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KIA's Review of the June 2012 Boston Camp Revised Interim Closure Plan.

KIA has reviewed the June 2012 Boston Camp Revised Interim Closure Plan for Hope Bay Mining Ltd. There are thirteen issues for consideration in response to this report with supporting observations, comments, and recommendations for further actions on the part of HBML. These issues are presented as follows:

Issue #1

Closure Objective Requires Clarification

As noted previously in KIA's comments on Windy Camp and Patch Lake Facility closure plan, the overall closure objective (goal) has been changed to be "to establish chemically and physical stability to protect human health and the environment." This appears to be a loosening of standards since the previous version of the closure plan had an overall objective (goal) of ensuring no adverse impacts to birds, aquatic, terrestrial and human life.

The current goals does not necessarily commit to no adverse impact but only a mitigation of impacts. The 2012 goal should be clarified to include no adverse impacts. The comments and recommendations made for Issue #3a on Goals, objectives and measures for Windy Camp and Patch Lake Facility Closure plan is applicable to the Boston Closure plan as well.

Recommendation

Hope Bay Mining Ltd. (HBML) clarifies the overall objective (goal) with respect to no adverse effects to human or ecological receptors.

Issue #2

Decommissioning of Camp Structures and Ancillary Facilities

The site facilities to be decommissioned are those associated with Chemicals of Potential Concern (COPC) beyond Petroleum Hydrocarbons (PHC) addressed in the 2012 Interim Closure Plan. IT is unclear how non-PHC COPC has been addressed in the current plan. Solvents, coolants, lubricant oils, metals, dioxins and furans might be associated with some of the listed facilities and activities and needs to be addressed.

Recommendation

A Conceptual Site Model (CSM) should be presented that identifies the assessment status of all COPC relevant to site activities. This should include not only the PHC currently



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identified in the 2012 Interim Closure Plan, but also COPC typical of identified site activities and materials used on site.

Issue #3

Airstrip Decommissioning

The closure plan state in one part that the airstrip will be decommissioned yet in another part it states the airstrip will be left in place. Clarity is required regarding the details of any airstrip decommissioning so KIA may review this in consideration of its own long-term plans for the area surrounding the site.

Recommendations

HBML should clarify the extent of airstrip decommissioning. The closure plan should be internally reconciled with regard to the final status of the site and eliminate contradictions on the final status of facilities and materials.

Issue #4

Drill Core Storage

On page 4 of the plan it states “Drill core will be consolidated on the Boston Camp pad. Drill core boxes will be placed on pallets and strapped inventoried and labeled. This area is outside of the 31 m-wide fish habitat buffer zone from the shoreline of Aimaokatolok Lake.”

It is unclear if the drill core storage method is sufficient to prevent acid generation and metal leaching should this occur. Also drill cuttings were identified for use in backfilling depressions. It is not known if these drill cuttings have been tested for acid generation and metal leaching potential. The approach to drill cuttings appears to contradict the statement in Part 1.8 of the Table of Concordance that “all facilities and materials will be removed.”

Also, pallets containing drill cores are known to attract nesting birds such as the common redpoll, which constructs nests within the pallets. To avoid contravention of Federal Migratory Bird Convention Act and Territorial Wildlife Acts, pallets should be surveyed for nests prior to movement. If nests are found, pallets should be left in place until young have fledged then moved. Alternately pallets could be moved outside the bird nesting period, after August and before May, to avoid potential conflicts.

Recommendations

All rock materials derived from exploration or mining activities should be tested for acid generation and metals leaching potential. If the drill cuttings are confirmed to be PAG rock, the material should be removed from site.



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Drill core pallets should be monitored for nesting birds and pallets moved only when nests are not present or when young are not present in nests.

Issue #5

Decommissioning and Demolition of Containment Structures

The closure plan does not clearly indicate if liners were installed in all containment berms. This needs to be confirmed. If a containment area does not have a liner, an assessment of the containment soils needs to be done with increased testing beneath liners than as identified in the plan. Also the closure plan does not clearly identify whether fuelling areas were assessed. Only the fuel storage and containment areas were identified.

