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(BHPB & Diavik)

September 16th, 2008

Files: MV2003L2-0013

Ms. Laura Tyler
BHP Billiton Diamonds Inc.
#1102, 4920-52nd Street
Yellowknife, NT X1A 3T1

Dear Ms. Tyler,

Re: 2007 Waste Rock and Waste Rock Storage Area Seepage Survey Report

The Wek'èezhìi Land and Water Board has reviewed and approved BHP Billiton's 2007 Waste Rock and Waste Rock Storage Area Seepage Survey Report submitted on April 16th, 2008 as required by Part F, Item 7 of licence MV2003L2-0013.

The Board requires BHP Billiton to provide an update on the status of the "Field Performance of Potentially Reactive Waste" (FPPRW) study during the annual reporting of the Seepage Report until the final FPPRW report has been submitted to the Board.

If you have any questions, please feel free to contact Ryan Fequet at rfequet@wlwb.ca or by phone at 867-669-9589.

Sincerely,

A handwritten signature in black ink, appearing to read "V. Blondin".

Violet Camsell-Blondin
Chair, WLWB

Copied: DDMI Distribution List



STAFF REPORT

Company: BHP Billiton Diamonds Inc.	
Location: Lac de Gras	License: MV2003L2-0013
Date Prepared: July 17 th , 2008	Meeting Date: July 29 th , 2008
Subject: BHPB Submission of the 2007 Waste Rock and Waste Rock Storage Area Seepage Survey Report	

Purpose/Report Summary

The purpose of this staff report is to present to the Board for approval BHP Billiton's submission of the 2007 Waste Rock and Waste Rock Storage Area Seepage Survey Report required by Part F, Item 4 of Water License MV2003L2-0013. The purpose of BHPB's report is to monitor the waste rock storage area seepage quality and characterize waste rock around the EKATI site.

Background / Discussion

Part F, Item 4 of Water Licence MV2003L2-0013 states that *"During the term of this Licence, the Licencee shall conduct Seepage surveys of all constructed ore stockpiles or Waste Rock Storage Facilities on the following basis:*

- a) *Sampling of detected Seepage twice per year; once during spring freshet and again in late summer or fall;*
- b) *Testing in the field shall include measurements of volume and rate of flow, field pH and conductivity;*
- c) *Laboratory analysis of each sample shall include major ions (as defined in the attached SNP), pH, conductivity, sulphate, alkalinity/acidity, nitrogen as total ammonia, hardness, total suspended solids, and dissolved metals by inductively coupled plasma mass spectrometry (aluminum, arsenic, barium, boron, cadmium, chromium, copper, iron, lead, manganese, molybdenum, nickel, selenium, strontium, uranium and zinc);*
- d) *Laboratory analysis of Seepage samples in areas down gradient of the Land Farm, Contaminated Snow Containment Facility and the Racetrack shall include TPH and BTEX as defined in the SNP;*
- e) *All data collected is to be reported to the Board within sixty (60) days of each survey.*
- f) *A report interpreting the results of both surveys shall be submitted to the Board for approval within sixty (60) days of the second survey and shall include site plans indicating the locations of any Seepage; the QA/QC protocols used; and a consideration of how the results will affect the Waste Rock and Ore Storage Management Plan required under Part F, Item 3."*

The Board met on May 14th, 2007 and approved a permanent extension of the submission of the annual Waste Rock and Waste Rock Storage Area Seepage Survey Report until March 31st of each year so as to allow more time for data analysis and to reflect the actual practices that were taking place.

BHP Billiton submitted their 2007 report on April 16, 2008. The report was circulated for comment to reviewers on April 25th with a comment deadline of June 30th end of day. Only Environment Canada and GNWT-ENR responded. Several comments were brought forward from last year's review of the 2006 report according to the August 10, 2007 Board Directive. BHP Billiton was given until August 8th, 2008 to provide their responses to all comments (please see attached table below).

Discussion

During the Board's August 10th meeting, five categories of reviewer comments were identified.

