July 5, 2012
11-10

Coalwatch
(via email)

Attention: John Snyder, President

Re: **Proposed Raven Compliance Coal Mine – AIR Review - Hydrogeology**

Dr Gilles Wendling from GW Solutions has completed a review of the ***Raven Underground Coal Project – Application Information Requirement (AIR) / Environmental Impact Assessment Statement Guidelines*** dated June 2012. GW Solutions expresses the following critique and comments:

Hydrogeology

- The table describing the groundwater Valued Components (Table 5.3.1, p 71) simplifies too much the identified issues and lacks in defining the interaction with proposed Raven Project activities (e.g., the mined galleries will significantly and permanently modify the groundwater regime within the footprint of the whole property and beyond), and this is not sufficiently identified in the rationale.
- The proposed spatial boundary (Figure 5.3.1, page 73) should extent further to the west to the top of the ridge and should also include the portion of the foreshore where groundwater discharges to Baynes Sound.
- For the groundwater quality assessment, it is imperative that the spatial boundaries include the foreshore and the area where groundwater discharges to Baynes Sound, due to the potential impact the deterioration of groundwater quality could have on the activities being conducted in Baynes Sound (e.g., the shellfish industry).
- The proposed program to characterize the groundwater regime is utterly inadequate (a total of 5 monitoring wells, and 3 test wells in one corner of the property). It will provide information about the characteristics of the various units in the subsurface within a very small spatial area (less than 1/10th of the total spatial boundary). Projecting what has been observed in a small portion of the site over the whole area poses the risk of describing a groundwater regime in a way that completely exclude the effects of heterogeneity, fracture zones, etc, which are very highly expected over a total spatial area of that size.
- The proposed monitoring window from October 2009 to February 2010 is too short. Background data should cover several wet and dry seasons in order to adequately characterize the seasonality of the groundwater fluctuation and the interaction between groundwater and surface water.

- It is essential that the results of the environmental assessment be based on studies and actual data collected on site and not based on assumptions and studies from other sites.
- The potential present and long term consequences of having both a conceptual model that does not represent the local groundwater regime and a numerical model based on very weak assumptions on describing the present groundwater regime and how it would be modified by the proposed mining activities are the following:

  1. The volume of groundwater traveling in the subsurface is possibly under or overestimated.
  2. The velocity of the movement of groundwater is possibly under or overestimated.
  3. The volume of groundwater to be removed from the subsurface during mining is poorly estimated. This may result in the inadequate operation of equipment and infrastructure (e.g., ponds) designed to handle a certain volume of water or discharge rate.
  4. If more groundwater has to be extracted than anticipated, this may result in an increased reduction of flow rates in streams due to groundwater surface water interaction, or increased erosion in streams downstream of discharge points.
  5. Mining and the creation of deep highly permeable galleries will modify the pathway of the groundwater movement, its velocity, and the volume of groundwater moving in the subsurface. In addition the quality of the groundwater will be modified. This will result in unpredicted modification of both the recharge and discharge zones in whole watersheds / sub-watersheds, with unpredicted modification of the biota (fauna an flora) at surface.
  6. Modification of the groundwater regime (both in quality and quantity) during and post mining activities will modify the interaction between the bedrock aquifers and the overburden aquifers. It will affect the aquifers used for water supply in an unpredicted way.
  7. Modification of the groundwater regime (both in quality and quantity) during and post mining activities will modify the discharge of groundwater along the foreshore into Baynes Sound. This will result in unpredicted modification of the biota (fauna an flora) in the marine environment along the shores.

Hydrology

- The table describing the hydrology and water quality Valued Components (Table 5.4.1, p 81) simplifies too much the identified issues and lacks in defining the interaction with proposed Raven Project activities (e.g., the mined galleries will significantly and permanently modify the groundwater regime within the footprint of the whole property and beyond, and this will have an effect on the hydrology in the area). The table limits the potential affected areas to Cowie Creek and Cougar Smith Creek watersheds. It should include all the watersheds and sub-watersheds in the spatial boundary.
- The local and regional study areas should not be limited to the Cowie Creek Watershed (Section 5.4.1.1, p. 82). Failure to do so will prevent the assessment of streams in watersheds that will be modified due the global modification of the groundwater and surface water dynamic.

- Conducting the hydrology study only in Cowie creek and adjacent Cougar Smith Creek (for water quality) is too limitative. Assuming that other streams in the potentially impacted area will be similar is too simplistic and not representative of the reality. As a consequence, the assessment of the effects the proposed project will have on the streams will be poor. Similarly, the risk identification, the future monitoring, and the proposed remediation plan will be inadequate. This will jeopardize the sustainability of these streams and their associated ecosystems.

In the reviewed June 2012 AIR document, both the hydrology program and the hydrogeology program refer to events that will take place in the future when referring to 2009 and 2010. It appears that the AIR program predominantly replicates what was proposed prior to 2009. Therefore, most of the comments and critiques expressed during the Draft AIR review process have NOT been taken into account and the AIR guidelines proposed for the Environmental Assessment have not been adjusted to address multiple and clearly expressed concerns and recommendations.

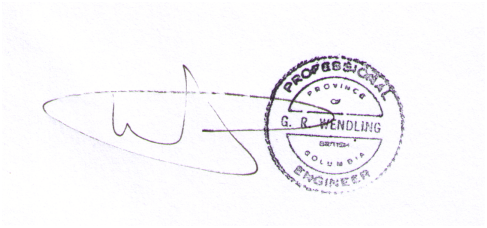
Closure

Based on the review completed by GW Solutions of the June 2012 AIR document, it appears that Compliance will not use methodologies and tools adapted to the hydrogeological and hydrological aspects of the project to be assessed. In addition, the majority of the comments, concerns, and recommendations expressed during the Draft AIR public comment period (including those expressed by professionals and several levels of governments) have not been taken into account. Therefore, the environmental assessment will not be thorough and rigorous, if completed as proposed in the June 2012 AIR document.

GW Solutions was pleased to provide this document. If you have any questions, please contact me.

Yours truly,

GW Solutions Inc.



Gilles Wendling, Ph.D., P.Eng.
President