JOINT REVIEW PANEL

IN THE MATTER OF the *Coal Conservation Act Application Nos. 1844520, 1902073, Environmental Protection and Enhancement Act Application No. 001-00403427;*

IN THE MATTER OF the *Water Act Application Nos. 001-00403428, 001-00403429, 001-00403430, 001-00403431,* and *Public Lands Act Application Nos. MSL160757, MSL160758, LOC160841, LOC160842, and LOC970943*; and

IN THE MATTER OF Benga Mining Limited Grassy Mountain Coal Project Impact Assessment Agency of Canada Reference No. 80101.

Written Argument of the Coalition of Alberta Wilderness Association and Grassy Mountain Group ("the Coalition")

January 8, 2021

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1.0 Introduction

1. These are the written argument filed on behalf of the Coalition of the Alberta Wilderness Association and Grassy Mountain Group ("Coalition") with respect to the Joint Review Panel's ("JRP" or the "Panel") consideration of Benga Mining Limited's ("Benga") applications[1] under the Impact Assessment Agency of Canada's ("IAAC") Reference No. 80101 for the Grassy Mountain Coal Project ("Project").

2. The Project involves an open pit mine for extracting bituminous coal suitable for steelmaking, a coal handling and preparation plant with associated infrastructure, an overland conveyor system paralleling an existing access corridor and connecting to a rail load out facility and a new section of rail track.[2] The Project will be located in southwest Alberta, approximately 150km southwest of Calgary in the Crowsnest Pass and will cover areas within Townships 08 and 09 and Ranges 03 and 04 West of the 5th Meridian. The steelmaking coal processing facility will be located approximately 7km north of Blairmore.[3]

3. The Coalition was granted full participation rights in this matter by the Panel on June 29, 2020 in the Panel's June 29 letter and confirmed in the August 10, 2020 letter[4].

4. The members of the Coalition, the descriptions of their lands and locations relative to the mine permit boundary are as follows:

No	Name	Legal Land Description (if applicable)	Location relative to the mine permit boundary
1	Fran Gilmar, Mitch and Rose Bonertz	SW30-8-3-W5M	Within mine boundary
2	Larry and Barb Donkersgoed, Donkersgoed Feeders Ltd.	SW19-8-3-W5M	Within mine boundary
3	Ed and Shannon Donkersgoed, Berdina Farms Ltd.	SW19-8-3-W5M	Within mine boundary
4	Norman and Connie Watmough, Tyler Watmough, Sun Cured Alfalfa Cubes Inc.	SE19-8-3-W5M	Adjacent to the mine boundary
5	Shirley Kirby	Plan 1014575 Block 19	7km south of the

[1] The applications are: Coal Conservation Act Application Nos. *Coal Conservation Act Application Nos. 1844520, 1902073, Environmental Protection and Enhancement Act Application No. 001-00403427;* the *Water Act Application Nos. 001-00403428, 001-00403429, 001-00403430, 001-00403431,* and *Public Lands Act Application Nos. MSL160757, MSL160758, LOC160841, LOC160842, and LOC970943*
[2] Benga's Application, CIAR 42, Doc 115588E, Section A, page A-1
[3] Benga's Submissions dated August 2020, Doc Ref 503, #135835E pdf 4.
[4] JRP's letter to Ackroyd LLP on behalf of the Coalition, Doc Ref 474, Document 135729E.

		Lot 25	northern portion of the mine boundary
6	John and Rae Redekopp	Plan 991 2103 Block 2 Lot 1	2 to 3 km southeast of the northern portion of the mine boundary
7	David Rothlin and Kari Lehr	Plan 9811164, Block 1 Lot 1	3 to 4 km southeast of the northern portion of the mine boundary
8	Vern Emard	SE30-8-3-W5M	Adjacent to the mine boundary
9.	Alberta Wilderness Association	N/A	N/A

5. A map showing the locations of the Coalition's members lands was filed as CIAR 752.

6. The Coalition's argument ("Argument") includes its replies to matters raised in Benga's written argument ("Benga's Argument"). To the extent that any matter is not specifically mentioned in this Argument, the Coalition's position remains as stated in the Coalition's submissions[5] and the oral testimonies of its members and expert witnesses. The non-specific response should not be construed as agreement with the position advanced by Benga.

7. References to "Paragraph" or "Paragraphs" in the sections below are references to the particular paragraph or paragraphs from Benga's Argument or this Argument.

8. Dr. Bewley gave the following response to a question from Mr. O'Gorman at 20Tr, p.4172:

> Okay. So I was involved in this particular response from a point of view of instream flow needs in some of the calculations that you see here. It's -- it's definitely an important question. If we get into kind of questions related to mitigation scenarios and kind of water volumes in those different scenarios, I may divert to someone else, but I can just talk from a kind of instream flow needs as a protection level for the fish aspect on this.

[5] CIAR 553.

7 I'm going to try a slightly unusual tactic here to
8 begin. I just want to -- a minute or two for some
9 preamble.

9. It seems odd that a Benga witness would have to resort to "tactics" in order to answer questions at the hearing about Benga's application.

10. Mr. Houston jumped in regularly to answers questions that were put to other Benga witness. This was not helpful and reduced the time allotted to intervener counsel to cross-examine the Benga witness panels. Mr. Houston's constant interruption and refusal to permit Benga's consultants to answer questions regarding their reports was inefficient and lengthened the hearing time considerably. Perhaps that was a deliberate "tactic" used by Benga for the hearing process.

11. Mr. Houston regularly summarized "what he heard" his fellow panel members say in response to questions that were not put to him. This was not helpful and reduced the time allotted to intervener counsel to cross-examine the Benga panels. Perhaps that was also a deliberate "tactic" used by Benga for the hearing process.

2.0 The Public Interest

12. The Joint Review Panel in the Northern Gateway Project[6] defined "public interest" follows:

> "The public interest is the interest of all Canadians. The public interest includes environmental, social, and economic considerations. Would Canada and Canadians be better off or worse off if the project were approved?"

13. The above described considerations that form the public interest are consistent with factors identified in Section 3 of the *Responsible Energy Development Act General Regulations*[7] *("REDA Regulations"),* which the Panel, as the Regulator is required to consider in determining applications before it.

14. Section 3 of *REDA Regulations* provides:

> For the purposes of section 15 of the Act, where the Regulator is to consider an application or to conduct a regulatory appeal, reconsideration or inquiry in respect of an energy resource activity under an energy resource enactment, the Regulator shall consider

[6] https://iaac-aeic.gc.ca/050/documents_staticpost/cearref_21799/97178/Connections_-_Report_of_the_Joint_Review_Panel_for_the_Enbridge_Northern_Gateway_Project_(Volume_1).pdf 16.
[7] *REDA Regulations,* Alta Reg. 90/2013.

> (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.

15. Section 15 of *Responsible Energy Development Act* ("*REDA*") requires that the Alberta Energy Regulator ("Regulator" or "AER") considers the factors stated in the regulations including the interests of the landowners in determining an application before it.

16. Benga is of the position that its Project will deliver "significant" economic development at the local, regional, and provincial levels and that the Project will not cause any significant adverse environmental effects.[8] As has been shown by the Coalition and its experts, that is not the case. The economic impact numbers, which Benga is erroneously interpreting as benefits, are over-stated, unreliable and not capable of being replicated. The residual environmental effects are significant and adverse and continue to remain so despite Benga's proposed mitigations. The Project's impacts on landowners remain adverse despite Benga's proposed mitigations.

17. In the Coalition's views, the approval and development of the Project will have significant adverse social, economic and environmental effects or costs that will exceed any economic benefits. The Coalition submits that approval of the proposed Project is not in the public interest and ought to be denied in accordance with the Panel's authority as the Regulator.

3.0 Requested Disposition

18. The Coalition respectfully requests that the Panel as the Regulator under the *REDA* deny Benga's applications for approval of the Project.

19. The Coalition further requests that the Panel as a review panel under *CEAA 2012* determine that the Project is likely to cause significant adverse environmental effects despite the proposed mitigations for the Project and that the magnitude of these effects will exceed the Project's benefits.

20. Although some of the Coalition's experts (for instance, Mr. Thompson and Mr. Farquharson) suggested some terms and conditions for inclusion in an approval should the Panel decide to approve the Project, the Coalition submits that determination of the Project should be based on assessment of all aspects of the Project's impacts on the environment, social, economic components. A consideration of all aspects of the Project's impacts shows that the Project is not in the public interest overall and should be denied.

[8] CIAR 962, PDF 8, paragraphs 5 and 6.

21. Further, the poor quality of the evidence, the lack of worst-case conservatism in the assessment of impacts, and the conflicting evidence presented at the hearing all weigh in favour of denying the Project. The Coalition submits that there are no terms or conditions under which the Project benefits could ever outweigh the Project's costs. The Coalition submits that the Project application and permits should be denied.

4.0 Review Framework

22. The Alberta Energy Regulator and the Federal Minister of Environment through the Impacts Assessment Agency of Canada have jurisdiction to review and determine Benga's applications.

23. The Regulator's jurisdiction to review applications is founded on the *REDA*.[9]. *REDA* mandates the Regulator:

> a. "to provide for the efficient, safe, orderly and environmentally responsible development of energy resources in Alberta through the Regulator's regulatory activities, and
>
> b. in respect of energy resources activities, to regulate
>
> i. the disposition and management of public lands,
>
> ii. the protection of the environment,
>
> iii. the conservation and management of water, including the wise allocation and use of water,
>
> in accordance with energy resource enactments and, pursuant to this Act and the regulations, in accordance with specified enactments."[10]

24. Section 15 of *REDA* requires that the Regulator considers the factors in the regulations including the interest of the landowners in determining applications before it. Section 3 of the *REDA Regulations* provides the factors to be considered. These factors are described in paragraph 14 of this Argument.

25. In considering the factors listed in Section 3 of *REDA Regulations*, the Panel must consider the justifiability of any significant adverse effects. Considering and including in the decision the justifiability of any significant adverse effects is required by section 29 of the *Agreement to Establish a Joint Review Panel for the Grassy Mountain Coal Project*[11].

26. While the Panel as the Regulator can make determinations regarding the justifiability of any significant adverse effects, the Panel under the *Canadian Environmental Impact*

[9] SA 2012, CR-173, section 2 and 24
[10] *Ibid,* section 2(1).
[11] CIAR 80.

Assessment Act 2012 ("*CEAA 2012")* shall not make any conclusions or recommendations with respect to the justifiability of any significant adverse environmental effects. The decision regarding whether the Project is likely to cause significant adverse environmental effects lies with the Governor in Council (Cabinet) who must decide whether the environmental effects are justified in the circumstances.

27. The Federal Minister of Environment's jurisdiction to review and approve Benga's applications as they relate to matters within the Government of Canada's regulatory jurisdiction is founded on the *CEAA 2012*.[12] *CEAA 2012* mandates the Government of Canada, the Minister, the Agency, federal authorities and responsible authorities to exercise their powers of administering the Act in a manner that protects the environment and human health and applies the precautionary principle.[13]

28. In deciding Benga's applications, the Regulator and the Minister must act in accordance with their enabling legislation, which has an overarching requirement to protect the environment and human health.

29. The establishment of a joint review panel and its terms of reference does not restrict the Panel's consideration to the items listed in the terms of reference. The Coalition agrees with Benga[14] that the joint review must still satisfy the requirements of *CEAA 2012* and REDA and associated enactments.

30. The Coalition agrees that section 20 of *REDA* requires the Panel to act in accordance with the *South Saskatchewan Regional Plan, 2014-2024* ("*SSRP*"). The *SSRP* is a legislative instrument pursuant to section 13 of the *Alberta Land Stewardship Act.*[15] Acting in accordance with the *SSRP* requires that the Panel's decision as the Regulator be consistent with the vision, the strategic directions, and the areas identified in the *SSRP* as being binding and enforceable.

31. The binding sections of the *SSRP* include provisions regarding air quality in the region (including air quality trigger limits)[16], areas designated as conservation areas[17], conserved land[18], surface water quality[19], recreation and parks areas[20], and landscape management in relation to Livingston Public Land Use Zone and the Porcupine Hills Public Land Use Zone.[21]

[12] S.C. 2012, c 19, S 52.
[13] *Ibid.,* Section 4(2).
[14] CIAR 962, Benga's Argument, paragraph 11
[15] SA 2009, c. A-26.8.
[16] *SSRP*, PDF 166 – 169, 184 - 185.
[17] *SSRP*, PDF 169 – 172.
[18] *SSRP*, PDF 173.
[19] *SSRP*, PDF 174-176, 186 – 194.
[20] *SSRP*, PDF 177 – 180.
[21] *SSRP*, PDF 181 – 183.

32. To ensure that decision makers are clear as to the portions of the *SSRP* that are binding and enforceable, the *SSRP* identified the sections on "Introduction, Implementation Plan and Strategic Plan" as well as the Glossary of Terms and Appendices as policy statements that are informative, not binding, and requiring of consideration by decision makers in their decision making process.[22]

33. The portion of the *SSRP* cited by Benga at paragraph 32 of its Argument falls within the informative and non-binding "Strategic Plan" section of the *SSRP*.

34. Although the *SSRP* recognized the presence of metallurgical coal deposits in the region and the potential for their future development due to recent coal exploration activities near the Municipality of Crowsnest Pass, coal exploration and development is not specifically cited in the vision of the *SSRP*.[23] Further, the *SSRP* recognized the importance of the diverse landforms, vegetation, and species including species at risk (species at risk in the region account for over 80% of the species at risk in Alberta that are federally and provincially listed) that are present in significant numbers in the region.[24]

35. The *SSRP* recognizes that biodiversity and the ecosystem services that they supply are vital to the continuation and sustenance of a healthy and prosperous way of life for Albertans.[25] Coal development, such as this Project, that results in destruction of significant numbers of rough fescue grasslands, species at risk vegetation, fish and wildlife is not consistent with the *SSRP*.

36. The *SSRP* also recognized the importance of Bow and Oldman River watershed to water quality and supply in the region[26] and the significant pressures being placed on water resources in the region.[27] According to the *SSRP*:

> Pressures on groundwater quality exist in localized areas across the region, with the associated potential for contamination of aquifers. Once an aquifer becomes contaminated, remediation is extremely difficult and expensive. Consequently, groundwater must be treated as a valuable resource that requires protection. Understanding recharge areas and the connection between surface water and groundwater is important for water management in southern Alberta.[28]

37. The importance of tourism and air quality management to maintenance of good quality of life and health of residents in the region was recognized and underscored in the *SSRP*. [29]

[22] *SSRP*, PDF 8 and 164.
[23] CIAR 553, PDF 269.
[24] *SSRP*, at PDF 23; CIAR 553, pdf 269.
[25] *SSRP,* at PDF 23.
[26] *SSRP*, at PDF 25.
[27] *SSRP*, at PDF 27.
[28] *SSRP*, at PDF 28.

38. It is clear from the reading of the *SSRP* that environmental sustainability and conservation is an overarching goal and vision of the *SSRP*. Economic development such as the proposed coal development should only proceed if environmental sustainability and social balance can be maintained.[30] It is the Coalition's view that this Project cannot maintain this balance.

39. The Coalition notes that the review panel in the Northern Gateway Project considered sustainable development as an important factor in their environmental assessment and in their consideration of the public interest.[31] If a similar approach is adopted by the Panel in its consideration of this Project, the Coalition submits that the Panel will find that approval of this Project will not result in an achievement of sustainable development.

40. The Coalition agrees with Benga's description at paragraphs 40 and 41 of Benga Argument regarding the role of the Panel under the *CEAA 2012*. However, the Coalition disagrees with Benga's assertion at paragraph 43[32] that the environmental assessment process must not eliminate uncertainty and is not intended to provide finality.

41. The Coalition submits that at the very least, the environmental assessment should provide sufficient, credible, reliable, and justifiable information to enable the Panel to discharge their mandates under the various legislation that they are bound to consider. What the Coalition has seen through the oral hearing process is a "make it up as you go" tactic. That is not responsible and does not give interveners, who will have to live with the consequences and the environmental effects of the Project, that fulsome consideration and rigour has been applied to protect them, their families, their livelihoods and Albertans who rely on the resources that will be impacted by the Project. A typical example of what could go wrong in a sensitive environment such as the Project area is the Teck Coal mine example.

4.1 Species at Risk Act Considerations

42. There are certain provisions of SARA that are of note in the Panel's consideration of Benga's application.

    a. Sections 32(1) of SARA prohibits the killing, harming, capturing or taking of an individual of a wildlife species that is listed as extirpated, endangered or threatened.

    b. Section 33 of SARA prohibits a person from damaging or destroying the residence of one or more individuals of a wildlife species that is listed as

[29] *SSRP*, at PDF 36 and 38-39.
[30] *SSRP*, at PDF 39.
[31] https://iaac-aeic.gc.ca/050/documents_staticpost/cearref_21799/97178/Connections_-_Report_of_the_Joint_Review_Panel_for_the_Enbridge_Northern_Gateway_Project_(Volume_1).pdf 16.
[32] Benga's Argument, PDF 16.

endangered, threatened or extirpated "if a recovery strategy has recommended the reintroduction of the species into the wild in Canada".

c. Section 58(1) of SARA provides:

> **58** (1) Subject to this section, no person shall destroy any part of the critical habitat of any listed endangered species or of any listed threatened species — or of any listed extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada — if
>
> > (a) the critical habitat is on federal land, in the exclusive economic zone of Canada or on the continental shelf of Canada;
> >
> > (b) the listed species is an aquatic species; or
> >
> > (c) the listed species is a species of migratory birds protected by the *Migratory Birds Convention Act, 1994*.

d. Section 61 (1) of *SARA* provides:

> "No person shall destroy any part of the critical habitat of a listed endangered species or a listed threatened species that is in a province or territory and that is not part of federal lands."

e. Section 61(1) provision does not apply in respect of aquatic species or the critical habitat of migratory bird species that are protected under the *Migratory Birds Convention Act, 1994.*[33]

f. Section 73(1) of SARA allows the minister to enter into an agreement with a person or to issue a permit authorizing a person to engage in an activity that affects a listed wildlife species, any part of its critical habitat or the residences of its individuals. Section 73(2) of *SARA* provides:

> **Purpose**
>
> (2) The agreement may be entered into, or the permit issued, **only if** the competent minister is of the opinion that
>
> > (a) the activity is scientific research relating to the conservation of the species and conducted by qualified persons;

[33] Section 61(1.1) of *SARA*.

> (b) the activity benefits the species or is required to enhance its chance of survival in the wild; or
> (c) affecting the species is incidental to the carrying out of the activity.

g. Section 73(3) of *SARA* provides the following pre-conditions to the entering into of an agreement or the issuance of a permit, which applies only if the minister is of the opinion that:

> (a) all reasonable alternatives to the activity that would reduce the impact on the species have been considered and the best solution has been adopted;
> (b) all feasible measures will be taken to minimize the impact of the activity on the species or its critical habitat or the residences of its individuals; and
> (c) the activity will not jeopardize the survival or recovery of the species.

43. The Coalition agrees with Benga[34] that the prohibitions in Sections 32 and 33 apply on both federal and provincial lands for aquatic species at risk (such as Westslope Cutthroat Trout) and migratory bird species protected under the *Migratory Birds Convention Act, 1994*.[35] For other species, the Sections 32 and 33 *SARA* prohibitions apply only on federal lands unless an order from the Governor in Council is made making them applicable to provincial lands.[36]

44. While the Coalition agrees with Benga that there is no prohibition on a proponent to apply for a Section 73 permit, all three Section 73(3) of SARA pre-conditions must be satisfied. The Coalition supports the Canadian Parks and Wilderness Society Southern Alberta Chapter (CPAWS) submissions in relation to the interpretation of "incidental" as used in Section 73(2)(c) of *SARA.*

45. Since a Section 73 permit is not before the Panel for determination, considering whether Benga's applications contain enough information to meet the pre-conditions is inappropriate and should not be entertained by the Panel. Further, considering how the minister might determine a permit application is also inappropriate and should not be entertained.

46. For the purpose of making a public interest determination in respect of the applications before it, the Coalition submits that the Panel should limit its considerations to the provisions of Sections 32(1), 33, 58(1), 61(1) of *SARA* referenced and quoted above.

[34] CIAR 962, paragraph 51.
[35] SC 1994, c. 22.
[36] Section 34(1) of *SARA.*

5.0 The Environmental Assessment

47. Benga states in its Argument that it is important for the Panel to put the applications for this Project into the appropriate context as it is easy to lose sight of the context after many years of IRs and a public hearing that lasted over one month.[37] Benga then goes on to list the items that the Panel should bear in mind while considering the applications.[38]

48. The Coalition agrees that it is important to put the applications into the appropriate context considering the many years that Benga has had to put together its application materials and the 12 addenda to the applications and yet, the application materials still have significant gaps and have not sufficiently mitigated the significant adverse effects that will arise from the Project. Details of this are discussed further in this Argument.

49. Further, it is important that the applications for the Project be considered from the perspective of the Project's impacts on members of the Coalition, especially those that are adjacent to or within the mine permit boundary, the residents of Crowsnest Pass, the businesses in Crowsnest Pass that rely on tourists to survive, the reliance of tourists and residents on clean air, good water quality and sustainable and thriving ecosystem, and the impacts on mature old growth forest and aquatic resources, some of which are listed as endangered and deserving of protection.

50. The Coalition submits that consideration of Benga's position regarding putting the applications into the appropriate context must include considerations of the submissions contained in this Argument.

51. In the Coalition's submissions[39], the Coalition identified the following concerns and issues with Benga's applications:

    a. Land Use, Access, and Residential Impacts;
    b. Property devaluation;
    c. Water Impacts, including ground water and surface water impacts, inflow needs assessment and water chemistry, impacts on aquatic resources including Westslope Cutthroat Trout, and climate change;
    d. Wildlife, biodiversity, vegetation, and habitats impacts assessment;
    e. Noise and air pollution impacts;
    f. Socio-economic effects; and
    g. Coal quality

52. The Coalition will address the above described issues following the hearing topics format. The Coalition relies on the submissions of other interveners adverse in interest to Benga in relation to the Project's impacts on air quality and human health as well as the

[37] Benga's Argument, PDF 21, para. 57.
[38] Benga's Argument, PDF 21, para 58.
[39] CIAR 553, PDF 7.

assessment of coal quality. Based on this reliance, the Coalition has not addressed these sub-issues in detail in this Argument.

5.1 Purpose of the Project, visual aesthetics, alternative means, land and resource use, socio-economic effects and historic resources

5.1.1. Project Need and Purpose

53. The need for this Project is spurred by international demand for steel-making coal. As Benga points out in its Argument, China and India are leading the demand for the coal.[40] Benga expects other Asian, South American and African countries to increase their demand for coal. It is noteworthy that the demand is not from Canada or Canadian industries but from other countries. It is not a question of the Project being needed to meet Canadian demand or for use in constructing critical infrastructure in Canada.

54. The need for the Project is purely economical and driven by a private organization's need to make profit for its shareholders. This was echoed by many interveners including Kari Lehr and David Rothlin.[41] With this in mind, the Panel must be convinced that the adverse effects of the Project are justifiable relative to the public benefits. In the Coalition's view, the adverse effects are not justifiable. It is not justifiable to destroy the environment in order to increase profit for a privately held corporation.

55. It is not justifiable to destroy recreation and tourism in order to increase profit for a private corporation. Many interveners, including the Coalition witnesses, testified to the increase in tourism in the community. Ms. Lehr, for instance, described some recreational activities that have been added into the community which has put the Crowsnest Past on the map as a tourist destination.[42] Approving this Project will likely result in a cessation of the growth in tourism that this area has been experiencing.[43]

56. While Benga asserts that the Project's economic development is compatible and mutually supportive of recreation and tourism,[44] that is not the case as seen in Sparwood in relation to Teck Resources mine. As many interveners attested to during the hearing,[45] tourists are not attracted to mining towns due to air pollution and dust concerns from mining activities. Therefore, mining is not compatible or supportive of recreation and tourism.

[40] CIAR 962, PDF 34, para109.
[41] CIAR 782, 6Tr. p. 1329-1330.
[42] CIAR 782, 6Tr. p. 1322-1323.
[43] *Ibid.* p. 1323-1324.
[44] CIAR 962, PDF 35, para. 116.
[45] For instance, the presentations of Mr. Des Moulins, CIAR 756, p. 477, 479-482, David McIntyre, CIAR 756, starting at p. 490; John and Rae Redekopp, CIAR 782, 6Tr. p. 1343.

57. As Mr. Des Moulins testified, if the Project is approved, the impacts on tourism will continue after the mine has closed. According to Mr. Moulins: "[T]he natural resource that was the basis of tourism, lifestyle, and recreation will have been compromised, and the community will likely be in a worse state than people think it is now. Approval of this mine certainly could bring very short-term prosperity to a few, but I think it is not in the long-term interest of the community."[46] The impact on the community, recreation, housing, employment, and tourism post mining has not been assessed and no plan has been provided for dealing with the effects of mine closure on the community.

58. Benga alleges that diversification of the local economy beyond one industry provides stability to the community and can increase local businesses. The Coalition agrees that diversification of the local economy provides stability but that should not be at the expense of a thriving tourism industry that is already established and growing.

59. Furthermore, the mining, quarrying and oil and gas industry already accounts for 19% of employment in Crowsnest Pass (2016 Census).[47] Additional mine employment will serve to make the community less diversified, not more diversified.

60. Permitting this Project will likely result in the displacement of the local tourism industry as fewer tourists may visit the Crowsnest Pass, especially during construction when Benga intends to use local accommodation to accommodate its peak work force. The result of allowing the mine to proceed will be an increased reliance on a single sector in the local economy – mining - and not recreation or tourism.

61. Many times during the hearing, Benga asserted that the Project would increase the population level and revive a dying community. As many members of the Coalition testified, the community of Crowsnest Pass is not dying. Tourism and real estate market have been on the increase. Mr. Redekopp, a realtor in Crowsnest Pass, provided the real estate market sales numbers which confirm that there has been increase in activity within the area and many more people are purchasing recreational homes.[48]

62. Regarding Benga's projection that the Project will result in tax of $490,000 being paid to the Municipality of Crowsnest Pass ("CNP") annually, Mr. Rothlin and Ms. Lehr explain that the residents of Valley Ridge Estates where they reside already pay more than two-thirds of the amount that Benga is projecting will accrue to the CNP. They further explained that dividing the projected tax revenue amongst the number of residents in

[46] CIAR 756, 3Tr. p. 485, L. 20-26.
[47] Mining, quarrying, and oil and gas extraction account for 535 of labour out of a total labour force population of 2,795. See Statistics Canada, Census Profile, 2016 Census for Crowsnest Pass, https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=4815007&Geo2=POPC&Code2=0074&SearchText=Blairmore&SearchType=Begins&SearchPR=01&B1=Labour&TABID=1&type=0
[48] CIAR 782, 6Tr. p. 1340 – 1341.

CNP (5,500) would amount to $100/year per person.[49] Therefore, $490,000 in tax revenue to CNP is insignificant in view of what the residents are already paying and it does not justify approving this Project and its devastating impacts on the community and members of the Coalition.

63. Further, CNP's support for the Project should not be given significant weight considering that CNP councilors did not appear to speak to their support of the Project and considering that CNP did not hold an information session to gather the community's input regarding the Project.[50] Even the golf course that Benga spent millions renovating does not pay taxes to the CNP as it is owned by a not-for-profit society.[51]

64. Benga asserts that its plan for progressive reclamation will minimize the magnitude and duration of impacts on visual aesthetics.[52] The long term slow growth of the Whitebark pine and the proven difficulty of re-establishing rough fescue grasslands raises questions about the efficacy of progressive reclamation in minimizing the magnitude and duration of impacts on visual aesthetics. As the Panel heard many times during the hearing, it will take at least 60 years to see any sizeable growth of any Whitebark pine tree that survives after planting. By then, tourism and demand for recreational homes in Crowsnest Pass may well be gone.

5.1.2 Land and Resource Use and Visual Impacts

65. The Coalition members have expressed concerns about the adverse residential and social impacts including land use and access restrictions that will be experienced on an ongoing basis should the proposed Project be approved and developed. The members have expressed concerns about diminution in their use and enjoyment of their lands as a result of the Project being approved.

66. Kari Lehr and David Rothlin, John and Rae Redekopp described their concerns about the potential impacts of the Project on their well water[53]. They noted that Benga had not provided them with any plan regarding resolving issues with their water well should their water well become contaminated. They further note concerns with the Project potentially polluting the health and well-being of the watershed that their neighbors, community and communities downstream and throughout Southern Alberta rely on. These concerns are real considering Ms. Kirby's statement that she currently sees coal particles in her toilet water.[54] The fact that Shirley Kirby still sees coal particles in her toilet water many years

[49] CIAR 782, 6Tr. p. 1316-1318.
[50] See for instance, the evidence of Ms. Lehr in this regard. CIAR 782, 6Tr. p. 1319.
[51] CIAR 782, 6Tr. p. 1320, L. 7-18.
[52] Benga's Argument, pdf 36, para. 119.
[53] CIAR 782, 6Tr. p. 1312-1313, p. 1335 -1337
[54] CIAR 782, 6Tr. p. 1352, L. 1-5.

after the last coal mining activity occurred in CNP suggests that it is likely that the Project may impact the Redekopps, Ms. Lehr and Mr. Rothlin's water wells.

67. John and Rae Redekopp raised concerns about Benga's water transfer licence applications and the fact that the Alberta government had not taken steps to protect the headwaters. As water is a precious resource, it should be protected at all costs.[55]

68. Kari Lehr and David Rothlin raised concerns about increase in dust affecting the quality of their lives and their use and enjoyment of their home.[56] Due to the location of their home and the wind direction, they have experienced strong winds that have blown away "heavy willow furniture off their front porch" and their roof shingles.[57] John and Rae Redekopp expressed similar concerns about air quality, coal dust, and the increase in air pollution and their exposure to increased wind velocity due to the destruction of the landscape that provides them with some shield from the northwest winds.[58]

69. Kari Lehr and David Rothlin, Rae and John Redekopp also noted concerns with the effects that blasting could have on Turtle Mountain and Bluff Mountain that are directly west of them and the potential for the blasting to trigger rockslides in the area. John Redekopp has already witnessed rockslides on Black Mountain and finds it disconcerting that Benga has not paid attention to the issue of blasting and impacts on rockslides.[59]

70. Some members have lived on or operated a farm or ranch in the area for many years. For example, Ms. Fran Gilmar[60] and Mr. Vern Emard[61] have owned, pastured cattle or horses on their lands for many years. Both Ms. Gilmar and Mr. Emard have ashes of their family members buried on their lands.[62] The Coalition members' lands are unique and hold special memories for them.

71. The Coalition members have commented on the beauty and wildness of the area, their use of the Project area for recreational activities, and the value they placed in the area. For instance, John and Rae Redekopp have 360 degrees views of Livingstone Range, Turtle Mountain and Bluff Mountain from their home and how they walk, ski, and bike to Lille and the Bellevue area.[63] They have expressed concerns about the destruction that will result if the Project is approved.

72. Ms. Gilmar commented on the quality of the water in Gold Creek which she drank from for 58 years. According to Ms. Gilmar, the Gold Creek water is "beautiful water. It's the

[55] CIAR 782, 6Tr. p. 1337.
[56] CIAR 782, 6Tr. p. 1313-1314.
[57] *Ibid.*
[58] CIAR 782, 6Tr. p. 1337-1338.
[59] *Ibid.* p. 1316 and 1339.
[60] CIAR 782, 6Tr, p.1227, L. 26; p. 1231 -1232.
[61] CIAR 782, 6Tr. p 1279-1280.
[62] CIAR 782, 6Tr. p. 1286, L. 25-26; p. 1234, L. 8-17.
[63] CIAR 782, 6Tr. p. 1333, L. 19-24; p. 1335.

last of the last. You do not find water like that anywhere.[64] Mr. Emard attested to the quality of the water in his oral evidence.[65] As will be discussed further in this Argument, the water quality in Gold Creek will be adversely affected if the Project is approved.[66]

73. Coalition members such as Norman, Connie and Tyler Watmough indicate that they graze cattle on their lands[67] and reside on their property seasonally. They host family and social gatherings on their lands as well as fish and camp on their lands with their children and grandchildren. All these uses and recreational benefits that they derive from the lands will be lost if the Project is allowed to proceed. They will also lose the opportunity of passing on the land, which they consider to be their family's legacy, to their future generations if the Project is allowed to proceed.[68]

74. Other Coalition members have expressed concerns about the impacts of the Project's potential approval in terms of loss of a place where they can be truly one with nature[69], and loss of a dream place where they can enjoy hiking, biking and fly fishing.[70] In the Coalition's views, the loss of these land uses and amenities are significant and cannot be mitigated.

5.1.3 Access Issues

75. Members of the Coalition such as Norman and Connie Watmough and their son, Tyler Watmough,[71] Larry and Ed Donkersgoed[72], Vern Emard,[73] and Fran Gilmar[74] have expressed concerns about land use and access restrictions that this Project will impose on them if this Project is approved.

76. Access to these members' lands is through Section 24-8-4-W5M, which is within the south dump area and partially affected by the mine pit[75]. Blockage and restriction of access to these members lands will make their lands unusable and unsaleable. These members have also expressed concerns that current activities carried out by Benga in the

[64] CIAR 782, 6Tr. p. 1237, L. 16-26, p. 1238, L. 1-2.
[65] CIAR 782, 6Tr. p. 1283.
[66] CIAR 782, 6Tr. p. 1242-1243.
[67] CIAR 782, 6Tr. p. 1251, L. 11-26.
[68] CIAR 553, PDF 383.
[69] CIAR 553, PDF 403.
[70] CIAR 553, PDF 420.
[71] CIAR 553, PDF 383.
[72] CIAR 553, PDF 404.
[73] CIAR 553, PDF 487-488.
[74] CIAR 553, PDF 425.
[75] CIAR 571, pdf 38.

Project area have already limited their access to and use of their lands[76] and have negatively affected their livestock grazing operations.[77]

77. They also expressed concerns about the impacts that access restriction will have on their ability to access emergency or medical services.[78]

5.1.3.1 Grassy Mountain Road ("GMR")

78. The parcels through which GMR runs was described by Mr. Secord during cross of Mr. Houston.[79] The GMR's affected parcels were put in evidence as CIAR 753.

79. The GMR land titles were subject to a restrictive covenant.[80] The restrictive covenant was between Devon Canada, Consol Canada and Crowsnest Pass Golf & Country Club.[81] The restrictive covenant restricted the Crowsnest Pass Golf and Country Club from using all or any portion of the golf course lands for residential purposes or from apply to rezone the lands for residential use. The effect of the restrictive covenant, which Mr. Houston agreed with,[82] is to prevent land within a mine permit area from being used for residential purposes. This confirms that mining and residential uses of land are incompatible.

80. A Road Plan, No. 8811754, affecting portions of the GMR at sections 2, 11 and 14, was registered at Land Titles.[83]

81. As confirmed by Mr. Houston, the GMR has been in place for over 50 years.[84] Mr. Vern Emard confirmed that the GMR has been in existence for many years and has been used by the members of the Coalition east of the mine pit (i.e. the Donkersgoed, the Watmoughs, Ms. Gilmar and Mr. Emard) and other residents since time immemorial.[85] The public use of GMR continued despite the changes in ownership of the lands surrounding it. Mr. Houston acknowledged this use by the public including members of the Coalition during cross.[86]

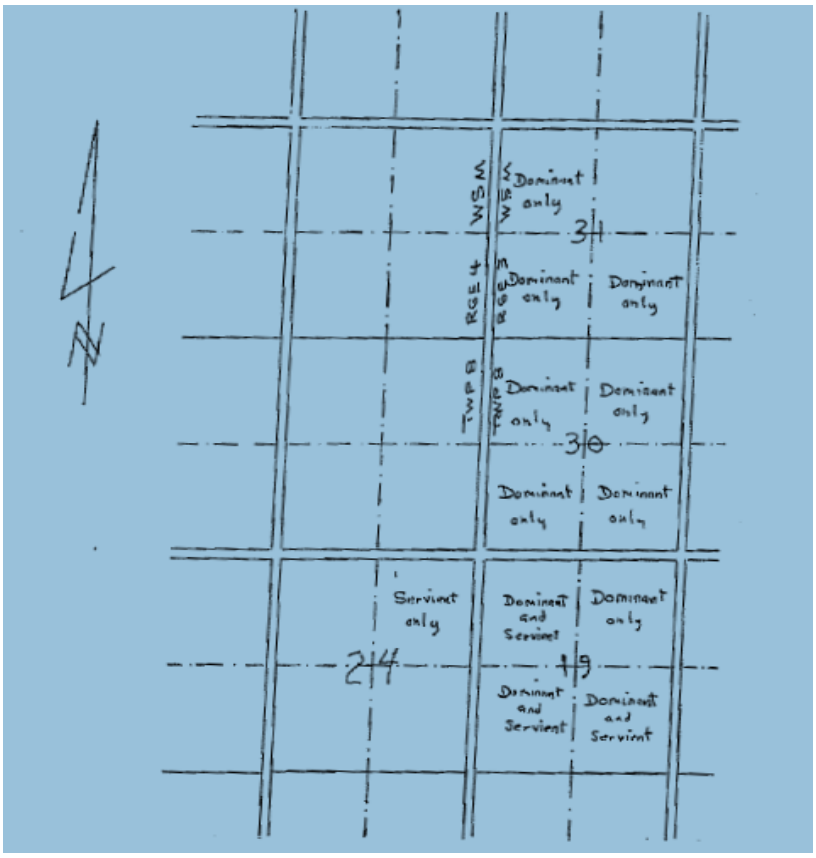
5.1.3.2 The Easement

82. The GMR was used by the Coalition members east of the mine pit to access their properties. To facilitate access to these landowners' lands, the land developer, Kootenay Wood Preservers Ltd. registered an access easement across all of the properties that it

[76] CIAR 553, PDF 403.
[77] CIAR 553, PDF 383.
[78] CIAR 784, 6Tr. p. 1274.
[79] CIAR 756, 3Tr. p. 656 – 658.
[80] CIAR 756, 3Tr. p. 659 – 660, 664 - 669; CIAR 753, PDF 2.
[81] CIAR 753, PDF 29; CIAR 756, 3Tr. p. 667.
[82] CIAR 756, 3Tr. p. 674, L. 20-25.
[83] CIAR 755.
[84] CIAR 756, 3Tr. p. 675, L. 8-11.
[85] CIAR 782, 6Tr. p. 1285.
[86] CIAR 756, 3Tr. p. 679.

subdivided to ensure that the owners continued to have access to their lands through Section 24-8-4-W5M.[87]

83. A copy of the easement was filed at CIAR 553 at PDF 406. A map showing the affected lands is produced below.



84. As the above shows, the northeast quarter of Section 24 is servient lands to all of the other properties affected by the easement i.e. Section 19, 30, and 31. Servient lands means that Section 24 bears the burden of providing access to the rest of Sections 19, 30, and 31.

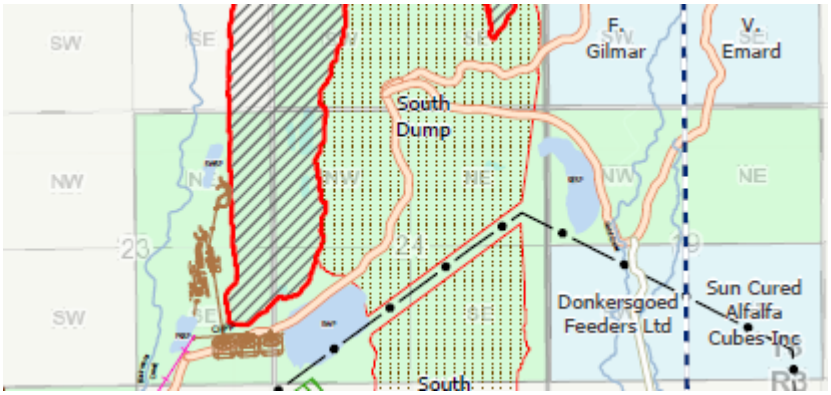
85. The northeast quarter of Section 24 (the servient lands) falls within the south rock/central rock disposal area.[88] The easement prohibits the owner of the servient lands (section 24) from "erect[ing] any buildings or structures upon, over or under, the Easement without the prior written consent of the owners of the Dominant Tenements".[89]

86. The easement also prevents the owners of the servient lands from interfering or interrupting the owners of the dominant lands from exercising the rights of access on or

[87] CIAR 553, PDF 411.
[88] CIAR 571, PDF 38.
[89] CIAR 553, PDF 412, section 3(b).

through the servient lands.[90] As the current owner of Section 24, the servient lands, Benga cannot and is prevented from interfering with the Donkersgoed, Ms. Gilmar, the Watmoughs, and Mr. Emard's rights to access Section 24.

87. Benga alleges in its Argument that the easements do not relate to the GMR and they do not provide a contiguous route to a public roadway.[91] A review of CIAR 571, PDF 38 shows that the easement road through Section 24 connects to and is contiguous with the GMR. The connection point is shown below.



88. Benga alleges further that the members of the Coalition east of the mine pit cannot claim a right to use the GMR based on their past use and benefit of the road.[92] The Coalition states that the long term use of the GMR road as a way to access NE ¼ Section 24 and then their lands and the fact that the GMR is the only usable and navigable road creates an easement right that is recognized in law on grounds of necessity.

89. The Alberta Court of Appeal in *Nelson v. 1153696 Alberta Ltd*[93] *("Nelson").* described easements and easement of necessity as follows:

> [34] The easement is a proprietary grant long recognized in law. Broadly speaking, its primary purpose is to permit a landowner to access his land over the property of another.
>
> [35] Easements may be acquired by way of an express grant made by the owner of the servient lands or by implied grant.
>
> [41] A useful description of rights of way of necessity, and one which is particularly applicable to the facts of this case, is found in Goddard, *A*

[90] CIAR 553, PDF 412, section 3(c).
[91] CIAR 962, PDF 43, para. 150.
[92] *Ibid.*
[93] 2011 ABCA 203 (CanLII)

Treatise on the Law of Easements (6th ed, Stevens and Sons, Limited, 1904) at 37:

> ... It frequently happens that property is so situated that, unless the owner is permitted to make some use of his neighbour's land, the property would be unusable and worthless. In cases of this kind the law generally steps in and provides the owner of the otherwise useless property with the easement he wants, because of the necessity he has for it. The most common instance of this kind of easement occurs when a piece of land is wholly surrounded by the land of other persons, so that unless the owner were permitted to pass over the surrounding land, he would have no means of getting to his own property, and it would be worthless. In this case the easement which the law would provide would be a right of way, commonly called a way of necessity ...

and at 359:

> Rights of way of necessity are acquired by implied grant. A grant of a way of necessity is presumed to have been made whenever land has been sold which is inaccessible except by passing over the adjoining land of the grantor or by committing a trespass upon the land of a stranger, *or when an owner of the land sells a portion and reserves a part which is inaccessible except by passing over the land sold.* This species of right has been recognised from very early times, and is said to depend upon the principle that when a grant is made, every right is also presumed to have been granted, without which the subject of the grant would be useless.
> [emphasis added]

90. An easement of necessity can be implied onto a land title even though an easement is not registered on title where the circumstances as described in the passages above are met. The Coalition submits that the circumstances discussed and considered by the Alberta Court of Appeal in *Nelson* applies in this situation.

91. As the evidence has shown, the use of the GMR by the Coalition members residing east of the mine pit is necessary for them to access their residences. Benga acknowledged that the GMR is the primary access to the Coalition members' lands east of the mine pit. There is no other reasonable and available access road that they can use.

5.1.3.3 Alternate Access Routes

92. Mr. Secord explored other access routes options suggested by Benga in their Reply Evidence[94] during his cross of Mr. Houston[95]. The Gold Creek Valley Lille route suggested by Benga is a trail that is accessible to only off-road vehicles and requires upgrading.[96] This trail cannot be used by Ms. Gilmar who drives a Dodge Dakota.[97] As Mr. Rothlin and Ms. Lehr indicate, the route will have to be upgraded and measures put in place to deal with increase in traffic and noise that residents of the Valley Ridge Estates will be exposed to should this occur. In their view, this route is not an acceptable option.[98]

93. Similarly, the potential route identified by Mr. Emard as a route that Benga could develop as an access route is not usable in its current form being that it is a trail accessible to only off-road vehicles.[99] These two routes are not usable in their current configuration without an upgrade and will likely impact Lille Historic Site.

94. The Gold Creek Valley Lille route suggested by Benga, if upgraded to permit use by motor vehicles and assuming it receives support from the residents of the Valley Ridge Estates, could provide access to the Donkersgoed and the Watmoughs.[100] However, it would not provide access to Mr. Emard and Ms. Gilmar. The Gold Creek Valley Lille route access through Section 19-8-3-W5M and section 24-8-3-W5M would likely be inaccessible to Ms. Gilmar because of the presence of the southeast surge ponds in Section 19 and the south rock dump in Section 24.[101] As Mr. Houston pointed out, Benga would not allow access through any portion of the Project area required for mining for safety and security reasons.[102]

95. The other alternate access route suggested by Benga is the HWY 40/Kasega route at the north end of the Project[103]. As was explored at the hearing, this route has access restriction (gate with potentially a lock)[104]. While HWY 40 is a gravel road, the Kasega road portion is a trail that Benga identified as requiring upgrading.[105] Mr. Emard also identified the Kasega road portion in CIAR 773 as a quad trail used by trappers and hunters to access their cabins.[106]

[94] CIAR 571, pdf 8
[95] CIAR 762, 4Tr. starting from p. 716.
[96] CIAR 762, 4Tr. p. 720, L. 14-18; p. 722, L. 23-26; p. 723 L. 1-5.
[97] CIAR 782, 6Tr. p. 1240, L.9-11.
[98] CIAR 782, 6Tr. p. 1326.
[99] CIAR 762, 4Tr. p. 723, L. 14-20.
[100] CIAR 762, 4Tr. p. 728-729.
[101] CIAR 762, 4Tr. p. 729-731
[102] *Ibid.*
[103] CIAR 571, PDF 8; CIAR 762, 4Tr. p. 734, L. 12-22.
[104] CIAR 762, 4Tr. p. 736, L. 16-21; CIAR 773.
[105] CIAR 762, 4Tr. p. 737, L.19-26
[106] CIAR 782, 6Tr. p. 1291, L. 17-24.

96. In addition to requiring an upgrade, using this alternate access route would require upgrading of vehicles as Ms. Gilmar pointed out[107] and it would require accessing the mine site at Section 31-8-3-W5M to get through to Ms. Gilmar's property. Ms. Gilmar pointed out that with mining activity occurring in the area, there would be no way to access her property.[108]

97. It is clear that the GMR is not being used because it is the most convenient, as Benga asserts in its Argument[109]. It is being used because it is the only route that is available, accessible, necessary, and workable. All the other routes require feasibility studies on their accessibility and likely require significant amounts of money to be expended to make them usable.

98. It will be onerous to require Ms. Gilmar, the Donkersgoed, the Watmoughs, and Mr. Emard to facilitate an alternate access route at significant costs to them when there is already an access route, the GMR, that they have been using since time immemorial. Further, the probability that a right of easement over the GMR could be implied in favour of Ms. Gilmar, the Donkersgoed, the Watmough, and Mr. Emard's properties suggests that the Panel should require Benga to create or provide an alternate access to these members of the Coalition, should it decide to approve the Project.

99. The Coalition notes that Mr. Houston, speaking for Benga, agrees that Benga will work with Mr. Emard and Ms. Gilmar to provide them with alternate access to their properties.[110] Benga should also be required to work with the Donkersgoed and the Watmoughs to provide them with alternate access should the Panel decide to approve the Project.

100. The Coalition further notes Benga's willingness to undertake a road re-alignment in relation to the lands owned by the Country Golf Club but it is unwilling to provide alternate access to members of the Coalition to enable them to continue using their properties.[111] The Coalition considers this a double standard approach.

5.1.3.4 Donkersgoed's Devon Agreement and Proper Forum

101. The Donkersgoed, through the purchase of SW 19-8-3-W5M from the previous owners (Raynelle Kyle) acquired a Road Use Agreement dated June 13, 2003 ("Devon Agreement").[112] The Devon Agreement authorized the Donkersgoed to use the access

[107] CIAR 782, 6Tr. p. 1240 L. 7-24.
[108] *Ibid.*
[109] CIAR 962, PDF 45, para. 156.
[110] CIAR 762, 4Tr. p. 739 L 5-14; p. 732-733.
[111] CIAR 756, 3Tr. p. 661-662; CIAR 754, PDF 2.
[112] CIAR 772.

roads that are through Sections 2, 11, 14, 23, W ½ 24, and S ½ 25-8-4-W5M (GMR) to access their property unless terminated with 120 days' notice for just cause.[113]

102. The Devon Agreement is similar to the Road Use Agreement that Benga acknowledged being aware of in respect of the Pagonis property at SW 31-8-4-W5M.[114] Yet, Benga claimed not to be aware of the Devon Agreement with the Donkersgoed.[115]

103. It is strange that Benga is unaware of the existence of the Devon Agreement with the Donkersgoed; yet, it is aware that the same agreement existed between Devon and the Pagonis when it acquired the Pagonis' property. Simple due diligence such as asking Devon if it had similar agreement with any other landowner in the area would have revealed to Benga the existence of the agreement with the Donkersgoed. To allege or insinuate that there is an onus on the Donkersgoed to bring the existence of this agreement to the attention of Benga during its consultation efforts is an attempt to deflect to the landowners its responsibility of fully assessing impacts of its Project on landowners.

104. Furthermore, the evidence on the record confirmed that for 5 years of this Project planning and application, Benga had only 2 telephone calls and 2 in-person meetings with the Donkersgoed. The rest of the communication with the Donkersgoed has been limited to emails that forward information newsletters about the Project or their so-called premium offers.[116] This calls into question the efficacy of Benga's consultation efforts with their immediate neighbours, the Coalition members residing east of the mine.

105. As the Donkersgoed, Watmoughs and Mr Emard have testified, their experiences with Benga have been that of a bully, engagement of scare tactics, and lack of willingness to cooperate or negotiate.[117] The Coalition submits that the Panel should place significant emphasis on the evidence of these members of the Coalition in this regard.

106. Benga's assertion that the Coalition has not shown the existence of similar agreements in favour of the Watmoughs, Mr. Emard and Ms. Gilmar[118] does not detract from its responsibility to inquire into the existence of these agreements and the fact that an easement could be implied onto its title to the properties affected by the GMR.

107. Benga assertion that the Devon Agreement is not registered on any of the titles to the properties is irrelevant. Section 61(1)(f) of the *Land Titles Act*[119] provides that

[113] CIAR 772, PDF 2, para. 4.
[114] CIAR756, 3Tr. p. 689-690; CIAR 762, 4Tr. p. 707.
[115] CIAR 756, 3Tr. 691, L. 12-18.
[116] CIAR 782, 6Tr. p. 1273-1274.
[117] CIAR 782, 6Tr. p. 1261, L. 22-23, p. 1264, L. 14-20, p. 1273-1277, and 1285, L. 19-20.
[118] CIAR 962, PDF 44, PARA. 153.
[119] RSA 2000, c. L-4.

> "The land mentioned in any certificate of title granted under this Act is, by implication and without any special mention in the certificate of title, subject to
>
> (f) any right of way or other easement granted or acquired under any Act or law in force in Alberta."

108. The Devon Agreement grants a right of way over the GMR to the Donkersgoed. By virtue of section 61(1)(f), the right of way granted is implied on any of the certificates of title affected the lands where the GMR is situate. Contrary to Benga's assertion at paragraph 154 of its Argument[120], Benga does not have to assume the Devon Agreement for the right of way to be implied on title to properties affected by the GMR.

109. Benga asserts that it has provided more than 120 days termination notice to the Donkersgoed. The validity of this notice is questionable considering Benga's position that it is unaware of the Devon Agreement. To what document is the 120 days' notice applicable?

110. Notwithstanding the above, if the Panel determines that the 120 days' notice is effective termination of the Devon Agreement for the Donkersgoed, that does not eliminate the common law easement right that may be implied regarding the GMR in favour of the Watmoughs, Mr. Emard, Ms. Gilmar, and the Donkersgoed pursuant to the *Nelson* decision.

111. Benga asserts that there is no right by prescription to use the lands of another while the owner still has use of the right of way for other purposes.[121] Benga relies on *Koziey Estate (Re)* in support of its assertion. It is important to note that the applicant's case in *Koziey Estate (Re)* was based on adverse possession. The applicant had been in possession of the road and had been using it to the exclusion of the respondent. That is not the case here. The Coalition members affected are not claiming adverse possession. Their right to use the GMR is based on an implied easement of necessity. They continue to share the use of the GMR with Benga.

112. Benga asserts that the proper forum for dealing with the Coalition's access concerns is in the courts.[122] Benga relies on the decision of the National Energy Board ("NEB") on the Trans Mountain Expansion Project to support its assertion.[123] The Coalition submits that the Panel, as the Regulator, is required by Section 15 of *REDA* to consider the interests of landowners in determining applications before it. The Panel cannot shift that responsibility to the courts.

[120] CIAR 962, PDF 44.
[121] CIAR 962, PDF 45-46, para. 159-161.
[122] CIAR 962, PDF 46, para. 162.
[123] *Ibid.* para. 163.

113. By virtue of the requirement in Section 15 of *REDA*, the Panel must consider the impacts of this Project on the landowners' interest as a result of the Project. In deciding the applications, the Panel must consider if Benga has proposed any mitigations of the impacts. This Project adversely impacts the Coalition members' ability to access their properties and to continue to use and enjoy their properties.

114. In the absence of any mitigation proposed by Benga, this adverse impact cannot be ignored or shifted to the courts for the Coalition members to litigate at significant costs. It will be contrary to the provisions of *REDA* for the Panel to ignore this impact and shift it to the courts as Benga alleges. While this approach will work for Benga who has significant financial resources at its disposal, this approach will cause injustice to the Coalition members who may be forced to sell their properties at very low prices or abandon the properties altogether due to inability to raise the funds to litigate this matter. The Coalition submits that the *REDA* is not set up to work injustice and should not be interpreted in a way that works injustice.

115. Further, the Coalition notes that the NEB operates under a different regulatory regime from the Regulator. While the NEB may have a discretion in selecting a pipeline route, there is no discretion for the Regulator regarding the requirement of Section 15 of *REDA*. The use of the word "shall" is prescriptive.

116. Benga may allege that it is also a landowner whose interests must be considered. The Coalition submits that the position of Benga in this application is that of a project proponent; therefore, this position overrides its position or interest as a landowner.

117. The Coalition submits that should the Panel decide to approve Benga's applications, a condition of approval should include that Benga provides alternate access to Donkersgoed, Watmough, Emard and Gilmar's properties. Notwithstanding this submission, the Coalition maintains that this Project should not be approved as it is not in the public interest.

5.1.4 Property Devaluation

118. The Coalition members have expressed concerns about the impacts of the Project on their property values. The Coalition is of the view that the approval of the Project will devalue the members' properties and, in some cases, make their lands totally worthless, especially where access to their properties is removed.

