

# Deficiency Statement for Avalon Rare Metals Inc.'s Thor Lake Rare Earth Element Project Developer's Assessment Report

## **Introduction**

The Review Board conducted a conformity check on *Avalon's Developer's Assessment Report* (DAR) for the Thor Lake Rare Earth Element Project. The Review Board compared the information provided in the DAR with the Final Terms of Reference and found the DAR to be deficient for a number of items. This list of deficiencies is divided into two parts:

**Part 1** includes information without which the environmental assessment cannot proceed. The developer must respond to these items before the process will move into the next phase.

**Part 2** includes information the Review Board needs to determine whether the proposed development is likely to cause a significant impact on the environment but may be submitted at a later date. The developer may submit responses to these items at its convenience but prior to the environmental assessment process reaching the technical reports step. For Part 2 items please provide a schedule of when and how these items will be addressed within the environmental assessment.

The numbering of headings and line items refers to sections and points within the Final Terms of Reference (ToR). Sections of the terms of reference quoted below are in italics.

## **Part 1 - Immediate Information Needs**

In the Review Board's opinion these items are needed for the understanding of potential impacts on the environment and provide the foundation for further analysis. The EA process will only proceed once these items have been addressed

### 3.2.4 Description of Existing Environment

15. *Terrain, surficial geology, structural geology, mineralogy, bedrock geology (type, depth, composition, and permeability), seismic activity records and risk factors, permafrost locations and types within the environmental assessment study area. In particular:*

c. *identify the chemical composition of host rock and ore bodies at the mine site including:*

ii. *uranium, thorium and beryllium content in ore.*

- Appendix F (SGS Environmental Characterization of ore, concentrate and tailings Interim Report Feb 28, 2011) is not yet complete. Submit the final Report on characterization of ore, concentrate and tailings to the Review Board.

f. *a description of existing fractures and faults at the project sites;*

- The specific locations of significant water bearing fractures and faults is not presented on the maps or discussed in the text. Given the complex geologic history and the intrusive nature of the deposits, and given that this mine lies beneath Thor Lake, fracture zones may be an important aspect of groundwater flow. Please provide test results from a more robust investigation into the nature of faulting above the underground mine.

### 3.2.5 Development Description

*Appendix A: Scope of Development, Pine Point, milling effluent discharge*

- The Knight Piesold document in Appendix C5 (Nov 3, 2010 p5) outlines preliminary characteristics assumed for hydrometallurgical tailings. It is stated that physical and geochemical tailings test work will be completed as soon as hydrometallurgical tailings samples are available to confirm tailings parameters.
- Section 6.5.2.2 of the DAR on page 726 states that tailings properties solids from the proposed milling process will be made up of gypsum (85%), leach residue (6%) and miscellaneous other solids (9%). Appendix C19 indicates that assumptions have been made regarding the physical characteristics of the tailings. The geochemical characteristics of the “leach residue” and “miscellaneous other solids” portion of the tailings solids in particular are not described. Section 4.8.3.1 of the DAR on page 518 describes the miscellaneous other solids as “e.g. hydroxides” but without further elaboration.
- Please thoroughly describe the geochemical characteristics of the leach residue (6%) and miscellaneous other solids (9%) portions of the tailings solids to be released

from the hydrometallurgical plant into the L-37 pit. A complete geochemical characterization of tailings from the hydromet plant is also required.

### **3.3.2 Key line of inquiry: water quality**

*Avalon proposes to have an underground mine in the proximity of lakes (proposed tailings management facility) that have been drawn down, in addition to bypassing the flow of volumes of water around Murky Lake by pumping directly from Drizzle Lake into Thor Lake while discharging effluent into, and recycling certain volumes of water from this watershed. This complex water management within a small area – and any potential impact(s) that may come from it – deserves a thorough analysis in this environmental assessment.*

#### **Thor Lake**

#### **Potential Pathways for Impacts to Water Quality from Project Components**

*For the locally impacted watershed and downstream water bodies (up to, and including a reasonable local area after, the confluence with Great Slave Lake) Avalon must:*

