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(BHPB & Diavik)

April 17<sup>th</sup>, 2009

Files: MV2003L2-0013

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

Dear Ms. Tyler,

**Re: 2008 Update to the Wastewater and Processed Kimberlite Management Plan**

The Wek'èezhii Land and Water Board (WLWB) met on April 16<sup>th</sup>, 2009 to consider BHP Billiton's submission of the 2008 update to the Wastewater and Processed Kimberlite Management Plan (WPKMP), as required by Part F, Item 1 of Water Licence MV2003L2-0013 and Part G, Item 1 of Water Licence MV2001L2-0008.

The Board has decided not to approve the current submission until additional technical information is provided and reviewed. At that time, the Board will reconsider BHP Billiton's request. Please submit the following:

1. The EBA Engineering Study that BHPB has referenced both in its cover letter (of March 23, 2009) and in its response to reviewer comments, and a technical memo that answers the following questions if they are not specifically addressed within the study.
  - a. Where is the borehole actually located?
  - b. Does EBA Engineering believe that one borehole is sufficient to monitor potential permafrost degradation around the entire Beartooth pit and why?
  - c. What do the thermistor results show so far i.e. has the temperature profile been stable despite perturbations from the excavation to the pit(s)?
  - d. What type of finite elemental analysis was performed and what were the assumptions in the model? BHPB's cover letter indicates that there were no major fractures that might contribute to hydraulic connections – was this conclusion based on pit wall geology only?
  - e. What are the uncertainties in the model and the conclusion that no permafrost degradation is likely prior to 2020? When would effects be predicted to occur, if at all?

Please refer to tracking number #3 in the attached staff report and comment table for more details. If you have any questions, please feel free to contact Ryan Fequet at [rfequet@wlwb.ca](mailto:rfequet@wlwb.ca) or by phone at 867-669-9589.

Sincerely,

A handwritten signature in black ink, appearing to read 'V. Camsell-Blondin'.

Violet Camsell-Blondin  
Chair, WLWB



## STAFF REPORT

<b>Company:</b> BHP Billiton Diamonds Inc.	
<b>Location:</b> Lac de Gras	<b>License:</b> MV2003L2-0013, MV2001L2-0008
<b>Date Prepared:</b> April 9 <sup>th</sup> , 2009	<b>Meeting Date:</b> April 30 <sup>th</sup> , 2009
<b>Subject:</b> BHP Billiton's Submission of the Wastewater Processed Kimberlite Management Plan	

### Purpose/Report Summary

The purpose of this report is to present BHP Billiton's submission of an update to the Wastewater Processed Kimberlite Management Plan (WPKMP) to the Board for approval. This management plan is required by Part F, Item 1 of Water License MV2003L2-0013 and Part G, Item 1 of Water License MV2001L2-0008.

### Background

BHP Billiton submitted an update to their Wastewater and Processed Kimberlite Management Plan (WPKMP) to the Wek'èezhii Land and Water Board on December 19<sup>th</sup>, 2009. On January 6<sup>th</sup>, 2009, Board staff requested comments from reviewers. Comments were received from the Independent Environmental Monitoring Agency (IEMA), the North Slave Metis Alliance (NSMA), GNWT – Environment and Natural Resources (ENR), Indian and Northern Affairs Canada (INAC), and the Department of Fisheries and Oceans (DFO).

BHP Billiton responded to reviewer's comments on March 23<sup>rd</sup>, 2009 and the comment table is provided below. Board staff have reviewed BHP Billiton's submission, reviewer comments and the company's response and have had our technical advisor, Steve Wilbur from Jaques Whitford Ltd, also look over the material.

Currently, minewater on site is pumped to the Long Lake Containment Facility (LLCF) where it passes through several filter dykes and eventually is released into the receiving environment. BHP Billiton is considering different options to reduce the amount of nitrate (from residual blasting agents) and chloride (groundwater from underground mining) which is put in to the LLCF. They're proposing to use Beartooth pit as an *"optional retention pond for minewater"*, particularly for water from the underground mine, the Fox pit sumps, and the sumps located outside of the ammonia-nitrate storage facility. *"The approach will be to utilize Beartooth pit to the degree necessary to ensure that water quality objectives in the LLCF are achieved"*.

Several issues were raised by reviewers and are discussed below for your consideration.