It is not clearly stated that all pond sediment exceeding acceptance criteria will be shipped to a licensed disposal facility and that material to be covered in place only consists of material meeting the remediation criteria. As noted previously, the remediation criteria have not defined all COPC.

The use of industrial land use criteria is no longer justified since the camp is closed in care and maintenance for an indefinite period of time. Wild land use criteria are more appropriate for post closure land use. Remediation work should be in accordance with wild land use supported by confirmatory testing of soils beneath the land farm liner using wild land criteria.

Recommendations

Extensive soil testing should be done of berm soils using wild land criteria for all COPC. Material exceeding, wild land criteria should be removed from site for disposal at a licensed facility.

Issue # 6

Decommissioning of Mine Workings

The 2007 Closure and Reclamation Plan stated that all equipment and hazardous materials had been cleared from the underground exploration decline 5 years previously in 2002. The workings were subsequently flooded with the decline frozen solid. This indicates the underground space is now stabilized by an ice plug.

The 2012 plan calls for a 15 m thick rock fill plug in the portal area and backfilling the portal opening with waste rock. The surface waste rock is to be contoured to prevent surface water ponding. The 2012 plan does not provide any details or drawings on how the portal area will be filled with the 15m thick rock fill plug in respect to the ice plug. The rock fill plug should be designed to stabilize the rock cover over the portal area within the seasonal active zone, where the ice plug would not be effective.



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The ventilation raise is capped with reinforced concrete with a gas vent in accordance with mining regulations. The wooden head frame and ventilation fan will be removed and disposed of as non-hazardous waste.

There is a concern regarding the geochemical nature of the waste rock that will be used for backfill. There is no mention of any waste rock stockpiles on site. The only documented stock piles are windrows of ore that have been placed on the rock fill pad which underlines the camp. The general fill used for pads and berms is low grade ore which contains visible sulphides and would have initial indications of some acid generation potential.

Recommendations

HBML should provide additional drawings of the underground workings, showing the extent of development and the areas now sealed by the ice plug. Details should be provided on the extent and grading of the rock fill plug proposed for the portal area.

HBML should provide further details on the material they propose to use for backfilling the portal.

The material should be geochemically stable and not result in the development of acidic drainage or leaching of metals into the environment.

Issue #7

Ore Stockpile Closure

It is not known whether the stockpiled ore has been tested for acid generation potential. Such testing is required for design of the long term disposal. Also, the level of detail provided for the configuration of the ore piles is not sufficient to determine if the approach is acceptable. It is not clear whether the geometry will be appropriate to prevent moisture infiltration, or whether the piles will be configured for long term land form stability. If an acceptable encapsulation design is developed, consideration should be given to relocating any other materials requiring on site disposal to these piles.

Recommendations

Acid generation and metals leaching potential should be addressed for all rock materials derived from exploration or mining activities.

Detail design of long-term ore stockpile disposal should be based on the acid generating potential of the stockpile along with monitoring of seepage.



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Issue #8

Decommission of Camp Rock Fill Pad

It is indicated in the closure plan that the rock fill pad material is non-acid generating and has significant acid neutralization potential. Should such assessment results be available for other materials discussed in the closure plan, this should be presented more clearly. As discussed previously, anything which promotes positive drainage and prevents ponding should also consider prevention of erosion from the runoff patterns created.

Recommendations

Details of acid neutralization potential should be available for other materials discussed in the closure plan.

Issue #9

Collection and Disposal of Waste

"Burnable waste" is not clearly defined in the closure plan. This material should be assessed to confirm that the burning activity will not release incomplete combustion by-products that can impact the environment such as dioxins and furans. Also the incinerator ashes will be managed according to existing management plans, but the plans that are referenced is not clear.

Recommendations

Clarity should be provided on which existing waste management plans are to be followed in handling incinerator ashes.

