



Box 1500
YELLOWKNIFE NT X1A 2R3

June 29, 2012

MVEIRB File Number: EA 0809-003
Ms. Nicole Spencer
Environmental Assessment Officer
Mackenzie Valley Environmental Impact Review Board
P.O. Box 938
Yellowknife, NT X1A 2N7

BY EMAIL: n.spencer@reviewboard.ca

Re: Tyhee NWT Corporation- Yellowknife Gold Project(2008) Environmental Assessment- Additional First Round Information Requests

Dear Ms. Spencer:

Aboriginal Affairs and Northern Development Canada (AANDC) is providing the following revised and additional information requests (IRs) for the Tyhee NWT Corporation (Tyhee) Environment Assessment (see attachment). AANDC appreciates the additional time granted by the Mackenzie Valley Environmental Impact Review Board (MVEIRB) to review the new information provided by the company on May 31, 2012.

As you are aware, AANDC recently requested clarification on the company's response to the MVEIRB IR 1-1-1. AANDC had assumed that the company seemed to be planning for an "exclusion of Nicholas Lake ore from the revised mine plan/mill process". However, in their response to AANDC's clarification request, Tyhee confirmed that the mine plan and scope of the Environmental Assessment has not changed and is the same as that described in the original Developers Assessment Report. The overall project includes mining and milling of both the Nicholas Lake and Ormsby deposits.

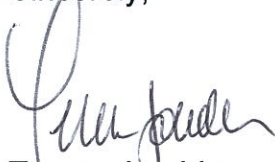
Still, the updated information submitted by Tyhee on May 31, 2012 only provides an assessment of Ormsby Ore, its tailings and its acid generating/leachate characteristics. No information has been presented on how the inclusion of Nicholas Lake ore will affect the newly proposed Tailings Containment Area and water balance, or, predicted quality of process water, tailings and effluent. Furthermore, it

has not been demonstrated how the inclusion of the Nicholas Lake ore would impact downstream water quality and the aquatic receiving environment.

AANDC notes that in an Environmental Assessment, information pertaining to all aspects of any project must be submitted for review and assessment to determine the potential of the project to cause significant adverse impacts on the environment. AANDC requires information on how including Nicholas Lake ore in the milling process will affect the tailings and effluent streams in order to fully review and assess the proposed project.

If you have any questions, please contact Lionel Marcinkoski at 669-2591 or via email at Lionel.Marcinkoski@aandc-aadnc.gc.ca or Nathen Richea at 669-2657 or via email at Nathen.Richea@aandc-aadnc.gc.ca .

Sincerely,

A handwritten signature in black ink, appearing to read 'Teresa Joudrie', written over a faint circular stamp.

Teresa Joudrie
Director
Renewable Resources and Environment Directorate

IR: 1-2-1 (Replaces IR 1-1 as submitted June 8th, 2012)

SOURCE: AANDC

TO: Tyhee NWT Corporation

SUBJECT: Local Study Area

PREAMBLE:

Figure 2.2-1 of the DAR depicted the local study area (LSA) for the Project based on mining of the Nicholas and Ormsby deposits. Tyhee's May 31, 2012 response to IRs stated that the Nicholas Lake deposit has been removed from the current mine plan. However, it has been clarified by the company that the Nickolas Lake deposit is still included in the mine plan and is part of the assessment (email dated June 25, 2012). AANDC wishes to ensure there are no changes to the LSA as presented in the DAR.

REQUEST:

- a. Tyhee to clarify the extent of the proposed LSA as presented in the DAR and whether the LSA may change if it is later determined that the Nickolas Lake deposit is removed from the mine plan.

IR: 1-2-2 (Replaces IR 1-2 as submitted June 8th, 2012)

SOURCE: AANDC

TO: Tyhee NWT Corporation

SUBJECT: Historic Mine Activity Interactions to the Project

PREAMBLE:

There are historical mining activities in the Project area. Figure 2.7-1 of the DAR provides a map that depicts the areas with anthropogenic impacts. Inferring from Figure 2.7-1, there is a potential that historic mining activities may have impacts on:

- Runoff water quality and quantity within the Round Lake drainage basin.
- Round Lake water quality and quantity.
- Water quality to Brien Lake.

Throughout the DAR and updated project description, there is only limited discussion of the interactions with historical mining activities. There are potential impacts from the historic mining on water quality and quantity and land use (e.g. site runoff, dust, seepage, intermittent effluent discharge, etc). As well, runoff from these disturbed areas and other areas of the constructed mine site (e.g. camp wastewater, pit dewater wells, ammonia storage areas, etc.) will report to the TCA.

REQUEST:

- a. Provide a description of how historic mining has been considered in the establishment of baseline information and how it will be considered in the impact assessment of groundwater and surface water quantity and quality that will report to the TCA and surrounding water bodies.
- b. Provide predictions of potential water quality to be pumped to the TCA from other areas of the mine site (e.g. camp wastewater, pit dewater wells, ammonia storage areas, etc.).
- c. Provide updated predictions of water quality and quantity by source for 'all' potential contaminant of potential concern (COPC) which include metals (Al, As, Ag, Cd, Cu, CN, Cr, Fe, Hg, Mo, Ni, Pb, Se, Tl, Zn), nutrients (NH₃, NO₃, NO₂, TP) and major ions (SO₄, Cl, Ca, Na, TDS).

IR: 1-3**SOURCE:** AANDC**TO:** Tyhee NWT Corporation**SUBJECT:** Baseline Local Surface Water Quality**PREAMBLE:**

The mine site water quality is a Key Line of Inquiry to be addressed in the DAR. Regional and local surface water quality was discussed. In general, regional water quality was compiled from relevant literature/studies. Local water quality detailed the 2004-2005 water quality sampling program, which generally consisted of four lake water quality sampling locations within the revised mine site project area (i.e., Round, Winter, Narrow, and Brien Lakes) over a period of two summers.

The 2004-2005 water quality sampling has a limited sampling history and spatial extent. More specifically, the 2004-2005 water sampling program is the only data presented on Brien and Narrow Lakes water quality. These two lakes may directly receive mine-impacted waters. Water quality sampling has not been completed on lakes downstream of Brien and Narrow Lakes, and therefore the associated baseline is unknown for these downstream lakes. The 2004-2005 water quality sampling program is limited in scope and does not adequately address the baseline surface water quality in the LSA. The missing information may have been collected as part of the Surveillance Network Programs (SNP) for Tyhee's advanced exploration water licence and the historic Discovery Mine site; however, relevant information is not summarized and presented in the DAR.

