NORTHWEST INSTITUTE
FOR BIOREGIONAL RESEARCH

PO Box 2781, Smithers, BC, Canada, V0J 2N0
Tel (250) 847-9693 • **Email** pat@northwestinstitute.ca • **Website** northwestinstitute.ca

July 23, 2020

Please accept Northwest Institute's submission to the British Columbia Environmental Assessment Office regarding the draft Application Information Requirements (dAIR) for the proposed Tenas Project. Attached is a memo prepared by Dr. Freed and Dr. Littlejohn, who conducted a technical review of the dAIR with a focus on how the project could potentially impact water quality in the nearby environment. In addition, we have some comments on the process.

This is a proposal for a mine with high potential for acid mine drainage and metal leaching that is close to a settled area of the province and close to the migration route of all species of Pacific salmon and steelhead. The connectivity between intended and unintended acid and metal runoff from the Tenas Mine and stream, river and groundwater flows is unknown. The community of Telkwa is less than ten kilometres away from the proposed mine and draws its drinking water from that interconnected water.

Many of the Bulkley-Morice salmon stocks migrate both downstream in the spring as emerging fry and upstream later in the year as spawning adults. Again, this significant salmon highway is less than ten kilometres from the mine. Acidity and metal runoff can not only cause mortality and morbidity in migrating salmon but sub-lethal levels can also hold up migrations causing later failure to spawn or adverse behaviour in juvenile fish.

From previous attempts to justify coal mine at the Tenas site, we know that the distribution of acid-generating rock – both in the coal itself and in the waste rock that needs to be removed – is highly variable with numerous hotspots. This will require dense sampling to confirm that acid drainage and metal leaching information is such that the mine is financially and environmentally feasible before an environmental assessment certificate is granted. That informational density does not appear to be close to the level required.

Therefore, we consider the current draft AIR to be a preliminary document. Substantially more work needs to be completed by the proponent and by the EAO

before it can be posted for public comment. The draft AIR is so poorly put together and so vague that neither the director, under s. 16(2) of the *Environmental Assessment Act, 2002* (the "Act"), nor the public can be assured that an application for an environmental assessment certificate by the proponent based on the draft AIR would meet the requirement of s. 16 of the Act.[1]

This project is of significant public concern and the draft AIR for public review should be completed with sufficient professionalism so that a meaningful review of the document is possible. Therefore, we request that a revised AIR be prepared and there be an additional public review period following its posting on the EAO website.

There is considerable interest in the proposed Tenas Project and several public interest groups like ourselves have contracted technical experts to assist with the review and we have the ability to assist with the screening and detailed review during the environmental assessment.

We request that groups' technical advisors be included in the Working Group for the EA review and permitting of the project.

This approach would meaningfully consider the publics significant concerns with the proposed project. This comment is relevant to the draft AIR, Section 2.1.

We also ask that a Community Advisory Committee (COC) be set up to include members of the public with an interest in the project. Such committees are mandated in the 2018 Environmental Assessment Act. While the Tenas Project is being reviewed under the old Act we believe it would be useful to establish a COC as a vehicle for sharing information and highlighting issues needing further consideration.

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[1] The following examples illustrate some of the deficiencies:

a. Section 4.6.1: The description of the RSA and LSA is unclear in terms of potential for downstream impacts from the project on water quality including any measurable change in water quality from current conditions in the Telkwa River downstream of the proposed discharge. The LSA/RSA depiction (Figure 9) is not legible. The legend has text running off the page. A corrected version is requested.

b. Figure 2 is not legible and a corrected version is requested.

c. In Section 4.6 (top page 63) there is reference to the Fish and Fish Habitat VC assessment supporting and being supported by ICs and VCs. It is concerning that this list does not include surface water quality and water quantity. It seems evident that fish need water and therefore this is important linkage (that is missing).

d. There are track changes and errors in the document. A more readable and finished product is requested for the review of the draft AIR.

e. The variation of blue/black writing is odd and distracting throughout the document. It is not clear what the blue/black writing indicates.

Based on the draft AIR (page 15), it would appear that the project is intended to proceed with concurrent permitting during the EA review. If so, could our group view the draft Information Requirements Table (IRT) for the permitting process and provide comment? If concurrent permitting is proceeding, the scope of the concurrent permitting of the project should be defined in order to meet the requirements of s. 16 of the Act.

