Collected Public Comments for Sukunka Coal Mine Project

August 19, 2015 to October 8, 2015

Comments will be available on this page until October 15, 2015 and after this date all posted comments will be available through the EAO electronic Project Information Centre (ePIC) application.

October 8, 2015

Personal Information Withheld - Vancouver, British Columbia

1. In section 5.2.6.4, the rationale behind selecting the Jarvie et al. (1999) paper as a description of the method to be used for calculating the nitrogen to phosphorus ratio is provided, stating that: "The Jarvie et al. (1999) formula is used here, as it is more conservative for assessing Project effects".
   Is this the most appropriate method to use in these waterways? The Schindler et al. (2008) paper recommends a different method, using total nitrogen and phosphorus. It is a more recent paper and was conducted by a top ecologist, and is a sound method to use to calculate the N:P ratio. Even with the Jarvie et al. (1999) method, Chamberlain Creek is labelled as nitrogen limited. What would Schindler's method calculate the N:P ratio as? If the differences are negligible, that would further back the decision to use Jarvie et al. (1999), and the claim that it is a "moderate" effect on the ecosystem. Could you provide the N:P ratio determined by the Schindler paper for comparison?
2. Section 5.2.4.1 states that "Additional water quality samples were collected in May and June to capture variability during freshet". However, it doesn't say how many or how the samples were averaged. How many extra samples were taken, and how were they averaged?
3. Section 5.2.5 Project Interactions with Water Quality and Aquatic Biota states that "The ranking takes a precautionary approach: interactions having a meaningful degree of uncertainty are assigned a rank of 2 and carried through a detailed effects assessment." What is a meaningful degree of uncertainty? How was it determined?

Abhishek Agrawal - Vancouver, British Columbia

With respect to the Water Quality and Aquatic Biota section, I would like to ask for clarification on the following points:

1. There is a contradiction between Section 5.7.2.2 and Appendix A-14. Section 5.7.2.2 states that "Baseline conditions, without the Project contribution, indicate an influence of Brule Mine on these parameters in the Sukunka River; however, cumulative selenium, nitrate, and sulphate concentrations will remain below the water quality guidelines (WQG) for the Project (all project phases) and a fully built Brule Mine", whereas, in the Conclusions of the Water Quality Model Report 27.A-14, A) The proponent's model predicts that the WQG will be met ONLY if the mitigation measures proposed are entirely successful; BUT B) They acknowledge that the mitigation measures proposed are an emerging technology; THEREFORE C) Isn't it reasonable to assume that the mitigation measures may very well not function exactly as expected and thus that the WQG may be exceeded for those parameters?
2. As per the Water Quality and aquatic biota report, in Section 4.2.2, many metals (arsenic, cadmium) and fish tissues exceed the WQG in the LAA. In Section 5.2.6.1.1.2 Proposed Site Performance Objectives, the proponent describes that WQG as "overly conservative" as it has ten-fold safety factor. In the light of this presumption, the proponent goes on to describe the exceedence of some toxic chemicals by 2-3 times as "small amount". The explanation for considering WQG as overly conservative, provided by the proponent in section 5.2.3.7, seems to question the authenticity of WQG for survival of aquatic biota.

Other comments:

· In the sections and appendices related to soil erosion, only a percentage of high-risk areas for erosion is mentioned. The proponent should develop a map of the high risk soil erosion zones and plan project activities beforehand to be able to apply the BMPs as promised qualitatively and in a generic way in the report. Has such a map been developed, and if so, why was it not included in the report?

· Both the sections Mine Water management and Groundwater management plan mention that no prior studies have been conducted and that "Glencore will complete groundwater monitoring during construction and operations." This suggests that the proponent will not have any prior data to compare the impact with. So it would be rather prudent on the part of the proponent and authorities to carry out a ground water mapping exercise [to map the monthly ground water levels and also quality of ground water] before going ahead with the deforestation activities.

Emma Luker - Vancouver, British Columbia

Section 2.1.1 of Appendix 20.A-7 states that: "The PMP value should be combined with an estimate of snowmelt when computing the probable maximum flood (PMF)," however there are no calculations included in the proposal that explicitly state PMF estimates. The measurement of

the PMP is mainly used to predict the PMF (Casas et al. 2010), and the Project document states that the PMP "should" be used to compute the PMF. Why does the proposal never state the PMF or include any statistics or information on the PMF? I request that equations using the PMP calculations be compiled to predict the PMF in order to avoid risks to the surrounding water quality due to contamination by overflow of the open water ditches from a flood or exceedingly intense rainfall event.

Literature Cited:

Casas. M. C., R. Rodriguez, M. Prohom et al. (2010). Estimation of the probable maximum precipitation in Barcelona (Spain). International Journal of Climatology, DOI: 10.1002/joc.2149.

Emma Luker - Vancouver, British Columbia

The proposed Project has a significant amount of contaminated water in open areas, namely in the sediment control ponds, diversion ditches and energy dissipaters (mentioned in Section 3.2 of Appendix 20.A-7 Preliminary Mine Site Water Management Plan). These open areas have been noted in several sections to contain mine contact water that has yet to be managed, and as mentioned in Section 5.2.1.5.2: "mine contact water often contains elevated selenium levels, which can lead to bioaccumulation and chronic toxicity in organisms that consume aquatic biota." Thus if there was a flood or unmanageable rainfall event it would be detrimental to the water quality and health of the biota in surrounding wetland areas. The Project uses Hershfield's probable maximum precipitation (PMP) equation from 1961 to predict the maximum rainfall that the area will receive, along with some other stabilizing measurements, but attaches no risk to these measurements. In Casas et al. (2010) it is stated that: "procedures for determining the PMP are […] inexact: results are estimates and a risk statement has to be assigned to them." Furthermore Douglas and Barros (2003) state that long-term rainfall data is needed in order to minimize risk, which is not included in the PMP estimation equations. I request a statement acknowledging the risk of using a 50 year-old estimation technique to be added to Section 2.1.1 in Appendix 20.A-7.

