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April 24, 2012

File: W2009L2-0001

Ms. Claudine Lee
BHP Billiton Ekati Diamond Mine
#1102, 4920-52nd Street
Yellowknife, NT X1A 3T1

Dear Ms. Lee,

Re: AEMP Fish Sampling Program

The Wek'èezhì Land and Water Board met on April 24, 2012 to consider BHP Billiton's *Proposed Work Plan for the Fish Component of the 2012 Aquatic Effects Monitoring Program*. The Board has approved the Plan; however, BHP must incorporate the revisions recommended by Board staff in the attached staff report. The revised Plan must be submitted for a conformity check by Board staff and fish sampling in 2012 and future years must be conducted in accordance with the revised Plan.

The Board also directs BHP to review the Review Comment Table attached to the staff report and to contact reviewers for further discussion where appropriate. If you have any questions, please feel free to contact Brett Wheler at brett@wlwb.ca or by phone at 867-765-4590.

Sincerely,

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

Violet Camsell-Blondin
Chair, WLWB

Copied: BHPB Distribution List



STAFF REPORT

Company: BHP Billiton Canada Inc. (BHP)	
Location: Ekati Mine (Lac de Gras)	License: W2009L2-0001
Date Prepared: Apr 17, 2012	Meeting Date: Apr 24, 2012
Subject: BHP's Proposed AEMP Fish Monitoring Program (for 2012 and future years)	

Purpose/Report Summary

The purpose of this staff report is to present to the Board BHP's submission of the Proposed Fish Monitoring Program. This proposal is part of the overall Aquatic Effects Monitoring Program (AEMP) required by Part J, Item 1 of Water Licence W2009L2-0001.

Background

During the 2009 AEMP Re-Evaluation, BHP committed to submit a proposed 2012 AEMP fish sampling program. The Board instructed BHP to submit this proposal no later than December 2011 to ensure that it could be reviewed and approved prior to the 2012 fish sampling event. The main purpose of the proposed fish sampling program was to address the issue of sampling mortality of round whitefish and lake trout. BHP has submitted a plan that is intended to reduce sampling mortality of these large-bodied fish while maintaining continuity of the fish-sampling data collected to date.

The Proposed AEMP Fish Monitoring Program was submitted January 3, 2012 and distributed for review on February 29, 2012; the review deadline was February 29, 2012 and the proponent response deadline was March 19, 2012.

Discussion

BHP has proposed several important changes to the AEMP Fish Monitoring Program to be conducted in 2012 and future years. These changes are listed below and reviewers' comments, BHP's responses, and Board staff recommendations are discussed.

- 1. Sampling and analysis of slimy sculpin every three years as a “sentinel species” (meaning that changes in the health of slimy sculpin will be used as a indicator of changes in the health of other species of fish).** BHP originally proposed to sample slimy sculpin in only a few of the AEMP lakes, but, in response to reviewer comments, the company has agreed to sample sculpin in all AEMP lakes (e.g. EC comment ID 1, DFO 2, IEMA 3). *Board staff agrees and recommends that slimy sculpin should be sampled in all AEMP lakes.*
- 2. Non-lethal sampling of lake trout muscle tissue rather than lethal sampling.** BHP expects that some incidental trout mortality will occur (e.g. trout may be caught in nets when fishing for whitefish). BHP proposes to analyze incidental trout mortalities for only a few of the AEMP parameters, not including stomach contents, egg counts, and liver metals. DFO (ID 3) and IEMA (ID 5) recommend that these fish be analyzed for all AEMP parameters. Board staff understand BHP’s rationale that the small number of trout sacrificed in each lake may limit the statistical robustness of analysis results; however some trout mortality is likely unavoidable, and data from these fish could provide an indication of whether further studies are warranted. *If there is incidental mortality of lake trout, then Board staff recommends that these fish be analyzed for all AEMP parameters.*
- 3. Decreased sampling frequency of lake trout and whitefish - to once every 6 years instead of once every five years - in order to reduce sampling mortality and to link with the sampling schedule for slimy sculpin (every three years).** IEMA (ID 4) and EC (ID 3) recommend that reducing the sampling frequency for trout and whitefish should only be considered “if there are no issues or trends from the 2012 trout, whitefish and sculpin and 2015 sculpin monitoring results.” DFO staff did not raise any concerns with sampling every 6 years, neither in the Comment Table nor when contacted by Board staff. In the opinion of Board staff, the benefits of sampling every 6 years (reduced sampling mortality of large fish and synchronizing the sampling schedules of large fish and slimy sculpin) can be achieved with minimal risk since slimy sculpin data collected every three years could be used to trigger specific studies on large-bodied fish - these studies do not need to wait until the regular 5 or 6 year sampling: they could be initiated at any time. *Board staff recommends that BHP's proposed plan to sample lake trout and round whitefish every 6 years be approved by the Board.*
- 4. An investigation into the spatial extent of hydrocarbons in Ekati area lakes.** The hydrocarbon investigation will focus on slimy sculpin and whitefish, but, in response to reviewer comments, BHP has agreed to perform PAH (hydrocarbon) analyses on incidental trout mortalities (EC comment ID 2, DFO ID 5, IEMA ID 3). *If there is incidental mortality of lake trout, then Board staff recommends that those fish be included in PAH (hydrocarbon) analyses.*