We look forward to working with the EAO to bring the draft AIR up to the requirements of the Act.

Sincerely,

Pat Moss
Executive Director

TECHNICAL MEMORANDUM

Date: **July 20, 2020**

To: **Pat Moss, Northwest Institute**

From: **Patrick Littlejohn, PhD., P.Eng. (registered in BC)**

Rina Freed, PhD., P.Eng. (registered in BC, ON, Yukon)

Subject: **Comments on Draft Application Information Requirements for Tenas Coal Project**

1 Introduction

Source Environmental Associates Inc. (Source) was engaged by the Northwest Institute to conduct third party technical review of the Tenas Coal Project with a focus on how the project could potentially impact water quality in the nearby environment, for example through acid mine drainage (AMD). This review was conducted to support the Northwest Institute's comments on the project's draft Application Information Requirements (AIR) as part of the public comment period. To conduct this review, Source reviewed the following project related documents:

- Draft Application Information Requirements Tenas Project proposed by Telkwa Coal Limited (May 2020)
- Tenas Metallurgical Coal Project Definitive Feasibility Study Results (March 2019)
- Tenas Project Description (November 2018)

The purpose of this memo is to provide an initial summary of the key issues identified followed by more detailed comments on content specific to the draft Application Information Requirements (AIR).

2 Summary of Key Issues

2.1 Discharge to Telkwa River

The proposed project would discharge mine impacted water directly to the Telkwa River rather than to smaller watercourses closer to the site such as Goathorn Creek, Tenas Creek or Four Creek. Larger rivers generally have more dilutive capacity than smaller creeks. However, sampling of the Telkwa River indicates that it has levels of cadmium, zinc and lead that are already above BC Water Quality Guidelines (BC WQGs). Any additional loading of these species would

cause further exceedance of BC WQGs in the Telkwa River and may have a deleterious effect on fish and other aquatic life.

Further, guidance from BC Ministry of Environment (ENV) states that dilution alone is not an acceptable method of managing mine contact water. Source recommends that an Alternatives Assessment be conducted to evaluate a location for discharge of mine water and that Ministry of Environment guidance on the use of initial dilution zones be incorporated into the mine plan.

2.2 Limited Water Treatment

The proposed project involves very limited treatment of mine impacted water prior to discharge to the Telkwa River. The project description states that potentially acid generating (PAG) mine waste will be stored in saturated pits to prevent acid generation and reduce treatment requirements. However, even mine waste that does not go acidic can release environmentally significant levels of contaminants. The proposed treatment method (sedimentation) would only remove suspended solids and would not have any impact on dissolved species that are present. There are many industrially proven methods for treating circumneutral mine contact water of this nature to remove dissolved species. Source recommends that a Best Available Technology assessment for water treatment be conducted in accordance with BC ENV guidance. This should be conducted in conjunction with the aforementioned discharge Alternatives Assessment.

2.3 Potential for Selenium Release

The release of selenium from coal mining has proven to be a significant issue and has been a large driver of water treatment and management requirements at coal projects around the province. The project description for the Tenas Coal project simply states that “most” of the rock units in the project contain lower levels of selenium than other western Canadian coal projects. However, this does not mean that selenium is not a potential issue for the site, as even small amounts of selenium can have a significant environmental impact. Based on precedent at other sites in BC, the cost and complexity of selenium management can be significant and so should be accounted for at the early stages of project planning. Because of the clear precedent of coal mines in BC impacting watercourses and aquatic life with selenium, Source believes that the lack of any particular mention of selenium in the draft AIR is a significant oversight. Source recommends that a detailed assessment of selenium release potential and management methods (i.e. selenium treatment, other waste handling methods) be conducted and integrated into the project plan.

2.4 Allowance for Care and Maintenance:

A common issue in mining projects is that projects are designed with the expectation that they will go from start-up to operations to closure in one continuous span. In actuality, many mines have periods of care and maintenance when the mine is taken offline for a significant period of time without initiating reclamation and closure activities. It is important to design a mine with allowance for care and maintenance periods and to have a detailed care and maintenance plan that is distinct from the closure and reclamation plan. One area where this is relevant to the Tenas project is in PAG material handling. PAG cell capacity must be available at the same time as PAG material is generated to in order to avoid temporary surface storage. Source recommends that Care and Maintenance be included as a project phase that is evaluated similar to the way that Construction, Operations, Closure and Post-Closure are included as project phases.