Literature Cited:

Casas. M. C., R. Rodriguez, M. Prohom et al. (2010). Estimation of the probable maximum precipitation in Barcelona (Spain). International Journal of Climatology, DOI: 10.1002/joc.2149.

Douglas, E. M. & A. P. Barros. (2003). Probable maximum precipitation estimation using multifractals: Application in the Eastern United States. Journal of Hydrometeorology, 4: 1012-1024.

Matthew Wagstaff - Vancouver, British Columbia

Text: GHG emissions from diesel usage is calculated in your GHG Technical Data Report using a "similar sized project". No information is provided as to which project you are referring to here. In what way are the projects similar? Is only output taken into account or are other factors that will greatly impact fuel usage over the lifetime of the project considered such as the average slope of operating roads?

Matthew Wagstaff - Vancouver, British Columbia

Section 17.0 GHG Management Study

"Land reclamations activities will speed up the replenishment of natural carbon sinks and will reduce the net deforestation in a given year".
- There are only very vague statements here surrounding this reclamation aspect of the project and no explanation for how much mitigation and therefore reduction will actually occur is presented in this chapter. There is also no mention of carbon storage in these soils being taken into account. More than 50% of carbon storage in temperate forests is contained in the soils and this will be released when the area is disturbed. Can you please clarify the reclamation activities that will actually be performed and their projected impacts on these carbon sinks.

Matthew Wagstaff - Vancouver, British Columbia

"....compared to these numbers Canada represented less than 2 percent of total global emissions in 2010..."
The comparison statements in this section appear to have been included in an attempt to rationalize and downplay the current and projected levels of emissions. Presenting this comparison as Canada accounts for only 2% of global GHG emissions frames this as a small amount. How can you justify framing this comparison this way when in fact Canada represents less than 0.5% of the global population?

Trivializing Canada's portion of GHG emissions and downplaying consequences of the project is inappropriate in the context of this assessment and these references should be removed from this section. While determining fair emission levels is obviously a tremendously difficult task, we should not be understating the fact that we produce four times what would be expected if emissions were evenly split by global population to justify our current emission levels, and especially to justify increasing our activity.

Relating emission changes to provincial and national totals rather than global totals is more relevant, but an even more appropriate and useful measure would be comparing projected

emissions with similar sized projects. This analysis should be included in this section of the assessment – how does the proposed project compare to similar sized projects?

Matthew Wagstaff - Vancouver, British Columbia

Section 17.0 GHG Management Study

"...recovery of fugitive coal bed methane is possible but not financially feasible for the current volume of methane released from the Project..." - Has the level of coal bed methane actually been monitored at the site or is it just assumed that the level is too low for it to be financially feasible to install recovery systems? The projected emission rate of 722.58 tonnes/year for both the surface mining project and potential underground mine is not insignificant – this is 18,065 CO2e or the same emissions as burning 2 million gallons of gasoline

October 7, 2015

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While I fully understand the need to explore new energy opportunities and the need for increased employment opportunities, we must also balance these with social and environment needs of the community. And after carefully studying the document, I have questions as follows,

1. Calculation problems?
In **Table 6.1-9**, the total expenditure for Dawson Creek government is $36.2 millions CAD. However, all the items listed in the expenditures add up to $34.5 millions, and the discrepancy seems not to result from rounding. Similarly, the total expenditure for Hudson's Hope is $3.7 million according to the table, while the items add up to $5.7.

Figure 6.1-3, presents a pie chart for the major components of the project capital cost. We can see that Mine Equipment, at $183.2 millions CDN, accounted for 41% of the whole cost. However, Owner's and other costs, at $2,200 millions CDN, is shown as accounting for only 20%. This is obviously a miscalculation.

Section 6.1.6.3.1 assesses the potential effects of employment change resulting from the project. I have a concern with the calculation process and multiplier. The document states, "**This estimate is based on the regional multiplier for the construction industry in the Dawson Creek BCLA**". And in **Section 6.1.6.3.1.1**, when estimating induced job, proponent stated that "**based on the observation in Section 6.1.6.1.1 that there would be 0.09 induced jobs for every direct and indirect construction job**". But **Section 6.1.6.1.1** does not mention any 0.09 multiplier or ratio at all, according to my observation. **Table 6.1-12** shows that there would be 0.11, rather than 0.09, induced jobs per direct and indirect job for Dawson Creek in Construction period. Similar problem also happens when calculating the induced job for operation period. So what are the multipliers for induced jobs? If these are miscalculations, then it is necessary to redo caculation. If the multipliers are correct, please explain why they are different from the multipliers in the table. Also, **Section 6.1.6.1.1** mentioned that in order to capture the changes in the region since 2006, the ratios were sclaed up. Are the employment ratios for induced jobs also scaled up?