Tyhee stated that regular and ongoing water quality information exists from on-going monitoring associated with the Tyhee's advanced exploration water licence and the historic Discovery Mine

site (Staples 2009; MESH 2009). The DAR did not provide a summary of relevant water quality data from these two reference documents. As a result, there is potentially an incomplete understanding of the baseline information presented in the DAR for this Project.

Tyhee acknowledges that Round Lake water quality has been influenced by the Discovery Mine tailings. It is unknown if other lakes in the LSA are also influenced by historical mining activities and are therefore impacting baseline characterization. Since the Discovery Mine remediation activities have recently been completed with only limited work still occurring, the baseline information for lakes in the LSA may still be partially influenced by the Discovery Mine.

REQUEST:

- a. Summarize and describe any trends in any baseline data and the SNP results from Tyhee's advanced exploration water licence and Discovery Mine site to the 2004-2005 water quality.
- b. Provide additional information or rationale why baseline water quality and quantity data in the lakes downgradient of Narrow and Brien Lakes have not collected. Describe how impact assessments have been considered for these downstream waterbodies without understanding natural background condition.
- c. To further understand variability in baseline data and cumulative effects, summarize the influence of the Discovery Mine site on LSA lakes prior to Tyhee's mining operations.

IR: 1-2-4 (Replaces IR 1-4 as submitted on June 8th, 2012)

SOURCE: AANDC

TO: Tyhee NWT Corporation

SUBJECT: Water Balance, Water Quality Modeling, Tailings Containment Area and Site Specific Water Quality Objectives (SSWQOs)

PREAMBLE:

Tyhee's May 31, 2012 response to MVEIRB IR number: 1-1-1 concludes that the revised mine plan and TCA design "indicates that improved water quality will be realized in the TCA and TCA discharge". It is not clear if this is solely a result of limiting the assessment to the process water and tailings input that would result from processing only the Ormsby deposit or if it is solely the result of the changes in the TCA design.

AANDC has reviewed the water balance and the TCA design concept as submitted on May 31, 2012. Upon review of the Knight Piesold technical memo dated May 30, 2012, it was apparent that the absence of Nicholas Lake ore in the mill process generally improves water quality in the

TCA. However, it has been clarified that the Nicholas Lake ore will still be processed at the mill and the process water and tailings will report to the TCA. Therefore, the current water balance and TCA predictions (year 4 and beyond) do not include the influence of processing the Nicholas deposit which is to be high in metals and could degrade the water quality within the TCA to levels previously presented in the DAR (processing both Nicholas Lake and Ormsby ore).

To understand the impacts of the project and the adequacy of mitigation measures (i.e. TCA designs, water treatment options, effluent quality, etc.) a complete water balance and updated water quality predictions for the TCA that includes the processing of both Ormsby and Nicholas Lake ore is critical. Currently, the TCA water balance and water quality information only contemplates the processing of Ormsby ore.

REQUEST:

- a. Describe whether the improved water quality in the TCA is a result of the design changes or the result of only modeling, assessing and characterizing inputs to the TCA from assuming only the Ormsby ore - which differs from the assessment in the DAR which includes both Nicholas Lake and Ormsby ore.
- b. Please provide 'updated' predictions and more details (including any assumptions) used to predict water quality and quantity in the TCA during project operations and post-closure. These updated predictions and information should consider the influence of processing both the Nicholas Lake and Ormsby ore. This information is required to further advance the technical review stage of this Environmental Assessment.
- c. Please provide an updated water balance that includes processing of both the Ormsby and Nicholas Lake deposits for the entire duration of the project.
- d. Develop appropriate SSWQOs for metals, nutrients and major ions applicable to the Project's downstream receiving environment that will be applied during operations and post-closure.

IR: 1-2-5 (Replaces IR 1-5 as submitted on June 8th, 2012)

SOURCE: AANDC

TO: Tyhee NWT Corporation

SUBJECT: Effluent Discharge Area and Rates

PREAMBLE:

Section 6.2.1.1 of the DAR describes discharge rates for releases from the TCA. Table 6.2-2 provided discharge rates for Narrow Lake in May and June that ranged from 11.1 – 173.6 L/s and 9.6 to 156.4 L/s, respectively. Discharge to Narrow Lake is proposed to be “regulated to

simulate, within practical limits, background flow volumes and the seasonal cycle”. In comparing the recommended flow releases (Table 6.2-3) to monthly discharge (Table 6.2-3), there does not appear to be a consistent formula that was used to develop the recommended flow releases. In general, the recommended flow releases were less than the upper bound monthly discharge.

The water balance provided by Knight Piesold on May 30, 2012 indicates that there are no expected discharges from the facility to off-site water bodies during the course of the project. In fact, the current water balance indicates that make-up water from Giauque Lake will likely be required following the fourth year of operations. Tyhee expects that there will be a need to discharge TCA water to the receiving environment during the term of the project’s water licence and would expect to have the capability to do so in the terms and conditions of the initial water licence issued by the MVLWB.

AANDC notes that discharges from the TCA (depending on update predictions of effluent quantity and quality) may change the predictions for water quality in Narrow Lake during operations and following closure. It may be difficult for Tyhee to achieve proposed SSWQOs without additional mitigation measures or treatment.

REQUEST:

- a. Provide additional discussion on the proposed effluent releases (volume, timing, discharge rate, etc.) to Narrow Lake as Tyhee expects there will be a need to discharge TCA water to the receiving environment during the term of the initial water licence. How was the potential for discharge determined and how was the proposed volume and rate determined/assessed such that it would mitigate against potential adverse effects in Narrow Lake.
- b. Please describe how the quality of effluent that will be discharged to Narrow Lake compares to natural background levels, once updated predictions are available that include processing both Ormsby and Nicholas Lake ore.
- c. Provide clarity around whether the effluent from the TCA entering Narrow Lake will be below CCME-WQG for the protection of Aquatic Life for all parameters during the entire length of the operation and during the post-closure period.
- d. Provide updated assessment of impacts to Narrow Lake using the revised TCA water balance and water quality model predictions for all COPCs (i.e. metals, nutrients, major ions).

