BHP Billiton Diamonds Inc.

Operator of the EKATI Diamond Mine

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resourcing the future

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February 10, 2009

Wek'èezhìi Land and Water Board
P.O. Box 2130
Yellowknife, NT
X1A 2P6
Attention: Ms. Violet Camsell-Blondin, Chair

Dear Ms. Camsell-Blondin:

Re. Sable Pigeon and Beartooth Water Licence Renewal/Amalgamation Process - Response to Questions from the January 26, 2009 Information Session

In November 2008, the Wek'èezhìi Land and Water Board (the "Board") held a public workshop on the renewal/amalgamation of the Sable, Pigeon and Beartooth ("SPB") Water Licence (MV2001L2-0008). The outcome of the workshop was a request for certain information and commitments from BHP Billiton Diamonds Inc. ("BHP Billiton"). In response to these requests BHP Billiton provided on January 16, 2009: 1) an amended proposal for changes to EQC with supporting rationale, 2) a proposed draft amalgamated water licence and 3) a table of responses to the information requests. This was followed by an Information Session (January 26, 2009) held by BHP Billiton to discuss the information with reviewers and First Nations. BHP Billiton's intent was to make an extra effort to clearly explain and answer initial questions on the January 16 information in the hopes that this might reduce or eliminate this type of question from the upcoming interventions for the Public Hearing. At this Information Session further clarification was requested from BHP Billiton by various parties, which is provided here.

The majority of the questions received were for further clarification or more information around a particular subject such as the proposed changes to the EQC or a clause in the water licence. Each question and response is provided in the attachment to this letter.

In one case the response requires a correction to the Draft Amalgamated Licence submitted to the WLWB by BHP Billiton on January 16, 2009. At the Information Session it was pointed out to BHP Billiton that the total petroleum hydrocarbon concentrations were missing from the table of EQC. The corrected version of this table is provided in the attachment to replace the existing table located in Section 3 Part G Item 11 d) of the Draft Amalgamated Licence.

We hope that you find the information to be clear and helpful. Please contact Eric Denholm, Superintendent - Traditional Knowledge and Permitting, at 669-6116 if you have any questions.

Sincerely,
BHP Billiton Diamonds Inc.

Eric Denholm
Superintendent – Traditional Knowledge and Permitting

EKATI Diamond Mine

Question 1

BHP Billiton was asked by reviewers (at the January 26, 2009 Information Session and January 29, 2009 Pre-Hearing Conference) for an expanded rationale in support of BHP Billiton's proposed change to the definition of "Receiving Environment" in the SPB Water Licence.

BHP Billiton Response

BHP Billiton believes that the proposed change is necessary in order to remove wording that creates confusion for implementation and enforcement of the water licence. The proposed wording is what was recently agreed to for renewal of the Main Water Licence in 2005 and which has been effectively implemented since that time without comment from any party. This is in contrast to the current wording of the SPB Water Licence which has not been fully implemented because there has not yet been any development at the Pigeon and Sable sites.

Proposed Change (unchanged from BHP Billiton's Renewal Application, March 2007)

"Receiving Environment" means the environment that is immediately impacted by discharges, this includes both aquatic and terrestrial environment;

Change to: "means, for the purpose of this Licence, the natural aquatic environment that receives any deposit or Discharge of Waste, seepage or Minewater from the Project"

(Expanded) Rationale

There are two parts to the (expanded) rationale for the proposed change, as follows:

a. Clarity

The purpose of a water licence is laid out in the *NWT Waters Act*, which is to regulate the use of water (Section 8) and the deposit of waste (Section 9) that enters or may enter a natural water body. The term *receiving environment* is used throughout the SPB Licence and to include terrestrial within that definition creates confusion in determining exactly what the water licence is attempting to regulate.

As regards Section 9 of the *NWT Waters Act*, there is a clause within the SPB Licence that regulates the deposit of waste that may enter a natural water body. Part G Item 11(a) of the SPB Water Licence requires that any surface runoff water that is not collected and that does not meet the EQC must be collected and treated to meet the EQC unless the Board authorizes otherwise. This clause provides the protection to the water environment that is required under Section 9 and BHP Billiton has not proposed to change the intent of this clause to do so.

BHP Billiton is fully committed to protecting the environment as a whole, including the terrestrial environment. Regulation of the terrestrial environment is provided through the Land Use Permits (issued by the WLWB) and the Surface Land Leases (issued DIAND) which cover all of the proposed mining areas. These are enforced by the DIAND Land and Water Inspector in a similar manner to the water licence.

BHP Billiton believes that confusion and uncertainty is introduced into the water licence by including direct reference to the "terrestrial environment". Previous discussion at the time of the renewal of the Main EKATI water licence in 2005 included the question of where the "terrestrial environment" begins for the purpose of ensuring compliance with the EQC and that BHP Billiton could be placed in a situation of immediate non-compliance under such wording. That discussion was resolved into the wording that appears in the Main EKATI water licence and that BHP Billiton has proposed for the SPB water licence.

b. Consistency

The definition of "Receiving Environment" is very important to the water licence because this definition defines where the EQC are to be applied and enforced. Operating the various development areas on the EKATI claim block under two different definitions of "Receiving Environment" carries a risk of confusion and miscommunication between operators and regulators and this does not increase protection of the environment. A single definition that continues the currently established and accepted practice provides confidence that all parties have a common understanding of where the EQC must be applied and enforced. The importance of this point is highlighted by the current process being undertaken by the WLWB to amalgamate the two water licences together, for the purpose of clarity and efficiency.

Additionally, the current federal initiatives and commitments that are working towards enhancing regulatory efficiency in the North appear to support the concept a single clear and consistent definition in this case.

Question 2

BHP Billiton was asked by reviewers (at the January 26, 2009 Information Session) to clarify what concentration of total suspended solids (TSS) would be used to control when dewatering from Sable Lake will be switched from Horseshoe Lake to Two Rock Sedimentation Pond.

