*taxus* subspecies) – listed on Schedule 1 as of February 2, 2018.

As per the EIS guidelines (CEAR #11), the EIA should contain a list of all federal species listed on Schedule 1 of the SARA; any published studies that describe the regional importance, abundance, and distribution of species at risk; residences, seasonal movements, movement corridors, habitat requirements, key habitat areas, identified habitat and/or recovery habitat, and general life history of species at risk; and exposure to relevant contaminants of concern based on data from existing sources. The EIA must also describe direct and indirect effects of the Project on those species and their critical habitat. This includes direct and indirect effects resulting from increased exposure to contaminants of concern; direct and indirect effects on the survival or recovery of federally listed species; and the direct and indirect impacts to existing recovery strategy and action plans including a discussion of how population and distribution objectives set out in those documents would be affected.

Where mitigation measures have been identified in relation to species and/or critical habitat listed under the SARA, the mitigation measures need to be consistent with any applicable recovery strategy and action plans. The EIA should also include a description of any proposed additional mitigation or offsetting measures that would serve to compensate for adverse effect to any critical habitat.

Information Request:

a) Provide an assessment of Baird's sparrow and American badger, recently listed on SARA Schedule 1. This assessment should include:

    i. the regional importance, abundance and distribution of species at risk;

ii. the residences, seasonal movements, movement corridors, habitat requirements, key habitat areas, identified critical habitat and/or recovery habitat, and general life history of species at risk; and

iii. the direct and indirect effects of the Project on those species and their critical habitat including:

- direct and indirect effects resulting from increased exposure to contaminants of concern;
- direct and indirect effects on the survival or recovery of federally listed species; and
- direct and indirect impacts to existing recovery strategy and action plans including a discussion of how population and distribution objectives set out in those documents would be affected.

b) Provide a revised list of mitigation measures adapted to the recently listed species at risk, taking into consideration that:

i. the mitigation measures are consistent with any applicable recovery strategy and action plans; and

ii. the description of any proposed additional mitigation or offsetting measures that would serve to compensate for adverse effect to any critical habitat is included.

c) Carry out a characterization of any residual effects from the Project on the recently listed species at risk that remain after the implementation of mitigation measures (e.g. magnitude, extent, duration, frequency, etc.) and present a conclusion regarding the significance of any residual effect.

Information Request 5.35

References:

Grassy Mountain Coal Project – Updated Environmental Impact Assessment. Consultant Report #9 - Wildlife. (CEAR #42).

Comments from Ktunaxa Nation Council. (CEAR #178).

Rationale:

Benga states in Consultant Report #9 (CEAR #42) “Ten wildlife Valued Components (VC) consisting of two amphibian, two avian and six mammalian species were selected for the wildlife Baseline Assessment and Application Assessment. An additional eight species were included in a high level assessment to provide supplemental information to the wildlife assessment. These eight species were chosen based on the same criteria as the VCs, and are considered special status species.” Benga also states “VCs with small home range sizes that were not expected to be affected by Project development at the local scale will not be affected by Project development at broader regional scale. As such, an effects assessment at the WRSA and GBRSA level were only considered for selected VCs.”

Table 2.4-2 in Consultant Report #9 (CEAR #42) indicated the "probability of occurrence" which confirms that the species occur in the area either through baseline wildlife surveys, incidental observations or other information. Species include Western toad, Barn swallow, Common nighthawk, Olive-sided flycatcher, Short-eared Owl, Little brown myotis, American badger, Wolverine and Grizzly bear. All of these species are SARA- and COSEWIC- listed species that have been confirmed in the GBRSA.

Table 4.6-1 of Consultant Report #9 (CEAR #42) indicates Elk as a VC with similar requirements to Grassland or Open Country Birds, including SARA-listed species such as the Bobolink and Common nighthawk. This table also provides additional selected surrogate species that are used to indicate habitat changes for migratory bird groups, noting for example that the Project effects on habitat availability for the Columbia spotted frog were expected to be similar for shorebirds and other migratory bird species that rely on ponds, streams and wetlands.