Conclusion

The changes to fish monitoring at Ekati that are presented in BHP’s Proposed Fish Monitoring Program appear to be reasonable and have sound rationale.

Recommendations

Board staff make the following recommendations:

1. The Board approve BHP's Fish Monitoring Program (for 2012 and future years).
2. The Board direct BHP to update the 2012 Work Plan to incorporate the revisions recommended in this staff report and the attached Review Comment Table. The updated Work Plan should be submitted by May 30, 2012 for a conformity check by Board staff.

Respectfully submitted,



Brett Wheler
Regulatory Specialist



Ryan Fequet
Regulatory Specialist

Attachments:

- Review Comment Table
- Proposed AEMP Fish Monitoring Program (Executive Summary and Work Plan printed; full report available on CD and through this [Online Registry link](#))

Review Comment Table

W2009L2-0001 - BHP - Aquatic Effects Monitoring Program - Proposed 2012 Fish Sampling Program (WLWB)

Proponent:	BHP Billiton Canada Inc.
File(s):	W2009L2-0001
Document(s):	W2009L2-0001 - BHP - AEMP - Proposed 2012 Fish Sampling Program (2.2MB)
Reviewer Comments Due By:	Feb 29, 2012
Proponent Responses Due By:	Mar 19, 2012
Distribution List:	Jan 13 at 17:05 .
Contact Information:	Brett Wheler 867-765-4590 Ryan Fequet 867-765-4589

Comment Summary

Environment Canada: Lisa Lowman				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response
4	General File	Comment: (Submitted after Due Date) EC Cover Letter		
1	Sentinel species sampling	Comment: (Submitted after Due Date) BHPB proposes to sample slimy sculpin for 2 reference lakes (i.e. Nanuq and Counts) and only three of the potentially impacted lakes (i.e. Leslie, Moose, and Cujo) Recommendation: EC supports both DFO & IEMA recommendations related to increased sampling efforts for slimy sculpin. EC recommends that sampling occur at all AEMP	Mar 19: BHP Billiton accepts and agrees with the recommendation that slimy sculpin should be sampled in all AEMP lakes in 2012 with parameters outlined in Table 6.2-1 of the proposed plan, this will include EROD analysis for PAHs. A clarification to the proposed plan is that if the results of the EROD analyses indicate the potential for increased exposure to PCBs and	Apr 18: Proponent response is acceptable. Board staff recommends that slimy sculpin should be sampled in all AEMP lakes rather than only a subset of lakes. Sampling of slimy sculpin is to take place every three years, as outlined in section 6.2.