119. As Mr. Redekopp mentions in his direct evidence, location is everything; a good location with good access and good features fetch good price.[124]

120. Mr. Gettel, of Gettel Appraisals Ltd., addressed the issue of property value impacts from the Coal Project in his written evidence and oral testimony. Mr. Gettel has extensive

[124] CIAR 782, 6Tr. p. 1341, 1345-1346.

experience with different property appraisals and has appeared before various administrative tribunals and courts on real estate appraisal matters.[125]

121. In his oral testimony, Mr. Gettel note that surface coal mines are not a common phenomenon in Alberta[126]; as such, there are not a lot of studies completed to assess the effects of surface coal mines on adjoining property values.[127] However, there are four potential areas where there could be an impact on property values. Those areas relate to dust concerns i.e. road dust, waste-disposal dust and coal dust, increased vehicular traffic caused by opening of the mine, introduction of rail loading facilities with their attendant noise and safety concerns and potentials for spills or train derailment, and fear of water and air pollution or soil contamination.[128]

122. Of all the factors highlighted, Mr. Gettel identified dust as the number one problem associated with surface coal mines, which is very common despite mitigation programs.[129] Due to the prevailing winds in the area being from the west and northwest, dust problems will likely arise for properties south and southeast of the proposed mine.[130] These include properties belonging to Norm, Shannon and Tyler Watmough, Ed and Larry Donkersgoed, Vern Emard, and Fran Gilmar. As dust including coal dust is a health concern, fears of exposure to ill-health manifest in real estate market and can cause property devaluation to occur.[131]

123. Further, proximity to mines exerted influence on property values. The closer the proximity, the greater the value loss and the greater the distance, the less the impact.[132] With proximity to the mine plus the high winds that are prevalent in the area, Mr. Gettel opined that dust would be a key factor impacting residential real estate values within Crowsnest Pass in relation to the development of the Project.[133]

124. Value losses could be placed into 3 categories – low impacts (0 – 10%), moderate impacts (10-15%) and high impacts (15-50%). Mr. Gettel concluded that potential losses would be in the low impact category. A very successful dust mitigation program could see the value losses at the low end of the range (0-10%) but if the dust becomes problematic, losses could go towards the higher end of the range.[134]

125. Mr. Gettel further opined that higher end housing that are typically more sensitive to negative externalities and value losses will experience value losses in the order of 10% or

[125] CIAR 782, 6Tr. p. 1199-1200.
[126] CIAR 782, 6Tr. p. 1201, L. 2-3.
[127] CIAR 553, PDF 53.
[128] CIAR 782, 6Tr. p. 1202, lines 7 – 17, p. 1210-1211; CIAR 553, PDF 45.
[129] CIAR 553, PDF 52.
[130] CIAR 553, PDF 59.
[131] *Ibid.*
[132] CIAR 782, 6Tr. p. 1028, lines 21-26
[133] *Ibid.;* CIAR 782, 6Tr. p. 1206, line 25, 1207, lines 1-2.
[134] CIAR 782,6Tr. p. 1213, L. 5-13.

more.[135] Currently, there is already a slowdown in real estate activity relating to some of the higher end recreational homes within the area simply because of apprehension in the market relating to the Project.[136]

126. Mr. Gettel further opined that Donkersgoed, Watmough, Gilmar and Emard's properties that are directly adjacent to the mine could suffer "very, very significant value impacts".[137] Loss of access to these properties would make them unsaleable.[138] Mr. Gettel confirmed in response to questions from Panel Chair that the property value impacts to these properties would be in the high-impact range of 15-50% and that these properties fit the extreme cases because of their proximity to the mine and that they share a road with the mining company.[139]

127. Based on Mr. Gettel's uncontradicted evidence, the Coalition submits that the Project will cause value losses in the order of magnitude of 15 to 50% for Ms. Gilmar, Vern Emard, Ed and Larry Donkersgoed and Norm and Tyler Watmough's properties. These value losses have not been mitigated.

5.1.4.1 Benga's Voluntary Purchase Program

128. Benga asserts that it implemented a voluntary purchase program to mitigate the property value losses incurred by members of the Coalition due to being within and adjacent to the mine permit boundary.[140] Benga further asserts that it made formal offers to acquire Coalition's members' lands (Watmough, Emard, Gilmar, and Donkersgoed (collectively, "Landowners East of the Mine Pit") at significant premiums and that many property owners sold their properties to Benga at those premiums.[141]

129. The Coalition submits that the record clearly shows that Benga's offers to the Landowners East of the Mine Pit are not at a significant premium. For an offer to purchase a property to be at a premium suggests that the offer must be higher than the fair market value. The *Black's Law Dictionary* defined "premium" as: "A sum of money paid in addition to a regular price, salary, or other amount; a bonus."[142]

130. During cross, Mr. Houston indicated that significant premium is "in the order of a hundred percent over fair market value".[143] While insisting that Benga's offer is at a significant premiums, Mr. Houston confirmed that Benga did not conduct appraisals on

[135] CIAR 553, PDF 60.
[136] CIAR 782, 6Tr. p. 1213, L. 20-26. Mr. Redekopp attested to this at CIAR 782, 6Tr. p. 1341, L. 9-13.
[137] CIAR 782, 6Tr. p. 1214, L. 8-10.
[138] CIAR 782, 6Tr. p. 1214, L. 11-14; CIAR 553, PDF 60-61.
[139] CIAR 782, 6Tr. p. 1221, L. 5 to 18.
[140] Benga's Argument, PDF 47, para. 166.
[141] Benga's Argument, PDF 47, para. 167
[142] *Black's Law Dictionary, 8th ed.* P. 1219, Emphasis added.
[143] CIAR 762, 4Tr. p. 746, L 1-2.

Donkersgoed, Emard and Watmoughs' properties.[144] Even the appraisal that it claims it conducted on Ms. Gilmar's property[145] was neither provided to Ms. Gilmar nor was the appraiser called as a witness to speak to the fair market value assessment of the properties that informed Benga's base values.

131. Benga further took the position that their offers to purchase the lands of the Landowners East of the Mine at $800,000 per parcel were double their assessed values.[146] Benga's assessed market value for lands adjacent to the mine and in the region was $400,000.[147] This base figure, as the evidence clearly showed, was created by Benga due to its low and unverifiable appraisals of properties. It does not represent fair market value of properties sold in the area.

132. The fair or base value of properties sold within the MD of Ranchlands and close to the mine has been $800,000 per quarter.[148] Mr. Gettel confirmed in his direct testimony that Benga's assumed base value of $400,000 for a quarter section[149] "is a rare instance" and the "absolute lowest value" that is obtainable in the area.[150] Mr. Gettel who has been working in Crowsnest Pass over the last ten years further confirmed that he had only seen the $400,000 value in properties acquired by Benga and nowhere else.[151]

133. As Mr. Watmough pointed out in his testimony, the Government of Alberta recently acquired a 96 acre parcel in their area for $850,000 ($8,854/acre). Using the per acre value of this purchase works out to $1,416,000 for a 160 acre parcel in the same area.[152] This is another evidence of property values in the area.

134. A review of the sale values of properties acquired by Benga in the area shows a value range of $800,000 to $1.3 million.[153] Even for the properties noted as being sold for $400,000 included a land exchange as an additional consideration. For example, Lee Brewerton's property NW 19-8-3-W5M[154] was purchased by Benga for $450,000 plus a land exchange.[155] Mr. Houston confirmed that they transferred a property previously owned by it to Mr. Brewerton's corporation.[156] This clearly shows that Benga's base price of $400,000 was not reflective of the market value in the area.

[144] CIAR 762, 4Tr. p. 746, L16-19.
[145] CIAR 762, 4Tr. p. 746, L 12-15.
[146] CIAR 762, 4Tr. p. 748, L 23-26, p. 749 L 1-7.
[147] CIAR 762, 4Tr. p. 749, L 15 – 24.
[148] CIAR 782, 6Tr. p. 1216 L 2 – 7.
[149] CIAR 762, 4Tr. p. 749 L. 15-18.
[150] CIAR 782, 6Tr. p. 1215 L. 23-26
[151] CIAR 782, 6Tr. p. 1216, L. 3-16.
[152] CIAR 782, 6Tr. p. 1261.
[153] CIAR 762, 4Tr. p.750 - 761; CIAR 757 and 758.
[154] CIAR 762, 4Tr. p. 753 to
[155] CIAR 762, 4Tr. p. 754.
[156] CIAR 762, 4Tr. p. 759, L. 19-24.

135. The Coalition submits that Benga's assessed or appraised values and the offers made to the Landowners East of the Mine Pit are unreasonable and was made in bad faith. A good faith offer that is consistent with Benga's declared principle of purchasing properties at significant premium and nearly double their assessed values should be at a start value of $1,600,000 and up to $2,600,000. This value range would reflect double the market value of the properties acquired in the area by Benga.

136. Further, a good faith offer dictates that the purchase offer for properties within the mine permit boundary should be similar. For instance, Benga paid $1.1 million to the previous owners of SW 31-8-3-W5M (Illyas and Margo Pagonis) for their property that is within the mine permit boundary.[157] Yet, Benga would not make a similar offer to Fran Gilmar, Ed and Larry Donkersgoed whose properties are within the mine permit boundary and outside of the mine footprint.

137. Mr. Houston attempted to justify the purchase prices of properties that Benga had purchased in the past by stating that Benga would pay a higher price for those properties that are within the Project's footprint because they were needed by Benga.[158] When questioned further about this in respect of the price of $1.1 million that Benga paid for the Pagonis property that is outside of the Project's footprint, Mr. Houston could not provide any justification.

138. According to Mr. Houston:

> 12· ·A· ·Mr. Chairman, that -- that particular property is
> 13· · · ·outside the footprint of the mine, and -- and, again, I
> 14· · · ·can't comment on the motivation of the company to -- or
> 15· · · ·the -- the -- the value that -- that Benga has paid for
> 16· · · ·any particular property.· I think I'll stop there.[159]

139. It is important that the Panel consider carefully the seriousness of Benga's offers to acquire the properties of the Landowners East of the Mine Pit in view of its assertion that the intent of these offers is to mitigate the property devaluation impacts of this Project on the Landowners East of the Mine Pit.

140. A reasonable and good faith offer should reflect the market values of properties purchased by Benga and others (i.e. Government of Alberta) in the area. Therefore, properties that are not within the Project's footprint should attract the same or similar offers subject to any improvement over and above the improvement on the Pagonis property that suggests or is indicative of a higher value. There is no evidence on record that Pagonis' property was worth more than Fran Gilmar or the Donkersgoed's properties that are within the Mine Permit Boundary.

[157] CIAR 762, 4Tr. p. 752 L 1-6; p. 762 L 17-22.
[158] CIAR 762, 4Tr. p. 761, L 14 – 26, p. 762 L 1-3.
[159] CIAR 762, 4Tr. p.762.

141. Benga asserts in its Argument that the reasonability of the offers is not within the jurisdiction of the AER to decide.[160] The Coalition submits that the reasonability of the offers should be considered by the Panel in assessing the Project's impacts on landowners interest as required by section 15 of *REDA* and section 3 of *REDA Regulations.*

142. Further, the reasonability of the offer is a matter that should be considered by the Panel in assessing the sufficiency and seriousness of Benga's proposed mitigation. While Benga posits that it is willing to negotiate property acquisitions with the Landowners East of the Mine, an unreasonable, rigid, and untenable position will not achieve a successful mitigation.

143. As these landowners indicate in their testimonies, Benga's attitude towards negotiating a reasonable settlement has been one of "take it or leave it" or "your property will be worthless if you don't have access". [161] Mr. Emard testified that Benga's negotiating tactic forced his ex-wife to sell her property at a low value of $650,000 after being told by Benga's representatives to "sell or you will have no access".[162]

144. Benga argues at paragraphs 169 to 170 of Benga's Argument that the Landowners East of the Mine Pit have access issues in existence which impacts the value of their properties. Benga's position begs the question: why did Benga pay up to $1.3 million for properties that share a road with the proposed mine some of which are not needed for the Project and are outside of the mine footprint? The fact that the properties purchased by Benga share the same Grassy Mountain Road with the mine should have affected their values, but it did not.

145. At paragraphs 171 to 172, Benga appears to suggest that the Donkersgoed misled the Panel in stating that they have not heard about the voluntary purchase program. It is important that the Panel consider paragraphs 171 to 172 of Benga's Argument in light of the Donkersgoed's testimony at CIAR 782, p. 1277 and the further clarification provided by Mr. Ed Donkersgoed as follows:

> 13· · · · · So if I could, just going back to your letter,
> 14· · ·Number 16, where you had underlined the voluntary
> 15· · ·purchase program.· Those are -- those were three words
> 16· · ·that we only heard again just in the last couple of
> 17· · ·days.· So it -- it -- the voluntary purchase program is
> 18· · ·something we never heard anything more about other than
> 19· · ·these few words on the letter.· **So if there was a**
> **20· · ·program per se, we certainly were not made aware of any**
> **21· · ·of the items within it**.

[160] CIAR 962, PDF 47 para. 168.
[161] CIAR 782, 6Tr. p. 1261, 1264, 1273, 1277, 1285, and 1297-1298.
[162] *Ibid.* p. 1297-1298.

146. Since Benga prides itself on maintaining an open communication line, it should have disclosed fully to the Coalition members how the voluntary purchase program worked and how they could avail themselves of it. It is important to note that the Landowners East of the Mine Pit have maintained open lines of communication with Benga and have indicated their willingness to negotiate in good faith the acquisition of their properties but that has not occurred. The fact that these landowners have made counter-offers[163], have discussed having an appraisal,[164] and have provided comparable properties for Benga to consider for a switch[165] indicate their willingness to achieve an acquisition of their properties.

147. At paragraph 174 of its Argument, Benga states that the Coalition members have not acknowledged the positive impacts that the Project could have on their property values.[166] There is no positive impact for the Landowners East of the Mine Pit when access is cut off and there is no alternative access. Further, any alleged potential positive impact is short-lived. As Mr. Gettel clearly explained in his direct testimony, an influx of new employees to the area could lead to an increase in demand that could translate to an increase in values leading up to the point that the mine is operational. After the mine is operational, there is no increase in value.[167] Instead, value losses occur as shown in Mr. Gettel's report and summarized above.

5.1.5 Landowner Effects and Mine Permit Boundary ("MPB")

148. Benga described its Project's footprint and the MPB in CIAR 42, Section A at PDF 159.

149. The MPB included Ms. Gilmar's lands and Ed and Larry Donkersgoed's lands[168] even though Benga did not hold surface rights to these lands as required by Section 4.1(c) of the *Coal Conservation Rules.*[169] Mr. Houston confirmed that Benga does not hold surface rights to these lands during cross.[170] This was confirmed also in Benga's Argument.[171]

150. Benga included the Donkersgoed and Ms. Gilmar's properties in the MPB even though mining is incompatible with residential development. Mr. Houston confirmed in cross that the effect of a restrictive covenant that restricts the Crowsnest Pass Golf and Country Club from rezoning their lands into residential development or using any portions of their

[163] CIAR 782, 6Tr. p. 1371, L. 1-8.
[164] CIAR 782, 6Tr. p. 1370, L 15-21.
[165] CIAR 782, 6Tr. p. 1297.
[166] Benga's Argument, PDF 48, para 174.
[167] CIAR 782, 6Tr. p. 1218, L 20-24.
[168] CIAR 752; CIAR 571, PDF 38.
[169] AR 10/2019. Section 4.1 (c) provides: "An application for a permit to develop a mine site to the stage of commercial coal production shall include, where applicable, (c) a statement of the applicant's rights to the coal and use of the land surface and a legal description of the lands to which those rights apply."
[170] CIAR 771, 5Tr. p. 1147. L. 25-26; p. 1148 L. 1-3.
[171] Benga's Argument, PDF 50, para. 178.

lands for residential use is because of the incompatibility of such uses.[172] Yet, Benga included these lands in the MPB.

151. A mine permit from the AER usually includes a figure that shows the boundaries of the area where mining activities are permitted. By including the Donkersgoed and the Gilmar's lands in the MPB, Benga is essentially asking for the surface rights to use these lands when Benga did not have a surface agreement regarding these lands.

152. During cross of Mr. Houston, Mr. Houston agreed that the MPB could be revised to exclude Donkersgoed and Gilmar's lands.[173] The Coalition agrees that the MPB should be revised to exclude Donkersgoed and Gilmar's lands.

5.1.6 Socio-Economic Effects

153. The Coalition members have expressed concerns about the need for this Project and questions Benga's assessment of the socio-economic benefits and impacts of this Project. In the Coalition's view, Benga's socio-economic impacts assessment is inadequate, unreliable and does not provide sufficient information on project benefits for the Panel to decide if the Project is in the public interest.

154. John Thompson of Watrecon Consulting Inc. reviewed Benga's evidence related to the socio-economic impacts and Project benefits. Mr. Thompson has extensive experience assessing economic impacts and economic benefits of coal mine projects.[174] In fact, Mr. Thompson assisted in writing the requirements for environmental assessment for the Government of Ontario in the 1970's.[175]

155. The findings of Mr. Thompson are contained in his report[176] and summarized in the Coalition's submissions at paragraphs 73 to 83.[177] Mr. Thompson's direct evidence appears at CIAR 786, 7Tr. p. 1687-1709.

156. In determining whether Benga's Project is in the public interest in view of its socio-economic impacts, the Panel must believe that the Project's benefits will exceed the sum total of all mitigated adverse effects i.e. Project's costs such that the project would therefore be in the public interest.[178]

157. The Coalition's position is that Benga's socio-economic impacts assessment provides a description of project benefits and socio-economic impacts that is incomplete, confusing, unreliable, and unreproducible. By characterizing economic impacts as project benefits,

[172] CIAR 756, 3Tr. p. 671, L. 20-25.
[173] CIAR 771, 5Tr. p. 1148 L. 5-10.
[174] CIAR 786, 7Tr. p. 1687-1689.
[175] CIAR 786, 7Tr. p. 1688, L. 9-16.
[176] CIAR 553, PDF 346.
[177] CIAR 553, PDF 27 to 31.
[178] CIAR 786, 7Tr. p. 1691, L. 19-26.

Benga has misrepresented the magnitude of project benefits. This misrepresentation affects the Panel's ability to draw clear conclusions about the nature or magnitude of the Project's economic effects and benefits.

158. Mr. Thompson in his report and in oral testimony has asserted that describing project's impacts as benefits leads to confusion considering that there are differences between project impacts and project benefits. With respect to describing provincial benefits, Benga commissioned a study of the provincial impacts of its project and it presented these impacts as "project benefits" in CIAR#503.

159. Mr. Thompson pointed out that economic impacts cannot be interpreted as project benefits. Mr. Shewchuk corroborated this through his response below when he was asked to point out which aspects of his economic impacts assessment could be classified as benefits:

> ·1· ·A· ·Mr. Chair, I -- I wasn't commissioned to calculate
> ·2· · · ·economic benefits.· I was calculate -- pardon me. I
> ·3· · · ·was commissioned to calculate economic impacts and
> ·4· · · ·economic assessments, and that is what is articulated
> ·5· · · ·in the socioeconomic impact assessment and associated
> ·6· · · ·submissions subsequent to its original production. [179]

160. Despite this observations of its own consultant, Benga's Argument continues to describe the provincial benefits of its Project using measures of economic impact, specifically in paragraphs 114 and 126.[180] There is little to no clear evidence in Benga's application materials as to the exact nature of Project benefits, especially at a local or regional level, and the Panel has instead been given measures of direct, indirect and induced effects which serve to confuse the issue.

161. The Coalition notes that the AER's Terms of Reference for the socio-economic assessment, as produced in Benga's AER's Terms of Reference Concordance Table[181] and in the Environmental Impact Assessment Summary[182], call for:

> 8.2 [A] Describe the socio-economic impacts of construction and operation of the Project including:
>
> (a) impacts related to
>
> ii. regional and provincial <u>economic benefits</u>.

[179] CIAR 762, 4Tr. p. 791, L. 1-6.
[180] CIAR 962, PDF 35 & 38.
[181] CIAR 42, Appendix 1, PDF 41.
[182] CIAR 42, Section E, PDF 229.

162. When the information quoted in the paragraph above is compared with the AER's Final Terms of Reference[183], it appears that Benga used a different version of Terms of Reference in its socio-economic assessment. The Final Terms of Reference did not include "economic benefits". It required assessment of impacts related to "regional and provincial economies". By not identifying an assessment of impacts related to economic benefits as a requirement is a significant gap in the Terms of Reference, which has been the cause of considerable confusion in this process.[184] Without an assessment of economic benefits, a public interest determination cannot be made.

163. Nonetheless, Benga identified that it would assess economic benefits of the Project but failed to quantify the regional benefits of the Project. At no point in the application materials did Benga indicate the extent to which existing regional residents would be employed in constructing or operating the Project; it has shown no awareness of barriers that might prevent regional residents from participating in the Project; nor has it identified or offered any specific mechanisms by which regional residents may be encouraged to participate. Thus, Benga has failed to meet its identified terms of reference and has not provided the Panel with information on regional economic benefits.

164. Benga continues to present inconsistent information regarding the direct operational jobs that will arise from this Project. In Benga's Argument, it presents the number as being 400 direct operational jobs.[185] During cross, Mr. Houston confirmed that the direct operational job estimate was 385 jobs with direct onsite labour being 211 person years.[186]

165. Similar inconsistent numbers were presented at paragraphs 114 and 126 of Benga's Argument regarding the total job numbers despite the correction presented by Benga in its Reply Evidence, CIAR 571, at pdf 13. According to Benga's Reply Evidence, the total labour estimate is 845 person quarters and not 850 person years.

166. Mr. Houston confirmed that Benga's Project benefits estimates were derived from its financial feasibility assessment and the socio-economic impacts assessment done by Nichols.[187] The financial feasibility model was the source of the estimates of the coal royalties and corporate income taxes to be paid by Benga. The Coalition notes that the financial model that Benga relies on for these estimates of taxes and royalties was never entered into evidence. Benga noted the coal royalties and the income taxes as project benefits even though Mr. Shewchuk confirmed that he did not conduct a project benefits analysis.[188]

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[183] AER Terms of Reference https://open.alberta.ca/dataset/12ab5b0c-c74d-4936-8fe7-2d550a2fa69e/resource/cd64e6d3-d7c9-4553-acf2-2b43e5b2cbc2/download/ftor-grassy-mtn-coal-project_19mar2015_final-np.pdf
[184] Note Mr. Thompson's statement in this regard at CIAR 786, 7Tr. p 1696 - 1701.
[185] CIAR 962, PDF 35, para. 114, and PDF 38, para. 126.
[186] CIAR 762, 4Tr. p. 778, L.12-15.
[187] CIAR 762, 4Tr. p. 767, L. 16-19.
[188] CIAR 786, 7Tr. p. 1692, L 16-20.

167. As Mr. Thompson noted in his direct evidence, Benga's claim that the Project would benefit the Province of Alberta through the payment of royalties on coals in the amount of $195 million over the life of the Project or an average of $30 million per year is inflated. It is not possible for Benga to pay more than 5 times the annual royalties currently being paid by all the metallurgical coal mines operating in Alberta.[189]

168. Mr. Thompson further noted that the *Coal and Mineral Development in Alberta, 2019*[190] showed that bituminous coal companies (1 producing coal for thermal power and 3 producing metallurgical coal) in Alberta produced 5.2 tonnes of bituminous coal and paid only $6.4 million in royalties.[191] He concluded that unless Benga:

> "[is] able to produce that coal at a much lower cost than its competitors, their claim of $30 million in annual royalties seem unrealistically high. A more reasonable number, based on production and amounts being paid by existing companies, would probably be in the order of 5 million a year."[192]

169. The Coalition notes that this evidence was not challenged by Benga through cross examination.

170. Mr. Thompson commented on Benga's claim that it would pay corporate income taxes of $126 million over the life of the project or about $19 million per year. Mr. Thompson noted that if the royalty numbers were unreliable as stated earlier, because they come from a financial assessment that has not been made available to the Panel, there could be no confidence in the income tax numbers because they were also taken from the same financial feasibility study that projected an assumed stream of net revenues.[193]

171. It is noteworthy that both the royalties and the income taxes will only be paid after the Project has generated annual revenues to cover all of the Project's previous costs. Mr. Houston confirmed that based on their 2015/2016 financial model, which was not filed, it would be about 5 to 6 years before royalties are payable.[194] Similarly, during the early years of mine operation, no corporate income taxes is payable to the provincial government. This was confirmed by Mr. Houston.[195]

172. Although other variables such as coal prices may influence the actual number of years when royalties or taxes may be payable, it is important that the Panel take this gap into consideration in assessing the economic benefits of this Project and the expected costs that the municipal governments will have to face to provide the infrastructure and services needed by the operations workforce.

[189] CIAR 786, 7Tr. p. 1693-1694.
[190] CIAR 7Tr. p. 1694.
[191] CIAR 786, 7Tr. p. 1694, L. 1-13.
[192] CIAR 786, 7Tr. p. 1694, L.14-19.
[193] CIAR 786, 7Tr. p. 1695, L. 4-10.
[194] CIAR 762, 4Tr. p. 813, L. 3-5.
[195] CIAR 762, 4Tr. p. 814-815.

173. Benga asserts at paragraph 144 of its Argument that Mr. Thompson did not demonstrate any specific calculation error regarding his concerns about the accuracy of the royalty payment projections. Benga referenced CIAR 786 at 1676 as support for its assertion. The Coalition notes that the reference relates to the evidence of Dr. Joseph and not Mr. Thompson's evidence. Nonetheless, Benga did not provide any calculation supporting its royalty payment projections; therefore, Mr. Thompson could not be expected to point to any calculation error when no calculation was presented.

174. In addition, considering the magnitude of the difference between Benga's claim and the actual royalties paid by other bituminous and metallurgical mining companies combined, there is no reasonable basis for assuming that Benga's projections on royalties or taxes are correct.

175. The Coalition agree that Benga's estimated 400 operations workforce could be counted as a project benefit, because these would be new jobs. However, when Mr. Shewchuk was asked about whether applicants could be held accountable to the statements made in their applications, Mr. Houston jumped in and specifically stated "we are not committing to hire 400 people".[196] This response makes it questionable or doubtful if any reliance should be placed on the veracity of the numbers that Benga has put forward regarding project benefits especially since the Panel has to rely on this information in making its public interest determination.

176. Further doubt about the magnitude of the estimated economic impacts, interpreted as benefits, was cast by Benga's own consultant. A summary of socio-economic impacts is included in Section E.11.7 of the Application[197]. Both Table E.11.6-1 of the Application[198] and Table 12.1 of CR# 11[199] provide a summary of the Project's residual effects on socio-economic VCs. The tables state the following:

    a. Impacts on employment regionally and provincially are considered to be positive, low and not significant;

    b. Impacts on government revenue are considered to be positive, low to moderate and not significant;

    c. Impacts on income are expected to be positive, low and not significant.

177. Although Mr. Shewchuk indicated that the significance of impacts was predicated on the effect being adverse,[200] this definition did not appear in the evidence until October 2018 in CIAR 89.[201] While this interpretation may be the case for evidence submitted after

[196] CIAR 762, 4Tr. p. 834, L 15-16.
[197] CIAR 42, Section E, PDF 246.
[198] CIAR 42, Section E, PDF 243.
[199] CIAR 42, CR #11, PDF 64.
[200] CIAR 762, 4Tr. p. 831, L. 23 – 24.
[201] CIAR 89, PDF 686.

that date, there is nothing in Benga's consultant's report to show the determination of significance was limited to adverse effects in evidence submitted prior to that date.

178. As Mr. Thompson pointed out in his uncontradicted testimony, all the evidence presented by Benga prior to October 2018 and in the socio-economic impact assessment (SEIA) assessed impacts on income, employment and government revenue as positive in terms of direction and not significant.[202] Mr. Shewchuk's description that consideration of "significance" relates only to and applies to adverse effects means that for an impact to be considered significant, it must be high in magnitude and of long term in duration. This description, as Mr. Thompson points out, represents a "major change in how the whole concept of significance was developed in the first stages of the application and how it's being interpreted now".[203]

179. When questioned about why Benga was choosing to describe project benefits as being significant despite the characterization in the consultant's report, Mr. Houston stated that there is a difference between common use of the word "significance" and "the formal use of the word 'significance' that we use for our effects assessment language".[204]

180. The Coalition submits that since Benga's Application did not provide any definition or threshold for what would constitute a significant economic effect, there should be no difference in how the term "significant" is applied. In the view of the Coalition, Benga is simply choosing to ignore its own consultant's interpretation of the significance of the Project's economic effects.

181. Benga contends at paragraph 128 of its Argument that no one can predict exactly what will happen if its Project goes forward because actual outcomes are beyond its control. With this statement, Benga appears to be suggesting that any errors or inconsistencies in its socio-economic assessment evidence which have been raised by the Coalition and other interveners are not really important and that the best estimates of Project's effects presented to the Panel should be sufficient for the Panel to make its decision.

182. In the Coalition's opinion, Benga's so called "best estimates" are so inconsistent, confusing, unreliable, and unreproducible that their reliability is questionable. Take the case of the estimated direct construction employment: initially this was 910 person-years[205]. Following the submission of direct evidence from the Coalition, this number was changed to 211 person-years in Benga's Reply Evidence[206]. Based on Benga's evidence related to construction costs ($137 million in labour costs[207]), Mr. Thompson pointed out that a 211 person years would mean an average cost of $649,000.00 per

[202] CIAR 786, 7Tr. p. 1704.
[203] CIAR 786, 7Tr. p. 1704, L. 26, p. 1705, L 1-3.
[204] CIAR 762, 4Tr. p. 833, L. 2 – 5.
[205] CIAR 42, Section A, PDF 97; CR #11, PDF 23; Section E, PDF 246.
[206] CIAR 571, PDF 13.
[207] CIAR 42, CR #11, PDF 19, Table 4.1.

person per year.[208] It is not possible for Benga to pay this amount annually to each construction worker.

183. Furthermore, Benga has claimed that the average construction workforce will average 120 with a peak of 195[209], but yet it is applying for approval to construct a semi-permanent 228-bed work camp based on a peak monthly workforce of 400.[210] The Coalition submits that the difference is not trivial and is beyond the level of uncertainty that should be considered within the normal range of variability associated with making socio-economic predictions.

184. Mr. Shewchuk asserted in cross that the economic effects estimates presented in CIAR 313 at pdf 27 were based on the model custom runs of Statistics Canada's input/output model.[211] Yet, in Consultant Report #11, it was stated that the impact estimates were based on "published statistics".[212] As noted by Mr. Thompson, there was no reference anywhere in the pre-filed materials or in the Reply Evidence that confirmed that Benga conducted a Statistics Canada custom model run of the economic effects estimates.

185. While the custom model runs were identified by Mr. Thompson as one of the ways of reducing uncertainties in SEIA,[213] Mr. Thompson noted that the use of a custom-model run could raise its own issues especially considering the challenges of developing appropriate input assumptions. He concluded that without seeing the what assumptions were used or how they were interpreted, he could not advise whether the revised estimates were realistic or not.[214]

186. The Coalition submits that merely stating during oral testimony that the revised economic effects information presented were based on a Statistics Canada custom-model run is not sufficient. The input parameters and input assumptions should have been presented to enable interveners conduct independent verification of the numbers presented.

187. At paragraph 144 of its Argument, Benga states that Mr. Thompson appears to agree that certainty is not possible with regard to the distribution of operational workforce between Alberta and BC.[215] Benga's statement misses the points that Mr. Thompson was portraying.

188. Mr. Thompson's points were:

[208] CIAR 786, 7Tr. p. 1708, L. 13-25.
[209] CIAR 571, PDF 13.
[210] CIAR 42, Section C, PDF 133-134.
[211] CIAR 762, 4Tr. p. 776.
[212] CIAR 42, CR#11, PDF 20.
[213] CIAR 553, PDF 352.
[214] CIAR 786, 7Tr. p. 1708, L. 1-7.
[215] CIAR 962, PDF 42.

a. there was no demonstrable evidence to suggest that the number of operational workforce choosing to live in BC would be as high as 40%;[216]

b. there was no assessment of the labour market in the community that would be most impacted;[217] and

c. that the worst-case scenario should have been modelled and appropriate mitigation adopted to address the worst case scenario.[218] The worst case being all the operational workers deciding to live in Alberta such that the assumed 60/40 split becomes irrelevant and inaccurate.

d. Mr. Houston was given the opportunity to comment on the worst case scenario occurring and Benga's plans to deal with same during cross.[219] However, Mr. Houston chose to waive this opportunity by suggesting that modelling the impact of all operational workforce living in Alberta would be hypothetical.[220] Mr. Houston and Benga have ignored the fact that their 60/40 split is also hypothetical considering that the percentages may change based on a number of factors. The Coalition submits that a conservative modelling should have been done based on the worst-case scenario. A conservative modelling would have shown the potential impacts at a worst level and would have increased the understanding of impacts of the Project on infrastructure and services in the region should the worst case materialize.

e. Benga pointed out a calculation error in Mr. Thompson's report in CIAR 553 at pdf 354 during cross.[221] The error relates to the cost of labour for operational workers in Alberta and BC. Benga correctly noted that the cost of labour for the operational worker residing in BC should have been $108,000.00 as against $65,850 noted in Mr. Thompson's report.[222]

189. Despite the revision, Benga's evidence still shows that the operational workers in Alberta and BC would be paid at different rates based on dividing the labour income estimates by the number of jobs for residents of BC and Alberta. While Mr. Thompson's calculations suggested that Alberta residents would be paid more, the revised calculation showed that BC residents would be paid more. The revision has no effect on the point being made which is that if the analysis was done correctly, workers living in Alberta and BC should receive the same income. The correction suggested by Benga confirms the inconsistency in the analysis.

[216] CIAR 786, 7Tr. p. 1703, L. 5 – 8.
[217] CIAR 786, 7Tr. p. 1741, L. 24-26; p. 1742, L. 1-22
[218] CIAR 786, 7Tr. p. 1703, L. 5 – 19.
[219] CIAR 762, 4Tr. p. 826, L. 17 – 21.
[220] CIAR 762, 4Tr. p. 827. L. 1-7.
[221] CIAR 786, 7Tr. p. 1725 – 1726.
[222] CIAR 786, 7Tr. p. 1726, L. 17 – 20.

190. Based on the foregoing, the Coalition submits that Benga's socio-economic assessment is seriously flawed and full of inconsistencies that have not been reconciled. Benga's dismissal of fundamental issues raised by Mr. Thompson as being applicable to the ToR stage of the process and its continued description of impacts as benefits trivializes the concerns that the Coalition has raised through Mr. Thompson. Benga's cavalier attitude is concerning considering the profound effect that the Project would have on the nearby communities. The Coalition submits that Benga has not proven that the economic benefits of its Project outweighs the costs of the Project.

5.2 Geology, geotechnical (including dam safety) and mining, accidents and malfunctions, industrial waste and waste management, effects of the environment on the Project (including climate change) and other issues.

5.2.1 Climate change - The Coalition Evidence

191. Dr. Fennell's pre-filed evidence entitled "Review of geology, hydrogeology, groundwater-surface water interaction, geochemistry, and climate change implications" is set out in Appendix C of CIAR 553 at PDF pg.68-91.

192. Benga did not address Dr. Fennell's pre-filed evidence in Benga's Response Submission evidence in CIAR 571. The only appearance of Dr. Fennell's name in the Response Submission is on PDF pg.179 in Mr. Davies' CV.

193. Dr. Fennell's Errata Sheet was marked as CIAR 844. His PowerPoint was marked as CIAR 875. His direct evidence was given at 23Tr, p.4837-4926.

194. Benga's cross-examination of Dr. Fennell was negligible (less than 13 pages); see 23Tr, p.5011, L.22 to p.5025, L.12.

195. Benga's attempt to address the evidence given by Dr. Fennell in its Final Argument was negligible (only 9 paragraphs); see CIAR 962, paragraphs 217 and 404-411.

5.2.2 Views of the Coalition

196. Benga has not accommodated future climate change and the potential implications it has for creek flow conditions and for the amount of dilution that would occur to contaminants that may be released directly or in the groundwater.

197. Benga states in paragraph 211 of its Final Argument that Benga has "planned and designed the Project based on worst-case scenarios and conservative assumptions that ensure Benga does not underestimate the potential effects of climate change in the project design, mitigations and contingencies." In fact, Benga did not rely on worst-case and conservative assumptions. This statement is not backed up by the climate change data

that Benga used for its application, in particular its reliance on mean scenarios from the wrong region (Pincher Creek) with a cut-off at 2050.

198. Benga indicates on PDF pg.105 of CR#1 in CIAR 42 that *"The primary source of PCC [Prairie Climate Centre] climate model data is the Pacific Climate Impacts Consortium (pacificclimate.org). The dataset was statistically* ***downscaled*** *to produce 10-km scale predictions for the* ***M.D. of Pincher Creek*** *from 12 global climate models…, for two emissions scenarios (RCP4.5 and RCP8.5) that reflect "high" and "low" carbon futures."* In fact, RCP4.5 reflects a low carbon future and RCP8.5 reflects a high carbon future. RCP8.5 is generally taken as the basis for worst-case climate change scenarios. RCP4.5 is an intermediate scenario where emissions peak around 2040 and then decline. There is still considerable debate on which scenario is the most likely. As Mr. Houston said in response to a question to Mr. Rudolph noted at 8Tr, p.1928:

> Q So, Mr. Rudolph, if we have been doing so well with managing CO2, then why is it still going up?
>
> A Mr. Secord, I -- I think managing CO2 and eventually achieving objectives of zero increase in CO2 is -- is important, but that's -- you know, not being there yet and doing nothing are two different perspectives, and I think what Mr. Rudolph was trying to explain was that this graph was based on a do -nothing approach or do-very-little approach.

199. In paragraphs 211 to 217 of its Benga Argument, Benga discusses its view about the worst-case scenario for greenhouse gas emissions. Benga even mentioned TransAlta's plans to convert one of its coal fired power plants to natural gas in paragraph 215.

200. Despite Benga's contention that Canada has made strides to curb CO2 emissions, this says nothing of the rest of the world. Global warming is not a local issue. It is a global challenge. So, whatever we do here in Canada and Alberta (1.6% of global emissions), it will be small compared to the large effects other countries will have. Basically, Canada and Alberta have limited control of the situation. It is the Coalition's view that Benga should be taking a precautionary approach by considering the worst-case scenario for future climate change, especially given the negative impacts that its mine will have on the future base flows of Blairmore and Gold creeks.

201. The data portal the Climate Atlas of Canada (www.climateatlas.ca) does provide climate projections for the Crowsnest region. Mr. Rudolph agreed that climate projections for the Crowsnest region are relevant to this project; see 8Tr, p.1880, L.5-7.

202. Mr Rudolph also agreed that climate projections for Crowsnest region are more relevant to this project than climate projections for the M.D. of Pincher Creek and that part of the M.D. of Pincher Creek is located in a very different climate regime from that of Grassy Mountain; see 8Tr, p.1880, L.8-14.

203. CIAR 787 is a Table that sets out 24 climate models from the Climate Atlas of Canada in Column 1. Column 2 of CIAR 787 shows the 8 models used in CR#1 by Benga from the Climate Atlas of Canada. Column 3 of CIAR 787 lists 4 other models used by Benga in CR#1from some source other than the Climate Atlas of Canada.

204. Why did Benga decide to use only 12 general circulation models (GCMs) for the climate change assessment process when there were, according to Mr. Rudolph, 29 models available at the time?

205. It appears to the Coalition that Benga was being selective in only choosing 12 GCMs in CR#1 and having the models look at climate projections for M.D. of Pincher Creek rather than at climate projections for the Crowsnest region.

206. In the 2nd paragraph on that same page, PDF pg.105 of CR#1 in CIAR #42, the statement is made that *"Average predictions from the 12 GCMs from the recent past and the year 2050 are presented, the latter for high and low carbon futures."* This is another example of Benga deciding to use the "average" predictions as opposed to "conservative" or "worst-case" projections. The use of "worst case" projections would have been a more conservative approach for Benga to take in this mine application. Unfortunately they have not used this approach through the entire assessment process.

207. Mr. Rudolph seemed to suggest that it did not matter because Benga redid some of the CR#1 work in CIAR 70, Addendum 6 and he referred to PDF pg.21 at 8Tr, p.1883, L.8-18.

208. Table 5.14-1 is set out on PDF pg.105 of CR#1 in CIAR #42:

Table 5.14-1 Projected Climate Parameters near Pincher Greek based on the Average of 12 GCMs (PCC 2016)

Parameter	Baseline Value (1961 – 1990)	High Carbon Prediction, 2050s	Low Carbon Prediction, 2050s
Number of Days above 30 °C	7.6	17.2	15.2
Number of Days below -30 °C	3.0	0.6	0.9
Precipitation (mm)	474.7	487.0	489.2
Total Winter	76.6	79.4	82.2
Total Spring	134.8	151.3	150.8

209. Table 5.14-1 shows the "Number of Days above 30°C" near Pincher Creek for the "High Carbon Prediction, 2050s" (*RCP8.5)* as 17.2 days, and for the "Low Carbon Prediction, 2050s" (*RCP4.5)* as 15.2 days.

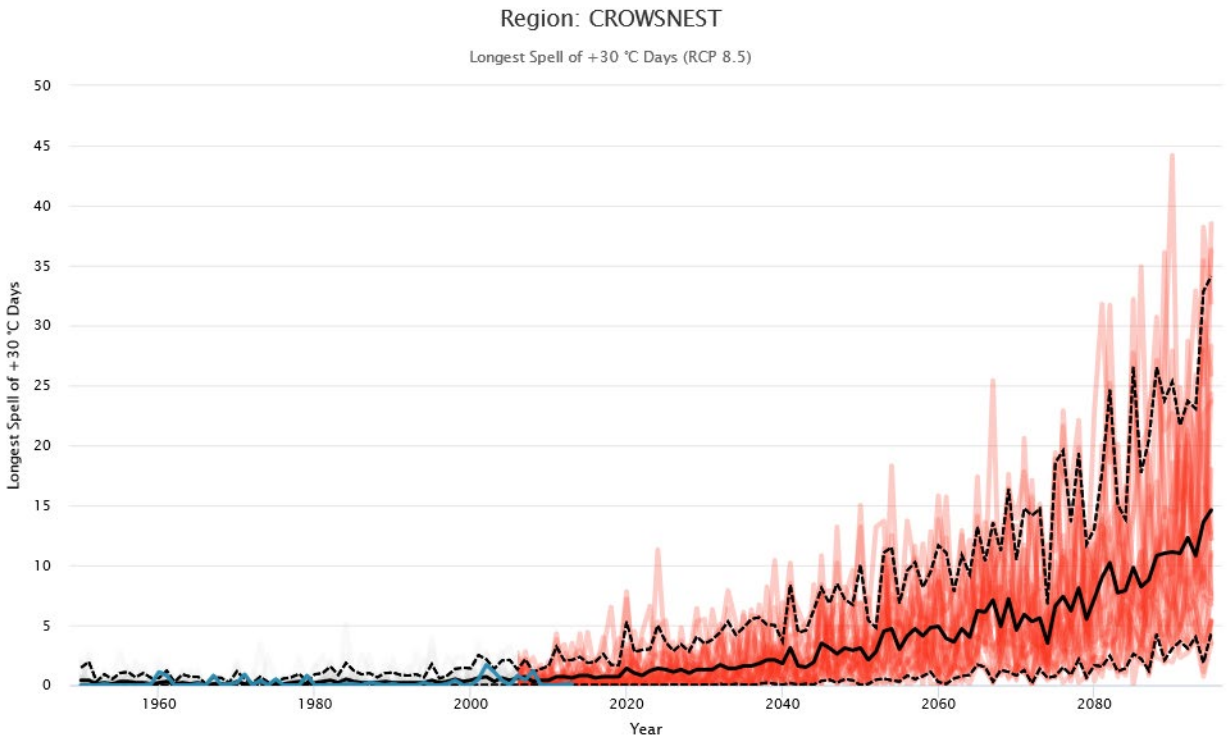
210. Mr. Rudolph was asked if Table 5.14-1 was updated in Addendum 6. Mr. Rudolph confirmed that the data on extreme temperatures was not updated; see 8Tr, p.1886:

Q Yeah. And has this table been updated with information from Crowsnest area?

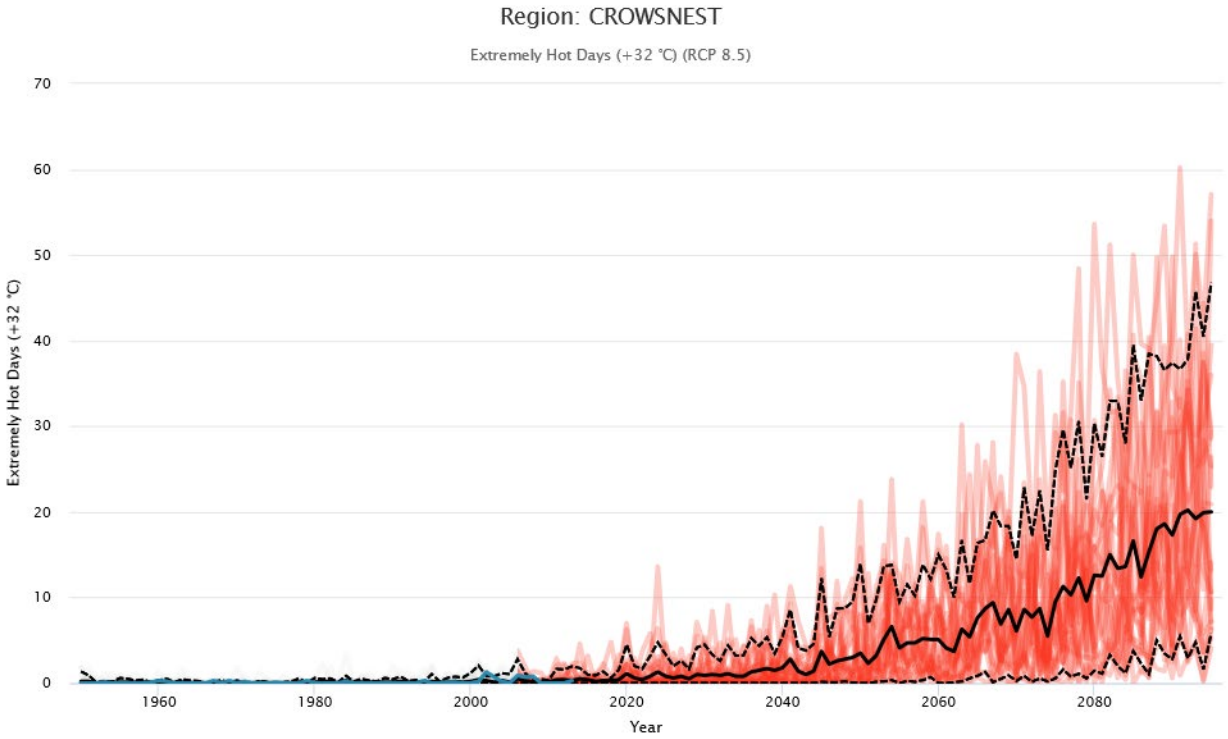
A This particular information has not been updated, no.
Q So even though, apparently, you tell me you've run -- have you run the 29 -- have you gone to the Climate Atlas and taken a look at this information for the actual project area?
A As I -- as I noted in CIAR 70 at PDF 21, we discuss information at GCM, global climate model, grid points near the area and provide a broader set of predictions, the number of days above and below -- or above 30 and below minus 30. They have been included there, but there was a much broader swath of information provided for those two points.
Q Okay. So what did you --
A This particular information may not have been updated, though.

16 Q Well, you're referring to CIAR 70. Tell me, is that
17 information updated in that exhibit for the number of
18 days above 30 degrees C in the project area?
19 A I would need to check to confirm --
20 Q Well, why don't you?
21 A -- Mr. Secord.
22 Mr. Chairman, I'm at CIAR 70 right now, and the
23 information on extreme temperatures is not included in
24 that -- in that section. It refers primarily to
25 precipitation extremes.

211. It is worth noting that CIAR 893 shows a 90th percentile scenario for RCP 8.5 for the Crowsnest Region of upwards of 33 days for the longest spell of +30°C days by the end of the century (shown by the upper black dotted line) where the Blairmore and Gold creeks, as well as all the lower flowing tributary streams would be absorbing the heat. It shows a worst-case scenario of 44 days by 2091 and that is shown by the top red line; see 23Tr, p.4990, L.21 to p.4902, L.6:



212. CIAR 894 shows a 90th percentile scenario for RCP 8.5 for the Crowsnest Region of upwards of 45 extremely hot days (+32 degree days) by the end of the century (shown by the upper black dotted line). It shows a worst-case scenario of 60 days of +32°C days by 2091 and that is shown by the top red line:



213. The data reported by Benga in Table 5.14-1 from Pincher Creek stops at the 2050's and does not extend to LTC conditions. The temperature data was not updated in Addendum 6. Is this just a coincidence or was Benga being selective in its choice of dates? It is quite clear that the impacts from this Project will transmit well beyond 2050, with some being permanent.

214. Given that baseflow to the creeks is projected to decrease by as much as 20% (and even more if appropriate constraints has been placed on the groundwater numerical model) in some instances, and the fact that discharge of groundwater is an important regulator of stream temperature conditions, Benga was asked how these extreme hot day projections were accommodated in its modelling for the threats to WSCT population as associated flora and fauna residing in Blairmore and Gold Creeks.

215. The following evidence was given by Mr. Houston on this topic at 8Tr, p.1938:

Q So given that base flow to the creeks is projected to decrease by as much as 20 percent in some instances and the fact that discharge of groundwater is an important regulator of stream conditions, how have these extreme hot days been accommodated in Benga's modelling for the threats to westslope cutthroat trout population and associated aquatic flora and fauna residing in Blairmore and Gold Creeks?

A I -- I feel like that's a lot like the last question you asked me, Mr. Secord. And I'll reiterate. The reduction of base flow that you're talking about is specifically with respect to Blairmore Creek. There is not a 20 percent reduction of base flow at Gold Creek.

And so if we're talking about Blairmore Creek -- and, again, I'll reiterate that the water that we would be returning to Blairmore Creek after treatment will have been through the saturated backfill zone and will be at the same temperature as groundwater.

216. Mr. Houston was wrong about Gold Creek. Table 3-6, Monthly Base Flow Reduction, Baseline to LTC; PDF pg.250 of CR#3 in CIAR 42 indicates a 20% decrease in the base flow of Gold Creek at GC02.

217. As Dr. Fennell noted in his Slide No. 24 in CIAR 875 ~ discussed at 23Tr, p.4896, L.2 to p.4903, L.15:

> Benga has not adequately assessed the impact to stream temperatures, DO conditions, and implications to WSCT considering the anticipated increase in "Long Spells of +30°C Days" (AQ#2 - Coalition - region-crowsnest 30 degree days - Geology Topics) and number of "Extremely Hot Days" (AQ#3 - Coalition - region-crowsnest +32 degree days - Geology Topics) combined with changing flow conditions, longer low flow periods, and baseflow reduction from mine dewatering and permanent lowering of the water table.

218. Dr. Fennell's Figure 7 at PDF pg.83 in CIAR 553:

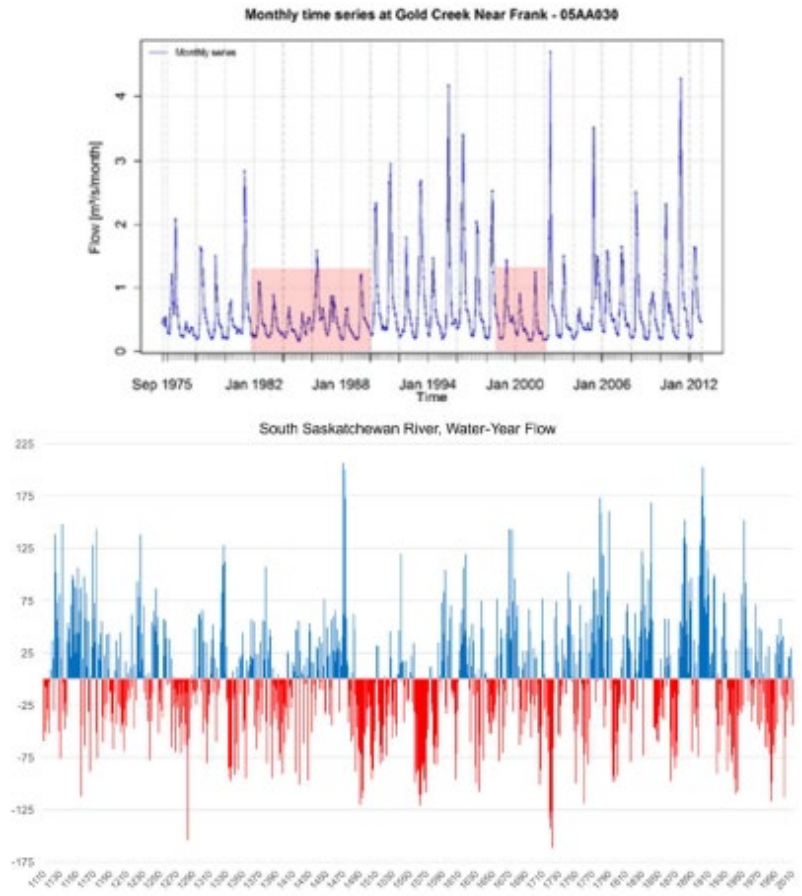


Figure 7. Monthly stream flow record for Gold Creek near Frank, AB[15] and tree-ring reconstruction of water-year flow showing positive (blue) and negative (red) departures from mean water-year flow[16]

219. Figure 7 indicates that there is considerable variability noted in historical and paleo-records for river flows and the regional climate.

220. Figure 7 shows long periods of low flow in Gold Creek between 1982 and 1990 and between 1999 and 2002. In this application Millennium has given us a limited window of 2013-2016 indicating that creek flow data collected between 2013 and 2016 are "representative" of long term trends; see bullet point no. 7 on PDF pg. 207 of CR#3 in CIAR 42. As a result, only a limited amount of historical data has been used by Benga in this application. The limited amount of historical data used by Millennium has in fact constrained, or limited, the variability of stream flows and climate conditions to a narrow window of time. As a result the hydrology and climate modelling done by Millennium in support of this application does not represent the "worst case" scenario when the variability noted in historical records has shown some extended periods of excess and deficit to the water balance of the region as shown in Dr. Fennell's Figure 7.

221. As Dr. Fennell noted in his Slide No. 22 in CIAR 875 ~ discussed at 23Tr, p.4893, L.24 to p.4895, L.11:

Benga has relied on selected return periods to bracket climate extremes. They have not considered, in their model projections, results from paleo-records in southern Alberta that indicate significant periods (multiple decades) of above and below average conditions.

222. Dr. Fennell's report at PDF pg.88-89 in CIAR #533:

5. Climate change considerations

There is concern regarding how climate change has been addressed in this application. Figure 9 shows the anticipated changes to the probability of more extreme temperature conditions in response to a shift in the mean, variability, and symmetry of normal temperature distributions. Similar changes can be anticipated for other climate variables, like precipitation. From a review of Figure 9 (on the following page) it is evident that as the global climates shift towards a new regime in the coming decades the probability of extreme events is anticipated to increase. This means hotter weather and more heat waves leading to increased meteorological and/or hydrological drought risk, and as well as an increase in more extreme wet conditions (increased flood risk and associated environmental concerns). A shift in the intensity, duration and frequency, or IDF, of precipitation events is also anticipated. According to Kuo et al. (2015)[20], projections have been reported as follows:

*"Future IDF curves show a wide range of increased intensities especially for storms of short durations (≤1-h). Conversely, future **IDF curves are expected to shift upward** because of increased air temperature and precipitable water which are projected to be about 2.9 °C and 29 % in average by 2071–2100, respectively."*

223. Benga was asked how has the anticipated shift in IDF (intensity, duration, and frequency) to more extreme conditions (>90th percentile) been accommodated in the stream flow modelling for Blairmore and Gold creeks? Mr. Houston's response was that Benga would be able to augment the flow to the Gold Creek in drier conditions; see 8Tr, p.1897, L.5-22.

