



Indian and Northern
Affairs Canada

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et du Nord Canada

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File: MV2003L2-0013
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BHP Billiton Diamond Inc.

April 4, 2008

Dr. Kathleen Racher
Regulatory Director - Mining
Wek'èezhii Land and Water Board
#1 4905-48th Street
Yellowknife, NT X1A 3S3

Re: BHP's Interim Closure and Reclamation Plan – Section 4 Comments

Dear Dr. Racher:

Indian and Northern Affairs Canada – Water Resources Division (INAC-WRD) has conducted a review of Section 4 which includes Chapters 7 through 9, as well as, Appendix F and G of BHP Billiton Diamond Incorporated's (BHP) Interim Closure and Reclamation Plan 2007 (herein referred to as the ICRP). INAC-WRD has placed our Section 4 comments in tabular format as requested by the Board, see Attachment 1. However, INAC-WRD also retained John Brodie to review this section of the ICRP; his review is attached to this letter for your consideration (Attachment 2).

INAC-WRD would like to commend both the Wek'èezhii Land and Water Board (WLWB) and BHP for all their efforts in this review process. There have been numerous versions and updated sections/tables as a result of the various reviews. We look forward to a final updated version of the ICRP.

As this is the last section of the ICRP review, INAC-WRD thought we would bring forward key issues that were identified over past months. We are doing such as an attempt to help the WLWB and BHP in preparing the final updated version of the ICRP.

INAC-WRD has identified the following Key Issues with the ICRP. These issues are not organized in any particular order and are discussed further below:

- Closure Planning
- ICRP Development
- Closure Criteria
- Reclamation Research, ICRP Updates and Closure Timelines
- BHP Commitments/Additional Information/Revisions

Closure Planning – INAC-WRD is of the opinion that BHP is no longer in the Preliminary Closure Phase of the mine and in fact they are amidst the Interim Closure Planning Phase and as such should be at a further stage in closure planning and closure research. The Ekati Mine is nearing 10 years of a proposed 20+ year mine life. As certain components of the mine are scheduled to be closed at differing times throughout the mine life, closure research and planning for these components should be completed in advance to ensure complete and successful closure. INAC-WRD would like to stress that because of the challenges associated with certain closure options (e.g. pit lakes and tailings covers), the need for focused and active closure research is extremely critical.

ICRP Development – The Mine Site Reclamation Guidelines for the Northwest Territories-INAC 2007 (p-4) describe what components an effective ICRP should have. The following components do not appear to have been properly addressed in the BHPB ICRP 2007:

- Detailed description of contingency plans
- Updated reclamation research plan
- Increasingly convincing evidence that the reclamation objectives can be achieved by the described activities
- Site specific closure criteria
- Updated post-closure monitoring requirements and responsibilities
- Renewed or updated descriptions of the likely post-reclamation risks to human and wildlife health and the environment relevant to the information available

Closure Criteria – INAC-WRD has raised concerns about closure objectives and measurable closure criteria in the past, which still have not been adequately addressed (INAC letter to BHP November 6, 2006). INAC has and will continue to request a greater level of detail, research and planning and further development of measurable closure criteria than is presented in the current version of the ICRP.

Again, INAC-WRD stresses that closure objectives should clearly relate to the closure criteria and assessment endpoints which can be measured to allow sign-

off. Without specific closure criteria there is no way to conclude that BHP has achieved its closure objectives for each mine component or that the overall mine has met its closure goal.

Research, ICRP Updates and Closure Timelines – It is difficult to follow the timelines associated with research, ICRP updates, progressive reclamation and final closure of various mine components. It is understood that the main challenge BHP is facing is the dynamic nature of the mine plan. However, if parts of the mine site are set to be closed in the near future, expedited timeline for component specific research and the incorporation of research results are necessary.

BHP Commitments/Additional Information/Revisions – It is noted that BHP has committed to compiling and releasing additional information and updating the ICRP once the review process is completed. Because of the numerous versions and updates to the document, INAC-WRD would like time to assess the final updated ICRP prior to the next step in the Board's review process (i.e. Public Hearing).

INAC hopes that the above is useful to both the WLWB and BHP. If you have any questions or require additional information on any of the above, please contact Nathen Richea at richean@ienc.gc.ca (867) 669-2657 or Marc Casas at casasm@inac.gc.ca (867) 669-2664.