IR: 1-6

SOURCE: AANDC

TO: Tyhee NWT Corporation

SUBJECT: Hydrogeology

PREAMBLE:

Sections 2.6 and 2.7 of the DAR present information pertaining to the surface geology and surface soil types within the Project area. Subsurface soil characteristics were presented from general literature of the region. No soil/bedrock borehole logs or groundwater levels were presented in the DAR specific to the Project area.

Section 2.10.4 states that shallow groundwater is “likely hydraulically connected with adjacent surface water bodies, marshes, ponds and bogs; however, insufficient information is presently available to characterize the hydraulic connections between surface water features and shallow and deep fractures”. Shallow piezometers were installed in the Fall 2009 field season; however, the location of installations, depth of installation, number of piezometers, and subsurface characterization (soil/rock types and groundwater levels) were not presented in the DAR. Therefore, Tyhee acknowledges insufficient information exists and the data currently collected has not been presented for reviewers to understand the degree of uncertainty.

Section 2.10.5 of the DAR discusses deep groundwater. In general, the description is based upon deep rock geology results (reference to specific geology results not presented) and one borehole drilled in proximity of the Ormsby pit. The borehole log for this one piezometer is not provided to understand subsurface characteristics. Tyhee acknowledges that the “degree of connectivity between the area drilled and the nearby Winter Lake is presently unknown” and that “additional testing will be required to better define the regional flow system and the area of groundwater flow contributing to the Ormsby pit”. As a result, there is uncertainty regarding the amount of water captured by the pit and underground workings.

Reference to a Klohn Leonoff (1992) report from the Discovery Mine was utilized to understand permafrost and mine inflow potential. Klohn Leonoff reported permafrost extent to about 38 m level in the historic Discovery Mine. It is unknown how this permafrost extent compares to the Ormsby deposit since the DAR contained limited to no exploration characterization results and the single deep piezometer borehole log was not presented. Further, Tyhee states, “recent testing by EBA suggests the depth of permafrost previously tested in 1992 may have changed and additional testing is needed to confirm the extent of permafrost”. No reference or additional information is provided to explain this statement and the implications on mine inflows.

Section 2.10.9 of the DAR states “limited groundwater quality information exists for the Ormsby and Nicholas Lake mine sites”. The initial, and only, groundwater sampling program was

completed in fall of 2009. The groundwater program included sampling of groundwater monitoring wells installed in inclined exploration and geotechnical investigation core holes. Six wells were installed at the Ormsby site, of which only one well (BH15) provided a good quality sample for groundwater at 20 m depth. The details of the well installations (e.g., depth, screened interval), as well as the locations of the wells were not presented in the DAR. As a result, it is unclear if sufficient baseline information exists to characterize the subsurface soil/bedrock water quality. A single groundwater sample was collected in 2009 for the Ormsby zone. This single groundwater sample is the only information presented related to baseline groundwater quality.

Section 4.2.2 of the DAR describes previous exploration activities within the Ormsby zone. In recent years, geological characterization of the deposit has been completed, which has included drilling, as well as, decline and subdrift development to support bulk sampling. Subsurface characterization and groundwater quality analysis was completed; however, the results are not consolidated or presented to aid in the understanding of the characteristics of the site. Further, Section 4.3.2 states that 19 geotechnical drill holes were completed at the Ormsby area that characterized the rock, groundwater, and ground temperatures.

In summary, the soil/bedrock subsurface and groundwater quality as presented in the DAR is limited and it is unclear if sufficient understanding of the environment and baseline exists. The references previous studies and exploration activities that may have partially characterized the subsurface soil/bedrock and groundwater characteristics. Relevant information from these previous studies is not presented in the DAR to aid in the understanding of subsurface soil/bedrock and baseline groundwater characteristics.

REQUEST:

- a. A geologic map(s) of the subsurface in the vicinity of the Ormsby pit and underground workings that depict the spatial distribution and structure of major rock types.
- b. Provide a map of the shallow and deep groundwater piezometer and groundwater well locations.
- c. Provide borehole logs for the shallow and deep groundwater piezometers that depict piezometer/well installation, subsurface soil/rock characterization, permafrost presence and degree, and groundwater levels.
- d. Describe how the uncertainty regarding hydraulic connections between surface water and shallow and deep groundwater has been accounted for in impact predictions. Detail the proposed plans and associated timing to fill any information gaps.
- e. Provide additional evidence to support the statement that “recent testing by EBA suggests the depth of permafrost previously tested in 1992 may have changed and additional testing is needed to confirm the extent of permafrost”. Provide discussion on the impact of this statement on predicted mine in-flows.

- f. Describe the proposed plans and associated timing to fill the information gap regarding extent of permafrost about the Project site.
- g. Describe the proposed plans and timeframe for implementation to characterize the baseline groundwater levels and quality in the Ormsby area.
- h. Consolidate relevant information from exploration activities at the Ormsby area to further support the characterization of subsurface soil/rock characteristics and groundwater quality/quantity.

IR: 1-7

SOURCE: AANDC

TO: Tyhee NWT Corporation

SUBJECT: Hydrogeological Modeling

PREAMBLE:

A conceptual hydrogeological model for the Ormsby mine area was presented in the DAR. The model was developed using available site data. As detailed above, and acknowledged by Tyhee, there is uncertainty in the subsurface hydrogeological information and additional information is needed. As a result, this uncertainty has carried forward to the assumptions in the conceptual hydrogeological model, such as, oversimplifying the subsurface characteristics to three layers, each with an isotropic and homogeneous conductivity and porosity, and representing the domain as porous media. These simplifications may only provide a preliminary approximation towards understanding groundwater inflows to the pit and underground mine. However, no details are provided on the degree of certainty in the model results in predicting groundwater inflows. The model is not calibrated to the site and is likely to lack multi-year groundwater water level data and only include limited groundwater quality information.

The conceptual hydrogeological model considered water inflows during mine operations. Closure conditions were not considered and therefore post-closure predictions of water flow and quality in the open pit and underground workings has not been assessed. As detailed above, there are likely hydraulic connections between the surface water and shallow and deep fractures; however, insufficient data is available to characterize. Specific to closure, Section 11.2.2.1 states the Ormsby open pit will be partially backfilled with water rock and partially flooded. The ability to predict post-closure groundwater flow (and solute transport) and interactions between the pit and underground workings and surface water has not been described.