224. Benga was asked how has the anticipated change to the IDF been considered regarding the impacts to WSCT habitat once the Blairmore and Gold creek watersheds are significantly altered permanently? Mr. Houston's response was that Benga would be able to augment the flow rates to the Gold Creek to ensure a minimal flow and to "concentrate the creek back into the main channel"; see 8TR, p.1987, L23 to p.1898, L.19.

225. The Coalition notes that "climate variability" is the variation in climatic conditions beyond individual weather events (i.e. months to years) and "climate change" means a trend in a particular direction, which tends to manifest over decades. Benga does not appear to have accommodated both of these aspects in the climate-related assessments for the Project area.

226. Benga was asked if it was familiar with the terms ENSO (El Niño and the Southern Oscillation), PDO (Pacific Decadal Oscillation), and PNA (Pacific North American tele-connection pattern); see 8Tr, p.1900, L.17 to p.1901, L.25. Benga confirmed that it did not make any reference to ENSO, PDO or PNA anywhere in its application; see 8Tr, p.1901, L.26 to p.1902, L.11. It is not clear to the Coalition how Benga accommodated (if

at all) ENSO, PDO and PNA influences in the hydrologic and water-quality modelling that has been done to assess the risks to Blairmore and Gold creeks when there is no mention of those phenomena is Benga's application. The only logical conclusion is that they have not accommodated the impacts of these climate phenomena, which are clearly documented to impact the water balance of Western North America.

227. As Dr. Fennell noted in his Slide No. 21 in CIAR 875 ~ discussed at 23Tr, p.4891, L.20 to p.4893, L.23:

> Benga has not adequately addressed the anticipated shift in timing and magnitude of precipitation and streamflow conditions in response to future climate change, and how this will affect their model projections. This includes implications for shortening of return periods for extreme events (i.e. increased probability).

228. It is not clear how the historically-noted and anticipated continued decline in the snowpack of the Project area been accommodated in Benga's impact assessment of the stream flows and climate change assessment.

229. The snowpacks have been declining in Western Canada over the last few decades; see Dr. Fennell's Figure 5 at PDF pg.81 in CIAR 553:

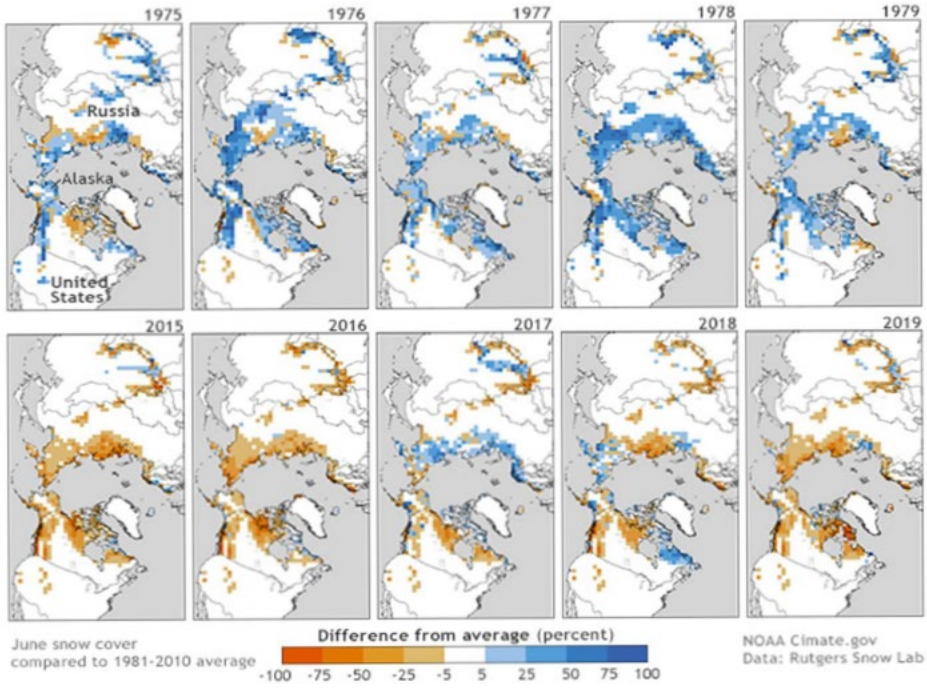


Figure 5. Change in June snow cover over North America from 1975-1979 and 2015-1019[12].

230. Benga said they had no reason to disagree with the data in Figure 7 at 8Tr, p.1903, L.2-8.

231. Benga agreed that the melting of the snowpack, existing as a form of stored water, is gradually released adding to the seasonal streamflow in the spring. A continued trend of decline is anticipated in the future as the winter season continues to shorten as the world

warms, with more rainfall and rain-on-snow events occurring. This will inevitably lead to a quicker loss of this stored water. It is not clear to the Coalition how this anticipated shift in the water balance has been accommodated by Benga in the hydrology modelling, including predictions regarding changes to the timing and magnitude of flows. In particular the modelling performed by Benga does not appear to have accommodated a "worst-case" approach to the scenarios developed to support Benga's application. By using "average" parameters, Benga has avoided acknowledging the magnitude of change and degree of variability that could be expected (it is not conservative enough). It has not considered worst-case climate scenarios.

232. As Dr. Fennell noted in his Slide No. 20 in CIAR 875 ~ discussed at 23Tr, p.4890, L.10 to p.4891, L.19:

> Benga has not considered how the continued loss of snowpack and increase in rain-on-snow events (resulting in shorter & higher magnitude runoff periods and longer low flow periods) will influence future hydrologic conditions and resulting water quality in Blairmore and Gold creeks.

233. Dr. Fennell's Figure 6 at PDF pg.82 in CIAR 553:

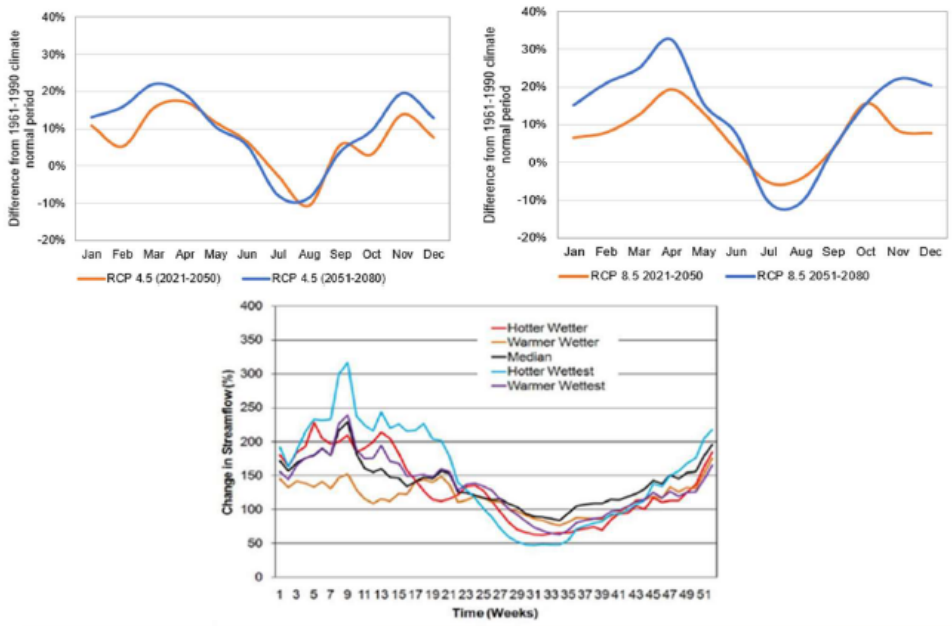


Figure 6. Climate model projections for seasonal precipitation under RCP 4.5 and RCP 8.5 scenarios[13] and anticipated changes to streamflow conditions under various climate scenarios[14] *(Note: 100% for "Change in Streamflow" on the vertical axis represents the baseline period of 1961-1990 from which future deviation of conditions is assessed)*

234. The changes to the timing and magnitude of stream flows will influence the dilution factor for contaminants released from the mining operations into Blairmore and Gold creeks. The changes to the timing and magnitude of stream flows will also influence the dilution factor for the release of contaminants from the closure landscape after Benga is long gone.

235. As Dr. Fennell noted in his Slide No. 23 in CIAR 875 ~ discussed at 23Tr, p.4895, L.12 to p.4898, L.17:

> Benga has not adequately addressed the anticipated shift in timing and magnitude of precipitation and streamflow conditions in response to future climate change, and how this will affect their model projections. This includes implications for shortening of return periods for extreme events (i.e. increased probability).

236. The following passage from Dr. Fennell's direct evidence is also relevant starting at 23Tr, p.4895, L.

If we want to talk about climate change now, we're talking about a shift in the -- the average and the variability of conditions. And I'll -- the images on the right-hand side are just a demonstration of what happens when that occurs. When you -- when you shift from the average to a new average, you actually increase the probability of extreme events occurring. And -- and same thing happens when -- with variability. The variability does increase.

So this is exactly what the climate models are projecting. We're projecting in the up -- the upper panels on the right-hand side are images taken from data that was provided by the Climate Atlas of Canada. This is the -- the -- the agency in Canada provides model outputs for various school climate models. This is the information that -- that was used in -- in Benga's application.

This is showing how the precipitation is projected to shift under different climate scenarios where -- whether it's the Representative Concentration Pathway 4.5 or RCP 8.5. It's showing that precipitation is --

is -- is projected to increase earlier in the year, again, consistent with less snow, more rain, rain and snow events, and being up to, you know, 20 and 30 percent higher, and then -- and then transition to below average during the low-flow period of upwards of -- of 10 to 15 -- 10 -- 10 percent or so. So you're getting a more protracted spring freshet and an extended low-flow period.

Equally, in the image below taken from some work by Dr. Sauchyn and others that's referenced in my -- in my submission, they looked at a number of different climate scenarios, whether it's hotter weather, warmer weather, so on and so forth, and -- and looked at how the streamflows were projected to change.

Now, I reference you to the -- the dotted line at "100 percent" because that is, effectively, the reference period or the -- of 1961 to 1990. So anything above 100 is an increase in the streamflow, and anything below is a reduction. And so in all the -- in most of these model cases, if not all, we're showing increases in streamflow earlier on in -- in the -- in the flow year, even upwards, in the most extreme case, of about -- you know, upwards of, I guess, 200 percent and -- and declines of upwards of -- of 50 percent and for a much, much longer period of time.

So this is this variability, again, that if not worked into some sort of dynamic modelling and only

using return periods, doesn't give the full picture, and so these anticipated shifts in -- in timing and magnitude have ramifications, and also, you know, the -- the change in intensity, duration, and frequency of -- of some of these climate events, which is projected to increase, actually increases the probability of these events occurring. So, in effect, a 1-in-10 event can actually become a 1-in-7 or a 1-in-5. It really depends on the probability.

237. Benga was asked how shifting precipitation patterns (precipitation as shown in Figure 6, PDF pg.82 in CIAR 553 and snow as shown in Figure 5, PDF pg. 81 in CIAR 553) will affect modelled baseflow estimations and the assimilative capacity of the creek systems for released contaminants after major alterations to the watersheds and associated groundwater flow systems occur; see 8Tr, p.1909, L.8 to p.1910, L.5. After a consultation with his colleagues, Mr. Houston's response appears at 8Tr, p.1910, L.13 to p.1913, L.12. His conclusion was that Blairmore Creek and the aquatic environment "could manage a higher level of selenium." See 8Tr, p.1912:

We've -- we've analyzed that situation. We're going to discuss that further in the water section, but we've analyzed that, and we have a fairly good story to tell about why that is -- remains a safe level. And for me, that -- that is what I understood you to mean by

"assimilative", that the -- that the Blairmore Creek and the aquatic environment could -- could manage a higher level of selenium.

238. The Coalition is concerned that the anticipated shift in temperature and precipitation conditions been not been properly accommodated in the forward simulations for stream flow volumes and timing (channel flow and baseflow, or groundwater, contributions) and there are questions about how a worst-case scenario will affect the ability of Blairmore and Gold creeks to assimilate contaminants originating from the mine and associated waste rock dumps and water management structures.

239. There are also large unanswered questions about whether the anticipated changes to the water balance of the Project area, under a changing climate (with extreme conditions projected to increase) have been properly accommodated in the SRK GoldSim modelling of trace elements and nutrient concentrations (Appendix C of CR#3 of CIAR 42). The Coalition does not believe that the model results provided are conservative enough to ensure protection of the existing and future WSCT populations and associated aquatic flora and fauna in the Project area. Furthermore, the model projections used by Benga to assess potential changes in future climate conditions affecting streamflow are based on instrumental measurements and do not capture the full range of variability that may be expected as shown in Dr. Fennell's Figure 7 at PDF pg.83 in CIAR 553.

240. Benga was asked to explain the reason, or reasons, why more extreme conditions have not been assessed, given that the potential for them occur certainly exists in the paleo-records. Mr. Houston's evidence was as follows at 8Tr, p.1921:

Q Right. So we looked at Dr. Fennell's Figure 7, you know, showing historical records. You've talked about your -- the window that the modellers used from 2013 to 2016. There's also reconstructed records for the last 900 years. So I would, I guess, ask: Explain the reason or reasons why more extreme conditions have not been assessed, given the potential for them to occur certainly exists in the paleo records.

A I -- I think that most of the data we're talking about, Mr. Secord, is applicable to the project over the next, let's say, 20 or 30 years, during the life of the project. And I think looking back 20, 30, 40, 50 years is a good database for projecting forward 30 years into the future as this project is -- is developed and finally decommissioned. That -- that seems to be a reasonable approach to me.

Q And is that what the modellers did in this case?

A Yes.

241. Benga was how the increase of heavy precipitation days (10 mm days and 20mm days) projected for the future have been accommodated in Benga's sediment transport models assessing the impacts of site clearing, development, and long-term operation of the mine? Mr. Houston's response was at 8Tr, p.1942:

Q Okay. Now, how have these increased numbers of heavy-precipitation days projected for the future been accommodated by Benga in sediment transport models assessing the impacts of clearing development?

A MR. HOUSTON: Mr. Secord, again, I'm not sure I totally follow your question, but you understand that the water that is captured on the site will be passed through sedimentation ponds where sediment will be removed before putting that water back into the creeks? So is that the nature of your question?

Q Not really, no. So I'm kind of thinking about what Mr. Emard talked about when he gave evidence, where he said one night when he was staying on his property, he was nearly washed away by an extreme precipitation event. And so what I'm thinking is -- about is situations where you're on the mine site. You're going to clear all of the trees. I'm assuming all of this takes place, you know, at the beginning of the mining operation. So I guess my question is: How have these increased number of heavy-precipitation days projected for the future been accommodated by Benga in sediment transport models assessing the impacts of clearing?

A So, Mr. Secord, Mr. Chair, the water management plan has us capturing all of the water, whether it be surface water, contact water, water pumped out of the

> pit. We'll be capturing all of that water, and every drop of it will be tested and confirmed to be suitable for putting back into the creeks.
>
> And so the -- most of the surface water, as Mr. Secord rightly points out, may have -- especially under extreme precipitation, may have a sediment load, and that water will be run through sedimentation ponds, and -- and the sediment will be precipitated before it's put back into the creek. So we'll make sure that that water is properly treated to remove sediment before it is put back in the creek.

242. It is hard for the Coalition to believe that Mr. Houston is so confident that Benga "will be capturing all of the water" and that "every drop of it will be tested". The Coalition expects that the JRP will also find it hard to believe Mr. Houston's position on this point given the lack of evidence provided to support it.

243. Mr. Houston was skeptical that the spring freshet (or runoff) period has been showing signs of shifting to earlier in in the year; 8Tr, p.1945, L.5 to p.1946, L22.

244. Given that the future projections are for a continued shift of the runoff period to earlier in the year, and for a shorter duration followed by a longer period of low flow conditions, this means that stream flows in Blairmore and Gold creek will be even more reliant on baseflow contributions from groundwater in the future; see 8Tr, p.1946, L3 to p.1947, L.10.

245. Mr. Houston confirmed that the Benga's mine development will be intercepting some of this baseflow through mine dewatering and a permanent lowering of the water table, but suggested that "the total flow to the creek is more or less unchanged"; see 8Tr, p,1947. L.11-19. It is unclear how this is physically possible if some of that flow is being captured or permanently diverted because of significant changes to the landscape, including the removal of a mountain.

246. Mr. Houston did not know if this observed and projected shift in future conditions had been accommodated in the stream flow modelling to address impacts to temperature, dissolved oxygen, and assimilation of contaminants originating from the mine development and closure landscape; see 8Tr, p.1946, L. 25 to p.1947, L.2.

247. Continued global warming is anticipated to shift the hydroclimate of the Project area to a new state, with the occurrence of more extreme conditions; see Figure 9, PDF pg.89 of CIAR 553). This will result in a complex interplay between both temperature and precipitation that will affect evaporation rates. Despite Benga's cavalier comment that the water balance of the area will not be affected other than by the removal of water in the coal itself, (see PDF pg. 85 in Section E of CIAR 42), it is not clear how this aspect has been included in the water balance modelling of the Project, as it relates to impacts on return flows and contaminant loading to Blairmore and Gold creeks. By extension how will this affect the WSCT populations and any other aquatic species or users reliant on the creeks for access to good, clean water, including Fran Gilmar, Vern Emard, Norm & Connie Watmough, Ed & Larry Donkersgoed, and their successors?

248. There does not appear to be any assessment of the potential effects that anticipated climate change will have on the viability of the end pit lake (EPL) or another other water bodies left behind after mining. This includes nutrient cycling (nitrogen and phosphorous), thermal stratification (and the related issues), and the implications for trace element mobilization from the native rock and sediments along the sides and base of these artificial water bodies. Additionally, the generation and release of greenhouse gases from these water bodies has not been acknowledged by Benga.

5.2.3 Conclusion

249. In conclusion, the Coalition relies on the following evidence given by Dr. Fennell at 23Tr, p.4918 to p.4922, L.15

Q MR. SECORD: Thank you, Dr. Fennell.
You may have covered this, but you have had the opportunity to review the transcripts of the cross-examination of Benga's witness panel too on climate change, and you've also followed the proceedings to date with respect to Benga's witness panel on the water -- the water topic block; correct?
A Yes, on both counts. Yes.
Q And is there any -- do you have any comments to make

regarding Benga's witness panel's responses to cross-examination, questions on climate change that you haven't already covered in your slide presentation?

A Yes. I guess, to begin with, I don't think that Benga fully understands the concerns that we and others have been raising in relation to this topic. They don't seem to be connecting the dots between climate variability, climate change, and their modelled project impacts as they relate to the water balance of the area and the risks to sensitive species and habitat. They just haven't considered the range of variability enough to provide a conservative assessment.

I have also -- I also have a hard time understanding why Benga used climate model data for the Pincher Creek region to explain what might occur in the Crowsnest region. The temperature and rainfall regimes of these two settings are very different.

And I'm confused when they selected data from only 12 models when they indicated that there were actually 29 at the time when they did the work. An explanation as to why they selected the models they did would have been helpful.

Anyway, based on the 24 models that I reviewed from the Climate Atlas of Canada website, which we had in CIAR 787, was -- reports the same data. It is still clear that as we go forward in time, we can expect

warmer temperatures and longer heat waves, among other things, and Mr. Secord brought this up in the geology and climate topic block.

History has also shown that low-flow conditions can extend for long periods of time, sometime [sic] decades. And for years now, we have been seeing a shift in flow characteristics of headwater streams. There's a link to declining snowpacks and change in precipitation patterns. When you consider these effects with the added drawdown effects from the mine dewatering and a permanent lowering of the water table, you get less groundwater contributions to streams like Gold Creek.

This is exactly what Benga projected. But what is still in question is whether they have accurately projected the degree or magnitude of this reduction, taking into consideration all of the future expectations around changes to temperature and precipitation.

What the reduction in base flow will do to local springs around Grassy Mountain is lessen the temperature-regulating effects of discharging groundwater and, when combined with higher temperatures for longer periods of time, create a serious risk thermal barriers -- of thermal barriers forming in certain reaches and the creation of lower dissolved

> oxygen levels for the fish and other supporting aquatic species.
>
> And during the winter, this reduction in warmer water discharging into the creeks will create some serious risks for overwintering habitat. Those are the dots I was hoping they would connect. But instead, we have been given projections based on 1-in-10 or 1-in-20 events which, in my opinion, do not adequately reflect the possible change of variability and change in return periods for extreme events that can be expected.
>
> If this -- if this is -- EIA is meant to be conservative, Benga should have assessed more extreme scenarios to see if it would have made any difference. Unfortunately, that doesn't seem to have occurred, which is disappointing and certainly not very helpful.

250. In summary, Benga has not planned and designed the Project based on worst-case climate change scenarios and conservative assumptions as suggested in paragraph 211 of their Final Argument and this is another reason why the application should be denied.

5.3 Vegetation, including species at risk, terrain and soils, including reclamation, conservation, closure, and biodiversity

5.3.1 Overview

251. The Coalition members have expressed concerns about the Project's impacts on vegetation especially species at risk vegetation and impacts on biodiversity. They are concerned about the destruction of thousands of mature slow growing Whitebark Pine, limber pine, and the destruction of rough fescue grasslands.

252. In the Coalition's views, despite Benga's progressive reclamation plan, it is doubtful and highly uncertain that Benga will return the Project area to pre-existing conditions and equivalent land capability that are supportive of re-establishment and growth of the Whitebark Pine, limber pine and rough fescue grasslands. Support for this position is discussed further in this Argument.

253. In order to understand the Project's impacts on vegetation including species at risk, terrain and soils, it is important to point out a few unique environmental features of the area that the Project will be situated.

254. The Project area is situated in the Montane Natural Subregion of the Rocky Mountain Natural Region. The Montane landscapes are of restricted distribution in Alberta with high biological diversity and ecological values. They provide important seasonal migration corridors for large carnivores, ungulates and songbirds as well as provide critical reproductive and overwintering habitat for a variety of species.[223]

255. The Project area is located in one or more environmentally significant areas that has been identified since the 1980s. (ESA).[224] While ESAs are not regulatory instruments or binding, they are useful planning tools[225] that assists in understanding the significance of an area that a project is to be located on. As Mr. Wallis points out in cross, the identification of an area as being an ESA imposes a higher duty of care on the proponent to actually investigate the site in view of the importance of the work required to be done and thoroughly document why the area is significant or not.[226]

256. Portions of the Project's footprint, i.e. the soil salvage area, occur on public land areas mapped as intact native grasslands, i.e. foothills fescue grassland.[227] The protective notations (PNT090084 and PNT090087) identify foothills fescue grassland as "a very valuable native grassland type that is limited in remaining area. Rough fescue grasslands are very sensitive to surface disturbance and difficult and costly to reclaim."[228]

257. It is noteworthy that Benga identified the rough fescue grass as being intact[229] and prevalent "throughout the five grassland sites assessed within the LSA, with cover at each site ranging from 20% to 40%".[230] The total area occupied by areas with foothills rough fescue was identified as 219.9 ha.[231] This is not an insignificant amount of rough fescue grassland that will be destroyed by the Project.

258. There are potential rare plant species and rare plant communities occurring within the Project's footprint.[232] 36.9% of the Project's footprint (soil salvage area) is ranked as

[223] CIAR 553, PDF 268.
[224] CIAR 842, 15 Tr. p. 3130, L. 24-26, p. 3132-3133; CIAR 553, PDF 282 – 283.
[225] CIAR 553, PDF 275.
[226] CIAR 842, 15Tr. p. 3166, L. 1-6; 12-15; p. 3169, L.18-22.
[227] CIAR 553, PDF 284.
[228] *Ibid.*
[229] The *SSRP* supports this identification as pointed out by Mr. Wallis at CIAR 842, 15Tr. p. 3133, L. 15-26 and p. 3134.
[230] CIAR 42, CR #8, PDF 89.
[231] CIAR 42, CR #8, PDF 90.
[232] CIAR 553, PDF 292-293.

having high rare plant potential and 10.7% are ranked as high or very high rare plant community.[233]

259. Considering the ecological significance of the Project area and the disappearance of old growth forest and the life forms and processes that they support from the Montane subregion due to industrial activities,[234] and the unproven success of re-establishing rough fescue grasslands, the Coalition submits that it is imperative that the wholeness of the Project area's montane landscapes and its ecological integrity remain intact, be maintained and not severely modified through approval of this Project which is an incompatible land use.

5.3.2 Whitebark and Limber Pine

260. The Whitebark Pine trees in the Project area are mostly healthy mature old growth trees. Ms. Bauman evidence during cross to the effect that "none of the trees appeared to be really healthy when I was out there"[235] is inconsistent with Benga's filed evidence,[236] misrepresents the true state of the trees in the Project area, and is self-serving.

261. Mr. Wallis responded to the inconsistent and self-serving response of Ms. Bauman as follows:

> 25· ·Ms. Bauman's testimony today is directly at odds with
> 26· ·Benga's own consultant's report and what I observed in
> 1· ·the field in 2020 outside the area that she looked at.
> ·2· ·**Most of the whitebark pine that I looked at were**
> **·3· ·healthy**.· **I did observe a very small number of blister**
> **·4· ·rust-infected trees in the more closed forest, but**
> **·5· ·trees on the steeper, more open slopes were apparently**
> **·6· ·still healthy, much as Benga's consultants reported**.
> ·7· ·If Ms. Bauman's testimony today about whitebark pine is
> ·8· ·accurate when she noted that:· (as read)
> ·9· · · · None of the trees appeared really healthy,
> 10· ·then there is little hope of finding trees of
> 11· ·cone-bearing age on the project site that are disease
> 12· ·resistant, and much of Benga's testimony in this
> 13· ·hearing about restoring whitebark pine is irrelevant.
> 14· ·I don't think that's the case.
> 15· · · · I note Benga's information about mitigation for
> 16· ·whitebark pine in CIAR 251, Package 2, Table 2.3-1,
> 17· ·PDF 11:· (as read)

[233] CIAR 553, PDF 293; CIAR 842, 15Tr. p. 3134, L. 10-13.
[234] CIAR 553, PDF 267; CIAR 842, 15 Tr. p. 3131, L. 15-26.
[235] CIAR 842, 15Tr. p. 3024, L. 12-21; p. 3025, L. 17-23.
[236] CIAR 42, CR #8, PDF 81-82.

> 18· · · · Reduce direct mortality of whitebark pine.
> 19· · · · Identify all whitebark pine in advance of
> 20· · · · tree clearing in the footprint.· Develop
> 21· · · · whitebark pine -- white pine/whitebark pine
> 22· · · · blister rust resistance, mark disease-free
> 23· · · · trees, and collect cones before clearing
> 24· · · · starts.· Select disease-free trees for
> 25· · · · planting, monitor survival.
> 26· ·It certainly would've been helpful to have Ms. Bauman's
> 1· ·findings from 2019 to examine and test her on as part
> ·2· ·of this hearing.[237]

262. Benga identified 21,000 Whitebark pine trees that would be removed during Project construction.[238] Benga mapped the locations of the 21,000 Whitebark pine trees in CIAR 42, CR #8, PDF 272 as sparse Whitebark pine area and Whitebark pine area.[239] Benga indicated that it confirmed the number of Whitebark pine trees that would be affected through aerial survey[240] and ground survey plots.[241]

263. Benga underestimated the number of trees impacted by the Project. Mr. Wallis conducted a field survey on August 2020 along the north edge of the proposed rock disposal area which formed part of the area mapped by Environment and Climate Change Canada ("ECCC") as potential critical habitat for Whitebark pine. Mr. Wallis survey revealed the presence of 107 healthy individual Whitebark pine trees along a 1173 metres transect with 87 of those occurring in the north rock disposal area.[242]

264. Mr. Wallis pointed out that given Benga's incomplete mapping of Whitebark pine in the north rock disposal area, there are significantly more Whitebark pine occurring in the north rock area and other mining area that are not acknowledged by Benga.[243] Further, Benga's efforts to identify the number of potentially affected Whitebark pine trees are unreasonable considering the availability of the 2017 Whitebark Pine Recovery Strategy range map that identifies the north rock disposal area as being a potential critical habitat.[244] At the very least, the range map should have been reviewed and careful steps taken to identify and map the Whitebark pine trees especially those occurring within the north rock disposal areas that were missed.

265. During cross of Benga's panel on vegetation, Mr. Houston attempted to justify that they found Whitebark pine trees in the middle of the north rock disposal area. According to

[237] CIAR 842, 15Tr. p. 3153-3155.
[238] CIAR 42, CR #8, PDF 82.
[239] CIAR 842, 15Tr. p. 3022, L. 10-17.
[240] CIAR 251, Package 2, PDF 107.
[241] CIAR 42, CR #8, PDF 82.
[242] CIAR 553, PDF 296, CIAR 842, 15Tr. p. 3139, L. 19-26
[243] CIAR 842, 15Tr. p. 3139, L. 26 & p. 3140, L. 1-5.
[244] CIAR 842, 15Tr. p. 3155, L. 10-26.

Mr. Houston, the sightings are denoted by "little asterisks" in the middle of the rock disposal area.[245] It is important to note that the legend at the bottom of the page referenced by Mr. Houston[246] identify the yellow asterisk in the middle of the rock disposal area as being a Limber Pine location. Nevertheless, the yellow asterisk does not account for the 107 individual pine trees surveyed and plotted by Mr. Wallis at CIAR 553, PDF 304.

266. The destruction of tens of thousands of old growth mature Whitebark pine in the soil salvage and rock disposal areas is not conservative. The fact that portions of the Project area are already disturbed[247] is not enough justification to destroy thousands of mature Whitebark pine trees.

267. Benga provided a map of existing and planned projects within the vicinity of the proposed Project at CIAR 89, PDF 760. A review of this map shows a small area of historic surface mine (denoted in orange colour) within the Project's footprint. When this map is compared to the map at CIAR 42, CR#8, PDF 272, it appears that the area representing the historic surface mine contains some sparse populations of Whitebark pine. Benga appears to agree that there are some populations of Whitebark Pine trees in the 185 hectares of the historic surface mine area.[248]

268. Benga takes the position that its plan to destroy thousands of Whitebark pine is not novel because regulatory bodies have authorized the destruction of these species through approvals granted to previous applicants.[249] Benga provided CIAR 838 as support for its position that destruction of Whitebark pine has been permitted by Parks Canada through as Sections 73 and 74 SARA approval process.

269. A review of CIAR 838 leads to the following conclusions:

    a. The permitted work was a Jasper Interconnection Project, a public utility project, to provide reliable electric supply to Jasper National Park and other residents. That is not the case here. Benga's Project is a private enterprise to provide profit to its shareholders.

    b. The project would follow existing pipeline right of way and road corridors for 75% of the route and the remaining 25% would follow existing ATCO electric distribution line corridor. By following existing disturbed corridors, impacts on vegetation are minimized. That is not the case here. A significant amount of land within the Project area will be newly disturbed.

[245] CIAR 842, 15Tr. p. 3023, L. 19-24.
[246] CIAR 42, CR #8, PDF 272.
[247] CIAR 962, PDF 68, para. 249.
[248] CIAR 842, 15Tr. p. 3053, L. 6-16.
[249] CIAR 962, PDF 19, para. 55.

c. Construction of the project was planned to occur in the winter to minimize impacts to soil, vegetation and wildlife. That is not the case here. Benga's Project will involve significant impacts to soil and vegetation.

270. In the absence of any comparative evidence between this Project and the others that shows the similarities between this Project, its landscape, the age of the Whitebark Pine present in the Project area, the size of the Whitebark Pine proposed to be destroyed (estimated at 21,000 or more), there is no justifiable basis to warrant the authorization sought in this Project. The Coalition submits that in the absence of such comparative and analytical evidence, the Panel should disregard Benga's submissions in this regard.

271. Benga asserts that ECCC identifies the White Pine Blister Rust as the greatest threat to Whitebark pine that may lead to a reduction in their population in the long term.[250] The existence of the threat of White Pine Blister Rust is not a justification for killing over 21,000 relatively healthy Whitebark pine trees. In fact, the threat of the White Pine Blister Rust justifies the federal and provincial listing of the Whitebark pine as endangered and deserving of protection.

272. Benga's asserts that it is compensating for any loss of Whitebark pine destroyed by overplanting with 63,000 Whitebark pine trees. As Mr. Wallis pointed out in his direct evidence, this assertion is absurd given the loss of the existing cone producing capable Whitebark pine trees for at least 60 years and given that it will be at least over a hundred years before that capability is returned, if its ever returned. [251] Benga has not produced any evidence that suggests that the capability will be returned in less than 100 years. In fact, the evidence, including oral testimonies of Mr. McCoy[252] confirms this.

5.3.2.1 Whitebark Pine Critical Habitat

273. Critical habitat for Whitebark pine exists within the Project footprint as identified in the *2017 Recovery Strategy for the Whitebark Pine Range* ("WBP Recovery Strategy") map.[253] Mr. Gregoire confirmed that although the 2017 Recovery Strategy for Whitebark Pine had not been finalized, the Whitebark pine critical habitat identified at pdf 4 of CIAR 825 was the identified critical habitat occurring within the Project area at the time (September 2018).[254]

274. Upon being questioned further, Mr. Gregoire confirmed that the critical habitat shown at pdf 4 of CIAR 825 was based on range maps that were publicly available,[255] still valid

[250] CIAR 962, PDF 74, para. 275.
[251] CIAR 842, 15Tr. p. 3156, L. 2-9.
[252] CIAR 830, 13Tr. p. 2672, L. 21-26.
[253] CIAR 840, PDF 1; CIAR 825, PDF 4.
[254] CIAR 842, 15Tr. p. 3075, L. 2-6.
[255] CIAR 842, 15Tr. p. 3076, L. 21-24.

and that the "yellow polygons would still represent occurrences of high-density, mature Whitebark pine trees".[256]

275. While Mr. Gregoire opines that critical habitat identification is not essential to sustain Whitebark pine population, that opinion does not align with the WBP Recovery Strategy objective which states: "The population and distribution objective for Whitebark pine is to establish a self-sustaining, rust resistant population of Whitebark pine throughout the species range".[257] Mr. Wallis pointed out that without some sort of critical habitat designation, it would be difficult to meet the objective of WBP Recovery Strategy.

276. Benga asserts at paragraph 280 of its Argument that the most up to date map for Whitebark pine critical habitat does not include the Project area.[258] In making this assertion, Benga failed to acknowledge that Mr. Gregoire confirmed that while the current mapping at pdf 5 of CIAR 825 showed no critical habitat within the Project area, that information was not finalized and could change at any time prior to posting of the final recovery strategy.[259] Also, the lack of identification of critical habitat at pdf 5 of CIAR 825 does not mean that the presence of Whitebark pine within the Project area ceases to have any relevance.[260]

277. Further, "the thinking" that eliminated critical habitat from the Project area is not public information; the result of the thinking was essentially generated for Benga's benefit.[261] The information that is in the public domain, whether or not "formally approved" as Mr. Gregoire asserts,[262] is the 2017 Recovery Strategy for Whitebark pine and the range map filed at CIAR 840. Mr. Wallis points out that the range map is the only map that designates in the legend "potential area containing seed dispersal, regeneration, and recovery critical habitat".[263]

278. In considering the status of the critical habitat designation for Whitebark pine, it important for the Panel to understand that the published proposed WBP Recovery Strategy has long since passed the legislated timeline for it to be finalized. That timeline ended in early 2018 (90 days from the date of the initial draft, which is October 18, 2017).[264] For all intents and purposes, the published WBP Recovery Strategy could be considered final.

279. The notation on the Whitebark pine range map (CIAR 840) states "Local inventory and assessment of Whitebark Pine stand density is required to complete the critical habitat

[256] CIAR 842, 15Tr. p. 3076, L. 17-20.
[257] CIAR 842, 15Tr. p. 3138-3139.
[258] CIAR 962, PDF 75.
[259] CIAR 842, 15Tr. p. 3077, L. 16-21.
[260] CIAR 842, 15Tr. p. 3081, L. 20-26; p. 3082, L. 1-2.
[261] CIAR 842, 15Tr. p. 3079, L. 16-24.
[262] CIAR 842, 15Tr. p. 3078, L. 9-13.
[263] CIAR 842, 15Tr. p. 3138, L. 7-18.
[264] CIAR 842, 15Tr. p. 3091, L. 7-8 & L. 1-5

identification (refer to Figure 4a)". It is clear from this notation that local inventory and assessment is required to complete critical habitat identification. This also suggests that removal of the critical habitat identification from the map requires site visit and assessment. ECCC confirmed that no site visit or site assessment occurred.[265]

280. Benga contends at paragraph 281(a) of Benga Argument that *SARA* prohibitions for Whitebark pine apply only to federal lands and not provincial Crown lands and private lands. Benga relies on Mr. Gregoire's assertion as support for its position. The Coalition provides the following comments in response:

a. Whitebark pine is listed as an endangered plant in Schedule 6 of Alberta's *Wildlife Regulations*[266]. Mr. Gregoire acknowledged this in cross.[267]

b. The *National Accord for the Protection of Species at Risk*[268] *("National Accord")* confirms federal, provincial and territorial ministers' commitment to establish:

> "complementary legislation and programs that provide for effective protection of species at risk throughout Canada, and that will:
>
> c. legally designate species as threatened or endangered;
> d. provide immediate legal protection for threatened or endangered species;
> e. provide protection for the habitat of threatened or endangered species;
> f. provide for the development of recovery strategies within one year for endangered species and two years for threatened species that address the identified threats to the species and its habitats;
> g. ensure multi-jurisdictional cooperation for the protection of species that cross borders through the development and implementation of recovery strategies;
> h. consider the needs of species at risk as part of environmental assessment processes;"

c. Based on the commitment contained in the *National Accord* the provincial government has agreed to provide protection to endangered species such as Whitebark pine and their critical habitat. That commitment resulted in the inclusion of Whitebark pine as an endangered species under the *Wildlife Regulations*. Therefore, by virtue of the *National Accord* the SARA prohibitions would be recognized and applied on provincial or Crown lands.

[265] CIAR 855, PDF 1.
[266] Alta Reg. 143/1997.
[267] CIAR 842, 15 Tr. 9. 3085, L. 22-25.
[268] CIAR 839

d. Further, Section 61(1) of *SARA* prohibits the destruction of critical habitat of a listed endangered species. Whitebark pine is listed federally and provincially as an endangered species; therefore, its critical habitat appearing in the published recovery strategy requires protection pursuant to Section 61(1) of *SARA.*

e. While Benga may apply for a *SARA* permit, no such permit application is before the Panel and there is no guarantee that Benga will be granted the permit sought. It will be wholly inappropriate for the Panel to consider whether Benga would meet the pre-conditions for a *SARA* permit in its consideration of Benga's applications before it.

f. Further, Benga's plans to revegetate the Project area with Blister Rust resistant stock have not been demonstrated as successful.

5.3.2.2 Benga's Proposed Mitigation for Whitebark Pine

a. Reduction of Project Footprint

281. One of Benga proposed mitigation for Whitebark pine is to minimize Project footprint to avoid populations of Whitebark pine.[269] It is not clear why Benga is proposing this as a mitigation option considering that its mapping[270] of Whitebark pine locations within the Project's footprint show Whitebark pine occurring in the mine pit area and in the north rock disposal area. As confirmed by Mr. Houston, Benga will not move or amend the locations of the mine pit area and the north rock disposal area.[271]

282. The best Benga could do is move certain Project features such as the access roads, the conveyor belt and other moveable features.[272] None of these moveable Project features are within the mine pit area or within the North rock disposal area.[273] As Mr. Wallis points out in his direct testimony, the northern part of the Project is within a potential critical habitat for Whitebark pine.[274]Benga has not committed to moving the mine pit area or the north rock disposal area, which would have made the proposed mitigation option a feasible and effective mitigation in reducing impact on Whitebark pine population.

283. Section 79(2) of the *Species at Risk Act* requires a project proponent to identify the adverse effects of the project on listed species and to ensure that measures are taken to avoid or lessen the adverse effects on the listed species and to monitor them.[275] The

[269] CIAR 251, Package 2, PDF 92.
[270] CIAR 42, CR #8, PDF 272.
[271] CIAR 842, 15Tr. p. 3030, L. 9-17.
[272] *Ibid.;* CIAR 842, 15Tr. p. 3029, L. 15-23.
[273] See mapping at CIAR 42, CR #8, PDF 272 and compare it with the Project Footprint map at CIAR 42, Section A, PDF 162.
[274] CIAR 842, 15Tr. p. 3136, L. 26, P. 3137, L. 1-3; CIAR 828, PDF 14.
[275] CIAR 842, 15Tr. p. 3136, L. 11-21.

Coalition submits that Benga's proposed mitigation of minimizing Project footprint does not avoid or lessen the adverse effects of the Project on Whitebark pine.

b. Collection of blister rust free seeds and replanting

284. Another mitigation proposed by Benga is to collect seeds from Whitebark pine trees in the Project area that are blister rust free and plant three times as much seedlings to replace the Whitebark pine removed.[276] The easiest part of this mitigation option is to collect the seeds or source seeds or seedlings from the nursery.

285. The main issue with this mitigation lies in the successful establishment of the planted seedlings. Whitebark pine is established in the current landscape due to the steeper slopes and poor soils in the area. As Mr. Wallis points out, the steeper slopes and poor soils allow Whitebark pine to outcompete more common species of vegetation that favour gentler terrain.[277]

286. Benga states in its application materials that the "Reclaimed soil-landscape patterns will be more homogenous than baseline conditions because reconstruction of the inherent variability associated with natural soil profiles is not possible".[278] The significant reduction (by 86%) in slopes over 30% steep (Classes 7, 8, and 9) across the entire mine area[279] and their replacement with a more homogenous and significantly less steep slopes (less than 5%) reduces the chances of survival of the Whitebark pine seedlings.[280]

287. Benga states at paragraph 260 of its Argument that the possibility of seedlings being blown away by the wind is extremely rare. Benga's assertion ignores the fact that the Project site is prone to high chinook winds which occur regularly and which residents have attested to as being strong enough to blow a person away. Using professional planters to plant the seedlings is not a guarantee that the seedlings will be protected from the high wind velocity that occurs in the area.

288. Benga asserts that it provided examples of reclaimed mine sites (for example, Luscar Mine, Gregg River, Coal Valley Mine, Obed Mine, and Grand Cache Mine)[281] in Alberta as indication that mine reclamation is possible and to show that it has drawn lessons from these mines for its reclamation plan.[282] As Mr. Wallis points out in his direct evidence, the reclamation efforts of industry have been focused on re-establishing common vegetation types. Industry "hasn't got a good handle on how to deal with the rarer types and the complexity of niches which they are needed to thrive."[283]

[276] CIAR 842, 15Tr. p. 3031 – 3032; CIAR 362, PDF 101.
[277] CIAR 842, 15Tr. p. 3140, L. 24-26, p. 3141, L. 1-2.
[278] CIAR 42, CR#7, PDF 103.
[279] CIAR 251, Package 2, PDF 147, Table F. 4.1-1; CIAR 3140, l. 16-26.
[280] CIAR 842, 15Tr. p. 3140, L. 24-26, p. 3141, L. 1-2; CIAR 828, PDF 19.
[281] CIAR 571, Appendix C, pdf 76-101.
[282] CIAR 571, PDF 20,
[283] CIAR 842, 15Tr. p 3159, L. 1-3.

289. While general mine reclamation is possible, the significant issue is that none of the mine examples confirm that equivalent land capability that was pre-existing prior to mine development was achieved following mine reclamation. The ability to achieve equivalent land capability is the only marker of a successful reclamation effort. Anything less than that is not sufficient and not compliant with regulatory requirements.

290. In addition, none of the mine sites show that there were pre-existing Whitebark pine, limber pine and rough fescue that were re-established following mining. In fact, the evidence from cross examination of Mr. McCoy, which is summarized below, confirms that there are no Whitebark pine, limber pine, and rough fescue grasslands that were re-established in the landscape post mining.

291. Mr. McCoy was cross examined extensively about each of these mines in relation to the type of vegetation that was present prior to commencement of mining and the type of vegetation that was returned post mining.[284] The responses from Mr. McCoy confirmed:

a. None of the mine sites are in the same natural subregions i.e. Montane subregion, as the project site. So, there are different vegetation types, different climates, and different ecosystem in operation before and after mining.

b. Benga could not confirm the type of vegetation that was present prior to mining[285] but speculates that the vegetation types introduced into the sites were similar to what was there before.[286]

c. There were no Whitebark pine or rough fescue grassland or *SARA* listed vegetation species that were present at the sites prior to mining.[287]

d. Even though the mine sites show some levels of revegetation, it would take at least 100 years for the vegetation patterns to reach pre-existing vegetation levels.[288]

e. Mr. McCoy could not speak to the exact location of the Gregg Mine's mine pit and the rock disposal areas even though he participated in the revegetation of the Gregg Mine as a summer student.[289]

292. The Coalition submits that the examples of mine sites reclamation provided by Benga do not demonstrate that the Project site will achieve equivalent land capability given that

[284] CIAR 830, 13Tr. p. 2666 – 2681.
[285] CIAR 830, 13 Tr. p. 2669, L. 19-21.
[286] CIAR 830, 13Tr. p. 2669, L. 8-11; P. 2674, L. 20-25.
[287] CIAR 830, 13Tr. p. 2668, L. 8-19; p. 2675, L. 14-16; p. 2678 L. 13-20; p. 2680-2681.
[288] CIAR 830, 13Tr. p. 2672, L. 21-26; p. 2673, L. 1-4.
[289] CIAR 830, 13Tr. p. 2676.

Benga could not verify through approved reclamation permits that equivalent land capability had been achieved in any of the mine sites illustrated; that none of the mine sites have similar vegetation to the Grassy Mountain's Montane vegetation; and none are located in the Montane natural subregion as the Project site.

293. Given the irrelevance of these mine sites, the Coalition further submits that the Panel should disregard these mine site examples and any purported lessons that Benga claims it has learnt from the reclamation of the sites and implemented in its Conservation and Reclamation Plan.

5.3.3 Rough Fescue Grasslands

294. The South Saskatchewan Regional Plan requires that intact rough fescue grasslands remain intact.[290]

295. Benga acknowledges that the Project will remove approximately 68 hectares of rough fescue grassland.[291] Removal of 68 hectares of rough fescue grassland is not in accordance with the *SSRP*.

296. Benga acknowledged that the preferred mitigation strategy for native rough fescue grasslands is avoidance[292] and that the "restoration of foothills rough fescue inhabited lands is relatively unproven."[293] Yet, Benga asserts at paragraph 285 of Benga Argument that its reclamation of rough fescue grassland in the Project area will be successful because it will follow research literature and Government of Alberta Guidance documents. Benga's assertion at paragraph 285 contradicts its own evidence.

297. The only research literature that Benga quoted as being the applicable literature that it relies on is the 2015 *Lancaster et. al*. report, filed as CIAR 826. It is important to note that *Lancaster et. al.* studied reclamation success of rough fescue on wellsites where the rough fescue grassland was disturbed during wellsite construction.[294]

298. The Lancaster study revealed no reclamation successes on the pre-2000 wellsites studied. On the post 2000 wellsites studied, the study noted "some hopeful expressions of native species infilling" and "very strong re-establishment of rough fescue on the Lewis wellsite where the surface topsoil had not been stripped".[295] This confirms that the successful re-establishment was limited to an area that the soil was undisturbed. That will not be the case in this Project.

[290] CIAR 830, 15Tr. p. 3133, L. 15-26.
[291] CIAR 830, 15Tr. p. 2572, L. 18-20.
[292] CIAR 830, p. 2572, L. 18-26.
[293] CIAR 251, PDF 108 and 110.
[294] CIAR 826, PDF 6.
[295] CIAR 826, PDF 7.

299. In Benga's Argument, Benga referred to pdf 23 of the Lancaster study as proof that use of seeding was successful. This reference appears in respect of a study by Sherritt (2012) which states:

> "Sherritt (2012) had success seeding foothills rough fescue on reclaimed sites in the Foothills Fescue NSR; however, he found it established (after two years) only when seeded as a monoculture, with little competition from other grasses.

300. The Sherritt study was conducted in an ecosystem, the Foothills Fescue Natural Subregion, that is different from the Project area, the Montane Natural Subregion. See pdf 19 of CIAR 826 for a discussion of the Montane natural subregion. The effect that different climate and ecosystem can have on successful reestablishment of rough fescue grassland is evident from the report at pdf 22. It was reported that Desserud et. al. found little to no rough fescue on pipelines in the Montane Natural Subregion despite the right of way having been seeded with rough fescue grasses 7 to 20 years prior.[296]

301. Benga referenced pdf 29 of Lancaster study as evidence of success in the use of plugs to re-establish rough fescue grassland. Again, the Woosaree and McKenzie 2015 referenced study was in the Foothills Fescue Natural Subregion. There is no study showing success of re-establishment of rough fescue grassland in the Montane Natural Sub-region.

302. Benga referenced pdf 30 of Lancaster study as evidence of natural revegetation success in re-establishing rough fescue grassland. The natural recoveries were in Foothills Fescue Natural Subregion. The Sherritt 2012 study noted "native species" growing in plots where they were not seeded. The record of "native species" did not include foothills rough fescue.

303. The Coalition submits that restoration of foothills rough fescue grassland is unproven in the Montane natural subregion. Benga's reliance on studies done in other natural subregions (Foothills Natural Subregion) as evidence that its restoration of rough fescue grassland in the Montane subregion is unsubstantiated and baseless. Benga has not provided any evidence that supports the successful re-establishment of rough fescue grassland in the Montane subregion using seeding or plugs as it claims it will use in this Project. The Coalition submits that the Panel should consider this lack of evidence in assessing the effectiveness of Benga's reclamation plan for rough fescue.

304. The Coalition further submits that the Panel should consider Benga's claims in light of evidence from Mr. Wallis. Mr. Wallis' evidence indicates that for over 30 years of his professional experience, the only areas where success in restoring rough fescue grassland has been documented are in areas where the surface layers are not disturbed.[297] Mr.

[296] CIAR 826, PDF 22.
[297] CIAR 842, 15Tr. p. 3159, L. 12-24.

Wallis further noted that assurances from Project proponents in various projects that he has been involved with have not produced a different result.[298]

5.3.4 Significance of Project's effects

305. Contrary to Benga's assertions, the Project will have significant adverse residual effects on terrestrial vegetation including SARA listed species and riparian vegetation that have not or cannot be mitigated. Mr. Wallis discussed Benga's classification of Project effects as "not significant" during his oral testimony[299] and concluded as follows:

> 14· · · · In my opinion, it is inconceivable that residual
> 15· ·effects are not significant.· Stating what you would
> 16· ·like to happen and putting in place the research to
> 17· ·find ways to make it work do not guarantee success.· It
> 18· ·is improper to characterize the residual effects as
> 19· ·"not significant".· And I believe that anywhere Benga
> 20· ·has identified effects of high magnitude as extended or
> 21· ·long-term in duration, those should be classified as
> 22· ·"significant" at some level and possibly others as
> 23· ·well.
> 24· · · · This is -- this approach of arriving at "not
> 25· ·significant effects" is not supported by the evidence,
> 26· ·given the continued declining populations of many
> ·1· ·species.· If each project would take that view, that
> ·2· ·there is no significance to the effects that it has on
> ·3· ·habitats and species, the declines of species and the
> ·4· ·loss of valuable and sometimes irreplaceable habitats
> ·5· ·will continue.[300]

306. The significance of the Project's residual effects also applies to riparian vegetation. Mr Houston claim that drawdown of 0 to 5% would have no impact on riparian vegetation because there is no connection between groundwater and surface plant communities[301] is wrong. Mr. Wallis uncontradicted evidence demonstrates that a drawdown of 0.5m to 5m would have significant impacts on riparian and spring fed vegetation.[302]

307. Mr. Wallis noted that certain riparian species could feel effects of drawdown in the range of 0.5 metres to 3.5 metres and that the lack of attention to the ecological effects of the

[298] *Ibid.* p. 3160, L. 1-10.
[299] CIAR 842, 15Tr. p. 3143-3145
[300] CIAR 842, 15Tr. p. 3144-3145.
[301] CIAR 830, 13Tr. p. 2684, L. 2-4.
[302] CIAR 842, 15Tr. p. 3146 - 3147; CIAR 828, PDF 25.

drawdown of less than 5 metres due to pit dewatering was a "potentially significant omission."[303]

308. Mr. Wallis further noted that Benga's application materials did not address the impact of more than 5 metres of drawdown at long-term closure or how far the drawdown of 0 to 5 metres might extend.[304] While the 5 metres drawdown is projected to occur within the Project's boundary, Mr. Wallis noted that the impact of the drawdown beyond the disturbed area and beyond the Project's boundary was unknown[305] and unassessed.

309. Benga has not proposed any mitigation for dealing with the resulting effects of draw down on riparian vegetation due to its ill-advised preference to ignore the potentially significant adverse effects and mark any such effects as insignificant. The Coalition submits that the Project will cause significant residual adverse effects.

310. Benga's plan is to construct the Project and reclaim in a sequenced manner.[306] This plan, as Mr. Wallis notes in his direct evidence, may pose logistical issues in terms of gathering sufficient Whitebark pine seeds prior to their destruction in years 5 and 8.[307] The logistical issues are exacerbated by the fact that Whitebark pine does not produce large cone crops with regularity and that it may be 5 years with little to no cone production.[308] Even when the Whitebark pine is established, it takes 60 to 80 years for the Whitebark to develop sufficient canopy to support cone production.[309]

311. Mr. Wallis further noted that even after Whitebark pine had been established on the landscape, it would have to interact with other factors such as pests, diseases, physical disturbance factors, soils and multiple abiotic factors.[310] Making the landscape more homogeneous as Benga proposes does not inspire much confidence about potential success; all of which point to a significant residual impact lasting over 100 years.[311]

5.3.5 Conservation and Reclamation

312. Benga's obligation is to return the Project area to equivalent land capability. Benga confirmed this obligation in its Final Argument.[312] Mr. Houston agreed during cross that returning land to equivalent land capability requires that the reclaimed land has the ability to provide the ecological goods and services that it provided prior to mining.[313]

[303] CIAR 842, 15Tr. p. 3146, L. 19 – 25.
[304] *Ibid*, p. 3147, L. 18-20.
[305] *Ibid,* p. 3147, L. 22-25
[306] CIAR 962, PDF 68-69.
[307] CIAR 842, 15Tr. p. 3150, L. 18-26, p. 3151, L. 1-8.
[308] *Ibid.*
[309] CIAR 842, 15Tr. p. 3151.
[310] *Ibid.* p. 3152.
[311] CIAR 842, 15Tr. p. 3152 – 3153.
[312] CIAR 962, PDF 68, para. 250.
[313] CIAR 830, 13Tr. p. 2600 – 2601.

This connotes that the replaced soil, subsoil and terrain must be capable of supporting the vegetation that was present prior to mining.

313. The Coalition is of the view that the local ecosystem will be set back decades in its ability to contribute the ecological goods and services it currently provides if the Project is permitted to proceed. It is still doubtful and unproven that Benga can successfully grow equivalent quantities of Whitebark pine on a significantly more homogenous, much more gentle post-mine landscape.[314] The Coalition submits that Benga's proposed reclamation plan continues to pose significant risks that have not been sufficiently addressed.

5.3.6 Reply to Benga's Comments on Mr. Wallis Evidence

314. The Coalition's position is that Mr. Wallis' evidence is credible, objective, independent and significant contrary to Benga's assertions. The majority of Mr. Wallis' evidence was unchallenged by Benga either through cross examination or through rebuttal evidence. Benga's cross examination was limited to ESA, which did not result in any change to Mr. Wallis' evidence in this regard.

315. Benga asserts at paragraph 287 of its Argument that Mr. Wallis expresses "the opinion of someone personally opposed to coal resource development in Alberta, and the opinion of someone who sits on the board of directors for an organization that has long opposed the Project".