		lakes for hydrocarbon, PCB, dioxin, and metal contaminant monitoring every 3 years to better understand spatial distribution and concentration levels in the Ekati area.	dioxins in fish from the potentially affected lakes compared to the reference lakes, then additional analyses on up to 3 round whitefish lake trout or slimy sculpin samples per lake with fish showing EROD activity will be conducted for PCBs and dioxins at that time. If the samples show no EROD activity then analysis of PCBs and dioxins may not be required.	Board staff appreciates the clarification provided by BHP regarding PCB and dioxin analyses and the methodology appears to be acceptable.
2	Maximizing the use of accidental fish mortality	<p>Comment: (Submitted after Due Date) As indicated in the proposed work plan, livers of round whitefish and slimy sculpin will be analyzed for the presence of hydrocarbons, PCBs and dioxins. However, while gill netting for round whitefish, there is the potential for incidental mortality of lake trout.</p> <p>Recommendation: EC supports DFO's recommendation that any lake trout mortality should be included in the analysis of hydrocarbons, PCBs and dioxins.</p>	<p>Mar 19: BHP Billiton accepts the recommendation that lake trout mortalities (up to a maximum of 5 individuals per lake) will be included in the PAH analyses. The PAH analyses are considered to be part of the palatability assessment, for which lake trout is a key species. PCB and dioxin analyses may be incorporated if necessary, as described in BHP Billiton's response to EC comment #1.</p>	<p>Apr 18: Proponent response is acceptable. If there is incidental mortality of lake trout, then Board staff recommends that those fish be included in PAH (hydrocarbon) analyses.</p>
3	Sampling Frequency for Whitefish and Lake Trout	<p>Comment: (Submitted after Due Date) BHPB has recommended that the sampling frequency for whitefish and lake trout be reduced from every five years to every six years to reduce fish mortalities and population effects on sampled lakes.</p> <p>Recommendation: EC supports IEMA's recommendation that states, "The onus should be on BHPB to make a case for reducing sampling frequency of lake trout and whitefish in 2015 after the second round of sculpin sampling and</p>	<p>Mar 19: BHP Billiton's recommendation is that sampling of lake trout and round whitefish occurs every 6 years rather than every 5 years to further reduce sampling mortality of large bodied fish and to align with the sampling of slimy sculpin. Slimy sculpin data collected every 3 years will serve to provide data during years when lake trout and round whitefish are not sampled and may aid in focusing future sampling efforts for large bodied fish</p>	<p>Apr 18: Proponent response is acceptable. In the opinion of Board staff, the benefits of sampling every 6 years (reduced sampling mortality of large fish and synchronizing the sampling schedules of large fish and slimy sculpin) can be achieved with minimal risk since slimy sculpin data</p>

		analysis. If there are no issues or trends from the 2012 trout, whitefish and sculpin and 2015 sculpin monitoring results, then the next round of whitefish and lake trout monitoring could possibly be pushed back from 2017 to 2018".	species. If the sentinel slimy sculpin data show that there is a need for specialized studies on large bodied fish prior to 2018, these studies can be focused on the specific concern(s) needing attention. Should the sentinel data not identify any concerns, sampling of large bodied fish in AEMP lakes would not occur until 2018, as per the proposed plan.	collected every three years could be used to trigger specific studies on large-bodied fish - these studies could be initiated at any time. Board staff recommends that BHP's proposed plan to sample lake trout and round whitefish every 6 years be approved by the Board.
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Fisheries and Oceans Canada: Bruce Hanna

ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response
1	General File	Comment: DFO Cover Letter		
2	Slimy sculpin as a sentinel species	<p>Comment: BHPB proposes to sample sculpin only in a subset of lakes including two reference lakes and three potentially impacted lakes. They will be assessed for all biological factors, metal analyses and PAH's</p> <p>Recommendation: Due to the importance of slimy sculpin as a sentinel species, sampling should occur in all lakes to establish a comprehensive baseline. The extra effort required could be offset by not sampling large bodied fish with the exception of hydrocarbon and palatability testing. The need for monitoring large bodied fish could be reassessed based on results from slimy sculpin.</p>	Mar 19: Please see our response to EC #1 and #3	Apr 18: Board staff recommends that slimy sculpin should be sampled in all AEMP lakes rather than only a subset of lakes.
3	Maximizing the use of sacrificed fish	Comment: Large bodied fish mortality will occur through the palatability study and hydrocarbon sampling. While the fish may be	Mar 19: Round whitefish will be sacrificed and sampled for all AEMP parameters. Lake trout will not be	Apr 18: Whitefish: Proponent response is acceptable - whitefish will