Ktunaxa Nation Council (CEAR #178) states the selection of the VCs for wildlife are incomplete noting that the VCs do not adequately represent the range of wildlife guilds and habitats that will be affected by the Project and that emphasis has been placed on choosing VCs that are secure species and/or species that are not specialized in their habitat needs, rather than those that are of conservation concern and have narrow habitat dependencies. Ktunaxa Nation Council also highlights that there are no small mammals (water vole, vagrant shrew, long-tailed weasel), or aquatic furbearers (river otter, beaver, mink) identified as VCs. Many of these species are known to occur in the region, with a probability of occurrence within the GBRSA or the LSA. These species are considered of high importance to Indigenous groups in the region. Ktunaxa Nation Council identified the following species that should have also been considered: Northern goshawk, American badger, Baird's sparrow and Sprague's pipit.

Information Request:

a) Justify the selected species of Valued Components and discuss how these provide adequate effects assessment and representation for additional migratory bird groups identified and SARA-listed species that have potential or confirmed probability of occurrence on site.

b) Clarify why species listed by Ktunaxa Nation and other Indigenous groups, including small mammals and aquatic furbearers, were not included as VCs.

c) Confirm whether Elk were used as a surrogate VC for Common nighthawk and Bobolink. If so, justify, with supporting research and literature, how Elk can be used as a surrogate VC for these two species.

d) Provide justification and supporting research and literature for the use of Columbia spotted frog and Western toad as surrogate species for shorebirds and waterfowl. If referring to habitat preferences, provide supporting literature to indicate that these species have similar requirements. Include requirements such as breeding area, foraging and shelter.

Information Request 5.36

References:

Grassy Mountain Coal Project – Updated Environmental Impact Assessment. Consultant Report #9; Volume 6 Section 3.2.4 Evaluation Criteria for Environmental Effects. (CEAR #42).

Comments from the Ktunaxa Nation Council. (CEAR #178).

Comments from the Tsuut'ina Nation. (CEAR #192).

Rationale:

In Consultant Report #9 (CEAR #42), Benga states that "Some studies suggest that residual thresholds from 10 – 60% may be necessary to prevent rapid population decline (Villard *et al*., 1999; Swift and Hannon, 2002), but a recent review (Swift and Hannon, 2010) concluded that most empirical studies support Andrén's (1994) initial proposed range of 10 – 30%." Benga, choosing the 20% threshold, states that they provide a precautionary approach for assessing habitat change, (i.e. a species will tolerate up to a 20% loss of effective habitat) for valued species at the WRSA and GBRSA levels. Indigenous groups (CEAR #178 and #192) raise the issue that a 20% threshold applied to all VCs is questionable, particularly VCs that are either federally or provincially listed which cannot lose more of their habitat without considerable impact.

Information Request:

a) Provide a literature review that supports using the threshold chosen (20%) across all VCs, including a specific discussion on use of this threshold for species at risk in the WRSA and GBRSA.

Information Request 5.37

References:

Grassy Mountain Coal Project – Updated Environmental Impact Assessment. Consultant Report #9 - Appendix C: Wildlife Habitat Suitability Models. (CEAR #42).

Comments from the Ktunaxa Nation Council. (CEAR #178).

Rationale:

Benga provided habitat suitability models for all VCs, with the exception of grizzly bear, in which a separate resource selection function suitability model was used. The modelling process involved the development of species accounts and species-specific ratings tables that summarized the status, ecology, habitat requirements, life requisites and seasonal use patterns in a given area.

Ktunaxa Nation Council (CEAR #178) expressed concerns with the limiting factors selected by Benga, providing example cases for the American marten and Canada lynx. The American marten, according to Ktunaxa Nation Council, requires snag availability for denning, suggesting that the most limiting attribute would be suitable denning sites. This view differs from Benga's selection of winter habitat availability, which they indicate was chosen as American marten are thought to be nutritionally and physiologically stressed during the winter season.

The Canada lynx, according to Ktunaxa Nation Council, occupy dens within mature or old growth stands with a high density of logs which makes habitat much more restrictive for females. Benga's selection suggest that winter is likely the most limiting period for lynx, as their survival tends to be lowest during winter periods.

Information Request:

a) For each of the following species listed: common nighthawk, olive-sided flycatcher, Great Gray Owl, American marten and Canada lynx, describe the selection process for determining the limiting habitat factors used within the Habitat Suitability Model.

b) Discuss the role Indigenous community and Traditional Knowledge played in determining the limiting habitat factors within the Habitat Suitability Model.

Information Request 5.38

References:

Grassy Mountain Coal Project – Updated Environmental Impact Assessment. Consultant Report #9 – Wildlife. (CEAR #42).

