



Avalon Rare Metals Inc.

**RESPONSE TO THE JANUARY 12, 2012 INFORMATION REQUESTS FROM THE
GOVERNMENT OF NORTHWEST TERRITORIES
FOR THE THOR LAKE RARE EARTH ELEMENT PROJECT
DEVELOPER'S ASSESSMENT REPORT**

**Submitted To:
MACKENZIE VALLEY ENVIRONMENTAL IMPACT REVIEW BOARD**

February 2012

Avalon Rare Metals Inc. (Avalon) is pleased to provide the following responses to Government of Northwest Territories' information requests provided via Mackenzie Valley Environmental Impact Review Board (MVEIRB) on January 12, 2012. Avalon's responses are found after each information request.

IR Number:	GNWT #1
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Adaptive Management
DAR Section:	7.0; 10.0
TOR Section:	3.4

Preamble:

Adaptive management plans must be in place to ensure unforeseen negative socio-economic impacts will be adequately addressed. Examples of unforeseen negative socio-economic effects include but are not limited to:

- Actual northern employment for operations coming in below the predicted 39 percent (%);
- Actual northern procurement for operations coming in below the predicted 39%
- Northern residents not filling entry level positions and/or apprenticeships as predicted;
- Increases in family breakdown among employees. It is important to know how Avalon will apply adaptive management throughout the life of the project to address changing and unexpected conditions, impacts and effects.

GNWT Request #1

1. Describe what steps Avalon will take to adapt to negative socio-economic effect, such as those identified above?
2. Additionally, please specify at what point Avalon will initiate mitigation actions under the identified circumstances.

Avalon Response #1.1

Avalon has identified several strategies in the DAR to maximize Northern employment and procurement and to minimize disruption to employee's families and communities. The primary strategy that Avalon uses to identify issues, identify mitigation measures, and/or adapt its strategies to avoid or mitigate negative socio-economic effects (that are within Avalon's responsibilities) is to continue to meet with the GNWT and Aboriginal partners.

Although not achieving predicted northern employment or procurement estimates is not ideal, it should still not be considered negative. However, it is understood that not achieving northern employment or procurement estimates is a potential outcome based on past mining experiences and the amount of skilled labour and available suppliers. Avalon has reviewed the lessons learned and the demographic data to identify potential issues.

Avalon has stated that it will maximize northern employment to the greatest extent possible to enhance local community economic benefits and to minimize the transportation burden associated with hiring employees from the south. The NWT currently has a limited labour pool due to the increased activity from existing mining operations and exploration projects. Avalon remains committed to its training and development initiatives to train and hire northern residents as well as work with the GNWT on ways to attract and retain individuals from the south.

Regarding procurement, the NWT is not currently producing the necessary reagents required at both plant sites, which make up a large component of operating expenditures. Avalon is working with the GNWT on the development of a local limestone supplier to eliminate the need for limestone being shipped to our Project sites from the south. Additional mitigation measures related to supporting local businesses in achieving contracts are described in Avalon Response #2.4.

During the Project's design, Avalon has already adapted its Human Resources strategy to include more flexible employee scheduling (one week on, one week off) to minimize disruptions to community and family life. Avalon will continue to monitor the feedback from its employees to determine if changes to its Human Resources strategy and policies are necessary.

Avalon Response #1.2

Over the past year, Avalon has been working with the GNWT to identify these types of challenges and determine how to best mitigate barriers to permanent residences in the NWT. A large barrier at the moment is available housing in Yellowknife and Avalon is hopeful that joint efforts with the GNWT and its Aboriginal partners will help to develop future housing for employees that are moving to the north.

Avalon intends to begin finalizing its detailed job descriptions this year, and will then work with the Aurora College and Mine Training Society to develop specific training courses that can be offered to our aboriginal partner communities and any willing participants in the region.

Avalon has identified several mitigation measures in the DAR that it plans on implementing. Avalon will continue to monitor the feedback from its employees, the GNWT, and its Aboriginal partners to determine if additional mitigation measures should also be implemented. As shown in the examples above and in the DAR, Avalon continues to be proactive in attempting to resolve issues before they arise.

IR Number:	GNWT #2
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Procurement
DAR Section:	7.1.2; 7.1.4; 7.2.14; Appendix K
TOR Section:	3.4

Preamble:

To protect the well-being of Northwest Territories (NWT) residents, it is important to promote resource development projects which support the achievement of economic self-reliance at the local level and maximize opportunities for local retention and investment of profits (GNWT Sustainable Development Policy).

As an example of the potential of the NWT to build capacity in providing mining services for the industry, the three NWT diamond mines have and are spending a cumulative total of 73% of their procurement purchases in the NWT. In contrast, in the DAR (sections 7.1.2, 7.1.4, Appendix K) the developer states that \$1,229 million in purchases will be made in the NWT for the project. This number represents only 38% of the total \$3,214 million in purchases for the project. Exhibit 1 of Appendix K shows that 25% of construction purchases and 39% of operations purchases (over 18 years of production) will be made in the NWT.

The GNWT has found that NWT businesses informed about available contracts and provided with information sessions on business and procurement opportunities are more likely to be able to participate in contract opportunities. Advanced communication of business opportunities is critical for northern businesses to compete to the best of their abilities.

The GNWT would like to ensure that opportunities for business development are maximized locally and territorially, and requests further details in this regard.

GNWT Request #2

1. Please provide a rationale, including methodology, for calculating total project purchases in the NWT.
2. Please provide further information on the type of purchases Avalon intends to make outside the NWT.
3. Please define and list the goods and services that Avalon considers specialized and non-specialized.
4. What steps will Avalon take to engage the local and NWT business community in competition for procurement contracts?
5. What steps will be added to ensure that local and NWT businesses have equal opportunity to compete on all procurement contracts, even those deemed to be specialized?

Avalon Response #2.1

Avalon provided a financial pro forma with detail on construction and operating expenditures by major category to an economic consultant. Avalon and the economic consultant discussed and arrived at reasonable shares of expenditures made to NWT businesses and interests.

The resulting estimates of purchases flowing to NWT businesses are conservative for several reasons:

- no allowance is made for the startup of new businesses to serve the mine;
- no allowance is made for growth over time (i.e. the NWT share is an initial year share); and
- the allocation of certain purchases to the NWT is conservative and somewhat arbitrary. For example, fuel would be trucked from Alberta and, therefore, fuel costs were attributed to the Rest of Canada even though the fuel supplier has an NWT business presence (we could have attributed fuel costs to the NWT in which case the NWT share of total operating purchases would have risen by 10 percentage points to 49%).

It may be that NWT diamond mines, in their declarations of local sourcing, attribute fuel costs to NWT. In addition, one would expect the local NWT sourcing of diamond mines, which are much larger ventures, to be greater than for the Thor Lake project.

The rationale behind our regional sourcing assumptions was a philosophy not to overpromise regarding potential NWT benefits; rather, the estimated NWT purchases should be considered a floor for total project purchases in NWT.

Avalon Response #2.2

At this point Avalon does not have the details on the specific purchases that will be made during the Project. The bulk of purchases from outside the NWT will be on customized equipment and supplies that are not currently available in the NWT, such as customized intermodal containers and reagents.

Avalon Response #2.3

For the purpose of interpreting the DAR, specialized is defined as custom, expert, or specific to a certain purpose or service. Non-specialized is defined as standard or commonly used or available. For example, in the DAR, Section 7.1.4 refers to “specialized goods and services/ expertise in the north”; in this case, specialized refers to customized goods or services, that are specifically related to rare earth mining, and that may not be considered standard or commonly available.

At this point Avalon does not have the details on specific purchases that will be made during the Project. Given the unique requirements of rare earth processing, the supply of the materials and services required is simply not available at this time in the north like it is for many of the more standard metal mines and processes. Included in this is the manufacture and supply of significant quantities of reagents and specialty processing equipment.

Avalon Response #2.4

The NWT Business Development and Investment Corporation (BDIC) and the GNWT ITI regional offices currently support the development of local and regional businesses in our operating areas. In considering contract bids, Avalon will prioritize Aboriginal and northern businesses, and will implement measures to maximize local business opportunities. These measures include:

- prepare an annual business opportunities forecast to identify foreseeable procurement requirements for mining equipment, operations and maintenance support services;
- provide technical support and assistance in accessing sources of commercial capital;
- identify Project components at all stages of development and operations that should be targeted for the northern business development strategy;
- facilitate subcontracting opportunities for northern businesses; and
- identify possible opportunities for joint ventures with Aboriginal and northern businesses.

Avalon will first work with our Aboriginal partners to identify supply and services contracts. Following that, and prior to construction activities, Avalon will undertake a process to review and prequalify NWT suppliers of goods and services. This will give local enterprises an early opportunity to understand the requirements of Avalon in all aspects of the contract including environment, health and safety requirements and standards, specifications (quality), quality control requirements, quantities, and delivery time and dates, amongst others.

Once the Project is approved and funded, a local NWT office and website will be opened to allow local suppliers to enquire about potential future business opportunities. Following agreements with our Aboriginal partners, prequalified suppliers/contractors will be among the first to be given an opportunity to bid on various contracts. Bid packages will be prepared for a variety of supplies and services and will regularly be advertised in appropriate local media where known capacity exists. Where a local business or supplier is identified and prequalified but unable to handle the quantities, efforts will be made to break up the contract to sizes manageable by local contractors in an effort for them to bid and hopefully be competitive.

In the case of small businesses, Avalon will make an effort to assist them in the development of systems and protocols that will be required during the bidding process. This will include support such as providing examples of environment, health and safety management plans, quality assurance/quality control protocol, if appropriate.

All of the measures described in this section can be provided early in the bidding processes to give local suppliers an opportunity at these contracts. Similarly, the Engineering, Procurement, Construction and Management (EPCM) contractor, who will assist Avalon Management to construct the Project, will be instructed to meet these requirements as well.

Avalon Response #2.5

Avalon is committed to preferentially purchase materials and services in the NWT as long as they meet the product/service requirements and are competitive in price, including those identified as specialized where it is feasible to do so.

As described in Avalon Response #2.4, Avalon will implement measures to maximize local business opportunities. These measures will include:

- prepare an annual business opportunities forecast to identify foreseeable procurement requirements for mining equipment, operations and maintenance support services;
- provide technical support and assistance in accessing sources of commercial capital;
- identify Project components at all stages of development and operations that should be targeted for the northern business development strategy;
- facilitate subcontracting opportunities for northern businesses; and
- identify possible opportunities for joint ventures with Aboriginal and northern businesses.

IR Number:	GNWT #3
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Public Reporting
DAR Section:	7.0
TOR Section:	3.4 (K5)

Preamble:

In section 7.0 of the DAR, the developer discusses its human environment assessment, including socio-economic effects, employment and business opportunities and social effects. When considering how these effects are monitored, it is important to understand how key information from this project will be gathered and reported to the public.

The GNWT sees public reporting as an important part of the EA process. Public reporting is key to understanding the accuracy of a project's EA. It is also important in determining potential adverse effects and enabling mitigation measures to be adjusted when necessary. The GNWT uses the information published by developers in the NWT to monitor and interpret the accuracy of the EA and also whether the socio-economic wellbeing of northerners is protected.

It is accepted practice for developers in the NWT to collect and annually report the socio-economic data listed below to both the GNWT and the public.

GNWT Request #3

1. Please confirm whether Avalon will collect and publicly report annually on:
 - a. hiring by hiring priority and job category in total numbers and percentage of total hires;
 - b. hiring by NWT community in total numbers and percentage of total hires;
 - c. total employment in person years by hiring priority and job category in total numbers and percentage of the workforce;
 - d. total employment in person years by NWT community in total numbers and percentage of the workforce;
 - e. total number of NWT resident employees who resigned or who were laid off, fired or otherwise terminated in the previous year;
 - f. participation in and results of training activities;
 - g. report on the gross value of goods and services purchased during the calendar year by major category of purchase in relation to each phase of the project. ('Purchases' based on the gross value of all purchases of goods and services including both goods and services produced in the NWT and goods and services produced outside the NWT that are purchased through NWT Businesses);

- h. a business forecast and assessment for the upcoming year; and
 - i. advancement and promotion of northerners including Aboriginal northerners.
2. Additionally, please identify what steps the developer will take to ensure it can collect, evaluate and report information annually on behalf of itself and its contractors?

Avalon Response #3.1

Avalon will be reporting its hiring statistics in its sustainability reports. As a first priority and as per our Aboriginal Accommodation Agreements, Avalon will make all reasonable efforts to employ Aboriginal employees, and secondarily to hire personnel from the NWT. Within possible confidentiality restrictions, it will include breakdowns between contractors and employees, between Aboriginal, northern (NWT) and other employees, both in terms of total employees and as percentages of the total workforce at all project sites (not just Thor Lake). As our systems mature and the company grows, we anticipate that we will further break down our reporting into job categories such as skilled and unskilled labour and by gender in an effort to eventually drive performance objectives in these areas. Other categories may be created to develop metrics for employment targets in specific areas.

In the future, Avalon proposes to track its ability to retain employees (i.e., track the number of employees who resign or are terminated – again, within the limits of confidentiality) in an effort to develop strategies aimed at optimizing the retention of competent employees. This may include targets for the advancement and promotion of Aboriginal and northern employees, but this is unlikely to occur in the early years of construction and operations where the focus will be on ensuring adequate skills and retention of existing employees.

Avalon will also invest in training activities, both internally and with external organizations. It has already reported its success with a targeted Aboriginal training program for driller helpers where Avalon successfully hired and retained a number of trainees from this program. (Please note that Avalon cannot legally or logistically track the employment success of individuals attending external training programs who do not decide to work with Avalon). This kind of focused training will continue in the future in our ongoing efforts to hire and retain local employees.

There will be several levels of training available to existing and future employees. It can include internal classroom training by Avalon trainers or contract trainers, particularly in the areas of health, safety, environment and community. Avalon will investigate opportunities to have external organizations, and especially Aboriginal training facilities, assist in cultural/community training activities as a minimum. In some cases, there will be “on the job” training, particularly for the more unskilled training activities during construction. Avalon will also support employees to participate in external training programs; this includes northern colleges in the area of apprenticeship training for some of the higher skilled job categories. It is anticipated that this training will increase prior to and during operations.

Due to the unpredictability of many factors there are no plans at this time to prepare detailed financial expenditure forecasts on an annual basis other than providing general, forward-looking statements. However, upon approval of the Project and as we advance construction and enter into operations, Avalon will be generating these forecasts.

Avalon Response #3.2

As our systems mature and the company grows, we anticipate that Avalon's Human Resources department will track several metrics. Data will be recorded specifically when employees are hired, promoted, and leave the company. Contractors will be required to track the same metrics.

Information reporting will occur through continued engagement with communities and governments. An annual Corporate Social Responsibility Report will also be prepared and distributed, which will evaluate and report on the metrics. If requested, Avalon would allow access to the mine site for the GNWT Bureau of statistics to conduct mine-employee surveys, similar to arrangements made for the *2009 NWT Survey of Mining Employees*.

IR Number:	GNWT #4
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Closure and Reclamation
DAR Section:	10.0
TOR Section:	3.4-17

Preamble:

While development is an important part of the NWT economy, so too is the well-being of NWT residents when considering the adverse effects of a boom-bust economy associated with non-renewable resource development. Avalon details its closure and reclamation plan in the DAR. This plan mainly considers the biophysical environment in terms of reclamation after closure (DAR section 10).

It is important that the local workforce, local businesses and communities are prepared for a successful transition by having in place plans and strategies to minimize the possible negative effects of mine closure, including unforeseen early closure and temporary shutdown, and to assist them in post-closure transition (TOR 3.4-17).

GNWT Request #4

1. When considering unforeseen closure, including temporary or early closure, please describe the method and timing of notice given to employees and GNWT program departments (in addition to requirements under the *Employment Standards Act*) should the need for lay-offs occur.
2. Please describe what anticipated steps Avalon will take to mitigate the negative effects of both temporary and permanent mine closure for local and regional businesses and communities.
3. Please describe what steps Avalon will take to mitigate the negative effects of both temporary and permanent mine closure for employees.

Avalon Response #4.1

Closure plan development and periodic review will be done in consultation with our Aboriginal partners, communities, the GNWT and other stakeholders in an effort to ensure that the plan's objectives and implementation are adequate and consistent. As required by legislation, the plan will be financially assured.

In addition to the requirements under the *Employment Standards Act*, with respect to any closure activity, the following principles will apply.

- a. Avalon will treat all employees with dignity and respect and will address issues and concerns in a timely manner.
- b. Communications with employees and the community will be done proactively and in a timely manner.
- c. With respect to permanent closure, Avalon will participate in and support the development of outplacement program(s) that will assist employees in training activities and adjustment to future endeavors.
- d. Avalon will empower employees to take the responsibility in their career decisions.
- e. The application of Avalon policies and procedures will be applied consistently and fairly across the operation.
- f. Avalon will develop specific human resource plans in advance of an anticipated final closure that will contain information regarding topics such as:
 - Production and personnel downsizing plan;
 - Outplacement activities (e.g., job search, interview skills, financial planning, change management, potential transfers within Avalon);
 - Communications (employees, Aboriginal partners, stakeholders); and
 - Human resources administration after closure.

A closure plan has been prepared. At approximately three years prior to closure, final detailed planning will occur that takes into consideration bio-physical and socio-economic conditions, and once completed, will be communicated to the employees, our Aboriginal Partners, and other stakeholders.

Avalon Response #4.2

It is difficult to predict the potential effects of a future temporary or permanent mine closure on the local and regional businesses and communities. Given the size of Avalon's operations relative to other businesses in the NWT, the effect of Avalon's closure would not be expected to have a major effect on the territories' business community.

In terms of mitigation measures, Avalon has committed to work with our Aboriginal partners, the communities, and our employees to support education and training that will increase intellectual capital and capacity, which is both sustainable and transferable to other opportunities. Furthermore, Avalon will continue to support, where practical and affordable, the development of local businesses.

Communication with suppliers, contractors and communities in advance of closure and during periodic reviews of the closure plan will allow each party to determine the potential effects of closure and to take action to mitigate those effects.

Effects from permanent closure will be partially mitigated in the short term by closure activities such as facility demolition and site restoration.

To the extent feasible and subject to approval of our Aboriginal partners and other stakeholders, Avalon would consider options whereby local businesses may use or relocate facilities for alternate purposes. This could include, for example, using or relocating infrastructure such as the maintenance facilities and shops, warehouse facilities, or camp. This would contribute to ongoing economic benefits after closure.

Sustained economic growth in the territory would also reduce the effect of the Thor Lake Project's eventual closure. It is the Aboriginal, federal, territorial and municipal governments' responsibility to manage the economic development of the north and to maintain social programs (such as employment insurance). Avalon will contribute to economic growth and development during the construction and operations phases through employee and business tax as well as the taxes of the suppliers and contractors that provide goods and services to Avalon.

Avalon Response #4.3

Avalon's primary mitigation measures to reduce the effects of mine closure on employees are two-fold:

- Proactive communication with its employees regarding any closures;
- Promoting and supporting education and training to increase an employee's capacity and, ultimately, transferability.

In addition to the actions identified in Response #4.1 and #4.2, employees who are affected by a temporary closure will be allowed to use their vacation time to partially offset the loss of wages.

During a temporary closure, a number of employees will continue to work on either a full or part time basis in care and maintenance activities, maintenance of water treatment facilities, and other activities related to sustaining the infrastructure until start up.

IR Number:	GNWT #5
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Employee Accommodation
DAR Section:	7.13, 3.2.2, 4.9.1
TOR Section:	3.2.5, 3.4

Preamble:

At the December 7, 2011 meeting between Avalon and the GNWT, Avalon described the variables surrounding the potential employee schedule at the hydrometallurgical plant. Avalon's preference is to have employees live within or re-locate to Hay River or Fort Resolution to work at the hydrometallurgical facility. Should employees not be able to re-locate, it is uncertain how they will maintain employment without accommodation.

GNWT Request #5

1. Please clarify what accommodation Avalon will provide to employees living outside of Hay River and Fort Resolution employed at the hydrometallurgical facility.

Avalon Response #5

If employees are unable to relocate to Fort Resolution or Hay River during operations, Avalon may arrange for accommodations in Hay River or Fort Resolution for employees during their rotation at the Hydrometallurgical facility. No accommodations will be provided at the hydrometallurgical facility during operations.

Temporary accommodation will be available for most construction workers at the Hydrometallurgical Plant during the construction phase.

IR Number:	GNWT #6
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Training
DAR Section:	3.1 – 3.3, 4.9, 6.14, 7.1.3 – 7.2.10, Table 4.9.4, 7.0.1, 7.1-4
TOR Section:	Concordance Table – Sec 3.2.4, 3.4 Plant Site – No. 10 – 12, 22, 35, 40, 41, 44, 73 – 76, 78-81, Appendix A, Appendix K1, K2

Preamble:

Avalon's Human Resources Management Plan, which is being finalized, may address some of the GNWT's questions, but in order for the GNWT to determine whether training and employment opportunities and hiring practices for Aboriginal and northerners in the NWT are being maximized throughout each phase of the project, and to assess these aspects of Avalon's project and its approaches and ensure adequate delivery, more information is required.

GNWT Request #6

1. Please indicate when the Human Resources Management Plan will be finalized and shared with the GNWT.
2. Clarify minimum grade level or experience for employment (7.2.10).
3. Education and Training. Please describe and detail Avalon's:
 - a. training and education partnerships with the Mine Training Society, Aurora College, the territorial Department of Education, Culture and Employment and other agencies and organizations in the NWT to address limited training capacity in the communities and improve access to training for community members,
 - b. pre-employment training programs that will enable potential employees to be ready and prepared to take advantage of immediate employment opportunities,
 - c. programs and initiatives to reduce the barriers to hiring and retaining employees including local study area residents, including Aboriginal and northern women, those with low education levels and/or single parents and that support their ongoing participation in the workforce,
 - d. supports and programs regarding on and off site professional development and opportunities for all employees to facilitate career advancement throughout all phases of the project,
 - e. cultural awareness and diversity training programs, and
 - f. plans to recognize cultural difference and support cultural activities on site and in the affected communities.

4. Employment. Further to Avalon's Human Resources Plan Outline - Table 4.9.3, please describe and detail the following:
 - a. plans to help attract, retain and support Northwest Territories' (NWT) residents before, during and after the project life,
 - b. the breakdown and explanation of job classifications beyond skilled and unskilled,
 - c. the inconsistencies in classifications (e.g. loader operator identified as unskilled under distribution and skilled in hydromet plant surface),
 - d. the training/apprenticeship opportunities for Aboriginal/northern hires as some positions appear to be "trainable",
 - e. which positions are apprenticeship positions and provide information regarding Avalon's support for apprenticeship training and occupational certification – including attending technical training, achieving the required number of hours etc.,
 - f. why site cleaners, trainers, cooks, custodians etc. are not included in this table and address this omission,
 - g. the preferential hiring and procurement practices of Avalon and its contractors throughout the project, and
 - h. the method and frequency for monitoring and reporting on apprenticeship participation and employee advancement and training.
5. Please provide further information Avalon provided in Table 7.1.4 and 7.1.5 please detail and describe:
 - a. how the company will meet its NWT hiring goals based on LSA/NWT communities' employment pool and degree of workplace readiness,
 - b. the plans to increase and maximize the number of NWT employees at all stages of the project, and
 - c. training, recruitment and retention approaches/incentives in local/regional affected area and other NWT regions outside the North and South Slave.

Avalon Response #6.1

The Human Resources (HR) Plan is at a conceptual level and will be developed in detail, stage-by-stage, throughout the life of the project. The first stage of this plan is the recruitment strategy, which is discussed in Section 4.9.3 of the DAR. Although Avalon looks forward to working with the GNWT and training institutions to meet its goal of maximizing Aboriginal and northern employment, Avalon will endeavor to complete its HR Plan for construction by the end of this year while the operations plan will be developed in 2013.

Avalon Response #6.2

Avalon is committed to employing as many persons as it can from the locally available labour pool. The criteria for employee selection will recognize the value of years of work experience. However, it needs to be emphasized that completion of Grade 12 is typically a minimum requirement, particularly for the more skilled positions.

Avalon Response #6.3

Avalon is in the process of creating its education and training programs and is following the guidelines outlined in the DAR, under Section 4.9. Avalon will also invest in training activities, both internally and with external organizations. It has already reported its success with a targeted Aboriginal training program for driller helpers where Avalon successfully hired and retained a number of trainees from this program. This kind of focused training will continue in the future in our ongoing efforts to hire and retain local employees.

There will be several levels of training available to existing and future employees. It can include internal classroom training by Avalon trainers or contract trainers, particularly in the areas of health, safety, environment and community. Avalon will work with the Aurora College and Mine Training Society to develop specific training courses that can be offered to willing participants. Avalon will investigate opportunities to have external organizations, and especially Aboriginal training facilities, assist in cultural/community training activities.

In some cases, there will be “on the job” training, especially for the more unskilled training activities during construction. Avalon will also support employees to participate in external training programs; this includes northern colleges in the area of apprenticeship training for some of the higher skilled job categories. It is anticipated that this will increase prior to and during operations.

Avalon is exploring several programs that may assist with the Company’s training needs. Each program has specific criteria established by its governing organization that employers must meet to become eligible for participation. Avalon will contribute to the training program(s) it uses by following the governing organization’s established criteria and guidelines. The programs that Avalon is currently considering include the following:

Mines Training Society

- Aboriginal Skills and Employment Partnership (requires multi-year training-to-employment plan).

Aboriginal Human Resources Development Council of Canada

- Project Partnerships

Service Canada

- Job Creations Partnerships

Northwest Territories Culture, Education and Employment

- Apprenticeship - Subsidized Wages
- Training on the Job - Subsidized Wages
- Training Plan Development
- Wage Subsidy Programs
- Employment Assistance Programs

Avalon Response #6.4

The Human Resources Plan is at a conceptual level and will be developed in detail, stage-by-stage, throughout the life of the project. The first stage of this plan is the recruitment strategy, which is discussed in Section 4.9.3 of the DAR. Other information related to supporting NWT businesses is described in Avalon Response #2.4

Avalon is currently working on its employment details for operations. This is expected to be completed well before operations begin, during the 18-24 month construction period. The employment details will provide additional information on job classifications, potential apprenticeship positions, etc. Avalon will work with the Aurora College and Mine Training Society to develop specific training courses that can be offered to willing participants.

The preferential hiring and procurement practices of Avalon and its contractors are discussed throughout the DAR and in Avalon Response #2.4.

Current plans for monitoring and reporting regarding Human Resources metrics are described in Avalon Response #3.1.

Avalon Response #6.5

Section 7.1.3 describes Avalon's commitment to hiring northern and Aboriginal employees and contractors. To achieve this commitment, Avalon has made concerted efforts to engage with its Aboriginal partners and the nearby communities to discuss all aspects of the proposed Project, including training and employment. Avalon is currently working on several agreements, which include training and employment commitments made through the life of the project.

Avalon is proud of the relationships it is building with its Aboriginal partners and nearby communities and believes that continued collaboration with them will help overcome several employment barriers that Aboriginal people encounter when looking for a job. Specifically, it is planned that continued collaboration with the communities to identify, communicate, develop and implement training will help mitigate the top three employment barriers identified by the Aboriginal Human Resource Development Council of Canada (2007):

- 1) few or no jobs;
- 2) education/experience mismatch; and
- 3) inadequate job information.

Specific strategies to address workplace readiness are identified in Section 4.9.3 and Section 7.1.3 of the DAR:

Using a strategic recruitment plan, Avalon intends to attract, recruit and retain qualified candidates, with priority given to Avalon's Aboriginal stakeholders and local communities. The five main elements of Avalon's recruitment plan are as follows:

- *Define: Identification phase;*
- *Plan: Strategic development phase;*
- *Attract: Recruitment phase;*
- *Screen: Selection phase;*
- *Select: Job offer phase.*

The recruitment process will be ongoing throughout the Project life. Strategies will include advertising and physical recruitment drives.

Postings for all open positions will be made in the local area newspapers surrounding Yellowknife and Hay River. Advertisements will also be posted in other mining communities throughout the northern territories and in neighbouring provinces. Employment opportunities will also be posted on mining websites such as InfoMine and Misco Jobs.

Physical recruitment drives will be comprised of Avalon Human Resources staff who will travel to various communities to advertise positions. Recruitment drives will provide candidates the opportunity to learn about Avalon, the Thor Lake Project, the positions available, and to submit their resume in person and/or be interviewed. Positions offered through recruitment drives will typically be hourly positions with multiple openings. Regional newspapers

A priority of Avalon's Human Resources Management Plan will be to focus on providing pre-employment training opportunities. The application of this strategy is expected to contribute to increased opportunities for local stakeholders to gain access to jobs and to obtain employment at the TLP. As stated in Section 4.9.4 of the DAR:

Avalon is committed to:

- *Recognizing and building cultural diversity and awareness about our Aboriginal communities through collaboration cultural education;*
- *Identifying and minimizing employment barriers for Aboriginal people in the communities;*
- *Remedying past discrimination in employment opportunities and preventing future barriers through education and appropriate learning and training initiatives;*
- *Improving distribution of Aboriginal employees throughout all occupational levels; and,*
- *Fostering a climate of unity, and equity in the organization.*

Avalon will consult and collaborate with local Aboriginal organizations and communities to encourage the effective development and delivery of the training programs. As discussed in Response #6.3, Avalon is also exploring several externally operated programs that may assist with the Company's training needs. Specifically, Section 7.1.3 states:

Avalon's Human Resources department, in partnership with the Mine Training Society (MTS), is focusing on providing pre-employment training opportunities that will ensure that local stakeholders gain access to employment through the Thor Lake Project. In addition to working with the MTS, Avalon will also be working with Aurora College to develop training programs that are tailored to job-specific functions related to the Thor Lake Project.

Response #2.4 also describes measures that Avalon will implement to support local businesses to bid on potential contracts.

Another incentive used to recruit and retain employees from local and regional communities is Avalon's plan to provide employees with flights from Yellowknife, Lutsel K'e and Hay River to/from the Thor Lake site, and bus transportation from Hay River and Fort Resolution to/from the hydrometallurgical plant site. Response #5 also identifies potential measures to accommodate regional residents in Hay River or Fort Resolution during their rotation at the Hydrometallurgical facility.

IR Number:	GNWT #7
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Employment
DAR Section:	7.1.3
TOR Section:	3.2.4, 3.4, 73-76, 78-81

Preamble:

Avalon discussed, in the DAR, its intended hiring residency preferences and priorities for staffing the mine and hydromet plant. To better understand such hiring efforts, it is important to be clear how each group of people is defined.

