shear diamonds

Memo - *DRAFT*

To: Murray Ball, Karen Costello, Andrew Keim, Eva Paul, Damien Cote, Phyllis Beaulieu

From: Allison Rippin Armstrong

CC: Julie Lassonde, Greg Powell, Kyle Conway, Peter Fournier

Date: September 11, 2012

Re: Current Conditions at the Jericho Diamond Mine, and the Identification of Potential Environmental Hazards and Risks

The Jericho Diamond Mine was placed on Temporary Closure on September 2, 2012. The decision to place the mine on Temporary Closure was made just three days earlier on August 31, 2012. Personnel that were on site spent the three days addressing the most pressing tasks that would: protect the health of the asset; provide easy access to equipment that would be needed during monitoring visits in winter months; secure the asset; and, minimize the potential of any environmental risks.

For the purpose of prioritizing the issues, non-compliances and potential environmental risks, this memo will group concerns in the following headings:

1) Potential risks/hazards to the environment
2) Current status of environmental monitoring programs
3) Non-compliances

<u>Potential Risks/Hazards to the Environment</u>

After thoroughly reviewing all aspects of the project, two potential risks have been identified. The first is the issue of wind blown Fine Processed Kimberlite (FPK), the second is the water levels in Cell B/C of the Processed Kimberlite Containment Area (PKCA).

Wind Blown FPK

In April of 2011, Shear noted the presence of FPK along the Southeast and East Dams of the PKCA. Shear later discovered that this was had been an issue during the previous year. In 2012, Shear conducted a clean up of FPK starting in early May and continuing until the project went on Temporary Closure. There is still a significant amount of clean up required.

Shear also constructed a sprinkler system to wet the FPK in Cell A of the PKCA to prevent wind dispersion. Four irrigation sprinklers were purchased and installed to provide additional coverage. The sprinkler system ran all summer until it was shut off on August 31, 2012. The FPK was completely saturated at the time of shut off. Shear had intended to continue wetting the FPK until freeze up with the hopes of creating a layer of ice on top of the FPK. Shear will assess the FPK during the upcoming site visit with Aboriginal Affairs and Northern Development Canada (AANDC).

Shear constructed panels of fencing to be erected in Cell A on the FPK. This fencing could not be installed during the summer as the FPK was too wet and behaved similar to quick sand. Shear had intended on installing the fencing in October when the ground would be firmer but not yet frozen through.

Shear also planned to cover the FPK with snow during the winter months to provide additional cover. The tire wall was lengthened during the summer, and Shear intended to add on to this with snow to construct a snow wall along the remaining perimeter of the top end of Cell A.

Without the implementation of these mitigation measures, it is highly likely that the top layer of the FPK will dry out and will be dispersed, by the wind, beyond the extent of the PKCA.

Water Levels in Cell B/C

Shear shut down the pump at the West Dam of the PKCA on August 31, 2012. Shear had intended to continue discharging from Cell B/C until freeze up to ensure that the water level was low enough to provide for freshet. The water level in Cell B/C was significantly higher at the time of Temporary Closure than Shear had hoped to reach by freeze up.

Given the turn around time for laboratory analytical results, and the notification time of ten (10) days to the inspector and the Nunavut Water Board, it will be critical to collect a water sample while there is still enough ice on Cell B/C, for safety, and time to submit the laboratory analytical results for approval to discharge once freshet starts. While weekly monitoring of the discharge water was on-going during the summer at Jericho, the final sample, including the toxicity testing in Lake C3, was not collected.

<u>Current Status of Environmental Monitoring Programs</u>

AEMP

In 2012, Shear conducted a winter and summer AEMP sampling program. During the winter sampling program samples were collected for water quality. Unfortunately, the DI water the laboratory provided was contaminated, as demonstrated by the trip and field blanks.

The summer program included the collection of samples for: water quality, sediment, benthic invertebrates, zooplankton, phytoplankton, periphyton, as well as a number of physical parameters. Unfortunately, given the current status of the project and the lack of funds, Shear had to notify the labs and put a hold on all work. Some of the samples have hold times and could be compromised if they are not analyzed.

Seepage Sampling

Shear conducted two rounds of seepage sampling in 2012; the first during freshet, the second after heavy rains. A third round of seepage sampling had been scheduled for early September. However, with the Temporary Closure of the mine this sampling was not conducted.

Hydrology

Staff gauges were installed in 2012, as well as bolts for referencing. The final elevations were not taken prior to freeze up as had been intended.

Fish Monitoring in the Lynne Lake Group, Southeast Lake and Shine Lake

Non-invasive fish monitoring was conducted in 2012 in the lakes that had been, or had the potential to be impacted by wind dispersed FPK. Minnow traps, angling and the use of a fish camera determined that there were no large bodied fish in Southeast and Ash lakes. However, Shear had submitted an application to conduct gill netting in these lakes to Fisheries and Oceans with the intention of conducting the netting mid September.

Discharge Water Quality Monitoring

In accordance with the water licence, Shear is required to collect samples for toxicity testing at the mixing zone in Lake C3 upon the completion of discharging. As well, a final sampling round for water quality is required. These samples were not collected.

Non-Compliances

On July 4th and 5th, 2012, AANDC Water Resource Officer, Eva Paul, along with Melissa Joy and Karen Costello, conducted an inspection at Jericho. Ms. Paul provided Shear with an inspection report highlighting her findings during the inspection. She also requested that a compliance report/plan be submitted on or before September 30, 2012. Earlier, in June, Environment Canada had been on site to conduct an inspection under the *Storage Tank Regulations* as well as under the *Fisheries Act* with regard to the windblown FPK. Although Shear is committed to providing the requested report/plan by the end of this month, it is important to note the following issues.

Hazardous Waste Transfer Area (HWTA)

The HWTA has been noted as a concern since Tahera owned and operated the mine site. In 2012, Shear moved all contaminated material into one cell to begin repairs in the other cell. The berms of the cell were raised, and the base was prepared and ready for the installation of the geotextile fabric and liner. The fabric, liner and temper were at Det'on Cho, awaiting a herc to deliver them to site. Arrangements were being made to bring A&A Technical and a geotechnical engineer with EBA Engineering to site to conduct and oversee the installation of the liner and the completion of the cell. The materials were not brought to site and the repairs to the HWTA were not completed.

Secondary Containment at Refueling Locations

During the Environment Canada inspection, it was brought to Shear's attention that secondary containment was required at all refueling locations, and that this requirement came into effect on June 12 of this year. The Inspectors allowed Shear until the end of 2012 to install secondary containment at all refueling locations.

The areas of refueling were all excavated and prepared and were awaiting delivery of the geotextile fabric and liner. The secondary containment was not completed at the time of Temporary Closure. The excavations remain open.

Spills

Clean up efforts of spills continued throughout the summer. At the time of Temporary Closure, a number of spills had yet to be closed and clean up was still required at a few locations.

Fuel Farm

During the previous winter, contaminated snow from a spill was placed in Phase II of the Fuel Farm. This snow was placed in drums in May of this year. The contaminated water in these drums was to be treated in the Oztek remediation unit in 2012. This was in progress at the time of Temporary Closure, however, a number of drums remain to be treated.