		<p>linked to a specific study, there is an opportunity to do further testing to make as much use of the fish as possible.</p> <p>Recommendation: All large bodied fish that are sacrificed for the palatability study and EROD analyses should be used to collect as much information as possible (e.g. metals analysis, stomach contents). Data collected from these fish could act as a trigger for further action under the adaptive management plan.</p>	<p>intentionally sacrificed, but palatability data will be collected from incidental mortalities (up to 5 per lake). This includes liver and gonad weights, DELT analysis, PAH analysis and analysis of chlorinated phenols. PCB and dioxin analyses may be incorporated if necessary, as described in BHP Billiton's response to EC comment #1. While BHP Billiton agrees that the data captured from sacrificed fish should be maximized, we propose that samples for the analyses of other parameters (i.e. stomach contents, egg counts and liver metals) should not be collected from lake trout because the limited number of data points collected per lake (i.e. minimum of zero and maximum of five) are not anticipated to prove useful in the determination of mine effects.</p>	<p>be analyzed for all AEMP parameters. Trout: Board staff understand the small number of trout sacrificed in each lake may limit the statistical robustness of analysis results; however some trout mortality is likely unavoidable, and data from these fish could provide an indication of whether further studies are warranted. If there is incidental mortality of lake trout, then Board staff recommend that these fish be analyzed for all AEMP parameters. Given that 2012 will be the first year of the revised fish sampling program, the level of analyses conducted on incidental trout mortalities is open for discussion in future years.</p>
4	DELT assessment	<p>Comment: BHPB will once again use the DELT assessment for fish caught during the palatability study with input from community members regarding fish condition. Photographs will be taken and referenced for each fish.</p> <p>Recommendation: In the palatability study report it would be useful to have the photos for each fish assessed by community members to show what is meant by their assessment of good</p>	<p>Mar 19: BHP Billiton will request comments on fish health from community members participating in the field sampling of large bodied fish including lake trout and round whitefish. These comments will be used in conjunction with the photographic records and support the assessment of fish health and the DELT program. For slimy sculpin, a formal DELT program</p>	<p>Apr 18: Proponent response is acceptable with regard to community members' comments on fish health: comments will be requested by BHP and will be used in conjunction with photographic records for the assessment of fish health and the DELT</p>

		or bad condition. DELT could also be used for assessing slimy sculpin (e.g. for comparison between sculpin infected with the tapeworm <i>Ligula intestinalis</i> and those not infected).	and photographic record will not necessarily be kept of each fish, however any parasites and/or other abnormalities in these fish will be noted and/or photographed. BHP Billiton has incorporated the DELT program into the AEMP sampling program for large bodied fish as part of the fish palatability study involving TK, as such, slimy sculpin will not be a focus species for this review given that they are not considered an important food species for humans. Where possible, community participation will be incorporated into slimy sculpin sampling and/or fish processing, however, the focus of their involvement will be on the assessment of large bodied fish, including round whitefish and lake trout.	program. Proponent response is acceptable with regard to DELT for slimy sculpin: parasites and abnormalities will be noted and photographed, but the DELT program will continue to be part of the fish palatability study and will thus be focussed on large-bodied fish.
5	Polycyclic Aromatic Hydrocarbons (PAHs)	<p>Comment: Livers of round whitefish and slimy sculpin will be analyzed for the presence of hydrocarbons, PCBs and dioxins. While gill netting for round whitefish, there is the potential for incidental mortality of lake trout.</p> <p>Recommendation: Any lake trout mortality should be included in the analysis.</p>	<p>Mar 19: Please see our response to EC #2</p>	<p>Apr 18: Proponent response is acceptable. If there is incidental mortality of lake trout, then Board staff recommend that those fish be included in PAH (hydrocarbon) analyses.</p>
GNWT - Environment and Natural Resources: Patrick Clancy				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response
1	General Comment	<p>Comment: No Comment</p> <p>Recommendation: No Recommendations</p>		
Independent Environmental Monitoring Agency: Kevin O'Reilly				

ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Staff Response
1	General File	Comment: Letter on 2012 Fish Sampling Proposal		
2	Sculpin Monitoring Locations (Table 6.2.1 and s. 6.3.1 pg. 6-1)	<p>Comment: The table states that two reference lakes and four impacted lakes (including Moose, Leslie and Cujo) will be sampled while the text says two reference lakes and three impacted lakes (Leslie, Moose and Cujo).</p> <p>Recommendation: BHPB should clarify if there will be a fourth impacted lake sampled for sculpin.</p>	Mar 19: There was an error in Table 6.2-1 and BHP Billiton's initial intention was to sample 3 potentially impacted lakes immediately downstream of the LLCF (Leslie and Moose) and KPSF (Cujo), however, based on consideration of reviewer comments, the plan will be modified to include slimy sculpin sampling in all 9 AEMP fish lakes.	Apr 18: Proponent response is acceptable. Board staff recommends that slimy sculpin should be sampled in all AEMP lakes rather than only a subset of lakes.
3	Monitoring Locations for Contaminant Sampling (s. 5.5 pg. 5-3; Table 6.2.1 ; s. 6.3.1 pg. 6-1 and s. 6.3.4 pg 6-6)	Comment: BHPB states that one of the reasons for doing the EROD analyses is to help establish a gradient or understanding of the spatial distribution of possible hydrocarbon exposure and that "all AEMP lakes, in addition to Cell E, be sampled in 2012" (pg. 5-3). Whitefish and sculpins are to be sampled for PCBs and dioxins only as it relates to EROD, with sculpins only sampled in 3 impacted lakes not including Kodiak. But now that an Environment Canada study has shown elevated levels of dioxins and furans in the sediment of Kodiak Lake likely from the nearby incinerator, at a minimum BHPB should sample both sculpin and whitefish in Kodiak Lake for PCBs and dioxins. Also, BHPB does not propose any liver analysis for Lake Trout, even though livers are to be weighed for up to 5 incidental mortalities per lake.	Mar 19: Please see our response to EC #1	Apr 18: Proponent response is acceptable. Board staff recommends that slimy sculpin should be sampled in all AEMP lakes rather than only a subset of lakes. If there is incidental mortality of lake trout, then Board staff recommend that those fish be included in PAH (hydrocarbon) analyses.

