

BENGA MINING LIMITED/RIVERSDALE RESOURCES

GRASSY MOUNTAIN COAL PROJECT

APPLICATION NOS. 1844520 AND 1902073

CLOSING ARGUMENT OF THE LIVINGSTONE LANDOWNERS GROUP

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I. INTRODUCTION AND OVERVIEW OF LLG'S POSITION

1. This is the closing argument of the Livingstone Landowners Group. The LLG submits that it is no exaggeration to say that the application by Benga Mining Limited to construct and operate the Grassy Mountain open-pit coal mine is precedent-setting. It is critical that the Panel get this right.
2. It is a matter of public record that the Government of Alberta recently rescinded the 1976 “A Coal Development Policy for Alberta” and that this has opened up large swaths of the southern Eastern Slopes to surface development. Not coincidentally, several other companies are actively pursuing coal projects near Grassy Mountain, in the Crowsnest Pass and north along the Livingstone Range. Although the Panel previously ruled that Benga did not have to consider these other projects in its Cumulative Effects Assessment—because they are currently in the exploration phase—there is no doubt that the Panel’s ruling on Grassy Mountain will have major implications for these other projects. It is not just the 15 square kilometre Grassy Mountain site north of Blairmore that is at stake here; it is the future of the southern Eastern Slopes.
3. In view of the high environmental sensitivity and significance of the southern Eastern Slopes, in considering the evidence in this proceeding, the Panel must apply the precautionary principle. The LLG submits, accordingly, that Benga has a high bar to meet.
4. As testified by Mr. John Lawson for the LLG, successive provincial governments have put into place protections for this sensitive area, such the Coal Policy and Information Letter IL 93-9 related to oil and gas development. Now, government policy appears to favour development over protection. However, in announcing the rescission of the Coal Policy, the government stated that “All coal developments will continue to be considered through the existing rigorous Alberta Energy Regulator review process. This review is based on each project’s merits, including its economic, social and environmental impacts.”¹

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<https://www.alberta.ca/coal-policy-guidelines.aspx#:~:text=The%20Coal%20Policy%20was%20originally,before%20modern%20regulatory%20processes%20exist ed.&text=Former%20category%201%20lands%20will,lands%20or%20freehold%20mineral%20rights>

5. In the case of Grassy Mountain, the rigorous review process is being conducted by this Panel. The LLG is confident that the Panel will discharge its obligation faithfully and diligently. The LLG submits that, based on the totality of the evidence, there is only one conclusion that can be reasonably arrived at; namely, that:
- the Grassy Mountain project will have significant adverse environmental effects;
 - Benga's proposed mitigation measures, in particular its water management and conservation and reclamation plans, do not adequately mitigate those significant adverse environmental effects;
 - those significant adverse environmental effects cannot be justified in the circumstances, having regard to the marginal economic and socio-economic benefits promised; and
 - the Grassy Mountain project is not in the provincial public interest, having regard to its social and economic effects and its effects on the environment and on landowners.
6. In the submissions that follow, the LLG will discuss how the evidence demonstrates that the Grassy Mountain site in the southern Eastern Slopes is very sensitive and demands extremely robust plans for mine design, closure and reclamation and mitigation. We will also discuss how the evidence shows that Benga has failed to put before the Panel such robust plans. Rather, Benga's plans are so conceptual and high-level that they do not provide a basis on which the Panel can conclude that the Project is in the public interest.
7. The Grassy Mountain project raises numerous issues, too many for any single hearing participant to tackle on their own. For this reason, the LLG cooperated and collaborated with other hearing participants to divide up issues and concerns. With regard to the issues
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addressed by the LLG, in these submissions it will be argued that the evidence before the Panel demonstrates:

- Benga's mine design does not adequately provide for management of selenium in groundwater and surface water;
- Benga's conservation and reclamation plan is highly simplistic and does not provide the basis to conclude that the Grassy Mountain site will ever be properly reclaimed;
- Benga has completely failed to consider and address the unique Chinook winds meteorology in the Crowsnest Pass and the impact this meteorology will have on dust emissions from the Project;
- Benga has failed to provide persuasive evidence that the Project will not give rise to the sort of nuisance impacts suffered by residents of Sparwood from Teck's Elk Valley coal mines and may not cause adverse health impacts on local residents; and
- The Project's economic benefits will not be significant and do not justify the Project being approved.

8. For all these reasons, the Livingstone Landowner Group respectfully asks that the Panel deny the applications before it.

II. STATUTORY SCHEME AND LEGAL FRAMEWORK

9. In this part of our argument, the LLG briefly discusses the statutory scheme and legal framework which governs the Panel's consideration of Benga's application. We also address the purpose of the public hearing and the role of intervener hearing participants in the Panel's overall assessment of the Project.

10. The Panel is a joint review panel appointed by Canada and Alberta. It has responsibilities and duties under both provincial and federal legislation. The LLG will review the most

important, but not all, of the various pieces of legislation that have relevance to this proceeding.

1. Provincial: Consideration and Approval under the *Responsible Energy Development Act* and the *Coal Conservation Act*

11. Benga Mining Limited (“**Benga**”) requires approvals under the *Coal Conservation Act*² (“**CCA**”) in order to construct and operate the Grassy Mountain Project. The CCA is an “energy resource enactment” under the *Responsible Energy Development Act*³ (“**REDA**”) and therefore Benga was required to submit its applications under the CCA to the Regulator.⁴

12. Section 15 of REDA states that where the Regulator is to consider an application, it shall consider any factor “prescribed by the regulations, including the interests of landowners” [emphasis added]. Section 3 of the *Responsible Energy Development Act General Regulation*⁵ states that for the purposes of section 15 of REDA, where the Regulator is to consider an application, it shall consider:
 - (a) the social and economic effects of the energy resource activity,
 - (b) the effects of the energy resource activity on the environment, and
 - (c) the impacts on a landowner as a result of the use of the land on which the energy resource activity is or will be located. [emphasis added]

13. Section 8.1 of CCA is titled “Disposition of applications”. Subsection 8.1(2) states that on receiving an application under the Act the Regulator shall not “grant a permit, licence or approval ... under this Act unless in its opinion it is in the public interest to do so.” [emphasis added]

² RSA 2000, c C-17.

³ Section 1(1)(j)

⁴ Section 30(1)

⁵ Alta. Reg 90/2013.

14. In short, like its predecessor the Energy Resources Conservation Board, a panel of the AER considering an application under the CCA is required to determine whether approval of the project in the public interest having regard to its social and economic effects and its effects on the environment and landowners.
15. The LLG also notes that when Benga submitted its application to the Regulator in 2015, it was required to prepare and file the application in accordance with AER Directive 061 “How to Apply for Government Approval of Coal Projects in Alberta”. Although Directive 061 was recently rescinded, Benga’s lead policy witness, Mr. Gary Houston, confirmed that the Grassy Mountain application was filed in accordance with Directive 061. Mr. Houston also put on the record Benga’s position that its application is fully compliant with Directive 061.⁶ As will be discussed below, the LLG disagrees and submits that Benga’s application is not compliant with Directive 061.

2. Federal: Approval under the *Canadian Environmental Assessment Act, 2012*

16. The Panel’s federal responsibilities arise under the *Canadian Environmental Assessment Act, 2012* (“**CEAA 2012**”). Under section 43 of CEAA 2012 the Panel is required to conduct an environmental assessment of the Project, hold hearings in a manner that offers interested parties an opportunity to participate in the environmental assessment, and prepare a report for the Minister of Environment (“**Minister**”) that sets out the Panel’s rationale, conclusions and recommendations.
17. Under sections 47 and 52 of CEAA 2012, the Minister must make a decision whether the project will likely cause significant adverse environmental effects taking into account proposed mitigations. One of the key roles of the Panel is to assist the Minister, through its report, in making his “significance determination”. If the Minister decides that the Project will have significant adverse environmental effects, he must refer to the Governor in Council (the federal Cabinet) the matter of whether those effects are justified in the circumstances.

⁶ CIAR #793, p. 1833.

3. Federal: *Species at Risk Act*

18. The Project will have adverse effects on two wildlife species listed under the federal *Species at Risk Act* (“SARA”): the Whitebark Pine and the Westslope Cutthroat Trout. In the case of the Whitebark Pine, Benga estimates the Project will destroy approximately 21,000 trees.⁷ Although the Panel itself has no jurisdiction under SARA, it may make recommendations in its report that may assist the competent federal Minister under SARA in the event Benga submits applications to that Minister for SARA permits.
19. In its Final Argument, Benga notes that a proponent may engage in activities that would otherwise be prohibited under SARA if the competent Minister issues a permit pursuant to sec. 73 or 74 of SARA. Benga also notes that permits under sec. 73 may be issued where the effects of the activity on the species at risk are “incidental” to the activity in question. Benga then argues that it is the purpose of the activity that matters, not the magnitude of the impact. Therefore, it may be inferred, Benga’s position is that the fact that 21,000 Whitebark Pines will be destroyed by the Project does not matter, since their destruction is incidental to the purpose of the Project, which is to mine coal.⁸
20. LLG disagrees and submits that the intentional destruction of such a large number of this listed species is clearly contrary to the spirit of SARA, the Preamble to which states that “Canada’s natural heritage is an integral part of our national identity and history” and recognizes that “wildlife, in all its forms, has value in and of itself and is valued by Canadians for aesthetic, cultural, spiritual, recreational, educational, historical, economic, medical, ecological and scientific reasons”.
21. Benga’s argument on SARA correctly notes that the Minister may only issue a sec. 73 permit if satisfied that (1) all reasonable alternatives have been considered; (2) all feasible measures will be taken to minimize the impact; and (3) the activity will not jeopardize the survival or recovery of the species. The LLG notes that the use of word “and” means all three requirements must be met. Benga concludes:

⁷ Although the LLG is also concerned about the impact of the Project on the Westslope Cutthroat Trout, by agreement with other hearing participants such as the Coalition and CPAWS, LLG left assessment of the Project’s impacts on WSCT to those participants.

⁸ CIAR #962, paras. 49-53.

Therefore, the legislation explicitly allows for a proponent to disturb SARA-listed species and critical habitat provided that, among other things, the activity will not jeopardize the survival or recovery of the species.

22. Finally, Benga lists a number of projects where SARA permits were issued for activities “related to Alberta coal mines, pipelines, hydroelectric generation facilities, electricity projects, and stream alterations”, notwithstanding it was “not just a possibility” the activity would negatively affect a SARA-listed species, but “a certainty”.⁹
23. LLG submits that the Grassy Mountain project is obviously distinguishable from the projects listed by Benga in its argument in terms of the magnitude of the impacts to listed species. Further, it fails to meet the first two branches of the test for granting a section 73 permit of having to satisfy the Minister that all reasonable alternatives have been considered and all feasible measures will be taken to minimize the impact.
24. For example, Benga’s mitigation plan for Whitebark Pine states that part of the mitigation strategy is to “minimize the project footprint” to avoid populations of Whitebark Pine where possible. Yet under cross examination Mr. Houston frankly acknowledged that the conceptual mine footprint has been established for several years and was not minimized to avoid Whitebark Pine: “So, Mr. Fitch, I think the mine pit, the boundary of the mine pit in particular, is something that is difficult to shift around a pine tree...” Mr. Houston also agreed that the “pit-optimization” process (by which the size and contours of the pit were established) “did not include consideration of where whitebark pines are located”.¹⁰
25. Further, the cases cited in para 55 of Benga’s Final Argument where SARA permits have been issued are clearly distinguishable from the Grassy Mountain Project, as the following discussion demonstrates:

(a) Example 1 – 2015 – Parks Canada – Sulphur Mountain Gondola (CIAR #571)

FortisAlberta received a permit to replace a 60-year old electrical supply line consisting of 30 wood poles and a conductor line. A ‘no action’ alternative was

⁹ *Ibid*, paras. 54-56.

¹⁰ CIAR #835, pp. 2812-2814.

considered and deemed not reasonable because the poles and related infrastructure had reached the end of their planned service life. In other words, the project was required to maintain a reliable supply to the gondola station. Alternative routes also presented unacceptable risks to human health and safety, engineering limitations, and greater impact on the Whitebark Pine. The project was not considered to jeopardize the survival or recovery of the species because “[t]he loss of individuals represents a small portion of the local and regional populations of the species, and is not expected to be ecologically significant.” This project is much smaller than and clearly distinguishable from Grassy Mountain.

- (b) Example 2 – 2018 – Parks Canada – Jasper National Park transmission line (CIAR #838)

ATCO Electric proposed the construction of a transmission line to connect Jasper with the AIES. The project involved the removal of 27,000 trees but these trees were not the endangered species under SARA. Rather, the project would disturb “Type 2 Matrix range” critical habitat for mountain caribou. However, the evidence was that this habitat was just one of several used by caribou and in fact the caribou rarely used the Type 2 habitat. Again, this project is distinguishable from Grassy Mountain.

- (c) Example 3 – 2020 – DFO Nooksack Dace in Brunette River, New Westminster, BC (CIAR #886)

In this case, the SARA permit was related to the Transmountain Expansion (“TMX”) Project, which had already been approved. Further, the impact on critical habitat was in a densely populated urban area, not a largely undisturbed natural setting. Clearly, the magnitude of this project is not comparable to the scale of destruction of habitat at Grassy Mountain.

- (d) Example 4 -2019 – DFO – Coal Valley Mine – Diversion of Mercoal Creek Tributary (CIAR #887)

This project involved the diversion of one tributary in the context of an existing project. In issuing a section 74 SARA permit, DFO noted that the area was already subject to monitoring as a condition of the existing coal mining operations. Not carrying out the project would result in the loss of an on-going data collection program. Again, this project is completely distinguishable from Grassy Mountain.

(e) Example 5 – 2020 – DFO Rocky Mountain Sculpin in Lee Creek, Alberta (CIAR #571)

The Town of Cardston proposed to stabilize the banks of Lee Creek using rip rap at three locations out of six previously authorized by DFO. DFO and the Town considered doing nothing but this alternative created more problems than it solved. Not engaging in the stabilization of the banks would have resulted in continued erosion, which would have steadily increased sedimentation into the watercourse, potentially harming the Rocky Mountain Sculpin and Bull Trout. Furthermore, continued erosion had the potential of introducing contaminants from the golf course and potential loss of infrastructure into the creek. This project is in no way comparable to Grassy Mountain.

(f) Other Examples

Finally, Benga identified a few other cases where SARA permits have been issued for activities that would adversely affect critical habitat for Westslope Cutthroat Trout. All these projects related to remedial works at existing bridges. Like many of the other examples cited by Benga, these were undertakings that involved either continuing an existing project or improving old infrastructure. They are in no way comparable to Grassy Mountain.

26. LLG maintains that what Benga is proposing—high magnitude disruption of SARA-listed wildlife species, with no evidence of good faith efforts made to minimize that disruption—is not consistent with the Act. Moreover, of the examples cited by Benga where SARA permits were issued, two involved public utilities and one a municipality. In those cases,

it was at least arguable that the project was serving a public purpose. Even the TMX involved a publicly regulated gas transmission facility.

27. By contrast, there is no larger public interest behind the Grassy Mountain project such as might provide offsetting justification for the destruction of 21,000 Whitebark Pines. It is a strictly for-profit enterprise. It has been sited deliberately, to maximize coal recovery. The listed SARA species just happen to be in the way.

4. Federal: Bill C-12 *Canadian Net-Zero Emissions Accountability Act*

28. On November 19, 2020, during the currency of the public hearing, Parliament gave first reading to Bill C-12, the *Canadian Net-Zero Emissions Accountability Act*.¹¹ As stated in section 4, the purpose of the Act is to require the setting of national targets for the reduction of greenhouse gas emissions in support of achieving net-zero emissions in Canada by 2050. The Act's Preamble refers to Canada's international obligations under the Paris Agreement to set "ambitious national objectives and undertake ambitious national measures for climate change mitigation".
29. Although Bill C-12 is not yet law, the LLG submits that Canada's international obligations under Paris Agreement to undertake ambitious national measures for climate change mitigation will have to be met, one way or another. Accordingly, the LLG also submits that in considering whether the Project is in the public interest having regard to its social and environmental effects, and whether it will have significant adverse environmental effects, the Panel must have regard to whether approval of the Project will contribute to Canada being able to meet its goal of achieving net-zero greenhouse gas emissions by the year 2050.

5. Precautionary Principle

30. In *114957 (Spraytech, Societe d'arrosage) v Hudson (Town)*, 2001 SCC 40, the Supreme Court of Canada accepted that the precautionary principle, originally developed in the context of international law, is a part of Canadian domestic law. The Court adopted the

¹¹ <https://parl.ca/DocumentViewer/en/43-2/bill/C-12/first-reading>

definition of the principle set forth in the *Bergen Ministerial Declaration on Sustainable Development* (1990):¹²

In order to achieve sustainable development, policies must be based on the precautionary principle. Environmental measures must anticipate, prevent and attack the causes of environmental degradation. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

31. Since *Spraytech*, the precautionary principle has been in many contexts, including environmental assessment. For example, *Pembina Institute for Appropriate Development v Canada (Attorney General)*, 2008 FC 302 was a judicial review of an oil sands mining project approval. The Joint Review Panel had concluded that provided proposed mitigation measures and recommendations were implemented, the project was not likely to cause significant adverse environmental effect. On judicial review, the Federal Court held that the scope of duties incumbent upon a review panel must be viewed through the prism of the guiding tenets of the precautionary principle and adaptive management (para. 33). Of note, the Court held that the former *Canadian Environmental Assessment Act* incorporated the precautionary principle.
32. In *Morton v Canada (Minister of Fisheries and Oceans)*, 2015 FC 575, a decision that engaged the *Fishery (General) Regulations*, the Court held that “the precautionary principle is at a minimum, an established aspect of statutory interpretation, and arguably, has crystallized into a norm of customary international law and substantive domestic law” (para. 43). The Court in *Morton* held that in failing to address the licensing of the transfer of smolt infected with a virus, the Minister did not err on the side of caution and as such his decision did not reflect the precautionary principle (para. 46).
33. In Alberta, the precautionary principle has been expressly applied by the Environmental Appeals Board in *Imperial Oil Ltd. v Alberta (Director, Enforcement & Monitoring, Bow Region, Regional Services, Alberta Environment)*, 2002 CarswellAlta 1016 and recently in

¹² Paragraph 31

Sears Canada Inc. et. al v Director, Regional Compliance, South Saskatchewan Region, Alberta Environment and Parks, 2020 CarswellAlta 1204. In *Sears*, the EAB applied the principle to hold, in the context of a release of contaminating substances, that it is enough the release of the substances had the potential to cause an adverse effect (para. 229). Further, the EAB applied to the principle to hold that the mere presence of the substances under a residential neighbourhood was causing an adverse effect (para. 234).

34. The LLG submits that in determining whether the Project is in the public interest having regard to its social and environmental effects, and whether it will have significant adverse environmental effects, the Panel must have regard to the precautionary principle. This is particularly so given the potential of the Project to cause adverse effects on human health.
35. Specifically, the LLG submits that application of the precautionary principle in this case requires that the Panel make the following assessments:
- Does the Project threaten serious or irreversible environmental damage (or damage to human health)?
 - If so, based on the information contained in the Record, is there sufficient certainty regarding the efficacy of Benga's proposed mitigation measures that the Panel is satisfied that approval of the Project is in the public interest and that the Project's adverse environmental effects will not be significant?

36. The LLG submits that the seriousness of the environmental damage that will be caused by Benga's proposed open pit coal mine is beyond question. The LLG further submits that it was amply demonstrated in the public hearing that Benga's proposed mitigation measures fall far short of providing anything close to certainty that Benga will be able to adequately mitigate those serious environmental impacts. Therefore, application of the precautionary principle requires the Panel to reject Benga's application.

6. Role of Interveners

37. In its written Final Argument, Benga argues (e.g., paras 14 and 29) that hearing participants who criticized Benga during the hearing for failing to provide adequate information and

sufficient details about mine design and mitigation plans waited too long and therefore those criticisms should be rejected:

14. Where hearing participants now ask that Benga be required to provide additional information, those comments and requests were properly made and addressed through public consultation leading up to the finalized AER ToR, and through the Information Requests (“IRs”) process.

...

29. Some participants appear to have waited until the hearing to express their comments and ideas on information requirements. The public consultation periods for the Project’s ToR and the IR processes were undertaken for a purpose, and that purpose has been satisfied. The hearing stage of an EA is not intended to act as a springboard for participants to re-open the earlier stages of the EA process.

38. With respect to the LLG specifically, Benga criticizes¹³ the recommendation made by the LLG’s mining expert, Dr. Gord McKenna, with respect to the out-of-pit waste rock dumps:

Dr. McKenna recommended that Benga’s designs for out-of-pit dumps for source control of selenium be reworked using the observational method as part of landform design. While this recommendation may have been relevant in determining the ToRs and the Agency’s Guidelines for the review of the Grassy Mountain Project, it does not assist the Panel at this stage. LLG did not recommend the use of landform design in any comments or submissions made prior to retaining Dr. McKenna. [emphasis added]

39. With respect, the LLG submits that these criticisms made by Benga in its Final Argument misrepresent the process and are unfair to hearing participants. With regard to the criticism of Dr. McKenna’s designs of the waste rock dumps in particular, the LLG submits it should be rejected out of hand as Benga’s witnesses at the hearing expressly commented positively on those designs (this will be discussed in detail below).

¹³ CIAR #962, Para 435

40. The LLG submits that the EA process may generally be understood to have consisted of three phases:
- 1) Review by the Regulator and the Agency, from the commencement of the EA process in July 2015 to the appointment of the JRP in August 2018;
 - 2) Review by the JRP, from August 2018 to the announcement of a public hearing, on June 29, 2020; and
 - 3) The public hearing process.
41. During the first two phases, the EA process was driven by the regulators, who asked for substantial additional information about the Project through Supplemental Information Requests (“**SIR**”). While members of the public were able to participate in these phases, and did, few if any received funding or independently had the resources to retain experts and legal counsel to assist them. It was only once the public hearing was announced that the AER’s rules around standing and local intervener costs became applicable.
42. In the case of the LLG, it had no certainty that it would be granted standing to participate fully in the hearing until the Panel issued its June 29, 2020 Notice of Hearing. Only then was the LLG able to begin hiring experts such as Dr. McKenna. For Benga to argue that LLG should have retained Dr. McKenna back in 2015, when the AER was determining the contents of the Terms of Reference for the EIA, is highly disingenuous.
43. The Joint Review process constitutes a blending together of the federal EA process and Alberta’s process for approving energy projects under REDA. Much more than the federal process, the Alberta process consists of adversarial, quasi-judicial proceedings, in which interveners (to use the Alberta term) are able to cross examine the Proponent’s witnesses and put forward evidence, including expert evidence, to contradict the Proponent’s evidence. The Alberta process would not be viable but for the local intervener cost regime, which dates back to the late 1970s, as otherwise interveners would not have the resources to go “toe to toe” with proponents.

44. In Alberta, interveners have always been given scope by the AER, and its predecessors the Energy Resources Conservation Board and the Alberta Energy and Utilities Board, to argue through the public hearing process that a proponent has failed to provide sufficient information or a sufficient level of detail to support the issuance of an approval. What the LLG and other hearing participants have done in this case is no different.
45. It is simply not the case that the LLG and other hearing participants “waited until the hearing to express their comments and ideas on information requirements” (para 29). What is the case is that they did not have the resources and thus the ability to do so before the hearing was announced. It is hardly surprising that in the public hearing, now supported by expert witnesses and cross-examination by legal counsel, participants were able to identify additional information gaps and weaknesses and shortfalls in Benga’s application and the EIA materials.
46. Finally, not only is Benga’s argument (that it was somehow “too late” for hearing participants to allege, in the public hearing, that Benga has provided a lack of information and detail) wrong, it is also irrelevant. Benga is the Applicant. It bears the onus of leading sufficient, and sufficiently persuasive, evidence to allow the Panel to issue the approvals Benga is seeking. In an adversarial, quasi-judicial process, it is always the case that the party opposing the application may challenge the proponent on the grounds that it failed to lead the evidence required to meet its onus.
47. If, as almost every hearing participant has alleged, Benga has failed to provide sufficient information to support approval of the Application, the Application must be denied. Or, should the Panel believe that the Application could be approved were Benga to provide further and better information, it is open to the Panel to order Benga to do so. Hearing participants like the LLG have simply offered suggestions of what further and better information may be required. There is absolutely nothing wrong with them having done that. To suggest otherwise, as Benga has done, is not only wrong as a matter of law, it is condescending and arrogant.

III. THE LIVINGSTONE LANDOWNERS GROUP AND ITS ROLE IN THE PUBLIC HEARING

48. The Livingstone Landowners Group (“LLG”) is a not-for-profit and non-partisan volunteer association of landowners and residents in the area east of the Livingstone Range to the Porcupine Hills and north of the Oldman River Reservoir. The LLG has over 125 members ranging from third-generation ranchers to landowners with homes in the area who have careers spanning law, the arts, educators, health care professionals and businessowners and leaders.¹⁴
49. The LLG was established in 2004 and since that time has had a mandate to work with industries interested in investing in the area to ensure their development plans are sustainable and respect the unique environmental aspects of the area. The LLG has worked successfully with oil and gas, logging, wind energy and electric power transmission line companies. The LLG is not against development but believes development in this very special area should be conducted in a way that is sustainable and does not damage the environment.¹⁵ As Mr. Lawson testified:

[N]either LLG nor, to my knowledge, anyone else concerned about Grassy Mountain and opposed to this application is opposed to economic opportunities or employment in the area. We understand that there are people who would seek such opportunities, and we have no quarrel with those people. But for mine benefits to be of value, they need to be stable and lasting, not just one more round in the boom-and-bust cycles so common in resource extraction. They must add to the existing economy and the community, not substitute or detract from them, and promises made must be real and maintained in the future.¹⁶ [emphasis added]

50. In addition, members of LLG have been and continue to be significant contributors to the creation and ongoing development of the South Saskatchewan Regional Plan. Finally, LLG members contribute to their community by undertaking on-the-ground activities to

¹⁴ CIAR #786, pp. 1570 and 1582.

¹⁵ *Ibid.*

¹⁶ *Ibid.*, pp. 1582-83.

ensure the sustainability of Crown land and headwaters in the Livingstone and Porcupine Hills area. For example, many LLG members volunteer their time in the summer to maintain trail and creek crossings damaged by off-highway vehicle traffic.¹⁷

51. The current President of the LLG is Mr. Bill Trafford (“**Trafford**”). Mr. John Lawson (“**Lawson**”) is a founding member and past President of the LLG. Bobbi Lambright (“**Lambright**”) is currently the Secretary of the LLG. Each of Trafford, Lawson and Lambright provided testimony to the Panel. In addition, Mr. Sid Marty (“**Marty**”) testified as part of the LLG’s “landowner panel”. Marty is an internationally recognized author.
52. In response to an undertaking requested by Benga, curricula vitae for Trafford, Lawson, Lambright and Marty were filed as exhibits during the public hearing.¹⁸ As is evident from their CVs, these are highly accomplished individuals:
 - Trafford was Executive Vice-President and Chief Development Officer at Alberta Health Services before retiring to consult and serve on various Boards.
 - Lawson was a senior civil servant with the Government of Yukon for many years, including serving as Deputy Minister of Executive Council Office and Secretary to Cabinet, and Deputy Minister of Justice. Since leaving the Yukon, Lawson has carried on a consulting business while running his family ranch. From 2013-2016 he was a part-time Hearing Commission for the AER.
 - Lambright is retired after a lengthy and distinguished career with the ATCO group of companies, most recently serving as Managing Director and Chief Operating Officer for ATCO Australia.
 - Marty has published several acclaimed books, including the award-winning *Men for the Mountains* (Canadian Authors’ Association prize and silver medal; and Best

¹⁷ *Ibid*, p. 1575.

¹⁸ CIAR #905.

Nonfiction Award, Province of Alberta), *Leaning on the Wind* (Mountain Literature Award, Banff Festival of Mountain Books and Short-List, Governor General's Literary Award, nonfiction), *Switchbacks* (Mountain Literature Award, Banff Festival of Mountain Books) and *The Black Grizzly of Whiskey Creek* (Canadian Rockies Award and Grande Prize, Banff Mountain Book Festival).

53. LLG's landowner witnesses testified in the first Topic Session (Purpose of the project, visual aesthetics, alternative means, land and resource use, socioeconomic effects and historic resources), on November 4, 2020.
54. The members of the LLG Landowner witness panel testified as to the unique and special features of the Livingstone – Porcupine Hills area and the concerns of the LLG and its members, including themselves personally, that the Grassy Mountain Project is simply not compatible with the primary values of the area.¹⁹ As succinctly stated by Sid Marty, the position of the LLG and its member is as follows:

... the proposed Grassy Mountain Mine is the wrong development, in the wrong location, in the wrong century.²⁰

55. Or as Mr. Trafford testified:

All of the 40-plus members of my family are committed to living, working, and raising families in Alberta. We know how important growing our economy and creating jobs is to all of our futures, and we all want to help. I can commit to you that not one single one of them believe that mountaintop removal to mine for coal is beneficial to the future of Alberta.²¹ [emphasis added]

56. Ms. Lambright resides with her husband on a 400-acre ranch property 15-20 km due east of Grassy Mountain. Most of their land is native prairie and they have a small permanent

¹⁹ CIAR #786, p. 1583 (testimony of John Lawson).