2. In **Section 6.1.6.3.2**, Glencore proposed that it would "**develop a local contracting strategy to enhance local benefits from the project**". As the proponent estimated earlier, about $45.8 million, including labour costs amount to $14.4 million, would be spent locally during construction period and $87.2 million in the operation period. But these data are only estimation and the strategy is still vague with few detail. Is it possible for the Glencore to set up quotas/minimum percentages of goods and services purchased locally in their local contracting strategy?

3. The proponent does not mention whether all the cost of the project would be covered by Glencore, or if there are any public subsidies by government. Would government support the project financially in any way(besides providing public services or infrastructure)? Will there be any tax credits or royalty exemptions? If yes, are this financial subsidies considered in the changes to government finances?

4. In **Section 6.1.6.4**, the proponent assesses the change in government finances. When assessing the project construction, it is stated that "**there would be no increase in demand for goods and services. The one exception is that project use of waste disposal sites could result in higher costs for local government, but these costs would be offset by increased revenues from tipping fees.**" This statement only mentions about the disposal sites while I believe it is necessary to consider transportation, health care cost, policing, support for the social safety, and other infrastructures may be paid by government. However, How would these factors influence the government finances? If there effects would be low in magnitude, at least we need explanation on why they are not important. Neither are those factored mentioned in project operation or closure and post-closure period.

It is noteworthy that, among all the factors mentioned before, health care cost could be the most important factor. **Section 7.6.3.2.6** evaluates potential social effect on health services and infrastracture. However it should be noted that, Communitis like Chetwynd and Tumbler Ridge are losing their physicians and trying to recuit more doctors. The health service condition in these communities is not optimistic. And the project might lay more burdan on the local health service. Would government pay more to sustain effective health care in these regions? Would that be potential economic effects? The proponent need to make further explanations about this.

Also, there are few concerns about impact on tourism or recreation in this EA document. Do government revenue rely on tourism income? How would the project impact tourism in the local or regional area? Is the tourism loss accounted for in the government financial loss? Are there any influences on arts and culture, or recreation to the community residents? It seems that these questions are neglected in the assessment of potential economic effects and I believe we need further discussion on these topics.

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- I get the overall sense that this "Management Study" isn't much about management at all; rather, management is the smallest portion of this section (under 17.7 'Adaptive Management') while the rest of the document explains the federal and provincial regulations and policies. While I understand that providing the context in which GHG management will be done is important, more details on the actual management portion would make the document more useful. For example, could you please provide estimates of emissions that will be reduced by prioritizing fuel efficiency?
- From what I gather, (1) 'best management practices for land clearing and mobile construction equipment'; (2) 'reclamation activities'; and (3) 'best achievable technologies for stationary combustion equipment' are actual management practices outlined. Could you please provide an example of each?
- Can you provide data (with numeric figures and a timeline) on the effect your outlined practices would have in relation to the numbers provided in Table 17.6-1 'Annual Project GHG Emissions Compared to Provincial, National and Global Totals'? Could you please provide your goals?
- Under 17.7 'Adaptive Management', it says "Glencore will implement best achievable technology into the final design of the project." Could you please specify what best achievable means here (i.e., rather than best available)? Does it mean achievable in the sense of affordable by Glencore? Or achievable in the sense of scientifically and technologically achievable? What is an example of a best achievable technology that Glencore will use? Is anything being compromised by implementing the best achievable technology rather than best available technology?
- Has Glencore looked into ways other than those outlined in this report for reducing and/or offsetting GHG emissions such as obtaining Certified Emission Reduction (CER) credits? If so, why? And If not, why not?

October 6, 2015

Alida O'Connor - Vancouver, British Columbia

The Sukunka Lousewort Bog is an intricate ecosystem made up of unique groundwater influenced plant communities. The lousewort was identified as a red- and then blue-listed plant species of conservation concern under the Dawson Creek LRMP, making it a candidate for special management. As you can see in Figure 5.4-9, the project development area and the Chetwynd haul option overlap and bisect the Lousewort Bog. This area of the project includes some of the most intensive activities, such as open pits and waste rock dumps. Yet, there is no predicted significant impact to a blue-listed species. How does the proponent intend on adhering to the

Dawson Creek LRMP and ensuring less than 20% blue-listed species loss when the bog is being excavated, covered, and divided? What does the "special management" associated with the LRMP entail and how will it be carried out for the Lousewort Bog?

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Section 13: Aboriginal Interests

Section 13.3.1.2 Changes in Hunted Species states:

"As described in Section 5.3, the Project would result in a permanent loss of caribou habitat as a result of project activities. Caribou were, and remain, an important traditional use species for all three of the Aboriginal groups. The loss has been classified as high magnitude, meaning that there would be a measurable decrease in high elevation winter range (HEWR) or ungulate winter range (UWR). For the Quintette caribou herd, any net adverse effect on HEWR has been assessed as a significant adverse effect (Natural Resource Board 2013)."

While this statement remains true, the assessment of caribou and habitat loss is flawed as will be pointed out below, so it remains unclear the extent of the impact not only on caribou, but three Aboriginal groups as a culturally important species.