316. Benga's assertions are baseless and should be disregarded in their entirety for the following reasons. There is no evidence on the record that Mr. Wallis is opposed to coal resource development in Alberta. In fact, the evidence shows that Mr. Wallis has worked for coal companies in relation to reclamation of their mine sites.[315] For instance, Mr. Wallis advised Luscar in relation to the Coal Valley Mine and did wildlife and rare plant fieldwork for them.[316]

317. The evidence also shows that Mr. Wallis has worked for a variety of clients, including federal, provincial, municipal governments, landowners, nonprofit organizations, forest products and energy companies,[317] and First Nations.[318] The fact that Mr. Wallis has worked for a variety of clients is further evidence of his history working on resource and land development projects up to and including 2020, as evidenced by his curriculum vitae at CIAR 553, Appendix L.

[314] CIAR 842, 15Tr. p. 3153, L.1-10.
[315] CIAR 842, 15Tr. p. 3158, L. 19-21.
[316] *Ibid.*
[317] CIAR 842, 15Tr. p. 3128, L. 7-10.
[318] CIAR 842, 15Tr. p. 3162, L. 13.

318. Mr. Wallis did not provide his personal opinions on the Project. Mr. Wallis report and oral testimony confirm that the evidence presented was his "professional opinion"[319] and his professional recommendation was that the Project be not approved in its current configuration.[320]

319. Benga asserts at paragraph 287 of its Argument that Mr. Wallis expresses the opinion of someone who sits on the board of directors of AWA and that the AWA retained Mr. Wallis to produce his report. This assertion is again unfounded and baseless.

320. Mere affiliation with an organization that is intervening in a project does not impugn the evidence of the expert. For the evidence to be considered as lacking in objectivity, every "nuance and each element" of the expert's report must be shown to be lacking in objectivity.[321] Bald assertions based solely on affiliation without demonstrated proof of lack of objectivity are not sufficient. All that Benga has done here is make assertions without showing proof of any successful challenge of Mr. Wallis' evidence that shows a lack of objectivity.

321. Regarding the assertion that Mr. Wallis was retained by the AWA, the evidence on the record is that Mr. Wallis was retained by Ackroyd LLP, counsel for the Coalition on behalf of the landowners, and not the AWA.[322] In fact, Mr. Wallis attested to the separation of functions between the Board and the staff of AWA.[323] The AWA volunteer Board, of which Mr. Wallis is a member of, does not retain counsel or experts. Mr. Wallis' evidence clearly indicates that he recused himself from AWA's Board consideration of this Project[324] and AWA was not part of his client base when he was retained by counsel.[325]

322. The Coalition submits that the Panel should take into consideration the very strong statements by Mr. Wallis as follows:

> 14· · · · · · So I absolutely consider myself independent and
> 15· · · ·sometimes at odds with both my clients and the
> 16· · · ·association of which I'm a member and on the board of
> 17· · · ·directors.· I've been a professional biologist for over
> 18· · · ·40 years, before our profession was even recognized in
> 19· · · ·legislation, and **I even fired clients that had me try**
> **20· · · ·to alter the reports to -- that would be more suitable**
> **21· · · ·to their position.**· So I take that very seriously and

[319] CIAR 842, 15Tr. p. 3161 – 3162, L. 1-2.
[320] CIAR 842, 15Tr. p. 3150, L. 2-4
[321] *1159465 Alberta Ltd. v. Adwood Manufacturing Ltd.,*2010 ABQB, 133 at paragraph 2.29.
[322] CIAR 842, 15Tr. p. 3164, L. 1-6.
[323] CIAR 842, 15Tr. p. 3163, L. 5-26.
[324] CIAR 842, 15Tr. p. 3163, L. 15; p. 3164, L. 17 – 19.
[325] *Ibid.* p. 3165, L. 6-7.

22· · · ·always have.[326]

323. At paragraphs 288 and 289 of Benga's Argument, Benga takes issue with Mr. Wallis' characterization of the significance of metallurgical coal potential in the SSRP. Mr. Wallis' evidence at CIAR 842, 15Tr. p. 3130 outlined that although the South Saskatchewan Regional Plan does state that coal resources in this part of the province should be exploited and developed as one of the land uses, any statements alluding to what Mr. Houston referred to in the plan other than access to freehold leases are in the nonbinding section. There are pages dedicated to maintaining native grasslands while only a few paragraphs deal with coal.

324. Benga asserts at paragraph 290 and 496 of Benga Argument that Mr. Wallis was "not willing to admit the limitations of ESAs, he refused to admit it is rather insignificant to simply note that the Project falls within one or more ESA, given that 45% of the province falls within an ESA (i.e. nearly every mining project in the province is likely covered by one or more ESA)". Benga further asserts that Mr. Wallis casts doubt on the authors of the Fiera 2014 report that he cites for significance of the ESAs.

325. Benga's assertions at paragraphs 290 and 496 of its Argument ignore the following facts:

a. Mr. Wallis clearly identified in his testimony that the many versions of Fiera reports were all different and they all provide different pieces of information.[327] They are all part of the puzzle and provide some level of information that was significant and comprehensive.[328]
b. The different versions of the Fiera reports[329] have not been replaced as they are still available on the Government of Alberta website. The bottom line as Benga notes in its mapping and as Mr. Wallis noted in his report "Fiera (2014) maps much of the area as at least provincially significant"[330];

c. The Fiera 2014 report acknowledges shortfall or limitations in their wetland system classification and indicates deficiencies in their information[331]; and

d. Mr. Wallis indicates that an ESA is essential in the planning process as it connotes a higher duty of care to do a thorough job in documenting why an area is significant or not.[332]

[326] CIAR 841, 15Tr. p. 3162.
[327] CIAR 842, 15Tr. p. 3167.
[328] *Ibid.* p. 3167, L. 7-9.
[329] CIAR 553, PDF 274.
[330] CIAR 553, PDF 275.
[331] CIAR 842, 15Tr. p. 3167, L. 9-12; CIAR 553, PDF 274-275.
[332] CIAR 842, 15Tr. p. 3166.

326. The Coalition notes that both Benga and Mr. Wallis agree that the Project falls within one or more ESAs and that ESAs are important planning tools with no regulatory sanction for non-compliance. Benga's criticism of Mr. Wallis in the Final Argument has not shown otherwise.

327. Benga's assertion at paragraph 291 of Benga's Argument amounts to attempts to obfuscate the issues and to misstate Mr. Wallis' evidence. Mr. Wallis did not say in his report that all of the Whitebark tree stands were healthy. In fact, Mr. Wallis said: "**I don't know of any forest stand where all of the trees are going to be totally healthy**. **That's not the way nature works."**[333] Mr. Wallis' further responses to questions from Mr. Brinker confirmed that the main statement "appeared relatively healthy" was a summary of his findings which was consistent with Benga's consultant's experience as noted in Consultant Report #8.[334]

5.3.7 Cumulative Effects

328. The Coalition position is that Benga's cumulative effects assessment should have included Atrum Elan South Coal Project as that project had progressed to the stage where it could be reasonably considered as being certain to proceed.

329. The provisions of CEAA's interim guidance document titled "Assessing Cumulative Environmental Effects under the Canadian Environment Assessment Act, 2012" ("CEAA Interim Guidance") were highlighted during cross of Benga's vegetation panel at CIAR 830 at pages 2601 to 2610. The provisions clearly show that proponents should include a project in their cumulative effects assessment if they are certain and reasonably foreseeable.[335] A project is considered certain to proceed if certain criteria are met including "pre-development approval for early works, permits for exploration or collection of baseline data" has commenced.[336]

330. The CEAA Interim Guidance further indicates that a high level of certainty as to whether the project will proceed is not required. Some doubt as to whether it will proceed or not is acceptable.[337] Contrary to Mr. Houston's assertion at 13Tr. p. 2604-2605, "defined steps towards achieving a regulatory approval" is not mandatory before the project is included in the cumulative effects assessment. The filing of a regulatory approval application is one of the criteria that may be considered; it is not required to be satisfied prior to the project being included.

[333] CIAR 842, 15Tr. p. 3170, L. 23-26.
[334] CIAR 842, 15Tr. p 3172, L. 5-12.
[335] CIAR 842, 15Tr. p. 2602, L. 18-26.
[336] CIAR 842, 15Tr. p. 2602, L. 18-26.
[337] *Ibid. CEAA Interim Guidance,* PDF 30.

331. Further the CEAA Interim Guidance does not require that the future project be economically viable before it is included in a Project's cumulative effects assessment, even though Mr. Houston suggests otherwise.[338]

332. The evidence on the record confirm that Atrum Elan South Coal's project is relatively certain to proceed; announcement of intention to proceed with exploration work was made on the news media by Elan Coal; announcement that a drill permit had been obtained was also made. [339] Announcement regarding the drill permit was made in 2014, prior to Benga's submission of the application.[340] Announcement regarding the coal exploration permit was made public on March 23, 2018 prior to Benga's completion of its cumulative impacts assessment report.[341] News regarding the Atrum Coal project and the potential amount of the coal embedded in the project area was made public on March 1, 2019.[342]

333. Based on the media announcement, Benga knew or ought to have known that Atrum Elan South Coal was reasonably certain to proceed in 2016 and in 2018 when it did its cumulative effects assessment. Mr. Houston confirmed Benga's awareness of the Atrum Elan South Coal in 2016 and in 2018.[343] Yet, it did not include the Atrum Elan South Coal Project in the 2016 cumulative effects assessment.

334. Benga did not undertake any reasonable efforts to ascertain if the Atrum Coal project was going to proceed. For instance, it did not conduct any search of the AER's integrated application system to see if Atrum Coal had filed an application for an exploration permit.[344] Benga could have canvassed the status of Atrum Coal from the Coal Association of Canada of which both Benga and Atrum Coal belong to. Reliance on the fact that Atrum Coal will not share any information because they are competitors is insufficient.[345]

335. Benga asserts at paragraph 312 of Benga's Argument that the JRP has determined in its letter to CPAWS that the JRP does not consider the Project to be reasonably foreseeable. As Mr. Wallis pointed out in his direct evidence, the JRPs' letter omitted a key relevant statement from CIAR 308, which is the criterion of "pre-development approval for early works, permits for exploration, or collection of baseline data".[346] Based on the fact that Elan Coal South had exploration permits, their project was reasonably foreseeable.

[338] CIAR 830, 13Tr. p. 2605, L. 13-26.
[339] CIAR 822, 823, and 824.
[340] CIAR 822, PDF 1.
[341] CIAR 823, PDF 1.
[342] CIAR 824.
[343] CIAR 830, 13Tr. p. 2607 – 2608.
[344] CIAR 842, 15Tr. p. 3049.
[345] CIAR 830, 13Tr. p.
[346] CIAR 842, 15Tr. p. 3141 – 3142.

336. The Coalition notes that some of Benga's witnesses (Mr. Beetles and Mr. Bewley) indicate on their resume that they work for Elan Coal South Project in baseline data collection and project design.[347] Given that these Benga witnesses work for Elan South Coal and have been gathering data and designing the project for Elan Coal, the Coalition submits that the Elan Coal project is reasonably foreseeable and should have been included in a more definitive manner in the cumulative effects assessment than was done.

337. The Coalition submits that when considered in the context of regulatory guidance, there are compelling reasons to deny this Project given its direct impact on tens of thousands of endangered Whitebark Pine trees within potential critical habitat as well as intact foothills fescue grasslands. As recommended by Mr. Wallis, the Coalition submits that the Project should not be approved.

5.4 Water, including surface and groundwater management, quantity and quality, selenium management and aquatic resources, including fish, fish habitat, and fish species at risk

5.4.1 Water, including Surface and groundwater management, quantity and quality and selenium management

5.4.1.1 The Coalition Evidence

338. Dr. Fennell's pre-filed evidence entitled "Review of geology, hydrogeology, groundwater-surface water interaction, geochemistry, and climate change implications" is set out in Appendix C of CIAR 553 at PDF pg.68-91.

339. Benga did not address Dr. Fennell's pre-filed evidence in Benga's Response Submission evidence in CIAR 571.

340. Dr. Fennell's Errata Sheet was marked as CIAR 844. His PowerPoint was marked as CIAR 875.

341. Dr. Fennell's direct evidence was given at 23Tr, p.4837-4926.

342. Benga's cross-examination of Dr. Fennell was negligible (less than 13 pages); see 23Tr, p.5011, L.22 to p.5025, L.12.

343. Benga's attempt to address the evidence given by Dr. Fennell in its Final Argument was negligible (only 9 paragraphs); see CIAR 962, paragraphs 217 and 404-411.

5.4.1.2 Water Worst Case Scenarios and the Public Interest

[347] CIAR 571, PDF 153 (Cory Bettles), pdf 164 (Dan Bewley).

344. The Coalition does not agree with Benga's use of the SRK Groundwater Numerical Model 2016 and the SRK GoldSim Model to evaluate a worst-case scenario for the water impacts from the mining project on Grassy Mountain.

345. The JRP should come to the conclusion that in the event of a reasonable worst case scenario, the project as proposed by Benga cannot assure the safety of Blairmore Creek, Gold Creek and the WSCT and that the risks to Blairmore Creek, Gold Creek and the WSCT are unacceptable.

346. The Coalition relies on the following passages from EUB Decision 2001-9 at page 1:

> **1 DECISION**
>
> The hearing considered whether the development of the proposed sour gas well would be in the public interest and included an examination of the unique topographic and demographic conditions in the vicinity of the proposed well in conjunction with the potential release rate from the well under reasonable worst-case conditions.
>
> Having carefully considered all of the evidence, the Alberta Energy and Utilities Board (EUB/Board) is of the view that the emergency response plan proposed by Shell Canada Limited (Shell) has not adequately addressed these unique conditions. Since public safety cannot be acceptably assured, the Board does not believe the drilling of the well, as currently proposed, to be in the public interest. Therefore, the Board denies Application No. 1042932 without prejudice to any future application.

347. There can be no doubt that the Benga application has unique topographic and aquatic conditions in the vicinity of the proposed coal mine.

348. In EUB Decision 2001-9 at page 9:

> **5.2 Views of the Interveners**
>
> The Coalition indicated that in their view a number of dispersion models, including GASCON2 and SLAB, could have a valid role in decision making. The key issue was the selection of the appropriate tool for the gas being dispersed. In this case, the interveners did not agree with Shell's use of GASCON2 to evaluate a worst-case release from the well. They believed that GASCON2 could not handle effects such as gravity slumping, reduced air entrainment associated with a denser-than-air plume, and the thermodynamics of evaporating liquids. They stated that they believed that the SLAB model was the more appropriate model in this case because it could handle the effects of a dense gas.
>
> The Coalition believed that a reasonable worst-case release scenario should be used in order to calculate publicly acceptable hazard zones. They submitted that probability information should not be applied for making decisions on hazard zones. They stated that a reasonable worst case would be the maximum well release rate over a 30-minute period, with little regard for mitigative measures, since they may or may not be successful.

349. In Benga's case the Coalition does not agree with Benga's use and configuration of the Groundwater Numerical Model and the Gold Sim Model to evaluate a reasonable worst case scenario.

350. EUB Decision 2001-9 at page 38:

> Finally, the Board was unable to conclude from the evidence at the hearing that the Shell ERP would adequately protect public safety under a reasonable worst-case scenario (i.e., full open flow without immediate ignition). The Board believes that for an ERP to be acceptable, it must be assured that public safety can be protected, irrespective of the probability of reasonable worst-case conditions actually occurring.
>
> In terms of protecting public safety, however, while all of these features would greatly reduce the probability of an event occurring, the Board must also address the results if, despite the taking of all reasonable precautions, the event does occur. For the Board to find that a well is in the public interest, it must be able to conclude that even in that case, public safety can be adequately protected. The Board does not believe that this means that the risk to public must or even can be reduced to zero. However, the Board must be convinced that the risk is acceptable.
>
> Given the evidence before the Board in this particular case, the Board is unable to reach such a conclusion. The Board believes that the unique combination of the potential size and H_2S release rate of the proposed well, the limited and difficult egress from many of the area residences, in some cases towards the well, the relatively large and diverse population with a high probability to be out of doors, and the potential presence of hypersensitive individuals proximal to the well all lead to the conclusion that in the event of the reasonable worst-case scenario, the ERP as currently proposed by Shell cannot assure public safety. In coming to this conclusion, the Board considered whether or not it could take the approach used in other cases, that is, to note that it
>
> would be prepared to approve the requested well licence if certain additional conditions were met. However, given the evidence before it, the Board decided that this approach would not be appropriate.

351. The major issue in this case is that Benga's modeling efforts are so flawed that it is impossible for the JRP to evaluate what the true risks are to Blairmore Creek, Gold Creek and the WSCT. Without knowing what the reasonable worst-case scenarios might be for the creeks and the WSCT, the JRP is not in a position to determine whether or not the risks are acceptable. Accordingly, the application must be denied.

5.4.1.3 Hydrogeology and the SRK Groundwater Numerical Model

352. SRK Consulting Canada Inc. ("SRK") constructed a Groundwater Numerical Model in 2016 attached as Appendix C to the MEMS Hydrogeology Report marked as CR#3 in CIAR 42.

353. The Introduction to the Groundwater Numerical Model provides as follows at PDF pg.172 of CR#3:

> SRK Consulting (SRK) has reviewed and compiled the available hydrogeological data for the Project and constructed a three-dimensional numerical groundwater model on the basis of this information. The model was calibrated to available piezometric head and creek base flow data and, with incorporation of the mine plan, subsequently used to predict the Project's effects on piezometric levels and creek base flows during the life of the mine and beyond mine closure, as well as assessing the likely quantities of precipitation which would contact mine waste and eventually be discharged as creek base flow.
>
> This information serves as an important data source used to assess the effect of the Project on the groundwater environment and is used as an input to the updated Project site-wide water and load balance (SRK, 2016b).

354. The JRP should not trust SRK's prediction of the Project's effects on creek base flows during the life of the mine and beyond mine closure for reasons that follow.

355. The JRP should also not trust SRK's prediction of the likely quantities of precipitation which will contact mine waste and eventually be discharged as creek base flow.

356. SRK's scope of work for the modeling was described at PDF pg.172 of CR#3:

> **1.2 Scope of Work**
>
> This report presents the results of the 2016 groundwater numerical modelling. The modeling objectives were to estimate:
>
> - The groundwater inflows to the pit during mining operations and following closure;
> - The extent of the Project influence on the groundwater system at the end-of-mine (EOM) and for the long-term closure[1] (LTC) phase;
> - How the Project will affect the quantity of groundwater discharging into the nearby creeks as base flow; and
> - The quantities of precipitation entering the groundwater system following contact with waste rock and travel time to discharge points.

357. The scope of work did not involve modeling reasonable worst case scenarios for the groundwater system or for the base flow of the nearby creeks.

358. Mr. Soren Jensen and Mr. Day were the only witnesses from SRK at the hearing and neither had any expertise in hydrogeology. Ms. Grainger was the Benga witness who fielded questions on hydrogeology. Ms. Grainger said she had never been to the Grassy Mountain site; see 17Tr, p.3452, L.6-7.

359. CR#3 in CIAR 42 at PDF pg.12:

> **3.2 MEMS Field Investigation**
>
> The hydrogeological data collection program consisted of:
>
> - drilling and installing 19 monitoring wells targeting either one of three coal seams across the Project, or the upper water table at the CHPP, and near a future rock disposal area, water management pond and Blairmore Creek;

360. The impacts associated with the mine development on the groundwater are predicated on the SRK numerical model which was developed using site data. Ms. Grainger confirmed that the SRK model was based on a total of only 19 groundwater monitoring wells; see 16Tr, p.3413, L.4-16. It is worth noting that some of the 19 monitoring wells were dry; see CR#3 at PDF pg.87, and that some wells are completed in nested configuration meaning that even less locations were assessed across the Project area.

361. Given the size of the Project area (over 1500 hectares or 3706 acres) and the complexity of the hydrogeology, 19 groundwater monitoring wells at even less locations cannot possibly capture the variability to produce adequate model predictions.

362. CR#3 in CIAR 42 at PDF pg.233:

> **Significance of Results**
>
> The British Columbia Groundwater Modeling Guidelines[12] (Wels et al., 2012) define three levels of modeling complexity, based on the potential impacts, modeling objectives, hydrogeological framework and data availability. The model developed to undertake this assessment may be classified as of moderate complexity, defined as follows:
>
> "*These are conceptual or numerical models based on a reasonable, though limited, dataset and having limited calibration. These models may be used to determine the potential range of change or to "bracket" potential effects that may occur due to a given stress.*"
>
> Hence, while specific results are calculated during the modelling process, there always remains a degree of uncertainty associated with these estimates. Quantification of the uncertainty may be a laborious and expensive process. SRK has attempted to quantify the uncertainty by providing a range of estimates; however, these ranges should not be viewed as definitive.

363. The statement is made by SRK that the groundwater transport model developed for the Project is "based on a reasonable, though limited, dataset and having limited calibration". The Benga panel was asked to explain what SRK meant by reasonable given the limited nature of the dataset supporting this model.

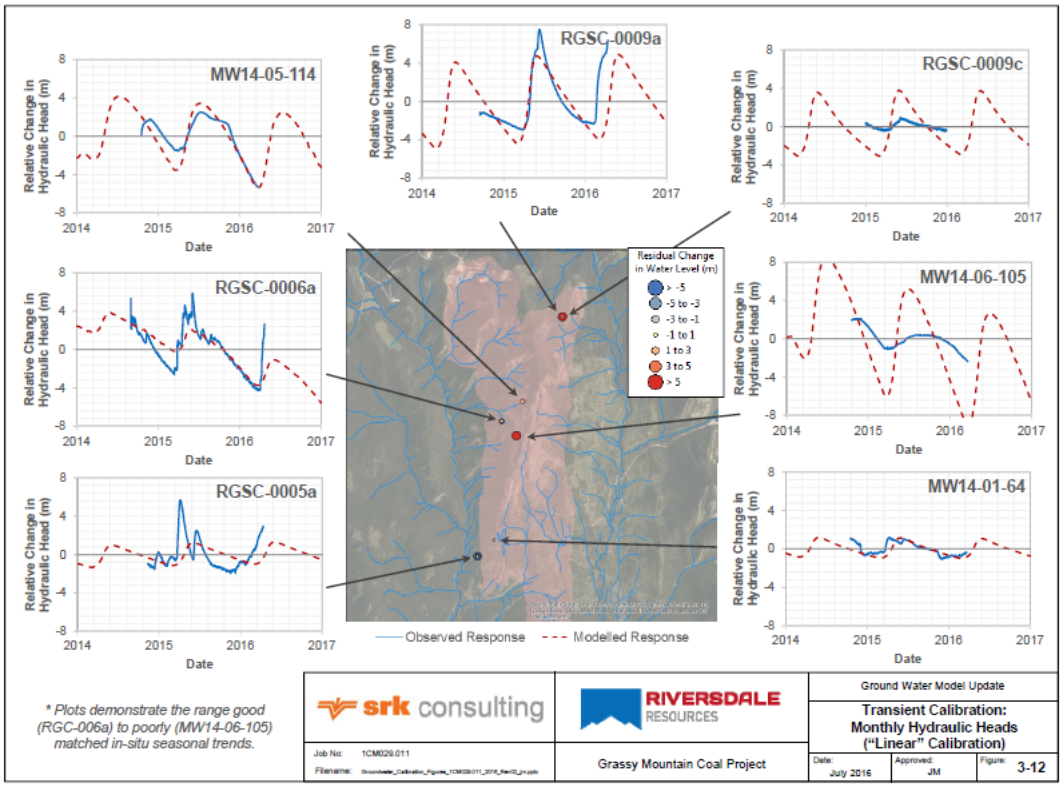
364. Although Ms. Grainger did not write the SRK report, or directly participate in the construction, calibration and manipulation of groundwater model parameters, she spoke to it at the hearing and gave the following underwhelming response at 16Tr, p.3417:

A My understanding of that would be that, yes, although the dataset is limited, as you pointed out, for a large area, it does -- it's internally consistent. It does provide us an overall understanding of the hydrogeology of the site. It's consistent with our observations. And on that basis, we can use it to predict the potential effects of the project on the hydrogeology at the site.

And I note that in the first paragraph that you quoted, it states that the assessment is classified as moderate complexity, not simplistic. But it is of an intermediate complexity, so it's not -- anyway. Deemed sufficient for the purpose of -- that was utilized for this assessment.

365. The SRK model is not based on a reasonable dataset or configuration of model parameters to accurately reflect the hydrogeologic conditions in the Project area. Given the fragility of the WSCT status and the importance of the creeks to their survival, "ranges that are not definitive" should be deemed unacceptable by the JRP.

366. PDF pg.226 of CR#3 in CIAR 42; Figure 3-12:



367. The blue lines in Figure 3-12 are the actual groundwater levels measured by Benga between 2014 and 2017 and represents the Steady state or observed response. The red dotted line is what the SRK model simulated over that that same time period. As you can see there are only 6 locations assessed.

368. The calibration of the groundwater level fluctuations for the Transient calibration in Figure 3-12 is not very good in some parts of the model domain, specifically the northeast quadrant RGSC-0009c (near Gold Creek) and MW14-06-105. The red dotted line is way more variable than the blue line for a number of the monitoring wells, which means that SRK did not constrain the model very well to the observed conditions (magnitude and timing) in and around Gold Creek.

369. At 16Tr, p.3419, Ms. Grainger stated:

> A I think the model report identifies that there are specific locations that are -- are not well-captured by the model. However, on the whole, the calibration did meet the requirements.

370. Ms. Grainger indicates that "…on the whole, the calibration did meet the requirements." even though there was notable error in the modelled versus the observed response of the groundwater hydrographs assessed. The assumption of that the calibration is sufficient is based on calibration statistics such as mean error, maximum absolute error, absolute mean error, root mean squared error, normalized root mean squared error, and the coefficient of determination (R2). However, when comparing modelled versus observed responses over time it is typical to use the Nash-Sutcliffe Efficiency coefficient to determine the predictive skill of hydrological models, and this was not done.

371. Ms. Grainger's response casts doubt on the ability of the model to accurately projected changes in certain parts of the domain assessed. As noted by Ms. Grainger at 16Tr, p.3422:

> A MS. GRAINGER: As I said earlier, it's acknowledged that in specific locations we may not have accurate predictions; however, the intent of the model is provide overall understanding and a good understanding of the system. So there may be specific locations where there are inconsistencies. That's been acknowledged, yes.

372. As Dr. Fennell noted in his Slide No. 10 in CIAR 875 relating to Figure 3-12 ~ discussed at 23Tr, p.4869, L.7 to p.4871, L.24:

> Despite Benga's contention that the model calibration is acceptable, comparisons of modelled vs. observed hydraulic heads is not very good in some parts of the model domain. This leads to concern regarding the ability of the model accurately simulate future conditions.

373. The JRP should have no faith that the SRK Groundwater Numerical Model is providing results that are anything close to what will actually happen during and after Benga's coal mine development.

374. One of the assumptions in the SRK groundwater model is that the geological strata are homogenous and anisotropic (with greater hydraulic conductivity (K) values in a north-south versus west-east direction).

375. Ms. Grainger noted at 16Tr, p.3425:

> 18 A So that was an assumption. The physical tests test the
> 19 conductivity in the planer direction, so in the
> 20 horizontal direction. So there's no way to tell from
> 21 the results whether that's reflective of the 'X'
> 22 direction or the 'Y' direction, whether it's
> 23 north-south or east-west. It just reflects generally
> 24 the more permeable direction.

376. This response in no way clarifies how this assumption will affect the model's output regarding the spatial extent of drawdown and baseflow reduction to Blairmore and Gold creeks.

377. Benga conducted an inadequate investigation to substantiate the assumption of more limited hydraulic conductivity in the west-east direction. Only one pumping test was conducted to determine connectivity between discrete monitoring well locations. As noted by Ms. Grainger at 16Tr, p.3426:

> 11 A So I think there was two questions there. There -- the
> 12 first was, yes, there was one pumping test that was
> 13 completed in a flowing core-hole which gave us some
> 14 limited information, but there's no observation wells
> 15 that were included in that pumping test. So it gives
> 16 us some data, but it's limited in its value because of
> 17 the lack of observation wells.

378. To do only one pumping test for a project of this magnitude, with such geologic and hydrogeologic variability, and containing so many risks is unacceptable. Why were these investigations by MEMS and/or SRK so limited, given the importance of this information to the modelled extent of drawdown and impact to baseflow in Blairmore and Gold creeks?

379. Ms. Grainger agreed that Grassy Mountain is a fracture dominated groundwater flow system so groundwater could go to left or right; see 16Tr, p.3428, L.21 to p.3429, L.3.

380. The Coalition is very concerned about a number of the assumptions made by SRK in its model.

381. SRK Model Assumption bullet point 1, PDF pg.207 of CR#3 in CIAR 42:

- For the purposes of the assessment, the entire rock/ sediment package may be treated effectively as a homogeneous, anisotropic medium;

382. Dr. Fennell noted in his Slide No. 4 in CIAR 875:

- *an understandable assumption; however, the complexity of the strata and likely presence of active and open faults and fractures will adversely affect this condition*

383. SRK Model Assumption bullet point 4, PDF pg.207 of CR#3 in CIAR 42:

- K is largely anisotropic, with highest K parallel to bedding planes/ coal seams and to thrust fault strike with lowest K perpendicular to bedding. In general terms, K, in all orientations, decreases with depth, according to the model proposed by Wei et al. (1995);

384. Dr. Fennell noted in his Slide No. 4 in CIAR 875:

- *the presence of faults and fracture networks acting a groundwater flow pathways will adversely affect this assumption*

385. SRK Model Assumption bullet point 5:

- Apart from preferential flow parallel to fault strike, there is no major fault acting as a significant conduit and no major regional deep flow influences;

386. Dr. Fennell noted in his Slide No. 5 in CIAR 875:

- *this is an unrealistic assumption; there is no proof to substantiate this claim as no investigation was conducted*

387. SRK Model Assumption bullet point 6:

- Recharge follows the same spatial trend with elevation as precipitation. The precipitation, evaporation and evapotranspiration mechanisms are not explicitly modeled but assumed to be integrated as "net recharge". It is assumed that this approach will not unduly bias the model; and

388. SRK states that "It is assumed that this approach will not unduly bias the model." This assumption is optimistic and does not consider a worst-case scenario.

389. Benga was asked how can this assumption be substantiated in the absence of any documented or field-based evidence? Ms. Grainger's response at 16Tr, p.3434 was as follows:

> A Well, the information that we have is recharge at different elevations at the project, which clearly show increasing elevation -- or increasing recharge with elevation. So there is a positive correlation between the two.

390. Benga did not substantiate any of the recharge estimates used, including their relationship with elevation. The recharge values used in the model were selected and apportioned to the model domain by the modellers, and in no way do the estimates tie-back to actual documented values.

391. If too much recharge is added to certain parts of the model domain, how will that affect the extent of drawdown in those portions of the model domain? Ms. Grainger's response at 16Tr, p.3434 was as follows:

> A So if I understand you, yes, applying too much recharge would -- it has multiple effects, and -- and that's part of understanding a numerical model, is all of these features are interlinked. So if we apply too much recharge, we also get water levels that are too high in the groundwater system. So there would be multiple changes that we would see. I think it's important to understand that recharge was calibrated in the process of building the model.

392. Dr. Fennell noted in his Slide No. 5 in CIAR 875:

- *the assumption of recharge has not been substantiated with any documented or field-based evidence*

393. SRK Model Assumption bullet point 7:

- Water level data and creek flow data collected between late 2013 and early 2016 are representative of the pre-mining steady-state conditions and long-term trends.

394. Dr. Fennell noted in his Slide No. 5 in CIAR 875:

- *the time horizon used is in no way representative given the extreme variability noted in creek flows as evidenced by the Water Survey of Canada gauging station "Gold Creek near Frank"*

395. Model Properties bullet point 2, PDF pg.209 of CR#3 in CIAR 42:

> **3.4.3 Model Properties**
>
> - The K field is anisotropic with a conductivity tensor where K_1 and $K_2 > K_3$[4] (Figure 3-3). The highest conductivity is parallel to bedding in the north-south direction. The north-south thrust fault systems are modelled to impede flows in the east-west direction. The complexity of the bedding are reproduced based on geological maps, geological models, and the beds orientations at a regional scale;

396. SRK states in Appendix C that "The north-south thrust fault systems are modelled to impede flows in the east-west direction". This configuration will have a profound effect on how much drawdown will propagate outward to the west and east of the mine pit and influence the groundwater discharge, or baseflow contribution, to Blairmore and Gold creeks.

397. Benga was asked why the SRK model has been configured this way when we know that there is evidence of active west-east faults based on the apparent trellis-style drainage pattern on Grassy Mountain. Ms. Grainger stated at 16Tr, p.3432 that there is no evidence of active east west faults in the project area:

> Q Are you saying, Ms. Grainger, that there is no evidence of active east-west faults in the project area?
>
> A MS. GRAINGER: That's correct. The model --

398. A trellis-style drainage pattern is characterized by tributaries joining at high angles, often approaching right angles, which is common in areas with rocks of different strength and resistance to erosion and in areas with regular series of folded bedding. Folding can promote the development of faults and fractures in more brittle rock types. This type of drainage system is typical in mountainous regions.

399. Ms. Grainger agreed that the trellis-style drainage pattern is present at the site; See 16Tr, p.3432:

> A I -- my understanding of a trellis-style drainage system is that it can occur when there's a -- a ridge and drainage is perpendicular away from that ridge. And that is what we see at the site, but that doesn't necessitate the existence of east-west faults in order to create that drainage pattern.

400. The existence of a trellis-style drainage pattern (or more of a hybrid-style as further clarified by Dr. Fennell following the submission of his Undertaking #23) is another factor that influences the modelled 400 m extent of drawdown from the pit boundary.

401. PDF pg.193 of CR#3 in CIAR 42:

> **2.2.2.4 Fernie Group**
>
> No testing data were obtained for the shales of the Fernie Group, which underlie the Kootenay Group rocks. These rocks are expected to be of low permeability, based on their lithology, and on the limited well yield database (Nielsen, 2009).
>
> **2.2.2.5 Thrust Faults**
>
> While no testing data exists for the thrust faults in the area of the Project, it is likely that these faults, which strike parallel to the hogsback ridge, likely present a hydraulic barrier to flow perpendicular to them, given the cataclastic nature of these faults and a tendency to form low-permeability fault gouge.

402. Ms. Grainger gave evidence that there are no east-west faults on Grassy Mountain at 17Tr, p. 3457:

> Q Okay. And to be clear, the model has been constructed in such a way that there are no east-west faults in the actual project area. Do I have that correct?
>
> A Correct. The -- the model does not include east-west faults because there's no evidence of them on Grassy Mountain. The fact that they are, you know -- that they do occur on the Livingstone Range to the east in different rocks than occur on Grassy Mountain, that was taken into account when we constructed the model. So there's no evidence for these features also occurring on Grassy Mountain.

403. This evidence given by Ms. Grainger is incorrect.

404. An article entitled "Stable-isotope geochemistry of syntectonic veins in Paleozoic carbonate rocks in the Livingstone Range anticlinorium and their significance to the thermal and fluid evolution of the southern Canadian foreland thrust and fold belt" by Michael A. Cooley, Raymond A. Price, T. Kurtis Kyser and Jon M. Dixon ("Cooley et

al.") published in AAPG Bulletin, v. 95, No. 11 (November 2011) pp. 1851-1882 has been marked as CIAR 892.

405. CIAR 892 documents east-west faults in the Livingstone Range. The Morin Creek Tear Fault (see Figure 2 on PDF pg.4 and Figure 3 on PDF pg.6 of CIAR 892) is immediately east of Gold Creek and has significant displacement along it. Figure 10 on PDF pg.12 of CIAR 892 shows many east-west transverse faults. Many of these faults do not have a large displacement along them, but they are fractures, which will allow fluids to move along them. These fractures can be seen in all outcrops of competent sandstone layers on Grassy Mountain.

406. The proof of east-west faults and fractures is discussed in the Cooley et al. article at the bottom of PDF pg.11 of CIAR 892:

> Regularly spaced (~150 m [~492 ft]), east-west–striking, steeply dipping zones of intense fracturing and minor faulting transect the north-south–striking limbs and hinge zones of chevron-style folds in the vicinity of Green Creek, Morin Creek, and Caudron Creek (Figure 10). The fracture zones, which commonly contain one or more discrete but discontinuous fault surfaces are commonly marked by gullies that form conspicuous erosion features in the steeper slopes and cliffs (Figure 10A, B).

407. As noted by Dr. Fennell in his evidence, the trellis- or hybrid-style drainage on Grassy Mountain is a direct indicator of this type of faulting and fracturing influence.

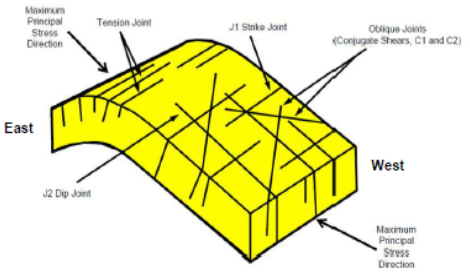
408. As Dr. Fennell noted in his Slide No. 7 in CIAR 875 ~ discussed at 23Tr, p.4860, L.4 to p.4861, L.23:

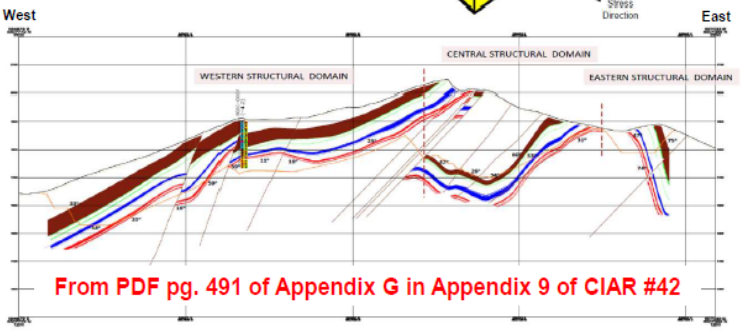
> The occurrence of trellis-style drainage in the Project area is direct evidence of north-south and west-east trending fault systems, which is consistent Benga's site investigations. West-east faults have not been included, explicitly, in Benga's modelling.

409. Furthermore Ms. Grainger's evidence under oath about there being no evidence of east-west faults on Grassy Mountain is contradicted by Benga's pre-filed evidence. This was noted on Dr. Fennell's Slide No. 6 below in CIAR 875 and discussed by Dr. Fennell in some detail at 23Tr, p.4853, L.25 to p.4859, L.25:

Complex geological setting

From PDF pg. 573 of Appendix B in Appendix 9 of CIAR #42





From PDF pg. 491 of Appendix G in Appendix 9 of CIAR #42

Example rock core photo

(from PDF pg. 575-689 of Appendix C in Appendix 9 of CIAR #42)

Benga has indicated that the Project area is geologically and structurally complex, with fault and fracture control on groundwater flow, including west-east faults (as reinforced by AQ#5 - Coalition - Cooley_veins_AAPG - Water Topics.pdf). This type of conditions is nearly impossible to mimic accurately within a modelling framework.

410. Dr. Fennell stated at 23Tr, p.4854:

> 9 of CIAR 42. You can see that thrusting where -- where the -- the beds have been stacked on top of each other. You see a -- a folding over on the -- on the other side, on the left-hand side, which has actually been eroded off, and you can see the offsetting of the beds. Those are the thrust faults, but we're going in a west-east direction.
>
> If I -- if I draw your attention again up to the top image, that -- that yellow folded image, you can see that Benga has identified that there are actually east-west trending fault and fracture systems. So

411. Dr. Fennell stated at 23Tr, p.4855:

> And I think when you look at the -- some of the joint sets and some of the conjugate joint sets, you're actually seeing that. So you see these conjugate joint sets that are actually on oblique angles to the -- to the east-west and north-south. So you've got a very complex fabric of fractures and faults that would be acting as a network to move water through the system. So I don't think it's fair to say we've -- we've got faults that are going north-south that are acting to impede flow when we're -- when we're presented with evidence like this.

412. It was wrong for the SRK Groundwater Numerical Model to exclude west-east faults from the configuration of model parameters and accordingly the JRP should not be satisfied that the model has come close to predicting worst case scenarios for groundwater and the future viability of Gold Creek and the threatened aquatic species therein.

413. PDF pg.183 of CR#3 in CIAR 42:

> 4.5 km downstream of the Blairmore confluence. MAP for the entire Blairmore catchment is estimated at 719 mm and Gold Creek 777 mm. Daisy Creek flows from south to north and drains the north side of the Grassy Mountain. Daisy Creek has an average slope of 7% and elevations ranging from 1,970 to 1,730 masl. It collects runoff from an upstream area of 60 km² and discharges into the Oldman River.

414. SRK used the average number 28% of the MAP for recharge in its model. The model predicted that 28% of the MAP in the Gold Creek watershed will end up as recharge. This equals 217 mm of recharge annually. This was explained by Ms. Grainger at 17Tr, p.3461:

> that so that it's -- as I was trying to explain yesterday, it's not a simplistic 28 percent. The 28 percent represent, essentially, the average across the site of the recharge -- excuse me -- that was

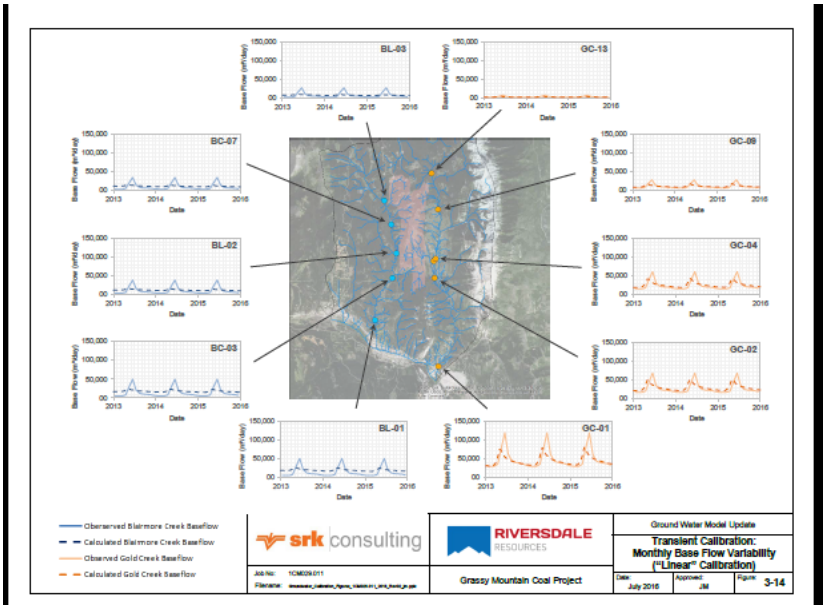
20 applied, but you can see that it's lower in some areas
21 and higher in some areas.

415. However, in some areas of the model, the recharge is as high as 50% or more. Ms. Grainger explanation for this was stated at 16Tr, p.3436:

8 A So it was increased in some specific areas, such as
9 a -- a clear-cut area, where it was interpreted that
10 groundwater recharge would be higher because of reduced
11 evapotranspiration.

416. SRK has underestimated the worst case due to how much recharge they have attributed to certain parts of the mine site and surrounding areas. Adding more recharge to certain parts of the model domain will effectively reduce the worst case spatial extent and magnitude of drawdown simulated for those areas. Furthermore as noted by Dr. Fennell, the high recharge values used by SRK will certainly work to reduce the magnitude of baseflow reductions predicted for Gold Creek.

417. PDF pg.228 of CR#3 in CIAR 42; Figure 5-14 Transient Calibration: Monthly Base flow Variability ("Linear" Calibration):



418. Figure 5-14 demonstrates that the SRK model consistently over- and under-predicts monthly baseflow in Blairmore Creek.

419. Ms. Grainger was asked to explain the considerable difference between the model's calculated versus observed baseflow variability. Her answer at 17TR, p.3463 was as follows:

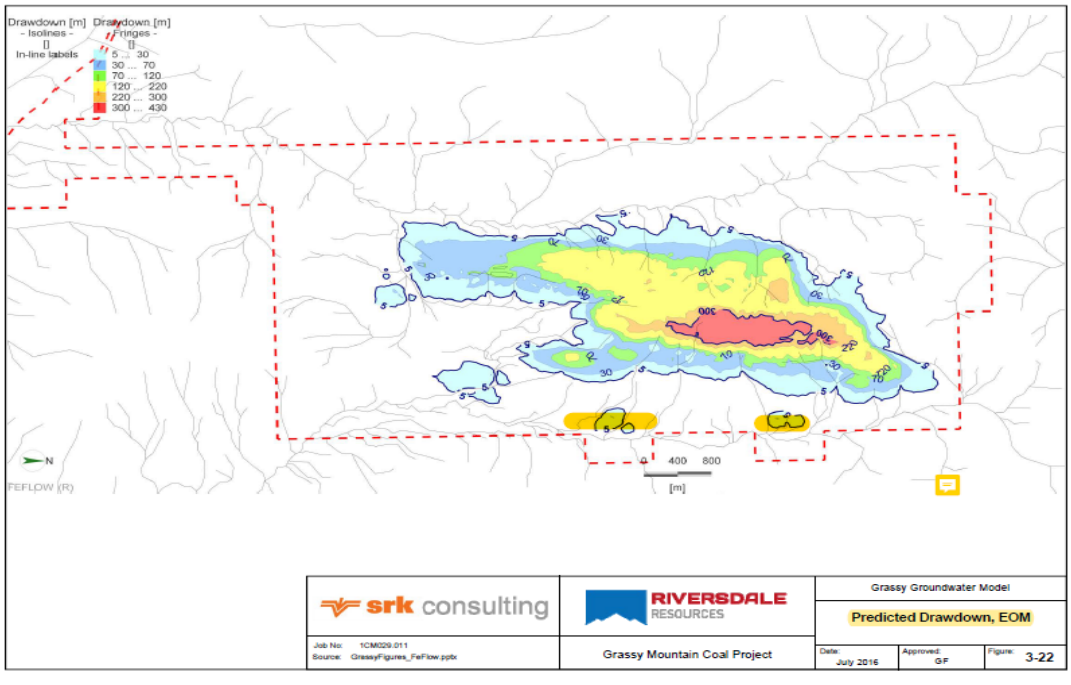
> A Well, there are differences. I think the intent is that, on the whole, we've got a reasonable match. I agree that some don't show as good a match, and we have discussed in the model report that there are specific areas where the model doesn't fit as well, but on the whole, we believe it is representative.

420. As Dr. Fennell noted in his Slide No. 11 in CIAR 875 relating to Figure 5-14 ~ discussed at 23Tr, p.4871, L.25 to p.4875, L.24:

> Baseflow estimation is challenging at the best of times, and subject to a number estimation techniques that infer rates from existing streamflow data (i.e. indirect method). Benga's comparisons of modelled vs. observed results over- or under-represents peaks and lows indicating that the model is not accurately representing timing and rate.

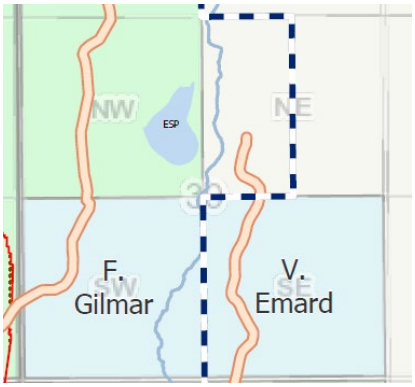
421. The statement that there is a "reasonable match" is therefore hard to substantiate given the obvious (from visual review) inability of the model to accurately simulate the timing and magnitude of monthly baseflow variability. And this, along with the issue related over-allocating recharge to certain parts of the model domain, casts significant doubt regarding the model's ability to provide accurate estimates of baseflow reduction to Blairmore and Gold creeks.

422. PDF pg.242 of CR#3 in CIAR 42; Figure 3-22, Predicted Drawdown EOM:



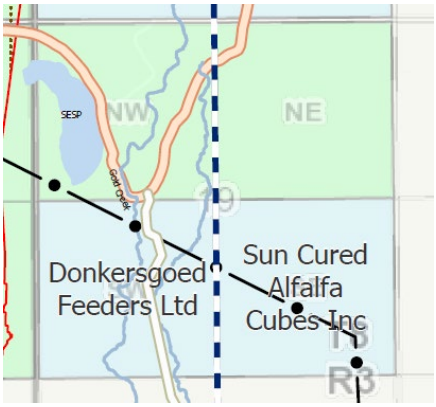
423. Figure3-22 shows the mine area as a sink. The drawdown of up to 5 m in the area of the NESP is very close to Gold Creek. Any amount of drawdown near the creeks, not just 5 m, will capture groundwater that would otherwise report to those creeks. This has not been communicated by Benga in a way that is consistent with the level of concern required for the sensitive WSCT habitat.

424. The ESP is located to the north of Fran Gilmar's property.



425. The drawdown of up to 5 m in the area of the ESP is also very close to Gold Creek.

426. The SESP is located to the north of the Donkersgoed property.

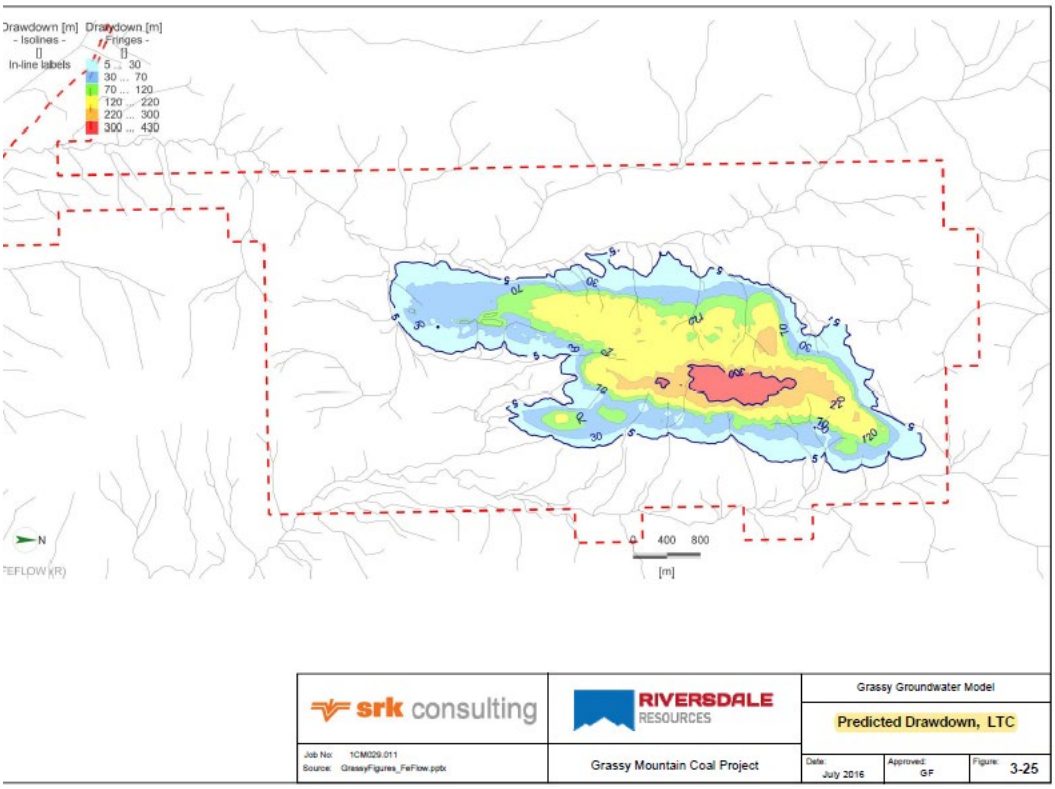


427. The drawdown of up to 5 m in the area of the SESP is very close to Gold Creek.

428. This was confirmed by Benga at 17Tr, p.3475:

```
 4   Q   Right.  And the creek itself would be -- would be less
 5       than 100 metres from -- would be approximately, what,
 6       100 metres from the east sedimentation pond?
 7   A   It is quite close.
 8   Q   And the creek is also within 100 metres of the
 9       southeast surge pond?
10   A   MR. HOUSTON:          I -- I can confirm that,
11       Mr. Secord.
12   Q   And the creek would also be within a hundred metres or
13       so of the northeast surge pond?  This is Gold Creek.
14   A   Yes.  I can confirm that as well.
```

429. PDF pg.246 of CR#3 in CIAR 42 Figure 3-25; Predicted Drawdown, LTC:



430. In Figure 3-25, the model projects that the drawdown will be limited to 400 m out from the mine pit area in all directions. To be clear, the drawdown of 5 m will be limited to 400 m out from the mine area, but the area drawdown of 1 m or less has not been shown. As noted earlier, any amount of drawdown near a creek will negatively impacts its baseflow contribution. By limiting the hydraulic conductivity in an east and west direction (which SRK did in its model) and by putting more recharge into the 1500 ha mine area than is realistic, the model will result in less drawdown extent and reduction in baseflow for Blairmore and Gold creeks; see 17Tr, p.3477, L.6-15.

431. As Dr. Fennell noted in his Slide No. 13 in CIAR 875 relating to Figure 3-25 ~ discussed at 23Tr, p.4878, L.11 to p.4881, L.9:

> Benga's 400 m limit of drawdown around mine pit is overfly optimistic, and the occurrence of isolated areas of drawdown outside the main area of drawdown is difficult to rationalize. The limit of 0-5 m drawdown is not defined.

432. Benga gave evidence at various times in the hearing about portions of Gold Creek "literally" drying up and produced a photograph taken in 2016 showing a dry creek bed; see Addendum 8 at CIAR 89, PDF pg.907:

433. Photo C was taken near the location of the GC02 monitoring station; see 17Tr, p.3545, L.10-25 per Mr. Bettles.

434. The following evidence was given by Mr. Houston on November 5th at 8Tr, p.1897:

How has the anticipated shift in IDF -- that's intensity and duration and frequency -- to more extreme conditions, so greater than the 90th percentile, been accommodated in the streamflow modelling for Gold Creek and Blairmore Creek?

A So what I would say, Mr. Chairman, is that one of the benefits of this project is -- and I think the concern is more on the drought end of the scale, Mr. Secord, if I understand your question.

But one of the benefits that this project brings, especially for Gold Creek, is the ability to store water in the various ponds associated with the mine project, and to allow some kind of balancing between -- especially in dry seasons and some ability to augment the Gold Creek streamflow in drier conditions. And

that's something we've mentioned in several places in our -- in our project application, that that would be a net positive for Gold Creek, if you will.

Q How has the anticipated change to the IDF been considered regarding the impacts to the westslope cutthroat trout habitat once the Blairmore and Gold Creek watersheds are significantly altered permanently by the mining operation?

A Exactly as I've just mentioned, Mr. Chairman. As -- once the mine is in place, if there is an extremely dry period -- and, again, thinking about the westslope cutthroat trout, a drought in Gold Creek, under current conditions, would result in a number of places in Gold Creek where the creek literally dries up. It doesn't dry up, but it goes -- it recedes into the surficial layer and becomes impassable for fish.

So a number of things that we're proposing to do: One, as I mentioned, we would have the capacity to augment the flow rates in Gold Creek to ensure a minimal flow.

435. It is interesting to note that the various ponds Mr. Houston referred to will be gone in the LTC scenario shown on Figure 3-25 above. And once gone, the ability to store water and balance the system will not exist.

436. Mr. Houston was asked about this "ability to augment" the Gold Creek streamflow at 17Tr, p.3469 and it turns out that it had nothing to do with the ability to store water in various sedimentation ponds:

10 Q So just to be clear, you're -- Benga's proposal, then,
11 to save the westslope cutthroat trout is -- has nothing
12 to do with augmenting the flow of water in Gold Creek
13 but to do some channelling work in some of those areas
14 where you took those photographs and try and improve
15 the channel? That's really what you're talking about?
16 A That -- that is what is contained within our fisheries
17 offsetting plan, yes.