²⁰ *Ibid*, p 1645-46.

²¹ *Ibid*, p. 1572.

creek running through their land with native fish. They fish, ride horses, kayak and hike. She testified:

This summer we took our horses out to an area called The Gap, just not that far from Grassy Mountain, and we were absolutely overwhelmed by the volume of people that were recreating in that area and the amount of traffic on that backwoods gravel road, and I think it is just indicative of the hunger that people have, you know, for these special places and the consequence to all of us when those places get destroyed. And the reality and I think you've heard it in spades from almost every resident that has spoken to you -- is that coal mining is simply not compatible with most of these other land uses.²² [emphasis added]

57. With regard to specific concerns of the LLG communicated in submissions filed as part of the EA process, Mr. Lawson summarized these as follows:

- Retention of the natural beauty and international acclaim of the Crown of the Continent landscape;
- The need to protect sensitive and fragile local animal and plant species;
- Proximity of the proposed mine to recognized environmentally sensitive areas and irreplaceable ecosystems;
- Lack of attention by Benga to reclamation and associated difficulties accentuated by harsh, dry and highly variable climatic conditions;
- Use of public lands for water capture, collection and treatment;
- Possible diversion of streamflows and conversion to industrial use;
- Downstream degradation of water quality in the Crowsnest and Oldman River systems, particularly selenium contamination with long-term or permanent damage to fish and other species;

²² *Ibid*, pp 1611-12.

- Detraction and degradation of recently established area parklands from visual impacts, noise and downwind dust; and
- Impacts on the health and well-being of the local population.²³

58. In providing this summary of specific LLG concerns, Mr. Lawson finished by testifying:

I note each of those to illustrate that the list of concerns and problems associated with this mine is extensive. It is long. The issues are serious and they're not unique to LLG.²⁴

59. The LLG submitted expert evidence to the panel on the following issues:

- Benga's mine design and reclamation and closure plans, and whether these adequately protect the environment and in particular water (Dr. Gord McKenna);
- Benga's air quality assessment, and whether it adequately considered the unique chinook wind conditions of the Crowsnest Pass (Dr. James Young);
- Benga's human health risk assessment, and whether it provides a complete picture of the evidence relevant to the issue of human health impacts from mountain-top removal, open-pit coal mines (Dr. John Dennis); and
- Benga's socio-economic impact assessment, and whether it supports Benga's optimistic predictions of the benefits that will be created by the Project (Dr. Chris Joseph).

60. The LLG landowner witness panel also provided evidence on these issues (in particular, on the wind conditions in the area), which will be referred to below in the topic-specific sections of this argument.

²³ *Ibid*, pp. 1583-84.

²⁴ *Ibid*, p. 1584.

61. The LLG submits that its participation in the Grassy Mountain public hearing was constructive and of benefit to the Panel. LLG's landowner witnesses spoke knowledgeably and passionately about the area in which they live and why it is so special and worthy of protection. The experts retained by the LLG provided fair, objective and non-partisan critiques of important aspects of Benga's application. The LLG submits that the Panel should place significant weight on the evidence submitted by its witnesses and elicited through cross-examination.

IV. THE PANEL'S ASSESSMENT OF THE EVIDENCE — OVERARCHING THEMES

62. LLG submits that through the course of the public hearing, certain overarching themes were either apparent from the start or emerged repeatedly as the evidence unfolded. Specifically, LLG believes that the Panel should assess the totality of the evidence having regard to the following three points:

- 1) The Eastern Slopes are a landscape of high environmental and cultural significance and sensitivity;
- 2) The Applicant Benga is a recently incorporated company whose only real asset is Grassy Mountain and which does not have either a proven track record or the corporate heft to carry off a large and risky project like Grassy Mountain; and
- 3) Benga's application is so high-level and "conceptual", so devoid of detail and substance, that it cannot possibly form the basis for an approval.

1. Significance of the Eastern Slopes

63. The LLG submits that it is beyond doubt that the Eastern Slopes are a very special area which warrant a high degree of protection. It is a special landscape which many think of as being Alberta's playground; hence it being the most significant and popular tourism attraction/destination in the Province.

64. It is also a special area agriculturally. It is some of the last best ranching country in the world because it contains large remnant tracts of native rough fescue grasslands. It is special hydrologically in that it provides water for much of southern Alberta, not to mention Saskatchewan and Manitoba.
65. The LLG submits that the Panel's determination of what is in the public interest must be made with this context in mind. Is the public interest really served by approving a large mountaintop removal, open-pit coal mine in an area as significant and special as the Eastern Slopes?
66. Ms. Lambright testified:

One of the things I don't think that's been mentioned specifically here is that the area we're discussing is one of the most endangered ecosystems in the world. You know, a lot of people talk about things like the Amazon rainforest, but the -- the grasslands and the grasslands where they meet the mountains truly is one of the most endangered ecosystems anywhere. We have -- we are part of the last 1 percent of Canada's grasslands. And as I'm sure you observed in the -- the Benga application, you know, some of the area directly in -- where they're placing their mine is fescue grassland, which -- rough fescue grassland, which is some of the most difficult grasslands to remediate.²⁵ [emphasis added]

67. John Lawson spoke eloquently about how special the Eastern Slopes are why they should be off-limits to large-scale industrial projects like the Grassy Mountain Project:

I would like to conclude my comments with two additional points, perhaps not so specifically addressed in the hearings, but arguably more important and overlaying this entire process and decisions to be made.

Provincial and federal governments have recognized and made promises to protect the Eastern Slopes and our headwaters for over a hundred years. Watershed protection has been designated as the highest priority from management. In fairly recent years, Peter Lougheed's Conservative government implemented the coal policy

²⁵ CIAR #786, p. 1609.

in 1976 to protect the Eastern Slopes. The oil and gas regulator in 1993 issued IL -- Information Letter 93-9 providing specific direction on limitations on industry operations along the Eastern Slopes for similar reasons.

This application is different from many others, and it should be considered as such. It and other current mining proposals recently described by one writer as "the Australian invasion" -- Grassy Mountain being only the first -- are of a scale and nature that, if approved, will irreversibly alter and degrade the Southern Eastern Slopes.

Grassy Mountain is not just another project. It is not even just another large mine project. It is an assault on the region and the heart of the Eastern Slopes, an assault that will change -- that is, in fact, designed to change the very nature of the slopes and how they are regarded going forward.

I submit that that transformation cannot be allowed to happen, not just because the mines are Australian -- although for those looking to economic benefits, foreign ownership will almost certainly mean more revenue leaving Canada and going offshore -- and not just because we do need to transition off coal, but precisely because these projects are on the Eastern Slopes, a precious, unique, irreplaceable world-recognized treasure to be maintained and protected. The Eastern Slopes are not and they must not be treated as a collection of gravel pits or sandboxes interchangeable to be moved about and dug up by big toys for private enrichment.²⁶ [emphasis added]

68. Benga asserts that its proposed mountain-top removal, open-pit coal mine will actually benefit the local environment because it is located on a disturbed site from previous mining operations that were never properly reclaimed. The asserted benefit is that this disturbed site will now be reclaimed to modern standards.²⁷ The LLG submits this is smoke and mirrors.

²⁶ CIAR #786, p. 1602-1604.

²⁷ See, e.g., CIAR #42, Section A, pdf 10-11: "A unique opportunity exists in this case to have the site rehabilitated to a better state at the conclusion of mining [than] it currently presents today."

69. The project footprint for Grassy Mountain is 1,520 ha, whereas the size of the previously unreclaimed mine area is only 185 ha—12% of the project footprint. By contrast, 1,185 ha or 78% of the project footprint is upland forest.²⁸ To gain the “benefit” of properly reclaiming 185 ha of unreclaimed mine area, Benga will destroy 1,185 of upland forest. Some benefit.
70. Similar to the claimed “benefit” of properly reclaiming former mine lands, Benga also justifies the Project on the basis that it is simply “re-establishing” a historical coal mine.²⁹ This is nonsense. Benga’s proposed open-pit mine dwarfs the historical mines that operated on Grassy Mountain and indeed anywhere in the Crowsnest Pass. For example, the Greenhill Mine produced a total of 14 Million tonnes of coal in 55 years, from 1913 to 1968. Benga is proposing to produce 4.5 Million tonnes per year for 23 years. Under cross-examination, Mr. Houston testified:

Q Right. But the point is, though, that the size of what you’re proposing dwarfs what has ever been done at Grassy Mountain in the past; correct?

A It—it’s larger in area and in volume of coal that would be produced; that’s correct.³⁰

71. The Panel should not be fooled. Benga’s proposed open-pit coal mine will be a massive industrial intrusion in the southern Eastern Slopes, without precedent in Alberta history. In view of the Eastern Slopes’ environmental significance and sensitivity, the LLG submits that there is a high bar for Benga to meet in order for the Project to be found in the public interest.

2. The Applicant fails to inspire confidence

72. The Applicant is Benga Mining Limited (“**Benga**”). Benga is a wholly-owned subsidiary of Riversdale Resources Limited (“**Riversdale**”), an Australian mining company.

²⁸ CIAR #771, p. 1001-1002.

²⁹ CIAR #42, Section A, pdf 6.

³⁰ CIAR #771, p. 1005-1007.

Riversdale in turn wholly owned by Hancock Corporation Pty Ltd (“**Hancock**”), another Australian mining company.

73. Benga was incorporated in 2013, the year before it submitted a project description for Grassy Mountain to the Agency and to the Regulator. Benga’s principal asset is Grassy Mountain.³¹
74. During the first topic session, Benga’s witness Mr. Youl, who testified via Zoom from Australia, frequently referred to “Riversdale” when discussing the wherewithal of the Applicant to carry off the Project. For example, when discussing the ability to attract potential customers for Grassy Mountain coal in China, Mr. Youl stated:

[W]e’ve got a very experienced marketing team within Riversdale, people with a long background in—in many companies. So China is just one region.³²

75. LLG also notes that most of Benga’s documents, including their written Final Argument, bear a Riversdale Resources letterhead. But Benga is not Riversdale.
76. As a matter of basic corporate law, a parent and subsidiary are different companies and the parent, as shareholder of the subsidiary, is not liable for the subsidiary’s debts and obligations. In LLG’s cross-examination of Benga’s witness panel in Topic Session 1, a very straightforward question was asked:

Q So -- and I've heard Hancock referred to earlier as “the deep pockets” here. So my question is: Is there any sort of an arrangement among the three companies, Hancock, Riversdale, and Benga, whereby if Benga were to become insolvent, either Riversdale or Hancock will assume Benga's liabilities, including its reclamation liabilities?³³

³¹ CIAR #771, p. 995.

³² CIAR #762, p. 865.

³³ CIAR #771, p. 996.

77. What followed, by way of response, was a lengthy non-answer from Mr. Houston. Eventually, the question was asked a third time, in the following way and with the following response given by Mr. Houston:

I just simply want to know, my clients want to know, if Benga fails, will Riversdale or Hancock step into its shoes?

A So, Mr. Chairman, Benga is the limited company in Canada. Typically limited companies and shareholders of limited company - - shareholders of limited companies don't take financial responsibility for -- for the company in which they hold shares. If that weren't the case, it would be difficult for me, as a shareholder in a number of companies, to take on that -- that -- that role. So that -- that's the way that the corporate structure is. [emphasis added]

78. There is nothing wrong with one company incorporating a subsidiary to carry out a project. But as acknowledged by Mr. Houston, Riversdale and Benga are separate legal entities with separate assets and liabilities. Benga cannot have it both ways. It cannot claim the benefit of Riversdale's marketing or other resources at the same time that Riversdale disclaims responsibility for Benga's current and future liabilities.
79. The project under review is Benga's project, not Riversdale's. The Panel should have no regard to the so-called "deep pockets" in Australia. The fact is, this major project is being advanced by Benga, a relatively small, purpose-created, single asset company. The LLG submits that creates significant risk.

3. Benga's Application is so high-level and "conceptual" it cannot form the basis for a decision that the project is in the Public Interest

80. The LLG submits that the thing that emerged most clearly and consistently during the hearing is that Benga's mine design, reclamation plan and mitigation plans are so "conceptual" and high level as to make it next to impossible to have any confidence in them. This makes the Panel's job of making a public interest determination extremely challenging.

81. The LLG has prepared a table, attached as Appendix A, which provides a lengthy list of examples from Benga's testimony during the public hearing where it justified a lack of detail or substance on the basis that the plan (or design or mitigation strategy) was conceptual, preliminary or high level.
82. The LLG submits that, fundamentally, Benga has failed to provide evidence sufficient to allow the Panel to make a determination that the project is in the public interest. This is particularly the case given the high bar that Benga has to meet in this case.
83. Benga's failure to provide detailed, substantive responses to so many of the questions that were asked of it, both during the SIR process and at the hearing, undermined its credibility. A witness can only say "we will address that during final design" so many times before the person asking the question throws up their hands in frustration.
84. Benga argues (in para 45 of its Final Argument) that:

[T]here is no expectation in the EA process for the proponent to have iron-clad, final detailed plans in place at this stage. That would be putting the cart before the horse, so to speak, and would be unfair to the proponent because of the level of investment that would be required, with no guarantee of a return. Requiring final detailed plans before a public hearing would usurp the role of the Panel in making its recommendations, and the role of the regulatory bodies who will be involved in finalizing plans necessary to secure permits under other legislation, such as the *SARA* and the *Fisheries Act*.

85. To be clear, the LLG (and, to our knowledge, anybody else) is not arguing that Benga should have provided plans that are "iron-clad" or "final". The LLG does argue that the Application and EIA must contain enough substance and detail to allow the Panel to make a public interest determination. Benga's application fails to do that, miserably.

V. THE PANEL'S ASSESSMENT OF THE EVIDENCE — SPECIFIC ISSUES

86. As noted above, the LLG retained four expert witnesses who provided the Panel with opinion evidence in the following areas:

- Mine design (selenium source control) and reclamation and closure: Dr. Gord McKenna;
- Air quality, meteorology and fugitive dust emissions: Dr. James Young;
- Human health risk assessment: Dr. John Dennis; and
- Socio-economic impacts and benefits: Dr. Chris Joseph

87. Having set out above three key overarching themes that should guide the Panel's assessment of the evidence, in this part of our argument, the LLG will the specific issues identified above having regard to the evidence of their experts and the evidence elicited from Benga during cross-examination.

1. Selenium: Out of Pit Waste Rock Dumps

(a) Mine Design

88. Throughout Benga's testimony at the public hearing, Mr. Houston said many times that Benga has the advantage of being one of the first coal mines to be designed from the beginning to deal with the problem of selenium leachate.³⁴ The LLG submits that if that is indeed the case, that advantage has been squandered. Contrary to what Benga would have the Panel believe, the LLG submits the evidence is that Benga's mine design overpromises and underdelivers, as succinctly noted by Dr. McKenna.

89. In particular, the LLG submits that the evidence simply does not support Benga's assumptions of a 95% capture rate for selenium-enriched contact water and a 99% selenium attenuation rate. That being the case, the LLG submits it is highly unlikely it will be able to meet its proposed objective of 15 ug/L for selenium in receiving waters (Gold Creek and Blairmore Creek).

³⁴ CIAR #962, para. 320.

90. First, the LLG submits that the location and design of the out-of-pit waste rock disposal areas (which will be referred to herein as the “**ex pit RDAs**”) make it highly unlikely that Benga will be able to achieve its target 95% capture rate. Second, the LLG submits that Benga’s selenium treatment plan, the use of saturated backfill zones (“**SBZ**”), is poorly conceived, unproven in the field and almost certain to not achieve the aggressive attenuation rate being promised by Benga.
91. The LLG’s review and assessment of these issues was based on the evidence of Dr. Gord McKenna. Dr. McKenna prepared a report for the LLG, “Engineering review of the EIA design, operation, and reclamation plans for the proposed Grassy Mountain Coal Project”, which was filed as part of the LLG’s evidence.³⁵
92. Dr. McKenna is a geotechnical engineer and geologist with a PhD in Geological Engineering from the University of Alberta. Dr. McKenna has 33 years’ experience in the mining industry, including coal mines. His focus is mine waste management, tailings dam safety and landform design. He is the founder and chair of the Landform Design Institute and an Adjunct Professor of Civil Engineering at the University of Alberta. Notably, Dr. McKenna was a member of the Strategic Advisory Panel on Selenium Management (related to Teck’s Elk Valley coal mines).³⁶
93. The Panel heard from Dr. McKenna twice, during the fourth topic session on vegetation, reclamation and closure and the fifth topic session on water and selenium. As Dr. McKenna stated in both his appearances:

My goal is neither to promote or oppose the mine here but, instead, to provide the Panel my expert opinion to aid in their decision and recommendations.³⁷

³⁵ CIAR #552, pdf 3.

³⁶ *Ibid*, p. 38.

³⁷ CIAR #848, p. 3225.

94. The LLG submits that the Panel should accord significant weight to Dr. McKenna's evidence. Dr. McKenna was highly qualified to comment on issues related to Benga's mine design. He had no axe to grind but rather offered the Panel his considered and honest opinion on what he sees as significant shortcomings in the mine design. Dr. McKenna makes his living in the mining industry and clearly believes that large mines, including coal mines, can be designed, constructed and operated in a manner that protects the environment, in particular water. He just isn't convinced that Benga has achieved that with Grassy Mountain.
95. Even Benga was impressed with Dr. McKenna. When Mr. Youl was questioned in the fourth topic session (reclamation) about CIAR #871, a drawing Dr. McKenna prepared showing various concepts that be incorporated into the design of the ex pit RDAs to improve capture efficiency, he stated:

But a lot of the things that I've picked up on this slide, like run-on control, separating clean water, entering the edge of the dump from the toe drains -- now, that's part of our design -- and compacting the -- the waste rock into thinner layers, having a -- a higher level of compaction on the edge of the dump, all that stuff makes sense. So this is all about managing the selenium percolation issue at the source rather than just letting -- letting the toe drain do all the work for you. So it's -- it's all good stuff. [emphasis added]

(b) Ex Pit Rock Disposal Areas

96. The LLG submits that the evidence shows that in its mine design Benga paid insufficient attention to selenium source control, focusing instead on treating contact water (i.e., water loaded with selenium) after it has been created.

1. Location

97. In its written Hearing Submission, Benga asserted that its commitment to adopt "best industry practice" is illustrated by, among other things, the fact that it "chose to locate ex-pit waste rock storage on high ground to minimize quantities of contact water and facilitate

collection of this water for removal of selenium and other metals”.³⁸ With respect, this statement is simply not true. Far from locating the ex pit RDAs on “high ground”, Benga specifically located them in valley bottoms where they will sit atop watercourses, thereby creating contact water.

98. Benga’s mine design includes 3 ex pit RDAs: the South RDA, the Central RDA and the North RDA. The South RDA and Central RDA are adjacent to each, separated by an electric transmission line. The location of these RDAs can be seen on numerous of the maps contained in the EIA. The LLG would refer the Panel to Fig. B.8.3-1³⁹ and Fig. A.1.0-4⁴⁰ as these maps show the RDA locations superimposed over topographical maps. These maps clearly show:

- the South and Central RDAs are centred on the valley or saddle which separates Grassy Mountain to the north from Bluff Mountain to the south;
- the centre of the South RDA is a watercourse which flows north down the north side of Bluff Mountain;
- in the southern part of the Central RDA, a watercourse flows south into what will be the Raw Water Pond;
- in the eastern part of the Central RDA, a watercourse flows for a short distance east towards what will be the Southeast Surge Pond;
- in the southern part of the North RDA, a watercourse flows west towards what will be the Northwest Surge Pond;
- in the northern and western parts of the North RDA, a watercourse flows north, then west, then south towards what will be the Northwest Surge Pond; and

³⁸ CIAR #503, pdf 4-5.

³⁹ CIAR #42, Section B, pdf 127.

⁴⁰ CIAR #42, Section A, pdf 161.

- the creek valleys in the North RDA are steep and deeply incised, up to approximately 300 metres in depth.

99. During cross-examination by the LLG in the second topic session, Benga was asked how it could say, on the one hand, that it located the ex pit RDAs on high ground, when on the other hand its own maps clearly show that the RDAs have been intentionally located in creek valleys. This led to the following exchange with Mr. Houston:

So you have agreed with me, Mr. Houston, that the south and the central rock-disposal areas are centred over a saddle separating Bluff Mountain and Grassy Mountain; right?

A Yeah. And I think what's really important in terms of the location is to have a location that is not a collector, let's say, of significant drainage from other areas. So we're not -- not collecting water from higher up and having it drain down through the rock-disposal area.⁴¹ [emphasis added]

100. With respect, collecting water from higher up and having it drain down through the RDAs is exactly what Benga is doing.
101. With regard to the North RDA, Mr. Houston acknowledged that the steeply incised valleys in that location are going to get filled with waste rock.⁴² Further, the EIA itself, in Section A, states that the northern end of the North RDA “was designed to take advantage of two valley bottoms for rock disposal.”⁴³
102. Notwithstanding these blatantly obvious facts, Mr. Houston kept insisting that the RDAs have been located on high ground so as to avoid having water flowing through them.⁴⁴ He went so far as to suggest, with respect to the North RDA, that it is located on high ground because it is “higher [and] ... less convenient than putting the rock in Blairmore Creek.”⁴⁵

⁴¹ CIAR #793, p. 1845.

⁴² *Ibid.*, pp. 1846, 1848 and 1852-1853.

⁴³ CIAR #42, Section A, pdf 42.

⁴⁴ *Ibid.*

⁴⁵ CIAR #793, p. 1864.

Mr. Houston was asked: “if you dump waste rock overtop of a creek in the bottom of the valley, does [the] water in that creek become contact water?”⁴⁶ After three tries, Mr. Houston confirmed that it does.⁴⁷

103. The fact is, the ex pit RDAs were not sited on high ground to minimize the creation of contact water, they were located to take advantage of creek valleys and “to minimize sterilization of economic coal”.⁴⁸ Mr. Youl confirmed that the choice of ex pit RDA locations “was driven by the desire to have a pit as large as possible so as to maximize coal production while still leaving room for waste-rock disposal.”⁴⁹
104. The LLG understands that it is not uncommon to locate ex pit RDAs in valleys because it is easy to dump waste rock into valleys. That does not mean, however, that creek valleys are the best locations if you want to minimize the creation of contact water. They clearly are not. Further, the LLG submits that the Panel should be very concerned that Benga, in its effort to present a persuasive case on selenium control, would advance an argument (that the ex pit RDAs have been located on high ground to avoid creating contact water) that is obviously contrary to the facts.

2. *Design*

105. The LLG submits that it is evident that Benga has put minimal effort into the design of the ex pit RDAs. For example, Section C of the EIA states the RDAs “will be constructed in lifts from the bottom up measuring 20 m to 40 m in height.”⁵⁰ However, when questioned about this Mr. Youl seemed unaware that the EIA says that. Instead he suggested that the lift heights could range between 15 – 45 metres but stated: “So the exact lift size, we can’t be specific at this stage. It’s still a work in progress”.⁵¹

⁴⁶ *Ibid.*, p. 1858.

⁴⁷ *Ibid.*

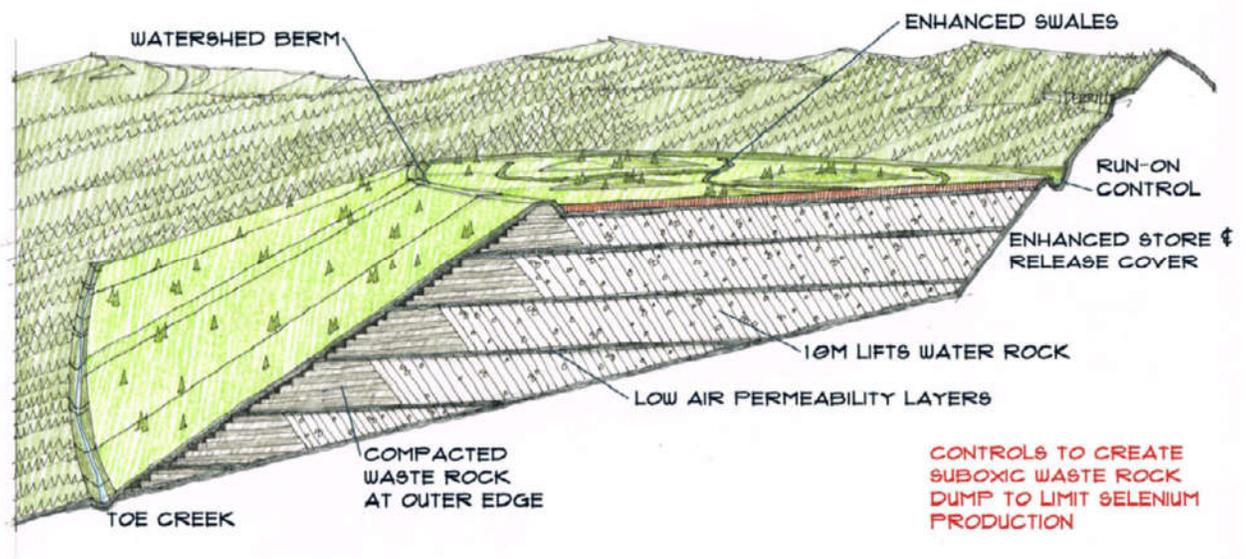
⁴⁸ CIAR #42, Section B, pdf 52 and CIAR #793, pp. 1860-1861.

⁴⁹ CIAR #793, pp. 1870-1871.

⁵⁰ CIAR #42, Section C, pdf 16

⁵¹ CIAR #793, p. 1865.

106. Beyond saying that they will be constructed in lifts, Benga's EIA says virtually nothing about ex-pit RDA design.
107. During the fifth topic session (on water and selenium), the LLG cross-examined Benga on a drawing prepared by Dr. McKenna titled "Controls to create suboxic waste rock dump to limit selenium production". This drawing was subsequently entered in evidence as CIAR #871. The Panel will recall that the drawing is of an ex pit RDA. It is reproduced below.



108. As explained by Dr. McKenna, this ex pit RDA design employs "multiple lines of defence". During his direct evidence in the fifth topic session (water and selenium), Dr. McKenna succinctly explained the various elements in the design, as follows:

Let me quickly show you how this works. And this is kind of starting from the upper right and working to the lower left. We keep the clean water clean by building run-on controls before the dump is constructed. We put on an engineered cover to limit the ingress of water and also oxygen through the top and through the slope. We install line[d] swales to keep the clean water clean or keep the clean water from percolating into the dump. We designed the topography into the waste rock dump plateau to carry the clean water to the ditches and off the landform and out to the receiving creeks. We put in a watershed berm along the outer edge of the dump to stop water from spilling over the crest and eroding the slopes and

exposing the waste and letting the oxygen in. We build up compacted rock at the outer edge of the dump, again, to limit oxygen ingress.

Benga is already planning a bottom-up construction with 20- to 40-metre lifts. These are for -- for good geotechnical reasons. But this lift thickness is probably too thick to be effective in limiting gas from moving around within the waste rock dump. If the lifts are too high, we end up seeing a chimney effect; oxidation of the rock causes heating of the gases, which causes them to rise, sucking in more air from the base. 5- to 10-metre lifts are more appropriate for this kind of a scheme here, but these might require building a rock drain in at the base of the dump to transmit the water. That would need to be in place before the rock fill can be placed on top of it.

Next we build the dump with a finer layer on each lift, which is shown on the picture. The finer layer holds moisture which limits the gases from moving between lifts. This approach to engineering waste rock dumps has been around a while, and we first started looking at it creating anoxic dumps 20 years ago...⁵² [emphasis added]

109. As noted by Dr. McKenna, this approach to engineering waste rock dumps is not new. Benga was asked whether its design for the ex pit RDAs incorporated any of these concepts. Mr. Houston responded by saying “absolutely we’re — we’re going to be looking at a lot of these ideas.”⁵³ In other words, Benga’s current design (to the extent there is one) for the ex-pit RDAs does not incorporate any of these concepts.
110. The LLG submits that it is apparent that Benga’s design of ex pit RDAs is generic and does not afford any basis for the Panel to conclude that Benga will be able to achieve its promised 95% capture efficiency.
111. In its Final Argument, Benga suggests that Dr. McKenna’s evidence should be accorded less weight because he is somehow self-interested, as founder and chair of the Landform Institute, in trying to advance the concept of landform design. With respect, this argument is both preposterous and insulting to Dr. McKenna. It is also hypocritical. When Mr. Youl

⁵² CIAR #907, pp. 5185-5186.

⁵³ CIAR #876, p. 3996.

was asked to comment on Dr. McKenna's drawing, he stated that the low permeability layers "is certainly an interesting idea" that Benga would look at. He continued:

There's an area of dump design that's evolving -- it's certainly evolving in Australia right now -- called a "geomorphic approach" where you're trying to establish a much more sustainable landform from the outset. So rather than just long slopes of -- of constant grade, creating some variability in that to help with the shedding of the water, but also to provide a more longer-term solution to erosion control and managing repeated storm events. So, yeah, this is all really interesting stuff. [emphasis added]

112. Clearly, there is not much difference between Mr. Youl's "geomorphic approach" and Dr. McKenna's "landform" approach. Mr. Youl, at least, appears to be well aware of the types of concepts advocated by Dr. McKenna for the design of the ex pit RDAs. Unfortunately, Benga's materials do not reflect any of this.