The BC Ministry of Environment estimates that South Peace Northern Caribou populations (including the Quintette herd, which is affected in this project) are on the decline by 75%. They are listed as a threatened species by the Committee on the Status of Endangered Wildlife (COSEWIC) and listed on the blue (Special Concern) list on the Species at Risk ACT (SARA). It is for this reason that SARA has developed a Recovery Strategy for the Woodland Caribou, Southern Mountain population (Rangifer tarandus caribou) in Canada (Environment Canada, 2014). In this strategy, they state a recovery goal of the Southern mountain caribou to:

"To guide recovery efforts, the population and distribution objectives are, to the extent possible, to:
• stop the decline in both size and distribution of all LPUs; • maintain the current distribution within each LPU; and • increase the size of all LPUs to self-sustaining levels and, where appropriate and attainable, to levels which can sustain a harvest with dedicated or priority access to aboriginal peoples.

Further, they also outline how they organized caribou subpopulations into 38 Local Population Units (LPUs), which take into account how the populations have declined and been fragmented into subpopulations over time. This is the unit in which is used across all caribou studies for population estimates, threats assessments and critical habitat requirements. However, the

Caribou Assessment Area (defined in Table 5.3.3.6.2) defines the CAA as "…the Quintette herd's HEWR and matrix habitat north of the Wolverine River." This is the area that was used to calculate the cumulative effects on the critical habitats, which is not consistent with the Strategy. The impacts on caribou should use the same Local Population Units (LPUs) as the defining boundaries of the Quintette herd to more accurately reflect the impacts on the Quintette herd. According to the strategy, the boundary should include all the habitat ranges applicable to the groups. Based on the proponent's def inition of the CAA, the high elevation summer, low elevation winter and Type 1 and 2 matrix ranges are missing.

Table 5.3 -40 shows the cumulative effects on the HEWR, but there is no section that shows the effects for the matrix habitats. Therefore, to be able to make assessment conclusions with confidence, an assessment of the cumulative effects on the matrix habitats should be included, with assessment showing the impacts on all critical habitats, using the boundary of all LPUs for the assessment area.

The Strategy states that "…the 65% undisturbed threshold only applies to low elevation winter range and Type 1 matrix range for the Northern and Central Groups." (the Quintette herd falls within the Central Group of the South Peace Northern Caribou). The strategy says that further study would be required to acquire more information (list is provided of resources) specific to southern mountain caribou to determine the level of undisturbed habitat in seasonal and matrix ranges that are required to sustain recruitment and reduce adult mortality. Please provide more information for the justification of applying this threshold to all habitat ranges based on current literature as well as site specific data collected.

There is a lot more work to be done on the assessment for caribou, including linking the assessment effects of critical habitat impacts back to the land base of traditional territory of the three aboriginal groups. If the results indicate a loss in critical habitat of the Quintette herd, the population numbers could potentially decrease substantially, reducing the opportunities for the aboriginal groups to utilize them as a cultural and subsistence resource. This would infringe upon the Treaty 8 rights of the three aboriginal groups. Section 13.2.7.3.3 of the EA report states that West Moberly and Saulteau First Nation have placed a moratorium on hunting caribou species, most likely to protect them and give them time to stabilize and recover. The Aboriginal groups have a constitutionally protected right to provide consent for how resources are used within all their traditional territories, and in light of recent case law, namely Tsilhqot'in and Grassy Narrows (Mandell Pinder, 2014) (Grassy Narrows 2014, SCC 48).

Further, to relate this back to the social effects, in Section 7.3.3.2.2.2, Diet and Nutrition, "For Aboriginal cultures, the harvesting of country or traditional foods and associated experiences,

such as physical activity and spiritual connection with the land, are associated with nutritional health benefits (e.g., subsistence food sources have been linked with lower rates of health conditions such as obesity and diabetes)(Earle 2011; FNHA 2012) and improved overall well-being (Earle 2011; FNHA 2012). The harvesting of country foods further maintains social and cultural health, by providing a mechanism for sharing, cooperation, non-cash economies, and cultural transmission (Earle 2011). Non-Aboriginals who participate in the harvesting of, or consuming of, country foods may experience similar nutritional and health benefits. For the three aboriginal groups, substantial cultural losses have already occurred with the loss of being able to hunt caribou, both voluntarily and legally prohibited from doing. More studies need to be conducted to determine the full impact of the effects, using already available data as well as new studies. There is a lot of literature documenting food insecurity for first nations (Powers, 2007)(Earle, 2011)(FNIGC, 2015)(Willows, 2005) (National Aboriginal Diabetes Association, n.d.), but data on food insecurity on reserve, by household, is lacking (Earle, 2011). This type of study would more accurately relate the impacts associated with the loss of important species such as caribou, and other culturally important species to cultural health indicators, such as poverty and unemployment (Health Canada, 2004), levels of traditional food knowledge, access to traditional food systems, and the safety of traditional/country food (Powers, 2007). It would be ideal to provide the three aboriginal groups with financial support to conduct this kind of study to determine the socio-cultural effects of caribou and diet and nutrition and cultural impacts associated with the decline of caribou for past present and future, as it relates to the project.

References:

British Columbia Ministry of Environment (BCMOE) (2014). Science Update for the South Peace Northern Caribou (Rangifer tarandus caribou pop. 15) in British Columbia. Accessed on September 25, 2014 from http://www.env.gov.bc.ca/wld/speciesconservation/nc/

Earle, Lynda (2011). Traditional Aboriginal Diets and Health. Prince George: National Collaborating Centre for Aboriginal Health.

First Nations Information Governance Centre (2015). FNIGC Data Online. Accessed on Septermber 27, 2015 from http://data.fnigc.ca/online

Environment Canada. 2014. Recovery Strategy for the Woodland Caribou, Southern Mountain population (Rangifer tarandus caribou) in Canada. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. viii + 103 pp.