The hydrogeological model domain was based on preliminary mine layouts and specifications for the open pit and underground workings. Tyhee stated “mine specifications have changed

since development of the model; however, results should still be applicable at a Pre-Feasibility level of study”. This statement acknowledges uncertainty in the results; however, the degree of certainty is not quantified.

Model results of mine inflows were presented in the DAR. It was stated that the value of mine inflows are “similar to those observed at other comparable mine sites in NWT”. No comparison of predicted results to other NWT comparable mines was provided to substantiate this statement. Tyhee stated that temporary increases in mine inflows might be encountered during mining. Increased mine inflows “may result from increased fracture density and/or openness, fault zone width or increased fault interconnectedness. The amount and duration of increased flow cannot be predicted with available data at this time”. The inability of the hydrogeological model to capture temporary increases in mine inflows is not fully described. Further, a quantitative estimate of the temporary increases in mine inflows is not provided to understand the potential ramifications on site water management.

REQUEST:

- a. Describe the degree of certainty in the predictions of mine inflows based on the conceptual hydrogeological model. The discussion on degree of certainty is to consider the assumptions in the model domain, subsurface characteristics, and site hydrogeological data (i.e., soil/bedrock characterization, groundwater level measurements, hydraulic conductivity testing, etc.).
- b. Describe the site data currently available to calibrate the hydrogeological model to predict steady state and transient groundwater flow and solute transport. Describe the minimum amount of site data to calibrate the hydrogeological model.
- c. Discuss the uncertainty to predict post-closure groundwater flows to characterize steady state and transient groundwater flow and solute transport between the open pit and underground workings to surface water. If the level of uncertainty is considered low, provide hydrogeological model results for post-closure conditions.
- d. Provide a quantitative evaluation of the degree of certainty associated with using preliminary mine layouts and specifications for the open pit and underground workings. The quantitative evaluation is to provide an estimate of the percent difference in the mine inflows at the feasibility level of study through to final design.
- e. Provide a comparison of predicted mine inflows to that of “comparable mine sites in the NWT”.
- f. Provide a quantitative estimate of the temporary increases in mine inflows that might be encountered during mining.
- g. Provide discussion on what information is required to enable a prediction of temporary increases in mine inflows.

IR: 1-8**SOURCE:** AANDC**TO:** Tyhee NWT Corporation**SUBJECT:** Site Infrastructure Physical Characteristics**PREAMBLE:**

Tyhee's March 28, 2012 response to IRs provided a revised site infrastructure map. In comparing the revised site infrastructure map to Figure 4.1-1 of the DAR (Ormsby Site Plan), the following items are changed:

- Waste rock pile location and shape
- Tailings containment area configuration
- Open pit shape

The DAR generally provided summaries of the volumes, footprint area, and mass of materials, as applicable for each of these mine components. Due to the change in layout and configuration, as presented in the revised site infrastructure map, there is uncertainty if volume balances for waste rock, tailings, and water have changed.

REQUEST:

- a. Provide an updated summary of key physical characteristics (footprints, dimensions, etc.) and volume and mass for the waste rock piles, tailings containment area, and open pit/underground mine (as depicted in Tyhee's March 28, 2012 revised site infrastructure map).
- b. Provide an updated base case production schedule as presented in Section 4.8, Table 4.8-1 of the DAR.

IR: 1-9**SOURCE:** AANDC**TO:** Tyhee NWT Corporation**SUBJECT:** Waste Rock Storage**PREAMBLE:**

Section 4.3.5 of the DAR, and the more recent March 28, 2012 revised site infrastructure map, depicts one option for the disposal location of waste rock. Section 4.3.5 states, "alternative sites

for waste rock storage areas at both Ormsby and Nicholas Lake have been reviewed with recommended locations based on accessibility and reduced environmental impact considerations”. This statement suggests an alternatives assessment for waste rock storage was completed; however, this information is not presented in the DAR.

Section 4.3.5 of the DAR states two design objectives for waste rock storage facilities: average final side slopes of 1H: 2.5V and surface till placement to allow for vegetation of the slopes as part of reclamation and closure. No detailed discussion or analyses are provided with regards to geotechnical stability, permafrost aggradation, and seepage quantity and quality.

Section 4.12.7 stated “where possible, PAG waste rock will be placed such that it will be adequately covered by NAG waste rock”. The required thickness of NAG cover over PAG is not defined. More generally, the measures to limit acid generation and metal leaching conditions in the waste rock facilities are not described.

Section 4.12.7 states “drainage from the waste rock pile will be contained within a catchment basin, tested and treated as needed before being discharged to the TCA or directly to the receiving environment. Surface runoff will be intercepted, collected and pumped in the tailings containment area”. The infrastructure required to collect surface water and groundwater migrating from the waste rock facilities is not described in detail or presented in the site surface in revised site infrastructure map.

REQUEST:

- a. Confirm if an alternatives assessment for waste rock storage was completed. If yes, provide the analysis with discussion on the assessment criteria. If no, provide discussion why an alternatives assessment is not needed and how the proposed option considered environmental impacts, community engagement, and social impacts.
- b. Provide additional discussion and any supporting analysis regarding the waste rock storage facilities design goals/objectives/criteria for geotechnical stability, permafrost aggradation, and seepage quantity and quality during operations and post-closure.
- c. Provide a recommended minimum NAG cover over PAG rock with supporting rationale.
- d. Provide additional discussion on the methods that will be applied to limit acid generating and metal leaching conditions from occurring within the waste rock facilities.
- e. Provide additional discussion on the methods to collect surface runoff from the waste rock facilities, depict on a revised site infrastructure map the approximate location of any ditching or berms to facilitate management of this water.

- f. Provide additional discussion on the necessity and, if required, methods to manage/collect shallow groundwater that may have received seepage waters from the waste rock facilities.

IR: 1-10

SOURCE: AANDC

TO: Tyhee NWT Corporation

SUBJECT: Waste Rock Pile – Round Lake

PREAMBLE:

Tyhee's March 28, 2012 response to IR Number: 1-1-5 detailed that Round Lake will be drained and this area used for waste rock storage. Round Lake has been the recipient of impacted waters from the Discovery Mine. The volume and quality of water to be discharged from Round Lake is unknown. The location of discharge is unknown and it is unknown whether this water will require treatment.