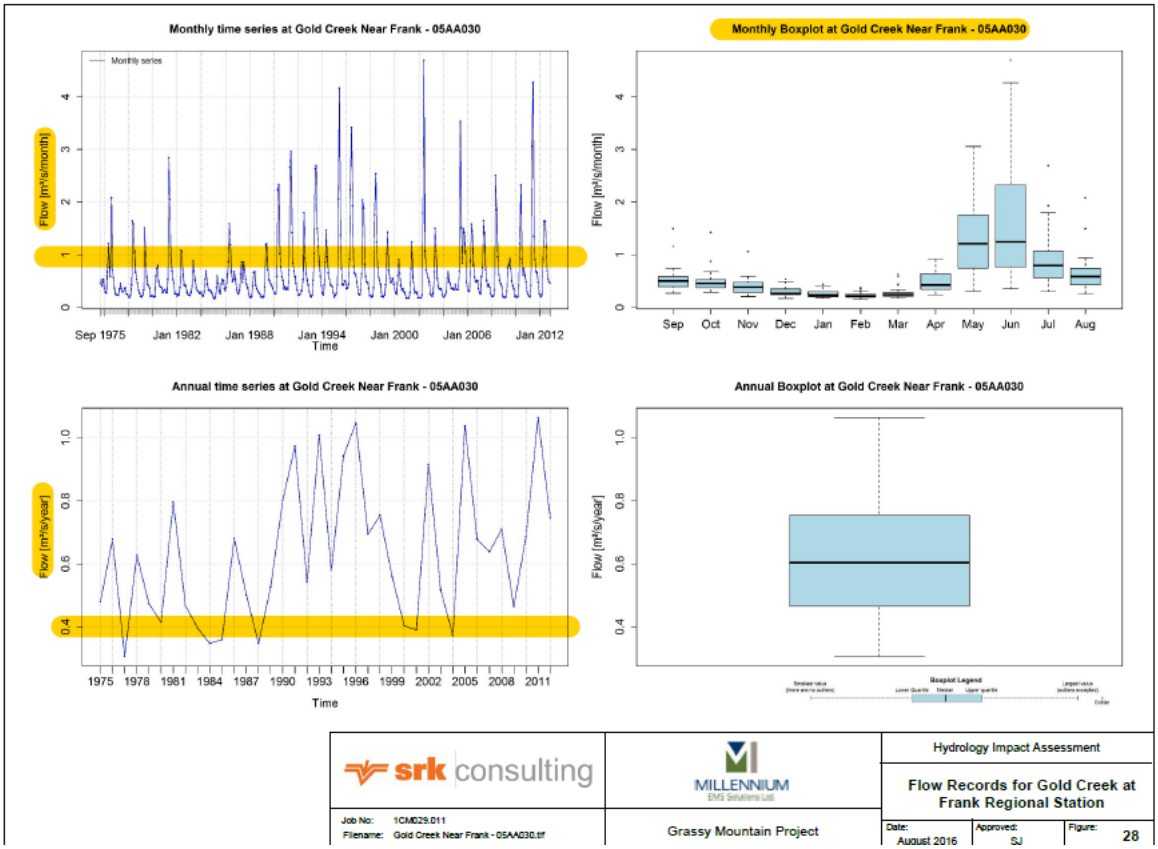
437. It would appear that Mr. Houston was making things up as he went along when he gave his "ability to augment streamflow" evidence on November 5th.

438. However, later on in his evidence, Mr. Houston suggested that water could be released from the NESP and ESP in channels built by Benga and directed towards Gold Creek, assuming that the water in those ponds had no contaminants; see 17Tr, p.3482, L.4 to p.3486, L.11. Assuming that this evidence is correct, what happens when these 2 ponds are gone? Mr. Houston also said that the instream flow needs showed there was enough water in Gold Creek so why then would Benga need to augment the flow of Gold Creek?

439. If some of the beds in Gold Creek can literally dry up and run below the surface, what if the SRK model is wrong and Benga's mining operations capture more than the projected 10-20% of the baseflow of Gold Creek? The Coalition is concerned that in a worst-case scenario, even MORE areas of Gold Creek could dry up where they would normally be flowing with consequent harm to WSCT and their habitat.

440. As noted above, Model Assumption Bullet point 7, PDF pg.207 of CR#3 in CIAR 42 states that "Water level data and creek flow data collected between late 2013 and early 2016 are representative of the pre-mining steady-state conditions and long-term trends".

441. PDF pg.66 in CR#4 of CIAR 42 Figure 28; Flow Records for the Water Survey of Canada's (WSC) Gold Creek near Frank station:



442. The 2013-2016 flow data is not considered "representative" of the variability expected when we have data from the Gold Creek near Frank gauging station that provides historical information on flow variability from 1975 to 2012. The Gold Creek near Frank gauging station shows periods where the annual flow in Gold Creek has been quite low for multiple years in a row. There are many years between 1975 and 2012 where the flow is less than 1m3/s/month.

443. Benga has failed to capture and consider in their impact assessment scenarios the multiple years of low flow in the 1975-2012 record. When baseflow is reduced by the drawdown caused by the removal of Grassy Mountain during mining and low flow occurs over multiple years, what will happen to the WSCT and their habitat in Gold Creek?

444. As Dr. Fennell noted in his Slide No. 19 in CIAR 875 ~ discussed at 23Tr, p.4889, L.1 to p.4890, L.9:

> Benga's reliance on a protracted flow period (2013-2016) to capture pre-mining steady-state conditions and long-term trends (or the range of variability) in stream flows is not sufficient to capture the magnitude and duration of historical low flow conditions. This produces overly optimistic model results for baseflow reductions and future water quality impacts.

445. This is another example of Benga failing to consider a worst-case scenario.

446. The importance of springs to the flow in Blairmore and Gold creeks has not been addressed very well in Benga's application. Numerous small springs are known to exist in the area and the flow from these features adds directly to the creeks via tributary drainage or provides baseflow contributions to the streams. Very few springs (only 6) were assessed during the preparation of Benga's application which raises a further question mark about the accuracy and representativeness of SRK's groundwater modelling.

447. As Dr. Fennell noted in his Slide No. 12 in CIAR 875 ~ discussed at 23Tr, p.4875, L.25 to p.4878, L.4:

> Removal of Grassy Mountain will permanently decrease the watertable by up to 430 m and "dry up" springs and wetlands, but the model suggests sustained flow immediately adjacent de-activated seepage nodes which is difficult to rationalize.

448. The saturated backfill zones (SBZs), rock dumps and water management ponds (sedimentation and surge ponds, and End Pit Lake or EPL) will be established on top of bedrock, and in some places residual soils covering the areas outside the mine pit. There is a lack of information regarding the physical and chemical nature of the soils and bedrock upon which the rock dumps, water management ponds, and the EPL will be established. Given the known presence of faults and fracture identified in Benga's application documents, it is highly likely that the underlying bedrock will also be faulted and fractured providing pathways for movement of seepage from those mine features.

449. There is the potential for trace elements to be mobilized from the underlying soil and bedrock materials (for instance from the Fernie Group) once the rock dumps and water management ponds are in place. Once the water management ponds are in place, will water leach out picking up trace metals from the underlying soil and rock and transport them to Gold Creek?

450. As Dr. Fennell noted in his Slide No. 15 in CIAR 875 ~ discussed at 23Tr, p.4882, L.12 to p.4883 L.20:

> Unlined rock dumps are situated in upland areas, up to 200 m above the creek valleys, which promotes a significant downward flow potential. Unlined ponds are also located near, or on top of, tributary streams. Both are situated on top of heavily fractured rock which translates to "high risk" for contaminant movement.

451. Benga has not looked at the worst-case scenario for contaminant movement towards Gold Creek from these water and waste management areas.

452. The deficiency of information regarding the soil and bedrock beneath the mine pit, rock dumps, water management ponds and EPL should not allow JRP to have any confidence that Benga actually knows what will happen once the Grassy Mountain area has been permanently disturbed, the groundwater level has been significantly dropped, waste rock

has been distributed across the landscape, and large selenium management areas have been established.

453. Model Properties Bullet point 3, PDF pg.9 of CR#3 in CIAR 42:

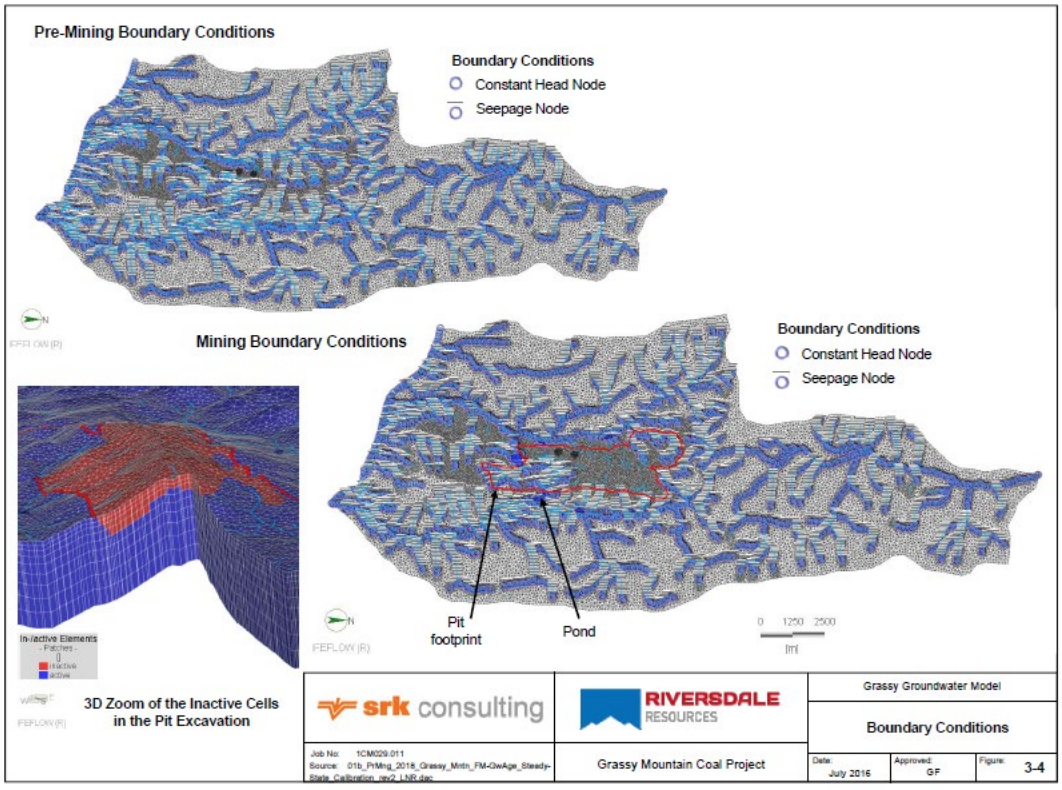
- K decreases with depth due to increases in the lithostatic stress. Wei et al. (1995) developed a model based on 5,532 injection tests at dam sites in the Rocky Mountain Front Range. The decrease in K is defined as per Wei et al. model as a function of depth (z):

$$K(z) = K_0\left(1 - \frac{z}{58.0+1.02*z}\right)^3,$$

where K_0 is the K at the ground surface.

454. The SRK model assumes K will decrease with depth as a result of the increase in lithostatic stress, or pressure from the weight of the overlying rock. Up to 430 vertical metres of Grassy Mountain will be removed to gain access to the coal, with waste rock being redistributed in dedicated dump areas. The removal of this overlying weight of material will cause K values in underlying and adjacent formations to increase in some areas and to decrease in other areas. Ms. Grainger confirmed that this transient change in K values has not been accommodated in the SRK model simulation; see 17Tr, p.3513. L.21-25. If it has not been accommodated in the model simulation, how will this affect the SRK model results regarding groundwater drawdown extent and magnitude of baseflow reductions to Blairmore and Gold creeks?

455. Figure 3-4 on PDF pg.214 of CR#3 in CIAR 42:



456. In the lower left corner of Figure 3-4, the model configuration shows that the area of the mine pit is dealt with using "inactive cells" and does not show the presence of an excavation. This is the SRK model's boundary conditions; red cells are inactive from a flow perspective; but you still see topography there.

457. The SRK model configuration does not reflect the anticipated increase to local K values beneath and adjacent to the mine pit once the weight of Grassy Mountain has been removed and redistributed; see 17Tr, p.3516, L.23 to p.3517, L.7.

458. As Dr. Fennell noted in his Slide No. 8 in CIAR 875 relating to Figure 3-4 ~ discussed at 23Tr, p.4861, L.24 to p.4865, L.16:

> Benga's groundwater modelling has not sufficiently considered the increase in hydraulic conductivity that will occur when the mine pit is excavated (i.e. an order of magnitude or so vs. ±50% used in model sensitivity analysis). The K values in the model have been dominated by measurements in the coal zone (to be removed), but information is lacking for the other formations.

459. Dr. Fennell stated at 23Tr, p.4865:

one particular formation. And there's information lacking for some of the others, and the most pertinent -- pertinent one is the one underneath, and that's the Fernie Formation. There's no information on that. And -- and this is the formation upon which we are going to be placing waste rock, ponds, submerged backfill zones, all of that kind of stuff, and -- and so we have a lack of information there, which is -- which is unfortunate, and it makes it very challenging to try to rationalize this model.

460. This is yet another flaw in the SRK Groundwater Numerical model which further reduces confidence that Benga actually knows what will occur as a result of their Project.

461. In the Groundwater Numerical model, the mean annual precipitation (MAP) used for the Gold Creek catchment is stated as 777 mm; see PDF pg.183 of CR#3 in CIAR 42:

2.1.4 Hydrology

> Blairmore Creek is a relatively steep, 50 km^2 catchment, with an average slope of 22%, and elevations ranging between about 1,300 and 2,320 masl, a mean elevation of 1693 masl, flowing from north to south through the valley west of the proposed Project. Gold Creek has similar geomorphological characteristics to Blairmore, with an average slope of 19% and elevations ranging from about 1,300 to 2,514 masl, a mean elevation of 1868 masl, draining an area of 63 km^2 to the east of the proposed Project, discharging into the Crowsnest River approximately 4.5 km downstream of the Blairmore confluence. MAP for the entire Blairmore catchment is estimated at 719 mm and Gold Creek 777 mm. Daisy Creek flows from south to north and drains the north side of the Grassy Mountain. Daisy Creek has an average slope of 7% and elevations ranging from 1,970 to 1,730 masl. It collects runoff from an upstream area of 60 km² and discharges into the Oldman River.

462. PDF pg.74 of CIAR 553 from Dr. Fennell's report:

> It is clear that all of the assumptions made by the modelling team will have an influence on the simulation outputs, including the projections made for spatial extent of drawdown and reductions to baseflow in Blairmore and Gold creeks. For example, lower K values in the west to east direction will limit the extent of drawdown and higher recharge will mute the effects of baseflow reductions. The altering of K by ±50% is not considered conservative enough given the order of magnitude differences noted, as shown in Figure 2 on the following page. Similarly, the assumption of an average of 28% of mean annual precipitation (MAP) as the recharge input to the model is high given documented mountain front/block recharge estimates (i.e. range of <1% to 38%, with an average of around 11% and geometric mean of around 6%)[2]. Also important is the fact that some parts of the model domain receive considerably more recharge than 28% of MAP, like the region east of the proposed mine pit footprint along the Gold Creek valley. The effect of this excessive recharge will serve to reduce the impacts of drawdown from the mine development and baseflow impacts.
>
> [2] *Wilson, J. L., & Guan, H. (2004). Mountain-block hydrology and mountain-front recharge In F. Phillips, J. Hogan, & B. Scanlon (Eds.), in Groundwater recharge in a desert environment, The southwestern United States. Washington, DC: AGU. https://doi.org/10.1029/ 009WSA08*

463. The average recharge applied by SRK to the upper layer of the groundwater model is 28% on average across the entire model domain. The values reported in the literature for mountain front recharge are generally less than this, with an average of 11% and a geometric mean of 6%. SRK has used recharge in excess of 55% of the MAP in certain areas of the mine site; see 17Tr, p.3523, L.6-9.

464. Benga's attempt to divert attention away from the Wilson and Guan (2004) study because the locations assessed are different than the Grassy Mountain area is not relevant. The laws of physics apply equally in all locations, and the results provided are from mountainous areas similar to the Project area. The estimates of recharge are a relative percentage of MAP and not an absolute value (in mm), so the same type of results (magnitude of % recharge) can be expected for this Project area as well.

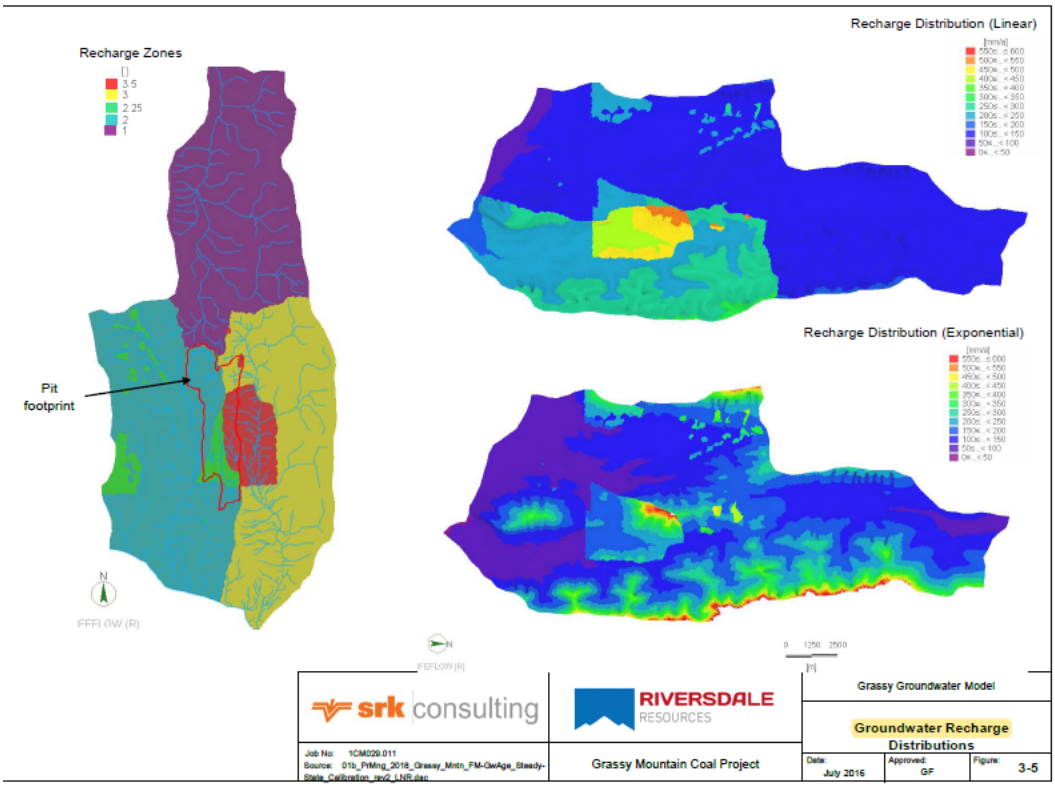
465. PDF pg.213 of CR#3 in CIAR 42; Groundwater Model Setup:

3.4.4 Boundary Conditions
Internal Boundaries
Recharge

Recharge from precipitation and snowmelt is applied on the top slice and is assumed to follow a similar relationship to that observed between MAP and elevation. Recharge rates were calibrated to the base and alternative calibration models that matched the base flow estimates for Gold Creek, Blairmore Creek and Daisy Creek, for both steady-state and transient conditions.

The two recharge distributions, "Linear" and "Exponential", corresponding to the base, and alternative calibration, models, are shown in Figure 3-5. The base case calibrated average recharge over the model domain is equivalent to 28% of MAP in both scenarios, and is generally consistent with observed base flow in Blairmore and Gold Creeks.

466. PDF pg. 215 of CR#3 in CIAR 42; Groundwater Recharge Distributions Figure 3-5:



467. Both the Recharge Distribution (Linear) and the Recharge Distribution (Exponential) use an average recharge of 28% of the MAP. However, the recharge applied in the middle reaches of Gold Creek and on the eastern half of the mine pit shown in Figure 3.5 is much higher at 450-550 mm, or greater than 55% of the MAP for that catchment; see 17Tr, p.3525, L.3 to p.3526, L20.

468. SRK has applied too much recharge to portions of the mine pit area and Gold Creek catchment, which lowers reduces the mine's effects on Gold Creek (as well as Blairmore

Creek). This is yet another major flaw with the SRK model and Benga's impact projections.

469. As Dr. Fennell noted in his Slide No. 9 in CIAR 875 relating to Figure 3-5 (discussed at 23Tr, p.4865, L.17 to p.4869, L.6):

> Benga has applied too much recharge (up to 50% or more) to certain parts of the model domain, which will reduce the effects and extent of drawdown, and lead to lower magnitude baseflow reductions in some locations.

470. Dr. Fennell stated in relation to Figure 3-5 above at 23Tr, p.4867:

> And so, again, in this area of orange, yellow, and green, we're seeing averages of -- of -- of mean annual precipitation that are on the order of 58 percent or more. That is unheard of in any of the recharge studies or work that I've done. To have that much recharge going into a particular part of a model domain like that, that is going to have serious ramifications for the amount of drawdown that can occur in the model, because, again, you know, the recharge is going in, and that's muting out drawdown effects.

471. The excess recharge applied along the Gold Creek valley will make the drawdown extent calculated for the mine development smaller and therefore does not represent a reasonable worst-case scenario.

472. Table C-20, PDF pg.295 of CR#3 in CIAR 42:

Table C-20: Relative difference (%) : Long-term closure sensitivity models to the long-term closure base case model

File name	RIVER / CREEKS															
	D1	BL03	BC07	BL02	BC03	BL01	Blairmore Creek	GC13	GC09	GC04	GC02	GC01	Gold Creek	Small Creeks	West Creek	Crowsnest River
Sensitivity: K/R ratio increased by 50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	49%	50%	50%
Sensitivity: K/R ratio reduced by 50%	-33%	-33%	-33%	-33%	-33%	-33%	-33%	-33%	-33%	-33%	-33%	-33%	-33%	-34%	-33%	-33%
Sensitivity: Isotropic layer K distribution	0%	-5%	-3%	-3%	-7%	-4%	-4%	1%	2%	2%	2%	4%	4%	-17%	-4%	-9%
Sensitivity: No influence from bedding / K decrs. With depth	2%	-3%	-2%	-2%	-4%	-2%	-1%	1%	-8%	-3%	-3%	1%	1%	-9%	-7%	-38%
Sensitivity: Kx = Ky (no influence from thrust faults)	1%	-1%	0%	-1%	-1%	0%	0%	4%	-1%	0%	0%	0%	0%	-5%	-2%	-22%
Sensitivity: Faults with low K (Kxyz /2.5)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-1%	0%	1%
Sensitivity: Faults with high K (Kxyz x2.5)	0%	0%	0%	0%	0%	0%	0%	-1%	0%	0%	0%	0%	0%	0%	0%	-1%
Sensitivity: K increased by 50%	1%	0%	0%	0%	0%	-1%	-2%	-4%	0%	0%	0%	0%	0%	1%	1%	23%
Sensitivity: K reduced by 50%	0%	0%	0%	0%	0%	1%	1%	3%	0%	0%	0%	0%	0%	-3%	-1%	-16%
Sensitivity: R increased by 50%	51%	50%	51%	50%	50%	52%	52%	54%	49%	50%	50%	50%	50%	46%	48%	26%
Sensitivity: R reduced by 50%	-33%	-34%	-34%	-33%	-34%	-34%	-34%	-36%	-33%	-34%	-33%	-33%	-33%	-33%	-33%	-18%
Sensitivity: R Dump increased by 50%	0%	0%	6%	5%	6%	6%	5%	0%	0%	0%	0%	1%	1%	-1%	0%	0%
Sensitivity: R Dump reduced by 50%	0%	0%	-4%	-4%	-4%	-4%	-4%	0%	0%	0%	0%	-1%	-1%	-1%	0%	0%

473. Ms. Grainger agreed that R (recharge) is significant in terms of baseflow outputs in Table C-20; see 17Tr, p.3528, L.22-24. Ms. Grainger agreed that K did not have a dominant effect in Table C-20; see 17Tr, p.3529:

> Q Do you agree that 'K' is not really that dominant in Table C-20 and that recharge is really the driving factor?
> A I've indicated that, yes, we're well aware that the model sensitivity does identify that recharge is significant in terms of the model outputs with respect to base flow.

474. The SRK model is already predicting a 10-20% reduction in baseflow contribution in 7 out of 10 reaches assessed for Blairmore Creek and Gold Creek; see 17Tr, p.3529, L.17-23.

475. In Table C-20, if R is reduced by 50% (i.e. less recharge), Gold Creek's baseflow is reduced by 33-36% depending on the reach. Ms. Grainger's evidence on this important point was as follows at 17Tr, p.3529:

> Q Okay. So using this sensitivity analysis, using -- so if we go to reduction -- reducing the -- the recharge by 50 percent -- so this is the third-last line of Table C-20, sensitivity 'R' reduced by 50 percent, it takes -- using 50 percent less recharge takes that 10 to 20 percent reduction down another 33 percent, correct, for the Gold Creek reaches?
> A No. That's -- that's incorrect. So this is a relative percent difference that's identified in this table.
> Q So what does that do -- so, for instance, on GC13, it's 36 percent; GC09, 33 percent; GC04, 34 percent; what does that mean in terms of -- what effect, then, does

it have on the base flow contributions in seven out of the ten reaches assessed?

A Well, as I said, I think what's significant about this information is it shows a -- the similar effect if recharge -- sorry. I'm not stating that very clearly, but ...

The percent reduction base flow from pre-mining levels doesn't change significantly in the sense that we see the same change -- if recharge is increased across the board and then we apply the -- the effect of the project, we see a same change in base flow as we do in -- in the base case -- or our -- our -- the simulation that we've presented here.

476. Ms. Grainger spoke about an increase in recharge. My question was directed at a 50% decrease in recharge as shown in Table C-20.

477. At 17Tr., p.3533, Ms. Grainger gave a further response:

Q Do you agree that the 55 percent recharge applied to the -- of the MAP applied to the middle reaches of the Gold Creek Valley will make the drawdown extent calculated for the mine development smaller?

A Well, the -- the recharge was increased in certain areas in order that the model was able to reproduce within an acceptable range the base flow that is observed along Gold Creek.

478. First of all, the baseflow was not observed. It was estimated using a particular method that "infers" based on a number of assumptions. A different method of baseflow separation would provide a different result. And unfortunately, Benga did not do any direct measurements of baseflow, which are not difficult to do. From the answer provided, the Coalition understands that the SRK model needs to have 55% of the MAP applied to the Gold Creek Valley in order to create the predicted 10-20% reduction in

baseflow contributions in 7 out of 10 reaches assessed for Gold Creek. Dr. Fennell has given evidence that 28% of MAP as an average is already too high when compared to documented values, which is further evidence that the SRK model is seriously flawed and is likely under-representing the impacts that will ultimately occur.

479. As Dr. Fennell noted in his Slide No. 18 in CIAR 875 (see black text) in relation to Table C-20 above ~ discussed at 23Tr, p.4887, L.8 to p.4888 L.26:

> **PDF pg. 261 of CR#3:** *"It is conceivable that recharge values, and hence, base flow could vary by as much as 50% higher or 33% lower than currently estimated values, hence base flow reductions due to mining could vary by a similar amount."*
>
> Reducing recharge by 50%, which is more reasonable given documented values (i.e. less than 11%), results in a decrease of 33-36% in modelled projections. This produces a further reduction in baseflow estimates provided in the impact assessment (e.g. -20% becomes -27%).

480. The Coalition believes the sensitivity analysis for the groundwater modelling is inconsistent. How can you have a relative 50% increase in baseflow when the recharge is increased by 50%, but only a relative 33-34% decrease in baseflow when the recharge is reduced by 50%. Where is the additional baseflow coming from to make the reduction less? This again speaks to the strangeness of this model.

481. Leaving Ms. Grainger aside, Benga's SRK Consultants even admit it themselves at PDF pg. 261 of CR#3 in the Groundwater Numerical Model report that baseflow could be reduced if less recharge is applied (see red italicized quote above). This would be a more reasonable worst-case scenario (and more in line with expected recharge conditions based on documented values).

482. Table 3-6, Monthly Base Flow Reduction, Baseline to LTC; PDF pg.250 of CR#3 in CIAR 42:

Table 3-6: Monthly Base Flow Reduction, Baseline to LTC

Month	D1	BL03	BC07	BL02	BC03	BL01	Blairmore Creek	GC13	GC09	GC04	GC02	GC01	Gold Creek
	15	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*
	Percent Change	Percent Change	Percent Change	Percent Change	Percent Change	Percent Change	Percent Change	Percent Change	Percent Change	Percent Change	Percent Change	Percent Change	Percent Change
January	0.14%	0.36%	-13.5%	-16.8%		-10.0%	-9.7%	-11.7%	-10.0%	-7.2%	-15.2%	-5.2%	-5.1%
February	0.14%	0.29%	-13.5%	-16.9%	-11.0%	-10.0%	-9.7%	-11.7%	-9.8%	-7.0%	-14.9%	-5.1%	-5.0%
March	0.14%	0.29%	-13.4%	-16.7%	-11.1%	-10.1%	-9.8%	-11.3%	-10.2%	-7.4%	-15.8%	-5.3%	-5.2%
April	0.12%	0.23%	-12.9%	-16.0%	-11.4%	-10.4%	-10.0%	-9.1%	-11.9%	-8.8%	-18.62	-5.9%	-5.8%
May	0.12%	0.20%	-12.6%	-15.7%	-11.3%	-10.2%	-9.8%	-8.2%	-12.5%	-9.6%	-20.0%	-6.3%	-6.2%
June	0.12%	0.21%	-12.8%	-16.0%	-11.1%	-10.1%	-9.7%	-9.6%	-12.5%	-9.5%	-19.3%	-6.4%	-6.3%
July	0.12%	0.21%	-13.1%	-16.2%	-11.1%	-10.1%	-9.7%	-10.3%	-12.2%	-9.2%	-18.6%	-6.3%	-6.2%
August	0.12%	0.21%	-13.2%	-16.3%	-11.1%	-10.1%	-9.7%	-10.8%	-11.9%	-8.9%	-17.9%	-6.2%	-6.1%
September	0.12%	0.21%	-13.3%	-16.5%	-11.0%	-10.0%	-9.7%	-11.1%	-11.5%	-8.6%	-17.4%	-6.0%	-5.9%
October	0.12%	0.21%	-13.4%	-16.6%	-11.1%	-10.1%	-9.8%	-11.4%	-11.2%	-8.2%	-16.8%	-5.8%	-5.8%
November	0.12%	0.18%	-13.5%	-16.7%	-11.1%	-10.1%	-9.8%	-11.6%	-10.8%	-7.9%	-16.3%	-5.7%	-5.6%
December	0.11%	0.21%	-13.5%	-16.8%	-11.1%	-10.1%	-9.8%	-11.7%	-10.6%	-7.8%	-16.0%	-5.6%	-5.5%
Average Transient Change	0.12%	0.23%	-13.2%	-16.4%	-11.1%	-10.1%	-9.8%	-10.7%	-11.3%	-8.4%	-17.2%	-5.8%	-5.7%
Steady State Change	-0.03%	-0.02%	-13.1%	-16.2%	-10.7%	-9.6%	-9.2%	-9.5%	-11.3%	-8.5%	-17.5%	-6.0%	-5.9%

483. The locations of the Gold Creek monitoring stations in Table 3-6 are shown on Figure 2-8 at PDF pg.184 of CR#3.

484. As Dr. Fennell noted on Slide 16 in CIAR 875 in relation to Table 3-6 above ~ discussed at 23Tr, p.4883, L.21 to p.4885 L.10:

> Benga's reliance on "average" conditions under-represents the higher magnitude modeled impacts that occur to certain stream reaches during critical times of the year (i.e. July to March low flow period).

485. It is pretty clear that Benga and its consultants have not modelled the worst-case scenario for Blairmore and Gold creeks, given how SRK has set up their model. In fact, they are likely underestimating the % decrease in baseflow, which is already quite high in some months and reaches at over -10% (and as high as -20%). If the presence of west-east faults and a more reasonable recharge input (e.g. 11%) would have been applied to the model, Benga would have produced very different results and unfavourable to their Project.

486. If you reduce recharge by 50%, it will take the monthly baseflow reductions at LTC shown in Table 3-4 down by another 33-36%.

487. Put another way, SRK is already using an average of 28% of MAP across the entire model domain for annual recharge (with some areas of higher and some areas of lower recharge). If one reduces the 28% MAP by 50% to 14% MAP recharge, this would result in a 36% to 33% reduction in baseflow at the Gold Creek monitoring stations listed in Table C-20 and Table 3-6. This was confirmed by Ms. Grainger at 17Tr, p.3536:

> 12 A So, Mr. Secord, my understanding of the data is that if
> 13 recharge was reduced by 50 percent, that across the
> 14 board -- and I -- it results in a reduction of
> 15 30 percent to these numbers or 35 as stated in the
> 16 table.

488. It is worth noting that 14% of MAP as the recharge input for the model may still be high, and this does not address the areas of highest recharge (up to 55% or more) in the central Gold Creek valley. If these areas or recharge are reduced by 50%, the resulting 27% or so of MAP is still difficult to justify based on documented values. Therefore, the SRK model does not capture the worst case scenario for Gold Creek (or Blairmore Creek) at LTC.

489. The SRK groundwater numerical model is very sensitive to the recharge values used. In fact, a reduction of 50% of the recharge used in the model results in up to a 36% decrease in baseflow estimates from the base case model (see Table C-20) which already projects 10-20% decreases in 7 out of 10 reaches assessed at LTC (see Table 3-6).

490. The SRK numbers are already detrimental to Gold Creek in some of the drier months at LTC and they are very likely to be even worse than predicted. GC02 shows a 17.4% reduction in base flow in the month of September based on the SRK model. If you apply a 33% decrease to that prediction, you get a 23% reduction in flow at GC02 based on the Table C-20 sensitivity analysis. And, September tends to be a lower flow month coming out of the summer low flow season (see Figure 28 in CR#4 of CIAR 42 in paragraph 128 above). During cross-examination, Ms. Grainger suggested that this was extending the analysis beyond its useful purpose; see 17Tr, p.3548, L.4 to p.3549, L.2. However, the sensitivity analysis does provide the JRP with a glimpse of a grim scenario, which is very different from the one being communicated by Benga in its application.

491. It is very concerning to note that there are already dried out reaches of Gold Creek such as a portion of the bed near GC02 in September 2016. Mr. Bettles also indicated that there is another dried up portion of the creek bed one kilometre upstream of GC02. Mr. Bettles also indicated that there a was another dried up portion of the creek upstream of Caudron Creek in the vicinity of GC09; see 17TR, p.3542, L.20 to p.3545, L.8.

492. Dr. Fennell noted that not getting the recharge parameter correct will have serious ramifications. See his Slide No. 17 in CIAR 875 in relation to Table 3-9 ~ discussed at 23Tr, p.4885, L.11 to p.4887 L.7:

Model sensitivity

Table 3-8: Sensitivity of Baseline "Linear" Model

Parameter	Parameter variation	Effect on Hydraulic Head % NRMSE	Effect on Base Flow
K & R	Reduced by 50%	Null	High
	Increased by 50%	Null	High
K	Reduced by 50%	Null	Null
	Increased by 50%	Medium	Null
Recharge	Reduced by 50%	High	High
	Increased by 50%	Null	High
K anisotropy	Isotropic ($K_{xy} = K_z$, K_{xy} oriented horizontally)	Null	Null
	Isotropic within layers: K decreasing with depth. No influence from bedding and coal seam orientation	High	Null
	Anisotropic: primary K (K_x and K_y) parallel to bedding. No influence from thrust faults	Null	Null
Geological Structure	Low K Thrust faults (barrier to flow): 2.5 order of magnitude lower than background	Null	Null
	Low K Thrust faults (conduit to flow): 2.5 order of magnitude lower than background	Low	Null

From Table 3-9, PDF pg. 258 of CR#3 in CIAR #42

and

Table 1, PDF pg. 74 of CIAR #553

Benga's model is highly sensitive to recharge, so not getting this parameter correct will have serious ramifications for the water balance calculations, baseflow reduction estimates, and resulting water quality modelling.

493. Dr. Fennell stated at 23Tr, p.4886:

> And so Benga's model is highly sensitive to recharge, and we talked about this earlier, and this is a parameter that if you don't get it correct, it can have severe -- serious ramifications for the water balance and the base-flow reduction estimates and how those project to threats to -- to -- to aquatic habitat, but also to -- to the water quality modelling, because we're -- now we're talking about contaminants that may be loading into a system, and there needs to be this diluting effect. And if that water is not there to dilute it, the conversation -- the concentrations are obviously going to be higher because they're not getting mixed with low-concentration water, so there's -- there's serious ramifications there.

494. It appears to the Coalition that Benga was being selective in picking 28% of the MAP as an average annual recharge rate. If the impact assessment results in the SRK model are so sensitive to recharge, why didn't Benga conduct any refined investigative work to identify more appropriate or realistic values to constrain this parameter better?

495. This is yet another example of why the SRK model is flawed and not very useful for decision-making.

496. The project is located in a structurally complex and active region in the Rocky Mountains of Alberta. Although north to south trending thrust faults are acknowledged in the application and included in groundwater model, there is no mention or inclusion of west to east trending faults, yet their presence is inferred from the trellis-style drainage pattern; see Figure 1, PDF pg. 72 of CIAR 553 and identified in Benga's own documentation (see figure in paragraph 96 above).

497. How does the absence of these west-east trending pathways for groundwater flow affect the groundwater model results and drawdown extent modeled?

498. If west to east faults were added into the groundwater model, how would this influence the extent of drawdown projected from the mine development, which in the model is indicated as only 400 m from the pit extent boundary out to the 5 m drawdown limit? And what about out to the 1 m or less drawdown limit? How far would that be?

499. It is likely that the extent of the drawdown would expand further to the west and east – likely reaching Blairmore and Gold creeks, further depriving them of even more baseflow contribution and possibly capturing and pulling in water from those two creeks. This would be a reasonable worst case scenario.

500. PDF pg.78 of CIAR 553 from Dr. Fennell's report:

> The SRK groundwater numerical model projects that drawdown effects will be limited to within 400 m of the mine pit extent (Figure 3, left image). This is a difficult conclusion to align with considering the concerns related to the model configuration, and results of empirical formula calculations indicating impact distances anywhere from about 1500 m up to 2400 m over a 50-year time span (using a K value consistent with the geometric mean of readings reported for the Mist Mountain Formation, i.e. 1.1 x 10^{-7} m/s)[8,9]. If greater variability in K values and more reasonable recharge had been used in the various model simulations, the results would have been very different (i.e. a greater spatial extent and magnitude of drawdown impact). The same would be expected for the simulated transit times of groundwater reported, which have been stated to be generally in excess of 50 years. It is worth noting that much shorter transit times (0-10 years) are noted in some parts of the model domain, particularly along the south-east flank of Grassy Mountain near the proposed Central and South Rock Disposal Areas (Figure 3 right image) .

501. This passage was corrected by Dr. Fennell's Errata Sheet CIAR 844:

3. Pdf page 78, 1st paragraph, 2nd sentence, should include corrected values for spreadsheet error noted following review and the assumptions used in the calculations, as follows:

"This is a difficult conclusion to align with considering the concerns related to the model configuration, and results of empirical formula calculations indicating impact distances anywhere from about 860 m up to 1880 m over a 50-year time span (using a K value consistent with the geometric mean of readings reported for the Mist Mountain Formation, i.e. 1.1 x 10-7 m/s). To correct for the expected increase in hydraulic conductivity following the removal of 430 m of overlying mountain, a value of 3.1 x 10-7 m/s was calculated using the depth relationship employed by SRK (pg. 38), along with an effective porosity of 5% to emulate fracture porosity, and 40 m of sustained drawdown from the mine pit) [8 9]

502. Estimates of the extent of drawdown from the pit boundary using analytical equations indicate a much larger area of influence, indicating impact distances from 860 m up to 1880 m over 50 years. This is another flaw in the SRK groundwater model failing to take into account a reasonable worst case scenario and only showing the drawdown extent out to the 5 m mark and no less.

503. PDF pg.194, Table 2-5: Summary of K Tests in CR#3 of CIAR 42:

Table 2-5: Summary of K Tests

Well ID	Easting	Northing	Screened Interval (mbgs)		K (m/s)	Test Type	Geology
			From	To			
Surficial Deposits							
MW15-12-7	684787	5503690	3.8	6.8	$5.1x10^{-6}$	Slug	Surficial deposits
Cadomin Formation							
MW15-11-9	684917	5504250	6.2	9.2	$5.2x10^{-7}$	Slug	Mudstone
MW15-11-18.5	684919	5504250	15.5	18.5	$5.2x10^{-6}$	Slug	Mudstone
MW15-12-14	684790	5503690	9.9	13.7	$2.6x10^{-6}$	Slug	Mudstone
Mist Mountain Formation							
MW14-01-64	685,434	5,504,891	61.7	115.5	$2.3x10^{-6}$	Slug	Coal seam 2, claystone, siltstone
MW14-02-74	685,588	5,504,347	71.1	99.9	$9.2x10^{-6}$	Slug	Coal seam 4, siltstone, mudstone
MW14-03-90	685,674	5,505,739	87.5	103.8	$1.3x10^{-7}$	Slug	Coal seam 4, carbonaceous mudstone/ claystone
MW14-04-93	685,809	5,507,380	89.0	93.0	$1.5x10^{-7}$	Slug	Siltstone, coal seam 4
MW14-05-114	685,982	5,507,539	108.9	117.0	$3.6x10^{-6}$	Slug	Coal seam 2
MW14-06-32	685,864	5,506,884	29.1	32.5	$4.2x10^{-7}$	Slug	Coal seam 1
MW14-06-105	685,982	5,507,539	108.9	117.0	$4.2x10^{-7}$	Slug	Coal seam 4, claystone
MW14-07-48	686,580	5,507,292	45.5	49.5	$1.3x10^{-6}$	Slug	Shale/claystone, coal seam 4
MW14-08-79	686,844	5,509,725	75.0	82.0	$1.0x10^{-10}$	Slug	Coal seam 2
RGSC-0004	685,490	5,506,218	93.7	164.1	$5.0x10^{-6}$	Packer	Coal seams 2 & 4 (34m) and interburden
RGSC-0004	685,490	5,506,218	47.9	164.1	$1.0x10^{-7}$	Packer	Coal seams 1 & 2 & 4 (55m) and interburden
RGSC-0005	685,118	5,504,574	57.4	92.0	$2.0x10^{-7}$	Packer	Coal seam 1 (25m) and interburden
RGSC-0005	685,118	5,504,574	95.4	140.0	$6.0x10^{-9}$	Packer	Coal seam 1 (7m) and interburden
RGSC-0006	685,577	5,507,161	59.1	91.3	$1.0x10^{-7}$	Packer	Coal seam 1 (21m) and interburden
RGSC-0006	685,577	5,507,161	92.6	146.0	$2.0x10^{-7}$	Packer	Coal seam 1 (53m) and interburden
RGSC-0007	685,627	5,507,655	46.6	78.8	$7.0x10^{-6}$	Packer	Interburden
RGSC-0007	685,627	5,507,655	77.1	124.7	$2.0x10^{-7}$	Packer	Interburden
RGSC-0007	685,627	5,507,655	125.9	176.7	$5.0x10^{-9}$	Packer	Coal seam 1 (11m) and interburden
RGSC-0008	686,638	5,507,638	18.6	93.6	$1.0x10^{-7}$	Packer	Coal seams 2 & 4 (27m) and interburden
RGSC-0009	686,742	5,509,160	54.5	99.1	$4.0x10^{-6}$	Packer	Interburden
RGSC-0009	686,742	5,509,160	99.0	149.3	$6.0x10^{-6}$	Packer	Coal seam 1 (30m) and interburden
RGSC-0010	686,807	5,510,108	36.8	72.3	$3.0x10^{-6}$	Packer	Coal seam 1 (16m) and interburden
RGSC-0010	686,807	5,510,108	76.4	151.6	$7.0x10^{-7}$	Packer	Coal seams 2 & 4 and interburden
RGOH3012	685,401	5,505,479	9.0	159.0	$4.0x10^{-7}$	Pump	Cadomin, seam 1, 2 and 4, MMF

Source: Hydraulic_conductivity_1CM029.005_gf_20150615.xlsx

504. Most of the hydraulic conductivity (K) values used to constrain the groundwater model have focussed on the coal-bearing rocks, which are the rocks being mined and removed. This is another flaw in the model as it does not give any indications of what the K values of the underlying materials beneath the mine or on the outside where waste management activities will occur.

505. This leaves many of the other formations, including those below the mine footprint as "unknown" or "unassessed". This is another example of SRK not looking at a reasonable worst case scenario. Ms. Grainger attempted to justify the limited data set and focus on coal-bearing rocks at 17Tr, p.3554, L.26 to p.3555, L13:

> Q Okay. All right. Back to PDF page 194. So would you agree that most of the hydraulic conductivity k-values used to constrain the groundwater model have focused on coal-bearing rocks?
> A Yes, that's correct. We've stated that most of our testing focused on the coal-bearing rocks.
> Q And this leaves many of the other formations, including those below the mine footprint, as unknown or unassessed?
> A They're not completely unassessed, but there's limited data for the other units. Part of the reason we focused on the coal-bearing -- or the coal seams themselves is 'cause frequently they are the more permeable units within the sequence.

506. As SRK noted in Section 3.4.3 Model Properties at pdf 209 of CR#3:

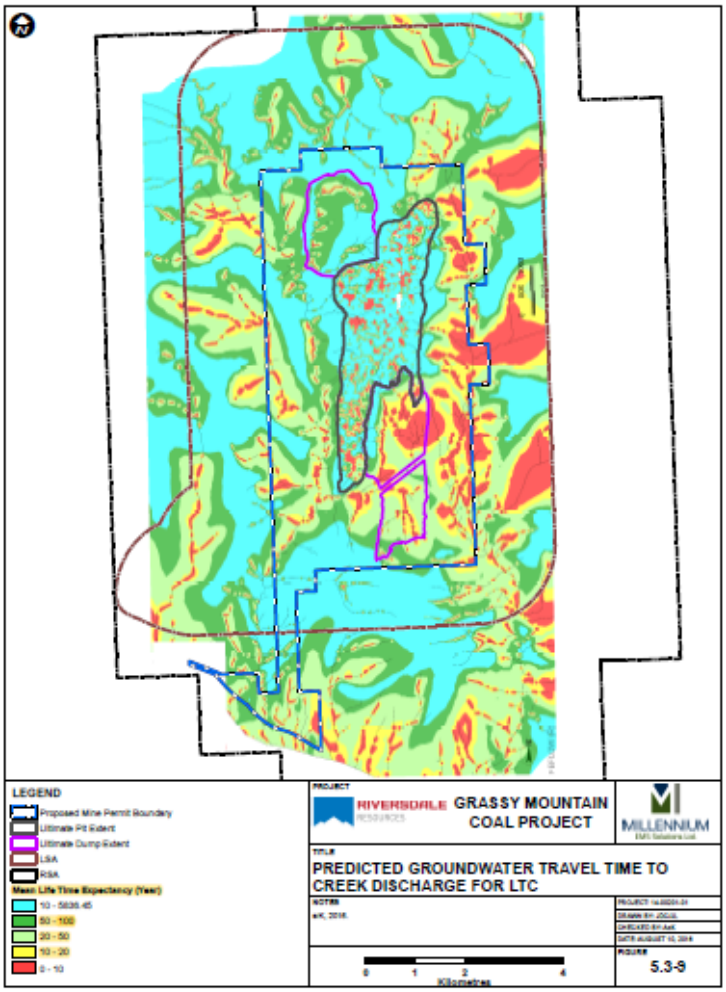
- Hydraulic conductivities (K) in bedrock, parallel to bedding, range between $6x10^{-10}$ to $1.7x10^{-7}$ m/s (Table 3-1). K values are constant within a given layer. As hydraulic testing generally targeted coal seams, the K of the host rock is not completely characterized;

507. How can the JRP be confident that the groundwater model is accurately reflecting the transmissive capabilities of the rocks, the extent of drawdown from the mine, the impacts to baseflow contributions, and the presence of pathways for contaminant movement when there is no local information to describe them?

508. PDF pg.55 of CR#3 in CIAR 42:

> Groundwater residence time (travel time to the creeks) from the LTC scenario is predicted to be mostly greater than 10 years (Figure 5.3-9), except below sedimentation ponds and close to creeks and tributaries. Within the proposed ex-pit and in-pit rock fill footprint, groundwater residence time is predicted by the model to be approximately less than 20 years (Figure 5.3-9). The groundwater modelled with longest residence time (greater than 50 years) is close to the topographic highs and the shortest (less than 20 years) are close to the topographic lows. Therefore, most basal leakage from the waste rock dumps would reside in the groundwater system for a duration that substantially exceeds the critical residence time to attenuate any selenium. Areas with short residence time (*i.e.*, less than

509. PDF pg.112 of CR#3 in CIAR 42; Predicted Groundwater Travel Time to Creek Discharge for LTC, Figure 5.3-9:



510. The travel time or mean lifetime expectancy of groundwater is stated as being in excess of 50 years over most of the model domain represented by the turquoise colour, with values of less than 20 years in the valley bottoms.

511. The ponds on the east side of the mine footprint (the NESP and the ESP near Fran Gilmar and the SESP located south of Fran Gilmar and north of the Donkersgoeds) are located in areas where the travel times are short (listed as 0-10 years), leading to concerns that seepage of contaminants to Gold Creek will occur.

512. These 3 ponds NESP, ESP and SESP are located in the 0-10 years travel time zone. Is the travel time 0 years or is it 10 years? Ms. Grainger had this response at 17Tr, p.3568, L.20 to p.3569, L. 5:

20 Q Okay. We can see in the -- in this figure the areas
21 where the travel times are zero to ten years. The
22 areas that are sitting in red, let's say in the area
23 where the ESP and SESP were located, is the -- is the
24 travel time zero years, or is it ten years?
25 A MS. GRAINGER: It's somewhere between those
26 two values. So, I mean, the -- this map is not
1 intended to show precisely at every location what the
2 travel time is. It's intended to give an indication of
3 the areas where it is short, as you pointed out, and --
4 and other areas where it is much longer under the
5 long-term closure conditions.

513. As noted by Dr. Fennell in his Slide No. 14 in CIAR 875 in relation to Figure 3-5.9 ~ discussed at 23Tr, p.4881, L.10 to p.4882, L.11:

> Benga's Mean Life Time Expectancy (or residence time) of groundwater in the area of the Central and South rock dumps, Sedimentation Ponds east of the mine, and the End Pit Lake is on the order of 0-10 years, meaning contaminants originating from these areas could reach Gold Creek in a relatively short period of time.

514. Ms. Grainger agreed that hydraulic conductivity testing of monitoring wells only provides an idea of the transmissive properties of the soil or rock in a very small area around the well; 17Tr, p.3570, L.9-13. Ms. Grainger agreed that the accuracy of K values is very important when modeling the effects of drawdown and residence times; 17Tr, p.3570, L.14-18. Ms. Grainger agreed that when longer-term pumping tests are conducted, the K values obtained are often higher - sometimes by an order of magnitude; 17Tr, p.3570, L.19-26. Ms. Grainger stated that Benga only did one pumping tests to better constrain the K values used in the groundwater numerical model; 17Tr, p.3571, L.1-8. Given that the accuracy of K values is very important when modeling the effects of drawdown, groundwater residence times, and contaminant movement towards receptors this is yet another serious flaw with the SRK model.

515. PDF pg. 55 of CR#3 in CIAR 42:

> Groundwater residence time (travel time to the creeks) from the LTC scenario is predicted to be mostly greater than 10 years (Figure 5.3-9), except below sedimentation ponds and close to creeks and tributaries. Within the proposed ex-pit and in-pit rock fill footprint, groundwater residence time is predicted by the model to be approximately less than 20 years (Figure 5.3-9). The groundwater modelled with longest residence time (greater than 50 years) is close to the topographic highs and the shortest (less than 20 years) are close to the topographic lows. Therefore, most basal leakage from the waste rock dumps would reside in the groundwater system for a duration that substantially exceeds the critical residence time to attenuate any selenium. Areas with short residence time (*i.e.*, less than 10 years) are of limited extent (*i.e.*, less than 5%) in comparison to areas with long residence time;

516. The statement is made "Therefore, most basal leakage from the waste rock dumps would reside in the groundwater system for a duration that substantially exceeds the critical residence time to attenuate any selenium." Ms. Grainger was asked to provide the justification for this statement, given that no transport and fate modelling was done. Her response was as follows at 17Tr, p.3572:

> A The justification was based on observations from the site. We collected data at water that was emanating from historical mining, like old rock piles and so on, which did not contain elevated concentrations of selenium, and from information from other sites. So that's summarized in the preceding text.

517. Ms. Grainger was asked how does this statement apply to other constituents, such as arsenic, chromium, mercury or cobalt, that might be mobilized. Her response was as follows at 17Tr, p.3572:

> A Well, in general, I mean, fundamentally, those weren't specifically looked at within the assessment, as there weren't concerns identified with those parameters specifically, but metals frequently do absorb -- absorb to particles during transport and can be attenuated in a very general sense.

518. It is clear that Benga does not know what will happen when such contaminants are released. This should have formed part of the assessment process knowing that they were released from some of the rock subjected to the humidity cell tests, and that some of them (among others) are already present in the baseline groundwater.

519. Benga indicates that the dominant pathways for groundwater flow in the Project area are faults and fractures in the rock. Benga did do some fracture orientation assessments to better understand these important features in the area of the proposed mine, but did not do this in areas beneath the solid and liquid waste management areas; see 17Tr, p.3573, L.9-16.

520. Benga only did one pumping tests to determine if there was evidence of hydraulic connectivity between the areas where waste solids and liquids will be stored and local water features; see 17Tr, p.3573, L.17-24. This is not sufficient enough given the geologic and structural complexity of the area, and a greater attempt at refining this understanding should have been made given the importance for an approval decision.

521. Benga indicates that if faults are encountered that present a risk of acting as pathways for groundwater flow and contaminant movement, the mitigation will be to seal them off. The visual identification of faults in the mine workings may not be possible due to the obscuring effect by residual fines and rock fragments. Similarly, on the outside of the mine footprint, rock dumps and water management ponds will be established in areas covered by soil, also obscuring any faults present. Accordingly, the placement of any monitoring wells could miss these obscured features.

522. Benga was asked how it will ensure that all faults and fractures are identified and monitored accordingly so that no contaminants bypass the surveillance system and reach Blairmore and Gold creeks. Ms. Grainger response was at 17Tr, p.3575:

> A Well, I -- I -- I think it would be impractical to monitor all faults and fractures; however, the intent would be to monitor downgradient immediately in the area of the rock disposal areas, for example, and to collect information there at a representative number of locations and also to monitor upstream of the receptors. And, again, we've -- we've provided additional detail and description of the monitoring plans.

523. Sealing off faults and fractures is a very difficult activity and, if successful, can actually result in changes to local groundwater flow patterns. This could alter contaminant movement patterns and reduce the effectiveness of monitoring wells positioned to detect releases from mine-related structures and waste management areas.