BHP Billiton Response

In the response table submitted to the WLWB on January 16, 2009 as part of the additional information package for the SPB Water Licence renewal, the responses to item 1d)ii/Attachment 3 and item 3c)i state that dewatering of Sable Lake directly to Horseshoe Lake will stop when the concentration of TSS approaches the water licence effluent quality criteria (EQC) of 25 mg/L (grab sample). The response to item 1d)i inadvertently implies that dewatering will continue until the concentration of TSS is over 25 mg/L, which is not the case.

BHP Billiton would like to clarify the process for Sable Lake dewatering in this regard.

Sable Lake will be initially dewatered directly to the receiving environment, Horseshoe Lake. This will continue while the TSS remains within the EQC for this parameter as outlined in the SPB Water Licence as 15 mg/L for four consecutive samples and 25 mg/L maximum grab. Prior to reaching either of these criteria dewatering activities will be redirected to the Two Rock Sedimentation Pond. In the case of dewatering activities, the SNP requires sampling for TSS daily (Section 3ii) and, therefore, the average will be based on four consecutive daily samples.

BHP Billiton has completed several dewatering activities at EKATI and will continue to follow similar methodology in future dewaterings. One example is Misery Lake. In 2000 this lake was initially dewatered overland to Lac de Gras. This was maintained until Misery Lake became visually turbid on May 2, 2000. The concentration of TSS on May 1, 2000, prior to shutdown of the dewatering to Lac de Gras, was 16 mg/L. This was well within the required EQC.

Question 3

At the January 26, 2009 Information Session reviewers pointed out that the total petroleum hydrocarbon concentrations were missing from the table of EQC in the Draft Amalgamated Licence submitted to the WLWB by BHP Billiton on January 16, 2009.

BHP Billiton Response

Please replace the table located in Section 3 Part G Item 11 d) of this document with this corrected version.

Parameter	Maximum Average Concentration	Maximum Concentration of Any Grab Sample
Total Ammonia	4.0 mg/L	8.0 mg/L
Total Aluminium	1.0 mg/L	2.0 mg/L
Total Arsenic	0.050 mg/I	0.10 mg/L
Total Copper	0.02 mg/L	0.04 mg/L
Total Cadmium	0.0015 mg/L	0.003 mg/L
Total Chromium	0.02 mg/L	0.04 mg/L
Total Lead	0.01 mg/L	0.02 mg/L
Total Zinc	0.03 mg/L	0.06 mg/L
Total Nickel	To be developed. See Section 2 Part I Item 3 of this Licence.	To be developed. See Section 2 Part I Item 3 of this Licence.
Nitrite	1.0 mg/L	2.0 mg/L
Total Suspended Solids	15 mg/L	25 mg/L
Turbidity	10 NTU	15 NTU
Total Phosphorus	0.2 mg/L	0.4mg/L
Total Petroleum Hydrocarbon	3.0 mg/L	5.0 mg/L

Question 4

Attachment B-3 Pg. 4: First Paragraph: *To estimate the average retention time in Two Rock Sedimentation Pond, a 12 year period was ...."*

Does this paragraph mean that the simulation consisted of 400 "replicates" or "runs" of 12 years each? If the preceding is correct; 1) Were water inflows for the 12 year period those which varied over the 12 years; 2) Why were 400 simulations chosen?; and, 3) Why was a 12 year cycle chosen?

Over what time period are inflows summed?

How are changes in the volume of the pond accounted for OR is the volume of the pond static over a year due to the assumption that volume pumped out = inflow?

BHP Billiton Response

Yes, the simulation consisted of 400 'replicates' of the same 12 years, with each model run consisting of varying annual precipitation for every year.

(1) The annual water inflows were varied based on varying annual precipitation values chosen from a random probability distribution derived from the historical precipitation record available.
(2) The choice of 400 simulations was chosen to provide a large number of runs for statistical analysis. From experience with this type of model, 300 or 500 simulations would yield similar results.
(3) The two rock model was previously set up for a 12 year run following this format, and this was not changed. Years beyond the mine plan can be omitted.

Over what time period are inflows summed?

Inflows were summed on an annual basis.

How are changes in the volume of the pond accounted for OR is the volume of the pond static over a year due to the assumption that volume pumped out = inflow?

The pond volume is assumed to remain constant.

Question 5

Attachment B-3 pg. 6: Paragraph above Table 2. *"It should be noted that ..."*

I do not understand the paragraph in general and particularly, what the word "its" refers to in the phrase " ... 65% *of its full capacity* ...". From one perspective (i.e. if the waste rock area is removed as a portion of the watershed) it seems that there should be a reduction in watershed area over time as the waste rock storage areas become covered. However, if this is correct there is an assumption that precipitation falling onto the waste rock area is somehow removed from the watershed.

BHP Billiton Response
During the first two years of operation, the model assumes that the waste rock storage area is only 65% of the full waste rock storage capacity. The area associated with this omitted 35% of the waste rock storage area is added to the natural Two Rock Pond watershed area for these first two years. In year 3 onwards, the waste rock storage area is assumed to be at its full volume, and no WRSA area is compensated for in the Two Rock Pond natural watershed area.

Question 6

Attachment B-3 pg. 8: Table 5 Titles: What does the word "upper" refer to?

BHP Billiton Response
"Upper" refers to the upper bound, or maximum predicted values.

Question 7

Attachment B-3 pg. 8: What is the definition of acronym "amsl"?

BHP Billiton Response
"amsl" should read masl which is a measure of elevation and stands for metres above sea level.

Question 8

Attachment B-4 pg. 5: What are the approximate ratios of diabase, granite, kimberlite and metasediments for each pit?

BHP Billiton Response
In the pits granite is the dominate rock type followed by kimberlite with small amounts of diabase and / or metasediment. Sable follows this trend with the majority of rock being granite and kimberlite with a very small amount of diabase and no metasediment.

Question 9

Attachment B-4 pg. 6: Table 2: Can the data from the Panda, Koala and Beartooth pits be separated to see the pit-specific data?

BHP Billiton Response
No this not possible. The data in this table are from the waste rock storage areas and the waste rock from these three pits (Panda, Koala and Beartooth) is all stored in the same location, the Panda/Koala Waste Rock Storage Area.

Question 10

Attachment B-5-A pg. 1: Figures. Can the raw data presented in these figures (rather than the mean, minimum and maximum) be made available?