To better understand the potential effects of Avalon's hiring strategy, predictions regarding the number of employees to be hired from outside of the Northwest Territories are needed.

GNWT Request #7

1. Please define and/or qualify the following terms:
 - a. Regional
 - b. Hiring preference/priority (Aboriginal, women, single parents, residents)
 - c. NWT First Nations
 - d. NWT resident
 - e. Canadian resident
 - f. Aboriginal
 - g. Aboriginal Community
2. Please provide information on how many and what types of jobs associated with the mine and hydromet plant Avalon anticipates to be staffed outside of the Northwest Territories during each phase of the project.
3. How many jobs are expected to be located outside the NWT during each phase of the project?

Avalon Response #7.1

Avalon is pleased to provide definitions and/or qualify its statements regarding the following terms used in the DAR:

- **Regional** – the term “regional” is used in many contexts throughout the DAR. However, in Section 7.1.3 of the DAR, as referred to in the Information Request, the term “regional” is defined as follows:
 - Table 7.1-6 “Regional Sourcing of Direct Labour” – refers to NWT as the region.
 - “Regional newspapers” – refers to newspapers with distribution in the areas near the Nechalacho and Pine Point site, such as the communities of Yellowknife, Hay River, Fort Resolution, N'Dilo, Dettah, Lutsel K'e and potentially other communities depending on the

distribution range. Depending on the distribution range of these newspapers, Avalon will consider advertising employment notices in newsletters for other communities outside of Yellowknife, Hay River and Fort Resolution, if the option is available.

- “Regional businesses” – are defined as NWT businesses located in the Great Slave Lake region, such as those communities shown on Figure 3.1-1 of the DAR “Communities Located Near Project Sites”.
- It is important to note that the Terms of Reference provided for the DAR by MVEIRB also uses the term “regional” without a specific definition.
- **Hiring Preference/ Priority (Aboriginal, women, single parents, residents)** – this term is not used in Section 7.1.3 or anywhere else in the DAR. However, Avalon does have a preferential northern and Aboriginal hiring policy, which reflects Avalon’s commitment to provide the first opportunity for hiring to NWT residents and Aboriginal peoples with the requisite skills. Based on Avalon’s policy, the terms NWT residents and Aboriginal peoples is inclusive of women, single parents, and residents that meet the NWT and/or Aboriginal standards for preferential hiring.
- **NWT First Nations** – this term is not used in Section 7.1.3 or anywhere else in the DAR. Avalon prefers to use the term Aboriginal in the DAR as it is inclusive of people defined as Indians, Métis and Inuit, as per the Canadian Constitution (see definition for “Aboriginal” below), unless referring to a specific First Nation, such as Yellowknives Dene First Nation, Lutsel K’e Dene First Nation, or Deninu Ku’e First Nation.
- **NWT Residents** – is defined as people who reside in the NWT on a permanent basis. This includes existing residents and in-migrants.
- **Canadian Residents** – is defined as people who reside in areas of Canada outside of the NWT.
- **Aboriginal** – Aboriginal peoples are defined as “the descendants of the original inhabitants of North America. The Canadian Constitution recognizes three groups of Aboriginal people — Indians, Métis and Inuit. These are three separate peoples with unique heritages, languages, cultural practices and spiritual beliefs.” (INAC 2004)
- **Aboriginal Community** – the communities in which Aboriginal people live. In the DAR, communities may be defined living on a reserve, off a reserve, in urban areas, or Inuit communities (as defined in INAC 2004). In Table 5.3-2, the term “Aboriginal Community” is also used to describe the Aboriginal Peoples and organizations that the company engaged with.

Reference:

Indian and Northern Affairs Canada (INAC). 2004. Words First: An Evolving Terminology Relating to Aboriginal Peoples in Canada. Retrieved January 13, 2012 from http://www.collectionscanada.gc.ca/webarchives/20071114213423/http://www.ainc-inac.gc.ca/pr/pub/wf/index_e.html

Avalon Response #7.2

As stated in Response #1.2, Avalon intends to begin finalizing its detailed job descriptions this year, and will then work with the Aurora College and Mine Training Society to develop specific training courses that can be offered to willing participants. The success of this program will partially determine the number and types of jobs that may be filled by NWT residents.

Gislason's report (see Appendix K in the DAR) projected the level of southern workers, in-migrant workers, and northern workers based on current NWT mining experiences. As stated in the DAR and in this response document, Avalon is committed to employing local and Aboriginal residents to the greatest extent possible and is working with external organizations to maximize training opportunities to fill potential positions. Avalon also recognizes that some professional and technical employees may need to be recruited from the south. Avalon will encourage in-migration of any southern hires.

Avalon Response #7.3

Avalon Rare Metals' maintains its corporate office in Toronto, ON and an operations office in Delta, BC. These offices will continue to provide services for the Thor Lake Project. It is expected that most Project jobs will be located in the NWT, at the Nechalacho mine site, the hydrometallurgical facility, and at the administration offices located in Yellowknife and Hay River.

IR Number:	GNWT #8
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Socio-economic impact mitigation – Training Commitments
DAR Section:	4.9.4, 7.1.3, 7.2,
TOR Section:	3.4, 22

Preamble:

To properly assess the potential effectiveness of alcohol and substance abuse, family adaptation and coping mechanisms some clarification regarding mitigation measures is required. These mitigation measures will address the potential increased demand for public services.

Further information regarding Avalon's pre-employment training plans and orientation sessions for new workforce entrants and/or new hires during the project will help identify potential impacts on government programs.

Further details regarding Avalon's and contractor's workplace orientation activities at the community level that will foster local understanding of the project and related opportunities/impacts throughout the project.

GNWT Request #8

1. Please describe how personal health and well-being issues will be addressed and what programs may be developed and implemented during all phases of the project. Specifically confirm whether financial management workshops, alcohol and substance abuse and family adaptation and coping mechanisms' workshops will be implemented on site and in the community.
For each health and well-being program detail how often each will be made available to each employee and describe any resources (brochures, etc.) that will be available outside of scheduled workshops.
2. Please list the communities in which pre-employment training and/or workplace orientation sessions will be held.
3. Please provide further information and clarification regarding pre-employment training and/or workplace orientation sessions that will be made available to new workforce entrants (i.e. for those the mine is their first job) and new hires during all phases of the project.
4. Will pre-employment training or workplace orientation sessions be extended to contract employees? If so, please describe the program. If not, please describe what contractors will be expected to provide in terms of work place training and/or workplace orientation during all phases of the project.

5. Please describe workplace orientation programs for community members that will help to increase local understanding of the project and related opportunities/impacts.

Avalon Response #8.1

Avalon is committed to maintaining a safe and healthy environment for its employees and contractors. Health and well-being programs will be developed in partnership with relevant agencies and affected communities to determine their priorities, avoid duplication, and increase the effectiveness of programming. Avalon would like local communities and agencies to help develop and deliver course content where appropriate.

Avalon Response #8.2

Pre-employment training and/or workplace orientations will combine elements of classroom and on-the-job-training. Portions of the trainings will be site-based at either the Nechalacho or the Hydrometallurgical Plant sites.

Other training locations will be determined by:

- Type of training required;
- Possible efficiencies with existing programs;
- Requests from local and Aboriginal communities;
- Partner organizations' locations - such as MTS or Aurora College; and
- Locations proven most effective for training in terms of recruitment, retention, performance and feasibility.

Avalon will consult and collaborate with local Aboriginal interests and communities to encourage the effective development and delivery of the training programs.

Avalon Response #8.3

There will be several levels of training available to existing and future employees. Training may include internal classroom training by Avalon trainers or contract trainers, particularly in the areas of health, safety, environment and community. Avalon will investigate opportunities to have external organizations, and especially Aboriginal training facilities, assist in cultural/community training activities.

Avalon will train employees in the following areas.

- Safety systems and safe work practices
- First aid and emergency response
- Environmental and waste management
- Construction equipment operation and maintenance
- Mining equipment operation and maintenance
- Process plant operation and maintenance
- Administration functions

At this stage in the permitting process a detailed plan for pre-employment training has not yet been developed. As an example of the type of training anticipated, the training courses for underground mining and process plant operators are described below.

Underground Mining

A two week introductory training program for underground miners will be implemented by Avalon for the Nechalacho deposit. The program includes eight modules that teach the skills required to work safely and productively underground. The modules include a combination of classroom theory, practical underground instruction/training, and on-the-job supervised experience.

The modules include:

1. Mine Health and Safety Act	16 hours
2. Safe Mining Practices (typical hazards)	16 hours
3. Zero Tolerance Behaviours	8 hours
4. Introduction to Scaling & Ground Control	12 hours
5. Introduction to Drilling	12 hours
6. Introduction to Loading & Blasting	12 hours
7. Introduction to Haulage	12 hours
8. Introduction to LHD operation	12 hours

Trainees receive 40 hours (5 days) of classroom training and a minimum of 60 hours (5 days) of underground on-the-job training. For all on-the-job training, new employees will spend one full shift with an experienced miner in all facets of operations. This miner training program is not intended to allow new employees to begin working individually. Upon completion of these requirements, trainees are paired with an experienced miner for an undetermined period of mentoring prior to being allowed to work independently.

Process Plant Training Program

A one week new hire introductory training program will be provided by Avalon for flotation plant and hydrometallurgical plant operations. The program will be tailored for each area of operation to include a minimum of six modules as follows:

1. Mine Health & Safety Act	16 hours
2. Safe Process Plant Operations (typical hazards)	16 hours
3. Zero Tolerance Behaviours	8 hours
4. Environmental Hazards / Spills Response	8 hours
5. Reagent Handling	8 hours
6. General Process Operations	44 hours

Trainees receive 40 hours (5 days) of classroom training and a minimum of 60 hours (5 days) of site specific processing on-the-job training. For all on-the-job training, new employees will spend one full shift with an experienced process operator in all facets of the plant. This process training program is not intended to allow new employees to begin working individually. Upon completion of these requirements, trainees will be given junior level jobs from which they will have the opportunity to advance or will be paired with an experienced operator.

Avalon Response #8.4

All contract employees will be required to take some form of workplace orientation and safety training program before being allowed to work on-site. This orientation will be provided by Avalon.

The type of training required by contractors will depend on the type of work required. Contractor training requirements will be described in the tender documents. Trainings that are specific to working at the Thor Lake Project may be provided directly by Avalon.

Pre-employment training is not typically provided to contractors.

Avalon Response #8.5

To build local understanding of the Project, Avalon's priority has been to meet early and regularly with local, territorial, Aboriginal and federal governments, and other stakeholders (see Section 5.0 of the DAR). In addition to in-person meetings, Avalon has also hosted several site visits to the Nechalacho and Hydrometallurgical Plant sites for representatives of governments and local communities.

Avalon's website is a useful tool for northerners to better understand the project, including plain language information and videos about rare earth elements and the project. Avalon has participated in outreach activities at local elementary and middle schools in our operating communities. Avalon has also been a presenter at workshops like the 2010 Metal Mining Opportunities Workshop and Hay River Start Your Engines Tradeshow.

Once in operation, Avalon will consider educational tours to the Project site for community, Aboriginal and territorial stakeholders when applicable.

IR Number:	GNWT #9
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Policies and Mitigation for Aboriginal and other Northern Women
DAR Section:	4.9.3, 4.9.4, 7.1.3,
TOR Section:	5, 6, 11, 36, 40, 73-76, 78-79

Preamble:

The TOR requires Avalon to outline its employment policies for Aboriginal and other northern women. Though the DAR references the Human Resources Management Plan it has not been completed nor does the DAR describe how it will reduce employment barriers for women or how it what policies and practices will encourage and support training and employment opportunities for Aboriginal and other northern women. Please provide further information so that the effectiveness of these measures can be assessed throughout each phase of the project.

GNWT Request #9

1. Please describe Avalon's strategy(ies) directed at Aboriginal and other northern women that Avalon will implement to create more opportunities or remove barriers to Aboriginal and other northern women.
2. Please confirm whether Avalon has employment policies for Aboriginal and northern women with procedures that remove barriers to working on site. If yes, please provide the policy or a description of the mitigation and enhancement strategies.
3. Please confirm whether Avalon has an anti-harassment policy and procedures currently in place. If yes, please provide the policy and procedures and explain how they will be communicated to employees and enforced on site.
4. Please describe Avalon's professional development opportunities for Aboriginal and northern women that facilitate career development and advancement in nontraditional occupations and other positions.
5. Should the development be approved and shorter shifts not be made available, please describe how this could affect the participation of Aboriginal and northern women in the workforce.
6. Please describe Avalon's mitigation and benefit enhancement strategies that will be implemented to reduce effects of limited access to childcare and detail how the effectiveness of these measures will be assessed.

Avalon Response #9.1

As discussed in Section 7.1.3, there are several barriers for women in the north to overcome when accessing the mining industry and trades employment sectors. Avalon understands the importance of targeting women as part of its commitment to hiring northern employees and to meeting its northern employment goals.

Avalon will work with community partners to try to address barriers. Avalon will also collaborate with organizations that have expertise in promoting women in the trades and in mining occupations like Skills Canada, the NWT Native Women's Association, the NWT Status of Women Council. Avalon will actively pursue the visibility of women in the company through its promotional materials and during recruitment drives and community outreach.

Avalon continues to work with its Aboriginal partners to overcome barriers to Aboriginal employment. Several strategies have been described in this response document, including education and training, agreements with Aboriginal communities, and support in developing businesses and business capacity.

Avalon Response #9.2

Avalon is committed to providing equal opportunity in all aspects of employment. According to Section 7.1.3 of the DAR, potential discrimination will be addressed within Avalon's Code of Business Conduct and Ethics Policy along with its human resource policies and employment procedures. Several strategies that Avalon will implement to overcome employment barriers for women and Aboriginal Peoples are described in Response #9.1.

Avalon Response #9.3

Avalon currently addresses harassment in its Code of Business Conduct and Ethics. The policy will be reviewed with each new employee during workplace orientation. The section related to harassment and its enforcement mechanism is as follows:

Abusive, harassing or offensive conduct is unacceptable, whether verbal, physical or visual. Examples include derogatory comments based on racial or ethnic characteristics and unwelcome sexual advances. Employees are encouraged to speak out when a co-worker's conduct makes them uncomfortable, and to report harassment when it occurs.

You may report ethical violations in confidence and without fear of retaliation. If your situation requires that your identity be kept secret, the Corporation will protect your anonymity. The Corporation does not permit retaliation of any kind against employees for good faith reports of ethical violations. An officer or employee who retaliates against someone who has reported an ethical violation in good faith is subject to discipline up to and including termination of employment. These procedures are intended to encourage and enable employees and others to raise serious concerns within the Corporation rather than seeking resolution outside the Corporation.

Avalon Response #9.4

Avalon continues to develop its human resource policies. At this point it has not yet detailed its professional development plans. Avalon will ensure that gender is taken into account when developing and incorporating our human resource policies.

Avalon Response #9.5

We anticipate that shorter shift rotations (i.e., one-week on, one-week off) will be more suitable for family life for northern and Aboriginal men and women than other mine rotation schedules currently used in the NWT. Since women disproportionately serve as caretakers within their families we believe a shorter shift rotation will encourage female employment at our Project sites. In particular, workers living in Hay River and Fort Resolution that work at the Hydrometallurgical Plant will be able to commute daily from home to the work site, during their one-week on rotation.

Avalon Response #9.6

Access to childcare remains a barrier to employment for many families whether in the south or in the north.. Avalon's primary strategy related to childcare is to offer shorter rotations at both work sites, and to offer daily commuting to Hay River and Fort Resolution from the Hydrometallurgical Plant site. The rotation schedule also allows workers to be home with their children every other week, which reduces their reliance on childcare during that period.

Avalon is also prepared to offer industry-standard wages, which are typically above the territorial average wages. These wages will allow employees to pay for childcare needs.

IR Number:	GNWT #10
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Employee Assistance Program
DAR Section:	4.9.2, 7.2.12

Preamble:

The DAR lists 'other' when describing employee compensation and benefits and that the proponent 'will provide support consistent with Company policies to employees and their immediate families in dealing with personal health issues, including, to the extent possible, issues related to the health and well-being of their families'.

GNWT Request #10

1. Does Avalon intend on including an Employee Assistance Program (EAP) as an 'other' benefit for their employees.
2. If so, please provide details regarding the services that will be covered in the EAP.
3. If so, please provide information regarding the immediate family members of the employee's ability to access the services entailed in the EAP.

Avalon Response #10.1

Yes Avalon intends to have an Employee Assistance Program (EAP) for its employees.

Avalon Response #10.2

The details of the EAP have not yet been confirmed as Avalon continues to develop its human resource policies.

Avalon Response #10.3

The details of the EAP have not yet been confirmed as Avalon continues to develop its human resource policies.

IR Number:	GNWT #11
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Health Care Coverage
DAR Section:	4.9

Preamble:

The DAR identifies that the proponent intends to provide their employees with Health Care Coverage.

GNWT Request #11

1. Please provide information regarding whether or not territorial/provincial medical insurance will be required to be carried by employees that are not NWT residents (and non-NWT contracted workers). For example, will Avalon ensure that their employees working in the NWT will all carry provincial or territorial health insurance from their home province (and be within their portability rules while working in the NWT) and that non-Canadian employees (and non-Canadian contracted workers) carry health insurance while working in the NWT?

Avalon Response #11

Avalon will require employees from outside of the NWT to have adequate medical insurance.

IR Number:	GNWT #12
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	First Aid
DAR Section:	4.9.5

Preamble:

In the DAR the proponent states they will have a first-aid facility and that personnel may receive first-aid training.

GNWT Request #12

1. Please provide information regarding the qualifications for employees staffing the first-aid facility.
2. Please provide information on what factors will determine when an injured or ill employee will be sent off-site to receive medical attention, and who will make that decision.
3. Please provide information regarding the process and means that will be put in place to transport a sick or injured worker to the nearest hospital if necessary.
4. Please provide information regarding the number of employees who will be required to carry a first-aid or industrial first-aid ticket.

Avalon Response #12.1

The NWT Mine Health & Safety Regulations require that a camp with more than 60 employees have a medical professional (i.e., doctor, nurse, paramedic or emergency medical technician) who is currently certified or registered by a Canadian jurisdiction and holds a current St. John Ambulance Advanced First Aid, Level 2 Certificate or a Canadian Red Cross First Responder Certificate.

Avalon Response #12.2

An injured or ill employee will be sent off-site if they cannot be diagnosed on-site or if they require medical care that exceeds the medical facility or medical expertise of the first aid station. The decision to be sent off-site will be left to the discretion of the medical professional or emergency response team.

Avalon Response #12.3

At the Hydrometallurgical site, there will be a dedicated medical vehicle for evacuation to Hay River with the option of medi-evacuation (medevac) in the event of a serious injury occurring at the Hydrometallurgical Plant.

At the Nechalacho site, there will be an underground medical vehicle equipped to treat and transport personnel from any location at the Nechalacho site to the airstrip for medi-evacuation. Avalon has not yet confirmed how it will provide medical services at site. Avalon may engage medical contractor(s) that includes medi-evacuation services. If medical services are provided by internal Avalon employees, Avalon will make arrangements for a suitable medi-evacuation service.

Avalon Response #12.4

The NWT Mine Health & Safety Regulations require:

- (a) all persons engaged in supervision,
- (b) all persons engaged in mine rescue,
- (c) all persons who are members of fire response teams,
- (d) one-fifth of the total number of the employees underground, and
- (e) one-tenth of the total number of employees on the surface,

to be trained in first aid and to hold a current and valid certificate at least equivalent to the St. John Ambulance Standard First Aid certificate, and to be trained in cardiac pulmonary resuscitation or to such other level as may be agreed to by the chief inspector.

IR Number:	GNWT #13
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Archaeological Impact Assessment of Proposed Developments in the Vicinity of Pine Point

Preamble:

While an archaeological impact assessment (AIA) of project components in the vicinity of Thor Lake was started in 2011, and will continue in 2012, similar work is not in progress for project components in the vicinity of Pine Point. The GNWT recognizes that the Hydrometallurgical Plant and much of the associated infrastructure will be built in areas that were disturbed by previous mining activities, and that the potential for archaeological sites in these areas is expected to be low, but requires a more detailed assessment of the potential for new ground disturbance in the vicinity of Pine Point in order to predict the risk of impact to archaeological sites by project activities. For example, it is unclear if the marshalling yard on the shore of Great Slave Lake, upgrades to the haul road, or the extraction of limestone for use in the Hydrometallurgical Plant, etc. will result in new ground disturbance.

GNWT Request #13

1. Please indicate all areas of the project footprint in the vicinity of Pine Point where new ground disturbance is expected.
2. Please provide a timeline for the completion of an AIA of these areas.

Avalon Response #13.1

The only Project infrastructure occurring on areas of new ground disturbance is the proposed marshalling yard at the dock area of Pine Point (south side of Great Slave Lake). Figure 4.8-8 of the DAR, and re-presented on the following page, shows the proposed footprint of the two hectare marshalling yard. Portions of the marshalling yard occur on previously disturbed ground, as shown in the figure. All other proposed infrastructure in the Pine Point area occur on previously disturbed ground.

Avalon Response #13.2

An archaeological impact assessment (AIA) of the marshalling yard at Pine Point will occur in the Summer of 2012, upon approval of the archaeological permit. The archaeologist will also conduct reconnaissance at the other proposed Pine Point infrastructure locations to confirm that they are located on previously disturbed ground and no further archaeological assessment will be required.

Q:\Vancouver\Graphics\ENGINEERING\15101007_ThorLake\006_DAR\15101007_DAR_CDR103.cdr



NOTES

1.

ISSUED FOR USE

CLIENT



EBA Engineering
Consultants Ltd.



THOR LAKE PROJECT

**Hydrometallurgical Plant Site
Dock Facility Layout**

PROJECT NO.
V15101007.006

OFFICE
EBA-VANC

DWN
SL

CKD
RH

REV
0

DATE
March 18, 2011

Figure 4.8-8

IR Number: GNWT #14

Source: Government of Northwest Territories

To: Avalon Rare Metals Inc.

Subject: Conceptual Wildlife Monitoring and Management Plan

DAR Section: 6.14.3 (Wildlife Monitoring: pages 836 – 837)

TOR Section: 3.3.1 (Impact assessment steps and significance determination factors: pages 18-19)

Preamble:

Avalon indicates in the DAR (Page 836) that

Upon Project approval, Avalon Rare Metals Inc. will prepare a Conceptual Wildlife Monitoring and Management Plan addressing furbearers, migratory birds, waterfowl, large ruminants, and large carnivores. Adaptive management will be included in the Wildlife Monitoring and Management Plan and will be tailored specifically for the TLP to avoid, minimize and mitigate any potential effects to wildlife if problems or issues are detected during construction, operation, and decommissioning/closure.

No further specific details on the content of the Plan were provided in the DAR.

In addition to the Request from MVEIRB in their August 25 2011 deficiency statement (page 14) for Avalon to provide conceptual monitoring and management plans during the EA phase, the GNWT would like to request specific information for the outline of the Wildlife Monitoring and Management Plan.

GNWT Request #14

1. In order to gain a better understanding of how Avalon intends on addressing wildlife mitigation, monitoring and follow-up please provide a detailed profile of a Conceptual Wildlife Monitoring and Management Plan that:
 - a. Addresses the wildlife valued components discussed in the DAR (furbearers, migratory birds, waterfowl, large ruminants, and large carnivores);
 - b. Contains a specific section related to SARA listed species, those assessed by the Federal Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and species identified in the General Status of NWT Species as 'may be at risk' or 'sensitive';
 - c. Considers all phases of the project construction, operation, and decommissioning/closure;
 - d. Incorporates the policy and mitigation measures listed in the DAR;

- e. Provides more detail on wildlife monitoring and follow-up activities (many examples of mitigation measure are described in the DAR but there is lack of information on the monitoring and follow-up that will be taking place);
- f. Provides commitments and procedures for reporting wildlife observations to ENR, EC and other relevant parties; and
- g. Is separated by Project Location (the Proposed Nachalacho Mine and Flotation Plant and the Hydrometallurgical Plant Site).

[NOTE – APPENDIX I ATTACHED: copies of the Fortune Minerals NICO Project Conceptual Wildlife Effects Monitoring Program (Appendix 18.11), Tyhee Corp Yellowknife Gold Project Draft Conceptual Wildlife Monitoring and Management Plan (CWMMP) - IR response 1-2-7, and a Profile of Draft Grizzly Bear and Wolverine Protection Plan by ConocoPhillips Canada submitted to the Joint Review Panel for the Mackenzie Gas Project Environmental Impact Review have been provided as examples of similar information by companies throughout an Environmental Assessment or Environmental Impact Review]

- 2. Will Avalon commit to working with ENR and other relevant parties [e.g. Environment Canada] as they develop the Wildlife Monitoring and Management Plan and to provide ENR and other relevant parties an endorsed finalized Wildlife Mitigation and Monitoring Plan 90 days prior to construction for each project location?
- 3. Will wildlife mitigation and monitoring also be incorporated into relevant parts of Waste Management and Human Safety plans? If yes, please provide details.

Avalon Response #14.1

As requested, Avalon is pleased to provide a Conceptual Wildlife Effects Monitoring and Management Plan (WEMMP) for Avalon's Thor Lake Project. The conceptual WEMMP is provided as Attachment 1 to this GNWT IR response document. As indicated, the WEMMP will focus on mitigation measures, monitoring and adaptive management of potential Project effects identified in the DAR on Valued wildlife Components (VCs), including Species at Risk.

Response #14.2

Avalon commits to working with ENR and other relevant parties in the development of the Wildlife Effects Monitoring and Management Plan with the goal of an endorsed, final Plan in place 90 days prior to construction proceeding at the Nechalacho Mine and Hydrometallurgical Plant site areas.

Avalon Response #14.3

Wildlife mitigation and monitoring will be referenced, as appropriate, in general terms in the Waste Management and Human Safety Plans. Specific mitigation and monitoring measures will be described in more detail in the WEMMP.

IR Number:	GNWT #15
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Biophysical environmental monitoring and management plans
DAR Section:	6.14.3 (Wildlife Monitoring: pages 836 – 837)
TOR Section:	3.3.10 (Biophysical environmental monitoring and management plans)

Preamble:

The TOR Section 3.3.10 #2 states:

2. For all valued components other than water, describe the framework for monitoring plans that will guide Avalon's evaluation of and adaptive management for impacts to valued components. Specify:
 - a. which phase of the development the plan is for;
 - b. what parameters the plan monitors for changes and how this relates to detection of a significant adverse impact to a valued component;
 - c. how monitoring data will be used to determine if action is required such as definitions of any methodologies used, critical values, and threshold conditions;
 - d. how Avalon's proposed mitigations fit into adaptive management plans, including how project management will be adapted if necessary to prevent significant adverse impacts, including but not limited to:
 - i. unexpected deviations from environmental assessment predictions for any substance of concern that may impact the valued component;
 - ii. provide a summary table listing all biophysical environmental monitoring and management systems, where they are described in the Developer's Assessment Report, the length of time the monitoring is proposed for, and a rationale for each timeline.
 - e. The framework for an overall Incineration and Waste Management Plan, including commitments for management of solid, liquid, hazardous and airborne wastes, and associated monitoring programs.

Section 6.14 of the DAR addresses 3.3.10 #2 (also see accordance table). However, the detail required in the Terms of Reference has not been fully presented; in particular the table referred to in (2)(d)(ii) above.

GNWT Request #15

1. In order for the GNWT to fully understand the proposed project related to wildlife mitigation, monitoring and follow-up and incineration and waste management please provide more detail on the Terms of Reference section 3.3.10 #2; including the table.

Avalon Response #15

Avalon Response #14 includes a Conceptual Wildlife Effects Monitoring and Management Plan (WEMMP), submitted as a separate document/report (Attachment 1). The WEMMP addresses the points outlined in the TOR Section 3.3.10 (2)(a-d) with regards to wildlife resources and the Thor Lake Project.

GNWT IR #15 is requesting details on wildlife mitigation and monitoring as it applies to the incineration of waste and overall waste management for the Project. Section 3.4 of the WEMMP outlines wildlife-specific mitigation measures to be included in the Thor Lake Project Waste Management and Monitoring Plan (Section 3.4 is re-presented below). The TLP Waste Management and Monitoring Plan is currently being developed. The Waste Management and Monitoring Plan will provide the details requested in the TOR, Section 3.3.10(2)(e).

3.4 Waste Management

The potential for human-wildlife encounters is greatly reduced by strict adherence to a waste management plan. Wildlife-specific mitigation measures to be included in the Waste Management Plan will include:

Wildlife-Specific Waste Management Mitigation Measures:
No littering policy.
No feeding of wildlife policy.
Separate food waste and non-food waste at source.
Nechalacho: Incinerate all waste foods and human garbage consistent with current industry good management practices to minimize black bear attraction to the local area.
Hydrometallurgical Plant: Store all waste foods and human garbage in bear-proof containers prior to off-site disposal.
Dispose of food waste and non-toxic combustible waste according to the Waste Management Plan to limit the presence of food attractants.
Non-food waste products (that cannot be incinerated or landfilled) to be collected, sorted, and placed in designated areas within a designated area until they can be shipped off site.
Provide designated, contained areas for lunch breaks with waste containers for food waste.
Clearly identify all food waste containers and those restricted from food waste.
Store food waste in an isolated area and incinerate quickly.
Follow procedures outlined in the Waste Management Plan and the Emergency Response and Spill Contingency Plan.

IR Number:	GNWT #16
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Waste food and human garbage management
DAR Section:	6.14.3 (pages 836 – 837); 6.9

Preamble:

Page 836 - 837 – Avalon indicates in the DAR that,

The potential attraction/habituation of specific wildlife species including black bears, wolves, coyotes, red foxes, wolverines and porcupines, will be minimized by ensuring all waste foods and human garbage is stored in wildlife-proof containers prior to being disposed of offsite in pre-approved manners. Landfilling of wastes will not be conducted on site.

And commitment Item #145 (page xcii) indicates that,

All waste foods and human garbage will be stored in wildlife proof containers prior to offsite disposal in an approved manner. No land filling of such wastes will be conducted on site.

However, numerous wildlife mitigation commitments have been provided throughout the document indicating that Avalon will,

Incinerate all waste foods and human garbage consistent with current industry good management practices to minimize predator attraction to the local area. (i.e. Section 6.9 - page 767, 769, 772, 776, 778, 782)

Except page 798 of Section 6.9 (Black bear policies and mitigation measures) which states Avalon will,

Store all waste foods and human garbage in bear-proof containers prior to offsite disposal.