*1. Describe impacts to water quality from the following sources:*

- a. the water quality resulting from processing ore to concentrate, including an analysis of pathways and destinations for the end-products of concentrate, all reagent chemicals, process byproducts, hydrocarbons, sludge, incinerator residue, explosives, greywater constituents and any other potentially hazardous products used at the mine site that enter the water treatment stream;*
- g. the tailings management facility supernatant water quality and quantity due to inputs to the facility from points 1a through 1f, as well as due to leachate from the tailings. On this matter, Avalon must give particular attention to uranium, thorium and beryllium levels in supernatant water – in addition to any other radioactive minerals/materials regardless of level of radioactivity, and any other metals or substances of concern. Include analysis of percent water content of tailings;*
- h. describe how metals solubility under site conditions (both acidic and neutral) has been considered in long term mine planning and engineering designs;*
- i. a comparison of the contaminant levels to natural background variability.*

*Avalon will both list the constituent contaminants and estimate their respective amounts from the above sources at the mine site. Also describe how each of the above sources, alone or in combination, may contribute to the leaching of metals, creation of acid rock drainage, or otherwise affect water quality. Avalon will include all results of testing to support such conclusions.*

- A comprehensive analysis of the water quality coming out of the Thor Lake process plant is required. Please provide expected concentrations of all constituents Avalon will discharge into the TMF (tailings facility).

- Track and account for all inputs that may affect water quality – including but not limited to ore and its constituent minerals and elements, as well as reagents – from discharge *into* the tailings facility to the point of discharge *from* the tailings facility (TMF). According to the criteria listed in section 3.3.1 of the ToR, demonstrate how the TMF functions to produce the downstream concentrations Avalon presents in the DAR for the 5-day decant concentration. Include an analysis as to how this may change over time as Avalon changes or otherwise optimizes its production process.

2. *Provide test results for substances that may leach from the concentrate that Avalon produces including levels of uranium, thorium, beryllium, any other radioactive element or minerals (regardless of level of radioactivity), as well as any other metals.*

- The Table of Concordance directs to Section 4.7.4 for this information, but this section does not contain relevant data or information relating to the concentrations of leachate expected from various substances. Section 4.7.3.1 does provide a reference to data contained in Appendix F for analysis of Shake Flask extraction results. The report does not identify which materials may be potential contaminants or evaluate the shake flask results. Please provide test results from a more robust investigation into the nature of effects to water quality from the parameters listed in this line item.

***Other Potential Pathways for Impacts to Water Quality***

8. *Describe effects to the local water table. Include a discussion of:*

- the immediate effects of de-watering or drawdown of Ring Lake and Buck Lake;*
- the long-term effects from a reduced local water table around the Ring Lake and Buck Lake area (the tailings management facility);*
- the effects from groundwater loss through inflows to the underground mine;*
- any other mechanisms for groundwater loss to occur, as well as changes to groundwater flow regimes;*
- how the above changes may affect the refresh rates for Drizzle, Murky, Egg and Thor Lakes and other lakes in the vicinity of the mine site these changes may potentially affect;*
- how the above changes may contribute to changes in local permafrost and active layers; and*
- how the above changes may translate into surface water impacts, groundwater impacts or effluent water quality.*

The input parameters used for the groundwater model, specifically hydraulic conductivity, do not reflect the full range of potential conditions at the mine site. High hydraulic conductivity values that were considered “not representative of bedrock at the depth of the deposit” were not used in the model and not considered in the

sensitivity analysis. Additionally the current geologic and hydrogeologic analysis has not been conducted at a thorough enough scale to identify areas of potential higher groundwater inflows. The analysis of inflow does not consider the potential for higher inflows. Please provide the results of an analysis that incorporates these missing key points.