BHP Billiton Response
The purpose of the charts provided in Attachment B-5a is to support the selection of the Beartooth pit for use in predicting minewater quality at the Sable site. The data calculations and figures provided are what is directly relevant to this report.

Question 11

Attachment B5-B Figures: Many analyte-TSS relationship graphics are missing. One of interest is Se. Can this be provided?

BHP Billiton Response
Where there are apparent omissions in these relationship graphs (concentrations of particulate and dissolved as well as the relationship of TSS and EQC metals) it is because there was insufficient data available to interpret relationships. For example, total selenium was only measured on 3 occasions at the Panda Sump and therefore a particulate and dissolved selenium concentration graph (Figure 9) and a TSS versus total selenium graph (Figure 19) were not completed. No graphs are presented for particulate and dissolved selenium concentration in Beartooth sump waters because few samples (less than 10) were analyzed for dissolved selenium.

Below are revised figures (Figure 9and 19) indicating the sample size of total selenium for each sump that insufficient number of selenium concentrations was available for interpretation. Also below is a revised Figure 17 that now includes the relationship of TSS and total molybdenum at the Beartooth sump (this was not included in the original submission).

Selenium

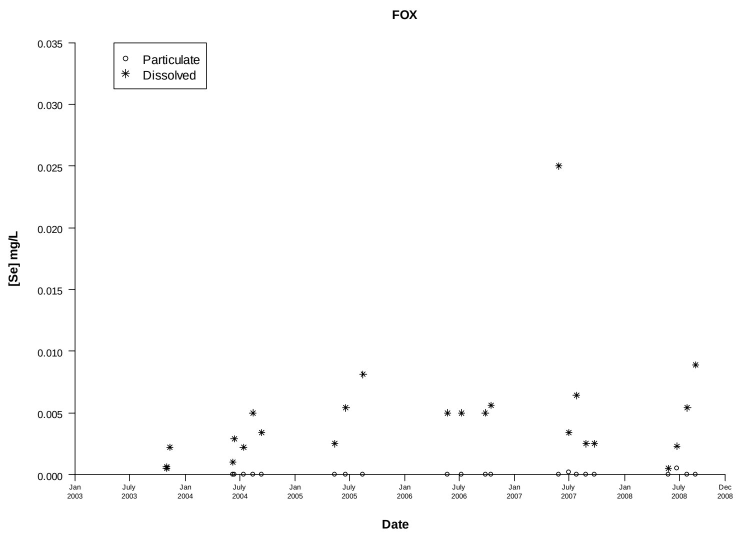
PANDA: Insufficient Data (Total Selenium N = 3)	KOALA: Insufficient Data (Total Selenium N = 4)
	MISERY: Insufficient Data (Total Selenium N = 5)

Figure 9. Concentration of Particulate and Dissolved Selenium in Fox Sump Waters. (REVISED)

TSS vs Molybdenum

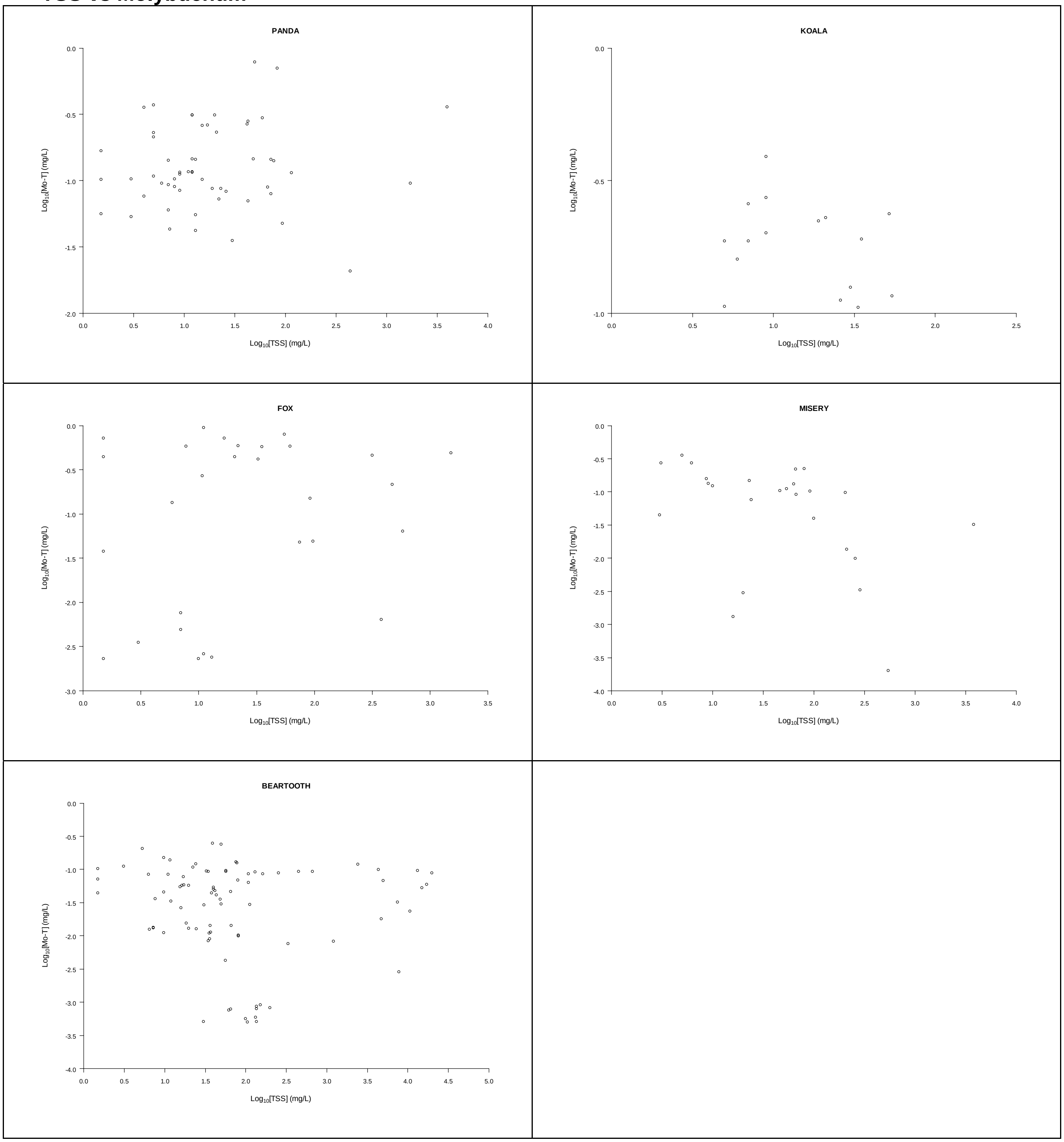
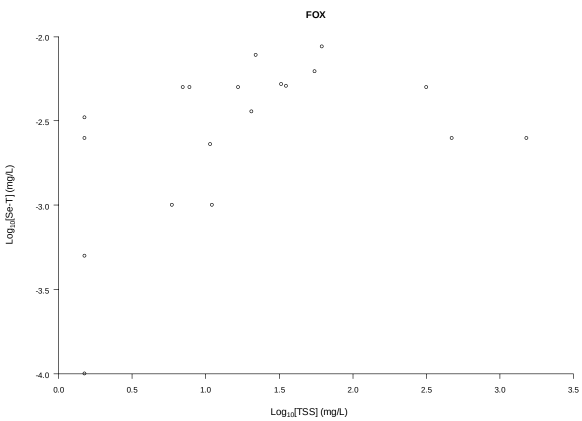


