



ALIGN  
OPTIMIZE  
INNOVATE

2013 SUSTAINABILITY REPORT SUMMARY



## MESSAGE FROM THE VICE PRESIDENT, SUSTAINABILITY

We are pleased to present this summary of highlights from Avalon's full 2013 Sustainability Report: **Align. Optimize. Innovate.**, released in December 2013 (the "Report").

This year's Report covers not only the calendar year 2012, but also the first eight months of 2013, to the end of Avalon's fiscal year 2013. We have done this to align our sustainability reporting period with the financial reporting period. This is one of many steps that Avalon has taken to integrate sustainability into everything we do. It ensures that our business and financial planning are fully integrated, and that these plans are aligned with our health and safety, environment, economic, community, and outreach objectives and commitments. This guarantees that adequate resources are available to accomplish what we have planned.

This has been a dynamic period in the development of our Company. The theme for this year's Report, **Align. Optimize. Innovate.**, was carefully selected to represent this dynamic transition. The triangle on the cover is also the Greek letter "delta", which stands for change. At Avalon, we are ever embracing change. In addition to aligning our reporting, we continue to align many of our other internal processes to ensure that sustainability is part of everything we do and included in all decisions we make. In a year of optimization to improve the overall performance of our Nechalacho Project, innovation was a key driver. By putting into action one of Avalon's core values, innovate, our willingness and ability to seek solutions to improve value for

shareholders, investors, the communities where we work, and all other stakeholders, we have been able to identify several key potential opportunities to reduce capital and operating costs, improve yields, and increase financial returns. Communicating these potential improvements and their impacts will become an important component of our sustainability activities moving forward.

During the reporting period, we accomplished many exciting things that help strengthen the organization and its sustainability values. We are seeing positive results in our efforts to improve our safety performance. We developed and implemented a risk management program to identify risks and opportunities and to ensure we manage both effectively. We signed an Accommodation Agreement with the Deninu K'ue First Nation and advanced negotiations with others. We developed effluent guidelines that do not yet exist for rare earth elements, and then designed and tested innovative treatment technologies that demonstrate that our effluent will not impact the environment. We implemented management systems to ensure that we can meet our objectives in the long term, and have plans to further develop others. We have demonstrated our leadership in the junior mining sector by contributing to the industry through presentations, courses, and communications on risk, biodiversity, safety, and sustainability. And finally, we contributed to the rare earth elements industry through working with educational institutions, governments, and industry associations to advance research and education.

We are pleased with our progress to date. We have integrated sustainability principles into all elements of our thinking and we have had this work independently assessed, by Sustainalytics Inc., to verify its veracity and integrity. We have a core belief that adopting principles of sustainability is fundamental to our success.

I invite you to read and evaluate the full Report available on Avalon's website. If you have any questions or comments, please feel free to e-mail me at [sustainability@avalonraremetals.com](mailto:sustainability@avalonraremetals.com).

Warmest regards,



Mark Wiseman  
Vice President, Sustainability



Northern lights over the Nechalacho camp

## ABOUT THE SUMMARY

The "Reporting Period" includes the calendar year 2012 ("CY12": January 1, 2012 to December 31, 2012), fiscal year 2012 ("FY12": September 1, 2011 to August 31, 2012) and fiscal year 2013 ("FY13": September 1, 2012 to August 31, 2013).

During the Reporting Period, Avalon achieved many important operational milestones on the Nechalacho Rare Earth Elements Project ("Nechalacho Project") in the Northwest Territories ("NWT"), Canada. In April 2013, a positive Feasibility Study was completed.

Where the Nechalacho Project is concerned, Avalon has reported on the Feasibility Study base-case scenario of the Nechalacho Mine Site at Thor Lake, NWT consisting of an underground mine and paste backfill plant, Concentrator and Tailings Management Facility and other project site utilities and infrastructure; the Hydrometallurgical Plant being located at Pine Point, NWT; and the rare earth Refinery Plant in Geismar, Louisiana.

Subsequent to the Reporting Period, Nechalacho's Report of Environmental Assessment was approved in November 2013 which allows the final permitting phase to begin.

Also refer to the last page of this Summary for an overview of the Nechalacho Project optimizations announced in April 2013.

