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QUEST RARE MINERALS LTD.

NI 43-101 TECHNICAL REPORT ON THE PRELIMINARY ECONOMIC ASSESSMENT (PEA) FOR THE STRANGE LAKE PROPERTY QUEBEC, CANADA

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1.0 SUMMARY

1.1 INTRODUCTION

Micon International Limited (Micon) has been retained by Quest Rare Minerals Ltd. (Quest) to compile the Technical Report under Canadian National Instrument 43-101 (NI 43-101) which discloses the results of the preliminary economic assessment (PEA), on Quest's Strange Lake Project (the Project).

The PEA has been completed to evaluate the potential economic and technical benefits of significant changes to the mining and processing aspects of the Project originally outlined in a prefeasibility study, the results of which were published in a NI 43-101 Technical Report dated 6 December, 2013 (Micon, 2013). By definition, the PEA can only indicate the potential viability of mineral resources and cannot be used to support mineral reserves.

The results of the PEA were summarized in a press release dated 9 April, 2014. The project is based on the mining and beneficiation of a rare earth element (REE)-rich deposit at Strange Lake in northern Québec, and processing a flotation concentrate at a facility at Bécancour in southern Québec. Processing will recover the rare earths and yttrium contained in the Strange Lake deposit as separated oxides.

This report is intended to be used by Quest subject to the terms and conditions of its agreement with Micon. That agreement permits Quest to file this report as a Technical Report with the Canadian Securities Administrators pursuant to provincial securities legislation. Except for the purposes legislated under provincial securities laws, any other use of this report, by any third party, is at that party's sole risk.

1.1.1 Rare Earth Elements

The rare earth elements (REE), a group of metals also known as the lanthanides, comprise the 15 elements in the periodic table with atomic numbers 57 to 71. Yttrium (Y), atomic number 39, is often included with the lanthanides since it has similar chemical and physical characteristics often occurs with them in nature.

The 15 lanthanide elements are divided into two groups. The 'light' elements (LREE) are those with atomic numbers 57 through 62 (lanthanum to samarium) and the 'heavy' elements (HREE) from 63 to 71 (europium to lutetium). The term 'middle rare earths' comprises those with atomic numbers 62 through 64 (samarium, europium and gadolinium, also referred to as SEG). Generally, the light rare earth elements are more common and more easily extracted than the so-called 'heavies'. In spite of its low atomic weight, yttrium has properties more similar to the heavy lanthanides and is included within this group. Promethium, atomic number 61, does not occur in nature. The rare earth element content of ores and products is generally expressed in terms of the oxide equivalent, or REO.

1.2 LOCATION AND PROPERTY DESCRIPTION

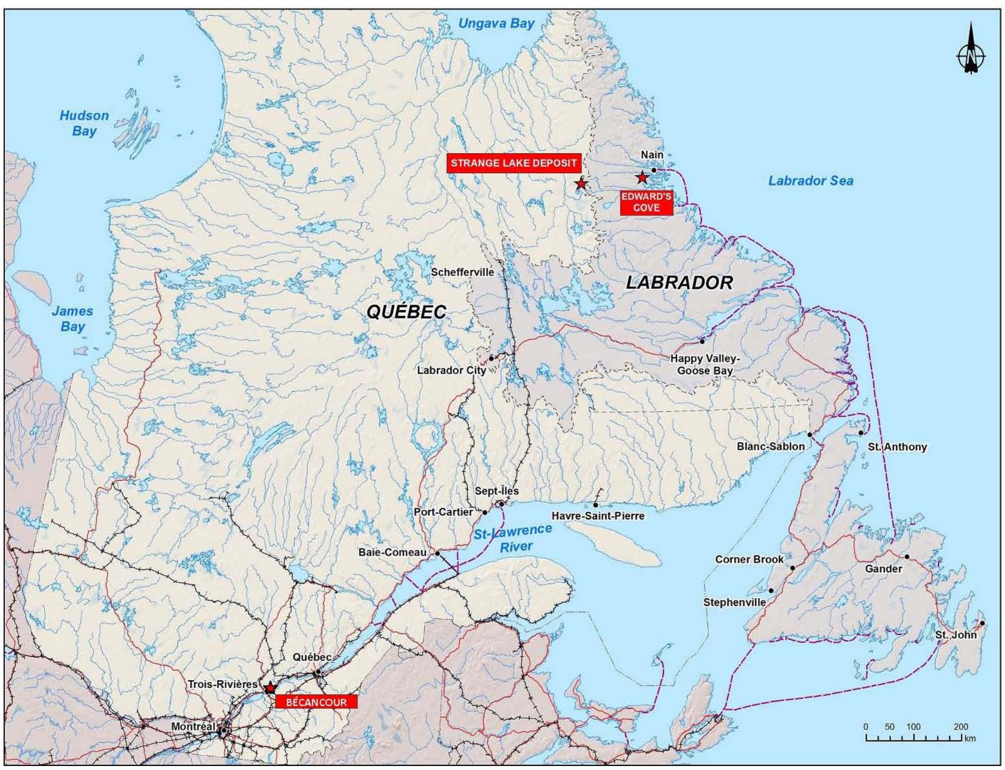
The Project is divided between two regional areas, these are:

1. Northern Project Area, comprising:
   - The mine site, beneficiation plant tailings management facility (TMF) at Strange Lake, Québec.
   - The port site at Edward's Cove, Newfoundland and Labrador.
   - The access road of about 170 km between the above sites.

2. Southern Project Area, situated at Bécancour Industrial Park, Québec comprising:
   - The Bécancour process plant site.
   - The process plant residue management facility (RMF).

See Figure 1.1 for locations of project facilities.

Figure 1.1
Strange Lake Project, Location of Mine Site, Port and Processing Facilities



1.2.1 Northern Project Area

The Strange Lake Property is situated on the provincial border between the Canadian provinces of Québec (QC) and Newfoundland and Labrador (NL). The Project is located on the southeast edge of Lac Brisson, approximately 235 km northeast of Schefferville, QC, approximately 150 km west of Nain, NL and 125 km west of the Voisey's Bay nickel-copper-cobalt mine, owned and operated by Vale. Administration for the region is covered by the Administrative Region of Nord-du-Québec and the Kativik Regional Government.

The Strange Lake Property is covered by Canadian National Topographic System (NTS) map sheets 24A08, 14D05, and 14D01. The latitude and longitude for the Property are approximately 56°21' N and 64°12' W, respectively.

1.2.2 Southern Project Area

The southern project area encompasses the proposed sites for the processing plant and residue management facilities (RMF) for the disposal of processing residue, located in the City of Bécancour, Québec. The facilities will be located in the Bécancour Waterfront Industrial Park, on the south shore of the St. Lawrence River, approximately 12 km southeast of Trois-Rivières and approximately 140 km northeast of Montreal. The site is located at 46°22'N, 72°17'W.

1.3 MINERAL CLAIMS, OWNERSHIP AND PERMITS

The Strange Lake Property is comprised of 534 individual mineral claims covering a total area of approximately 23,230 ha. A total of 404 of these claims are in Québec and 30 are located in Newfoundland and Labrador. Quest has been letting claims expire on the peripheral edges of the property as they are not material to the integrity of the property.

The mineral claims in Québec cover the B Zone and a portion of the Main Zone rare earth element (REE) deposits. The mineral claims in Newfoundland and Labrador cover an area immediately south of the Main Zone REE deposit, historically referred to as the A Zone by Iron Ore Mining Company of Canada (IOCC). Quest has informed Micon that all of the claims are current and there are no outstanding issues.

The mineral claims comprising the Strange Lake Project area around the B-Zone deposit are 100% owned by Quest. Quest has informed Micon that all of the mineral claims are free of NSR and other encumbrances except one claim CDC2123065 which has a 2% NSR. Claim CDC2123065 is located at approximately 1.2 km east of the B Zone deposit.

Quest has informed Micon that it has obtained all permits required to conduct exploration activities on the property.

1.4 HISTORY AND GEOLOGICAL SETTING

The Strange Lake project lies within the Paleoproterozoic Rae or Southeastern Churchill Province (SECP) located in the northeastern Canadian Shield of Québec and Labrador. The Strange Lake deposit is part of a post-tectonic, peralkaline granite complex which has intruded along the contact between older gneisses and monzonites of the Churchill Province of the Canadian Shield.

Mineralization of interest at Strange Lake occurs within peralkaline granite-hosted pegmatites and aplites and, to a lesser degree, within the host granites, particularly in intra-pegmatitic granites.

The Strange Lake Property has been covered by national and provincial government surveys between 1967 and 2009. In 1980, in partnership with the Geological Survey of Canada (GSC), the Newfoundland and Labrador Department of Mines and Energy, Mineral Development Division released a detailed lake sediment, water and radiometric survey. This survey was the first time the strong dispersion pattern of the Strange Lake mineralization was published and it led directly to the Iron Ore Company of Canada (IOCC) discovery of the Strange Lake Alkali Complex (SLAC) and associated REE and high field strength elements (HFSE) mineralization. Subsequent drilling up to 1984 culminated in the discovery of the Strange Lake REE and HFSE mineralization, which IOCC named the A Zone (renamed Main Zone by Quest).

Analytical data of ZrO_2 and Y_2O_3 obtained by IOCC from diamond drilling and bedrock mapping were used in the calculation of the younger alkali granite in the central part of the Strange Lake area, and aided in the identification of the second most anomalous zone of mineralization in the Strange Lake area, named the B Zone by IOCC.

Between 1980 and 2006, a succession of companies other than IOCC worked in the area or on the property encompassed by the current Strange Lake Property boundaries. In 2006, Freewest Resources Canada Inc. (Freewest) staked 23 non-contiguous claim blocks totalling 220,813 ha for the purpose of uranium exploration. In late 2007, Freewest transferred its George River Project claims to Quest. The Property is encompassed by Freewest's Block 1 exploration target and contiguous to Block 8.

In April 2010 Wardrop, a Tetra Tech Company, published a mineral resource estimate on the Strange Lake B Zone deposit in a NI 43-101 Technical Report. Wardrop also completed a PEA on the Project in September, 2010 and updated the mineral resource estimate in May, 2011.

The most recent and current mineral resource estimate with an effective date of 31 August, 2012 on the Strange Lake B zone deposit was published by Micon in December, 2012. Micon also completed a prefeasibility study on the Project in December, 2013.

1.5 MINERAL RESOURCE ESTIMATE

1.5.1 Resource Classification

Micon has assigned the resources in the B Zone deposit to the Indicated and Inferred classification on the basis of data density. At this time Micon has not assigned any Measured resources. The majority of the B Zone deposit has been drilled at a spacing of 50 m by 50 m with some areas drilled at 25 m by 50 m. At depth, the drill hole spacing becomes 200 m by 100 m since the majority of holes were drilled to less than 150 m depth. The Indicated class was assigned to all resource blocks which fall in areas with a drill spacing of at least 50 m by 50 m and were estimated using at least 16 samples from a minimum of four drill holes. All remaining resource blocks in the block model occurring within the optimized pit shell and with an estimated a grade greater than zero were assigned to the Inferred classification.

1.5.2 Resource Estimate

The mineral resources at B Zone occur near to surface and are amenable to conventional open pit mining methods. An economic cut-off base case grade of 0.5% TREO was considered appropriate for reporting the mineral resources.

Indicated Mineral Resources are estimated at 278.13 Mt at 0.93% TREO. Inferred Mineral Resources are estimated at 214.35 Mt at 0.85% TREO.

The effective date of the mineral resource estimate is August 31, 2012. The estimate was disclosed in the previously filed Technical Report dated December 14, 2012.

It is Micon's opinion that no known environmental, permitting, legal, title, taxation, socio-economic, marketing or political issues exist that would adversely affect the mineral resources presented above.

1.6 MINERAL RESERVE ESTIMATE

There is no mineral reserve. The present PEA can only indicate the potential viability of mineral resources and cannot be used to support mineral reserves.

1.7 MINING METHODS

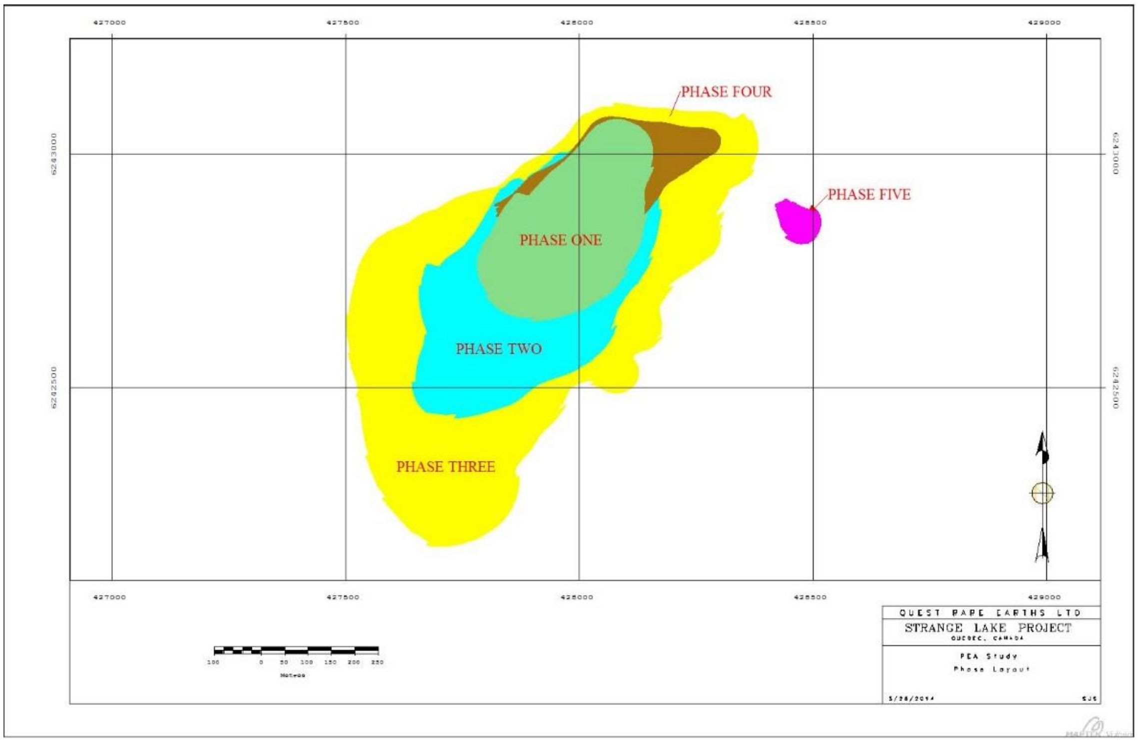
A conventional open pit mining operation is proposed for the extraction of mineralized material from the B Zone rare earth element mineral deposit for the Strange Lake Project.

Mining will be undertaken by Quest using its own equipment and workforce. Specialized contractors will be used for the initial site clearing and initial haul road construction in preparation for the mining equipment fleet. Explosives, blasting agents, fuel and other consumables will be sourced from established suppliers.

The Strange Lake Project resources are contained in a single deposit. The open pit and internal phases were designed using Vulcan software, preliminary geotechnical designs, recommended standards for road widths and minimum mining widths based on efficient operation for the size of mining equipment chosen for the project.

The ultimate pit limit for the Strange Lake deposit was selected based on Lerchs-Grossmann (LG) open pit optimizations using Whittle™ software. The pit will be developed using five distinct phases designed to approximate an optimal extraction sequence. The phase designs are based on slope design parameters and benching configurations provided by AMEC. A mine production schedule was prepared by Micon using Maptek's Chronos scheduling software. The five pit phases are shown in Figure 1.2.

Figure 1.2
Plan View of Pit Phases at 440 m Elevation



Pit designs were constrained by a 120-m offset from Lac Brisson which lies to the northwest.

The PEA mine design assumes a mine life of 34 years which completely exhausts the low grade stockpiled material. However, the PEA economic model assumes a 30 year life which results in 11.16 Mt low grade mined mineralization remaining in a stockpile.

Over the 34-y mine life, an estimated 4.77 Mt of overburden will be removed from the pit area. Total mineralized material mined is estimated at 57.30 Mt. Total waste rock placed in the waste stockpile is estimated to be 15.79 Mt.

In order to avoid the worst winter weather, the mine will be operated on a nine-month (270-day) basis. During this time period, the mine will operate two 12 h shifts, 7 d/w.

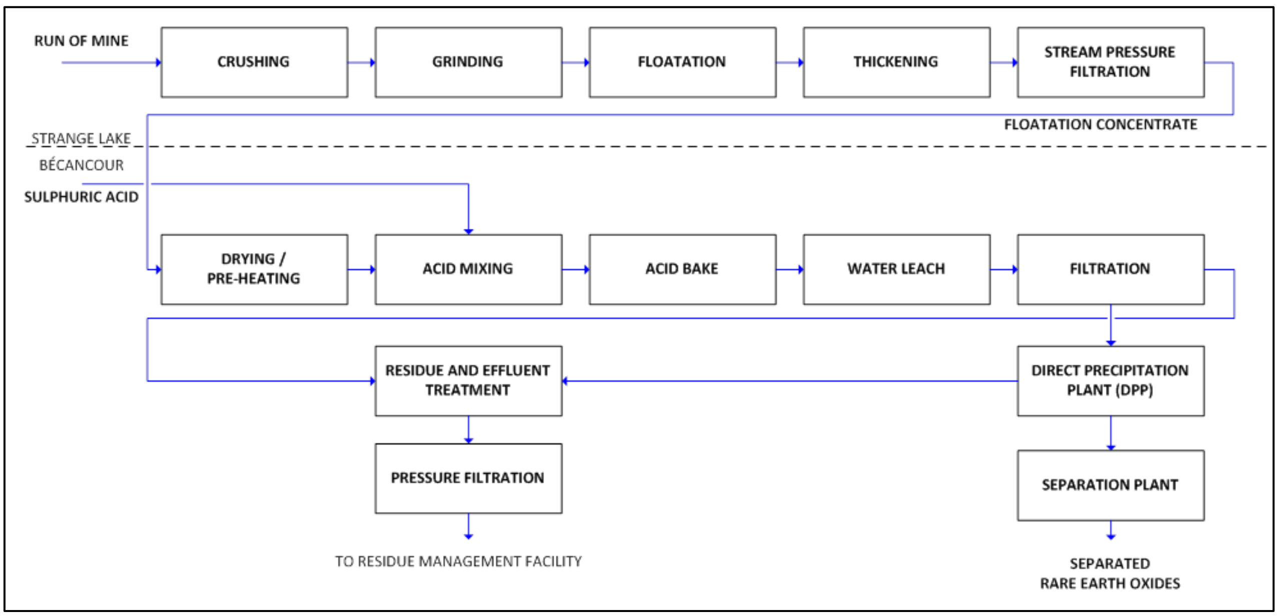
1.8 METALLURGICAL TESTWORK AND RECOVERY METHODS

Development testwork that forms the basis of the PEA process flowsheet and design was carried out primarily at SGS Lakefield Research, in Lakefield, Ontario. These testwork programs used representative mineralized samples from the Strange Lake B Zone deposit.

The PEA flowsheet comprises crushing, grinding and flotation that will be undertaken as the Strange Lake site, followed by further processing at a facility at Bécancour. Processing at Bécancour will include acid thermal processing (acid bake) and water leaching to extract the payable elements into solution followed by hydrometallurgical precipitation to recover the rare earth elements and yttrium into a mixed REE+Y concentrate. The REE+Y concentrate will be treated to recover individual rare earth and yttrium oxides.

A simplified process block diagram is presented in Figure 1.3.

Figure 1.3
Simplified Process Block Flow Diagram



The crushing, grinding and flotation processing facility at Strange Lake is designed to operate for 365 days per year at a design throughput of 1,346,000 t/y for the first 23 years of the mine life. A plant expansion will enable the processing of up to 3,170,000 t/y of lower grade stockpiled mineralized material from year 24 onwards to the end of planned production.

The average design throughput of the southern Quebec processing facility is 1,671 t/d of flotation concentrate. This facility is designed to operate for 365 days per year.

The average metal recoveries estimated from the metallurgical testwork are presented in Table 1.1. These recoveries were used for the mine optimization and in the PEA economic model.

Table 1.1
Average Project Metal Recoveries

Element	Flotation Yr 1-23 (%)	Flotation Yr 24-30 (%)	Leach Extraction (%)	Direct Precipitation Plant Recovery (%)	Separation Plant Recovery (%)	Recovery from Mine to Separated Oxide Yr 1-23 (%)
La	93%	60%	87%	95%	98%	75%
Ce	92%	59%	89%	94%	98%	76%
Pr	92%	58%	91%	94%	98%	77%
Nd	91%	56%	91%	94%	98%	77%
Sm	91%	54%	90%	93%	98%	75%
Eu	90%	51%	89%	93%	98%	73%
Gd	91%	52%	90%	94%	98%	75%
Tb	90%	52%	88%	93%	98%	72%
Dy	90%	52%	86%	92%	98%	70%
Ho	90%	51%	84%	92%	98%	68%
Er	89%	50%	83%	91%	98%	65%
Tm	88%	48%	81%	89%	98%	62%
Yb	87%	47%	80%	85%	98%	58%
Lu	86%	45%	79%	85%	98%	57%
Y	90%	51%	86%	94%	98%	71%

1.9 INFRASTRUCTURE

1.9.1 Northern Project Area

Facilities considered essential to support operations comprise an accommodation camp, a multi-functional building and a maintenance workshop building. Site access roads will link the mine and beneficiation plant with these buildings, mineralized material stockpiles, waste rock dump, ponds, landfill, and an airstrip.

1.9.1.1 Mine Site Water Supply and Sewage Treatment

Lac Brisson is expected to be the major source of fresh water, and esker SG-1 is also considered a potential source. More detailed analyses, particularly for radionucleides, will be required to confirm suitability of each source and, in line with best practice, all potable water will be treated before use.

Sewage treatment plant at the mine site will comprise a containerised, skid-mounted plant with septic and equalization tanks.

1.9.1.2 Fuel Storage and Distribution

Fuel storage at the mine will be for the equivalent of approximately three weeks of supply. This tank will be located in a bermed containment area; secondary containment will protect against leaks and spills. A further 13 weeks supply will be stored at the Edward's Cove port and delivered to the mine by road tanker as required.

A refuelling station will serve light and heavy vehicles.

The airstrip will be equipped with a 30 m^3 tank for the storage of aviation fuel to be used in case of emergency.

1.9.1.3 Power Supply

A power plant at the mine site will be equipped with a battery of diesel generators. A diesel power plants will also be installed at the port site. The airstrip will also have its own supply, provided by a 250 kW diesel generator.

1.9.1.4 Mine Site Buildings

A temporary construction camp will be located within the vicinity of the proposed mine site facilities. Permanent camp facilities will also be located within the vicinity of the mine site. The camp will be a modular design constructed to industry acceptable standards for long term, permanent site accommodation for mine operations personnel, with additional space for truck drivers and other visitors. Arctic corridors will be provided to link the buildings.

A multi-functional building will incorporate heated and non-heated warehouses, change-house, lockers, laundry facilities, medical and fire safety, laboratory, offices and meeting rooms for mine management and administration staff; garages for emergency vehicles, and associated emergency response equipment storage.

The main mine site maintenance shop will be part of the mine site maintenance and warehouse facility.

Heated and unheated storage at the mine site will be provided in the multifunctional building sufficient to store goods and equipment parts for use during the winter months.

1.9.1.5 Airstrip

The airport facility will be capable of operating 24 h/d, 365 d/y. The runway and taxiway will be constructed of gravel. A trailer will be used for the terminal building.

1.9.1.6 Medical Emergency Response

Medical and emergency response facilities will be provided at the multifunctional building at the mine site. An ambulance will be available and maintained in the ambulance bay of this building complex and a nurse's station will be provided at the mine permanent camp.

1.9.1.7 Waste Management and Landfill

Recoverable materials will be compacted on site, and sent to a sorting facility. Special waste will be sent to an authorized treatment/disposal facility. Kitchen/organic waste and other non-recyclable and non-hazardous domestic wastes will be despatched by road twice a week to the port site for incineration. A landfill to accommodate non-hazardous solid waste will be built along the access road between the airport and the open pit.

1.9.1.8 Tailings Management Facility

Residue from the flotation plant will be stored in the tailings management facility located at the mine site. In order to minimize any potential impact to the local environmental, the tailings will be thickened filtered and dry-stacked within a lined area.

1.9.1.9 Mine Access Road

The link between the port and the mine site will be an 8-m wide all-weather access road, constructed over a distance of about 170 km. The preferred alignment represents the shortest route; provides the fastest travel time for a roundtrip between the port and the mine site; and traverses less difficult topography than other routes considered in the study. The proposed route crosses three water courses; two culverts and a bridge will be required, and will meet seasonal caribou crossing requirements.

1.9.1.10 Edward’s Cove Port

A systematic analysis of various options for the location and design of a wharf resulted in the identification of Alternative 6 (Floating Wharf) as the preferred option, principally since this structure could be dismantled during the ice season, and potentially requires less capital.

As well as the marine works (wharf), on-shore infrastructure at the port includes ancillary facilities located 2 km from the shoreline. A temporary landing barge and airstrip will be required during the construction phase.

Concentrate will be delivered to the port in 30-t shipping containers. Container handling at Edward’s Cove varies depending on the season:

- When ships are at berth (summer operation) full containers will be delivered to the ship, and concentrate will be reclaimed by front end loader from the concentrate stockpile to fill empty containers unloaded from the ship.

- When there are no ships at berth (winter operation) lids will be removed from full containers which are then handled using a reach stacker equipped with a Rotabox, to empty the concentrate from the container into a mobile feed hopper. From here, a transfer conveyor and a stacker conveyor will feed the concentrate stockpile.

Empty containers will be loaded onto tractor trailers for back haul to the mine.

Fuel Handling and Storage

The fuel tank farm will be located near the wharf where tankers will be offloaded. Arctic diesel fuel will be pumped from the fuel tanker using the ships pumps, boosted as required through a pumping station located on the dock and delivered to the tank farm through a double walled pipeline system. The tanks will be placed within a bermed containment area. Secondary containment will protect against accidental leaks and spills. A foam-based fire protection system will be employed.

Road tankers will collect fuel from a filling station located between the tank farm and the access road to the mine site.

Port Area Facilities

In the port area, an accommodation camp, multi-functional building and warehouse will be established in the location used as a laydown area during construction.

At the commencement of project construction, a hotel barge or similar vessel will be used to house construction workers for the terminal. The permanent camp will be located approximately 2 km south of the wharf along the access road connecting the port with the mine. It will be of a pre-fabricated modular design, constructed to industry acceptable standards.

Water Supply, Treatment and Run-Off Management

Groundwater is believed to be the most cost-effective and convenient source for the modest volume of water supply required in the port area. Specific sources should to be identified and tested at the feasibility stage.

Wastewater treatment will be through skid-mounted, containerized sewage treatment plants.

The concentrate stockpile area will be fully bermed and lined with geomembrane to prevent absorption of water, and so will generate runoff proportionate to rainfall received.

Power Supply

After consideration of alternatives, the study concluded that both the port and its camp should be powered using medium speed diesel generators burning Arctic fuel. Approximately 85% of surplus heat energy will be recovered from the generators using a recovery system supplying heat to adjacent buildings.

1.9.1.11 Other Infrastructure

Communications (voice and data) from the Northern project area will be via a bi-directional satellite link, with local networks for on-site communications, supplemented by two-way radios and a satellite-based real time location system (RTLS) for vehicles travelling between the mine and the port.

1.9.2 Southern Project Area

1.9.2.1 Bécancour Port

The existing port and berth structures at Bécancour are adequate to receive vessels of the size required to deliver up to 610,000 t/y concentrate in containers. No marine works or modification of the port is envisaged in the PEA.

1.9.2.2 Bécancour Processing Plant

As well as the port facility, existing infrastructure supporting the processing of concentrate at the Bécancour plant includes the availability of utilities at the industrial park (industrial water supply, sewage disposal, electrical power and gas supplies). In addition, the industrial park is responsible for the provision of emergency (fire, medical) and waste management services.

1.9.2.3 Site Drainage

The concentrate stockpile area will be lined with a geomembrane to allow collection of all rainwater and a network of drains will deliver this runoff to a retention pond where solids will settle before the water is sent to the process plant.

1.9.2.4 Residues Management

As part of the December, 2013 PFS, SLR International Corporation (SLR) prepared a study that describes the nature of the process residues, and the selection of the method and location of residue disposal in southern Québec. SLR also provided conceptual designs for the residue management facility (RMF) with 30-year capacity at an average processing rate of 4,000 t/d. The SLR studies have been used as a basis for the PEA conceptual design and cost estimates for the process waste management facilities.

With production of the flotation concentrate at the Strange Lake site and a simplified hydrometallurgical process for the recovery of rare earths and yttrium, production of residues in the Bécancour processing facility will be smaller than envisaged in the PFS.

1.10 MARKET STUDIES AND CONTRACTS

Quest retained Roskill Consulting Group Limited (Roskill) to prepare an analysis of the markets for rare earths, zirconia and niobium based on the production level for the Strange

Lake project. Roskill interviewed a total of 31 companies representing the sectors of interest, located in North America, Europe and Asia. The report was updated for rare earths and niobium in January, 2013 and an update on rare earth pricing was prepared in August, 2013.

1.10.1 Rare Earth Elements and Yttrium

Rare earths and yttrium usually enter the market as chemical concentrates, oxides, metals or metal alloys. Most oxides are typically sold at purities of >99.9% REO and metals within the same range for total metal content.

China has dominated the global supply of rare earths since the mid-1990s after a rapid growth in rare earth output and, in 2012, is estimated to have accounted for 86% of global rare earth supply. Both production and exports of Chinese rare earths are controlled by the central government. Outside China, rare earths are produced in the United States, Russia and India, with relatively minor amounts also produced in Malaysia and Brazil.

Most LREEs are derived from bastnaesite and monazite, the majority from Inner Mongolia and Sichuan in China, but with increasing volumes from the Mountain Pass operation of Molycorp, Inc. (Molycorp) in the United States and the Mount Weld operation of Lynas Corporation Ltd. in Australia. Almost all HREEs are derived from ion adsorption clays that are found in a number of provinces in southern China. Production of HREEs in the rest of the world is expected to come principally from the minerals which occur in igneous alkaline or carbonatite intrusives.

The rare earths market is not a single entity and the individual elements have their own demand drivers. For example, neodymium and dysprosium are used mostly in magnets while the principal market for terbium and yttrium is in phosphors. High growth rates for the applications in which neodymium and HREEs are used emphasise the lack of connection between the natural occurrence of the rare earth elements and the ratios in which they are consumed. Inevitably, there will be periods in which some rare earth elements are in surplus while others are in deficit.

Roskill estimated that metallurgical applications, magnets and catalysts each accounted for approximately 20% of total demand for rare earths in 2012. Polishing compounds accounted for a further 15%. Ceramics, phosphors and glass each accounted for between 5% and 10% of the total with the balance in a wide range of relatively minor applications.

Global trends which have strongly influenced the demand for rare earths are miniaturization, particularly of consumer electronic devices, automotive emissions control and energy efficiency, coupled with the general shift of manufacturing away from the United States, Europe and Japan to China, South Korea and elsewhere. Demand for rare earths within China has grown significantly over the past 10 years. This reflects the extent of its increased manufacturing capability, specifically in a wide range of products which utilize rare earths.

1.10.2 Pricing

There is no terminal market for rare earth products and sales are arranged between buyer and seller.

Spot prices for the principal rare earth oxides, FOB China, are reported by Industrial Minerals, www.indmin.com, and prices for a full range of Chinese rare earth products are reported by Asian Metal, www.asianmetal.com and Metal-Pages Ltd., www.metal-pages.com.

Based on its assessment of the updated pricing outlook prepared by Roskill in August, 2013 and its own data collection and analysis, Quest prepared projections of prices for separated rare earth oxides.

1.10.3 Contracts

In July, 2013, Quest announced the signing of a non-binding letter of intent with TAM Ceramics Group of New York, LLC (TAM), under which TAM intends to purchase 100% of zirconium basic sulphate (ZBS) which, at the time, was envisaged would be produced from the Strange Lake project. Due to the change in Quest's flowsheet, ZBS will not be produced although the extraction of zirconium from the processing residues will be developed in the future. The letter of intent will be allowed to expire at the end of 2014.

Quest is pursuing opportunities for strategic alliances, tolling and off-take agreements.

At the time of writing, there are no other contracts or agreements in place.

1.11 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

Environmental work is being carried out with support from local Aboriginal partners and regional service providers to the greatest extent possible.

Quest reports that work on the Environmental Impact Assessment (EIA) for all project components will start early in 2014, following submission of a project description to the relevant government authorities. EIAs may be triggered in four jurisdictions: two in Québec (north and south), Newfoundland and Labrador (provincial and Nunatsiavut), and one with the federal government. Assuming some degree of harmonization between jurisdictions, the EIA studies and associated public consultations are expected to take approximately two years to complete. The EIA would be followed by a period of up to six months in which to obtain necessary environmental approvals prior to initiating construction.

Appropriate mitigation and monitoring plans are being considered by the project team to address unavoidable environmental impact of mining, including possible compensation scenarios for any net wildlife habitat loss and project closure reclamation.

It is understood that Quest has in hand all permits necessary to conduct exploration and prefeasibility study work. Permits and approvals will be sought once the project is released from the EIA process.

No potential environmental issues have been identified that may affect extraction of mineral reserves at Strange Lake and which cannot be mitigated through implementation of appropriate measures.

1.11.1 Baseline Studies

The Strange Lake Project has been divided into northern and southern areas for the purposes of environmental baseline studies. Baseline studies have been undertaken for all or part of the relevant project components located in northern Québec. For the southern Québec area, a desktop review of existing information was completed by spring 2013 followed by field investigations to collect baseline data. These baseline studies are currently being completed and other studies will be undertaken in spring and summer, 2014.

Baseline studies in both northern and southern areas are broadly similar in scope and include physical, biological and social/socio-economic components (covering traditional knowledge and archeological surveys).

Ongoing environmental monitoring and reporting are conditions of both federal and provincial environmental assessment approvals, as well as certain operating permits. The EIA process will provide the basis for a monitoring program.

1.11.2 Closure Plan

A conceptual closure plan was developed for the December, 2013 PFS to cover all of the project components in the northern and southern areas. Quest will comply with the Québec Mining Act and its associated regulations, as well as with similar standards in Newfoundland and Labrador. Companies are required to file a site rehabilitation plan and to provide financial guarantees in both provinces. The PEA assumes that the conceptual closure plans developed for the PFS still apply.

The conceptual closure plan follows the 1997 Québec guidelines to restore the mine site to a satisfactory condition. It assumes that the future land use in the northern project area is wildlife habitat and that disturbed areas will be returned to the pre-mining state so that traditional activities can resume. Alternative land uses may be explored as more information is available regarding stakeholder expectations. It is assumed that progressive rehabilitation will not be carried out during operations, mainly because the entire open pit will continue to be developed and the road/port used during the life of the mine. An allowance of 10 years for post-closure monitoring has been made for data collection and analysis to demonstrate achievement of the closure criteria and objectives.

It is assumed that future use for the Bécancour site will continue to be industrial.

No post-closure monitoring for the processing plant area is anticipated. Post-closure monitoring and maintenance for the RMF was developed for the December, PFS. The approach remains applicable to the PEA.