2.5 AMD Management Strategy and use of PAG Cells

The project description describes the use of subaqueous storage of PAG material to avoid the onset of AMD. However, PAG material that is left on surface while PAG cell capacity is constructed will weather and may turn acidic before the material is disposed of. It is therefore important to minimize the amount of time that PAG material is exposed to air (i.e. temporarily impounded on surface outside PAG cells or impounded in PAG cells before water cover is introduced). A detailed schedule of PAG handling should be developed that accounts for volume of PAG material generated and volume of subaqueous storage capacity available year over year in the mine plan. This connects with the previous point on Care and Maintenance, as the planned method of handling PAG could fail if the mine goes into Care and Maintenance while PAG rock is left exposed to air rather than in subaqueous cells.

To fully evaluate the adequacy of the proposed approach to PAG management, significantly more detail associated is required. Key components whose design directly relate to environmental effects include (but are not limited to) the open pits, PAG cells, surface waste rock dumps, and water management infrastructure. Information required to conduct such an evaluation varies by mine feature. For example, evaluation of pit suitability as PAG cells requires an understanding of pit geometry, dewatering infrastructure design, conceptual blasting plan, method(s) of converting pit(s) to PAG cells, and role of the pit in the overall water balance (i.e. ability to maintain water cover with or without additional water taking). For PAG cell designs that use water retaining dams, dam structures should be depicted with dam heights, slopes and foundations and construction materials should be identified with supporting evidence of their suitability for use in dam construction. Geotechnical analysis of water retaining structures (i.e. PAG cells) and their foundations should be provided (ex. geotechnical field investigation, associated laboratory work, sensitivity analysis, etc.). For surface waste rock dumps, detailed descriptions of waste rock dump geometry as well as construction method should be included.

All the above material should be discussed to show the planned evolution of these mine features over the course of the mine plan and should not simply focus on the final build of each feature expected at closure. The above material should also all be cross referenced with the appropriate sections on geochemical assessment of the different materials (i.e. Metal Leaching/Acid Rock Drainage potential) to discuss the implications of the proposed designs on ML/ARD.

2.6 Geochemistry Evaluation and PAG Inventory

A key aspect of the proposed PAG management strategy is the estimate of the expected amount of PAG material and the criteria used to classify material as PAG or NAG. For example, if PAG is found in unanticipated locations or in greater amounts than anticipated then the PAG management strategy could be compromised. Significant information outlining the geochemical program for the project is required to evaluate this aspect of the program, such as details on the geochemical program that supports the estimate of PAG/NAG inventory (i.e. number and location of samples, geochemical testing methodology, results). Further, it is important to understand how representative the geochemical program is of waste rock as well as the coal bearing ore, for example by conducting a statistical analysis of geochemical sample locations to quantify the level of uncertainty in the PAG inventory estimate.

2.7 Focus on AMD on Water Quality Impact

The project description heavily references PAG and AMD as the main potential mechanisms for water quality impact by the project. However, even non-acidic mine contact water can be degraded in an environmentally significant way. Key contaminants of potential concern such as copper, cadmium, selenium, and sulphate can leach from minerals into contact water under circumneutral conditions. Nitrogen species released by explosive blasting can also impact water quality (ex. nitrate and ammonia). Coal mine impacted water can also contain elevated levels of dissolved carbon dioxide that can then impact aquatic habitat through deposition of calcite. While AMD is indeed an important mechanism for water quality degradation, all of the aforementioned phenomenon have precedent from other coal mining projects in BC and so should be evaluated for this project as well.

3 Comments on Draft Application Information Requirements

Source's comments in this section includes general comments as on the draft AIR as well as references to specific sections of the draft AIR. Bold text at the beginning of the comment refer to the section heading of the draft AIR.

General comments:

The evaluation of potential effects on surface water, groundwater and aquatic habitat necessitates use of conceptual models. The AIR should require that Conceptual Models be developed as clear, simple figures for the water balance, water quality load balance, hydrogeological inputs and the Site Conceptual Model for the ecological risks and contaminant pathways.