1. Comments to be addressed by four study reports
 - a. Acid Rock Drainage (ARD) classification of Kimberlite Wastes
 - b. Field Performance of "potentially reactive wastes"
 - c. Further evaluation of the origin of acidity in Seep-019 waters
 - d. LLCF Fine Processed Kimberlite Porewater Characterization
2. Comments related to Misery Seeps
3. Comments related to the thermal data for the waste rock piles
4. Comments related to the link between seep water quality and management of the waste rock piles
5. Miscellaneous Comments

Of the four reports that BHPB has committed to undertaking, the "Field Performance of potentially reactive wastes" is still underway as it depends on several years of data collection. Board Staff have reviewed the comments within each category and feel that BHPB has adequately addressed reviewer's concerns and the Board's requests.

Recommendation

Based on the information received from reviewers, Board Staff recommend the Board approve BHPB's submission of the 2007 Waste Rock and Waste Rock Storage Area Seepage Survey Report and require BHPB to provide an update on the status of the "Field Performance of Potentially Reactive Waste" (FPPRW) study during the annual reporting of the Seepage Report until the final FPPRW report has been submitted to the Board.

Respectfully submitted,



Kathleen Racher, PhD.

Regulatory Director



Ryan Fequet, B.Sc.

Regulatory Specialist

- Attached:
- BHPB's Submission of the 2007 WR & WRSA Seepage Survey Report (CD)
 - BHPB Response Comment Table, submitted August 8th, 2008
 - EC Comments, submitted June 30, 2008
 - ENR Comments, submitted June 30, 2008
 - Board Directive, August 10, 2007

BHP Billiton's Submission of the Waste Rock and Waste Rock Storage Area Seepage Report – Submitted April 16th, 2008

Tracking Number	Comment ID	Topic	Review Comment	Company Response / Proposed Revision	WLWB Response / Recommendations
A: GNWT - Environment and Natural Resources (ENR) Comments – Received June 30th, 2008					
1	ENR – 1	Monitoring	ENR staff are pleased to learn that BHPB has proposed weekly sampling during the open-water season of 2008, in addition to spring and fall surveys of SEEP-018, SEEP-019 and SEEP-052 locations, for analysis of total and dissolved metals, major ions and field parameters.	Acknowledged.	
B: Environment Canada (EC) Comments – Received June 30th, 2008					
2	EC – 1	Panda/ Koala/Beartooth Waste Rock Storage Area	Seeps 018B and 019 continue to be of concern based on the increasing levels of trace metals, sulphate and nitrogen. The report states that some of the observed increases may be due to an increase in dust due to mining activity and disposal of recently-blasted Beartooth waste rock on the margins of the Panda/ Koala/Beartooth WRSA. Nickel, sulphate and nitrate at Seep 019 are continuing on an increasing trend. The report suggests that the general increases at SEEP-018B are due to continued leaching of waste rock weathering products and blast residues.	Note that the <u>total</u> concentrations of four metals were elevated (Al, Fe, Pb, Cr; only Cr was at a historical maxima) but that the corresponding dissolved fractions of those metals remained at low levels. This is the basis for the reference to dust from mining activities. The Seepage Report does not identify an increasing trend for nickel, sulphate and nitrate at Seep 019. The Seepage Report shows that the concentrations of certain parameters at SEEP-019 (including total nickel, sulphate and nitrogen) remain elevated above concentrations at the reference area, as has been observed over the sampling history. This is summarized in Section 7, page 36. The collection of weekly samples through 2008 will provide additional data to assess variability and overall trends.	Acceptable
3	EC – 2	Misery Waste Rock Storage Area	Seep 052 is continuing to show signs of increased metals, specifically zinc and nickel which remains a concern, as per	The Seepage Report does not identify an increasing trend for total metals or other parameters at SEEP 052. Concentrations of	Acceptable