HEALTH AND SAFETY

**Avalon will continue to build on its Safety Management System and work towards its goal of Zero Harm.**

While the recordable injury frequency rate did not meet Avalon's objective for zero harm, for the first time since the inception of its sustainability reporting, Avalon was lost time accident free in FY13.

Safety Performance (Frequencies are per 200,000 hours per worked)				
	CY11	CY12	FY12	FY13
Lost Time Injury Frequency	15	7	13	0
Medical Aid Injury Frequencies	6	2	2	3
Total Recordable Frequency	20.6	8.7	15.3	2.7
Severity Frequency	212	657		22
Lost Time Injuries	8	3	6	0
Medical Aid Injuries	3	1	1	1
Total Recorded Injuries	11	4	7	1
Total Hours	106,745	91,628	91,291	72,839
Days Lost	113	301	237	0

The Health and Safety induction training was expanded in CY12. Key procedures such as the emergency response plan and crisis management plan were reviewed and updated to recognize changes in the growing of the Company.

During the Reporting Period, Avalon further advanced its health and safety program from reporting against lagging indicators to measuring and reporting leading indicators. Leading indicators are proactive and measure the actions taken to prevent accidents, while lagging indicators report on safety performance after the accidents have taken place. Of all the Nechalacho drilling programs during the Reporting Period, there were 672 crew safety meetings held, many of which included risk assessments. There were 191 hazards identified and corrected and 43 near misses reported with appropriate actions taken to prevent reoccurrences.

Further enhancements to the program targeted for FY14, in the event of site activities, include improved reporting on near misses and identification and tracking of safety actions arising from near miss reports, inspections, and hazard identification activities.



Nechalacho camp employees practicing first aid evacuation drills

COMMUNITY & STAKEHOLDER ENGAGEMENT

**Intensified community engagement is a priority at Avalon as formal agreements advance and facilitate two-way communication regarding project optimization.**

In CY12, Avalon and the Deninu K'ue First Nation signed an Accommodation Agreement which provides business and employment opportunities, as well as measures to mitigate potential environmental and cultural impacts that may result from the Nechalacho Project's development. The Accommodation Agreement also includes equity participation in the Nechalacho Project.

Negotiations continue with four other Aboriginal organizations and governments who have signed Negotiation Agreements.



Don Bubar, Avalon President and CEO and Chief Louis Balsillie from the DKFN shake hands during the Accommodation Agreement signing ceremony

AVALON AT WORK

**In support of achieving company objectives, Avalon recognizes the importance of investing in its diverse workforce.**

Avalon is proud of its accomplishments in the area of local hiring and training. Of the workers at the Nechalacho Project in the NWT, on average 65% were Aboriginal.

Once the Nechalacho Project financing is in place, Avalon expects to employ a comprehensive owner's team at the Nechalacho Mine, Hydromet Plant and Refinery. Combined, these teams will total approximately 50 employees. Negotiations for a Socio-Economic agreement with the Government of the NWT were initiated with the objective of optimizing northern employment and purchasing as well as working with the Government of the NWT to improve education, training, and other initiatives.



Don Bubar, Avalon President and CEO present Virginia Morgan, Director Communications, with the 2012 Special Achievement Employee Award for creating a sense of community with the development of an employee newsletter