Comments from the Timberwolf Wilderness Society. (CEAR #156).

Comments from the Canadian Parks and Wilderness Society - Southern Alberta Chapter. (CEAR #176).

Rationale:

In Consultant Report #9 (CEAR #42), Benga provides thresholds related to habitat loss and fragmentation related to linear features, as well as the associated increase in human activity, increasing the risk of wildlife mortality. Table 3.2-9 suggests that road densities >2.4 km/km^2 are high risk to grizzly bear persistence and therefore high impact, while road densities between 0.6-2.4 km/km^2 were considered to be of moderate risk. This coupled with other risk factors, such as low population numbers, low reproductive potential and the expected planned development were also considered.

To mitigate this risk, Benga suggests mitigation measures such as commencing early reclamation with species favourable to grizzly bear forage and species that provide suitable cover (CEAR #42).

Given the federal and provincial status of grizzly bears and their need for movement between patches of habitat to ensure their ecological needs are met, CPAWS (CEAR #176) noted that the construction and operation of an open pit mine at this location has potential to remove a significant amount of habitat. CPAWS states that most research suggests that open road density of 0.6 km/km^2 is a rough threshold above which female grizzly bears may have unsustainable survival rates or levels of habitat avoidance and such areas become population sinks.

Timberwolf Wilderness Society (CEAR #156) states that "the amount of road development in particular (documented by Sawyer *et al.* 1997, Farr *et al.* 2018, among others), a good proxy for human development, has been far above known ecological thresholds (e.g., Lamb *et al.* 2018)." Timberwolf Wilderness Society further notes that "Many of the signs point to ecological limits for this species that have already been crossed and that the impacts need to be greatly reduced to enable the population to

recover from their current status within Alberta. The large mine site development can be expected to reduce key habitat and further fragment the bear populations in this region, restricting movements and breeding still more."

Information Request:

a) Provide additional details with supporting literature and research on why 0.6-2.4 km/km^2 is considered moderate risk for grizzly bears.

b) Provide the road densities predicted in the GBRSA over the life of the mine, taking into consideration any planned progressive reclamation.

c) Provide examples of where surface coal or other mines, after reclamation efforts, have created suitable grizzly bear habitat in terms of forage and species that provide suitable cover. Include examples of other mines that have used progressive reclamation to mitigate effects to grizzly bear habitat.

Information Request 5.39

References

Grassy Mountain Coal Project – Updated Environmental Impact Assessment. Consultant Report #9 – Wildlife. (CEAR #42).

Comments from the Coalition of Alberta Wilderness Association and Grassy Mountain Group, and Shirley Kirby. (CEAR #164).

Comments from the Canadian Parks and Wilderness Society - Southern Alberta Chapter. (CEAR #176).

Comments from the Ktunaxa Nation Council. (CEAR #178).

Comments from the Tsuut'ina Nation. (CEAR #192).

Rationale:

Proposed mitigation measures for wildlife are discussed in various sections throughout the updated EIA and referenced within the various addenda. In Consultant Report #9 (CEAR #42), Benga provides a Wildlife Mitigation and Monitoring Section in which Benga proposes mitigation measures and wildlife monitoring programs designed to reduce or minimize the effects of the Project on wildlife and to monitor the effects of the Project to allow for effective adaptive management of mitigation measure over time. Benga states that they will be implementing a number of best management practices, Project design features and other measures to avoid or minimize effects. Throughout the EIA, Benga also refers to, and depends on, the ability to reclaim the landscape at closure as a means to mitigate effects on wildlife.

Several Indigenous communities and stakeholders have expressed concern regarding the efficacy of mitigation measures throughout the life of the Project and the reliance on reclamation at closure to reduce impacts to wildlife (CEAR #164, #176, #178, and #192).

The Panel requires further information to better understand Benga's proposed mitigation measures for wildlife and to assess the effectiveness of these measures. The Panel also requires an understanding of the adaptive management measures that will be adopted if the proposed mitigation measures do not perform as anticipated.