Figure 17. TSS vs Total Molybdenum in Panda, Koala, Fox, Misery and Beartooth Pit Sump Waters. (REVISED)

TSS vs Selenium

PANDA:
Insufficient Data (Total Selenium N = 3)

KOALA:
Insufficient Data (Total Selenium N = 4)



MISERY:
Insufficient Data (Total Selenium N = 5)

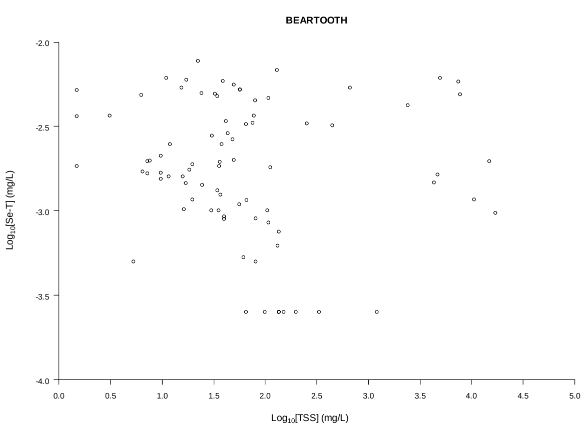


Figure 19. TSS vs Total Selenium in Fox and Beartooth Pit Sump Waters. (REVISED)

Question 12

Attachment B5-C: Can the concentration data over time be provided?

BHP Billiton Response

The purpose of the data provided in Attachment B-5c is to demonstrate that there are no important time trends in pit sump data that should be applied to the prediction for Sable pit minewater quality. The data calculations and figures provided are what is directly relevant to this report.

Question 13

Attachment B5-C - Table 1: What are the units of the slope estimates?

BHP Billiton Response

The slope estimates in Table 1, 2 and 3 are in units of mg/L/day, where day is a serial number in Microsoft Excel format between 1/1/1900 and 12/31/9999. This represents changes in concentrations of parameters over time. However as indicated in the text it is preferable to examine changes in loadings over time where the unit of the slope estimate is mg/day (where day is a Microsoft Excel defined serial number). Below are three tables that use loadings from Beartooth and Fox sumps:

- Table 1. Change over Time in Loadings of Total Metals
- Table 2. Change over Time in Loadings of Dissolved Metals
- Table 3. Change over Time in Loadings of Nutrients and Other Parameters

Note that the N values for loadings are less than those for concentrations because the amount of water or flow on the corresponding day could be 0 L (representing 0 mm of precipitation) and therefore a loading of 0 mg. Regression analysis was not completed for loadings at Koala, Misery and Panda pit sumps because the total number of days sampled where loadings were greater than zero was less than 10 (Koala, N = 3; Misery, N = 3; Panda, N =6).

Table 1
Change Over Time in Loadings of Total Metals

			Relationship of $\log_{10}$[Metal] with time Kendall				
			Regression			Kendall	
Sump	**Total Metal**	**N**	**Slope**	**P value**	**R Squared Adj**	**Tau**	**P value**
Beartooth Pit	**Aluminum**	**28**	**0.00097**	**0.027**	**0.142**	**0.3**	**0.03**
	Arsenic	28	na	0.643	na	0.08	0.553
	Copper	**28**	**0.00065**	**0.077**	**0.082**	**0.3**	**0.03**
	Cadmium	28	na	0.244	na	0.14	0.294
	Chromium	28	na	0.056	na	0.27	0.048
	Lead	28	na	0.128	na	0.23	0.096
	Molybdenum	28	na	0.974	na	-0.04	0.782
	Nickel	**28**	**0.00064**	**0.113**	**0.059**	**0.32**	**0.02**
	Selenium	28	na	0.758	na	-0.06	0.663
	Zinc	**28**	**0.00108**	**0.011**	**0.194**	**0.33**	**0.014**
Fox Pit	Aluminum	10	na	0.864	na	0.07	0.858
	Arsenic	10	na	0.94	na	-0.07	0.858
	Copper	10	na	0.282	na	-0.2	0.474
	Cadmium	10	na	0.923	na	0.11	0.721
	Chromium	10	na	0.615	na	0.11	0.721
	Lead	10	na	0.68	na	-0.11	0.721
	Molybdenum	**10**	**0.00087**	**0.098**	**0.218**	**0.51**	**0.049**
	Nickel	10	na	0.076	na	0.38	0.152
	Selenium	9	na	0.493	na	0.33	0.251
	Zinc	10	na	0.853	na	0.09	0.788

Bold indicates significant change according to non-parametric regression.
'na' indicate non-significant slope and R squared.
Dashes indicate insufficient data to complete regression analysis.