2. **Selenium: Saturated Backfill Zones**

113. Water management, especially the containment or attenuation of selenium, is an issue of great consequence for any mining project. It is also the weakest element of Benga's mine plan. Speaking for the LLG, Mr. Lawson highlighted the considerable concern over Benga's feeble plan to control selenium leachate:

Selenium, in particular, is an obvious and serious concern to residents, recreation and ecotourism interests, agriculture, and anyone else dependent on the Crowsnest and Oldman systems. That's over 1 million people across Alberta and beyond. We need only look across the border into British Columbia to see how elusive solutions for selenium capturing and treatment have been, notwithstanding many years and millions of dollars spent to find them. Yet we have here in this application rather bland assurances absent evidence to show that it can be effectively contained or treated in this environment and on the scale of the proposed mine. We are asked to simply believe.⁵⁴

⁵⁴ CIAR 786, p. 1587:3-16.

114. The plan we are asked to believe in has one principal element: the saturated backfill zone system (“**SBZ system**”). The Project relies on this novel technology to manage selenium as a major element of the overall mine plan, the environmental management plan, and it has a major impact on the mine’s feasibility.
115. Benga argued that it has several water management mitigation measures. However, in reality, those measures are all just features of the SBZ system. This is evident in their response to IR 5.1(a), which asked for any technically and economically feasible mitigation measures required to meet existing selenium guidelines. Four of the five measures in the response related to the SBZ and the last one was a last resort contingency measure.⁵⁵
116. Given this, the Panel should expect to see enough engineering and modeling to be able to evaluate the efficacy of such a system and understand its financial and environmental risks as well as the available remedial measures should its performance be less than promised. Given that this is a novel technology, the level of design and documentation should have been commensurately higher. Such a design might be expected to include:
- A groundwater model that demonstrates the flow paths within the saturated backfill, the residence time, and the expected attenuation of selenium over time. The model should include the impact of seepage through dikes, the impact of underground workings, and the proposed pit lake. The model should include a sensitivity analysis to deal with uncertainty in such things as geometry, material properties, and attenuation rates.
 - Designs of the in-pit dikes showing the material types and construction techniques, their ability to control seepage, and their geotechnical stability, and other issues related to dam safety.

⁵⁵ CIAR #251, pdf. 19.

- A characterization of the bedrock hydrogeology to show that fractures and faults, as well as the historical underground workings, do not present a significant risk of uncontrolled seepage which would affect the ability to create a large saturated zone.
- A design report with all of these elements that includes clear cross-sections and three-dimensional representation of the pits, underground workings, dykes, backfill areas, saturated areas, flow directions and velocities, expected injection mounds and drawdown cones.
- Calculations regarding the water balance including net percolation of water through the covers, losses to groundwater, losses to underground workings, the behavior of the injection of the contaminated water from the ex-pit waste rock dumps, and the extraction wells.

117. The LLG submits that Benga's submissions and evidence at the hearing showed that the EIA does not contain the above information and that Benga conducted overly simplistic preliminary assessments. Benga's SBZ system is so devoid of detail as to provide no basis for the Panel to make a public interest determination. Given the importance of selenium attenuation to the watershed of Alberta, Saskatchewan and Manitoba, the LLG submits that on this basis alone the Project should not be approved.

118. However, should the Panel approve the Project, the LLG recommends that approval be made conditional on Benga providing additional layers of mitigation independent of the SBZ system, including measures prior to treatment through the SBZ system. Pre-treatment has not been seriously contemplated,⁵⁶ even though Benga's own expert, Mr. Jensen, explained that Benga could produce reducing conditions at the base of the south dump pre-treatment, which would have the effect of reducing the load of selenium .⁵⁷ The LLG also recommends that approval be conditional on Benga providing a detailed engineering

⁵⁶ CIAR #881, pp. 4318:18-26, 4319:1.

⁵⁷ CIAR #881, pp. 4317:24-26, 4318:1-11.

evaluation and feasibility studies from scaled-up field tests or pilot projects of the SBZ System.

(a) Overview of the SBZ System

119. The SBZ system is intended to treat the contact water that has percolated through the waste rock in the rock disposal areas. Benga's SBZ system consists of a mine pit backfilled with waste rock and saturated with contact water to make the water anoxic or suboxic.⁵⁸ In the absence of oxygen, selenium in the contact water held inside the SBZ is supposed to drop out of the solution.⁵⁹ The treated water from the SBZ will then be drained and discharged into Blairmore Creek with few or no intermediate steps.
120. Benga assumed, without testing, that the SBZ system would attenuate 99% of the selenium in the contact water, or reduce it to 15 ug/L, which is considerably higher than the provincial guideline of 2 ug/L.
121. The proposed system at end-of-mine will feature three saturated zones, which together form the complete SBZ system. The first zone, **SZ1465**, will be located at the south end of the mine, close to Blairmore Creek, and will be built over the first 9 years of mining. It will also feature the single dewatering well serving the entire system.⁶⁰ The second zone, **SZ1636**, will be in the northwest area. The third and last zone to be built will be **SZ1700** at the northeast end, separated from the end-pit lake by a thin wedge of undisturbed rock.⁶¹ For a drawing of the entire SBZ concept, see Figure C.5.3-5.⁶²
122. Each zone will have a maximum elevation. For example, SZ1465 will be capped at 1,465 meters. The maximum elevation of the saturated zones is the alleged limit of the subsurface

⁵⁸ CIAR #42, Section C, pdf. 101, 104.

⁵⁹ CIAR #313, pdf. 232.

⁶⁰ CIAR 42, Section C, pdf. 104, Section C.5.3.4.2.

⁶¹ Figure C.5.3-7, CIAR #42, Section C, pdf. 253.

⁶² Figure C.5.3-5 CIAR #42, Section C, pdf. 251.

water, not the highest point of the in-pit backfill.⁶³ As a result, waste rock other than what is dumped in the rock disposal areas will also sit atop the saturated zones and be exposed to oxygen and oxidation.

123. SZ1465 will be constructed in a series of phases so that Benga can continue mining to the north of the zone. In that period, the only thing standing between the saturated backfill and the actively mined pit will be dikes constructed of compacted waste rock.⁶⁴

(b) Features of the SBZ

124. In order for the SBZ to successfully attenuate any selenium, Benga must construct an SBZ system in which all of the following features work in synchronicity.
125. Benga must capture 95% of the contact water at the toe of the out-of-pit rock disposal areas (“RDAs”), while surge ponds and a raw water pond (“RWP”) hold contact water pre-treatment. Contact water must reach the sub-oxic zones as it flows through the SBZ system, while the pit floor and walls must hold water to prevent it from reaching the watershed and ensure the necessary retention time to create the bioreaction needed to remove selenium. The sub-oxic zones must be encouraged through a carefully calibrated and monitored carbon injection program.⁶⁵ Also, cover soil from the reclamation program must limit oxygen and oxygen-rich water from percolating into the saturated zone, and Benga must carefully monitoring of the effluent, the water in the watershed, and the sub-oxic zones.

(c) No Evidence of the Efficacy of the SBZ

126. During the SIR process, ECCC noted a high level of uncertainty with Benga’s plan. The elements that introduced uncertainty were “the exposure of waste rock to air, location of the effluent pipe, variability of the feed concentrations, retention time, and proliferation of micro-organisms.”⁶⁶ Furthermore, despite Benga’s responses to multiple information

⁶³ Figure C.5.3-6, CIAR #42, Section C, pdf. 252.

⁶⁴ CIAR #42, Section C, pdf. 105.

⁶⁵ CIAR #42, Section C, pdf. 101.

⁶⁶ CIAR #283, pdf. 14.

requests, ECCC still has no confidence that the SBZ system alone will prevent the release of harmful amounts of selenium into the environment.⁶⁷

127. Benga acknowledged that a detailed engineering evaluation is needed to determine the feasibility of the proposed measures,⁶⁸ yet admitted that one has not been conducted.⁶⁹ Instead, Benga is asking the Panel to rely on the results of its barrel and column tests, as well as using Teck Coal as the closest analog.⁷⁰ Furthermore, Benga is well aware metal leaching is a long-term issue with mining.⁷¹ yet failed to show how the SBZ system would be self-sustaining post-closure.⁷²

(d) No Evidence the SBZ will Attenuate 99% Selenium

128. Benga assumed the SBZ system would achieve 99% attenuation.⁷³ Benga provided no evidence this would be possible. The closest comparator to Benga's SBZ is Teck's Elk Valley saturated rockfill ("SRF") system, and the evidence shows the SRF has only attenuated approximately 90%.⁷⁴ Benga admitted there is no information on record to substantiate their confidence in the SBZ's attenuation rate.⁷⁵ These concerns were raised during the SIR process, yet Benga refused to provide supporting evidence on the efficacy of its SBZ system.⁷⁶ As a result, Benga's bare assertions should be given no weight by the Panel.

⁶⁷ CIAR #347, pdf. 4.

⁶⁸ CIAR #876, p. 3944:7-12

⁶⁹ CIAR #876, p. 3947:5-11.

⁷⁰ CIAR #876, p. 3946:16-25.

⁷¹ CIAR #884, p. 4488:8-14.

⁷² CIAR #884, pp. 4507:19-26, 4508:1-7.

⁷³ CIAR #42, Appendix 10, pdf. 233.

⁷⁴ CIAR #881, p. 4353:926.

⁷⁵ CIAR #881, p. 4357:1-7

⁷⁶ CIAR #283, p. 11.

129. In fact, the evidence indicates the opposite of what Benga claims. ECCC noted that the best Benga was able to achieve in its barrel tests was 90% attenuation under “optimal conditions”.⁷⁷ At 90%, the selenium concentration in the effluent would be 150 ug/L, which after dilution in Blairmore Creek would be approximately 70 ug/L—almost five times greater than Benga’s proposed standard of 15 ug/L and 35 times the provincial guideline of 2 ug/L.⁷⁸
130. Benga’s expert also admitted that the barrel and column tests were not a reliable comparator to the SBZ system.⁷⁹ Furthermore, Benga’s estimates of selenium concentration in the influent were based on averages and not reasonable worst case scenarios.⁸⁰ As such, they are not conservative assessments.
131. At the hearing, Benga tried to change its position and say that 99% attenuation was not what they meant all along. Mr. Houston said “If I had to go back and rewrite this, I – I think I – I would because what’s important about the saturated zone is – is what it’s able to achieve in terms of effluent quality, and – and that’s the 15 micrograms per litre...”⁸¹ Later, Benga again changed its position again and said they had two limits: the 99 percent and the 15 micrograms per litre.⁸² Benga’s ever-changing selenium attenuation target is consistent in one aspect only: it is an assumption without evidence that it can be achieved.

(e) The target of 15 ug/L or 99 percent is convenient, not protective

132. The LLG submits Benga chose 99% attenuation or 15 ug/L not because it was protective of the environment, but because it is more convenient and less expensive to achieve than the provincial or federal guidelines. Benga’s own expert, Mr. Jensen, said he felt

⁷⁷ CIAR #167, p. 13.

⁷⁸ CIAR #167, pdf. 13

⁷⁹ CIAR #881, p. 4346:15-20.

⁸⁰ CIAR #881, p. 4314:12-23.

⁸¹ CIAR #876, p. 3938:9-24.

⁸² CIAR #881, p. 4302:3-14.

“comfortable” reaching 15 ug/L.⁸³ A target of 5 ug/L or lower, however, would require additional mitigation measures.⁸⁴ Additional measures would be costly, and Benga preferred the SBZ over other methods because of the lower cost, not because it was more protective.⁸⁵

133. Taken together, it is clear Benga is attempting to keep costs low at the expense of the environment. It is (or should be) aware the SBZ system alone cannot achieve the provincial or federal guidelines and would need to invest in additional mitigation systems that are independent of the SBZ. When Benga was challenged on the reasonableness of the 99% target, it changed its position to promote an easier to achieve target of 15 ug/L, even though there is no evidence it can achieve even that.

134. The LLG submits that the federal and provincial guidelines are protective of the environment and adhere to the precautionary principle. Benga should not be allowed to pollute Blairmore and Gold Creek, and by extension the Crowsnest River with a selenium loading that is neither recommended nor achievable by the SBZ system.

(f) No Evidence Benga’s SBZ will Compare to Teck’s SRF

135. Benga attempted to argue that the technology of the SBZ system is nothing new, and implausibly claimed that it is identical to the process used in mechanical water management plants as ABMet, which is a highly controlled, active water treatment plant, monitored in real time.⁸⁶ At the hearing Benga admitted mechanical systems are not a good basis to predict the performance of the SBZ system.⁸⁷ Other case studies presented by Benga are equally unhelpful and described by Mr. Jensen as nothing more than “circumstantial evidence”.⁸⁸

⁸³ CIAR #881, p. 4311:1-15

⁸⁴ *Ibid.*

⁸⁵ CIAR #876, p. 3925:10-16.

⁸⁶ CIAR# 313, pdf. 232.

⁸⁷ CIAR #881, pp. 4343:25-26, 4344:1-3 and 10-19.

⁸⁸ CIAR #881, p. 4352:1-10.

136. The only case study available to the Panel is Teck's SRF. Benga submitted Teck's Elk Valley Water Quality Plan ("EVWQP") as part of Addendum 11.⁸⁹ It is worth highlighting how Teck's plan is different from what Benga is proposing.
137. Teck was ordered by the Government of British Columbia to develop the plan after monitoring results showed the Elk Valley mines impacted water quality.⁹⁰ The EVWQP has specific targets for selenium and other contaminants⁹¹ and many commitments were made legal requirements as well.⁹² Teck's failure at the West Line Creek resulted in a major fine against Teck.⁹³
138. Teck has had a specific SRF research and development team since 2012⁹⁴, which conducted Failure Modes and Effects Analysis to identify risks associated with the SRF technology. That information was used to "guide laboratory and field studies to evaluate those risks", even before Teck executed a pilot SRF trial.⁹⁵ Teck has spent hundreds of millions of dollars on the management of selenium, more than the projected total capital expenditure at Grassy Mountain.⁹⁶ Teck has also been advancing its work on the study of the Gravel Bed Reactor ("GRB").⁹⁷
139. In short, Teck extensively studied how to implement the technology in the Elk Valley. Further, Teck continues to actively study and pursue other technologies to provide added layers of mitigation. To be clear, however, Teck was forced to do this by the regulator in B.C. because of the effects its activities were having on the Elk Valley watershed.

⁸⁹ CIAR #313, p. 1038.

⁹⁰ CIAR #313, p. 1052.

⁹¹ CIAR #313, p. 1061.

⁹² CIAR #313, p. 1053.

⁹³ CIAR #876, p. 4006:4-11.

⁹⁴ CIAR #313, pdf. 1021

⁹⁵ *Ibid.*

⁹⁶ CIAR #876, p. 4003:21-25.

⁹⁷ CIAR #313, p. 1023.

140. For all its boasting that the SBZ system will be better,⁹⁸ Benga has not done a fraction of the work that Teck has done and cannot claim with any degree of certainty that its SBZ system will compare favourably to Teck's SRF. Benga is relying on overly simplistic tests and has not performed a detailed engineering evaluation of the SBZ system nor considered implementing other measures.
141. The LLG submits that rather than take Benga's bald assurances on the effectiveness of the SBZ at face value, the Panel must instead view the overwhelming evidence of Teck's experience and apply the precautionary principle. If Teck – a highly experienced and highly capitalized company with numerous assets in Canada – has taught us anything, it is that selenium control is expensive, uncertain, and to be successful requires at a minimum clear goals and ongoing, long-term commitments backed by legally-binding conditions. Otherwise, the watershed in the Crowsnest Pass, and the other water systems connected to it, may experience the collapse of not just the SARA-listed Westlope Cutthroat Trout population, but entire fisheries.

(g) The SBZ System is Poorly Designed and Poses Grave Risk

142. Benga stated that “[t]he key to the attenuation process is the formation of sub-oxic conditions.”⁹⁹ The long-term success of the SBZ system depends on maintaining the water level in the SBZ which would keep acid and selenium generating rock in a submerged situation.¹⁰⁰ Keeping the waste rock saturated and fed with organic material to encourage the reducing environment is the only way the SBZ system will attenuate selenium.¹⁰¹
143. Benga's submissions and evidence at the hearing show they cannot demonstrate the SBZ system will create or maintain sub-oxic conditions. First, the SBZ will not be designed to ensure water flows through the SBZs as intended. Second, the SBZ, which needs to hold contact water, will leak from several areas. Third, Benga's carbon feed program will be

⁹⁸ CIAR #881, pp. 4369:17-26, 4370:1-2.

⁹⁹ CIAR #313, pdf. 232.

¹⁰⁰ CIAR 881, pp. 4247:23-26, 4248:1-8.

¹⁰¹ CIAR 881, pp. 4345: 4345:1-15.

ineffective and unsustainable. Fourth, Benga's reclamation cover program will fail to reduce net percolation into the SBZ system, risking increased levels of oxygen infiltration.

(h) In-Pit Design will Create Several Preferential Water Pathways

144. Contact water is pumped from the RWP into the last saturated zone to come online. Water is meant to flow through the SBZ system as it is built until the whole system comes online, at which point it is meant to flow through all three zones, from highest to lowest.¹⁰² Once pumped into the SBZ it will somehow find its way to the dewatering well at the bottom of SZ1465.¹⁰³ Benga's assumes that the water will flow only one way, "downhill from this [end-pit] point all the way to the south part of the mine."¹⁰⁴
145. As noted by Dr. McKenna, there are significant concerns with water flows inside the SBZ system. For example, water is supposed to flow between zones without engineered tunnels or channels, and Benga did not show how water will seep through suitable waste rock as predicted rather than seek preferential pathways.¹⁰⁵
146. Benga does not understand how water inside the SBZ will reach its intended destination without seeking preferential pathways. According to Benga's expert, Ms. Grainger, water flow depends on how the rocks are placed. It may "move faster locally where there's larger pore spaces and better connectivity, but where there are smaller particles, they're going to move more slowly."¹⁰⁶ Benga also stated that they would design the SBZ to ensure there's good porosity throughout.¹⁰⁷
147. With respect, Benga's own evidence shows their plan will not achieve the intended porosity. Benga's plan is to simply dump the waste rocks from 50 to 100 meters above the

¹⁰² CIAR #42, Section C, pdf. 247-251.

¹⁰³ CIAR #876, p. 3980:13-21.

¹⁰⁴ CIAR #876, p. 3989:5-14.

¹⁰⁵ CIAR #42, Section C, pdf. 250.

¹⁰⁶ CIAR #876, p. 3970:2-9.

¹⁰⁷ CIAR #876, p. 3982:8-9

base of the pit.¹⁰⁸ Mr. Youl admitted that Benga will do nothing to ensure the waste rock has a more uniform size,¹⁰⁹ and the rock distribution would include small and large rocks.¹¹⁰ Mr. Youl noted that larger particles will roll to the base and smaller ones down the slope, creating a chevron pattern: parallel slices at an angle.¹¹¹ Essentially, the dumping of rock will create uneven pore spaces in a layered pattern, creating barriers where water will seek paths of less resistance.

148. There will be other barriers preventing water from flowing as intended. A cross-section of SZ1465 shows the base of the pit is not a constant downgradient and features three in-pit dikes before the dewatering well.¹¹² Dr. McKenna noted that this figure alone shows that water may take several preferential pathways, such as water flowing over the dikes and short-circuiting to the dewatering well. Dr. McKenna further commented that Benga failed to demonstrate that preferential pathways would not be an issue.¹¹³
149. As with much of Benga's conceptual design, Benga simply assumed water would flow all the way to the dewatering well. They did not develop a groundwater model or conduct any studies to support their assumption.¹¹⁴ Water short-circuiting to the nearest exit is not the only concern with the in-pit design. Benga also admitted that water in the SBZs may sink to the bottom, forming stagnant areas, and remain there for decades.¹¹⁵ Benga's SBZ system, therefore, presents the reasonable scenario in which contact water will seek preferential pathways, while water in the sub-oxic zones will remain pooled in place. Thus, water may be discharged that has been only partially treated.

¹⁰⁸ CIAR #876, pp. 3982:21-26, 3983:1-14.

¹⁰⁹ CIAR #876, pp. 3962:14-26 and 3973:24-26, 3974:1-3.

¹¹⁰ CIAR# 876, p. 3974:10-16.

¹¹¹ CIAR #876, p. 3984:1-21 and CIAR 881, p. 4385:5-14.

¹¹² CIAR #42, Section C, pdf. 252.

¹¹³ CIAR #907, pp. 5196:1-26, 5197:1.

¹¹⁴ CIAR #876, p. 3981:12-26.

¹¹⁵ CIAR #876, p. 3981:6-10.

150. Dr. McKenna noted that one of his concerns with the SBZ system is that it was too much like a “leaky bathtub”.¹¹⁶ A simplified drawing of Teck’s SRF – submitted by Benga – shows that the system is like a bathtub, holding waste rock and water in a sub-oxic zone for the required time before it is pumped out and discharged.¹¹⁷ Benga did not demonstrate how the well / pumping system would work or the long-term functioning of the dewatering well after closure.
151. There are three design flaws that suggest Benga’s bathtub will leak: (1) leakage through the in-pit dikes; (2) leakage through the underground workings; and (3) seepage through groundwater flows.

(i) The In-Pit Dikes

152. By the end-of-mine, SZ1465 will have been operating for 20 years, yet it is the zone with the highest risk of leaking. Benga plans to build SZ1465 while actively mining in the same pit,¹¹⁸ using dikes for which there has been no design update since 2016.¹¹⁹ Nor will Benga provide any before approval.¹²⁰ The dikes are meant to get the SBZ operating early because Benga recognizes there is a timing constraint.¹²¹ Benga will also have active mining below the dikes to the north.¹²²
153. The dikes, therefore, are high-consequence structures, both holding the contact water inside the SBZ and providing protection to crews working on the other side. The LLG submits that the dikes are a fatal flaw in the SBZ system. It is unclear whether they will be stable enough to allow safe mining downstream in the pit, or whether seepage rates through the

¹¹⁶ CIAR #907, p. 5197:2-6.

¹¹⁷ CIAR #313, p. 1042.

¹¹⁸ CIAR #42, Section C, p. 247-249 and CIAR# 876, p. 3958:4-7.

¹¹⁹ CIAR #876, p. 3961:3-9.

¹²⁰ CIAR #42, Section C, p. 105.

¹²¹ CIAR #876, pp. 3957:22-26, 3958:1-3.

¹²² CIAR #876, pp. 3959:22-26, 3960:1-4.

dikes can be managed adequately to ensure the saturated zone has the required integrity to act as a bathtub.

154. The dikes will not be constructed of low permeability materials, but rather will consist of compacted fill.¹²³ Benga plans to use the same waste rock compressed with bulldozers.¹²⁴ When Benga was asked if it wasn't preferable to build the dikes with low-permeability materials, Benga insisted they would not.¹²⁵ Benga accepts the dikes will have leakage,¹²⁶ but due to a lack of design, Benga cannot demonstrate whether or how this leakage might affect the saturated zone.

(j) SZ1465 Sits Atop old Underground Works

155. Benga designed SZ1465 to sit atop old, abandoned underground mine works.¹²⁷ Partially treated water may leak through the historic underground mine workings and result in a very small and ineffective saturated zone volume and uncontrolled discharge.
156. Figure C.5.3-6 shows that the underground works will be on the south wall of SZ1465 and extend for 350 meter at the base of the saturated zone and below two of the in-pit dikes.¹²⁸ Benga has not addressed water flowing under the dikes and out into the active mining pit.
157. Mr. Houston admitted water currently seeps from the old workings, and claimed they were monitoring it.¹²⁹ The potential for more substantial leakage with a fully flooded saturated zone on top of these tunnels is significant and potentially catastrophic.

¹²³ CIAR #876, p. 3962:8-13.

¹²⁴ *Ibid*, p. 3962:14-20.

¹²⁵ *Ibid*, p. 3963:10-15.

¹²⁶ *Ibid*, p. 3963:20-23.

¹²⁷ *Ibid*, p. 3965:12-16.

¹²⁸ CIAR #42, Section C, pdf. 252.

¹²⁹ CIAR #884, p. 4610:11-16.

158. Since submitting its EIA, Benga has known about this leak, yet they still do not know the extent of the underground tunnels. At the hearing, Mr. Youl said they had a rough estimate of 10 portals, but that there could be more.¹³⁰ Each portal is estimated to be 10 feet by 10 feet.¹³¹ The size of these tunnels is based on anecdotal evidence from “the old timers who worked in the area and third-party knowledge talking about how they actually mined in those days.”¹³²
159. Benga said it has historical maps that were correlated with drilling and ground-penetrating radar.¹³³ However, Mr. Youl admitted the ground-penetrating radar was not used to locate the tunnels, only that it provided some ‘interesting’ information about the underground works.¹³⁴ The historical maps and the ‘interesting’ information, of course, were never submitted as evidence before this Panel. When Mr. Fitch pressed Benga on whether they had done a specific assessment of the location of the underground works, the best Benga could offer is a reference to ‘risk workshops’ and ‘experts in the field’ to plan mitigation.¹³⁵ The findings of these workshops and experts were not submitted as evidence before this Panel either.
160. During the SIR process Benga never addressed leakage from the underground works, and at the hearing they suggested they would seal them with compacted material and grout.¹³⁶ The compacted earth would be of the same material as the dikes, though, “sized to get it right.”¹³⁷

¹³⁰ CIAR #876, p. 4016:13-18.

¹³¹ CIAR #876, p. 3972:1-2

¹³² CIAR #876, pp. 4016:19-26, 4017:1-2.

¹³³ CIAR #876, p. 3966:22-26.

¹³⁴ CIAR #884, pp. 4526:23-26, 4527:1-5.

¹³⁵ CIAR #876, p. 3967:5-13.

¹³⁶ CIAR #876, p. 3970:6-19.

¹³⁷ CIAR #876, p. 3970:23-24.

161. Benga's plan for sealing the tunnels is not just speculative, it is downright dangerous. Benga knows the water pressure on these seals could be approximately 100 meters of water column of pressure,¹³⁸ though the exact amount is not really known because Benga did not assess it. Mr. Houston conceded that an all out failure of a plug would equate to a hole on the side of the SBZ, and would likely seep along the wall of the plug.¹³⁹ Furthermore, these potential plugs have not been costed,¹⁴⁰ so the Panel cannot assess whether Benga has properly budgeted for the expense of using grout to plug several 10 feet by 10 feet holes.
162. The location of SZ1465 is a fatal flaw compounding the problems created by the dikes. As a result, the evidence strongly suggests that SZ1465 will leak from the north face through the dikes, and from the bottom and the south wall through the underground works.

(k) Unknown Groundwater Flows

163. Water will also seep via underground flows. Mr. Houston admitted Benga has not conducted exhaustive geotechnical investigations.¹⁴¹ In fact, Benga does not have information about how much base-flow recharge was occurring along Blairmore and Gold Creek.¹⁴² This is one of the single most important issues for the whole site – the rate of base flow to the creeks should have been top of mind. Given the deficiency of information regarding the soil and bedrock beneath the mine pit, Benga is not asking the Panel to trust evidence, but to trust in some future regulation that is not in evidence.¹⁴³
164. During the SIR process, Canada noted that Benga's hydrogeologic assessment and groundwater modelling left a high level of uncertainty.¹⁴⁴ In answer to IR 6.12, Benga

¹³⁸ CIAR #876, pp. 4018:25-26, 4019:1-4.

¹³⁹ CIAR #884, p. 4609:11-17.

¹⁴⁰ CIAR #876, p. 4020:6-13.

¹⁴¹ CIAR #854, pp . 3502:24-26, 3503:1-10.

¹⁴² CIAR #854, p. 3592:5-13.

¹⁴³ CIAR #854, p. 3511:6-25

¹⁴⁴ CIAR #891, p. 4639:15-20.

suggested using cement and grout on identified fractures.¹⁴⁵ When asked whether Benga had any examples of grout being a valid technique in mining, Benga could not provide any.¹⁴⁶

(l) Water Flow and Water Containment are Imperative

165. The LLG submits that Benga cannot leave the issues of water flow and containment to some future plan, but rather must address the dikes, the underground works and the groundwater flows prior to construction. Other features of Benga's plan – such as reclamation, carbon feeding, and monitoring – intersect with these significant deficiencies.
166. An ineffective reclamation program will compound other SBZ flaws. This is because the flow of concentration loadings from waste rock are supposed to decrease as the waste rock disposal areas are reclaimed.¹⁴⁷ The reclamation program is supposed to provide cover over the backfill to reduce the amount of contact water coming out of the waste rock.
167. Benga knows oxygen will seep into the system. At the hearing, they admitted that they expect oxygen to infiltrate through snow melt and rainfall, but claimed the amount will be minimal and easily consumed because the covers would be effective.¹⁴⁸ Then, Mr. Houston clarified that the only cover they would place atop the backfill is the 20 cm of topsoil and revegetation.¹⁴⁹
168. As noted elsewhere in these submissions, Benga's reclamation program is inadequate, and considering its pivotal role in the SBZ system, it threatens to undermine the creation of sub-oxic conditions. Dr. McKenna explained:

The other way where the mines had a lot of difficulty previously was cracking due to settlement in that, so you can get an open

¹⁴⁵ CIAR #313, pdf. 176.