## Discussion

Staff have organized the issues raised by reviewers into three general categories (numbers in parentheses refer to tracking numbers of comments in attached comment table):

### 1. Permafrost

INAC (#3) and IEMA (#20) were concerned that the chloride and nitrate-rich water would affect the permafrost around the Beartooth pit and specifically between the Beartooth and Panda/Koala pits. From INAC's comments *"INAC-WRD is concerned that the addition of mine water already high in Chloride will exacerbate permafrost thawing and the creation of a talik zone, which could create connectivity with other pits, underground workings and groundwater."*

BHP Billiton discussed the new "Beartooth Borehole" that is now in place to monitor the permafrost and that they now have work done from EBA Engineering confirming that filling the pit with this water isn't expected to affect the permafrost.

### 2. Lost Research Opportunities

The flooding of the open pits at the EKATI site is an important concept in the closure and reclamation of the mine and one of the areas with the greatest uncertainty. Beartooth pit would have been the first open pit to be flooded and therefore could possibly have provided valuable information on the ideal rate of pit flooding, erosion and ARD potential, anticipated water quality, geochemical interactions and more. DFO (#1), INAC (#10) and IEMA (#15, 19) are concerned that by using the Beartooth pit to store minewater its potential to be used as a 'test pit' will be lost.

BHP Billiton stated in their response to INAC(#10) that *"there was never a plan or schedule in place that would have delayed flooding of other pit lakes for the lengthy timeframe that would be required to use monitoring information from Beartooth pit as a means of verifying pit flooding as an acceptable closure method"*.

During the 'ICRP Final Working Group Meeting', BHP Billiton's consultant from ResCan explained how each pit is unique and specific studies will have to be conducted for each pit before it can be flooded. BHPB reiterates this in its response letter: *"There are some common aspects to pit flooding such as the pumping activities; however, each pit lake will have unique conditions that will control its long term water quality and mixing characteristics (i.e., size, catchment area, location in the watershed, geochemistry). Therefore, each pit needs to be evaluated and modelled on a pit-by-pit basis, as is being done through the ICRP Reclamation Research Plan."*

Nonetheless, BHPB plans to monitor water quality, water column characteristics and water elevations as the pit fills and this data may have some use for future pit flooding operations.

### 3. Water Quality during Operations and at Closure

INAC (#4-9, 11) and IEMA (#17-18) have raised concerns about the water quality in the Beartooth pit during operations and at closure if BHP Billiton were to store the nitrate and chloride-rich water in the open pit.

Reviewers posed questions regarding the potential for stratification of the pit lakes, metal leaching, acid rock drainage (ARD), what would happen to the water at closure if it wasn't of a quality that it could be released through the LLCF and so on.

BHP Billiton stated in several of their responses to reviewer comments (tracking #s 5, 9) that *"BHP Billiton is committed to achieving the closure water quality criteria for all lakes, which ensures that whatever unanticipated contingency or adaptive management measures may be required will be implemented."*

## Summary

From their responses, it seems that BHP Billiton is committed to ensuring that all options are considered and that the Beartooth pit will be reclaimed to a quality that will achieve the goal of closure and reclamation as described in the Interim Closure and Reclamation Plan (ICRP).

There are however many information gaps and technical questions left unanswered after BHP Billiton's response to reviewer comments. Although the information provided by BHP Billiton is helpful, there is no way to verify, validate or assess many of their statements and conclusions.

## Recommendation

The ground temperature data is important information to verify BHPB's predictions that the permafrost around the Beartooth pit will be stable and not affect water quality in the receiving environment. Board staff recommend that this update not be approved as currently submitted and the company be required to provide additional technical information. Once this information is submitted and reviewed, the 2008 update to the WPKMP can then be reconsidered by the Board.

Respectfully submitted,



Kathleen Racher, PhD.  
Regulatory Director



Ryan Fequet, B.Sc.  
Regulatory Specialist

Attached: i) BHP Billiton's December 19<sup>th</sup>, 2008 Cover Letter for their submission of the Revised Waste Water and Processed Kimberlite Management Plan (WPKMP)  
ii) Original comment letters from INAC, ENR, DFO, NSMA, IEMA