A closure risk register summarizing proposed conceptual closure plan treatments and associated residual risks has been developed.

1.11.3 Engagement and Communications

General issues affecting all stakeholder categories will be addressed through the EIA and consultation processes. An Engagement and Communications Plan (ECP) has been developed to establish social acceptance for the project based on defined engagement levels. The ECP will support future project development activities. It is structured around consultation with governments, Aboriginal groups and non-aboriginal stakeholders. The ECP has been designed to ensure key stakeholders are well informed and have ongoing opportunities to engage in discussion about the project, and for their concerns and interests to be addressed. The ECP is designed to fulfill the requirements of the different jurisdictions for local review and consultation.

Quest initiated early meetings with certain northern Aboriginal leaders in 2008. A series of strategic meetings was undertaken in 2012 to provide all key groups with similar levels of information and a comparable opportunity to ask questions and comment on the initial project concept. In January 2013, draft Memoranda of Understanding were presented to potentially-affected Aboriginal groups, to serve as a basis for negotiations to commence in 2014 on Impact and Benefit Agreements (IBA) or other similar arrangements. The current schedule anticipates resolution by early 2016, which will facilitate the federal government’s own requirement to consult with Aboriginal groups before issuing environmental approvals. Both Aboriginal and government stakeholders have been provided with regular updates on the progress of both environmental studies and community engagement.

In southern Québec, a preliminary evaluation of potential social and cultural issues was carried out through a desktop review. No direct consultations have yet been held since the project components in the southern project area were publically announced only early-November, 2013. Socio-economic baseline studies and stakeholder mapping exercises have been carried out. A review was also completed of the issues and concerns raised by economic and environmental citizen groups and NGOs during the development of other industrial developments around the area in the last decade.

1.12 CAPITAL AND OPERATING COSTS

1.12.1 Capital Costs

One of the primary objectives of the PEA was to achieve a capital cost estimate with a target accuracy of better than ±35%, for the mine site, port site, access road and processing plant site, including indirect and Owner’s costs.

To achieve this objective, the majority of the direct capital cost items were estimated from engineering designs and costs available, based on work Quest completed for the PFS. Available capital cost information was appropriately factored and adjusted to estimate the direct capital cost for the revised project plan. For the mine, port, and access road, preliminary design information was used to develop material take offs which were priced at current day rates. There are no changes to the port and access road from what is presented in the PFS. . The indirect costs were calculated on the basis of conceptual methodology of executing the projects to estimate time and resources required, and vendor quotations. For some components, percentages were considered more appropriate and were based on experience.

The total estimated capital cost for the project in 2nd/3rd quarter 2013 is CAD$1,631 million including an itemized contingency applied to direct and indirect costs. Certain areas unchanged from the PFS retained the PFS contingency while new estimates for the PEA have a contingency of 25% applied. The separation plant has a contingency built into its estimate. A summary of the capital cost is included in Table 1.2.

Table 1.2
Summary of Capital Cost Estimate

Area	Capital Cost ($M)
Strange Lake Mine Site	201.0
Mine Access Road	228.3
Edward's Cove Port	52.8
Bécancour Process Plant	127.4
Bécancour Direct Precipitation	72.6
Bécancour Balance of Plant	88.6
Bécancour Residue Disposal Site	41.1
Becancour Separation / Refinery	190.4
Indirect Costs	407.0
Contingency	221.4
Total	**1,631.0**

The capital cost estimate was prepared by Quest and Micon, primarily based on factorization of existing cost estimates (completed by AECOM, Hatch and SLR for Quest's 2013 PFS) to reflect the updated project scope.

1.12.1.1 Sustaining Capital Costs

Sustaining capital is the investment required to maintain production at the planned level throughout the 30 year project life. The sum total over the 30 years is estimated at $529 million.

1.12.2 Operating Costs

Table 1.3 shows a summary of the estimated LOM operating costs.

Table 1.3
Summary of Operating Cost Estimate

Area	LOM Operating Cost ($M)	Avg. Annual Cost ($M)	Unit Operating Cost ($/t milled)	Unit Operating Cost ($/t flotation concentrate)	Unit Operating Cost ($/t production)
Mining	654	21.8	14.18	38.38	2,092
Beneficiation	1,002	33.4	21.71	58.77	3,203
Concentrate transport	1,625	54.2	35.23	95.37	5,198
Processing	6,595	219.8	142.95	386.96	21,092
G&A (site costs)	315	10.5	6.84	18.50	1,009
Off-site costs	519	17.3	11.24	30.44	1,659
Total	**10,710**	**357**	**232.15**	**628.42**	**34,254**

The costs presented above include all on-site and off-site cash costs, but exclude post closure rehabilitation costs and non-cash depreciation charges.

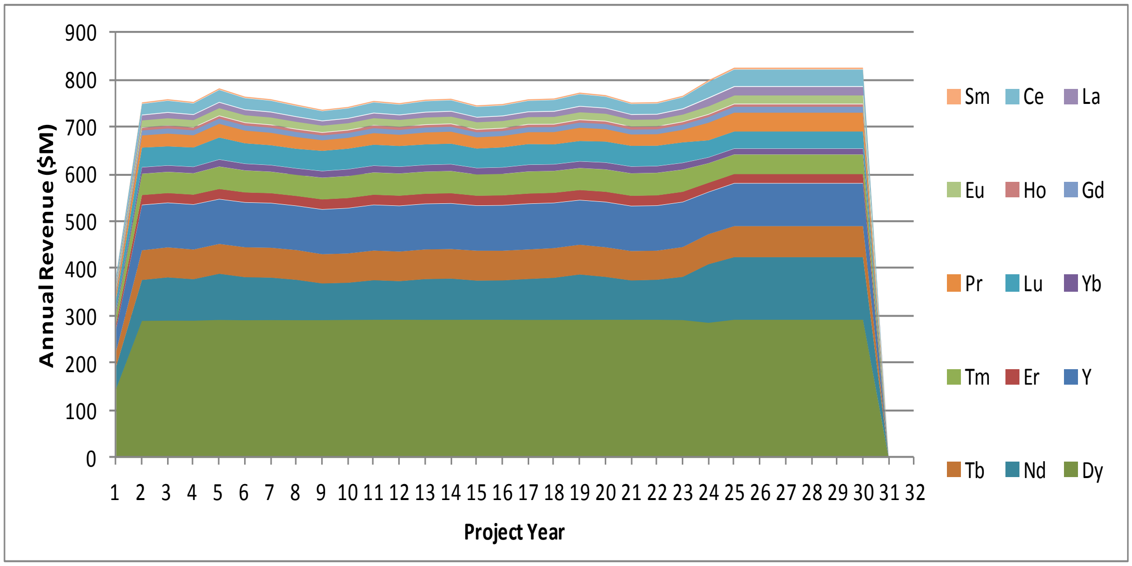
1.13 Economic Analysis

Assessment of the economic viability of the project, including testing of the sensitivity of returns to changes in key parameters, has been carried out using a discounted cash flow model. For the purposes of the evaluation, it has been assumed that the operations are established within a single corporate entity. The project has been evaluated on an unlevered, all-equity basis.

The model uses inputs from all elements of the project to provide a comprehensive financial projection for the entire project, on an annual basis over a 30-year operating life. All costs and revenues are expressed in constant, 2013 Canadian dollars. Where appropriate, an exchange rate of $1.05 per US dollar has been applied.

Annual revenues by element are shown in Figure 1.4 which how the project focuses on producing a relatively constant supply of individual rare earth products throughout the mine life.

Figure 1.4
Annual Revenues by Element

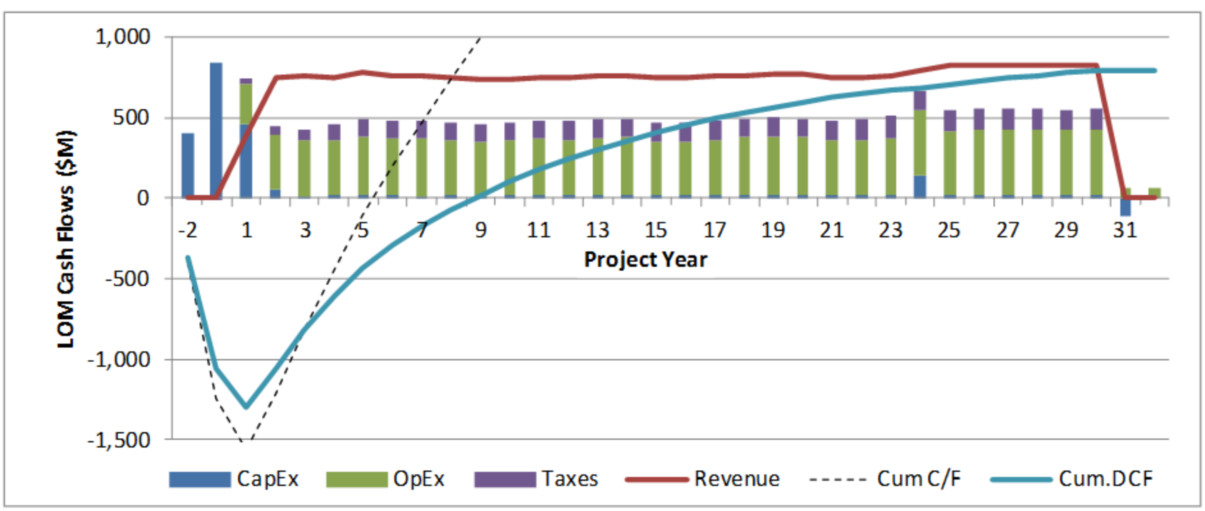


Over the life of the operation, 42% of annual REO production and 78% of total project revenues will be derived from the HREE+Y concentrate.

1.13.1 Cash Flow Projection

The project cash flow is illustrated in Figure 1.5.

Figure 1.5
LOM Project Cash Flow



The net present value (NPV) over a range of discount rates, internal rate of return (IRR) and undiscounted payback of the base case cash flow are shown in Table 1.4.

Table 1.4
LOM Income Statement and Cash Flow

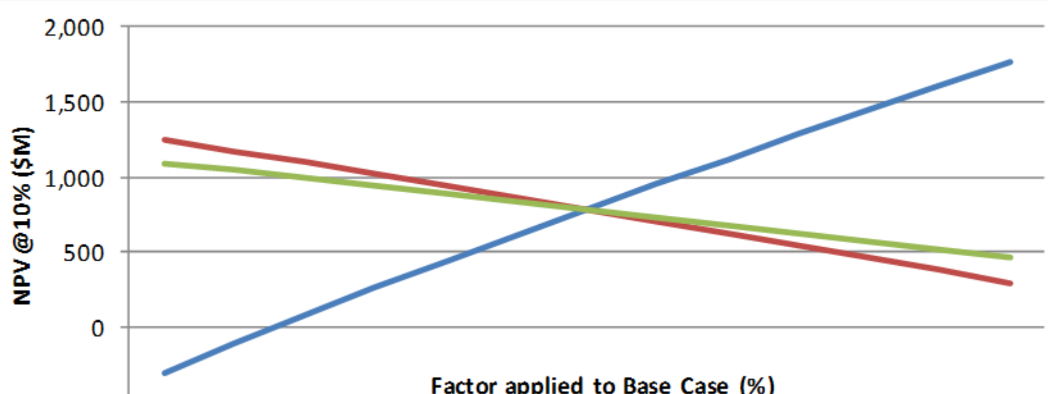
Discount Rate (%)	Pre-Tax NPV ($M)	After-tax NPV ($M)
8%	2,072	1,236
10%	**1,416**	**788**
12%	947	465
IRR (%)	20.1	16.7
Payback period (y)	5.0	5.3

Micon considers that a discount rate of 10%/y to be appropriate for use as its base case for the purposes of conducting further analysis of project value.

1.13.2 Sensitivity Study

Micon has tested the sensitivity of the project after-tax NPV at an annual discount rate of 10% (NPV_{10}) to changes in the principal drivers of project value over a range of 30% above and below base case parameters. The results, shown in Figure 1.6, demonstrate that after-tax NPV_{10} remains positive even with a 20% adverse change in project revenues, representing any combination of grade, yield, market prices and discount factors.

Figure 1.6
Sensitivity Study Results



	70%	75%	80%	85%	90%	95%	100%	105%	110%	115%	120%	125%	130%
Prices	-297	-98	88	268	443	617	788	955	1,120	1,283	1,445	1,606	1,766
Opex	1,248	1,173	1,097	1,021	944	867	788	708	626	545	463	380	297
Capex	1,093	1,043	993	942	892	840	788	735	682	627	573	518	463

The project is significantly less sensitive to changes in operating and capital costs, with an adverse 30% change reducing NPV_{10} by approximately 62% and 41%, respectively.

1.13.3 Conclusion

Micon concludes that the project base case cash flow and sensitivity studies demonstrate that the project has potential to provide economic returns and is sufficiently robust to withstand adverse changes in the tested parameters over the expected range of accuracy of the PEA.

1.14 OTHER RELEVANT DATA AND INFORMATION

1.14.1 Project Development Schedule

Quest has set out the following milestones and dates for the development schedule for the Strange Lake Project. It can be seen that, within the overall project development schedule, the schedule for submission of documentation relating to the EIA and the receipt of approval of the EIA are critical to the start of construction in January, 2017.

Submission of EIA project description	:	September, 2014
Start feasibility study	:	October, 2014
Start detailed design and engineering	:	January, 2015
Submission of EIA report	:	Nov, 2015
Approval of EIA	:	December, 2016
Delivery of construction permits	:	January, 2017
Start of construction	:	January, 2017
First concentrate shipment	:	April, 2019
Bécancour plant start-up	:	May, 2019

1.14.2 Risk Register

A project risk register was developed during the PFS (December, 2013) to assess risks and develop management or mitigation measures for the project. Seven critical risk items were identified, which had assigned preventive and mitigation measures.

It was noted that the minority of these identified critical risk factors relates to strictly technical issues , the remainder generally relate to environmental and/or social issues. Risks to project development associated with exposure to radioactive elements are likely to have greater impact on project activities in southern Québec.

The risk register will be updated during the feasibility study stage which will allow preventive and mitigation measures to be identified in greater detail.

1.15 INTERPRETATION AND CONCLUSIONS

The PEA has been completed to evaluate the potential economic and technical benefits of significant changes to the mining and processing aspects of the Project originally outlined in a prefeasibility study (PFS), the results of which were published in a NI 43-101 Technical Report dated 6 December, 2013 (Micon, 2013). By definition, the PEA can only indicate the potential viability of mineral resources and cannot be used to support mineral reserves.

A PEA for the Strange Lake Project, which is based on the mining and beneficiation of a REE-rich deposit at Strange Lake in northern Québec and processing at a facility at Bécancour in southern Québec, will recover individual pure rare earth oxides.

Table 1.5 presents the key project parameters, based on 100% equity financing.

Table 1.5
Key Project Parameters

Parameter	Units	Quantity
Pre-tax economics		
IRR	%	20.1
NPV_{10}	$ million	1,416
Payback period	y	5.0
After-tax economics		
IRR	%	16.7
NPV_{10}	$ million	1,236
Payback period	y	5.3
Mining		
Average mining rate (years 1 to 23)	Mt	3.354
Production rate (years 1 to 23)	Mt/y plant feed	1.045
Mine production life	y	30
Total revenue	**$ million/y**	**758**
Operating costs	**$ million/y**	**357**
Unit operating cost	**$/t milled**	**232**

1.16 RECOMMENDATIONS

The PEA study shows that for the selected base case the Project has the potential to provide positive economic returns and is sufficiently robust to withstand adverse changes in the tested parameters over the expected range of accuracy of the study. It is Micon's recommendation that the project development continues towards the feasibility level, which includes work necessary to optimize and define each area and the work required to prepare capital and operating cost estimates with an accuracy of +/-15%.

It is also recommended that the work required to advance the project approval process continue. This includes fieldwork and studies associated with the environmental impact assessments (EIA) for various jurisdictions, environmental authorizations, permits and licences, non-environmental permitting; and community relations.

1.16.1 Budget for Ongoing Work

As shown in Table 1.6, Quest has budgeted a total of $14.30 million for work on the Strange Lake Project to the end of 2014 by which time results of pilot plant studies will have been generated, substantial work on the EIA will have been completed. This will allow the company to determine details for the project feasibility study.

Table 1.6
Budget for Ongoing Work

Description	$M
Project optimization	5.0
Integrated pilot plant and demonstration plants	7.7
EIA	0.9
Project management team	0.7
Total	**14.3**

Micon has reviewed the proposed budget and considers that it is reasonable and appropriate.

2.0 INTRODUCTION

2.1 SCOPE OF WORK AND TERMS OF REFERENCE

Micon International Limited (Micon) has been retained by Quest Rare Minerals Ltd. (Quest) to compile the Technical Report under Canadian National Instrument 43-101 (NI 43-101) which discloses the results of a preliminary economic assessment (PEA) on Quest's Strange Lake Project (the Project).

The PEA has been completed to evaluate the potential economic and technical benefits of significant changes to the mining and processing aspects of the Project originally outlined in a prefeasibility study (PFS), the results of which were published in a NI 43-101 Technical Report dated 6 December, 2013 (Micon, 2013). By definition, the PEA can only indicate the potential viability of mineral resources and cannot be used to support mineral reserves.

The changes to the Project included in the PEA compared to the December, 2013 PFS, comprise the following:

- Revised mine optimization strategy.
- Significantly lower mining rate.
- Inclusion of a beneficiation plant at the project site.
- New tailings management facility at the mine site.
- Transportation of flotation concentrate rather than mined material to a processing facility in southern Quebec.
- Simplified and less expensive process to recover rare earths and yttrium.
- Inclusion of a rare earth separation plant.

Where possible, cost estimates have been adjusted and factorized from the PFS. In the case of new items, such as the flotation plant and the rare earth separation facility, a new estimate has been prepared to a PEA level of accuracy.

The results of the PEA were summarized in a press release dated 9 April, 2014. The project is based on the mining and beneficiation of a rare earth element (REE)-rich deposit at Strange Lake in northern Québec and processing a flotation concentrate at a facility at Bécancour in southern Québec. Processing will recover the rare earths and yttrium as separated oxides.

All of the mineral claims for the Strange Lake project are 100% owned by Quest.

2.1.1 Scope of the PEA

The Strange Lake mine and processing plant comprise the following principal components:

- Strange Lake site in northern Québec which includes:

- Conventional open pit mine based on the B Zone of the Strange Lake Alkali Complex and with an average production rate of 1.06 Mt/y mineralized material for the first 23 years of production.

- Crushing facilities and beneficiation plant at the mine site with a design production capacity of 610,000 dry t/y of flotation concentrate.

- Flotation tailings storage facility.

- Road from Strange Lake to proposed port site at Edward's Cove, Newfoundland, approximately 170 km long.

- Port facilities at Edward's Cove.

- Processing plant site at Bécancour, southern Québec which includes:

  - Concentrate receiving facilities and stockpile.

  - Pyrometallurgical and hydrometallurgical facilities.
  - Residue management facility (RMF).
  - Administration facilities.

The locations of the principal project components are shown in Figure 2.1.

Capital cost estimates for the PEA were completed to an intended level of accuracy of ±35%, based on prices as of fourth quarter, 2013/first quarter, 2014, and exclude escalation. Operating cost estimates were completed to an intended level of accuracy of ±20%, based on prices as of fourth quarter, 2013.

2.2 QUALIFIED PERSONS AND SITE VISITS

The Qualified Persons (QPs) for this Technical Report are the following:

- Richard Gowans, P.Eng.: metallurgical testwork and processing, processing capital, operating cost estimates, infrastructure and economic evaluation.

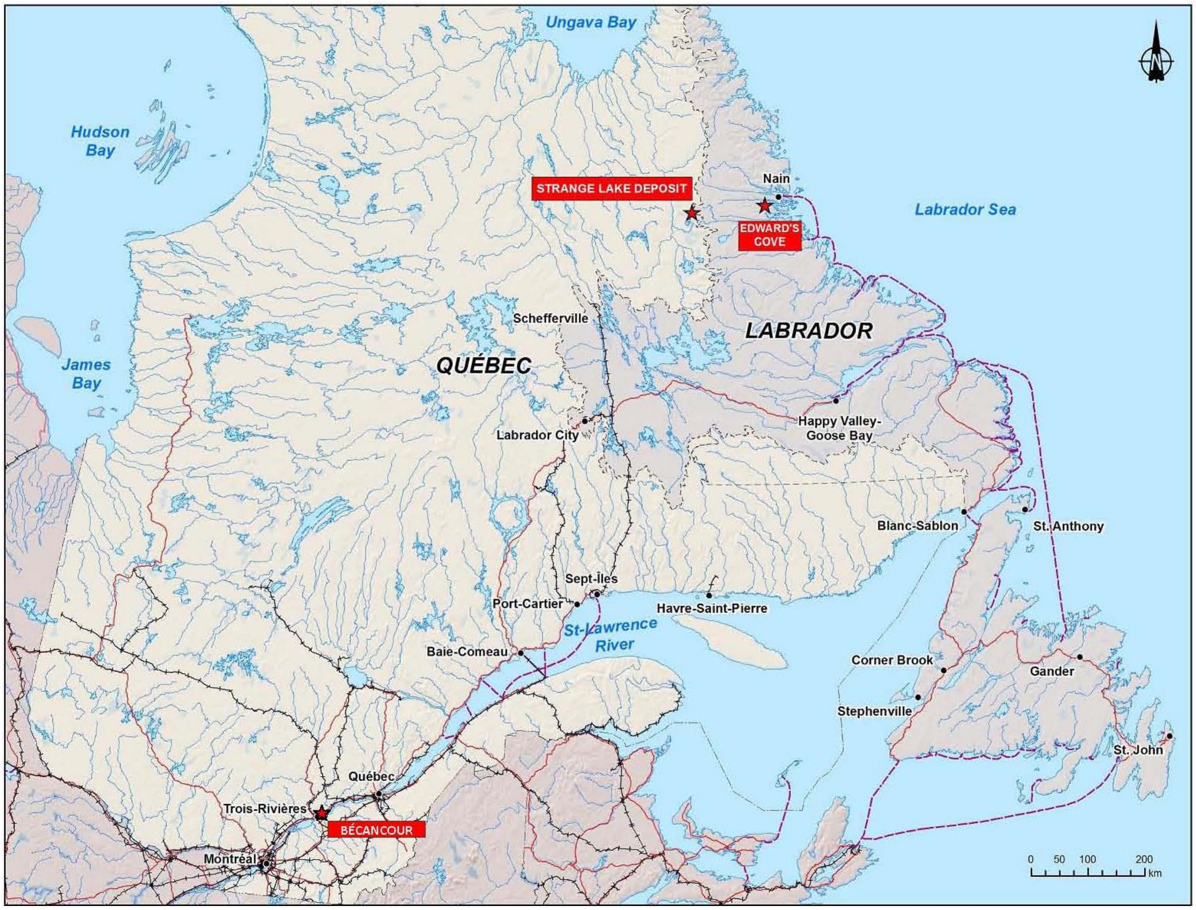
- William Lewis, P.Geo.: geology, mineral resource estimate and all aspects of the resource database.

- Sam Shoemaker, Jr., Reg.Mem.SME: mining and mineral reserve estimate, mine capital and operating cost estimates.

- Jane Spooner, P.Geo.: market analysis.

- Rimant (Ray) Zalnieriunas, B.Sc. (Hon), P.Geo.: sample preparation and QA/QC.

Figure 2.1
Strange Lake Project, Location of Mine Site, Port and Processing Facilities



Micon December, 2013 Technical Report..

Site visits to the Strange Lake property have been carried out on the following dates:

- William Lewis: March 26 and 29, 2012.
- Ray Zalnieriunas: July 3 to 6, 2011, August 14 to 25, 2011 and March 27 to 28, 2012. Mr. Zalnieriunas also visited the commercial sample preparation laboratory at Goose Bay, Newfoundland, during the period December, 2011 to January, 2012.

2.3 PREVIOUS TECHNICAL REPORTS

The results from a prefeasibility study on the Project were reported by Micon in the NI 43-101 Technical Report issued on December 6, 2013, entitled NI 43-101 Technical Report on the Pre-Feasibility Study for the Strange Lake Property, Quebec, Canada, with an effective date of 23 October, 2013 (Micon, 2013).

The Strange Lake B Zone mineral resources on which the PEA is based were most recently reported by Micon in the NI 43-101 Technical Report issued on December 14, 2012, entitled Technical Report for the Strange Lake B Zone Rare Earth Element (REE) Deposit, Québec, Canada, Updated Mineral Resource Estimate with an effective date of 31 August, 2012 (Micon, 2012).

A previous mineral resource estimate was prepared by Wardrop, a Tetra Tech Company (Wardrop) in the NI 43-101 Technical Report entitled Strange Lake B Zone Resource Model Update with an effective date of May 25, 2011, (Wardrop 2011). An earlier resource estimate was described in Wardrop Technical Report dated April 16, 2010, (Wardrop 2010a).

A preliminary economic assessment (PEA) was completed on the Strange Lake Project the results of which were disclosed in a Technical Report dated September 24, 2010, (Wardrop 2010b).

These reports can be accessed from SEDAR's electronic database http://www.sedar.com.

2.4 USE OF REPORT

This report is intended to be used by Quest subject to the terms and conditions of its agreement with Micon. Subject to the authors' consent, that agreement permits Quest to file this report as a Canadian National Instrument 43-101 (NI 43-101) Technical Report on SEDAR (www.sedar.com) pursuant to Canadian provincial securities legislation. Except for the purposes legislated under provincial securities laws, any other use of this report, by any third party, is at that party's sole risk.

The requirements of electronic document filing on SEDAR necessitate the submission of this report as an unlocked, editable pdf (portable document format) file. Micon accepts no responsibility for any changes made to the file after it leaves its control.

The conclusions and recommendations in this report reflect the authors' best judgment in light of the information available to them at the time of writing. The authors and Micon reserve the right, but will not be obliged, to revise this report and conclusions if additional information becomes known to them subsequent to the date of this report. Use of this report acknowledges acceptance of the foregoing conditions.

2.5 ACKNOWLEDGEMENT AND RELATIONSHIP WITH QUEST

Micon does not have, nor has it previously had, any material interest in Quest or related entities. The relationship with Quest is solely a professional association between the client and the independent consultant. This report is prepared in return for fees based upon agreed commercial rates and the payment of these fees is in no way contingent on the results of this report.

2.6 FORWARD-LOOKING INFORMATION

This Technical Report discloses the results of the prefeasibility study on the Strange Lake project and contains forward-looking information relating to metal recoveries, mine life and production rates, metal price assumptions, estimated capital and operating costs and cash flow projections. There is no assurance that the results will be realized.

2.7 UNITS AND ABBREVIATIONS

Cost estimates and other inputs to the cash flow model for the project have been prepared using constant money terms, i.e., without provision for escalation or inflation. All costs are presented in Canadian dollars ($, CAD), unless otherwise noted. Prices for rare earth products are given in United States dollars (US$).

This report includes technical information which requires subsequent calculations or estimates to derive sub-totals, totals and weighted averages. Such calculations or estimations inherently involve a degree of rounding and consequently introduce a margin of error. Where these occur, Micon does not consider them to be material.

All currency amounts are stated in Canadian dollars, or as specified, with commodity prices typically expressed in US dollars (US$). Unless otherwise noted, quantities are stated in Système International d'Unités (SI) units, the standard Canadian and international practice, including metric tonnes (tonnes, t) and kilograms (kg) for weight, kilometres (km) or metres (m) for distance, and hectares (ha) for area. Wherever applicable, any Imperial units of measure encountered have been converted to metric units for reporting consistency.

The CAD:US$ exchange rate assumption used in the financial analysis was based on that of November, 2013.

References to TREO, unless otherwise stated, include Y_2O_3.

Table 2.1 provides a list of the abbreviations used in this report.

Table 2.1
List of Abbreviations

Name	Abbreviations
Acadia Mineral Ventures Ltd.	Acadia
Ammonia	NH_4
Ammonium hydroxide	NH_4OH
Ammonium nitrate fuel oil	ANFO
Armco Mineral Exploration Ltd.	AME
Beryllium	Be

Name	Abbreviations
Beryllium oxide	BeO
Becquerel per cubic metre (radon)	Bq/m^3
BQ 'thin-kerf' (drill size)	BQTX
BQ 'thin-wall' (drill size)	BTW
Calcium	Ca
Calcium fluoride	CaF_2
Canadian Institute of Mining, Metallurgy and Petroleum	CIM
Canadian Environmental Assessment Agency	CEAA
Canadian National Instrument 43-101	NI 43-101
Canadian National Topographic System	NTS
Canadian Nuclear Safety Commission	CNSC
Centimetre(s)	cm
Cubic metre(s)	m^3
Day(s)	d
Days per year	d/y
Dead weight tonnes	DWT
Decibel with A weighted filter	dBA
Degree(s)	^{o}
Degrees Celsius	^oC
Department of Fisheries and Oceans (federal)	DFO
Digital elevation model	DEM
Dollar(s), Canadian and US	$, Cdn$ and US$
Electromagnetic	EM
Engineering, procurement and construction management	EPCM
Environmental Impact Assessment	EIA
Environmental Management Plan	EMP
Europium	Eu
Exempt Mineral Lands	EML
Fluorine	F
Fluorite-hematite breccia zone	FHBX
Foot/feet	ft
Freewest Resources Canada Inc.	Freewest
Gallons (US) per minute	gpm
General and Administrative	G&A
Geological Survey of Canada	GSC
Global Positioning System	GPS
Gram(s)	g
Grams per cubic centimetre (density)	g/cm^3
Grams per metric tonne	g/t
Greater than	>
Hafnium	Hf
Hafnia (hafnium oxide)	HfO_2
Hazen Research Inc.	Hazen
Heavy rare earth element(s)	HREE
Heavy rare earth oxide(s)	HREO
Hectare(s)	ha
High Field Strength Elements	HFSE
Hinterland Resources Ltd.	Hinterland
Hour(s)	h
Hydrochloric acid	HCl

Name	Abbreviations
Hydrofluoric acid	HF
Impact and Benefits Agreement	IBA
Indian and Northern Affairs Canada	INAC
Induced coupled plasma mass spectroscopy	ICP-MS
Induced polarization resistivity	IP-RES
Internal rate of return	IRR
Inverse distance cubed	ID^3
Inverse distance squared	ID^2
Iron Ore Mining Company of Canada	IOCC
James Bay and Northern Québec Agreement	JBNQA
Joint Review Panel	JRP
Kativik Environmental Quality Commission (Québec)	KEQC
Kilogram(s)	kg
Kilometre(s)	km
Kilometres per hour	km/h
Kilowatthours per tonne	kWh/t
Labrador Inuit Lands	LIL
Lanthanum	La
Lerchs-Grossmann	LG
Less than	<
Life-of-mine	LOM
Light rare earth element(s)	LREE
Light rare earth oxide(s)	LREO
Litre(s)	L
Litres per day	L/d
Metre(s)	m
Metres above sea level	masl
Metres per second	m/s
Micon International Limited	Micon
Microgram(s)	µg
Microgram per cubic metre	$\mu g/m^3$
Micron(s)	µm
Million	M
Million cubic metres	Mm^3
Million tonnes	Mt
Million ounces	Moz
Million years	Ma
Million metric tonnes per year	Mt/y
Milligram(s)	mg
Milligrams per litre	mg/L
Millilitre(s)	mL
Millimetre(s)	mm
Ministère du Developpement durable, de l'Environnement et des Parcs	MDDEP
Ministère des Ressources Naturelles, de l'Environnement et de la Faune	MNRF
Mitsui Mining & Smelting Co. Ltd.	Mitsui
Motor control centre	MCC
MPX Geophysics Ltd.	MPX
National Topographic System	NTS
Net present value	NPV
Net smelter return	NSR

Name	Abbreviations
Newfoundland and Labrador	NL
Newfoundland Department of Natural Resources, Mines and Energy	NLDNR
Niobium	Nb
Niobium pentoxide	Nb_2O_5
Non-governmental organization	NGO
Northeastern Québec Agreement	NEQA
North American Datum	NAD
Not available/applicable	n.a.
Process Research Ortech Inc.	Ortech
Ounce(s)	oz
Ounces per year	oz/y
Parts per billion	ppb
Parts per million	ppm
Percent(age)	%
Peak ground acceleration	*g*
Potassium	K
Prefeasibility study	PFS
Pregnant leach solution	PLS
Preliminary economic assessment	PEA
Programmable logic controller	PLC
Proposed Airport 6	PA6
Quality Assurance/Quality Control	QA/QC
Québec	QC
Québec land surveyor	QLS
Québec Ministry of Natural Resources and Wildlife	MRNF
Quest Rare Minerals Ltd.	Quest
Rare earth element	REE
Rare earth oxide	REO
Residue management facility	RMF
Rock Quality Designation	RQD
Run-of-mine	ROM
Second(s)	s
Sodium	Na
Solvent extraction	SX
Specific gravity	SG
Southeastern Churchill Province	SECP
Société du parc industriel et portuaire de Bécancour	SPIPB
Strange Lake Alkali Complex	SLAC
Sulphuric acid	H_2SO_4
System for Electronic Document Analysis and Retrieval	SEDAR
Système International d'Unités	SI
Thorium	Th
Three-dimensional	3D
Tonne(s) (metric, 1,000 pounds)	t
Tonnes per day	t/d
Tonnes per month	t/m
Tonnes per year	t/y
Total rare earth element	TREE
Total rare earth oxide, unless otherwise stated, include Y_2O_3	TREO
Universal Transverse Mercator	UTM

Name	Abbreviations
Uranium	U
United States	USA
United States dollar	US$
Very low frequency electromagnetic	VLF-EM
Wardrop, a Tetra Tech Company	Wardrop
WMC International Limited	WMC
X-ray fluorescence	XRF
Year(s)	y
Yttrium	Y
Yttrium oxide	Y_2O_3
Zirconium	Zr
Zirconia (zirconium oxide)	ZrO_2

3.0 RELIANCE ON OTHER EXPERTS

Micon has reviewed and analyzed data provided by Quest relating to the prefeasibility study for the Strange Lake Project, and has drawn its own conclusions therefrom, augmented by its direct field examination.

While exercising all reasonable diligence in checking, confirming and testing it, Micon has relied upon Quest for the provision of the prefeasibility study for the Strange Lake Project and the data contained therein.

Micon has not carried out any independent exploration work, drilled any holes or carried out any program of sampling and assaying on the property. Micon has relied on the previous sampling conducted by Wardrop discussed in its May, 2011 Technical Report and the 2011 Quest re-sampling of diamond drill hole BZ10040, as verification of the mineralization on the Strange Lake deposit as well as its own observations during the site visit.

Micon has not reviewed or independently verified any of the documents or agreements under which Quest holds title to the Strange Lake property and the underlying mineral concessions and Micon offers no legal opinion as to the validity of the mineral titles claimed. Micon has not reviewed or independently verified any of the documents or agreements under which Quest may hold title to property within the Bécancour Waterfront Industrial Park. A description of the properties, and ownership thereof, is provided in Section 4.0 for general information purposes only.

Micon has relied upon the expertise of Quest's environmental consultants for the information provided in Section 20 of this report, dealing with Environmental Studies, Permitting and Social or Community Impact.