		<p>Recommendation: All incidental mortalities for Lake Trout should be EROD analyzed. Sculpin in all AEMP lakes should be analyzed for PCBs and dioxins, to establish a better spatial distribution of potential incinerator emission exposure. If there is no conclusive spatial distribution, this part of the program could be scaled back in the future.</p>		
4	<p>Sampling Frequency for Whitefish and Lake Trout (3.4 pg. 3-5; 4.4 pg. 4-11 and Table 6.2.1)</p>	<p>Comment: BHPB has recommended that the sampling frequency for whitefish and lake trout be reduced from every five years to every six years to reduce fish mortalities and population effects on sampled lakes. While the Agency supports the latter two objectives, this needs to be balanced against the need for further monitoring information, and more specifically, the results from sculpin sampling in 2012 and 2015 and the whitefish and lake trout sampling in 2012.</p> <p>Recommendation: The onus should be on BHPB to make a case for reducing sampling frequency of lake trout and whitefish in 2015 after the second round of sculpin sampling and analysis. If there are no issues or trends from the 2012 trout, whitefish and sculpin and 2015 sculpin monitoring results, then the next round of whitefish and lake trout monitoring could possibly be pushed back from 2017 to 2018.</p>	<p>Mar 19: Please see our response to EC #3</p>	<p>Apr 18: Proponent response is acceptable. In the opinion of Board staff, the benefits of sampling every 6 years (reduced sampling mortality of large fish and synchronizing the sampling schedules of large fish and slimy sculpin) can be achieved with minimal risk since slimy sculpin data collected every three years could be used to trigger specific studies on large-bodied fish - these studies could be initiated at any time. Board staff recommends that BHP's proposed plan to sample lake trout and round whitefish every 6 years be approved by the Board.</p>
5	<p>Lake Trout Sampling (pg. 6-4 & 6-5 and</p>	<p>Comment: BHPB is proposing to limit the data collected from Lake Trout incidentally killed — up to 5 mortalities per lake — (no egg counts,</p>	<p>Mar 19: Please see our response to DFO #3</p>	<p>Apr 18: Whitefish: Proponent response is acceptable - whitefish will</p>

	Table 6.2.1)	<p>liver and gonad weights, sex or maturity, and no stomach contents). BHPB should maximize the data collected from these fish. The report also says that incidentally killed trout would be sampled for metals in muscle but not in livers. We understand the point of this is to determine a correlation between dermal punch samples' metal concentrations with full muscle tissue concentrations (corrected for the effects of moisture loss from tissue plugs vs full tissue samples). If metals will be analyzed from those trout anyway, it seems reasonable to expect metal analyses in livers as well as muscle. It would also be helpful to have an understanding of trout food sources (stomach analysis) if there are any contaminant trends noted in these fish.</p> <p>Recommendation: BHPB should provide a rationale as to why all incidental Lake Trout mortalities will not be sampled for egg counts (only if enough gravid females die to make this worthwhile), liver and gonad weights, sex and maturity, stomach contents and especially liver metals.</p>		<p>be analyzed for all AEMP parameters. Trout: Board staff understand the small number of trout sacrificed in each lake may limit the statistical robustness of analysis results; however some trout mortality is likely unavoidable, and data from these fish could provide an indication of whether further studies are warranted. If there is incidental mortality of lake trout, then Board staff recommend that these fish be analyzed for all AEMP parameters. Given that 2012 will be the first year of the revised fish sampling program, the level of analyses conducted on incidental trout mortalities is open for discussion in future years.</p>
6	Lake Trout Sampling (Table 6.2.1)	<p>Comment: BHPB proposes that there be no hydrocarbon analysis and no PCB or dioxin analysis of Lake Trout. If there are incidental mortalities of Lake Trout, all of those fish should be sampled for these contaminants, especially to help establish whether there is a gradient and to establish a proper baseline.</p> <p>Recommendation: BHPB should provide a rationale as to why Lake Trout incidental</p>	<p>Mar 19: Lake trout will not be intentionally sacrificed in an effort to reduce sampling effects on the population, however palatability data (including PAHs) will be collected from incidental mortalities (up to 5 individuals per lake). PCB and dioxin analyses may be incorporated if necessary, as described in BHP Billiton's response to EC comment #1.</p>	<p>Apr 18: Proponent response is acceptable (see response to EC comment #2). If there is incidental mortality of lake trout, then Board staff recommend that those fish be included in PAH (hydrocarbon) analyses.</p>