Sincerely,

-original signed by-

Sevn Bohnet
A/ Manager
Water Resources Division

Comment Table – ICRP WORKING GROUP #4

Received From – Indian and Northern Affairs Canada (INAC)

Tacking Number	ICRP SECTION	TOPIC	COMMENT
1	8.0	General	<p>In general there is a lack of detailed information. The chapters are basic summaries and often simply refer to references, which are not available or difficult to track down. A preferred solution is to provide more detail in the ICRP and make the references available (i.e. On CD).</p>
2	8.2	Figure 78 – Water Balance	<p>Using the numbers provided in Figure 78 there appears to be approximately 2.84 million m³ of water being removed from the LLCF into Leslie Lake.</p> <p>Using the number provided in Figure 78 the following calculations (approximations) were made:</p> <p>Inputs (Cells A, B, C) ----- 6.5 Mm3 Withdrawn for Processing Plant-- <u>5.14 Mm3</u> Surplus----- 1.36 Mm3</p> <p>Discharge to Leslie Lk----- 4.2 Mm3.</p> <p>Therefore there is an excess of approximately 2.84 Mm3 (4.2 – 1.36) of water being removed annually from the LLCF.</p> <ul style="list-style-type: none"> - Can you explain what this means to the water balance of the LLCF? - Is it due to volume of solids, or precipitation? - How is ice entrainment being considered in this schematic?
3	8.3	Table 84	<p>-The vast majority of the described effects are listed as being negligible or minor. Considering that some of these parameters are not well known and are still being researched, it would appear premature to claim that the effects will be negligible or minor. More information is required to make these claims</p> <p>-For LLCF water quality the contingency is water treatment during the reclamation</p>

			period. INAC-WRD requests more information be included in the ICRP regarding the type of Water Treatment System or methods which BHPB intends to use as a contingency if water treatment is determined to be required during the reclamation period.
4	8.4	Pit Lake Load Balance Models	BHP states at the start of this section that it is only a summary and a pit lake report will be forthcoming. Considering the importance of this document, can BHP confirm that the pit lake studies and the final report will be completed by December 31 st , 2008 or earlier?
5	8.4.2 and 8.4.3	Pit Lake WQ & Stability	INAC-WRD would like to thank BHPB for organizing the presentation on the issues surrounding pit lake water quality and stability, they were very informative and helpful. They did however highlight the complexity of these systems and the difficulty in modeling and prediction. This only emphasises the need to implement a pit lake study sooner rather than later so some of these variables can be answered before closure.
6	8.4.4	Source Lake Extraction Rates	INAC-WRD is concerned that average values are used to determine the drawdown of the source lakes and prediction of downstream effects. Table 19 (p-115) indicates that Ursula Lake will be used as a source lake for 14 years. Considering the extended time frame, there are certain to be years of low water. Therefore, a range of possible scenarios would be more appropriate. For example use a series of possibilities ranging from high to low flow years. You can then use these ranges to provide details describing at what flow or drawdown level mitigation (i.e. reduce or stop pumping) will be required.
7	8.6.1	Physical Configuration of LLCF	This section states that ‘A relatively small volume of Kimberlite will also have been discharged into Cell D during the final years of operations, creating a beach in the northwest corner of the cell’. This is a change of plans from restricting PK to Cells A, B, and C and possibly using the pits for the remainder. Furthermore considering that this will be deposited towards the end of mine life, the impact at closure will be greater. How will these potential impacts be mitigated?
8	8.6.2	Model Set up	The effect of subsurface porewater expulsion should be considered in the model.
9	9.2	Progressive Reclamation Planning	INAC-WRD-WRD is unclear how the BHP is planning for the closure of large mine components prior to 2020. The following statement is confusing, “Closure of large