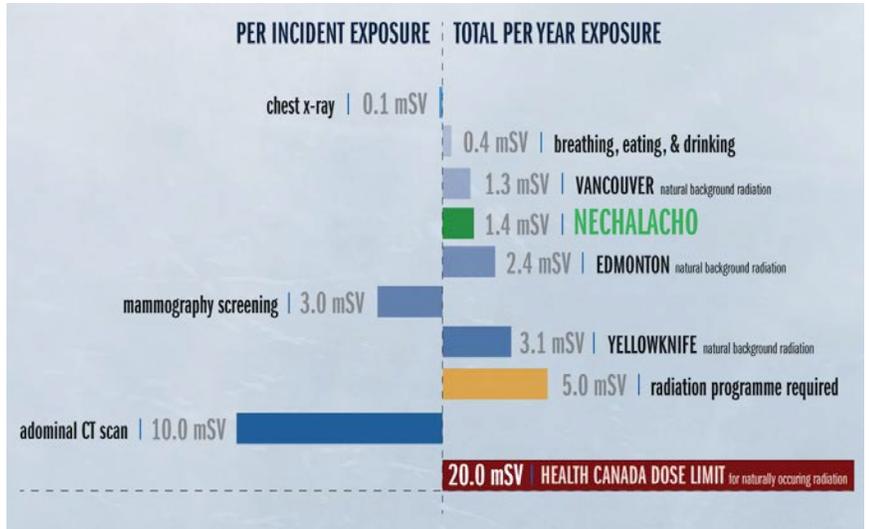
URANIUM AND THORIUM MANAGEMENT

All drill core samples and pilot plant metallurgical products are analyzed for uranium (U) and thorium (Th) which comprises over 50,000 analyses.

SENES Consultants Limited, one of the leading independent experts in energy, nuclear, and environmental sciences, noted in their 2010 pathways study report that there will be no short or long term concerns to the environment, workers, or communities from the Nechalacho Mine. Further study in 2013 confirmed the same results at Pine Point.

Although not required by regulation, Avalon will develop radiation protection programs for its operations to further reduce the potential risks to its workers.

The diagram to the right compares U and Th exposure at the Nechalacho Mine to major Canadian cities against regulation requirement levels



Comparing uranium and thorium exposure at the Nechalacho Mine to major Canadian cities and against regulation requirement levels



Nechalacho camp employee boating on Thor Lake



Solar panel unit at the Nechalacho camp



Mark Wiseman, VP Sustainability and Jim Andersen, CFO, taking the public bus in Ottawa

BARGING

Barging remains a concern of the local communities. Barging emergency response systems are well established, including recovery of lost cargo, and can be backed up with response capability by Avalon and the Coast Guard in the NWT.

PERMITTING

With Ministerial Approval of the Environmental Assessment now in hand, submissions to secure the necessary Land Use Permits and Water Licenses for the Nechalacho Project from the Mackenzie Valley Land and Water Board will be finalized. Avalon does not anticipate that these steps will cause any delays to its present construction schedule.

ENERGY

Highlights of some of the steps Avalon took toward optimizing and reducing its energy use:

- The fewer metres drilled in CY12 resulted in a decrease in diesel used. Avalon’s analysis of energy use showed that the lengths of the holes drilled were on average 21% deeper than in CY11. Avalon concluded that this increase in the average hole length resulted in a decrease of 3% in the average diesel use per metre drilled.
- Avalon introduced an initiative to reduce the number of flights into camp by utilizing the flights more efficiently. This resulted in a 59% decrease in aviation fuel use for FY13 when compared to FY12.

Avalon continues to explore options of using renewable energy sources and has been collecting wind and solar data since 2009.

Avalon is also looking to implement innovative camp facilities that are more energy efficient and maximizing opportunities to capture natural energy by strategically placing and aligning buildings. It’s also investigating the opportunity to grow a range of fruits and vegetables on site using greenhouse technology and waste heat generated. This will reduce energy demand for food that would have been shipped.

***In 2013, excellent progress was made in furthering Avalon's environmental management and permitting at the Nechalacho Project. A major permitting milestone was achieved with the favourable Report of Environmental Assessment from the Mackenzie Valley Environmental Impact Review Board.***

## WASTE AND SPILLS MANAGEMENT

Avalon did not have any significant chemical or fuel spills at the Nechalacho Project as defined by the Northwest Territories Regulations.

Despite containment berms at petroleum product storage and use areas, Avalon did have minor quantities of soil or ice that contained drips of petroleum products in CY12. This was dramatically reduced in FY13, though the quantity of drilling was also much lower. These were cleaned up and removed from site. All spills were recorded, regardless of how small. These records are available for inspection by the Land Use Inspector.



Drill core boxes built for Avalon by the Deninu K'ue Development Corporation of Fort Resolution

## BIODIVERSITY

There were no known impacts to the Species at Risk Act or International Union for Conservation of Nature listed species during the Reporting Period at the Nechalacho sites.

In late CY12, Avalon reduced the noise from its drills with improved muffling techniques, with only a minor reduction in drilling efficiency. Avalon also took steps to further reduce the potential for light disturbance from the drill camp by re-directing or changing existing lights.