GNWT Request #16

1. The GNWT recognizes Avalon's desire to minimize wildlife attraction and to ensure worker safety. However, please clarify, with respect to the preamble above, how waste food and human garbage will be managed at both project sites for each phase of the project and which best management practices will be followed?

Avalon Response #16

Avalon is currently developing the Thor Lake Project Waste Management and Monitoring Plan (WMMP), in accordance with the Mackenzie Valley Land and Water Board's (MVLWB 2011) *Guidelines for Developing a Waste Management Plan*.

Food waste and domestic refuse will be put into wildlife-proof containers (provided at remote sites and underground lunchrooms). This waste will be collected daily and stored in indoor waste storage facilities at both the Nechalacho site and the Hydrometallurgical Plant site prior to being incinerated, or transported to an appropriate recycling or disposal facility. Indoor storage minimizes animal attraction and prevents waste from leaching into the environment.

At the Nechalacho site, an incinerator will be used during construction and operations phases to incinerate food waste and domestic refuse on a daily basis. Incineration is an effective and environmentally sound waste disposal method, and was selected because it follows the recommendations outlined in Environment Canada's *Technical Document for Batch Waste Incineration*, it reduces the potential for wildlife attraction and it does not leave any solid waste at the site after closure.

At the Hydrometallurgical site, food waste and domestic refuse will be transported regularly to the Hay River Landfill for disposal.

The goals of the Thor Lake Project Waste Management Plan are to develop a system for the proper handling and disposal of waste, to minimize potential effects from the Project on the environment, and to comply with all applicable legislation, regulations, authorizations, permits and licences for the duration of the Project.

To achieve these goals, the Plan will:

- Identify waste types potentially generated during construction, operations, and reclamation and closure phases;
- Identify procedures to promote reduction, reuse, and recycling of waste materials;
- Identify practices and procedures for waste handling, collection, storage, transport, and disposal; and
- Identify waste monitoring and mitigation procedures.

The Plan will be revised to include any regulatory requirements from the existing Project permitting process, and will be adaptively managed based on the results of Project monitoring and mitigation, and best management practices.

Specific legislation, regulations and guidelines related to waste management include:

Federal

- Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil (CCME 2001b);
- *Canadian Environmental Protection Act* (1999);
- *Explosives Act* (1985);
- *Northwest Territories Waters Act* (1992);

- Technical Document for Batch Waste Incineration (Environment Canada 2009);
- *Territorial Lands Act* (1985);
- *Transportation of Dangerous Goods Act* (1992).

Territorial

- *Environmental Protection Act* (1988);
- Guideline for Industrial Waste Discharges in the NWT (RWED 2004);
- Guideline for the General Management of Hazardous Waste in the NWT (RWED 1998a);
- Guidelines for the Management of Biomedical Waste in the Northwest Territories (ENR 2005);
- Guideline for Waste Antifreeze (RWED 1998b);
- Guideline for Waste Batteries (RWED 1998c);
- Guideline for Waste Solvents (RWED 1998d);
- *Public Health Act* (1988);
- *Transportation of Dangerous Goods Act* (1990); and
- *Used Oil and Waste Fuel Management Regulations* (GNWT 2003).

References:

- Canadian Council of the Ministers of the Environment (CCME). 2001b. Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil. Retrieved from www.ccme.ca/assets/pdf/phc_standard_1.0_e.pdf
- Environment and Natural Resources, GNWT. 2003. Used Oil and Waste Fuel Management: Plain Language Guide. Retrieved from: http://www.enr.gov.nt.ca/_live/documents/content/Used_Oil_Guide.pdf
- Environment and Natural Resources, GNWT. 2005. Guidelines for the Management of Biomedical Waste in the Northwest Territories. Retrieved from: www.enr.gov.nt.ca/_live/documents/content/biomedical_waste.pdf
- Environment Canada. 2009. Technical Document for Batch Waste Incineration. Retrieved from: www.ec.gc.ca/gdd-mw/default.asp?lang=En&n=F53EDE13-1
- Mackenzie Valley Land and Water Board (MVLWB). 2011. Guidelines for Developing a Waste Management Plan. Retrieved from: http://mvlwb.com/files/2011/07/MVLWB-Guidelines-for-Developing-a-Waste-Management-Plan-Mar-31_11.pdf
- Renewable Resources, Wildlife, and Economic Development, GNWT. 1998a. Guideline for the General Management of Hazardous Waste in the NWT
www.enr.gov.nt.ca/_live/documents/.../General_management.pdf

Renewable Resources, Wildlife, and Economic Development, GNWT. 1998b. Guideline for Waste Antifreeze. Retrieved from:

http://www.enr.gov.nt.ca/_live/documents/content/antifreezeguideline.pdf

Renewable Resources, Wildlife, and Economic Development, GNWT. 1998c. Guideline for Waste Batteries. Retrieved from:

http://www.enr.gov.nt.ca/_live/documents/content/batteryguideline.pdf

Renewable Resources, Wildlife, and Economic Development, GNWT. 1998d. Guideline for Waste Solvents. Retrieved from: www.enr.gov.nt.ca/_live/documents/content/solvents.pdf

Renewable Resources, Wildlife, and Economic Development, GNWT. 2004. Guideline for Industrial Waste Discharges in the NWT. Retrieved from

http://www.enr.gov.nt.ca/_live/documents/content/industrial_waste_guidelines.pdf

IR Number: GNWT #17
Source: Government of Northwest Territories
To: Avalon Rare Metals Inc.
Subject: List of Commitments
DAR Section: Main report – wildlife commitments pages xci - xciii

Preamble:

In addition to a Concordance Table, Avalon included a List of Commitments in the DAR. A list of commitments is a very useful tool for a developer to clearly state specific and measurable actions that will be taken during construction as well as during and after project operations. Parties rely heavily on the wording of commitments as a process for tracking and reporting on commitments throughout the life of a project.

There appears to be some disconnect between some of the Commitments Items and what is written in the DAR. Clarification of the List of Commitments to ensure the list provides the full commitment is required to ensure a firm understanding of the commitments. In addition, since a well worded commitment may replace a need for a recommended measure, a final list of commitments is very beneficial.

GNWT Request #17

1. Please cross check these two documents and add to the List of Commitments based on the content in the DAR.
2. Will Avalon commit to providing a final List of Commitments two weeks prior to the final Public Hearing?

Avalon Response #17.1

Avalon has cross-checked the content of the DAR sections pertaining to wildlife commitments and has updated the Wildlife section of the Table of Commitments accordingly as identified in the underlined text below.

Item #	Plant Site	Avalon Commitment
WILDLIFE		
133	Both	GNWT's ENR <i>Food and Waste Management Guidelines</i> will be implemented to ensure carnivores do not become habituated and eventually require relocation and destruction. <u>Adaptive management will be applied to Avalon's waste management strategies such that if problem wildlife (e.g. black bears, bald eagles, red fox, etc.) is attracted to the site, additional management practices will be implemented.</u>
134	Both	<u>Develop and implement an education program for all Project employees and contractors detailing wildlife related policies and mitigation.</u>

Item #	Plant Site	Avalon Commitment
135	Both	As required by the <i>NWT Mine Health and Safety Regulations</i> (s.15.05), all field personnel will undertake bear-safety training. In the event that a bear is disturbed and/or encountered during project operations, information on the sighting will be forwarded to the local Renewable Resource Officer at the earliest opportunity. If a bear is encountered, response should be in accordance with ENR's <i>Bear Response Guidelines</i> (by extension, all employees must be familiar with these guidelines; it will be included in employee training). Any defense of life and property (DLP) kills must be reported ASAP.
136	Hydromet Plant	Power poles from the existing substation will be located alongside existing access roads. Marking material will be added to enhance visibility of the power lines between the poles.
137	Both	Implement a no hunting policy for all Project employees and contractors within the Project's zone of influence defined by the shooting restrictions of 3 kilometres from the Project sites.
<u>138</u>	<u>Both</u>	<u>Implement a transportation and traffic management plan to minimize vehicular interactions with wildlife, including:</u> <ul style="list-style-type: none"> • <u>Implementation of speed limits on all site roads</u> • <u>All Project-related transportation activities will give the right-of-way to any wildlife that such activity may encounter</u> • <u>Implementation of an alert system to warn personnel of wildlife (barren-ground caribou, moose, bear, wolverine, etc.) in the Project area by relaying sighting information to vehicles and equipment operators and on-site personnel to avoid the area, if possible</u> • <u>Implementation of bus transportation for employees and contractors from Hay River and Fort Resolution to the Hydrometallurgical Plant site to minimize the risk of vehicle-wildlife collisions and disturbances from the road</u> • <u>Dust suppression strategies (e.g. water or approved dust suppressant products) in accordance with GNWT dust suppression guidelines</u>
<u>139</u>	<u>Nechalacho</u>	<u>Develop standard aircraft procedures for flying into and departing from the Nechalacho Mine airstrip to accommodate caribou if present.</u>
140	Both	Maintain a minimum flight altitude of 600 m during all times, except during takeoff and landings.
141	Both	If a mineral lick is present in the Project area, the proponent will maintain a 300 m buffer zone between any development activities and the lick.
<u>142</u>	<u>Both</u>	<u>Maintain a buffer zone of 500 m between identified large mammal dens (wolf, black bear, wolverine) and Project personnel during construction; dens discovered within 500 m of the Project area after construction will be reported immediately to GNWT ENR to determine appropriate course of action.</u>
143	Both	If caribou are encountered during the development they will be left alone, and as necessary, local wildlife officials will be consulted.
144	Both	No wildlife will be purposefully encouraged to habituate to human presence (e.g. wildlife will not be fed).
<u>145</u>	<u>Both</u>	<u>Habitat clearing activities will be avoided to the greatest extent possible from May 15 – August 15 annually to prevent accidental mortality of adults, eggs, and pre-fledged young of SARA listed species (e.g. Common nighthawk, Olive-sided flycatcher, Rusty blackbird, etc.) as well as other upland breeding birds.</u>

Item #	Plant Site	Avalon Commitment
146	Nechalacho	<u>Mowing or other activities within the airstrip buffer zone will be avoided from late April to late July to prevent accidental mortality of nesting and fledging Short-eared owls.</u>
147	Both	Conduct limited wildlife monitoring in the immediate vicinity of the Nechalacho and Hydrometallurgical development area. Avalon will record all significant wildlife observations made by site personnel while in the Project area, and report any wood bison sightings to GNWT's ENR.
148	Both	All waste foods and human garbage will be stored in wildlife proof containers prior to offsite disposal in an approved manner. No land filling of such wastes will be conducted on site.
149	Both	To the extent reasonable, infrastructure design will consider minimizing attraction of predators: wedges of greater than 45 degrees to deter ravens from nesting; all areas (large and small) with horizontal surface that can be enclosed will be enclosed; horizontal supports will be of the minimum possible width; anti-nest spikes or angled surfaces will be used near heat sources at greater than 45 degrees; surface complexity of all infrastructure will be reduced to avoid small nooks and crannies; all buildings and stairs will be skirted down to the ground; waste management will be consolidated in one secure, well-monitored location; domestic waste will not be exposed to the environment; all infrastructure will be continuously monitored for points of compromise; monitoring of wildlife use of decommissioned sites will continue once project is complete.
150	Both	The primary mitigation measure for any species at risk will be avoidance. If species at risk are encountered the proponent will avoid contact with or disturbance to the species, its habitat, or its residence. Monitoring will be done to determine the effectiveness of mitigation or to determine if further mitigation is required. At minimum, the proponent will record and provide to the relevant authorities all observations of any species at risk, including information on location sighted, number and reaction of the wildlife to project activities, and in some cases further monitoring may be required for particular species. Mitigation and monitoring will be consistent with recovery strategies and action or management plans for the particular species.
151	Both	The proponent will undertake monitoring for whooping crane near the Project area. Wetlands near the Project area including the area identified as shrubby fen in the local study area will be visually checked every two (2) weeks from May to September to see if any cranes are present. If a whooping crane is observed, the wetland area will be visually checked on a weekly basis for cranes and measures undertaken to avoid disturbance to the bird. As well, Environment Canada will be contacted to determine whether any further mitigation measures might be required. Additionally, any other observations of whooping cranes will also be reported to Environment Canada.
152	Both	The developer will provide employee education on the SARA listed species, so that personnel will understand what they are looking at and know what to identify when they do see it, as well as make it a policy that they report that immediately to Avalon's EHS Coordinator.
153	Both	Maintain sufficient buffer distances between development activities (e.g., re-fueling and material storage) and water bodies.

Avalon Response #17.2

Yes, Avalon will commit to providing an updated “final” List of Commitments two weeks prior to the Public Hearings. It should be noted however, that based on previous experience with other MVEIRB hearings processes, it is anticipated that further revisions to the List of Commitments may need to be incorporated as a result of the hearings phase of the EA review process.

IR Number:	GNWT #18
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Employee Accommodation
DAR Section:	7.13, 3.2.2, 4.9.1
TOR Section:	3.2.5, 3.4

Preamble:

Avalon has stated that the air modeling was performed in accordance with the Guidelines for Air Quality Dispersion Modeling in BC. The air quality assessment for this project was completed using the CALPUFF in a two dimension mode often referred to as CALPUFF-ISC. The BC modeling guideline recommends that CALPUFF-ISC only be used “in areas with uniform terrain and land use when spatial variability of the meteorological fields is not significant”. For complex terrain and complex flow conditions, the BC modeling guideline recommends using CALPUFF in the full 3-dimensional mode with 3-dimensional wind fields.

ENR considers the terrain at the mine site is not uniform and is relatively complex.

GNWT Request #18

1. Please provide justification for the use of CALPUFF-ISC rather than CALPUFF 3D.

Avalon Response #18

Terrain elevations inside the mine site study area range from 156 to 309 m above sea level, extracted from 1:250,000 scale Canadian Digital Elevation Data (see Figure 1 below). With a maximum elevation change of approximately 150 m in a 20 km by 20 km domain, the terrain in the study area is considered to be relatively uniform and the spatial variability of the meteorological fields is not expected to be significant. Therefore CALPUFF-ISC is considered to be an appropriate model for this study area. Examples of complex terrain where use of CALMET would be required in BC would be a mountain valley in the interior or a coastal area with differences in terrain elevation on the order of several hundred metres.

Furthermore, there is only one meteorological station located inside the study area. The next closest station is the Yellowknife Airport station, which is located 100 km west-northwest of the Nechalacho Mine. The maximum radius of influence of a surface station (RMAX 1) is typically set at 10 to 20 km in CALMET and therefore data from a surface station located 100 km away would not influence the CALMET wind fields if incorporated. There is limited value in running CALMET with data from only one surface station particularly when there is so little variation in terrain elevation.

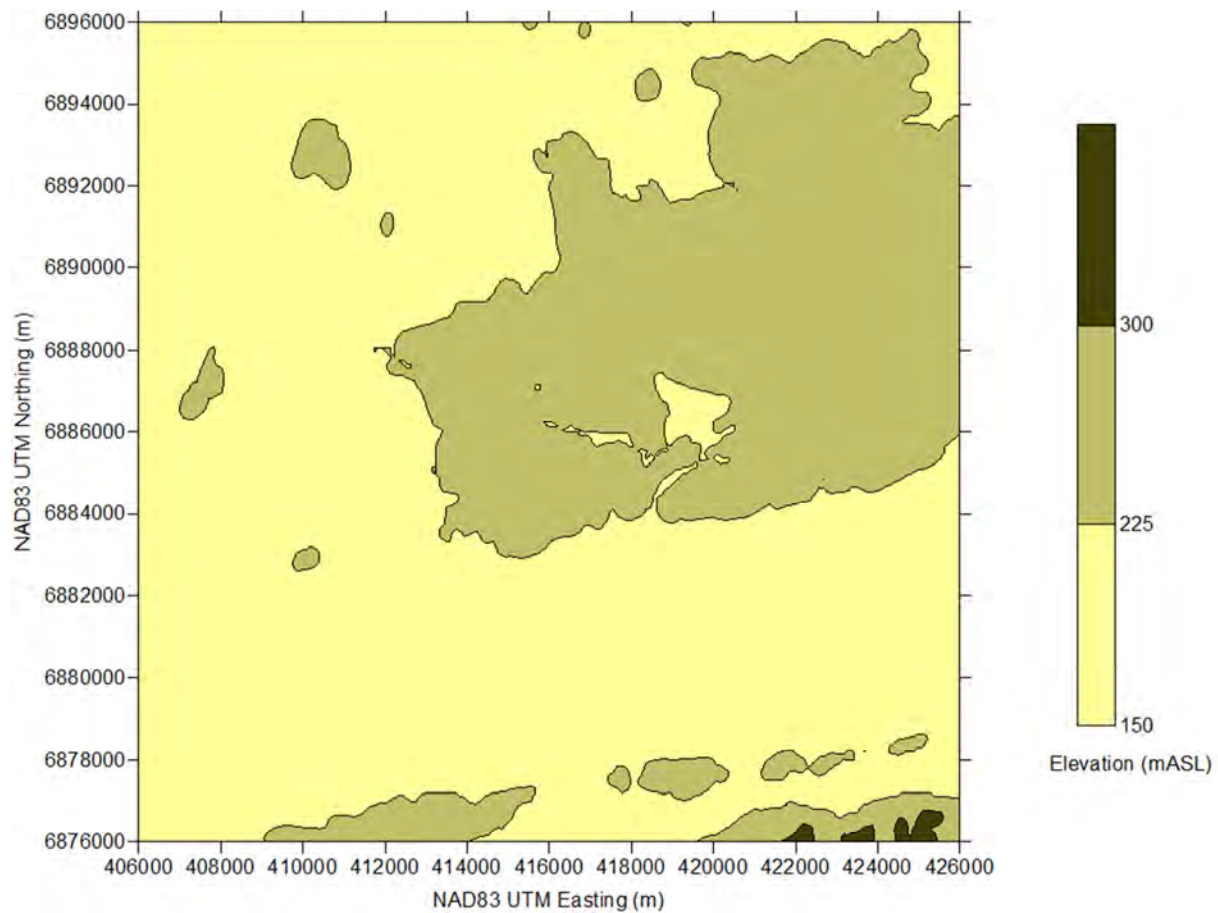


Figure 1: Elevation inside Nechalacho Study Area

IR Number:	GNWT #19
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Wet deposition in the CALPUFF model
DAR Section:	6.2.2.3

Preamble:

The DAR indicates that both SO₂ and NO₂ are expected emissions from the Thor Lake project, and both can lead to the formation of acid rain; however, the modeling exercise did not appear to account for aqueous phase transformation or chemical transformation. The GNWT understands that in the absence of those features, then wet deposition of the predicted emissions is not accounted for and therefore, potential loading to the surrounding land and water has not been assessed.

GNWT Request #19

1. Please clarify if wet deposition, aqueous phase transformation, or chemical transformation was conducted in the model run. If so, please provide the results in model ready format. If not, please provide justification.

Avalon Response #19

Only deposition of total suspended particulates (TSP), also referred to as dustfall, was modelled. Wet deposition, aqueous phase transformation and chemical transformation were not modelled as they were not explicitly required in Section 3.3.8 of the Final Terms of Reference for this Project. Aqueous phase transformation and chemical transformation are complicated processes to model and therefore it is not standard practice to model these effects unless specifically requested. Furthermore, the predicted annual average ambient concentrations of NO₂ and SO₂ are well below ambient air quality objectives, indicating that it is unlikely those emissions would result in significant acid deposition. Based on experience modelling large projects in the Alberta Oil Sands, significant changes to potential acid input (PAI) tend to occur in areas where ambient air quality objectives are also exceeded.

IR Number:	GNWT #20
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Use of a fenceline approach for model results
DAR Section:	6.2.2.5

Preamble:

The results of the model were provided for areas outside of a fenceline, which the GNWT understands, was established based on the understanding that ambient air quality objectives apply outside facility boundaries. The GNWT Guidelines for Ambient Air Quality Standards in fact apply to all areas of the NWT, and as such, fenceline modeling is not applicable.

GNWT Request #20

1. Please provide the ambient ground level concentrations from the model predictions and corresponding isopleths for the entire project site, including the areas within the fencelines.

Avalon Response #20Nechalacho Mine

Receptors were added inside the fenceline, as shown in Figure 2, and additional modelling was conducted for these receptors. In addition, revised emissions from the diesel generators, assuming 100% load and presented in Table 3 in response to GNWT Request #26, were included in the modelling.

In the previous modelling, it was conservatively assumed that all NO_x would be converted to NO_2 . This was considered to be an overly conservative assumption when all of the receptors inside the fenceline were considered. Therefore the ozone limiting method was applied to convert predicted NO_x concentrations to NO_2 concentrations. Typical ozone values assumed for the ozone limiting method are $100 \mu\text{g}/\text{m}^3$ for hourly averages and $40 \mu\text{g}/\text{m}^3$ for annual averages. The 2010 NWT annual report states that typical monthly average background ozone concentrations are in the range of 40 to $80 \mu\text{g}/\text{m}^3$. In Yellowknife in 2010, the highest maximum 1-hour ozone concentration of $106 \mu\text{g}/\text{m}^3$ occurred in May with lowest maximum 1-hour ozone concentration of approximately $60 \mu\text{g}/\text{m}^3$ in September. For this study, $106 \mu\text{g}/\text{m}^3$ (56 ppb) ozone was used to calculate 1-hour and 24-hour average NO_2 concentrations and $40 \mu\text{g}/\text{m}^3$ (21 ppb) ozone was used to calculate annual NO_2 .

The maximum predicted ambient concentrations of CACs are shown in Table 1. Exceedances of the one-hour and 24-hour SO_2 standards are predicted to occur inside the plant fenceline 1% and 3% of the time, respectively. Exceedances of the 24-hour TSP standard are predicted to occur inside the plant fenceline 17% of the time. No other exceedances were predicted. The spatial

distribution of the maximum predicted concentration for one-hour NO_2 , one-hour SO_2 , 24-hour SO_2 , annual SO_2 , 24-hour TSP, annual TSP and 24-hour $\text{PM}_{2.5}$ are presented in Figures 3 to 8. Areas of predicted exceedance of one-hour SO_2 (Figure 4), 24-hour SO_2 (Figure 5) and 24-hour TSP (Figure 7) are very small.

Maximum predicted dustfall inside the fenceline is the same as the maximum predicted dustfall outside the fenceline presented in the DAR and therefore is not repeated here.

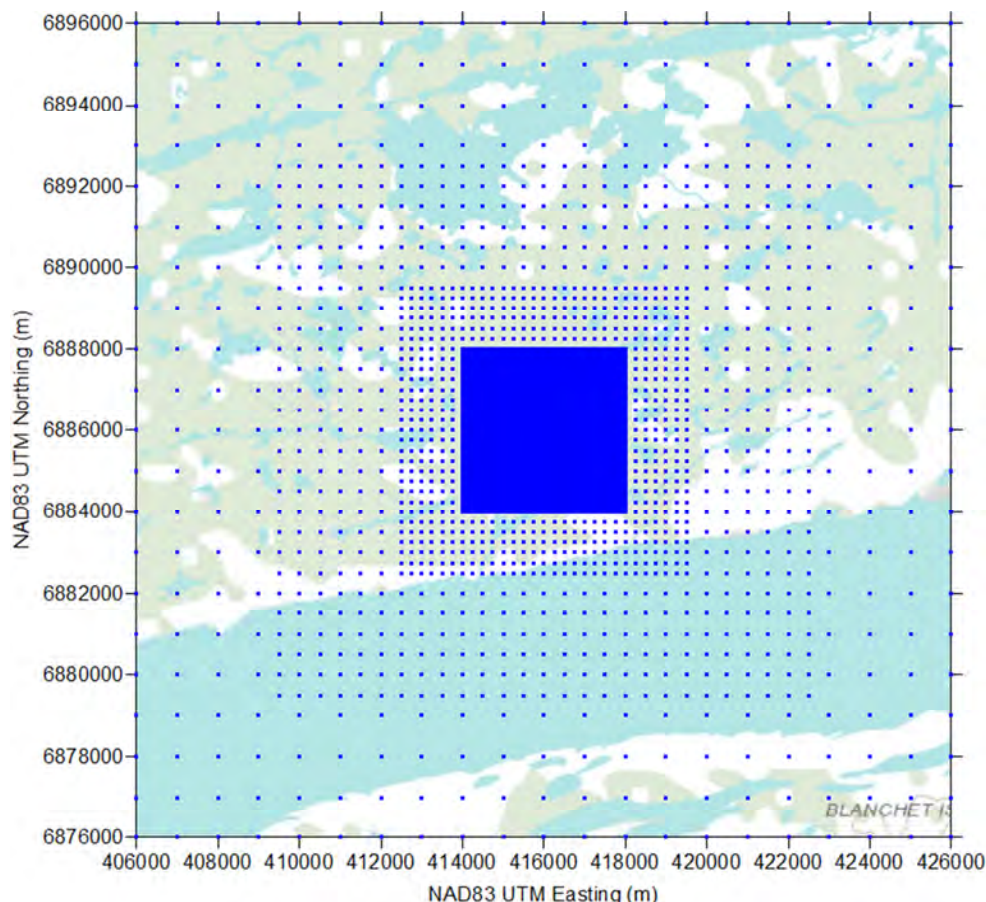


Figure 2: Nechalacho Mine Air Quality Local Study Area Showing Gridded Receptors

TABLE 1: MAXIMUM PREDICTED CAC CONCENTRATIONS FOR NECHALACHO MINE AND FLOTATION PLANT				
Pollutant	Averaging Period	Maximum Concentrations ($\mu\text{g}/\text{m}^3$)	NWT AQ standard ($\mu\text{g}/\text{m}^3$)	Frequency of Exceedance
NO_2	1-hour	255	400	-
	24-hour	175	200	-
	annual	44	60	-
SO_2	1-hour	758	450	1%
	24-hour	388	150	3%
	annual	26	30	-
CO	1-hour	4,256	15,000	-
	8-hour	2,401	6,000	-
TSP	24-hour	752	120	17%
	annual	51	60	-
$\text{PM}_{2.5}$	24-hour	4	30	-