There is no discussion of the potential for accumulation of poor quality sediments at the base of Round Lake that may have been generated as a result of impacts from the Discovery Mine. Should poor quality sediments be encountered, it is unknown at this time how they will be managed or if they will impact the operations of the waste rock pile, or the overall seepage quality from the waste rock pile.

REQUEST:

- a. Provide a summary of the volume and expected quality of water to be drained from Round Lake. Detail if water treatment is required of this water prior to discharge. Detail the location of discharge.
- b. Provide a discussion on the potential for the presence of poor quality sediment accumulation in Round Lake as a result of the Discovery Mine operations.
- c. If an accumulation of sediment is observed in Round Lake:
 - What thickness or amount of sediment would trigger a requirement to manage this material to avoid long-term environmental water quality concerns from the waste rock seepage waters?
 - Describe how this sediment will be managed.
 - Describe how this sediment may impact the waste rock seepage water quality.

IR: 1-11

SOURCE: AANDC

TO: Tyhee NWT Corporation

SUBJECT: Tailings Containment Area Dams

PREAMBLE:

Several dams will be constructed to contain the water and tailings deposited in the tailings containment area. Section 4.12.2.1 provided select details of the containment dams. Water that seeps through, or under, the dams is to be “collected and managed within the containment ditch located in the northern portion of the drained Winter Lake. Any seepage that is collected in the containment ditch will then be pumped back into the TCA”. It is unclear if ditching is only required on the northern portion of Winter Lake.

Section 4.12.2.4, Figure 4.12-1 provides a typical dam cross-section. The material types used in the dam construction are not specified; however, it is assumed that suitable material may be borrowed from the Ormsby Pit area. At a minimum, three material types are needed for the dam construction: rock shell, core, and filter. To construct the core, this likely will require a low permeability material; it is unknown at this time if a geomembrane will be utilized. The subsurface characteristics within the Ormsby Pit have not been provided to the degree necessary to gauge whether suitable materials for dam construction are present. If the Ormsby Pit does not have suitable quantity or quality of material, borrow materials from quarries may be required.

The tailings containment dams are to be an engineered structure that will remain at site post-closure. No details are provided to understand the potential consequences of dam failure and the standard of care expected of the dam owner and designers. MVEIRB’s Terms of Reference requested information regarding potential “failure of any feature of the tailings containment area”. Additional information regarding dam classification will aid in the understanding of risks and consequences of failure associated with the tailings containment area dams. Discussion is required on the failure modes/types, risk of failure, and associated potential impacts resulting from a failure of the dams, as well as, the tailings pipeline, reclaim water pipeline, ditches and containment sumps to collect seepage waters.

REQUEST:

- a. Depict on the revised site infrastructure map the approximate location and extent of the containment ditching associated with the tailings containment area.
- b. Provide additional discussion on the dam material types and contingency if the Ormsby Pit cannot provide a suitable borrow material (type or volume) for construction.

- c. Locate and describe potential quarry locations for make-up materials for the proposed dams as a contingency in the event additional material is required.
- d. Outline the dam classification with supporting rationale, according to the 2007 Canadian Dam Association, Dam Safety Guidelines, which will be applied in the engineering design for the tailings containment dams.
- e. Provide detailed information regarding the failure of any feature of the tailings containment area, as per MVEIRB's Terms of Reference. At a minimum, details pertaining to the failure modes/types, risk of failure, and associated potential impacts resulting from a failure are requested for each of the following pieces of TCA infrastructure: dams, tailings pipeline, reclaim water pipeline, ditches and containment sumps to collect seepage waters, and water treatment plant.

IR: 1-12

SOURCE: AANDC

TO: Tyhee NWT Corporation

SUBJECT: Waste Management

PREAMBLE:

Section 4.12 of the DAR stated "all solid non-combustible and non-hazardous waste will be disposed of in a landfill or other approved onsite location". This statement is unclear on the proposed approach to managing this waste. An assessment of the expected volume of solid non-combustible and non-hazardous waste was not presented in the DAR.

REQUEST:

- a. Provide clarity on the management decisions that may be applied to disposal of non-combustible and non-hazardous waste in an on-site landfill or transported off-site.
- b. Provide a volume calculation for the amount of non-combustible and non-hazardous waste generation during operation and post-closure.

IR: 1-2-13 (Replaces IR 1-13 as submitted on June 8th, 2012)

SOURCE: AANDC

TO: Tyhee NWT Corporation

SUBJECT: Acid Rock Drainage and Metal Leaching

PREAMBLE:

Appendix H of the DAR details the geochemical characterization of the rock and tailings for the Project. The Technical Memo from Knight Piesold also further characterizes the Ormsby ore. The following summarizes the characteristic of the Nicholas Lake and Ormsby ore:

- Ormsby Transitional greywacke and interbedded argillites are PAG/ML
- Whole ore tailings (Ormsby-Nicholas Lake mixture) are PAG/ML
- Within the Ormsby amphibolite, some samples are more reactive than others and some samples are non PAG.

However, in the DAR a segregation criterion was recommended as a requirement to determine PAG and non-PAG amphibolite rock such that non-PAG rock can be used for mine construction (e.g., laydown areas, roads, etc.). Details of how to define a segregation criterion such that it can practically be implemented and any confirmatory monitoring testing have not been presented in the DAR. Contingency measures, should a segregation criterion not be developed, or if there is an inadequate quantity of non-PAG amphibolite rock, have not been presented.

REQUEST:

- a. Develop and provide segregation criteria to identify PAG and non-PAG amphibolite rock. Provide additional details on any confirmatory testing that may occur during construction to ensure the correct type of rock is being used for site construction.
- b. Provide a description of the contingency plan should a segregation criterion result in lower volumes of rock being acceptable for construction. Assess the need and potential locations of a quarry to make up rock for construction and the potential impacts of quarrying rock for construction purposes.

IR: 1-2-14 (Replaces IR 1-14 as submitted on June 8th, 2012)

SOURCE: AANDC

TO: Tyhee NWT Corporation

SUBJECT: Closure and Narrow Lake Inflow

PREAMBLE:

Tyhee's mine plan has been slightly revised as described in Tyhee's May 31, 2012 response to MVEIRB IR number: 1-1-1. Also, the location of the Waste Rock Piles and the design of the TCA have changed. It is not clear how these changes will impact the closure and reclamation at the site.