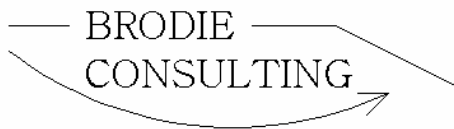
			<p>mine components scheduled for reclamation prior to 2020 will entail planning and plans, to a small degree of the main EKATI mine closure, from conceptual through to execution.” Can BHP explain their plan more clearly? BHP states that over the next 3 years, many of the mine components will be in the pre-feasibility stage of closure planning. What will be done for those mine components that are scheduled to be closed prior to 2011 (e.g. Phase 1 Pond, Panda/Koala/Beartooth WRSA, Beartooth pit, etc.)?</p>
10	Appendix F	General	<p>-The Research Objectives and Planned Research headings are not clearly connected to closure criteria or objectives. Considering that this is a Reclamation Research Summary Table, the research should be more clearly linked to closure criteria and/or objectives. -The research summaries are far too vague and do not provide enough information to determine if the work being done is adequate. In order to help resolve this problem, a greater level of detail is required in the research summaries and the reference material cited should be made available (i.e. On CD or website) -The research tables do not reference timelines or deadlines for the research. There are no timeframes for research results, so it is difficult to determine if they are aligned with the closure dates established in the mine plan.</p>
11	Appendix F Table 43	Land 1	<p>The vegetation section was informative, particularly the seed collection, storage and propagation program. What areas of the mine will be reclaimed using local seed sources. The use of local seed sources is encouraged and preferred over native cultivars. Will the references for this section be made available?</p>
12	Appendix F Table 43	Water 1	<p>Similar to comments made in tracking number 6, INAC-WRD is concerned that a reduction in outflow of 21.5% for Ursula Lake and 18.1% for Upper Exeter may result in downstream impacts. This is particularly true considering that the values are based on average precipitation values and do not consider impacts and mitigation of a low flow year.</p>
13	Appendix F Table 43	Water 2 and 3	<p>INAC-WRD is confused regarding the difference between “research on pit lake final elevations” and the “estimated final lake level elevations for pit lakes”. It seems that final pit lake elevations are available. Will BHP provide both the predicted levels for</p>

			pit lake with and without plugs?
14	Appendix F Table 43	Water 4	INAC-WRD stresses that these pit lake studies and the pending report is crucial to the review and assessment of BHP's Interim Closure and Reclamation Plan.
17	Appendix F Table 43	Wildlife 1	INAC-WRD supports DFO's position that fish barriers should be designed in such a way that they are easily removed if and when water quality criteria are met and DFO and others are satisfied the pits are safe for fish.
18	Appendix F Table 43	Wildlife 2	INAC-WRD has questions about the perimeter pit berms being proposed by BHP. Can BHP further explain the rationale for perimeter berms and expected design life of the berms? Are there any other options to restrict/mitigate wildlife accessing to the pits?
19	Appendix F Table 43	Operations 3	BHP has conducted some initial research on directing Processed Kimberlite (PK) into the pits to reduce the overall depth and pumping requirements. INAC-WRD notes that directing PK into the pits is not brought forward as an option in the ICRP but BHP will continue to research this as an option. When will this research begin and how long will it take? We note as per the mine plan as early as 2010 a pit will become available for closure?
20	Appendix F Table 43	Operations 4	BHP has indicated that research on engineered plugs in the UG mines is ongoing but has not been completed. When will the research be completed and what type of research other than feasibility will be conducted?
21	Appendix F Table 44	Water 1	<p>-INAC-WRD notes that the results from earlier research states that the Ion exchange mechanisms have been suggested as a possible cause. An SRK report confirmed that ion exchange is the likely cause of the low pH and elevated aluminum. Since the cause of the pH depression is understood, what mitigation measures are going to be implemented to stop the aluminum non-compliance of Seep-018B/019?</p> <p>-INAC-WRD has raised concerns about SEEP-018/019 for the past years as total aluminum is higher than discharge criteria. Is BHP conducting research as to why the toe berms are not working in this area? What options are being considered to deal with this seepage (i.e. containment, pumping to the LLCF, etc.)?</p> <p>-BHP indicates that increasing trends in underground inflow rates since 2003 with large temporary inflows of groundwater. Also, current trends indicate that the</p>