524. Benga's unlined surge and sediment ponds, as well as waste rock dumps, are to be established in upslope locations to provide a suitable setback from Blairmore and Gold creeks. Being situated at a higher elevation will result in a driving head of water that will push any mobilized contaminants downward through the base of these structures and into the underlying rock and fractures systems; 17Tr, p.3585, L.1 to p.3586, L.5.

525. Benga was asked if it is unclear how deep contaminants will migrate before moving laterally and whether there is considerable risk that they will eventually reach the creeks undetected. Ms. Grainger's responded as follows at 17Tr, p.3586:

Q Do you agree that it is unclear how deep contaminants will migrate before moving laterally so there is considerable risk that they will eventually reach Blairmore Creek and Gold Creek undetected?

A MS. GRAINGER: Generally speaking, Mr. Secord, the -- any contaminants would migrate downwards towards the water table and then migrate in the water table following the groundwater flow path, so that would be a combination of downwards and lateral. It's not just down and then straight across. It -- it would move through the unsaturated zone, if there is such an unsaturated zone beneath the structure, such as there is at some of the rock disposal areas, for example, and then once reaching the water table, would move in a combination of downwards and lateral.

526. Ms. Grainger did not address whether there was considerable risk that contaminants will eventually reach the creeks undetected. In fact, it is not as simple as Ms. Grainger has indicated. In the presence of faults and fractures that cut across formations the groundwater could penetrate much deeper than the water table and into other formations connected to local creeks. If monitoring wells do not intercept these deeper formations, or the nature of the faults and fractures are not understood well enough, the development of an effective monitoring system will be extremely difficult leading to enhanced risk.

527. PDF pg.126 of Section E in CIAR 42:

E.6.3.1.3.2 Potential Changes in Water Quality

As the mine progresses through operations there's the potential for changes to sediment and water quality variables that may have chronic or lethal (acute) effects on aquatic biota if they have the potential to enter the aquatic ecosystem. Water quality effects on the Aquatic Health VC has been

528. PDF pg.216 of CR#3 in CIAR 42:

3.5 Model Calibration

Model calibration involves varying the hydraulic parameters within a reasonable range defined by the conceptual model, in order to find the best match between simulated and observed data, and to identify areas where further information is needed. Frequently, the calibration process requires re-examination and changes to model structure (i.e., to the conceptual model). The calibration process undertaken on this model involved a two-step procedure:

1. Steady-State calibration to the pre-mining hydraulic head and base flow measurements collected between 2014 and 2016. Calibration was focused on:
   - Estimating of the K to recharge $(K/R)^7$ ratio based on the hydraulic head distribution;
   - Calibrating of recharge values by matching the measured base flow flux; and
   - Determining K with recharge constraint using the K/R ratio.

The steady-state calibration provided the initial hydraulic head distribution for subsequent transient models.

2. Transient calibration to seasonal hydraulic head and base flow fluctuations observed between 2014 and 2016. The transient calibration provides an estimate of the diffusivity (K/S) of the groundwater system, which can be used to constrain the absolute specific yield (S_y) and specific storage (S_s) based on the calibrated K value identified from the steady-state calibration.

This overall calibration approach provides an estimate of the regional K, storativity, and recharge values. However, although calibration is considered reasonable for larger-scale approximations, models may exhibit large uncertainties at the local scale due to localized heterogeneities not recognized or incorporated into the larger model.

529. It is stated that "This overall calibration approach provides an estimate of the regional K, storativity, and recharge values. However, although calibration is considered reasonable for larger-scale approximations, models may exhibit large uncertainties at the local scale due to localized heterogeneities not recognized or incorporated into the larger model."

530. Benga was asked how does this caveat provide confidence to the JRP that the SRK model is generating accurate and reasonable results that significantly influence ramifications for baseflow reductions and waste assimilation calculations, both during mine development and post-closure?

531. Ms. Grainger responded at 17Tr, p.3588:

> A MS. GRAINGER: Mr. Secord, I can just speak to the model and the localized heterogeneities and -- and that specific piece.
>
> So my understanding is your concern is: How do we have confidence in the model given that there are some uncertainties at specific locations? And that's a function of the -- the model. It cannot accurately represent -- it is a -- any model is a simplification of a very complex system. It provides us an overall understanding, and we believe it's representative in terms of the base-flow reductions that are predicted. Could there be variations at a specific location? Potentially. But the overall understanding and -- and predictions, we believe, are informative and do give us confidence in completing the assessment.

532. If the SRK Groundwater Numerical Model contains large uncertainties at the local scale and does not generate accurate and reasonable results that take into consideration the level of variability known to exist in the area, then Benga's application should be denied.

5.4.1.4 Groundwater-Surface Water Interaction and the SRK GoldSim Model

533. There is no indication in Benga's application of how areas of groundwater contribution to stream flows were identified and quantified in Blairmore and Gold creeks. Ms. Grainger stated at 17tr, p. 3592.

> A From my perspective, there were -- you're correct in that there were not specific -- we didn't map exactly where and how much base-flow recharge was occurring along Blairmore and Gold Creeks. The base flow was estimated by reach.

534. PDF pg.236 of Appendix 10B in CIAR 42; Water and Load Balance Model:

3 Model Description

3.1 Model Platform and Timescale

The water balance and quality model for the Grassy Mountain Project was developed using the GoldSim software package (version 11.1 GoldSim Technology Group 2014).

Flow inputs to the model are monthly averages. The model used a daily time step and results (flow and quality) were reported as monthly averages.

535. Mr. Jensen made the following comments about SRK's GoldSim model at 17Tr, p.3595:

A So I would -- I would respond to that by saying that the GoldSim model is really nothing other than a graphical user interface on -- on a spreadsheet model. It's nothing we couldn't do in a spreadsheet that -- that -- or there's nothing you can do in GoldSim that you couldn't do in a spreadsheet. So it really is more a matter of, you know, I -- I -- the -- the assumptions we've stated, the inputs we've used, and the model assumptions we've used to arrive at our model results are stated. You know, so we're happy to -- to discuss them. We didn't prepare the -- the model code itself for distribution, but, you know, an experienced modeller would be able to look at our inputs here and -- and replicate our results.

536. Mr. Jensen was then asked if the fate of WSCT was based on a spreadsheet. His response was as follows at 17Tr, p.3596:

Q MR. SECORD: So, Mr. Jensen, are you saying we are using a spreadsheet to understand water quality and the fate of the westslope cutthroat trout?
A MR. JENSEN: Well, in as far as we're using

math, I mean, the -- the -- the type of computations that go into this model you could do equally well in the spreadsheet as you -- as you can in a GoldSim model, the mechanics -- the conceptual model and the mechanics of the computations are all the same, whether --

Q Do you agree?

A Irrespective of -- of if you calculate it by hand or in a spreadsheet or -- or in GoldSim. It -- it doesn't make a difference.

537. PDF pg.236 of Appendix 10B in CIAR 42; Water and Load Balance Model:

3.2 Scenarios

3. Worst Case for water quality: The "Worst Case" predictions was run using the upper limit source terms with average hydrological conditions. The Worst Case was meant to screen for parameters that would be potentially problematic in the event that actual loading rates are higher than the base case. The results are intended as estimates of concentrations that are very unlikely to be exceeded.

538. The Water Balance and Load Modelling work done by SRK to support Benga's application indicates that the "Worst Case" predictions were based on upper limit source terms and "average" hydrological conditions".

539. Benga was asked how is using "average" hydrological conditions considered "Worst Case" when extreme, or upper limit, conditions would be more appropriate? Initially Mr. Day was going to answer the question but then Mr. Jensen gave the response; see 17Tr, p.3592, L.14 to p.3594, L.25. From his response it would appear that SRK never considered using extreme, or upper limit, hydrological conditions. SRK's use of average hydrological conditions indicates that the GoldSim model does not represent a reasonable worst-case scenario.

540. PDF pg.203 of CR#3 in CIAR 42; Table 2-6: Mine Plan:

Table 2-6: 2016 Mine Plan

Component	Mine Plan, April 7, 2016
Mine life	23 years - Commissioning & Operation: Late 2018 – 2041
Disturbance area	1387 ha
Total pit footprint	6.2 km^2
Pit shell	1-2 pits
Maximum depth of the pits	• About 430 mbgs, to a base elevation of 1,590 masl. • Base of the pits will extend, in some places, up to approximately 110 m below Blairmore Creek, 40 m below Gold Creek, and up to 430 m below the estimated water table.

541. Benga considers that the impacts from their Project will be "not significant" in terms of changes to the groundwater and surface water regimes. The removal of Grassy Mountain will result in a permanent decrease and alteration of the local water table. The mine will remove up to 430 vertical metres of a mountain, with a hole in the earth extending up to 110 m below Blairmore Creek, and up to 40 m below Gold Creek; see Table 2-6 above. This will produce a permanent "sink" or depression in the water table that will cause groundwater to be drawn inward towards that depression. And, this will intercept flow that would otherwise have reported to certain reaches of Blairmore Creek and Gold Creek. How can this not "significantly" affect the flow conditions in the Blairmore and Gold Creek watersheds and associated drainage courses?

542. Numerous upland springs, wetland areas and seepages supporting habitat on the mountain as well as along the remaining upland areas around the mine pit will inadvertently dry up and be lost forever. How can this, in any way, be considered "not significant"?

543. CIAR 251, Addendum 10, PDF pg.121-122:

> The Water and Load Balance Model indicates that baseflows provide almost all of creek total flow for the majority of the annual hydrograph, except for May, June and July when snowmelt and higher rainfall sums contribute potentially large surface/overland flow contributions to creek flow. In addition, large rainfall and runoff events are not uncommon in late summer or fall.

544. PDF pg.250 of CR#3 in CIAR 42; Table 3-6:

Table 3-6: Monthly Base Flow Reduction, Baseline to LTC

Month	D1	BL03	BC07	BL02	BC03	BL01	Blairmore Creek	GC13	GC09	GC04	GC02	GC01	Gold Creek
	15	16	17	18	19	20	21	22	23	24	25	26	27
	Percent Change	Percent Change	Percent Change	Percent Change	Percent Change	Percent Change	Percent Change	Percent Change	Percent Change	Percent Change	Percent Change	Percent Change	Percent Change
January	0.14%	0.36%	-13.5%	-16.8%		-10.0%	-9.7%	-11.7%	-10.0%	-7.2%	-15.2%	-5.2%	-5.1%
February	0.14%	0.29%	-13.5%	-16.9%	-11.0%	-10.0%	-9.7%	-11.7%	-9.8%	-7.0%	-14.9%	-5.1%	-5.0%
March	0.14%	0.29%	-13.4%	-16.7%	-11.1%	-10.1%	-9.8%	-11.3%	-10.2%	-7.4%	-15.8%	-5.3%	-5.2%
April	0.12%	0.23%	-12.9%	-16.0%	-11.4%	-10.4%	-10.0%	-9.1%	-11.9%	-8.8%	-18.62	-5.9%	-5.8%
May	0.12%	0.20%	-12.6%	-15.7%	-11.3%	-10.2%	-9.8%	-8.2%	-12.5%	-9.6%	-20.0%	-6.3%	-6.2%
June	0.12%	0.21%	-12.8%	-16.0%	-11.1%	-10.1%	-9.7%	-9.6%	-12.5%	-9.5%	-19.3%	-6.4%	-6.3%
July	0.12%	0.21%	-13.1%	-16.2%	-11.1%	-10.1%	-9.7%	-10.3%	-12.2%	-9.2%	-18.6%	-6.3%	-6.2%
August	0.12%	0.21%	-13.2%	-16.3%	-11.1%	-10.1%	-9.7%	-10.8%	-11.9%	-8.9%	-17.9%	-6.2%	-6.1%
September	0.12%	0.21%	-13.3%	-16.5%	-11.0%	-10.0%	-9.7%	-11.1%	-11.5%	-8.6%	-17.4%	-6.0%	-5.9%
October	0.12%	0.21%	-13.4%	-16.6%	-11.1%	-10.1%	-9.8%	-11.4%	-11.2%	-8.2%	-16.8%	-5.8%	-5.8%
November	0.12%	0.18%	-13.5%	-16.7%	-11.1%	-10.1%	-9.8%	-11.6%	-10.8%	-7.9%	-16.3%	-5.7%	-5.6%
December	0.11%	0.21%	-13.5%	-16.8%	-11.1%	-10.1%	-9.8%	-11.7%	-10.6%	-7.8%	-16.0%	-5.6%	-5.5%
Average Transient Change	0.12%	0.23%	-13.2%	-16.4%	-11.1%	-10.1%	-9.8%	-10.7%	-11.3%	-8.4%	-17.2%	-5.8%	-5.7%
Steady State Change	-0.03%	-0.02%	-13.1%	-16.2%	-10.7%	-9.6%	-9.2%	-9.5%	-11.3%	-8.5%	-17.5%	-6.0%	-5.9%

545. Benga indicates that the average reduction in baseflow in Gold Creek will be in the order of 6%. Table 3-6 shows that the maximum reduction in baseflow calculated during modelling extends as high as 17-19% during lower flow periods, when baseflow is critical for aquatic species. How can this be considered "not significant"?

546. The reduction on baseflow is obviously different for different reaches of Blairmore and Gold creeks. As such, the impacts to smaller order tributary reaches is anticipated to be much more than the impacts to larger drainage features receiving input from multiple tributaries.

547. How did Benga select the reaches that they wanted to model to ensure that the full spectrum and magnitude of baseflow decreases could be assessed? Are there some reaches of Blairmore Creek and Gold Creek that could see a decrease of more than 20%? Given the previous concerns regarding how the model has been constrained it is highly likely.

548. The GoldSim model identifies some constituents in Blairmore and Gold creeks approaching or exceeding AEP's 2018 chronic guidelines for protection of freshwater aquatic life (FWAL). These include aluminum, ammonium, cobalt, selenium, and mercury.

549. PDF pg.259 in Appendix 10B of CIAR 42:

> Concentrations of dissolved cobalt, selenium and zinc show similar patterns of increase above background concentrations as the mine development expands. Concentrations of these parameters reach their maximum in closure when increased leakage rates from the SZs is predicted (SRK 2016d). They also reach steady state soon after closure, as the site is reclaimed.

550. PDF pg.415 in Appendix 10B of CIAR 42:

> The water quality model developed for the Project was used to evaluate potential water quality effects in the downstream creeks as well as requirements for water quality mitigation measures. Results of the evaluation are summarized as follows:
>
> - Selenium leaching from waste rock is the primary water quality parameter of concern in terms of protecting downstream water quality. Selenium concentrations expected in waste rock seepage and in the mine water are up to three orders of magnitude greater than generic guideline concentrations for freshwater aquatic life.
> - Estimated waste rock seepage concentrations for a number of dissolved metals, including cobalt and zinc, are expected to be 5 to 50 times higher than applicable aquatic guideline concentrations.

551. It is unclear why Benga considered that selenium is the primary water quality parameter of concern when there is direct evidence that other equally harmful trace element can be mobilized from the waste rock materials (as evidenced by the humidity cells tests and baseline groundwater in the Project area).

552. The D3 August 2016 Blairmore Creek Water Quality Projections from August 2016 are set out at PDF pg.309-334 of Appendix 10B.

553. The D4 August 2016 Gold Creek Water Quality Projections are set out at PDF pg.335-360 of Appendix 10B.

554. The D5 August 2016 Saturated Zone and Ponds Water Quality Predictions are set out in PDF pg.361-436 of Appendix 10B.

555. The 2016 Water Quality Projections for Blairmore Creek and Gold Creek were updated in the March 2020 Addendum 11 as a result of Benga shelving its original proposal to have the End Pit Lake outflow into Gold Creek; see 17Tr, p.3606, L.21 to p.3607, L.20.

556. The new graphs (dated February 2020) replacing some of the D3 and D4 graphs from 2016 are set out in CIAR 313, Addendum 11, PDF pg.250:

> a) Provide modeled estimates of mean monthly concentrations of contaminants of concern in Blairmore Creek and Gold Creek using available hydrographs and reasonable assumptions given the hydrologic period-of-record and the proximity of gauging stations. The use of synthetic hydrographs may be required. Conduct the modeling for the mine operation, at closure and post-closure. The post-closure period should include effects of climate change on variability of seasonal water flows.

Response:

Figure 6.25-1 and Figure 6.25-2 show updated hydrology for Gold Creek and Blairmore Creek on a mean monthly basis with climate change incorporated in the updated hydrological inputs.

Modelled estimates of mean monthly concentrations of contaminants of concern in Blairmore Creek and Gold Creek for this flow scenario are graphed in Appendix 6.25-1.

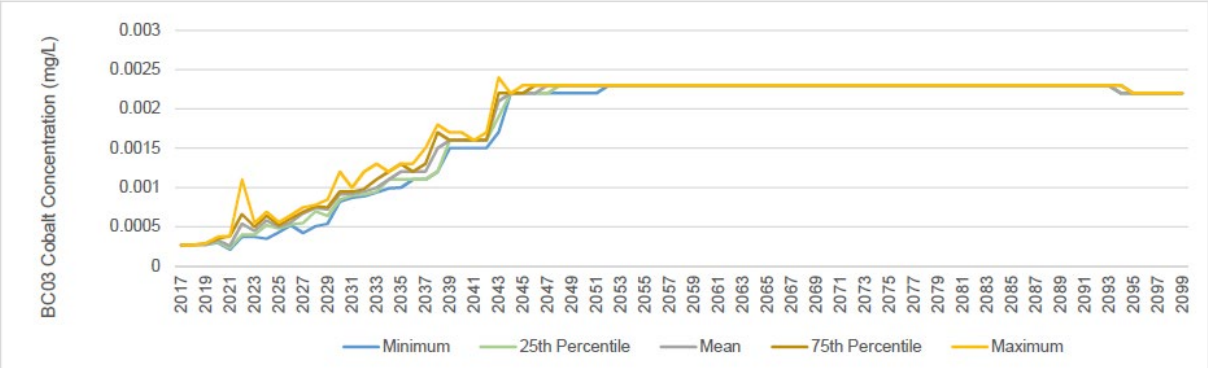
Figure 6.25-3 shows model results for total selenium concentration in Blairmore Creek under mean monthly flow scenarios over the 20-year time span during operations to illustrate the seasonal variation while Figure 6.25-4 and Figure 6.25-5 show the same results data for Blairmore and Gold creeks respectively but for an 80-year time span.

As indicated by the graphs, selenium concentrations in the creeks, modelled on a mean monthly basis, are significantly more variable than those that had been previously calculated based on annual average flows. Peak selenium levels in Blairmore Creek under this flow scenario are approximately 9 µg/L, which is slightly higher than the annual average calculation of 7 µg/L but still lower than the proposed Project-specific guideline for selenium.

557. Addendum 11 (CIAR 313) did not result in any changes to SRK's D5 August 2016 Saturated Zone and Ponds Water Quality Predictions in Appendix 10B of CIAR 42; see 17Tr, p.3622, L.19-23.

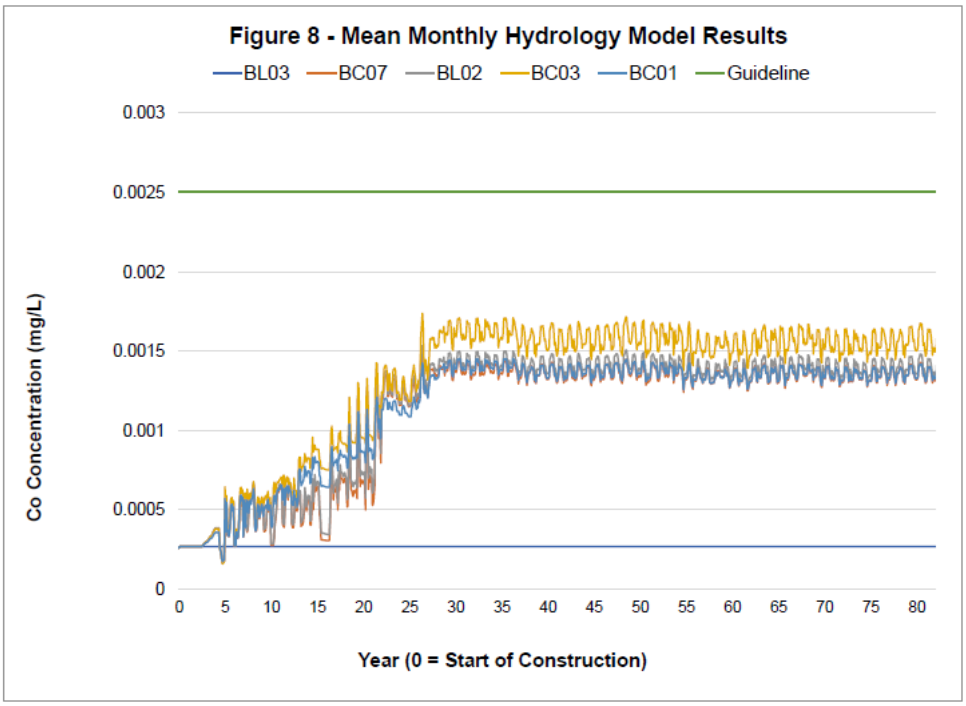
558. Whether some of the elements are at, slightly over, or approaching guideline values, you have to consider the accuracy of the modelling given the lack of hydrologic variability that has been modelled by Benga, including the effects of climate change and longer low flow periods anticipated. This will influence the magnitude of dilution that occurs when water is released to the local creeks and hence their projected concentrations.

559. At PDF pg.315 in Appendix 10B of CIAR 42, the 2016 SRK prediction for cobalt concentration at BC03 was as follows:



560. Using a water hardness of 250 mg/L (as CaCO3), which is consistent hardness values reported in CR#5 of CIAR 42, Table A3.1 (pdf page 148) and Table 9 (pdf page 48), the 2018 AEP long term chronic guideline for the protection of freshwater aquatic life (FWAL) is 1.5 µg/L or 0.0015mg/L for cobalt; see CIAR PDF 850, PDF pg.42. The 2016 SRK prediction shows BC03 exceeding AEP's long term chronic guideline for cobalt starting around 2037.

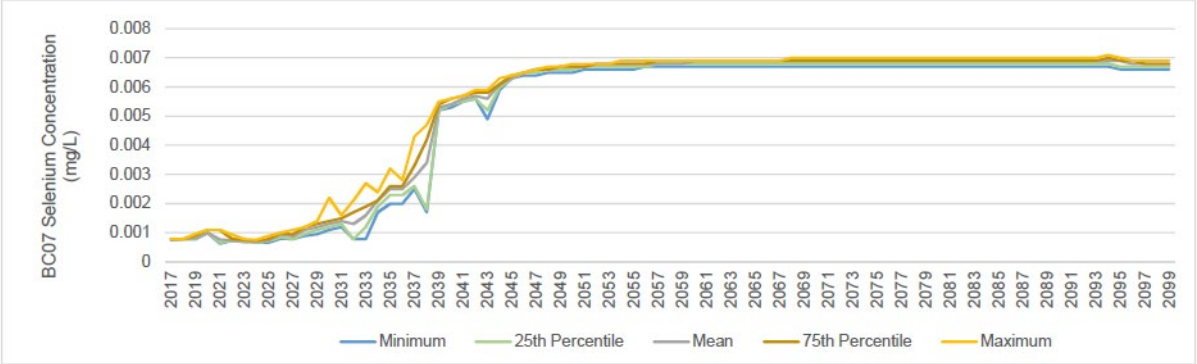
561. Benga's new graph (Figure 8 dated February 2020) at CIAR 313, PDF pg.1175 shows certain reaches of Blairmore Creek exceeding AEP's long term chronic guideline for cobalt starting around year 25:



562. Benga has used the wrong guideline shown by the green line in Figure 8. The guideline is based on an equation. For a hardness of 250 mg/L, the long-tern chronic guideline should be 0.0015 mg/L. The actual hardness ranges for the baseline samples are:

- Blairmore Creek: 44-255 mg/L (PDF pg.148 and 151 of CR#5 in CIAR #42); and
- Gold Creek: 30-307 mg/L (PDF pg.154 of CR#5 in CIAR #42).

563. At PDF pg.319 in Appendix 10B of CIAR 42, the 2016 SRK prediction for selenium concentration at BC07 was as follows:



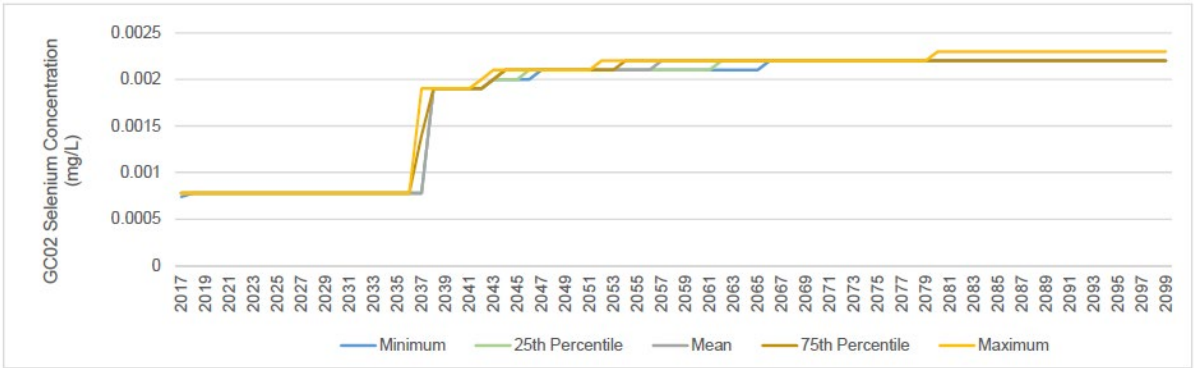
564. The 2018 AEP long term chronic guideline for the protection of freshwater aquatic life (FWAL) is 2 µg/L or 0.002 mg/L for selenium; see CIAR PDF 850, PDF pg.35:

Selenium - total	Metalloid				BC 2014	Exceedance of the alert concentration in sensitive environments indicates the need for increased monitoring of water and other ecosystem compartments to support early detection of potential Se bioaccumulation issues and provide earlier opportunities to commence proactive management actions.
Guideline		µg/L	2			
Alert Concentration		µg/L	1			

565. AEP also has an "alert" concentration of 1µg/L or 0.001 mg/L. Exceedances of the "alert" concentration are of concern to AEP.

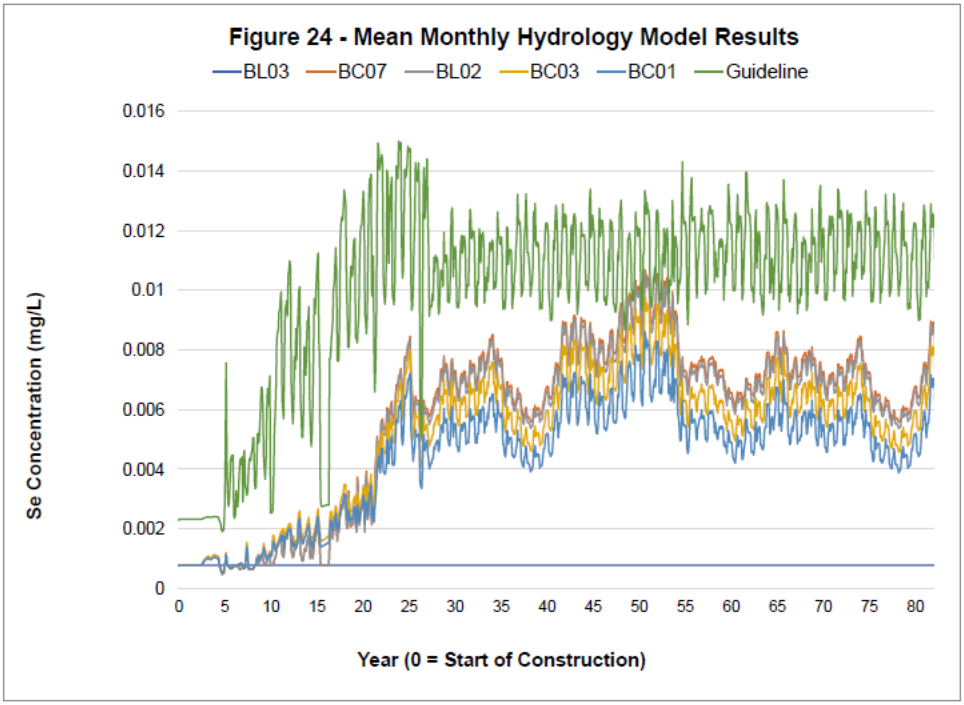
566. The 2016 SRK prediction shows BC07 exceeding AEP's 2018 long term chronic guideline for selenium starting around 2029.

567. At PDF pg.357 in Appendix 10B of CIAR 42, the 2016 SRK prediction for selenium concentration at GC02 was as follows:



568. The 2016 SRK prediction shows GC02 exceeding AEP's 2018 long term chronic guideline for selenium starting around 2043.

569. Benga's new graph (Figure 24 dated February 2020) at CIAR 313, PDF pg.1191 shows all of the stations of Blairmore Creek exceeding the AEP's long term chronic guideline for selenium of 0.002 mg/L starting around Year 13. However, if the SSWQO guideline shown in green in Figure 24 is used, exceedances of the guideline will occur around Year 27 and around Years 47-54. For the SSWQO, Se levels are tied to sulphate concentrations.



570. Mr. O'Gorman questioned Benga about its request for a SSWQO for selenium in 19Tr, pg.4113-4129 and requested Undertaking No. 21 which required Nautilus to redo their Figures from the Appendix in CR#5. Benga's proposed SSWQO shown by the green lines in Figure 24 goes up and down like a yo-yo and will not be simple to implement.

571. At 19Tr, p.4115, Mr. O'Gorman had the following exchange with Mr. Davies:

selenium acts very differently than most other aquatic chemicals that we have concerns about and we have guidelines for, the -- the 2-microgram-per-litre guideline is essentially a generally -- it's meant to be generally protective of environments that are highly

sensitive to selenium accumulation in the food chain. And so if you're looking at assessing the project and the effects of selenium in Blairmore Creek, it's not really an effective way of -- of accurately assessing

say, but I think you'd agree that this was a pretty important piece of work that you did in terms of attempting to support your position or request for a site-specific water quality objective for the project; is that right? For selenium, obviously.

A I'd agree, but one thing I would qualify that with is that there's -- there's two reasons to develop site-specific thresholds. One is from an assessment perspective, and one is from an operational perspective.

572. In 21Tr, p.4454-4476, Mr. O'Gorman questioned Benga further on the requested SSWQO for selenium and Benga's response to Undertaking 21 marked as CIAR 878.

573. At 21Tr, p.4455: Mr. O'Gorman asked the following question:

Q Okay. I think we've agreed that you are -- through the conversation we just had a few minutes ago, but I'll ask you to be clear. Are you proposing -- so all of this -- these results end up with a suggested -- sulphate-adjusted, selenium site-specific water quality objective. Are you asking this panel to accept this

SSWQO or a WW -- SSWQO, i.e., these particular numbers or the concept of one?

574. Mr. Houston responded to that question at 21Tr, p.4457:

19 A MR. HOUSTON: If I could, Mr. O'Gorman, I
20 tend to agree with my -- my colleague Mr. Davies. We
21 understand that this -- the science that demonstrates
22 the protective nature of what we're proposing needs to
23 be translated into something that could be useful both
24 from an operating management perspective and -- and a
25 regular -- regulatory perspective. So we would fully
26 expect that there would be some interpretation of the

1 results and then something -- some objective set down
2 that's perhaps simpler to implement.

575. What exactly is Benga asking for?

576. Benga stated in CIAR 571 PDF pg.21:

> Benga notes that ECCC states in its submission to the JRP[57] that "Benga has proposed a 15 µg/L site-specific water quality objective (SSWQO) for selenium". This is incorrect. Benga has proposed a 15 µg/L Se limit for effluent released to Blairmore Creek; the proposed site-specific benchmark for Se in Blairmore Creek varies with waterborne sulphate concentrations, with predicted values of 2 to 14 µg/L Se, depending on background sulphate, over the life of the project and in closure and post-closure phases. Over this time, Se concentrations in Blairmore Creek downstream of effluent discharge (at site BC-03) are predicted to range between approximately 4 and 9.5 µg/L.

577. Is Mr. Houston saying this variable SSWQO will be difficult to implement?

578. Shouldn't Benga be telling us exactly what interpretation of the results it is looking for?

579. Shouldn't Benga be telling us exactly what it is applying for or hoping for from the JRP?

580. Is Benga asking the JRP to establish an SSWQO which is "perhaps simpler to implement" than the one shown in Figure 24 above?

581. The JRP should not be approving Benga's requested SSWQO for selenium. The Nautilus Report relied on studies based on plants and algae that are not present in the creeks at Grassy Mountain. An SSWQO for selenium in this case should not be permitted because WSCT will have to be regularly captured and killed over the next 80 years in order to have the fish tissue available to check for and verify selenium uptake. This is not in keeping with the SARA requirement for the protection of the WSCT.

582. Toxicity testing would be the responsibility of Benga as noted in the following passage from the 2018 AEP Guidelines CIAR 850, PDF 15

> In all cases, additional toxicity testing may be required and would be the responsibility of the proponent. Site-specific guidelines can only be developed from full guidelines. Caution should be exercised in the decision to derive acceptable scientifically-rigorous site-specific guidelines due to the significant amount of time and resources required to develop an acceptable guideline. In many cases, the development of a site-specific water

583. There is only one page dealing with the SSWQO for selenium in Benga's final argument. It reads as follows in CIAR 962, PDF pg.89:

> 335. As noted in Benga's October 5, 2020 submission, ECCC reviewed the proposed SSWQO and concluded: "A sulphate-adjusted guideline for selenate is based on sound science, since sulphate and selenate compete for the same active (saturable, energy-requiring) transporter in algae". [472] Benga agrees with that statement.

584. The Coalitions notes that in CIAR 542 at PDF pg..41, ECCC actually said this:

> **ECCC's Conclusions**
>
> ECCC is of the opinion that the SSWQO developed by Benga, which has been derived using pre-mining (baseline) conditions, contains several assumptions which decrease confidence in the degree of protection to aquatic organisms that the Objective can achieve. While ECCC does not object to the derivation of site-specific environmental quality guidelines, in this instance the site-specific risk assessment and its derived SSWQO may not accurately characterize the risk to receptors from exposure to selenium during and following mine operations.

585. Benga appears to have missed this statement of "Conclusions" from the ECCC in its discussion of the SSWQO in Section 5.6.4 of its Final Argument above.

586. The Coalition agrees with the ECCC's statement regarding assumptions that decease the confidence in the SSWQO being proposed for the following reasons:

587. Benga did not use local species of algae and plants, so it is unclear how well the species used in the Nautilus experiments represent (or correlate with) those in Blairmore (and Gold) creek.

588. Sulphate (SO42-) will be released to Blairmore Creek as a result of the mine activities. It is therefore a contaminant that will have values higher than AEP's FWAL of 429 mg/L for very hard water (181-250 mg/L as CaCO3). In fact, Benga is modelling that SO4 concentrations are projected to increase as high as 1250 mg/L or so. Therefore, SO4 will have the ability to adversely affect WSCT. However, Benga has not focussed any attention on this SO4 issue, and that it will need to be treated down to a more appropriate level. What we find interesting is that Benga is justifying a higher Se level using another contaminant that should not be present at such high levels anyway.

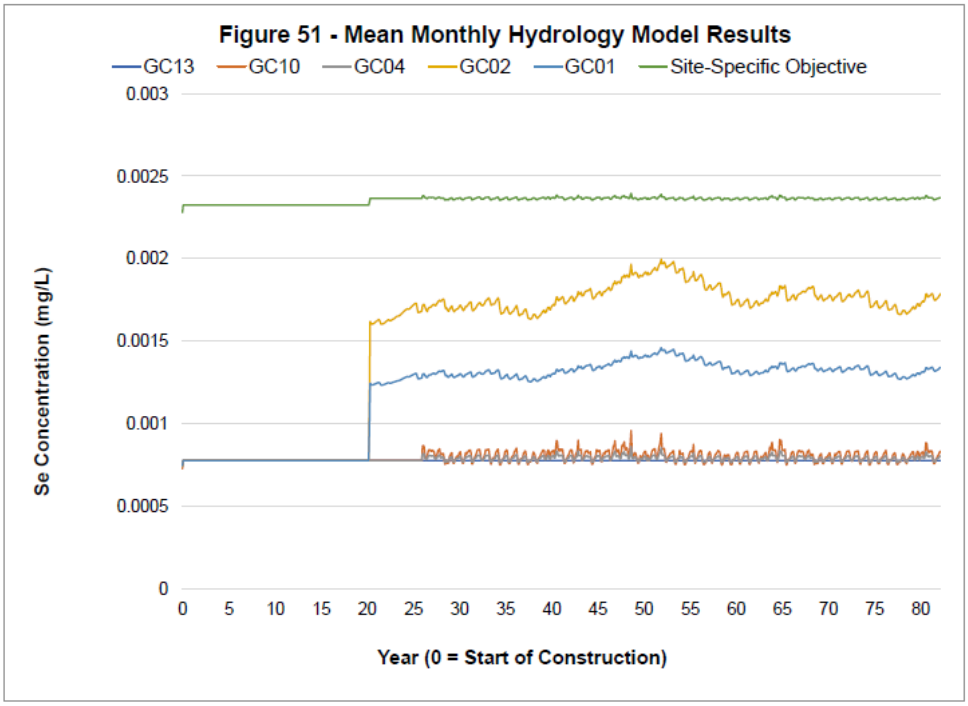
589. The assumption is being made that the primary species of Se will be the selenate (SeO42-) ion versus selenite (SeO32-) in the river water; however, that has not been substantiated with any chemical speciation of the Se (as pointed out by ECCC and others). In fact, no speciation work on selenium (or any other harmful trace elements identified) has been done on any water samples from the local creeks, wetlands, porewater of the river sediments, etc. If the Se is not 100% selenate ion then this will likely affect the SSWQO, but Benga has not assessed this aspect.

590. The assumption is being made that the SO4 ions will out-compete the selenate ions for active transporters in algae, but this again assumes that something else will not react with the SO4 ions first to make them unavailable to block active transporter site, for example a cations like calcium (Ca2+), magnesium (Mg2+), strontium (Sr2+), cadmium (Cd2+) cobalt (Co2+), copper (Cu2+), lead (Pb2+), manganese (Mn2+), etc. It is possible that ion-complexes will form between the SO4 ions and the other cations but Benga does not appear to have assessed this interference effect either.

591. Also, if SO4 ions are taken out of solution by precipitation reactions to form minerals like amorphous calcium carbonate (ACC), also called vaterite, or more pure forms of minerals like gypsum (CaSO4), it will not be available to out-compete the selenate ions for active transporter sites, and therefore the selenate will bioaccumulate more in lower food chain. Intuitively, this should lead to a lower SSWQO. It does not appear that Benga did any modelling to evaluate this potential effect either.

592. Then there are all the other trace elements that are likely to be released, which again seem to be getting overlooked. It needs to be made clear, based on what is being seen at Teck's Elk Valley operation, that the release of other harmful trace elements (including radioactive ones like uranium) is highly likely, and that treating for Se in the SBZs could actually enhance their release – change conditions to mitigate one trace element and create conditions conducive to mobilizing another (i.e. geochemical whack-a-mole). Benga is playing chemistry as Dr. Fennell stated in his evidence and have not done an appropriate level of geochemical modelling, or transport and fate assessment work, to adequately assess this risk and facilitate an informed decision by the JRP.

593. Benga's new graph (Figure 51 dated February 2020) at CIAR 313, PDF pg.1219 shows GC02 in Gold Creek exceeding the FWAL alert guideline for selenium in Year 20 and GC02 reaching the 0.002 mg/L long term chronic guideline around Year 53:



594. The SRK Water & Load Balance Model (PDF pg.361-411 of Appendix 10B in CIAR 42) indicates contaminant levels in the sedimentation and surge ponds, as well as the EPL, that approach or exceed levels above the AEP's chronic guidelines for the protection of freshwater aquatic life. Benga has also failed to consider the seepage of water from these ponds into the groundwater, and the transport of entrained contaminants to those receptors. How, then, can the impacts from the Project be considered "not significant" if they have not even been assessed?

595. There will likely be a discrepancy in what the SRK GoldSim model is providing for anticipated contaminant levels in the water management structures and receiving creeks and what may actually occur. In fact, there is a likelihood that the contaminant levels will be higher than reported in the SRK model if mitigation techniques are not as effective as reported, or the ranges of hydrologic variability to result in the projected dilution effects have not been properly considered.

596. How will Benga guarantee that discharges of contaminants from the water management structures do not exceed chronic levels for aquatic life, and how will that be ensured under extreme conditions such as excessive precipitation and necessary pond discharge? How will this also be guaranteed well into the future?

597. If the extent of drawdown simulated by the model is grossly under-represented and the drawdown actually does propagate out further than anticipated (intercepting more groundwater contribution to Blairmore and Gold creeks than currently modelled), how will this affect the baseflow reduction calculations?

598. The inability to accurately simulate the monthly baseflow variability indicates that the SRK model is not providing results that give comfort that Benga understand how their Project will influence the local environment. Given the importance of this modelling exercise for the decision to either approve or deny this application, how can the JRP make an informed decision if the model cannot reasonably simulate what is actually occurring?

599. If the monitoring is unsuccessful at detecting contaminants seeping or leaching from the waste management structures, and contaminants are detected in Blairmore or Gold Creeks what will Benga do to mitigate this situation? It is worth noting that remediation of any contaminant plume by groundwater recovery wells will create even more drawdown and intercept groundwater that would otherwise report to the creeks. This will inadvertently reduce the amount of baseflow contribution to the creeks in addition to that already being modelled by SRK. This possibility, and the associated ramifications for Blairmore and Gold creeks, been not been assessed in the application.

600. PDF pg.85 in Section E of CIAR 42:

> The only true loss of water from the Project area is the moisture associated with the clean coal that is shipped off site to market (CR #4 Section 5.1). However, within the Project area there are changes to surface water flows as water is collected, diverted, treated, and discharged, and changes to the inventory of water stored in various reservoirs such as ponds, saturated zones, and groundwater. Changes to surface characteristics of the developed mine areas are expected to result in higher runoff, which is a net gain in terms of the water balance. Estimated net change to discharge from Blairmore Creek and Gold Creek is provided in CR #4 Figure 41.

601. Benga's statement that "[t]he only true loss of water from the Project area is the moisture associated with the clean coal that is shipped off site to market" is a very misleading statement, given that the mine development will result in removal of vegetation and soil, expose otherwise covered rock, and establish rock dumps and water management structures to manage solid and liquid wastes. In fact, the loss of water from evaporation will increase from natural conditions and could be significant. These aspects were not considered in the overall mine water balance.

5.4.1.5 Geochemistry

602. Benga chose to only model "dissolved" concentrations of contaminants and not "total" concentrations. The use of "total" concentrations would have been more conservative and reflective of the effluent that will be discharge from the mine water management structures. Benga was asked why it decided to use this less conservative approach. The response was as follows at 17Tr, p.3614:

14 A So, yes, it -- it would be more conservative to -- to
15 assume some solids load, but what -- what we
16 effectively assumed is that the -- that the
17 sedimentation structures operate as designed.
18 Q So why did Benga decide to use -- or why did SRK decide
19 to use this less-conservative approach?
20 A Again, the -- the purpose of the assessment here is
21 to -- is to evaluate what sort of mitigation's
22 required. And given the fact that, you know, we have
23 incorporated the -- the operation of sedimentation
24 ponds into this assessment, it -- you know, it -- it
25 it's consistent, I think, with the fact that our
26 assumptions, as clearly stated in this -- in this model
1 report, that we assumed that the mitigation measures
2 that are reflected here are effective.

603. It is highly likely that colloids with associated trace elements will be mobilized into the groundwater under the waste rock areas and water management ponds. Their movement will be facilitated by the presence of fractures and faults which are highly likely to exist as well. This is another example of how Benga is not taking a more conservative approach and failing to model a reasonable worst-case scenario.

604. Table B8: Dissolved Metals Results is set out at PDF pg.137-142 of CR#3 in CIAR 42.

605. The presence in Table B8 of some contaminants at levels above established Canada guidelines for the protection of drinking water and AEP guidelines for the protection of freshwater aquatic life has been confirmed in some of the monitoring well samples assessed by Benga. These have also been noted in some of the springs, creeks and existing ponds sampled by Benga. In addition to selenium, this includes aluminum, cadmium, chromium, copper, mercury, nickel and zinc. Table B8 results indicate the natural presence of these contaminants in the waters of the Project area. Therefore, there is a risk of these contaminants being mobilized as a result of Benga's mining and waste management processes including the altering of redox conditions in the SBZs; see 17Tr, 3618, L.11 to p.3620, L.18.

606. PDF pg. 112 of Addendum 10, Package 5 in CIAR 251:

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

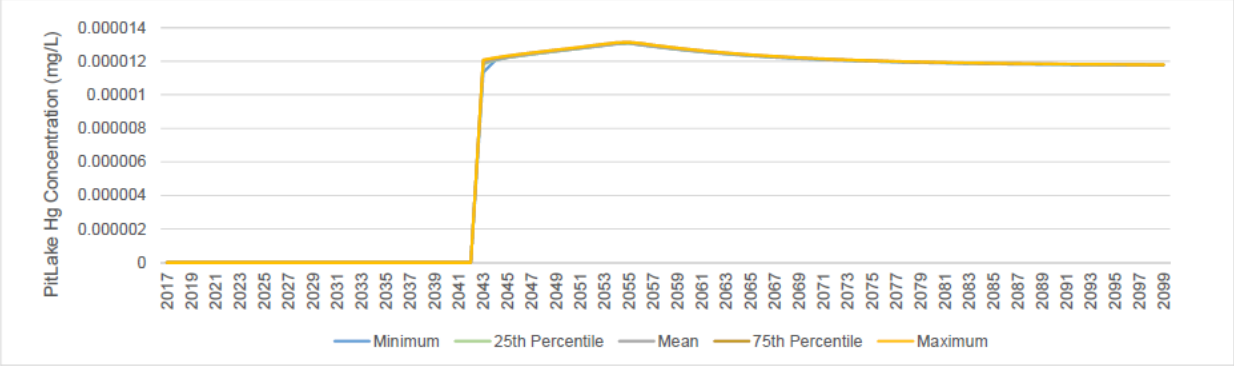
Response:

As listed in CR#3 Section 5.1 (CEAR #42), sources that could affect groundwater quality and potential receptors include the surge ponds (northwest surge pond, southwest surge pond and southeast surge pond), sedimentation ponds (northeast sedimentation pond, east sedimentation pond, west sedimentation pond, plant site sedimentation pond and rail loadout sedimentation pond), the saturated fill zones, raw water pond, diversion ditches and drainage controls, and rock pile areas (north rock disposal area, central rock disposal area and south rock disposal area). To a lesser degree, facilities within the CHPP handling or storing waste oil, lubricants and gas & diesel for the site's vehicles are also considered as potential sources.

The end pit lake is not identified as a potential source as the water stored in the lake is located in its own groundwater catchment area.

607. Benga's response to IR 5.18(v) on PDF pg.112 of Addendum 10 states that the EPL is not identified as a potential source of contamination to the groundwater and potential receptors. This statement is incorrect. Mr. Jensen said the reason for this was because there had been a misinterpretation made by the author of the response to IR 5.18(v); see Tr, p.3626, L.11-26. Mr. Houston said the reason why the IR response was incorrect was because the question in IR 5.18(v) was confusing; see 17Tr, p.3627, L.2-11. Benga has indicated that the EPL will be partially filled with groundwater. This means that it has to have the ability to seep in through pathways like faults and fractures. Once the EPL has filled the hydraulic gradient will reverse and water will seep back those same pathways. Therefore, how can it not be a potential source considering that some of the elements modelled for it are being shown at concentrations above FWAL? (see CIAR 42, Appendix 10 - Water and Load Balance Report, D5 pdf pages 361-411).

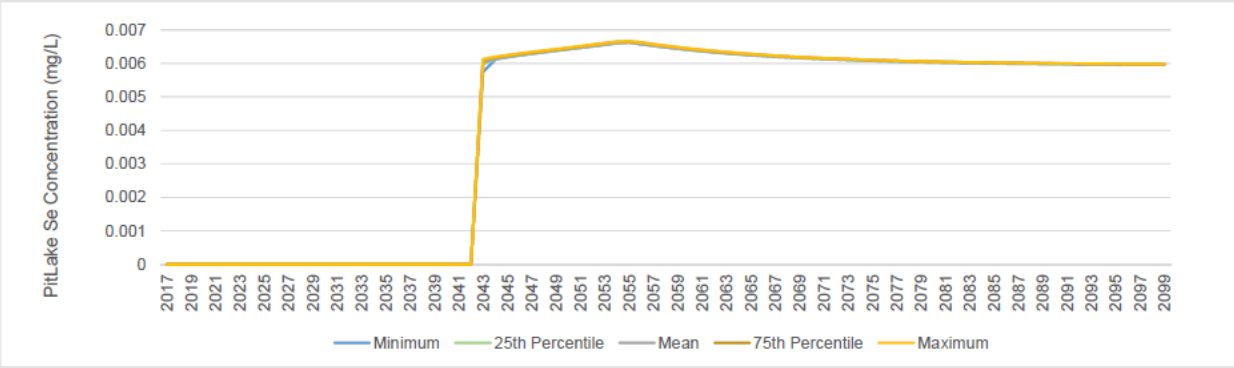
608. At PDF pg.380 in Appendix 10B of CIAR 42, the 2016 SRK prediction for mercury concentration in the EPL was as follows:



609. This graph shows that from 2042 to 2099, the EPL will exceed the 2018 AEP long term chronic guideline for total mercury for the protection of freshwater aquatic life (FWAL), which is 0.005 µg/L or 0.000005 mg/L; see CIAR 850, pdf 33:

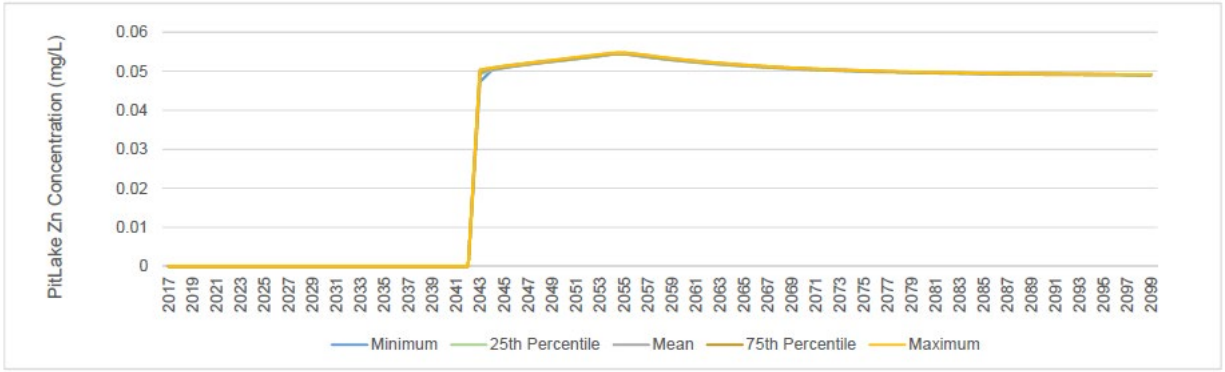
Mercury - total:	Metal					In this context, total refers to analysis of unfiltered samples and not forms. Guidelines should be applied to unfiltered samples.
- Total		µg/L	0.005	0.013	AEP 1998	Averaging period is 4 d for long-term and 1 hr for short-term.
- Methyl-		µg/L	0.001	0.002	AEP 1998	Averaging period is 4 d for long-term and 1 hr for short-term.

610. At PDF pg.404 in Appendix 10B of CIAR 42, the 2016 SRK prediction for selenium concentration in the EPL was as follows:



611. This graph shows that from 2042 to 2099, the EPL will exceed the 2018 AEP long term chronic guideline for the protection of FWAL, which is 2 µg/L or 0.002 mg/L for selenium; see CIAR PDF 850, PDF pg.35.

612. At PDF pg.410 in Appendix 10B of CIAR 42, the 2016 SRK prediction for zinc concentration in the EPL was as follows:

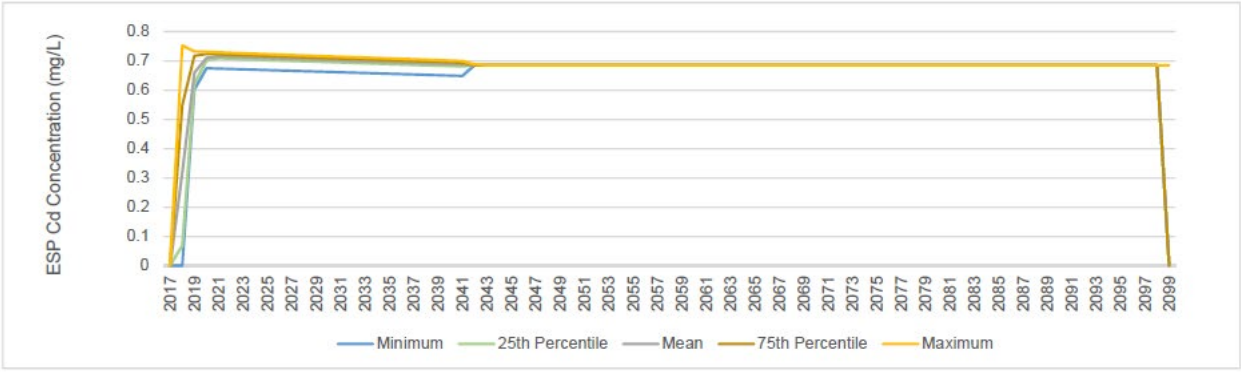


613. This graph shows that from 2042 to 2099, the EPL will exceed the 2018 AEP long term chronic guideline for the protection of FWAL, which is 30 µg/L or 0.03 mg/L for zinc; see CIAR 850, PDF pg.37.

614. As noted, the results provided in Water and Load Balance Model for the EPL and the ESP (PDF pg.362-411 of Appendix 10B in CIAR 42) show that some constituents are

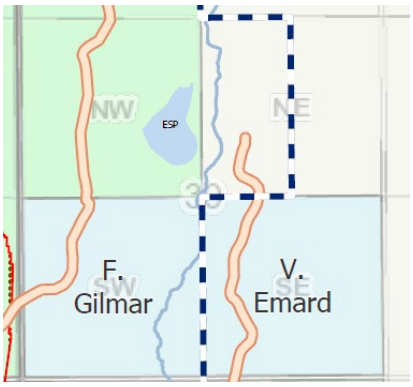
projected to reach values well in excess of the AEP guidelines for the protection of freshwater aquatic life.

615. At PDF pg.370 in Appendix 10B of CIAR 42, the 2016 SRK prediction for cadmium concentration in the ESP was as follows:



616. Using a water hardness of 250 mg/L (as CaCO3), the 2018 AEP long term chronic guideline for the protection of FWAL is 0.34 µg/L or 0.00034 mg/L for cadmium; see CIAR 850, PDF pg.42. This graph shows that from 2019 to 2097, the ESP will exceed the 2018 AEP long term chronic guideline for the protection of FWAL for cadmium.

617. This graph also shows that the ESP will quickly exceed the Canadian Drinking Water Maximum Acceptable Concentration for cadmium which is 0.005 mg/L; see Table B8: Dissolved Metals Results at PDF pg.137 of CR#3 in CIAR 42. Ms. Gilmar's residence and water supply is inside Benga's proposed Mine Permit Boundary and directly south of the ESP and therefore is at high risk to being impacted.



618. As noted by Dr. Fennell in Slide No. 29 in CIAR 875~ discussed at 23Tr, p.4911, L.14 to p.4912, L.26:

Unlike the groundwater numerical model, Benga has not provided a satisfactory explanation of how the GoldSim model was configured, or how hydrologic and climatic variability has been included. Contaminant capture efficiencies are also overly optimistic. Elevated levels of some harmful elements are noted for the water management ponds, with levels approaching harmful values in the creeks.