However, according to Section 11.2.5.3 of the DAR, "it is intended to maintain sufficient flow to Narrow Lake inlet stream", and hence Narrow Lake, to conserve ecological productivity. In the DAR, it is stated that "loss of flow from Round Lake has the potential of altering the physical and chemical characteristics of Narrow Lake" and that pre-mining discharges from Round Lake to Narrow Lake are significant. It was concluded that "a substantive reduction of flow to Narrow Lake has the potential to result in changes in water level, disruptions to migrating timing, loss of stream habitat, reductions in flow rates downstream of Narrow Lake, and possible effects on the timing and extent of Narrow Lake stratification". It is not presently clear how impacts to Narrow Lake will be mitigated at closure.

REQUEST:

- a. Provide updated closure and reclamation plans based on updated project mining plans and designs (i.e. waste rock areas and TCA). Please refer to AANDC's *Mine Site Reclamation Guidelines* for descriptions of information to be considered during closure planning exercises.
- b. Describe any changes to the potential impacts of seepage water from modified facilities on the receiving environment and downstream water bodies post-closure.
- c. Describe the potential water quality within the open pit and where this water will flow once the pit is full. Describe contingency options in the event the pit requires additional time to fill or the water quality within the pit is poor and requires mitigation.
- d. Outline mitigations for TCA seepage and specify activities for maintaining water quality and water levels in Narrow Lake post-closure.

IR: 1-15

SOURCE: AANDC

TO: Tyhee NWT Corporation

SUBJECT: Winter Road Joint Venture

PREAMBLE:

Section 8.2 of the DAR states that the “Secondary Route” of the Tibbitt to Contwoyto Winter Road (TCWR) will be used for transportation. It was noted that the winter road is operated by the TCWR Joint Venture (i.e., not Tyhee).

Section 8.2 of the DAR states that if the “Secondary Route” is not constructed by the TCWR Joint Venture for any particular year, “Tyhee NWT Corp will construct and operate the winter road from Prosperous Lake to the YGP”.

REQUEST:

- a. Confirm potential environmental impacts associated with the winter road Tyhee will use to mobilize and demobilize supplies and ore for its mining project.
- b. Describe Tyhee’s plans for constructing and operating the winter road, if the portion from Prosperous Lake to the YGP is not built in any year during mining operations.
- c. Describe how impacts and potential significant adverse effects for winter road construction and operation will be mitigated by Tyhee.

CARD Information Requests to Tyhee NWT Corp

IR Number: 16

Source: AANDC-CARD
To: Tyhee
Issue: Existing Air strip from Discovery Mine

Background

Tyhee proposes to upgrade and utilize the Discovery Mine air strip (Section 4.3.1 of the DAR). Tyhee's DAR states that an upgraded design has been provided to the MVLWB. It is unclear if this is in reference to the design recommendations provided in EBA (2007) or if these design recommendations have since been superseded by something more recent. The previous analysis of the airstrip did not include the increased frequency of airstrip usage associated with mining development (only current level of activity). It is also uncertain if any lengthening of the air strip is planned.

Request

1. Please provide more information on the upgraded design of the air strip. Any proposed upgrade should effectively mitigate the identified damage criteria and failure mechanisms.
2. Please provide details of all materials to be used in upgrades to the air strip including proper geochemical characterization prior to placement.
3. Please describe the management actions that Tyhee would take in response to potential damage or failure of the air strip during the construction, operational and reclamation periods of the mining development.
4. Clarify what level of security is proposed to address any future damage to the tailings cap.

IR Number: 17

Source: AANDC-CARD
To: Tyhee
Issue: Existing Access Roads

Background

Tyhee's DAR proposes to upgrade and utilize the existing roads on site and construction of new roads to provide access to surface facilities (Section 4.5.1 of the DAR). The current site access roads run across a portion of the tailings cover from Discovery Mine. Additional access roads to new facilities are also anticipated but no details are provided in the DAR. It is unclear if the all access road will run over top of the Discovery Mine tailings cover. No details are provided in the DAR concerning the planned upgrades (e.g. width, thickness, materials, etc.) to the existing access roads. Further, no aspects related to associated surface drainage changes are provided. No details regarding the type or frequency of traffic that will utilize the roads are provided.

Request

1. Please provide a revised figure at an appropriate scale showing the extents of the Discovery Mine cover system with respect to Tyhee's proposed facilities and operations.
2. Please provide estimates of vehicle sizes (and related subgrade loadings) and frequency estimates for any site roads.
3. Please provide details of all materials to be used in the construction of the access roads including proper geochemical characterization prior to placement.
4. Please describe the mitigation strategies that Tyhee would take for all access roads to avoid potential impacts to the integrity of the tailings cover system, concrete seals and crown pillar areas associated with the Discovery Mine site.
5. Please describe the management actions that Tyhee would take in response to a potential failure or damage of the access roads over the tailings cover materials.

IR Number: 18

Source: AANDC-CARD
To: Tyhee
Issue: Laydown Area

Background

Tyhee proposes to utilize the surface of the cover system, west of the air strip as a lay down area (Section 4.5.2 of the DAR). It is unclear what the laydown area will be utilized for in terms of loads and equipment that will be operating in the area. No details are provided in the DAR concerning any planned upgrades to the cover system in the laydown area to mitigate impacts to the cover system.

Request

1. Please provide more information on the terms of loads and equipment operating in the laydown area.
2. Please describe the management actions that Tyhee would take in response to a potential failure in the integrity of the laydown area cover system associated with the Discovery Mine site.
3. Please provide all materials used in the construction of the laydown areas including proper geochemical characterization prior to placement.

IR Number: 19

Source: AANDC-CARD
To: Tyhee
Issue: Camp Location and Parking Lot

Background

Tyhee's DAR proposes to construct a 200 person camp west of the Discovery Mine cover system (Section 4.5.3 of the DAR). Though not shown on the figure, the proposed facilities are adjacent to the existing non-hazardous waste landfill at the Discovery Mine site. It is unclear if the parking lot area will be prepared using blasting or leveling by application of additional fill.