¹⁴⁶ CIAR #884, p. 4529:3-26.

¹⁴⁷ CIAR# 42, Appendix 10, pdf. 254.

¹⁴⁸ CIAR #881, pp. 4251:1-26, 4252:1-11.

¹⁴⁹ CIAR #881, p. 4552:12-23.

crack that – that goes all the way through your – your cover, and then that becomes a conduit for – for water, and we expect a certain amount of that.¹⁵⁰

169. The reclaimed soil will likely crack allowing air and oxygenated water into the saturated zone. This is because Benga has proposed a highly simplistic method of topsoil reclamation which proposed an average topsoil depth of 20 cm, based on a simple volumetric calculation.¹⁵¹ Even Benga's closest analog, Teck, determined – based on studies – that soil covers from store-and-release covers are not enough on their own and require additional design elements to further reduce net percolation.¹⁵² Without a highly engineered cover, Benga's cover will allow oxygen to flow freely into the SBZs.
170. Benga's accelerated rate for reclamation, as designed, may in fact be a detriment in this regard. Benga plans to begin reclamation by year 1, with the first mined area to be reclaimed in year 2.¹⁵³ Selenium builds up over time, however. By the time selenium becomes a problem, the pit floor of SZ1465 will be buried under 100 to 260 meters of in-pit backfill,¹⁵⁴ and presumably portions of it will have been reclaimed. Benga will not be able to go back and seal fractures or tunnels. By then, even a GRB or treatment plant would not be able to mitigate water seeping through an unknown number of pathways.
171. Another key feature of the SBZ system is the carbon feed. Unfortunately, Benga provided no evidence supporting that the carbon feed system will be effective and sustainable. In fact, Benga admitted that it does not have a clear plan for this essential feature of the SBZ system: it does not even know how many inlet wells or how much methanol it needs.¹⁵⁵

¹⁵⁰ CIAR #907, p. 5229: 17-22.

¹⁵¹ CIAR #835, pp. 2793:9-26, 2794:1-13.

¹⁵² CIAR #313, p. 1015.

¹⁵³ CIAR #42, Section F, pdf. 38-40.

¹⁵⁴ See Figure C.5.3-6, CIAR #42, Section C, p. 252 for the height of the in-pit backfill.

¹⁵⁵ CIAR #876, p. 3947:5-10.

172. This key feature should not be left to some unknown detailed design. A failure of the carbon feed will result in large volumes of untreated contact water. Mr. Bowles, expert witness for CPAWS, explained that the carbon feed may be hindered by problems such as the permeability of the in-pit rock and preferential flow paths.¹⁵⁶ Furthermore, there exists the potential of biofouling.¹⁵⁷
173. This creates the potential scenario that the perfect sub-oxic conditions may be limited to an area immediately surrounding the injection of the carbon feed.
174. There is also a potential for too much carbon feed. At the hearing, Benga agreed that feeding too much methanol could be detrimental and could produce sulfide or start to solubilize selenium again.¹⁵⁸ Thus, Benga's poorly designed system could both leave large volumes of water untreated and overdose the immediate area of injection.
175. Benga's monitoring plan is inadequate. Benga stated that the location of its monitoring wells is to be determined and based on future investigations.¹⁵⁹ Benga's expert described it as "quite high level".¹⁶⁰ It lacks the information needed to update the site-specific water quality objective.¹⁶¹ The plan also lacks something as critical as monitoring of the flow rates from various ponds, including the selenium rich surge ponds.¹⁶²
176. Given that Benga has assumed water will behave in a certain way inside the system, the concern is that Benga's monitoring plan will be simplistic and miss unidentified leakages and pathways. By the time that Benga realizes there is selenium build-up, there could be a

¹⁵⁶ *Ibid.*

¹⁵⁷ *Ibid.*

¹⁵⁸ CIAR #881, pp. 4383:22-26, 4384:1-4.

¹⁵⁹ CIAR #854, p. 3583:7-21.

¹⁶⁰ CIAR #884, p. 4453:13-26.

¹⁶¹ CIAR #884, p. 4454:16-22.

¹⁶² CIAR #881, p. 4204:16-23.

number of different sources of the problem, many of which will be buried under waste rock.

(m) Flowback into the End-pit Lake

177. Benga did not adequately consider the interaction between the SBZ and the end-pit lake. Benga plans to have the end-pit lake decant into the SZ1700 if the level of water in the end-pit lake goes above the planned elevation of 1,700 m.¹⁶³ However, it is also reasonable to think that the water will decant from the SBZ to the lake.
178. Water decanting from the SBZ to the end-pit lake is likely to be untreated. The end-pit lake has ecologic functions that would be impaired by elevated selenium levels and the lake is already expected to feed Gold Creek through underground runoff.¹⁶⁴ In fact, Benga has modelled some amount of leakage, which could reach Gold Creek in as little as a year.¹⁶⁵ Benga assumed that water in the SBZ will not flow into the end-pit lake because it is expected to flow slowly downhill toward SZ1465.¹⁶⁶ However, as has become evident, this is not a reliable assumption – water doesn't flow downhill, it flows down gradient – if the water level in the lake is lower than that in the waste rock, the seepage flow direction will be towards the lake.
179. In response to these concerns, Benga said it would manage how quickly the end-pit lake will be filled.¹⁶⁷ Of course, Benga was not able to say how it would manage this process.¹⁶⁸

(n) Benga is Consciously Waiting for Selenium Levels to Rise

180. Benga claimed it has designed the Project to manage selenium. It asserted that “[a]s one of the first mines to be designed from the beginning to deal with this problem, the Grassy

¹⁶³ CIAR #876, pp. 3988:10-26, 3989:1-4.

¹⁶⁴ CIAR #876, p. 3991:11-26.

¹⁶⁵ CIAR #876, p. 3992:1-12 and CIAR 884, p. 4514:13-24.

¹⁶⁶ CIAR #876, p. 4024:9-15.

¹⁶⁷ CIAR #876, pp. 4024:25-26, 4025:1-13.

¹⁶⁸ CIAR #876, pp. 4025:19-26, 4026:1-11.

Mountain Project has a tremendous advantage over existing operations.”¹⁶⁹ On closer inspection, it is clear Benga is counting on the slow build up of selenium to postpone meaningful treatment of the contact water.

1. *Selenium Contamination is Expected*

181. Benga expects selenium levels to be high if its assumptions are wrong. In response to IR 6.25, Benga found that at attenuation rates of 90% and 95%, “the resulting concentrations of selenium in Blairmore Creek are unacceptable at 70 ug/L and 35 ug/L, respectively.”¹⁷⁰ Benga qualified this finding by stating that even at 90% attenuation, selenium levels are not forecast to exceed 10 ug/L until 10 years *after* the start of operation.¹⁷¹ Benga also expects selenium in Blairmore Creek to exceed the site-specific objective in year 10 if attenuation is only 90%.¹⁷²
182. Similarly, if the capture rate is not 95% but rather 90% or 80%, selenium concentration in Blairmore would spike.¹⁷³ Again, Benga qualified this answer by saying that even at the reduced capture rates selenium will not exceed 10 ug/L for the first 10 years, giving Benga time to monitor and remediate.¹⁷⁴
183. The LLG submits that this is an unconscionable and perilous way of conducting water management. It is undisputed that the SBZ system cannot achieve 99% attenuation. Also, the SBZ system is plagued by serious flaws that risk loading the creeks with selenium sooner and at greater levels than predicted. DFO noted that there was significant risk in

¹⁶⁹ CIAR #962, para. 320.

¹⁷⁰ CIAR #313, pdf. 251.

¹⁷¹ *Ibid.*

¹⁷² CIAR #313, pdf. 254.

¹⁷³ CIAR #313, pdf. 335-336.

¹⁷⁴ CIAR #313, pdf. 252.

taking this wait-and-see approach.¹⁷⁵ ECCC described the selenium issue as a time bomb with its effects felt much later.¹⁷⁶ By the time they are felt, it will be too late.

184. If the mine proves uneconomical, in year 10 Benga may no longer be operating, leaving the foreseeable rise of selenium in the lap of the public. At the hearing, Benga admitted it provided a preliminary post-closure cost estimate that was a broad number “based on judgment”, not on the need to operate specific pieces of equipment.”¹⁷⁷ The example of Teck shows selenium control is expensive. A reliance on the slow build up of selenium permits Benga to dodge the responsibility to implement at the front end costly mitigation methods such as a GRB or a fluidized bed reactor.¹⁷⁸

2. *There is no Trigger Point for Contingencies and Contingencies are Inadequate*

185. At the hearing, Benga said they would monitor for trends before implementing the GBR as a contingency.¹⁷⁹ The first problem with this approach is that, as noted earlier, Benga’s monitoring plan is draft and lacks detail. The second problem is that Benga has not identified any triggers that would prompt it to construct additional infrastructure.¹⁸⁰ This is true both for the treatment of selenium and the treatment of other metals in the water such as arsenic.¹⁸¹
186. Benga’s approach to off-spec water will be to recycle water through the SBZ system and adjust the SBZ treatment process by changing operational parameters such as points of injections, carbon input, and amount of carbon input/oxygen content.¹⁸² Notably, Benga’s ‘engineering adjustments’ all relate to the carbon feed, the only feature it is able to control

¹⁷⁵ CIAR #891, p. 4642:11-25.

¹⁷⁶ CIAR #891, p. 4656:7-15.

¹⁷⁷ CIAR #884, pp. 4485-4484:1-17.

¹⁷⁸ CIAR #313, pdf. 233-237.

¹⁷⁹ CIAR #884, p. 4373:15-19.

¹⁸⁰ CIAR #884, pp. 4409:24-26, 4410:1-8.

¹⁸¹ CIAR #881, pp. 4240:26, 4241:1-13.

¹⁸² CIAR #251, p. 13.

once the saturated zones have been constructed, backfilled, and likely reclaimed. If the problem is not the carbon feed but leakage, groundwater flows, or oxygenation of the saturated zone through cracks in the reclamation soil, Benga has no plans to address these problems. As such, recycling the water through the SBZ system just postpones the problem.

187. Finally, Benga’s approach does not adequately address other contaminants of concern. For example, there is a potential for mobilization of arsenic in the saturated zones. Benga stated at the hearing that it did not consider it a significant issue, but they do not have the data to support that assertion.¹⁸³ At the same time, Benga admitted that Teck’s SRF presented important uncertainties with regard to the mobilization of metals.¹⁸⁴ Benga’s own expert had advised Benga to have a post-treatment mechanism for SBZ effluent because he could not categorically say that arsenic, manganese and iron would not be mobilized.¹⁸⁵

3. Selenium: Site-Specific Guideline

188. The LLG urges the Panel to reject Benga’s proposed sulphate-adjusted site-specific water guideline (“**Proposed Guideline**”). Like the SBZ, the Proposed Guideline is a novel and unproven method of protecting receiving watersheds from selenium accumulation. As with much of the Project, the implementation of the Proposed Guideline lacks scientific rigour and has been repeatedly rejected by Environment and Climate Change Canada (“**ECCC**”).

(a) The SBZ System and the Proposed Guideline are Incompatible

189. The LLG submits that Benga’s SBZ design and the Proposed Guideline are wholly incompatible. First, the Proposed Guideline depends on selenate being the dominant species coming out of the effluent because sulphate can only attenuate selenate.¹⁸⁶ However, Benga admitted that “residual selenium leaving the SBZ is likely to be

¹⁸³ CIAR #881, p. 4239:9-23.

¹⁸⁴ CIAR #881, p. 4369:17-24, 4370:1-11.

¹⁸⁵ CIAR #881, p. 4255:24-26, 4234:1-20.

¹⁸⁶ CIAR #42, CR 5, p. 20.

substantially comprised of selenite, given the reducing treatment environment of the SBZ.”¹⁸⁷ This is because the SBZ is meant to chemically reduce selenate to selenite.¹⁸⁸

190. Second, the Proposed Guideline relies on the SBZ’s ability to attenuate selenium and create the adequate bioreaction. This, of course, is only possible if contact water has enough retention time and the sub-oxic conditions are maintained, two key elements that the SBZ’s leaky bathtub design cannot accomplish. Long retention time is also necessary to prevent the mobilization of organoselenium species,¹⁸⁹ which Benga’s expert noted are more bioaccumulative than selenate and are not mitigated by sulphate.¹⁹⁰
191. Finally, Benga does not have a plan to address selenite coming out of the effluent. Benga first said it would mitigate selenite by constructing a cascade from the discharge point to oxygenate the water and promote oxidation of selenite to selenate.¹⁹¹ However, Benga later was forced to clarify that in fact the cascade was not intended to convert selenite to selenate¹⁹² and there is no evidence that the proposed cascade treatment will be effective.¹⁹³ Therefore, if the SBZ system fails to attenuate selenium in the contact water, the effluent will be loaded with selenite, which has a much higher uptake and bioaccumulation. This will render meaningless the Proposed Guideline.

(b) The Proposed Guideline is not Supported by Evidence

192. Benga has had four years since the submission of its EIA to provide evidence to validate its Proposed Guideline. Despite repeated requests, Benga has refused (or been unable) to provide supporting evidence.

¹⁸⁷ CIAR #251, Package 5, p. 13.

¹⁸⁸ CIAR #881, p. 4139:11-16.

¹⁸⁹ CIAR #881, p. 4180:8-11.

¹⁹⁰ CIAR #881, p. 4142:9-14.

¹⁹¹ CIAR #251, Package 5, pdf. 13.

¹⁹² CIAR #313, pdf. 229.

¹⁹³ CIAR #347, pdf. 5.

193. On January 21, 2019, it was ECCC’s view “that the proposed site-specific guideline for selenium not be used without further work and validation.”¹⁹⁴ [emphasis added] Then, on May 4, 2020, ECCC noted that the Proposed Guideline’s risk assessment “incorporates erroneous assumptions about selenium bioavailability (which vary depending on selenium species) and the mistake is compounded at each step of the risk assessment...To propose an appropriate site-specific water quality criterion for selenium, it is therefore essential to know what soluble form of selenium is released (selenate or selenite).”¹⁹⁵
194. At the hearing, ECCC explained that there are three scenarios of selenium uptake involving selenite (highest uptake), selenate (medium uptake) and selenate with high sulphate concentration (lowest uptake). However, Benga had only assessed the lowest uptake scenario.¹⁹⁶ As such, Benga has failed to present the Panel with a reasonable worst-case scenario. It did not even present a medium-case scenario.
195. Benga also suggested that future monitoring data, after mining commences, will be used to validate the model used to develop the Proposed Guideline.¹⁹⁷ Yet Benga’s expert, Mr. Davies, admitted that while monitoring and collection of data for the Proposed Guideline would be required, significant data would not be obtained for many years due to the slow build up of selenium. He called it a “mixed blessing” that “that the concentrations of selenium aren’t really projected to increase in the creek for several years.”¹⁹⁸ Mr. Davies noted that collecting more data would not help with projections.¹⁹⁹

(c) Benga Chose A Moving Target

196. The LLG submits that Benga’s approach to selenium management is based on a moving target, which goes against sound engineering principles. Dr. McKenna explained that

¹⁹⁴ CIAR #167, pdf. 15.

¹⁹⁵ CIAR #347, pdf. 4.

¹⁹⁶ CIAR #891, p. 4659:6-13.

¹⁹⁷ CIAR #251, Package 5, pdf. 12.

¹⁹⁸ CIAR #884, p. 4451:20-25

¹⁹⁹ CIAR #884, p. 4451:26, 4452:1-12.

Benga needs to choose its water quality criterion at the outset, because a change in the criterion will cascade through the whole operation of the system with the result that a lot of work may have to be redone.²⁰⁰

197. As noted earlier, Benga has been inconsistent about which target it aims to achieve (99% attenuation or 15 ug/L). At the hearing it promoted the more convenient and easier to meet target of 15 ug/L. But the Proposed Guideline makes this a moving target. Mr. Houston explained:

“My expectation is that the – the water quality objective for selenium – I would think that the – the formula would still hold and that the requisite water quality objective for selenium, which is not a fixed number but a – a number that’s based on the sulphate concentration, would – would reduce in – in step with that lower level of sulphite.”²⁰¹

198. Moreover, the Proposed Guideline itself has not been adequately finalized, and Mr. Houston admitted that it would be subject to further interpretation to arrive at something that is simpler to implement.²⁰²
199. Dr. McKenna also warned about the potential for calcite minerals precipitating and cementing in the streams, a problem that once it starts is hard to stop.²⁰³ This calcite problem is exactly the kind of issue that can create a chain-reaction in Benga’s Proposed Guideline. The Panel asked Mr. Davies whether hardness or calcification could result in a cascading effect on the Proposed Guideline, and Mr. Davies agreed that it could.²⁰⁴ This means that if Benga has to address calcification, it may need to reduce sulphates, which in turn will affect the selenium levels. Since Benga does not have multiple layers of mitigation independent of the SBZ, it cannot easily change selenium levels.

²⁰⁰ CIAR #907, p. 5183:15-21.

²⁰¹ CIAR #884, p. 4427:9-15.

²⁰² CIAR #884, p. 4457:19-26, 4458:1-2.

²⁰³ CIAR #907, pp. 5201:12-26, 5202:1

²⁰⁴ CIAR #884, p. 4446:4-18.

(d) The Proposed Guideline is Contrary to the Precautionary Principle

200. Rather than provide supporting evidence, Benga has attacked the provincial guideline as ‘overly protective.’²⁰⁵ ECCC noted that there is no jurisdiction anywhere in the world that uses a sulphate adjusted selenium guideline.²⁰⁶ In response, Benga argued that there is often a lag time for regulation to catch up with the state of science,²⁰⁷ implying that its Proposed Guideline is somehow more advanced than the guidelines used in every jurisdiction.
201. Benga’s Proposed Guideline may be the result of emerging science; at best, therefore, it is part of a larger scientific debate. However, it cannot be said to be protective of the environment in the face of evidence to the contrary and lack of evidence to support such a claim.
202. It is precisely in scenarios such as these that the precautionary principle should be applied. In *Morton*, the issue was whether the Minister had applied the correct licensing scheme when smolt infected with piscine reovirus (“PRV”) were transferred to a fish farm. The Appellant argued that the transfer of diseased fish was contrary to the *Fishery (General) Regulation* and could potentially cause heart and skeletal muscle inflammation (“HSMI”). The Court noted that the causal relationship between PRV and HSMI had not been conclusively established, but expert evidence showed PRV was the viral precursor to HSMI (para. 35). The Court also noted that there were scientists who questioned the link (para. 45). Despite this “healthy debate” the Court held that, on all the evidence, permitting the transfer of diseased fish was not consistent with the precautionary principle (para. 46).
203. Similarly, the body of evidence from the regulators in this case shows that the Proposed Guideline lacks validation and may in fact be harmful as it does not adequately address important elements such as selenium speciation. Again, at best sulphate-adjusted

²⁰⁵ CIAR #251, Package 5, pdf. 9.

²⁰⁶ CIAR #167, pdf. 18.

²⁰⁷ CIAR #251, Package 5, pdf. 11.

guidelines are part of a ‘healthy debate’ in an area where every jurisdiction on earth still applies a fixed selenium guideline ranging from 1 to 5 ug/L.

204. Finally, Benga’s own evidence is that residual selenium will be selenite, for which it has no plan to attenuate and which sulphate cannot mitigate. The evidence of Dr. McKenna supports that implementing the Proposed Guideline is poor engineering practice which could result in multiple, costly changes in the SBZ system, the basket in which Benga has put all its eggs for selenium attenuation. Considering this, the LLG submits that it would not be reflective of the precautionary principle to approve Benga’s Proposed Guideline.

4. Reclamation and Closure

205. Benga’s proposed mountaintop removal, open-pit coal mine will have significant adverse environmental effects. An area of 15 square kilometres will be “disturbed”. In removing the top of Grassy Mountain, Benga will destroy the local landscape and everything in it: trees, vegetation, wetlands, creeks. Do not worry, says Benga, the land will be fully reclaimed. This means it will be restored to “equivalent capability”. But it will never be the same.
206. The restoration of equivalent capability “does not mean that the reclaimed landscape will be identical to pre-disturbance conditions”.²⁰⁸ Further, after reclamation “native species richness is expected to be lower than the intact naturally developed vegetation”²⁰⁹ and “soil nutrient, moisture regime, slope, aspect, and slope position of specific points within the mine footprint will not be the same as baseline conditions.”²¹⁰ Finally:

After mining and reclamation of Project infrastructure there will be a permanent loss of organic landforms and the extreme slopes in the upland terrain will be reduced to a maximum slope angle of 23°. The natural variability and complexity of the existing terrain within the LSA will not be duplicated by creation of re-contoured landscapes.

²⁰⁸ CIAR #251, Package 2, pdf 41.

²⁰⁹ *Ibid*, pdf 73.

²¹⁰ *Ibid*, pdf 84

The reclaimed landscape will be more homogenous than current conditions.²¹¹

207. The LLG submits that given the high environmental significance and sensitivity of the southern Eastern Slopes, reclamation is critical. Yet, incredibly, Benga has paid little attention to reclamation and closure in its mine design, with the result that the Panel can have little confidence that Benga can effectively mitigate the large-scale destruction inherent in open-pit mining.

(a) Grassy Mountain has poor reclamation suitability

208. Reclaiming Grassy Mountain will be challenging. The terrain is high altitude, steep and varied. As stated by Dr. McKenna, Grassy Mountain “is a sensitive mine site in a sensitive region ... it requires a higher level of design that has been done to protect the environment.”²¹²

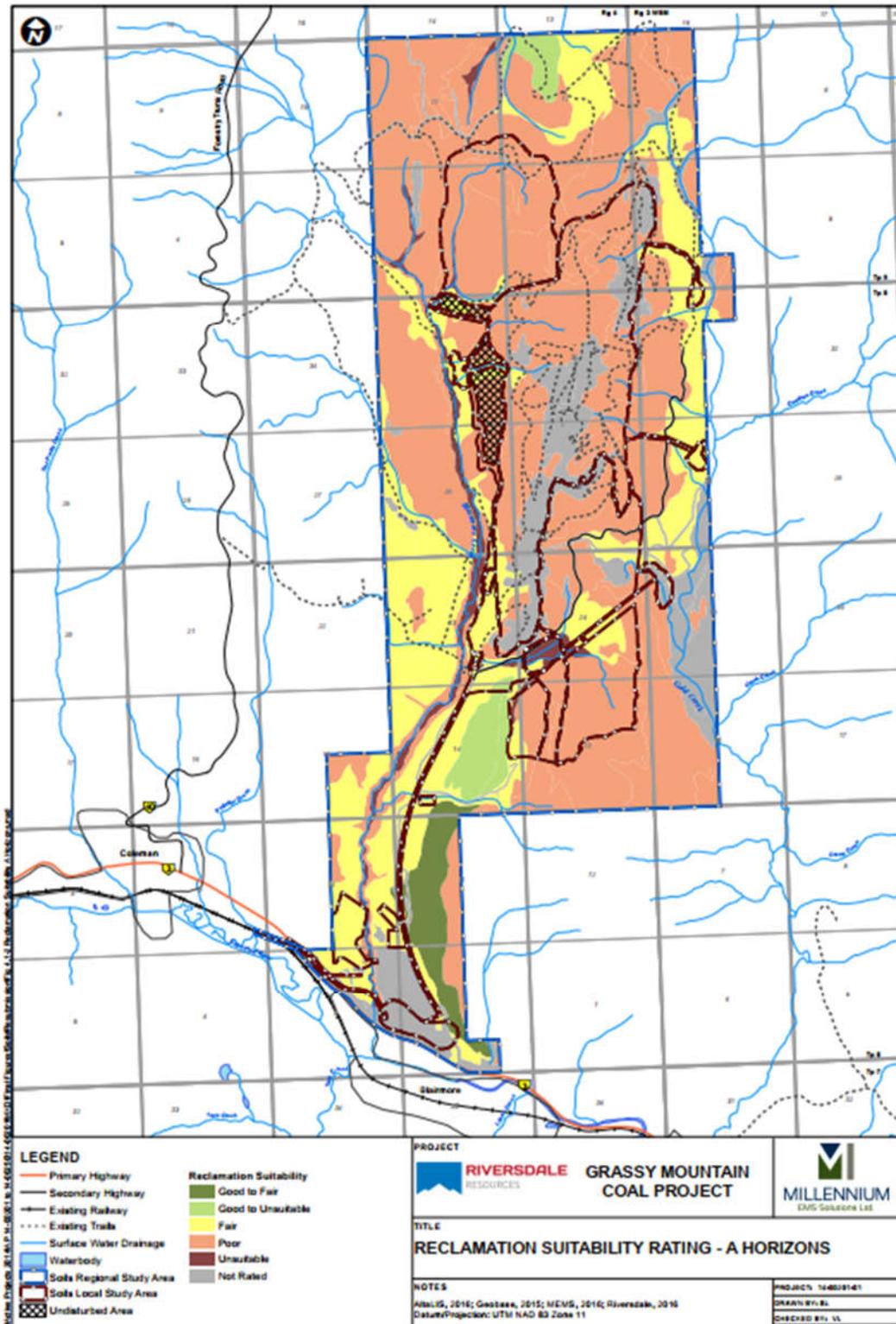
209. The first problem is that the terrain and soils on the Project site have poor reclamation suitability. Reclamation suitability is addressed in section 4.2 of Consultant Report 7 (“CR 7”). The site was rated for reclamation suitability using four categories: Good, Fair, Poor and Unsuitable. Poor soils are those that have “severe limitations that make use questionable.” Unsuitable soils are those that have chemical or physical properties that “are so severe reclamation would not be economically feasible or in some cases impossible.”²¹³

210. Table 4.1-2 in CR 7 sets out the reclamation suitability ratings for the relevant soil models for the A horizons (surface soil), B horizons (subsoil) and C horizons (parent material). The majority of the A horizon soils are rated as poor or unsuitable. The reclamation suitability of surface soils (A horizon) at the Grassy Mountain site are graphically depicted in Fig. 4.1-2 of CR 1, which is reproduced below:

²¹¹ CIAR #42, Consultant Report 7, pdf 106.

²¹² CIAR #833, pdf 4.

²¹³ CIAR #42, Consultant Report 7, pdf 44.



211. As this figure shows, a large majority of the Project site has poor reclamation suitability. Yet Benga's plan is to use only materials salvaged onsite for reclamation, from the A and

B horizons.²¹⁴ The LLG submits that Benga’s reclamation plan does not seriously grapple with the underlying challenge presented by the poor suitability of the reclamation material.

212. Not only do the soils on the Project site have poor reclamation suitability, they are also subject to high to severe erosion risk. In the Updated Conservation & Reclamation Plan (“**C&R Plan**”), Benga acknowledges that erosion “will occur on the new landscape at the Project.... Some erosion of replaced reclamation is expected to occur on steep slopes and long slopes.” In addition, drainage courses on the reclaimed landscape will shift over time as erosion occurs.²¹⁵

213. Table 4.3-1 in CR 7 sets out Benga’s water erosion risk ratings. The majority of the soil units are rated as currently having “very low” risk of water erosion but that risk will be “severe” after mining and the land is “recently reclaimed”. The vast majority have the following comment in the far right column of the table:

Extremely severe potential soil loss without vegetation cover or no mitigation practices applied.²¹⁶

214. Table 4.3-2 sets out Benga’s wind erosion risk ratings. As noted at the bottom of the table, “[s]oil units would generally be at moderate to high risk of wind erosion (assuming no vegetative cover).”²¹⁷

215. Within the Local Study Area, approximately 42.1% (640.5 ha) of the area has a high risk of wind erosion and 77.9% (1,185.0 ha) of the area has a severe risk of water erosion (assuming no mitigation) prior to vegetation establishment.²¹⁸ Further, “the potential for

²¹⁴ CIAR #835, p. 2754.

²¹⁵ CIAR #251, Package 2, pdf 154.

²¹⁶ CIAR #42, CR 7, pdf 52-55.

²¹⁷ *Ibid*, pdf 57.

²¹⁸ *Ibid*, pdf 94.

impacts resulting from wind and water erosion on soil quality exists throughout the life of the Project.”²¹⁹

216. In its significance determination for erosion, Benga states that the residual effect is irreversible and the probability of erosion occurring is “potentially high”. Yet it rates the magnitude of the effect as only moderate and concludes that the residual environmental effect after mitigation is “not significant”.²²⁰

217. With respect, this conclusion does not stand up to scrutiny. The Regulator certainly has doubts about this conclusion. In an SIR to Benga, it stated:

Benga discusses the wind erosion risk, however, they do not relate the risk to the Project location (in the Crowsnest Pass) and the operational challenges due to high winds/erosion risk. The impact rating is not significant despite being irreversible.²²¹

218. As a result, the Regulator asked Benga: “Considering the Project location and the high risk of many soils in the LSA, justify the impact rating of not significant for impact on soil quality.”²²² Benga’s response, put shortly, was that it will employ “appropriate mitigation measures”; therefore, the risk is mitigated. With respect, this answer ignored the context specifically raised by the Regulator in the SIR, namely the location of the Project in the Crowsnest Pass, an area of very high winds.

