

Angela Love  
Regulatory Officer  
Mackenzie Valley Land and Water Board  
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May 23, 2017

Dear Ms. Love:

**Re: Gahcho Kué Standard Operating Procedure V.2.1 (MV2005L2-0015)**

De Beers Canada Inc. (De Beers) is pleased to submit the revised Gahcho Kué Standard Operating Procedure (SOP) V.2.1 for Board review and approval in accordance with Part E, item 8 of Water License MV2005L2-0015 and as directed by the Board in the correspondence of April 20, 2017.

The April 20, 2017 Board letter requested a revised SOP which addresses the previous recommendation related to bi-annual sampling of different grain size fraction, which was made during the review of the Rock Placement Verification Program Report (MVLWB 11). For clarity that comment along with our previous response and Board response is provided in Table 1 below:

**Table 1 MVLWB Comment 11 from the Rock Placement Verification Program Review (2016)**

<b>Reviewer Comment/Recommendation</b>	<b>Proponent Response</b>	<b>Board Response</b>
<p><b>Comment</b> No information was provided as to what grain size was sampled and tested from blasted rock used for construction or placed within the SMRP.</p> <p><b>Recommendation</b> De Beers should confirm whether or not grain size specific sampling or testing was completed. It would be recommended that additional analyses of specific particle size fractions should be conducted such that there can be an evaluation of whether there is partitioning</p>	<p><b>June 23:</b> Rock is ground up by the drill prior to sampling and furthermore the sample is prepared in the lab where it is dried and finely crushed to better than 70 % passing a 2 mm (Tyler 9 mesh, US Std. No.10) screen. A split of up to 250 g is taken and pulverized to better than 85 % passing a 75 micron (Tyler 200 mesh, US Std. No. 200) screen.</p> <p><b>September 16:</b> In accordance with the approved sampling program for the Bi-Annual Audit (Section 8.1, Geochemical</p>	<p>Noted.</p> <p>De Beers shall update the Standard Operating Procedure to provide further details of protocols for the selection, storage, preparation, and analysis of mine rock and determination of PAG material. It is recommended that the MEND Report 1.20.1, 2009 (<a href="http://www.abandonedmines.org/pdfs/MENDPredicti onManual-Jan05.pdf">http://www.abandonedmines.org/pdfs/MENDPredicti onManual-Jan05.pdf</a>) be reviewed for guidance on the approach to selection, storage and preparation of samples. De Beers shall also make this</p>

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Reviewer Comment/Recommendation	Proponent Response	Board Response
<p>of sulphides and/or carbonates into any one particle size. In general, the -2mm size fraction is considered the most reactive size fraction and therefore the focus of geochemical sampling in blasted rock piles.</p>	<p>Characterization Plan, V.3), samples of mine rock have been collected from construction material, mine roads, rock pads and mine rock piles. No specific particle size fraction was selected for the sample collection or analysis, as this is not a component of the approved sampling program. Sample rock was selected at each location by examining rock fragments characteristics (colour, grain size, texture, visible minerals etc.) and selecting a sample representative of the dominant rock type at each location.</p>	<p>update to the Rock Placement Verification Program Report.</p>

The Rock Placement Verification Program Report was revised and re-submitted to the Board in November 2016. It was approved by the Board on November 22, 2016.

To better address the original recommendation that additional analyses of specific particle size fractions should be conducted, De Beers has revised the SOP to include sampling and sieving at the mobile crusher and south mine rock pile (SMRP) during the bi-annual audit. The crushed rock from the mobile crusher is destined for use in project infrastructure areas. The crushed rock will be sieved for both coarse and fine fractions including material smaller than 2mm. The sample from the SMRP (NAG placement area) will also be sieved to both coarse and fine fractions and submitted for the same analysis. Samples will be analyzed for any trends in partitioning of sulphides and or carbonates by particle size.

De Beers trusts that this revision addresses the original reviewer recommendation and looks forward to the review and approval of the Standard Operating Procedure V.2.1. Please contact me anytime regarding this submission at 867-688-9227 or [sarah.mclean@debeersgroup.com](mailto:sarah.mclean@debeersgroup.com)

Sincerely,



Sarah McLean  
Regulatory Specialist

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**APPENDIX A**

**PRELIMINARY STANDARD OPERATING PROCEDURE – GEOCHEMICAL  
CLASSIFICATION FOR SEGREGATION OF MINE ROCK**

## **A1 OBJECTIVE, SCOPE AND APPLICABILITY**

The objective of this guideline is to establish a uniform method for the handling and placement of mine rock at the Gahcho Kué Mine. This includes the collection rate of appropriate samples, responsibilities for sampling and data analysis, criteria for identification of PAG rock, placement of PAG rock in designated areas, and ongoing analysis of results.