## ***Pine Point***

### ***Potential Pathways for Impacts to Water Quality from Project Components***

*At the Pine Point processing site, Avalon proposes to deposit tailings into a porous pit and use a second pit to hold supernatant water – this requires thorough analysis. For the locally impacted watershed and downstream water bodies of the Pine Point processing site (up to, and including a reasonable local area after, the confluence with Great Slave Lake):*

12. *Describe impacts to water quality from the following sources:*

a. *the water quality resulting from processing concentrate, including an analysis of pathways and destinations for reagent chemicals, process byproducts, hydrocarbons, sludge, incinerator residue, explosives, greywater constituents and any other potentially hazardous products used at the project site that enter the water treatment stream;*

- Although the pathways are generally described, the water quality parameters for the listed constituent streams are not reported in the DAR.
- A comprehensive analysis of the water quality coming out of the Hydrometallurgical process plant is required. Please provide expected concentrations of all constituents Avalon will discharge into the L-37 tailings facility (HMF).
- Track and account for all inputs that may affect water quality – including but not limited to concentrate and its constituent minerals and elements, as well as reagents – from discharge *into* the L-37 tailings facility (HMF) to the point of discharge *from* the L-37 tailings facility (HMF), as well as justify downstream concentrations going into the N-42 pit and beyond the N-42 pit discharge point. According to the criteria listed in section 3.3.1 of the ToR, demonstrate how the L-37 tailings facility (HMF) functions to produce the downstream concentrations Avalon presents in the DAR at the N-42 pit point of discharge and beyond the N-42 pit discharge point. Include and analysis as to how this may change over time as Avalon changes or otherwise optimizes its production process.

c. *runoff from the sulphur storage area;*

- Please indicate how Avalon will manage water runoff from the sulphur storage area and how this may affect the water quality Avalon will discharge from the hydromet facility.

f. *the tailings management facility (or facilities) supernatant water quality and quantity due to inputs to the facility from points 12a through 12f, as well as due to leachate from the tailings. On this matter, Avalon must give particular attention to uranium, thorium and beryllium levels in supernatant water – in addition to any other radioactive minerals/materials regardless of level of radioactivity, and any other metals or substances of concern. Include analysis of percent water content of tailings;*

- A single analysis of simulated Hydromet filtrate solution is not adequate to anticipate likely contaminants and concentrations from the Hydrometallurgical Plant Site.
- Please provide test results from a more robust investigation into the nature of effects to water quality from all parameters listed in this line item.
- For the HMF, beryllium is not considered in the analysis of water quality impacts nor analyzed in the simulated filtrate solution. Please provide this analysis for the HMF tailings as requested in the ToR.

### **3.5 Accidents and malfunctions**

6. *Conduct a best-practice risk assessment for the project, exploring the potential for events listed in points 1 through 5. Discuss systems, components, hazards and associated failure modes. The developer will assess likelihood and severity of each risk identified from the points 1-5[in this section].*

- A best practice risk assessment is required in this section particularly for the events listed in points 1-5 in this section. This information has not been provided in the DAR. Please provide a risk assessment for the project including likelihood and severity of each potential accident and malfunction event described in points 1-5.

## **Part 2 – Other Deficient Items**

This part contains information needs that in the Review Board’s opinion Avalon can address as the EA progresses. It includes items that, while important, do not necessarily impede further analysis. It also includes items for which data collection, and therefore a significant amount of time, may be required. The developer should outline a schedule of when and how these items will be addressed within the environmental assessment.

## 3.2 General Information Requirements

### 3.2.4 Description of Existing Environment

2. *Ambient air quality, including baseline concentrations of criteria air contaminants [...] including dioxins and furans.*

The Terms of Reference requests baseline concentrations of air contaminants including dioxins and furans. Dioxins and furans have not been included in the baseline information provided by Avalon Rare Metals Inc. Please include baseline information of dioxins and furans at both sites.

6. *Current and historic data on surface water and groundwater quality for the Pine Point processing site area*

Historic groundwater samples for the Pine Point area are provided. However, no information is provided on current water quality in the pits (L-37, N-42) proposed for effluent deposition from the hydrometallurgical plant. Please provide water quality data for parameters listed in line item 5 of section 3.2.4 of the Terms of Reference for any surface water in the pits and as well as any pit wall seepage (Section 2.7.2.2) at the L-37 pit and the N-42 pit.