Table 2
Change Over Time in Loadings of Dissolved Metals

			Relationship of log_{10}[Metal] with time Kendall				
			Regression			Kendall	
Sump	**Total Metal**	**N**	**Slope**	**P value**	**R Squared Adj**	**Tau**	**P value**
Beartooth Pit	Aluminum	3	-	-	-	-	-
	Arsenic	3	-	-	-	-	-
	Cadmium	3	-	-	-	-	-
	Chromium	2	-	-	-	-	-
	Copper	2	-	-	-	-	-
	Lead	3	-	-	-	-	-
	Molybdenum	3	-	-	-	-	-
	Nickel	3	-	-	-	-	-
	Selenium	3	-	-	-	-	-
	Zinc	2	-	-	-	-	-
Fox Pit	Aluminum	8	na	0.770	na	0.07	0.902
	Arsenic	8	na	0.665	na	0.14	0.711
	Cadmium	8	na	0.101	na	-0.21	0.536
	Chromium	8	na	0.936	na	0.07	0.902
	Copper	8	na	0.593	na	0.21	0.536
	Lead	8	na	0.615	na	0.21	0.536
	Molybdenum	8	na	0.949	na	0.07	0.902
	Nickel	8	na	0.611	na	-0.14	0.711
	Selenium	8	na	0.822	na	0.21	0.536
	Zinc	8	na	0.335	na	0.25	0.454

Bold indicates significant change according to non-parametric regression.
'na' indicate non-significant slope and R squared.
Dashes indicate insufficient data to complete regression analysis.

Table 3
Change Over Time in Loadings of Nutrients and Other Parameters

			Relationship of log_{10}[Parameter] with time				
			Regression			Kendall	
Sump	**Total Metal**	**N**	**Slope**	**P value**	**R Squared Adj**	**Tau**	**P value**
Beartooth Pit	Nitrate-N	27	na	0.354	na	-0.14	0.306
	Nitrite-N	17	na	0.788	na	-0.01	1
	Chloride	27	na	0.794	na	0.04	0.786
	Sulphate	27	na	0.358	na	0.07	0.602
	TSS	**27**	**0.00103**	**0.056**	**0.104**	**0.28**	**0.047**
	Total Phosphate-P	28	na	0.33	na	0.17	0.22
Fox Pit	Nitrate-N	10	na	0.835	na	0.2	0.474
	Nitrite-N	8	na	0.37	na	0.43	0.174
	Chloride	7	na	0.018	na	0.62	0.072
	Sulphate	10	na	0.083	na	0.47	0.074
	TSS	10	na	0.167	na	0.29	0.283
	Total Phosphate-P	10	na	0.81	na	0.07	0.858

Bold indicates significant change according to non-parametric regression.
'na' indicate non-significant slope and R squared.
Dashes indicate insufficient data to complete regression analysis.

Question 14

Attachment B5-C - Table 1, 2 and 3: It appears that the statistical significance of a regression analysis was decided on the basis of a p value, testing for a significant non-zero Kendall's Tau. Is this correct? If not how was the statistical significance of the regression analyses decided?

BHP Billiton Response

Parametric and non-parametric (Kendall's Tau) were initially completed to examine changes in water quality parameters over time. The results of statistical significance for parametric and non-parametric analyses should closely match. However, not all log transformed water quality variables closely resembled a normal distribution. Therefore, non-parametric results were considered more appropriate to estimate statistical significance.

Question 15

Attachment B5-C - Table 1 and 2: In many instances no regression analyses were conducted due to insufficient data yet substantive sample sizes are presented. Does the phrase "insufficient data" mean that data were at or below a DL and therefore there were insufficient data > DL to conduct a regression analysis? If yes, does this explanation apply to all analytes? If not, why are there insufficient data to conduct regression analyses?

BHP Billiton Response

The legend for the table was not precisely stated. Below are revised tables with corrected legends:

- Table 4. Change over Time in Concentration of Total Metals
- Table 5. Change over Time in Concentration of Dissolved Metals
- Table 6. Change over Time in Concentration of Nutrients and Other Parameters

Insufficient data are represented by dashes and 'na' represents non-significant slopes and R Squared values as determined by non-parametric regressions.

Table 4
Change Over Time in Concentration of Total Metals (continued)

			Relationship of log_{10}[Metal] with time Kendall				
			Regression			Kendall	
Sump	Total Metal	N	Slope	P value	R Squared Adj	Tau	P value
Beartooth Pit	**Aluminum**	**87**	**0.0007**	**0.001**	**0.119**	**0.15**	**0.044**
	Arsenic	**87**	**-0.0001**	**0.578**	**-0.008**	**-0.18**	**0.015**
	Copper	87	na	0.005	na	0.00	0.997
	Cadmium	87	na	0.122	na	0.04	0.62
	Chromium	**87**	**0.0008**	**< 0.001**	**0.127**	**0.16**	**0.029**
	Lead	87	na	0.009	na	0.09	0.21
	Molybdenum	**87**	**-0.00047**	**0.009**	**0.068**	**-0.17**	**0.017**
	Nickel	**87**	**0.00044**	**0.004**	**0.081**	**0.28**	**< 0.001**
	Selenium	86	na	0.043	na	-0.12	0.105
	Zinc	**87**	**0.0008**	**< 0.001**	**0.224**	**0.29**	**< 0.001**
Panda Pit	**Aluminum**	**59**	**0.0006**	**0.023**	**0.071**	**0.21**	**0.019**
	Arsenic	59	na	0.297	na	-0.04	0.656
	Copper	59	na	0.426	na	0.09	0.318
	Cadmium	**58**	**0.0001**	**0.319**	**< 0.001**	**0.24**	**0.014**
	Chromium	59	na	0.933	na	-0.02	0.849
	Lead	**59**	**0.0003**	**0.117**	**0.026**	**0.19**	**0.039**
	Molybdenum	**59**	**0.00028**	**0.009**	**0.099**	**0.29**	**0.001**
	Nickel	59	na	0.376	na	0.1	0.263
	Selenium	3	-	-	-	-	-
	Zinc	**59**	**0.0003**	**0.039**	**0.056**	**0.25**	**0.007**

Bold indicates significant change according to non-parametric regression.
'na' indicate non-significant slope and R squared.
Dashes indicate insufficient data to complete regression analysis.