The descriptions of geology, mineralization and exploration used in this report are taken from reports prepared by various companies or their contracted consultants, as well as from various government and academic publications. The conclusions of this report rely in part on data available in published and unpublished reports supplied by the companies which have conducted exploration on the property, and information supplied by Quest. The information provided to Quest was supplied by reputable companies and Micon has no reason to doubt its validity.

Micon is pleased to acknowledge the helpful cooperation of Quest management and consulting field staff, all of whom made any and all data requested available and responded openly and helpfully to all questions, queries and requests for material.

Some of the figures and tables for this report were reproduced or derived from historical reports written on the property by various individuals and/or supplied to Micon by Quest. In the cases where photographs, figures or tables were supplied by other individuals or Quest they are referenced below the inserted item.

4.0 PROPERTY DESCRIPTION AND LOCATION

The Project is divided between two regional areas, these are:

1. Northern Project Area, comprising:
    - The mine, beneficiation plant and tailings storage facility at Strange Lake, Québec.
    - The port at Edward's Cove, Newfoundland and Labrador.
    - The access road of about 170 km between the above sites.

2. Southern Project Area, situated at Bécancour Industrial Park, Québec comprising:
    - The Bécancour process plant site.
    - The process plant residue management facility.

4.1 NORTHERN PROJECT AREA

The following description has been extracted from the December. 2013 Micon Technical Report (Micon, 2013) and updated where applicable

4.1.1 Location and Description

The Strange Lake property is situated on the provincial border between the Canadian provinces of Québec and Newfoundland and Labrador. The property is located on the southeast edge of Lac Brisson, approximately 235 km northeast of Schefferville, QC, approximately 150 km west of Nain, NL, 125 km west of the Voisey's Bay nickel-copper-cobalt mine, owned and operated by Vale SA, and approximately 1,100 km northeast of Québec City, QC. Administration for the region is covered by the Administrative Region of Nord-du-Québec and the Kativik Regional Government.

The Strange Lake property is covered by Canadian National Topographic System (NTS) map sheets 24A08, 24A09, and 14D05. The latitude and longitude for the Project is approximately 56°21' N and 64°12' W.

Figure 4.1 shows the location of the Strange Lake Project.

Figure 4.1
Location of the Strange Lake Property

Micon December, 2013 Technical Report.

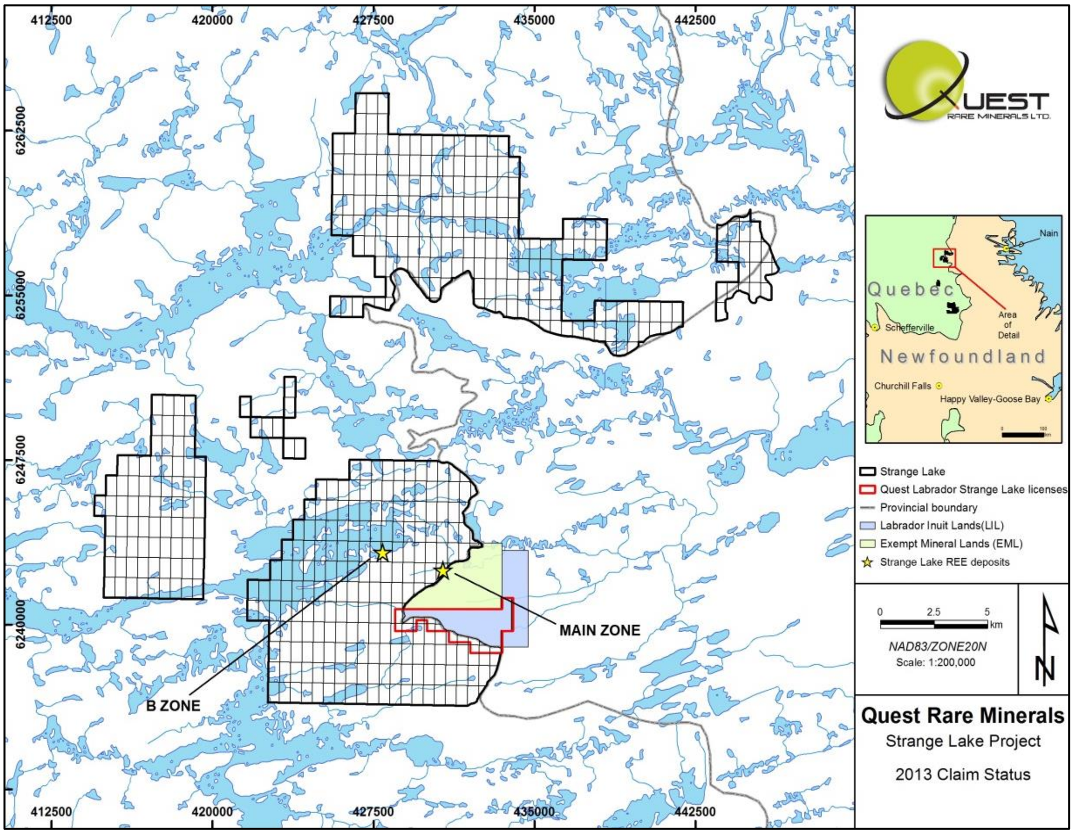
The Strange Lake Property is comprised of the 534 individual mineral claims covering a total area of approximately 23,230 ha, as summarized in Table 4.1 and illustrated in Figure 4.2. Quest has been letting claims on the peripheral edges of the property expire as they are not material to the integrity of the property.

The mineral claims in Québec cover the B Zone and a portion of the Main Zone rare earth element (REE) deposits. Quest has informed Micon that all of the claims are current and there are no outstanding issues.

Table 4.1
Summary of the Strange Lake Mineral Claims by Province

Province	Number of Claims	Area (ha)
Québec	504	22,479.84
Newfoundland and Labrador	30	750
Total	534	23,229.84

Figure 4.2
Strange Lake Property Mineral Claim Map



Micon December, 2013 Technical Report.

The mineral claims in Newfoundland and Labrador cover an area immediately south of the Main Zone REE deposit, historically referred as the A Zone by the Iron Ore Mining Company of Canada (IOCC). Mineral tenure in Newfoundland and Labrador allows for contiguous claims to be made under a single licence number. There are also several mineral claims that overlap the Québec and Newfoundland and Labrador claims due to the disputed location of the provincial border. Included within the Newfoundland and Labrador total is a small group of 18 mineral claims that occurs along the coast of Labrador, south of the Voisey's Bay mine, that were acquired in 2011. These mineral claims are listed here but they are not subject to this report and are mentioned only for completeness.

With regards to the mineral rights in Newfoundland and Labrador adjacent to the east of the Property, there are two blocks of claims designated Exempt Mineral Lands (EML) and Labrador Inuit Lands (LIL). The EML is currently off limits for exploration and mining and the LIL, may be explored with permitting and consultation with the Inuit of the Nunatsiavut Government.

4.1.2 Ownership and Permits

The mineral claims comprising the Strange Lake Project area around the B-Zone deposit are 100% owned by Quest. Quest has informed Micon that all of the mineral claims are free of NSR and other encumbrances except one claim CDC2123065 which has a 2% NSR and for the claims in the EML designation and those designated LIL. Claim CDC2123065 is located at approximately 1.2 km east of the B Zone deposit.

Quest has informed Micon that it has obtained all permits required to conduct exploration activities on the property.

Quest Rare Minerals Ltd, (formerly Quest Uranium Corporation), was incorporated under the Canada Business Corporations Act on June 6, 2007 as a wholly-owned subsidiary of Freewest Resources Canada Inc. (Freewest) with the intention of taking over the uranium exploration activities previously conducted by Freewest.

On December 7, 2007, Freewest transferred its 100%-owned uranium properties to Quest for 8,000,000 common shares of Quest for consideration of Cdn$2,400,000. The uranium properties included the George River property, five uranium properties in Ontario and one uranium property in New Brunswick. Freewest retained rights to certain precious metals and base metals with respect to certain properties transferred.

On December 11, 2007, Freewest distributed an aggregate amount of 6,256,979 common shares of Quest held by Freewest to its shareholders.

On May 8, 2009, Quest entered into a purchase and sale agreement with two prospectors, namely Messrs. Réal Gauthier and Terrence P. O'Connor, pursuant to which Quest acquired a 100% interest in a single block of mining claims in the Strange Lake area of northeastern Québec (the "Strange Lake Property") by issuing an aggregate of 50,000 common shares of Quest to the two vendors. In addition, the vendors hold a 2.0% net smelter return (NSR) on the Strange Lake Property, which Quest can purchase in full for $1.5 million.

On June 15, 2010, Quest entered into an exploration and option agreement with Search Minerals Inc. (Search) and Alterra Resources Inc. (Alterra), a wholly-owned subsidiary of Search, pursuant to which Quest has an option to acquire up to a 65% undivided working interest in 30 mining claims located on the southeastern contact of the Strange Lake Alkalic Complex in western Labrador, in the Province of Newfoundland and Labrador. Pursuant to the exploration and option agreement, Quest may earn a 50% undivided working interest in the 30 mining claims by issuing an aggregate of 90,000 common shares of Quest to Alterra and by incurring mining exploration expenditures of $500,000 in the aggregate, both over a period of three years. If Quest does so, it will have an option to acquire an additional 15% undivided working interest in the 30 mining claims by making a payment of $75,000 before the fourth anniversary date of the exploration and option agreement, and by issuing an additional 150,000 common shares to Alterra and incurring mining exploration expenditures of $1,250,000 in the aggregate on or before the fifth anniversary date of the exploration and option agreement.

Pursuant to the exploration and option agreement, Quest entered into an assignment agreement with Search and Alterra pursuant to which Quest transferred and assigned to Search nine claims located in western Labrador in consideration for 10,000 common shares of Search. Immediately following the transfer by Quest to Search, Search transferred these nine claims to Alterra. These nine claims, together with 21 claims already owned by Alterra, comprise the 30 claims that are the subject of the exploration and option agreement. The 30 mining claims are subject to a 1.5% net smelter return royalty in favor of Alterra. Quest may, at any time, purchase two-thirds of the 1.5% net smelter return royalty for $1 million.

On November 7, 2012, Quest entered into an agreement with Search and Alterra under which Quest agreed to exchange the Operator fees receivable from Search of $67,141 against its obligation to issue 40,000 common shares of Quest to Alterra in order to earn its 50% undivided working interest.

As at July 31, 2013, Quest had issued a total of 40,000 common shares under the agreement, at a price of $1.887 per share (October 31, 2012 – 40,000 common shares at a price of $1.887 per share) and incurred $751,572 in exploration expenditures (October 31, 2012 – $751,572). As a result, Quest has acquired a 50% undivided working interest in the claims. The right of Quest under the original agreement to earn an additional 15% interest remains unchanged.

Quest is currently evaluating whether to exercise the option of earning a further 15% interest in the property or to convert the option agreement into a 50-50 joint venture with Search to undertake all future exploration on the property.

Micon is unaware of any outstanding environmental liabilities at the Strange Lake property, other than those normally associated conducting exploration programs in Canada. Micon is unable to comment on any remediation which may have been undertaken by previous companies.

Micon is unaware of any other significant factors or risks that may affect access, title or the right or ability of Quest to perform work on the Strange Lake property.

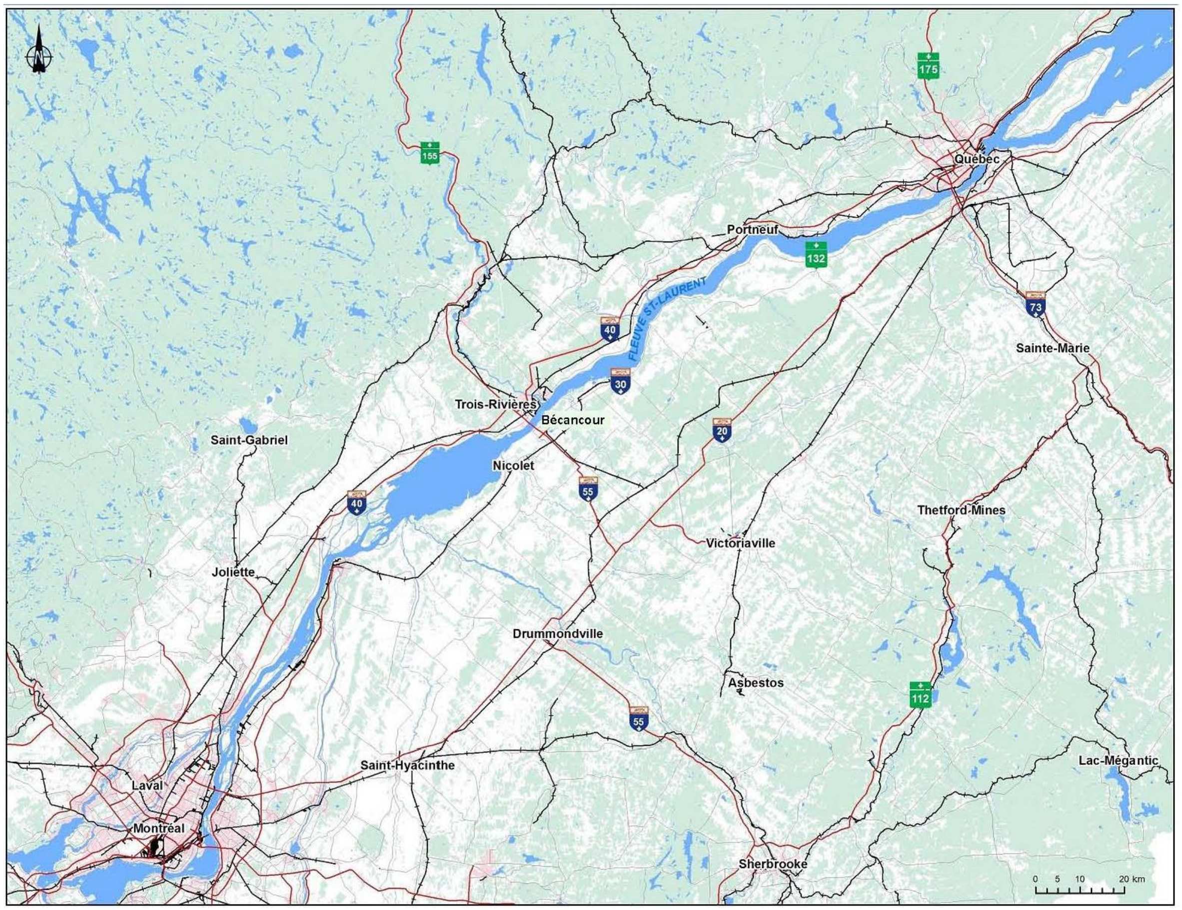
Other than those discussed in this report, Micon is not aware of any royalties, back-in rights, payments or other agreements and encumbrances which apply to the Strange Lake property.

4.2 SOUTHERN PROJECT AREA

4.2.1 Location and Description

The southern project area encompasses the proposed sites for concentrate processing and residue management facilities (RMF) for the disposal of processing residue, located in the City of Bécancour, Québec. See Figure 4.3.

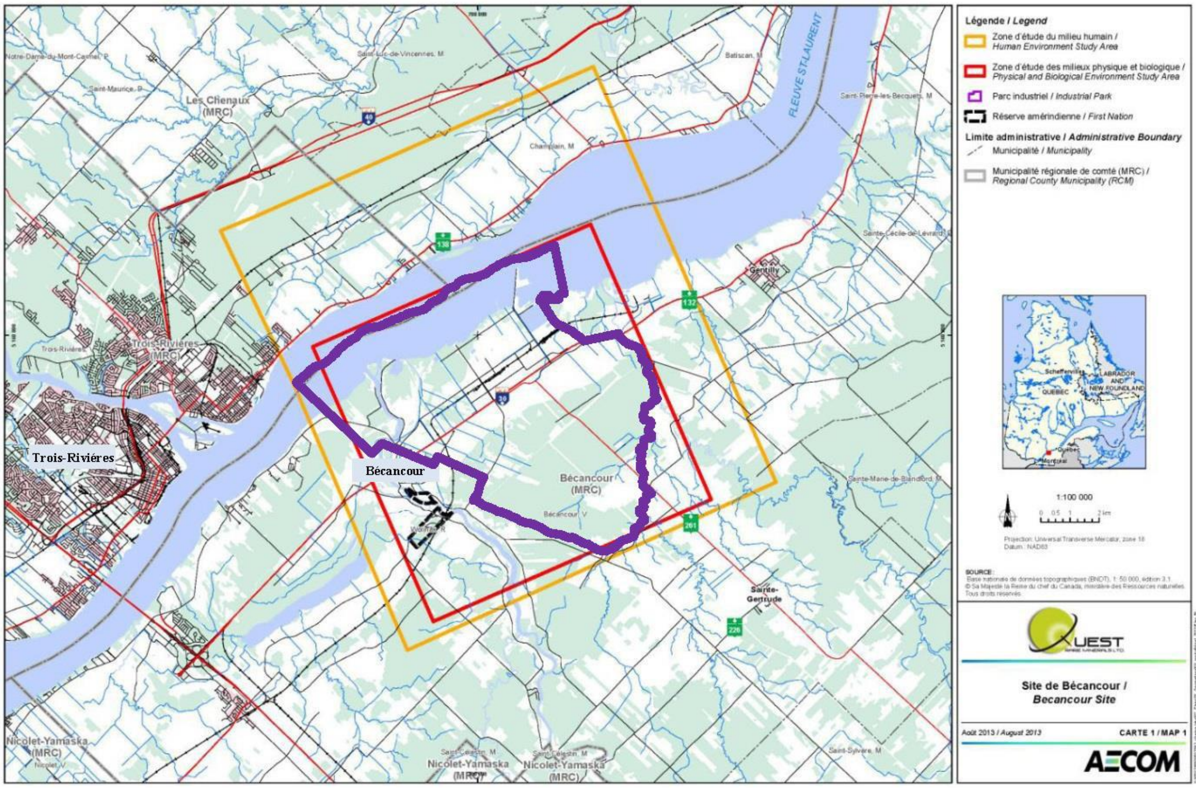
Figure 4.3
Bécancour General Location Map



Micon December, 2013 Technical Report.

The facilities will be located in the Bécancour Waterfront Industrial Park, on the south shore of the St. Lawrence River, approximately 12 km southeast of Trois-Rivières and approximately 140 km northeast of Montreal. The site is located at 46°22'N, 72°17'W. See Figure 4.4.

Figure 4.4
Location of Bécancour Waterfront Industrial Park



Micon December, 2013 Technical Report.

The Bécancour industrial park is managed by the provincially-owned Société du parc industriel et portuaire de Bécancour (SPIPB) and covers an area of 6,900 ha, of which around one-third is used by industrial or service companies. Existing operations are concentrated in the portion of the industrial park located north of Highway 30.

Within the industrial park, companies own the land they occupy. The SPIPB owns most of unoccupied lands within the industrial park, although a few properties are privately owned.

4.2.2 Ownership

The process plant and RMF will be owned and operated by Quest under the terms of specific written agreements to be developed with SPIPB for the nominal operating life of 30 years.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 NORTHERN QUÉBEC PROJECT AREA

The following Section has been extracted from the December, 2013 Technical Report by Micon.

5.1.1 Accessibility

The Strange Lake property is situated roughly 1,100 km northeast of Québec City, the provincial capital of Québec. It is only accessible by aircraft from Schefferville, Québec, and Nain or Goose Bay, Newfoundland. There are several regularly scheduled daily flights to Schefferville, Nain and Goose Bay from major cities in eastern Canada. Aircraft may also be chartered out of those northern communities.

Fixed-wing flights from Schefferville are typically 60 minutes and flights from Goose Bay are typically 90 minutes. Staging for the Strange Lake project is done from both Schefferville and Goose Bay. Flight time to Nain from Strange Lake is approximately 40 minutes.

5.1.2 Climate and Physiography

Northern Québec and Labrador are characterized by a cool subarctic climatic zone where summers are short and cool, and winters are long and cold with heavy snowfall.

The minimum and maximum mean annual temperatures are -10°C and 0°C, respectively. The average July minimum and maximum temperatures are 7°C and 17°C and the average January minimum and maximum temperatures are -29°C and -19°C (WorldClimate, Indian House Lake, Québec, www.worldclimate.com). Annual average precipitation is approximately 660 mm (WorldClimate, Border, Québec). The region receives up to approximately 350 cm of snow annually and the ground is snow-covered for six to eight months of the year. Exploration activities may be conducted during the summer and autumn months (June to November) and during the winter to early spring (January to April).

The property is situated in a glacially scoured terrain of rolling hills with low to medium relief where elevations vary from roughly 420 masl to 570 masl. The property is situated on west side of the major watershed that forms the border between Québec and Newfoundland.

The exposure and lack of vegetation in the area contributes to strong winds that generally have an easterly or westerly direction. Trees are confined to sheltered valleys or enclaves where mean temperatures may be higher.

Ericaceous shrubs and herbs, which are typical of tundra or heathland vegetation, consist mainly of willow, sedges, grasses, alders, sweet gale and juniper.

The property is dominantly covered by a layer of glacial till of variable thickness with abundant rock outcroppings. Glacial esker deposits are also common and range between 5 to 25 m thick. Vegetation throughout the property consists mainly of short tundra growth of shrubs and caribou moss, interspersed with low tamarack trees.

5.1.3 Seismic Activity

The Strange Lake mine site is located in a relatively quiet earthquake zone. There has been no recorded earthquake within a radius of 180 km around the project site, as recorded in the Seismic Hazard Earthquake Epicentre File (Halchuk, 2009).

5.1.4 Local Resources and Infrastructure

There are no local resources in or around the Strange Lake property. Some local labour may be hired out of Goose Bay, Nain or Schefferville, but most skilled and professional labour will need to be sourced from other regions within Canada.

The nearest mine to the property is the nickel-copper mine of Vale SA at Voisey's Bay, roughly 125 km to the east, on the coast of Labrador.

The property and environs have no developed infrastructure. The nearest developed infrastructure is located in the community of Nain. Nain is a coastal community that also serves as the local supply and service centre for the nearby Voisey's Bay mine. There is no road access to Nain and it is serviced by regular, year-round flights from Goose Bay and by coastal freighters during the summer months. Schefferville is also a small community that is serviced by regular daily flights and twice-weekly by rail from Sept-Îles on the Bay of St. Lawrence.

There is an 800-m gravel airstrip located on the property that provides access to the Strange Lake Project.

The nearest seaport is in Nain, 125 km east of the property and the nearest railhead in Schefferville, 235 km southwest of the property, with access to the seaport at Sept-Îles.

There is no source of electricity on or near the property and power must be generated on site. The nearest sources of electricity are in Voisey's Bay, Churchill Falls and Menehek Lake.

Water sources are abundant on and adjacent to the property.

5.2 SOUTHERN QUÉBEC PROJECT AREA

5.2.1 Accessibility

The proposed plant and RMF are located in the Bécancour Waterfront Industrial Park, on the south shore of the St. Lawrence River in the physiographic area known as the St. Lawrence

Lowlands. The terrain is generally flat and rises gently from the river, from approximately 20 m to 40 m above sea level at the southern edge of the park. Several minor watercourses drain the area to the St. Lawrence, with wetlands concentrated near the river, as well as near the local height of land in the southern portions of the industrial park.

5.2.2 Seismic Activity

The Bécancour industrial park lies in an area of moderate seismic activity. Events below magnitude 5 on the Richter scale will not result in any damage or failure of any engineered industrial structures, systems and components even if they have not been explicitly designed to resist earthquakes. Recorded events along the St. Lawrence River valley between Québec City and the vicinity of Montreal have been in the range 5.0 to 5.9 on the Richter scale. (NRCan interactive website).

5.2.3 Climate and Physiography

The Bécancour region experiences a humid continental mid-latitude climate characterized by warm summers and cold winters with frequent periods of very cold temperatures and clear skies. Temperature variations are moderated somewhat by the presence of the St. Lawrence River, especially in the winter when the river is not frozen. Between 1971 and 2000, the average summer temperature was 16.8°C (May to August) with a recorded maximum of 35.6°C. The average winter temperature (November to February) was -7.8°C with a minimum recorded low of -39°C. The coldest month is typically January, and the warmest is typically July.

Normal precipitation (snow and rainfall) for Bécancour from 1971 to 2000 varied from a low of 63 mm in February (water equivalent of snowfall) to a high around 120 mm in August. The annual average precipitation was approximately 1,085 mm per year during this period. Dominant wind directions are from the southwest (25 % of the time), from the north (19 % of the time, and northeast (17 % of the time).

Vegetation around the site consists of abandoned croplands dominated by young trees or shrubs, swamps and marshes, some cultivated fields and some tree plantations.

5.2.4 Local Resources and Infrastructure

The Bécancour Waterfront Industrial Park is located within the City of Bécancour (population 12,438 in 2011) and the Regional County Municipality (RCM) of Bécancour (population 20,081 in 2011 including the City of Bécancour) on the south shore of the Saint-Lawrence River. The Aboriginal reserve of the Abenaquis community of Wôlinak (population 180 in 2011) is located in close proximity on the south side of the City of Bécancour. The City of Trois-Rivières (population 131,338 in 2011) is located some 12 km away on the north shore of the St. Lawrence River.

The industrial park has excellent, well-established, all-weather transportation links to provincial and national road and rail systems. Highway 30 runs through the northern part of the park serving the south shore of the St. Lawrence River. It connects with Highways 20 and 40 via Highway 55, and which provide links to Montreal and Québec City. Highway 261 runs from southeast to northwest across the industrial park, between Highways 30 and 20. The industrial park builds and maintains its own network of roads that meet the specific standards of heavy carriers. The park is served by the Canadian National Railway (CN).

Shipping facilities at the port of Bécancour are open year-round. Ships requiring up to 10.67 m water depth can be docked at five berths. In addition to storage, services including stevedoring, towage, customs, and a marine agency are available.

Electricity is provided from the Churchill Falls and James Bay hydroelectric facilities, as well as the network of power stations along the St. Maurice River, and a 550 MW cogeneration plant is located in the park. The park is also serviced by natural gas, industrial water, fire protection, potable water and sewer systems.

A preliminary analysis of the labour pool in Bécancour shows that the region has a sufficient number of well-trained workers to support the construction and operation of the plant and RMF. Over 75% of the population of the RCM have attained a high school certificate or higher education. There are also several local training institutions, although specific training may be required for development of the specialized skills associated with rare earth mineral processing.

Existing commercial occupants of the industrial park include Aluminerie de Bécancour Inc. (Alcoa Inc. and Rio Tinto PLC), Silicium Québec SEC, Olin Canada ULC and TRT-ETGO.

6.0 HISTORY

The following has been extracted primarily from the December, 2013 Technical Report by Micon and updated where necessary. The December, 2013 report mentions that the most of the following historical information was derived from Chamois and Cook (2007).

6.1 GEOLOGICAL SURVEYS

6.1.1 Geological Survey of Canada (1967 to 1993)

From 1967 to 1971, the Strange Lake and George River area was mapped at a scale of 1:250,000 by the Geological Survey of Canada (GSC). In 1979 to 1980, a regional lake sediment study was conducted, in partnership with the Newfoundland and Labrador Mineral Development Division. A regional lake sediment survey covering the Québec portion of the area was completed during 1982 and a regional lake sediment and water sampling was completed over the Labrador portion of the project area in the early 1990s.

Several areas within the George River region, northwest of the Property, were mapped in more detail throughout the 1970s and 1980s by the Québec Ministry of Energy and Resources, along with some regional stream sediment sampling.

6.1.2 Newfoundland and Labrador Department of Natural Resources (1980 to 2009)

Between 1980 and 2009, the Newfoundland and Labrador Department of Natural Resources (NLDNR) Geological Survey Division and Department of Mines and Energy conducted numerous studies in the Strange Lake area.

In 1980, in partnership with the GSC, the NLDNR released a detailed lake sediment, water and radiometric survey. This survey was the first time the strong dispersion pattern of the Strange Lake mineralization was published and it led directly to the discovery by IOCC of the Strange Lake Alkali Complex and associated Rare Earth Elements (REE) and High Field Strength Elements (HFSE) mineralization.

In 1984, as exploration continued at Strange Lake by IOCC, the NLDNR conducted an aggregate resource assessment that investigated a possible transportation route from Strange Lake to the east coast of Labrador.

In 1988, additional lake sediment and water geochemistry sampling was carried out with a focus on rare metal mineralization in granitoid terranes in the Churchill Province. All geochemical data for the Strange Lake area was re-analyzed in 2009.

Extensive geomorphological and surficial geology studies were conducted by NL government geologist Martin Batterson with D.M. Taylor in 1988, 1991, 2001, 2005, and 2009). Bedrock geology mapping was conducted by Ryan (2003) on NTS map sheets

14D/03, 04, 05 and 06 and 24A/08 and NLDNR geologists published research papers on the Strange Lake Alkali Complex.

6.2 MINING COMPANIES

6.2.1 Iron Ore Company of Canada, 1979 to 1984

From September, 1979 to March, 1981, IOCC completed several exploration programs on, and to the northeast of the Property. The exploration programs included:

- Reconnaissance geological mapping.
- A helicopter-borne radiometric survey.
- A ground radiometric survey.
- A limited amount of geochemical sampling including:
- Eight soil samples.
- Six lake and stream sediment samples and one rock sample.
- A small track-etch survey on eight sites.
- One 35.97-m diamond drill hole.

During this initial period of exploration, the Strange Lake Alkali Complex was discovered and subsequent drilling up to 1984, of a total of 373 diamond drill holes, culminated in the discovery of the Strange Lake REE and HFSE mineralization, which IOCC named the A Zone (renamed Main Zone by Quest).

From September, 1981 to September, 1982, IOCC completed geological, geophysical and geochemical work on the NL side of the Strange Lake discovery. The geological mapping was completed at 1:50,000 and 1:10,000 scales with traversing on 200-m spacing where gneisses were observed in a few scattered outcrops to the east and north of the alkali granite complex. Alkalic rock units (locally medium grained, fine grained and altered) were mainly observed; outcrop is sparse with less than 10% outcrop exposure in the vicinity of the Strange Lake Alkali Complex.

Various geophysical surveys were conducted in the Strange Lake area in an attempt to delineate differences in lithology, alteration and/or mineralization within the bedrock covered by extensive overburden. These included ground magnetometer, VLF-EM and IP-RES geophysical surveys. The magnetometer and VLF-EM surveys were useful at defining and updating the geological contacts between the gneisses and the alkali rocks as well as detecting gouge-rich, water-saturated fault zone breaks and fracture zones highlighted by offsets and truncations. The IP-RES surveys permitted to correlate with zones of greater porosity within the altered peralkaline granite. The geochemical surveys consisted of soil surface outcrop rock and water drill core analysis. Analytical data for ZrO_2 and Y_2O_3 obtained from diamond drilling and bedrock mapping were used in the calculation of the age of the younger alkali granite in the central part of the Strange Lake area, and aided in the identification of the second most anomalous zone of mineralization in the Strange Lake area, named the B Zone by IOCC.

A total of 373 diamond drill holes were completed and surveyed with the drill locations reported in the UTM coordinate system. The elevations are reported in metres. The Glacial Boulder Survey was carried out to trace the boulders to their sources. The survey was done by systematically checking every alkali boulder in the area with a portable GIS-4 integrating gamma-ray spectrometer. Two boulder trains were recognized; the northern train consisting of fine grained pegmatitic and medium grained granitic; the southern train is mainly made of pegmatite granite. A total of 133 boulders were sampled and assayed for yttrium, zirconium and niobium oxides.

From July, 1979 to September, 1980, IOCC completed geological and geochemical surveys. The geological survey was carried out at the reconnaissance scale. Only gneisses were encountered. The geophysical survey was carried out by a helicopter-borne radiometric survey at 100-ft terrain clearance and followed by a ground radiometric and magnetometer surveys.

Between January, and December, 1983, IOCC completed geological, geophysical and geochemical surveys on the Québec portion of the Strange Lake property. The alkali granite was remapped at a scale of 1:10,000-scale in order to better incorporate the drill hole and outcrop data and to search for new outcrop areas.

The ground spectrometer geophysical survey was conducted in the western part of the property to help trace anomalous till associated with the radioactive mineralized boulders previously located. Lines were surveyed 50-m apart with survey stations every 25 m. Boulders were discovered up-ice to all known bedrock sources and precisely located.

The geochemical survey consisted of outcrop sampling. Rock samples were analysed systematically for minor elements and selectively for major elements. A frost soil survey was carried out over the anomalous areas detected by the spectrometer survey. Only beryllium and yttrium returned significant anomalies. Geochemical surveys consisted of soil sediment and water samples. Air photo interpretation was completed permitting terrain and structural features. East-west lineations, crags and tails were observed to be expressions of faults. Northeast and southwest lineations were also observed.

IOCC commissioned several metallurgical, conceptual and economic studies throughout the 1980s to determine the potential economic viability of the deposit.

In 1982, IOCC retained Witteck Development Inc. of Mississauga, Ontario, to conduct hydrometallurgical test work on Strange Lake concentrates for the extraction of zirconium, beryllium, and REEs. In 1983, IOCC contracted K.D. Hester & Associates of Oakville, Ontario, to review the hydrometallurgical test work and update reagent costs. In March 1983, IOCC retained the Warren Spring Laboratory, in Hertfordshire, England, to report on the beneficiation of Strange Lake mineralization and the liberation of Y_2O_3, Nb_2O_5, ZrO_2, BeO and REO.

In 1984, Hazen Research Inc. (Hazen) was retained to review the metallurgical test work and propose a preliminary process design and layout to treat 30,000 t/d of Strange Lake mineralized material focusing on the extraction of yttrium, zirconium, beryllium and niobium.

Also in 1984, IOCC completed a preliminary feasibility study on Strange Lake based on an open pit scenario, 250,000 t/y operation with processing facilities located in Schefferville. The products of this study included zirconium, yttrium and niobium.

In January and February, 1985, IOCC completed a cost estimate study and economic evaluation study. The economic evaluation study considered two scenarios:

1. Selling 200 t/y Y_2O_3 (99.99% grade).
2. Selling 300 t/y Y_2O_3 (at two different grades).

Each scenario also included LREO and HREO based on market prices at that time.

In March, 1985, Arthur D. Little, Inc. (ADL) completed a marketing and economic viability study on the Strange Lake project on behalf of IOCC. ADL concluded that yttrium demand was unlikely to increase fast enough for start-up of operations in 1989 and recommended further economic studies.

6.2.2 Armco Mineral Exploration Ltd., 1980

Between June and July, 1980, Armco Mineral Exploration Ltd. (AME) conducted a helicopter-supported exploration program within an area covered by IOCC 1979 airborne survey to the south of the property. Limited geochemical sampling included 51 soil samples, two esker sand samples, and nine rock samples.

6.2.3 Acadia Mineral Ventures Ltd., 1990

In 1990, Kilborn Inc. was retained by Acadia Mineral Ventures Ltd. (Acadia) to conduct a preliminary economic analysis on the Strange Lake mineralization based on historic metallurgical test work.

6.2.4 Mitsui Mining & Smelting Co., Ltd., 1992 to1995

From 1992 to 1995, Mitsui Mining & Smelting Co., Ltd. (Mitsui) conducted a metallurgical research project on the Strange Lake Main Zone REE deposit. Between 1992 and 1993, Mitsui carried out a geological survey and study and preliminary chemical and physical tests. From 1994 to 1995, mineral processing and chemical processing tests were conducted on the Strange Lake Main Zone minerals (then referred to as the ‘A Zone’). The testwork focused on recovery of yttrium, zirconium, niobium, cerium and fluorine. The report proposes future testwork on REE purification; however, it is unknown whether this work was conducted.