The AIR contains no reference to requirements for water quality model predictions and water balance model predictions and the guidance documents on requirements. This is an important omission that needs to be amended.

Specific comments:

1.1 Project Phases: Section 1.1 of the draft AIR mentions project phases. The list of project phases should include Care and Maintenance, similar to Construction, Operations, Closure and Post-Closure. Care and Maintenance is an important phase of mine life in terms of evaluating potential environmental impact and should be considered given the actual industrial history of coal and metal mining in BC, where very few if any projects go directly from operations to closure with no interruption. Specific locations in the draft AIR where Care and Maintenance should be included as a specific phase include the following:

- Page 25, section 3.4
- Page 32, section 4.1
- Page 33, section 4.1.1
- Page 39, section 4.2
- Page 40, section 4.2.1
- Page 43, section 4.2.3
- Page 45, section 4.3.1
- Page 52, section 4.4
- Page 57, section 4.5.1
- Page 63, section 4.6.1
- Page 69, section 4.7.1
- Page 75, section 4.8.1
- Page 87, section 5.1.1
- Page 91, section 5.2, 5.2.1
- Page 93, section 5.2.3
- Page 96, section 6.1.1
- Page 99, section 6.2.1
- Page 102, section 6.2.3
- Page 104, section 6.3.1

- Page 108, section 6.4.1
- Page 114, section 6.5.1
- Page 118, section 7.1.1
- Page 124, section 8.1.1

The Care and Maintenance phase could align with the period during which there is the maximum amount of PAG material on surface exposed to air (rather than being disposed of sub-aqueously in PAG cells). This is important because the proposed plan describes PAG material would immediately be stored in flooded cells, but the mine entering Care and Maintenance would make this unlikely. The duration of a Care and Maintenance period should be set based on industrial history in BC (i.e. 10+ years) for the purposes of evaluation. Water quality and water balance modeling should be conducted for this project phase.

1.3 Alternatives Assessments: Section 1.3 of the draft AIR describes alternatives that were assessed in developing the project. Please add the following text for alternatives assessments in general:

1. Public consultation on the alternatives must considered the use of public resources such as water resources and dilution capacity. It is essential that the public be consulted on the use and potential alteration of public resources.
2. Environmental Impacts, feasibility, costs, community impacts, and health impacts:
    a. Please add: public comments, public perception of the compact nature or extent of the mine impacts, non-degradation goals for water quality and use of shared resources (i.e. water quality in waters of significant cultural and ecological significance)
3. Alternative means of carrying out the proposed Project that will be considered in the Application include:
    a. Please add: effluent discharge locations for all mine phases*
    b. Please add: effluent treatment technologies that are designed for effluent discharge locations
    c. Please add: NAG rock management plans
    d. Please add: closure mitigation plans for water quality
    e. Please add: nitrogen management plan

One alternative assessment that is notably missing is the assessment for location for discharge of water and water treatment methods. These are critical aspects of mitigating risk to aquatic habitat and life. It is not permissible to use dilution as a replacement for Best Achievable Technology and mitigation planning. A larger receiver should not be chosen to avoid using treatment technologies that are the best achievable. An alternatives assessment for discharge location and water treatment methodology should be conducted in concordance with Ministry of Environment guidance on use of initial dilution zones and Best Available Technology.

Specific to an water discharge alternatives assessment, please add the following text:

- "The consultation on the alternatives must consider the use of shared public resources such as water resources, including the use of dilution capacity and alteration of water quality from current conditions."

Criteria to be used in assessing alternatives should include:

- Public sentiment and perception of risk (i.e. not limited to proponent sentiment and perception of risk)
- Maintenance of water quality (i.e. the goal of non-degradation of water bodies with significant cultural and ecological significance including the Telkwa River, Bulkley River and Skeena River)
- Reduction of project footprint and returning contact water to the watercourses that it would otherwise report to (i.e. Tenas Creek, Four Creek and Goathorn Creek)

Alternative Means of Carrying Out the proposed Project that will be considered in the Application:

- Discharge Location
- Discharge Treatment Technology
- Waste rock management
- Blasting techniques and nitrogen management

3.1 Selection of Valued Components: Surface waters should be a Valued Component (VC) along with Aquatic Resources. The designation of surface waters (quality and quantity) as an Intermediate Component (IC) is concerning and inconsistent with a number of other projects. Water and aquatic resources have intrinsic value and are not simply linked through fish and other VCs designated by the project. People experience water and feelings of safety in being able to drink water and travel in water without harm from industrial pollution. Water is a shared resource, not just fish habitat.