Tracking Number	Reviewer ID	Topic	Review Comment	BHP Response / Proposed Revision	WLWB Response
<b>Department of Fisheries and Oceans (DFO) Comments – Received January 30, 2009</b>					
1	DFO – 1	Research Opportunity	<p>In the December 15, 2008 submission to the WLWB, BHPB states that “the use of Beartooth pit in this manner does not in any way compromise the closure and reclamation of the Ekati site.” DFO does not necessarily agree with this assertion as it results in a lost opportunity to use Beartooth Pit as a pilot to determine how best to reclaim the open pits. DFO supports IEMA’s request for additional information discussing the lost research opportunities.</p> <p>If the use of Beartooth Pit as a minewater retention pond is determined to be the best alternative for addressing the LLCF water quality issues, it would be important to identify any data gaps that could be filled by monitoring the pumping of water into the pit. This information could then be included in the reclamation research plan.</p>	<p>See cover letter.</p> <p>Monitoring of water quality, water column characteristics and water elevations will be carried out in Beartooth pit on a minimum once per year (summer) basis, as safety and access allow. Ground temperatures in the Beartooth borehole will be monitored on a minimum twice per year basis. Portions of the Beartooth pit wall are known to be less physically stable and safe access to the pit bottom may not always be possible in the absence of the active ground control measures that have been utilized throughout operations.</p>	<p>BHPB should be required to update the WWPKM Plan officially – that is, to submit the updated plan in its entirety rather than simply stapling a letter to the existing plan. In the updated plan, we would expect to see commitments to specific monitoring and how that can and should be reported on (for example some monitoring results would be appropriate in summarized form in the Annual report versus the SNP data).</p> <p>Board Staff do think that the results of the ground temperature data would be of interest to the Board to verify BHPB’s prediction that the permafrost around Beartooth will be stable.</p>
<b>North Slave Metis Alliance (NSMA) Comments – Received January 30, 2009</b>					
2	NSMA – 1	Capacity	<p>Unfortunately, due to circumstances beyond our control, we do not currently have the capacity in-house to evaluate the plan, nor do we have the financial resources to engage independent technical advice or to consult with our members. We have no choice, therefore, on this occasion but to rely entirely on the Crown to fulfill the Fiduciary Duty it owes us to protect, conserve and manage our lands, waters, and resources in our best interests, and to infringe on our rights as little as possible.</p>	<p>See responses to comments from INAC.</p>	<p>No comment.</p>

**Indian and Northern Affairs Canada (INAC) Comments – Received January 30, 2009**

3	INAC – 1	Permafrost	<p>It is understood that Beartooth pit is surrounded by permafrost making it a potential candidate for accepting mine water. However, INAC-WRD is concerned that the addition of mine water already high in Chloride will exacerbate permafrost thawing and the creation of a talik zone, which could create connectivity with other pits, underground workings and groundwater. What is the current depth, extent and temperature of the permafrost beneath Beartooth pit? It is not clear where groundwater would migrate if the pit water were to escape into the talik zone. Has BHPB conducted any hydro-geological investigations at this location? How much water does BHPB anticipate will be in the pit each year and at closure in 2020? This information would be useful in predicting the generation of the talik zone over time.</p>	<p>See cover letter.</p> <p>The EBA Engineering study referred to in the cover letter was based on chloride-rich underground minewater. For this assessment, a borehole approximately 350 m deep was drilled in permafrost midway between the Beartooth and Panda pits and instrumented with 13 operable thermistors. The depth of the borehole extends to approximately 140 m beneath the final bottom of Beartooth pit. This instrumented borehole provides current data on permafrost to that depth and will provide a location for monitoring permafrost through mine operations.</p> <p>The results of finite element thermal analysis show that flooding would have little or no effect on the thermal conditions in the areas around the Panda underground workings within the planned life span (2020) of the underground operations. This means that there will not be any talik zone created by the end of the mine life in 2020. By that time, underground mining will be complete and the pump flooding programs for all of the open pits will have begun for long-term closure.</p>	<p>Of all the issues raised by reviewers, Board Staff believe that the possibility of permafrost thawing around Beartooth as a result of minewater storage is an issue that may affect water quality in the receiving environment. For example, permafrost degradation could lead to problems with erosion or possibly groundwater contamination – just to name a few examples.</p> <p>Therefore, we recommend that the Board request the EBA Engineering Study that BHPB has referenced both in its cover letter (of March 23, 2009) as well as in its response to reviewer questions. It should be understood that this additional information will not be subject to a review process per se – instead, the assurances that BHPB has given about the stability of the permafrost should be appropriately supported by the technical information. If BHPB does not wish to submit the entire study, it could still release the essential elements of the studies, perhaps in the form of a technical memo signed by an engineer, that will support BHPB’s claims in this regard. Specific questions that the Engineering Study or memo should answer include:</p> <ul style="list-style-type: none"> <li>• Where is the borehole actually located?</li> <li>• Does EBA Engineering believe that one borehole is sufficient</li> </ul>
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					<p>to monitor potential permafrost degradation around the entire Beartooth Pit and why?</p> <ul style="list-style-type: none"> <li>• What do the thermistor results show so far – for example has the temperature profile been stable despite perturbations from excavation to the pit(s)?</li> <li>• What type of finite elemental analysis was performed and what were the assumptions in the model? BHPB’s cover letter indicates that there were no major fractures that might contribute to hydraulic connections – was this conclusion based on pit wall geology only?</li> <li>• What are the uncertainties in the model and the conclusion that no permafrost degradation is likely prior to 2020? When would effects be predicted to occur, if at all?</li> </ul>
4	INAC – 2	Water Quality	What is the expected water quality in Beartooth pit during operations and at closure and what information/rationale does BHPB have to justify these expectations?	The quality of water in Beartooth pit during operations (assumed in this case to mean after open pit mining has stopped and during its use a minewater retention pond) will depend on the water that is pumped into the pit. The operating strategy for Beartooth pit will be to utilize the pit strategically when this reduces water quality risks in the LLCF. For example, a situation where all of the underground minewater is pumped into Beartooth pit for the remainder of the mine life is unlikely	Board Staff believe that the Board needs assurance that minewater directed to Beartooth pit will not directly or indirectly affect the receiving environment; with that in mind, Board Staff do not believe that we need more information on the expected quality of the minewater in Beartooth pit at this time.