7. *Hydrology and hydrogeology, including surface water and groundwater amounts, direction of flow, likely surfacing points/discharge area (for groundwater), and maps and descriptions of associated watersheds, both in the local area of the project site as well as downstream until the confluence with Great Slave Lake.*

f. *relationship between the groundwater regime and permafrost and active layer conditions, including a characterization of those conditions, and how permafrost and active layer changes influence hydrogeology at both project sites;*

- Please provide a discussion on how such changes would affect the hydrogeology of the project sites.

h. *a map indicating the location with rationale of all existing and planned wells, and seeps within the study area and other monitoring locations;*

- Please confirm if a seep survey has been conducted. If not, please conduct a field seep survey and provide results of analysis. If one has been conducted, please provide results of survey and analysis.

*16b. Physical and chemical make-up of water body sediments downstream [...] of the potentially affected water bodies of both project sites, including baseline concentrations of dioxins and furan.*

- Appendix A section 7 describes water body sediments as required in the ToR, with the exception of dioxins and furans. Concentrations of these contaminants are not described and samples were not collected – as stated in Section 2.9.1.8 page 230 of the DAR Main Report. Please provide baseline data on sediments as required in the Terms of Reference.
- In addition Appendix A, Executive Summary notes that data on radionuclides and rare earth elements in sediments is not available at this time (p. ii). Avalon is deficient for this item from the Terms of Reference. Please provide baseline data on sediments as required in the Terms of Reference.

### **3.2.5 Development Description**

*8. A description of the milling process from initial separation to concentrate, including primary and secondary crushing and floatation and filtration processes.*

Section 4.7.2.4 provides a list of reagents currently planned for use in the floatation plant although the section notes that optimization test work continues. A complete list of reagents and estimated quantities or reagents is required during the EA phase in order to accurately characterize tailings, process plant effluent and impacts to water quality and the environment. Please provide a complete list of reagents for use in the floatation plant.

*10. A description of the expected physical properties of paste backfill, including mineralogy, chemical characterization, as well as expected long term stability, reactivity and structural integrity.*

- The DAR does not discuss paste backfill mineralogy, chemical characterization, long term stability, reactivity or structural integrity. An understanding of paste geochemistry is important, particularly in terms of geochemistry and interaction with groundwater during operations and at closure. Please provide a more thorough answer to address these deficiencies.
- In Section 10.6.2.2, groundwater quality in the cumulative effects segment of the DAR there is a statement that the current mine plan estimates that 95% of void space underground will eventually be filled with paste backfill. Please confirm this statement.



*11. Mine rock management area including location, underlying ground conditions and volume of waste rock over the life of the mine.*

In Section 4.7.3.2 Avalon indicates that waste rock and low grade rock to be removed from underground is roughly 400,000 tonnes. Please describe total volume of waste rock to be stored on surface during the life of the mine and the volume of waste rock to remain on surface at closure.

*30. The water collection, management and treatment systems and all of their component parts...*

In section 4.7.3.2, a settling pond is proposed to collect drainage from the waste rock pile as well as floatation plant site runoff. It is unclear whether or not this settling pond is the same project component as the “plant site runoff collection sump” shown on Figure 4.5-1 as well as 4.7-6. No information on the settling pond or the sump is provided. Please describe the location, size, volume capacity, liner characteristics of the settling pond and sump and confirm whether they are the same design feature or different project components.

*13. The proposed upgrade to the Thor Lake-Great Slave Lake access road, including construction (width of ROW, vegetation removal, road bed type) and the expected number of trips on that road, water crossings, as well as the type and weight of load, any related storage*

The single sentence on the access road upgrade in Section 4.5.2.1 does not address the requirements of the ToR. Please provide a more thorough answer to upgrade of the road.

*15. A description of the entire hydrometallurgical cycle*

- Section 4.8.2.1 provides a general overview of the hydrometallurgical plant. Please provide a scale drawing of the actual hydrometallurgical plant showing the physical structures in the process steps identified in Figure 4.8-2.
- Section 4.8.2.2 provides a preliminary list of reagents in Table 4.8-1 and acknowledges that the list is incomplete and that quantities may change as the process is optimized. A complete list of reagents and estimated quantities or reagents is required during the EA phase in order to accurately characterize tailings, hydrometallurgical plant effluent and impacts to water quality and the environment. Please update Table 4.8-1 with a complete list of reagents to be used in the hydrometallurgical plant along with quantities to be used annually.