It is inconsistent to designate forests, wetland and plants listed with vegetation as VCs but streams, creeks, rivers, and lakes as ICs. Surface waters should be considered a VC and surface water quality should be considered a subcomponent. Surface waters are "ultimate receptors" as much as wetlands and other VCs listed. In addition, it is concerning that an assessment of surface waters as an IC is not completed (to avoid redundancy). An assessment of surface waters is critical for the EA Application and must be conducted.

Please add surface water quality to the table of VCs and please complete an assessment of potential impacts for this critical VC.

3.3 Existing Conditions: Section 3.3 refers to existing conditions. As Surface waters (quantity and quality) are not included as VCs, many of these statements do not apply to surface water baseline data collection and analysis. Please correct this significant error in the draft AIR (see highlights below). It is critical to understand the following in relation to water:

- An explanation of if and how other past and present projects and activities in the study area have affected or are affecting each VC;
- Where additional project and VC-specific field studies are conducted, the scope and methods to be used will follow published documents pertaining to data collection and analysis methods, where these are available. Where methods used for the assessment deviate from applicable published guidance, the rationale for the variance will be provided in the Application; and
- Description of what TEK, including Indigenous Traditional Knowledge, was used in the VC assessment.
- The Application will contain the existing (or baseline) technical reports in the Appendices and will summarize key findings contained in these technical reports directly in the Application, in a manner that allows the reader to understand each VC's effects assessment.

This error may apply to other ICs. In addition, this type of error may be important elsewhere in section 3.

3.5 Mitigation Measures: This section does not adequately describe the process required for development mitigation measure for some VC/ICs including surface waters. It is necessary to define when mitigation measures are needed (and this has not been clarified). For example, public sentiment might be that mitigation measures should be developed if the water quality of the discharge (end of pipe) exceeds BC WQGs, not just when the proponent feels mitigations measures are required. This is not clear in the draft AIR and needs to be clarified. It is not the proponent's choice to develop mitigation measures for protection of a public resource like water quality in the receiving environment based on the proponent's values. Values of more diverse groups need to be considered including the public interests.

The expectation is that mine water mitigation planning will respect the principal of avoidance of mine water discharge to water bodies with current conditions that exceed water quality guidelines. For example, the Telkwa River already exceeds water quality guidelines for some COCs. It is not acceptable to discharge additional load to a system that already has water quality exceedances, and this should be clarified through the initial stages of the project. Unfortunately, this key consideration has been missed in the project description and draft AIR; statements are made that current conditions exceed water quality, discharges are planned via pipeline to Telkwa River and no water treatment is contemplated. Discharge planning must consider requirements for water

bodies of significant cultural and ecological significance (including sensitive fish species) and plan for non-degradation. The current approach of planning for discharge to a large receiver (via pipeline) with no mitigation (i.e. water treatment) is unacceptable and should be addressed via the expectation setting phase (i.e. the draft AIR).

Section 3.5 neglects to refer to Best Available Technology and Discharge Alternative Assessments. In general, the section appears to reflect VC and ICs other than surface waters.

3.6/3.7 Characterization of Residual Effect and Determination of Significance: This section on methodology is very subjective and may lead to a biased result. It is important that Qualified Professionals (QP) completing this work clearly take ownership for their work for characterization of residual effect and for determination of the significance of the residual effect. For each determination, the Qualified Professional should need to state a commitment to independence of the proponent's preferences. The QP should seek to reach consensus through engagement with all QPs knowledgeable on the project and subject area. It should be possible to reach a collaborative, technical consensus, rather than have the appearance of bias in favor of favourable outcome for the proponent.

For the determination of Confidence and Risk, the QP should consider the experience from existing coal mines in BC to verify the predictions.

