



November 2, 2007

Zabey Nevitt  
Executive Director  
Wek'eezhii Land and Water Board  
#16 Yellowknife Airport  
Yellowknife, NT X1A 3T2

Dear Mr. Nevitt:

**BHP BILLITON DIAMONDS INC., MV2001L2-0008**  
**Tundra Soil Study Part 1.2.**

The Department of Environment and Natural Resources (ENR) has reviewed the above study and would like to provide the following comments based on its mandated responsibilities under the *Wildlife Act*, the *Forest Management Act (FMA)* and the *Environmental Protection Act (EPA)*.

**Project Description**

As a water license requirement, monitoring of seepage water flowing from the Panda / Koala / Beartooth waste rock storage area has been undertaken at toe seep stations SEEP-018 and SEEP-018/B, and down gradient station SEEP-019. Sampling at SEEP-019 from 2002 to 2005, has shown elevated aluminum levels and lower pH levels, as compared to SEEP-018/B. The cause of this difference created concern relating to the acid producing potential in the waste rock, and a detailed soil chemistry analysis was subsequently conducted to address this concern.

One reviewer's hypothesis proposed that ion exchange in shallow soils along the flow path may account for differences observed in the water chemistry. SRK Consulting (SRK) conducted soil sampling, which demonstrated that major cations (such as calcium) present in waste rock pore waters are exchanging with aluminum ions (present in tundra soil complexes). This results in the subsequent release of aluminum and a decrease in pH. In addition, SRK states, "the amount of aluminum released would be expected to decline with time as the population of aluminum ions occupying exchange sites decreases".

## **Specific Concerns / Recommendations**

ENR notes that the scoping calculations performed by SRK suggest that the ion exchange theory is correct. It is recommended that this information be used in the design of further studies into the geochemical processes affecting the waste rock storage areas, such as those acting along the flow path between SEEP-018/B and SEEP-019.

Now that we can be reasonably certain that this process plays a role in the geochemistry of the area, an investigation should be undertaken to address other concerns raised by Dr. Bill Price (Seepage Survey 2004 Review, submitted by IEMA) including the potential for increased metal leaching from mine waste due to the presence of acidic water.

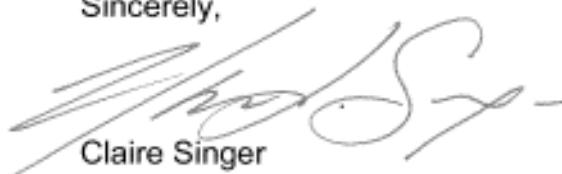
The scope of this study should:

- Be applied to all waste rock storage areas onsite (are the surficial materials and soil chemistry in this area similar to those of other waste rock storage areas?),
- Assess other hypotheses for the observed pH changes and present a plan outlining how other geochemical anomalies will be identified throughout the site,
- Indicate when acidic seepage is a significant environmental concern in the context of naturally acidic soils,
- Include information on past placement of waste materials in contact with acidic tundra soils and associated loadings to the environment, and
- Include mitigation measures if required.

In addition, ENR staff note that on page 4 of the technical memo, paragraphs 2 and 3 speak to the same issues. We recommend that one of these paragraphs be removed for clarity.

If you have any questions or concerns, please do not hesitate to call Claire Singer, Environmental Regulatory Analyst at 920-6591.

Sincerely,



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