Health Canada, Office of Nutrition Policy and Promotion Health Products and Food Branch (2004). Income-Related Household Food Security in Canada. Ottawa: Health Canada. Accessed o September 28, 2015 from http://www.nada.ca/resources/food-security/

Grassy Narrows First Nation v. Ontario (Natural Resources), 2014 SCC 48 (CanLII), < http://canlii.ca/t/g80bn> retrieved on 2015-03-09>

Mandell Pinder (2014). Tsilhqot'in Nation v. British Columbia 2014 SCC 44 – Case Summary. Retrieved on March 8, 2015, from http://www.mandellpinder.com/tsilhqotin-nation-v-british-columbia-2014-scc-44-case-summary/

National Aboriginal Diabetes Association (n.d). Diabetes Resources, Food Security. Accessed on September 27, 2015 from http://www.nada.ca/resources/food-security/

Power, Elaine. (2007). Food Security for First Nations and Inuit in Canada Background Paper. First Nations and Inuit Health Branch, Health Canada

Willows, N.D. (2005). Determinants of Healthy Eating in Aboriginal Peoples in Canada. Canadian Journal of Public Health 96 (Supplement 3): S32-S36

Personal Information Withheld - Vancouver, British Columbia

My comment concerns Section 7.3, Community Health. Please see attached file.

Submission to the Sukunka Coal Mine Project, Public Comment Process

Section 7.3: Community Health

In *Table 7.3-1: Coverage of Social Determinants of Health and Indicators*, "culture" is identified as a social determinant of health. However, "ethnicity" is identified as the sole indicator for culture, but the proponent has not defined this indicator nor provided a rationale for its inclusion. Further, the table suggests that because this indicator has already been addressed in Section 7.2, Population and Demographics, it has not been carried forward for further assessment. In essence, this means that impacts on culture as a social determinant of health are not assessed outside of Section 7.2, Population and Demographics. However, neither culture nor ethnicity are directly mentioned in Section 7.2, and while *Table 7.2-4: Summary of Residual Social Effects: Population and Demographics* suggests that "the presence of a large workforce in a relatively lightly populated area will affect the local population/demographic structure, and may affect a broad range of socio-economic indicators", significance is evaluated as "low" and none of the identified mitigation measures are directly associated with either culture or ethnicity.

Essentially, the assumption underlying the use of ethnicity as an indicator for culture as it is operationalized here is as follows: as long as the project does not have a significant effect on the demographic composition of the communities within the study area, then culture will not be impacted. For local First Nations, the implications of this assumption may be problematic for several reasons. Significantly, from an Aboriginal community health perspective, this approach overlooks several key factors influencing culture as a social determinant of health. Examples of such factors include community cohesion, community identity, land stewardship/connection to the land, traditional practices, community knowledge, community autonomy in governance and decision-making, and more. While some (though not all) of these factors have been evaluated elsewhere in this section (e.g., the proponent would likely argue that community cohesion has been addressed in Section 7.3.5.2.1.3, Family and Community Dynamics), it is not sufficient to point to these sections without addressing the interrelatedness of culture, community health, land use, and traditional practices in a First Nations context. This point is particularly relevant if, as in the section on Family and Community Dynamics, no First Nations-specific baseline data has been provided.

Similarly, while impacts to traditional land use areas have been addressed in Section 12.0, Traditional Knowledge and Traditional Land Use, these impacts have *not* been assessed in relation to culture as a social determinant of community health. This approach (considering valued components discretely rather than holistically) disregards Aboriginal understandings of community health, and overlooks recent guidelines concerning how best to approach Aboriginal/indigenous community health in impact assessment that have emerged over the past several years (e.g., Greenwood et al, 2015; First Nations Health Authority, 2014; Reading and Wien, 2009; First Nations Health Development Project, 2006). Many of these documents

outline more culturally relevant methods and approaches for identifying and evaluating potential impacts, and some include suggestions for indicator selection. Possible examples include:

- # of cultural activities and degree of participation
- # of youth/Elders speaking traditional languages
- # of formal Elder/youth activities and degree of participation

Given the likelihood that this project will negatively impact local First Nations' cultures, and given important linkages between culture and community health in Aboriginal communities, it is concerning to see such limited attention paid to cultural impacts in Section 7.3. It is clear from the lack of detail in this area that the proponent has not sufficiently considered community health impacts with regard to Aboriginal communities inside the study area. The proponent should, at the very least, define how they are using "ethnicity" as an indicator of culture, and carry out additional, more community-relevant baseline studies for assessing impacts to culture as a social determinant of health. The proponent should also be expected to support opportunities for local First Nations to contribute to the selection of more appropriate indicators for assessing impacts to culture as a social determinant of health. For suggestions and best practices concerning how best to accommodate First Nations in the assessment of cultural impacts, please consult Turner et al (2008) and Gregory & Trousdale (2009).

Citations:

Greenwood et al. 2015. *Determinants of Indigenous Peoples' Health in Canada: Beyond the Social.* Canadian Scholar's Press.

First Nations Health Authority. 2014. *Traditional Wellness Strategic Framework.*

Reading, Charlotte, and Fred Wien. 2009. *Health Inequalities and Social Determinants of Aboriginal Peoples' Health.* National Collaborating Centre for Aboriginal Health.