17. *A description of the tailings management facility or facilities proposed in existing open pits at Pine Point including storage capacity, operational life of each facility, pit floor conditions and permeability, presence of standing water, distance to groundwater table, rock types, presence of faults, pit wall stability and any containment dams or dykes.*

- The DAR briefly discusses the use of the L-37 pit as the Hydrometallurgical Tailings Facility and the N-42 pit as the discharge point for supernatant water from the HTF. There is no discussion of pit floor conditions and permeability, presence of standing water, distance to groundwater table, rock types, presence of faults, or pit wall stability for either pit. Avalon is deficient for this item from the Terms of Reference – please address these deficiencies.
- Please confirm whether the information for the N-42 pit is included in the input parameters for the groundwater model. If yes, please provide clarification on where these parameters are. If no, please provide results from an updated model that includes these parameters.

23. *The volume and management of sludge produced at the water treatment facilities.*

- The DAR does not address the management of sludge from the sanitary wastewater treatment facilities, although it does discuss the management of the liquid effluent. Please provide a response to this line item for both sites through all project phases.

30. *The water collection, management and treatment systems and all of their component parts, reagents, including drainage and other control structures, water and sewage treatment facilities, water storage facilities, and water transport components. Indicate how treatment systems will function to achieve stated mitigation objectives.*

- The DAR provides a general description of the water treatment systems, but does not provide fully describe how these systems will achieve water quality objectives. Please provide a thorough description sufficient to explain “how treatment systems will function to achieve stated mitigation objectives” for all water collection, treatment and management systems as described in line item 30.

### 3.3.2: *Water quality after mitigation at last point of control (water quality objectives)*

Section 4.8.4.1 states that water released from the L-37 pit is expected to meet regulatory licensing criteria. During the EA phase the developer is required to predict water quality objectives for effluent into the environment after the last point of control. Please describe the specific water quality objectives (WQO) for discharge of effluent

from the hydromet plant end of pipe into the L-37 pit and WQO from the L-37 pit to the N-42 pit.

*Appendix A: Scope of Development - Construction, Thor Lake: construction of the concentrate and supply storage/laydown area adjacent to the barge docking facility*

The minimum area required for storage of full containers (16,000 m<sup>2</sup>) and empty containers (1,200 m<sup>2</sup>) is described in Section 4.7.5.7. For the purposes of determining impacts of the development on the environment and in particular on the viewshed from Great Slave Lake, the total maximum footprint of the concentrate and supply storage/laydown area is required. Please describe the maximum footprint required for all container laydown areas and the total terrestrial project footprint at the dock facility. Please provide the information in Figure 4.7-11, Nechalacho Docking Facilities, in a scale drawing.

**3.3.2 Key line of inquiry: water quality**

*Avalon proposes to have an underground mine in the proximity of lakes (proposed tailings management facility) that have been drawn down, in addition to bypassing the flow of volumes of water around Murky Lake by pumping directly from Drizzle Lake into Thor Lake while discharging effluent into, and recycling certain volumes of water from this watershed. This complex water management within a small area – and any potential impact(s) that may come from it – deserves a thorough analysis in this environmental assessment.*

**Thor Lake**

**Other Potential Pathways for Impacts to Water Quality**

11. *Describe the collective impact of all changes listed above on the watershed.*
  - Although the DAR discusses individual impacts to surface water and groundwater components within the watershed, it does not present a clear summary of the collective water quality impacts. By project phase from start to closure and according to the criteria listed in section 3.3.1 of the ToR, provide this clear summary.
  
12. *Describe the long-term effects of all changes listed above on the watershed. Include a discussion of changes to water quality from chemical loading of the receiving environment.*
  - The DAR discusses the collective loading from the TMF at various locations downstream as far as Thor Lake over the 20 year operational life of the mine. No other long-term water quality effects are thoroughly discussed for any other points

within the watershed. In addition, Avalon has not characterized long term paste backfill interaction and potential effects to water quality. By project phase from start to closure and according to the criteria listed in section 3.3.1 of the ToR, provide further discussion on this line item overall, and on the points raised here.