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			the previous year. The increasing trend and development of maximum levels for some metals indicates that continued efforts to locate the cause of such increases are needed. Seep-081 is showing its highest observed levels to date of sulphate, conductivity, total calcium and total magnesium, with pH also at record levels in lab testing.	most parameters, including zinc and nickel, were similar to that of 2005 and 2006. The concentrations of some metals at SEEP 052 remain elevated relative to other seeps as has been observed in previous years. The Seepage Report documents the increased dataset that was available for 2007 due to the weekly samples collected by BHP Billiton. This accounts for the increased variability observed through 2007. The continued weekly sampling frequency through 2008 will provide further data to assess variability and overall trends. The concentrations of some parameters at SEEP 081 are at maxima for this seep; however these concentrations remain low and within the ranges observed at other seeps from the Misery site.	
4	EC – 3	Monitoring & Closure	EC is please to see that Ekati has shown increased monitoring to those sites of concern, however there is no discussion of future implications, should increasing or harmful levels continue over time. Many of the seeps report to the LLCF, however this does not resolve issues at or near closure of the mine. EC is interested in a discussion surrounding how the effects of poor water quality, from the waste rock piles, will be addressed at closure. As the mine continues through progressive reclamation it will be important to examine how these water	The seepage, waste rock and thermal monitoring data support the approach taken in the Waste Rock and Ore Storage Management Plan that the rock piles are being constructed to provide safe conditions for closure and reclamation.	Acceptable

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			quality issues will be resolved should observed trends continue.		
Comments Brought Forward from the Review of the 2006 Seepage Survey Report					
Category #1 - Comments to be Addressed by Four Study Reports					
5	INAC (original tracking #2)	Reporting of Additional Studies	The cover letter to the 2006 Waste Rock and Waste Rock Storage Area Seepage Survey report indicates that BHPB has initiated additional studies in early 2006. When will these results be available? How will the results of these studies be conveyed to reviewers? How will the results be incorporated and/or influence future seepage surveys, sampling and interpretation? Would these results be also considered in the Reporting / updating of the ICRP, Geochemical and Leaching Characterization Plan and most importantly the Adaptive Management Plan?	<p>There were four studies initiated in 2006 and reports for three of these were submitted to the WLWB through 2007. The fourth study will take several years to generate data that can be productively analysed and reported on.</p> <ol style="list-style-type: none"> 1. ARD Classification of Kimberlite Wastes, submitted July 19, 2007, concluded that classification of kimberlite wastes as acid consuming is valid; no further activity is planned. 2. Field Performance of Potentially Reactive Material; is a field leaching test (open drums) that will take several years to generate adequate data for analysis and reporting. 3. Origin of Acidity in SEEP-019 Water, submitted September 28, 2007, validated the suspected hypothesis for the origin of acidity and aluminum in SEEP-019 water and predicted that concentrations would decrease with time; as a result of this study and the results of the 2007 monitoring program, monitoring of this seep was increased to weekly through summer 2008 to provide additional data to evaluate 	Acceptable

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Tracking Number	Comment ID	Topic	Review Comment	Company Response / Proposed Revision	WLWB Response / Recommendations
				<p>temporal trends; all monitoring data will be reported to the WLWB in the 2008 Seepage Report along with any further planned activities.</p> <p>4. LLCF Fine PK Porewater Characterization, submitted August 17, 2007, concluded that porewater is in equilibrium with solid phase PK and is a valid proxy for long term porewater quality from beached PK; no further activity is planned although the results will be used in future reclamation research work.</p> <p>None of these studies necessitates mitigation measures or revision to Management Plans or other reports. However, the results of all of these studies will be used as general information in future revisions to Management Plans or other reports as is appropriate.</p>	
6	INAC (original tracking #5)	General Comment	Seepage chemistry at SEEP-019 and SEEP-345 has been noted to be near later Licence limits in 2006. At what point will additional mitigation be implemented to help control aluminum and pH?	The chemical mechanisms that have caused elevated aluminum concentrations and depressed pH have been adequately validated (report 3 in Tracking Number 5). The anticipated trend is for generally decreasing concentrations of aluminum and increasing pH at SEEP-109, as was seen in 2007 and reported in the 2007 Seepage Report. The monitoring frequency at SEEP-019 has been increased to weekly through summer 2008 to provide additional data to verify the anticipated trends.	Acceptable