				given the assimilative capacity of the LLCF to receive at least some portion of the water and the on-going efforts that BHP Billiton will pursue to reduce nitrate concentrations. Modeling of future water quality in each pit lake is being carried out through the ICRP Reclamation Research Plan.	
5	INAC – 3	Water Quality	What are the potential methods to manage/treat this water at mine closure (i.e. other than pumping into Panda pit)? As per the current request, chloride will not be the only elevated parameter in this water at closure. Elevated parameters such as metals could restrict potential closure options.	Note that pumping the water into Panda pit in this case could also be stated as pumping the water into the Panda/Koala underground mine since the underground workings is where the water will flow to. Consideration of treatment methods is not necessary in this case. The residual minewater will not negatively interact with the water in the overlying Panda or Koala open pits due to density/salinity gradients. If there were not a substantive density/salinity gradient for the Beartooth pit water at closure as compared to surface water, then there would be no need to pump the water into the underground mine. Also note that for closure BHP Billiton is committed to achieving the closure water quality criteria for all pit lakes, which ensures that whatever unanticipated contingency or adaptive measures may be required will be implemented.	BHPB will need to ensure that the final water quality in the pits meets the criteria set out in an approved Interim (and Final) Closure and Reclamation Plan in order to get their security deposit back.  If BHPB's predictions are not correct at this time, BHPB will have the responsibility of doing whatever it takes to achieve the agreed upon water quality in the pits prior to walking away from the site. In the meantime, the Board has the responsibility to ensure that the receiving environment will not be adversely affected through this alternative use of Beartooth Pit.
6	INAC – 4	Water Quality	It is possible that water placed within the pit may become stratified, either thermally or chemically?	It is possible that seasonal thermal stratification as is seen in natural water bodies may develop in Beartooth pit if a pond of suitable size is created. However, the depth to surface area ratio and the weak penetration of sunlight at low water levels in the pit bottom may preclude this as a possibility until a sizeable pond is	No comment.