3.8 Cumulative Effects Assessment: The definitive feasibility study for the project describes how the project was designed with the ability to expand from 145 t/h coal production rate to 350 t/h by adding equipment to the coal handling plant and/or by mining additional area currently under ownership by Telkwa Coal Limited (TCL). If TCL intends to potentially expand the project, this expansion should be included in the cumulative effects assessment for the application.

The cumulative effects assessment should also consider the fact that the Telkwa River already contains levels of certain contaminants above water quality guidelines, as discussed in section 2.1 of this document.

3.9 Follow-up Strategy: Each follow-up strategy should also include timelines for effects assessment, evaluation of mitigation efficacy, and implementation of additional measures. If mitigation measures fail or if unforeseen effects occur, it is important that effective mitigation measures are applied in a reasonable timeframe.

4.1.3 Potential Effect of Dustfall: An additional potential effect from dustfall is impact to surface water quality either as sediment in aquatic habitat or as ML/ARD if from dust particulate.

4.3 Surface Water: These sections are critical to the effects assessment and yet the draft AIR appears vague and limited. Significantly more effort is recommended to outline expectations for

surface water quality given the importance of this valued component. The opening paragraph of this section of the draft AIR describes a very narrow mechanism for surface water quality impact, sediment deposition. AMD and the other mechanisms described in section 2.6 of this document are also highly relevant mechanisms for impact to surface water quality and should be included in this discussion.

The requirements in these sections are too general, and the draft AIR will not ensure that a meaningful technical review can proceed based on the information requirements outlined. Expectations should be clarified with respect to typical coal mine effects and assessment such as:

- A bioaccumulation assessment of selenium in the aquatic environment
- Requirements to consider speciation of selenium (and potential risks due to uptake by aquatic organisms)
- Water quality objectives for Telkwa River and Bulkley River including non-degradation protection goals and development of community supported narrative water quality objectives.
- Numeric water quality objectives or thresholds based on the narrative water quality objectives.
- Management plans to protect surface water should be listed including AEMP, AMP, Mine Site Water Management Plan
- Requirements to show the mine design is predicted to meet the water quality objectives agreed on with the other water users, and contingency planning to meet water quality objectives should monitoring show trends indicate that objectives may not be maintained.

Overall, significantly more effort should be spent identifying expectations for water quality mitigation planning (that is beyond the scope of this review).

4.3.1 Surface Water Study Area: The Telkwa River downstream of project influence (i.e. confluence of Four Creek, Tenas Creek and Goathorn Creek and downstream of proposed discharge site) as well as the Bulkley River downstream of the confluence with the Telkwa River should be included in the LSA.

4.3.2 Surface Water Existing Conditions: Studies of existing conditions should reflect up-to-date scientific and analytical understanding of potential impacts. For example, older baseline water quality data is often hindered by detection limits and the list of species analyzed. In addition, methods for fish tissue analysis for metals, in particular selenium, have evolved significantly in the last 10 years, reflected in the current approach to selenium in BC water quality guidelines (i.e. measurement in egg/ovary, whole body and muscle tissue). Use of data from older versions of the Tenas project (i.e. Manalta Coal Ltd. will likely not include this level of understanding. The

baseline data set must be sufficiently robust to assess recent trends in data. It is recommended that 5 years of monthly data be required. It is important to assess older data from reports as it may be outdated with respect to current conditions.

Two highly relevant guidance documents to be included in this section are BC Ministry of Environment's guidance on Initial Dilution Zones (Development and Use of Initial Dilution Zones in Effluent Discharge Authorizations, Version 1.0, April 2019) and the Best Available Technology fact sheet (Best Available Technology Fact Sheet, March 2015). These two documents should be included in the list of guidance documents noted in the application.

4.3.3 Surface Water Potential Effects: Potential effects of the project on surface water quality also include changes of selenium speciation that make it more bioavailable, release of blasting residue (nitrate/ammonia), and release of calcite saturated water.

Regarding surface water quantity, the AIR should specify that the water balance must consider maintenance of a water cover in the pit (for covering the PAG cell). The water balance should indicate if there is a long-term need to take water from local sources and (if applicable) assess the impact of the water removal.

4.3.4 Surface Water Mitigation Measures: Mitigation measures should include a best available technology assessment for water treatment conducted in conjunction with a alternatives assessment for discharge location.