		mortalities need not be sampled to establish a spatial distribution for exposure to hydrocarbons and incinerator emissions.	Depending on the number of incidental mortalities occurring, definition of a spatial distribution of exposure to PAHs, PCBs and dioxins may not be possible for lake trout however the reduction of mortalities has been deemed preferable, additionally, data collected from round whitefish and slimy sculpin will be available to suit this purpose.	
7	DELT for Lake Trout and Use of TK (Table 6.2-1)	<p>Comment: It is not clear from the Table or text whether BHPB intends to continue DELT analysis of Lake Trout that inadvertently die in nets or from handling. The Agency supports the continued DELT analysis of Lake Trout. DELT analysis should also be developed and applied to sculpins. The proposed analysis of parasite loads suggest this will be done. The Agency understands that BHPB intends to involve Aboriginal community representatives in the 2012 fish sampling program.</p> <p>Recommendation: BHPB should continue to conduct DELT analysis of Lake Trout . DELT analysis for sculpin should be developed and applied if community participants have TK on this species. Any concerns, issues and Traditional Knowledge insights arising from Aboriginal community involvement in the fish sampling program should be documented along with BHPB's comments and responses, including any changes to the program and/or analysis.</p>	<p>Mar 19: BHP Billiton agrees that DELT analyses should be performed on lake trout. This was an unintentional omission from Table 6.2-1 of the proposed plan. For a response on how slimy sculpin will be incorporated into the DELT assessment please see our response to DFO #4. BHP Billiton will continue to consider any community concerns or ideas when developing the AEMP program.</p>	<p>Apr 18: Proponent response is acceptable with regard to DELT analysis on lake trout. Proponent response is acceptable with regard to DELT for slimy sculpin: parasites and abnormalities will be noted and photographed, but the DELT program will continue to be part of the fish palatability study and will thus be focussed on large-bodied fish.</p>
8	Other	<p>Comment: In recent DFO studies in an</p>	<p>Mar 19: Given the limited source of</p>	<p>Apr 18: Board staff</p>

<p>Potential Contaminants of Concern</p>	<p>oligotrophic experimental lake, synthetic estrogen introduced into the lake for only 3 years resulted in a population crash of a forage species (fathead minnow) due to lack of recruitment thought to be caused by impairment of gonad development. At EKATI, it would be helpful to know if pharmaceuticals ingested by workers there are making their way from the sewage outflow in LLCF, through the filter dikes in LLCF and into Cell E and beyond. As this was not identified as a concern during the EA process, the Agency is not aware of any tests that have been conducted on possible endocrine-disrupting compounds (EDCs) in Ekati sewage. Given the size of the camp (larger than most communities in the NWT) and length of occupation (more than 10 years) there is some potential for these compounds to be in the LLCF and possibly farther downstream in the watershed.</p> <p>Recommendation: BHPB should consider analyzing fish for EDCs and/or an initial survey of water within the LLCF for these compounds.</p>	<p>these compounds at EKATI and rapid degradation time of EDCs in the environment (Campbell et al. 2006 and references therein) as well as the long residence time of LLCF waters, BHP Billiton does not believe EDCs to be of concern for the receiving environment at EKATI. Campbell, C.G, S.E. Borglin, F.B. Green, A. Grayson, E. Wozei, W.T. Stringfellow. 2006. Biologically directed environmental monitoring, fate, and transport of estrogenic endocrine disrupting compounds in water: A review. Chemosphere 65: 1265-1280</p>	<p>encourages BHP, IEMA, and DFO to discuss this concern and then provide a brief update to the Board.</p>
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