## **A2 MANAGEMENT OF MINE ROCK**

The overall protocol for identification and handling of mine rock is as follows:

1. Sample locations are identified by the Mine Planners prior to drilling and the drill cuttings are sampled and analyzed by the Mine Geologists.
2. Samples will be analyzed onsite for the Total Sulphur content by an on-site LECO Sulphur Analyzer.
3. The threshold for the definition of PAG material is a total sulphur content greater than 0.1%. Any sample or cluster of samples exceeding this threshold will be demarcated as PAG material.
4. The demarcated area is defined as half the distance between the PAG and nearest NAG sample. This protocol will be reviewed and updated as required as the database of available information increases during operations.
5. Results of the on-site analysis will be available prior to the removal of rock from the pit and placement in the appropriate areas.
6. The PAG area will be demarcated by the mine surveyor using survey stakes and flagging, or other means after the blast. This will define the area to be loaded as PAG material.
7. The mine operations team will be responsible for monitoring the loading of mine rock after blasting and survey staking to ensure that PAG material is being dispatched to the assigned PAG area.
8. Non-PAG material will be used for construction on land as well as within the basin of Kennady Lake above the original high water mark.

9. PAG material will be placed as follows:

- Within the submerged zones of either the South or West Mine Rock Piles;
- Within a PAG management zone of either the South or West Mine Rock Pile. PAG management zone will be demarcated to ensure that there is a minimum horizontal distance of 15 metres (m.) from the pile's edge.
- Within the mined out Hearne and 5034 pits.
- Within internal dykes below the original high water mark of Kennady Lake.

10. The amount of PAG material (i.e. truck loads/tonnes) placed on each level of the mine rock piles, in the submerged zones, within the basin of Kennady Lake, or within the mined out pits will be recorded by the mining team and provided to the mine Technical Services team.

11. An annual report identifying geochemical trends with any follow-up actions will be completed. The report will be included within the MV2005L2-0015 Annual Water License Report

## **A3 SAMPLING AND ANALYSIS (SAMPLE IDENTIFICATION, SHIPPING, AND TURNAROUND TIMES)**

Sampling and analysis of mine rock will be undertaken where there is potential for mine rock to be used for construction, or placed above the final water level in Kennady Lake.

### **Field Sampling at Pits**

- Blasting and sampling will take place following a regular pattern or grid spacing as defined by the Mining Planning Engineers.
- Samples will consist of drill cuttings collected as composite grab samples from each hole prior to loading of explosives.
- No specific particle size fraction will be selected. Rock will be ground up by the drill prior to sampling.
- Samples will be uniquely identified, by blast hole designation, and the

location and results of samples will be recorded using a site database managed by the mine Geologist.

- Sampling will occur at a minimum frequency of eight (8) samples per 100,000 t, or 1 sample per 12,480 t, which equates to a bench sample grid spacing of about 20 m, with a bench height of 12 m, and an assumed rock density of 2.6 tonnes per cubic metre (t/m<sup>3</sup>). Care will be taken to sample at this frequency on each bench.

### **Field Sampling at Mine Infrastructure**

- During the bi-annual audit, rock placed in mine rock piles, roads, and other infrastructure is sampled as per Section 8.1.1 of the Geochemical Characterization Plan.
- Samples of mine rock are collected from areas in which ROM has been placed in the last 6 months, typically, mine roads, rock pads and mine rock piles.
- Sample rock is selected at each location by examining rock fragments characteristics (colour, grain size, texture, visible minerals etc.) and selecting a sample representative of the dominant rock type at each location.
- During the bi-annual audit a sample will be collected from the conveyor at the mobile crusher and sieved to separate the coarse and fine fractions. The sample collected from the SMRP (NAG placement area) will also be sieved to the coarse and fine fractions. These fractions (including fines <2mm) will be analyzed by the LECO instrument for total Sulphur contents to understand Sulphur fractionation into the fine grained rock.
- Sample rock is shipped to an off-site lab for ABA analysis.

### **Lab Analysis of pit samples**

- For the purpose of Total Sulphur analysis, samples are dried and finely crushed to better than 70% passing a 2 mm (Tyler 9 mesh, US Std. No.10) screen.
- A split of up to 250 g is taken and pulverized to better than 85% passing a 75 micron (Tyler 200 mesh, US Std. No. 200) screen.
- A random selection of 30 samples/year will be split and submitted to an accredited laboratory under a chain of custody protocol as a quality assurance/quality control measure