6.2.5 WMC International Limited, 2000 to 2001

During 2000 and 2001, WMC International Limited (WMC) completed a multi-faceted exploration program for copper and nickel over a very large area generally located northwest of the property. Work included regional geological mapping and sampling, a greater than 60,000 line-km aeromagnetic survey, a greater than 15,000 line-km airborne EM survey, regional heavy mineral concentrate stream sediment sampling, a limited amount of ground EM and diamond drilling consisting of seven holes totalling 2,225 m and borehole EM surveying. According to the reports at the time, the results from this exploration did not warrant additional work.

6.2.6 Freewest Resources Canada Inc., 2006 to 2007

In 2006, Freewest staked 23 non-contiguous claim blocks totalling 220,813 ha for the purpose of uranium exploration. From August to September, 2006, Freewest completed an exploration program that included a helicopter-borne magnetic, electromagnetic and spectrometer geophysical survey and a prospecting and mapping program over seven of the claim blocks. The results of these exploration programs found anomalous uranium (U_3O_8) values in Blocks 1, 2, and 8 and an anomalous copper-nickel in Block 3.

In late 2007, Freewest spun out its George River project claims to Quest. The Strange Lake property is encompassed by Freewest’s Block 1 exploration target and contiguous to Block 8.

Where available, detailed descriptions of the exploration conducted on the property are contained in provincial assessment reports or in Technical Reports filed on SEDAR by the various companies which worked on the Strange Lake property prior to its acquisition by Quest.

6.2.7 Quest Rare Minerals Ltd., 2007 to 2011

Since late 2007, when the George River Project claims were transferred to Quest, Quest has been conducting an extensive exploration program of mapping, surface sampling, geophysical and geochemical surveys and drilling to outline the extent of the mineralization located on its Strange Lake Property. To this end Quest has outlined a large near-surface REE deposit which has the potential to be both economic and a long term producer should it enter into development and production stages.

6.2.7.1 Geophysical Surveys, 2008 to 2011

During the 2008 exploration season, Quest conducted a campaign of helicopter-borne geophysical surveys that consisted of airborne radiometric and magnetic geophysical surveys.

During the 2009 exploration season, Quest conducted an airborne geophysical survey over two other exploration targets to the west and to the south of the Property. The B Zone deposit was not included in this survey.

No additional geophysical surveys were carried out in either 2010 or 2011.

6.2.7.2 Exploration, 2008 to 2011

During the 2009, 2010 and 2011 exploration seasons, Quest collected a total of 1,170 samples from the Property. The samples were collected during prospecting, bedrock mapping and channel sampling.

6.2.7.3 Geological Mapping, 2009 to 2011

Geological mapping conducted during the 2009, 2010 and 2011 exploration programs was focused within the extents of the SLAC. The purpose of mapping was to increase the accuracy of historical geology maps of the SLAC and to provide context for channel samples in an area of complex structure and geology south of the B Zone termed the "fluorite-hematite breccia zone" (FLBX). Mapping samples were generally restricted to outcrop.

6.2.7.4 Drilling, 2009 to 2011

Quest completed a drill program on the Property between July and September, 2009. The drill program consisted of 3,930.5 m of drilling including 19 drill holes completed on the B Zone totalling 2,180.7 m of drilling and 30 drill holes conducted on the Main Zone. All 19 drill holes in the B Zone encountered pegmatite-hosted REE mineralization with thicknesses ranging up to 36 m and averaging 13 m.

From July to October 2010, Quest completed approximately 14,270 m of drilling over the B Zone as well as the deepening of some the 2009 drill holes. The objectives of the 2010 drill program were to infill and continue to define the known deposit and resource. All 78 drill holes from the 2010 drill program encountered pegmatite-hosted REE mineralization with true thicknesses ranging up to 53 m and averaging 15 m.

Quest conducted winter and summer drilling at Strange Lake during 2011 on a variety of areas within the intrusion. A total of 25,425.3 m of drilling was completed over 224 holes. During the winter of 2011, 22 holes, including one designed specifically for metallurgy, were drilled at the B Zone for a total of 3,005.6 m. Drilling at the B Zone successfully intersected pegmatite-hosted REE mineralization in all 22 holes. The summer drilling program at the B Zone was focused on definition drilling, infilling areas between the 2009 and 2010 holes, and also following unconstrained mineralization in the southwest, east and north of the deposit. Drilling totalled 167 holes, including 29 for metallurgical purposes, for 20,772.15 m.

6.2.8 Quest Rare Minerals Ltd., 2012 to 2013

The exploration and drilling programs conducted by Quest in 2012 and 2013 are discussed in Sections 9 and 10 of this report. These sections were extracted from Sections 9 and 10 of the December 14, 2012 Technical Report by Micon.

The 2012 drilling program did not add any further information to the data set for the B-Zone mineral resource estimate and there was no drilling conducted on the Strange Lake Project in 2013. Therefore, the 2012 mineral resource estimate remains valid and can be used as the basis for the PFS.

6.3 PREVIOUS MINERAL RESOURCE ESTIMATES

Wardrop conducted mineral resource estimates for Quest in 2010 and 2011. The results of the mineral resource estimate conducted by Wardrop are contained in Technical Reports entitled "Strange Lake Project B Zone Deposit, Québec. National Instrument 43-101 Resource Estimate" dated April, 2010 (Wardrop, 2010a) and "Strange Lake B Zone Resource Model Update" with an effective date of May 25, 2011 (Wardrop, 2011). These reports have been filed on SEDAR by Quest.

The most recent and still current mineral resource estimate for Quest was conducted by Micon. The current mineral resource estimate has an effective date of August 31, 2012, and was disclosed in a Technical Report dated December 14, 2012.

The August, 2012 resource estimate is discussed in Section 14 of this report which has been fully extracted from the December, 2012 Technical Report.

6.4 PREVIOUS TECHNICAL AND ECONOMIC STUDIES

Quest engaged Wardrop to conduct a Preliminary Economic Assessment (PEA) on the Strange Lake Properties B Zone. The Technical Report for this PEA is dated September 24, 2010 (Wardrop, 2010b).

A Technical Report authored by Micon, dated December 6, 2013, was issued to report the results of a prefeasibility study (Micon, 2013). This study was based on the shipping of 1.46 Mt/y of crushed ore for processing at a facility at Bécancour in southern Québec to recover a concentrate containing heavy rare earth elements (HREE) and yttrium, zirconium in zirconium basic sulphate (ZBS), niobium pentoxide (Nb_2O_5) and a mixed light rare earth element (LREE) double sulphate concentrate.

6.5 MINING PRODUCTION OR EXTRACTION

There has been no mining or processing of any of the mineralization located on the Strange Lake property other than a bulk samples extracted from the deposit using BQTK-size drill holes.

7.0 GEOLOGICAL SETTING AND MINERALIZATION

The following Section has been extracted from the December, 2013 Technical Report by Micon.

7.1 REGIONAL GEOLOGY

The Strange Lake project lies within the Paleoproterozoic Rae or Southeastern Churchill Province (SECP) located in the northeastern Canadian Shield of Québec and Labrador. The SECP is thought to have formed as a result of oblique collisions involving the Superior and Nain cratons with a third intervening Archean block. Mapping has defined a number of distinctive, north-south trending lithotectonic domains within the SECP east of the Labrador Trough. From west to east these domains include: the Labrador Trough, the Laporte, the Lac Tudor Shear Zone, the De Pas, the George River Shear Zone, the Mistinibi-Raude and the Mistastin.

The majority of the property is located in the Mistastin domain in the east and the Mistinibi-Raude domain to the west. Figure 7.1 is a regional geology map of the area surrounding the B Zone and Main Zone on the Strange Lake Property.

The following is taken from Chamois and Cook (2007).

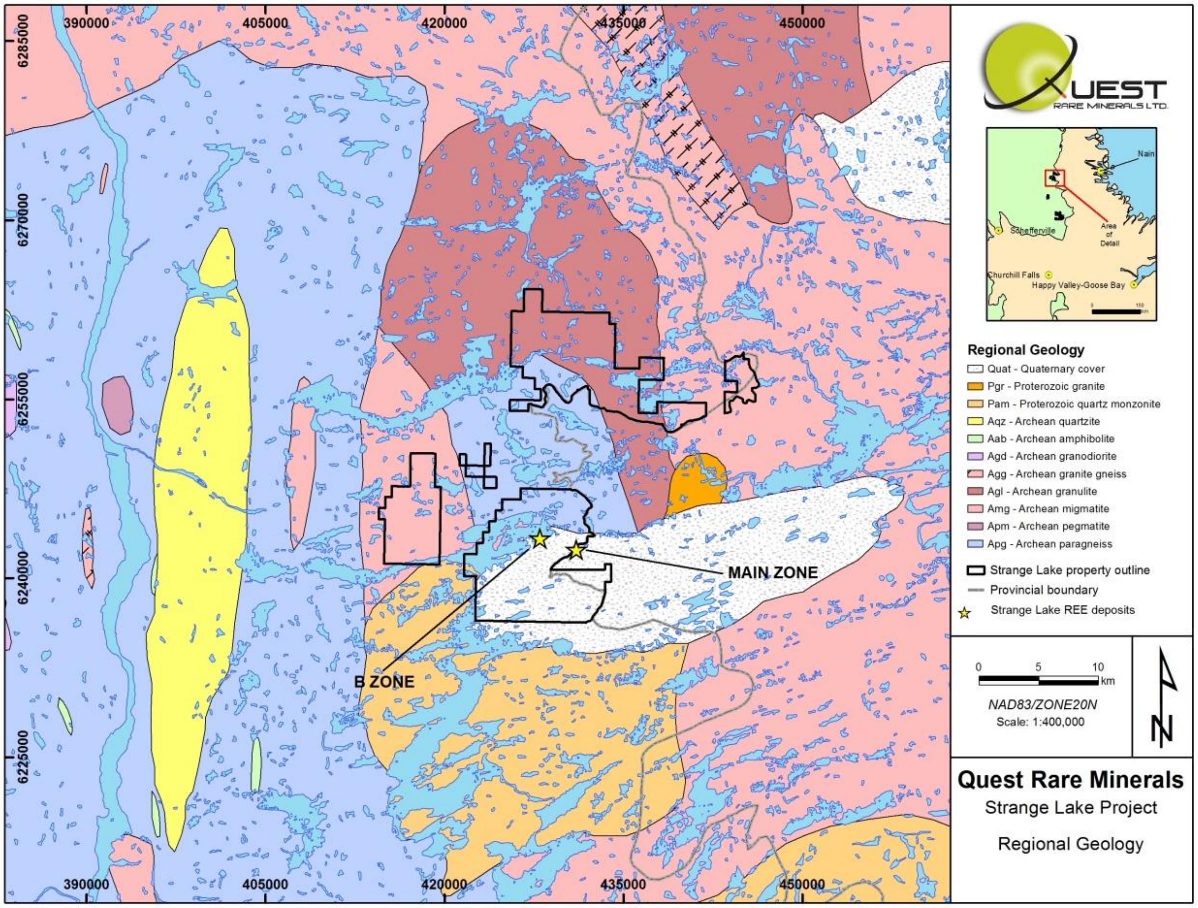
> "The Labrador Trough underlies the westernmost portion of the area and has been described in detail by Dimroth et al. (1970). The Labrador Trough is interpreted to be a passive margin wedge located along, and overlying, the eastern edge of the Superior craton. It consists of a western, dominantly sedimentary succession with some alkali basalts and an eastern, generally younger, dominantly mafic to ultramafic igneous succession comprised of tholeiitic basalts, gabbros, spilites and ultramafics."

The descriptions of the following domains are modified from Van der Leeden et al. (1999).

> "The Laporte domain consists of immature metasedimentary rocks including pelitic and semipelitic schists, gneisses, meta-arkoses and mafic metavolcanics and metagabbros, along with minor quartzite, metaconglomerate, marble metamorphosed ultramafics. Lenses of migmatized ortho- and paragneisses of granodioritic composition occur regionally within the assemblage."

The Lake Tudor Shear Zone is a regional feature of up to 20 km wide, which can be traced for over 150 km. It affects rocks of the Laporte domain to the west and of the De Pas domain to the east. Deformation within the zone is complex. Evidence exists for regional dextral shearing as well as contraction, bringing rocks in the east over rocks to the west.

Figure 7.1
Regional Geological Map of the Area Surrounding the B and Main Zones on the Strange Lake Property



Provided by Quest, November, 2013 and extracted from the December, 2013 Micon Technical Report.

A small peralkaline intrusion called the Strange Lake Alkalic Complex (SLAC) intrudes the northeastern margin of the Elsonian aged Napeu Kainiut pluton and heterolithic gneiss, possibly of Aphebian age (Salvi and Williams-Jones, 1990). This peralkaline granite commonly has been the focus of numerous academic and industry research and exploration studies (e.g. Miller, 1986; Salvi & Williams-Jones, 1990; Salvi and Williams-Jones, 1996; Salvi and Williams-Jones, 2006). The SLAC comprises several distinct magmatic units that vary in modal abundance of rock forming minerals and the relative concentrations of REE and HFSE.

Historically, IOCC geologists differentiated granitic units within the complex by texture, absence or presence of dark grey fine-grained inclusions and abundance of so-called “exotic” minerals (Miller, 1986), typically REE or HFSE bearing minerals. Accordingly, they describe three general phases: an early “exotic-poor” (i.e. REE and HFSE poor) granite, “exotic-rich” granite and pegmatitic peralkaline granite (e.g. Miller, 1986).

Subsequent examination by academic researchers differentiated these granitic phases by petrographic phase relationships: the exotic-poor granite was termed hypersolvus granite (one-feldspar system) and the exotic-rich granite was termed subsolvus (two-feldspar system). The highest concentrations of REE and HFSE are in the subsolvus granite and pegmatite-aplite phases. Recent research indicates that widespread high temperature (≥350°C) orthomagmatic sodium (Na)-rich fluids initially altered the subsolvus granites, which was followed by low temperature (≤200°C) externally derived calcium (Ca)-rich alteration fluids.

7.2 MINERALIZATION

Mineralization of interest at Strange Lake occurs within peralkaline granite-hosted pegmatites and aplites and, to a lesser degree, within the host granites, particularly in intra-pegmatitic granites.

Pegmatites and minor aplite (fine-grained pegmatite) comprise gangue with feldspar (potassic>sodic), glassy to white quartz, arfvedsonite, gittinsite, fluorite and various minor accessory minerals including titanite, allanite, pyrochlore and gadolinite, which are readily identifiable in core. Gittinsite and amphibole appear to have generally formed contemporaneously and both exhibit euhedral to subhedral morphologies. Feldspar exhibits a variable paragenetic relationship relative to arfvedsonite and gittinsite, but is commonly somewhat later in complex pegmatites and earlier in simpler, late pegmatites. Quartz is late and interstitial and fluorite, which is commonly dark purple to black, is commonly later than quartz. Arfvedsonite is typically strongly replaced by either coarse bottle green aegirine or red-brown earthy hematite and may be strongly leached to form vugs that are sometimes quartz-hematite lined. Gittinsite is typically altered to a mottled orange-pink to beige colour and spotted with very fine grey-green LREE-bearing allanite, giving a spotted salt and pepper texture. Feldspar is often altered as concentric oscillating zones or mixed hematite and fluorite, giving a mottled, often fractured appearance.

Subsolvus granite, which typically contains very fine-grained dark grey to black rounded inclusions of hypersolvus granite is the most voluminous unit in the Strange Lake Alkali Complex (SLAC) and is the principal host to REE-bearing pegmatites. Minor white-grey mm-scale reaction rims locally wrap around these inclusions. It is typically fine- to medium-grained (i.e., less than 1 cm) comprising variably altered feldspar (sodic>potassic?), intergranular white-grey quartz, subhedral variably altered arfvedsonite, interstitial/poikilitic gittinsite and euhedral ghosts of narsarsukite; wispy pale purple or interstitial dark purple fluorite is ubiquitous. Extensive albitization of the granite creates an overall granular to sugary appearance in the groundmass while arfvedsonite, which commonly exhibits a bimodal grain size of fine mm-scale anhedral grains and relatively coarser-grained euhedral crystals, is variably altered or may be fresh. Similar to arfvedsonite in pegmatites, arfvedsonite is commonly altered either by aegirine, particularly proximal to pegmatites, or earthy brown-red hematite; large portions of the B Zone exhibit fresh arfvedsonite in a variably altered matrix. Narsarsukite, which is grey when unaltered, is often tan-beige, indicating replacement by titanite. Gittinsite is variable in colour, but is commonly partially replaced by dark grey-green LREE-bearing allanite; replacement may take the form of salt and pepper spotting as in pegmatites or as amorphous patches. Alteration typically developed in the host subsolvus granite is not typically developed in the inclusions.

Table 7.1 below illustrates the elements and common oxides that occur in the B Zone deposit and Table 7.2 contains a list of pegmatite minerals. Unless otherwise stated, references to TREO include Y_2O_3.

Table 7.1
List of Elements and Oxides Associated with Rare Earth Metal Mineralization

Element	Element Acronym	Common Oxides	
Associated Elements and Oxides			
Zirconium	Zr	ZrO_2	
Niobium	Nb	Nb_2O_5	
Hafnium	Hf	HfO_2	
Beryllium	Be	BeO	
Uranium	U	U_3O_8	
Thorium	Th	ThO_2	
Yttrium	Y	Y_2O_3	
Light Rare Earth Elements and Oxides			
Lanthanum	La	La_2O_3	
Cerium	Ce	CeO_2	
Praseodymium	Pr	Pr_6O_{11}	
Neodymium	Nd	Nd_2O_3	
Samarium	Sm	Sm_2O_3	
Heavy Rare Earth Elements and Oxides			
Europium	Eu	Eu_2O_3	**TREO**
Gadolinium	Gd	Gd_2O_3	
Terbium	Tb	Tb_4O_7	
Dysprosium	Dy	Dy_2O_3	
Holmium	Ho	Ho_2O_3	
Erbium	Er	Er_2O_3	
Thulium	Tm	Tm_2O_3	
Ytterbium	Yb	Yb_2O_3	
Lutetium	Lu	Lu_2O_3	

Provided by Quest.

Table 7.2
List of Minerals and Formulae Found in the B Zone

Mineral Name	Mineral Formula
Quartz	SiO_2
K-Feldspar	$KAlSi_3O_8$
Aegirine	$NaFe^{+3}Si_2O_6$
Zircon	$ZrSiO_4$
Gittinsite	$CaZrSi_2O_7$
Titanite	$CaTiSiO_5$
Feldspar (Albite)	$NaAlSi_3O_8$
Fe-oxide/hydroxide	FeOOH
Fluorite	CaF_2
REE-Epidote (allanite)	$(Ce,Ca,Y)_2(Al,Fe^{+3})_3(SiO_4)_3(OH)$
Pyrochlore	$(Na,Ca)_2Nb_2O_6(OH,F)$
Arfvedsonite	$NaNa_2(Fe^{+4}Fe^{+3})Si_8O_{22}(OH)_2$
Milarite	$K_2Ca_4Al_2Be_4Si_{24}O_{60}\bullet(H_2O)$
Gerenite/Gadolinite/Kainosite	$(Ca,Na)_2(Y,REE)_3Si_6O_{18}\bullet2(H_2O)$/ $Y_2Fe^{+2}Be_2Si_2O_{10}$/ $Ca_2(Y,Ce)_2Si_4O_{12}(CO_3)\bullet(H_2O)$
Chlorite	$(Mg,Fe^{+2})_5Al(Si_3Al)O_{10}(OH)_8$
Thorite	$ThSiO_4$
Calcite	$CaCO_3$
Apatite	$Ca_5(PO_4)_3(OH,F,Cl)$
Monazite	$(La,Ce,Nd)PO_4$

Provided by Quest.

8.0 DEPOSIT TYPES

The following has been extracted from the December, 2013 Technical Report by Micon.

The Strange Lake deposit is part of a post-tectonic, peralkaline granite complex which has intruded along the contact between older gneisses and monzonites of the Churchill Province of the Canadian Shield.

The granite complex is sub-circular and comprises a series of compositionally and petrographically distinct granites, which can be differentiated based on petrography (one feldspar versus two) and relative concentrations of the REE and HFSE, which generally exhibit unique ranges that are characteristic of each granite. These granites (see Figure 7.1, above) are in sharp contact with the surrounding country rocks and the apparent contact between the granite complex and country rocks is outward dipping at 20º to 30º. A structural zone comprising stockwork fluorite-hematite veining and hematite-fluorite breccia occurs discontinuously along the contact between the SLAC and country rocks. The least fractionated granite is a fine-grained, massive hypersolvus granite and it exhibits the lowest concentrations of REE and HFSE in the complex; it occurs in the geometric centre of the complex. This granite is surrounded by a medium-grained, massive subsolvus granite that exhibits a distinct enrichment in REE and HFSE. Within the subsolvus granite, pegmatite and aplite sheets and dikes occur, and these are the main host to REE and HFSE mineralization and represent the latest, most fractionated phase of magmatism in the complex.

8.1 GENETIC MODEL

Within the SLAC, there is a progressive enrichment in REE and HFSE, from a relatively low abundance in the hypersolvus granites, to a relative enrichment in the subsolvus granites. During the crystallization sequence, high-temperature, Na-rich fluids altered portions of the subsolvus granite, resulting in a relative depletion in Zr, Y, and REE relative to subsolvus granites that were not enriched in Na. It has been postulated that during the evolution of the subsolvus granites in the SLAC, the above elements were mobilized by Ca-free, fluorine (F)-rich fluids, forming REE-fluorine complexes. Subsequently, externally-derived Ca-rich low-temperature fluids began mixing with F-rich fluids that were concentrated in the carapace of the intrusion; the calcium caused a destabilization of the fluorine complexes and resulted in the precipitation of low temperature REE and HFSE bearing phases and fluorite. Thus, formation of the SLAC (or other peralkaline-hosted REE deposits) requires multiple phases of alteration including the evolution of a fluorine-rich fluid to concentrate and mobilize REE and HFSE and the subsequent introduction of destabilizing Ca-rich fluids resulting in REE precipitation in order to form potentially economically exploitable mineralization.

The SLAC is comparable to other REE deposits such as the Khaldzan-Buregte REE-Nb-Zr deposit in Western Mongolia. This deposit has similar mineralogy both in the granite hosts and ore mineralogy consisting of Na-K feldspar, quartz, albite, arfvedsonite, aegirine, fluorite in the host granite and mineralized material made up of elpidite, gittinsite and zircon, as well as pyrochlore and rare metal fluorcarbonate minerals, monazite and polylithionite. The Khaldzan-Buregte REE deposit is thought to have formed at least in part due to metasomatism of the REE-rich peralkaline granite after its emplacement. The surrounding and REE-poor peralkaline granites and mafic rocks did not concrete REE, similar to the SLAC where the mineralization is predominantly in the more evolved, REE-rich, subsolvus granite, aplite and pegmatites and not in the REE-poor, hypersolvus or surrounding quartz monzonite and gneisses. Although the SLAC is similar in (bulk) composition and overall formational processes to the Khaldzan-Buregte REE deposit it differs in that it is not associated with mafic igneous rocks and does not have many discrete magmatic pulses whereas the Khaldzan-Buregte REE deposit has several documented pulses.

Zr-Nb-REE mineralization in the peralkaline granites from the Amis Complex in Namibia also exhibit similar REE and HFSE enriched magmas and mineralogy to the SLAC but on a much smaller scale. This Zr-Nb-REE mineralization is thought to be magmatic in origin with post magmatic alteration demonstrated by replacement reactions and interstitial and vein-filling REE+Y rich fluorocarbonates.

The underlying similarities between these deposits and the SLAC is that they are peralkaline, A-type granites with magmas that were originally enriched in REE and HFSE prior to the metasomatism, which allowed for mobilization of the immobile elements though halogen-rich fluids resulting in further concentration and subsequent precipitation of secondary of REE rich minerals.

Micon notes that the exploration programs at the Strange Lake project have been planned and executed on the basis of the deposit model discussed above.

9.0 EXPLORATION

The following has been extracted from the December, 2013 Technical Report by Micon

9.1 GEOPHYSICAL SURVEYS, 2008 TO 2012

During the 2008 exploration season, Quest conducted a campaign of helicopter-borne geophysical surveys that consisted of airborne radiometric and magnetic geophysical surveys. MPX Geophysics Ltd. (MPX) was contracted by Quest to conduct the surveys over the Property. A total of 614.7 line km of north-south lines were flown, on 400-m flight line spacing over the Strange Lake Property at a nominal height of 40 m. An additional 71.0 line km of east-west lines were flown as tie-lines for a total of 685.7 line km.

The instrumentation included a differential real time Global Positioning System (GPS), and a Pico-Envirotec GRS-10 multi-channel gamma-ray spectrometer system, and a high sensitivity magnetometer installed on a single sensor fixed boom, seven feet in front of the helicopter rotor blade. The helicopter used was an AS350BA.

During the 2009 exploration season, Quest also conducted an airborne geophysical survey over two other exploration targets to the west and to the south of the Property. The B Zone deposit was not included in this survey.

No additional geophysical surveys were carried out in either 2010 or 2011.

In March and April, 2012, the Geological Survey of Canada conducted a high resolution airborne gravity and magnetics survey over the Strange Lake property as part of the TGI-4 initiative. The results of this survey are publically available.

Quest with the assistance of Abitibi Geophysics Inc. of Val d'Or, Quebec conducted a geophysical investigation of the B Zone to define geophysical signatures of the deposit that can be applied to the identification of new REE deposits both at Strange Lake and elsewhere. The survey comprised a ground dipole-dipole IP-resistivity survey and a walking magnetics survey on behalf of Quest. The IP-resistivity survey was conducted at 100 m spacing and covered approximately 62 line-km and the magnetics survey covered approximately 57 line-km. The results indicate that IP resistivity is capable of broadly distinguishing REE mineralization compared to unmineralized granite, but there are conflicting results between the geometry of the intrinsic and interpreted geology and that of the geophysical models.

9.2 EXPLORATION, 2009 TO 2011

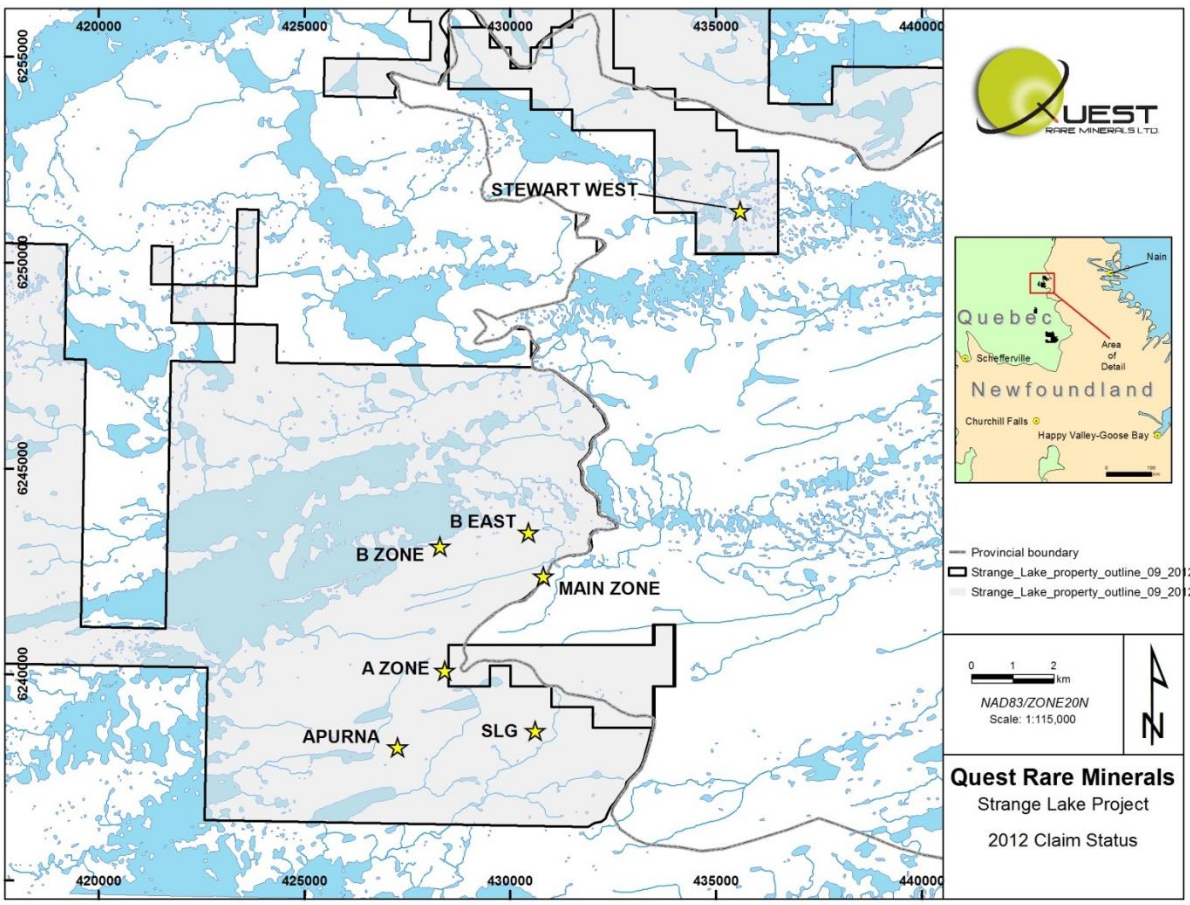
During the 2009, 2010 and 2011 exploration seasons, Quest collected a total of 1,170 samples from the property, comprising 326 in 2009, 388 in 2010 and 456 in 2011. Samples were collected during prospecting, bedrock mapping and channel sampling. Geological mapping was conducted to further delineate historical geological maps, while channel sampling was done as follow-up on anomalous bedrock areas proximal to the B Zone. Figure

9.1 shows the exploration target areas on the property. Table 9.1 is a summary of the samples collected during 2009, 2010 and 2011 exploration and Figure 9.2 illustrates the locations of all 2009, 2010 and 2011 surface samples collected from the property. Many samples outside the current property boundary reflect recent reductions in the property limits and these samples were formerly within the property.

9.3 GEOLOGICAL MAPPING, 2009 TO 2011

Geological mapping conducted during the 2009, 2010 and 2011 exploration programs was focused within the extents of the SLAC. The purpose of mapping was to increase the accuracy of historical geology maps of the SLAC and to provide context for channel samples in an area of complex structure and geology south of the B Zone termed the fluorite-hematite breccia zone (FLBX). Mapping samples were generally restricted to outcrop.

Figure 9.1
Exploration Target Location Map



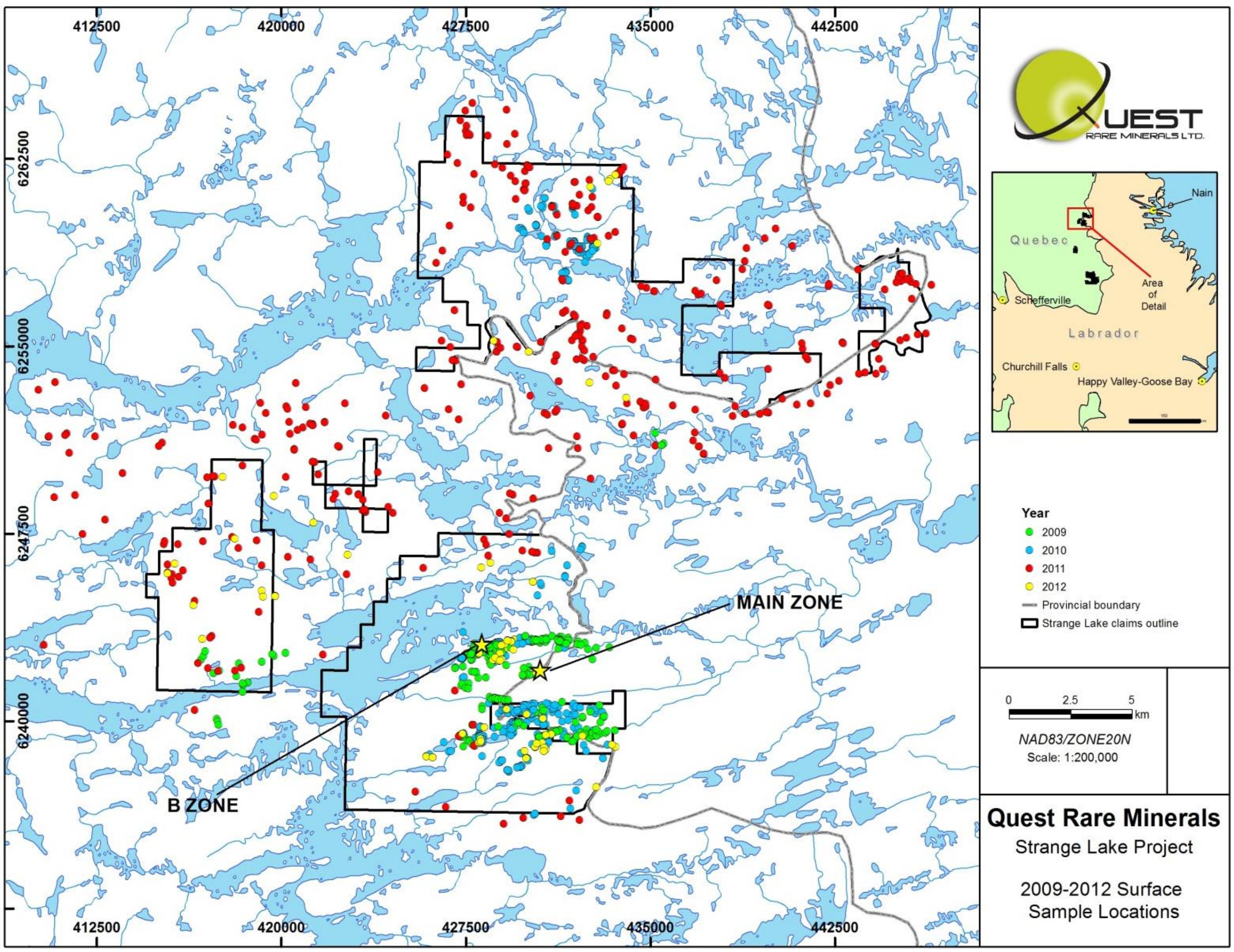
Micon December, 2013 Technical Report.

Table 9.1
Summary of 2009 to 2011 Surface Sampling

Year	Mapping/Prospecting		Channel Sampling	Total
	Outcrop	Float	Outcrop	
2009	89	224	13	326
2010	142	158	77	377
2011	265	149	42	456
2012	83	1	-	84
Total	579	532	132	1,243

Provided by Quest.

Figure 9.2
Exploration Surface Sample Location Map



Micon December, 2013 Technical Report.

9.4 Geological Mapping 2012

In 2012 Quest conducted a property-wide bedrock mapping program to rule out any undiscovered REE or other types of mineralization on the Strange Lake property. A total of 84 samples were collected during this program. The results do not affect the resource calculations conducted in 2011.

9.4.1 Strange Lake B-Zone Prefeasibility Study Work

A 1,000-m drilling program was planned by AMEC of Mississauga, Ontario to drill geomechanical and geotechnical monitoring holes for the PFS. These holes were drilled within the proposed pit shell and along its northern edge. In addition, a 150 m decommissioning drilling program was planned, south of the B Zone deposit, to assist with the location of the potential mine's infrastructure.