Note: Values in boldface exceed the NWT AQ standards

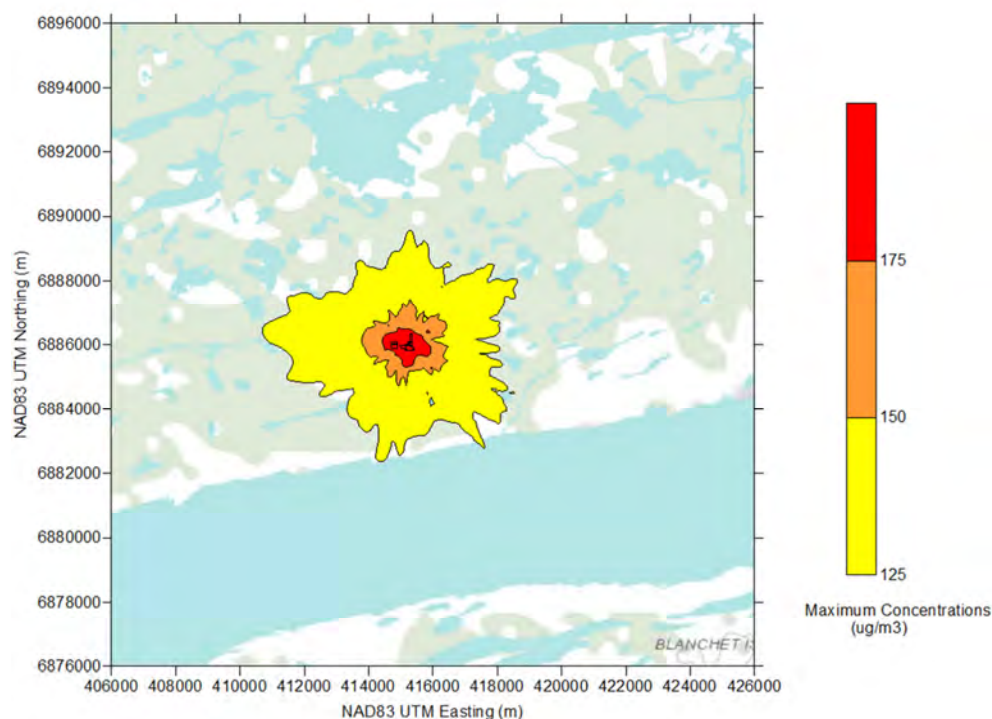


Figure 3: Isopleths of Maximum Predicted One-Hour Average NO_2 Concentrations

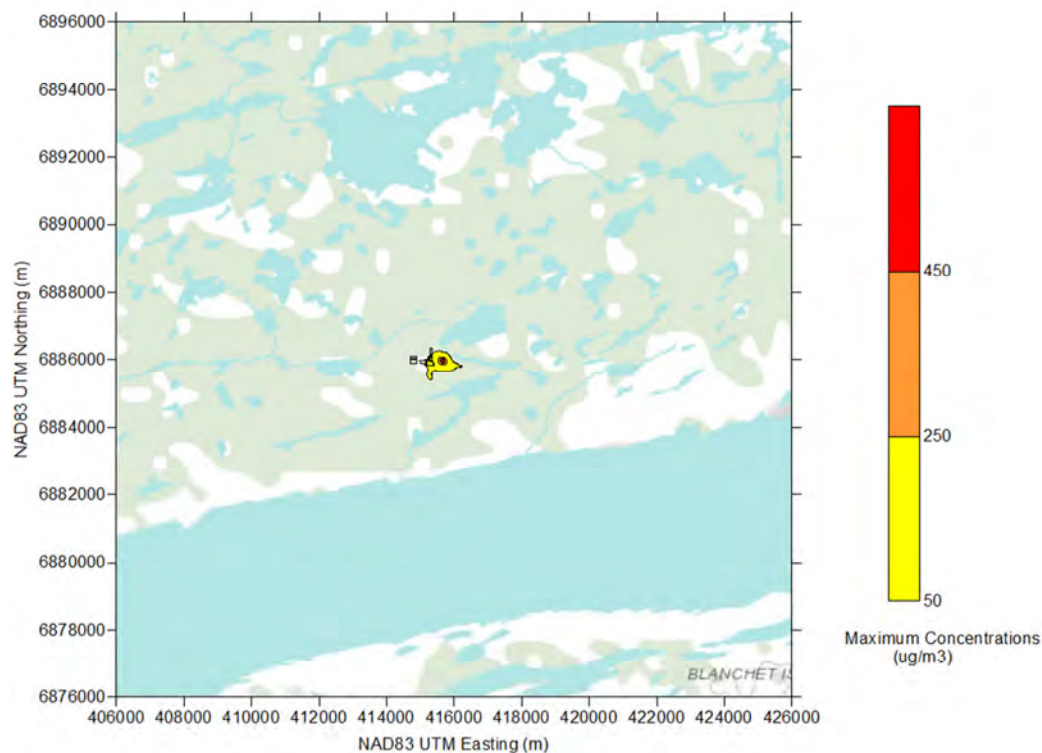


Figure 4: Isopleths of Maximum Predicted One-Hour Average SO_2 Concentrations

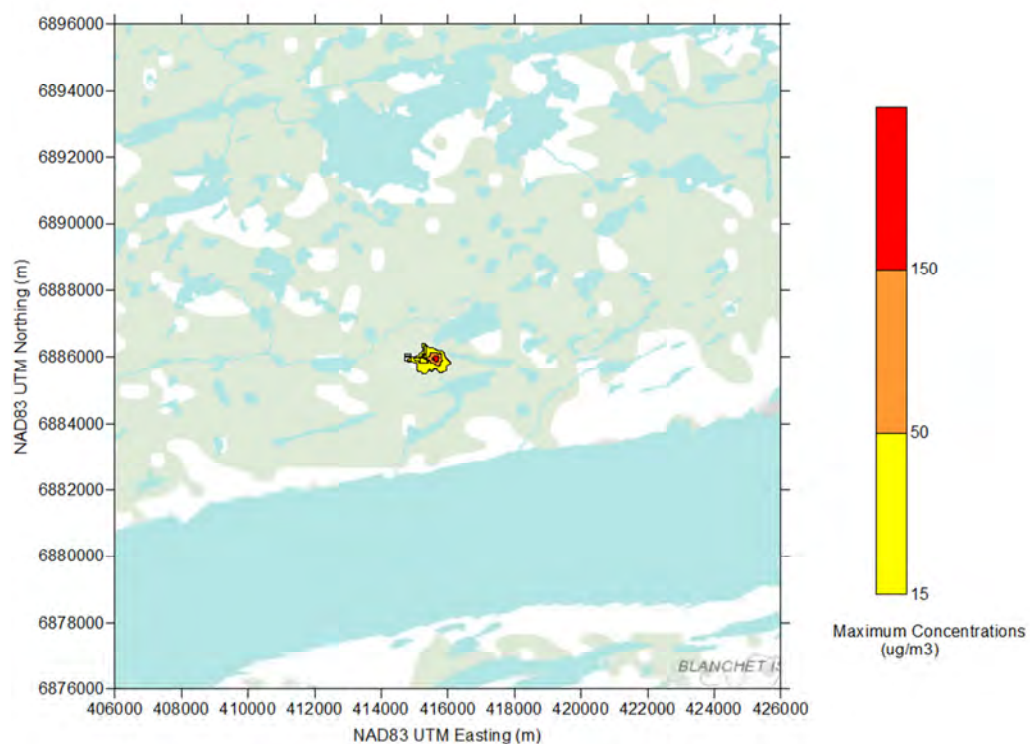


Figure 5: Isopleths of Maximum Predicted 24-Hour Average SO_2 Concentrations

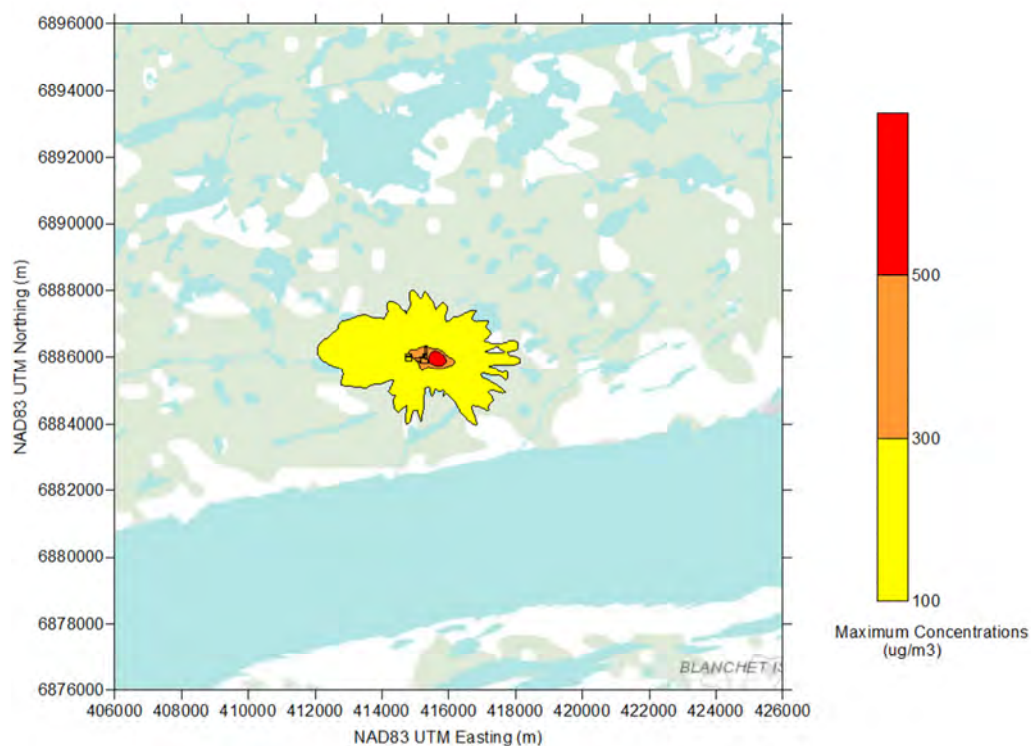


Figure 6: Isopleths of Maximum Predicted One-Hour Average CO Concentrations

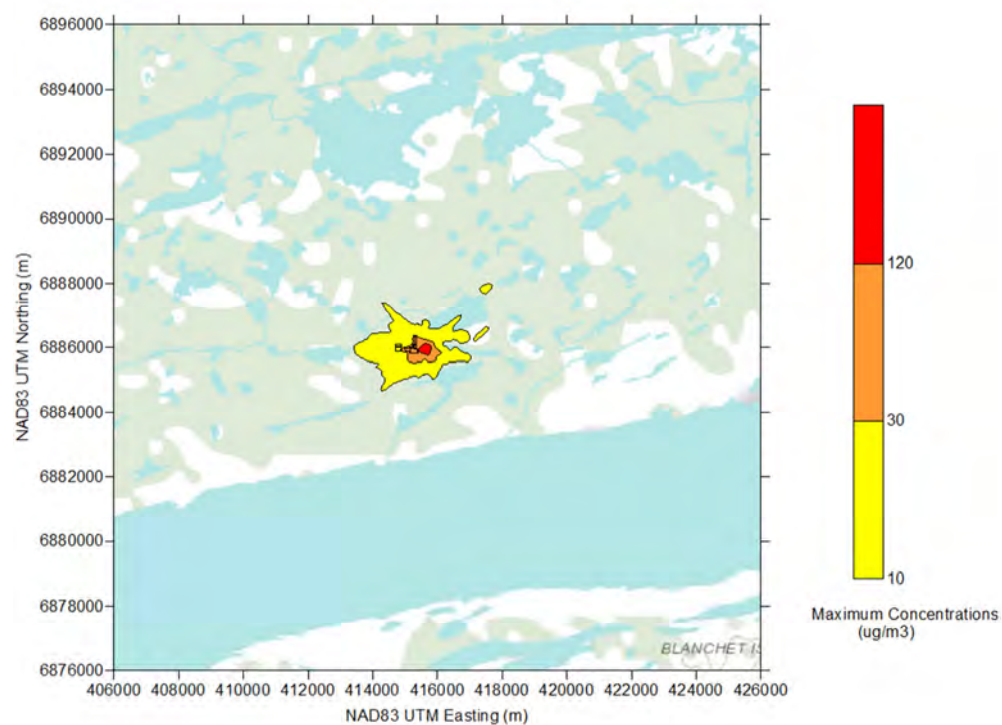


Figure 7: Isopleths of Maximum Predicted 24-Hour Average TSP Concentrations

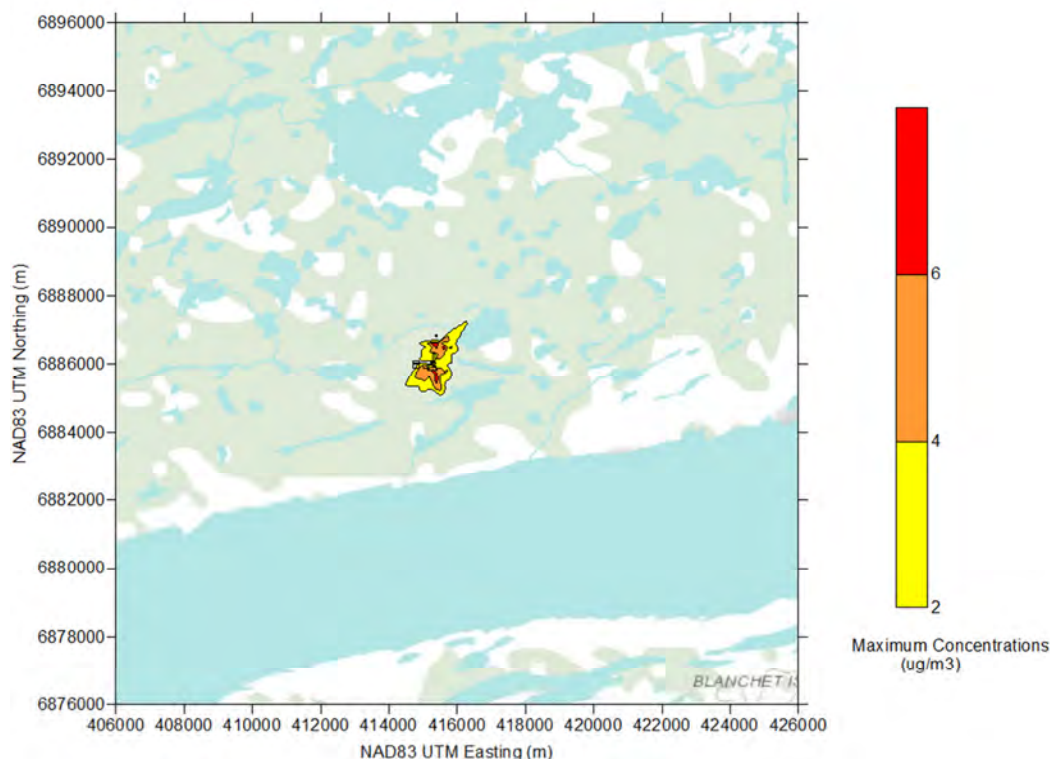


Figure 8: Isopleths of Maximum Predicted 24-Hour Average PM_{2.5} Concentrations

Hydrometallurgical Site

Receptors were added inside the fenceline for the hydrometallurgical site, as shown in Figure 9, and SO₂ emissions were remodeled. The maximum predicted ambient SO₂ concentrations are shown in Table 2. Predicted concentrations are less than the 24-hour and annual SO₂ standards. The maximum predicted 1-hour SO₂ concentration is 614 µg/m³, which exceeds the 1-hour standard. The frequency of exceedances is 0.5%. Maximum one-hour, 24-hour and annual SO₂ concentration isopleth contour plots are shown in Figures 10 to 12. The areas of exceedance for the one- averaging periods is small and limited to inside the plant boundaries, where no public access is expected.

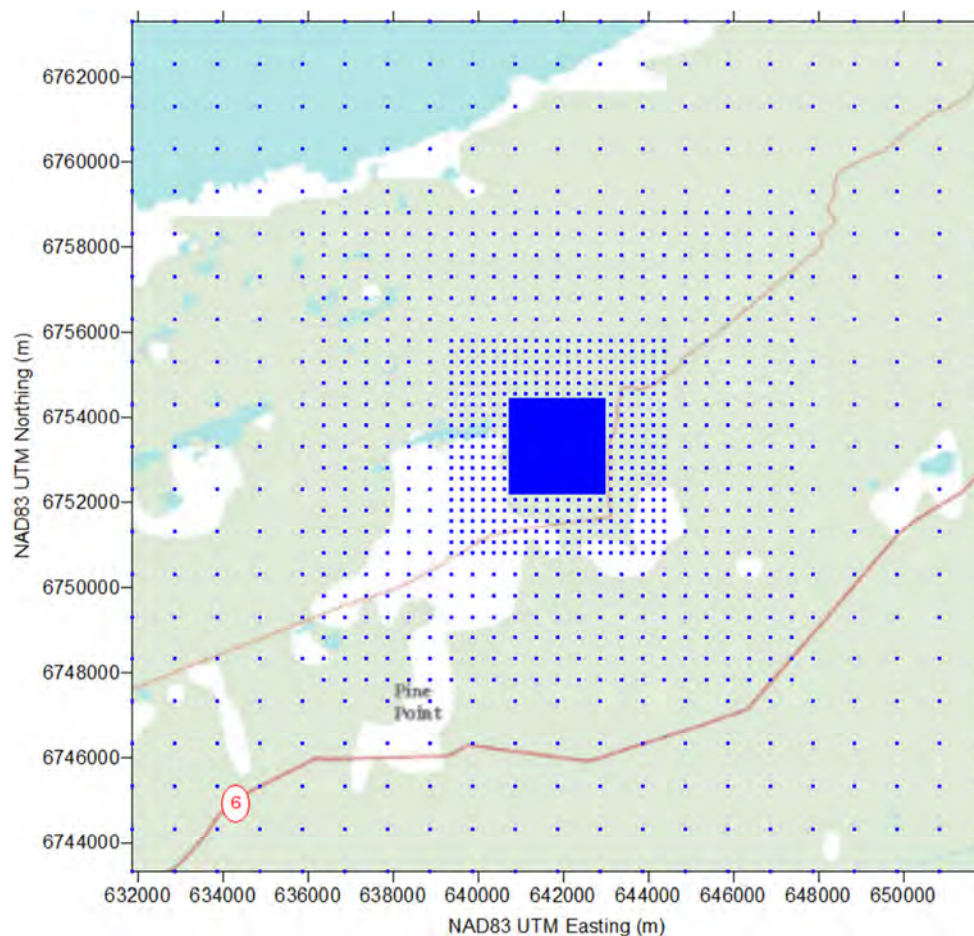


Figure 9: Hydrometallurgical Plant Air Quality Local Study Area Showing Gridded Receptors

TABLE 2: MAXIMUM PREDICTED CAC CONCENTRATIONS FOR HYDROMETALLURGICAL PLANT				
Pollutant	Averaging Period	Maximum Concentrations ($\mu\text{g}/\text{m}^3$)	NWT AQ standard ($\mu\text{g}/\text{m}^3$)	Frequency of exceedance
SO ₂	1-hour	614	450	0.5%
	24-hour	141	150	-
	annual	16	30	-

Note: Values in boldface exceed the NWT AQ standards

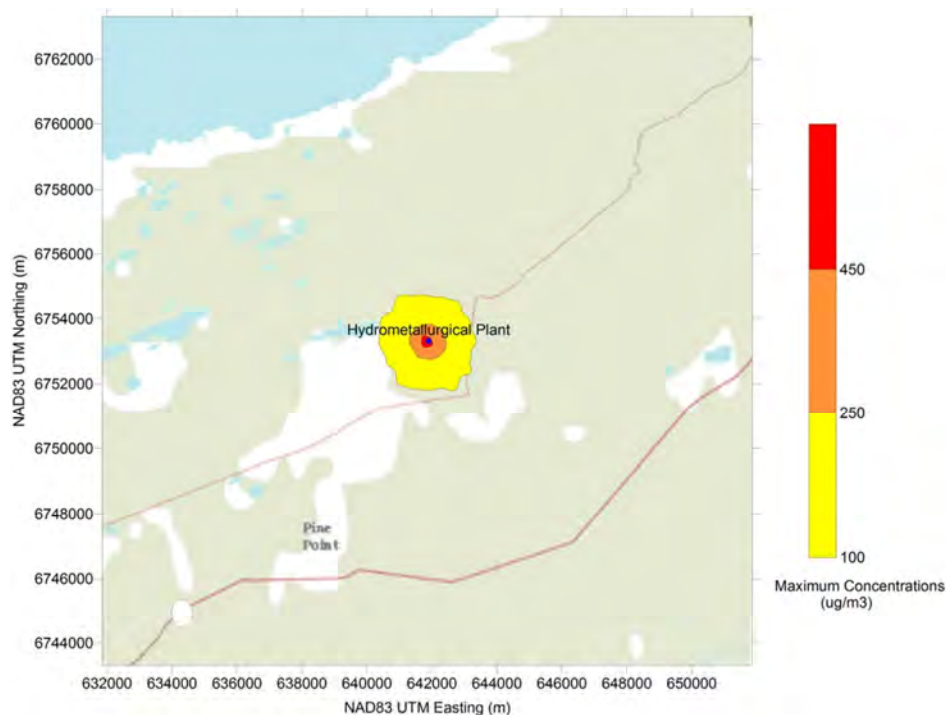


Figure 10: Isopleths of Maximum Predicted One-Hour Average SO_2 Concentrations

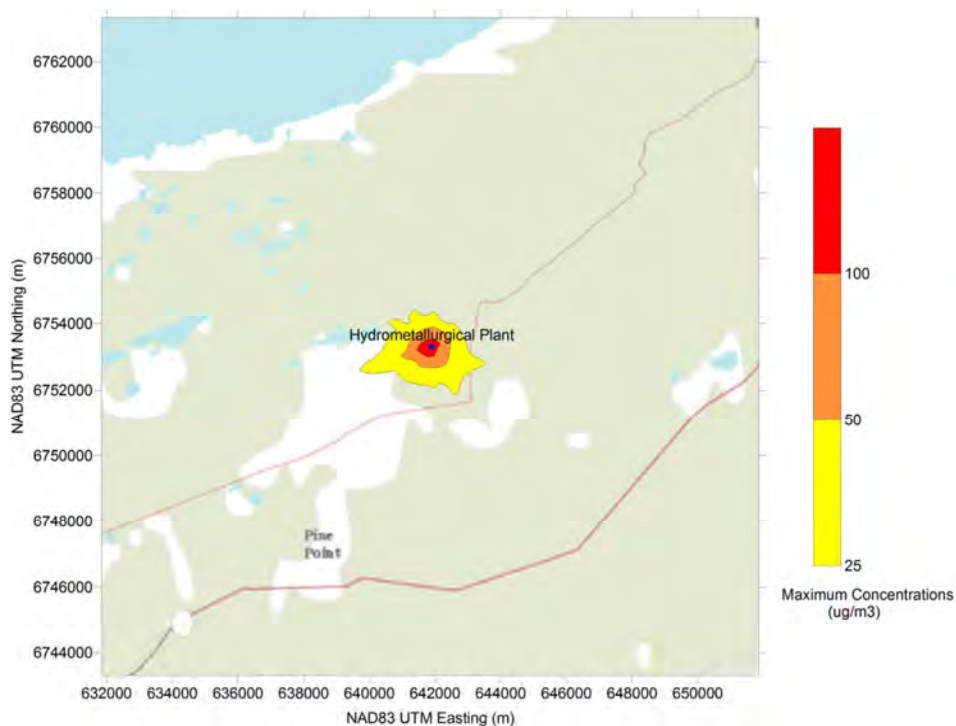


Figure 11: Isopleths of Maximum Predicted 24-Hour Average SO_2 Concentrations

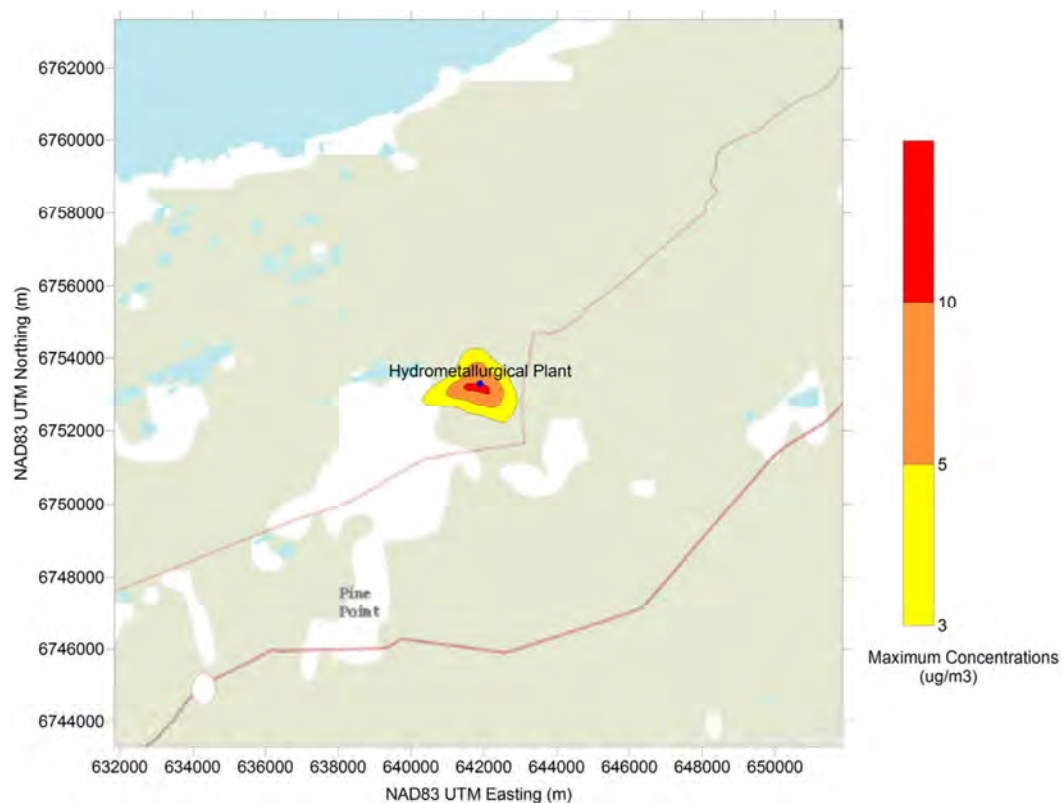


Figure 12: Isopleths of Maximum Predicted Annual Average SO₂ Concentrations

IR Number:	GNWT #21
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Categorization of Emission sources
DAR Section:	6.2.2.3

Preamble:

The DAR categorized the emission sources are Major, Moderate, or Minor, and determined that Minor sources would not be quantified or modeled. It is unclear what threshold was used by Avalon to determine the appropriate category for each emission source. Some of the sources categorized as minor (fuel combustion in vehicles, and fugitive dust emissions from haul truck/roads) have been found to be significant emission sources at other northern mines. Quantified emission estimates should be provided for all sources.

Further, the Product dryers claimed to have sufficient dust collection, yet no details were provided to justify this.

GNWT Request #21

1. Please provide quantified emission estimates for all sources, including details on any emissions treatment, and include them in the model.

Avalon Response #21

The categorization of the sources was based on professional judgment and experience with similar projects. Emissions due to fuel combustion in vehicles and fugitive dust from haul roads are not expected to have a significant effect beyond a few hundred metres of the roads because there are insufficient vehicle movements for the roads to be considered a continuous source of emissions (unlike a major highway in an urban centre) and because tailpipe and road dust emissions are emitted close to ground level and therefore have limited plume rise and consequently limited dispersion. Previous dispersion modelling using the roadway-specific CALINE line-source model for free-flowing traffic suggests that the effect of such roadway emissions tends to be limited to within approximately 200 m of the road.

Nonetheless, to satisfy the GNWT's request, emissions due to fuel combustion in vehicles and fugitive dust emissions from unpaved roads were estimated.

Emissions due to fuel combustion in on-road vehicles were estimated with emission factors, in units of grams of pollutant per mile travelled, obtained from the Canadian version of the US EPA MOBILE6.2 model, known as MOBILE6.2C. MOBILE6.2C emission factors are dependent on various user-specified factors such as climatic conditions, fuel characteristics, travel speeds and vehicle age. Environment Canada climate normals for Yellowknife Airport were used to estimate the annual relative humidity of 59% and maximum and minimum temperatures of -0.2°C and -9°C, respectively. The MOBILE6.2C default values were used for all other parameters. The number of vehicles, location and route, speed and annual kilometers travelled are provided in Table 3.

TABLE 3: VEHICLE PARAMETER INPUTS FOR MOBILE 6.2

Vehicle Type	Number of Vehicles	Location/ Route	Purpose	Speed (km/h)	Annual Kilometres Travelled
Light-Duty Diesel Trucks	9	Mine	Employee transport on site	50	10,000
	2	Hydrometallurgical Plant		50	10,000
Heavy-Duty Diesel Trucks	1	Hydrometallurgical Plant to Hay River	Concentrate delivery	80	496,400
	1	Hay River to Hydrometallurgical Plant	Diesel fuel delivery	80	102,850
	1		Limestone delivery	80	186,150
	1		Sulphuric acid delivery	80	186,150

Emissions due to fuel combustion by haul trucks on site (from the flotation plant to the Thor Lake barge landing site and from the dock to the hydrometallurgical plant) were estimated with the US EPA NONROAD model. The emissions of the non-road haul trucks were based on hours of activity, load factors and the model year. Table 4 shows the information used in the NONROAD model to estimate haul truck emissions.

TABLE 4: INFORMATION USED TO ESTIMATE NON-ROAD HAUL TRUCK EMISSIONS

Truck Haul Route	Load Factor	Model Year	Annual Activity Hours
Flotation plant to Thor Lake barge landing site	31%	2000	803
Dock to hydrometallurgical plant	31%	2000	1,927

Haul trucks operating on unpaved roads result in the re-suspension of road dust particles. The magnitude of road dust emissions is dependent on vehicle weight and precipitation. Heavy vehicles will increase the magnitude of emissions and precipitation will decrease the magnitude of emissions. Particulate matter emissions from the use of unpaved roads were calculated following the method described in US EPA AP-42 Section 13.2.2 and summarized by the following equation:

$$E = k \left(\frac{s}{12} \right)^a \left(\frac{W}{3} \right)^b$$

where:

E = emission factor in pounds (lb) per vehicle-mile-travelled

k, a, b = empirical constants (Table 5)

s = surface material silt content (%)

W = mean vehicle weight (tons)

TABLE 5: EMPIRICAL CONSTANTS FOR EMISSIONS FROM USE OF UNPAVED ROADS			
	TSP	PM₁₀	PM_{2.5}
k	4.9	1.5	0.15
a	0.7	0.9	0.9
b	0.45	0.45	0.45

Source: US EPA 2006c.

The unpaved road lengths are 5 km from the floatation plant to the Thor Lake barge landing site and 12 km from the dock to hydrometallurgical plant. The AP-42 default silt content of 8.4% was used for the haul road surface material. An average control efficiency of 75% was assumed for year-round road dust control. The use of a 75% control efficiency reflects an increase in the moisture content of the haul road surface to roughly twice that of the natural moisture level, as a result of watering activities and natural precipitation (AP-42, Figure 13.2.2-2).

Estimated emissions due to fuel combustion by vehicles and fugitive dust from unpaved roads are presented in Table 6. Also shown in Table 6 are emission estimates for other sources at the mine and hydrometallurgical plant as presented in Tables 6.2-18 and 6.2-13 of the DAR, except that the diesel generator emissions at the mine have been updated as per the values presented in Table 7 of Response #26.

Overall, estimated emissions at the mine site are much greater than at the hydrometallurgical plant, with the exception of SO₂ emissions. At the mine site, the largest sources of NO_x, CO and PM_{2.5} emissions are the diesel generators; the largest sources of SO₂ emissions are the ventilation raises; and the largest sources of TSP are the ventilation raises and transfer and handling of material above ground.

The on-road vehicle emissions contribute less than 0.1% of total CAC emissions at the mine site. At the hydrometallurgical plant, on-road vehicles contribute 28% of NO_x, 22% of CO and 3% of fine particulate matter emissions. The on-road vehicle emissions contribute less than 1% of the total estimated SO₂ and TSP emissions at the hydrometallurgical site.

TABLE 6: EMISSIONS (T/Y) AT THE THOR LAKE MINE AND HYDROMETALLURGICAL PLANT

Location	Source	NO _x	SO ₂	CO	TSP	PM _{2.5}
Mine	On-Road Vehicle Emissions (combustion, tire and brake wear)	6.3E-02	7.4E-04	7.2E-02	1.2E-02	9.8E-03
	Non-road Truck Haul Tailpipe Emissions	5.1	4.3E-03	1.1	0.2	0.2
	Road Dust	-	-	-	37	1.0
	Ventilation Raises	25	23	128	44	3.3
	Mine Air Heater	10	0.1	2.6	1.7	0.8
	Diesel Generators	778	0.56	225	16	14
	Transfer and Handling	-	-	-	44	3.3
	Subtotal	818	24	357	143	22
Hydrometallurgical Plant	On-Road Vehicle Emissions (combustion, tire and brake wear)	5.1	8.1E-03	7.6E-01	1.3E-01	1.1E-01
	Non-road Truck Haul Tailpipe Emissions	12	1.0E-02	2.7	0.7	0.7
	Road Dust	-	-	-	88	2.5
	Sulphuric Acid Plant	-	158	-	-	-
	Subtotal	18	158	3.4	89	3.3
Total		836	181	360	231	26

Haul truck tailpipe emissions at the mine contribute less than 1% of total CAC emissions estimated for the mine. At the hydrometallurgical site, haul trucks contribute 27% of fine particulate matter, 79% of CO and 67% of NO_x emissions.

Road dust from the unpaved haul roads contributes 26% and 99% of total TSP emissions at the mine site and hydrometallurgical plant, respectively. Road dust also contributes 5% and 76% of total PM_{2.5} emissions at the mine site and hydrometallurgical plant, respectively. However, there is large uncertainty in the emission estimation method for fugitive road dust as it does not account for the fact that much of the material is deposited on the road and then re-entrained; the estimation method assumes that new material is constantly being emitted.

Avalon is committed to minimizing dust emissions through the diligent application of appropriate dust suppression strategies (in particular water spray) both above and below ground, as per the GWNT dust suppression guidelines. Additionally, in the normal course of mining, the mine will have higher relative humidity than experienced on surface due to the drilling, bolting and backfilling events that utilize water in their processes that will increase the ambient moisture content in the mine.