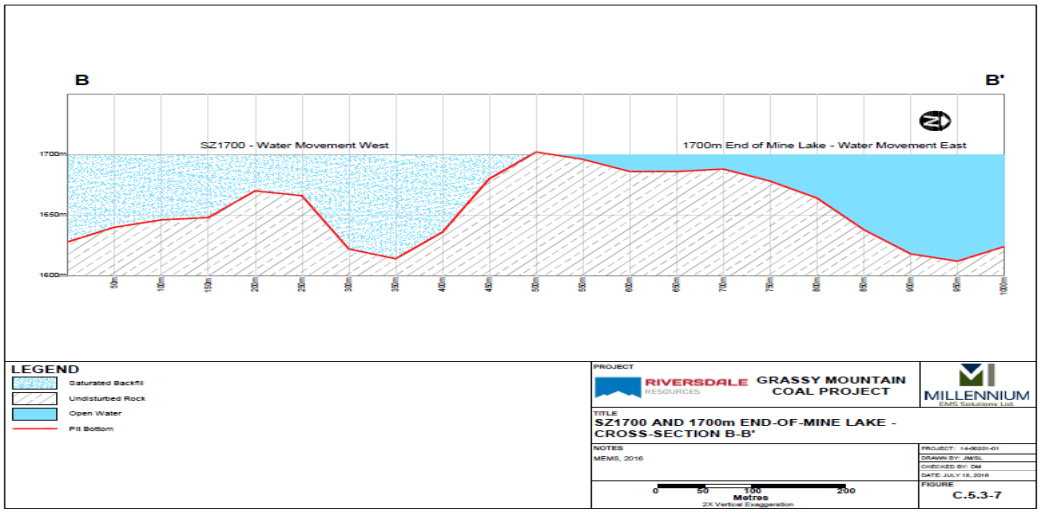
619. PDF pg.255 of Appendix 10B in CIAR 42:

> **5.4 Concentration Limits**
>
> A solubility limit for sulphate was applied globally in the model. Sulphate is constrained to 2030 mg/L under Base Case conditions and 2740 mg/L for Upper Case conditions.
>
> Elevated concentrations in pit lake water may occur due to potential acidity. Pit lake water leaves the project area via two pathways:
>
> 1. As overflow to the NESP, and subsequently to Gold Creek, via horizontal drains after reaching the flood elevation
> 2. As leakage once the pit lake begins to fill. Pit lake leakage reports to Gold Creek at prediction node GC10.
>
> Pit lake water will be neutralized as it flows through groundwater pathways and enters the creek with sufficient neutralization capacity. Concentration limits are applied for aluminum and iron at prediction node GC10 to represent assumed precipitate at neutral pH.

620. Benga was asked how it determined that the EPL water will leave the lake via leakage once the lake begins to fill and that the leakage would report to Gold Creek at prediction node CC10. Benga's response was as follows at 17Tr, p.3524:

> MR. JENSEN: So that was determined based on sort of the general direction of the groundwater flow in -- in that area. We looked to -- we looked to the groundwater model assessment for some input to what appropriate assumption to apply in this case.

621. PDF pg.253 of Section C in CIAR 42; Figure C.5.3-7:



622. The EPL will be up to 75 m deep, or more. It is likely that the lake will stratify and that the bottom portions will become oxygen deficient (i.e. sub-oxic or anoxic) given the presence of organic substrate, such as residual coal fines and other organics in the bottom sediments.

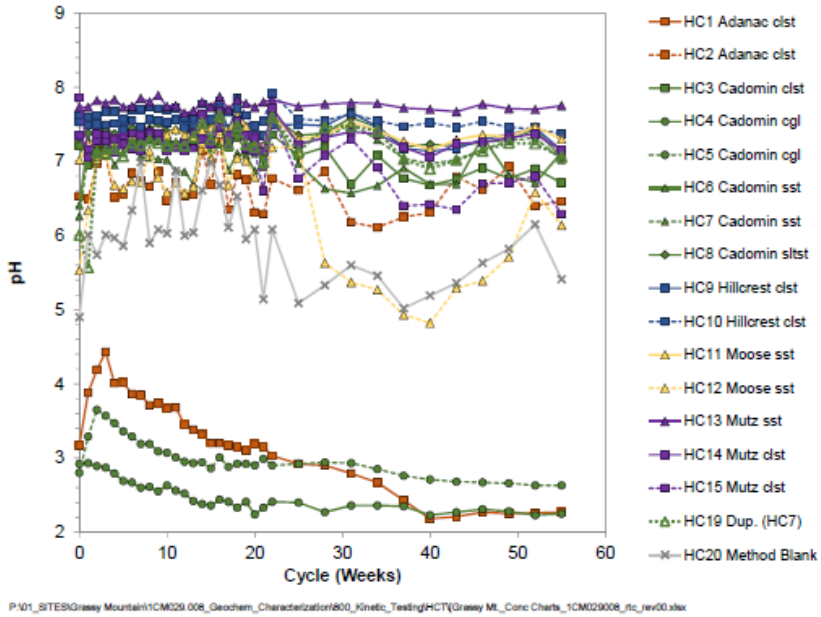
623. As noted by Dr. Fennell in Slide No. 28 in CIAR 875 ~ discussed at 23Tr, p.4909, L.2 to p.4911, L.13:

> Benga has not assessed the dynamics of the water management ponds & end pit lake in relation to nutrient cycling (e.g. nitrate and phosphorous), stratification and the creation of sub-oxic to anoxic conditions (including generation of GHGs), shift in trophic levels, and potential mobilization of redox-sensitive (and harmful) trace elements.

624. The risk of mobilizing trace elements exists, yet Benga has not modelled or addressed this risk.

625. PDF pg.1-216 of Appendix 10A in CIAR 42 contains the Geochemical Characterization Report prepared by SRK.

626. Waste Rock Humidity Cell Test Charts can be found in Appendix H starting at PDF pg.117; see for instance PDF pg.118:



627. The Waste Rock Humidity Cell Test Charts mimic what is going on in a rock dump and what contaminants may be mobilized. The rock dumps are 100 m or more above the creeks and there are strong downward gradients and the likely presence of faults and

fracture networks, so the contaminants will have the potential to migrate to Gold Creek and Blairmore Creek.

628. The Humidity Cell Tests (HCTs) conducted by SRK show that oxidation-reduction potential (ORP) values increased to 500-600 millivolts (i.e. oxic) during the multi-week testing period. And, with the exception of two formation rock types (Adanac and Cadomin), a relatively stable pH between 6.5 and 8.0 was noted. Following a period of equilibration, other constituents that increased during testing included (mainly from Adanac and Cadomin rock samples):

- sulphate, arsenic, cadmium, chromium, copper, lead, mercury, molybdenum, phosphorous, silver, tin, uranium, vanadium, and zinc.

629. This is evidence that harmful trace elements can be mobilized from the native rock based on both the natural groundwater quality measured in the area and the HCT results. How will this be successfully monitored for in any leachate that originates from the waste rock dumps, or in the sedimentation ponds receiving coal and rock fines from the mine disturbance?

630. There are a number of factors that complicate the use of HCTs. These include sample representation (does it accurately reflect reality), the amount of time it takes for microbial oxidizers to grow, sample alteration during storage prior to testing, geochemical reactions that add or remove constituents, and the results chosen for use in impact modeling. Other things that will influence how useful laboratory data is to describe what will actually happen at field-scale include:

- actual onsite geochemical processes at play;
- the mineralogy of the rock or rock mixtures (including secondary mineralogy, like iron oxyhrdroxides formed from mineral weathering and precipitation reactions);
- available surface area of the rocks for reactions, and
- the influence of hydrologic and hydrogeologic processes on leachate concentrations.

631. Has Benga incorporated these factors into their impact analysis to ensure the most conservative assessment of contaminant generation, migration, and assumed attenuation? And, was the HCT testing long enough to reach an equilibrium to address any kinetic effects for certain constituents and understand the full magnitude of constituent increases?

632. Most of the HCT tests were for 40 weeks, and some of the constituents (i.e. arsenic, cadmium, chromium, copper, molybdenum, phosphorous, uranium, and vanadium) were still increasing in concentration, meaning the system had not reached an equilibrium state.

633. PDF pg.127 of CR#3 in CIAR sets out Table B6; Field Measured Parameters:

Table B6. Field Measured Parameters.

Location	Type	Data Source	Date	Monitoring Device	Electrical Conductivity	pH	Total Dissolved Solids	Temperature	Dissolved Oxygen
			mm/dd/yyyy		mS/cm	---	mg/L	°C	mg/L
MW14-01-64	GW	MEMS	2/2/2014	Hanna pH/EC/TDS	3.57	7.44	1650	4.1	-
		MEMS	10/16/2014	Hanna pH/EC/TDS	0.70	5.1	340	6.8	-
		MEMS	3/21/2016	YSI	0.6384	6.83	415.35	8.7	2.72
MW14-02-74	GW	MEMS	2/4/2014	Hanna pH/EC/TDS	4.06	8.52	2040	0.9	-
		MEMS	10/17/2014	Hanna pH/EC/TDS	0.33	-	150	8.4	-
		MEMS	3/21/2016	YSI	0.394	6.19	256.11	4.8	3.2
MW14-03-90	GW	MEMS	2/4/2014	Hanna pH/EC/TDS	3.18	12.21	1640	2.6	-
		MEMS	10/17/2014	Hanna pH/EC/TDS	0.22	-	120	3.9	-
		MEMS	3/22/2016	YSI	0.1818	10.09	118.3	5.2	5.75
MW14-04-93	GW	MEMS	10/16/2014	Hanna pH/EC/TDS	0.47	7.38	160	2.4	-
MW14-05-114	GW	MEMS	10/17/2014	Hanna pH/EC/TDS	0.67	-	330	3.5	-
		MEMS	3/24/2016	YSI	0.3135	11.56	204.75	3.7	6.8
MW14-06-32	GW	MEMS	3/23/2016	YSI	0.2544	6.74	165.75	3.3	3.24
MW14-06-105	GW	MEMS	10/16/2014	Hanna pH/EC/TDS	0.25	7.12	260	3.7	-
		MEMS	3/23/2016	YSI	0.3672	6.85	238.55	3.1	5.53
MW14-07-48	GW	MEMS	10/17/2014	Hanna pH/EC/TDS	0.30	-	200	5.6	-
		MEMS	3/22/2016	YSI	2.4271	11.14	1586.5	4.8	6.54
MW14-08-79	GW	MEMS	10/17/2014	Hanna pH/EC/TDS	2.25	-	1120	6.1	-
		MEMS	3/23/2016	YSI	15.445	13.04	10,062	3	7.6
MW15-11-9	GW	MEMS	3/23/2016	YSI	0.6692	8.56	435.5	4.5	9.28
MW15-11-18.5	GW	MEMS	3/23/2016	YSI	0.6544	6.3	425.1	5	2.08
MW15-12-7	GW	MEMS	3/21/2016	YSI	0.5667	7.13	358.55	5.8	11.71
MW15-12-14	GW	MEMS	3/21/2016	YSI	0.5605	7.06	364.65	5.8	6.69

634. Benga only constructed 19 monitoring wells with some wells nested in the same locations and some of them dry. Table B6 contains data for 13 of these monitoring wells. The Table shows that the groundwater from some of these 13 monitoring wells has significant dissolved oxygen concentrations. This would generate more oxic conditions which could possibly mobilize selenium and other contaminants assessed in the humidity cell tests.

635. As Dr. Fennell noted in his Slide No. 27 in CIAR 875 in relation to Table B6 above ~ discussed at 23Tr, p.4906, L.21 to p.4908, L.24:

> Benga has identified that the groundwater is quite oxygenated (oxic), and that there are already elevated concentrations of harmful trace elements present in the area. This is an indication of their ability to be mobilized under the right geochemical conditions.

636. Dr. Fennell stated at 23Tr, p.4907:

I want to point you to some of those numbers. You can see numbers in the -- in the order of -- anywhere ranging from, you know, 2.8 to 12 milligrams per litre of dissolved oxygen. I mean, when you start getting up into those 5, 6, 7, 10 milligrams-per-litre oxygen, that's a lot of dissolved oxygen. That means that your -- your groundwater systems are going to be in an oxygenated state. So let's think about down the road when, you know, everything's done and -- and the SBZs are covered up and the groundwater is flowing back in and everything's going back to normal and you've got oxygenated water going into these SBZs, we can now convert that elemental selenium back into selenate back into the environment. So that -- that's a concern.

637. Dr. Fennell stated at 23Tr, p.4908:

and the legend is down in the bottom there. You see that you have things already present in the water naturally occurring, aluminum, barium. We've got chromium, copper, iron, maganese, mercury, selenium. We've got, looks like, zinc, uranium, silver. All of these things are actually already in the water, which is telling you that they're already able to be mobilized. And so place on top of that a geochemical disturbance, and I don't know what could happen. And so I'm quite surprised that none of these things -- these are harmful trace elements -- weren't really looked at a little bit more closely. I know

638. Benga says it is going to create a Permanent Selenium SBZ Landfill on the mine site and keep it anoxic or suboxic forever; see 17Tr, p.3465, L.10-15.

639. Given the information in Table B6 that the groundwater is already in an oxic state, and that any infiltrating precipitation will also be oxygenated due to its contact with the atmosphere, Benga may not be able to keep its Permanent Selenium SBZ Landfill anoxic or suboxic, leading to the risk of remobilizing any sequestered selenium at some time in the future.

640. PDF pg.251 in Appendix 10 of CIAR 42:

> **5.2 Groundwater Quality**
>
> Due to limited data availability, certain parameters have not been analyzed for in groundwater including beryllium, bismuth, lithium, molybdenum, ammonia, phosphorus, tin, strontium, titanium, thallium, vanadium and zirconium. For these parameters no source term was included for groundwater and the concentration was assumed to be 0 mg/L. The data was assumed to be of good quality, and SRK did not perform any additional QA/QC procedures on the data. The data set has the limitation of containing a short data record with few samples that may not reflect the complete range of concentrations in the area.

641. Benga states in Appendix 10 of CIAR 42 that "Due to limited data availability, certain parameters have not been analyzed for in groundwater including beryllium, bismuth, lithium, molybdenum, ammonia, phosphorous, tin, strontium, titanium, thallium, vanadium, and zirconium. For these parameters no source term was included for groundwater and the concentration was assumed to be 0 mg/L". Some of these elements are considered toxic to aquatic life.

642. The 2018 AEP long term chronic guideline for the protection of FWAL for ammonia is listed in CIAR PDF 850, PDF pg.36.

643. The 2018 AEP long term chronic guideline for the protection of FWAL is 73 µg/L for molybdenum; see CIAR PDF 850, PDF pg.34.

644. The 2018 AEP long term chronic guideline for the protection of FWAL is 0.8 µg/L for thallium; see CIAR PDF 850, PDF pg.36.

645. When faced with no data for chemical constituents, it is common to use some percentage of the respective method detection limits (e.g. 50%) so that impact modelling can be done in a conservative manner. Mr. Jensen agreed with that approach at 17Tr, p.3629, L.19-24.

646. SRK choose not to employ this common conservative approach in its impact modelling because Mr. Jensen said it was "completely irrelevant" to the outcome of the model; see 17Tr, p.3629, L.25 to p.3631, L.3. This is another example of SRK and Benga failing to model a reasonable worst case scenario.

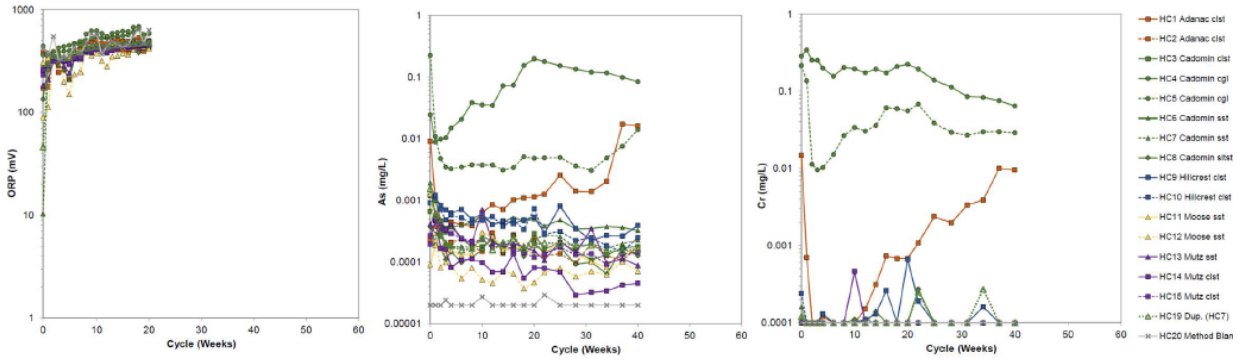
647. The speciation of trace elements like arsenic, chromium, selenium, etc. will determine their mobility and toxicity characteristics. Coal consists of carbon, which is an organic substrate and a food source for native bacteria. Coal fines will be part of the sediment loading to the ponds and EPL. The influence of this organic substrate has not been incorporated into the assessment of geochemical conditions and the influence on element speciation and mobility in those containment structures has not been assessed.

648. As noted above, the sedimentation ponds are designed to receive coal fines and other particulate matter from the mine workings and contain them from the surrounding environment. These fines will have elements associated with them that may be harmful if released later on by geochemical reactions in the ponds.

649. Conditions in the saturated backfill zones SBZs will be reduced to suboxic and possibly anoxic to promote precipitation and sequestration of selenium. The creation of these anoxic or suboxic conditions increases the risk of mobilizing other harmful trace elements (like arsenic). Benga has not assessed this risk, which is a serious deficiency in the assessment process that could lead to unintended consequences. So much attention has been placed on selenium that other harmful elements have been completely overlooked by Benga.

650. As Dr. Fennell noted in his Slide No. 26 in CIAR 875875 ~ discussed at 23Tr, p.4905, L.20 to p.4906, L.20:

Humidity cell tests



Appendix 10, Appendix H, PDF pg. 117-216 of CIAR #42

Benga's testing of the various bedrock formations indicates that mobilization of harmful trace elements is possible under oxic conditions, but they did not investigate mobilization potential under sub-oxic or anoxic conditions. They also did not assess mobilization potential from formations beneath the mine footprint, unlined rock dumps and water management ponds.

651. This is another example of Benga failing to consider a reasonable worst-case scenario.

652. Mr. Day confirmed that it is clear from the HCTs that when oxic conditions exist selenium, and other harmful trace elements, increase in concentration; see 17Tr, p.3631, L.4 to p.3632, L.3. The success of the SBZs to sequester selenium is dependent on the conditions in those structures remaining anoxic or suboxic. How will Benga ensure that the SBZs remain anoxic or suboxic in perpetuity after Benga is gone from the scene?

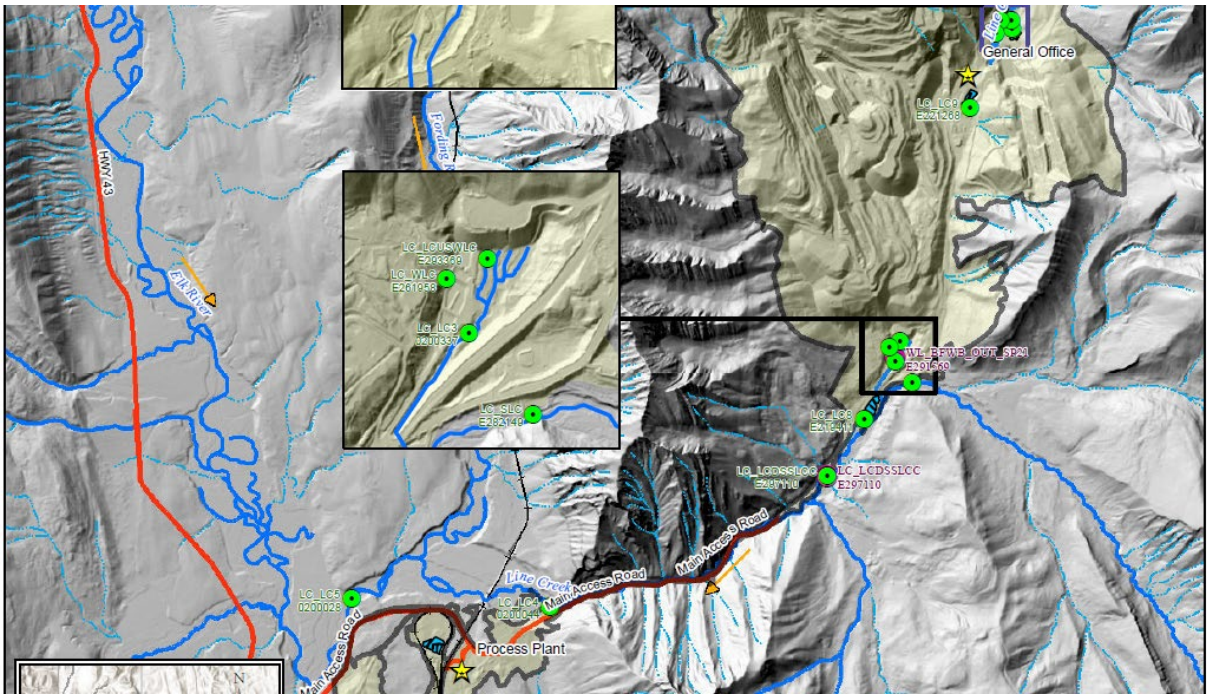
653. Mr. Jensen confirmed that dosing of the SBZs with an organic substrate will likely have to occur to promote the reduction in redox conditions necessary to precipitate and sequester the selenium. Benga has not looked into how this will affect the mobility of other harmful elements like arsenic, chromium, cobalt, copper, lead, mercury, molybdenum, nickel and is taking a wait and see approach; see 17Tr, p.3634, L.14 to p.3635, L.13.

654. Monitoring conducted in 2018 by Teck Resources Limited (Teck) in the Elk Valley to the west of Benga's Grassy Mountain project has identified the presence of elements such as cadmium, cobalt, chromium, nickel, uranium and zinc which exceed the guidelines for the protection of freshwater aquatic life. The same can be expected for Benga's project given the similarity of the formations. This begs the question why would we want to create another problem area in a very sensitive watershed in the Rocky Mountains when we are already dealing with one a few valleys over to the west.

655. In Teck's Monitoring Report for 2018, LC-WLC is listed in Table 4 on PDF pg.25 of CIAR 895 as "Receiving Environment – West Line Creek". Blairmore Creek and Gold Creek will be the receiving environment for Benga's project.

656. In Teck's Monitoring Report for 2018, exceedances the guidelines for the protection of freshwater aquatic life for cadmium (pg.4856), mercury (pg.4860), selenium (pg.4862), uranium and zinc (pg.4864) were reported at Station LC_WLC. The data for LC_WLC starts at PDF pg.4856 of CIAR 895.

657. Teck's LC_WLC monitoring station is located at the south end of the Teck's mining operation. See the lower left inset panel of Map 3 on PDF pg.160 of CIAR 895:



658. Benga has not assessed the risk that their operation might have on the concentrating, and potential release, of naturally occurring radioactive materials (NORM) or technically enhanced naturally occurring radioactive materials (TENORM) into the local environment. Mr. Houston said Benga did not think it was important; see 17Tr, p.3641, L.12-21. Yet, we know this is occurring at Teck's operations. This is another example of Benga failing to model a reasonable worst case scenario.

659. Mr. Houston also said that he did not know if the rocks in Teck mining operation were the same as the rocks that Benga would be mining on Grassy Mountain; see 17Tr, p.3641, L.22 to p.3643, L.10. This is a strange response given that both mining operations are in the Mist Mountain formation.

660. As noted by Dr. Fennell in Slide No. 30 in CIAR 875 ~ discussed at 23Tr, p.4913, L.1 to p.4915, L.17:

> Benga has placed considerable focus on Se, and less so on others. However, there is direct evidence at other nearby metallurgical coal operations mining the same rocks (Mist Mnt. Fm.) that the release of other harmful trace elements is occurring, and at concentrations exceeding freshwater aquatic guidelines (including NORMS).

661. There is a lot of faith being place in the SBZs to attenuate selenium. The retention factors are being communicated by Benga very high at 95% and it is likely that this capture efficiency will be much less given some of the expected geochemical complications (e.g. pH, CO2 levels, redox conditions). What will be the time lag between when Benga finds out that the SBZs are not working as planned and when suitable water treatment can be deployed?

662. As Dr. Fennell noted in his Slide No. 25 in CIAR 875 ~ discussed at 23Tr, p.4903, L.16 to p.4905, L.19:

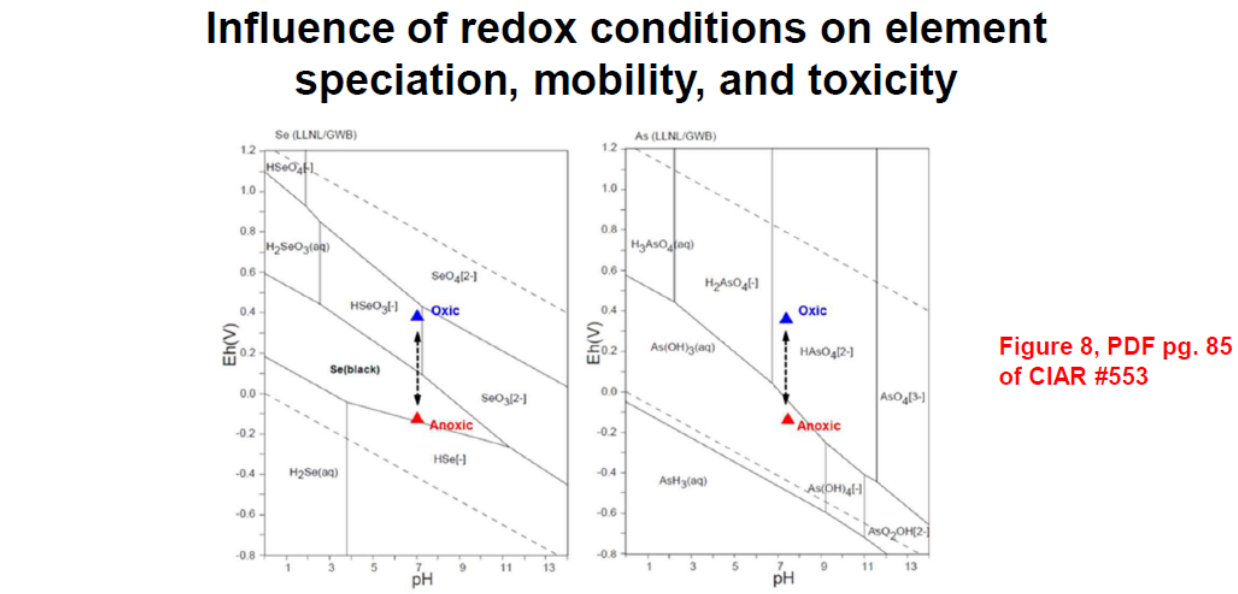


Figure 8, PDF pg. 85 of CIAR #553

Benga proposes to create and maintain sub-oxic conditions in the SBZs to sequester Se (with high efficiency), but they have not considered how this might mobilize other harmful trace elements that will eventually discharge to local water bodies. They have also not explored how Se mitigation success might be hampered by lower than anticipated redox, or Eh, conditions (e.g. HSe^-, hydrogen selenide).

663. Dr. Fennell stated at 23 Tr, p.4905:

And so -- you know, Benga has proposed to create this -- this -- these SBZs to sequester the selenium with -- with high efficiency, which I -- which I have a hard time believing that that's the efficiency that's actually going to occur, and they haven't considered how they might mobilize other harmful elements, like arsenic or chromium or cobalt or uranium or any of these other things, and when -- when these reox conditions are changed. And that's not just in the SBZs; this is in the ponds that -- as well as at the base of the rock dumps.

664. This is another example of Benga failing to consider a worst-case scenario.

665. Benga has no intention of lining the areas beneath the surge and sedimentation ponds to ensure that leakage of contaminants does not occur into the groundwater that ultimately

discharges to springs, tributary streams and Blairmore and Gold creeks. If Benga can use geomembrane liners under rock (for the gravel bed reactors), it should also use geomembrane liners under the surge and sedimentation ponds. This, of course, does not deal with the large waste rock areas, which are also planned to be unlined and in direct contact with bedrock that is likely fractured.

666. Adaptive Management seems to be the over-arching solution to contaminant issues that are not completely understood at this point in time. This is a reactive stance with no guarantee of success and not appropriate given the unique features and risks associated with the Project area.

5.4.1.6 Conclusion on Models used by Benga to support its application to remove the top of Grassy Mountain

667. Dr. Fennell discussed Models in the context of decision-making in Slide No. 3 in CIAR 875 ~ discussed at 23Tr, p.4843-4847:

Models in the context of decision-making

1. Models are a gross simplification of natural geological, hydrogeological, hydrological, and geochemical conditions *(it is hard to mimic nature with high degree of accuracy)*.
2. Models require a suitable amount of base information to reduce assumptions and lead to better results *(less data = less accuracy)*.
3. Model outputs are highly influenced by complexities in actual conditions, and are subject to propagating errors where conditions are not well-known or constrained.
4. Models produce non-unique results, with similar results being achieved using different combinations of input parameters *(i.e. curve-fitting)*.
5. Models can be helpful in determining the direction things may go, but are challenged when trying to simulate absolute magnitude.
6. Models are only as good as the individuals building them, and are not meant to replace human intelligence *(different results will be obtained by different modellers, and some modellers are better than others)*.

668. In relation to point no. 5 above Dr. Fennell stated at 23Tr, p.4846:

> Next, models can be helpful in determining the direction that things may go, but they're challenged when trying to simulate absolute magnitude. And when we're talking about things like base flow or drawdown, that's important, because that has implications for water bodies. A drawdown of half -- half a metre may not seem like much, but it could be quite a lot for -- for a water body that is having groundwater discharging into it. When you're talking about magnitudes higher, like 5 metres, that's -- that is huge, and so that can -- that has serious ramifications. So this is -- this is an important aspect.

669. Dr. Fennell discussed the model assumptions used by Benga in Slide Nos. 4 and 5 in CIAR 875 ~ discussed at 23Tr, p.4848-4853:

Model assumptions used by Benga (CR #3, pdf pg. 36, CIAR #42)

- *"For the purposes of the assessment, the entire rock/sediment package may be treated effectively as a homogeneous, anisotropic medium".*
  - *an understandable assumption; however, the complexity of the strata and likely presence of active and open faults and fractures will adversely affect this condition*
- *"The system will largely behave as a confined aquifer, although it can effectively represent unconfined conditions where these occur".*
  - *a reasonable assumption*
- *"On the scale of the assessment, groundwater system flow, which is expected to occur dominantly via fracture flow, can be approximated by an Equivalent Porous Media (EPM) model".*
  - *a reasonable assumption*
- *"K (hydraulic conductivity) is largely anisotropic, with highest K parallel to bedding planes/coal seams and to thrust fault strike with lowest K perpendicular to bedding. In general terms, K, in all orientations, decreases with depth, according to the model proposed by Wei et al. 1995".*
  - *the presence of faults and fracture networks acting a groundwater flow pathways will adversely affect this assumption*

- *"Apart from preferential flow parallel to fault strike, there is no major fault acting as a significant conduit and no major regional deep flow influences".*
  - *this is an unrealistic assumption; there is no proof to substantiate this claim as no investigation was conducted*
- *"Recharge follows the same spatial trend with elevation as precipitation. The precipitation, evaporation and evapotranspiration mechanisms are not explicitly modeled but assumed to be integrated as "net recharge". It is assumed that this approach will not unduly bias the model".*
  - *the assumption of recharge has not been substantiated with any documented or field-based evidence*
- *"Water level data and creek flow data collected between late 2013 and early 2016 are representative of the pre-mining steady-state conditions and long-term trends".*
  - *the time horizon used is in no way representative given the extreme variability noted in creek flows as evidenced by the Water Survey of Canada gauging station "Gold Creek near Frank"*

670. Some of the model assumptions relied on by Benga are simplistic, unrealistic, unsubstantiated and unrepresentative.

671. Benga relies on SRK's Groundwater Numerical model results and SRK's GoldSim model results to suggest that the project's adverse environmental effects will be "not significant". As noted above in the Water Section of this argument, the models are seriously flawed, reasonable worst-case scenarios have not been assessed, and the SRK model results should not be relied upon by the JRP to assess the risks posed by this Project.

672. The Coalition does not agree with Benga's use of the SRK Groundwater Numerical Model 2016 to evaluate a worst-case scenario for the groundwater flow and baseflow reduction impacts in the Grassy Mountain area.

673. Coalition does not agree with Benga's use of the SRK GoldSim Model to evaluate a worst-case scenario for the groundwater and surface water quality impacts in the Grassy Mountain area.

674. Dr. Fennell came to a number of conclusions about Benga's application as set out in Slides Nos. 31 to 33 in CIAR 875 ~ discussed at 23Tr, p.4915, L.18 to p.4918, L.13:

Major conclusions

1. Benga's conceptual models of the Grassy Mountain area are not consistent with actual conditions, which are much more complex and variable than considered.
2. Benga's findings are predicated on model simulations that are subject to many assumptions and limitations that substantially affect the final results (e.g. overly optimistic capture efficiency for Se in SBZs).
3. Benga's physical and chemical models are constrained with limited information (i.e. control points), and do not honour the range of variability expected for the geologic, hydrogeologic, hydrologic, and climatic conditions of the area.
4. Benga's models have concluded that the effect of drawdown from the mine development, and release of contaminants to the local water bodies, will not results in adverse impacts. This is predicated on overly optimistic conclusions.
5. Benga has not used a suitable range of variability in their assessment of hydrology and climate consistent with historically-measured values or paleo-records.
6. Benga has not fully assessed how geochemical conditions will influence the mobility and toxicity (i.e. speciation) of metals and trace elements likely to be released from the mine development and closure landscape.
7. Benga has relied on "average" conditions in many cases and has not sufficiently provided conservative, or "worst-case" scenarios to support the decision-making process.
8. Benga is overly confident that their monitoring will be successful in detecting contaminants originating from the mine and closure landscape, and that mitigation measures will be successful well into the future.
9. Benga has relied too heavily on "Adaptive Management" to deal with a limited understanding regarding irreversible changes to the water table, water balance, and geochemistry that will permanently impact area ecosystems.
10. Benga's consistent impact ratings of "not significant" are inconsistent with the removal of a mountain, re-distribution of the waste rock, creation of large Se management areas, and permanent disturbance to the local watersheds.
11. The risk of creating another "Elk Valley" situation, where attempts are still being made to mitigate the impacts, is "significant" and needs to be considered in any decision regarding this Project.

675. Dr. Fennell stated at 23Tr, p.4918:

> And finally, you know, I think this is something we really need to -- to take to heart. The risk of creating another Elk Valley situation, which is very likely in this case, where -- you know, Teck has been spending a lot of effort trying to mitigate -- to understand and mitigate the impacts. This is a significant risk and -- and certainly needs to be considered in any decision regarding this project.

676. The risk of Benga creating another Elk Valley situation at Grassy Mountain is very real and cannot be discounted based on the flawed modeling results used to support conclusions that the Project will not create significant that will propagate well into the future.

677. The JRP should come to the conclusion that in the event of a reasonable worst case scenario, the project as proposed by Benga cannot assure the safety of Gold Creek and the WSCT, and that the risks to Gold Creek and the WSCT are unacceptable. Therefore, Benga's application should be denied.

678. The Coalition also relies on Dr. Fennell's closing comments on Benga's Water Topic Block evidence at 23Tr, p.4921, L.16 to p.4926, L.18.

5.4.1.7 Comments on Benga's Final Argument relating to Dr. Fennell

679. Reading Benga's comments in their Final Argument, they are basically just re-stating what they had in their EIA documents. Nothing new.

680. It seems their main tactic is to try and discredit reasonable and supported evidence by deflecting. For example: "Dr. Fennell reached far beyond his expertise as a hydrogeologist and hydrochemist when he spoke of Canada's climate commitments…". The Coalition does not believe this is pertinent to concerns regarding Benga's application and the lack of sufficient evidence to back up their arguments. In any event, Dr. Fennell has climate-related expertise. As noted by Dr. Fennell at 23Tr, p.4840:

> Lastly, I have sat on a number of boards and panels to provide support on water and climate-related issues and have appeared a number of times before review panels such as this, both on the industry and public side, providing evidence and testimony to assist with project reviews and approval decisions.

681. With respect to the trellis-style drainage as evidence of west-east faulting, it seems the Undertaking No. 23 (CIAR 924) that Dr. Fennell provided did not educate Benga or their counsel sufficiently and was just inconvenient information (backed up with references). It is clear that the drainage pattern in the study area is complex and controlled to some degree by fracturing and faulting…. a hybrid system as documented in Undertaking No. 23. It is obvious Benga does not understand or does not want to understand this conclusion due to its inconvenience.

682. When presented with clear evidence from their own work on fracture patterns in the area (which clearly indicate a west-east fault pattern), they impose tilting as a mechanism to remedy and reduce impacts to a larger extent of drawdown. Very convenient but certainly not a valid argument to deal with the limitations of their models to reflect actual conditions.

683. Benga's position that mountain front and mountain block recharge assessed somewhere else in the world will not follow the same laws of physics in the study area is simply wrong. It is clear they do not understand, or do not want to understand, this concept as they continue to express a position that is unsupported by any clear evidence.

684. It is clear that they do not understand what their model is doing regarding recharge. The 28%, as stated by them, is an "average" over the entire model domain, and the values we noted in the high recharge area of the Gold Creek catchment are on the order of 55% or greater using their information. That level of recharge is unheard of, and certainly not documented anywhere in the world.

685. The fact that they did not indicate the full extent of drawdown from mine dewatering, by only showing where the 5m drawdown contour exists, is another crafty tactic on their part. The fact is, drawdown will obviously extend further out to a 4-, 3, 2 and 1 m isoline and at some point a zero effect. This has not been acknowledged. Any amount of drawdown reaching Gold Creek will intercept groundwater that would eventually get there to form baseflow and will inevitably capture, or pull in, water from the creek itself. As such the combination of excess recharge and muted drawdown due to lack of west-east faults in the model reduces the impact to baseflow reduction in the creeks. Another convenience to Benga's benefit. If the model had been properly constructed we would

have seen even more baseflow reduction, so what they are presenting is understated and unrealistic.

5.4.1.8 Comments on Mr. O'Gorman's Wrap Up Questions to Benga

686. Mr. O'Gorman asked Mr. Houston the following "wrap up" questions at 21Tr, p.4595:

> This one is for you, because it's a big overall wrap-up question, and those are your -- those are your bailiwick, as I understand.
>
> So if I think about the whole range of sorts of water and aquatic habitat issues that we've heard about this week and through four years of regulatory process, we've got some uncertainties about potential impacts at levels of selenium and what their impacts may be along with -- that's been discussed a lot. We've got some uncertainties around potential for sulphate toxicity, predicted concentrations. Some of the modelling used all this reaching in excess of a thousand milligrams per litre. We've got some exceedances of water quality guidelines for some other items, which we haven't even talked about today, but I'm actually going to come back to in my real, final wrap-up question for this panel. So maybe this is a bit out of order. My apologies. Again, it's late in the day.
>
> We've got, you know, concerns about potential shift, maybe, in the phosphorous concentrations in Blairmore Creek that might shift the trophic status of that creek; that was raised in some of the hearing

materials. We haven't talked about it in this part of the hearing so far, but it's been said.

There's potential for calcite deposition, you know, if -- in light of predicted hard -- increases in hardness.

I guess we're curious about whether you conducted, from your perspective, a real, thorough cumulative effects assessment of all of these issues on westslope cutthroat trout and how, looking at all these uncertainties, we can have confidence as a Panel about what the possible impacts to the trout and their habitat are going to be?

687. Mr. Houston had a long answer, part of which was at 21Tr, p.4597:

So I think from -- from where we sit, the westslope cutthroat trout in Gold Creek are going to benefit from this project, benefit in the implementation of the offsetting plan, cleaning up the -- or getting the creek back into the -- the original creek bed, adding some overwintering habitat, replacing the riparian habitat that we -- we will have to take out as a part of the -- the mining project.

688. The Coalition would like to comment on Benga's response. The Panel needs to seriously question the efficacy of Benga's work to assess the cumulative effects of all these issues on the WSCT survival. To date the main focus has been placed on Se and a few other constituents, at the expense of all the other contaminants and potential effects you have pointed out. That shows Benga's lack of understanding about how their project is going to affect the region, during operation and into perpetuity.

689. It is apparent Benga has not done any work to understand synergies between contaminants or project effects and how those aspects will increase the risk to WSCT

survival, not to mention the overall health of both Blairmore and Gold creek watersheds. Benga remain convinced that they are going to "improve" the conditions for the WSCT via engineered solutions with very little to show, if anything at all, that what they are proposing will work. We also don't know what their manipulations of the environment will do to create conditions that work against their stated goals. This speaks to Benga's over-confidence and arrogance that they actually know what is going to happen and they will be able to deal with it sufficiently.

690. It is abundantly clear that Benga has provided no substantive evidence to their claims of how Se mitigation will work other than pointing to Teck's operations. The fact is, their proposed approaches are only conceptual notions based on unsubstantiated assumptions. If we look at what is going on in the Elk Valley today, there is a good chance that we will create the same situation here decades down the road. No sufficient reason, or reasons, to believe otherwise have been provided by Benga. If we knew then what we know now would we have approved all those projects in the Elk Valley? At the very least it seems appropriate that an applicant that wants to take down a mountain and permanently alter the landscape do a full, holistic assessment of the risks to species like WSCT before the decision is made to destroy some of the last remaining habitat for these listed species. That is not an unreasonable request.

691. Mr. O'Gorman then had some "final questions" for Benga which started at 21Tr, p.4600:

> Alberta guidelines for chromium, cobalt, ammonia, and nitrate and the Canadian environmental quality trigger value for phosphorous in oligotrophic systems. We've already pointed out and we've discussed that the modelling of selenium and sulphate concentrations in that appendix produces predicted mean monthly concentrations which are higher than those referenced by Benga in its derivation of the proposed site-specific water quality objective for selenium. It's higher than concentrations used in sulphate toxicity tests conducted by Benga. And on top of that, you've also produced Benga's produced predicted water

quality in the end-pit lake. Predicted concentrations of various contaminants in there are a cause for concern. Several predicted contaminant concentrations exceed guidelines, sometimes substantially, including selenium, arsenic, cadmium, cobalt, copper, nickel, and zinc.

And I will clarify -- I said I wasn't going to freestyle -- but we are saying you predicted for all of those various contaminants a -- you know, constant exceedances but exceedances that vary at points in times above guidelines.

So this morning in response to one of my questions, we -- well, in various ways we heard Benga express some reservations about the modelling used to produce the predictions in that appendix in Addendum 11, which was submitted just in earlier 2020. However, as we've noted before, conservatism is the underlying basis for our deliberations in this process. So I would like to ask two questions now, with that preamble, and I will read them both together.

How confident are you, based on your modelling results in Addendum 11 for Blairmore Creek and Gold Creek, that the predicted concentrations, especially ammonia and phosphorous -- but also all the concentrations, since all of the contaminants will be

present together in the receiving environment -- how confident are you they will not represent a significant adverse effect to the aquatic environment, particularly to westslope cutthroat trout, during the years of operation and into the first years of post-closure? That's Part 1.

How confident are you, based on your modelling results that we've just discussed, for the -- in Addendum 11 -- sorry, for the end-pit lake that the predicted concentrations of contaminants of potential concern will not represent a significant adverse effect to the aquatic life in the end-pit lake that might, you know, be there in the foreseeable future?

And Part 3: Given uncertainties associated with the predicted concentrations and the potential consequences to aquatic life, notably to the westslope cutthroat trout, would Benga deploy treatment from the start for these additional contaminants of potential concern that are predicted to exceed guidelines, and I mean from the start of operations? This would include metals and metalloids, such as arsenic, chromium, and cobalt, as well as ammonia and phosphorous.

692. The Coalition would like to comment on Benga's answers or non-answers to Mr. O'Gorman's final questions. The lack of attention to the other harmful trace elements is frankly appalling. Any proper risk assessment to support a regulatory decision on such a destructive project would have addressed all of this before such final questions. In fact, the final questions should never have been needed in the first place if the proper work had been done. Instead, Benga has provided a very narrow window of assessment that provides a false sense of security that they actually know what will happen when they take down a mountain, redistribute the waste rock across the landscape, permanently alter

the water balance of two watersheds supporting sensitive fish species and their habitat, permanently change the groundwater flow conditions, and create large Selenium management areas that will likely require perpetual care and maintenance.

693. It is clear that Benga has not taken a conservative approach despite their rhetoric to the contrary. They have used unrealistic constraints in their physical and chemical modelling and have failed to accommodate the degree of variability in conditions that seriously affect model outputs. What they have presented is the opposite of worst-case…they have presented an optimistic case to advance their application.

694. All of this this undermines the confidence that Benga is sophisticated enough pull this project off with "not significant" effects. The fact that Benga is resistant to investing in a metals plant from the "get-go" (to use Mr. Houston's words) when we know that metals, trace elements, and even NORMS will be, or are likely to be, an issue is appalling. This type of attitude does not deserve to be reinforced by a project approval. If they really want to develop this project, they should do the work necessary to convince decision-makers and local stakeholders that they know what they are doing and have all the angles covered.

695. The blanket use of Adaptive Management to address their ignorance regarding project effects that will propagate into the future is totally unacceptable. Frankly, the fact that these many questions remain after so many years of studies and documentation is an indication that this project is ill-conceived, overly optimistic, and unrepresentative of the site conditions, and therefore stands a good chance of creating another Elk Valley here in Alberta. The decision to approve such a poorly assessed project today will resonate into the future. The decision to deny the application should be an easy one, given the lack of supporting evidence to provide comfort that the project will be successful from an environmental and overall sustainability point-of-view.

5.4.2 Aquatic Resources including Fish and Fish Habitat and Fish Species At Risk

5.4.2.1 The Coalition evidence

696. Mr. Allan Locke's pre-filed evidence entitled "Environmental Flow Recommendation Approach to Blairmore and Gold Creeks, Alberta" is set out in Appendix E of CIAR 553, PDF pg.134-146. His direct evidence was given at 22Tr, p.4818-4824. There is no mention of Mr. Locke's pre-filed evidence in Benga's Response Submission CIAR 571. There was no cross-examination of Mr. Locke by Benga; see 22Tr, p.4824, L.22-24. Benga's Final Argument addresses Mr. Locke's evidence in paragraphs 415 and 416. In paragraph 416 Benga said it generally agreed with Mr. Locke's recommendation.

697. Mr. Lorne Fitch's pre-filed evidence entitled "Grassy Mountain Coal Mine Review, with particular reference to possible impacts on "Threatened" Westslope cutthroat trout" is set out in Appendix G of CIAR 553, PDF pg.161-198. His direct evidence was given at

23Tr, p.4926-4952. There is no mention of Mr. Fitch's pre-filed evidence in Benga's Response Submission CIAR 571. Benga's cross-examination of Mr. Fitch was less than 14 pages of transcript; see 23Tr, p.4997, L.8 to p.5010, L.26. Benga's Final Argument addresses Mr. Fitch's evidence in paragraphs 417-426.

698. Dr. John Post's pre-filed evidence entitled "Submission from Dr. John R. Post, Professor, University of Calgary" is set out in Appendix J of CIAR 553, PDF pg.219-221 and in his PowerPoint marked as CIAR 874. His direct evidence was given at 23Tr, p.4958-4987. There is no mention of Dr. Post's pre-filed evidence in Benga's Response Submission CIAR 571. Benga's cross-examination of Dr. Post was less than 11 pages of transcript; see 23Tr, p.4987, L.25 to p.4997, L.7. Benga's Final Argument addresses Dr. Post's evidence in paragraphs 412-414.

5.4.2.1.1 Mr. Allan Locke

699. Mr. Locke was very clear in his pre-filed evidence in CIAR 553. His Executive Summary was as follows at PDF pg.136:

> Based on the review of the Proponent's report, it is recommended that additional assessment be carried out using the existing data. Recommendations for further analysis include:
>
> - in addition to micro-habitat data, include meso-habitat data to develop a percent of flow reduction criterion,
> - develop several metrics and thresholds to assess effects of changes in flow for chronic (long-term) impacts, intermediate (medium-term) impacts, and acute (short-term) impacts, and
> - develop an ecosystem baseflow criterion that will be included in the environmental flow recommendation for Blairmore and Gold Creeks using both micro- and meso-habitat data.
>
> Public involvement and support are critical elements of environmental flow studies. The public has a vested interest in natural resources management because they are the ones for whom natural resources are held in trust. The public has a legitimate right and responsibility to be involved in the water management decision-making process. It is further recommended that all discussions for developing a fully protective environmental flow regime for Blairmore and Gold Creeks includes: the Proponent, the provincial and federal regulators, the Coalition, and any other interested party.

700. Mr. Locke was not cross-examined by Benga. As noted in paragraphs 415-416 if its Final Argument (CIAR 962, PDF pg.107), Benga "generally" agreed with Mr. Locke's evidence and recommendation.

701. In paragraph 380 of Benga's Final Argument, Benga is of the opinion that pools are needed for over wintering and they will build them. But of course, all the other habitat types are also required. The Coalition notes that if an intervener's expert witness states something that fits the narrative of Benga, the witness is judged in Benga's eyes to be

"correct". If an intervener's expert witness states something that does not fit the narrative of Benga, the witness is judged by Benga to be "incorrect".

702. With respect to paragraph 414 of Benga's argument, Mr. Locke's statement regarding the lack of over wintering pools was generic regarding all east slope streams based on five references. Dr. Post's evidence was specific to Gold Creek. Benga has over-simplified the situation. The Coalition believes Benga is "not correct" in describing these two statements as being contradictory. Mr. Fitch and Dr. Post have already addressed specifics about creating over-wintering pools in Gold Creek and whether they are "needed" and, whether they will persist over time.

703. With respect to paragraph 414 of Benga's argument, "This ecosystem base flow, combined with the percent of flow reduction factor, can then be used to set an environmental flow recommendation for Blairmore and Gold Creeks which will address the low flow periods in late summer and winter.603 Benga generally agrees with Mr. Locke's recommendation." The Coalition does not know how to interpret "generally agrees", but its best guess is that Benga means "no". As Mr. Locke stated in his written and oral evidence, he recommends a complete Environmental Flow analysis be carried out, one that fully protects the creeks. The incomplete analysis that was done by Benga has been used as the base upon which all the other ground and surface water aspects of the project have been evaluated. The Coalition cannot guess at how different the results of these analyses will be relative to a complete environmental flow determination, but it is reasonable to assume they will be different.

5.4.2.1.2 Mr. Lorne Fitch

704. Mr. Fitch was very clear in his pre-filed evidence in CIAR 553. His Executive Summary was as follows at PDF pg.161:

> The proposal details an open-pit, mountain-top coal strip mine, on top of a legacy coal mine on Grassy Mountain, north of Blairmore, Alberta. Watersheds on either side of Grassy Mountain will be impacted by this development. Gold Creek contains the last, major concentration of pure-strain Westslope cutthroat trout in the Crowsnest River watershed. Blairmore Creek has potential for recovery efforts to meet requirements for Westslope cutthroat trout, a federally and provincially listed "Threatened" species at risk. Westslope cutthroat trout have declined precipitously throughout their range in the Oldman and Bow watersheds, for a variety of reasons, most notably the impact of cumulative effects.

The proposed mine will negatively impact the existing Westslope cutthroat trout population of Gold Creek and the potential of Blairmore Creek for recovery efforts. Monitoring proposed by the proponent is not rigorous, robust or sensitive enough to detect changes and impacts in a timely manner for correction. Mitigation/compensation actions proposed are untested, unproven, unsuitable, theoretical and overly optimistic to ensure Westslope cutthroat trout populations persist and are allowed to recover.

The Westslope cutthroat trout population is currently vulnerable to existing land uses, which are beyond the range of natural variation these native trout evolved with and adapted to—the mine proposal puts the population at even greater risk.

The potential for an irreversible loss of a pure-strain population of Westslope cutthroat trout, locally adapted to Gold Creek is of such significance that this must become a dominant consideration in evaluating the advisability of the coal mine project.

705. Benga's cross-examination of Mr. Fitch did not put any dents into the conclusions that he reached in his pre-filed evidence which was based on his 50 years of experience; see 23Tr, p.4927:

25 By way of background, I'm a professional
26 biologist, a retired provincial fish and wildlife
1 biologist, and a former adjunct professor with the
2 University of Calgary. I have approximately 50 years
3 of experience in natural resource management.
4 In my time with the Alberta Fish and Wildlife
5 division from 1971 to 2006, I was a fisheries biologist
6 with inventory and research responsibilities from 1973
7 to 1980. A significant part was undertaking biological
8 inventories of Eastern Slope trout streams, including
9 detailed physical habitat measurements, water-quality
10 assessments, aquatic invertebrate population
11 investigations; and fish population, age, growth, and

12 distribution studies. This included an inventory of
13 the Crowsnest River watershed, inclusive of Blairmore
14 and Gold Creeks in 1976.

706. Contrary to what Benga has stated, seasonal dry channels are not a significant limiting factor for WSCT. Actually, these are not "dry" but only lack surface flow. These occur on many streams and because these are seasonal, they do not preclude movement of trout in other times. Benga has not provided details on how, in their offsetting plans, they would "correct" these seasonally dry channels.

707. As noted by Mr. Fitch, the restoration of damaged riparian areas is problematic since it is very difficult to re-establish suitable riparian plants on sites with invasive plant establishment, compacted soils, poor soil development, unstable stream banks and lack of shallow ground water.

708. With respect to paragraph 356 of Benga's Final Argument, it is one thing to assert Gold Creek has "suboptimal habitat", but it is another to actually provide any evidence, from other Westslope cutthroat trout streams to support that assertion. Benga has not done that basic level of comparison.

709. With respect to paragraph 357 of Benga's Final Argument, in a similar fashion, to assert Gold Creek "is not good habitat", without defining what "good" or "bad" habitats are, is an empty gesture.

710. With respect to paragraph 369 of Benga's Final Argument, Benga does not acknowledge that one primary reason for trout declines in Gold Creek are related to the 2015 event that allowed legacy mine spoil to spill into the stream, turning the stream black to the confluence with the Crowsnest River and possibly causing either a large fish kill, or interfering with successful spawning for several years afterwards.

711. Whether using Hatfield's population estimates or those of Jim Rennie, there has been a loss of Westslope cutthroat trout in Gold Creek related to the July 2015 legacy coal spoil pile failure. Benga was the property owner at the time of the legacy coal spoil pile failure. Benga's reliance on modelling to predict effects, like "negligible effects are anticipated on surface water quality from sediment related impacts", did not include information from the July 2015 event, even though it would have been useful (and honest) information. In Mr. Fitch's evidence he pointed out the disturbing trend in mountain coal mine failures of settling ponds and other erosion events, despite the use of engineering principles based on modelled results. The July 2015 event should emphasize the risk to aquatic resources from coal mining activity, both legacy and proposed, that cannot be mitigated.

712. With respect to paragraph 372 of Benga's Final Argument, more recent reviews of what constitutes critical habitat for WSCT by the Canadian Science Advisory Council (referenced in Mr. Fitch's pre-filed evidence) provide detailed advice on identification of critical habitat that include all of the floodplain or riparian zone. See the reference to Caskenette, Durchak and Enders (2020) at PDF pg.173 of CIAR 553.