In CY12, Avalon formally committed to working with Aboriginal and government agencies through attending both public technical review sessions and public hearings held in the NWT. In FY13, Avalon participated in a caribou management workshop with government, consultants, Aboriginal organizations, industry, and community members.

In CY13, Avalon formalized a Biodiversity Management Plan. In support of this, the Company also drafted a Wildlife and Wildlife Habitat Protection Plan and will be developing a Wildlife Effects Monitoring Plan in FY14.



Nechalacho employees removing empty barrels by barge

## WATER USE AND DISCHARGE

Camp water use in CY12 was estimated at 449,000 litres, or less than one litre per minute on an annualized basis. This was also well below the CY11 estimate of 650,000 - 900,000 litres. Much of this reduction was due to fewer people on site in CY12.

## DRILLING

Total water use for drilling at the Nechalacho site in CY12 was 16,250 cubic metres (16,250,000 litres), or an annualized rate of 31 litres per minute. The water consumed in drilling in CY12 was 739 litres per metre drilled, which compares with 550 litres per metre and 850 litres per metre in CY10 and CY11 respectively.

## CREATING GUIDELINES FOR AQUATIC LIFE

Avalon has developed conservative Canadian Council of Ministers of the Environment ("CCME")-like guidelines for the protection of aquatic life for all the rare earths. Avalon, adopting the CCME methodology, took the lowest effect level identified for each metal and divided it by 10 to develop these effluent guidelines. Avalon will measure and report its water quality performance against these, and existing Metal Mining Effluent Regulations and CCME guidelines.



Moose at the Nechalacho site

**ECONOMIC PERFORMANCE**

During the course of FY12, Avalon invested over \$45 million in expenditures, of which approximately \$32.9 million was capitalized expenditures on exploration and evaluation of assets, and property, plant, and equipment. Comparable numbers for FY13 were \$28 million total spent, with \$19 million of that number being capitalized expenditures. The non-capitalized expenditures in each year were directed towards employee and contractor employment (salaries, benefits, and stock based compensation), corporate donations, corporate and administrative expenses, and general exploration expenses.



Avalon donated to the activities during the 2012 Ekwo Carnival, Dettah, NWT

**ECONOMIC CONTRIBUTIONS**

In FY13, Avalon approved 15 donations out of 39 donation requests from the NWT. In FY12, Avalon approved 21 donations out of 43 donation requests from the NWT. The amount and type of donations are summarized in Table 5 on page 44 of the Report. Efforts to conserve limited resources in present market conditions resulted in a decrease in donations in FY13 from FY12.



Avalon contributed to six handgames events in FY12 and FY13 and sponsored the construction of bleachers for the Lutsel K'e Dene First Nation handgames tournament

**PROCUREMENT AND LOCAL HIRING**

Avalon has defined 'local' to be a good or service purchased within the province, state, or territory of each Project site. In order to be considered, all vendors are evaluated against the following criteria by Avalon:

- A commitment to health, safety and environment
- Ownership by / partnerships with Aboriginal businesses
- Relevant experience
- Solid reputation
- Meet product and service requirements
- Value

The table below shows the expenditure breakdown on the Nechalacho Project by vendor group in FY12 and FY13, with yearly comparisons from FY10. For the Reporting Period, the percentage of Aboriginal, local, and other workers at the Nechalacho exploration camp was 65% Aboriginal and 35% Non-Aboriginal. Total expenditures and the proportional percentage dropped in FY13 because the focus was on metallurgical testwork and feasibility and engineering studies (services that were not available in the NWT), rather than exploration drilling programs.

Avalon is committed to preferentially purchasing materials and services locally. As Avalon moves from advanced exploration to construction and operations for the Nechalacho Project, contracts will be given preference by the following priorities:

1. Vendors from Aboriginal partner communities
2. Vendors from the NWT
3. Vendors within Canada
4. Vendors outside Canada

Avalon will implement measures to include Aboriginal and NWT vendors in the Nechalacho Project. Measures include:

- identifying Project components at all stages of development and operations which can support Northern business development;
- facilitating subcontracting opportunities for Northern businesses;
- identifying and analyzing possible joint venture opportunities with Aboriginal and Northern businesses;
- providing technical support and assistance in accessing commercial capital;
- preparing annual business opportunities forecasts; and
- understanding opportunities for involvement need to be identified early enough to allow the local companies to prepare so they can meet Project requirements and have the best chance to participate.