Prefeasibility field work on the B-Zone project commenced in July, 2012 with completion later in 2012. AECOM conducted environmental and off-site infrastructure surveys. All field work in the northern project area was completed in 2012.

9.5 Micon Comments

Exploration surface sampling is generally restricted to the outcrops mapped on surface. In general the surface sampling is just used to identify the mineralization, if any, contained in the rocks exposed in the outcrop. While some samples may contain significant mineralization they are generally used to potentially identify the extensions of previously identified zones or in some cases new zones. In all cases, the surface sampling was not used in the resource estimation process. It is for these reasons that any significant assays for the surface sampling were not tabulated or identified since they are only an exploration tool.

In general terms, the surface samples are representative of the mineralized material that is identified on the Strange Lake property. The grade of the individual samples appropriately reflects the variability of the mineralization contained in the deposit and within the various rock types at the Strange Lake project.

10.0 DRILLING

The following has been extracted from the December, 2013 Technical Report by Micon. There was no drilling conducted on the Strange Lake Project in 2013.

10.1 DRILLING, 2009

10.1.1 2009 Drilling Program

Quest completed a drill program on the Strange Lake property between July and September, 2009. The drill program consisted of 3,930.5 m from 49 BQ 'thin-kerf' (BQTK) size drill holes over the B Zone and Main Zone deposits. A total of 19 drill holes were completed on the B Zone totalling 2,180.7 m of drilling and their locations are shown in Figure 10.1 and listed in Table 10.2. The remaining 30 drill holes were conducted on the Main Zone and are not the subject of this report. An additional five drill holes, totalling 340.0 m, were conducted for bulk sampling purposes.

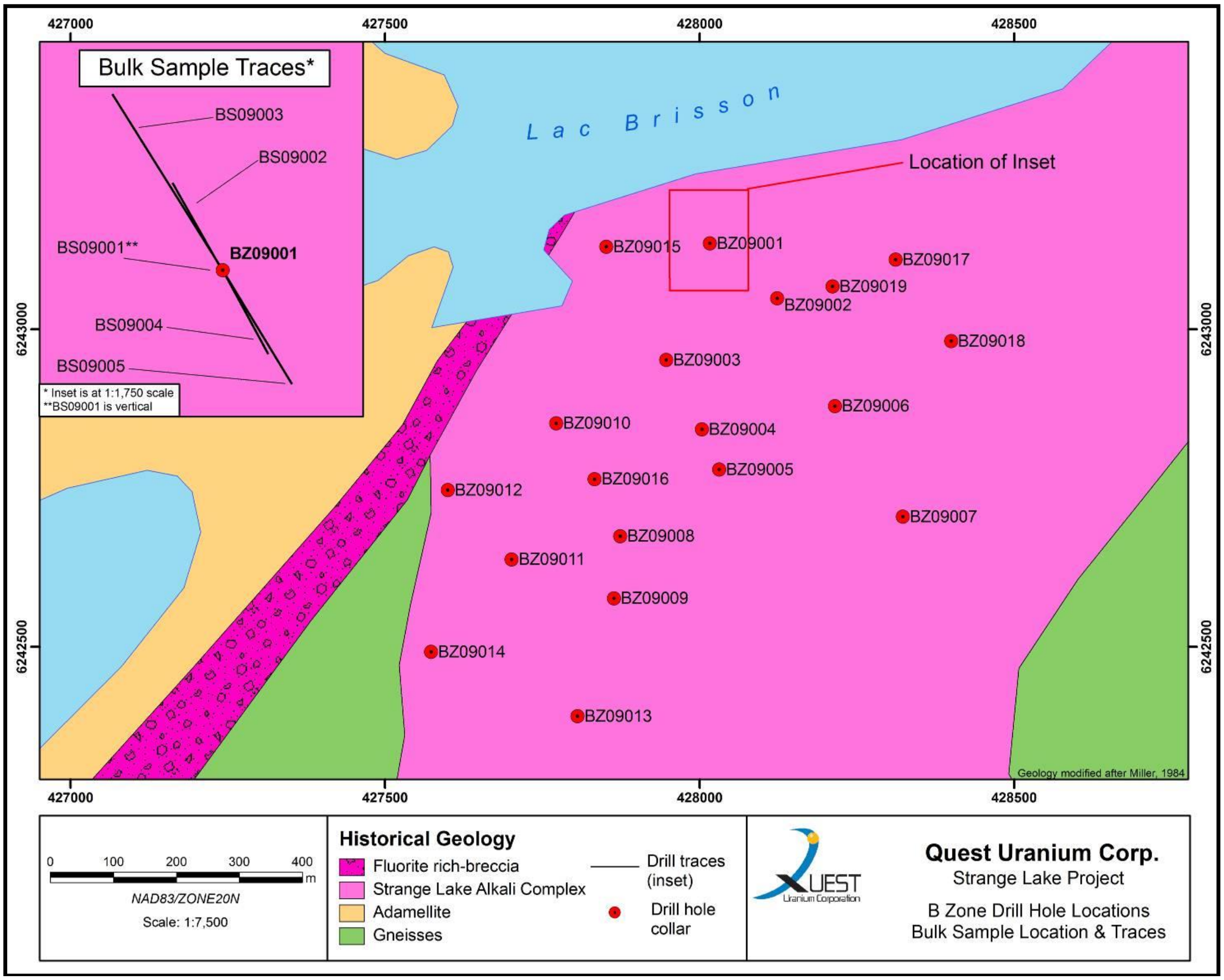
Quest contracted Boreal Drilling, based in Val d'Or, Québec, to carry out the drilling for the 2009 drill program. The drilling was conducted using two Versadrill 0.8 drills. The drill program was supported by helicopters from Canadian Helicopters, based out of Sept-Îles, Québec, using a Bell206L and a Eurocopter B2 (A-Star). Boreal Drilling is an independent drilling contractor which works on a fee for service basis.

The drill program over the B Zone was conducted to confirm historic drilling by IOCC and to test a significant airborne radiometric anomaly, approximately 2,000 m by 500 m, that surface sampling confirmed was related to REE-mineralized boulders and outcrop.

All 19 drill holes in the B Zone encountered pegmatite-hosted REE mineralization with the mineralization thickness ranging up to 36.17 m and averaging 13.45 m. The core length of the mineralization is approximately the true thickness as the drill holes are, with the exception of BZ09015, all sub-vertically dipping and the lithological and mineralized units appear to dip gently (5° to 10°) to the northwest.

The drill core was logged on site and entered directly into Gemcom Gemslogger™ and all drill core was photographed prior to sampling. The drill core was sampled on intervals ranging from 0.2 m to 2.0 m, split in two halves with one half collected for analysis and the second half replaced in the core box for record keeping. The drill core boxes from the 2009 drill program are stored at Quest's Mistinibi Camp, located 45 km south of the B Zone deposit.

Figure 10.1
B Zone 2009 Drill Hole Location Map



Micon December, 2013 Technical Report.

Table 10.1
Summary of 2009 B Zone Drilling

Drill Hole	UTM[1] Easting	UTM[1] Northing	Elevation (masl)	Bearing (°)	Dip (°)	Length (m)
BZ09001[2]	428016.069	6243135.246	449.004	0	-90	101.0
BZ09002	428123.161	6243049.776	455.807	0	-90	75.0
BZ09003	427946.934	6242952.709	460.367	0	-90	75.5
BZ09004[2]	428003.607	6242842.408	474.385	0	-90	101.0
BZ09005	428031.147	6242779.245	486.724	0	-90	125.0
BZ09006	428215.196	6242879.106	482.379	0	-90	112.5
BZ09007	428322.788	6242704.763	518.328	0	-90	152.0
BZ09008[2]	427873.632	6242674.166	488.948	0	-90	93.5
BZ09009[2]	427863.717	6242576.185	500.547	0	-90	136.0
BZ09010	427771.970	6242852.044	461.225	0	-90	101.0
BZ09011	427701.191	6242637.601	478.877	0	-90	112.7
BZ09012	427599.707	6242746.605	463.167	0	-90	102.5

Drill Hole	UTM[1] Easting	UTM[1] Northing	Elevation (masl)	Bearing (°)	Dip (°)	Length (m)
BZ09013	427805.865	6242390.381	521.959	0	-90	144.5
BZ09014	427573.176	6242491.753	492.824	0	-90	150.5
BZ09015[2]	427851.484	6243130.114	446.379	147	-60	111.0
BZ09016[2]	427832.723	6242764.085	472.420	0	-90	104.0
BZ09017	428311.257	6243109.844	458.376	0	-90	110.0
BZ09018	428399.866	6242981.378	476.914	0	-90	120.0
BZ09019	428211.257	6243067.634	459.027	0	-90	101.0

[1] UTM coordinates are based on the NAD83 datum, Zone 20.
[2] Drill hole deepened in 2010.
Provided by Quest.

All 2009 drill hole collars, at the Strange Lake Project, were surveyed by Groupe Cadoret, based in Baie-Comeau, Québec. All collars were surveyed with an R6 and R8 Trimble real time differential GPS and were surveyed to an accuracy of 0.001 m. Groupe Cadoret is an independent surveying contractor which works on a fee basis.

All down-hole surveys were conducted on all drill holes using a Reflex EZ-AQ, a magnetic surveying instrument. The Reflex instrument was calibrated at the factory before being used in the field.

10.1.2 Bulk Sample Drilling, 2009

In addition to the diamond drill program, a bulk sample was collected from an additional five-hole drill program for the purpose of metallurgical test work.

Bulk sampling drilling was conducted by the same drilling contractor at the BZ09001 drill site. A total of five BQTK-size drill holes were completed for the bulk sample, for a total of 340.0 m, drilled in a fan pattern (see Figure 10.1) at the drill site and are listed in Table 10.2. The bulk sample drilling was conducted from one drill site at various intersecting angles to the lithology and mineralization trend to minimize the costs of moving the drill to other sites.

Table 10.2
Summary of the 2009 Bulk Sample Drilling

Drill Hole	UTM Coordinates		Hole Description			
	Easting	Northing	Elevation (masl)	Bearing (°)	Dip (°)	Length (m)
BS09001	428016	6243135	449	0	-90	45.5
BS09002	428016	6243135	449	330	-75	50.0
BS09003	428016	6243135	449	330	-50	119.0
BS09004	428016	6243135	449	150	-75	50.0
BS09005	428016	6243135	449	150	-50	75.5
Total						**340.0**

Provided by Quest.

The core was logged without detail, photographed, and sampled into three separate categories of high grade, low grade, and altered; the difference between low grade and altered is small. The grade category was determined using a Niton XRF analyzer. The logged core weights were approximated on site by using the core volume multiplied by a density of 2.85. The bulk sample weight was approximately 1,014 kg.

The whole drill core was taken for the bulk sample. The drill core was logged at the drill site, bagged on sample intervals and placed in metal 200-L fuel drums. The drums were wire-sealed and sent by de Havilland DHC-2 Beaver aircraft directly to Schefferville from Lac Brisson. Only two trips were required for three drums of samples. From Schefferville, the drums travelled by train to Sept-Îles where they were transferred to truck transport to Val d'Or, under the care of Boreal Drilling. From Val d'Or the samples were trans-shipped to Montreal and from Montreal to Boulder, Colorado where they were received by Hazen.

These samples were used for metallurgical testwork by Hazen under a program completed in November, 2010.

10.2 DRILLING, 2010

From July to October, 2010, Quest completed an extensive diamond drill program on the Strange Lake Property that consisted of approximately 14,270 m of 78 BQ 'thin-wall' (BTW) size drill holes in the B Zone deposit as well as deepening of some the 2009 drill holes. The aims of the 2010 drilling program were both to infill and to continue to define the limits of the known deposit and resource base. The drill program brought the total number of drill holes, excluding the 2009 bulk sample holes, completed on the B Zone to 97 for a total of approximately 17,474 m. The drill hole collar locations for the 2010 drill programs are shown in Figure 10.2. A summary of the drill holes is contained in Appendix B of the May, 2011, Wardrop Technical Report.

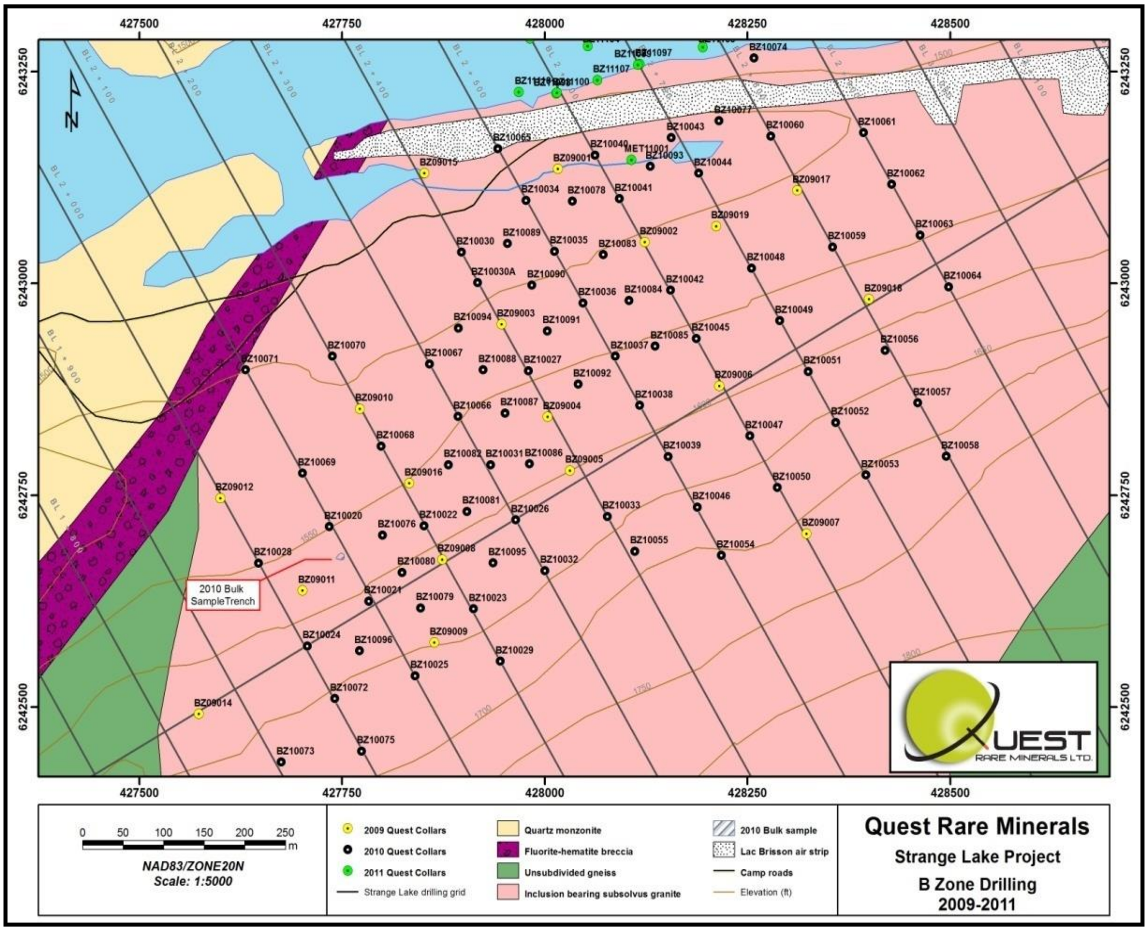
Quest retained Boreal Drilling (Boreal) to conduct the 2010 diamond drilling program. Boreal is an independent contract drilling company based out of Val-d'Or. The drilling was conducted using Versadrill 0.3 drills and was supported by Eurocopter BA (A-Star) helicopter from Canadian Helicopters, based in Sept-Îles.

All 78 drill holes from the 2010 drill program encountered pegmatite-hosted REE mineralization with thickness ranging up to 53 m (BZ10040) and averaging 15 m. The thickness is approximately the true thickness as the drill holes plunge sub-vertically (with the exception of BZ09015 and BZ10030), while the lithology and mineralized units are sub-horizontal or dip gently, approximately 5° to 10°, to the northwest.

Drill core was logged on site and entered directly into Gemcom Gemslogger™ software and sampled on intervals ranging from 0.2 m to 2.0 m. Once completed, the drill core was sawn in half with one half collected for analysis and the second half replaced in the core box for permanent record keeping. All drill core was photographed after the core was sawn in half.

The drill core boxes from the 2010 drill program are stored on site, in outdoor core racks at Quest's Strange Lake exploration camp. This is located adjacent to the B Zone, on the edge of Lac Brisson.

Figure 10.2
2010 Drill Program, Drill Hole Location Map



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All 2010 drill hole collars, at the Strange Lake Project, were surveyed by Corriveau J.L. & Associates Inc., (Corriveau) based in Val-d'Or, Québec. All collars were surveyed with an R8 Trimble real time differential GPS and were surveyed to an accuracy of ±0.03 m horizontal (X-Y) and ±0.05 m vertical (Z). Corriveau is an independent licensed federal and provincial Québec land surveyor (QLS) which works on a fee for service basis.

10.3 DRILLING, WINTER 2011

Quest conducted winter and summer drilling at Strange Lake on a variety of areas within the intrusion. A total of 25,425.3 m of drilling was completed over 224 holes.

A winter drilling program was conducted between March and April, 2011 at two different locations. At the B Zone, 22 holes, including one designed specifically for metallurgy were drilled for a total of 3,005.6 m. In Labrador, a joint venture program between Quest and Search Minerals and its subsidiary, Alterra, conducted four holes for a total of 310.3 m on the Alterra project. Drilling at the B Zone except the metallurgical hole was conducted on the ice at Lac Brisson to target the extension of pegmatite mineralization under the lake. Drilling at the B Zone successfully intersected pegmatite-hosted REE mineralization in all 22 holes. At the Alterra project, drilling intersected pegmatite in three of four holes drilled.

10.4 DRILLING, SUMMER 2011

During the summer drilling program at the Strange Lake project, drilling expanded beyond the B Zone. Drilling at the B Zone was focused on definition drilling, infilling areas between the 2009 and 2010 holes, and also following unconstrained mineralization in the southwest, east and north of the deposit. B Zone definition drilling totalled 17,257.0 m over 138 holes and 3,515.1 m over 29 additional holes for metallurgical purposes. Drilling at the B Zone was successful in further delineating the pegmatite continuity as well as determining the edges of the pegmatite system. Although not all holes intersected pegmatite mineralization, background TREO in the granites was consistent with results from the previous seasons. Drilling in 2011 was conducted at a high enough resolution to allow for generalized three-dimensional geological modelling of the pegmatites and alteration types.

Drilling at the FLBX target included three holes for a total of 360.0 m. The FLBX drilling was focused on intersecting the subsurface projection of REE-mineralized veins, fractures, aplite dikes and quartz-rich pegmatites all of which cross-cut the Archean country rock augen gneisses. Drilling successfully intersected narrow REE-mineralized aplite dikes and pegmatites from the SLAC in all three holes.

Drilling at an area called “Proposed Airport 6” or PA6, was planned to test for REE mineralization along the strike length of a proposed permanent airstrip required for future development. This condemnation drilling was proposed for four holes but only a single hole was drilled in 2011, the remaining three being completed in 2012. Hole PA611002, 63.0 m deep, did not intersect any pegmatite, but pervasive hematite alteration similar to the B Zone occurred from top to bottom and average TREO grades for the granite were similar to that of the B Zone granites.

Condemnation and geotechnical drilling was undertaken in the summer of 2011. Condemnation drilling at an area named Proposed Tailings 1 was conducted to test for pegmatite-hosted REE mineralization in an area proposed for tailings storage and totalled 679.2 m over 10 holes. Geotechnical drilling was conducted at the B Zone. Groundwater monitoring wells were drilled west of the proposed tailings storage area and several condemnation holes in the Proposed Tailings 1 storage area were twinned for installation of monitoring wells. In total, geotechnical and groundwater drilling totalled 217 m in 17 holes. Groundwater monitoring holes did not penetrate bedrock and contribute zero metres to this total. It should be noted that the PFS did not envisage processing and tailings disposal at the mine site.

Winter drilling at the B Zone is presented in Figure 10.3 and summer drilling areas are shown in Figure 10.4.

Figure 10.3
2011 Winter Drill Program, Drill Hole Location Map for B Zone

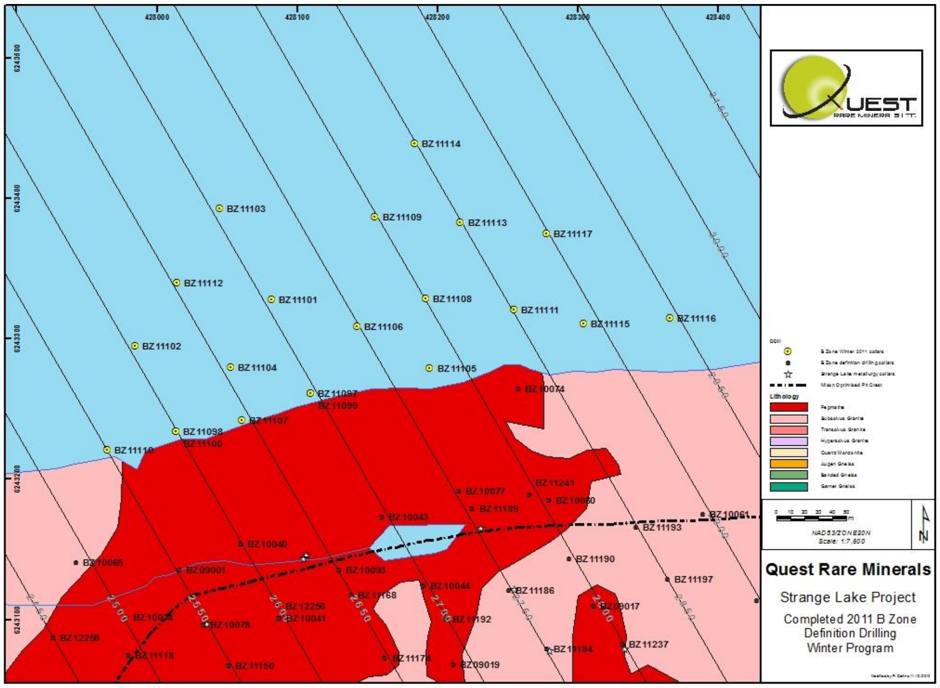

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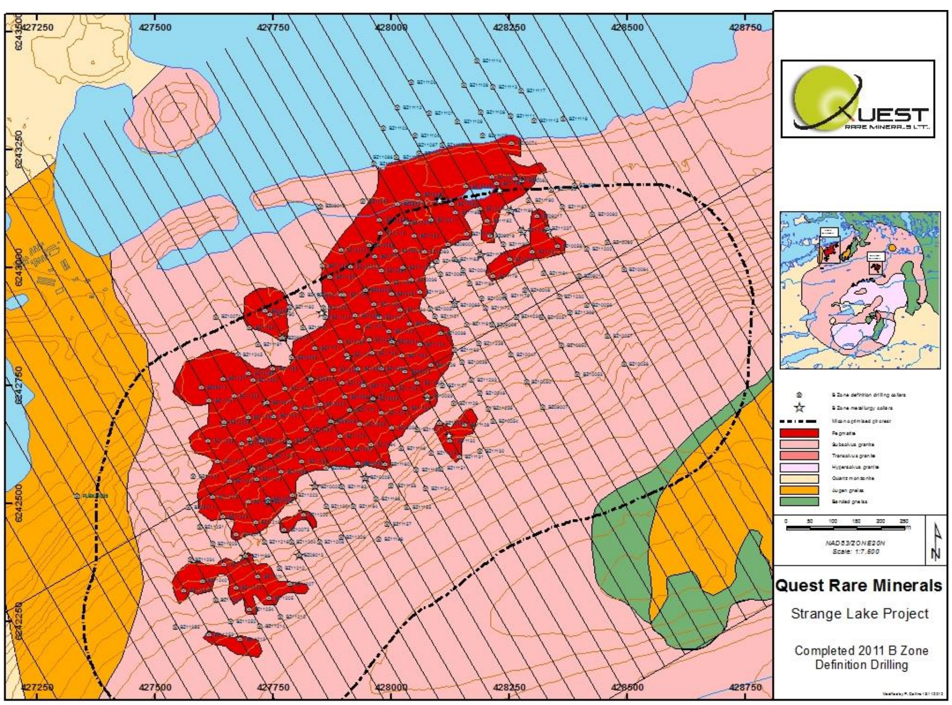
Figure 10.4
2011 Summer Drill Program, Drill Hole Location Map for B Zone



Micon December, 2013 Technical Report.

The 2011 drilling at Strange Lake is summarized in Table 10.3 with the detailed drill hole collar data presented in Appendix 2 of Micon, 2012.

Table 10.3
Summary of 2011 Winter and Summer Drilling Programs

Zone	Meterage	Number of Holes
Alterra	310.31	4
B Zone	20,110.62	159
Metallurgy	3,667.11	30
FLBX	360.00	3
Geotechnical	217.00	17
Proposed Airport 6	63.00	1
Proposed Tailings	697.24	10
Grand Total	**25,425.28**	**224**

The 2011 drill program was contracted to Boreal Drilling. The drilling was conducted using Versadrill KmB 0.3 drills and was supported by up to two Eurocopter B2 (A-Star) helicopters from Canadian Helicopters, based out of Sept-Îles, Québec. The helicopter and crews were permanently stationed at Quest's exploration camp.

Drill core was logged on site and entered directly into Gemcom Gemslogger™ software and subsequently exported to Quest's SQL drilling database. Sampling was conducted in intervals ranging from 0.5 m to 2.0 m. Once completed, the drill core was sawn in half with one half collected for analysis and the second half replaced in the core box for record keeping. All drill core was photographed prior to the core being sawed in half but after sample intervals had been marked on the core.

As in 2010, the core boxes containing the half-core from the 2011 program were stored on site, at Quest's Strange Lake exploration camp.

As in 2010, all 2011 drill collars were surveyed by Corriveau. All collars were surveyed with a Leica VIVA 2 mobile real-time differential GPS system linked to a Trimble 5700 base station and Zephyr antenna and were surveyed to an absolute accuracy of ±0.05 m horizontal (X-Y) and ±0.10 m vertical (Z) and a relative accuracy of ±0.02 m horizontal (X-Y) and ±0.04 m vertical (Z).

10.5 DRILLING, 2012

Subsequent to the 2011 drilling program on the B-Zone, the results of which were incorporated into the 2012 updated resource estimate, Quest conducted further drilling in 2012 on the property that did not impact the resource estimate.

During the winter of 2012, drilling was conducted at Alterra, south of the Main Zone, to follow up from results obtained during the 2011 winter drilling program here. Fourteen (14) holes were drilled at Alterra for a total of 1,541.85 m. Drilling successfully intersected REE-hosted pegmatite mineralization in thirteen of fourteen holes.

In the summer of 2012, exploration drilling program drilling was expanded beyond the B Zone to follow up on previously identified surficial mineralization. Initially, drilling was conducted at the B Zone in the southwestern extension of the deposit. Here, 1,406.35 m was drilled over 10 holes. This drilling was a combination of step-out drilling and infill, where spacing in 2011 was 100 m rather than 50 m. Pegmatite mineralization was intersected where expected during infill, increasing the confidence levels in geological modeling. Step-out drilling also intersected new mineralization in the southwest, though not all holes successfully intersected pegmatites.

Outside the B Zone, drilling for REE exploration purposes was conducted at ALTW, FLBX and SLW. Geotechnical drilling was conducted in a number of additional areas nearby to the B Zone and also more distal, such as at PA6, the proposed airport site. ALTW is a geophysically anomalous area defined by a 2012 IP-resistivity survey conducted by Abitibi Geophysics. Results here were poor and no obvious cause for the conductivity and resistivity anomalies was defined. The FLBX area is immediately south of the B Zone and may be spatially related to the B Zone. Drilling was designed to test a number of surface features including mineralized pegmatites that breach the host augen gneiss. Drilling successfully intersected the expected targets, though thicknesses were less than expected and REE grades lower than expected. SLW is a zone approximately 1,500 m southwest of the furthest south drilled holes at the B Zone. This zone was drilled on the basis of two IOCC holes that intersected but never followed up on a maximum total thickness of approximately 10 m of pegmatites. Quest drilling successfully intersected pegmatites in all three holes, ranging from a total of 1.33 m to 5.94 m of pegmatites. Table 10.4 summarizes the 2012 drilling.

Table 10.4
Summary of 2012 Drilling

Zone	Metreage	Number of Holes
Alterra	1,089.9	11
ALTW	306.0	3
B East	452.0	3
B Zone	1,406.4	10
FLBX	348.0	3
Geotechnical	950.0	24
Proposed Airport 6	194.0	3
SLW	328.6	3
Total	**5,074.8**	**60**

10.5.1 Strange Lake B-Zone Prefeasibility Study Work

A 1,000 m drilling program was planned by AMEC to drill geomechanical and geotechnical monitoring holes for the previous PFS. These holes were drilled within the proposed pit shell and along its northern edge. In addition, a 150 m decommissioning drilling program was also planned, south of the B Zone Deposit, to assist with the location of the proposed mine infrastructure. This drilling did not affect the 2012 updated mineral resource estimate conducted by Micon.

10.6 MICON COMMENTS

Micon visited the core logging facilities, reviewed the documentation and sampling procedures for the core during its 2012 visit to the site and held discussions with the geological personnel. Micon concludes that the drilling and core sampling at the Strange Lake project are conducted in a manner which provides representative samples of the mineralization and that the sampling procedures meet current industry best practice guidelines. Therefore, Micon concludes that the samples can reliably be used for resource estimations.

The 2012 drilling program did not add any further information to the data set for the B-Zone mineral resource estimate and there was no drilling conducted on the Strange Lake Project in 2013. Therefore, the 2012 mineral resource estimate remains valid and can be used as the basis for this PEA.

11.0 SAMPLE PREPARATION, ANALYSES AND SECURITY

The following has been extracted from the Micon December, 2013 Technical Report.

Written guidelines for core logging and field sampling are outlined in a Quest procedures document (Quest, 2010b, 2011 revised version). Quest supervisory staff maintains that these guidelines are rigorously followed and, while in camp, Micon did not note any deviation from these stipulated procedures and methodologies.

11.1 SAMPLING METHODS, INITIAL QUALITY CONTROLS AND SAMPLE SECURITY

Following delivery of core by the drilling contractor to the secure core shack at the Strange Lake project camp, the core boxes and core are routinely examined for damage or mislabelling and the core is entered into the local database log file for processing. A technician washes and degreases the core and then enters core and RQD (rock quality designation) measurements into the digital drill form. A geologist logs the hole using Gemcom Gemslogger™ software, taking appropriate photographic records and marking out samples for later cutting. Individual core samples are identified by sequentially numbered sample tags, part of which is later affixed to the core tray and part which accompanies the cut sample to the assay laboratory. Samples with a nominal length of 1 m to 0.5 m are normally marked out for sections of core visually deemed to be "mineralized" or "pegmatitic", while the remaining core is usually sampled at 2-m interval lengths.

Quest stipulates that all sample assay tag books are entered into a master sample tracking database and assigned to individual geological staff so that each person will be linked to the samples they collected. This database lists where standards, blanks and duplicates are inserted and differentiates drill core samples from rock samples. Sample tag books are pre-labelled to ensure that QA/QC samples are not missed or placed out of sequence. The second tag in the books should be marked, not the first. The first tag goes with the sample to the laboratory.

The Quest sampling procedure, as noted in the May, 2011 Technical Report, (Wardrop, 2011), is as follows:

> "Samples should not overlap between different rock and/or sharply defined alteration types, such as dark green alteration in the granite (this does not include presence or absence of melacratic inclusions at Strange Lake); therefore where geological and/or alteration contacts occur, the sample should be split at the contact. Mineralized or anomalous zones, including all pegmatites but otherwise defined as having elevated radioactivity and or focused zones of alteration, should aim to be 1 m or less but greater than 20 cm, while unmineralized (average background radioactivity or weakly altered) samples should aim to be 2 m long; exceptions to this may be at the end of the drill hole (last sample) if there is minimal alteration; samples should never exceed 3 m. For each sample, the from-to interval shall be marked on the core using yellow grease pencils by putting arrows at the start pointing down-hole and at the finish of the interval pointing up-hole (e.g. [□ your sample # here □]). The sample number shall be clearly marked on the core. In the case of duplicate samples, a line shall be drawn down the middle of the core and each sample number marked on either side of the line. The line is a

> guide for the technician so that they can saw the core first in half as per normal sampling and then split that half – each duplicate is thus a quarter of the core. When entering sample info for duplicates into the drilling database, duplicates should be named "Duplicate A" and "Duplicate B" – the former being the sample duplicated and the latter being the duplicate. Sample tags shall be inserted at the beginning of a sample interval and where duplicates occur, sample tags can be placed adjacent to each other at the start of the interval. All core samples are split by core saw."

Once the geological logging process has been completed, the core is moved to the sampling room, where technicians saw the core in half using water-cooled diamond-impregnated saw blades. Half of the sawn sample is placed into a plastic sample bag with the respective sample tag, while the remaining core half is returned to the core tray for archiving in core racks at a designated area of camp. The bagged samples are placed into rice bags, for a total of no more than five samples per bag so that the rice bag does not exceed 23 kg in weight, and are sealed using a nylon cinch. The individual rice bags are labelled with the sample interval, company and contact information. Once entered into the shipping database, the rice bags are transported to a secure container to await air shipment to the laboratory.

Diamond drill core and the resulting diamond drill core samples are treated in a secure manner. Drill contractors are contractually obligated to the safeguarding of collected core, until delivered to Quest at a mutually agreed to site, which in this case is the Strange Lake camp core shack. Once core is logged, sampled and samples packaged for shipment, they are temporarily stored at the core shack or another sheltered facility. Samples are batch transported by charter aircraft and delivered directly to the Activation Laboratories Ltd. (Actlabs) preparation laboratory in Goose Bay, Labrador. Once the samples have been prepared for analysis, they are shipped directly by commercial courier to the Actlabs facilities in Ancaster, Ontario for analysis. Coarse and pulp sample rejects are stored in Goose Bay, Newfoundland, at a secure Quest storage facility.

11.2 ANALYTICAL PROCEDURES AND LABORATORIES USED

Quest uses Actlabs, located at 1348 Sandhill Drive, Ancaster, Ontario, L9G 4V5 as the primary independent commercial assaying provider. The laboratory maintains an information web site at www.actlabs.com. Quest submits cut core samples to the Actlab preparation laboratory located in Goose Bay, under strict sample protocol procedures. Actlabs routinely runs its own series of blanks, duplicates and certified reference materials. The frequency of each depends on the analytical method. Actlabs is accredited to ISO 17025 for specific registered tests as per their scope of accreditation Lab# 266. It has also achieved accreditation to CAN-P-15779 which is specific to mineral analysis laboratories.

After sample preparation, core samples for the Quest project undergo several analyses for elements and lithogeochemistry, namely Actlabs codes:

> Code-8 REE Assay F Option
> Code-4Litho-Quant (11+) Major Elements fusion.
> Code-4E – XRF (for niobium).