Issue #10

Remediation of Hydrocarbon Impacted Soils

The phase 3 Environmental Site Assessment (ESA) will assess chemistry results against industrial land use criteria. The applicability of these assessment criteria to closure planning at the site is no longer justified since Hope Bay has been placed into care and maintenance. Given that the site is not in operation for an indefinite period of time, wild land criteria is a more appropriate criteria for ESA assessment.

In situ bioremediation is cited as a remedial approach for some PHC impacted soils on the site. It is not known if the climate and other site conditions are conducive to this approach. Therefore contingency plans should be conceptually identified in the event the remediation process is not observed in follow-up monitoring of the site.



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The plan also states that “the option to encapsulate impacted soils in place is also preserved should it be demonstrated that hydrocarbon risk is minimal and/or other remediation methods are ineffective or inappropriate for a given area.” Any plans regarding encapsulation or any assessment of other methods should have KIA’s input.

Recommendations

HBML should use wild land criteria for phase 3 ESA for assessment of COPC impacts to the environment.

HBML should develop contingency plans in the event the remediation process is not observed in follow-up monitoring of the site.

KIA should have input on the decision of what type of remediation approach is used on the site.

Issue #11

Drill Site Reclamation

An inventory of drill holes to assess the extent of remediation work required has been referenced in the plan but insufficient information is provided to determine if the proposed reclamation method is adequate.

The initial statement that “steel casing will not be backfilled” indicates that actions beyond simply capping drill hole casings are not being considered. This creates a potential risk of future cross contamination of aquifers or geological units through the drill holes. The casings should be back filled with grout, cut flush with the ground and capped.

Recommendations

Drill hole casings should be filled with grout, cut flush to the ground and capped to prevent cross contamination of aquifers and geological units.

Issue #12

Re-vegetation of Tundra

The re-vegetation plan is vague and provides little information in terms of objectives, timelines, and ways in which monitoring is to be conducted to ensure objectives and timelines are met.

The plan states that salt affected areas of soil will be re-vegetated with salt tolerant species. However, no information is provided to identify the areas that will be monitored for the attenuation of salt impact. Also, no information is provided on whether the proposed re-vegetation species are appropriate for the area or how that determination will be made.



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While re-establishment of native vegetation in the Arctic environment without native stock is difficult, this does not prevent the establishment of clear goals for re-vegetation in ecological functions such as protection against erosion, maintenance of natural hydrology, surface and soil detoxification, and wildlife habitat. These objectives may vary between sites based on differing site-specific needs. However, stating ecological goals requires that monitoring can be designed such that it can determine the success of the plan, and that the plan can be adaptively modified if need be in order to reach the goals.

Recommendations

HBML should establish clear objectives, timelines, and monitoring approaches to re-vegetation of tundra with particular attention to areas affected by salt.

Risk-based assessment should be done for remediation goals and objectives to provide justification for the remediation approach, timelines, and post-closure monitoring.

HBML should clarify the type of native Arctic plant species that are salt tolerant by providing more details on them.

Issue #13

Cost Estimating

The 2012 Interim Closure Plan does not contain details on the implementation plan remedial and closure measures. It was not possible from this to assess the magnitude of costs and whether apparent high unit costs in some items were balanced by apparent low unit costs in other items to result in a reasonable overall cost estimate. However, the following comments can be made with respect to costs based on the comments already provided with respect to the 2012 Interim Closure Plan document:

- The costs are based on volumes that are estimated by applying industrial criteria as both the assessment criteria and remediation goal for soils exceeding the criteria. If wild land criteria are used, the volume of soil affected would increase along with the level of remedial effort and costs.
- The remediation costs only address hydrocarbon soils and no other COPC. Other COPC should be addressed and the associated cost for them included in the overall cost estimate.
- Geochemical assessments may deem various materials to be inappropriate for long-term placement at site or indicate longer term ARD and metals leaching risks. If these risks exist, the reclamation cost could be significantly higher than currently estimated.



Cost estimates should be based on the use of wild land criteria in the assessment and remediation of the site including other COPC in addition to PHC, and geochemical assessments for ARD and metals leaching potential.

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