713. At PDF pg. 174 of CIAR 553, Mr. Fitch stated:

> Lastly, the authors' review of Westslope cutthroat trout habitat concludes that, "this suggests the width of the meander belt should be considered as Critical Habitat. Due to its mountainous habitat, for Westslope Cutthroat Trout, slope in the remaining floodplain will determine the extent of the riparian features to be considered Critical Habitat, with sediment and vegetation playing lesser roles. Where slope is greater than 8%, the entire floodplain to the upland ledge will need to be protected to control erosion. Features that hold water and allow for infiltration (e.g., dense vegetation, wetlands) within the groundwater recharge area should be considered Critical Habitat to maintain areas of upwelling. In addition, riparian features adjacent to upstream habitat of aquatic Critical Habitat may be considered Critical Habitat to protect water quality, level, and flow. Finally, riparian habitat adjacent to migration and movement corridors connecting aquatic Critical Habitat may need protection to ensure water quality and flow."

714. With respect to paragraph 380 of Benga's Final Argument, Benga provided no evidence that wintering pools were lacking and hence limited the trout population in Blairmore or Gold creeks. They seem to have ignored the work by Benson 2019 (referenced in Mr. Fitch's pre-filed evidence at PDF pg.138, 141 and 145 of CIAR 553).

715. With respect to paragraph 381 of Benga's Final Argument, Benga's site selection for the artificial creation of wintering pools and the techniques for construction indicate these will not be successful in creating permanent features useful to WSCT. These sites will be subject to bedload movement, infilling and channel shifts as Mr. Fitch indicated in his pre-filed evidence.

716. With respect to paragraph 418 of Benga's Final Argument, Benga has confused restoring riparian areas subject to livestock grazing with remediation of industrial/mining sites. Grazing related restoration is a function of changing livestock intensity, timing of grazing and introducing rest when declines in riparian health are noted, where the essential pieces of riparian health still exist and will respond naturally. These include the presence of native plants, deep-binding roots from trees and shrubs and a stream channel that has not become deeply incised. This is contrasted with attempts to rebuild a riparian area where all the essential pieces have gone missing and the site is compromised by a combination of invasive plant species establishment, compacted soils, poor soil

development, unstable stream banks and a lack of shallow ground water. The latter is not the arena in which Cows and Fish operates and to conflate the two is erroneous.

717. Additionally, the quote in paragraph 418 of Benga's Final Argument about "hoof power" was taken out of context by Benga. This points out the effects of cattle grazing on riparian areas when they are wet, as in the spring. This becomes management advice to avoid riparian areas in such times, not an indictment about cattle grazing at other times of the year.

718. With respect to paragraph 420 of Benga's Final Argument, nowhere does Benga mention they would undertake changes to livestock grazing to benefit riparian areas on Blairmore and Gold creeks. All they have suggested is some remediation efforts on a few sites impacted by mining and the evidence is these will not materially add to WSCT trout habitat, even if they are successful.

719. With respect to paragraph 422 of Benga's Final Argument, up to the early 1970s riparian areas were considered "sacrifice areas" for livestock grazing and these areas suffered as a result. However, with better research, education and demonstrations of changes an appreciation of the ecological processes and service provided by riparian areas has changed grazing management practices. These practice changes have improved soil and water conservation, water quality, biodiversity and primary productivity. Mountain-top, coal strip mines remain "sacrifice zones", using the same techniques of removal of overburden, disposal in stream valleys with resulting change in hydrological response and water quality. To suggest mountain-top coal strip mines have evolved parallel to shifts in riparian grazing management practices is ludicrous.

720. With respect to paragraph 426 of Benga's Final Argument, noise, to a trout is vibration that can come from above the water surface, or below, transmitted through bedrock by nearby blasting, heavy equipment usage and truck traffic.

5.4.2.1.3 Dr. John Post

721. Dr. Post was very clear in his pre-filed evidence in CIAR 553. His Conclusions were as follows at PDF pg.221:

Conclusions

Westslope Cutthroat Trout of the East Slopes of southern Alberta are a *SARA* Listed Threatened species that has undergone substantial range contraction due to anthropogenic threats. Of the approximately 274 abundant stream populations that occurred historically in Alberta, only 50 small remnant pure populations remain (many of these populations contain less that 100 individuals). Province wide abundance has been estimated to be less that 5,000 mature WSCT. Unless current threats are effectively ameliorated, the species will become Endangered or Extirpated (COSEWIC 2016). This mining development proposal will further destroy Critical Habitat for the species. Although offsetting is proposed, there is no evidence that it will be effective in supporting the short or long-term persistence of the species. The proponent is committed to a substantial monitoring plan, but without evidence to the contrary, it will likely be useful only as documentation of a further reduction in the viability of one of the largest of the remaining locally adapted populations of WSCT in Alberta. This habitat destruction will likely result in, what was at one time the most widely distributed native trout in Alberta, WSCT becoming Endangered if these incremental losses of Critical Habitat are allowed to continue.

722. Benga's cross-examination of Dr. Post did not put any dents into the conclusions that he reached in his pre-filed evidence which was based on his many years of relevant experience; see 23Tr, p.4959:

A Certainly. I obtained a PhD in 1987, which seems like years ago -- it is -- from York University in Toronto dealing with population dynamics of freshwater fishes.

Since 1991, I've been a professor at the University of Calgary focusing on fish ecology, conservation, and management.

I'm in my 11th year of an appointment as a member of the Committee on the Status of Endangered Wildlife in Canada that, as I guess everyone knows, makes recommendations to the federal minister of Environment and Climate Change about at-risk species, all species in Canada, from mosses and lichens, to whales. And my primary duty on COSEWIC is as co-chair to Freshwater Fishes Specialist Subcommittee that reviews science dealing with at-risk fish species in -- in Canada,

makes recommendations to COSEWIC that then take it to the federal minister.

I'm also a former associate editor of the Canadian Journal of Fisheries and Aquatic Science, which is a leading international journal in fisheries and aquatic science.

As a fisheries scientist, I have about 120 peer-reviewed publications in national and international journals and books, and many other written and oral communications in fisheries sciences. These are all listed in my CV, which is 40-plus pages, and I'm more than happy to talk about any of that. But I focused here on the primary roles that I have -- that I played that are pertinent to our discussions today.

723. Benga stated in paragraph 412 of its Final Argument, "It is not clear whether Dr. Post reviewed the EIA at all. The brevity and lack of specificity in Dr. Post's report suggests that at best, Dr. Post undertook a cursory desktop review of just enough documentation in the EIA to support the conclusions he had drawn before ever looking at the Project's details". This assertion is inaccurate. Two months is plenty of time to do a deep-dive into the EIA and clear and concise is the gold standard in science. In fact, Dr. Post conducted a thoughtful overview of the EIA and its conclusions.

724. Benga stated in paragraph 413 of its Final Argument, "Dr. Post introduced new evidence in a PowerPoint presentation, including calculations not included in his report." In fact, Dr. Post provided two simple divisions (fish divided by pools for each creek) as evidence in the oral presentation that were not in the written submission. These individual estimates were reported in the EIA and discussed on multiple occasions during the course of hearing, so it was not new information. The remainder of the Dr. Post's oral PowerPoint presentation was a description of the evidence and conclusions from his pre-filed written submissions. It is ridiculous for Benga to argue that "The Panel should give this evidence very little, if any, weight, given its inappropriate introduction". It appears to the Coalition that Benga did not find Dr. Post's evidence favourable to approving their development proposal, and therefore they felt that they needed to discredit Dr. Post's expert witness submissions.

725. The Coalition notes that Benga's cross-examination by Benga of Post was strictly procedural, and there was no questioning of the veracity of scientific evidence presented by Dr. Post, in either the written submissions or PowerPoint presentation. The logical conclusion from Benga's cross-examination is that Benga had no counter evidence, and that Dr. Post's opinions are correct.

726. Many times in the EIA, and in the oral hearing, Benga asserted that the Gold Creek habitat was of "poor quality". This was repeated in the Benga's Final Arguments – for example, paragraphs 356, 357, 379 and 380. Evidence presented in COSEWIC (2016), and reiterated by Dr. Post, was that Gold Creek had the 6th largest pure WSCT population in Alberta. This is consistent with the Alberta FSI, although as referenced, the FSI is at a scale larger than individual creeks. The proper conclusion to be drawn is that the current habitat of Gold Creek is clearly capable of supporting a large and robust WSCT population.

727. Construction of overwinter pools is presented as a primary offsetting measure to counterbalance the elimination of critical habitat in Gold Creek (see paragraphs 380-381 of Benga's Final Argument). In fact, there is no evidence presented in the EIA, or during the hearing, that overwinter pool habitat is limiting WSCT in Gold Creek and therefore no evidence that constructing more overwinter pools is an effective offset. In fact, the available data collected by Benga, and the MSc thesis by Benson, suggests that it is not limiting in Gold Creek. In addition, there is no evidence presented in the EIA that artificially constructed pools will function as winter refuge, with sufficient upwelling to reduce frazil ice, and that they will persist beyond the next freshet. The proper conclusion to be drawn is that there is no evidence that creating artificial overwinter pools in Gold Creek will enhance threatened WSCT and therefore it is not a viable offsetting proposal.

728. Mr. Locke's statement re: overwinter pool habitat is correct as a general statement about trout in creeks in the temperate zone – shortage of deep complex habitat can limit trout abundance. But Dr. Post's opinion is that overwinter pools appear to be relatively abundant in Gold Creek, and this is one of the reasons why Gold Creek has maintained a relatively large population, in contrast to most other WSCT streams in Alberta. There is no evidence that Mr. Locke's general statement about trout streams pertains to Gold Creek.

729. Re-establishing connectivity in 1-3 sites in Gold Creek is the second primary offsetting method proposed by Benga (see paragraphs 382-383 of Benga's Final Argument). But the EIA provides no evidence that the intermittent seasonal barrier is limiting WSCT abundance and persistence in Gold Creek. The Creek is open for most of the time in most years and trout persist up and downstream of the intermittently separated sections. The general observation is that WSCT do most of their longer-range movements associated with the ascending limb and peak of the spring freshet when the creek is free flowing and are rather sedentary most of the rest of the year. The proper conclusion to be drawn is that

there is no evidence that this manipulation will enhance the abundance and persistence of threatened WSCT in Gold Creek and therefore is not a viable offsetting technique.

730. Benga's Final Argument did not raise the issue of Brook Trout removal as an offsetting method, so Dr. Post's testimony must have been convincing.

731. In summary, the EIA documents and Final Argument provided by Benga provide no credible evidence that the proposed offsetting methods will be effective in replacing the loss of critical habitat, and therefore will not protect or enhance the persistence of WSCT in Gold Creek.

732. The net impact of the project will be a reduction in the critical habitat of WSCT and compromise the long-term persistence of this threatened species in Alberta.

733. Benga states that WSCT and their habitat will be monitored, and that they will develop an "Aquatics Resource Management Plan" and "Aquatic Effects Monitoring Plan". But monitoring and paper plans do not replace critical habitat, and likely will do nothing other than document the further incremental erosion of viability of WSCT in the East Slopes of Alberta.

734. The JRP should reach the conclusion that Benga's project will involve a net "harmful alteration and disruption or destruction of fish habitat" and therefore fails to "ensure the distributional and population objectives for this SARA listed species" and will "jeopardize the survival or recovery of the species".

5.5. Dust, air quality, greenhouse gas emissions, noise, and light

735. Various members of the Coalition gave evidence regarding their concerns about air quality and dust impacts that would arise from the Project. Ms. Shirley Kirby's evidence on air quality concerns is set out in her submissions at CIAR 553, PDF 492 to 498 and in her direct evidence starting at page 1352 of CIAR 782.

736. The Coalition provided an expert witness on noise. Mr. Farquharson's pre-filed evidence is set out in Appendix M of CIAR 553. His direct evidence was given at CIAR 941, 28Tr, p.6129 – 6145.

5.5.1 Noise

737. The noise generated from the Project will adversely affect the use and enjoyment of the Coalition's members' residences that are east of the mine pit. The members east of the mine pit include the Donkersgoed, the Watmoughs, Ms. Gilmar and Mr. Emard (collectively, "Landowners East of the Mine Pit").

738. The noise generated from the conveyor belt, the rail loadout station, and from blasting operations will increase the noise levels for residents in Crowsnest Pass such as Shirley Kirby, Rae and John Redekopp, and Kari Lehr and David Rothlin. These members of the Coalition expressed concerns about potential increase in noise levels and their impacts on them in their written and oral submissions.[348]

739. Mr. Farquharson noted that the conveyor system would be a significant noise source to the community. In view of the distance covered by the conveyor system and the fact that table of source sound power levels recorded the conveyor's noise levels on a per metre of length basis, Mr. Farquharson recommended that Benga require potential suppliers to supply mock-ups or to direct Benga to sites where the installed conveyor system emits lower noise levels or satisfies the noise limitations on the conveyor as per Benga's Consultant Report #2b.[349] Mr. Farquharson also recommended that an independent review of the noise emissions of the final design of the conveyor system be conducted.[350]

740. Mr. Farquharson noted that the proposed coal rail loadout system would also be a significant noise source to the community. He recommended that third party noise emission studies be conducted on the proposed coal rail loadout system.[351] This will ensure that the noise levels emitted by the rail loadout system remain within acceptable levels.

741. The Coalition requests that should the Panel decide to approve the Project, the Panel should require as conditions of approval that independent third-party noise emission studies be conducted on the proposed coal rail loadout system and on the conveyor system. The Coalition further requests that the reports from these studies be filed with the AER and the Municipality of Crowsnest Pass in a format that can be accessed by the residents of Crowsnest Pass.

5.5.1.1 Noise Environment for Residences East of the Mine Pit

742. The current noise levels are very quiet and could be considered pristine as per the definition in Directive 38.[352] In comparison to other places that Mr. Farquharson has been to in his over 30+ years of monitoring noise in Alberta, the area east of the mine pit where the members of the Coalition reside, represents a "pretty quiet area and is probably as close to the definition of "pristine" as we can with having homes still present." [353]

[348] CIAR 782, 6Tr. p. 1309 – 1363.
[349] CIAR 553, PDF 342.
[350] *Ibid.*
[351] CIAR 553, PDF 342.
[352] Directive 38 defines "pristine" as a "pure, natural area that might have a dwelling but no industrial presence, including energy, agricultural, forestry, manufacturing, recreational, or other industries that already impact the noise environment". Directive 38,PDF 35.
[353] CIAR 941, 28Tr. p. 6140, L. 8-22.

743. As confirmed by Mr. Bilawchuk during cross, there are no industrial development, roads, energy producing equipment or other industrial noise sources within or in close proximity to the Residences East of the Mine Pit.[354] The use of the area by recreational vehicles such as ATV is very limited and insignificant.[355]

744. Given the current noise levels that could be considered pristine, the introduction of the Project would cause the noise levels to increase significantly. As Mr. Farquharson noted in direct evidence, there is a good chance that the noise levels east of the mine pit could get well into 20dBA.[356]

745. It is important to the Coalition members residing east of the mine pit that pre-construction noise survey be conducted to determine the actual noise levels in the area. Pre-construction noise survey would provide the baseline noise conditions and could show that the area east of the mine pit is in a very quiet noise environment such that a cumulative noise level of 40dBA would be very significant and far above what would be considered acceptable levels of noise impact. Acceptable level of impact is 5dBA above background noise levels.[357]

746. The Coalition requests that should the Panel approve the Project, there should be a condition of approval requiring Benga to conduct pre-construction noise survey in the area east of the mine pit and to provide copies of the noise survey results to the Coalition members residing east of the mine pit and file it with the AER.

747. If the results of the pre-construction noise survey show that the area east of the mine pit meets the definition of pristine in AER's *Directive 38*, the Coalition submits that the Panel require Benga to recomplete its NIA to include an A2 ambient adjustment as per *Directive 38*.

5.5.1.2 Mining Equipment

748. If the results of the pre-construction noise survey show that the area east of the mine pit meets the definition of pristine in AER's *Directive 38*, the Coalition submits that the Panel require Benga to recomplete its NIA to include an A2 ambient adjustment as per *Directive 38*.

749. As confirmed by Mr. Bilawchuk, Benga's noise impact assessment (NIA) predicted the noise levels for the Project using assumed sound power levels of typical mining equipment used in other mining projects and based on mine plans that were available at the time.[358]

[354] CIAR 907, 24Tr. p. 5333, L. 7-10.
[355] CIAR 941, 28Tr. p. 6140, L. 19- 22.
[356] CIAR 941, 28Tr. p. 6140, L. 23-26; p. 6141, L.1-2.
[357] CIAR 941, 28Tr. p. 6141, L. 3-7.
[358] CIAR 907, 24Tr. p. 5312-5314

Benga provided the list of mining equipment and the sound power levels used in the NIA at PDF 52 of Consultant Report #2.[359]

750. Mine plans do change as more information become available. It is likely that different equipment with different sound power ratings may be used in the Project considering that Benga has not selected any equipment for the Project. The Coalition notes that Benga committed to including equipment noise specifications as a requirement to the mine bid or tender process and to having a program or policy in place that will contain the assessment criteria for selection of mining equipment.[360] While these commitments are good commitments as noted by Mr. Farquharson,[361] follow through is equally important. The Coalition requests that the Panel include in its decision that Benga's commitments are binding and enforceable by the AER.

751. Since the sound power levels of the equipment used in the assessment aided in the permissible sound levels being in compliance with AER's noise guidelines, the Coalition submits that Benga's first year noise impact assessment should be conducted using the actual sound power levels of the mining equipment selected for use at the mine.

752. The Coalition notes that Benga has committed to doing a reassessment of noise after one year and every five years after that during the mine operations.[362] Mr. Houston clarified during cross that the Benga would "do a noise – noise study that mimics the noise study that was done for the original assessment".[363]

753. At paragraph 469 of Benga's Argument, Benga refers to conducting "noise monitoring studies". In the Coalition's view, noise monitoring study is different from "reassessment of noise" or "noise study that mimics the original assessment". The original assessment is a prediction of the sound level from operations. Mimicking the original assessment means that another NIA will be completed. The Coalition submits that Benga should be required to conduct a noise impact assessment using sound power levels from actual mining equipment and incorporating the other elements discussed in this Argument within one year of commencement of operation.

754. Noise monitoring studies should be in addition to the noise impact assessment. Mr. Farquharson recommended in his direct evidence, that the noise monitoring program include a reasonable sample of the area, be of a long duration to cover the impacts of different weather conditions, notification of the community about the start of operations and when operations may be considered normal, and incorporate input based on noise complaints.[364]

[359] CIAR 42, CR#2.
[360] CIAR 907, 24Tr. p. 5319, L. 12-22.
[361] CIAR 941, 28Tr. p. 6139, L. 1-9.
[362] CIAR 907, 24Tr. p. 5317, L. 3-8, p. 5318, L. 4-9.
[363] CIAR 907, 24Tr. p. 5318, L. 4-6.
[364] CIAR 941, 28Tr. p. 6139-6140.

755. Subject to the Coalition's submissions regarding requiring Benga to conduct a noise impact assessment within one year of operation, the Coalition agrees with Benga's proposals at paragraph 469 of Benga's Argument.

756. Contrary to Benga's assertion at paragraph 471 of Benga's Argument, Mr. Farquharson recommended that Benga should complete "noise impact assessments" at 5-year intervals and to file those with the AER.

757. The Coalition submits that Benga should be required to do both a noise impact assessment and to conduct noise monitoring studies within 1 year of operation and at 5 year intervals.

5.5.1.3 Residential Receptors

758. AER's Directive 038 provides guidance on how receptors are selected for the purposes of a noise impact assessment. Residences are defined based on whether they are "permanently occupied dwelling" or "seasonally occupied dwelling".

759. "Permanently occupied dwelling" is defined as "a fixed residence occupied on a full-time basis".[365] A "seasonally occupied dwelling" is defined as:

> A fixed residence that, while not being occupied on a full-time basis, is occupied on a regular basis. A regular basis does not imply a scheduled occupancy but implies use of six weeks per year or more. The **residence must not be mobile and should have some sort of foundation or features of permanence (e.g., electrical power, domestic water supply, septic system) associated with it. Summer cottages or mobile homes are examples of seasonally occupied dwellings**, while a holiday trailer simply pulled onto a site is not.

760. The residences of Mr. Emard, Ms. Gilmar, the Donkersgoed, and the Watmoughs are seasonally occupied dwellings.

761. The Coalition notes that Benga agrees that Mr. Emard and the Watmoughs' residences qualify as receptors because they are permanently occupied dwellings that meet the definition in the AER's *Directive 038*.[366] Both Benga and Mr. Bilawchuk are wrong in this regard. Mr. Emard and the Watmoughs' residences are not permanently occupied dwelling as that definition is used in *Directive 38*.

762. The Watmoughs submission confirms that the primary use of their land was for grazing cattle, for family social events and or recreation.[367] The Watmoughs also confirm that they have a "seasonal residence and various camping stalls on SE 19".[368] It is clear from the

[365] AER Directive 038, PDF 35, https://static.aer.ca/prd/2020-07/Directive038_0.pdf
[366] CIAR 919, 25Tr. p. 5355-5356.
[367] CIAR 553, PDF 383.
[368] CIAR 553, PDF 384.

Watmoughs submission, which it does not appear that Benga or Mr. Bilawchuk reviewed, that the Watmoughs residence on SE 19 is seasonally occupied and is a receptor for noise modelling consideration.

763. Mr. Emard's submission confirms that his home on SE ¼ 30 is a "second home or vacation retreat" that has become a retirement home.[369] Mr. Emard further confirmed the recreational use of his home in his oral evidence wherein he stated that he visited his property every weekend; sometimes turning his visits into a 4 days a week visit.[370]

764. Benga does not agree that Ms. Gilmar's and the Donkersgoed's residences qualify as receptors under *Directive 038* even though there is ample evidence on record that confirm that their residences qualify as receptors and should have been included in the noise impact assessment.

765. Starting with Ms. Gilmar. Ms. Gilmar states in her submissions that she has "a residence, barns and corrals on SW 30".[371] Ms. Gilmar further stated that as often as she could, she would go up to stay at her residence and enjoy the beauty that Grassy Mountain offers.[372]

766. In her oral testimony, Ms. Gilmar explained how she and her husband used their property for 30 years. They would go up to SW 30 every day, graze their cattle on their grazing lease and would always return home to SW 30 every night.[373] Ms. Gilmar also testified about how they installed a water well on their land and how she drank from Gold Creek for 58 years.[374] Ms. Gilmar confirmed that she frequently visits her property and was there the day before November 2, 2020 (i.e. November 1, 2020).[375]

767. The Coalition submits that Ms. Gilmar's residence on SW 30 qualify as a seasonally occupied residence based on her use of the property. Further, the water well that Ms. Gilmar has on her property that supply water to her residence suggests permanence as required by *Directive 38*. Mr. Houston confirmed in cross that Ms. Gilmar's residence (a cabin) has a foundation and is "nailed down" to the ground, although he prefers to call it "rustic". [376] All these confirm that Ms. Gilmar's residence on SW 30 qualifies as a receptor and should have been included in the noise impact assessment that was done.

768. Ed and Larry Donkersgoed state in their submission that they have a cabin on their lands at SW 19 that they often make use of and that they have used their cabin many times a

[369] CIAR 553, PDF 487.
[370] CIAR 782, 6Tr. p. 1282, L. 12-20.
[371] CIAR 553, PDF 422.
[372] CIAR 553, PDF 422.
[373] CIAR 782, 6Tr. p. 1233
[374] CIAR 782, 6Tr. p. 1235-1237.
[375] CIAR 782, 6Tr. p. 1238, L. 7-11.
[376] CIAR 928, 26Tr. p. 5724-5725.

year.[377] In their oral testimony, the Donkersgoed provided further description regarding their property and its use as follows:

> 22· ·A· ·Sure.· We've got -- we've got a mobile home on there,
> 23· · · ·and it's -- it's powered, and we got propane to it.
> 24· · · ·We've got several outbuildings.· It's -- it sits in a
> 25· · · ·meadow that -- that has peaks both to the west and to
> 26· · · ·the east and Grassy Mountain to the northwest.· So it[378]
> 1· · · ·sits in place that you can literally sit on the deck
> ·2· · · ·there and -- and stare for hours and just feel like
> ·3· · · ·you've -- you've got a very relaxing place.[379]
> 19· ·Q· ·And in terms of utilities, you have electrical.· I take
> 20· · · ·it electricity?
> 21· ·A· ·Correct.· We've got power there, and we've -- we use
> 22· · · ·Gold Creek as our water supply.· And outside of the
> 23· · · ·spring runoff time of year, that water is crystal clear
> 24· · · ·and safe to drink.
> 25· ·Q· ·And you also have propane for heat?
> 26· ·A· ·Correct.**[380]**

769. It is clear from the quoted transcripts of the Donkersgoed's testimonies that the Donkersgoed's mobile home qualifies as a seasonally occupied dwelling pursuant to *Directive 38* and as such, should have been included in Benga's 2016 NIA.

770. The Coalition notes that Benga is aware that the Donkersgoed and Ms. Gilmar's residences are mobile homes and cabins that are affixed to the ground[381] and yet chose to instruct its consultant, Mr. Bilawchuk, to exclude these residences in the NIA or to assume that there are no residences within the MPB.[382]

771. Mr. Bilawchuk, who should have confirmed if it was appropriate to exclude Ms. Gilmar and the Donkersgoed's residences from the NIA, did not bother to verify if these residences were properly assessed for exclusion. He did not even bother to visit the Project site.[383] Of note is Mr. Bilawchuk's testimony that in other projects that he has worked on, he would undertake independent verification or assessment after instructions have been given.[384] Mr. Bilawchuk failed to do this and attempted to justify this failure by stating that he relied on information provided to him by Benga.

[377] CIAR 553, PDF 403.
[378] CIAR 782, 6Tr. p. 1266.
[379] *Ibid.,* p. 1267
[380] CIAR 782, 6Tr. p. 1267.
[381] CIAR 928, 26Tr. p. 5724, L. 20-26; p. 5321, L. 14-16.
[382] CIAR 907, 24Tr. p. 5327, L. 15-19, p. 5328, L. 1-4.
[383] CIAR 919, 25Tr. p. 5355, L. 17-22.
[384] CIAR 919, 25Tr. p. 5351, L. 4.

772. Benga takes the position that their assessment of whether Ms. Gilmar and the Donkersgoed's residences qualify as receptors was based on usage i.e. whether the properties were being used for more than 6 weeks in a year.[385] When asked how they arrived at that assessment, Mr. Houston could not provide further details other than to say that they had not been monitoring usage but their assessment was they were not being used 6 weeks in a year.[386]

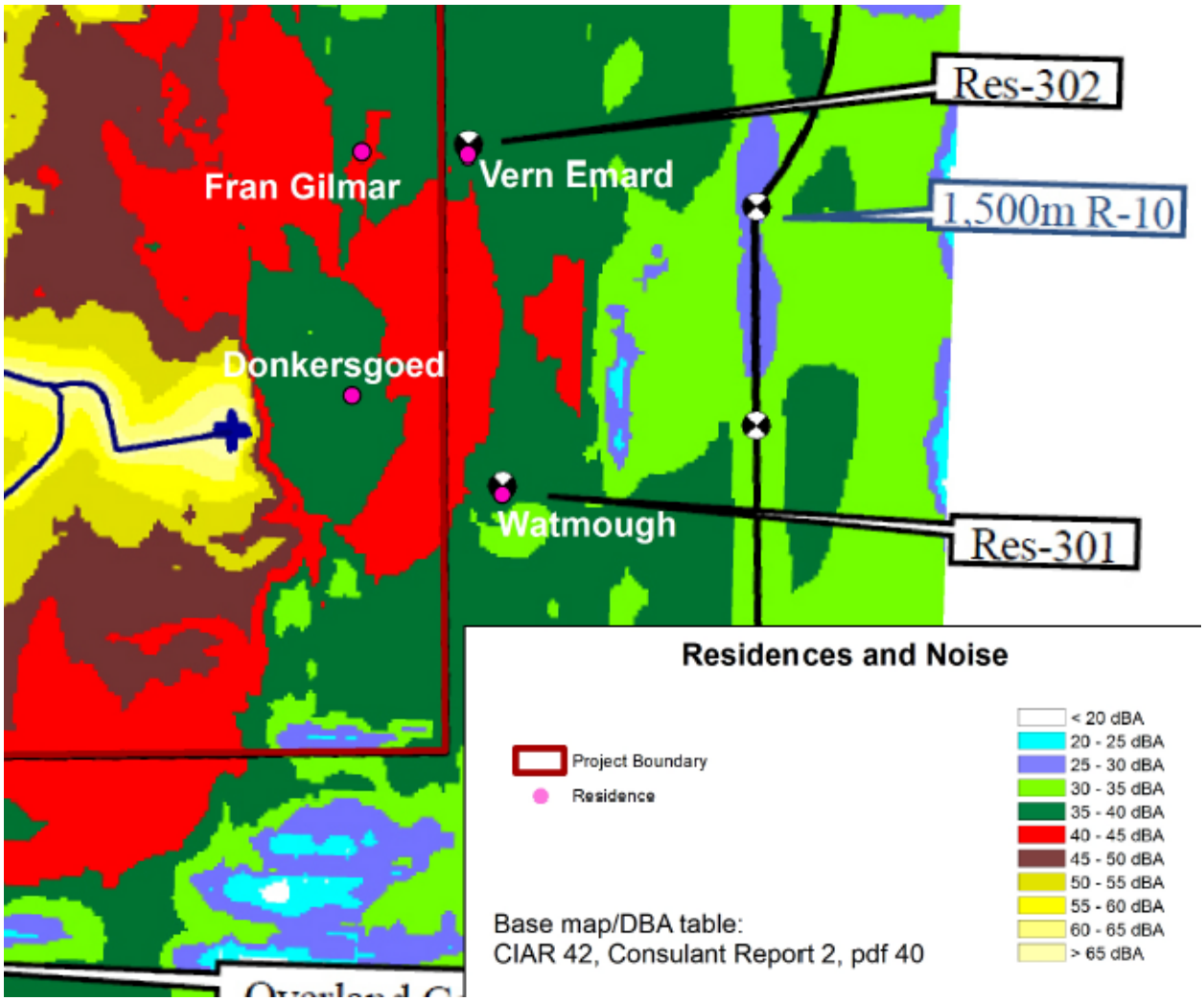
773. The Coalition submits that Benga's assessment, which purports to be based on *Directive 38* is flawed and unsupported by evidence. In addition, usage of 6 weeks or less is only one indicator of seasonality of the residence as the definition in *Directive 38* suggests. As Mr. Farquharson points out in his direct evidence, the usage of 6 weeks or less is not something that acousticians place significant value on considering that they have often times, included trapper's cabins in their NIAs.[387] In Mr. Farquharson's experience (since 1989), the only kind of structures that they have omitted or disregarded in conducting noise impact assessments were holiday trailers pulled into an area.[388] Mr. Bilawchuk agrees that they have included trapper's cabins as seasonal residences in other projects in the past. [389]

774. The Coalition further submits that the Panel should require Benga to recomplete its NIA to include Ms. Gilmar and the Donkersgoed's residences. As Mr. Farquharson pointed out in his direct evidence, adding these two residences and producing a revised NIA should not be difficult.[390]

775. It is important that the NIA is recompleted to include these residences considering that the noise contour map, updated by Mr. Wallis, show that the permissible sound level during day time operations is exceeded in relation to Ms. Gilmar's residence despite the application of Benga's mitigation and the Donkersgoed's residence is close to the noise sources. [391]

776. An excerpt of CIAR 934 for daytime noise levels is presented below.

[385] CIAR 907, 24Tr. p. 5325
[386] *Ibid.*
[387] CIAR 941, 28Tr. p. 6136-6137.
[388] *Ibid.*
[389] CIAR 919, 25Tr. p. 5360, L. 1-4; CIAR 910, pdf 6.
[390] CIAR 941, 28Tr. p. 6137, L. 20-26, p. 6138, L. 17-24.
[391] CIAR 934.



777. Mr. Farquharson notes in his direct evidence that acoustic reflectivity of the northern portion of the mine especially the mine pit and the rock disposal areas will change as mining progresses. With the stripping of vegetation, the harder rock ground is exposed, which tend to be acoustically quite reflective.[392]

778. The Coalition notes that Mr. Bilawchuk has used a ground absorption factor of 0.5 in the Coal Valley Mine Robb Trend Project, a similar open-cut top of the mountain mining project in Alberta with similar vegetation cover (tall and dense vegetation) and similar topography (hilly).[393] Yet, Mr. Bilawchuk applied a different ground absorption factor to Benga's Project.

779. The Coalition submits that using a ground absorption factor of 0.7 in the NIA, as Mr. Bilawchuk has done, does not accurately represent the different acoustical reflectivity of

[392] CIAR 942, 28Tr. p. 6141-6142.
[393] CIAR 910, PDF 6 and 9.

the environment during mining. It also underrepresents the actual noise levels generated by the Project.

780. As Mr. Farquharson points out in direct evidence, different ground absorption factors can be used to ensure that the best data is incorporated in the NIA and the results of the NIA are accurate. This provides better assurance of mine compliance and reduces the time spent dealing with complaints or waiting for complaints to arise to redo the NIA.[394]

781. The Coalition submits that the NIA to be recompleted should reflect the ground conditions that will be present at the mine during mining by adopting different ground absorption factors to represent the different ground conditions that will be present at the start of mining operations.

5.5.1.4 Summary

782. The Coalition submits that prior to the commencement of operations or within one year of commencement of operations, Benga should be required to conduct a noise impact assessment that will include Ms. Gilmar and the Donkersgoed's residences and that incorporates a varying range of ground absorption factors to account for the differences in the reflectivity of ground surfaces during mining. The pre-construction noise impact assessment should be provided to the Coalition and filed with the AER.

783. Benga should develop a community consultation program that includes noise issues and noise complaint process. The Coalition notes that Benga has committed to developing this community consultation program. Consistent with the recommendation of Mr. Farquharson, information relating to noise generated from the program should be recorded and followed up on.[395]

784. Prior to commencement of operations and any time a noise complaint is received, Benga should conduct a comprehensive sound survey at select residences that will include the residences east of the mine pit and any other receptor deemed a critical receptor by the AER. This should be included in a condition of approval assuming the Panel determines that approval of the Project is in the public interest, although the Coalition does not believe that the Project is in the public interest.

785. The Panel should require Benga to file with the AER its updated mine plan and NIA at five-year intervals. The Coalition notes that Benga has committed to doing this but requests that should the Panel determine that the Project is in the public interest, this work should be included as a condition of approval.

5.5.2 Air Quality

[394] CIAR 941, 28Tr. p. 6142-6143.
[395] CIAR 941, 28Tr. p. 6144, L. 11-16.

786. Members of the Coalition have also expressed concerns about air pollution and dust that will arise from Project's operations.

787. Shirley Kirby, for instance, noted concerns with the air quality assessment that was done. In Ms. Kirby's views, the air quality assessment and the proposed mitigations of impacts are unreliable, ethically questionable, incomplete and inadequate. It also lacks commitment to the environment and to the people of Crowsnest Pass.[396]

788. Ms. Kirby further noted that Benga's Consultant Report #1 did not mention that Crowsnest Pass was one of the regions in Alberta that has never had provincial air quality monitoring. The closest monitoring station is at Lethbridge, which is a signal that the entire southeast Saskatchewan airshed region must take actions to prevent air-quality deterioration. Benga selected values for the assessment of Particulate Matter 2.5 and Particulate Matter 10 from sites such as BC, which was a 100km away and in residential communities. These sites cannot accurately reflect air quality conditions in CNP.[397]

789. Ms. Kirby expressed concerns that baseline air quality data have not been established for CNP. This should be established before any mining operations commence.[398] Ms. Kirby noted that proper monitoring of air quality in CNP to ensure that the Alberta Ambient Air Quality Objectives are being met is essential. [399] Ms. Kirby concluded that approval of the Project would put the protection and the maintenance of the residents' quality of life in jeopardy and it would be contrary to federal climate commitments.

790. John and Rae Redekopp expressed similar concerns about air quality, coal dust, and the increase in air pollution and their exposure to increased wind velocity due to the destruction of the landscape that provides them with some shield from the northwest winds.[400] They noted that while Benga provided plans on dealing with dust at the loadout and other mine locations, Benga had not addressed how dust would be controlled at the pit area. Having witnessed dust clouds rolling off the mines from B.C., they questioned Benga's ability to control the dust from the mine pit.[401] Preserving trees and bushes around the mine pit to trap dust emissions will result in the forest being covered in coal dust which can become dislodged and spread.[402]

791. John and Rae Redekopp further noted that Benga had not provided them with the results of the air quality monitoring that Benga commenced 3 years prior.[403]

[396]CIAR 553, PDF 492.
[397] CIAR 782, 6Tr. p. 1353.
[398] *Ibid.* p. 1354.
[399] *Ibid.* p. 1356-1357.
[400] CIAR 782, 6Tr. p. 1337-1338.
[401] *Ibid.*
[402] CIAR 782 6Tr. p. 1338.
[403] *Ibid.*

792. The impact of dust from the Project's operations will also be experienced by the landowners east of the mine pit. Project's impacts on air quality has adverse health effects where there are exceedances.

793. The Coalition adopts the written and oral evidence of the Livingstone Landowners Group's experts on air quality and its health impacts on residents of CNP.

5.6 Wildlife, including migratory birds and species at risk, wildlife health, and human health risk assessment

794. The Coalition has expressed concerns about the Project's impacts on wildlife and their habitats as well as impacts of the Project on biodiversity. For instance, Ms. Gilmar has reported sightings of various wildlife such as Grizzly Bears, Golden Eagles and others from her lands and the potential presence of snake hibernacula within the Project area.[404]

795. The Coalition provided expert evidence on wildlife including species at risk. Mr. Wallis' pre-filed evidence is set out in Appendix K of CIAR 553 and his opening presentation is at CIAR 909. His direct evidence was given at CIAR 941, 28Tr, p.6105 – 6129.

796. As previously indicated, the Project area is in the Montane natural subregion, which Mr. Kansas acknowledged is unique.[405] The uniqueness of the Montane natural subregion differentiates it from the natural subregions in which the other mines in the mine examples provided by Benga operate.

797. The Project will have a moderate impact on some wildlife of conservation concern.[406] For instance, the Project will remove a variety of productive habitats for little brown myotis for decades or longer.[407] Little brown myotis is a SARA listed wildlife.

798. Within the Project's footprint, there are habitat complexes with mature forest along some slow flowing open water and drainages that may be suitable habitat for Little Brown Myotis. Some areas within the Project's footprint that Benga has mapped as low or moderate habitats suitable for Little Brown Myotis saw significant number of bat passes.[408] A significant portion of the high and moderate suitability habitat west of the Livingstone Range in southwestern Alberta occurs in the mine footprint.[409]

799. Mr. Wallis noted that the Project's impacts on Little Brown Myotis alone might not be sufficient reason to deny the Project, but it adds weight to other valued components that

[404] CIAR 553, Appendix A, Submissions of Fran Gilmar, pdf 44.
[405] CIAR 907, 24Tr. p. 5262, L. 16 – 21.
[406] CIAR 941, 28Tr. p. 6106, L. 25-26.
[407] CIAR 941, 28Tr. p. 6107, L. 9-14.
[408] CIAR 941, 28Tr. p. 6107, L. 16-26, p. 6108-6109.
[409] CIAR 941, 28Tr. p. 6108.

would be impacted by this Project which emphasizes the environmental significance of this area.[410]

800. Mr. Wallis emphasized that it was improper for Benga to universally characterize residual effects as not significant considering that there would be significant impacts on Little Brown Myotis and that the cumulative effects of the Elan South Coal mine was not considered.[411]

801. While the Coalition acknowledges that some wildlife species may return quickly to the landscape following reclamation work by Benga, there are some species of conservation concern such as Little Brown Myotis that may not return in significant quantities for decades or longer. This risk warrants the classification of impacts on wildlife as significant.

802. Similarly, the Clark's Nutcracker relies on old Whitebark pine forests because of the cones that they produce. As noted in the range-wide restoration strategy for Whitebark pine referenced by Mr. Wallis, it would take 125 to 250 years for Whitebark pine to attain good canopy volume to have high cone production.[412] Removal of the Whitebark pine trees from the Project area will have an impact on the Clark's Nutcracker.

803. At paragraph 486 of Benga's Argument, Benga relies on the results of the wildlife monitoring report for the Mercoal West-Yellowhead Tower Mine Extension Project ("MY-YT Wildlife Report") as support for the speed of wildlife's return to a reclaimed mine landscape.

804. Benga relies on the results of the MY-YT Wildlife Report despite the apparent deficiencies and inaccuracies that Mr. Wallis highlighted during his direct evidence at CIAR 941, 28Tr. p. 6112 to 6118. Mr. Wallis evidence was clear that the claim of the author of the MY-YT Wildlife Report that stated that more than 50% of the bird species returned to the reclaimed landscape than the undisturbed areas was false.[413]

805. Mr. Wallis carefully explained that Ms. MacCallum:

a. Mixed up data. For instance, she included several decades of wildlife species data at the Coal Valley mine compared with only a couple of years at the proposed extension areas at Mercoal West and Yellowhead Tower. She also included data from Mr. Wallis pre-disturbance wildlife surveys of 1970s and early 1980s in addition to data from her own records.[414]

[410] CIAR 941, 28Tr. p. 6108.
[411] CIAR 941, 28Tr. p. 6109-6110
[412] CIAR 941, 28Tr. p. 6120.
[413] CIAR 941, 28Tr. p. 6112.
[414] CIAR 941, 28Tr. p. 6114, L. 12-19.

b. Included data from undisturbed sites at the Coal Valley Mine in the list of the 142 bird species that were claimed as having returned to the reclaimed landscape[415]; and

c. Listed birds that were nonbreeding migrants and accidentals, many of which were associated with water habitats that were poorly represented in the pre-development ecosystem;[416]

806. Mr. Wallis further stated that when all the breeding bird species from Mercoal West and Yellowhead Tower are added up, you get a total of 67 species and a total of 64 species for Coal Valley including the undisturbed areas of Coal Valley. These numbers were a far cry from the number of bird species associated with the Coal Valley Mine being 50% higher.[417] Mr. Wallis further noted the absence of controls or comparisons by Ms. MacCallum.

807. As Mr. Wallis explained, the truth regarding the presence of wildlife species following reclamation work at Coal Valley Mine are:

a. none of the mature and old growth forests and rare wildlife habitats, like the fen wetland complexes and the stream/valley habitat diversity has returned to the Coal Valley reclaimed landscape after 30 years of completion of reclamation.[418]

b. The reclaimed wetlands did not closely resemble natural regional wetlands and the reclaimed wetlands had a relatively high proportion of non-native and/or weedy species. The recovery of native plant species in natural habitats after a fire is faster than the recovery after mining.[419]

c. There is a lack of understory terrestrial species in some of the reclamation areas and native plant species are still in small numbers.[420]

808. The Coalition notes that Mr. Wallis' critique of Ms. MacCallum's work was not contradicted by Benga or challenged through cross examination. The Coalition submits that the Panel should accord significant weight to Mr. Wallis evidence in this regard. The Panel should bear in mind that Mr. Wallis advised the owners of Coal Valley mine regarding the mine in considering the evidence of Mr. Wallis.

809. The Coalition further submits that even if Benga is more successful in reclaiming the landscape than the Coal Valley Mine experience which took 40 years post reclamation

[415] CIAR 941, 28Tr. p. 6114, L. 20-26.
[416] CIAR 941, 28Tr. p. 6115, L. 1-6. Mr. Kansas acknowledged this in cross.
[417] *Ibid,* p. 6115, L. 7-16.
[418] CIAR 941, 28Tr. p. 6115, L. 17-22.
[419] *Ibid.* p. 6116, L. 13-18.
[420] *Ibid.,* p. 6116 - 6117.

before any noticeable wildlife was seen[421], it will still take over a hundred years after reclamation to get back much of the forest structure and old growth characteristics, and the rarest and endangered wildlife that will be lost.[422] There is no evidence on the record that suggests the contrary.

810. During cross of Mr. Kansas, Mr. Kansas suggested that he would be discussing using other types of agronomics with Benga because using native seed mixes to try to recreate the landscape that is currently present at the mine would not attract large animal species or "big game" as he called it because the grasses would not provide the kind of nutrition that the large animal species need.[423] As Mr. Wallis warned, replacing complex and diverse montane habitats especially on public lands with habitats dominated by longer-lived agronomics is not only inappropriate but also does not translate to equivalent land capability as we know it currently.[424]

811. Benga assigned a low habitat suitability rating to mature and old-growth coniferous forests because male Little Brown Myotis occasionally roost in conifer snags.[425] Mr. Kansas supporting this rating stated that "coniferous trees don't have the same kind of bark that – that hide -- can hide this species except for Douglas Fir tree that occurs in the montane."[426]

812. Despite acknowledging that Douglas Fir tree, a coniferous tree in the Montane subregion, could be roosting habitat for Little Brown Myotis, Mr. Kansas refused to acknowledge that old growth coniferous trees could be an important roosting habitat for Little Brown Myotis.[427]

813. Mr. Kansas continued to maintain his denial even after he was referred to the *2018 Recovery Strategy for Little Brown Myotis, Northern Myotis, and Tricoloured Bats in Canada* that clearly identified "large diameter trees" as being used as roosting habitats.[428] The Coalition submits that the Panel should accord no weight to Mr. Kansas testimony and to Benga's classification of old growth coniferous forests to be low suitability habitat for Little Brown Myotis.

814. Old growth coniferous forests should have been rated high similar to the old growth deciduous forests as they could provide a roosting habitat for Little Brown Myotis since they are large diameter trees. Further, where conifers are dominant in the landscape, they

[421] CIAR 907, 24Tr. p. 5278, L.1
[422] CIAR 941, 28Tr. p. 6118, L. 20-25.
[423] CIAR 907, 24Tr. p. 5278-5279
[424] CIAR 941, 28Tr. p. 6119-6120.
[425] CIAR 44, Wildlife Addendum, PDF 16.
[426] CIAR 907, 24Tr. p. 5284, L. 23-26.
[427] CIAR 907, 24Tr. p. 5284-5285.
[428] CIAR 907, 24Tr. p. 5286-5287.

play an important role as roosts. Mr. Wallis gave some examples of where conifer-dominated forests have acted as roosts for Little Brown Myotis. [429]

815. At paragraph 492 of Benga's Argument, Benga listed some mitigation measures that it proposed to mitigate impacts of the Project on Little Brown Myotis and its habitat. As discussed by Mr. Wallis in his direct evidence, the successful use of bat boxes/houses as a replacement roosting habitat, especially for maternity roosts, is unproven and uncommon.[430] The few successful uses of bat boxes for maternity roosts were in relation to the replacement of the boxes on buildings.[431]

816. Benga's proposed mitigation of planning vegetation clearing to avoid the May to August summer bat season may be effective in avoiding direct mortality to Little Brown Myotis and other bats. It does not mitigate the loss of the habitat that occurs as a result of the clearing.[432]

817. The Coalition submits that there will be significant residual impacts, particularly on species and habitats of conservation concern. The significance of that extended duration of loss has not been adequately acknowledged in Benga's assessment.[433]

5.6.1 Reply to Benga's Argument regarding Evidence of Mr. Wallis

818. Contrary to Benga's assertions at paragraph 495 of Benga's Argument, Mr. Wallis engaged in an objective analysis of the Project and its potential effects. As stated earlier in the vegetation topic block, being a director of AWA had no bearing on the evidence that Mr. Wallis produced which was largely uncontradicted. Mr. Wallis stated on numerous occasions during his testimony and in his report that his evidence was his professional opinion; not personal opinion. Again, as pointed out in the vegetation topic block above, Mr. Wallis is not opposed to "all resource development". He has worked for resource developers, government, industry representatives and landowners. He takes his profession and work seriously and presents facts, not trumped up or non-accurate statements like Mr. Kansas and Ms. Bauman.

819. If affiliation to an organization is used as the sole criteria for judging the objectivity of a report produced by an expert, the Coalition would submit that most of Benga's consultants' reports should be assessed in view of their affiliations to the Coal Association of Canada ("CAC"), whose sole aim, as acknowledged by Mr. Campbell,[434] is to promote the development, growth, and advancement of the Canadian coal industry. For instance, at

[429] CIAR 941, 28Tr. p. 6122 – 6126.
[430] CIAR 941, 28Tr. p. 6124.
[431] *Ibid.* p. 6125, L. 19-22.
[432] CIAR 941, 28Tr. p. 6158, L. 11-23.
[433] CIAR 941, 28Tr. p. 6126.
[434] CIAR 750, 2Tr. p. 429 - 430.

the time of the hearing, Millennium EMS Solutions Ltd. that prepared the wildlife and vegetation reports was a member of CAC[435]. Millennium EMS Solutions Ltd. authored many of the reports that Benga relied on at the hearing.

820. Contrary to Benga's assertions at paragraphs 496 and 497, Mr. Wallis evidence presented the true state of facts, which would assist the Panel in making a determination in this case. The Coalition notes that Benga has not provided any evidence that shows any inaccuracy in the statements of Mr. Wallis. Benga had ample opportunity to provide such evidence or to challenge Mr. Wallis' assertions but chose not to do so.

821. It was important to refute assertions of Benga's biologists that are simply not true or do not present a fulsome picture. Puffery was a perfectly appropriate language to describe the inflated and untrue claims of Mr. Kansas that there were more bird species on the reclaimed mined lands at Coal Valley than on the surrounding unmined lands. Mr. Wallis gave detailed explanations regarding why Mr. Kansas claims were wrong at CIAR 941, 28Tr. p. 6112 to 6118. Some of Mr. Wallis explanations have been summarized earlier in this Argument.

822. Mr. Wallis' evidence did not focus more on asserting that other experts were wrong. In providing his evidence, Mr. Wallis indicated a number of areas where he agreed with Benga or its consultants. The Coalition notes that Mr. Wallis agreed with Mr. Kansas on areas where Mr. Kansas' evidence were accurate such as the importance of creating a structure in the development of plant and wildlife biodiversity.[436]

823. As previously stated in the vegetation topic block, the authors of the Fiera 2014 report identified deficiencies or limitations in their report. Mr. Wallis merely highlighted that but also noted that the Fiera 2014 report is an additional tool that could be used in association with others.

824. At paragraph 499 of Benga's Argument, Benga referenced the *Recovery Strategy for the Little Brown Myotis* as support for the use of bat boxes by Little Brown Myotis. The Coalition notes that pdf 46 of the document cited by Benga relates to use of bat boxes in urban areas and in commercial and industrial buildings. This is consistent with the evidence given by Mr. Wallis at CIAR 941, p. 6125, L. 19-22 where he noted the limited success of bat boxes in buildings.

825. The Coalition submits that Mr. Wallis' evidence is clear, objective, truthful, non-partisan and should be accorded significant weight.

6.0 Concluding Remarks

[435] *Ibid.*
[436] See for example, CIAR 941, 28Tr. p. 6118, L. 1-2.

826. Mr. O'Gorman noted that Benga had expressed some reservations about the modelling used to produce predictions submitted in Addendum 11 less than a year ago and that conservatism is the underlying basis for deliberations in this process at 21Tr, p.4601:

> So this morning in response to one of my questions, we -- well, in various ways we heard Benga express some reservations about the modelling used to produce the predictions in that appendix in Addendum 11, which was submitted just in earlier 2020. However, as we've noted before, conservatism is the underlying basis for our deliberations in this process. So I would like to ask two questions now, with that preamble, and I will read them both together.

827. It is unacceptable for a project of this scale and the models upon which the project relies, to have so much uncertainty surrounding them, especially considering the fragile state of the WSCT and its ecosystem which will be negatively impacted by Benga's demolition of Grassy Mountain.

828. The right thing to do in these circumstances is to deny Benga's application.

829. There are several examples of the AER and its predecessors denying approval of applications that have gone through hearing processes over the last 25 years. The reasons for the denials are varied. Some of the denied applications involved projects on the eastern slopes with the potential for significant negative impacts to the local environment. The following list of "applications denied" is not exhaustive:

- ERCB Decision 94-08 (Amoco Canada Petroleum Company) Whaleback region. In that decision the ERCB stated:

> "Finally, the Board, after hearing the evidence from experts for all parties involved, is convinced that the Whaleback does contain tremendously valuable and unique natural resources. These resources are a living legacy both for today and in the future. While the Board accepts that Amoco would attempt to develop the natural gas resources of the Whaleback with as little impact as possible on the region, the Board is not convinced that such development could be carried out in a manner which would not seriously degrade those surface values."

- EUB Decision 99-30 (Stampede Oils Inc.)
  https://static.aer.ca/prd/documents/decisions/1999/d99-30.pdf

- EUB Decision 2001-09 (Shell Canada Limited) ~ discussed above in relation the use of models to predict reliable worst-case scenarios.
  https://static.aer.ca/prd/documents/decisions/2001/2001-09.pdf

- EUB Decision 2003-024 (Petrovera Resources Limited).
  https://static.aer.ca/prd/documents/decisions/2003/2003-014.pdf
  In that decision, the Board denied one of the applications for a gas well. The Board stated:

> Petrovera put forward mitigative measures to prevent impact on the shallow aquifer during the drilling and production of the 2-3 well. While Petrovera's mitigative measures are extensive, the Board believes approval of a well site in the recharge area of this shallow, unconfined aquifer with receptors (springs) located ± 500 m directly down gradient and in close proximity to the Lindbergh Group's domestic water supply wells could pose an unacceptable level of risk. Although the Board recognizes that the risk of an uncontrolled release in the south half of Section 3 is low, the consequences to the hamlet's water wells or the springs, should this occur, would be significant and potentially long term. On the basis of the evidence before it, the Board does not believe that this is an acceptable risk, and therefore it will not permit surface activity in the south half of Section 3.

  For "consequences to the hamlet's water wells or the springs" substitute "consequences for the WSCT and its ecosystem" in current case.

- EUB Decision 2003-101 (Polaris Resources Ltd.) Whaleback region.
  https://static.aer.ca/prd/documents/decisions/2003/2003-101.pdf

> **11 CONCLUSION**
>
> In considering whether to grant the well licence, the Board must return to the initial question: Can this well be drilled by this applicant in this location at this time in a manner consistent with the public interest? After a careful review of all the evidence, the Board has concluded that it must deny the well licence application.
>
> First the Board repeats that the need for the well is solely to provide information. To grant the application, the Board would have to be satisfied that the well's inherent risks to the environment and the public, were sufficiently mitigated as to not outweigh the benefits for the well. The evidence set out above has not provided that measure of satisfaction in this matter.

- EUB Decision 2007-080 (Intrepid Energy Corporation)
  https://static.aer.ca/prd/documents/decisions/2007/2007-080.pdf

- ERCB Decision 2008-092 (Omers Energy Inc.)
  https://static.aer.ca/prd/documents/decisions/2008/2008-092.pdf

- ERCB Decision 2009-072 (Trilogy Blue Mountain Ltd.)
  https://static.aer.ca/prd/documents/decisions/2009/2009-072.pdf

- AER Decision 2018 ABAER-002 (Bashaw Oil Corp) https://static.aer.ca/prd/documents/decisions/2018/2018-ABAER-002.pdf

830. The Coalition submits that the evidence in this case does not and cannot provide the JRP with the measure of satisfaction and conservatism needed in order to determine whether approval of Benga's coal mine application is in the public interest. Accordingly, Benga's application must be denied.

ALL OF WHICH IS RESPECTFULLY SUBMITTED THIS 8TH DAY OF JANUARY 2021.

COALITION OF ALBERTA WILDERNESS ASSOCIATION AND GRASSY MOUNTAIN GROUP

by its legal counsel,

ACKROYD LLP

<Original signed by>

Ifeoma M. Okoye and Richard C. Secord