A description of these individual assaying techniques is provided within the laboratory's "Schedule of Services and Fees". The current 2013 Canadian schedule is available at http://www.actlabs.com/files/Canada_2013_Reduced.pdf. The 2011 protocol, company sample handling, analytical methodology and sample security was reviewed and accepted by Wardrop (Wardrop, 2011), which went on to note the following:

> "All drill core and rock samples are sent by aircraft directly to Actlabs preparation laboratory in Goose Bay. Employees, officers, and directors of Quest have not conducted any sample preparation prior to the samples being sent to Actlabs.
>
> "Upon arrival at ActLabs preparation laboratory in Goose Bay, as a routine practice with rock and core, the entire sample is crushed to a nominal minus 10 mesh (1.7 mm), mechanically split (riffle) to obtain a representative sample and then pulverized to at least 95% minus 150 mesh (106 microns).
>
> "Quest's samples were prepared under ActLabs Code RX 1. This is a crush of the sample (of less than 5 kg) with up to 75% of the material passing a 2 mm screen, split to 250 g, and pulverized under hardened steel to 95% passing through 105 micron screen.
>
> "Actlabs, also as a routine practice, automatically uses cleaner sand between each sample. The quality of crushing and pulverization is routinely checked as part of Actlabs quality assurance program.
>
> "The prepared samples were then sent, by Actlabs, to their laboratory in Ancaster, Ontario, for Analysis. The remaining sample pulps and sample rejects are stored at the preparation facility in Goose Bay."

A description of the sample analyses carried out by Actlabs at its Ancaster facility is as follows:

Actlab Code: 8 REE ASSAY PACKAGE; F OPTION

Samples of 0.2-g are fused with a combination of lithium metaborate and lithium tetraborate in an induction furnace to release the fluoride ions from the sample matrix. The fuseate is dissolved in dilute nitric acid, prior to analysis the solution is complexed and the ionic strength adjusted with an ammonium citrate buffer. Subsequent analysis is by Induced Coupled Plasma Mass Spectroscopy (ICP-MS).

The fluoride ion electrode is immersed in this solution to measure the fluoride-ion activity directly. An automated fluoride analyzer from Mandel Scientific is used for the analysis. The detection limit on fluorine is 0.01% F.

Actlab Code: 4LITHO-Quant (11+) Major Elements Fusion

A 1-g sample is digested with aqua regia and diluted to 250 mL volumetrically. Appropriate international reference materials for the metals of interest are digested at the same time. The samples and standards are analyzed on a Thermo Jarrell Ash ENVIRO II simultaneous and sequential ICP, Varian Vista 735 ICP or Thermo 6500 ICP.

Actlab Code: 4E – XRF (For Niobium)

Niobium was analyzed separately by X-ray fluorescence (XRF) due to the low upper detection limit in the ICP-MS method. The trace elements analyses are done on pressed powder pellets made from 6 g of sample. Spectral interferences are corrected from pre-calculated interfering factors. Because of the trace level (<1,000 ppm) of the analytes, only the mass absorptions are corrected for matrix effects. The mass absorption coefficients are derived from measuring the Compton scatter of the rhodium (Rh)-tube. The background and mass absorption corrected intensities are then calculated against the calibrations constructed from 24 international geological reference materials.

For the exploration and resource development samples, Quest has not designated a secondary umpire laboratory and continues to use Actlabs for its routine QA/QC sample analysis for blanks, standards and duplicates. As part of the 2012 Micon review, one diamond drill hole was selected and sent out for "umpire duplicate" sampling to ALS-Chemex (ALS Global).

Umpire quarter core samples were freight delivered to the ALS Chemex preparation laboratory at 1512 Old Falconbridge Road, Sudbury, Ontario P3A 4N8. After crushing and pulverization, pulp samples were couriered to the ALS Chemex primary laboratory facilities in Vancouver, British Columbia for final analysis using analysis code ME-MS81h. This analysis uses ICP-MS methods after carrying out a lithium borate fusion prior to acid dissolution and a high sample to volume ratio in an analytical protocol that is relevant for mineralized rare earth samples. Digital data and the corresponding certificate for this work were issued as 11193099.

Actlabs and ALS-Chemex are independent of Quest.

11.3 Summary of QA/QC Procedures and Results

A Quest core sampling procedure and QA/QC protocol was developed in 2009 and was used without change to the beginning of 2011. Some minor modifications for the summer-fall drilling season on sample minimums and adherence to strict contact controls was implemented, but on the main remained unchanged through the 2012 drilling program.

A primary objective is to achieve a 5% insertion rate of QA/QC samples (i.e., standards, blanks and duplicates) into the data stream. This is done on a regular pre-set sample number basis and a frequency of every 50 samples (i.e., staggered but regularly spaced duplicate, blank and standard every sample book of 50 samples) by inserting two standard samples per hundred samples, two blank samples per hundred samples and also cutting two duplicate quarter-core samples on a per 100 sample basis.

On occasion, an additional blank may have also been inserted into the data stream following an interval of high-grade mineralization that is greater than 2 m in core length, in order to track any possible contamination that may be resulting from high grade samples. In order for all QA-QC samples to be "blind", the names of the standard and blank are not marked on the sample bag or the tag that is sent to the laboratory. Likewise, duplicate samples are not labelled as duplicates on the tags that go to the laboratory.

A similar rate of QA/QC samples is used for rock samples, with standards, blanks and duplicates inserted once per 50 samples. For exploration and resource development samples, as in the case of the drill core samples, sample tag books are pre-marked with the QA/QC samples to ensure that they are not used for rock samples.

11.4 MICON COMMENTS

Micon has reviewed or observed the procedures and protocols used for sample preparation, security and analytical procedures and finds that they meet or exceed industry standards and norms.

12.0 DATA VERIFICATION

The following has been extracted from the Micon December, 2013 Technical Report.

12.1 MICON SITE VISIT

Micon most recent visit to the Strange Lake Project was conducted between March 26 and 29, 2012. Micon was assisted during the 2012 visit by a number of employees working for Quest. During this trip, the drilling was reviewed and discussed, core sampling QA/QC was reviewed, and general exploration programs past, present and future were discussed as well as the goals and objectives of the programs.

Micon has reviewed and analyzed data provided by Quest and its consultants, and has drawn its own conclusions therefrom, augmented by its direct field examination. Micon has not carried out any independent exploration work, drilled any holes or carried out any program of sampling and assaying on the property. Micon has relied on the previous sampling conducted by Wardrop discussed in its May, 2011, Technical Report (Wardrop, 2011) as verification of the mineralization on the Strange Lake deposit, as well as its own observations during the March, 2012 site visit.

12.2 QUALITY ASSURANCE/QUALITY CONTROL VERIFICATION

Data verification of the analytical results consisted of a desktop and statistical review, a data audit in which 10% of the assay records were manually compared to signed official assay certificates and a comparative re-assaying of a randomly selected diamond drill hole.

12.2.1 Blanks

During 2011, Quest used commercially available bagged quartz silica sand as its blank sample. Prior to and during 2009, other blank materials were used, such as an internal material referred to as “Blank-Q”

An initial review of analytical results for all of the Strange Lake drilling carried out on the Main and B Zones indicates that possibly 44 samples out of a total of 276 blanks (i.e., 16%) may show some signs of sample cross-contamination. At least one sample (307750) is definitely not a blank. It is recommended that the sample results proceeding and following this sample are examined in order to verify that has not been accidently switched in the original assay certificate.

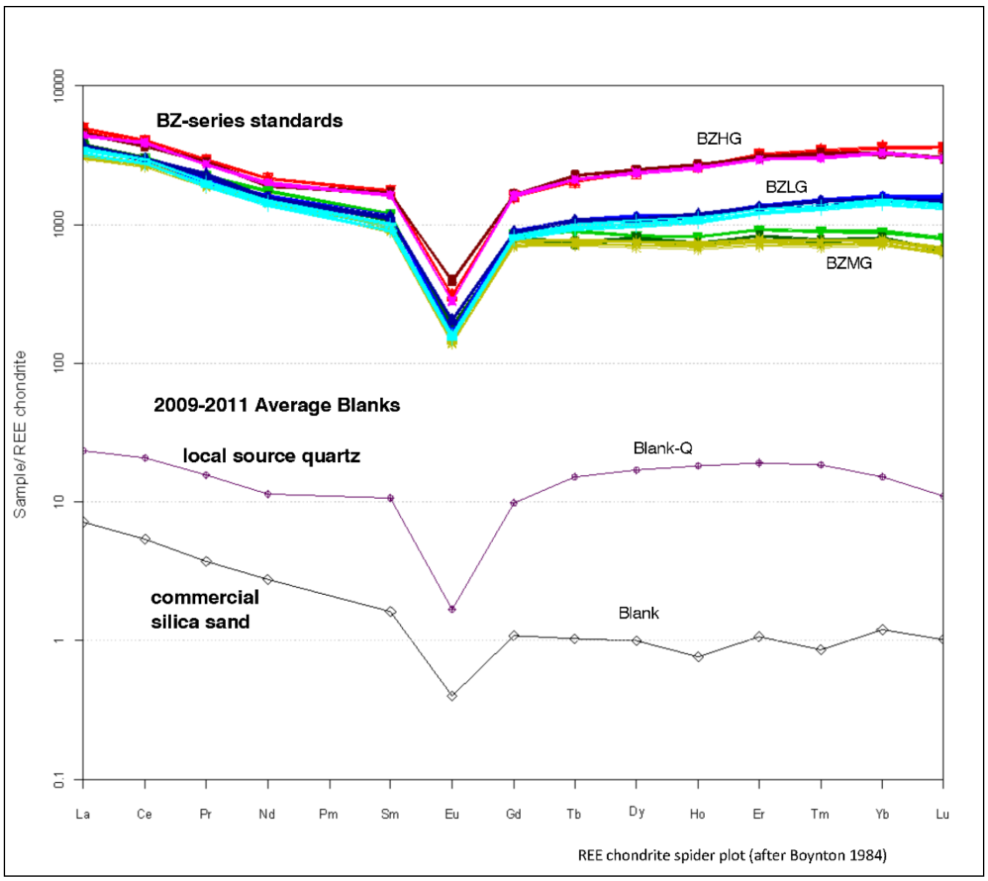
The majority of the contaminated “blanks” show elevated values of Zr, LREE and Hf. Overall, the HREE values are acceptable. All of these samples were collected in 2009. It is recommended that an expanded audit be completed to check if these samples are not simply mislabeled Blank-Q.

Blank-Q represents a visually clean quartz vein sample that was collected from a "metapelite outcrop" pit and used as a pragmatic blank during the initial exploration work in 2009 when the high purity silica blanks had been exhausted. This locally derived blank gives an acceptable average baseline to which individual sample results can be regressed to. A total of 30 such samples were identified in the diamond drilling database.

A plot of the mean Blank and Blank-Q normalized REE values is provided in Figure 12.1. A set of the mean suggested values for the three in-house Quest standards is also presented in this figure. These standards are discussed below.

Overall, the analyzed blanks were found to be of sufficient quality and no significant problems with the analytical database have been identified.

Figure 12.1
Plot of Quest Blanks and Standards



12.2.2 Control Standards

Quest has made a decision to use in-house control standards, of which several have been implemented over the years.

Prior to 2009, an internal set of standards termed STD-1 and STD-2 were prepared from material collected at a pit (at Main Zone?). Reportedly, four reference assays made for each sample in order to establish the nominal assay values. In total, 40 STD-1 and 48 STD-2 samples were found in the BZ database.

The current series of BZ-series control standards was prepared by Hazen Research Inc. (Hazen) as cut subsets from material collected in 2009 by a diamond drilling bulk sampling program. As described by Wardrop (2011), this metallurgical sample was collected by a five-hole, 340 m drill program at the BZ09001 drill site oriented at various dips and azimuths in DDH's BS09001 to BS09005 (inclusive).

> "The core was logged without detail, photographed, and sampled into three separate categories of high grade, low grade, and altered; the difference between low grade and altered is small. The grade category was determined using a Niton XRF analyzer. The logged core weights were approximated on site by using the core volume multiplied by a density of 2.85. The bulk sample weight was approximately 1,014 kg.
>
> The whole drill core was taken for the bulk sample. The drill core was logged at the drill site, bagged on sample intervals and placed in metal 200 L fuel drums. The drums were wire sealed and sent by de Havilland DHC-2 Beaver aircraft directly to Schefferville from Lac Brisson; only two trips were required for three drums of samples. From Schefferville the drums travelled by train to Sept-Îles where they were transferred to truck transport to Val d'Or, under the care of Boreal Drilling.
>
> From Val d'Or the samples were trans-shipped to Montreal and from Montreal to Boulder, Colorado where they were received by Hazen."

Of the three original logging categories, for purposes of the Quest control standards, the following apply:

"high grade" corresponds now to standard BZHG.
"low grade" corresponds to standard BZLG.
"altered" corresponds to BZMG.

In total, 45 samples of each of the three Quest standard categories were submitted for a round robin series of analysis to three laboratories (15 samples per laboratory) in order to determine the "best value" (certified value) of the standards. These samples were sent to Actlabs, ALS-Chemex and Acme Analytical Laboratories Ltd. (Acme). The recommended average values have been calculated.

The overall conclusion is that the results of the round robin testing are of an acceptable level of accuracy, for this level of in-house standards. Normal standard practice, for "in-house standards" round robin assaying is to use five independent and reputable laboratories. The 2012 set of work only used three independent laboratories for the in-house standards but even only using three laboratories the in-house standards are valid.

In comparing the Hazen head grades to the results obtained by the round robin, there is very good correlation of results at the weight percent level. This indicates that there had been very good homogenization of the bulk sample and/or very good subsampling protocols used by Hazen in splitting out material to be used for the standards. The material supplied to Hazen was primarily provided by Actlabs.

12.2.3 Control Duplicates

The Quest duplicate protocol used in 2009-2010 was to cut two quarter cores of the top-half cut of sawn core when a duplicate sample was deemed to be needed and indicated by a sample numbering scheme. The physical upper quarter, when viewed in a core box, was flagged as DUP-A, while the lower quarter was flagged DUP-B. DUP-B was also given the immediate following assay number to that of DUP-A. This system was implemented as an attempt to minimize introduced biases due to volume differences.

In the summer of 2011, when data was transferred from Target to the GEMS SQL database system, samples which had been flagged as DUP-A were listed as part of the normal data sample stream. DUP-B samples now reside in the QA/QC table as an indicated duplicate. At that time, the duplicate sampling protocol was changed to a more traditional method of cutting and submitting complete half core for assay and quartering the remaining core in the box for duplicate sample purposes.

In reviewing the 2012 GEMS databases against the 2009-2010 Target database, there appear to be five more DUP-As in Target than there are QA/QC duplicates in GEMS. This would tend to indicate that possibly five duplicate samples are missing from the current database which needs to be explained. No significant errors or biases were detected by duplicate sampling checks.

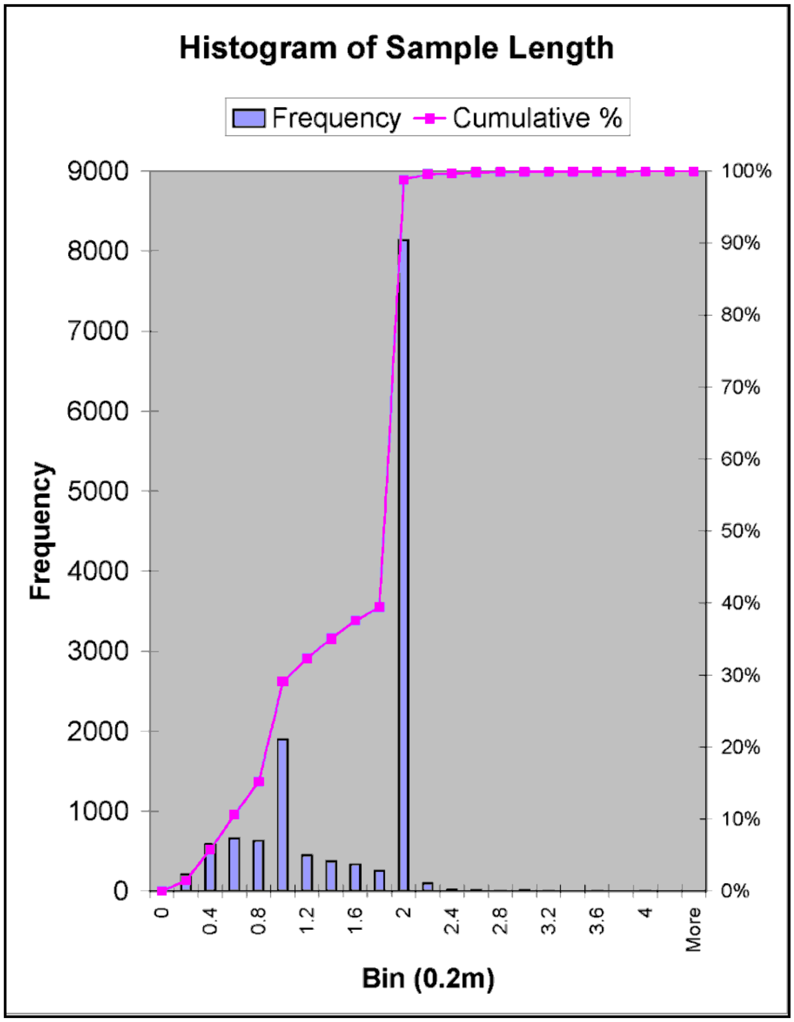
12.2.4 Sample Characteristics

The average sample length taken by Quest staff during the period of 2009 through the first quarter of 2011 was 1.56 m and a mode of 2 m (see Figure 12.2). In addition, 537 measured samples return an average density of 2.73.

12.2.5 Umpire Sampling

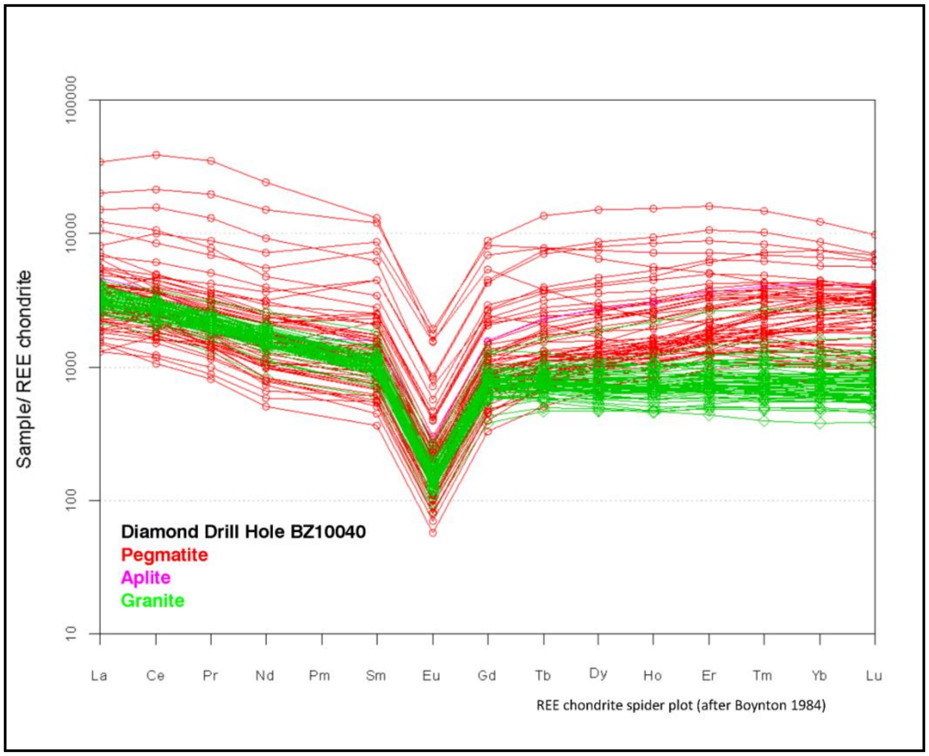
A total of 131 samples were sub-sampled by quarter-sampling one drill hole selected at random and sent to ALS-Chemex as part of a due diligence umpire checks under the direction of Micon. In addition to the quarter core, staff also inserted a set of QA/QC blanks and standards to reproduce the original data submittal set. Data were received for these samples in late October, 2011. Data are contained in an ALS-Chemex certificate numbered TM11193099 and dated October 17, 2011.

Figure 12.2
Quest Sample Length Distribution



Plots of the original DDH BZ10040 results (see Figure 12.3) show a typical negative Eu dip anomaly and horizontal "bat-wing" REE pattern developed due to elevated HREE. The sampling also clearly shows that the intersected BZ10040 samples of pegmatite versus the granite are in general elevated in HREE, but in some cases are depleted in LREE relative to granite. Note that a single aplite sample is also quite elevated in REE content.

Figure 12.3
Normalized REE Pattern of DDH BZ10040 Sampling (N = 129)



Of the 131 umpire duplicate samples submitted to ALS-Chemex, 123 samples represent fresh quarter core from the remaining original half core that was in the core racks on site; 3 samples represent Duplicate B quarter cores; 2 samples are silica sand blanks; 2 samples are BZLG standards; and 1 sample was initially submitted as a BZMG standard in 2010, but is replaced by a 2011 BZHG standard. The 2011 resampling retains the same sample numbering system as the original. Table 12.1 summarizes the results of the control samples.

Table 12.1
2011 Submitted Control Samples BZ10040

Sample	Initial 2010 Sample Type	Duplicate 2011 Sample Type
105998	DUP B	flagged insufficient
106000	BZLG	BZLG
106025	Blank	Blank
106048	DUP B	flagged insufficient
106050	BZMG	BZHG
106075	Blank	Blank
106098	DUP B	flagged insufficient
106100	BZLG	BZLG

A preliminary A/B comparison of the resampling results involved calculating the "Half Absolute Residual" (HARD) values. This involves taking half of the absolute value of the relative difference of the initial and subsequent assay as a function of the assay sample average, and is expressed by the formula:

HARD = ½ * ABSOLUTE [(A-B) / (A+B)]

Table 12.2 summarizes the calculated HARD values for resampling.

Table 12.2
2011 Summary of Calculated HARD Values, BZ10040 Re-sampling

Element	Maximum (%)	Minimum (%)	Average (%)	Median (%)	Mode
Y	26.3	0.0	4.0	2.6	-
Zr	30.8	0.1	3.8	2.7	-
La	20.2	0.0	4.5	3.2	0.002488
Ce	21.3	0.0	4.2	3.1	0.071429
Pr	22.7	0.0	4.6	3.3	-
Nd	26.8	0.1	4.7	3.1	-
Sm	20.1	0.1	4.8	2.9	0.045045
Eu	30.0	0.0	5.1	3.0	0
Gd	24.2	0.0	5.0	3.7	0
Tb	22.7	0.1	4.7	3.1	0.035714
Dy	25.3	0.0	4.3	2.5	0.038462
Ho	28.1	0.0	3.9	2.2	-
Er	29.2	0.0	4.3	3.4	0
Tm	29.2	0.0	4.3	3.2	0.166667
Yb	29.9	0.0	4.1	3.0	0.044379
Lu	30.5	0.0	4.2	3.1	-
Hf	34.3	0.1	5.2	4.4	0.125

The maximum HARD values are all returned by four of the inserted control standards, namely the two blanks which have initial low REE values and will as is normal return a large relative value on re-assay, sample106048 DUP_B, which may be showing a pegmatite nugget effect, and the mis-matched control standard sample 106050 which compared BZMG with BZHG. Several other samples show HARD values in the order of 10%, which is assumed to be due to a sampling nugget effect.

The A/B analytical results indicate that the Actlab results are of acceptable quality and show no significant systemic bias when compared to the ALS-Chemex results. The R^2 values generated from these charts are shown in Table 12.3.

Table 12.3
Summary of 2010 A/B Comparison BZ10040 Umpire Re-assaying Results

Element	Linear Fit (y=)	R-squared Value
Y	1.017x	0.9161
Zr	0.896x	0.8595
La	0.9257x	0.8064

Element	Linear Fit (y=)	R-squared Value
Ce	0.8984x	0.8865
Pr	0.8571x	0.882
Nd	0.8401x	0.9049
Sm	0.9668x	0.8906
Eu	0.9256x	0.8689
Gd	0.9928x	0.8595
Tb	1.0314x	0.8971
Dy	1.006x	0.9094
Ho	1.0251x	0.9162
Er	0.9609x	0.9125
Tm	0.9414x	0.908
Yb	0.9677x	0.8974
Lu	0.9748x	0.8882
Hf	1.1823x	0.8595

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

The flowsheet selected for the PEA is based on crushing, grinding, flotation, acid bake and water leach, impurity precipitation, rare earth precipitation, and solvent extraction (SX) to recover separated rare earth oxides. Most of these processing steps, with the exception of rare earth separation, have been tested on mineralization from the Strange Lake B Zone.

Testwork that forms the basis of the PEA was carried out primarily at SGS Lakefield Research, in Lakefield, Ontario.

13.1 HISTORICAL TESTWORK

A number of metallurgical testing and engineering studies have been completed on mineralized samples from the Strange Lake deposits. Most of the early work was undertaken on the Main Zone deposit which is located mainly on the Newfoundland and Labrador side of the provincial divide with more recent studies concentrated on the B Zone deposit which is located in Québec.

Historical studies undertaken on Main Zone mineralization include the following:

- Witteck Development Inc, (WDI) of Mississauga, Ontario, on behalf of IOCC; hydrometallurgical testing (1982), mineralogical study and beneficiation (flotation) testing (1983) and leaching, solid/liquid separation and preliminary SX tests (1983).

- IOCC, economic evaluation study (1985).

- Lakefield Research, scoping flotation tests and leaching testwork on samples of Strange Lake mineralization and flotation concentrate for Arcadia (1990).

- Kilborn Consulting Engineers and Architects (Kilborn), preliminary technical and economic study for the recovery of yttrium and zirconium on behalf of Arcadia (1991).

- Mitsui Mining and Smelting Company Limited (Mitsui), detailed study into the extraction of REE and zirconium from Strange Lake samples. Testwork included mineralogy, beneficiation (magnetic separation), leaching, precipitation and selective dissolution (1992 to 1996).

More studies have been completed recently on the B zone mineralization located in Quebec.

13.1.1 Hazen, 2010

In 2010, Hazen completed a preliminary program of testwork using samples that represented B Zone mineralization. This testwork included quantitative mineralogical characterization of the rare earth occurrence in three samples, investigation of physical beneficiation and a preliminary investigation into bench scale leaching. The three samples, weighing a total of about 1 t, were collected by Quest. One composite sample termed high-grade mineralization reportedly representing the pegmatitic zone was used for the major part of the investigation. The other two samples were lower grade with respect to rare earth content and were referred to as low-grade and altered ore.

The historical testwork using samples of Main Zone mineralization gave the following preliminary results:

- Typical flotation recoveries from a de-slimed sample of approximately average resource grade (0.9% Y_2O_3, 3.0% ZrO_2 and 0.7% Nb_2O_5) of around 80% Y_2O_3, 60% ZrO_2 and 90% Nb_2O_5 with 40% mass recovery.

- Preliminary magnetic separation recovery of 60% Y_2O_3 with 25% weight recovery.

- Bond ball mill work index of around 16 kWh/t.

- Sulphuric acid leaching extractions of about 70% for both yttrium and zirconium with the acid addition of 200 kg/t of feed, temperature of 80 ºC, leach time of 24 hours and sample grind size of 95% passing 200 mesh.

The mineralogical investigation consisted of detailed QEMSCAN® analyses to characterize the REE mineralization and associated gangue constituents. These analyses revealed that the REE mineralization is complex, consisting of several REE mineral species as well as REE–yttrium-bearing gangue minerals, i.e., not actual REE mineral species.

The initial mineralogical analyses showed that yttrium and REE were mainly contained in (pyrochlore $(Na,Ca)_2Nb_2O_6(OH,F)$), phosphates (monazite), and carbonates (bastnaesite and possibly parasite ($Ca(Ce,La_2(CO_3)_3F_2)$), gadolinite ($(REE,Y)_2Fe_2+Be_2Si_2O_{10}$), gerenite ($(Ca,Na)_2(Y,REE)_3Si_6O_{18}.2H_2O$), kainosite ($Ca_2(Y,Ce)_2Si_4O_{12}(CO_3)\bullet H_2O$) and other yet-unidentified calcium–yttrium–REE-bearing silicates.

Other yttrium- and REE-bearing minerals identified included zircon (probably partially hydrated), gittinsite ($CaZrSi_2O_7$), thorite ($(Th,U)SiO_4$), and epidote (probably allanite ($Ca(Y,La,Y)Fe_2+Al_2(Si_2O_7)(SiO_4)O(OH)$)).

The main gangue minerals were quartz and feldspar (K-feldspar and albite) with minor occurrences of amphiboles and pyroxenes, mica, chlorite, titanite, and milarite ($(K_2Ca_4Al_2Be_4Si_2O_4O_{60}.(H_2O)$)).

Physical upgrading tests included gravity concentration using diagnostic heavy-liquid separation, tabling, centrifugal concentration, froth flotation, and magnetic separation.

Heavy liquid tests showed that at a separation SG of 2.85 the rejection of quartz and feldspar was 62% with a loss of about 14% for yttrium, zirconium, and cerium. The gravity tables, centrifugal concentrator and flotation tests did not successfully produce reasonable separations but the magnetic separation tests gave yttrium losses of between 14% to 30% and TREE losses of between 16% to 21% with a weight loss of sample of around 50%.

The results of preliminary acid dissolution tests conducted on the three sample types showed extractions of yttrium plus heavy REE in the 80–90% range.

13.1.2 Metallurgical Samples

Four metallurgical composite samples representing B Zone mineral resources have been used for metallurgical testing. These are:

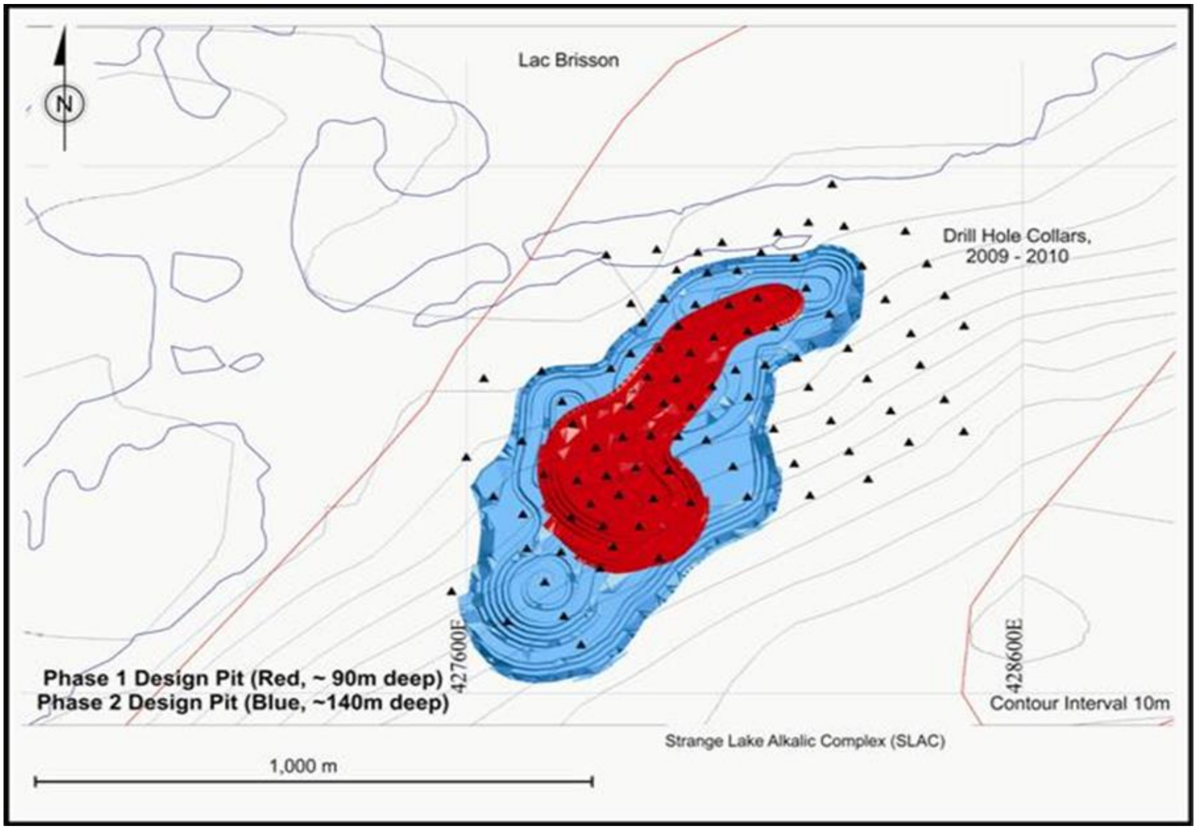
- Master Composites sample P1, representing the first 10 years of mine life.
- Master Composites sample P2, representing the subsequent years of mine life.
- Metallurgical Core Sample – Met Hole 11001.
- Blend of Metallurgical Core Samples – Met Holes 11029 and 11030.

The Master Composite P1 and P2 samples were prepared by selecting and combining coarse reject material from diamond drill cores from the 2009 - 2010 programs that fell within an envelope of a proposed initial phase 1 open pit (P1) and the subsequent phase 2 pit (P2), which are illustrated in Figure 13.1.

The Met Hole 11001 sample weighting a total of about 700 kg was from a single drill hole that was completed in March 2011. The average assay of this sample was a reasonable representation of the expected 25 year life of mine average across nearly all of the elements. The location of this hole was at the north eastern end of the deposit.

The Met Holes 11029 and 11030 were twin holes of Met Hole 11001. The combined sample weight from these two holes was approximately 1,000 kg.

Figure 13.1
P1 and P2 Composite Sample Locations and Conceptual Pit Designs



Provided by Quest, 2012.

The mineralogical characterization reports by Hazen of Met Hole 11001, P1, and P2 stated that these samples contain, on average, approximately 85% silicate gangue including about 33% quartz, 33% feldspar (K-feldspar and albite), and 17% other silicates including mainly aegirine, riebeckite, magnesio–riebeckite, magnesium–iron silicate, titanite, and chlorite.

The mineralization of these metallurgical samples consisted of fine-grained assemblages of REE-bearing minerals. The samples contained approximately 9% REE silicates and 1% REE-bearing minerals. The REE + yttrium were distributed mainly between gadolinite, kainosite, allanite, calcium–yttrium–REE silicates, calcium–LREE–yttrium silicates and zircon, which, with gittinsite, was also the source of zirconium. Pyrochlore was the main niobium bearing mineral.

The P1 composite had a slightly higher TREO content than the P2 and Met Hole 11001 composites, mainly due to the higher yttrium and cerium content. The total content of zirconium-bearing minerals and the pyrochlore levels in P1 and P2 were higher than in Met Hole 11001.

The P2 composite has been used in all flotation and hydrometallurgical testing performed to date at SGS.

13.1.3 Research and Productivity Council (RPC), New Brunswick, 2012

The flotation batch testing program completed at Research and Productivity Council (RPC), Fredericton, New Brunswick on P2 composite samples from the Strange Lake B Zone demonstrated the effectiveness of flotation process in rejecting substantial portion of the quartz, feldspar and other gangue minerals while concentrating as high as possible the rare earth elements as well as yttrium, zirconium and niobium in a concentrate suitable for further hydrometallurgical processing.

A total of 50 bench scale flotation tests were completed to investigate the effect of parameters such as reverse flotation alternative, reagent scheme, particle size distribution, de-sliming, pulp density and temperature.