219. The LLG submits that it is clear that erosion is going to present a significant challenge to reclamation at Grassy Mountain. Benga has failed to demonstrate it can address that challenge.

²¹⁹ *Ibid*, pdf 93.

²²⁰ *Ibid*, pdf 100-101.

²²¹ CIAR #69, pdf 143.

²²² *Ibid*.

(b) Benga's reclamation plan is highly simplistic and poorly thought through

1. Reclamation cover depth

220. Benga states that it plans to reclaim the site using an average cover depth of 20 cm of reclamation materials throughout the site, regardless of site-specific issues such as slope, aspect, planned reclamation eco-site, etc. What is the basis for the cover depth of 20 cm?
Math:

Approximately 3.3 million m³ of reclamation material is available to be salvaged which will facilitate an average reclamation material replacement depth of 20 cm on reclaimed lands.²²³

221. Under cross-examination, Mr. Houston confirmed that indeed the average depth of 20 cm reclamation cover was derived mathematically from the total amount of reclamation material available. However, he also argued that "it coincides with the depth that is appropriate for reclamation."²²⁴ Benga was then asked to identify where in the EIA we can find an analysis supporting the appropriateness of a reclamation cover depth of 20 cm:

Q Okay. So then let's pursue that, then. There are thousands of pages of documents, and I acknowledge I might have missed it. But where do we find the analysis that supports 20 centimetres as being the right depth? You know, in all of your documents, where is that analysis?

A One minute, Mr. Chair.

A MR. MCCOY: Sorry, Mr. Fitch. I'm -- I'll respond. It's Dane McCoy.

The -- the -- you're -- you're correct in -- in your calculations or assumption that we have done sort of a volumetric calculation that there will be 20 centimetres of soil available across the -- the entire site. So, on average, we will put that much back. The -- the use of 20 centimetres is -- is -- has been used successfully at other -- other mine sites in -- in Alberta and has sufficiently been able to achieve equivalent land capabilities. So I hope that answers your question.

Q Okay. So there's no -- there was no technical analysis; it's based on 20 centimetres having been used at other mine sites?

²²³ CIAR #251, pdf 63.

²²⁴ CIAR #835, 2792-2793.

A MR. HOUSTON: It's based on professional judgment,
Mr. Chair.²²⁵

222. Mr. McCoy then testified that the 20 cm cover depth had been used at the Luscar, Gregg River and Coal Valley mines and in fact was an approval condition for those mines. However, he subsequently clarified that those mines had a range of reclamation soil depths, from 10 to 30 cm.²²⁶ In fact, when questioned by Ms. LaCasse for the Regulator, Mr. McCoy corrected himself that the conditions in the coal mine approvals stipulated that the approval holder place 30 cm (not 20 cm) in upland areas and 15 cm in lowland areas.²²⁷
223. The LLG submits that Benga's evidence on reclamation cover depth is simplistic and completely unsatisfactory. This is how Dr. McKenna characterized it:

The current mine plan reclamation plan uses a very simplistic design. The proponent has determined there's about 3.3 million cubic metres of available reclamation material needed to cover or to put on 15 million square metres of reclaimed land. That's 1,500 hectares. Long division provides the design in this 20 centimetres cover soil depth. This is the amount placed on all substrates at all elevations, on windy polygons and calm ones, on old roads, on waste rock dumps alike. This is the kind of mining engineering and design promoted in my 1973 version of the mining engineering handbook. This thinking is long out of date and insufficient to meet the lofty goals like equivalent capability, especially given the site conditions, not to mention the need to control the ingress of water and oxygen into waste rock dumps which impacts selenium generation. It's unusual to propose this one-size-fits-all blanket approach.

Normally for vegetated covers, the goals are set, the landscape is divided into polygons, soil scientists figure out the soil moisture regime and the soil nutrient regime and plot these on an adaptive grid as shown above.

They use this to figure out what ecosites will flourish in various -- with various soil prescriptions. In particular, the water-holding capacity of the soil often governs vegetation performance. Will there be enough water during a drought to sustain the plants? The model results are tested in long-term vegetation plots that we

²²⁵ *Ibid*, pp. 2793-2794.

²²⁶ *Ibid*, pp. 2794-2795.

²²⁷ *Ibid*, p. 2907 and 2918-2919.

talked about in the last slide. The soil prescriptions, the depth, the layering, the material properties are adjusted and designed to support the desired ecosites and land uses and net percolation requirements.

If the designs don't meet the requirements, the designs are adjusted. This is a practice of Teck coal mines elsewhere in the Rockies under Alberta regulations. It's embedded in oil sands mine design reclamation. This -- I expected to see this in the report, but I didn't.

Yes, all this does have to fit into a reclamation material balance. There's only so much soil to salvage, and especially in a mountain mine. And this is why it's so critical to get this right ahead of mining. If the requirements need more material than is available to be salvaged, then more overburden needs to be stripped, taking a deeper cut down in the glacial tills before mining.

If you don't do this during initial mine development, the material is lost during excavation of the mine pits or buried in waste rock -- under waste rock dumps. The designs can't wait. The point is soil prescriptions and mine waste covers are so much more than dividing two numbers together. And even if this were a good idea, the reclamation plan fails to show how this rudimentary prescription will meet the goals for equivalent capability in each part of the reclaimed landscape. And the lack of analysis in design and planning means that certain doors will be closed even before mining starts. There needs to be a proper design before mining begins, before permitting, and with a plan and eventually field trials to show that it's all going to work.²²⁸ [emphasis added]

224. In general, Dr. McKenna found that Benga's closure and reclamation plan lacks several key items:

- no design basis memorandum;
- no cover design;
- no soil profile analyses;
- no surface water drainage systems on dumps

²²⁸ CIAR #848, pp. 3246-3249.

- no design to reduce surface water erosion;
- little design for the end pit lake;
- no design for aesthetics;
- a “build it and they will come” wildlife habitat design;
- an under-developed plan to manage water for selenium.²²⁹

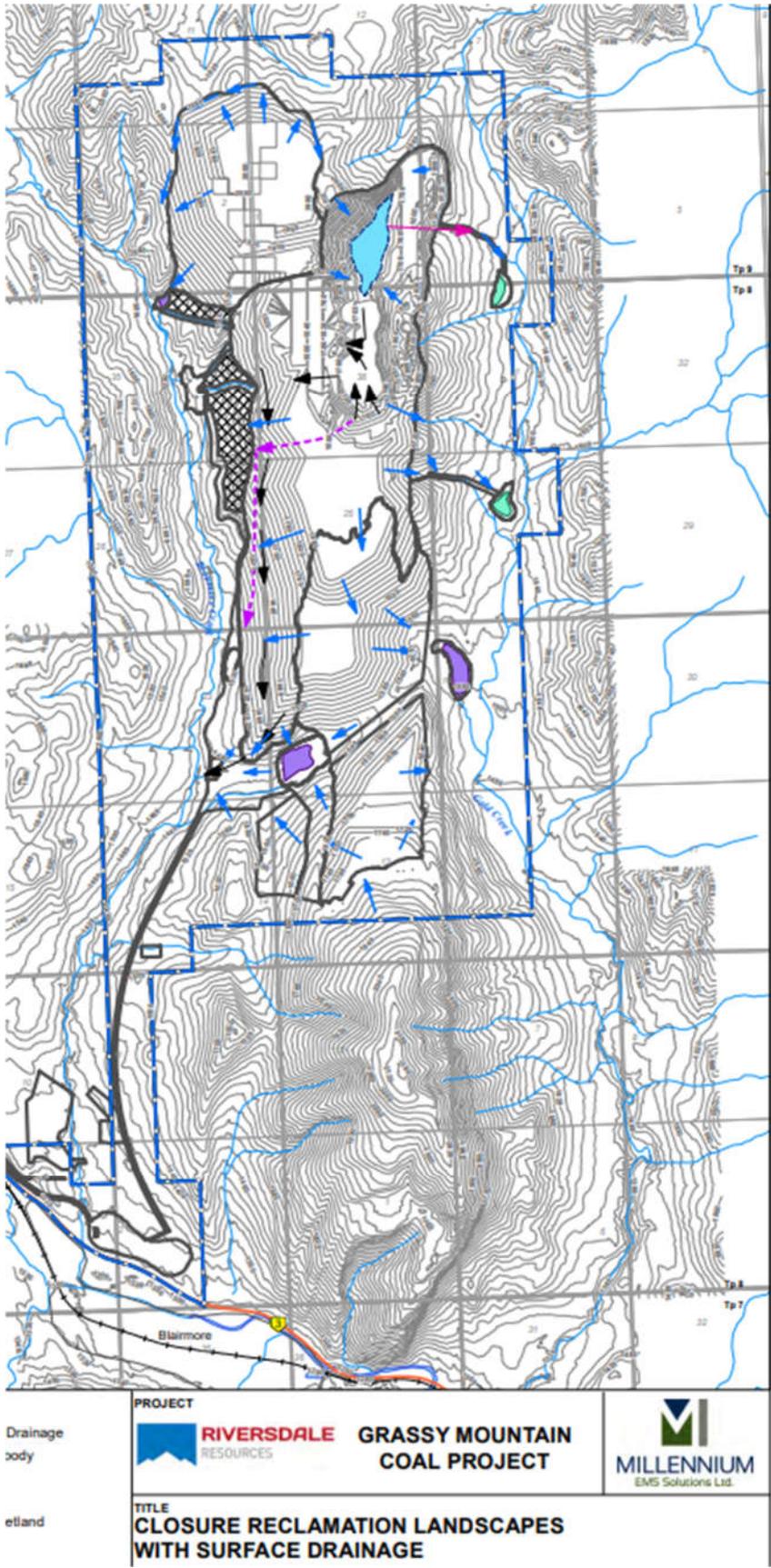
225. Dr. McKenna’s conclusion was stark: there is a high risk that full reclamation at Grassy Mountain will never be achieved.²³⁰

2. *Surface Water Drainage*

226. As noted above, Benga acknowledges that drainage courses on the reclaimed landscape will shift over time as a result of erosion. Yet Benga cannot even tell the Panel where these reclaimed drainage courses will be, how many watercourses there might be or even if there will be any at all. Instead, they provide (in Fig. F.4.4-2 of the C&R Plan) a map that shows nothing more than blue arrows indicating drainage direction:

²²⁹ CIAR #833, pdf 8.

²³⁰ *Ibid*, pdf 7.



227. When asked why the figure does not show any reclaimed/constructed creek drainages, but just directional arrows, Mr. Houston testified:

Mr. Fitch, that -- there -- there are -- the -- the intent of this drawing is to show the general drainage patterns around the -- sort of the reclaimed landscape, and so the idea is -- is -- you know, you could move that -- the blue arrows, you could move them up and down. And it's not actually meant to be a location where a creek or drainage is being funnelled or directed. So it's just a general drainage pattern. In fact, the intent would be not to have it directed to a particular area; it would be to have it flow -- you know, any moisture that landed on the site to flow in -- downslope as -- as quickly and -- not quickly, but as efficiently as possible and not to -- to collect and to cause, you know, drainage channels or whatever.

Q Okay. So I think what I took from all of that is your -- there is no plan to construct creek beds as part of the reclaimed landscape. Is that right?

A MR. HOUSTON: So, Mr. Fitch, I think we need to go back to the -- the idea that this is a conceptual plan, and the details will be -- will be developed. Mr. McCoy has talked about the micro-mesoscales where we would have variations in elevation, and those would be developed more as we get into the detailed design. So I -- I think that you, you know -- that those -- those kinds of features, if -- if they are appropriate will be developed at a later stage.

Q Well, sir, I understand the plan is conceptual, but are you telling me that you don't even know whether you'll be constructing artificial creek or stream beds? You haven't got that far?

A I think that's correct, that we haven't determined whether that would be appropriate or not, and -- and beneficial.²³¹

228. This was Dr. McKenna's reaction to Fig. F.4.4-2:

[I] look at the plan, and ... all I see ... are little blue arrows on the map called "drainage direction" with no indication of what the design storm would be, how the channels would carry the water, how much they would cost, how the land would be protected from uncontrolled erosion. Channels to safely carry runoff water from

²³¹ CIAR #835, pp. 2786-2787.

waste rock dumps [are] a feature of textbooks in the 1970s would have been forgotten by the -- a lot of mines today, including Grassy.

Here's what I've seen happens when you don't have a well-designed and well-constructed surface water drainage system. Water ponds on the landscape sinking into the waste rock and causing chemicals to leach from the waste rock dumps. Where the ponded water slops over a dump crest, floods down, the soil cover is washed away, big gullies, and deposition is alluvial fans at the toe of the slope, sometimes blocking a watercourse down there too. Mine waste is often inadvertently dumped where the channels are supposed to be constructed, and who is going to move a dump to fit a channel in later? When it comes time for the reclamation certificate, the regulator may wonder where all the channels are and why they weren't built. The miner doesn't want to cut down the trees that have grown and disturb the land to build channels. I know. I've been there with the S4 dump certification at – at Syncrude. It's too late. There's increased cost, increased risk, and decreased environmental performance results.

The surface water drainage is serious business. It's designed by professionals. It's constructed with the greatest of care. It's repaired and maintained so it acts as intended. The Grassy EIA provides commitments regarding erosion but no designs to manage it.²³²

229. In his report and testimony, Dr. McKenna was clear that, in his view, Benga has expended little effort on the design of surface water drainage in the reclaimed landscape. This was particularly surprising to Dr. McKenna, since (as indicated in the quotation above) “[i]n my practice, water is the main issue in mine reclamation, surface water, groundwater, soil moisture.”²³³
230. In contrast to Mr. Houston’s evidence that Benga has not even yet determined whether it will design engineered watercourses, Dr. McKenna testified that this was a critical piece of reclamation planning. In this regard, he referred to a rule of thumb for mines in Alberta that for each square kilometre of land about one kilometre of watercourses is required. In

²³² *Ibid*, pp. 3241-3242.

²³³ CIAR #848, 3240.

the case of Grassy Mountain that “would amount to about 15 kilometres of watercourses, which seems reasonable.”²³⁴

231. The LLG submits that the almost complete absence of surface water design is a major deficiency in Benga’s conservation and reclamation plan.

3. *Direct placement of reclamation materials*

232. In the C&R Plan, Benga states several times that direct placement of reclamation materials (i.e. materials that have not been stockpiled) will be undertaken “when available”,²³⁵ or “whenever practical”,²³⁶ or “where feasible”,²³⁷ and “as much as is practicable”.²³⁸ The caveats used by Benga are telling, because elsewhere Benga acknowledges:

- the scheduling of direct placement opportunities “is limited to having recontoured lands available in proximity to reclamation material salvage materials”;²³⁹
- the geology of the coal bearing strata and the required man plan for the development of the Project “make the scheduling of direct placement of reclamation materials difficult to achieve;”;²⁴⁰ or, as Mr. Houston testified, “I guess another way of saying that is that the mine plan won’t be developed around reclamation. Reclamation will be layered on top of the mining plans”.²⁴¹

²³⁴ *Ibid*, p. 3241.

²³⁵ CIAR #251, pdf 69.

²³⁶ *Ibid*, p. 41.

²³⁷ *Ibid*, p. 52.

²³⁸ *Ibid*, p. 74.

²³⁹ CIAR #69, pdf 127.

²⁴⁰ CIAR #251, pdf 117.

²⁴¹ CIAR #835, pp. 2800-2801.

- “Stockpiled reclamation material will be used to reclaim areas on the majority of the disturbance area.”²⁴² [Emphasis added]

233. The LLG submits that the Panel should put very little weight on Benga’s optimistic assertions concerning direct placement of reclamation materials. The truth is, as Benga acknowledges, that the majority of the site will be reclaimed using stockpiled reclamation material.

4. *End Pit Lake*

234. Dr. McKenna commented on Benga’s end pit lake design in both the fourth topic session, on conservation and reclamation, and the fifth topic session, on water and selenium. When he testified in the reclamation session, Dr. McKenna was not aware that Benga had changed its plans for the end pit lake, from draining it through a tunnel to Gold Creek, to allowing water from the lake to flow into the SZ1700. Dr. McKenna did not like the original plan and he does not like the new one any better:

But now I understand the new idea here at Grassy is to drain the pit lake and its watershed over an in-pit bedrock ledge ... at 1,700-metre elevation This would have the lake waters simply overflow onto the surface of the waste rock dump, from my understanding, and into the 1,700 saturated zone....

The lake water would percolate through the top of the dump to enter the saturated backfill zone, flow within the waste rock, and report out to the treated water exit point down at the south end of the -- of the mine.

I understand there's no plan to engineer this seam until closer to the date that it'll be constructed. Having an end-pit lake discharge onto and through an unengineered fill seems to me to be a high risk and maybe unprecedented. I've seen and even built small soakaways in waste rock dumps to manage water and small ditches from tiny watersheds, but I've never seen anything like the scale proposed here. To have an 18-hectare lake in its watershed simply discharge out onto the top of a dump on top of a mountain, even with an engineered design, seems to be a high risk.

²⁴² CIAR #251, pdf 117.

I don't see any supporting calculations yet, or whether the system has enough infiltration capacity on an average day, let alone to soak away an extreme precipitation or runoff event which would suddenly reduce huge quantities across the reclaimed landscape. Would wash out areas of the soakaway, areas of the plateau, potentially cutting massive gullies and depositing alluvial fans.²⁴³

235. As Dr. McKenna stated, this new design for the end pit lake is very unusual and completely lacking in supporting details. As he asked: what if the soakaway zone were already saturated, which is implied by the design, or it filled up over time? What if it were frozen over? What if the soil and vegetation plus was soaked away? The answer: “Very little of the flood might actually percolate and the rest would head across country.”²⁴⁴
236. The LLG urges the Panel not to gamble on this unusual and untested design. Benga was clearly sensitive about the water quality in the end pit lake, as Mr. Houston absolutely refused to answer when both CPAWS and the LLG asked about the potential for fish in the lake. The LLG is very concerned that the end pit lake is not going to be safe for any kind of wildlife.

(c) Conclusion

237. Reclamation is the primary mitigation proposed by Benga. A lot rides on Benga getting it right. But as Dr. McKenna said in his report and testimony, Benga’s EIA presents optimistic goals, many of which will be difficult to achieve. This would be the case even if Benga had more fully developed plans for such critical points as the design of the reclamation cover, surface water drainage and the end pit lake. The LLG submits that Benga’s conservation and reclamation plan is so lacking in detail the Panel cannot make a public interest determination based on it.

²⁴³ CIAR #907, pp. 5199-5200.

²⁴⁴ *Ibid*, p. 5200.

5. Air Quality and Dust

238. The LLG submits that Benga's Air Quality Assessment ("AQA") does not accurately portray dust impacts from the Project.

(a) Failure to Consider Chinook Winds

239. The proposed Grassy Mountain open-pit coal mine is located in the Crowsnest Pass, by common acknowledgement one of the windiest parts of Alberta and likely Canada. While much of the evidence on air quality and dust came from expert witnesses, such as the independent expert retained by the LLG, Dr. James Young, several local landowners also testified about the wind conditions where they live. Ms. Lambright in particular provided compelling testimony about the wind where she and her husband live (15-20 km due east of the Project):

You know, just -- just to give you an example on that, within the last two weeks at our home, we have had extreme temperature swings. One day we went out, it was minus 24 degrees, and we had over a foot of snow, and that had been the case for several days. Within a matter, literally, of days, the wind had ripped through. And I use that word advisedly. It ripped through. The snow was gone, and the temperature was plus 16. We have had I don't know how many wind warnings or alerts in the last two weeks, and we don't get a wind warning or an alert unless the wind speed is expected to be in excess of 100 kilometres per hour.

And various people have talked about, you know, how -- how damaging that could be, but I think just to make it real for you, we have driven out of our yard onto the main Highway 22, which goes near our place, to find not one but multiple semitrucks overturned in the ditch, large motor homes overturned in the ditch. That's why they have those wind warning signs, including the one that Mr. McIntyre showed you that broke when the wind speed hit 180 kilometres an hour. Those aren't freak storms. That's life in that area. And we all put up with it because it's so incredibly beautiful when the weather is behaving, and that's most likely in the summertime.

There's a small gas plant just down the road from our home. The roof of that gas plant at one point was peeled back like a can opener and had to be completely replaced. A large metal hay shed not too far from where we live, the entire front of that shed was ripped off

and blown several kilometres into a power line, which then created a wildfire. These winds are nothing to trifle with, and it certainly has been repeated in these hearings that that does not appear to have been adequately considered in a lot of the promises and comments that have been domain -- are made.²⁴⁵ [emphasis added]

240. Environment and Climate Change Canada's ("ECCC") Daily Data Report for November 2020 from the Crowsnest Alberta monitoring station confirmed that within the two weeks of the public hearing, there were two days (November 3 and November 5, 2020) where the maximum wind gusts were 91 and 97 kph, respectively.²⁴⁶
241. Notwithstanding the well-known incidence and magnitude of chinook winds in the Crowsnest Pass, Benga's Air Quality Assessment ("AQA") failed to address chinook winds. To be clear, it is not that chinook winds were inadequately considered in the AQA; they were not considered at all. Under cross examination, Benga's air quality expert, Mr. Rudolph of AECOM, acknowledged:

So, sir, when I did a document search through your Consultant Report Number 1, air quality, and I looked for the word "Chinook" in proximity to the word "wind", I got no hits. Does that surprise you?

A · It doesn't surprise me, no.

Q · No. There is no mention of Chinook winds anywhere in your air quality assessment, are there?

A · There -- there may not be, no.²⁴⁷

242. As previously noted, the LLG retained Dr. James Young to give independent expert evidence on the issue of air quality and, in particular, whether Benga's AQA adequately considered fugitive dust emissions having regard to chinook winds. Dr. Young prepared a report for the LLG which was submitted to the Panel as part of the LLG's evidence, titled

²⁴⁵ CIAR #786, pp. 1617-18.

²⁴⁶ CIAR #914.

²⁴⁷ CIAR #919, pg. 5415

“Comments on Air Quality and Meteorology concerning the Grassy Mountain Coal Project”.²⁴⁸ Dr. Young’s CV was provided with his report.²⁴⁹

243. The LLG submits Dr. Young is a highly credible expert who provided important evidence to the Panel highlighting shortcomings in Benga’s evidence on air quality and fugitive dust emissions. Dr. Young is a professional engineer and air quality professional with over 45 years of experience in applied atmospheric research whose credentials include serving as:

- Acting Director General of Research in the Atmospheric Environment Service of Environment Canada;
- Chief of the Air Quality section of Environment New Brunswick;
- Senior Consultant for SENES Consultants and Arcadis Canada for their weather-related services;
- Canadian co-Chair of the International Air Quality Advisory Board of the International Joint Commission, providing guidance on transboundary air emissions for 14 years;
- past-President of the Air and Waste Management Association of Ontario; and
- past-President of the Canadian Meteorological and Oceanographic Society.²⁵⁰

244. With respect to fugitive dust emissions specifically, Dr. Young has authored academic papers and advised pit and quarry clients on dust control during windy conditions.²⁵¹

²⁴⁸ CIAR #552, pp. 53-58.

²⁴⁹ *Ibid*, pp. 60-61.

²⁵⁰ CIAR #943, pp. 6177-6179.

²⁵¹ *Ibid*, p. 6182.

245. In his report and testimony, Dr. Young opined that Benga's AQA contains "no serious consideration of high wind speeds with respect to dust."²⁵² In fact, Benga's AQA uses an assessment methodology which wrongly concludes that high winds will result in lower dust concentrations when the opposite is true. As Dr. Young testified, Benga's methodology is appropriate for gas dispersion, but not particle (dust) dispersion. Dr. Young concluded:

Put simply, an increase in wind speed will result in an increase in dust ... -- an increase in dust emissions, whereas the air quality assessment in Benga's own reply that was shown on the screen suggests the opposite.²⁵³

246. Further, Benga's AQA used an equation from the US Environmental Protection Agency ("USEPA") which Dr. Young opined was not appropriate for the Grassy Mountain Project because it is only reliable for predicting dust emissions over time (e.g. annually) but almost certainly underpredicts emissions on the windiest days:

This equation works well for estimating emissions over a longer period, like a year, [but] can underestimate dust emissions for an hour or a day because it -- based on the frequency of winds above a threshold speed rather than the actual wind speed.

This approach does not recognize an increase in dust amounts to higher speeds, so the fact that the proponent has used 'F' equal to 100 percent will only be conservative for total dust generated over a year, but the method does not give an indication of just how much dust is generated for any shorter period.²⁵⁴

247. Dr. Young's analysis of meteorological data from the ECCC Beaver Mines monitoring station showed that "the daily maximum emissions can range from as high as 723 to as low as 231 kilograms [per day] in a single 12-month period. Emissions of 723 kilograms per day could mean at least a 37 percent increase in concentration of dust on the worst day

²⁵² *Ibid*, p. 6183.

²⁵³ *Ibid*, pp. 6183-6185.

²⁵⁴ *Ibid*, p. 6186.

above what the proponent has calculated. This suggests to me that the proponent has not looked at the worst case."²⁵⁵

248. Further, Dr. Young testified that in his opinion the USEPA equation used by Benga in its AQA not only does not tell us what emissions will be on the actual windiest day, it underpredicts fugitive dust emissions at high wind speeds: "Therefore, the use of the standard equation in this case will underestimate emissions during a Chinook wind".²⁵⁶
249. Another concern raised by Dr. Young is the representativeness of wind speed data obtained by Benga from two on-site monitors. In one of its SIR responses, Benga stated that high wind speeds (89-102 kph) had not been reported at any of the monitoring stations from which data was obtained.²⁵⁷ In fact, data presented by Benga showed virtually no wind speeds greater than 30 kph at the North on-site monitoring station and virtually no wind speeds greater than 50 kph at the South on-site monitoring station.²⁵⁸
250. Dr. Young expressed significant concerns with the data obtained by Benga from the on-site monitoring stations. First, he noted that the measurements were made at a height of 2 metres, "not the standard 10 metres." Dr. Young noted that if you look at the data from the ECCC Beaver Mines monitoring station, "which is at a standard 10-metre height, you will see wind gusts as high 60 to 97 kilometres per hour over the past 12 months".²⁵⁹
251. Second, Dr. Young noted that only 2-3 months' data was acquired from the on-site monitoring stations, whereas a "typical ... meteorological representation of a site requires a minimum of 75 percent of the available hours in each season to be gathered to ensure the data is representative of the site."²⁶⁰ Worse, the 2-3 months' data were gathered during the

²⁵⁵ *Ibid*, p. 6187.

²⁵⁶ *Ibid*, p. 6188.

²⁵⁷ CIAR #251, pdf. 19.

²⁵⁸ *Ibid*, p. 24.

²⁵⁹ CIAR #943, p. 6189.

²⁶⁰ *Ibid*, p. 6190.

months June – October, whereas the peak period for high wind speeds is November – January, “so even the peak period has not been assessed on the proponent’s site.” Therefore, Benga’s own data from the on-site monitoring stations does not support the conclusion that high wind speeds do not occur on the Project site. It is also inconsistent with ECCC data from nearby monitoring stations and with what is well understood about “the Chinook climatology in this area which suggests 20 to 35 days of Chinook winds each year.”²⁶¹

252. The LLG submits that the Panel should place considerable weight on Dr. Young’s evidence, which was clear, succinct and objective. In its Final Argument, Benga criticizes Dr. Young for having never been to the Project site.²⁶² With respect, that is entirely irrelevant. Nothing in Dr. Young’s evidence required or depended on him visiting the site. Although this is a ridiculous argument made by Benga, LLG notes that two of Benga’s witnesses (Mr. Bilawchuk²⁶³ and Ms. Grainger²⁶⁴) also acknowledged never having been to the site.
253. In the same paragraph, Benga alleges that Dr. Young’s review of the Project was “purely abstract”.²⁶⁵ That is simply not true. In fact, Dr. Young’s review was arguably less abstract than Benga’s AQA, which provides the results of predictive mathematical modelling done with no reference to the actual Chinook wind climatology of the Crowsnest Pass.

(b) Deficiencies in Benga’s Modelling of Fugitive Dust Emissions

254. By contrast, LLG submits that through cross examination, Benga’s evidence on fugitive dust emissions was shown to contain errors and inconsistencies, to be not clear and ultimately not reliable. In particular, the LLG cross-examined Mr. Rudolph extensively on

²⁶¹ *Ibid*, pp. 6190-6191.

²⁶² CIAR #962, para. 448.

²⁶³ CIAR #919, p. 5355.

²⁶⁴ CIAR #854, p. 3452.

²⁶⁵ *Ibid*.

the size of the area used in the fugitive dust modelling and “control efficiencies” for dust from the haul roads.