Avalon regularly meets with Northern and Aboriginal businesses to understand how their businesses might contribute to the Nechalacho Project. These meetings also allow businesses to ask questions about potential opportunities associated with the Nechalacho Project. Avalon has worked with business associations and chambers of commerce to engage with Northern business communities. In FY13, Avalon established an Aboriginal Business Registry. Negotiated agreements with Aboriginal governments and organizations define businesses to be listed for preferential contracting opportunities.

Nechalacho Expenditures by Vendor Group (unaudited)								
	FY13		FY12		FY11		FY10	
	%	\$ Amount						
Aboriginal Vendors	6%	999,426	7%	2,123,233	14%	2,265,463	16%	1,963,078
Local Vendors	4%	610,138	6%	1,819,914	8%	1,294,550	11%	1,349,616
Other Vendors	90%	14,724,326	87%	26,388,749	78%	12,621,863	73%	8,956,542
TOTAL		16,333,890		30,331,895		16,181,875		12,269,235

NWT EDUCATION

Avalon works to encourage positive educational outcomes, particularly in the area of science. Avalon has connected members of its management team – biologists and geologists – with elementary and high school students. Avalon staff sit on the education outreach committee for the NWT Geoscience Forum. Avalon also participated with various NGOs, Aboriginal governments and organizations, and educational institutions that requested Avalon to participate in their educational initiatives throughout the Reporting Period.



Grade Four and Five students from the Deninu School experiment with magnetism while learning about rare earths

UNIVERSITY OUTREACH

Avalon staff continued to deliver lectures to undergraduate chemistry, metallurgy, mining, and geology classes as part of its ambitious University Outreach Initiative launched in 2011. Avalon sponsored student projects and case competitions, championed graduate-level technical and business seminars, as well as sponsored research projects. A full listing of university research projects can be found in the Report.



Dr. Frank Gu from the Waterloo Institute of Nanotechnology presents Avalon with a thank you letter from the Nano Engineering Class of 2016 for supporting the Grand Rare Earth Nano Challenge in 2011

INDUSTRY OUTREACH

Avalon chaired the organizing committee for the inaugural Rare Earth Symposium at the 51st Annual Conference of Metallurgists (“COM”). The Symposium, held in Niagara Falls, Ontario in September 2012, presented 44 peer-reviewed papers from nine countries. The program covered a wide range of subjects, including rare earth mineral and metal processing, advanced materials technologies, the environment, and recycling. Avalon was subsequently invited to chair the 2nd Rare Earth Symposium at COM13, which occurred in October 2013. The COM13 program included 54 peer-reviewed papers from 17 countries.

Avalon, working with Natural Resources Canada and a number of upstream and downstream REE companies, was instrumental in establishing CREEN. CREEN is an industry-led, multi-stakeholder network focused on supporting research and development leading to collaborative solutions that will advance Canada’s REE sector to produce and secure 20% of the global demand for separated critical rare earth products by 2018.

2014 GOALS AND OBJECTIVES

The operational goals and objectives made throughout the Report have been extracted and summarized below. Some of these goals are project process related and require certain phases and/or preceding-dependent targets to be completed before they can begin. For example, hiring of owners team and construction will not start without having secured project financing.