13.1.4 Hazen, 2011 -2013

Pegmatite and granite samples were used as proxies for P1 and P2 composites for determination of Bond ball mill, rod mill, abrasion and crusher impact work indices, and unconfined compressive strength testing. The results showed that both samples were of moderate hardness.

Beneficiation testwork was also carried out with the objective of rejecting a barren portion of the mineralization rather than a high grade concentrate. Magnetic separation tests were conducted at Hazen but this unit process is not included in the current beneficiation flowsheet.

13.1.4.1 Acid Bake Feed Filtration Test

Solid-liquid separation testwork on ground feed material for the acid bake testwork was carried out by Bokela GmbH of Karlsruhe, Germany in October, 2012.

Vacuum and pressure filtration tests were carried out on P1 material, with and without steam. The filtration tests showed that the moisture content in feed material can be reduced to less than 10% in a steam pressure filtration unit, compared with 19% in vacuum filters.

13.1.4.2 Acid Bake and Water Leach (ABWL)

Initial sulphuric acid leaching tests were completed at Hazen in 2010. Relatively poor results led to testwork on acid bake and water leach processes at Hazen between March, 2012 and August, 2013 on the P1, P2, Met Hole 11001 and blend of Met Hole 11029 and 11030 composite samples. The acid bake water leaching tests were followed by leach liquor evaporation work to reduce the volume of solution proceeding to the hydrometallurgical plant while precipitating LREE as sodium double salt concentrate.

The following was concluded from ABWL testwork at Hazen:

- Extractions of REE, yttrium, zirconium and niobium decreased with increasing particle size, with zirconium and HREE being most sensitive. A particle size of 80% passing (P_{80}) 40 μm was required to achieve high extractions.

- Addition of 500-600 kg acid per tonne of feed was required to achieve high extractions and testwork suggested that about 35-45% of the addition can be recovered at high strength (90% H_2SO_4).

- A baking time of 1.5-3.0 h was required to achieve high extractions and approximately one additional hour was required to recover the excess unreacted acid.

- Products of the acid bake (sulphates and bisulphates) could be dissolved in water at ambient temperature and at 5°C within 10 min. Longer dissolution times (up to 60 min) resulted in slight loss of LREE, which was thought due to the formation of sodium-LREE double salt. Zirconium extraction was not sensitive to leaching time although there was a slight improvement in niobium extraction.

- Due to the propensity of REE to form double alkali salts, and the presence of sodium and potassium in the Strange Lake B Zone mineralization, the effect of sodium concentration in the leach was also studied. Extractions to solution were not significantly changed when sodium was not added to the leach water at 22°C or 5°C and extraction of zirconium and niobium was not affected. In the presence of sodium, leaching of REE decreased significantly at 22°C leaching temperature, but only slightly at 5°C, as a result of the higher solubility of sodium-LREE double salts at lower temperatures. It was concluded that leaching at 5°C would maximize REE solubility and extractions to solution.

- Studies on residue washing and soluble losses concluded that 98.9% washing efficiency and 0.8% soluble loss can be achieved by washing the leach residue in 0.9 m^3 water per tonne or in displacement washing mode. The use of pressure filtration is expected to improve these values.

- Deportment of acid from several bake tests conducted at 500 kg H_2SO_4/t using a number of composite samples gave acid consumptions in the sulphation reaction of between 136 and 205 kg H_2SO_4/ t feed or 27% to 41% of total acid addition. The acid consumed in the sulphation reactions tended to increase with increase in TREE+ yttrium, Zr and Nb grades.

- Acid recovery test results suggested that maximum acid recovery could be achieved within 1 h of evaporation.

13.1.4.3 Solid-Liquid Separation Tests

Solid-liquid separation tests, including thickening and filtration, were conducted by FL Smidth at Hazen on the following five process streams from the Strange Lake B Zone testwork:

- Wet ore ground to P_{80} of 40 µm.
- Water-leached residue from the acid bake tests.
- Neutralized residue.
- Precipitate from synthetically-generated SX raffinate.
- Combination of neutralized residue and synthetically-generated SX raffinate to simulate tailings residue.

Rheology tests were completed on the underflow from the thickening tests at the FL Smidth laboratory at Midvale, Utah.

A High Rate Thickener was recommended for the ground ore material as the first stage of solid-liquid separation from which the underflow could be further dewatered in Bokela Hi-bar pressure steam filters to less than 10% moisture. Pressure filters with cake wash were selected for the leach residue as they showed lower moisture content compared with horizontal belt filters.

13.1.5 Ortech, 2011 -2013

Pregnant leach solution (PLS) generated at Ortech and Hazen using the acid bake water leach (ABWL) process was used for the development of a hydrometallurgical process for recovery of zirconium, niobium, REE and yttrium, and the removal of uranium and thorium. The hydrometallurgical flowsheet for Quest's 2013 PFS was selected using the results from metallurgical testwork completed during 2012 and 2013 at Ortech's test laboratory in Mississauga, Ontario, under the supervision of Quest.

13.2 RECENT TESTWORK - SGS (2013-2014)

Recent test work completed at SGS from December 2013 to March 2014 identified an improved and simplified metallurgical flowsheet that focusses only on the recovery of rare earth elements and, compared to the PFS, reduces the number of processing steps required. The results from this work have been used as the basis for the PEA process design.

13.2.1 Flotation

Recent flotation testwork completed at SGS Lakefield confirmed the result of the initial scoping tests done at RPC, Fredericton, New Brunswick in 2012. A reagent scheme and simple rougher flotation circuit have been identified to show reasonable mass reduction while achieving good REE and yttrium recovery.

Twenty scoping flotation tests were conducted to confirm the result from 2012 RPC test program. The scoping tests were completed using 2 kg aliquots of the P2 Composite sample to establish the process conditions and to test alternative reagent schemes. The 2kg batch test using KBX-3 as the main collector was then scaled up to 10 kg batches. Twenty additional batch tests were completed using 10 kg samples to confirm the initial 2 kg batch tests. These tests indicated that about 96% of the TREE+ yttrium can be recovered in a concentrate containing 60% of the mass in four rougher flotation stages with desliming flotation feed at a particle size of 80% passing (P_{80}) 10 µm.

13.2.2 Acid Bake and Water Leach (ABWL)

Recent acid bake and water leach testwork completed on flotation concentrate generated from the SGS flotation test program discussed above suggested that the thermal sulphation process for converting the REE and yttrium in the ore acid mixture to water soluble sulphates can be managed such that limited impurity metals such as iron, aluminium and others are dissolved during subsequent water leaching. This process produced a PLS with low levels of impurity metals and free acid that would feed the direct precipitation process. Metal recoveries achieved during the acid bake and water leach testwork are presented in Figure 13.2. The rare earth elements can be recovered from the PLS by using a simple precipitation method.

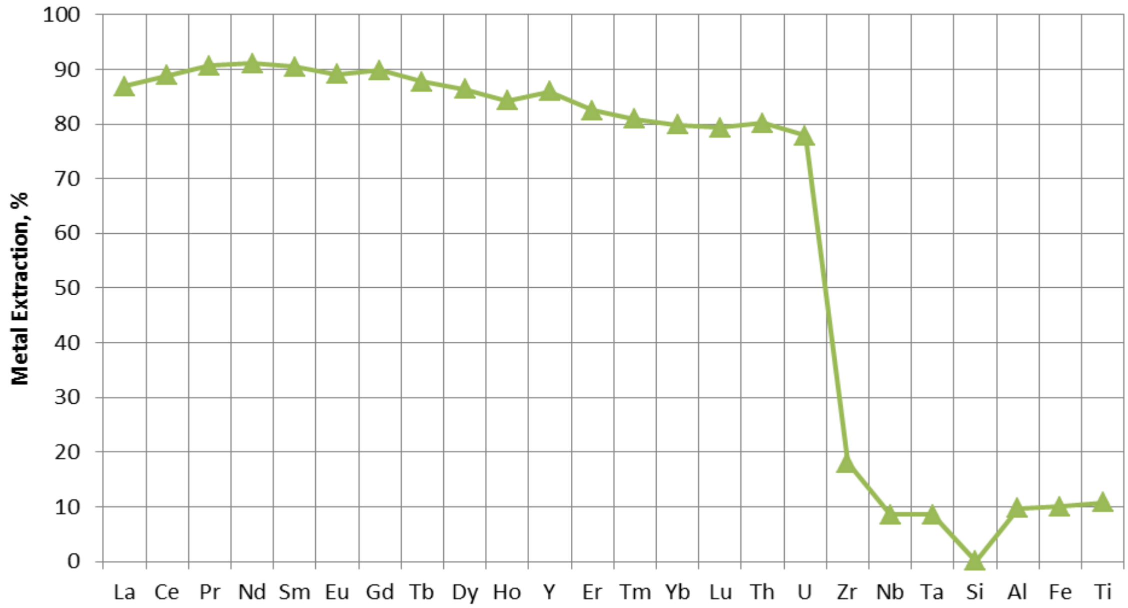
13.2.3 Solution Treatment

PLS solution generated by the ABWL processing of P2 flotation concentrate at SGS was used for the solution treatment flowsheet development tests.

ABWL optimization testing, described above, resulted in production of relatively clean PLS containing low levels of iron, aluminum, titanium, zirconium, and niobium, and very low free acid (pH = 2). Batch tests at SGS demonstrated that this PLS solution was amenable to a simplified solution treatment process, consisting of an impurity removal (IR) step to precipitate the bulk of residual impurities (primarily iron, aluminum, thorium, titanium, zirconium, and niobium) and a crude concentrate precipitation step to recover rare earth values from solution.

The additional process steps that are envisioned in production of a mixed oxide separation plant feed (rare earth hydroxide re-dissolution, oxalic acid precipitation, and calcining) are well known and will be tested during the current ongoing program of testwork.

Figure 13.2
Metal Recoveries to Solution for SGS ABWL Test 25.2
(provided by Quest, March 2014)



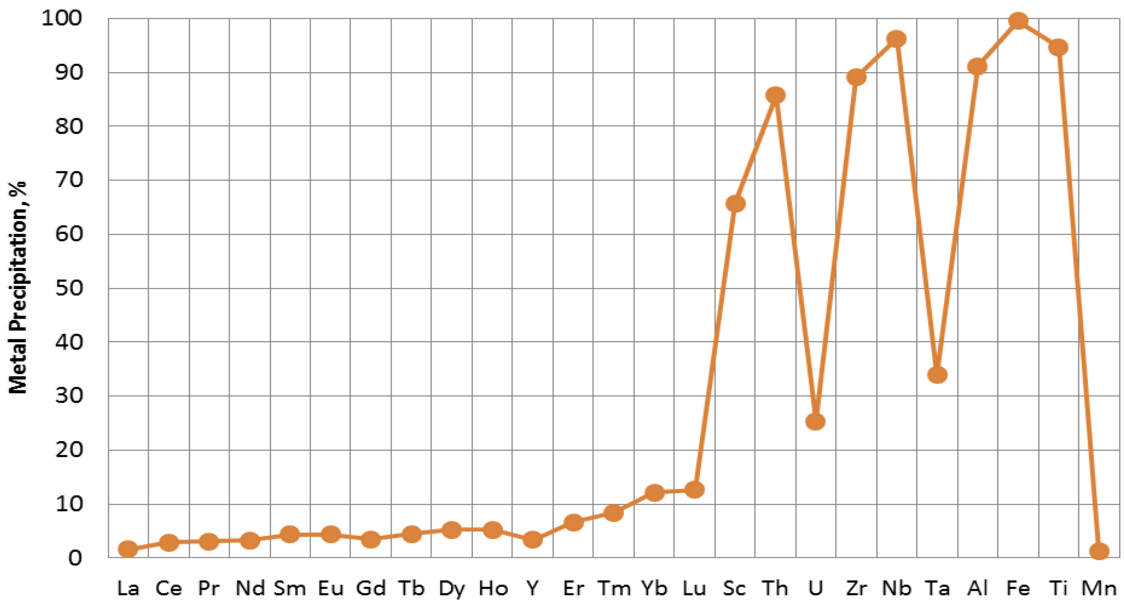
13.2.3.1 Impurity Removal (IR)

In impurity removal testing at SGS, the pH of a number of composite PLS solution test samples was adjusted using a variety of neutralizing agents, including $CaCO_3$ and MgO. The procedure involved the addition of the reagent slurry into an agitated reactor to achieve the target pH, followed by filtration and washing to remove the precipitate containing impurities. MgO was selected for the pH adjustment reagent based on the excellent selectivity it demonstrated in removing impurities with minimal rare earth losses to the precipitate. A sample impurity removal test result is presented in Figure 13.3.

13.2.3.2 Crude Concentrate Precipitation

Filtrates from the impurity removal tests underwent further testing to produce crude rare-earth concentrates, which in the PEA flowsheet are planned to be re-leached before being re-precipitated with oxalic acid and calcined to a mixed rare earth oxide. Testwork demonstrated nearly complete recovery of the rare earths from the impurity removal filtrates (over 99%) to the crude concentrate.

Figure 13.3
Impurity removal precipitation extents in SGS IR test P6 (provided by Quest, March 2014)



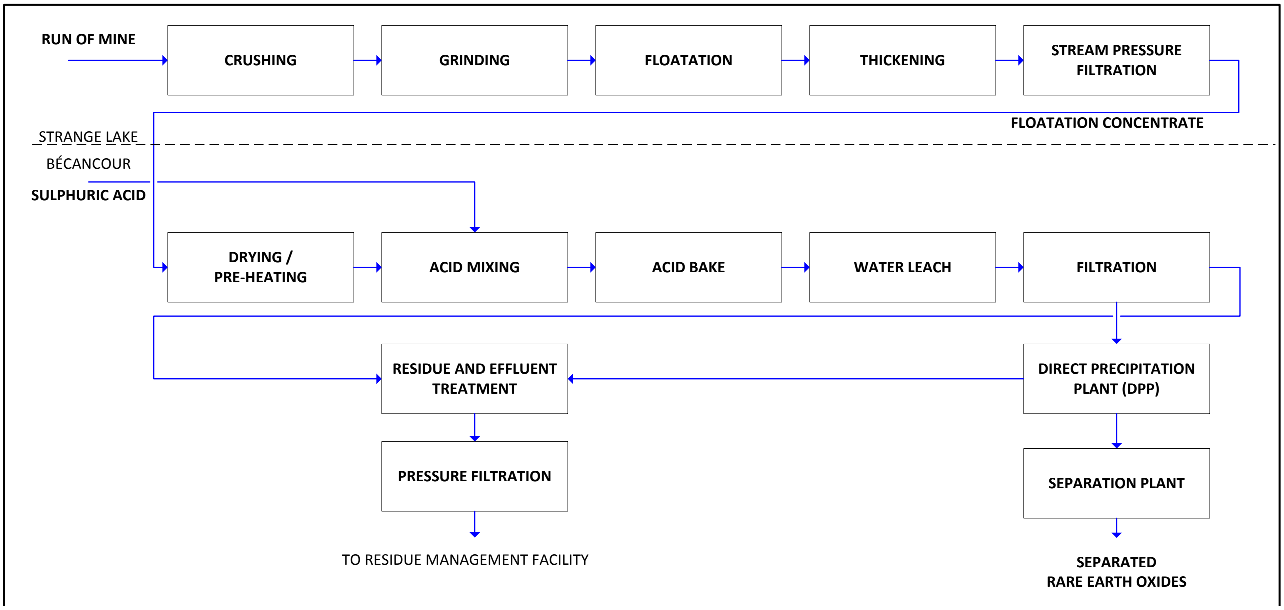
13.3 PROCESS FLOWSHEET SELECTION

The process selected for the PEA is based on the recent metallurgical development testwork completed at SGS. It comprises crushing and grinding, flotation, and acid thermal processing (acid bake) and water leach to extract the payable metals into solution. The PLS will be partially neutralized with MgO to precipitate low levels of residual impurities, before further neutralization to produce a crude rare earth concentrate. The crude concentrate will be re-leached and the rare earths re-precipitated and finally calcined to produce a mixed rare earth oxide feed to rare earth separation.

In the separation plant, the mixed rare earth oxide will be digested and the solution fed to a series of solvent extraction batteries. The organic will be stripped and the rare earths precipitated. A portion of the stripped organic will undergo regeneration before being recycled back to the extraction batteries. The purified rare earth solids produced in the separation plant will be calcined to produce the final separated rare earth oxide products.

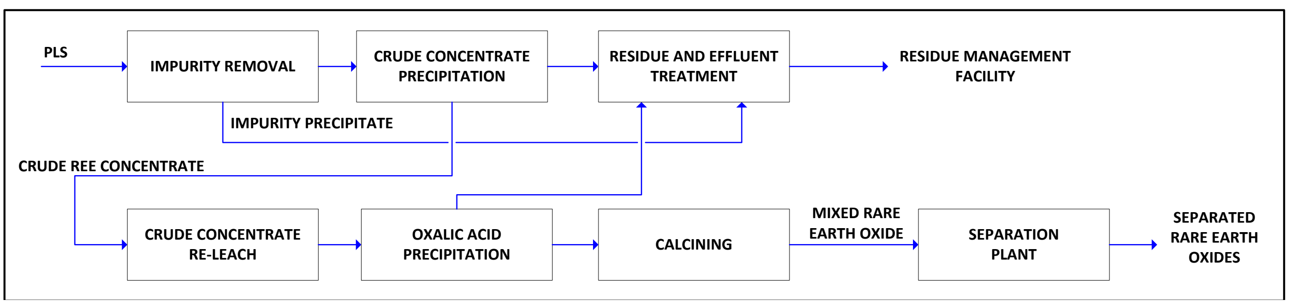
Simplified process block diagrams are presented in Figure 13.4 and Figure 13.5.

Figure 13.4
Simplified Process Block Flow Diagram



Provided by QUEST, March, 2014.

Figure 13.5
Simplified Hydrometallurgical Process Block Flow Diagram



Provided by QUEST, March, 2014.

13.4 PLANNED PILOT PLANT TESTWORK

Quest tested acid baking and water leaching on a whole ore sample at the mini-pilot plant scale at Ortech in 2013. Further work on flotation, acid bake and REE+ yttrium concentrate production from PLS has also been completed in 2014 on a laboratory bench scale at SGS. Three further stages of pilot plant testwork are planned to confirm laboratory bench-scale test results from the recent SGS program. These are:

- Flotation pilot plant
- Mini-pilot plant testwork program.
- Large scale pilot/demonstration unit.

13.4.1 Flotation Pilot Plant

A flotation pilot plant is planned for the first half of 2014, with a target total throughput of a minimum of 30 t of material.

13.4.2 Mini Pilot Plant

A 100 kg/d mini pilot plant has previously operated at Ortech to confirm some of the processes selected for the 2013 PFS. Quest intends to test the improved and simplified processes selected for the PEA in a mini-pilot program at SGS, in advance of larger scale piloting.

13.4.3 Large Scale Pilot/Demonstration Unit

The large scale pilot/demonstration unit will be installed at the full feasibility stage of the project. It is planned to have a concentrate throughput of up to 500 kg/d and will test all of the flowsheet process steps up to the production of a mixed oxide concentrate, on a continuous basis.

14.0 MINERAL RESOURCE ESTIMATES

This PEA is based on the mineral resource estimate disclosed in the Micon Technical Report by Lewis et al., 2012 from which the following has been extracted.

14.1 GENERAL

Micon has estimated mineral resources for the B Zone deposit within the Strange Lake Property. The other occurrences within the Strange Lake Property are at an early exploration stage and have insufficient data to conduct resource estimation at this time. The B Zone mineral resource estimate was prepared in compliance with the CIM standards and definitions for the estimation of mineral resources and reserves. Surpac mining software was used for the mineral resource modelling.

This section of the report includes technical information which requires subsequent calculations or estimates to derive sub-totals, totals and weighted averages. Such calculations or estimations inherently involve a degree of rounding and consequently introduce a margin of error. Where these occur, Micon does not consider them to be material.

14.2 DATA USED FOR THE MINERAL RESOURCE ESTIMATE

All of the digital data used in the mineral resource estimate have been supplied by Quest. The effective cut-off date for the data provided was January, 2012 but the effective date of the mineral resource estimate is August 31, 2012. The mineral resource estimate utilized assay data from 256 diamond drill holes completed by Quest between 2009 and 2011. The total drilled length is 37,434 m and the sample database contains sample assay information for 22,565 samples. The primary assay fields which were used in the resource modelling are presented in Table 14.1. The drill hole database was provided in GEMS format and was converted to an MS Access database for use in Surpac software. Assay values in the database below detection limit were assigned a value of half the detection limit to provide a valid number for resource modelling. A lithology table was provided with codes for each of the major rock types in the deposit, primarily pegmatite and subsolvus granite.

Table 14.1
Assay Fields Used in the Resource Modelling

LREO, %	Lanthanum (La_2O_3), Cerium (CeO_2), Praseodymium (Pr_6O_{11}), Neodymium (Nd_2O_3), Samarium (Sm_2O_3)
HREO + Yttrium, %	Europium (Eu_2O_3), Gadolinium (Gd_2O_3), Terbium (Tb_4O_7), Dysprosium (Dy_2O_3), Holmium (Ho_2O_3), Erbium (Er_2O_3), Thulium (Tm_2O_3), Ytterbium (Yb_2O_3), Lutetium (Lu_2O_3), Yttrium (Y_2O_3)
Additional oxides, %	Niobium (Nb_2O_5), Hafnium (HfO_2), Zirconium (ZrO_2)
Other elements, ppm	Beryllium (Be), Uranium (U), Thorium (Th)

Quest conducted further exploration drilling in 2012 but this drilling did not impact or add any further information the database used for the 2012 updated mineral resource estimate for the B-Zone. Thus the August 31, 2012 mineral resource estimate remains unchanged and is still valid for use in the PEA which is the subject of this report.

An NSR value using estimates of metal prices and recoveries provided by Quest was added to the sample assay database. The parameters used for the Net Smelter Return (NSR) calculation are presented in Table 14.2.

Table 14.2
Parameters for NSR Calculation

Elements	US$/kg	Recovery (%)	$/%/t
Zirconia (ZrO_2)	6.43	85	54.7
Dysprosium (Dy_2O_3)	718.53	88	6,323.1
Niobium (Nb_2O_5)	28.74	83.5	240.0
Neodymium (Nd_2O_3)	63.78	88	561.3
Terbium (Tb_4O_7)	1,523.63	88	13,407.9
Yttrium (Y_2O_3)	15.28	88	134.5
Erbium (Er_2O_3)	37.19	88	327.3
Thulium (Tm_2O_3)	81.19	88	714.5
Ytterbium (Yb_2O_3)	16.19	88	142.5
Lutetium (Lu_2O_3)	336.19	88	2,958.5
Praseodymium (Pr_6O_{11})	63.78	88	561.3
Gadolinium (Gd_2O_3)	20.13	88	177.1
Holmium (Ho_2O_3)	16.19	88	142.5
Europium (Eu_2O_3)	1,349.03	88	11,871.5

A cross-sectional interpretation of the pegmatite lithology was provided to Micon by Quest. The nature of the pegmatite in the deposit consists of many narrow lenses which are interlayered with subsolvus granites and vary widely in shape and continuity from section to section across the deposit. Analysis of the pegmatite intercepts in the cross-sectional interpretation shows that around 40% of the intercepts are less than 2 m thick but there is a cluster of individual lenses forming a pegmatite spine down the centre of the deposit on a bearing of around 030°. This spine is consistent across the entire drilled strike length of the deposit. Across strike, the pegmatite forms a dome shape with narrow flanks dipping around 10°.

14.3 DATA ANALYSIS

Both the pegmatite and subsolvus granite lithologies are mineralized but they have different statistical properties. The mineralization in the pegmatite has the highest grade forming as a log-normal distribution with a positive skew. The coefficient of variation is lowest in Zr and Hf oxides at 0.35, and varies between 0.61 and 0.68 in the LREO and 0.48 and 0.76 in the HREO. The mineralization in the subsolvus granite forms as a normal distribution with little skew. The mean, standard deviation, variance and coefficient of variance are all lower in the subsolvus granite than in the pegmatite. The coefficient of variation is between 0.28 in the LREO, 0.3 to 0.5 in the HREO and lowest in Zr and Hf oxides at 0.25. Histograms and cumulative frequency plots comparing Dy_2O_3 data in the pegmatite and granite are presented in Figure 14.1 and Figure 14.2. Dysprosium was selected to illustrate the cumulative frequency plots and other analyses in this section because it was the element with the highest calculated in-situ value. The descriptive statistical properties of the pegmatite and granite are presented in Table 14.3.

Figure 14.1
Histogram and Cumulative Frequency of Pegmatite

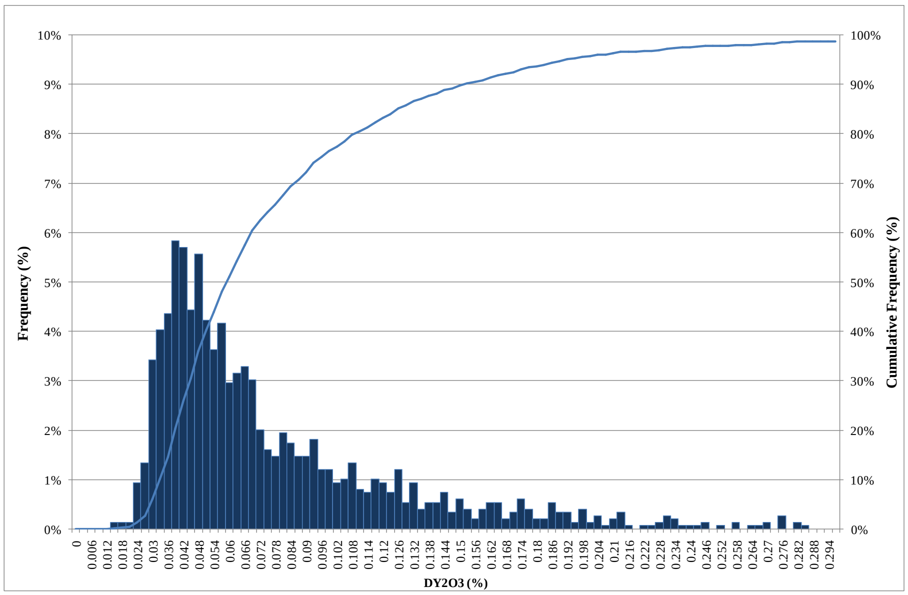


Figure 14.2
Histogram and Cumulative Frequency of Subsolvus Granite

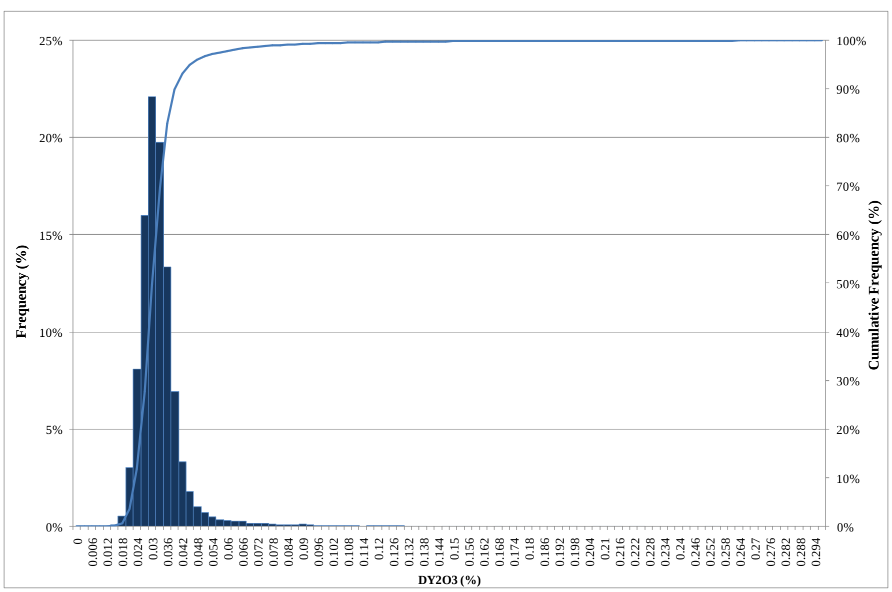


Table 14.3
Basic Statistical Parameters for Pegmatite and Subsolvus Granite Domains

	TREO	LREO	HREO +Y	La_2O_3	CeO_2	Pr_6O_{11}	Nd_2O_3	Sm_2O_3	Eu_2O_3	Gd_2O_3	Tb_4O_7	Dy_2O_3	Ho_2O_3	Er_2O_3	Tm_2O_3	Yb_2O_3	Lu_2O_3	Y_2O_3	Nb_2O_5	HfO_2	ZrO_2
Subsolvus Granite Domain																					
Number	15,886	15,886	15,886	15,886	15,886	15,886	15,886	15,886	15,886	15,886	15,886	15,886	15,886	15,886	15,886	15,886	15,886	15,886	15,886	15,886	15,886
Min	0.028	0.015	0.013	0.003	0.008	0.001	0.003	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.008	0.003	0.001	0.054
Max	9.531	8.671	4.118	1.681	4.244	0.508	1.922	0.317	0.079	0.245	0.061	0.43	0.087	0.254	0.036	0.196	0.029	2.771	2.013	0.147	6.131
Mean	0.9	0.564	0.336	0.125	0.276	0.03	0.108	0.024	0.001	0.023	0.005	0.032	0.007	0.022	0.003	0.022	0.003	0.217	0.165	0.045	1.865
Median	0.87	0.554	0.315	0.124	0.271	0.03	0.106	0.024	0.001	0.022	0.005	0.03	0.007	0.02	0.003	0.02	0.003	0.203	0.155	0.043	1.783
StdDev	0.242	0.157	0.131	0.035	0.077	0.009	0.032	0.007	0.001	0.007	0.002	0.013	0.003	0.009	0.001	0.009	0.001	0.088	0.066	0.011	0.464
Variance	0.058	0.025	0.017	0.001	0.006	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.008	0.004	<0.001	0.215
COV	0.268	0.278	0.391	0.275	0.28	0.286	0.293	0.287	0.539	0.305	0.362	0.396	0.414	0.423	0.429	0.426	0.429	0.405	0.396	0.243	0.249
Pegmatite Domain																					
Number	1,489	1,489	1,489	1,489	1,489	1,489	1,489	1,489	1,489	1,489	1,489	1,489	1,489	1,489	1,489	1,489	1,489	1,489	1,489	1,489	1,489
Min	0.39	0.163	0.185	0.024	0.075	0.009	0.031	0.006	<0.001	0.006	0.002	0.014	0.004	0.011	0.002	0.01	0.001	0.115	0.047	0.003	0.13
Max	8.319	5.014	4.191	0.862	2.508	0.315	1.102	0.233	0.013	0.236	0.059	0.42	0.101	0.314	0.046	0.228	0.029	2.854	3.257	0.23	9.594
Mean	1.661	0.804	0.857	0.166	0.401	0.044	0.152	0.041	0.003	0.045	0.011	0.079	0.018	0.059	0.01	0.062	0.009	0.562	0.383	0.068	3.025
Median	1.363	0.659	0.671	0.139	0.325	0.035	0.122	0.033	0.002	0.035	0.008	0.059	0.014	0.048	0.008	0.056	0.009	0.433	0.323	0.066	2.968
StdDev	0.941	0.51	0.567	0.098	0.257	0.03	0.103	0.027	0.002	0.03	0.008	0.056	0.013	0.038	0.006	0.031	0.004	0.387	0.245	0.025	1.077
Variance	0.885	0.26	0.321	0.01	0.066	0.001	0.011	0.001	<0.001	0.001	<0.001	0.003	<0.001	0.001	<0.001	0.001	<0.001	0.15	0.06	0.001	1.159
COV	0.566	0.634	0.661	0.593	0.642	0.678	0.679	0.655	0.668	0.676	0.717	0.719	0.694	0.645	0.578	0.505	0.457	0.688	0.64	0.366	0.356

Correlation coefficients calculated between the different oxides shows that the REOs correlate most closely with one another but do not correlate with the other oxides of Zr and Hf. Generally, the LREOs correlate most closely with other LREOs and, likewise, for the HREOs. The correlation coefficients are linked to the atomic weights of the elements, with reduced correlation between elements further apart on the periodic table.

Analysis of the grade distributions shows that the average grade in the REOs increases slightly towards the northeast of the deposit, particularly for the HREOs. Grade distribution in the granites is fairly uniform although there is a distinct drop off in grade below the 300 m elevation in all of the oxides.

14.3.1 Specific Gravity

Quest conducted specific gravity (SG) readings on 631 samples from the B Zone using the immersion method at the Sudbury offices of Vale, and performed according to the Vale protocol. The samples were grouped into 141 pegmatite samples and 490 granite samples. The results suggested a specific gravity of 2.74 g/cm^3 for pegmatites and 2.72 g/cm^3 for granites and country rock.

Before collecting SG data, a complete calibration of the weight scale was undertaken in accordance to the Vale procedure. This included internal and external calibration tests using different calibration masses on the weight scale.

As part of a second QA/QC control, approximately 10% of the samples were forwarded to an external laboratory for comparative SG measurements.

14.4 GEOLOGICAL INTERPRETATION

The different statistical properties in the pegmatite and subsolvus granite suggest that it is ideal to consider them separately in resource modelling. However, the shape and distribution of individual pegmatite lenses is too variable between sections for them to be connected up effectively to form a solid wireframe model. Therefore, Micon has focused on modelling the wider pegmatite spine and dome structure allowing some mixing between the interlayered lithologies in order to maintain continuity of the domain along strike and allow construction of a wireframe solid. As it is primarily comprised of pegmatite and contains the highest grade mineralization in the deposit this domain was termed the Enriched Zone.

High grade intervals of at least 5 m thick were identified in the drill hole database using a combination of the pegmatite lithology indicators and NSR value. The maximum acceptable internal dilution was 3 m of low grade mineralization, provided that the total composite grade remained above the cut-off. Various NSR cut-offs were applied and the descriptive statistical properties of the resultant high grade intervals were compared to the properties from the raw pegmatites to ensure that a representative population was being selected for modelling. An NSR cut-off of Cdn$725 was ultimately used as it formed intervals which could be connected between sections and maintained the descriptive statistical properties of the pegmatite.

This process of modelling the Enriched Zone intervals in the database introduced around 40% more samples compared to the pegmatite lithology, with a net reduction in the average grade across the elements of 15%. The standard deviation and coefficient of variation of the sample data selected was also reduced slightly compared to the pegmatite lithology samples. Cumulative frequency statistics showed a log-normal population with a strong positive skew.