Information Request:

a) Based on the previous information provided by Benga, provide a draft Wildlife Mitigation and Monitoring Plan. Describe the components of the plan including, but not limited to:

   i. a clear statement of the mitigation and monitoring plan objective(s) and scope, spatial and temporal extent at each stage of the life of the Project;

   ii. a list of target species or surrogate species and habitat types to be monitored, including those identified by Indigenous groups;

   iii. an outline of mitigation measures for each species and habitat, including any proposed offsets;

   iv. identification of indicators that will be monitored to determine whether mitigation measures are effective and how identified indicators will be monitored;

   v. a description of the strategies and actions that will be implemented, adhering to the mitigation hierarchy of avoid, minimize, restore, and offset, to mitigate project and site-specific effects on wildlife species at risk and of cultural significance throughout the life of the Project that may occur through:

      - direct habitat loss;
      - indirect habitat loss;
      - habitat fragmentation and effects on wildlife movement; and
      - mortality;

   vi. identification and discussion of any Project-specific mitigation measures that may have a positive impact on wildlife including any details of proposed conservation offsets.

   vii. a description of uncertainties that may necessitate the use of adaptive management;

   viii. thresholds that monitoring results will be compared to that will trigger implementation of adaptive management or alternative mitigation measures;

   ix. a description of the adaptive management approach that will be used to assess and improve the effectiveness of mitigations; and

   x. to the extent possible, a description of how, when and where mitigation measures will be implemented including details on leading methodologies used and their supporting literature or research.

Information Request 5.40

References:

Comments from the Ktunaxa Nation Council. (CEAR #178).

Ktunaxa Nation Rights and Interests Study in relation to the Grassy Mountain Coal Project. (CEAR #189).

Government of Alberta: Status of the America Bison (*Bison bison)* in Alberta: Update 2017. Alberta Wildlife Status Report No. 38[11].

Rationale:

Ktunaxa Nation Council (CEAR #178, #189) state that the plains bison is of critical cultural and ecological importance to the past and future practice of Ktunaxa Nation rights in the Project area and eastern slopes of the Rockies. While bison are currently extirpated and habitat in the area of the Project is currently vacant, return of plains bison, and Ktunaxa harvest of bison in the Project area is planned and reasonably foreseeable. Indigenous groups have stated that the historical exploitation of the buffalo, relocation by agriculture settlement and other anthropogenic developments have reduced or eliminated the current buffalo populations in some areas. The Ktunaxa Nation, along with the Piikani Nation, and a number of other Indigenous groups are signatories to the Buffalo Treaty: A Treaty for Cooperation, Renewal, and Restoration. Ktunaxa Nation Council indicates that the "plains bison is of critical cultural and ecological importance to the past and future practice of KNC [Ktunaxa Nation Council] rights in the Project area and eastern slopes of the Rockies" and that the "Project is located within an area that is critical to restoration plans and as a signatory to the treaty, the Ktunaxa Nation wishes to ensure the Project provides a reasonable assessment of impacts on bison habitat suitability and capability, that it provides reliable habitat offsetting supportive of bison for the duration of Project impacts, and that end land use goals are clearly supportive of long term future habitat restoration for bison and Ktunaxa harvest in the area" (CEAR #178). The Ktunaxa Nation notes that the assessment currently fails to take into consideration potential effects of the proposed Project on bison habitat and bison recovery, particularly in light of the proximity of reintroduced bison in the National Parks, the potential for range expansion into the Project area, and plans under the modern Buffalo Treaty.

The Government of Alberta states that the future prospects for restoration and recovery of free-ranging plains bison on its original range within southern and central Alberta are limited by the amount of available intact grassland habitats in today's predominantly anthropogenic landscape. A majority of the Plains bison (95%) occur within the Elk Island National Park and recent initiatives have taken place by Parks Canada to reintroduce Plains bison to Banff National Park (2017). To further ecologically restore Plains bison, large native prairies that can support the far-ranging bison are needed. Additionally, recent studies have shown the importance of understanding the mechanistic role of bison foraging behaviour to better predict distribution and habitat use. In general, the most important habitats for plain bison are prairie grasslands and open meadow habitat types. Although potentially successful, the recovery of free-ranging bison will vary with the spatial scale and long-term productivity and availability of reclaimed habitat.

[11] Available online: https://open.alberta.ca/publications/9781460140901

Information Request:

a) Provide an assessment of Project impacts on plains bison habitat suitability and capability within the WLSA.

    i. include an explanation of whether, at present, the LSA presents suitable habitat for the Plains bison and their potential migration.

b) Discuss whether or how the Project impact may affect the objectives of the Buffalo Treaty.

c) Describe the potential of the Project area to support plains bison habitat and habitat connectivity.

d) Summarize the outcomes of any discussions Benga has had with Indigenous groups or relevant government agencies regarding future prospects for restoration and recovery of free-ranging plains bison in the project area.