Goals and Objectives	Target Completion
<b>OVERALL CORPORATE</b>	
Work with industry, customers, and government to advance REE recycle initiatives	Initiate in 2014
Secure project financing for the Nechalacho Project	2014
Risk Assessment for Separation Rapids	2014
Update Risk Management Policy and Procedures	Every three years or upon significant change
<b>GOVERNANCE</b>	
Enhance and update HSE Policy to Sustainability Policy	2014
Draft Criminal Record Policy	2014
<b>PEOPLE</b>	
Target of Zero Harm	ASAP then Ongoing
Hold Public Meetings with communities of interest	2014
Information to Aboriginal partners given outside formal negotiation framework	2014
Reduction of employee turnover to 10%	2014
Conduct Employee Survey to create baseline for employee engagement and satisfaction	2014
Finalize and implement Anti-Harassment, Bullying, and Violence Policy	2014
100% of employees engage in professional development activities to grow capabilities	2014
Improve areas recognized in need of development from Employee Survey results	2014/2015
Increase female representation on the Board of Directors	2015
Improve leading indicators i.e. near miss reporting and follow up, inspections and hazard ID	Prior to construction start
Hire owner’s team	Prior to construction
<b>ENVIRONMENT</b>	
Ministerial approval of Nechalacho Environmental Assessment	FY13
More effective communications regarding radioactivity	2014
Develop a Wildlife Effects Monitoring Plan with input from Aboriginal partners	2014
Detailed barging plans to be completed and shared with Aboriginal partners	Prior to construction
Develop Emergency Response procedures in consultation with Aboriginal partners	Prior to construction
Systems to report barging activities	Prior to construction
Complete administrative details for measurement of waste management	Prior to construction
<b>ECONOMICS</b>	
Social economic agreement with GNWT	Prior to construction
Improve supplier and contractor management	Prior to construction

# NECHALACHO PROJECT FEASIBILITY STUDY OPTIMIZATION

In April 2013, Avalon announced results of its Feasibility Study for the Nechalacho Project. Since its release, the Company has been focusing on optimizing the Nechalacho Project development model. In August 2013, Avalon announced the optimization efficiencies of the Concentrator and hydrometallurgical process flowsheet the Company is evaluating. Optimization goals include lowering capital and operating costs, reducing environmental impacts, enhancing metallurgical recoveries, reducing risk, and improving overall operation efficiency. The foregoing work is essential to improving project economics in order to increase the investment fundamentals that are vital to attract funds to commence construction.

## ENVIRONMENT AND OPTIMIZATION

The integration of environmental issues and benefits has been central in the optimization of the Nechalacho Project. Potential improvements include:

### CONCENTRATOR:

A simplification of the reagent suite, improvements to flotation, and streamlining of the process resulting in improved recoveries and reduced environmental risk. This included:

- Improved grinding, which produces less fine material called slimes, eliminating the need for a de-slimes circuit and reduces energy use.
- Determining the gravity concentration circuit as unnecessary, thereby reducing capital, operating costs, and energy use.
- Developing a process to recover magnetite, improving the Project economics and a more sustainable use of the ore body by maximizing the recovery of contained metal.
- While confirmatory toxicity testing for water quality was ongoing at the end of the Reporting Period, only environmental improvements and reduction of environmental risk are anticipated.

### HYDROMET PROCESSING:

If the alternative optimized hydrometallurgical flowsheet is proven economically viable, it would increase recoveries for the heavy rare earths to over 90% and produce a high quality zirconium chemical by-product. The previous process identified in the Feasibility Study used sulphuric acid as a solvent and did not contemplate recovering this as separate saleable product. However, a consequence of utilizing this optimized flowsheet (which uses hydrochloric acid and caustic soda) is the potential need to locate the plant closer to supplies of these chemical reagents which are not readily available anywhere near the NWT.

Optimization of the Hydromet Process during the Reporting Period identified effluent quality and quantity. The tailing waste quality is not anticipated to significantly change. The quantity of waste may increase and the implications of this are currently being evaluated.

### REFINERY:

During FY13, additional baseline studies were completed at the Geismar site of the proposed rare earth Refinery in Louisiana. A Phase One Environmental Assessment was drafted, and the permitting process was initiated. This included an update of the wetlands assessment and an effluent discharge impact assessment. No significant impacts to the environment or impediments to the permitting process were identified.



Employees returning to the Nechalacho camp at Thor Lake, NWT

## AVALON'S VALUES

In FY12, Avalon strengthened its corporate vision, mission and values to better reflect the growing company. Below is an illustration of Avalon's Values. The pyramid is anchored in **Health and Safety** to show that people are our foundation and we care for people. Health and Safety is an integral part in everything we do and in every decision that is made. **Respect, Integrity,** and **Accountability** are the values representing who we are to and for one another, our Being. **Collaboration and Innovation** are the values representing how work will get done, our Doing. This is all topped off with **Results**, the measurable outcomes of who we are and what we do. Avalon's definition of each Value can be found in the Report.