First Nations Health Development Project. *Community Health Indicators Toolkit.* 2006. Saskatchewan Population Health and Evaluation Research Unit.

Turner et al. 2008. "From invisibility to transparency: identifying the implications." *Ecology and Society,* 13 (2).

Gregory, Robin, and William Trousdale. 2009. "Compensating aboriginal cultural losses: an alternative approach to assessing environmental damages." *Journal of Environmental Management,* 90: 2469-2479.

October 5, 2015

Adrian Semmelink - Vancouver, British Columbia

The proponent frequently uses the words "if deemed necessary" concerning mitigation options for preventing soil erosion (in section 5.5.6.2.6). Considering that—as a result of these mitigations—the proponent has assessed the impact of soil quantity loss as negligible, should these mitigation options not be mandatory? According to the report "[change] in soil volume (m3) was not assessed, as the effects of erosion should be mitigated adequately by the implementation of BMPs and mitigation measures (Section 5.5.6.1.1)." Therefore, they are currently relying on the mitigation measures to mitigate this effect but not committing to many of them. Additionally, according to the report the "[change] in soil volume due to erosion cannot be reasonably predicted based on the unplanned nature of any erosion events that might occur

(Section 5.5.6.1.1)." Despite their assertion that the volume of soil loss due to soil erosion cannot be reasonably assessed there are technique s that can do that, such as the Revised Universal Soil Loss Equation used by many government agencies such as the U.S. Department of Agriculture (Renard, Foster, Weesies, McCool, & Yoder, 1998). Therefore, they are basing their assessment of a negligible effect on no empirical evidence and than not committing to many possible mitigation techniques that could reduce the change in soil quantity due to soil erosion. Therefore, if the proponent will not conduct a study of how soil erosion could effect soil quantity loss, all mitigation measures proposed as "if deemed necessary" should be added as conditions to the EA Certificate to ensure that the effect of soil erosion is indeed negligible. These mitigation options could include, but are not limited to, the 'compaction of soil stockpiles to limit wind erosion' or the use of 'bioengineering options in high risk erosion areas'.

Renard, K.G., Foster, G. R., Weesies, D. K., McCool, & Yoder, D.C. (1998). Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation. U.S. Department of Agriculture, Agriculture Handbook No. 703, 404.

In section 5.5.7 Summary of Residual Environmental Effects on Soil, the proponent suggests that the residual effects on soil quantity from soil cover loss will be adverse, moderate magnitude, permanent, irreversible and not significant. However, the report estimates that soil cover loss will be approximately 12%. Therefore, the only criteria that enables the proponent to assess the soil cover loss as not significant is the magnitude which would have to be higher than 20% change from baseline conditions according to the proponents report. However, the 20% is completely arbitrary and the proponent offers no explanation why this is not for example a 5% or 10%. To highlight the arbitrariness of how they set thresholds for changes in magnitude it is useful to note that these thresholds are universal for all residual environmental effects on soil. Therefore, they did not distinguish between effects when considering changes in magnitude. This is confusing, as surely the consequences of different environmental effects would be different. In the case of soil cover loss Podwojewsku, Janeau, Grellier, Valentin, Lorentz, & Chaplot (2011), show that the significance of soil loss would depend on how much soil cover would remain. Furthermore, the distribution of the soil cover loss was not evaluated in the report. If the 12% cover loss is located in one part of the project the soil quantity loss from that part could be significant even by their criteria as that could lead to a localized soil cover loss of more than 20%. Therefore, the proponent's assertion that a 12% loss in soil cover and the associated soil loss are negligible is false. Especially, because as I mentioned in my previous comment they have not completed an analysis of what the effects of soil erosion could be on soil quantity. The proponent should be required to change their characterization of 'change in soil quantity due to cover loss' effect to significant.

Podwojewsku, P., Janeau, J. L., Grellier, S., Valentin, C., Lorentz, S., & Chaplot, V. (2011). Influence of grass soil cover on water runoff and soil detachment under rainfall simulation in a sub-humid South African degraded rangeland. Earth Surface Processes and Landforms, Volume 36, Issue 7, pages 911–922. Retrieved from: http://onlinelibrary.wiley.com/doi/10.1002/esp.2121/full

Michaela Neuberger - Vancouver, British Columbia

Sukunka Coal Project

PUBLIC COMMENTS: ASSESSMENT OF POTENTIAL ECONOMIC EFFECTS

1. Cyclical nature of mining

An important characteristic of the mining industry is its cyclical nature – it is subject to the 'ups and downs' of world commodity markets. The 2014 PWC report "The Mining Industry in British Columbia" confirmed that following the economic downturn in 2008, the steady and continuous drop of many minerals and metals has led to reduced revenue and margins. Consequently, a handful of mines were put on care and maintenance in the province, to let mining companies cope with the current price slump. CBC News reported on Sept 17, 2015 that analysts believe a rebound in coal prices is still a few years away. Even more alarming, industry experts around the world agree that coal is in terminal decline. On July 13, 2015 Bloomberg Business published an article called "The Latest Sign That Coal Is Getting Killed", claiming that financial bond markets reflect this new reality. Bonds are used by coal companies to raise money for such things as new mines and environmental cleanups. They are more stable and fluctuate less than stocks. Coal bond prices tumbled 17 percent in the second quarter of 2015, according to an analysis by Bloomberg Intelligence, showing that investors are increasingly reluctant to lend to coal companies. This is the fourth consecutive quarter of price declines and by far the worst performance of any industry group (oil and gas bonds have been rising). This decline in coal bond prices is an indicator of the sector's long term challenges: reduced demand in Asia; environmental pressure to stop burning fossil fuels, starting with coal; the rise of renewables; and health issues (Bloomberg Business, July 23, 2015).