Table 4
Change Over Time in Concentration of Total Metals (complete)

			Relationship of log_{10}[Metal] with time Kendall				
			Regression			Kendall	
Sump	**Total Metal**	**N**	**Slope**	**P value**	**R Squared Adj**	**Tau**	**P value**
Koala Pit	Aluminum	22	na	0.111	na	-0.26	0.101
	Arsenic	22	na	0.024	na	-0.14	0.366
	Copper	22	na	0.534	na	-0.17	0.295
	Cadmium	22	na	0.406	na	0.11	0.492
	Chromium	22	na	0.977	na	0.07	0.689
	Lead	22	na	0.259	na	-0.13	0.424
	Molybdenum	22	na	0.086	na	0.21	0.176
	Nickel	**22**	**0.00065**	**< 0.001**	**0.472**	**0.57**	**< 0.001**
	Selenium	4	-	-	-	-	-
	Zinc	22	0.0003	0.143	0.059	0.22	0.193
Fox Pit	Aluminum	34	na	0.516	na	0.10	0.423
	Arsenic	**34**	**0.0004**	**0.004**	**0.209**	**0.37**	**0.002**
	Copper	34	na	0.054	na	-0.10	0.423
	Cadmium	34	na	0.215	na	0.24	0.056
	Chromium	**34**	**0.0004**	**0.07**	**0.071**	**0.26**	**0.031**
	Lead	34	na	0.886	na	-0.02	0.87
	Molybdenum	**34**	**0.00104**	**< 0.001**	**0.443**	**0.54**	**< 0.001**
	Nickel	**34**	**0.0008**	**< 0.001**	**0.332**	**0.55**	**< 0.001**
	Selenium	**22**	**0.0003**	**0.06**	**0.124**	**0.33**	**0.041**
	Zinc	34	na	0.821	na	0.07	0.552
Misery Pit	**Aluminum**	**26**	**-0.0011**	**0.001**	**0.364**	**-0.46**	**0.001**
	Arsenic	26	na	0.946	na	-0.02	0.912
	Copper	**26**	**-0.0006**	**0.017**	**0.184**	**-0.35**	**0.014**
	Cadmium	26	na	0.87	na	0.11	0.456
	Chromium	**26**	**-0.0008**	**0.014**	**0.193**	**-0.33**	**0.02**
	Lead	**26**	**-0.0009**	**0.001**	**0.35**	**-0.50**	**< 0.001**
	Molybdenum	**26**	**0.00133**	**< 0.001**	**0.593**	**0.67**	**< 0.001**
	Nickel	**26**	**0.00032**	**0.036**	**0.137**	**0.4**	**0.004**
	Selenium	5	-	-	-	-	-
	Zinc	**26**	**-0.0007**	**0.02**	**0.172**	**-0.38**	**0.007**

Bold indicates significant change according to non-parametric regression.
'na' indicate non-significant slope and R squared.
Dashes indicate insufficient data to complete regression analysis.

Table 5
Change Over Time in Concentration of Dissolved Metals (continued)

			Relationship of log_{10}[Metal] with time Kendall				
			Regression			Kendall	
Sump	**Total Metal**	**N**	**Slope**	**P value**	**R Squared Adj**	**Tau**	**P value**
Beartooth Pit	Aluminum	9	-	-	-	-	-
	Arsenic	8	-	-	-	-	-
	Cadmium	6	-	-	-	-	-
	Chromium	5	-	-	-	-	-
	Copper	9	-	-	-	-	-
	Lead	9	-	-	-	-	-
	Molybdenum	9	-	-	-	-	-
	Nickel	9	-	-	-	-	-
	Selenium	8	-	-	-	-	-
	Zinc	4	-	-	-	-	-
Panda Pit	Aluminum	43	na	0.412	na	0.18	0.121
	Arsenic	**42**	**-0.0009**	**< 0.001**	**0.254**	**-0.22**	**0.038**
	Cadmium	**43**	**0.0002**	**0.455**	**-0.01**	**0.3**	**0.006**
	Chromium	43	na	0.117	na	-0.06	0.571
	Copper	**43**	**-0.0007**	**< 0.001**	**0.265**	**-0.32**	**0.003**
	Lead	43	na	0.267	na	-0.12	0.305
	Molybdenum	**43**	**0.00049**	**0.016**	**0.111**	**0.4**	**< 0.001**
	Nickel	43	na	0.441	na	-0.04	0.691
	Selenium	42	na	0.06	na	-0.08	0.489
	Zinc	43	na	0.085	na	-0.14	0.21
Koala Pit	**Aluminum**	**19**	**-0.0008**	**< 0.001**	**0.588**	**-0.47**	**0.008**
	Arsenic	19	na	0.019	na	-0.25	0.15
	Cadmium	19	na	0.461	na	-0.02	0.915
	Chromium	19	na	0.543	na	0.18	0.321
	Copper	19	na	0.415	na	-0.21	0.234
	Lead	19	na	0.524	na	0.16	0.385
	Molybdenum	19	na	0.011	na	0.21	0.22
	Nickel	**19**	**0.00074**	**0.003**	**0.388**	**0.43**	**0.011**
	Selenium	19	na	0.224	na	-0.12	0.534
	Zinc	19	na	0.133	na	0.24	0.178

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'na' indicate non-significant slope and R squared.
Dashes indicate insufficient data to complete regression analysis.