### ***Pine Point***

#### ***Potential Pathways for Impacts to Water Quality from Project Components***

*At the Pine Point processing site, Avalon proposes to deposit tailings into a porous pit and use a second pit to hold supernatant water – this requires thorough analysis. For the locally impacted watershed and downstream water bodies of the Pine Point processing site (up to, and including a reasonable local area after, the confluence with Great Slave Lake):*

12. *Describe impacts to water quality from the following sources:*

*g. impacts on local aquifer(s) if exfiltration through an existing pit is selected as one of the preferred options for the Pine Point site, the hydrogeological information must include a review of, travel time to Great Slave Lake, volume of ex-filtrate, migration pathway (location and depth), monitoring points, distinct points of control and contingencies for non-compliant discharges;*

- For the L-37 pit, please indicate monitoring points, distinct points of control, and contingencies for non-compliant discharges.

#### ***Impacts to Water Quality after mitigation and Avalon's last point of control***

17. *Describe the collective impact of all potential changes listed above on the local watershed.*

- Although the DAR discusses individual impacts to surface water and groundwater components within the watershed, it does not present a clear summary of the collective water quality impacts. By project phase from start to closure, provide this clear summary according to the criteria listed in section 3.3.1 of the ToR.

#### ***Impacts to Water Quality after mitigation and Avalon's last point of control***

### **Both sites**

19. *For the local watershed and downstream water bodies (up to and including a reasonable local area after the confluence with Great Slave Lake, describe impacts to water quality and*

*quantity from final effluent discharged to the environment during all phases of the Thor Lake Rare Earth Element Project life cycle, incorporating:*

- a. identification of the constituents of, and quantity likely to come out of, each on-site water source;*
- d. predicted changes over time in the amount or quality of project water outflows;*
  - For each year of operation, provide a thorough analysis for the discharge from the Pine Point HMF according to the criteria listed in section 3.3.1 of the ToR.
- h. identification of the uncertainties and confidence levels in the predictions, the assumptions used, and the likely range of variation for the parameters identified.*
  - The DAR does not present all of the thorough discussions or analyses required above. According to the criteria listed in section 3.3.1 of the ToR, please provide an expanded discussion and identification of uncertainties, confidence levels in predictions, assumptions used and likely ranges of variation for presented parameters.

### **3.3.6 Wildlife**

*1 f. Discuss effects of tailings ponds on waterfowl, other aquatic birds and furbearers*

Section 6.9.1.10 discusses potential impacts to horned grebes (and other waterfowl) from construction of the tailings management facility (TMF) at the Nechalacho Mine. General mitigation measures are provided, however, no discussion of impacts to horned grebes (or other waterfowl) is provided for the operations phase of the TMF. Waterfowl are known to use active tailings ponds during mine operations. Please describe the potential impacts of horned grebe (and other waterfowl) interaction with the TMF during the operations phase of the project and provide mitigation measures to reduce or eliminate impacts.

### **3.3.8 Air Quality**

*1 b. provide test results for the general composition of and impacts from dispersion of dust from tailings facilities, stockpiles, waste rock piles and similar dust producing components of the project. Include an analysis of the levels of uranium and thorium in fugitive tailings dust, or any other radioactive element from any material.*

Emissions sources at the Nechalacho mine site are described in Table 6.2-9. The source of fugitive dust emissions from haul truck/roads is described in this table and the transfer and handling of ore is described in table 6.2-17. Fugitive dust emissions are not described from other potential sources such as the ore stockpile, waste rock pile, tailings pond or the quarry. In addition, an analysis of uranium and thorium from these fugitive dust sources was requested. Please predict impacts of fugitive dust from all project components during operations including ore stockpile, waste rock pile, tailings management facility and quarry at the TLP. Include an analysis of levels of thorium and uranium in fugitive dust. Please also provide mitigation measures for all sources of fugitive dust noted above (Section 6.2.4).

*1 e. Include a discussion on expected emission levels for and impacts related to dioxins and furans from waste incineration.*

The scope of air quality assessment in Section 6.2.2.1 of the DAR did not consider dioxin and furan emissions from waste incineration as a source of criteria air contaminants (CACs) from the both project sites. Waste incineration is given a rank of “minor” in Table 6.2-9, Emissions Sources. Dioxins and furans, however, are not included as CACs in waste incineration and have therefore not been assessed. Please include dioxins and furans as a CAC in the effects assessment of waste incineration at the TLP.