IR Number:	GNWT #22
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Contaminants considered in the emission assessment
DAR Section:	6.2.2.1
TOR Section:	3.3.8

Preamble:

The TOR requested that CAC's from all levels of the project be considered, and as such, Avalon has focused on these specific parameters. The GNWT recognizes that other project-specific parameters have not been included in the air quality assessment, for example, the acid gases resulting from the sulphuric acid plant and acid bake kiln. Further, Section 3.3.8, 1(b) and (c) of the TOR required that test results for the general composition of and impacts from dispersion and deposition of dust from tailings facilities, stockpiles, waste rock piles, handling and transport of ore and concentrate, and similar dust-producing components of the project, as well as radioactive elements, be detailed. This information was not included in the Air Quality assessment for the project.

GNWT Request #22

1. The GNWT requests that project-specific emissions be listed and quantified from each component of the process, in addition to the CAC's already presented. This should include speciation of dust, as per the requirements of Section 3.3.8, 1(b) and (c) of the TOR.

Avalon Response #22

The tailings will be liquid slurry that will be transported to the tailings pond through pipelines and therefore fugitive dust due to transportation should be negligible.

The tailing facilities will remain moist throughout the year and therefore will not be a source of fugitive dust emissions. The tailing facilities will be reclaimed after the operation phase has ceased. Samples of whole rocks from heads, tailings and concentrates were analyzed and speciation of rocks is detailed in Tables 9, 10 and 11 in *Avalon Rare Earth Metals Inc. – Nechalacho Rare Earth Element Project – Project 11806-007 Interim Report* (SGS Minerals Service 2011). The rocks mostly consist of SiO₂, Al₂O₃ and Fe₂O₃ and trace amounts of other minerals. The fugitive emissions are expected to have similar content as these rocks.

Avalon will have a set of procedure to minimize dust emissions from stockpiles. Dust emissions are usually generated when a LHD dumps the materials in a stockpile. After blasting, the shot muck will be washed down by spraying water. The LHD can then load the wet ore and dump it to the designated stockpile. Should the shot muck dry up, water will be sprayed on the stockpile.

When production begins, the ore is transported by a conveyor through the main ramp. To minimize the dispersion and exposure to dust, water is sprayed on the crushed ore at the conveyor loadout.

The concentrate from the flotation plant will be placed in an ore bag to minimize any dust emissions. The ore bag is then placed in closed, half-height intermodal containers. Any dust emissions will be enclosed in the flotation plant and hydromet plant.

The ore contains no or very tiny traces of radioactivity, which will not be a concern to airborne radioactive dust.

Dust will be generated when there is traffic on the access roads at Thor Lake and Pine Point. The heaviest traffic would be the road from the Thor Lake process plant to the dock facility, and the road from the dock facility at Pine Point to the hydromet plant. To suppress the dispersion of dust, magnesium chloride will be applied on the roads or water will be sprayed on the roads by a water truck.

IR Number:	GNWT #23
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Ore Transport and Handling
DAR Section:	4.5.2.1, 4.7.2.5, 4.8.2.3, 6.12

Preamble:

The description of the transport and handling of ore and concentrate is limited. The GNWT understands that a conveyor system will be used to transport crushed ore from the underground to the flotation plant; however, is not clear on the methods to be used to prevent dust migration during this process. The GNWT understands that concentrate from the flotation plant will be transported in half-height, intermodal containers (i.e. sea-cans) to the ferry crossing and then on to the hydromet facility. It is unclear how a top loading and end-loading intermodal container will be sufficiently sealed to prevent dust escapement, or how Avalon intends to ensure the exterior is clean prior to transport to prevent contaminant loading along the transport route.

During the dumping process at the hydromet facility the GNWT understands that a dry dust collection system would be used, but limited details are provided to explain the system or how it will control dust plumes during this step. The GNWT understands the transport of the products from the hydromet facility to the railhead will be conducted in sealed bulk bags or intermodal containers, and 20 tonne trucks and pup trailers with covers. It is unclear how Avalon will be ensuring that contaminant loading does not occur along the transportation route when shipping a fine granular product using bulk bags that tie closed with a rope, or a tarp cover over a pup trailer.

GNWT Request #23

1. Please describe the measures that will be taken during containment, handling and transport of ore, concentrate, and product to ensure that dust escapement, migration and loading does not occur throughout the process.
2. Please include a chemical breakdown of the components of the dust from the ore, concentrate, and products with an assessment of potential environmental effects from contaminant loading.

Avalon Response #23.1

As discussed in Section 4.7.2.5 of the DAR, the moist (~8% moisture) concentrate produced at the Nechalacho Flotation Plant site will be stored in custom-designed, covered containers with removable lids. The containers will be half-height intermodal containers with external dimensions of 6.1 m long (20 ft) by 2.4 m wide (8 ft) by 1.3 m high (4 ft 3 in). Containers will have end doors and

removable tops as shown in Photo 4.7-1 of the EIS and re-presented in this response. Containers will hold 40 t of concentrate on a dry basis.

Although not clearly indicated in the DAR, the containers will be loaded at a designated location inside the Flotation Plant building.

Approximately 6,500 containers will be required during operations. Avalon will purchase containers for its exclusive use. Approximately 3,285 containers are required on site for the start of operations, but the purchase and delivery of the remaining containers can be deferred until the first shipments of concentrate are outbound from the site.

Containers will be weighed and stored near the Flotation Plant at the Nechalacho mine site through the winter months. As the containers will be stored in a double layer, a 16,000 m² storage area is required.



Photo 4.7-1

Half height container with removable top and end door

Loaded containers will be moved throughout the operating season to the dock site storage area adjacent to GSL so that they are in position for loading when the seasonal shipping season commences. Containers will be moved short distances at the Nechalacho mine site and at the dock at GSL by container forklift. For the five kilometre haul to the GSL dock, the containers will be loaded on container trailers at the TLP site and offloaded at the dock site.

Subsequently, as discussed in Section 4.8.2.3 of the DAR, the intermodal containers containing the concentrate will be barged across Great Slave Lake to the seasonal Hydrometallurgical Plant dock facility to be located on the south shore of the lake. The concentrate containers will be unloaded from the barges and trucked 8.6 km to a secure storage area located on the west side of the Hydrometallurgical Plant.

Heavy duty forklift trucks will be used to take the containers to a thaw shed (for containers that were stored at Nechalacho during the winter period). A walking beam conveyor system or similar system will be used for moving containers through the thaw shed and into the dumping system

located inside the Hydrometallurgical Plant. The thaw system will use excess heat from the process plant generated as steam.

Containers will be dumped by elevating one end of the container allowing the contents to slide out. The dumped material will fall onto grizzly bars above a hopper and conveyor system to break the fall and for safety reasons.

After dumping, any material on the outside of the container (inside the facility) will be removed by washing using a minimal amount of water or by vacuuming. The container is then inspected, re-assembled, and returned to the storage yard. A dry dust collection system will be used to capture dust that may be generated inside the building.

Following processing of the concentrate in the Hydrometallurgical Plant, as indicated in Section 4.8.2 4 of the DAR, approximately 418 tonnes of moist acid bake residue (concentrate) and light rare earth products will be produced per day. The moist acid baked residue makes up 330 tpd while the moist light rare earth filter cake is 88 tpd. Both the concentrate and light rare earth products will be blow dried during filtration to reduce moisture content to ~8% and prepare the products for shipment to Avalon's separation plant to be located in the south.

The acid bake residue (concentrate) will be loaded into 20 tonne trucks and pup trailers (inside the loading area at the Hydrometallurgical Plant site). The truck boxes will be covered for direct shipment to the railhead facilities operated by CN rail. The light rare earth products will be placed in either intermodal containers or sealed bulk bags for shipment to ensure that product is not lost during the handling and/or transportation process. The light rare earth products will be hauled 85 km from the Hydrometallurgical Plant to the Hay River railhead on flatbed trucks. Truck shipments are expected to occur daily during one twelve hour shift. The concentrates and light rare earth products will be transferred to railcars inside a CN loading facility and direct-shipped south from the railhead by CN Rail to Avalon's separation plant.

The acid bake residue concentrate and light rare earth products produced at the Hydrometallurgical plant will be extremely valuable, and Avalon will be ensuring that all reasonable procedures, as described in this response, will be taken to ensure that dust escapement is effectively mitigated through all phases of production and processing.

Avalon Response #23.2

The mineralization of the ore and Flotation Plant concentrate were summarized in Tables 4.7-2, 4.7-3 and 4.7-4 of the DAR. More detailed data on the chemical breakdown of the ore and Flotation Plant concentrate (X-ray fluorescence analysis) are provided in Table 9 (whole rock/ore) and Table 10 (Flotation Plant concentrate) in the SGS (2011) report that is available on the MVEIRB project registry.

IR Number:	GNWT #24
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Air Quality and Deposition Guidelines
DAR Section:	6.2.2.2

Preamble:

The version of the GNWT Guideline for Ambient Air Quality Standards referenced in the DAR is not the most recent version. Further, the applicability of the deposition guidelines is unclear, since some are based on aesthetic criteria rather than for the protection of environmental or human health.

GNWT Request #24

1. The GNWT requests that the 2011 version of the GNWT Guideline for Ambient Air Quality Standards be referenced in the air quality assessment of the DAR, and all associated tables be updated.
2. The GNWT further requests that the Proponent justify the applicability of the referenced deposition guidelines.

Avalon Response #24.1

The ambient air quality standards referenced in the air quality assessment of the DAR were obtained from NWT Ambient Air Quality Standards published in January 2011. The only difference is the order in which the contaminants are presented.

Avalon Response #24.2

Since there is no deposition standard in the Northwest Territories, dustfall criteria from other jurisdictions were referenced. The most stringent criterion was used to compare with the modelled results. The BC deposition objectives are based on the ambient air control objectives outlined in the 1979 Pollution Control Objectives for the Mining, Smelting and Related Industries of British Columbia. It was primarily established for nuisance concerns and may act as an initial indicator to prompt further investigation into health concerns if any.

IR Number:	GNWT #25
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Stack Heights
DAR Section:	6.2.2.5

Preamble:

Avalon assumed that the stack height of the diesel generators will be 20m. At other northern mines the stack heights for similar generators were assumed to 10m. The assumed height of the stack will affect the ambient concentration of air pollutants predicted by the air quality models.

GNWT Request #25

1. Please justify the selected stack height of 20m (i.e. 65ft) for each of the 1.45MW generators.

Avalon Response #25

At the DAR compilation stage, Avalon was still at the preliminary design stage. RWDI consulted with Finning, the manufacturer of the 1.45 MW generators. Finning indicated that an example from previous project, which used similar equipment, used a stack height of 30 m. This was considered to be high and therefore was reduced to 20 m.

IR Number:	GNWT #26
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Load factors on the generators
DAR Section:	6.2.2.5

Preamble:

Diesel power generation accounts for more than 75% of the NO_x and 30% of the PM_{2.5} emissions at the Nechalacho mine site (Table 6.2-18). Avalon assumed the US EPA default load factor of 43% in the emission calculations for the diesel power generators. However it is not clear if this default load factor is applicable to this project. It is proposed that the mine site will use six 1.45 MW diesel generators to meet the continuous power demand of 8.4 MW. The maximum capacity of the six generators is 8.7 MW. At 43% load, the generators will produce 3.7 MW, less than half of the expected power demand. It is noted that other northern mines have used load factors in the range of 70% for diesel generators when calculating air emissions. The assumed load factor directly affects air emission estimates. Avalon needs to justify the use of the 43% load factor in its emission estimates for diesel generators.

GNWT Request #26

1. Please justify the use of 43% load factor on the 1.45MW generators.

Avalon Response #26

The emissions associated with the diesel generators were previously estimated using US EPA NONROAD model with default load factor of 43%. RWDI contacted Finning, the manufacturer of the diesel generators, and obtained emission factors for PM, CO and NO_x with load factor of 100% to meet the power demand of 8.4 MW. Emission factor for SO₂ was calculated using AP-42 Chapter 3 Section 4. Emission factor for PM_{2.5} was calculated based on size distribution from stationary internal combustion engines AP-42 Appendix B.2.2. The revised emissions for diesel generators are presented in Table 7. These revised emissions were incorporated in the re-modelling for Response # 20.

TABLE 7: EMISSIONS ASSOCIATED WITH DIESEL GENERATORS OPERATING AT FULL LOAD

	NO _x	SO ₂	CO	TSP	PM _{2.5}
Emission rate per generator (g/s)	4.1	0.003	1.2	0.084	0.076
Emission inventory for six diesel generators (t/y)	778	0.56	225	16	14

IR Number:	GNWT #27
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Sulphuric Acid plant emission factor
DAR Section:	6.2.2.6

Preamble:

Avalon has indicated that the sulphur dioxide emission factor for double absorption, as per US EPA AP-42 Section 8.10, was used to estimate the SO₂ emissions from the sulphuric acid plant. The GNWT understands that this equates to a 99.7% conversion efficiency. Details on the method that will ensure this high conversion efficiency are unclear.

GNWT Request #27

1. Please detail the absorption process that will be in place to ensure the process will achieve the predicted sulphur dioxide emission factor.

Avalon Response #27

In, the Double Contact Double Adsorption (DCDA) process, SO₂ and SO₃ gases pass through the absorption towers twice to achieve further adsorption and conversion of SO₂ to SO₃, which results in the production of higher grade sulfuric acid.

In the first stage of conversion, the gases of SO₂ enter the catalytic converter, usually a tower with multiple catalyst beds, and get converted to SO₃. The exit gases from this stage contain both SO₂ and SO₃, which are passed through intermediate absorption towers where sulfuric acid is trickled down packed columns and SO₃ reacts with water, increasing the sulfuric acid concentration. Though SO₂ too passes through the tower it is unreactive and comes out of the absorption tower.

This stream of gas containing SO₂, after necessary cooling, is passed through the catalytic converter bed column again achieving up to 99.8% conversion of SO₂ to SO₃ and the gases are again passed through the final absorption column thus resulting in a high conversion efficiency of SO₂ and enabling production of a higher concentration of sulfuric acid.

The industrial production of sulfuric acid involves proper control of temperatures and flow rates of the gases as both the conversion efficiency and absorption are dependent on these.

IR Number:	GNWT #28
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Meteorological data
DAR Section:	6.2.2.5, 6.2.2.6

Preamble:

The GNWT understands that the on-site met data for the hydromet site was gathered from Hay River, and that gaps were filled with data from the Yellowknife airport. No details were provided to indicate the extent of data gaps.

GNWT Request #28

1. Please detail the extent of missing data from the Hay River meteorological data-set.

Avalon Response #28

From 2002 to 2006, there were only six hours of missing data:

- 2002 January 15, hour 24
- 2002 June 1, hour 11
- 2002 June 12, hour 11
- 2003 August 20, hour 1
- 2006 April 2, hour 9
- 2006 May 12, hour 12

IR Number:	GNWT #29
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Air Quality Monitoring
DAR Section:	6.14.2
TOR Section:	3.3.10 Part 2

Preamble:

Avalon notes that air quality data collected from local met stations (Yellowknife, Hay River) will likely be adequate for monitoring air quality and potential effects resulting from the Thor Lake Project. The GNWT would like to point out that met stations primarily measure wind speed and temperature, and do not monitor for air emissions associated with the Thor Lake Project. Therefore, they will provide little utility in measuring effects from the project. Section 3.3.10 part 2 of the TOR required the description of a framework for monitoring plans for all valued components other than water. The GNWT notes that verification of the modeled predictions are the final component in a typical air quality assessment, to ensure that assumptions and calculations were accurate.

GNWT Request #29

1. Please provide a monitoring plan to verify the results of the AQ modeling, including ambient air and deposition components.

Avalon Response #29

The air quality monitoring plan provided by RWDI can be found in DAR Appendix J Section 8. The section is also repeated below:

“The assessment of criteria air contaminant emissions during operation was based on emission estimates. To confirm the input parameters used in the dispersion modelling, it is recommended that stack testing be conducted on the diesel generators, mine air heater, and sulphuric acid plant after commissioning.

The dispersion modelling results indicate that the maximum predicted concentrations are much less than the NWT Ambient Air Quality Standards. Therefore, as long as the actual stack parameters and measured emission rates are consistent with the modelling assumptions, on-going ambient monitoring should not be necessary.”

However, the revised model results presented in Response #20 indicate the potential for exceedances of SO₂ and TSP inside the plant boundaries. Therefore it is recommended that one passive SO₂ monitor be located at the location of predicted exceedance inside the plant fenceline at the mine site and that one be installed at the hydrometallurgical plant in the location of the predicted exceedance of the one-hour standard. It is also recommended that TSP be monitored inside the fenceline of the mine site in the area of predicted exceedance for a minimum of one year.

IR Number:	GNWT #30
Source:	Government of Northwest Territories
To:	Avalon Rare Metals Inc.
Subject:	Re-vegetation Strategy
DAR Section:	11.1

Preamble:

Avalon indicates that appropriate and approved seed mixes will be used, with native species being used where possible. However, they also indicate that agronomic species could be used. While we are pleased to see that only certified weed-free seed sources will be used, it could be argued that given the location of the sites many agronomic species may be considered weeds themselves.

GNWT Request #30

1. The proponent is asked to provide further details on the anticipated types of native and agronomic species that may be used and describe any potential impacts that the use of these species will have on the vegetation community in the surrounding areas.

Avalon Response #30

Avalon plans to tailor its revegetation efforts to the local ecology, which will involve assessing both areas that require revegetation as well as adjacent undisturbed areas prior to the development of a revegetation strategy. Revegetation will likely involve the use of seed (collected locally and/or supplied commercially) as well as transplanted or salvaged materials (e.g., from development areas), where feasible.

Avalon intends to use native plant species wherever possible, which will include using cultivars of native species developed for use in reclamation activities in northern latitudes. Seed mixtures of these cultivars have been used successfully in reclamation efforts elsewhere in the NWT (e.g., Giant Mine, EKATI Diamond Mine, Discovery Mine, Colomac Mine, amongst others), and may include some or all of the following species:

- Polar grass [*Arctagrostis latifolia* (R. Br.) Beauv.],
- Bluejoint [*Calamagrostis canadensis* Michx.],
- Tundra bluegrass [*Poa glauca* Beauv.],
- ARC Glacier alpine bluegrass [*Poa alpina* L.],
- Bering's tufted hairgrass [*Deschampsia beringensis* Hulten],
- Tufted hairgrass [*Deschampsia caespitosa* L.], and
- Common creeping red fescue [*Festuca rubra* L.].

Truly “agronomic” species (e.g., *Agropyron* spp., *Lolium* spp., or *Triticum* spp.) would be used sparingly (e.g., would only comprise 10% of a seed mix) and only in instances where the establishment of a rapid cover would be required and native species are either unavailable or unsuitable to meet this purpose. Agronomic species selection would be contingent on the species having a limited ability to spread, having an annual growth habit, and are easily out-competed by native vegetation.

ATTACHMENTS

Attachment 1: EBA, A Tetra Tech Company (EBA). February 2012. Conceptual Wildlife Effects Monitoring and Management Plan. A plan prepared by EBA for Avalon Rare Metals Inc.

Attachment 1



Avalon Rare Metals Inc.

**CONCEPTUAL WILDLIFE EFFECTS MONITORING AND
MANAGEMENT PLAN**

**Prepared for:
AVALON RARE METALS INC.**

**Prepared by:
EBA, A TETRA TECH COMPANY**

FEBRUARY 2012

ISSUED FOR REVIEW

FILE: V15101007.004

TABLE OF CONTENTS

I.0	INTRODUCTION	I
1.1	Objectives of the Wildlife Effects Monitoring and Management Program	3
1.2	Project VCs and Species at Risk	3
1.2.1	Nechalacho Mine and Flotation Plant	3
1.2.2	Hydrometallurgical Plant	4
2.0	PROJECT STUDY AREAS.....	4
3.0	PROPOSED MITIGATION MEASURES.....	6
3.1	Potential Project Effects.....	6
3.2	General Measures	7
3.3	Mitigation Measures for Key Species	8
3.3.1	Wildlife Common to both the Nechalacho Mine Area and Hydrometallurgical Plant Site	8
3.3.1.1	Moose (<i>Alces alces</i>)	8
3.3.1.2	Black Bear (<i>Ursus americanus</i>)	10
3.3.1.3	Other Fur-bearers	11
3.3.1.4	Short-eared Owl	13
3.3.1.5	Common Nighthawk	15
3.3.2	Olive-sided Flycatcher	16
3.3.2.1	Rusty Blackbird	17
3.3.2.2	Horned Grebe	19
3.3.3	Nechalacho Mine Area and Flotation Plant	20
3.3.3.1	Barren-ground Caribou (<i>Rangifer tarandus groenlandicus</i>)	20
3.3.3.2	Bald Eagle (<i>Haliaeetus leucocephalus</i>)	21
3.3.4	Hydrometallurgical Plant Site (Pine Point)	23
3.3.4.1	Woodland Caribou	23
3.3.4.2	Wood Bison	24
3.3.4.3	Waterfowl	25
3.3.4.4	Whooping Crane	26
3.3.4.5	Peregrine Falcon	27
3.3.4.6	Yellow Rail	28
3.3.4.7	Northern Leopard Frog (<i>Lithobates pipiens</i>)	29
3.4	Waste Management.....	30
3.5	Targeted Deterrent Measures/Actions.....	31
3.6	Training and Site Orientation	31
3.7	Project EMP	32
4.0	MONITORING.....	32
4.1	General Wildlife Monitoring.....	32
4.2	Species at Risk and VCs	33
4.3	Raptors	35
4.4	Direct Habitat Loss and Modification	36

5.0 REPORTING	36
6.0 ADAPTIVE MANAGEMENT	36
7.0 CLOSURE.....	37
REFERENCES.....	38

TABLES

Table 1	Thor Lake Project Environmental Issue Matrix.....	6
---------	---	---

FIGURES

Figure 1	Thor Lake Project Location.....	2
Figure 2	Local Study Areas and Regional Study Areas, Thor Lake Project.....	5

APPENDICES

Appendix A	EBA's General Conditions
------------	--------------------------

1.0 INTRODUCTION

Avalon Rare Metals Inc. (Avalon) proposes to mine, mill, and produce rare earth carbonate and oxides, zirconium, niobium and tantalum oxides from the Nechalacho deposit, located on its Thor Lake Property. The proposed project is referred to as the Thor Lake Project (the Project or TLP).

Approximately 12-14 million tonnes of mineral resources will be mined from the Nechalacho deposit over a period of about 20 years of operations. Construction will begin 16-18 months before the start of operations. At the end of mine life, reclamation activities will begin and continue for a period of about three years.

The proposed TLP has two main site components: an underground mine and flotation plant (Nechalacho Mine and Flotation Plant site), to be located at the Thor Lake Property, and a hydrometallurgical plant (Hydrometallurgical Plant site) to be located at the existing brownfields site of the former Pine Point Mine, 85 km east of Hay River, NT on the south shore of Great Slave Lake (Figure 1, (Avalon 2011)).

Rare earth elements (REEs) will be mined underground and concentrated at the Nechalacho Mine and Flotation Plant site. The resulting REE concentrates will be barged during the summer months across the east end of Great Slave Lake to the Hydrometallurgical Plant site. Upon arrival, the concentrate will be trucked from the south shore of Great Slave Lake to the Hydrometallurgical Plant site via a short (8 km) haul road. The concentrate will be further processed at the Hydrometallurgical Plant. The resulting final products will be hauled to the Hay River railhead in sealed containers via truck, and direct shipped by the CN railway for further processing in the south.

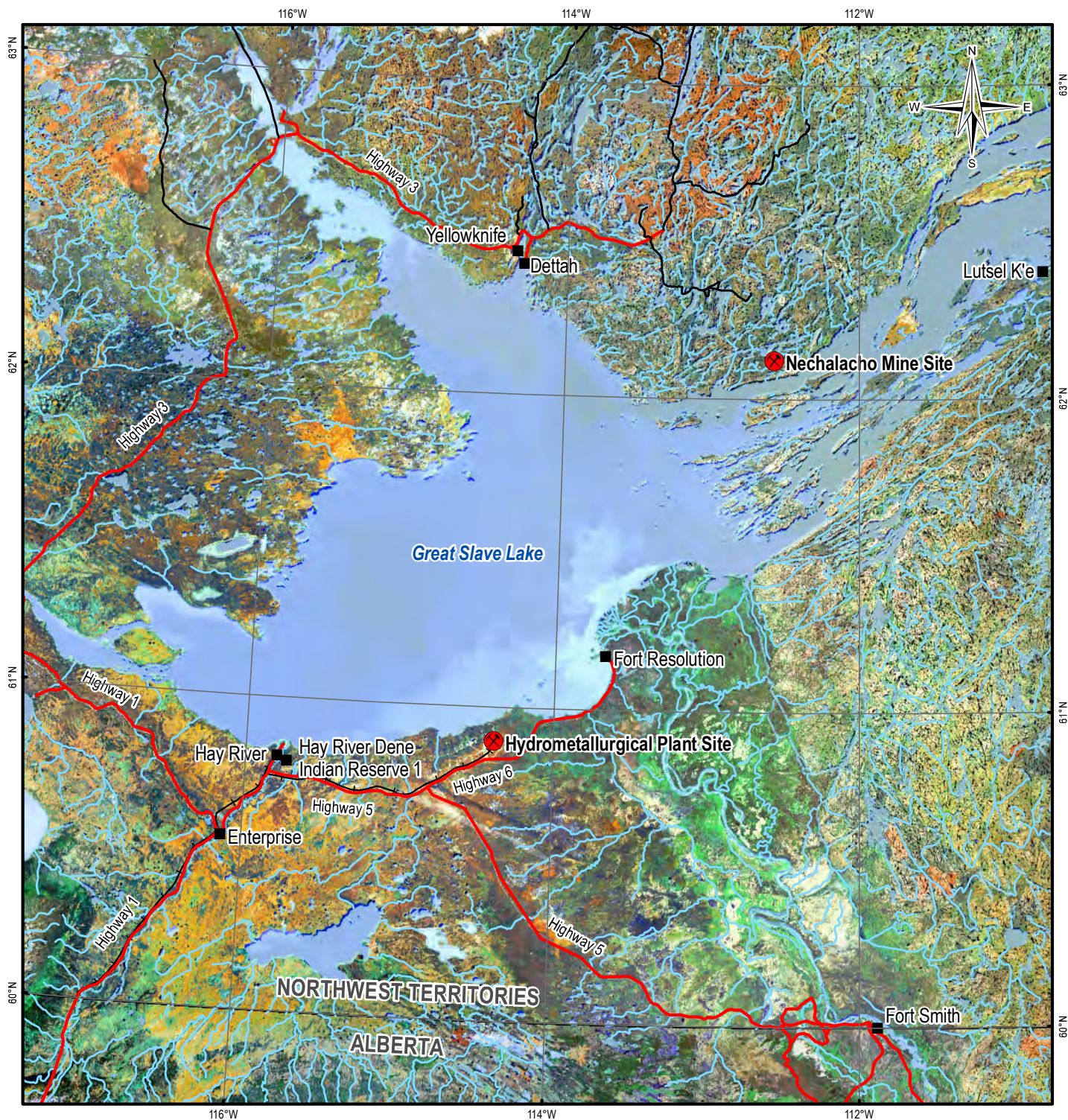
The Developer's Assessment Report (DAR; Avalon 2011) for this Project provides a full description of the project, baseline environmental study results, and effects assessments.

The present conceptual plan is the next step in developing a comprehensive Wildlife Effects Monitoring and Management Program (WEMMP) for this Project. Avalon commits to working with ENR and other relevant parties in the development of the final Wildlife Effects Monitoring and Management Plan with the goal of an endorsed, final Plan in place 90 days prior to construction at the Nechalacho Mine site and Hydrometallurgical Plant site areas.

The initial phase in the development of a WEMMP involves defining the wildlife environmental issues that may result from the construction, operations, and decommissioning phases of a project, and identification of mitigation measures to avoid or minimize potential adverse effects. In anticipation of, and adherence to regulatory requirements, Avalon Rare Metals Inc. retained teams of specialist consultants to carry out multi-year baseline studies to characterize existing terrestrial environmental conditions (Stantec 2010), and to consolidate existing information, assess potential effects, and recommend mitigation strategies (Avalon 2011).

The Effects Assessment was guided by the Terms of Reference (TOR) issued by the Mackenzie Valley Environmental Impact Review Board (MVEIRB 2011), which identified specific Key Lines of Enquiry and required the description and assessment of effects based on all Project activities and phases. The information and data compiled as a result of these efforts form the basis for the preparation of a science based WEMMP.

Q:\Vancouver\GIS\ENGINEERING\151\15101007_ThorLake\Maps\006_DAR\15101007_DAR_Map059_ES_Location.mxd



LEGEND

- ✕ Site Location
- Community
- Road
- Winter Road
- Railroad
- ~ Watercourse
- Waterbody

NOTES

Base data source: ESRI Data Maps

ISSUED FOR USE

THOR LAKE PROJECT

Site Locations

PROJECTION NWT Lambert	DATUM NAD83
Scale: 1:2,000,000	
40	20 0 40
Kilometres	
FILE NO. V15101007_DAR_Map059_ES_Location.mxd	
PROJECT NO. V15101007.006	DWN SL
OFFICE EBA-VANC	DATE May 17, 2011
CKD RH	REV 1



Figure 1

1.1 Objectives of the Wildlife Effects Monitoring and Management Program

This conceptual Wildlife Effects Monitoring and Management Program (WEMMP) outlines a framework to monitor and mitigate any potential direct and indirect effects to wildlife from the Thor Lake Project (TLP). The WEMMP is conceptual at this stage, with the intention of providing a starting point for discussions with ENR and other interested parties. A detailed Program with specific study designs, methods and procedures will be developed during the permitting phase. The goal is to have a finalized WEMMP approved 90 days prior to construction for each Project location.

The WEMMP is designed to achieve the following objectives:

- Provide information to assess predictions of effects outlined in the Project DAR;
- Implement mitigation measures to reduce risks and disturbance to wildlife and wildlife habitat;
- Determine the effectiveness of proposed mitigation measures;
- Incorporate local traditional knowledge, where applicable; and
- Propose best management practices (BMPs) or adaptive management measures and at what point they should be implemented.

1.2 Project VCs and Species at Risk

Project scoping focuses the effects assessment on key issues of concern, commonly referred to as Valued Components (VCs). VCs represent elements of the natural and human world considered to be of value by society. Species at Risk are typically included as VCs for assessing potential project effects.