Table 5
Change Over Time in Concentration of Dissolved Metals (complete)

			Relationship of log_{10}[Metal] with time Kendall				
			Regression			Kendall	
Sump	Total Metal	N	Slope	P value	R Squared Adj	Tau	P value
Fox Pit	Aluminum	24	na	0.189	na	0.17	0.264
	Arsenic	24	na	0.079	na	0.24	0.102
	Cadmium	24	na	0.807	na	0.06	0.708
	Chromium	**24**	**0.0004**	**0.139**	**0.056**	**0.33**	**0.033**
	Copper	**24**	**-0.0007**	**< 0.001**	**0.612**	**-0.59**	**< 0.001**
	Lead	24	na	0.367	na	0.14	0.373
	Molybdenum	24	na	0.486	na	0.11	0.487
	Nickel	24	na	0.74	na	0.03	0.862
	Selenium	**24**	**0.0002**	**0.079**	**0.095**	**0.33**	**0.026**
	Zinc	24	na	0.884	na	-0.1	0.533
Misery Pit	**Aluminum**	**20**	**-0.001**	**0.001**	**0.461**	**-0.5**	**0.003**
	Arsenic	20	na	0.087	na	0.22	0.183
	Cadmium	20	na	0.487	na	-0.08	0.666
	Chromium	20	na	0.859	na	0.16	0.381
	Copper	**20**	**-0.0007**	**0.079**	**0.115**	**-0.32**	**0.056**
	Lead	**20**	**-0.0003**	**0.139**	**0.069**	**-0.38**	**0.044**
	Molybdenum	**20**	**0.00085**	**0.001**	**0.47**	**0.52**	**0.002**
	Nickel	**20**	**0.00062**	**0.008**	**0.29**	**0.34**	**0.041**
	Selenium	20	na	0.056	na	0.16	0.33
	Zinc	20	na	0.868	na	-0.04	0.843

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Dashes indicate insufficient data to complete regression analysis.

Table 6
Change Over Time in Concentration of Nutrients and Other Parameters (continued)

			Relationship of $\log_{10}$[Parameter] with time				
			Regression			Kendall	
Sump	**Total Metal**	**N**	**Slope**	**P value**	**R Squared Adj**	**Tau**	**P value**
Beartooth Pit	Nitrate-N	86	na	0.023	na	-0.09	0.236
	Nitrite-N	**52**	**0.0000**	**0.861**	**-0.019**	**0.24**	**0.012**
	Chloride	86	na	0.423	na	0.05	0.5
	Sulfate	**86**	**0.0001**	**0.349**	**-0.001**	**0.16**	**0.027**
	TSS	**86**	**0.0008**	**< 0.001**	**0.129**	**0.17**	**0.023**
	Total Phosphate-P	87	na	0.021	na	0.14	0.061
	pH	86	na	0.001	na	-0.10	0.158
Panda Pit	**Nitrate-N**	**58**	**-0.0007**	**< 0.001**	**0.408**	**-0.47**	**< 0.001**
	Nitrite-N	**49**	**-0.0005**	**0.034**	**0.073**	**-0.25**	**0.011**
	Chloride	**59**	**0.0004**	**0.01**	**0.096**	**0.23**	**0.011**
	Sulfate	**59**	**0.0002**	**0.02**	**0.076**	**0.19**	**0.038**
	TSS	57	na	0.54	na	0.08	0.385
	Total Phosphate-P	**59**	**0.0003**	**0.052**	**0.048**	**0.22**	**0.015**
	pH	59	na	0.073	na	-0.10	0.314
Koala Pit	Nitrate-N	22	na	0.4	na	0.06	0.714
	Nitrite-N	21	na	0.98	na	0.04	0.809
	Chloride	**21**	**0.0009**	**0.007**	**0.287**	**0.50**	**0.002**
	Sulfate	**21**	**0.0008**	**< 0.001**	**0.564**	**0.56**	**< 0.001**
	TSS	22	na	0.685	na	0.04	0.821
	Total Phosphate-P	22	na	0.357	na	-0.14	0.397
	pH	22	na	0.595	na	0.03	0.864

Bold indicates significant change according to non-parametric regression.
'na' indicate non-significant slope and R squared.
Dashes indicate insufficient data to complete regression analysis.

Table 6
Change Over Time in Concentration of Nutrients and Other Parameters (completed)

			Relationship of log_{10}[Parameter] with time				
			Regression			Kendall	
Sump	Total Metal	N	Slope	P value	R Squared Adj	Tau	P value
Fox Pit	**Nitrate-N**	**34**	**0.0003**	**0.05**	**0.089**	**0.27**	**0.028**
	Nitrite-N	**24**	**0.0006**	**0.054**	**0.12**	**0.42**	**0.004**
	Chloride	**20**	**0.0020**	**< 0.001**	**0.537**	**0.63**	**< 0.001**
	Sulfate	**33**	**0.0010**	**< 0.001**	**0.733**	**0.86**	**< 0.001**
	TSS	31	na	0.232	na	0.19	0.143
	Total Phosphate-P	32	na	0.292	na	0.07	0.559
	pH	**33**	**0.0001**	**< 0.001**	**0.442**	**0.57**	**< 0.001**
Misery Pit	**Nitrate-N**	**26**	**0.0011**	**0.002**	**0.301**	**0.34**	**0.016**
	Nitrite-N	25	na	0.053	na	0.24	0.102
	Chloride	25	na	0.02	na	0.29	0.049
	Sulfate	**25**	**0.0011**	**< 0.001**	**0.724**	**0.75**	**< 0.001**
	TSS	26	na	0.06	na	-0.23	0.103
	Total Phosphate-P	28	na	0.017	na	-0.26	0.055
	pH	**25**	**0.0000**	**0.006**	**0.253**	**0.47**	**0.002**

Bold indicates significant change according to non-parametric regression.
‘na’ indicate non-significant slope and R squared.
Dashes indicate insufficient data to complete regression analysis.

Question 16

Attachment B5-C - Table 3: In the Table 3 no regression analyses are conducted for some substances. Is this due to insufficient data? If yes, do the answers to the questions presented immediately above also apply to Table 3? If not, why were regression analyses not conducted?

BHP Billiton Response

Please see the response for Question 12.

Question 17

Attachment B5-D, Pg. 41- 43: A scaling factor of 2.16 is applied to Beartooth sump water quality parameters to adjust for the different surface area of the Sable pit.

Why is the scaling factor based on the relative surface areas of the pit walls?

What other indicators of pit water quality were considered?

How were the surface areas of the pits estimated?

BHP Billiton Response
The source of "water quality parameters" (contaminants) is taken as proportional to the entire surface area of the pits: walls and benches. This is based on rock weathering which would be proportional to the rock area. The surface area of Sable Pit is 2.16 times the surface area of Beartooth Pit.

The horizontal plane surface areas of the pits were estimated based on satellite imagery (Beartooth = 0.19 km^2) and information from mine planners (Sable = 0.41 km^2).