				<p>established. Further, chemical stratification might occur if an adequate volume of natural runoff entering the pit accumulates to create a surface layer overlying a more dense saline layer of minewater. However, the very low volumes of natural runoff into the Beartooth pit and the turbulence that will be caused from minewater inflows may preclude this as a possibility.</p>	
7	INAC – 5	Water Quality	<p>How will BHPB manage other influences on water quality within the pit such as ARD potential, metal leaching, ammonia dissolution from pit walls, Total Suspended Solids, hydrocarbons, etc.? Will minewater placed within the pit cause leaching of metals from the kimberlite itself? Studies from Diavik Diamond Mine have indicated that both acidic and neutral water have led to metal leaching from kimberlite.</p>	<p>Any of the chemical interactions listed in the comment could occur in Beartooth pit to some (anticipated small) degree. The pit walls are primarily granite with only minor amounts of kimberlite or metasediment exposed. However any such interactions would occur during pump-flooding with clean water as well and so this does not represent an operational "negative" for this management plan. The pit water will be monitored (see response comment DFO-1) and the observable effects of any such chemical interactions would be identified. Future pit water quality is assessed under the ICRP Reclamation Research Plan.</p>	<p>See response to Tracking #5 above. Board Staff agree that tracking this information while Beartooth pit is being filled could be very useful to the Reclamation Research.</p>
8	INAC – 6	Water Treatment	<p>INAC-WRD appreciates that placing minewater laden with chloride and nitrate into Beartooth pit may be a good alternative to conducting treatment of this water, partially as it filters through the LLCF, but also at the outflow of Cell E. However, at the end of operations, this water may still require treatment in order to meet the connectivity objective of the Interim Closure and Reclamation Plan (ICRP). Issues resulting from the placement of minewater in Beartooth pit may generate additional remediation requirements at the end of mine operations (e.g. operation of a water treatment plant). Accordingly, this could possibly modify the total amount of security required for the operation.</p>	<p>See response comment INAC-3.</p>	<p>Board Staff agree with INAC and believe that this can and will be dealt with through the Closure and Reclamation Plan process from now until closure.</p>

9	INAC – 7	Closure	If Beartooth pit was allowed to fill to the upper limit (i.e. 2 metre freeboard), the pit itself would have a capacity of 12.1 Mm <sup>3</sup> . How would this pit and the associated volume of pit water be handled at closure if water quality issues still exist? Could Beartooth pit not be connected to the other pits as is the plan in the ICRP? If so how? How would pit water migration into the talik zone be managed at closure?	See response comment INAC-1 as regards information that there will not be a talik zone. For closure BHP Billiton is committed to achieving the closure water quality criteria for all pit lakes, which ensures that whatever unanticipated contingency or adaptive measures may be required will be implemented. Water quality in pit lakes, including Beartooth pit, is assessed under the ICRP Reclamation Research Plan.	See Board response to Tracking #3 above. Also note that the existing ICRP Reclamation Research Plan for Open Pits may have addressed water quality predictions, but not with the assumption that minewater would be the principle constituent. The existing research plan assumes “clean” water would be added to Beartooth Pit, so the issue of affected water is a new issue that has not been explicitly addressed in the current ICRP-RRP. <b>The updated WPKM Plan should contain a reference for the need to address this in the RRP; the next version of the ICRP-RRP should address this directly.</b>
10	INAC – 8	Closure	Using Beartooth as a test pit has been raised by many reviewers. When considering the merit of any short term use for Beartooth, it should be weighed against the benefit of using it as a test pit. A very significant portion of the overall mine closure (pit lakes, fish passage, hydrological connections, etc.) hinges on the pit lakes being meromictic and therefore meeting water quality objectives. The model used to predict the eventual water quality in the pit lakes is highly complex, resulting in a degree of uncertainty due to multiple variables and the associated uncertainty of those values over time. The importance of using Beartooth to verify and fine tune the model cannot be overstated.	See cover letter. Note that there was never a plan or schedule in place that would have delayed flooding of other pit lakes for the lengthy timeframe that would be required to use monitoring information from Beartooth pit as a means of verifying pit flooding as an acceptable closure method. Flooding the pits for closure has been the established closure method since the initial project assessments.	Board Staff believe that BHPB has addressed this question adequately in the cover letter attached to this comment table (March 23, 2009). See also our response in Tracking #7.
11	INAC – 9	Closure	No details were provided on how BHPB could use the filling of the pit to answer some of the outstanding questions relating to water quality of the pit lakes at closure. Information should be gathered in order to help determine the interaction between the water and pit walls, settling/stratification of mine water, the effect on permafrost, etc. A research plan should be developed before Beartooth is approved for use as a mine water retention pond.	See response comments DFO-1 and INAC-5.	See responses above.
12	INAC – 10	References	In our review of the updated version of BHPB Interim Closure and Reclamation Plan, we noted several documents that would help	As clearly stated in the references, these are all internal documents used by BHP	As stated above, Board Staff do believe that BHPB needs to submit whatever