			<p>salinity of mine water from the UG workings will increase in the future. Has BHP done any hydrogeological modelling of groundwater inflows given these noted increases above? Have they made any predictions on how the groundwater may influence the WQ of the LLCF with time? What are the expected groundwater inflow rates once UG operations are near complete (i.e. maximum amount of inflow)?</p>
22	Appendix F Table 45	Land 2	<p>INAC-WRD is concerned that BHP does not have a % success rate component as part of the revegetation studies/research. This would be both useful and necessary if BHP wishes to use revegetation percentage as measurable closure criteria for the site.</p>
23	Appendix F Table 45	Wildlife 1	<p>Why isn't BHP utilizing both the recent and potential ongoing opportunities to monitor and research caribou use of the haul ramp, particularly as this is a proposed closure option for the Waste Rock Piles?</p>
24	Appendix F Table 46	Land 1	<p>- Research Completed b) states that field measurements including temperature and water samples at depth were initiated in 2001. When will the available information be provided as the need for this information was highlighted in the Section 3 working group meeting and BHP committed to provide this as soon as they could.</p> <p>-Research Completed c) refers to a doctoral thesis that was originally designed to study the LLCF, but was subsequently changed to study the effect of climate, snow cover, and vegetation on peatlands across the Slave Province. It is unclear how a peatland study is relevant to the closure of the LLCF given the very different substrate properties.</p> <p>-This topic was raised at the Section 3 working group meeting and BHP stated that work is currently being done on the LLCF by Carleton University (refer to Section 3 transcript pages 45 and 46). This is clearly not the case.</p> <p>- Research Reference iii) notes a Thesis Proposal – Permafrost Aggradation and Pore-water Expulsion in Saturated Fine Tailings. The associated description refers to the peatland studies being conducted across the Slave Province. It is clear that the description does not match the reference. This should be clarified.</p> <p>-BHP's response to Tracking Number 27 for Section 3 refers to Table 46 and how it will be updated. The most recent copy of Table 46 provides only a summary of the work conducted and does not provide any details. INAC-WRD was also asked to refer to report EKATI Diamond Mine Quality of Pore Water Extracted from Cell B. As we</p>

			have stated in the past (refer to Section 3 working group transcript page 31) this report refers only to porewater quality within the active layer and therefore does not address the question of sub-surface porewater quality.
25	Appendix F Table 46	Land 2	Is BHP continuing research on weathering processes on PK over time? Will they be investigating the potential concerns brought forward regarding vegetation growth, erosion, wind dispersion and downstream sediment loads in the long term? When will this research take place and what is its completion date?
26	Appendix F Table 46	Land 3	When will BHP be commencing research on rock placement on tailings as part of closure? How long will the research take? Will the research be completed prior to the Phase 1 Pond closure?
27	Appendix F Table 46	Land 4	When will BHP complete this research (pilot study) on revegetation of the LLCF? What is the expected duration of the pilot study? What is the alternative if the results of the pilot study are not favourable?
28	Appendix F Table 46	Land 5	-Again, when will BHP complete this research (pilot study) on revegetation of the LLCF? What is the expected duration of the pilot study? What is the alternative if the results of the pilot study are not favourable? -Results from completed research states that native grass cultivars can be successfully established in the mid-slope portion of the LLCF. The possibility of the cultivars escaping into the surrounding environment should be considered.
30	Appendix F Table 46	Land 6	When will research on grazing impacts on the LLCF take place? How long will they take place and when will the results be known? Is this expected to be part of the pilot study mentioned above? Wouldn't the contaminant uptake by the plants and the potential transfer of contaminants to the grazers be part of this study?
31	Appendix F Table 46	Water 1 and 2	What are the timelines established for the additional modeling of Water Quality and Extra Fine Processed Kimberlite in the LLCF?
32	Appendix F Table 46	Water 3	INAC-WRD is uncertain as to why the LLCF dyke weir locations are a research objective but there is not application of the results of the research? Is this only a monitoring requirement? If not, how will the weir locations be determined at closure?
33	Appendix F Table 46	Wildlife 1	When will BHP complete this research on revegetation of the LLCF? Will it be part of the planned pilot study? What is the expected duration of the pilot study? What is

			the alternative if the results of the pilot study are not favourable?
34	Appendix F Table 46	Wildlife 2	When will the results of RESCAN’s Risk Assessment on metals uptake by wildlife be completed? Are there any plans for additional research on this matter?
35	Appendix F Table 46	Wildlife 3	INAC-WRD supports DFO’s position that fish barriers should be designed in such a way that they are easily removed if and when water quality criteria are met and DFO and others are satisfied the pits are safe for fish.
36	Appendix F Table 46	Operations 1	Why hasn’t BHP conducted any research on the “Design internal drainage channels”? What is the associated timeline for this research? How will these internal channels effect pit lake stability and mixing? When does BHP expect the results of this research?
37	Appendix F Table 47	Water 1	When will BHP conduct the research on sediment materials characteristics and the water quality of the King Pond Settling Facility? When will the research be completed? Will this research be expedited if no further work is planned for the Misery site?
38	Appendix F Table 47	Wildlife 1	When will BHP conduct the over-wintering fish habitat research for the King Pond Settling Facility? Will this research be expedited if no further work is planned for the Misery site?
39	Appendix F Table 48	Operations 1	When will BHP conduct the research on demolition and encapsulation of material either in the WRSA, UG or Open Pits? INAC-WRD notes that most WRSAs are currently close to final elevations and that the effects of placing demolition material in the UG or in Open Pits on water quality are not known at this time. If this is to be truly considered as part of final closure the research, planning and scheduling of operations is extremely critical to the success of this option.



