**BHP Billiton Diamonds Inc.**
**Operator of the EKATI Diamond Mine**

bhpbilliton

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Independent Environmental Monitoring Agency
P.O. Box 1192
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Attention: Mr. Bill Ross
Chair

Dear Mr. Ross:

**Re: Freezing of the Waste Rock Storage Areas at EKATI**

Concerns have been raised regarding the freezing of the Waste Rock Storage Areas at EKATI with particular reference to the Coarse Rejects Storage Area. A review of the available information has been carried out to evaluate this concern. This letter responds to those concerns and outlines the reasoning behind the response.

Waste rock from the development of the open pits and the underground mining operations is stored in three Waste Rock Storage Areas (WRSA), namely Panda/Koala WRSA, Fox WRSA and Misery WRSA. The Coarse Rejects from the processing of the kimberlite ore is stored at the western end of the Panda/Koala WRSA. Each WRSA has been instrumented to provide information to ensure BHP Billiton understands the thermal and hydrological behaviour of the WRSAs.

The scientific evidence collected from the instrumentation indicates that the Waste Rock Storage Areas are becoming "super-cooled", (i.e. they have become substantially colder than the typical regional permafrost temperatures of -4°C to -6°C) as a result of convective cooling within the WRSA. The permafrost foundation soils beneath the WRSA have also shown sustained cooling below normal freezing ground temperatures.

BHP Billiton acknowledges that not all areas of the WRSA have shown the same degree of sustained cooling, specifically parts of the Misery WRSA, and internal parts of the Panda / Koala WRSA including the area of the Coarse Rejects storage. This is further discussed below.

**Misery WRSA:** As stated in previous reports and communications the Misery WRSA has been noted to be cooling at a slower rate than the Panda/Koala WRSA. This has been attributed to the following:

- Finer graded layers within the WRSA due to the metasediment (biotite schist) layering during placement. This reduces the depth to which the cold winter winds can percolate thereby slowing the super-cooling process,
- Temporary stockpiles of kimberlite ore placed on top of the WRSA causing snow drifting and providing a blanketing effect,
- Snow drifting on the side of the WRSA reducing the ability of the cold winter winds to pass into the WRSA,
- The initial ground temperature at the Misery WRSA was higher than at other locations and this is due to the former presence of a pond raising the local ground temperature.

Further details on the Misery WRSA are included in the report titled Thermal Evaluation of Waste Rock Piles, EKATI Diamond Mine, September 2006.

Despite the cooling of the Misery WRSA being slower than the rate observed in areas of the Panda/Koala, the temperatures observed in areas unaffected by the snow drifting show a progressive cooling to temperatures colder than the natural permafrost.

**Fox WRSA:** As stated in previous reports the Fox WRSA is currently underdevelopment and the amount of information to date is limited. However the available data indicates that permafrost has developed in the toe berms constructed to mitigate against any potential flow towards the receiving environment. In addition the natural ground has progressively cooled since construction and installed instrumentation will continue to be monitored on a regular basis.

**Panda / Koala WRSA:** This WRSA includes the area for the deposition of the coarse kimberlite rejects on the western side of the area. The majority of seepage flows towards the LLCF with the exception being a small seepage on the north-east corner of the Panda / Koala WRSA. Instrumentation was installed (from 2000 onwards) in to the Panda / Koala WRSA soon after construction was underway to monitor the progression of permafrost into the waste rock and the temperatures throughout the rock pile. Temperatures around the perimeter of the WRSA are lower (-5 to -10°C) than the surrounding permafrost indicating that the process of convective cooling is greater around the edges than in the centre of the WRSA. It is believed that this is due to:

- Distance from the edges and a reduction in wind speed as it percolates through the rock pile,
- Finer grained material in the centre of the WRSA slowing down the percolation of the cold winds.

The area of the WRSA which contains the coarse rejects from the process plant is located at the western end of the Panda / Koala WRSA and is warmer than the temperatures recorded in other areas of the rock pile. There are two installations which measure the ground temperature in this area, one failed in 2005 and the other is now located in a hollow due to build up of coarse rejects around it. Consideration has been given to the reasons around the recorded warmer temperatures compared to the rest of the Panda / Koala WRSA.

The following reasons for the slower cool down of the CRSA are given:

- The coarse rejects are a wet product from the process plant. The continual addition of warm wet rejects will slow down the cooling process.
- The coarse rejects are a fine graded material which will not encourage the percolation of the cold winds. It is therefore not to be expected that the CRSA will cool as fast as the coarse material. We have seen the same process at Misery WRSA.
- The instrumentation indicates that the CRSA is cooling, however the hollow around the remaining functioning installation causes snow and melt water to accumulate. This reduces the cooling in this area and therefore impacts on the temperatures recorded.
- The previous use of the area for the deposition of sump water resulted in the continual addition of 'warm' water to the pile, thereby reducing the cooling. This procedure has now been suspended and will not have an impact in future.

BHP Billiton has taken note of the concern raised regarding the cooling of the CRSA and will continue to collect information on this area as production continues. However it is our opinion that this area, as it is cooling, will completely freeze upon the cessation of operations as identified with our existing Waste Rock and Ore Storage Management Plan.

We trust that the preceding information meets with your requirements at this time. Should there be any questions please do not hesitate to contact the undersigned.

Yours truly,
BHP Billiton Diamonds Inc.,

Richard Weishaupt
Manager, Health, Safety, and Environment

RW/RBM/LT/...

cc. Ms. Violet Camsell-Blondin
Chair-WLWB