1. *Size of Area Modelled*

255. A key input in modelling fugitive dust emissions is the size of the area being modelled: the larger the area being disturbed and creating dust, the greater the emissions. The LLG submits that the AQA is wildly inconsistent about this key input and it is highly likely that it underpredicts fugitive dust emissions.
256. To begin, Mr. Rudolph agreed that in one place the AQA identifies the size of the “Mining Area” (i.e., the area in which dust-creating ground disturbance could be occurring) to be 161 hectares²⁶⁶ while in another place it is identified as being 121 ha. When asked about the discrepancy, Mr. Rudolph said he was unable to explain it “offhand”.²⁶⁷
257. Mr. Rudolph was then asked why his modelling assumed only 10% of the 121 ha is active for calculating wind-driven emissions (and not 5% or 15%, for example). He was unable to say, other than that it “is an estimate, I think, based on experience in other areas.” Surprisingly, Mr. Rudolph stated that the 10% figure did not come from the Applicant—the coal miner—but was “arrived at independently”.²⁶⁸
258. Next, Mr. Rudolph acknowledged that the AQA, which stated that 100% of the stockpile areas for run of mine coal and clean coal was modelled, was incorrect. In fact, only 50% was modelled.²⁶⁹ That error explained yet another discrepancy in the AQA, which is that the sum of the different areas modelled is 39 ha, not the 35 ha that was actually modelled (a discrepancy that had been noted by Dr. Young).²⁷⁰

²⁶⁶ CIAR #42, pg. 38 and CIAR #919, pg. 5417

²⁶⁷ CIAR #42, pdf. 193 and CIAR #919, pg. 5417

²⁶⁸ CIAR #919, 5420-5421.

²⁶⁹ *Ibid.*, p. 5422.

²⁷⁰ *Ibid.*

259. Yet another error apparently identified by Mr. Rudolph was that the 35 ha did not include the Reclamation Area, as stated in the AQA.²⁷¹ Later, Mr. Rudolph changed his mind and testified that the Reclamation Area was included in the 35 ha.²⁷² While Mr. Rudolph was clear on one point—that 35 ha was modelled—he acknowledged that the AQA contains no map showing the location of those 35 ha.²⁷³
260. Finally, and most importantly, Benga’s mine progression map for Year 19 (the year modelled in the AQA) shows approximately 300 ha being actively mined that year.²⁷⁴ Mr. Rudolph acknowledged that but was unable to intelligibly relate the figure of 300 ha to the “undiscounted” figure of 120 ha used in the AQA:

Q Well, sir, you've now told me something different than what you told me before. In your Appendix A to your air quality assessment, you say that the -- the active mining area in Year 19 is 121 hectares, but you assumed that only 10 percent would be active based on that roughly corresponding to a month. That's what you told me; correct?

A I did.

Q Yeah. And so the result of that was that the number you used in your modelling was roughly 12 hectares; correct?

A Correct.

Q Okay. So now we're learning that, in fact, through Year 19, there would be approximately or up to 300 hectares of active mining area, and 10 percent of that is 30 hectares, not 12; right?

A Well, 10 percent of -- of that is the -- is the -- 10 percent of 120 is 12, yes, but to get to 120, it's -- it's not a -- you know, we're still looking at the approximate area that's disturbed in a year and then what is actually happening on any given time that we're -- that we're modelling.²⁷⁵

²⁷¹ *Ibid*, p. 5424.

²⁷² *Ibid*, p. 5432.

²⁷³ *Ibid*, p. 5434.

²⁷⁴ CIAR #42, Section C, pdf. 212.

²⁷⁵ CIAR #919, pp. 5428-5429.

261. Given the lack of clarity in that response, Mr. Rudolph was given another opportunity to explain the discrepancy between the two figures (300 ha vs 121 ha), but was unable to do so in any satisfactory way:

Q Sir, how did you get from 300 hectares to 121?

A I would have to go back to my notes for that, but ...

Q You don't know?

A I've given -- I've given you the -- the -- the approach that we've used to find that. No. Do I -- do I know what was -- or, you know, precisely how -- what was done at the - you know, in 2015 when this was done? I -- I -- I don't.²⁷⁶

262. This is a major difficulty with Benga's evidence. As Dr. Young testified:

My calculations are based on the proponent's estimate of open disturbed areas totalling 35 hectares. I listened to Mr. Rudolph's discussion of this issue during cross-examination and would say that he did not make a strong argument for the figure of 35 hectares being a reasonable worst-case scenario. This is an important parameter because if it is an error, it has a direct relationship to emissions. If it is too small by say "50 percent", then emissions would increase by 50 percent.²⁷⁷

263. The difference between 30 ha and 12 ha is substantial: 150%. That means that if the correct area for modelling purposes is 30 ha (10% of 300 ha), not 12 ha (10% of 121 ha), fugitive dust emissions have been underpredicted by 150%.

2. *Haul Roads*

264. With respect to the haul roads, the AQA assumed only 30% of these roads are actively disturbed because the entire width of the road would not be used by the haul trucks.²⁷⁸ After acknowledging that haul truck traffic will be going both ways on the haul roads, Mr. Rudolph was asked:

²⁷⁶ *Ibid*, pp. 5430-31.

²⁷⁷ CIAR #943, p. 6188.

²⁷⁸ CIAR #42, pdf. 193 and CIAR #919, pp. 5424-5525.

So are you saying that 70 percent of the haul roads will not be actively disturbed notwithstanding that there's two-way traffic on them?

A Well, our assumption was that about 10 to 15 metres of the haul road would be used up at any one time; that's right.

Q Right. And I guess my question is: How does that accord with the fact that you're going to have two-way traffic on the haul roads, which, I mean, I think we can probably agree means more than 30 percent of the width of the road is going to be used?

A There are -- there are -- there will be times, certainly, when they're passing and a greater width would be used, but we're -- our assumption was that 30 percent of the haul road would be disturbed at any one time.²⁷⁹

265. In other words, the AQA failed to consider that there will be two-way traffic on the haul roads when it used the figure of 30% to represent the amount of road area that will be actively disturbed by truck traffic.

266. Based on the foregoing, LLG submits it is clear that the AQA underestimates, perhaps dramatically, fugitive dust emissions from the project.

(c) Control Efficiency

267. In the AQA, the predicted fugitive dust emissions from haul roads assumed a “control efficiency” of 80% in summer (due to watering the haul roads) and 90% in winter (due to the haul roads being frozen and/or snow-covered).²⁸⁰ The LLG submits that Benga’s own evidence does not support these control efficiencies. For example, in the AQA the summer control efficiency from the only coal mine listed as an example is 53%, well below 80%.²⁸¹

268. In response to an SIR from the Agency, Benga provided more examples of control efficiencies. Two new examples for coal mines were provided, but neither of these support

²⁷⁹ CIAR #919, p. 5425.

²⁸⁰ CIAR #42, Consultant Report 1a, pdf. 190-191.

²⁸¹ *Ibid.*, p. 191 and CIAR #919, p. 5480.

80% being a representative control efficiency on coal mine haul roads.²⁸² In fact, Benga was asked by the Agency a second time about its ability to meet the target control efficiency of 80% and in its response cited an ECCC document that suggests the highest control efficiency achievable using water (Benga's plan) is 70%.²⁸³

269. When asked about it, Mr. Rudolph acknowledged that to be correct but then suggested ECCC had updated the document and based on that update said he did not think "the assumption of 80 percent that we've made is—is out of—out of the park."²⁸⁴ Mr. Rudolph was asked to undertake to provide the updated information. In his response to the undertaking, Mr. Rudolph corrected himself and stated that the ECCC information "remains current".²⁸⁵
270. The LLG submits that Benga's own evidence does not support control efficiencies for fugitive dust emissions from haul road of 80%. Rather, the evidence supports control efficiencies at coal mines in the range of 55-70%. As stated by Benga in response to the follow-up SIR from ECCC, if the control efficiency is 50% instead of 80%, that would represent an emissions increase of 115%.²⁸⁶ Clearly, this is another way in which Benga has underestimated fugitive dust emissions from the Project.
271. Finally, it is important to note that when asked about the dust control mitigation measures it proposes, Benga confirmed that the mitigations it is proposing are the same "well known" mitigations that are used at other coal mines around the world²⁸⁷—i.e., including the ones that are unable to achieve control efficiencies of 80%.

²⁸² CIAR #55, Attachment 2, pdf. 10 and CIAR #919, pp. 5485-5486.

²⁸³ CIAR #70, pdf. 41.

²⁸⁴ CIAR #919, 5497-5498.

²⁸⁵ CIAR #928, p. 5599

²⁸⁶ CIAR #70, pdf. 42.

²⁸⁷ CIAR #919, pp. 5500-5502.

(d) Impact of Dust

272. The Sparwood Livability Study (“SLS”) was entered into evidence at the hearing.²⁸⁸ The LLG submits that it is compelling evidence that the mine will have significant nuisance and, potentially, health effects on those living in proximity to the Grassy Mountain open-pit coal mine, especially for people with respiratory conditions such as asthma.
273. According to the SLS, 75.4% of survey respondents either disagreed or strongly disagreed that the air they breathe in Sparwood is clean and healthy.²⁸⁹ Further, 73.7% of survey respondents agreed or strongly agreed that mine-related dust in Sparwood is affecting their quality of life.²⁹⁰ In fact, the SLS stated that the issue of air quality was raised “more often than any other topic throughout the engagement period, numerous stakeholders are concerned about the coal dust and air quality in and around Sparwood.”²⁹¹ With regard to the issue of respiratory health, the SLS states:

Many comments were received about air quality and the impact of coal dust on respiratory health. Some questioned the validity of local respiratory disease data that has been shared, suggesting that incidences of respiratory problems may be under-reported as workers often access health care in other communities. Many cited the lack of access to physicians, and person/family struggles with asthma.²⁹²

274. The members of the LLG do not want to suffer the fate of residents of Sparwood. They prefer that the air they breathe remain clean. Having regard to all the evidence elicited on the issue of fugitive dust emissions from the proposed Grassy Mountain open-pit coal mine, they believe that Benga has underpredicted and significantly downplayed the impact that dust from the Project will have on nearby residents.

²⁸⁸ CIAR #920.

²⁸⁹ *Ibid*, pdf 36.

²⁹⁰ *Ibid*, pdf 42.

²⁹¹ *Ibid*, pdf 56.

²⁹² *Ibid*, pdf 57.

(e) Greenhouse Gas Emissions

275. Benga's proposed open-pit coal mine at Grassy Mountain will have an operating life of 23 years, followed by four years of active reclamation, followed by many years of semi-passive selenium remediation. Therefore, the Project will produce greenhouse gas ("GHG") emissions well into the late 2040s.
276. In the AQA, Benga states that total national GHG emissions in 2013 were 726 megatonnes and total Alberta emissions were 267 megatonnes.²⁹³ The AQA predicts that the maximum GHG emissions from the Project will be 362 kilotonnes, in Year 19. Benga dismisses these emissions as insignificant, on the basis that they represent only 0.14% of 2013 Alberta GHG emissions and 0.05% of national emissions.
277. As discussed above, Canada recently gave first reading to the *Canadian Net-Zero Emissions Accountability Act* which is intended to legally bind the federal government to a process to achieve net-zero emissions by 2050. During cross-examination in the sixth topic session, Mr. Houston agreed that in order to meet the target of net-zero emissions, "we're going to have to be a long way below" 726 megatonnes by 2042.²⁹⁴ The following exchange ensued:
- Q Okay. So then it follows, I think, that this project will not only not help Canada achieve net-zero emissions by 2050, it will have the opposite effect; correct?
- A Actually, we should be finished production by 2048, so that's fortuitous.
278. With respect, this response from Mr. Houston can only be described as glib.
279. The LLG submits it is clear that by Year 19 of mine operations, national and provincial GHG emissions (having regard to Canada's increasingly stringent climate change commitments) will be significantly below 2013 levels, meaning the Project's contribution

²⁹³ CIAR #42, Consultant Report 1a, pdf 47.

²⁹⁴ CIAR #919, pp. 5518-5519.

to total emissions will be much greater than the percentages stated in the AQA. Mr. Houston's glib response notwithstanding, there is no doubt that the Grassy Mountain project will not help Canada achieve net-zero emissions by 2050 but rather will make it more difficult for that target to be met.

280. During the hearing, an article titled *Global methane emissions from coal mining to continue growing even with declining coal production* was entered in evidence as CIAR #915. Among the study's conclusions is that future coal mine methane and "after mine" methane emissions "are significantly higher than those in previous studies given the detailed analysis." Mr. Rudolph reviewed CIAR #915 and was questioned about it but expressed no opinion on this conclusion.²⁹⁵
281. The LLG is concerned that Benga's AQA underestimates fugitive methane emissions from the Project, perhaps significantly.

6. Human Health Risk Assessment

282. Pursuant to the Regulator's Terms of Reference, Benga was required to "[d]etermine quantitatively whether there may be public health impacts from the project."²⁹⁶ In response, Benga prepared a "Human Health and Wildlife Screening Risk Assessment" ("HHRA"), which was updated twice during the SIR process (in Addendum 10 and Addendum 11) because the original document was found by the Panel to be deficient.
283. The LLG submits that the Panel must apply the precautionary principle when reviewing the HHRA and assessing the evidence before it on the issue of human health. There can be no other issue than health where it is more important that the Panel have a high degree of confidence in reaching its conclusions.
284. The HHRA was reviewed for the LLG by Dr. John Dennis, who has a Masters Degree in Industrial Hygiene and a PhD in medicine. Dr. Dennis taught pollution and health risk

²⁹⁵ *Ibid.*, p. 5510.

²⁹⁶ CIAR #42, Appendix 1, pdf 39.

assessment in the United Kingdom for 20 years, focusing on occupational health. During that time, Dr. Dennis consulted to the World Health Organization and the United Nations. Dr. Dennis was eminently qualified to review the HHRA.²⁹⁷

285. Dr. Dennis prepared a report which was filed as part of the LLG's evidence, titled "Review of Human Health Risk Assessment, Benga Mining Grassy Mountain Coal Project".²⁹⁸ Dr. Dennis testified before the Panel, in Topic Session 6 on the final day of the hearing.
286. In his report and testimony, Dr. Dennis noted that Benga's HHRA is narrow in scope because all it does is provide mathematical predictions (i.e., modelling) of pollutant concentrations emitted to the environment. As described by Dr. Dennis in his testimony, the HHRA follows "a fairly linear and standard approach".²⁹⁹
287. Another way to describe the HHRA is that it is a generic, off-the-shelf document that fails to recognize and acknowledge the uncertainties and complexity inherent in assessing potential impacts of industrial activity on human health. More importantly, it completely ignores and fails to address epidemiological health studies showing an association between mountain-top removal ("MTR") open-pit coal mining in the Appalachia region of the United States and human health impacts. As stated by Dr. Dennis:

[M]y main concern, which I'll be coming to towards the end of this short presentation, is that the project EIA does not address a large body of literature which has reported health issues associated with mountaintop mining practices, and this is existing epidemiology that really should be in front of the Panel and should be considered as part of the process.³⁰⁰

288. Put simply, the HHRA "does not address real-world health studies which have reported health impacts associated with similar mining operations."³⁰¹

²⁹⁷ CIAR #552, p. 80.

²⁹⁸ *Ibid*, p. 64.

²⁹⁹ CIAR #943, p. 6200.

³⁰⁰ *Ibid*, p. 6197.

³⁰¹ *Ibid*, p. 6200.

(a) Failure to acknowledge and address complexity

289. In his testimony, Dr. Dennis succinctly summarized the numerous steps or components in a HHRA, each of which requires the application of professional judgment and the production of estimates in the modelling process:

- Identification of chemical emissions
- Estimation of emission concentrations to air, water and land
- Estimation of dilution rates (particularly problematic in the Crowsnest Pass area of Alberta where local Chinook winds can be very strong and challenge the validity of models used to predict emission rates and pollution dispersion)
- Estimation of exposure dose (inhalation, ingestion, absorption)
- Estimation of ‘safe’ exposure limits – these are derived from a combination of sources from Canada, US, Europe and international organizations (e.g. WHO)
- Estimation of human health risk from individual chemical vs chemical group exposures
- Estimation of risk to human health from exposure to mixtures of chemicals
- Potential synergism
- Ever-evolving understanding of the health impacts of pollutants on healthy and compromised people of substances originally considered not harmful (e.g., asbestos, lead, benzene, hexavalent chromium, smoking, etc.)³⁰²

290. Given the number of estimations or “guesstimates” that must be made in a HHRA, each of which builds on the others, any conclusions about the significance of impacts must be treated cautiously (in accordance with the precautionary principle) and not as definitive

³⁰² CIAR #935, p. 6.

predictions of health risk. Yet that is how they are presented by Benga (and indeed all proponents).

(b) Failure to address and acknowledge relevant epidemiological studies

291. At the hearing, LLG cross-examined the author of the HHRA, Mr. Mitchell. As acknowledged by Mr. Mitchell, “epidemiology is actually studying populations that have been — and these are in the chemical risk assessment context — have a known exposure to a chemical and assessing the effects — the health effects”.³⁰³ [emphasis added]
292. Because epidemiological studies “actually study” real people who have suffered real exposures, Dr. Dennis described them as “the gold standard”.³⁰⁴ By contrast, when asked whether it would be preferable to have actual epidemiological information instead of having to make predictions, Mr. Mitchell was reluctant to agree. However, when asked whether it would not be better if, in addition to laboratory studies, you also had epidemiological studies, he agreed, “where we have good epidemiological studies”.³⁰⁵
293. Notwithstanding Mr. Mitchell’s equivocations, the LLG submits that it is clear that epidemiological studies of actual populations are superior to studies that rely wholly on predictive modelling.
294. In his report and testimony Dr. Dennis described an extensive epidemiological literature in which human health effects are associated with MTR open-pit coal mining. He pointed to 33 different peer-reviewed studies showing these associations. The co-author of many of these studies is Dr. Michael Hendryx, a statistics epidemiologist and professor in the U.S. In a personal communication to Dr. Dennis (attached as an appendix to Dr. Dennis’s report³⁰⁶), Dr. Hendryx summarized the findings from these studies as follows:

³⁰³ CIAR #919, pp. 5534-5535.

³⁰⁴ CIAR #943, pp. 6221 and 6222.

³⁰⁵ CIAR #928, pp. 5563-5564.

³⁰⁶ CIAR #552, pdf. 46

Mountaintop removal coal mining in central Appalachia, is associated with human health problems:

- *Higher cancer rates*
- *Higher heart and lung disease rates*
- *Higher kidney disease rates*
- *Higher rates of birth defects*
- *Higher levels of impaired functioning due to health problems*

The pattern of results shows that:

- *Health problems are present after statistical adjustment for age, smoking, obesity, poverty, education, availability of doctors, and other risks*
- *Health problems are most severe in areas where amounts of mining are greatest*
- *Health problems in mountaintop removal mining areas are worsening in more recent years versus earlier years*
- *Health problems are present for men, women and children and reflect more than occupational exposure.*

295. In its Final Argument, Benga criticized this evidence, suggesting that it is hearsay.³⁰⁷ Quite apart from the fact that the AER and tribunals like the Panel receive hearsay evidence all the time, the LLG notes that Benga elected not to raise the legitimacy of Dr. Hendryx's email with Dr. Dennis during cross-examination. If Benga really believes the personal communication from Dr. Hendryx is not legitimate, it was obligated to put that to Dr. Dennis during cross-examination. Since it did not, Benga cannot object to the evidence on that basis.

296. When asked about this body of epidemiological literature, Mr. Mitchell acknowledged that he is aware of it but made no mention of it in the HHRA:

³⁰⁷ CIAR #962, para. 528.

Q Sir, do you acknowledge that there is extensive epidemiological literature on the health of populations living near mountaintop removal mining in the Appalachia region in the eastern United States?

A I acknowledge that there -- there have been epidemiological studies done on these populations.

Q Thank you.

And your human health risk assessment makes no reference at all to any of that literature, does it?

21 A Not specifically.³⁰⁸

297. Dr. Dennis testified that these 33 studies were subjected to a “meta analysis” by the U.S. federal government. Each paper was reviewed by two different qualified reviewers who independently reviewed each study. Each paper was reviewed according to strict criteria to assess potential problems such as bias, appropriateness of the methods used, etc. If the two reviewers disagreed, a third, senior reviewer arbitrated. The meta analysis concluded that though there is no one study that unequivocally proves that MTR open-pit mining causes health impacts, there is evidence of health impacts and that further research is needed.
298. Not surprisingly, Benga argues that these studies are inconclusive and that a direct link between the exposures and health effects cannot be confirmed. In his direct evidence, Dr. Dennis was asked if he agreed and responded as follows:

A No. Every study will have limitations, and any one of these studies, in isolation, you could say, Well, it's just the one study. There's just too many of them. They're all showing the same thing.³⁰⁹

...

[There] are just too many of these studies all pointing the same direction. Each of them does have a limitation. Each of them has noise. All epidemiology does.³¹⁰

³⁰⁸ CIAR #919, p. 5535.

³⁰⁹ CIAR #943, p. 6219.

³¹⁰ *Ibid.*, p. 6221.

299. In its Final Argument, Benga says that the Panel “cannot take any assurance that the Appalachian studies are relevant at all” to Grassy Mountain and suggests that they are not because of the unique geography and geology of the Appalachian Mountains.³¹¹
300. In response, the LLG submits that it was incumbent on Benga to bring this literature to the Panel’s attention and demonstrate, if it could, that it is not relevant to Grassy Mountain. Instead, Benga brazenly ignored the existence of this literature, even though its human health expert Mr. Mitchell was aware of it. But for LLG retaining Dr. Dennis, the Panel would never have been made aware that there is an extensive body peer-reviewed literature in which human health effects are associated with MTR open-pit coal mining. The Panel should not lightly accept that Grassy Mountain is sufficiently different from the Appalachian Mountains to render the entirety of that extensive literature irrelevant.
301. The LLG submits that Benga has put the Panel in a difficult position by not being forthcoming about the existence of the epidemiological studies of human health impacts from MTR open-pit coal mining in Appalachia. The Panel should not sanction such conduct by letting Benga off the hook and approving the Project. The precautionary principle dictates, in these circumstances, that the Panel consider this important evidence.

7. Impacts vs Benefits from the Project

302. As noted above, the LLG submits that the adverse environmental effects of Benga’s proposed mountaintop removal, open-pit coal mine are significant. The question is, then, are they worth it? LLG submits the answer, clearly, is No.
303. Broadly speaking, Benga claims that the Project will create socio-economic benefits including employment, royalties and taxes to the three levels of government, and benefits to the economy in the Crowsnest Pass through increased spending by suppliers and local businesses. Benga conducted a Socio-Economic Impact Assessment³¹² (“SEIA”) which it

³¹¹ CIAR #962, para 531.

³¹² CIAR #42, Consultant Report 11.

says supports the existence of these benefits. The SEIA was supplemented by a Cumulative Effects Assessment on socio-economics prepared in response to SIRs from the Agency.³¹³

(a) The SEIA does not support Benga’s claims about Project benefits

304. The LLG retained Dr. Chris Joseph, a resource economist and specialist in impact assessment, to review the SEIA. Dr. Joseph’s evidence will be reviewed below. To begin, however, the LLG submits that you do not have to be an expert to know that the benefits claimed by Benga are not actually significant. All you have to do is read the SEIA, in particular Table 12.1. In that table, Benga’s consultant Nichols Applied Management (“Nichols”) presents its evaluation of the significance on socio-economic Valued Components (“VC”). Because of its importance, the LLG here reproduces in its entirety Table 12.1:

Table 12.1: Project Operations Residual Effects on Socio-Economic VCs

VC	Nature of Potential Impact or Effect	Mitigation/ Protection Plan	Geographical Extent of Impact ¹	Duration of Impact ²	Frequency of Impact ³	Ability for Recovery ⁴	Magnitude ⁵	Project Contribution ⁶	Confidence Rating ⁷	Probability Occurrence ⁸	Significance ⁹
Income	<ul style="list-style-type: none"> Project expenditures will generate income for businesses and workers 	<ul style="list-style-type: none"> See Section 4.2.3 	Regional/ Provincial	Long	Continuous	Reversible in long-term	Low	Positive	High	High	Not Significant
Government Revenue	<ul style="list-style-type: none"> The Project will generate revenue for government 	N/A	Regional/ Provincial/ National	Long	Continuous	Reversible in long-term	Low to Moderate	Positive	High	High	Not Significant
Employment	<ul style="list-style-type: none"> Project activities will generate employment opportunities 	<ul style="list-style-type: none"> See Section 4.2.3 	Regional/ Provincial	Long	Continuous	Reversible in long-term	Low	Positive	High	High	Not Significant
Population	<ul style="list-style-type: none"> The operations jobs created by the Project are expected to be filled primarily by in-migrants to the region, thereby increasing the permanent population in the RSA. 	<ul style="list-style-type: none"> See Section 5.4 	Regional	Long	Continuous	Reversible in long term	Low	Mixed	High	High	Not Significant

³¹³ *Ibid*, Addendum 8, Appendix A-1.

VC	Nature of Potential Impact or Effect	Mitigation/Protection Plan	Geographical Extent of Impact ¹	Duration of Impact ²	Frequency of Impact ³	Ability for Recovery ⁴	Magnitude ⁵	Project Contribution ⁶	Confidence Rating ⁷	Probability Occurrence ⁸	Significance ⁹
Housing	<ul style="list-style-type: none"> Project-related population increases will increase demand for housing in the RSA. 	<ul style="list-style-type: none"> See Section 6.4 	Regional	Long	Continuous	Reversible in long term	Moderate	Positive	High	High	Not Significant
Social Infrastructure	<ul style="list-style-type: none"> Project-related activities, workers, traffic, and population effects will place demands on social infrastructure in the RSA 	<ul style="list-style-type: none"> See Section 7.4 	Regional	Long	Occasional to Periodic	Reversible in long term	Low	Negative	High	High	Not Significant
Municipal Infrastructure and Services	<ul style="list-style-type: none"> Project-related activities and population will place demands on municipal infrastructure in the RSA 	<ul style="list-style-type: none"> See Section 8.4 	Regional	Long	Continuous	Reversible in long term	Moderate	Negative	High	High	Not Significant

VC	Nature of Potential Impact or Effect	Mitigation/Protection Plan	Geographical Extent of Impact ¹	Duration of Impact ²	Frequency of Impact ³	Ability for Recovery ⁴	Magnitude ⁵	Project Contribution ⁶	Confidence Rating ⁷	Probability Occurrence ⁸	Significance ⁹
Traditional Land Use and Culture	<ul style="list-style-type: none"> Project-related local wage employment opportunities and land use might affect local traditional land use and associated social and cultural conditions for local Aboriginal communities. 	<ul style="list-style-type: none"> See Section 9.4 Project-specific effects on traditional land use can be found in the Aboriginal Consultation , Traditional Ecological Knowledge and Land Use section of the EIA 	Regional	Extended	Continuous	Reversible in long term	Low	Mixed	High	High	Not significant
Transportation	<ul style="list-style-type: none"> The transportation of materials, equipment and workers will increase traffic in the RSA. 	<ul style="list-style-type: none"> See Section 10.4 	Regional	Long	Continuous	Reversible in long term	Moderate	Negative	High	High	Not Significant

VC	Nature of Potential Impact or Effect	Mitigation/Protection Plan	Geographical Extent of Impact ¹	Duration of Impact ²	Frequency of Impact ³	Ability for Recovery ⁴	Magnitude ⁵	Project Contribution ⁶	Confidence Rating ⁷	Probability Occurrence ⁸	Significance ⁹
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¹Local, Regional, Provincial, National, Global
²Short, Long, Extended, Residual
³Continuous, Isolated, Periodic, Occasional, Accidental, Seasonal
⁴Reversible in short term, Reversible in long term, Irreversible - rare
⁵No Impact, Low Impact, Moderate Impact, High Impact
⁶Positive, Mixed, Negative
⁷Low, Moderate, High
⁸Low, Medium, High
⁹Significant, Not significant

305. It is crystal clear, looking at Table 12.1, that Nichols—Benga’s own consultant—rates the positive effects of the project as being of “low magnitude” and “not significant”. To summarize:

(a) for Income, which Nichols describes as “Project expenditures will generate income for businesses and workers”, the magnitude of this positive project effect is rated as low and its significance as “Not significant”;

(b) for Government Revenue, which is described as “The Project will generate revenue for government”, the magnitude is rated as low to moderate³¹⁴ and its significance as “Not significant”;

(c) for Employment, which is described as “Project activities will generate employment opportunities”, the magnitude is rated as low and the significance as “Not significant”;

(d) for Housing, which is described as “Project-related population increases will increase demand for housing in the RSA”, the effect is rated as being positive, the magnitude as moderate and the significance as “Not significant”.

306. To reiterate, *Benga’s own evidence does not support its claims to significant socio-economic benefits from the Project.*

307. Interestingly, on April 30, 2018, in the 6th Addendum, Benga filed an updated version of Table 12.1 which contained no change in either the way the information was presented in the table or in its content.³¹⁵ However, on June 19, 2020, Benga filed, as part of Addendum 12, another updated version of Table 12.1.³¹⁶ This second updated version presented the information in a different way. Following is an example, for the “Income” VC:

³¹⁴ Moderate at the regional level, low at the provincial and national levels: CIAR #42, CR 11, pdf 23.

³¹⁵ CIAR #42, 6th Addendum, pdf 545 and CIAR #771, pp. 1047-1048.

³¹⁶ CIAR #42, Addendum 12, pdf 111.