Request

1. Please clarify the proximity of the proposed facilities to the existing Discovery Mine site landfill and cover system, along with details on surface water drainage plans for these areas.
2. Please provide more information on the construction of the parking lot area.
3. Please describe the mitigation strategies that Tyhee would take to avoid potential impacts to the integrity of the landfill cover system and avoid traffic on the surface of the landfill cover system.

IR Number: 20

Source: AANDC-CARD
To: Tyhee
Issue: Round Lake Outflow Management

Background

Tyhee's DAR notes that, during operations, outflow from Round Lake will be directed into the Tailings Containment Area (TCA) (Section 6.2.1.1 of the DAR). There is no detail provided in the DAR on how this water will be directed into the TCA which will be located up-gradient from the natural discharge location. Subsequent MVEIRB submissions have indicated the proposed waste rock pile location has been moved and will now cover the majority of Round Lake, however no details were provided in terms of what base preparations will be made, how water will be managed and whether diversion ditches will be constructed in or around the tailings cap system. It should be noted that there are submerged tailings in Round Lake, and the Round Lake system has been used as a polishing area for water flowing off the tailings cap in that direction.

Request

1. Please provide more details on the management of surface water flow from Round Lake during the operational phase of the project.
2. Please describe the mitigation strategies that Tyhee would take if discharge from Round Lake is not properly managed and the water level in Round Lake may rise to the point where a portion of the Discovery Mine tailings cover is submerged.
3. Please confirm the exact location of any proposed waste rock pile, and if within the Round Lake catchment area, how the base of the pile will be constructed to minimize impacts to tailings, whether diversion ditches are required and where, and any expected change to the water level within or adjacent to the tailings cap system.
4. As the Round Lake polishing system is now likely to be disturbed by the project, please clarify how water quality objectives will be obtained for not only the components Tyhee is directly responsible for, but also for the contaminants associated with the historical Discovery Mine.
5. Clarify how the Round Lake outflow will be managed prior to, during and after the revised waste rock pile construction timeframe. Different mitigation measures are expected to be required during these distinct timeframes.

IR Number: 21

Source: AANDC-CARD

To: Tyhee

Issue: **Borrow Source Development and Transportation**

Background

Tyhee proposes that some borrow material may be sourced from the esker complex located east of the Discovery Mine site. No information regarding how these materials will be transported to the site or stockpiled on site prior to use has been included within the DAR.

Request

1. Please provide more information on the transportation routes and whether it will cross any of the remediated areas of the Discovery Mine site and Borrow Pit areas.
2. Please provide more information on the site/location of stockpiling of material and whether it will be placed within the remediated Discovery Mine site area, including all areas of the tailings cover system.
3. Please provide more information on the ABA testing results for any borrow sources considered to be used on site.

CARD Information Requests to Tyhee NWT Corp Responses

IR Number: 1-1-5

Source: AANDC-CARD

To: Tyhee

Issue: **Water Quality Issues Related to Existing Impacts from
Discovery Mine (Cumulative Effects)**

Background

In a MVEIRB submission by Tyhee to IR Number 1-1-5 dated May 29 2012, Tyhee indicated one of their proposed waste rock pile locations has been moved and will now will cover a larger portion of the Discovery Tailings cap, and completely cover Round Lake.

Tyhee's response has changed significantly from the original waste rock management proposal submitted in their DAR and no details have been provided that will allow AANDC-CARD to properly assess the potential impacts of the proposed new waste rock location on cumulative water quality relating to the existing impacts from the Discovery Mine, the integrity of the Discovery Tailings cap and on other engineered structures relating to the remediation of the Discovery Mine site. In order to do so, AANDC requires additional information on the engineering and geotechnical designs for the proposed new waste rock management system.

It should be noted that the tailings cap from the remediation of the Discovery Mine site is spread over is over 33ha and contains 1,100,000 tonnes of mercury-containing and acid generating tailings. There are also submerged tailings in Round Lake, and the Round Lake system has been used as a polishing area for water flowing off the tailings cap in that direction as well as any porewater release.

Request

1. Please provide more information on the engineering and geotechnical designs for the construction of the waste rock storage facility covering Round Lake and part of the Discovery Mine tailings cap, including but not limited to its area, size of waste rock material, volume of material, and mass and depth of waste rock material. The design should also describe mitigation measures to address the expected puncturing of the low-permeability clay cap and potential flushing out of contaminated pore water associated with additional loading and traffic.
2. Please provide more information on how (what size of machinery and associated ground pressure and vibration) and when (what time of year) the waste rock facility will be constructed, including associated risk and mitigation measures.

3. Please provide more information on the proposed new waste rock facility in relation to all remediated structures associated with the remediation of the Discovery Mine site.
4. Please describe the management actions that Tyhee would take in response to potential damage or failure in the integrity of the Discovery Mine tailings cover associated with the waste rock storage facility.
5. Please provide more information on the water management system associated with the proposed new waste rock containment facility.
6. Please provide more information on how Round Lake, run-off and seepage from the new waste rock storage facility will be drained directed to the TCA or treated and/or discharged to the environment.
7. Please clarify how water quality objectives will be obtained for not only the components Tyhee is directly responsible for, but also for the contaminants associated with the historical Discovery Mine.
8. Clarify how the Round Lake water and outflow will be managed prior to, during and after the revised waste rock pile construction timeframe. Different mitigation measures are expected to be required during these distinct timeframes.

AANDC IRs - Tyhee's MAY 31st, 2012 Responses to the MVEIRB

IR: 1-2-1-1

SOURCE: AANDC

TO: Tyhee NWT Corporation

SUBJECT: Nicholas Lake Deposit

PREAMBLE:

AANDC provided correspondence with the Tyhee from June 25th, 2012, RE: the Nicholas Lake deposit. AANDC was under the impression that Tyhee had modified its mine plan to remove or exclude the Nicholas Lake deposit and focus only on the Ormsby deposit which was extended to have a 10 year life. However, Tyhee clarified that the Nicholas Lake deposit was still a part of the mine plan but that it would not be included in the mine plan until year 4 of the operation.

AANDC is concerned that the information currently available from the company (May 31, 2012) only includes characterization of the Ormsby deposit and tailings. No characterizations have been presented on the Nicholas Lake deposit or tailings. However, Tyhee indicated that additional test work is being conducted at this time on the Nicholas Lake deposits and tailings. Tyhee expects that the results of this work will be available soon.