The ratio of the horizontal surface areas of the pits can be used for the ratio of the total area of the pit walls.

Because pit wall angles at EKATI are very similar, the 3-D shapes are geometrically similar and the entire surface areas of the pits will have the same ratio as the horizontal surface areas.

For example, an inverted cone with a 45º apex angle and a base radius of r has:

-a base surface area of π r^2

-a total surface area of π r s, where s is the slant length and for the 45º cone is equal to 1.41 * r

The total surface area of a 45º cone is, therefore equal to 1.41 π r^2 .

The ratio of to the total wall area to the horizontal area (base area) is 1.41; that is, independent of r.

The source of contaminants was estimated from the water quality from Beartooth pit sump.

Question 18

Attachment B5-D, Pg. 42 Summary Table: Was TSS in Sable Pit minewater predicted? If yes can those predictions be made available?

Are additional summary statistics available? Of interest are the median and 25th and 75th percentiles.

BHP Billiton Response
Concentrations of TSS were not predicted because settling of particulates is expected in the eastern cell of the Two Rock Sedimentation Pond because of the filter dyke and long retention time.

Question 19

Attachment B5-D, Pg. 45 Table 1 and Table 2: Why are medians presented in this table whereas means are used elsewhere?

Were median concentrations used to generate the Beartooth mass loadings?

BHP Billiton Response

The use of the average in Table 1 was an oversight. The median concentrations (mg/L) are:

Aluminum-T	3.5
Ammonia	23.3
Arsenic-T	0.003
Cadmium-T	0.0002
Chloride	44.5
Chromium-T	0.014
Copper-T	0.039
Lead-T	0.002
Moly-T	0.069
Nickel-T	0.128
Nitrate	94.9
Nitrite	5.7
Selenium-T	0.004
Zinc-T	0.018

Medians were not used to generate Beartooth mass loadings, rather, as stated on page 43 of Appendix B-5d, Beartooth mass loadings were calculated by pairing Beartooth water quality data with runoff estimates.

Question 20

Attachment B6: This attachment presents concentrations. What are the expected loadings of ammonia, Ni, nitrate and Zn to Horseshoe Lake?

BHP Billiton Response

The annual loadings entering Horseshoe Lake are summarized in the following table.

	Annual Loadings (mg/year)			
	Ammonia	**Nickel**	**Nitrate**	**Zinc**
Year 1	2.04E+07	1.03E+05	6.75E+07	8.92E+04
Year 2	1.45E+08	2.54E+06	4.58E+08	3.73E+05
Year 3	5.60E+08	2.07E+07	1.79E+09	2.18E+06
Year 4	7.41E+08	3.59E+07	2.49E+09	4.17E+06
Year 5	7.76E+08	4.22E+07	2.72E+09	5.74E+06

These values were calculated based on the assumption that Two Rock Sedimentation Pond is a steady state system where inflow and outflow are equal; therefore, the sum of all inflows to Two Rock Sedimentation Pond was assumed to be equal to the outflow.

The Trapezoidal Rule of integration was applied to the outflow volume and concentration from Two Rock Sedimentation Pond over the time period of each year of operation and is adequate for providing approximate estimates of loadings. The formula of the trapezoidal rule when applied to the dataset is,

$$\int_0^t = \frac{Timestep}{2}[Q_0C_0 + 2Q_1C_1 + 2Q_2C_2 + ... + 2Q_{n-1}C_{n-1} + Q_nC_n]$$

Where *Q* is the outflow per timestep, and *C* is the concentration at a given timestep.

The Two Rock outflow concentrations are reported by GoldSim on a timestep of 0.432 days. Thus, to make the concentration and flow data compatible, the annual outflow was converted into units of volume per timestep. As a result, a constant flow rate is assumed for all timesteps in a given year. *Note: Annual flow is based on observed precipitation data (Year 1 = 2004 data, Year 2 = 2005 data, Years 3, 4 & 5 = 2006 data).

Question 21

Attachment B6, Pg. 7: What is the contingency plan in the event that the filter dike does not filter as efficiently as expected? (i.e the best professional judgement regarding the filtering efficiency of filtering dike is incorrect?)

Was a range of removal efficiencies provided? If yes, was the range of removal efficiencies used to estimate predicted concentrations in Horseshoe Lake? I am trying to understand if the average, best, worst, etc. removal efficiency was used to predict the concentrations of AOPC in Horseshoe Lake.

BHP Billiton Response

If the filter dyke does not work as efficiently as expected and water quality at the discharge of Two Rock Sedimentation Pond does not meet the EQC, the following contingencies have been identified in the Development Description Report provided in the March 2008 renewal application;

- coagulation and/or flocculation to further remove suspended solids and suspended solid associated parameters as has been practiced successfully at other locations at EKATI and
- significant storage time to allow for further settling or implementation of an alternative plan.

For the four parameters modeled in Horseshoe Lake no removal from the filter dyke was included in the predictions.

Question 22

Attachment C1: This section is summarized by the statement that "The best method for discharging water from Two-Rock Pond into Horseshoe Lake is by pipeline to the center, deeper part of the lake."

> One of the advantages of method D (pipeline to near outlet of Horseshoe Lake) is that there is better mixing during high flow event than the method described as "best" in the summary to this section. However, it is my understanding that the worst-case concentrations modelled in Horseshoe Lake occur during high flow events. If this understanding is correct would it not make sense to model predicted concentrations in Horseshoe Lake under method D?

BHP Billiton Response

Although Option D may provide better mixing during a high flow event there are operational difficulties associated with this approach. The lake is shallow in this location and would therefore freeze to the bottom encasing the pipeline in ice which would remain frozen inside the pipe longer than the surrounding ice. This would cause potential delays for discharging in the spring which is a critical discharge period for operations and to maintain natural flow regimes. Also if discharge is not possible during this high flow period then the benefits of high flow mixing would not be realized. It is also important to keep in mind that Option C provides good mixing that accomplishes the WQOs for all parameters within a very small mixing zone with the potential exception of Ni during brief periods of peak flow (this is proposed to be studied further). This does not differ significantly for Option D.