Pathway of Effect	Description of the Effect	Description of the Mitigation or Commitment	Reference	Description of Residual Effects	Residual Effects Conclusion
1. Changes to regional income.	Construction and operation of the Project may result in a change in income of households and individuals in the region.	1. No mitigations required.	EIA, CR #11, CIAR #42	Project contribution is positive during both construction and operation as the Project will contribute to increased incomes to individuals, households, and businesses in the region.	No adverse residual effect

308. As can be seen, in the second updated version of the Table, Benga does not assess the significance of the positive effects from the Project but rather simply notes that for those VCs there is predicted to be “No adverse residual effect.”

309. Under cross-examination by the Coalition, Mr. Shewchuk stated that in the SEIA he only assessed project “impacts”, not benefits, and concluded that they are not significant. Ms. Okoye asked:

So which one is it? Is it that the projects impacts are not significant or that the project benefits are not significant. Which one is it?³¹⁷

A MR. SHEWCHUK: Mr. Chair, Ms. Okoye, I'd -- I'd like to take you to CIAR 89 at Addendum 8, filed in October of 2018. On document page 319, you can see the definition we used to establish significance for socioeconomic effects. And you'll note that significance is predicated on the effect being adverse. And so I believe when we characterize an effect as being significant, it's with respect to it having an adverse effect.³¹⁸ [emphasis added]

310. With respect, that answer was wrong and simply not true, as Mr. Shewchuk was later forced to admit. First, the reference he gave was incorrect, but that’s a small matter.³¹⁹ Second, and more importantly, when the LLG was cross-examining Mr. Shewchuk on the SEIA, the following clarifying points were elicited:

- the SEIA does, indeed, identify both positive and negative project effects;³²⁰
- in fact, this is required by AEP;³²¹

³¹⁷ CIAR # 762, p. 831.

³¹⁸ *Ibid*, pp. 831-832.

³¹⁹ The correct reference was CIAR #89, pdf 686.

³²⁰ CIAR #771, pp. 1028-1029.

³²¹ *Ibid*, p. 1029.

- while the term “benefit” has “certain meanings within different analytical frameworks”, a positive impact can be characterized as one that is “beneficial”;³²²
- in the SEIA, the analysis of project contribution, magnitude and significance is the same with respect to positive and negative effects;³²³

311. Most importantly, Mr. Shewchuk clarified that the statement that a significance determination is predicated on the effect being adverse is contained in Benga’s updated cumulative effects assessment for socio-economic VCs, a document that was prepared for and at the request of the Agency. He also acknowledged that, unlike in Alberta, the federal environmental assessment regime does not require the assessment of positive effects, just negative effects.³²⁴ He testified:

A So -- so, Mr. Chairman, it's -- it's true that the -- the requirements for the cumulative effects assessment are different at the provincial and the federal level. And in this Addendum 8, Benga had been asked to repackage the previous assessment and -- and supplement it where required to explicitly meet the -- the federal requirements.

...

So, as I said, this cumulative effects assessment we’re looking at it specifically targeted to—to address the requirements of the CEA, 2012.³²⁵ [emphasis added]

312. This line of questioning concluded as follows:

Q Right. So, Mr. Shewchuk, back to you. That's why in Addendum 8 at PDF page 686, you identified to the Agency that ... only adverse effects were ... looked at for significance; correct?

A MR. SHEWCHUK: Mr. Chair, that's correct. I would like to point out, though, we were asked to draw positive effects through into the residual effects analysis.

Q By whom?

³²² *Ibid.*

³²³ *Ibid.*, pp. 1036-1037.

³²⁴ CIAR #771, pp. 1050-

³²⁵ *Ibid.*, p. 1052.

A I believe that was direct -- may I confer with my colleagues for a moment, please?

Q Sure.

A Mr. Chair, that would be CEA.

Q Right. So you were asked -- I guess to try to draw a bow on this, you were asked on Friday by Ms. Okoye whether you were assessing project impacts or project benefits as being not significant, and you referred her in your answer to this passage that you just read into the record, which is from the updated cumulative environmental assessment that was done for the Agency in October 2018; correct?

A Yes, that's correct, Mr. Chair.

Q All right.

So the context for the statement that residual effects are considered significant if the effect on socioeconomic conditions is adverse was made -- or that context is that it was the -- the statement was made for CEA, that doesn't require the assessment of positive effects; correct?

24 A Yes, Mr. Chair.³²⁶ [emphasis added]

313. The LLG has emphasized this testimony because it confirms what is clear from the face of the SEIA; namely, that for the purposes of Alberta's requirements, Benga did assess the significance of positive project effects (i.e., project benefits). And Nichols assessed those positive effects — every single one — as being “Not significant”.
314. Finally, Mr. Shewchuk was questioned about the Teck Frontier hearing, at which both he and Dr. Joseph were witnesses. He confirmed that, as reflected in the decision report from the Teck hearing, the Joint Review Panel in that proceeding assessed the significance of the predicted positive economic effects of the project.³²⁷
315. As in the Teck proceeding, this Panel is required to assess the significance of the predicted positive economic effects of the Grassy Mountain Project. The Panel need look no further than Table 12.1 in the SEIA to inform itself that these effects are predicted to be not significant.

³²⁶ CIAR #771, pp. 1052-1053.

³²⁷ *Ibid.*, p. 1096.

(b) Shortcomings of Benga's SEIA

316. Not only does the SEIA not support Benga's claim of substantial economic benefits from the Project, it suffers from many shortcomings that render it of dubious utility for the Panel.
317. As noted above, Benga's SEIA was reviewed for the LLG by Dr. Joseph. Dr. Joseph prepared a report titled "Review of Grassy Mountain Coal Mine Economic Impact Assessment", which was filed as part of the LLG's evidence.³²⁸
318. As indicated in his CV, attached to his report,³²⁹ Dr. Joseph has Bachelors, Masters and Doctorate degrees in resource and environmental management. His PhD was focused on major project impact assessment. He has written peer-reviewed journal articles on, and is a leading expert in, the field of impact assessment. The Grassy Mountain hearing was Dr. Joseph's ninth appearance as an expert witness in the field. Dr. Joseph has consulted to, among other bodies, Environment Canada and has participated in research for the Impact Assessment Agency of Canada.
319. In his report, Dr. Joseph came to several conclusions about Benga's SEIA, including:
- 1) the SEIA did not use a methodology that allows the Panel to understand what the net benefits of the Project will be; instead, it assessed gross impacts;
 - 2) Benga's conclusion that the Project will generate "major economic development and community benefits" is not supported by the SEIA;
 - 3) The SEIA's accounting of Project economic impacts is partial, in that impacts such as competition for labour, incremental financial burdens on government and the social costs of carbon have not been assessed;

³²⁸ CIAR #552, pdf. 129.

³²⁹ *Ibid*, pdf. 150

- 4) Benga's methodology assumes no constraints on labour or other forms of capital, and ignores various costs, and therefore is not capable of assessing net economic impacts;
 - 5) The SEIA contains limited acknowledgement and discussion of the effect of uncertainty on its economic impact predictions, notwithstanding that certain factors (in particular the price of coal) are highly uncertain; therefore, the SEIA's conclusions are not robust;
 - 6) The SEIA fails to define key terms in its effects characterization, making it impossible to validate the conclusions of no-significant effects;³³⁰
320. In addition, during cross-examination, Mr. Shewchuk acknowledged the following with respect to the SEIA:
- the SEIA separately assessed labour income, taxes and royalties; while Mr. Shewchuk did not agree this constituted "doubt counting" he did agree that these indicators are not additive;³³¹
 - similarly, there is "a parallel" between the metrics of employment and labour income;³³²
 - the SEIA is predicated on increased demand for nonrenewable energy and as of the date of the hearing Benga continues to hold that position;³³³
 - the SEIA did not assess the social costs of carbon emissions;³³⁴

³³⁰ CIAR #552, pdf 130-131.

³³¹ CIAR #771, pp. 1038-1039.

³³² CIAR #771, pp. 1039-1042.

³³³ *Ibid*, pp. 1042-1045.

³³⁴ *Ibid*, p. 1078.

- the effects of the Project on Canada’s ability to meet its 2030 greenhouse gas emission target and commitments under the Paris Agreement were considered in the SEIA;³³⁵
- the SEIA only assessed gross economic impacts, not net impacts, because of the input-output methodology (“**IOM**”) employed;³³⁶
- the IOM methodology assumes there are no constraints on project inputs such as labour and other forms of capital;³³⁷
- the SEIA did not assess the potential monetary costs of the Project on social and physical infrastructure;³³⁸

321. To test the SEIA’s conclusions, in view of the deficiencies identified and the considerable uncertainty around key inputs such as coal price, Dr. Joseph ran a limited-in-scope cost-benefit analysis (“**CBA**”). The inputs and assumptions used in the CBA are set out in Table 1 in Dr. Joseph’s report. The results of the analysis are set out in Table 2. Those results show that for 6 out of 16 scenarios run, a negative Net Present Value (“**NPV**”) for the Project is indicated. In addition, two other scenarios have very low positive NPVs (\$59 Million and \$130 Million).³³⁹

322. While more of the scenarios run by Dr. Joseph have a positive NPV than a negative NPV, in his discussion of these results Dr. Joseph explains that “there are several reasons why a near-zero or even negative NPV result is likely”. These include the likelihood of coal prices continuing to fall as the world moves away from fossil fuels, construction cost overruns and substantial social costs of carbon, which are anticipated to grow significantly as Canada sets new and more stringent climate change targets.

³³⁵ *Ibid*, p. 1080.

³³⁶ *Ibid*, p. 1090.

³³⁷ *Ibid*, p. 1094-1095.

³³⁸ *Ibid*, p. 1095.

³³⁹ CIAR #552, pdf 143-145.

323. Mr. Shewchuk freely acknowledged that what Nichols did was not a cost-benefit analysis.³⁴⁰ He testified that this was “in keeping with the terms of reference and other filed applications”.³⁴¹ For example, Nichols prepared a SEIA for Teck Frontier.
324. While doing a SEIA using economic impact analysis and input-output methodology may be common in the oil sands context, the LLG submits it is insufficient in the context of a coal mine application under the CCA.
325. As noted earlier, Benga was required to and did file its CCA application pursuant to Directive 061. Directive 061 was originally issued in 1978. Section 5 of Directive 061 applied to “Initial Coal Mining Applications”. Subsection 5.7 (on page 65) outlined the requirements for an “Economic Assessment” of the proposed mine. Directive 061 is no longer available online, so s. 5.7 is reproduced below:

³⁴⁰ CIAR #771, p. 1032.

³⁴¹ *Ibid*, p. 1090.

5.7 ECONOMIC ASSESSMENT

The economic assessment and the EIA (see section 5.6 of this guide) should be submitted as one document.

The economic assessment of a coal mining project should generally include

- a broad description of the general desirability of the project
- an evaluation of the commercial viability of the project
- an economic impact analysis of the project at the local and provincial levels
- a benefit-cost analysis in terms of Alberta
- and a benefit-cost analysis in terms of Canada where coal, or electric power generated from coal, is destined for markets outside Alberta

Commercial Viability

Where coal is destined primarily for markets outside Alberta or for generation of electric power at a power plant dedicated for export, you must appraise the commercial viability of the project, and include projections, on an annual basis, of

- revenues from production
- itemized capital investment and operating costs
- interest on debt and some discussion of the project financing
- capital cost allowance and debt retirement schedules, royalties, and taxes
- net cash flow to shareholders
- discounted-cash-flow rate of return.

You must also appraise the sensitivity of expected return on investment to changes in the major cost items and variations in the discount rate.

Where the coal is to be dedicated to a mine-mouth power plant or to an industrial use within Alberta,⁵ you must assess

- the levelized cost of coal together with a justification of the discount rate assumed in calculating the levelized cost
- the capital cost, with labour and material costs shown separately
- the payroll cost during the operating phase of the project

Economic Impact Analysis

You must estimate for the project, both locally and provincially,

- its economic impact, including a detailed description of all types of local expenditure
- the associated income multipliers
- the total direct and indirect income generated

Benefit-Cost Analysis

You should submit

- an evaluation of all quantifiable direct benefits and costs incurred each year during construction and operation of the proposed project, as outlined within the commercial viability evaluation and as they pertain directly to Alberta and Canada
 - a summary of additional quantifiable public benefits and costs incurred each year during the construction and operation of the project, as outlined in other sections of the application and as they pertain directly to Alberta and Canada.
-

- the discounted net benefit of the project determined by using an appropriate discount rate, and a discussion of the rationale for selecting that rate
- an appraisal of the sensitivity of the net present value both to changes in the major cost items and to variations in the social discount rate
- a summary of any non-quantifiable benefits and costs incurred during the life of the project as outlined in other sections of the application and as they pertain directly to the province (environmental, social, etc.)
- an appraisal of the broad desirability of the project for the province having regard for
 - commercial viability
 - quantifiable benefits and costs to provincial and local government
 - quantifiable and non-quantifiable benefits and costs to the environment and to society

172. Clearly, Benga’s SEIA fails to comply with the comprehensive information requirements set out in s. 5.7 of Directive 061, which specifically require that a benefit-cost (i.e, cost-benefit) analysis be done for coal mine applications. The LLG has been unable to find any indication on the record that Benga asked to be relieved of the obligation to meet these requirements or was granted such relief by the Regulator.

(c) The magnitude of the predicted positive economic effects is lower than originally predicted

173. As discussed above, in the SEIA Nichols concluded that the magnitude of most of the positive economic effects from the Project are of “low magnitude”. That was in 2016, when the SEIA was originally prepared.

174. It is a matter of record that both Dr. Joseph and the socio-economics expert for the Coalition, Mr. Thompson, identified an error in Benga’s calculation of construction labour.³⁴² The error was that in the SEIA Nichols confused “person years” of construction

³⁴² See, e.g., CIAR #552, pdf 141-142.

for “person quarters”. The correction of this error, after it was discovered by experts retained by hearing participants, resulted in substantial reductions in key economic VCs, such as construction GDP and labour income. These downward reductions are summarized in CIAR #788.

175. Briefly, the most noteworthy reductions are:

- construction GDP in Alberta decreased by 32% from \$265 Million to \$163 Million;
- labour income in Alberta decreased by 39% from \$192 Million to \$98 Million;
- construction GDP in B.C. decreased by 22% from \$70 Million to \$47 Million;
- construction labour income in B.C. decreased by 40% from \$49 Million to \$29 Million.³⁴³

(d) The economic benefits from the Project, in particular government revenues, are highly sensitive to coal prices

176. In Benga’s opening statement at the commencement of the hearing, Mr. Houston stated that royalties and taxes payable to the provincial and federal governments are expected to total \$1.7 Billion over the life of the Project. This is based on an assumed coal price of \$140 USD/tonne.

177. The evidence is clear that the predicted economic benefits of the Project are highly sensitive to coal prices. Therefore, if coal prices go down so too do government royalties and taxes.³⁴⁴ So, for example, in its response to a SIR from the JRP, Benga confirmed that if a coal price of \$100 USD/tonne is used, the amount of government taxes and royalties drops substantially, to \$437 Million (\$19 Million per year).³⁴⁵

³⁴³ CIAR #788.

³⁴⁴ CIAR #771, p. 1063-1064.

³⁴⁵ *Ibid*, pp. 1064-1065.

178. It is noteworthy that Mr. Youl testified that metallurgical coal prices “have collapsed in the recent couple of months”.³⁴⁶ During the first Topic Session, metallurgical coal prices were approximately \$100/tonne, significantly below Benga’s assumed price of \$140/tonne.³⁴⁷
179. The evidence on what coal prices Benga will get for production from Grassy Mountain is further muddied by the fact the figure of \$140 USD/tonne is not what Benga actually expects to receive; rather, it is “an indicator” or “marker” price which will be subject to some kind of discount which Benga refused to disclose. Obviously, government taxes and royalties will be paid on the actual price received by Benga, not its indicator or marker price.³⁴⁸

(e) Benga has assessed economic and environmental effects based on different coal prices

180. As discussed above, Benga’s projection of economic benefits from the Project are based on a coal price of \$140 USD/tonne. Yet the adverse environmental effects assessed by Benga are based on a coal price of \$100 USD/tonne.
181. In the second topic session on geology and mining, the LLG cross-examined Benga on how it designed the pit. This process is described in Benga’s application materials as the “pit optimization” process. Mr. Youl confirmed that the goal of pit optimization is to design a pit that will get you the most coal for the least cost.³⁴⁹
182. The pit optimization process is explained in Section C of the EIA, starting at pdf 17, and was discussed with Mr. Youl during cross-examination. Basically, Mr. Youl confirmed that Benga looked at a series of “nested” pit configurations with sizes based on coal prices ranging from \$90/tonne to \$170/tonne. The \$90/tonne pit was the smallest, followed by

³⁴⁶ *Ibid*, pp. 954.

³⁴⁷ *Ibid*, p. 1070.

³⁴⁸ *Ibid*, pp. 1087-1089.

³⁴⁹ CIAR #793, p. 1839.

the \$100/tonne pit, etc. up to the \$170/tonne pit, with each pit nested in the next largest pit. These nested pits are depicted in Fig. C.1.2-1.³⁵⁰

183. The pit selected by Benga is the \$100/tonne pit. However, additional coal resources exist, particularly to the north, and these “additional resources could be accessed through a northern expansion of the currently proposed mining pit should the economics prove favourable.”³⁵¹
184. Mr. Youl was asked about this statement and whether it meant that if Benga actually gets a selling price of \$140/tonne for its coal, expansion of the pit to the north might be pursued. This exchange with Mr. Houston ensued:

Well, I think what I just heard you say, Mr. Houston, is that, yes, if you get consistently high prices for your coal from Grassy Mountain, you might consider expanding the pit?

A And -- and if the --

Q Is that correct?

A Well, there are other factors. I --

Q Well, that may be, but is that correct?

A I would say if the resource turns out to be like we think it is, based on our preliminary geology and geotechnical information, and if prices maintain and the other things you mentioned, we may consider expanding the pit, yes.³⁵² [emphasis added]

185. In its Final Argument, Benga argues that it would be “inappropriate to speculate about possible future expansions” in this proceeding. The LLG disagrees. Regardless, what Benga doesn’t address is that there is a lie at the core of Benga’s case, which is that it has

³⁵⁰ CIAR #42, Section C, pdf 190.

³⁵¹ *Ibid.*, p. 45.

³⁵² CIAR #793, p. 1873.

assessed environmental effects of a mine design based on \$100/tonne coal while it touts the benefits from the Project based on \$140/tonne coal:

Sir, the environmental effects of this project are based on the pit as applied for; correct?

A That's correct.

Q And that pit size is based on a-hundred-dollar coal, isn't it?

A Yes, it is.

Q All right.

The benefits that Benga says will accrue as a result of this project, however, are based on \$140 coal?

A But based –

Q That's what you're saying?

A Based on a market price of 140 US dollars, yes.³⁵³

186. Put simply, the environmental effects are being underestimated and the economic benefits are being oversold. The Panel should not accept this.

(f) Impact of the Project on Tourism

187. Benga claims that its proposed open-pit coal mine and the tourism are industry “are mutually supportive.” The argument is that the mine will grow the local economy, which will support local businesses like restaurants and hotels and this, in turn, will help make the Crowsnest Pass a more attractive tourist destination.³⁵⁴ LLG submits this argument is specious.

³⁵³ CIAR #793, p. 1877.

³⁵⁴ CIAR #771, p. 1012.

188. For example, when asked whether the existing Teck open-pit coal mines have had the effect of boosting tourism in Sparwood, Mr. Houston declined to answer.³⁵⁵ Mr. Houston did, however, acknowledge that tourists do not typically go to Sparwood but rather carry on to Fernie.³⁵⁶ This led to the following exchange:

Q All right.

So you've raised Fernie. So let me ask you ... sir, in your view, do people go to Fernie because it has nice restaurants and -- and interesting stores, or do they go there to ski in the winter and hike and bike in the summer?

A I -- Mr. Chairman, you know, as an amateur tourist myself, I know when I go to a location like Fernie that I look for the whole package. So I -- I enjoy nice accommodations; I enjoy a variety of restaurants; and then, of course, the activities that are available there, you know, are -- are part of the package as well. But I go for the whole package.

Q So, sir, let me ask this another way: Which came first? The ski hill and the experience of hiking and biking, or the restaurants and the shops?

A Yeah. I -- I think everything has to come together. It's probably a lot of effort by the local community to develop everything in -- in parallel, I -- I would think.

Q Sir, would you agree with me that tourist towns need a draw or an attraction?

A I'm just trying to think of some examples, Mr. Fitch, but I -- I guess, yes, as a tourist, you would go somewhere for a reason.

Q And isn't the draw or the attraction in Fernie and -- and in Crowsnest Pass the same, which is mountains, nature, rivers, recreational possibilities? You agree with that, sir?

A From a tourism point of view, absolutely.

Q So how, then, is removing the top of one of the local mountains going to contribute to attracting or drawing more tourists?

³⁵⁵ *Ibid.*, p. 1014.

³⁵⁶ *Ibid.*

A So, Mr. Chairman, we're going to talk a lot about our -- our reclamation program, about the environmental mitigation measures that Benga has proposed for this mountain, and that's all coming up in -- in the next few weeks.

Our objective with this project is to, first of all, mine the coal and derive economic benefit for the region in terms of jobs, in terms of GDP, perhaps in terms of helping to support local services, but – but we also have proposed environmental mitigations to ensure that the site is reclaimed and brought back to a -- a natural state, and that will all happen, as we've mentioned, during the course of the mining, so that by the time we're finished mining, two-thirds of the site will have already been reclaimed.

So with those environmental protections and – and that planning in place, we -- we see that this mine can coexist with a -- a tourism industry in a region like this.

Q Mr. Houston, tourists don't go to look at open-pit mines, do they?

A Not -- not in general, Mr. Fitch.³⁵⁷

189. With respect, LLG submits that mountaintop removal, open-pit coal mines are clearly not compatible with tourism and the effect of the Project on local tourism will undoubtedly be negative. When asked about this, Mr. Shewchuk argued that Benga's Land Use Report³⁵⁸ states that project impacts on tourism will be "neutral". When asked how that could be, Mr. Shewchuk said he was unable to answer as he was not the author of the Land Use Report. The question never was answered.

VI. CONCLUSION

190. For the reasons discussed above, the LLG submits that the Grassy Mountain Project is not in the public interest, having regard to its social and economic effects and its effects on the environment and landowners. Therefore, the LLG respectfully requests that the Panel, exercising its jurisdiction under provincial legislation, deny Benga's application.

³⁵⁷ *Ibid*, p. 1014-1016.

³⁵⁸ CIAR #42, Consultant Report 10, pdf 72.

191. The LLG also submits that the Project will have significant adverse environmental effects and that Benga's proposed mitigation measures, including its water management and its conservation and reclamation plans, fail to render those environmental effects non-significant. Further, the LLG submits that the evidence clearly demonstrates that these significant adverse environmental effects are not justified in the circumstances. The LLG respectfully requests that the Panel include in its report to the Minister recommendations to this effect.
192. If the Panel is not prepared to deny the Project outright, but rather thinks that the Project's many shortcomings can be addressed through the imposition of conditions, the LLG submits that:
- those conditions must be stringent enough to ensure, to the extent it is possible to do so, that the mitigations proposed by Benga will be effective to render the significant adverse environmental effects acceptable;
 - many of the most important conditions the Panel should impose must be prerequisites to Benga commencing construction;
 - These pre-construction conditions must, at a minimum:
 - require that Benga implement a design basis memorandum to clearly define goals, design objectives, and design criteria, including feasibility-level designs for reclamation and the SBZ system, and an engineering risk assessment to evaluate the likelihood of achieving the required performance. In particular, that Benga commit to clear goals on water quality with defined triggers for the implementation of contingencies.
 - require Benga to prepare and obtain approval of feasibility-level engineering designs for the ex-pit waste rock disposal areas and the saturated backfill zones;

- require Benga to prepare and obtain approval of a more detailed progressive reclamation plan that includes feasibility-level engineering designs of reclamation cover systems, surface water drainage and the end-pit lake;
- commit to the implementation of progressive certification of reclaimed land by certifying reclamation in blocks throughout the life of the mine rather than waiting until end-of-mine;
- update its post-reclamation mine site financial calculations and assurances so that they are based on more concrete assessments of the operation and management of the site, including the maintenance of additional pieces of equipment such as the gravel bed reactor;
- require Benga to re-do its Air Quality Assessment to properly assess fugitive dust emissions having regard to the unique chinook winds meteorology in the Crowsnest Pass;
- provide a design report that incorporates clear cross-sections and three-dimensional representation of the pits, underground workings, dikes, backfill areas, saturated areas, flow directions and velocities, expected injection mounds and drawdown cones;
- provide updated designs of the in-pit dikes showing material types, construction techniques, geotechnical stability, and measures for the control of seepage
- update the characterization of the bedrock hydrogeology showing fractures, faults, and a comprehensive study of the underground workings. This update should include detailed and costed mitigation measures to prevent uncontrolled seepage from the saturated zones;
- require Benga to implement pre-treatment mitigation measures to reduce selenium load going into the SBZ;

- require Benga to establish at least one additional layer of post-SBZ water treatment for selenium, such as a gravel bed reactor, to provide secondary treatment of all SBZ-treated water prior to its release to the watershed;
- perform scaled-up and updated attenuation tests that assess attenuation in non-optimal conditions, and provide the results for approval;
- Reject the sulphate-adjusted site-specific guideline in favour of the provincial guidelines.
- require Benga to conduct seepage / groundwater flow modelling of the water in the SBZ, and design engineered water flow systems, to ensure that contact water in the SBZ has sufficient residence time and flows to its intended end discharge point (avoiding uncontrolled discharge to the environment) with full consideration of all operational and closure phases;
- require Benga to prepare and submit for approval feasibility-level geotechnical designs for in-pit dikes for SZ1465;
- update the design of the end-pit lake to include engineered solutions for the drainage of the lake into the SBZ system, and use a landscape ecology approach for the wildlife habitat design;
- establish detailed, fully funded, long-term monitoring programs for each major environmental issue, including groundwater and surface water quantity and quality, wind and air quality monitoring, closure and reclamation, wildlife and fish monitoring (including species at risk), that would commence prior to construction;
- update the human health risk assessment to include a discussion of epidemiological studies from open-pit mines;
- establish a fully-funded, independent, permanent oversight committee composed of citizen representatives and experts with established powers

and responsibilities related to construction, operation and closure of the Project;

- provide adequate bonding or other guarantees of financial accountability, from either Benga or its parent companies;
- require Benga to develop a plan to address reclamation and other environmental/safety contingencies in the event of temporary or premature shutdown;
- in light of growing federal commitments on climate change, require that Benga conduct more complete greenhouse gas modelling for all sources, including fugitive methane emissions from mining operations;
- stipulate that Benga's approval can/will be suspended or cancelled in the event of serious and/or continuing breaches or design and performance failures.

193. To be clear, the LLG submits that Benga not only be required to meet each of these conditions but to do so to a standard that is approved by the Regulator. Further, in deciding whether to approve the fulfillment by Benga of a condition, the Regulator must seek input from the citizens' oversight committee.

194. The LLG thanks the Regulator for a full and fair hearing.

ALL OF WHICH IS RESPECTFULLY SUBMITTED at the City of Calgary, in the Province of Alberta, this 8th day of January, 2021.

MCLENNAN ROSS LLP
<Original signed by>

Per:

Gavin S. Fitch, Q.C. and Cesar Agudelo
Solicitors for the Livingstone Landowners
Group

APPENDIX “A”

**EXAMPLES FROM BENGA’S TESTIMONY OF THE CONCEPTUAL NATURE OF
AND LACK OF DETAILS IN THE EIA**

LIST OF ELEMENTS IN BENGA’S PLAN CONSIDERED CONCEPTUAL

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OCT 27, 2020 – CIAR 740

Reference	Topic Session	Cross Examination By	Content
46:9-17	Opening Remarks	N/A	Benga claimed that over the past four years it has provided detailed responses and that many of its responses updated and revised baseline assessments and mitigation strategies.

OCT 30, 2020 – CIAR 762

Reference	Topic Session	Cross Examination By	Content
770:17-25 771:20-26 773:3-7 774:9-11	Purpose of the project, Visual Aesthetics, Alternative means, Land and Resource Use, Socio-economic Effects, Historic Resources.	Coalition of Alberta Wilderness Association and Grassy Mountain Group.	<p>Benga confirmed that the capital and operating costs are based on a conceptual level design. Mr. Youl elaborated that the estimates are not a Class 5 estimate in the AACE International Recommended Practice No. 18R-97 Cost Estimate Classification System because that would require a high level of confidence and they had not done a detailed engineering design when the estimate was provided. Mr. Youl noted that Benga did not set out to achieve a certain class estimate.</p> <p>Later, Mr. Houston stated that they were not able to put a level of accuracy on the overall capital cost estimate.</p>
815:5-24	Purpose of the project, Visual Aesthetics, Alternative means, Land and Resource Use, Socio-economic Effects, Historic Resources.	Coalition of Alberta Wilderness Association and Grassy Mountain Group.	Mr. Houston refused to say how many years the mine will have to operate before it starts paying income tax, claiming that level of detail was inappropriate, and relying instead on an average.