1.2.1 Nechalacho Mine and Flotation Plant

Section 6.9.1 of the DAR (Avalon 2011) assessed the potential effects of the proposed Nechalacho Mine and Flotation Plant and associated activities on the wildlife resources of these areas. The wildlife VCs assessed included barren-ground caribou, moose, black bear, other furbearing mammals, and a number of bird species including Bald Eagle, Peregrine Falcon, Short-eared Owl, Common Nighthawk, Olive-sided Flycatcher, Rusty Blackbird and Horned Grebe. Several of these species are listed as Species at Risk and include:

Species	NWT Status	COSEWIC	SARA
Wolverine (<i>Gulo gulo</i>)	Sensitive	Special Concern	Not Listed
Common Nighthawk (<i>Chordeiles minor</i>)	At Risk	Threatened	Threatened (Schedule 1)
Olive-sided Flycatcher (<i>Contopus cooperi</i>)	At Risk	Threatened	Threatened (Schedule 1)
Rusty Blackbird (<i>Euphagus carolinus</i>)	May Be At Risk	Special Concern	Special Concern (Schedule 1)
Short-eared Owl (<i>Asio flammeus</i>)	Sensitive	Special Concern	Special Concern (Schedule 3)
Peregrine Falcon (<i>Falco peregrinus anatum</i>)	Sensitive	Special Concern	Not Listed
Horned Grebe (<i>Podiceps auritis</i>)	Secure	Special Concern	Not Listed

Grizzly bears (*Ursus arctos*), assessed by COSEWIC as “Special Concern”, may rarely occur in the Nechalacho Mine area as an accidental species.

1.2.2 Hydrometallurgical Plant

Section 6.9.2 of the DAR (Avalon 2011) assessed the potential effects of the proposed Hydrometallurgical Plant and associated activities on the wildlife resources of this area. The wildlife VCs assessed included woodland caribou, moose, wood bison, black bear, other furbearing mammals, and a number of bird species including Whooping Crane, Peregrine Falcon, Yellow Rail, Short-eared Owl, Common Nighthawk, Olive-sided Flycatcher, Rusty Blackbird and Horned Grebe. Several of these species are listed as Species at Risk and include:

Species	NWT Status	COSEWIC	SARA
Wood Bison (<i>Bison bison athabasca</i>)	At Risk	Threatened	Threatened
Woodland Caribou (<i>Rangifer tarandus caribou</i>)	Sensitive	Threatened	Threatened
Wolverine (<i>Gulo gulo</i>)	Sensitive	Special Concern	Not Listed
Whooping Crane (<i>Grus Americana</i>)	At Risk	Endangered	Endangered (Schedule 1)
Common Nighthawk (<i>Chordeiles minor</i>)	At Risk	Threatened	Threatened (Schedule 1)
Olive-sided Flycatcher (<i>Contopus cooperi</i>)	At Risk	Threatened	Threatened (Schedule 1)
Yellow Rail (<i>Coturnicops noveboracensis</i>)	May Be At Risk	Special Concern	Special Concern (Schedule 1)
Rusty Blackbird (<i>Euphagus carolinus</i>)	May Be At Risk	Special Concern	Special Concern (Schedule 1)
Short-eared Owl (<i>Asio flammeus</i>)	Sensitive	Special Concern	Special Concern (Schedule 3)
Peregrine Falcon (<i>Falco peregrinus anatum</i>)	Sensitive	Special Concern	Not Listed
Horned Grebe (<i>Podiceps auritis</i>)	Secure	Special Concern	Not Listed

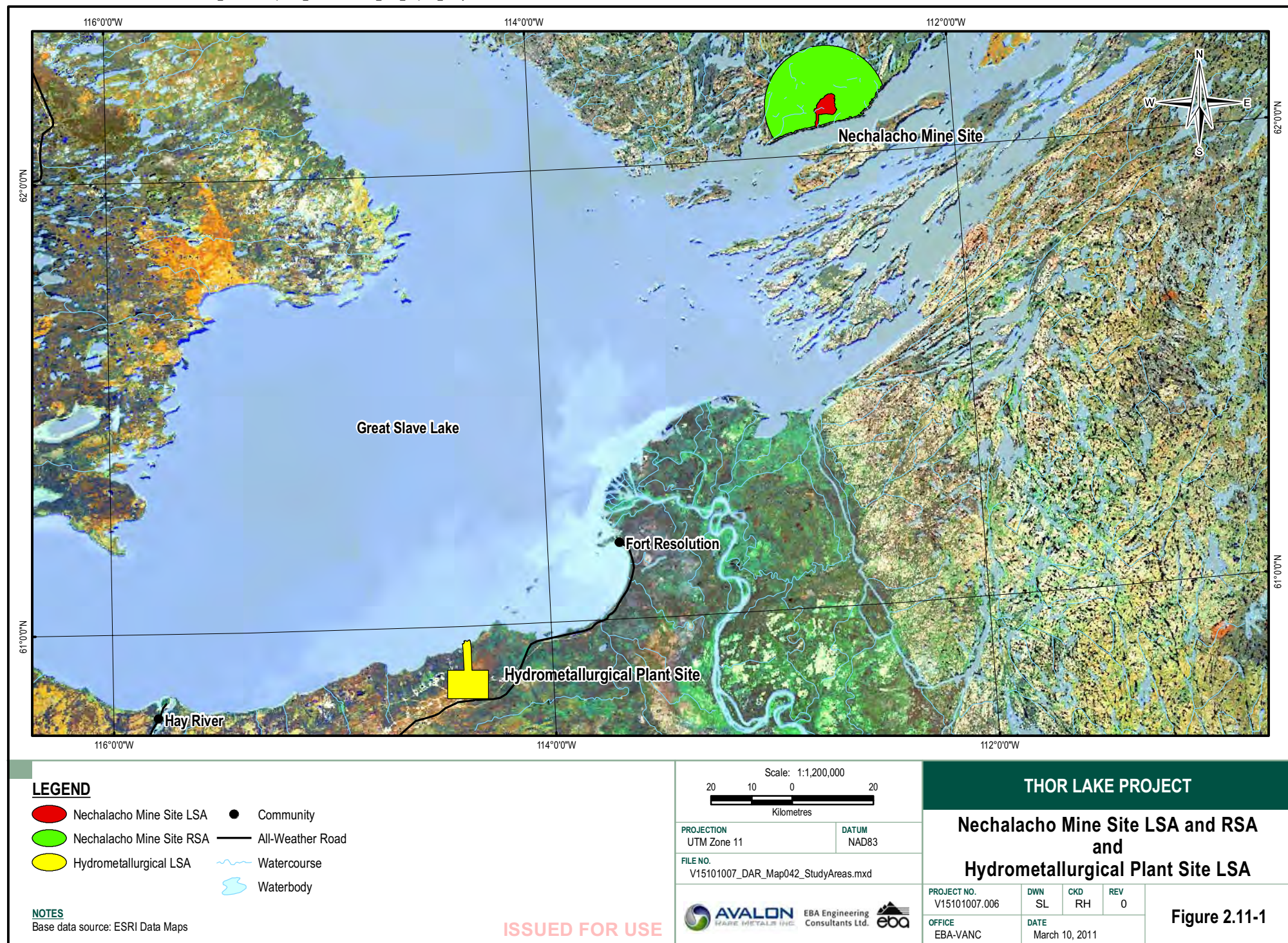
Wildlife interactions and direct mortality associated with the TLP will be monitored for all species encountered, as well as, direct changes to wildlife habitat (Section 4.0).

2.0 PROJECT STUDY AREAS

For the DAR, local and regional spatial boundaries were identified for biophysical and socio-economic components based on their respective characteristics and anticipated interaction with Project activities. Spatial boundaries were based primarily on the Project footprint and a zone of influence beyond which effects are expected to be non-detectable.

Local Study Area (LSA): The LSA at the Nechalacho Mine site encompasses the proposed Project footprint and areas extending up to 500 m away from the outer Project edges (Figure 2.11-1, (Avalon 2011)). The total LSA covers approximately 2,188 ha. At the Hydrometallurgical Plant site, the LSA covers approximately 8,434 ha and was also based on the anticipated configuration of Project infrastructure.

Regional Study Area (RSA): For most biophysical components, the RSA at the Nechalacho Mine site is approximately 45,319 ha in size, represented by a 15 km radius that extends out from the proposed Project footprint (Figure 2.11-1, (Avalon 2011)). This area covers all of Avalon's mineral leases and the expected home ranges of many wildlife species considered in the assessment of potential Project effects. Due to the pre-existing disturbance at the Hydrometallurgical Plant site, no RSA was defined for biophysical components, with the exception of air quality.



3.0 PROPOSED MITIGATION MEASURES

3.1 Potential Project Effects

Table 1 (reproduced from the DAR (Avalon 2011)) identifies the biophysical components that may be affected by the various activities associated with mine development: construction, operation, and decommissioning/closure. It is apparent that many of these activities may interact with wildlife resources.

Table 1: Thor Lake Project: Environmental Issue Matrix

Project Component	Air Quality	Water Quality	Fish	Wildlife	Vegetation
Site Preparation and Construction	✓	✓	✓	✓	✓
Underground Mining	✓	✓			
Mine Rock Storage		✓	✓	✓	✓
Acid Rock Drainage (ARD) if present		✓	✓		
Thor Lake Flotation Plant	✓	✓	✓	✓	✓
Power Generation	✓			✓	✓
Sewage		✓	✓		
Tailings Containment		✓	✓	✓	✓
Water Supply/Water Management		✓	✓		
Solid and Hazardous Waste Management	✓	✓	✓	✓	
Airstrip	✓			✓	✓
Access Roads	✓	✓	✓	✓	✓
Temporary Docking Facility		✓	✓	✓	✓
Seasonal Barge Traffic	✓	✓	✓	✓	

The air quality effects assessment (DAR, Section 6.2 (Avalon 2011)) has determined that air emissions associated with all phases of the TLP will be localized, short-term, periodic, low magnitude and rapidly reversible, for all criteria air contaminants (CACs) and are predicted to be lower than the corresponding NWT AQ Standards. As a result, the limited air emissions are not anticipated to have a measurable effect on wildlife VCs.

In addition, as discussed in Section 4.9.6 of the DAR (Avalon 2011), a screening-level radioactivity pathways assessment of the Thor Lake Project was completed to determine if there were any potential environmental pathways for radiological exposures, in particular, to vegetation, wildlife or fish and fish habitat. The assessment considered all potential pathways associated with the Project and concluded there were no potential environmental effects, including effects on wildlife (DAR, Appendix G (Avalon 2011)).

The assessment determined that for all VCs, with the application of the proposed mitigation measures, the residual environmental effects of the Thor Lake Project were anticipated to be negligible and insignificant. Furthermore, any identified environmental effects were generally limited to the immediate footprints and local study areas of the Nechalacho Mine and Flotation Plant and associated infrastructure, and most were reversible once activities ceased. The WEMMP, based on the framework identified in this document, is intended to confirm the assessment conclusion, and provide an approach to resolve unanticipated adverse effects.

The following subsections provide further information regarding the key terrestrial environmental issues and questions resulting from the assessment of the Project, and proposed mitigation measures to address these concerns.

3.2 General Measures

Two approaches are used by Avalon to remove or limit effects to wildlife and wildlife habitat. The first is the use of environmental design features, which are physical structures and policies that have been incorporated into the design of the TLP, such as containment structures around fuel storage. The second strategy is mitigation, which are actions taken to reduce the magnitude and spatial extent of effects, such as giving wildlife the right-of-way on roads, advising staff of wildlife on-site, and implementing the Emergency Response and Spill Contingency Plan. A summary of the environmental design features and mitigation that will be implemented for the TLP include the following:

TLP Environmental Design and General Mitigation Measures:

Limit the spatial extent of the TLP footprint (i.e., anticipated mine site and associated infrastructure).
Promote natural re-vegetation and practice progressive reclamation.
Remediate and decommission the site when mining operations are complete.
Skirt all buildings to the ground to limit opportunities or animals to find suitable shelter.
Locate noisy equipment inside buildings or underground.
The incinerator will be housed in an enclosed structure, to improve combustion and reduce the availability of attractants while garbage awaits incineration.
Use double-walled containers or single-walled containers in lined containment areas for all fuel storage.
Provide spill containment supplies in designated areas.
Use a fuel transfer house with double-locked mechanisms.
Use of culverts and other design features that reduce changes to local flows, drainage patterns, and drainage areas, where applicable.
Use of high efficiency scrubbers in processing equipment to limit emissions of particulate matter.
Use of dust control systems on rock crushing and other dust generating equipment.
Enforcement of speed limits and use of water on roads during the summer and fall to suppress dust.
Management and isolation of attractants, particularly food waste.
Reporting of raptor nesting activity observed within 1.5 km of the TLP to the Department of Environment and Natural Resources (ENR).
Land clearing only outside of the breeding season for migratory birds (15 May through 31 July) for all facilities where migratory birds may nest.
Reporting of all relevant observations of wildlife (particularly of caribou, wolverine, and wood bison) to environment staff.
Effective implementation of the Waste Management Plan, particularly as it relates to the disposal of food waste.
Identifying and monitoring birds nesting on TLP infrastructure.
Prohibiting hunting, trapping, harvesting, and fishing by site employees and contractors.

TLP Environmental Design and General Mitigation Measures:

Contacting ENR to receive additional direction regarding new issues that arise.
Providing the right-of-way to wildlife.
Develop standard aircraft procedures for flying into and departing from the Nechalacho Mine airstrip to accommodate caribou if present.
Enforcing a minimum flying altitude of 300 m for helicopters, whenever possible.
Restricting vehicle use to designated roads, and prohibiting recreational off-road use of vehicles.
Use of signage and radio to warn drivers when wildlife moves through an area.

3.3 Mitigation Measures for Key Species

The MVEIRB Terms of Reference (2011) requested Avalon to describe the effects that the development at both sites may have on wildlife and wildlife habitat. A number of wildlife species occur or potentially occur within the TLP area as year round or seasonal residents, spring and fall migrants, or transients. Potential effects on wildlife from the proposed TLP may include direct and indirect habitat loss and alteration, habitat fragmentation, physical or behavioural disturbances including habitat avoidance, displacement, habituation, and possibly contamination and/or mortality.

The following sections discuss the key wildlife species that live in or utilize the Nechalacho Mine and Flotation Plant and Hydrometallurgical Plant study areas, how they may be affected by development-related activities, and the available mitigation measures for preventing or minimizing any potential effects on wildlife. The first section discusses wildlife common to both Project areas.

3.3.1 Wildlife Common to both the Nechalacho Mine Area and Hydrometallurgical Plant Site

3.3.1.1 Moose (*Alces alces*)

Moose occur throughout the boreal forest of the NWT and are listed as secure in the Northwest Territories. Moose populations are sensitive to harvesting and predation. Harvests of moose near the Nechalacho Mine area are expected to be low and likely opportunistic due to the remoteness of the site. Wolves and black bears are the main predators of moose and moose calves. Moose habitat is not considered limiting in the local and regional study areas.

The main ways the Nechalacho Mine and associated infrastructure and activities can affect moose is through habitat loss, change in daily movements, and mortality. TLP features may also directly affect moose daily movements through avoidance during the short-term construction and closure phases and longer-term operations phase. Scientific evidence suggests moose may avoid linear features and other land use developments by 100 to 500 m depending on the season, sex, surrounding habitat, and population (Salmo Consulting Inc. et al. 2004). The effect on moose daily movements as a result of avoidance behaviour to development-related infrastructure is low in magnitude and local in extent. Disturbances are expected to be brief, perhaps lasting a few minutes to a few hours, and are reversible upon cessation of the activity or by moving away from the activity. The number and frequency of such exposures would be expected to be limited.

Evidence of moose occupying many of the available habitat types within the Hydrometallurgical Plant study area have been documented (EBA 2010). Moose sign was also considered common along the existing haul road corridor. Moose are an important subsistence species in the study area and are commonly included as an indicator species in many northern projects.

Within the Hydrometallurgical Plant study area, the shrubby fen, the existing haul road right-of-way, and the shoreline of Great Slave Lake have the highest cover of willow within the study area and would support moose feeding habitat year round. In the spring and summer when forbs, grasses, and aquatic plants are available the use of browse material declines. Wet and aquatic habitats are common feeding areas during all non-winter months, but tend to peak during late June to early August when plant nutrition and digestibility are highest (Peek 1998). The beaver pond and the shallow shoreline of Great Slave Lake within the Hydrometallurgical Plant study area may be used by moose during the summer season. Other shallow lakes and ponds along Highway 5/6 and the rail line may also be utilized during the summer months.

The main ways that the Hydrometallurgical Plant and associated infrastructure and activities may directly affect moose are through habitat loss, changes in daily movements through avoidance and displacement, and mortality. As a result of Avalon's decision to locate the physical footprints of the Hydrometallurgical Plant and all associated infrastructure on existing brownfields/disturbed terrain, the direct loss of preferred moose habitat as a result of the Hydrometallurgical Plant is expected to be low in magnitude and reversible at mine closure.

The Hydrometallurgical Plant and associated infrastructure and activities may also directly affect moose daily movements through avoidance and disturbance during the short-term construction and closure phases and longer-term operations phase. The effect on moose daily movements as a result of avoidance behaviour to development-related infrastructure and noise is low in magnitude, sporadic to continuous for the life of the Project, and reversible upon cessation of the activity or by moving away from the activity.

Activities relating to the construction, operation, and closure of the Hydrometallurgical Plant, such as vehicle and rail traffic pose the greatest risk to moose mortality.

Proposed Policies and Mitigation Measures for Moose:

No hunting policy for all Project employees and contractors while working on or off-site for Avalon.
Develop standard aircraft procedures for flying into and departing from the Nechalacho Mine airstrip to accommodate moose if present.
Maintain a minimum flight altitude of 600 m during all times, except during take-off and landings.
Implement speed limits on all site roads; implement speed limits on the haul road from Great Slave Lake to the Hydrometallurgical Plant
Bus transportation for employees from Hay River and Fort Resolution to the Hydrometallurgical Plant site to minimize the risk of vehicle-wildlife collisions and disturbances from the road.
All Project-related transportation activities to give the right-of-way to any wildlife including moose that such activity may encounter.
Alert system to warn personnel of barren-ground caribou in the local area by relaying sighting information to vehicles and equipment operators and on-site personnel to avoid the area, if possible.

Proposed Policies and Mitigation Measures for Moose:

Dust suppression strategies (e.g. water or approved dust suppressant products) in accordance with the GNWT dust suppression guidelines.
Develop and implement an education program of wildlife related policies and mitigation to all Project employees and contractors.
Regularly monitor and adjust, where appropriate, mitigations to minimize disturbance to moose.
Incinerate all waste foods and human garbage consistent with current industry good management practices to minimize predator attraction to the local area.
Reclamation following mine closure will help re-establish self-sustaining ecosystem types.
Regularly monitor and adjust, where appropriate, mitigations to minimize disturbance to moose.

3.3.1.2 Black Bear (*Ursus americanus*)

Black Bears are common throughout the boreal forests of the NWT, and are relatively common in the areas of the Nechalacho Mine and Flotation Plant and Hydrometallurgical Plant. The main ways that these features and associated infrastructure and activities can affect black bears are through habitat loss or alteration, changes in daily movements through avoidance, displacement, and habituation (e.g. attraction) behaviours, and mortality. Black bears are expected to be harvested on occasion in the area of the Hydrometallurgical Plant.

Black bear habitat will be directly lost as a result of the construction activities for the Nechalacho Mine and Flotation Plant and associated infrastructure. Appropriate black bear feeding and denning habitat is common throughout the LSA and RSA. Direct loss of black bear habitat is considered low in magnitude, local in extent, and reversible in the short-term following closure of the mine.

Black bears can be expected to be present in the vicinity of both Project areas and associated infrastructure and activities quite regularly, and may potentially directly encounter or be disturbed by localized development-related noise or activities. Encounters with development-related noise or activities will most commonly occur in the spring, summer, and fall during construction, operation, and closure of the Nechalacho Mine. Construction of the Hydrometallurgical Plant, in particular, is expected to generate some degree of disruption, at least temporarily. These encounters may result in black bears avoiding the disturbance or adjacent quality habitat. A low potential for development-related encounters during winter hibernation may only occur during the construction phase.

Black bears are most sensitive to disturbance during winter denning (late September to April). Construction will occur during winter months; however, the Hydrometallurgical Plant will be constructed within an existing brownfields site (approximately 0.25 km² in size) therefore no denning black bears will be directly affected during construction.

Potential attraction and habituation of black bears to waste foods and human garbage is of particular concern since this can lead to black bear mortality. Black bears may also be attracted to the low traffic haul roads, particularly in the spring when plant emergence may be earlier than in the forest. Black bear mortality may occur during the construction, operation, and closure phases of both sites, particularly as a result of attraction and habituation to the Project. The risk of collision with the vehicles and equipment is considered negligible. The consequence of black bear attraction, habituation, and possible mortality from the Nechalacho Mine is moderate.

Proposed Policies and Mitigation Measures for Black Bears:

No hunting policy for all Project employees and contractors while working on or off-site for Avalon.
Avoid all known or suspected den sites.
Bus transportation for employees from Hay River and Fort Resolution to the Hydrometallurgical Plant site to minimize the risk of vehicle-wildlife collisions and disturbances from the road.
Implement speed limits on all site roads and on the haul road from Great Slave Lake to the Hydrometallurgical Plant.
All Project-related transportation activities to give the right-of-way to any wildlife including black bears that such activity may encounter.
Alert system to warn personnel of black bears in the local area by relaying sighting information to vehicles and equipment operators and on-site personnel to avoid the area, if possible.
Dust suppression strategies (e.g., water or approved dust suppressant products) in accordance with the GNWT dust suppression guidelines.
Develop and implement an education program of wildlife related policies and mitigation to all Project employees and contractors.
Nechalacho: Incinerate all waste foods and human garbage consistent with current industry good management practices to minimize black bear attraction to the local area.
Hydrometallurgical Plant: Store all waste foods and human garbage in bear-proof containers prior to offsite disposal.
Adaptive management will be applied to Avalon's waste management practices. If black bears are attracted to the site (i.e., problem wildlife) additional management practices, if required, will be adopted.
Reclamation following mine closure will help re-establish self-sustaining ecosystem types.

3.3.1.3 Other Fur-bearers

Other fur-bearing mammals determined or likely to be present in the Project areas from time to time include snowshoe hare (*Lepus americanus*), red squirrel (*Tamiasciurus hudsonicus*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), porcupine (*Erethizon dorsatum*), coyote (*Canis latrans*), grey wolf (*Canis lupus*), red fox (*Vulpes vulpes*), wolverine, weasel (*Mustela nivalis*), river otter (*Lutra canadensis*), mink (*Mustela vison*), marten (*Martes americanus*), fisher (*Martes pennant*), and lynx (*Lynx canadensis*). Known grizzly bear range is located outside the study area; however, grizzly bears may rarely occur in the Nechalacho Mine study area. Each of these fur-bearing mammals differs in their habitat requirements and general biology. In general, the fur-bearers present in these areas are sensitive to disturbance at their natal dens sites and or during the winter when food resources may be limiting and energy demands are greatest. The period from late February to early June is considered the most sensitive period for fur-bearers.

Of the fur-bearing species commonly occurring in the Nechalacho Mine study area, only the wolverine has special conservation status (assessed by COSEWIC as "Special Concern" and ranked by GNWT ENR as "Sensitive"). Wolverines are particularly sensitive to human-caused effects, including mortality due to attraction to human developments and habitat loss. Wolverines live at low densities even under optimal conditions (Banci 1994); however, they can be expected to occur within the Nechalacho Mine study area on a year round basis, wherever appropriate prey exist. Wolverines may be sensitive to habitat loss,

fragmentation, extensive developments, and their associated access roads. However, some wolverines can become habituated to human developments and activities.

The grey wolf, another large predator and important fur-bearer for local hunters and trappers, occurs across the area on a year-round basis, wherever prey (e.g., caribou and moose) exist. Like most carnivores, wolves can be sensitive to disturbance, especially during their reproductive period (Chapman 1977). The denning period for wolves typically begins in early May.

Marten are expected to occur throughout the forested areas of the Nechalacho Mine study area, particularly in Spruce Upland, Mixed Upland, and Spruce Wet broad habitat types; however, all habitats may be occupied if abundant prey and cover exist. Like many fur-bearers, marten are particularly sensitive to disturbance during their denning period. Litters are born in dens in mature forests in rock piles, tree roots, deadfall, or peat banks in March or April.

The main ways that the Nechalacho Mine and associated infrastructure and activities can affect fur-bearers is through habitat loss, change in daily movements (including avoidance, displacement, and habituation (e.g. attraction)), and mortality. A small amount of fur-bearer habitat will be directly lost as a result of the clearing and construction activities of the Nechalacho Mine and Flotation Plant and associated infrastructure (including the tailings management facility). Habitat suitable for fur-bearer feeding and denning habitat is common throughout the Nechalacho Mine LSA and RSA. Direct loss of habitat for forest dwelling fur-bearers will be lost as a result of the Flotation Plant and associated infrastructure, whereas, aquatic fur-bearers such as beaver, muskrat, and river otter habitat will be irreversibly lost as a result of the tailings management facility. Direct loss of fur-bearer habitat is considered low in magnitude, local in extent, and reversible following closure of the mine, with the exception of aquatic fur-bearers. Habitat loss effects are low to moderate in consequence.

In the area of the Hydrometallurgical Plant habitat loss for all fur-bearing species, except for the aquatic fur-bearers such as beaver and muskrat is considered negligible since the Hydrometallurgical Plant and its associated infrastructure will be located on existing Pine Point mine brownfield sites. In addition, a negligible amount of habitat may be directly lost due to upgrading the existing haul road. Potential adverse effects on aquatic fur-bearers could result from degradation of the former T-37N pit habitat. Water from the T-37N pit will be utilized for potable and process water, which may alter aquatic fur-bearer habitat. However, aquatic fur-bearer habitat is common in the LSA and the Pine Point region. Development-related habitat loss or alteration is negligible in magnitude, local in geographic extent, reversible at site closure, and a high likelihood of occurrence.

Fur-bearers may be expected to be present in the vicinity of the Nechalacho Mine footprint area quite regularly and may potentially directly encounter or be disturbed by localized development-related noise or activities. Similarly, fur-bearers will be exposed to low levels of vehicle traffic, site infrastructure, and human presence. The disturbance or avoidance of habitat may result in changes in their daily movements. Construction of the Nechalacho Mine and Flotation Plant, in particular, is expected to generate some degree of disruption, at least temporarily. The duration of exposures during construction, operation, and closure are expected to be low, perhaps lasting a few minutes to a few months, and are reversible upon cessation of the activity or by moving away from the activity. The number and frequency of such exposures to disturbance of fur-bearers would be expected to be low and infrequent.

Potential attraction and habituation of fur-bearers to waste foods and human garbage is of particular concern since this can lead to fur-bearer mortality, particularly for wolverine, red fox, and grey wolf. Wolves, coyotes, red foxes, and wolverines may become attracted to the Hydrometallurgical Plant and associated footprint area, which may result in mortality. In addition, there is a negligible risk of mortality from development-related equipment and vehicles. An attraction and habituation effect that leads to mortality as a result of the Hydrometallurgical Plant is considered moderate in magnitude. The consequence of fur-bearer attraction and habituation resulting in mortality to the Nechalacho Mine is moderate.

Mortality of fur-bearer young may occur during clearing activities during the natal season.

Proposed Policies and Mitigation Measures for Other Fur-bearers:

No hunting and trapping policy for all Project employees and contractors while working on or off-site for Avalon.
Avoid all known or suspected den sites.
Bus transportation for employees from Hay River and Fort Resolution to the Hydrometallurgical Plant site to minimize the risk of vehicle-wildlife collisions and disturbances from the road.
Implement speed limits on all site roads and on the haul road from Great Slave Lake to the Hydrometallurgical Plant.
All Project-related transportation activities to give the right-of-way to any wildlife including fur-bearers that such activity may encounter.
Alert system to warn personnel of fur-bearers in the local area by relaying sighting information to vehicles and equipment operators and on-site personnel to avoid the area, if possible.
Dust suppression strategies (e.g., water or approved dust suppressant products) in accordance with the GNWT dust suppression guidelines.
Develop and implement an education program of wildlife related policies and mitigation to all Project employees and contractors.
Nechalacho: Incinerate all waste foods and human garbage consistent with current industry good management practices to minimize fur-bearer attraction to the local area.
Hydrometallurgical Plant: Store all waste foods and human garbage in wildlife-proof containers prior to offsite disposal.
Adaptive management will be applied to Avalon's waste management practices. If fur-bearers are attracted to the site (i.e., problem wildlife) additional management practices, if required, will be adopted.
Reclamation following mine closure will help re-establish self-sustaining ecosystem types.

3.3.1.4 Short-eared Owl

Short-eared owls likely arrive in the TLP area by late April or May and depart by late October. The main way that the Nechalacho Mine and associated infrastructure and activities could potentially affect short-eared owls is through the creation of potential nesting habitat, adverse changes in daily movements, particularly displacement from seasonal feeding habitat, and mortality. Although short-eared owls likely do not nest within the Hydrometallurgical Plant study area, they may nest wherever appropriate habitat exists along Highway 5/6. As a result of Avalon's decision to locate the physical footprints of the Hydrometallurgical Plant and all associated infrastructure on existing brownfields/disturbed terrain, the direct physical effects of these components of the TLP on Short-eared owl nesting and feeding habitat is negligible.

Although the potential for short-eared owls nesting within the Nechalacho Mine study area is currently negligible, the cleared airstrip buffer zone may provide suitable nesting habitat. The potential creation of short-eared owl nesting habitat is considered negligible in magnitude and a negligible consequence.

Short-eared owls are sensitive to disturbance during nesting, and may abandon nests as a result (GNWT ENR 2010a). Aircraft, human activities, and equipment operation near the nest site may disturb nesting owls. Disturbance effects at the nest site is considered low in magnitude, local in extent, and reversible upon cessation of the activity or by moving away from the activity. Disturbance effects at the nest site have a low likelihood of occurrence.

Short-eared owls may infrequently occur in the Nechalacho Mine study area to feed during the construction, operation, and closure phases, and may conceivably be disturbed by localized vehicle traffic or aircraft noise and activity. A short-eared owl encountering human activities, and vehicular or aircraft traffic may show minor displacement behaviour and avoid the immediate area. Effects to the short-eared owl daily movements as a result of the Nechalacho Mine and associated activities is considered low in magnitude, periodic in frequency, and low likelihood of occurrence.