			<p>address some of the uncertainties INAC-WRD has identified and some of the statements BHPB has made associated with this proposal:</p> <p><i>Fluor, 2006. Conceptual report on feasibility of processed kimberlite backfill into Beartooth Pit. (BHP Billiton internal document)</i></p> <p><i>Mathis, 2005. Proposed Beartooth Pit Pushback Geotechnical Investigation. Assessment Present and Future. Prepared by James I. Mathis, Ursa Engineering. May, 2005. (BHP Billiton Internal Document).</i></p> <p><i>Rescan, 2006. Conceptual Plan for Storage of Mine Water and Processed Kimberlite in Beartooth Pit. (BHP Billiton internal document)</i></p> <p><i>Rescan. 2008. Conceptual Plan for Storage of Mine Water and Processed Kimberlite in Beartooth Pit. Prepared for BHP Billiton Diamonds Inc. by Rescan Environmental Services Ltd. March 2008. (BHP Billiton Internal Document)</i></p> <p>INAC-WRD requests that these documents, or a revised document including relevant information from the above documents, be made available to reviewers to assist the interpretation and assessment of this proposal.</p>	<p>Billiton for project planning purposes. This is a normal procedure which allows BHP Billiton to proceed with concept studies without the cost and time required for preparation of interim reports in a manner suitable for external review. In the case of the ICRP Reclamation Research Plan, these references were shown in order to compile a complete list of documents for continued internal use by BHP Billiton staff or contractors working on future reclamation research projects. This has been BHP Billiton's consistent response to requests under various management plans and reviews for the release of internal documents.</p>	<p>documentation is needed to support its claims and predictions. That does not mean that those documents would be subject to external review – and the Board would not ask for comments on the additional information. Board Staff are recommending that some additional reference material be submitted to support BHPB's assurances around the stability of permafrost around Beartooth Pit in particular (see Tracking #3). At this time, Board Staff are not recommending the other reports, as listed by INAC, be submitted to the Board by BHPB although INAC and BHPB are, of course, free to have further discussions on their own.</p> <p>Reviewers who ask the Board to request such additional information must make reference to specific conclusions that BHPB has made that require the support of the reference material.</p>
<b>GNWT Environment &amp; Natural Resources (ENR) Comments – Received January 30, 2009</b>					
13	ENR – 1	Mitigative Measures	<p>Have additional mitigative measures or contingencies been considered, in addition to the use of Panda Pit for underground disposal of residual waters exhibiting poor water quality, in 2031, when Beartooth Pit is intended for flooding?</p>	<p>See response comment INAC-3.</p>	<p>See response to INAC-3 (Tracking #5)</p>
14	ENR – 2	ICRP Updates	<p>The recently submitted Final Draft Interim Closure and Reclamation Plan (ICRP) does indicate the use of Beartooth Pit for this proposed purpose, however explanations on how it may alter original calculations or expectations, such as shallow zone creation, pit stability, water quality, reclamation timing, permafrost, flooding rates, are not provided, nor is it included in this update. ENR recommends that information, as it becomes known, be provided to the Board and stakeholders.</p>	<p>The information suggested will be assessed under the ICRP Reclamation Research Plan.</p>	<p>No comment.</p>