Land Use and EA Methodology

Information Request 5.41

References:

Eighth Addendum to the Environmental Impact Assessment. Appendix A-1, Table 2-1 and Figure 2-2. (CEAR #89).

Rationale:

In Appendix A-1 in Addendum 8 (CEAR #89) Benga provided Figure 2-2 to illustrate "Existing and Planned Projects within the Vicinity of the Proposed Project". No such figure was provided to illustrate the past activities listed in Table 2-1.

A visual representation of past projects in the Grizzly Bear Regional Study Area would be helpful to the Panel and participants in their review of the environmental assessment.

Information Request:

Provide a figure similar to Figure 2-2 in Appendix A-1 in Addendum 8 (CEAR #89) to illustrate the extent of past projects and activities considered in the cumulative environmental assessment for the Project.

Information Request 5.42

References:

Final Environmental Impact Statement Guidelines. Sections 1.4, 3.1, 4.3, 6.5, 6.6.3, 8.1. (CEAR #11).

Eighth Addendum to the Environmental Impact Assessment. Section E - Environmental Assessment. (CEAR #89).

Eighth Addendum to the Environmental Impact Assessment. EIA Section F - Conservation and Reclamation Plan. (CEAR #89).

Eighth Addendum to the Environmental Impact Assessment. Appendix A-1. (CEAR #89).

Comments from the Coalition of Alberta Wilderness Association and Grassy Mountain Group, and Shirley Kirby ("the Coalition"). (CEAR #164).

Comments from the Canadian Parks and Wilderness Society – Southern Alberta Chapter. (CEAR #176).

Comments from JFK Law Corporation on behalf of Káínai First Nation. (CEAR #184).

Rationale:

In the EIA and addenda, Benga mentions the South Saskatchewan Regional Plan and integrated resources plans that were considered in the assessment of effects, under Sections E.10 and F.1.6 in the EIA (CEAR #42), Sections 4.2 and 5.3 of Consultant Report #10 (CEAR #42), and section 8.1 in Addendum 8 (CEAR #89). The information contained in these sections discusses the relevant objectives and principles from these plans that were taken into consideration in the closure and reclamation plan for the land use and resources, the land and resource use assessment, and the alignment of the proposed Project with the development objectives for the region.

The Káínai First Nation (CEAR #184), the Coalition (CEAR #164), and the Canadian Parks and Wilderness Society's Southern Alberta Chapter (CEAR #176), questioned how applicable regional land use plans were taken into account in the assessment of effects on valued components, beyond what is discussed by Benga in the EIA and its addenda.

For example, the Káínai First Nation requested further information on how existing land use plans, guidelines or policies were integrated into the assessment of effects of changes to the environment on Indigenous peoples, impacts to Aboriginal and Treaty rights, and mitigation measures committed to by Benga (CEAR #184). Also, the Coalition (CEAR #164) commented on the Livingstone – Porcupine Hills Land Footprint Management Plan and asked how the cumulative effects assessment considered the proposed establishment of management thresholds and performance metrics under this plan.

Although Benga identified that land use plans were considered in the environmental assessment for the purpose of closure and reclamation as well as effects on land use and resources, the EIA does not explicitly discuss whether the plans contributed:

- provide benchmarks and thresholds for criteria used to characterize residual Project effects, cumulative effects, and determine significance for valued components, including effects on Aboriginal and Treaty Rights;
- identify technically and economically feasible mitigation measures that may apply to residual Project effects and cumulative effects, regardless of significance; and,

- inform the development of follow-up programs required to verify the accuracy of the environmental assessment, and to determine the effectiveness of mitigation measures.

Information Request:

a) Provide a summary of the information within applicable regional land use and resource plans that is relevant to the effects assessment of each valued component, and to the identification of potential impacts on asserted and established Aboriginal and Treaty rights. This information may include, but is not limited to:

    (i) objectives and outcomes that can serve as benchmarks or thresholds to inform the characterization of Project effects and cumulative effects, and

    (ii) strategies and actions proposed under the regional land use and resource plans that are relevant to mitigation measures and follow-up programs proposed for the Project.