Although it is inherently difficult to forecast economic cycles and world commodity prices, it is reasonable to assume that over the 20+ years lifetime of the Sukunka Coal mine world coal prices will gradually decline. Within this downward spiral, the industry will also experience cyclical ups and downs. I suggest to account for these cycles in the mine's economic activity and plan for at least two twelve month long care and maintenance periods during which operations and development are curtailed. This should be accounted for in terms of employment and revenue impacts.

2. Underground mine

An underground mine area was initially included in the Project Description (Stantec 2013) and the version of the Application that was submitted to the BC EAO in January 2015 for screening purposes. During the screening process, the BC EAO and the Ministry of Energy and Mines (MEM) requested additional geotechnical and geochemical studies for the underground mine. As a result, underground mining will now not be considered for approximately six years into the operation of the mine. The level of information requested by the BC EAO and MEM is currently not available and Glencore decided in April 2015 to remove underground mining as a component of the Project.

The above ground Sukunka Coal mine will produce up to 3 million tons per year (Mt/y) of saleable metallurgical coal for export to market. Should the underground mine be pursued, it is estimated to produce a further 3.0 Mt/y of run of mine (ROM) coal. In the current assessment, Glencore did not remove the underground mine from the estimations of capital costs and other economic benefits. The proponent recognizes, however, that the resulting project cost is now at the lower end of the original cost estimate. This is problematic, however, since the resulting lower project costs will likely overstate potential project effects in terms of employment and revenue.

According to the BCEAO Reviewable Projects Regulation, a production capacity exceeding 250,000 t/y or more of coal is subject to review. Moreover, the CEAA Regulations Designating Physical Activities Section 15(d) stipulates that coal production capacity of 3,000 t/d or more needs to be subject to an environmental assessment. Both the above ground and underground mine individually exceed these thresholds. Thus, should Glencore wish to pursue an underground mine in the future, separate applications and reviews will take place, including an integral environmental assessment pursuant to

BC EAO and CEAA regulations. The current EA of the Sukunka Coal Mine project should therefore be adjusted to reflect the capital cost and employment effects of the above ground operations only; the current assessment includes the economic benefits but excludes almost all of the environmental impacts of a potential underground mine.

3. Change in Labour demand – Closure and Post-Closure

The closure and post-closure phases of the mine are associated with employment loss, both through loss of operational jobs and project spending following closure. This will have effects on labour demand and supply, the regional economy, and government finances.

First, employment loss calculations are inconsistent; Section 6.1.6.3.1.3 states that the long-term effect of post-closure will be the loss of all direct mining employment (543 jobs of which 160 would employ residents of the LAA) as well as the related indirect and induced employment (90 jobs). Section 6.1.6.3.3.3 states, however, that post-closure will result in the loss of 310 indirect and induced jobs. Please explain the different numbers of indirect and induced employment loss and rectify calculations where appropriate.

Second, Glencore claims to have limited opportunities to directly mitigate these losses (Section 6.1.6.3.3.3.). As part of the mitigation measures Glencore should provide re-training programs and workshops to help workers apply for new jobs. This service should be offered to all direct mining employees affected by project closure.

October 2, 2015

Personal Information Withheld - Vancouver, British Columbia

Section 7.3: Community Health

1) Healthy Food Options

In Section 7.3.5.2.2, Proposed Mitigation, the proponent states that the camp will include "healthy food choices." Will this include culturally sensitive food options, given that the proponent aims to hire Aboriginal workers as part of their employment strategy, and that the proponent recognizes traditional foods as important for wellbeing (Section 7.3.3.2.2.2, Diet and Nutrition)? If not, what steps will the proponent take to ensure that the traditional food options to support the wellbeing of Aboriginal employees are available?

2) Employee and Family Assistance Program

In Sections 7.3.5.2.2, Proposed Mitigation, and 7.3.5.2.3.2, Health Behaviours, the proponent states that an Employee and Family Assistance Program will be provided to employees and their families dealing with stress and other issues that may trigger an increase in drug and alcohol use. Will this program include both Western methods such as clinical psychology and counselling, and traditional, Indigenous methods of counselling?

This is key to the program's effectiveness, as the proponent aims to hire Aboriginal workers as part of their employment strategy, and literature clearly shows that Indigenous methods based in traditional and culture are important to healing and well-being (McCormick 2007, Heinrich 1990, Constantine et al. 2004, Brady 1995, Vicary & Westerman, 2004) and that Western approaches to counselling may in fact be incompatible, ineffective, or even oppressive for

Aboriginal people (Stewart 2008, Hodge 2009, Ranzijn et al. 2007). If the program does not currently offer traditional, Indigenous methods of counselling, how will the proponent support the wellbeing of Aboriginal employees? The proponent must explicitly describe its measures to support Aboriginal employees for this program to be an effective mitigation measure.

3) Family and Community Dynamics

In Section 7.3.5.1.1, Analytical Assessment Techniques for Community Health, the proponent states, "potential effects on community health are assessed by describing pathways that could lead to a change in…family and community dynamics." Subsequently, in Section 7.3.5.2.1.3, Family and Community Dynamics, the proponent states that the family and community dynamics will not be assessed further as a measurable parameter because "the Project will not result in a large influx of demographically different workers", assuming that a large demographic change is the only source of negative impacts on family and community dynamics.