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				Other parameters remain below licence limits. No mitigation measures are necessary at this time.	
7	INAC (original tracking # 21)	Storage Area	It is clear that there are potential problems with Water Quality at SEEP-018B, SEEP-019 and the new station SEEP-345. If results in 2007 continue to increase (i.e. higher than previously observed) adjustments to the Waste Rock Management Plan are likely required.	See Tracking Number 6.	Acceptable
8	INAC (original tracking # 35)	6.3 Panda/Koala Area Fluctuating Seepage Results	What will be done if the seepage results in this area continue to be higher than the previously determined ranges? Particularly, pH and metals concentrations have been noted to be higher in 2006 than in the years past. It is clear that SEEP-018B, 019 and 345 are problem areas; conditions are extremely variable over the years and have been above the previously determined highs in 2006.	See Tracking Number 6.	Acceptable
9	EC (original tracking #44)		<i>"The main concerns are seeps 018B and 019/345. Ammonia and nitrite are showing a trend in increasing levels and are well above the reference site levels as well as exceeding CCME guideline levels. Low pH levels coupled with an increasing trend in sulphur and metal concentrations, such as nickel and uranium raise questions around the basis and/or cause of the potentially harmful</i>	See Tracking Number 6.	Acceptable

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			<i>runoff. What added mitigation measures, if any, are going to be implemented to ensure the protection of the surrounding watershed?"</i>		
10	EC (original tracking #46)	Studies	<i>"The report indicates that BHP Billiton has initiated a number of focused studies to improve the understanding of seepage chemistry and of the geochemical weathering of EKATI waste rock. EC would be interested to learn what studies are being carried out and any interim results including those related to the above mentioned sites of concern."</i>	See Tracking Number 5.	Acceptable
Category #2 – Comments Related to Misery Seeps					
	Board Staff feel that BHP Billiton has addressed reviewer comments regarding the Misery Seeps adequately in their cover letter dated April 16 th , 2008. (Tracking # 6, 27, 37, 42, 45)				
Category #3 – Comments Related to the Thermal Data for the Waste Rock Piles					
	Board Staff feel that BHP Billiton has addressed reviewer comments regarding the thermal data for the waste rock piles by including that report within the annual Seepage Survey Report. (Tracking # 20, 26, 32, 39)				
Category #4 – Comments Related to the Link Between Seep Water Quality & Management of the Waste Rock Piles					
	Board Staff acknowledges that BHPB has responded to this request in their cover letter dated April 16 th , 2008. However, Board Staff feel that further discussion is required regarding the implications to the Waste Rock Ore Storage Management Plan and the management of the waste rock piles from the findings of the Seepage Survey. (Tracking #3, 23, 24, 25, 28, 29, 36, 38, 41)			The overriding intent of the WROMP is to create conditions where the rock piles will freeze into permafrost and provide for long term physical and chemical stability. The WROMP provides various engineering specifications for maximum height (50 m above natural ground), individual lift heights (10-20 m), and so on. The thermal monitoring data that is presented in the 2007 Seepage Report (Appendix C) verifies that the freezing process has or is occurring within the	Acceptable

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				<p>various waste rock storage areas. This information was commented on by EBA Engineering Consultants in the 2007 Seepage Report (Appendix C), who have industry leading experience in this field. The thermal monitoring data shows that there is no need for changes to the WROMP on the basis of achieving the desired freezing into permafrost.</p> <p>The Seepage Report also provides the results of water quality testing of seepage water and acid rock drainage testing of different types of waste rock as they are mined. The results provided in the 2007 Seepage Report (Chapters 3 through 6) identify two areas of current interest (SEEP-018/019 and SEEP-052) where seepage water quality has been targeted for increased data collection. The SEEP 018/019 area was also the subject of a special study in 2007 which identified the chemical mechanism through which certain metals from the natural soil can be taken up into the seepage water. This study has been reported separately to the Board (September 28, 2007). Neither of these locations of interest represents a negative effect in the receiving environment. Additionally, the acid rock drainage testing of waste rock being mined shows the anticipated results, which fall within the established and expected norms. These two sets of information (seepage water quality and acid rock drainage</p>	

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				testing) show that there is no need for changes to the WROMP on the basis of achieving acceptable seepage water quality.	
Category #5 – Miscellaneous Comments					
			Board Staff encourage BHP Billiton to continue to provide updates on all relevant studies and provide appropriate linkages within common documents. We appreciate the level of cooperation BHP Billiton has shown to date.		