**Independent Environmental Monitoring Agency (IEMA) Comments – Received January 30, 2009**

15	IEMA – 1	Trade-offs	<p>The Agency is not opposed in principle to the use of Beartooth pit for minewater storage. While we understand the economic rationale for BHPB’s preferred use of Beartooth as a sump, we had hoped that there would be a careful examination of the environmental trade-offs and lost research and monitoring opportunities, in providing a rationale for whatever decision was reached. This is not part of the three-page December 15, 2008 letter the company has submitted to the Board to support its request. The next available pit for these other purposes would be Fox in 2014. If Beartooth pit was used for processed kimberlite deposition, it may be possible to avoid using Cell D for any tailings disposal and provide an extra measure of protection for water coming out of the Long Lake Containment Facility.</p> <p>The Agency is of the view that BHPB should submit additional information that discusses the trade-offs and lost opportunities and a rationale for the preferred use of Beartooth as a sump.</p>	<p>See cover letter and response comments DFO-1 and INAC-8.</p> <p>The proposed use of Beartooth pit does not preclude its use in future for processed kimberlite. Any feasible plan for placement of processed kimberlite into Beartooth pit would also need to include a water return system to reclaim water from the pit (this is because the small size of the pit would quickly be used by water rather than PK in the absence of reclaim pumping). Therefore, there would be a means of pumping out stored minewater.</p>	Please see response to INAC-8 (Tracking #10)
16	IEMA – 2	References	<p>We believe that there are some supporting documents that BHPB should submit to the Board and the interested parties to help ensure that an informed decision is reached about this significant change in wastewater management. We found references to the following documents in the Final Interim Closure and Reclamation Plan Working Draft, and would like to suggest that BHPB should submit these to support this change request:</p> <p>Fluor, 2006. Conceptual report on feasibility of processed kimberlite backfill into Beartooth Pit. (BHP Billiton internal document)</p> <p>Mathis, 2005. Proposed Beartooth Pit Pushback Geotechnical Investigation. Assessment Present and Future. Prepared by James I.</p> <p>Mathis, Ursa Engineering. May, 2005. (BHP Billiton Internal Document). [If this document can shed light on the integrity of the</p>	<p>See response comment INAC-10.</p> <p>The last reference listed (SRK, 2003) is incorporated (completely) into the 2003 Beartooth Pipe Waste Rock and Ore Storage Management Plan which was approved by the Board. This information was a requirement of the Sable, Pigeon and Beartooth water licence and was provided to the Board in a format consistent with the existing management plan for the other WRSA’s.</p>	Please see response to INAC-10 (Tracking #12)

			<p>permafrost around Beartooth or the geochemical reactions that may take place with the minewater.]</p> <p>Rescan, 2006. Conceptual Plan for Storage of Mine Water and Processed Kimberlite in Beartooth Pit. (BHP Billiton internal document)</p> <p>Rescan, 2008. Conceptual Plan for Storage of Mine Water and Processed Kimberlite in Beartooth Pit. Prepared for BHP Billiton Diamonds Inc. by</p> <p>Rescan Environmental Services Ltd. March 2008. (BHP Billiton Internal Document)</p> <p>SRK. 2003. Beartooth Pipe Acid/Alkaline Drainage (ARD) and Geochemical Characterization Plan. Prepared for BHP Billiton Diamonds by SRK Consulting, January 2003.</p>		
17	IEMA – 3		<p>The Agency would like to know what changes may occur in the stored minewater (rich in chloride, nitrates and perhaps other contaminants including hydrocarbons) when it is in Beartooth pit in terms of any chemical interactions resulting from contact with the pit walls and kimberlite and what the final water quality may be after storage for eleven years. This may require some characterization of the predicted minewater inputs and likely chemical interactions. These topics may already be the subject of scrutiny as part of the Pit Lake studies (see pg. 7-11 and 7-12 of the ICRP), but information is needed now to help evaluate the safety of Beartooth pit minewater storage.</p>	See response comment INAC-5.	Board Staff agree that tracking this information while Beartooth pit is being filled could be very useful to the Reclamation Research.
18	IEMA – 4		<p>The letter from BHPB states that if the water quality in Beartooth pit at closure does not meet discharge criteria, it will be pumped into Panda pit or the underground workings. The Agency would like to know what the anticipated water quality will likely be in Panda with the addition of the stored Beartooth minewater, with or without pump flooding? Will it be possible to discharge the resulting Panda pit water into the receiving environment? If not, what is the contingency at that point?</p>	See response comments INAC-2 and INAC-3.	Please see response to INAC-2 (Tracking #4)

19	IEMA – 5		If the decision is made to use Beartooth pit for minewater storage, the Agency would like to know whether BHPB intends to undertake any monitoring or research during the 11 year period of its use? We are of the view that there may be some opportunities to learn about the behaviour of the minewater, through analysis of physical and chemical changes (e.g. the extent of meromixis) during the use of Beartooth that may improve pump flooding techniques and water management for later pits.	See cover letter and response comment DFO-1.	No comment
20	IEMA – 6		Finally, the Agency is concerned about the possible effects on permafrost of storing minewater in Beartooth. Outstanding questions should be answered before this option is approved. How much permafrost now separates Beartooth from the nearby Panda pit and underground workings, and what is the potential for the water retained in Beartooth to leak into Panda?	See response comment INAC-1.	Please see response to INAC-1 (Tracking#3)