REQUEST:

- a. Provide the results of test work conducted on the Nicholas Lake deposit and tailings, similar to that provided for the Ormsby deposit and tailings.
- b. Provide any updates to the tailings facility and water balance that may result from the additional tailings volume and quality, which may require placement in the center cell of the TCA. Determine if the Nicholas Lake tailings will also require subaqueous disposal.
- c. Describe or provide preliminary engineering designs or descriptions of the North and South Divider Dams and the North and South Embankment. Explain how the dividers will be placed in Winter Lake and whether any draw down will be required prior to construction.
- d. Describe any interconnections between Winter Lake and the local groundwater zone. Discuss whether the use of Winter Lake as a TCA could degrade local groundwater in the area.

IR: 1-2-1-2

SOURCE: AANDC

TO: Tyhee NWT Corporation

SUBJECT: Proposed TCA and Subaqueous Disposal

PREAMBLE:

Based on the planned operational philosophy, the TCA pond volumes were estimated throughout the life of the project where the initial pond volume is that of southern portion of Winter Lake, 1.4 million m³. As the operations continue, the pond volume is continually decreasing as the water in the TCA is used to make up the process water shortfall for operations. For average climatologic conditions, the pond volume ranges from 300,000 to 1.4 million m³ for the life of the project. After year 4, it is necessary to supply additional makeup water from Giauque Lake for the ore processing operations.

Due to the location of the project, during the winter months, the pond is expected to freeze. Therefore, analyses were performed to estimate the depth of ice in the pond for the life of the project since when portions of the pond are frozen, this water cannot be reclaimed. When the frozen pond volumes are compared with the total pond volumes, at times, especially after the first few years of operation, a significant portion of the pond volume (up to 90 percent of the total volume) is frozen in the winter months. Make-up water will likely be drawn from Giauque Lake.

Flotation tails are to be deposited in the southern and northern cells while the leached tailings are deposited sub-aqueously in a center cell mixed with a yet to be determined amount of flotation tailings. The northern and southern embankments are designed with graded rock layers with a low-permeability core to minimize leakage.

REQUEST:

- a. Confirm the average depth of water in each cell of the TCA facility.
- b. Determine the anticipated maximum volume and depth of Leach Tailings to be placed in the center cell of the TCA and how much water will be required in the cell to maintain an adequate cover during low water years (i.e. when water volume is reduced to ~300,000 m³). Indicate whether the tailings volume within the center cell will increase once processing of the Nicholas Lake deposit begins.
- c. Please describe how the Float and Leach Tailings will be deposited into the center cell to ensure that Leach Tailings remain below the water surface and do not become exposed during later years in the mine life.

- d. Please describe the source of discharge water that will be pumped to Narrow Lake (i.e. which cell). Describe if poor quality water that results from the leachate from the Leach Tailings will be controlled and prevented from migrating to the North and South cells of the TCA.
- e. Determine if the placement of tailings into the TCA displaces the volume of water that exists in the TCA during startup of the processing plant. Describe the total number and proposed methods of raise the TCA embankments and Cell Dividers during the course of the mining operation.

IR: 1-2-1-3

SOURCE: AANDC

TO: Tyhee NWT Corporation

SUBJECT: Acute/Chronic Toxicity Testing

PREAMBLE:

Tyhee requested acute toxicity testing be completed on the mixed tailings supernatant and more recently on the Ormsby processing supernatant. For the later testing, a sample of the master composite float tailings supernatant, which had been left in contact with the tailings for 6 weeks to better approximate the conditions in the TCA, was subjected to WET testing. The sample was tested against *Daphnia magna* and *Pimephales promelas* (fathead minnow).

The results indicate a 100 percent survival rate for both organisms. These data are consistent with testing conducted on the combined Ormsby and Nicholas flotation tailings which reported 100 percent survival for a 48-hour test using *Daphnia magna* and 100 percent survival for a 72-hour test using rainbow trout.

However, AANDC does not believe any chronic toxicity testing has been conducted to date on the supernatant water. AANDC notes that under the Metal Mining Effluent Regulations, effluent cannot be acutely toxic. Testing done thus far suggests that the simulated effluent is not acutely toxic. Still, simulated supernatant effluent may cause chronic toxicity which may cause unacceptably adverse effects to aquatic organisms. At this time we do not know the level of chronic toxicity in the simulated supernatant. Therefore, AANDC cannot fully assess the potential for effects that may result from chronic exposures in Narrow Lake nor determine if they will lead to significant adverse effects during operations and beyond (i.e. 10+ years).

REQUEST:

- a. After the completion of the Nicholas Lake deposit characterization work, conduct whole effluent chronic toxicity testing using test methods and species approved by Environment Canada.

IR: 1-2-1-4**SOURCE:** AANDC**TO:** Tyhee NWT Corporation**SUBJECT:** EEM /AEMP Monitoring Designs**PREAMBLE:**

Tyhee responded to the MVEIRB IR 1-1-4 regarding Water Quality Monitoring and Adaptive Management. Tyhee has indicated that any discharge from the TCA would meet Schedule 4 of MMER. However, Tyhee has not conducted an assessment of the applicability or potential effects to Narrow Lake and downstream water bodies if the effluent discharged from the TCA was at or near the MMER limits presented in Tyhee's Response to MVEIRB's IR 1-1-1. AANDC notes that the MMER values are a minimum standard and many values are as much as 100 X higher than CCME WQG for the protection of aquatic life.

Furthermore, Tyhee's response to the IR provides little information on the proposed monitoring design and methodology for determining adverse effects to the aquatic environment in Narrow Lake and beyond. AANDC is aware that as the YGP is a Metal Mine, the company will be required to prepare an Environmental Effects Monitoring (EEM) program. However, Tyhee has provided little information on proposed monitoring locations, monitoring parameters and monitoring methods. AANDC wishes to inform Tyhee that it has developed AEMP Guidelines to assist proponents in developing and establishing monitoring programs that collect "the right information, at the right locations, at the right time", as well as, attempt to harmonize the EEM/AEMP monitoring programs.

AANDC wishes to ensure that the Proponent will have the ability to detect change and implement management response in a timely and effective manner.

REQUEST:

- a. Tyhee review AANDC's AEMP Guidelines and prepared a conceptual monitoring framework for Narrow Lake and the downstream environment that compliments Steps 1 through Step 3 of the AEMP design process.