4.4.2 Groundwater: The proposed project would involve storage of PAG material under water cover in PAG cells. Water from these cells may exfiltrate to ground water. The AIR needs to specify that the seepage impacts to Tenas Creek and Four Creek must be fully characterized through appropriate hydrogeological models. This includes the potential for seepage from the pit to the receiving environment.

4.5 Aquatic Resources: Levels of metals in invertebrates should be included as an indicator for this intermediate component.

4.5.1 Aquatic Resources Study Area: The Telkwa River downstream of project influence (i.e. confluence of Four Creek, Tenas Creek and Goathorn Creek and downstream of proposed discharge site) as well as the Bulkley River downstream of the confluence with the Telkwa River should be included in the LSA.

4.5.2 Aquatic Resources Existing Conditions: Baseline studies should also include assessment of selenium levels in invertebrate tissue as this is a potential pathway for bioaccumulation of selenium in fish. Further, river sediment should be assessed for the presence of calcite, as deposition of calcite sediment can occur from coal mining contact water.

4.5.3 Aquatic Resources Potential Effects: Potential effects also include increase of selenium levels in invertebrates as well as deposition of calcite sediment in the receiving environment.

4.6.1 Fish and Fish Habitat Study Area: The Telkwa River downstream of project influence (i.e. confluence of Four Creek, Tenas Creek and Goathorn Creek and downstream of proposed discharge site) as well as the Bulkley River downstream of the confluence with the Telkwa River should be included in the LSA.

4.6.2 Fish and Fish Habitat Existing Conditions: Include selenium concentrations (baseline and predicted) in fish tissues. Fish tissues should include ovary and muscle tissue concentrations as per BC water quality guidelines for selenium, similar to baseline work done for other proposed coal mines. At present the subcomponents and indicators are too limited and lack clarity. Current fish health, abundance and condition is not a prediction of future fish health, abundance and condition. This is a reason to have precautionary water quality targets that avoid risk and respect the inherent value of water that is not substantially altered by industrial projects.

Presence of calcite sediment should be assessed as part of this VC.

4.6.3 Fish and Fish Habitat Potential Effects: Elevated levels of metals and metalloids (particularly selenium) in fish tissue, deposition of calcite sediment and impact of heavy metals and acidity on fish migration patterns[1] should be included as a potential effect in the Fish and Fish Habitat VC.

4.9 Avian Species: The presence of selenium in bird eggs should be included as an indicator for the Avian Species VC, as per BC water quality guidelines.

4.9.2 Avian Species Existing Conditions: Data on selenium levels in bird eggs should be collected as part of baseline studies.

4.9.3 Avian Species Potential Effects: Elevated levels of selenium in bird eggs should be included as a potential effect in the Avian Species VC.

[1] This potential effect is described in the following reference: G.R. Scott, *et al*, “Cadmium disrupts behavioural and physiological responses to alarm substance in juvenile rainbow trout (*Oncorhynchus mykiss*)” (2003) 206 J. Exp. Biol. 1779.

6.4 Land and Resource Use: The land and resource use section should include the sections of the Telkwa River and Bulkley River in the local study area as potentially effected public resources. These watercourses are used by the community as public resources.

9.0 Accidents and Malfunctions: Misplacement and mischaracterization of PAG material should be considered as a malfunction or accident that is to be discussed in the application.

13.0 Management Plans: Management plans for selenium and nitrogen should be included in the application. Selenium management plan refers to management and monitoring of selenium contamination resulting from the mine. For coal mines, it is standard to consider selenium management mitigation planning. This is a key omission in the draft AIR as this expectation is not clarified. Coal mines typically have some concerns regarding selenium and the past work on this mine may have missed this as it occurred some time ago. The AIR needs to outline expectations for characterization of current and predicted selenium species in water, invertebrates and fish tissue. Nitrogen management refers to management of water soluble explosive residue on blasted material and subsequent water quality impact. A Care and Maintenance management plan should be included in the application.

4 Closing

Thank you for the opportunity to provide third party technical review of the Tenas Coal project. If you have any questions about the points raised in this document, please contact the undersigned.

Yours sincerely,

Source Environmental Associates Inc.
per:

Patrick Littlejohn, Ph.D., P.Eng.
Senior Chemical Engineer, Mining

Rina Freed, Ph.D., P.Eng.
Senior Environmental Engineer, Mining