### **3.3.10 Biophysical environmental monitoring and management plans**

Please provide conceptual monitoring and management plans during the EA phase according to the following guidelines:

- Waste Management Plan: Guidelines for Developing a Waste Management Plan March 31, 2011 published by the MVLWB
- Aquatic Effects Monitoring Program: Guidelines for Designing and Implementing Aquatic Effects Monitoring Programs for Development Projects in the Northwest Territories: Recommended Procedures for Developing Detailed Designs for Aquatic Effects Monitoring Programs 2008. Indian and Northern Affairs Canada
- Adaptive Management Plan: Guidelines for Adaptive Management – a Response Framework for Aquatic Effects Monitoring (draft October 17, 2010). WLWB

## **3.4 Human Environment**

### ***K4b traditional land use and wildlife harvesting***

*32: Describe...changes in all-season access from potentially affected communities due to the Thor Lake mine site-Great Slave Lake access road and any changes in access by non-resident hunters*

It is unclear how or if access will be controlled along the Thor Lake access road from Great Slave Lake to the minesite. Please describe if and how public access will be controlled at the barge landing site and along the access road during various seasons of operation.

*33: For visual and audible changes from Great Slave Lake*

*a) describe and illustrate any potential visual impacts to the viewshed as seen from Great Slave Lake;*

*b) describe any other points along remainder of Great Slave Lake and islands where the project will be visible or audible, illustrate and describe how it will look and sound*

*c) describe any measures taken to minimize these sensory disturbances*

The developer was asked to illustrate visual and auditory changes from this development as experienced by someone in a boat on Great Slave Lake from the barge landing site and adjacent laydown and container storage areas on shore. An illustrated analysis of viewshed impacts at the barge landing site and its impacts on traditional activities has not been provided. Please provide a viewshed analysis including illustrations of visual changes as seen from Great Slave Lake 1 kilometre from both docking sites. Please include measures proposed to mitigate adverse impacts on visual and auditory impacts as seen and heard from the lake and describe any residual impacts.

#### ***K5 Human Environment Monitoring and Management Plans***

*39 a: how access along the Thor Lake mine site-Great Slave Lake access roads at both sites will be monitored and, if feasible, managed*

This requirement in the Terms of Reference is related to line item #33 above. Please describe how access along the Thor Lake mine site – Great Slave Lake access road and the Pine Point – Great Slave Lake access road will be monitored and managed.

#### **Appendix H: Traditional Knowledge Study Communication/Consultation Logs**

This Appendix provides the consultation logs associated with TK Studies. Are the TK Studies complete? Will Avalon be providing the TK Studies to the Review Board?

### **3.5 Accidents and malfunctions**

*For this section, the developer will first discuss impacts to a valued component from an accident or malfunction as though it has happened, then discuss the associated probability of the event. For water quality related accidents or malfunctions, Avalon will provide analysis of potential impacts to water quality with the same depth and breadth of analysis as similar line items under that key-line-of-inquiry section.*

3. *Discuss what could leach from Avalon's frozen-concentrate transport container if left to thaw over a summer season or during a temporary shutdown of operations. Also discuss the likelihood of that happening over the course of a transport season and suggested mitigations to prevent any impacts.*

- Please provide a response to this line item.

### **3.7 Closure and Reclamation**

2. *In the Conceptual Closure and Reclamation Plan, discuss management and monitoring programs for any materials/locations (including the underground works) that may cause acid rock drainage or metals leaching. Include:*

c. *the likely rate of movement of water (including groundwater) through the tailings, mine rock management area and underground workings, associated uptake of acids, metals or any other contaminants into groundwater or surface waters, and monitoring location requirements and contingency plans for greater than expected rates of contaminant release;*

- The DAR does not address post-closure water movement through the tailings or the underground workings; associated uptake of acids, metals or any other contaminants into groundwater or surface waters; post-closure monitoring requirements or contingency plans. Please provide a response to this line item for both sites through all project phases.