The brownfields sites of the former Pine Point mine (including the Hydrometallurgical Plant site) are considered to possess poor quality feeding habitat for short-eared owls due to the limited amount of revegetation that has occurred to date, which limits prey species abundance. The main way that the Hydrometallurgical Plant and associated infrastructure and activities could potentially affect short-eared owls is through changes in daily movements, such as displacement from seasonal feeding and nesting habitat, and mortality.

The risk of mortality from vehicle/equipment collisions, particularly along the haul road and airstrip is considered low. Mortality effects are considered moderate in magnitude, local in extent, sporadic in frequency, and low likelihood of occurrence. In addition, the mortality as a result of the development-related traffic along Highway 5/6 during construction, operation, and closure of the Hydrometallurgical Plant and its associated infrastructure is considered low. Short-eared owls are at most risk of mortality while hunting along Highway 5/6 during the construction, operation, and closure phases.

Proposed Policies and Mitigation Measures for Short-eared Owls:

No hunting policy for all Project employees and contractors while working on or off-site for Avalon.
Avoid all known or suspected nest sites.
Avoid mowing or other activities in the airstrip buffer zone during nesting and fledging season (late April to late July).
Implement speed limits on all site roads.
Bus transportation for employees from Hay River and Fort Resolution to the Hydrometallurgical Plant site to minimize the risk of vehicle-wildlife collisions and disturbances from the road.
All Project-related transportation activities to give the right-of-way to any wildlife including short-eared owls that such activity may encounter.
Dust suppression strategies (e.g., water or approved dust suppressant products) in accordance with the GNWT dust suppression guidelines.
Develop and implement an education program for wildlife related policies and mitigation to all Project employees and contractors.

3.3.1.5 Common Nighthawk

Within the TLP areas, common nighthawks are expected to arrive in mid-May or early June and depart by mid-August to mid-September (CWS and GNWT ENR 2008). Suitable nesting and foraging habitat exists throughout the Nechalacho Mine study areas. The main way that the TLP and associated infrastructure and activities could potentially affect common nighthawks is through direct habitat loss, changes in daily movements including avoidance and displacement from habitat, and mortality.

The Flotation Plant and associated infrastructure, including the tailings management facility, tailings delivery pipeline, and airstrip will directly affect potential common nighthawk nesting and feeding habitat. Avalon's footprint design of the underground mine and crushing operations, clustering of the surface facilities, use of existing roads, and placement of the tailings delivery pipeline along the existing road minimizes the amount of direct habitat loss. Common nighthawks will also occupy cleared areas with limited development-related activities, such as the airstrip, tailings management facility, and the roads for resting and feeding. Favourable common nighthawk habitat is common across the LSA and RSA. Direct loss of common nighthawk habitat will be low in magnitude, local in extent, and reversible at Project closure. The consequence of this low amount of habitat loss as a result of the Nechalacho Mine and its associated infrastructure is low.

The Hydrometallurgical Plant, dock facility, and graded marshaling yard will be located on potential common nighthawk nesting and feeding habitat. Common nighthawks likely do not nest on the existing haul road from Great Slave Lake to the Hydrometallurgical Plant site due to existing traffic relating to the commercial fishery and other local traffic; however, feeding may occur throughout the road length.

Common nighthawks are most sensitive to disturbances during nesting and fledging seasons. Common nighthawks may be present in the vicinity of the footprint area, including at the seasonal dock facility on occasion and may potentially be disturbed by local equipment and vehicle traffic noise or activity. A common nighthawk encountering disturbance activity or vehicle traffic during construction, operation, and closure phases may show minor displacement behaviour and avoid the immediate area. Avoidance and disturbance effects as a result of the TLP and associated activities are considered low in magnitude and a low consequence.

Clearing operations pose the greatest risk of mortality to nesting common nighthawks. Mortality risks during the other construction, operation, and closure phases including collision with vehicles and equipment may also occur. The TLP and associated activities may attract predators (e.g., gulls, common ravens, and red foxes), which may lead to the indirect death of common nighthawks.

As a result of Avalon's decision to locate the physical footprints of the Hydrometallurgical Plant and all associated infrastructure in a limited area of the large existing brownfields/disturbed terrain of the former Pine Point Mine area, the direct physical effects of these components of the TLP on preferred common nighthawk habitat in the area of the Hydrometallurgical Plant are expected to be negligible. Common nighthawk feeding and nesting habitat is common throughout the LSA and the Pine Point region.

Proposed Policies and Mitigation Measures for Common Nighthawks:

Avoid all known or suspected nest sites.
Avoid clearing activities from mid-May to late August.
Implement speed limits on all site roads and on the haul road from Great Slave Lake to the Hydrometallurgical Plant.
Bus transportation for employees from Hay River and Fort Resolution to the Hydrometallurgical Plant site to minimize the risk of vehicle-wildlife collisions and disturbances from the road.
All Project-related transportation activities to give the right-of-way to any wildlife including birds that such activity may encounter.
Dust suppression strategies (e.g., water or approved dust suppressant products) in accordance with the GNWT dust suppression guidelines.
Develop and implement an education program for wildlife related policies and mitigation to all Project employees and contractors.
Keep worksites clean and manage waste to avoid attracting egg and chick predators such as gulls, common ravens, and red foxes.
Incinerate all waste foods and human garbage consistent with current industry good management practices to minimize predator attraction to the local area.

3.3.2 Olive-sided Flycatcher

Olive-sided flycatcher habitat exists throughout the TLP area. The species arrives in the Northwest Territories in late May and early June to breed, and departs in late July and early August (GNWT ENR 2010a). Feeding olive-sided flycatchers are closely associated with waterbodies that have a high density of insects (e.g. beaver ponds, lake edges, streams), but also feed in open and semi-open habitats such as brownfields sites, natural and man-made habitat edges, and Bedrock-Lichen, Spruce and Mixed Upland, Shrub Fen, and Graminoid Fen broad habitat types. The main way that the TLP and associated infrastructure and activities could potentially affect olive-sided flycatchers is through habitat loss, changes in daily movements through avoidance and displacement from seasonal feeding and nesting habitat, and mortality.

As a result of Avalon's decision to locate the physical footprints of the Hydrometallurgical Plant and all associated infrastructure on existing brownfields/disturbed terrain, the direct loss of preferred olive-sided flycatcher habitat will be limited to the small amount of habitat cleared for the haul road upgrades and the marshaling yard. Olive-sided flycatcher habitat loss is considered low in magnitude and reversible at mine closure.

A small amount of olive-sided flycatcher nesting habitat will be cleared for the Nechalacho Mine and Flotation Plant and their associated infrastructure. Habitat clearing may result in mortality if active nests are disturbed. The timing of habitat clearing will influence the risk of mortality during construction. Mortality of olive-sided flycatchers, their eggs, and young as a result of habitat clearing can be mitigated if habitat clearing occurs outside nesting season.

Olive-sided flycatchers benefit from habitat edges. Clearing operations for the Nechalacho Mine and Flotation Plant (and associated infrastructure) will result in the adverse loss of feeding and nesting habitat, but will also increase habitat edges and add suitable habitat. The direct loss of olive-sided flycatcher habitat as a result of the Nechalacho Mine and associated infrastructure is considered negligible.

The TLP and associated infrastructure and activities may also directly affect olive-sided flycatcher daily movements through avoidance and disturbance during the short-term construction and closure phases and longer-term operations phase. The species may potentially be disturbed by localized vehicle and aircraft traffic noise or activity. Similarly, olive-sided flycatchers may occasionally fly over or feed in open areas including previously burnt areas and wetlands adjacent to Highway 5/6, along the haul road from the Hydrometallurgical Plant to Great Slave Lake, and throughout the Pine Point region. In addition, olive-sided flycatchers may avoid suitable habitat due to noise levels, human presence, and dust levels, particularly along the haul road.

Proposed Policies and Mitigation Measures for Olive-sided Flycatchers:

Avoid all known or suspected nest sites.
Avoid clearing habitat from May 15 to August 15 to prevent accidental mortality of olive-sided flycatcher adults, eggs, and pre-fledged young (as well as other upland breeding birds).
Implement speed limits on all site roads and on the haul road from Great Slave Lake to the Hydrometallurgical Plant.
Bus transportation for employees from Hay River and Fort Resolution to the Hydrometallurgical Plant site to minimize the risk of vehicle-wildlife collisions and disturbances from the road.
All Project-related transportation activities to give the right-of-way to any wildlife including birds that such activity may encounter.
Dust suppression strategies (e.g., water or approved dust suppressant products) in accordance with the GNWT dust suppression guidelines.
Develop and implement an education program for wildlife related policies and mitigation to all Project employees and contractors.

3.3.2.1 Rusty Blackbird

Rusty blackbirds can be expected to occur in the Nechalacho Mine study area from early May to late September. Appropriate rusty blackbird habitat within the Nechalacho Mine LSA occurs along many shallow ponds/lakes and fens, including within the proposed tailings management facility. Appropriate habitat within the Hydrometallurgical Plant site study area occurs at the beaver pond near T-37N pit. This beaver pond is located at the edge of a former Pine Point mine brownfields site and two adjoining roads. Additional rusty blackbird habitat exists throughout the Pine Point region. As a result of Avalon's decision to locate the physical footprints of the Hydrometallurgical Plant and all associated infrastructure on existing brownfields/disturbed terrain, no direct physical effects on preferred rusty blackbird habitat is expected.

The main way that the Nechalacho Mine and associated infrastructure and activities could potentially affect rusty blackbirds is through direct habitat loss, changes to daily movements including habitat avoidance and displacement, and mortality. The main way that the Hydrometallurgical Plant and associated

infrastructure and activities could potentially affect rusty blackbirds is through changes in daily movements, in particular avoidance and displacement from seasonal feeding and nesting habitat at the beaver pond located adjacent to the T-37N pit and in treed wetlands along the Highway, and mortality.

Direct habitat loss may occur during clearing operations at the tailings management facility. All other proposed development-related infrastructure is positioned away from shorelines and rusty blackbird habitat. Similarly, the temporary dock facility and storage yard at Great Slave Lake consists of upland spruce and bedrock, which is considered poor quality rusty blackbird habitat. Direct loss of rusty blackbird habitat at the tailings management facility is considered high in magnitude, irreversible, and of moderate significance since rusty blackbird habitat is considered relatively common in the LSA and RSA.

Rusty blackbirds may conceivably be present in the vicinity of the tailings management facility on occasion during the operation phase and may potentially be disturbed by infrequent activity. Similarly, rusty blackbirds may occasionally fly over or feed in the wetland areas, marshes or bogs, near the haul road. A rusty blackbird may encounter development-related activity during construction, operation, and closure phases. Those encountering construction or vehicular traffic (and associated noise) may show minor displacement behaviour and avoid the immediate area of activity; however, the sensitivity of rusty blackbirds to human disturbances is unknown. Traffic at the beaver pond near T-37N pit and along the Highway poses the greatest threat to rusty blackbird mortality in the Pine Point area. The duration of any such exposures are expected to be brief, perhaps lasting a few minutes to a few hours, and are reversible upon cessation of the activity or by moving away from the activity.

Clearing operations during construction at the tailings facility pose the greatest risk of mortality to nesting birds, their eggs, and young.

Proposed Policies and Mitigation Measures for Rusty Blackbirds:

Avoid all known or suspected nest sites.
Avoid clearing habitat from May 15 to August 15 to prevent accidental mortality of rusty blackbird adults, eggs, and pre-fledged young (as well as other upland breeding birds).
Implement speed limits on all site roads and on the haul road from Great Slave Lake to the Hydrometallurgical Plant.
Bus transportation for employees from Hay River and Fort Resolution to the Hydrometallurgical Plant site to minimize the risk of vehicle-wildlife collisions and disturbances from the road.
All Project-related transportation activities to give the right-of-way to any wildlife including birds that such activity may encounter.
Dust suppression strategies (e.g., water or approved dust suppressant products) in accordance with the GNWT dust suppression guidelines.
Develop and implement an education program for wildlife related policies and mitigation to all Project employees and contractors.

3.3.2.2 Horned Grebe

Horned grebes are expected to arrive within the TLP areas at the end of April or early May to breed and depart by mid-August to early September (GNWT ENR 2010a). Horned grebes are most sensitive to disturbance during the nesting (including pre-fledging) and moulting periods. Horned grebes have the potential to occur within the TLP areas and along Highway 5/6 during construction, operation, and closure phases.

The main way that the Nechalacho Mine and associated infrastructure and activities could potentially affect horned grebes is through habitat loss, changes to daily movements including habitat avoidance and displacement, and mortality. Within the Nechalacho Mine footprint area, potential horned grebe nesting habitat exists at the tailings management facility. Direct loss of potential horned grebe nesting habitat will occur as a result of the tailings management facility; however, there will be a negligible loss of moulting habitat from the Nechalacho Mine and associated infrastructure. The loss of potential nesting habitat is considered high in magnitude and irreversible. The potential consequence of losing horned grebe nesting habitat is considered moderate.

Potential moulting habitat exists in Great Slave Lake near the dock facility and in Thor Lake. A negligible amount of moulting habitat may be lost from the temporary dock facility. As a result of Avalon's decision to construct a temporary docking facility each open water season, moulting habitat potentially lost from the facility will be reversible at closure of the Nechalacho Mine. The direct physical effects of these components of the Nechalacho Mine and its associated infrastructure on preferred horned grebe moulting habitat are expected to be negligible in magnitude since horned grebe moulting habitat is common throughout the LSA and RSA.

Potential nesting and moulting horned grebes may encounter development-related activity at the tailings management facility and docking facility during construction, operation, and closure phases. Those encountering construction or barging traffic (and associated noise) may show minor displacement behaviour and avoid the immediate area of activity. The sensitivity of horned grebes to development-related activity is unknown. Any exposure to development activities is expected to be brief, perhaps lasting a few minutes to a few hours, and are reversible upon cessation of the activity or by moving away from the activity. Habitat avoidance and disturbance in response to the Nechalacho Mine and associated activities is considered low in magnitude and local in extent.

Construction of the tailings management facility poses the greatest risk of mortality to nesting birds, their eggs, and young. The Nechalacho Mine and associated activities may also attract nest predators (e.g., gulls, Common Ravens, and red foxes), which may lead to the indirect death of horned grebes. Without mitigation, mortality as a result of the Nechalacho Mine and associated infrastructure is considered moderate in magnitude, a moderate likelihood of occurrence, and a moderate consequence of effect.

Within the Hydrometallurgical Plant site study area, potential horned grebe nesting habitat exists at the beaver pond near T-37N pit, and potential moulting habitat exists in Great Slave Lake near the dock facility. Additional nesting and moulting habitat exists along Highway 5/6. No direct loss of potential horned grebe nesting habitat will occur as a result of the Hydrometallurgical Plant and its associated infrastructure. The temporary docking facility may result in the seasonal loss of a negligible amount of horned grebe moulting habitat. As a result of Avalon's decision to construct a temporary docking facility each open water

season, moulting habitat potentially lost from the facility will be reversible at closure of the Hydrometallurgical Plant. The direct physical effects of these components of the Hydrometallurgical Plant and its associated infrastructure on preferred horned grebe habitat is negligible in magnitude, local in extent, medium-term in duration, isolated, reversible, low occurrence of effect, and a low consequence.

The main way that the Hydrometallurgical Plant and associated infrastructure and activities could potentially affect horned grebes is through changes in daily movements at the beaver pond located adjacent to the T-37N pit, at the dock facility, and the Highway. Potential nesting and moulting horned grebes may encounter Hydrometallurgical Plant development-related activity (including barging and associated activities) periodically during construction, operation, and closure phases. Those encountering construction or vehicular/barging traffic (and associated noise) may show minor displacement behaviour and avoid the immediate area of activity, the haul road and/or the Highway. Habitat avoidance and disturbance in response to the Hydrometallurgical Plant and associated activities is considered low in magnitude, reversible in the short-term, and a low likelihood of effect.

Traffic along the Highway poses the greatest risk of mortality to horned grebes. The Hydrometallurgical Plant and associated activities may also attract nest predators (e.g., gulls, Common Ravens, and red foxes), which may lead to the indirect death of horned grebes.

Proposed Policies and Mitigation Measures for Horned Grebes:

Avoid all known or suspected nest sites.
Maintain existing drainage patterns to avoid potential alterations to existing horned grebe habitat.
Implement speed limits on all site roads and on the haul road from Great Slave Lake to the Hydrometallurgical Plant.
No hunting policy for all Project employees and contractors while working on or off-site for Avalon.
Bus transportation for employees from Hay River and Fort Resolution to the Hydrometallurgical Plant site to minimize the risk of vehicle-wildlife collisions and disturbances from the road.
All Project-related transportation activities to give the right-of-way to any wildlife including birds that such activity may encounter.
Dust suppression strategies (e.g., water or approved dust suppressant products) in accordance with the GNWT dust suppression guidelines.
Keep worksites clean and manage waste to avoid attracting egg and chick predators such as gulls and common ravens.
Maintain sufficient buffer distances between development activities (e.g., re-fuelling and material storage) and waterbodies, where possible.
Develop and implement an education program for wildlife related policies and mitigation to all Project employees and contractors.

3.3.3 Nechalacho Mine Area and Flotation Plant

3.3.3.1 Barren-ground Caribou (*Rangifer tarandus groenlandicus*)

Barren-ground caribou from the Bathurst herd can be expected to occasionally over-winter in the Nechalacho Mine Area and the islands in the east arm of Great Slave Lake from November to May. The main ways that the Nechalacho Mine and Flotation Plant (and associated infrastructure and activities)

may affect barren-ground caribou is through direct change in over-wintering habitat availability, movements (including avoidance and displacement), and mortality.

Avalon's footprint design of the underground mine, clustering of the surface facilities, use of existing roads, and placement of the tailings delivery pipeline along the existing road will minimize the amount of direct habitat loss. Nevertheless, a small amount of winter feeding, resting/security, and traveling habitat will be lost as a result of the Nechalacho Mine and its associated infrastructure. The Flotation Plant and its associated infrastructure may directly affect a negligible amount of poor quality feeding habitat, and the tailings management facility may directly affect a low amount of feeding, resting/security and traveling habitat. Due to the Bathurst caribou herd's large winter range and infrequent occurrence in the area, the amount of quality forage, resting/security, and traveling habitat lost due to the Nechalacho Mine is predicted to be low in magnitude. Direct loss of habitat will be local in extent and reversible in the long term since lichen recovery following habitat disturbance may take decades. However, this reversible loss of such a small amount of habitat that may be infrequently used by caribou is considered to be insignificant at both the local and regional scale.

Proposed Policies and Mitigation Measures for Barren-ground Caribou:

No hunting policy for all Project employees and contractors while working on or off-site for Avalon.
Develop standard aircraft procedures for flying into and departing from the Nechalacho Mine airstrip to accommodate caribou if present.
Maintain a minimum flight altitude of 600 m during all times, except during take-off and landings.
Implement speed limits on all site roads.
All Project-related transportation activities to give the right-of-way to any wildlife including barren-ground caribou that such activity may encounter.
Alert system to warn personnel of barren-ground caribou in the local area by relaying sighting information to vehicles and equipment operators and on-site personnel to avoid the area, if possible.
Dust suppression strategies (e.g. water or approved dust suppressant products) in accordance with the GNWT dust suppression guidelines.
Develop and implement an education program of wildlife related policies and mitigation to all Project employees and contractors.
Regularly monitor and adjust, where appropriate, mitigations to minimize disturbance to caribou.
Incinerate all waste foods and human garbage consistent with current industry good management practices to minimize predator attraction to the local area.
Reclamation following mine closure will help re-establish self-sustaining ecosystem types.
Regularly monitor and adjust, where appropriate, mitigations to minimize disturbance to barren-ground caribou.

3.3.3.2 Bald Eagle (*Haliaeetus leucocephalus*)

Bald eagles can be expected within the Nechalacho Mine study area from early April to November, and to occur wherever appropriate prey exist. Like most raptors, Bald Eagles are most sensitive to disturbance during their nesting period.

The main ways that the Nechalacho Mine and associated infrastructure and activities can affect bald eagles are through feeding habitat loss and changes in daily movements including habitat avoidance, displacement, and habituation (e.g. attraction). Bald eagle feeding habitat may be directly lost as a result of the tailings management facility. This low amount of habitat loss is considered negligible in magnitude since bald eagle feeding habitat is common in the local and regional study areas. Effects of potential feeding habitat loss are local in extent, long-term in duration, and of negligible consequence.

Bald eagles may avoid or be displaced by development-related visual and noise disturbances and dust throughout the life of the Project. The level of avoidance or displacement is unknown, but is likely determined by the level of human presence and activity. Therefore, avoidance and disturbance impacts may be greatest during construction and operation. Effects from visual and noise disturbances near the local roads, aircraft, and site infrastructure is considered to be low in magnitude, local in extent, periodic, reversible upon cessation of the activity or by moving away from the activity. The consequence of avoidance or displacement by development-related visual and noise disturbances is considered low.

The GNWT recommends permanent structures and long-term habitat disturbances should be at a minimum of 1000 m distance from bald eagle nests, and ground and air access should remain at least 1000 m from the nest during a period from March 30 to July 31 (Joint Review Panel 2009). The nearest bald eagle nest site is located 1040 m from the Flotation Plant site (nearest construction site), 1370 m from the airstrip, and 1760 m from the haul road. Disturbances at known bald eagle nests as a result of the Nechalacho Mine and Flotation Plant construction, operation, and closure activities is considered negligible in magnitude. Project-related infrastructure and activities are located a sufficient distance to known bald eagle nests.

Proposed Policies and Mitigation Measures for Bald Eagles:

Avoid all known or suspected nest sites.
All Project-related transportation activities to give the right-of-way to any wildlife including raptors that such activity may encounter.
Dust suppression strategies (e.g. water or approved dust suppressant products) in accordance with the GNWT dust suppression guidelines.
Develop and implement an education program for wildlife related policies and mitigation to all Project employees and contractors.
Incinerate all waste foods and human garbage consistent with current industry good management practices to minimize attraction to the local area.
Adaptive management will be applied to Avalon's waste management practices. If bald eagles are attracted to the site (i.e. problem wildlife) additional management practices, if required, will be adapted.
Reclamation following mine closure will help re-establish self-sustaining ecosystem types.

3.3.4 Hydrometallurgical Plant Site (Pine Point)

3.3.4.1 Woodland Caribou

Boreal woodland caribou are known to occur in low numbers in the area of the former Pine Point Mine where the proposed Hydrometallurgical Plant will be located, along Highway 5/6, and along the rail line from Hay River to the NWT/Alberta border.

As discussed in the DAR (Avalon 2011), the Hydrometallurgical Plant and associated infrastructure will be entirely located on a barren portion of the previously disturbed and reclaimed former Pine Point Mine site. All access and haul roads required to service the Hydrometallurgical Plant and associated infrastructure will utilize existing former Pine Point Mine roads, some of which will require upgrading. In particular, the 8 km haul road extending from the seasonal dock facility located at Great Slave Lake south to the Hydrometallurgical Plant site will be upgraded to accommodate the haul trucks. Upgrading of this portion of the haul road will involve the direct loss of a negligible amount of potential woodland caribou habitat. Therefore, direct loss and fragmentation of woodland caribou habitat as a result of the proposed Project is considered negligible.

As a result of Avalon's decision to locate the physical footprints of the Hydrometallurgical Plant and all associated infrastructure on existing brownfields/disturbed terrain, the direct physical effects (including direct habitat loss and fragmentation) on preferred woodland caribou habitat in the area of the Hydrometallurgical Plant are expected to be negligible. Similarly, existing haul roads, Highways, and rail lines will be utilized. Fragmentation of woodland caribou habitat will remain at baseline conditions. Direct habitat loss and fragmentation of woodland caribou habitat as a result of the Hydrometallurgical Plant and associated infrastructure is considered negligible.

The main ways that the Hydrometallurgical Plant and associated infrastructure and activities may affect woodland caribou are through changes in daily movements including habitat avoidance and disturbance, and mortality. Based on the available information, a small number of woodland caribou may be expected to be present in the vicinity of the Hydrometallurgical Plant and associated infrastructure on occasion and may potentially directly encounter or be disturbed by localized development-related noise or activities. Similarly, woodland caribou would be expected to encounter and cross Project-related road and rail line infrastructure where they would be exposed to vehicle and rail traffic.

Activities relating to the construction, operation, and closure of the Hydrometallurgical Plant, such as vehicle and rail traffic pose the greatest risk to woodland caribou mortality.

Proposed Policies and Mitigation Measures for Woodland Caribou:

No hunting policy for all Project employees and contractors while working on or off-site for Avalon.
Bus transportation for employees from Hay River and Fort Resolution to the Hydrometallurgical Plant site to minimize the risk of vehicle-wildlife collisions and disturbances from the road.
Implement speed limits on the haul road from Great Slave Lake to the Hydrometallurgical Plant.
All Project-related transportation activities to give the right-of-way to any wildlife including woodland caribou that such activity may encounter.

Proposed Policies and Mitigation Measures for Woodland Caribou:

Alert system to warn personnel of woodland caribou in the local area by relaying sighting information to vehicles and equipment operators and on-site personnel to avoid the area, if possible.
Dust suppression strategies (e.g. water or approved dust suppressant products) in accordance with the GNWT dust suppression guidelines.
Develop and implement an education program of wildlife related policies and mitigation to all Project employees and contractors.
Regularly monitor and adjust, where appropriate, mitigations to minimize disturbance to caribou.
Address GNWT ENR's woodland caribou Best Management Practices for Industrial and Commercial Activities (to be developed by 2012) to manage or mitigate habitat impacts and sensory disturbances on woodland caribou (GNWT ENR 2010b). These Best Management Practices will be adopted within the corporate wildlife monitoring program, wherever feasible.
Preserve natural drainage patterns along the haul road to maintain the natural function and processes of peatland habitats adjacent to the haul road.
Regularly monitor and adjust, where appropriate, mitigations to minimize disturbance to woodland caribou.

3.3.4.2 Wood Bison

The proposed Hydrometallurgical Plant site lies outside known wood bison herds' ranges; however, bison from the neighbouring Slave River Lowlands and Wood Buffalo National Park may occasionally occur in the area. Bison have the potential to occur at low densities within the Hydrometallurgical Plant site, wherever appropriate habitat exists. Bison from these two herds contain diseased individuals. As a result, the majority of the proposed Highway 5 transport route lies inside a Bison Control Area (BCA) where all bison are removed to ensure diseased animals do not migrate and infect other disease-free herds. Any person seeing bison in the Bison Control Area (including the majority of the Highway 5 route) is encouraged to report the sighting to the nearest GNWT ENR office. Any resident hunter seeing a bison in the control area may harvest it and keep the meat, as long as the kill is reported.

The main ways that the Hydrometallurgical Plant and associated infrastructure and activities may directly affect wood bison are through habitat loss, changes in daily movements through avoidance and displacement, and mortality. To date, wood bison critical habitat has not been identified within the NWT. However, as a result of Avalon's decision to locate the physical footprints of the Hydrometallurgical Plant and all associated infrastructure on existing brownfields/disturbed terrain, the direct loss of wood bison habitat in the area of the Hydrometallurgical Plant is expected to be low in magnitude, local in geographic extent, and reversible at mine closure. Project-related habitat loss is a low consequence.

Wood bison, particularly males, utilize access roads and other linear features as travel corridors (GNWT ENR 2010-2020), and bison often use development sites, including communities and possibly camps. This habituation and use of human development sites may lead to an increase in bison/human conflict, property damage, and increased vehicle mortalities. Few bison are expected to infrequently occur within the Hydrometallurgical Plant study area and along Highway 5/6. However, all wood bison occurring in the bison control area will be removed by GNWT ENR.

Proposed Policies and Mitigation Measures for Wood Bison:

Cooperate with and report any wood bison sightings seen in the Bison Control Area to the nearest GNWT ENR office as and when such sightings occur.
No hunting policy for all Project employees and contractors while working on or off-site for Avalon.
Bus transportation for employees from Hay River and Fort Resolution to the Hydrometallurgical Plant site to minimize the risk of vehicle-wildlife collisions and disturbances from the road.
Implement speed limits on the haul road from Great Slave Lake to the Hydrometallurgical Plant.
All Project-related transportation activities to give the right-of-way to any wildlife including wood bison that such activity may encounter.
Alert system to warn personnel of wood bison in the local area by relaying sighting information to vehicles and equipment operators and on-site personnel to avoid the area, if possible.
Dust suppression strategies (e.g. water or approved dust suppressant products) in accordance with the GNWT dust suppression guidelines.
Develop and implement an education program of wildlife related policies and mitigation to all Project employees and contractors.
Regularly monitor and adjust, where appropriate, mitigations to minimize disturbance to wood bison.

3.3.4.3 Waterfowl

Waterfowl nesting habitat exists within the Hydrometallurgical Plant study area at the beaver pond near pit T-37N and along the shoreline of Great Slave Lake near the marshaling station. Favoured nesting and brood rearing habitat for a variety of waterfowl species includes a high ratio of open water and emergent vegetation. The beaver pond near pit T-37N is favourable nesting and rearing habitat. The T-37N pit itself currently supports willow and forest cover along the south and western shorelines, waste rock along the north and eastern shorelines, and small patches of aquatic vegetation in the south and west shoreline areas.

Since the Hydrometallurgical Plant and its associated infrastructure will be constructed on existing disturbed areas, direct waterfowl habitat loss is considered negligible. The temporary docking facility and the graded marshaling yard will be located on the south shoreline of Great Slave Lake, in an area previously disturbed by a commercial fishing operation. A negligible amount of local habitat may be directly affected due to the seasonal construction of the dock. Use of water from the former T-37N pit for potable and process water may also result in a negligible alteration of waterfowl habitat. In summary, direct loss of waterfowl habitat is considered negligible in magnitude, local in extent, medium-term in duration, isolated, reversible in the short-term, high likelihood of occurrence, and of low consequence.

The main ways the Hydrometallurgical Plant and its associated infrastructure may adversely affect waterfowl is through changes in daily movements through disturbance and avoidance behaviours, and mortality.

The barge operation, the temporary dock facility and associated activity, use of water from the former T-37N pit, and the operation of the haul road and Highway 5/6 have the potential to disturb waterfowl. Barging will occur during the open water season from approximately the end of June to the end of October. The timing of barging operation coincides with waterfowl brood rearing, moulting, and fall migration.