MEMORANDUM

DATE: March 5, 2008

TO: Nathen Richea, INAC Water Resources

FROM: John Brodie, P. Eng.

SUBJECT: Ekati Mine, ICRP Section 4

Section 4 of the review of the BHPB Ekati Mine ICRP is to address:

Section 7 Temporary Closure Measures
Section 8 Environmental Assessment
Section 9 Progressive Reclamation
Appendix F – Reclamation Research
Appendix G - Post Closure Monitoring

Part 7 – Temporary Closure Measures

The essence of the proposed temporary closure measures is maintain the site and to continue to comply with Water Licence criteria. This is acceptable. It is good to see that the company has committed to continuing any progressive reclamation that may be in progress at the time of any temporary shutdown.

Part 8 – Environmental Assessment

This part has not been reviewed as this is not my area of expertise.

Part 9 - Progressive Reclamation

Progressive reclamation at a number of areas is described. There is no indication that these areas have been inspected and approved by the INAC Inspector. Inspections, with sign-off or approval, should be done to allow the company to claim full credit for the work (public relations, corporate accountability, and possible reduction in reclamation security) and to correct any misunderstanding (between the company and the inspector) about what is acceptable standard of work.

All progressive reclamation needs to be tied to approved reclamation measures. As some of these are not approved (which is the reason for this review process), all progressive reclamation is more like reclamation research, pending approval of the measures.

Progressive reclamation which does not meet the ultimately approved performance targets may have to be modified or changed.

App. F Reclamation Research

BHPB's initiatives on reclamation research should be supported. Appendix F identifies many elements of the proposed reclamation work where improvements in cost or performance may be achieved.

In general, all reclamation research needs to be tied to approved reclamation measures and demonstration thereof.

Pages 208 to 225 of Appendix F of the ICRP present the research study plans for the mine components. Although many of these are really clarification and determination of engineering inputs, it is fine that they are included in the lists of information required to develop the best reclamation strategy.

A few comments on the Tables & Figures in Appendix F are as follow:

- Figure 20 – Underground Mines, research considerations may need to look at short-term flushing of hydrocarbons and explosive residue unless the pits are closed and flooded in a manner which largely precludes flushing to the environment.
- Figure 21 – Waste Rock Storage
 - Biological stability – access ramps and geometry of trafficable (by caribou) areas should consider the potential for predatory action by wolves (as there will be unnatural barriers which prevent escape).
 - There is no mention of revegetation. Table 45 clearly indicates BHPB's intent to revegetated tailings, yet there is no consideration of using PK as a substrate which could accelerate the natural revegetation of the waste rock piles.
- Table 45, access ramps on rock piles; it is noted that caribou use the existing haul roads for access onto the WRSA's. The heavy vehicle traffic crushes the rock surface and produces a smooth uniform surface. Construction of new access ramps by dozing down from the crest of the dump will not have the same surface quality in context of animals walking. BHPB should evaluate the extent and type of surfacing which may be required to meet reclamation objectives.
- Figure 22 – PKCF, This table does not address the physical stability of the very fine and low density PK which has infilled the pond areas of each cell.
- Table 46, PKCF;
 - This table suggests that upper zone of the beaches will be covered with a 1 m thick rock layer. This may be impractical to construct with run-of-mine waste rock and still meet reclamation objectives for land use that “will enable safe wildlife passage”
 - In the lessons learned portion of this table it is suggested that “The wetter, lower slope positions of the LLCF appears well suited to revegetation”.

What evidence is there to support this? The frost heaving in this area suggests that this is not the case.

- Table 47 Dam, Dikes Etc; Long-term physical stability of the Panda Diversion channel is not identified here.

App. G Post Closure Monitoring

Typically this is a modification of the operational monitoring, with the addition of performance monitoring of closure measures. Considering the pending approval of the ICRP and the outstanding reclamation research requirements, it is premature to comment on the details of the post-closure monitoring program.

In general, the proposed scope appears comprehensive. BHPB should commit to modifications in scope as details of the reclamation program are confirmed.

The schedule of post-closure monitoring should start at the completion and approval of reclamation activities.