NOV 2, 2020 – CIAR 771

Reference	Topic Session	Cross Examination By	Content
1073 – 1075	Purpose of the project, Visual Aesthetics, Alternative means, Land and Resource Use, Socio-economic Effects, Historic Resources.	Livingstone Landowners Group	Benga refused to provide further details on the economic assessment of the viability of the mine despite having that information available to them.
1095:9-24	Purpose of the project, Visual Aesthetics, Alternative means, Land and Resource Use, Socio-economic Effects, Historic Resources.	Livingstone Landowners Group	Mr. Shewchuck confirmed that Benga did not perform a detailed cost estimate for upgrades or additional services required for municipal or physical infrastructure.
1165:18-26	Purpose of the project, Visual Aesthetics, Alternative means, Land and Resource Use, Socio-economic Effects, Historic Resources	AER Panel Questions	Benga confirmed that only “very, very high-level costs were developed”.

NOV 5, 2020 – CIAR 793

Reference	Topic Session	Cross Examination By	Content
1804:17-26 1805:1-5 1816:1-9	Geology, Geotechnical and Mining, Accidents and Malfunctions, Industrial Waste and Waste Management.	Timberwolf Wilderness Society	In response to a question about what would happen if the sedimentation ponds failed, Benga stated that an inundation study would be needed and that it would be part of the detailed design. However, that is not something that has been done. The same applies to the surge ponds. This despite the fact Benga acknowledges that a requirement of the environmental assessment is to consider the consequences of failures.
1812:20-26 1813:1-19	Geology, Geotechnical and Mining, Accidents and Malfunctions, Industrial Waste and Waste Management.	Timberwolf Wilderness Society	In response to a question about what mitigations Benga would implement in the unlikely event of a failure of the ponds, Mr. Houston stated that they would implement an emergency response plan and that would be looked at in the design.
1818:10-26 1819:1-4	Geology, Geotechnical and Mining, Accidents and Malfunctions, Industrial Waste and Waste Management	Timberwolf Wilderness Society	Benga confirmed that they have not designed the structures of the ponds and that additional information would be needed.
1821:21-26 1822:1-7	Geology, Geotechnical and Mining, Accidents and Malfunctions, Industrial Waste and Waste Management	Timberwolf Wilderness Society	Benga confirmed that the design drawings in Appendix 9 are conceptual, and further, that the conceptual drawings are based on preliminary understanding of the geology and a preliminary assessment of the magnitude.
1865:6-24 1866:1-19	Geology, Geotechnical and Mining, Accidents and Malfunctions, Industrial Waste and Waste Management	Livingstone Landowners Group	Benga confirmed that they do not know the exact lift size they will use when constructing the rock-disposal areas, even though their application materials suggested a lift size between 20 to 40 meters.
1872:15-20	Geology, Geotechnical and Mining,	Livingstone Landowners Group	When asked whether Benga would expand the mine pit if it actually consistently got selling prices of \$140/tonne, Mr. Houston noted that

	Accidents and Malfunctions, Industrial Waste and Waste Management		they need more geotechnical data on the quality of the coal, which will occur as the mine progresses, and then they will understand a lot better what is or is not economical.
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NOV 6, 2020 – CIAR 799

Reference	Topic Session	Cross Examination By	Content
1991:13-26 1992:1-26 1993:19-22	Geology, Geotechnical and Mining, Accidents and Malfunctions, Industrial Waste and Waste Management	CPAWS	Benga confirmed that its mine schedule is preliminary and based on preliminary information. Benga does not even have a short time horizon plan of five years. It is a conceptual plan developed in 2016 based on information Benga had at the time.
2058:21-26 2059:1-24 2061:8-14	Geology, Geotechnical and Mining, Accidents and Malfunctions, Industrial Waste and Waste Management	M.D. Ranchland	Benga admitted that it had not submitted an emergency response plan in its evidence even though CIAR 42, Section C, p. 144 says that a detailed emergency response plan will be designed. Benga further admitted that its current emergency response plan only speaks to the current state of Benga operations, which are office related.
2067:5-15 2070:12-25	Geology, Geotechnical and Mining, Accidents and Malfunctions, Industrial Waste and Waste Management	M.D. Ranchland	Benga admitted that it had not consulted with Ranchland about its response and cleanup procedures, and that those details will come with the detail design. Only then will they develop specific spill response procedures. Benga also noted that they don't know where the diesel tanks will be, or their size, what secondary containment is going to look like, which they admit will be needed to "evaluate the possible accidents that could occur and what response should be to them."
2112:12-26 2113:2-16	Geology, Geotechnical and Mining, Accidents and Malfunctions, Industrial Waste and Waste Management	AER Staff	When asked if Benga could provide more detail about the mitigation measures that might be implemented to reduce or eliminate the likelihood of an accidental release of flocculants, Benga said they could not answer without knowing which liquid, the volume, and its composition. When asked if they could talk about the likelihood of occurrence and magnitude of

			impact of an accidental release using Benga's assessment, Benga was unable to answer.
2124:12-26 2126:6-12	Geology, Geotechnical and Mining, Accidents and Malfunctions, Industrial Waste and Waste Management	AER Staff	<p>When asked if Benga could provide details about the anticipated content of the environmental management plan and the construction environmental management plan, Benga responded that they would develop it as they go through the detailed design.</p> <p>When asked if they could give a timeline as to when the plans would be completed, Benga only said that they would be completed sometime before construction.</p>
2145:26 2146:1-4	Geology, Geotechnical and Mining, Accidents and Malfunctions, Industrial Waste and Waste Management	AER Staff	Benga was not able to provide any details on the anticipated content of the spill prevention and response plan.
2178:3-23	Geology, Geotechnical and Mining, Accidents and Malfunctions, Industrial Waste and Waste Management	AER Panel	When asked whether Benga had considered the potential for public-safety issues in Blairmore and Frank from a catastrophic release in those communities, Benga noted that they had not as it would be part of the next steps in the dam design and approval.
2180:2-14	Geology, Geotechnical and Mining, Accidents and Malfunctions, Industrial Waste and Waste Management	AER Panel	Benga's level of familiarity with the Alberta Geological Survey monitoring activities on Turtle Mountain is that Mr. Houston stopped by the Frank Slide interpretive site.

NOV 12, 2020 – CIAR 830

Reference	Topic Session	Cross Examination By	Content
2572:4-17	Vegetation, including Species at Risk, Terrain and	Direct evidence of Benga	Benga claimed that it developed a detailed vegetation and wetlands assessment in 2014 and supplemented it in 2016. It also claimed that they conducted an extensive review of the literature

	Soils, Conservation and Reclamation, Closure and Biodiversity		available to identify proven strategies of successful reclamation.
2608:12-26 2609:1-3	Vegetation, including Species at Risk, Terrain and Soils, Conservation and Reclamation, Closure and Biodiversity	Coalition of Alberta Wilderness Association and Grassy Mountain Group	Benga confirmed its cumulative effects assessment of 2016 did not include the Elan Hard Coking Coal Project even though they were aware of it before the assessment.
2636-2639	Vegetation, including Species at Risk, Terrain and Soils, Conservation and Reclamation, Closure and Biodiversity	Coalition of Alberta Wilderness Association and Grassy Mountain Group	Benga acknowledged that its restoration of foothills rough fescue is based, in part, on the Lancaster et. al. 2016 paper that concluded that revegetation with native species vegetation was not successful. Benga further notes that they will be applying better and newer technology than the one used in the timeframe of the Lancaster study but did not explain what that technology will be.

NOV 13, 2020 – CIAR 835

Reference	Topic Session	Cross Examination By	Content
2751:1-26 2752:1-11	Vegetation, including Species at Risk, Terrain and Soils, Conservation and Reclamation, Closure and Biodiversity	Livingstone Landowners Group	Benga proposed for the first time that the angle of the maximum slope may go as high as 27 degrees, but that it will wait until it develops the detailed reclamation plan, which comes after the detailed design for the mine, because all current designs are conceptual.
2772:8-25	Vegetation, including Species at Risk, Terrain and Soils, Conservation and Reclamation, Closure and Biodiversity	Livingstone Landowners Group	When asked if Benga had unspecified stockpile sites for reclamation soil – sites not yet identified in the evidence – Mr. Houston said that because this is a conceptual plan he couldn't say if there would be other stockpiles somewhere else.
2787:4-26 2788	Vegetation, including Species at Risk, Terrain and Soils, Conservation and Reclamation, Closure and Biodiversity	Livingstone Landowners Group	Benga confirmed that its reclamation plan does not include any artificial or engineered creek beds that could help prevent water from pooling and uncontrolled erosion of the reclaimed site.
2793:9-26 2794:1-13	Vegetation, including Species at Risk, Terrain and Soils, Conservation and Reclamation, Closure and Biodiversity	Livingstone Landowners Group	Benga admitted that that the average depth of the reclamation material across the project footprint was obtained by doing a volumetric calculation. Benga further admitted that the 20 centimeter depth was not based on any technical analysis, but rather undefined professional judgment.

2803:4-26 2804:1-9	Vegetation, including Species at Risk, Terrain and Soils, Conservation and Reclamation, Closure and Biodiversity	Livingstone Landowners Group	Benga confirmed that all it knows is that the majority of the site will be reclaimed using stockpiled reclamation material despite its claim that it will engage in direct placement.
2811:1-17	Vegetation, including Species at Risk, Terrain and Soils, Conservation and Reclamation, Closure and Biodiversity	Livingstone Landowners Group	Not only does Benga not have more than a rough estimate for when the ponds will be reclaimed, it does not know if the rough estimate of 50 years will start in year 23 or some time after.
2812:13-19 2813:20-26 2814:1-6	Vegetation, including Species at Risk, Terrain and Soils, Conservation and Reclamation, Closure and Biodiversity	Livingstone Landowners Group	Benga admitted that its pit optimization process did not include consideration for whitebark pines even though one of its stated mitigation plans is to minimize the project footprint to avoid populations of whiteback pine where possible.
2863	Vegetation, including Species at Risk, Terrain and Soils, Conservation and Reclamation, Closure and Biodiversity	M.D. Ranchland	Benga acknowledged its vegetation studies missed noxious weeds currently present in the mountain.
2868:10-26 2869:1	Vegetation, including Species at Risk, Terrain and Soils, Conservation and Reclamation,	M.D. Ranchland	Even though Benga proposed to implement a noxious and invasive species control program prior to and during construction and operation of the project and reclamation programs, Benga admitted that it had not yet written such a program.

	Closure and Biodiversity		
2871:23-26 2872:1-10 2874:15-23	Vegetation, including Species at Risk, Terrain and Soils, Conservation and Reclamation, Closure and Biodiversity	M.D. Ranchland	When asked if Benga would wash its hands of any weeds escaping the footprint after reclamation, Benga stated that it would work cooperatively with the MD of Ranchland to deal with that. Then it admitted that that is not stated in their application. Benga further elaborated that it has not had any discussions with the MD of Ranchland about weed control.
2887:21-26 2888:1-18	Vegetation, including Species at Risk, Terrain and Soils, Conservation and Reclamation, Closure and Biodiversity	AER Staff	When asked whether Benga could confirm that the soil from all three foothills rough fescue communities would be prioritized, Mr. Houston said that it is an objective, but that at this stage of planning they cannot be certain it would be possible. In fact, Mr. Houston did not want to set any expectations.
2889:2-22	Vegetation, including Species at Risk, Terrain and Soils, Conservation and Reclamation, Closure and Biodiversity	AER Staff	Benga was unable to even say whether its statements in CIAR 69, PDF 127 are accurate without a detailed mining plan.
2896:22-26 2897:16-19	Vegetation, including Species at Risk, Terrain and Soils, Conservation and Reclamation, Closure and Biodiversity	AER Staff	Benga was asked what additional soil information would be gathered prior to disturbance to define the reclamation material balance. Despite admitting at 2794:1-13 that its reclamation soil depth was based on professional judgment and not on technical studies, Mr. Houston responded that the data Benga has and their operating practices would be sufficient. So no additional data will be gathered.
2965:10-20	Vegetation, including Species at Risk, Terrain and Soils, Conservation and Reclamation,	AER Staff	Benga was unable to give any details about how the biodiversity plan would be developed within the conservation and reclamation plan.

	Closure And Biodiversity		
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NOV 14, 2020 – CIAR 842

Reference	Topic Session	Cross Examination by	Content
3004:11-20	Vegetation, including Species at Risk, Terrain and Soils, Conservation and Reclamation, Closure and Biodiversity	AER Staff	Benga admitted it did not have a rare plant mitigation plan in place and will wait until before the removal of the topsoil to do detailed sweeps and surveys to look for rare plants.
3034:23-26 3035:7-16	Vegetation, including Species at Risk, Terrain and Soils, Conservation and Reclamation, Closure and Biodiversity	JRP Secretariat Staff	Ms. Bauman said that Benga would need more detailed health surveys on the site to find a tree that appeared healthy and was of cone-bearing age for the whitebark pine.

NOV 17, 2020 – CIAR 854

Reference	Topic Session	Cross examination by	Content
3502:24-26 3503:1-10	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	Coalition of Alberta Wilderness Association and Grassy Mountain Group	When asked if the SBZ would be located on top of bedrock, Benga admitted that they had not done exhaustive geotechnical investigation at all of the sites and that more information is needed for the subsurface conditions.

3504:13-18	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	Coalition of Alberta Wilderness Association and Grassy Mountain Group	Benga admitted that there is a lack of information regarding the physical and chemical nature of the water management ponds.
3511:11-25	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	Coalition of Alberta Wilderness Association and Grassy Mountain Group	When asked how does the deficiency of information regarding soil and bedrock beneath the mine pit, rock dumps, and water management ponds help the Panel have confidence in Benga's plan, Mr. Houston simply asked that the Panel have confidence in some future design and regulation.
3583:7-21	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	Coalition of Alberta Wilderness Association and Grassy Mountain Group	To a question about how Benga will determine the locations for the monitoring wells, Mr. Houston said that it would wait until a detailed investigation.
3592:5-13	Water, including Surface and Groundwater Management, Quantity and	Coalition of Alberta Wilderness Association and	Ms. Grainger admitted that Benga did not map where and how much base-flow recharge was occurring along Blairmore and Gold Creeks, they only estimated by reach.

	Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	Grassy Mountain Group	
3600:24-25 3601:1-13	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	Coalition of Alberta Wilderness Association and Grassy Mountain Group	Benga admitted that its assumptions and early data already shows metals such as aluminium and zinc will exceed allowable guidelines, but said that the build up will only occur over 15 to 20 years. Benga's position is they will wait until real world experience forces them to implement a metal treatment plant.

VOL. 18 – NOV 18, 2020 – CIAR 866

Reference	Topic Session	Cross Examination by	Content
3839:26 3840:1-23 3842:16-24 3843:6-12 3843:21-26	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	Timberwolf Wilderness Society	Benga confirmed that it has not provided an update to its estimates of impact to critical habitat for fish or fish habitat since the recovery plan was released and the extent of the critical habitat in Gold Creek was dramatically increased. Instead, Benga deferred it to a future application to DFO. Nevertheless, Benga admitted that they need to do some “revised accounting” and “redo the math” given the legal definition of critical habitat. Benga also admitted that they do not know how many hectares of critical habitat the Project is going to affect.
3844:21-26 3845:1-7	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	Timberwolf Wilderness Society	Benga admitted that in the time since the recovery plan was issued in December 2019 they had not proposed to resubmit their draft offsetting plan.
3903-3904	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	Timberwolf Wilderness Society	Benga admitted the Panel must make a decision based on the information before it, and it also admitted that the outcome of hypothetical future discussions with the DFO are not before the Panel. However, Benga also refused to clarify which of the 21 recommendations from the DFO they would be willing to accept.

NOV 19, 2020 – CIAR 876

Reference	Topic Session	Cross Examination by	Content
3944-3946 3947:5-11	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	Livingstone Landowners Group	Benga acknowledged that detailed engineering evaluation will be needed to determine the feasibility of the proposed measures, but that no such detailed evaluation has been conducted.
3953:12-29 3954:1-3	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	Livingstone Landowners Group	Benga has only a rough schedule for the development of the SBZ and will not conduct further testing until the start of construction.
3964:25-26 3965:1-5	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	Livingstone Landowners Group	Benga confirmed that in all the pages of the filed documents there are no designs for the dikes that will be placed inside the SBZ near where workers will be working, and which will be relied on to build the first few cells of the south SBZ. Mr. Houston said that “it’s a conceptual level of design, Mr. Fitch, and – and the details of the design...are continue to be worked.”

3966:16-26 3967:1-21	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	Livingstone Landowners Group	When asked whether the SBZ will be located atop underground workings, Benga confirmed that they would be, but that the location of these workings “are being confirmed.” They acknowledged that the underground workings present issues, but that it will be finalized in the detailed design. In fact, Mr. Houston stated that they won’t know until they have done the mine excavation.
3979:26 3980:1-12	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	Livingstone Landowners Group	Benga confirmed that they do not know how many dewatering wells they will need and that a more detailed design is needed.
4000:1-17	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	Livingstone Landowners Group	When asked where in the materials can one find evidence of the work Benga has done to refine the conceptual design of the out-of-pit waste rock dumps, Benga responded that their application is based on the conceptual designs done in 2016. All detailed engineering will be subject to approval.
4057:14-26	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic	M.D. of Ranchland	When asked whether Benga had any discussion with the MD of Ranchland regarding an emergency response plan, Mr. Houston said that one would come later, parallel to the detailed design of the project.

	Resources, Including Fish and Fish Habitat and Fish Species at Risk.		
4104:7-26 4105:15-26	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	JRP Secretariat Staff	In relation to a question from Mr. Lambrecht regarding the timeframe for a successful offsetting measure, Benga recognized they needed to do more detailed surveys to understand soil conditions.

NOV 20, 2020 – CIAR 881

Reference	Topic Session	Cross Examination by	Content
4164:16-21 4195:24-26 4166:1-3	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	AER Staff and Panel	Responding to a question about implementing alternative measures to applying for additional water allocations in case of operational challenges, Mr. Houston said they will wait until the detailed design stage to do a reliability study, and only after that will they make a decision on whether to have stand by units.
4204:16-23	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic	AER Staff and Panel	Benga has not finalized how they will monitor flow rates out of the various ponds. They will wait until the final design of the ponds.

	Resources, Including Fish and Fish Habitat and Fish Species at Risk.		
4218:7-22 4219:2-10	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	AER Staff and Panel	Benga has not finalized the environmental design flood, which is the hydrological event that is to be managed without release of untreated water to the environment.
4220:7-26 4221:20-26	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	AER Staff and Panel	Benga is going to wait until the detailed design phase to solidify the dam classifications for the various water storage structures. The ratings they provided are not based on data, but on an undefined professional judgment.
4233:18-26 4234:1-13	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	AER Staff and Panel	Benga was unsure and had not yet tested for the reductive dissolution of arsenic, manganese, and iron. Since they cannot categorically say it won't be an issue, Millenium advised Benga to plan for post treatment of the SBZ effluent.

4239:9-23	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	AER Staff and Panel	Benga said that it doesn't think the presence of nitrate in the SBZ would cause the release of more arsenic but does not have the data to support this.
4241:1-13	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	AER Staff and Panel	When asked what results from monitoring would trigger the decision to build a metals treatment plant, Benga said they do not know of a specific number that would trigger it. They would wait until further testing even though they expect the mobilization of arsenic and other metals would develop gradually.
4323-4324	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	AER Staff and Panel	Benga said that their thinking on the out-pit dumps has evolved without providing details on how or committing to any new details. In fact, they said their design is changing every day.
4325:4-19	Water, including Surface and Groundwater Management, Quantity and	AER Staff and Panel	Mr. Youl agreed with Dr. McKenna that prior to construction there should be a formal options analysis, but that it will come after approval.

	Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.		
4329:6-26 4330:1-3	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	AER Staff and Panel	To a question from the Panel, Benga stated that collection ditches and a capture well for the deeper groundwater flow paths were only intended to serve as examples of things that can be done, and not intended to address the specifics of exactly how they will capture seepage from the waste rock. This is in reference to CIAR 42, Appendix 10, p. 425.
4341 4342:1-8	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	AER Staff and Panel	Benga confirmed that the case studies they presented for attenuation were only meant as circumstantial evidence.
4370:1-11	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish	AER Staff and Panel	Benga claimed that the SBZ in Grassy Mountain would be better than Teck's but noted there are uncertainties such as the potential to mobilize metals, and that that is an important uncertainty.

	and Fish Habitat and Fish Species at Risk.		
4378-4379	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	AER Staff and Panel	When the Panel asked Benga what would happen if the company stopped mining and the SBZ is unfinished, Benga did not provide any contingencies.
4380:12-17	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	AER Staff and Panel	Benga confirmed that they would need a field test of at least a year before they can get the results that inform the design.

NOV 21, 2020 – CIAR 884

Reference	Topic Session	Cross Examination by	Content
4453:13-26	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	AER Staff and Panel	Mr. Davies confirmed that the aquatics monitoring plan is only a draft and “quite high level.” According to Mr. Davies there is a lot to sort out, such as what needs to be monitored and other data to support the effects predictions Benga has made.
4454:16-22	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	AER Staff and Panel	Mr. Davies confirmed that Benga’s draft aquatic monitoring plan does not contain the kinds of information needed to update the site-specific water quality objective.
4457:19-26 4458:1-2	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	AER Staff and Panel	Mr. Houston confirmed that Benga’s site-specific water quality objective needs to be translated for operational and regulatory purposes, and that further interpretation is needed to set down something simpler to implement.

4483:6-26 4484:1-17	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	AER Staff and Panel	Benga confirmed that their estimate of \$20 million over 25 years for maintenance of the site post-closure is based on nothing more than judgment, and they will wait until the end of life to provide a better estimate. Benga also said that if it looks like a bigger number that would motivate them to “perhaps look at some additional mitigations”. What they provided is not an estimate based on operating specific pieces of equipment, but rather a broad number.
4485:23-26 4486:1-22	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	AER Staff and Panel	Benga confirmed that they are unable to estimate the time horizon of weathering and selenium, and thus, they have no idea how long it will take to treat post-closure.
4507:19-26 4508:1-9	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	AER Staff and Panel	When asked about the level of confidence in their results, Benga confirmed that their modelling shows no attenuation over time. Mr. Houston said that logic told him there would be attenuation, but that it was not possible to put a time frame. Despite having no time frame and models showing no attenuation, Benga said they are committed to maintaining the site until it is self-sustaining.
4526:1-26 4527:1-13	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic	AER Staff and Panel	When asked whether ground-penetrating radar activities were used to assess groundwater transport, Mr. Youl confirmed that it had not been used for that purpose. He also confirmed that it could be used as a tool for that.

	Resources, Including Fish and Fish Habitat and Fish Species at Risk.		
4535:26 4536 4537:1-17	Water, including Surface and Groundwater Management, Quantity and Quality, Selenium Management and Aquatic Resources, Including Fish and Fish Habitat and Fish Species at Risk.	AER Staff and Panel	When asked if they are committed to increasing the density of groundwater monitoring, Ms. Grainger stated that what they had was a “very preliminary indication of potential distribution.” Mr. Houston also confirmed that the groundwater monitoring plan will be modified with the detailed design phase. Mr. Houston also declined to commit to a certain density for groundwater monitoring wells.

NOV 26, 2020 – CIAR 919

Reference	Topic Session	Cross Examination by	Content
5415:12-19	Dust, Air Quality, Greenhouse Gas Emissions, Noise, and Light; Wildlife, Including Migratory Birds and Species At Risk, Wildlife Health, and Human Health Risk Assessment	Livingstone Landowners Group	Benga confirmed its air quality assessment does not mention Chinook winds.
5425:7-23	Dust, Air Quality, Greenhouse Gas Emissions, Noise, and Light; Wildlife, Including Migratory Birds and Species At Risk, Wildlife Health, and Human Health Risk Assessment	Livingstone Landowners Group	The wind driven dust modelling road does not account for the fact that the haul road will have two way traffic.
5428-5431	Dust, Air Quality, Greenhouse Gas Emissions, Noise, and Light; Wildlife, Including Migratory Birds and Species At Risk, Wildlife Health, and Human Health Risk Assessment	Livingstone Landowners Group	The wind driven dust modelling is based on an estimate of 121 hectares, but Benga was not able to explain the rationale behind 121 hectares when presented with a map that showed approximately 300 hectares.
5469:25-26 5410:1-4, 14-21	Dust, Air Quality, Greenhouse Gas Emissions,	Livingstone Landowners Group	Mr. Rudolf agreed that data from Beaver Mines monitoring station and Crowsnest indicate peak winds occur during the months of November through January. Whereas Benga measured only

	Noise, and Light; Wildlife, Including Migratory Birds and Species At Risk, Wildlife Health, and Human Health Risk Assessment		between the months of June and October. Mr. Rudolf also admitted that Benga's measuring stations measured wind speed at 2 meters' height and not the standard 10 meters used by Environment Canada.
5474:5-9	Dust, Air Quality, Greenhouse Gas Emissions, Noise, and Light; Wildlife, Including Migratory Birds and Species At Risk, Wildlife Health, and Human Health Risk Assessment	Livingstone Landowners Group	Mr. Rudolf agreed that wind speeds at 10 meters would almost certainly have been higher.
5478:11-26 5479:1-24	Dust, Air Quality, Greenhouse Gas Emissions, Noise, and Light; Wildlife, Including Migratory Birds and Species At Risk, Wildlife Health, and Human Health Risk Assessment	Livingstone Landowners Group	Mr. Rudolf admitted that its dust emissions from the road surface, as indicated in Consultant Report #1 was based on assumptions made on other environmental impact assessments meant for regulatory applications, and not data or scientific literature.
5480:10-26	Dust, Air Quality, Greenhouse Gas Emissions, Noise, and Light; Wildlife, Including Migratory Birds and Species At Risk, Wildlife Health, and Human Health Risk Assessment	Livingstone Landowners Group	Mr. Rudolf confirmed that emission reduction examples provided in Table A4-2 of Consultant Report #1 contained only one example of a coal min and its emission reduction of PM 10 was only 10%.

5485:23-26 5486:1	Dust, Air Quality, Greenhouse Gas Emissions, Noise, and Light; Wildlife, Including Migratory Birds and Species At Risk, Wildlife Health, and Human Health Risk Assessment	Livingstone Landowners Group	Mr. Rudolf then confirmed that an updated table of examples of emission reductions which included other coal mines showed that 80% reduction was not representative of coal mines.
5504:8-11	Dust, Air Quality, Greenhouse Gas Emissions, Noise, and Light; Wildlife, Including Migratory Birds and Species At Risk, Wildlife Health, and Human Health Risk Assessment	Livingstone Landowners Group	Benga admitted that it has not, as of this date, completed a fugitive emissions management plan.
5514:21-26	Dust, Air Quality, Greenhouse Gas Emissions, Noise, and Light; Wildlife, Including Migratory Birds and Species At Risk, Wildlife Health, and Human Health Risk Assessment	Livingstone Landowners Group	When asked if Benga considered the comparing the greenhouse gas emissions from the Project to other operating businesses that employ 400 people, Benga confirmed that it had not.

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Reference	Topic Session	Cross Examination by	Content
5568: 1-21	Dust, Air Quality, Greenhouse Gas Emissions, Noise, and Light; Wildlife, Including Migratory Birds and Species At Risk, Wildlife Health, and Human Health Risk Assessment	Livingstone Landowners Group	Mr. Mitchell acknowledged that they did not look at any more current data beyond the 2006 “Current Health Status in the Region” report.
5592:6-19	Dust, Air Quality, Greenhouse Gas Emissions, Noise, and Light; Wildlife, Including Migratory Birds and Species At Risk, Wildlife Health, and Human Health Risk Assessment	CPAWS	Mr. Houston noted that the concentrations of chemicals of potential concern in the end-pit lake are based on very preliminary conceptual designs.
5595:4-9	Dust, Air Quality, Greenhouse Gas Emissions, Noise, and Light; Wildlife, Including Migratory Birds and Species At Risk, Wildlife Health, and Human Health Risk Assessment	CPAWS	When asked if there could be malformations in birds, Mr. Houston again noted that it is all based on a conservative assessment of a conceptual end-pit lake plan.

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Reference	Topic Session	Cross examination by	Content
5840:18-26 5841:1-23	Dust, Air Quality, Greenhouse Gas Emissions, Noise, and Light; Wildlife, Including Migratory Birds and Species At Risk, Wildlife Health, and Human Health Risk Assessment	AER Panel	When the Panel asked Benga what mitigation measures has Benga proposed to reduce its contribution to incremental risk from contaminants of concern, Mr. Houston responded that its primary mitigation measures are air contaminant reduction and treatment of water through the water management system. Other than that, Benga will wait until the detailed design and first years of operation. Also, Mr. Houston referred to undefined “mitigations to come” with respect to the end-pit lake.
5842:5-18	Dust, Air Quality, Greenhouse Gas Emissions, Noise, and Light; Wildlife, Including Migratory Birds and Species At Risk, Wildlife Health, and Human Health Risk Assessment	AER Panel	Benga recognized that there may be a situation where the initial filling of the end-pit lake could result in water quality that is not what they expect, but that they would have some “post-filling measures” to treat the water. The post-filling measures are undefined and have not been submitted into evidence.