The risk of development-related (including Highway 5/6) waterfowl mortality is considered negligible at the Hydrometallurgical Plant study area, and low along Highway 5/6. The risk of waterfowl mortality increases along the Highway as traffic volumes increase. Mortality as a result of the Hydrometallurgical Plant and associated activities is considered moderate in magnitude and a moderate likelihood of occurrence without mitigation. The number and frequency of exposures would be low and sporadic.

Proposed Policies and Mitigation Measures for Waterfowl:

No hunting policy for all Project employees and contractors while working on or off-site for Avalon.
Maintain existing drainage patterns to avoid potential alterations to existing waterfowl habitat.
Avoid all known or suspected nest sites.
Bus transportation for employees from Hay River and Fort Resolution to the Hydrometallurgical Plant site to minimize the risk of vehicle-wildlife collisions and disturbances from the road.
Implement speed limits on the haul road from Great Slave Lake to the Hydrometallurgical Plant.
All Project-related transportation activities to give the right-of-way to any wildlife including waterfowl that such activity may encounter.
Dust suppression strategies (e.g., water or approved dust suppressant products) in accordance with the GNWT dust suppression guidelines.
Keep worksites clean and manage waste to avoid attracting egg and chick predators such as gulls and Common Ravens.
Develop and implement an education program for wildlife related policies and mitigation to all Project employees and contractors.

3.3.4.4 Whooping Crane

A breeding population of whooping cranes is located in Wood Buffalo National Park. Non-breeding individuals are known to inhabit marshes, bogs, and shallow lakes between Wood Buffalo National Park and the Mackenzie Bison Sanctuary. The nearest known whooping crane nest is located approximately 20 km east and south of the proposed Hydrometallurgical Plant site. Whooping cranes are sensitive to disturbance during breeding season. In general, cranes are relatively tolerant of carefully operated boats (including barges) and land vehicles; however, people on foot and low flying aircraft are more disturbing (Environment Canada 2007).

The Hydrometallurgical Plant and its associated infrastructure will not affect whooping crane habitat. The Hydrometallurgical Plant and the former Pine Point mine pits (including L-37 and T-37N) are located in brownfield sites that do not provide whooping crane feeding or nesting habitat. In addition, no whooping crane nesting or feeding habitat will be directly lost by the haul road upgrades or the graded marshaling yard.

The main way that the Hydrometallurgical Plant and its associated infrastructure and activities could potentially affect whooping cranes is through changes in daily movements of non-breeders. Whooping cranes may conceivably be present in the vicinity of the beaver pond near T-37N pit on occasion and may potentially be disturbed by localized development-related noise or traffic. Similarly, non-breeding whooping cranes may occasionally fly over or feed in marshes, bogs, or shallow lakes adjacent to Highway 5, and throughout the Pine Point region.

A whooping crane encountering such activities may show minor displacement behaviour and avoid the immediate Hydrometallurgical Plant development area and/or the Highway. The duration of any such exposures are expected to be brief, perhaps lasting a few minutes to a few hours, and are reversible upon cessation of the activity or by moving away from the activity. Development-related effects on whooping crane daily movements are considered low in magnitude and a low likelihood of occurrence. The number and frequency of exposures is considered low and isolated.

The highest risk of development-related whooping crane mortality is along Highway 5/6 during construction, operation, and closure. The risk of mortality increases along the Highway as traffic volumes increase.

Proposed Policies and Mitigation Measures for Whooping Cranes:

Maintain existing drainage patterns to avoid potential alterations to existing waterfowl habitat.
Avoid all known or suspected nest sites.
Bus transportation for employees from Hay River and Fort Resolution to the Hydrometallurgical Plant site to minimize the risk of vehicle-wildlife collisions and disturbances from the road.
Implement speed limits on the haul road from Great Slave Lake to the Hydrometallurgical Plant.
All Project-related transportation activities to give the right-of-way to any wildlife including whooping cranes that such activity may encounter.
Dust suppression strategies (e.g., water or approved dust suppressant products) in accordance with the GNWT dust suppression guidelines.
Develop and implement an education program for wildlife related policies and mitigation to all Project employees and contractors.

3.3.4.5 Peregrine Falcon

The Hydrometallurgical Plant study area lies outside the known peregrine falcon breeding range (CWS and GNWT ENR 2008); however, two individuals have been observed in the Pine Point region during September 2005 field surveys. It is expected that the peregrines observed were generally migrants or non-breeders from known populations in the northeast corner of Wood Buffalo National Park or the east arm of Great Slave Lake. The general Pine Point area does not meet the necessary habitat requirements for nesting peregrine falcons (i.e., cliff ledges close to water). The Hydrometallurgical Plant and its associated infrastructure will not directly affect peregrine falcon nesting or feeding habitat.

The main way that the Hydrometallurgical Plant and its associated infrastructure and activities could potentially affect peregrine falcons is change in daily movements of non-breeding floaters or migrants and mortality. Although the Hydrometallurgical Plant study area is outside known breeding ranges, non-breeding floaters or migrants may utilize feeding habitats in the Hydrometallurgical Plant study area and along Highway 5/6 including open shorelines of lakes, ponds, wetlands, and beaver ponds.

Mortality as a result of the development-related traffic along Highway 5/6 during construction, operation, and closure of the Hydrometallurgical Plant and its associated infrastructure is considered low. Migrants or non-breeding floaters may utilize Highway 5/6 and open areas surrounding the Hydrometallurgical Plant and its associated infrastructure, including the Highway for hunting.

Proposed Policies and Mitigation Measures for Peregrine Falcons:

No hunting policy for all Project employees and contractors while working on or off-site for Avalon.
Conduct a field survey to document possible nesting peregrine falcons at pits L-37 and N-42 prior to construction and operation. If evidence of peregrine falcon nesting in these pits is observed, avoidance and/or mitigation to minimize adverse impacts from construction and operation will be developed.
Bus transportation for employees from Hay River and Fort Resolution to the Hydrometallurgical Plant site to minimize the risk of vehicle-wildlife collisions and disturbances from the road.
Implement speed limits on the haul road from Great Slave Lake to the Hydrometallurgical Plant.
All Project-related transportation activities to give the right-of-way to any wildlife including raptors that such activity may encounter.
Dust suppression strategies (e.g., water or approved dust suppressant products) in accordance with the GNWT dust suppression guidelines.
Develop and implement an education program for wildlife related policies and mitigation to all Project employees and contractors.

3.3.4.6 Yellow Rail

Based on their known distribution in the NWT (GNWT ENR 2010a) and their preferred habitat requirements, yellow rails occur in the Pine Point region, wherever appropriate habitat exists. Yellow rails are sensitive to disturbances during nesting season, particularly human presence and activities and changes in water levels. As a result of Avalon's decision to locate the physical footprints of the Hydrometallurgical Plant and all associated infrastructure on existing brownfields/disturbed terrain, no direct physical effects on Yellow Rail habitat in the area of the Hydrometallurgical Plant LSA are expected. In addition, the Hydrometallurgical Plant and its associated activities do not change the risk of yellow rail mortality within the LSA.

The main way that the Hydrometallurgical Plant and associated infrastructure and activities could potentially affect yellow rails is through changes in daily movements, such as displacement from seasonal feeding and nesting habitat along Highway 5/6. A yellow rail may encounter vehicular traffic along Highway 5/6 during the Hydrometallurgical Plant construction, operation, and closure activities and may show minor displacement behaviour and avoid the immediate area of the Highway. However, the Hydrometallurgical Plant is not considered to substantially increase traffic volumes along the Highway. The duration of any such exposures are expected to be periodic, are reversible in the short-term, and low in magnitude.

Proposed Policies and Mitigation Measures for Yellow Rails:

Bus transportation for employees from Hay River and Fort Resolution to the Hydrometallurgical Plant site to minimize the risk of vehicle-wildlife collisions and disturbances from the road.
Maintain existing drainage patterns to avoid potential alterations to potential habitat downstream

3.3.4.7 Northern Leopard Frog (*Lithobates pipiens*)

Northern leopard frogs have been recorded along the Slave and Taltson Rivers, as far north as Fort Resolution and may occur year round in the Hydrometallurgical Plant LSA and the Pine Point region wherever appropriate habitat exists. Potential northern leopard frog habitat is present within the Hydrometallurgical Plant site study area and along Highway 5/6. Direct habitat loss of potential summer feeding northern leopard frog habitat will occur at the temporary dock facility and the graded marshaling yard (approximately 2 ha in size). The dock facility is situated in shallow water without emergent vegetation and would therefore be considered poor breeding and over-wintering habitat. The graded marshaling yard may be used by adults during the summer period, outside the breeding season. As a result of Avalon's decision to locate the physical footprints of the Hydrometallurgical Plant and all other associated infrastructure on existing brownfields/disturbed terrain, the direct physical effects of these components of the TLP on preferred northern leopard frog habitat in the area of the Hydrometallurgical Plant are expected to be negligible.

The main way that the Hydrometallurgical Plant and associated infrastructure and activities could potentially affect northern leopard frogs is through habitat alteration and mortality. The Hydrometallurgical Plant and its associated activities may result in alteration of breeding and over-wintering habitat during the operation phase. During the operation phase, water from the T-37N pit will be used to support the Hydrometallurgical Plant with potable and process water, therefore altering water levels. Northern leopard frog breeding habitat in the T-37N pit is considered poor quality due to the limited amount of emergent vegetation, and over-wintering habitat is considered moderate quality. Adverse impacts of a moderate alteration in water levels at the T-37N pit during northern leopard frog breeding is considered negligible in magnitude due to the low breeding habitat potential of this pit and the availability of higher quality breeding habitat in the immediate area (beaver pond) and the region.

In addition, airborne dust from the haul road has the potential to alter northern leopard frog habitat. Introduced fine sediment into the roadside ditches and the beaver pond, has the potential to increase the water turbidity and possibly degrade the habitat by inhibiting aquatic plant growth and macro-invertebrates, and water pH (Forman and Alexander 1998). Habitat alteration effects are considered moderate in magnitude and local in extent.

Northern leopard frogs are particularly susceptible to mortality from high traffic roads due to their innate behaviour. Research suggests that northern leopard frogs do not strongly avoid roads or traffic, consequently increasing their risk to road mortality (Bouchard et al. 2009). Bouchard et al. (2009) reported a 6% mortality rate while crossing roads with very low traffic volumes (10.86 mean vehicles per hour) and a 28% mortality rate at higher traffic volumes (58.29 mean vehicles per hour). In relation to northern leopard frog mortality risks, traffic volumes along the haul road are anticipated to have very low traffic volumes, and the Thor Lake Project will have a negligible mortality risks along Highway 5/6.

Similarly, a large removal of water from the T-37N pit during northern leopard frog over-wintering period may result in mortality. The water in the T-37N pit originates from the groundwater, and pit recharge will be sufficient to support the Hydrometallurgical Plant and its associated activities year round. In addition, egg masses that are secured to emergent vegetation near the water surface may desiccate if a moderate reduction in water levels occurs during the breeding season. Mortality as a result of the

Hydrometallurgical Plant traffic and water removal from the T-37N pit is considered moderate in magnitude, local in geographic extent, and low likelihood of occurrence. Any mortality effect will be irreversible, isolated in frequency, and a moderate consequence.

Proposed Policies and Mitigation Measures for Northern Leopard Frogs:

Maintain existing drainage patterns to avoid potential alterations to existing northern leopard frog habitat.
Maintain sufficient water levels in the T-37N pit to sustain oxygenation of the water and avoid freezing conditions near the bottom substrate.
Dust suppression strategies (e.g., water or approved dust suppressant products) in accordance with the GNWT dust suppression guidelines.
Maintain sufficient buffer distances between development activities (e.g., re-fuelling and material storage) and waterbodies, where possible.
Develop and implement an education program for wildlife related policies and mitigation to all Project employees and contractors.

3.4 Waste Management

The potential for human-wildlife encounters is greatly reduced by strict adherence to a waste management plan. Wildlife-specific mitigation measures included in the Waste Management Plan include:

Wildlife-Specific Waste Management Mitigation Measures:

No littering policy.
No feeding of wildlife policy.
Separate food waste and non-food waste at source.
Nechalacho: Incinerate all waste foods and human garbage consistent with current industry good management practices to minimize black bear attraction to the local area.
Hydrometallurgical Plant: Store all waste foods and human garbage in bear-proof containers prior to offsite disposal.
Disposal of food waste and non-toxic combustible waste according to the Waste Management Plan to limit the presence of food attractants.
Non-food waste products (that cannot be incinerated or landfilled) to be collected, sorted, and placed in designated areas within a designated area until they can be shipped off site.
Provide designated, contained areas for lunch breaks with waste containers for food waste.
Clearly identify all food waste containers and those restricted from food waste.
Store food waste in an isolated area and incinerate quickly.
Follow procedures outlined in the Waste Management Plan and the Emergency Response and Spill Contingency Plan.

3.5 Targeted Deterrent Measures/Actions

The goal of wildlife deterrent actions is to respond to wildlife situations using humane wildlife control methods that keep both humans and wildlife safe. All deterrent actions will start with the least intrusive method, and then increase in intensity until wildlife may need to be relocated or destroyed. Each deterrent action will stop as soon as the animal moves away from the potentially hazardous site or human activity. Deterrent options will only be used to keep wildlife away from hazards.

Wildlife deterrent actions will be undertaken only by designated individuals (such as the environment staff or security staff). These individuals will be required to hold a valid Canadian Possession-Acquisition Firearms License. Training will include Bear Safety and Wildlife Deterrent Training specific to caribou, and wolverine. This training will include basics in wildlife ecology and behaviour, prevention of wildlife-human encounters, contingencies for wildlife-human encounters, proper use of deterrents, and recording and reporting procedures.

For deterrents to be successful there must be:

- Knowledgeable, trained personnel who will select corrective deterrent actions based on each wildlife situation;
- Consistent application of deterrents;
- Effective implementation of the Waste Management Plan, particularly as it relates to the disposal of food waste;
- Safe and effective methods to prevent the presence or continuous presence of wildlife within the anticipated TLP Lease Boundary;
- Procedures to remove wildlife from the airstrip or roads during an emergency;
- The absence of food, shelter, and other rewards for animals that investigate the site; and
- Evaluation of every deterrent action to determine the reason for the animal's presence and the method it used to gain access to a hazardous area.

Records of deterrent actions will be entered in a Wildlife Deterrent Report by TLP Project environment staff and forwarded to ENR.

3.6 Training and Site Orientation

Limiting potential impacts to wildlife begins with educating the work force. An orientation and structured training session for site personnel, contractors, and visitors will allow opportunities to educate the work force on why and how potential wildlife impacts can be avoided or minimized. Examples of wildlife-related components in orientation sessions include the policy that wildlife has the right-of-way, strategies to reduce employee-wildlife interactions, and the prohibition of feeding wildlife. Personnel will also be instructed on how to record wildlife observations.

3.7 Project EMP

Relevant TLP operating procedures and plans developed as part of the Project's Environmental Management Plan (EMP) will be appended to the WEMMP when available. Operating plans relevant to wildlife include:

- Waste Management Plan
- Hazardous Materials Handling and Storage Plan
- Emergency Response and Spill Contingency Plan

4.0 MONITORING

The mitigation measures, BMPs, Project design features, and company policies (presented in Section 3.0) developed for the Project are intended to address potential Project effects identified through the effects assessment (Avalon DAR 2011). Monitoring wildlife activities and interactions with the TLP will determine the effectiveness of the proposed mitigation measures for the Project, confirm the results of the effects assessment, and provide some level of confidence in addressing wildlife issues.

Potential primary effects to wildlife may include direct and indirect habitat effects and direct mortality. The following sections describe the proposed conceptual wildlife monitoring program. Specific procedures and reporting templates will be developed through discussions with ENR and interested parties.

4.1 General Wildlife Monitoring

Wildlife will continue to be present in the vicinity of the TLP during construction, operation, and closure. As noted above, some species are attracted to human activity; and therefore, wildlife interactions are anticipated. The general wildlife monitoring program is proposed to:

- Identify/record wildlife species (common, uncommon, species at risk), their numbers and locations within and around the Project footprint;
- Identify human and Project-wildlife incidents;
- Identify risks to wildlife and Project personnel; and
- Describe any general effects to wildlife.

Objectives	Methods	Frequency and Duration	Thresholds/Triggers
1. Document the occurrence of wildlife in the area of the TLP. 2. Document and manage wildlife attraction to the TLP. 3. Keep staff advised of wildlife activity.	Project environmental staff will survey/inspect all areas of the Project site, scanning for wildlife and recent wildlife sign (e.g. scat, tracks). Survey to be conducted on foot, area surveyed recorded, and the nature/details of all observations documented. Environmental staff will routinely	Surveys for wildlife presence within and around the TLP will occur at least twice per week. Investigation and reporting of incidents will be completed as they occur. Both programs will be continuous throughout the	The threshold level for wildlife incidents will be a single incident, in that each incident will be investigated to identify the cause. Environment staff may suggest changes to environmental design

Objectives	Methods	Frequency and Duration	Thresholds/Triggers
4. Avoid human-wildlife interactions. 5. Determine the effectiveness of mitigation measures in place. 6. Verify predicted potential effects from direct Project-related mortality on wildlife.	<p>question staff working outside about recent wildlife sightings, problems, and concerns.</p> <p>TLP staff and contractors will be expected to report all observations of caribou, moose, wolverine, wolf, black bear, and fox to environment staff, both at the TLP site, and along access and haul roads.</p> <p>Environment staff will respond to, investigate, and record the presence and incidents involving deterrent actions, injury, or mortality of animals, and complete follow-up procedures or actions as necessary.</p> <p>Wildlife sighting logs will be maintained at various areas around the TLP site for staff to record observations of wildlife.</p> <p>If wildlife mortality occurs, environment staff will conduct an investigation to determine the cause, collect photographs, and store the carcass until further notice from ENR.</p> <p>All wildlife sightings, deterrent actions, injuries, and mortalities will be reported in the annual Wildlife Effects Monitoring Report. In addition, ENR will be notified of caribou, moose, black bears, migratory birds, and species at risk mortalities within 24 hours of the incident.</p>	<p>construction, operation, and closure.</p>	<p>features, mitigation practices, or provide additional training for staff.</p> <p>Wildlife incident reporting will provide information for adaptive management such as identifying areas requiring improvements to wildlife mitigation for reducing interactions and potential mortality risks.</p>

4.2 Species at Risk and VCs

Considering the low density of the identified species at risk and VCs in the RSAs and the small geographic scale of any potential effects, species-specific monitoring and detecting effects to these species is unlikely to be successful. Monitoring for these species is therefore considered in the broader context of that proposed for other wildlife. Mitigation specific to species at risk and VCs is outlined in Section 3.3.

Detailed observations of any of these species will be reported, including the time and date, location, and number. Should any of these species be observed near construction or mining activities, construction or mining managers should be notified immediately and subsequent actions identified. Generally wildlife should be left undisturbed. In cases where there is a risk to the animals, humans or equipment, deterrent

actions should be considered beginning at the lowest level. The objective would be for the animals to voluntarily move away from the potentially hazardous situation without causing unnecessary stress or injury.

The current absence or low abundance of Bathurst caribou and woodland caribou (hereafter 'caribou' refers to both species) in the RSAs make it difficult to predict and document effects because negative interactions between mine activities and caribou are unlikely to occur due to the low caribou density, or might be undetectable. Consequently, monitoring will initially rely on anecdotal data recorded in wildlife logs related to caribou presence/abundance, harvester knowledge, and preliminary monitoring observations. The goal of the initial monitoring will be to collect data that confirms presence then test potential Project effects predictions where possible, and collect information that will quickly trigger further monitoring if needed.

Objective	Methods	Frequency and Duration	Thresholds/Triggers
<ol style="list-style-type: none"> 1. Confirm the presence of caribou in the RSAs. 2. Verify predicted potential effects from Project. 3. Determine the effectiveness of mitigation measures in place. 	<ol style="list-style-type: none"> 1. Continued dialogue with local hunters and trappers, who will be able to provide information about relative abundance of caribou in and around the RSAs. 2. Wildlife monitors will travel the roads once per month, when daylight allows sufficient visibility, to count the number of caribou present in the area. The winter period is the only season when Bathurst caribou may frequent the Mine RSA and the numbers could be variable from year to year; however, the data will provide a standardized count of Bathurst caribou observations and increased observations will be one of the triggers for further monitoring. 3. Truck drivers and all employees will be required to report caribou sightings in the Project development areas and along the transportation corridor. 4. Records will be kept of all sightings in wildlife sightings logs. 	<p>Wildlife monitors will travel the roads once per month, when daylight allows sufficient visibility, to count the number of caribou present in the area.</p>	<p>Avalon will only initiate more detailed monitoring if one of three conditions occurs:</p> <ol style="list-style-type: none"> 1. There is a general public perception that mine activities are affecting caribou in the area (e.g., FN bands or communities approach Avalon with a general or specific concern). 2. Local harvester observations or initial monitoring data indicate a need to better understand potential impacts (e.g., consistent caribou tracks that approach the transportation routes, but do not cross). 3. Monitoring data document increased abundance of caribou in the RSAs, and stakeholders feel there is a need to further investigate effects of mine activities on caribou.

4.3 Raptors

Raptors are birds of prey and include falcons, eagles, hawks, ospreys, and owls. Raptors considered species at risk and observed or expected to occur within the RSA include peregrine falcon (anatum subspecies) and short-eared owl.

Monitoring is required to identify and mitigate hazards to nesting raptors within the TLP (i.e., anticipated mine site), and to confirm their presence/absence in the RSA. Considering the low density of raptors documented in the RSA during baseline studies, monitoring is not expected to be able to test impact predictions related to the magnitude and spatial extent of indirect habitat effects.

Objectives	Methods	Frequency and Duration	Thresholds/Triggers
1. Mitigate hazards to raptors attempting to nest within the TLP areas. 2. Document raptor occurrence in the TLP areas. 3. Verify predicted potential effects from Project. 4. Determine the effectiveness of mitigation measures in place.	<p>If raptor nests are confirmed in the TLP areas. Nest site visits will be completed from the ground or by helicopter using standard fly-by methods to identify occupying species and to count eggs and young.</p> <p>Surveys will not be carried out in the rain, and visits will be kept as short as possible to limit disturbance to the birds.</p> <p>Nest sites will be visited during late May or early June to determine occupancy, and during mid- to late July to determine nest success and productivity. Nests will be considered occupied if at least one adult bird is observed. Nests will be recorded as successful if at least one chick is observed in the nest. The presence of eggs and chicks will be noted, and the number of eggs and chicks will be recorded if possible.</p> <p>Raptor nest monitoring data may be made available to ENR for regional monitoring purposes, or to the North American Peregrine Falcon survey.</p> <p>Any reports or observations of raptor nesting activity will be documented and reported. In these cases, the follow-up action will be determined in consultation with ENR, and will consider any hazards to the nest.</p>	<p>Complete surveys twice annually during construction through closure.</p> <p>First annual survey in late May/early June to document nest presence/occupancy; second in mid- to late-July to record nest success/productivity.</p>	<p>Considering the low density of raptors, the proposed monitoring is not expected to detect direct project-related effects. Should a raptor nest be identified within the TLP areas, ENR will be contacted to determine the appropriate course of action.</p>

4.4 Direct Habitat Loss and Modification

Project construction will result in direct habitat loss and modification. Following initial construction of the TLP infrastructure and mine, expansion of the Project footprint will proceed at a slower rate and spatial extent. To assess habitat changes the Project footprint following construction and at operations start will be documented and compared to baseline conditions.

Objective	Methods	Frequency and Duration	Thresholds/Triggers
Verify predictions from direct habitat loss as presented in the DAR.	Create as-built drawings of the Project footprint, including all mine components, roads, infrastructure, and buildings. Use as-built footprint to compare/calculate actual loss of habitat compared to that predicted in the DAR.	Complete as-built drawings within 12 months of construction completion and the start of mining. Monitoring changes to the footprint to start at end of construction and continue annually for 2 years into operations or until the spatial extent shows little/no change.	N/A - Project footprint must meet land use permits and leases to construct the Project.

5.0 REPORTING

Avalon will present the findings of the monitoring and management program through annual reports. The reports will contain a summary of methods, current data collected, and a record of wildlife observations, interactions, deterrent actions, and incidents, including mortalities. Recommendations for adjustments to the Program may also be included. The annual reports will allow feedback and input from regulatory agencies and interested parties.

With the progression of the Project through its various phases and life cycle, specific points will be identified for a full analysis of all data and information collected to date, an assessment of any documented Project effects, an assessment of the mitigation measures applied, and recommendations for future phases.

6.0 ADAPTIVE MANAGEMENT

Adaptive management is an approach commonly used for coping with uncertainty. Applying adaptive management involves the use of monitoring results to incrementally improve performance. Information feedback from results of an effective monitoring program is essential for success. The WEMMP must be flexible enough to incorporate comments, suggestions, and information from scientific sources as well as local traditional knowledge. If Project effects do occur and are of a magnitude greater than that predicted in the DAR, Avalon will determine a course of action in consultation with regulators and interested parties.

If negative effects are detected, potential actions may include:

- An increase in monitoring effort;
- Design and implement different monitoring programs to further define and understand the effects; or
- Implement additional mitigation measures to reduce the effects.

7.0 CLOSURE

We trust this report meets your present requirements. Should you have any questions or comments, please contact the undersigned at your convenience.

EBA, A Tetra Tech Company

Prepared by:

Reviewed by:

ISSUED FOR REVIEW

ISSUED FOR REVIEW

George Carlson, M.Sc., R.P. Bio.
Senior Wildlife Ecologist
Tel: 604.685.0017 x307
gcarlson@eba.ca

Richard Hoos, M.Sc., R.P. Bio.
Principal Consultant
Tel: 604.685.0017 x239
rhoos@eba.ca

REFERENCES

- Avalon. 2011. Developer's Assessment Report, Thor Lake Project, Northwest Territories. Submitted to the Mackenzie Valley Environmental Impact Review Board.
- Banci, V. 1994. Wolverine. The Scientific Basis for Conserving Forest Carnivores: American Marten, Fisher, Lynx and Wolverine in the Western United States. Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, L.J. Lyon and W.J. Zielinski (Eds.). General Technical Report RM-254, U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. Ft. Collins, CO. 99-127 pp.
- Bouchard, J., A.T. Ford, F.E. Eigenbrod, L. Fahrig. 2009. Behavioral responses of Northern Leopard Frogs (*Rana pipens*) to roads and traffic: implications for population persistence. *Ecology and Society*, 14(2): 23-33.
- Canadian Wildlife Service (CWS) and Environment and Natural Resources (GNWT ENR). 2008. Species at Risk in the Northwest Territories, 2008 Edition: a guide to NWT species legally listed under the federal Species at Risk Act and those under consideration for listing. Government of Northwest Territories, Yellowknife, NT. 54 pp.
- Chapman, R.C. 1977. The Effects of Human Disturbance on Wolves *Canis lupus*. M.S. Thesis, University of Alaska, Fairbanks. 209 pp.
- EBA Engineering Consultants Ltd. (EBA). 2010. 2010 Baseline Wildlife Habitat Assessment – Proposed Haul Road and Hydrometallurgical Plant Area, Pine Point, Northwest Territories. Report prepared by EBA Engineering Consultants Ltd. For Avalon Rare Metals Inc.
- Environment Canada. 2007. Recovery Strategy for the Whooping Crane (*Grus americana*) in Canada. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. 27 pp.
- Forman, R.T. and L.E. Alexander. 1998. Roads and their major ecological effects. *Annu. Rev. Ecol. Syst.* 29: 207-231.
- Fortune Minerals Limited. 2011. Conceptual Wildlife Effects Monitoring Program. NICO DAR. Prepared by Golder Associates for Fortune Minerals Ltd. May 2011.
- Government of Northwest Territories, Environment and Natural Resources (GNWT ENR), 2010a. Species at Risk in the Northwest Territories: 2010 edition. Government of Northwest Territories. 65 pp.
- Government of Northwest Territories, Environment and Natural Resources (GNWT ENR), 2010b. Implementation Plan for the Action Plan for Boreal Woodland Caribou in the Northwest Territories: 2010 – 2015. 14 pp.
- Government of Northwest Territories, Environment and Natural Resources (GNWT ENR), 2010-2020. Wood Bison Management Strategy for the Northwest Territories. NWT Species at Risk. Retrieved February 8, 2011 from:
http://www.enr.gov.nt.ca/_live/documents/content/wood_bison_management_strategy.pdf

- Joint Review Panel for the Mackenzie Gas Project (Joint Review Panel). 2009. Chapter 10 Wildlife. In: Foundation for a Sustainable Northern Future: Report of the Joint Review Panel for the Mackenzie Gas Project. Retrieved March 4, 2011 from: <http://www.ngps.nt.ca/report.html>
- Mackenzie Valley Environmental Impact Review Board (MVEIRB). 2011. Final Terms of References for Environmental Assessment of Avalon Rare Earth Metals Incorporated's Thor Lake Rare Earth Element Project EA1011-001.
- Peek, J.M. 1998. Habitat relationships. Pages 351–375 in A.W. Franzmann and C.C. Schwartz, editors. Ecology and management of the North American moose. Smithsonian Institution Press, Washington, D.C., USA.
- Salmo Consulting Inc., Axy's Environmental Consulting Ltd., Forem Technologies Wildlife and Company Ltd. 2004. Deh Cho Cumulative Effects Study, Phase 1: Management Indicators and Thresholds. 172 pp.
- Stantec Inc. 2010. Thor Lake Rare Earth Metals Baseline Project Environmental Baseline Report: Volume 6 – Wildlife Resources. Final Report. Report prepared for Avalon Rare Metals Inc., Toronto, ON.

APPENDIX A

APPENDIX A EBA'S GENERAL CONDITIONS

GENERAL CONDITIONS

GEO-ENVIRONMENTAL REPORT

This report incorporates and is subject to these “General Conditions”.

1.0 USE OF REPORT AND OWNERSHIP

This report pertains to a specific site, a specific development, and a specific scope of work. It is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site or proposed development would necessitate a supplementary investigation and assessment.

This report and the assessments and recommendations contained in it are intended for the sole use of EBA's client. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA's Client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA's instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. The Client warrants that EBA's instruments of professional service will be used only and exactly as submitted by EBA.

Electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

3.0 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by EBA in its reasonably exercised discretion.

4.0 INFORMATION PROVIDED TO EBA BY OTHERS

During the performance of the work and the preparation of the report, EBA may rely on information provided by persons other than the Client. While EBA endeavours to verify the accuracy of such information when instructed to do so by the Client, EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.