However, there are other factors that can negatively impact family and community dynamics—primarily family dynamics—even if there is no influx of demographically different workers. The very NR Can report that the proponent cites to show that demographic changes trigger adverse impacts to family and community dynamics also lists other potential triggers for adverse impacts that are not related to demographic change. For example, the report states harmful impacts may occur if "one partner is away from home for extended periods of time". A project may "lead to the introduction of new lifestyles and consumption patterns that can disrupt community life and lead to a breakdown of traditional lifestyles." Drug and alcohol use may lead to "family breakdown" and "strained relationships". Section 4.7, Some Examples, lists further adverse impacts to family dynamics that are not likely to be caused by demographic changes, including "breakdown of family values" and "in crease in family violence" (NR Can 2003).

The proponent also cites a Northern Health report stating that demographic changes trigger adverse impacts to family and community dynamics. This report also includes adverse impacts to family and community dynamics that are not triggered by demographic changes. Section 2.3.2, Preliminary Assessment of Northeastern British Columbia Communities, states that changing family roles can lead increased substance abuse (Northern Health 2007). Certain aspects of the project, such as switching to shift-rotation work, may trigger such changes.

The National Aboriginal Health Organization also highlights the social impacts of resource extraction on families due to shift work, not demographic changes. They state that "strain at home can lead to conflicts, family violence, the neglect of children, and family break-ups," and that "a greater burden falls on women…[taking] time away from other activities, such as

participation in community life." The report states further that community dynamics may be negatively impacted as volunteerism declines (NAHO 2008).

As such, it is inappropriate that the proponent not assess changes to family and community dynamics as part of the assessment of change in community health conditions, simply because there will not be a large and rapid influx of demographically different workers into the community. There are many other factors within the project that can trigger changes to family and community dynamics—such as shift-rotation work or a primarily male workforce— which may have a significant effect on the community if not mitigated. The proponent takes an overly narrow view of the measurable parameter, and in so doing excludes potentially significant adverse impacts from the assessment.

The proponent must assess the impacts on family and community dynamics resulting from triggers other than demographic changes as part of its assessment of change in community health conditions. The proponent must also account for these impacts in Section 7.3.5.2.2, Proposed Mitigation, and Section 7.3.5.2.3, Characterization of Residual Change in Community Health Conditions. The proponent must also plan for mitigation measures to address these impacts. The existing Employee and Family Assistance program described in the proposal does not specifically address these triggers, nor the impacts that result from them. As described above, the program would also be ineffective in addressing these triggers and impacts in an Aboriginal context if it does not explicitly plan for culturally specific, traditional Aboriginal methods.

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Personal Information Withheld - Vancouver, British Columbia

1. In the Greenhouse Gas Management Study, the notes to Table 17.4-1 say that the Provincial Inventory Report (PIR) includes GHG estimates for afforestation and deforestation, which were not disaggregated to the provincial-level in the National Inventory Report (NIR). In order to be conservative, why were the numbers from the NIR rather than the PIR used as baseline information in the study?
2. Section 4.2 Land Clearing Residuals and Biomass Burning of GHG Technical Data Report suggests that a carbon sink, namely trees and other vegetation in the Northeast eco-region with a total area of 566.5 ha is removed, while in the Greenhouse Gas Management Study, it claims that the cleared area will be returned to its original state. What evaluation has been done to confirm that there was no net effect removing this carbon sink then replenishing it since it was not quantified in the assessment?
3. Section 4.1 Diesel Fuel Usage of GHG Technical Data Report states that hours of operation and equipment load factors of other construction equipment were estimated by Stantec based on a similar-sized project. How do you define the "similar size"? Is this in terms of tonnes of coal produced? Other factors such as environmental conditions and the operation parameters of

equipment can affect diesel fuel usage. Which similar project is referred to? Otherwise, please find a better project as the basis for comparison or calibrate the calculation in some way.

4. Table 4.2-1 of GHG Technical Data Report, shows that the total land clearing area is 566.5 ha, while text summary below Table 4.2-2 states that the total area to be cleared is estimated to be 916.4 ha. It appears the lower number is used when calculating GHG emissions in Table 4.2-4; however, if the higher number is actually correct, this calculation should be redone and factored into the larger assessment.
5. In the GHG Technical Data Report, can you clarify why there is a slight discrepancy between the data shown in Table 4.2-4 and the results from using corresponding data in Table 4.2-2 and Table 4.2-3 to calculate? For example, Table 4.2-2 and Table 4.2-3 data indicate that uprooting and burning of area with merchantable timber predicted to emit 58,923.9 tonnes CO2e, while in Table 4.2-4, the result given is 58,815.86 tonnes CO2e.
6. The Technical Data Report doesn't provide data on estimated operation time for mobile equipment used to calculate the GHG emissions in Table 5.1-2; please provide this data. Also, the data of underground post-mining factors (Table 5.3-1) was not available, so how was the CH4 emission in Table 5.3-2 calculated?

September 1, 2015

Personal Information Withheld - Tumbler Ridge, British Columbia

The access to the Sukunka Mine needs to change so that it uses the existing infrastructure already in place at the old Bullmoose Mine (Teck). This will help to decrease the environmental impact on the surrounding area and help the town of Tumbler Ridge flourish again.