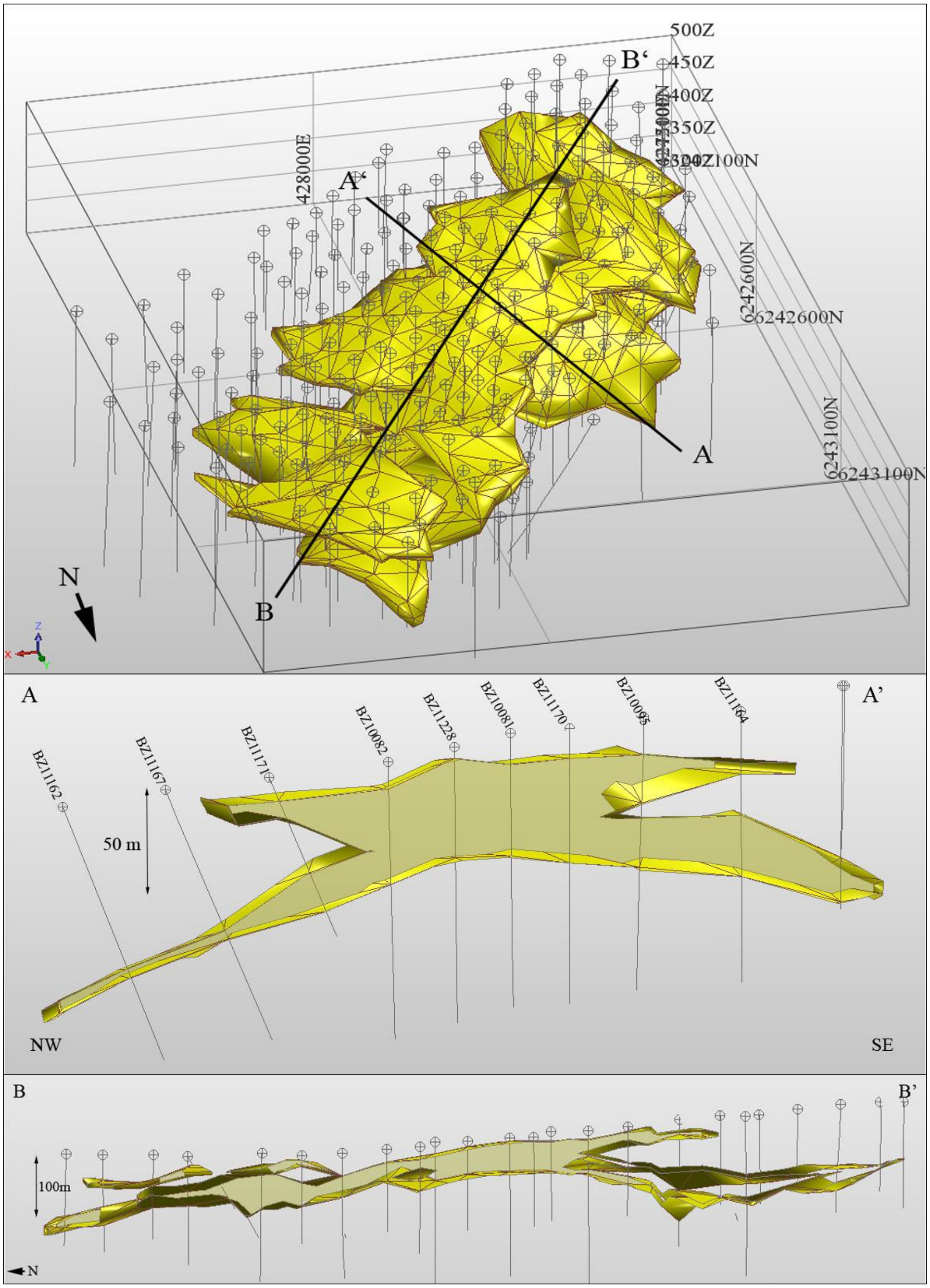
To make the domain model, each interval was connected on section and the envelope was extruded 50 m beyond the outermost holes in the zone. The envelopes were then joined between the sections to create a closed wireframe solid model. The resultant model is roughly 1,200 m long, consistent over the entire strike length of the deposit, and up to 500 m wide. Structurally the domain follows the dome shape with the pegmatite spine down the centre of the deposit on a bearing of 030°. There are areas where the model bifurcates into separate upper and lower lenses but these are connected to form a single model. The domain obtains a maximum thickness of 56 m in hole BZ10040 but, on average, the thickness is 14 m. The domain is open to the northeast but limited to the south and east by low grade boreholes. The northern end extends below the lake. A long section and three-dimensional view of the modeled domain is presented in Figure 14.3.

The subsolvus granite domain includes all remaining drilled mineralization outside of the Enriched Zone domain model. This domain contains some high grade samples from some narrow and isolated pegmatite intercepts which were rejected from the Enriched Zone. As the vast majority of samples are subsolvus granite the main statistical properties of the population are not affected. It is expected that these high grades will influence the local estimates during resource modeling and therefore they have been capped. The mineralization remains open in all directions from the drilled area so the subsolvus granite domain does not need to be constrained by a wireframe model.

14.5 Statistical Analysis

The sample data within the domain models were flagged in the assay database and the descriptive statistics and cumulative frequency distributions of the sample populations were examined.

Figure 14.3
Enriched Zone Wireframe Domain Model



14.5.1 Grade Capping

Grade capping was applied to the assays to remove any outlier values which could exert an undue influence during block grade interpolation. In the Enriched Zone the methodology employed for establishing the outlier limit was to sort the sample populations from smallest to largest and cap to the value where there is a large increment in grade as the population breaks apart. Fewer than 100 samples were capped as the sample populations contain very few outlier grades. This is supported by the low coefficient of variation shown by the pegmatite sample population.

In the granites the outlier limit was set at the 99th percentile value. This set a lower capping value than in the Enriched Zone so that the isolated high grade pegmatite samples within the domain do not result in local grade overestimation or grade smearing. Typically up to 250 samples were capped using this method.

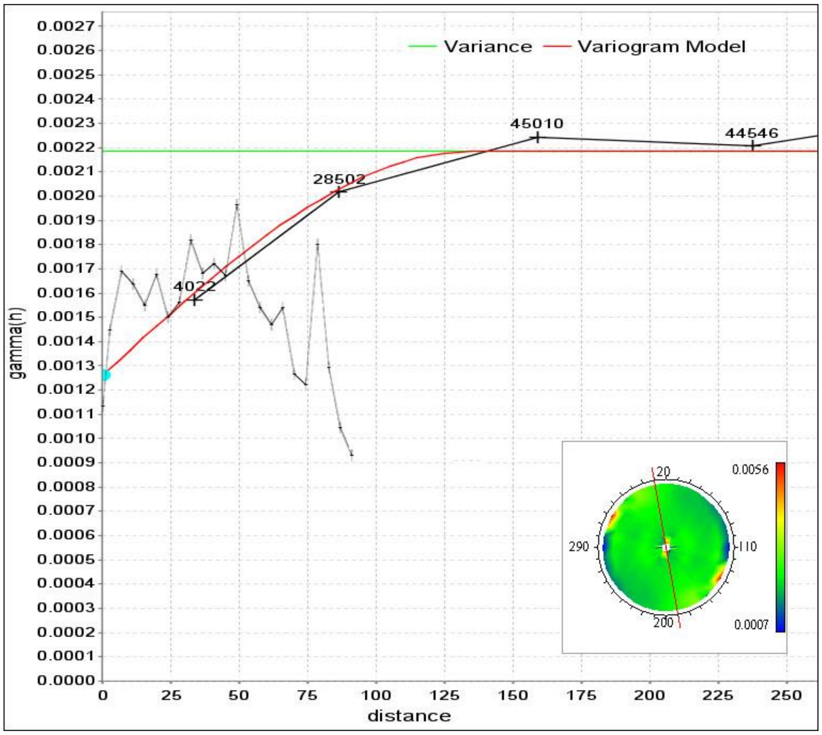
14.5.2 Compositing

The length of samples in the assay database is variable with a minimum of 0.03 m up to a maximum of 4.0 m. However, the average sample length is 1.59 m so it was decided to composite all samples to 2 m for resource modelling. The composites were constructed using a best-fit algorithm that allowed the composite length to be varied within a given tolerance of 25% in order to minimize the loss of data but maintain a consistent composite length. The descriptive statistical parameters for the composited data in the Enriched Zone are presented in Table 14.4. The effect of the grade capping and compositing was a small reduction in the average grades. The coefficient of variation remains low, which will assist in allowing an unbiased estimate of the mean grade within the resource estimation.

14.5.3 Variography

Experimental semi-variograms were evaluated for all oxide fields using the composite data from the Enriched Zone domain. In order to determine the direction of maximum grade correlation a total of 36 directional semi-variograms were formed on a plane plunging at 8° towards a bearing of 020° with an angular tolerance of 20°. A lag range from 30 m to 70 m was used to account for the variation in data spacing in the different directions. The semi-variogram model for Dy_2O_3 is presented in Figure 14.4.

Figure 14.4
Semi-Variogram Model for Dy_2O_3



The most obvious characteristic of the semi-variograms was a high nugget value. A down-hole variogram at a lag spacing of 2 m was produced to confirm the short range spatial variability of the data and to define the nugget value. A down-hole semi-variogram model was also made for the pegmatite only, in order to rule out the possibility that the nature of the Enriched Zone with interlayered pegmatite and granite could have increased the variability of the grade. All results showed a similar high nugget which suggest that the high nugget is intrinsic to the mineralization. Another important characteristic is that there is little anisotropy between the principal directions with variogram range typically around 150 m in all directions. This is shown on the planimetric variogram map in the bottom right of Figure 14.4 and suggests that the grade variability is similar in all directions. These characteristics were consistent in the variography of all of the oxides.

Table 14.4
Basic Statistical Parameters for the Enriched Zone Domain

	TREO	LREO	HREO +Y	La_2O_3	CeO_2	Pr_6O_{11}	Nd_2O_3	Sm_2O_3	Eu_2O_3	Gd_2O_3	Tb_4O_7	Dy_2O_3	Ho_2O_3	Er_2O_3	Tm_2O_3	Yb_2O_3	Lu_2O_3	Y_2O_3	Nb_2O_5	HfO_2	ZrO_2
Enriched Zone Domain (uncut)																					
Number	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076
Min	0.496	0.12	0.087	0.022	0.063	0.006	0.02	0.006	<0.001	0.008	0.002	0.008	0.002	0.004	0.001	0.003	<0.001	0.05	0.052	0.001	0.065
Max	8.336	5.09	3.808	1.114	2.548	0.319	1.116	0.234	0.013	0.221	0.054	0.368	0.09	0.3	0.044	0.235	0.03	2.557	2.995	0.219	9.304
Mean	1.452	0.733	0.719	0.154	0.364	0.04	0.138	0.037	0.002	0.039	0.009	0.067	0.015	0.049	0.008	0.051	0.007	0.471	0.349	0.06	2.631
Skew	2.576	3.788	2.596	3.717	3.854	3.998	3.859	2.929	2.696	2.673	2.721	2.743	2.725	2.6	2.379	1.896	1.426	2.63	4.269	1.013	0.972
StdDev	0.824	0.444	0.5	0.087	0.224	0.026	0.09	0.023	0.001	0.026	0.007	0.049	0.011	0.034	0.005	0.029	0.004	0.341	0.216	0.023	1
Variance	0.679	0.198	0.25	0.008	0.05	0.001	0.008	0.001	<0.001	0.001	<0.001	0.002	<0.001	0.001	<0.001	0.001	<0.001	0.116	0.047	0.001	1.001
COV	0.568	0.606	0.696	0.567	0.615	0.645	0.647	0.633	0.653	0.663	0.72	0.733	0.725	0.688	0.635	0.573	0.538	0.724	0.619	0.377	0.38
Enriched Zone Domain (CUT)																					
Number	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076	2,076
Min	0.496	0.119	0.087	0.022	0.063	0.006	0.02	0.006	<0.001	0.008	0.002	0.008	0.002	0.004	0.001	0.003	<0.001	0.05	0.052	0.001	0.065
Max	6.287	4.232	3.612	0.7	2.305	0.24	0.84	0.196	0.013	0.205	0.05	0.364	0.088	0.258	0.038	0.211	0.028	2.451	1.4	0.146	6.373
Mean	1.439	0.725	0.714	0.151	0.361	0.039	0.136	0.036	0.002	0.039	0.009	0.066	0.015	0.049	0.008	0.051	0.007	0.467	0.343	0.06	2.625
Skew	2.266	2.994	2.424	2.428	3.233	3.036	3.003	2.631	2.572	2.462	2.606	2.541	2.557	2.306	2.094	1.648	1.308	2.475	2.161	0.837	0.785
StdDev	0.777	0.404	0.481	0.075	0.208	0.023	0.08	0.022	0.001	0.025	0.007	0.046	0.011	0.032	0.005	0.028	0.004	0.328	0.178	0.022	0.98
Variance	0.604	0.163	0.231	0.006	0.043	0.001	0.006	<0.001	<0.001	0.001	<0.001	0.002	<0.001	0.001	<0.001	0.001	<0.001	0.108	0.032	<0.001	0.96
COV	0.54	0.557	0.673	0.497	0.577	0.579	0.588	0.609	0.642	0.641	0.702	0.703	0.704	0.658	0.61	0.554	0.53	0.703	0.52	0.37	0.373

A variogram model was made for each oxide with the principal axis selected in the direction in which the first point with at least 2,000 pairs has the lowest gamma value. The parameters from the variography analysis for the oxides are presented in Table 14.5.

Table 14.5
Variogram Parameters from the Enriched Zone Domain

Oxide	Bearing	Plunge	Dip	Maj-Semi	Maj-Min	Nugget	Covariance	Range	Nugget Effect
La_2O_3	170	7	4	1.25	2.6	0.0042556	0.0013696	140	76
CeO_2	170	6	10	1.1	2.6	0.0280819	0.0156769	150	64
Pr_6O_{11}	170	6	10	1.5	2.1	0.0003834	0.0001352	160	74
Nd_2O_3	190	7	2	1	3	0.0037438	0.0026219	120	59
Sm_2O_3	160	6	0	1.4	2.5	0.0003964	0.0001136	160	78
Eu_2O_3	170	7	10	1	2.4	0.0000013	0.0000007	145	64
Gd_2O_3	170	6	20	1	3	0.0003840	0.0002380	140	62
Tb_4O_7	160	6	-10	1.2	2	0.0000260	0.0000190	160	58
Dy_2O_3	190	2	-10	1	1.8	0.0012615	0.0009232	135	58
Ho_2O_3	160	6	0	1	1	0.0000804	0.0000376	95	68
Er_2O_3	170	7	-10	1.5	1.8	0.0007461	0.0003177	165	70
Tm_2O_3	160	6	-10	1	2	0.0000150	0.0000087	146	63
Yb_2O_3	160	6	0	1.8	2.5	0.0004946	0.0002892	150	63
Lu_2O_3	160	6	0	1.8	2.3	0.0000120	0.0000030	170	80
Y_2O_3	170	6	-20	1.6	1.8	0.0731801	0.0366315	160	67
Nb_2O_5	170	7	-30	1	2.2	0.0134738	0.0181174	230	43
HfO_2	60	-6	0	1.8	2.2	0.0003643	0.0001306	150	74
ZrO_2	60	-6	-10	1.3	1.5	0.5368078	0.4225670	125	56

Although the selection of the direction of highest grade correlation is relatively ambiguous, as discussed above, in most of the REO mineralization the principal direction selected was following a bearing of 160 to 190^{o}. This is close to the orientation of the drill lines so could be related to the closer spaced drill hole data on the section lines. The dip of the variogram models varies, with the LREO having a positive dip (towards the east) and the HREO, generally having a negative dip (towards the west). This roughly corresponds with the different flanks of the dome structure for the Enriched Zone domain, and could be caused by the influence of slightly less variability or enrichment of LREO in the eastern flank and HREO in the western flank. It is unlikely that in the eastern flank of the dome the HREO mineralization would be cross-cutting the narrow pegmatite lenses.

Micon believe this structural control is most likely the major influence on the distribution of mineralization rather than any other underlying patterns shown due to the relatively omni-directional results from the variography.

14.6 BLOCK MODEL

The B Zone block model utilized regular-shaped blocks measuring (X) 10 m by (Y) 10 m by (Z) 5 m which are rotated at 030º. This block size configuration was the most appropriate considering the geometry of the mineralization and the distribution of sample information. The parameters that describe the block model are summarized in Table 14.6.

Table 14.6
Dimensions of the B Zone Block Model

Block Model	X direction	Y direction	Z direction
Origin (m)	426,880	6,242,292	100
Extents (m)	428,380	6,244,192	600
Parent Block Size (m)	10	10	5
Number of Parent Blocks	150	190	50

The block model was limited below a topography surface created using 1-m contours. Each block in the model which fell within the wireframe model was flagged in the Enriched Zone domain. The volume difference between the wireframe and the domain blocks was less than 1%. The Granite domain blocks were flagged below a contoured overburden surface. Without an actual wireframe the extents of the granite domain is limited by the availability of drill hole data during the resource estimation.

14.6.1 Grade Interpolation

The regular spaced drilling data for the B Zone deposit allows a linear grade interpolation method to be effective. On the basis of the omni-directional results with limited anisotropy shown in the variography analysis there will be very little difference between an Ordinary Kriged or an Inverse Distance estimate. Micon has therefore selected Inverse Distance as the method for grade interpolation in the B Zone block model as it allows simple variation in the power to account for the different statistical properties shown by the different elements. In the REE oxides which show a high nugget effect the grade interpolation was performed using Inverse Distance squared (ID^2). This spreads the estimation weight across the informing composite samples so that the estimation is smoothed, as dictated by the high nugget. In the oxides with lower nugget effect Inverse Distance cubed (ID^3) was used which assigns more of the estimation weight to the closer informing composite samples. Discretization to 2-m cells was applied to the grade interpolations to account for the volume variance effect.

The Enriched Zone and Subsolvus Granite domains were estimated and reported separately. Average grades for each of the 21 major fields shown in Table 14.1 were interpolated.

In the Enriched Zone domain the ellipses were orientated following the dip of the flanks of the dome structure. The domain was split down the axis of the dome into the northwest and southeast dipping flanks which were estimated separately. The variogram range of 150 m and major-minor axis anisotropy was used to define the search radius for the ellipse. The grade of each block was interpolated using up to 16 composite samples with a maximum of 4 from a single borehole. This allowed composite samples from every direction from the block into the grade interpolation.

In the Granite domain, a single ellipse was used with a 150 m search radius orientated on a bearing of 020° with a plunge of 8º. As with the Enriched Zone domain, the grade of each block was interpolated using up to 16 composite samples with a maximum of 4 from a single borehole so that composite samples from every direction were used. Since the estimates were unconstrained, the total number of samples used to estimate the grade of each block was recorded to be used in the resource classification.

When the estimations were complete, fields were added to the block model to sum up the total TREO and the LREO and HREO grades and the NSR value was re-estimated. Images showing the distribution of grade values in the block model are presented in Figure 14.5 through Figure 14.7.

Figure 14.5
Three-dimensional Isometric View of Block Model Showing Grade Distribution of LREO

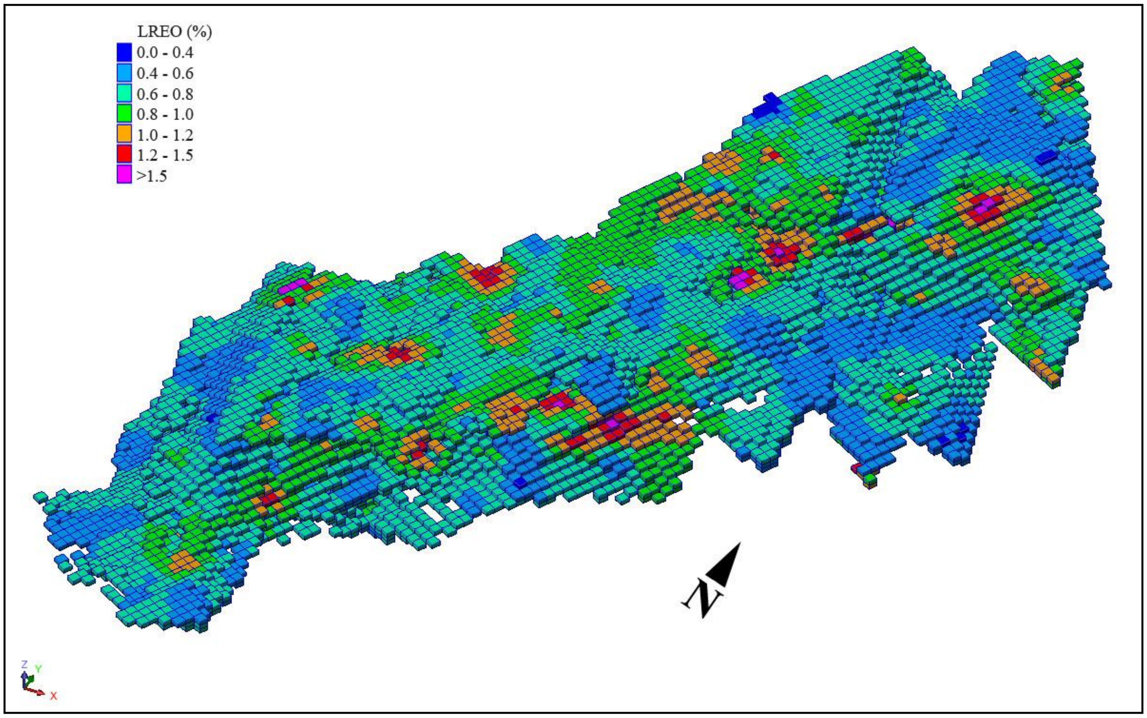


Figure for visualization purposes only, not to scale.

Figure 14.6
Three-dimensional Isometric View of Block Model Showing Grade Distribution of HREO+Y

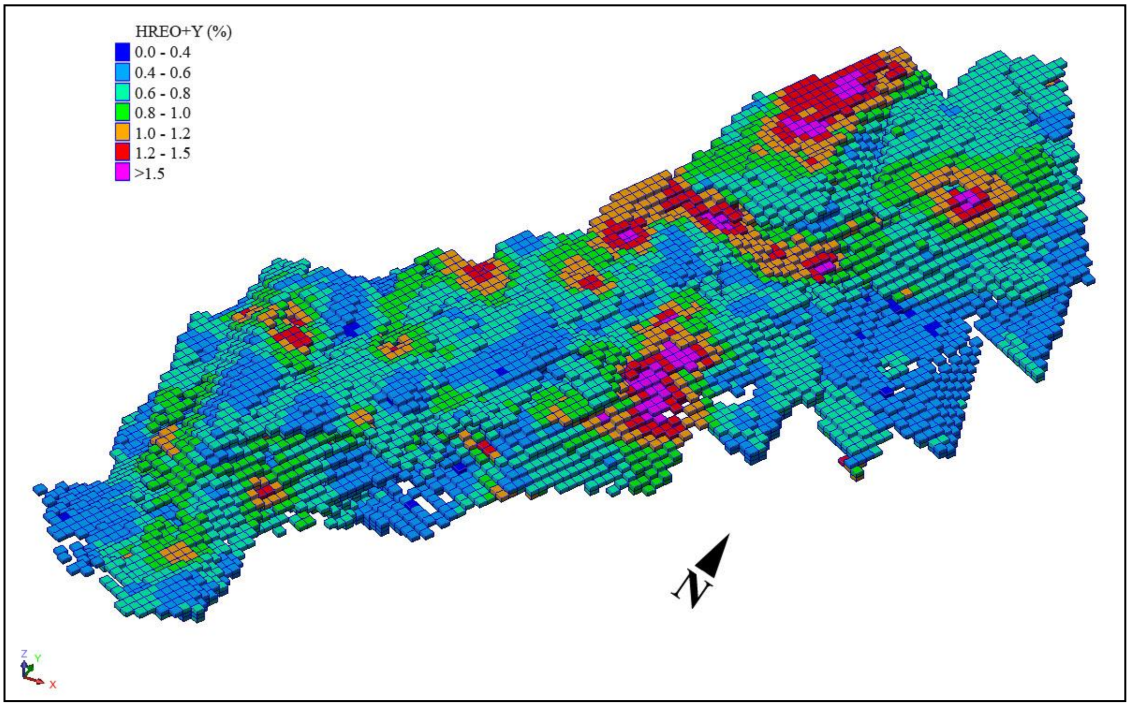


Figure for visualization purposes only, not to scale.

Figure 14.7
Three-dimensional Isometric View of Block Model Showing Grade Distribution of TREO

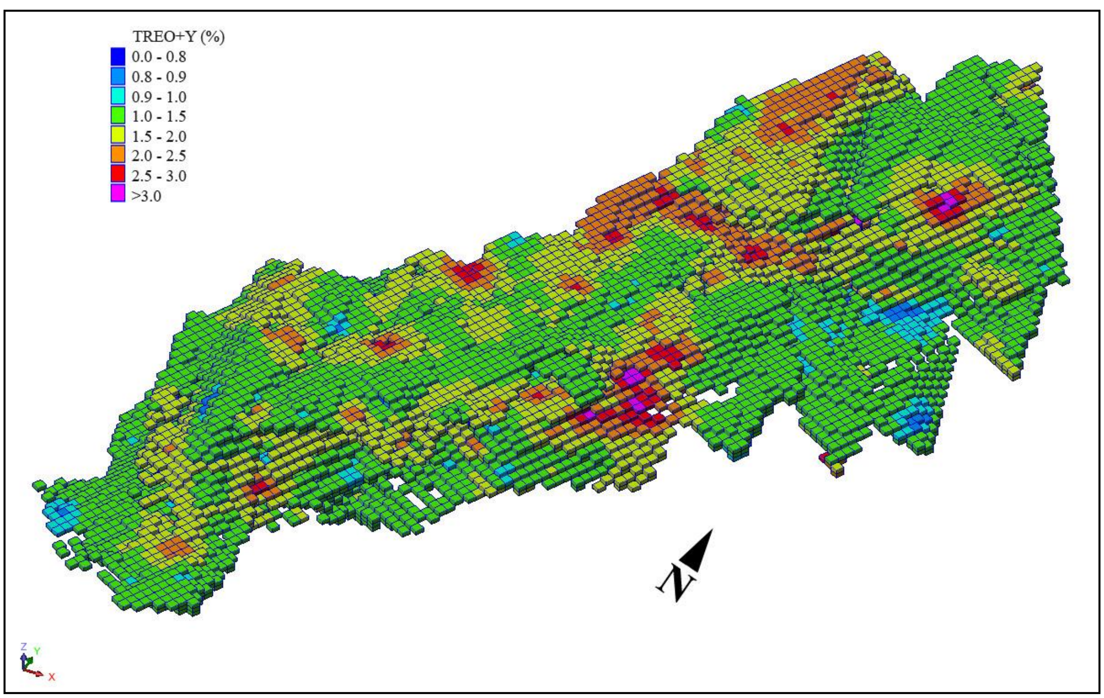


Figure for visualization purposes only, not to scale.

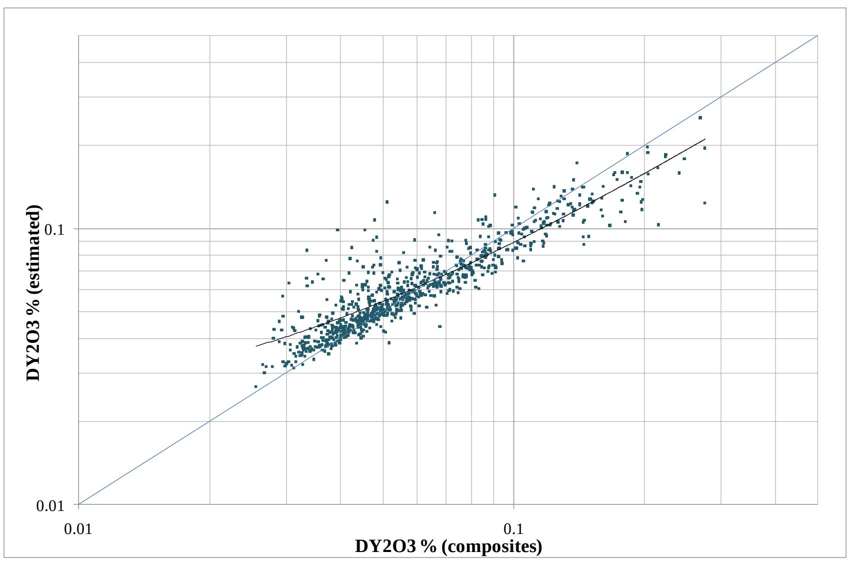
The results show that there are localized areas of very high grade mineralization and these are concentrated mostly at the northern end of the Enriched Zone.

14.6.2 Block Model Validation

In order to validate the B Zone block model and check for conditional bias introduced during the grade interpolation, several plots were created which compared estimated block grade estimates and composite sample average grades on a local and global scale.

In the first check, all the composite samples were declustered to a volume equivalent to the parent block size of the block model. Average composite grades were imported into the block model to allow a direct comparison of composite grade and estimated grade, providing insight into the accuracy of local estimates. The scatter plots in Figure 14.8 show the correlation between the composite sample data and the estimated grade for Dy_2O_3. A correlation coefficient of 0.91 between the declustered composites and block estimates confirms a good correlation.

Figure 14.8
Declustered Composite Grade Versus Block Estimate Grade for Dy_2O_3

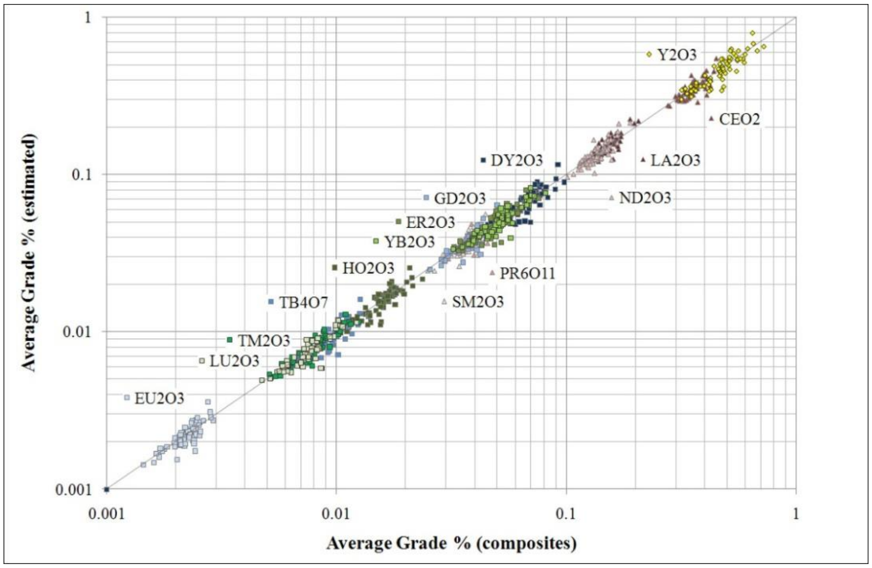


The results of the declustering shows some smoothing of grade compared to the 1:1 line, which is typical of linear grade interpolation. The degree of smoothing is not severe and the correlation coefficient is typically high at around 0.9 for all of the oxides.

The second validation check involves reblocking the model into a larger cell size to check the accuracy of the estimates on a larger scale. The block model was re-blocked into 100 m by 100 m by 50 m cells, and the average grades between the block estimates and composites are compared. Cells containing fewer than 10 composite samples were removed from the plot as they contain too little data for a meaningful comparison. The scatter plots in Figure 14.8 and

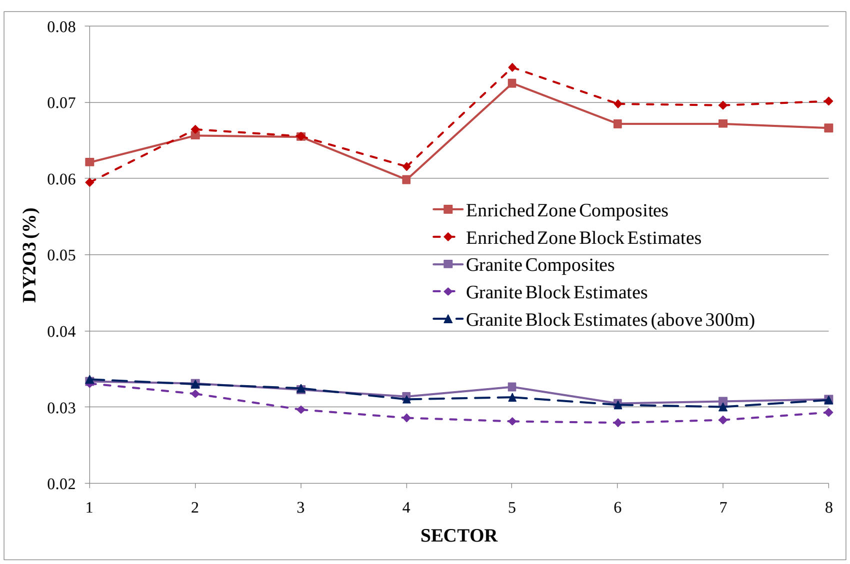
Figure 14.9 show good comparisons for all elements with tight clusters of points along the 1:1 line.

Figure 14.9
Declustered Composite Grade Versus Block Estimate Grade for Dy_2O_3



Another method used to validate the block model was to sub-divide the drill hole data into sectors spaced roughly 150 m along strike, having more or less equal drilling density, and compare the average grade of the composites to the average estimated block grade within the sector. The sectors were numbered 1 to 8 starting in the southwest end of the deposit. The resultant plot is presented in Figure 14.10.

Figure 14.10
Sector Analysis for Dy_2O_3



The plot for the Enriched Zone domain shows that the estimated average grade is higher than that of the composites in some of the sectors at the north end. The error between the composite and block average grade in the northern sectors is less than 2% which is within an acceptable estimation error for the deposit.

The difference in grades may suggest over-estimation in these sectors but it may also be the result of the block estimates being influenced by composite samples from adjacent sectors, or by isolated high grade samples being used to estimate the grade in several blocks and therefore becoming more heavily weighted in the block grade average than in the composite average. In either case, the issue is caused by some high grade samples which can be difficult to control in a linear estimation. In order to check that these samples were not causing local over-estimation, the estimation was re-run using composite sample data with a lower capping grade set, thus removing more of the very high grade samples. Although the difference was smaller, the block estimate average grade was still higher than the sector composite average grade, suggesting it is caused by the location of the composite samples.

In the Granite domain the block estimates are lower, on average, compared to the composite samples. Again, this is caused by the location of the composite samples since, below the 300 m elevation, the drill hole density is lower, at approximately 200 m by 100 m spacing between holes, and the average grade of samples is also lower. Thus, all of the blocks below the 300 m elevation are being estimated using a few low grade composite samples, so they are not weighted equally with those above the 300 m elevation. When only the blocks above 300 m are shown on the chart, the average grades compare well.

From the various validation methods applied by Micon, it is satisfied that there has been no bias introduced into the grade estimation in the B Zone block model.

14.6.3 Pit Optimization

The mineral resources at B Zone occur near to surface and are amenable to conventional open pit mining methods. Open pit optimization was run on the block model to define the proportion of the resources which could be mined from an open pit. A boundary was drawn to exclude the resources below the lake from the pit optimization.

The NSR attribute in the block model was used for the net revenue calculation in pit optimisation. The parameters used for the NSR calculation are given in Table 14.2. Other assumed technical and economic parameters for the optimization were provided by Quest and these are presented in Table 14.7. The resource estimate also assumes a 100% recovery of the mined material.

The resultant pit shell is 1.75 km long by 1.0 km wide and over 400 m deep (Figure 14.11). It includes the majority of the estimated resources in the block model with the exclusion of those below Lac Brisson.

Table 14.7
Parameters for Pit Optimization on the B Zone

Parameter	US$/t
Mining operating cost	5.18
Processing costs	227.01
G&A costs	14.31
Site other costs	12.29
Pit slopes (degrees)	45

Figure 14.11
B Zone Optimized Pit Shell

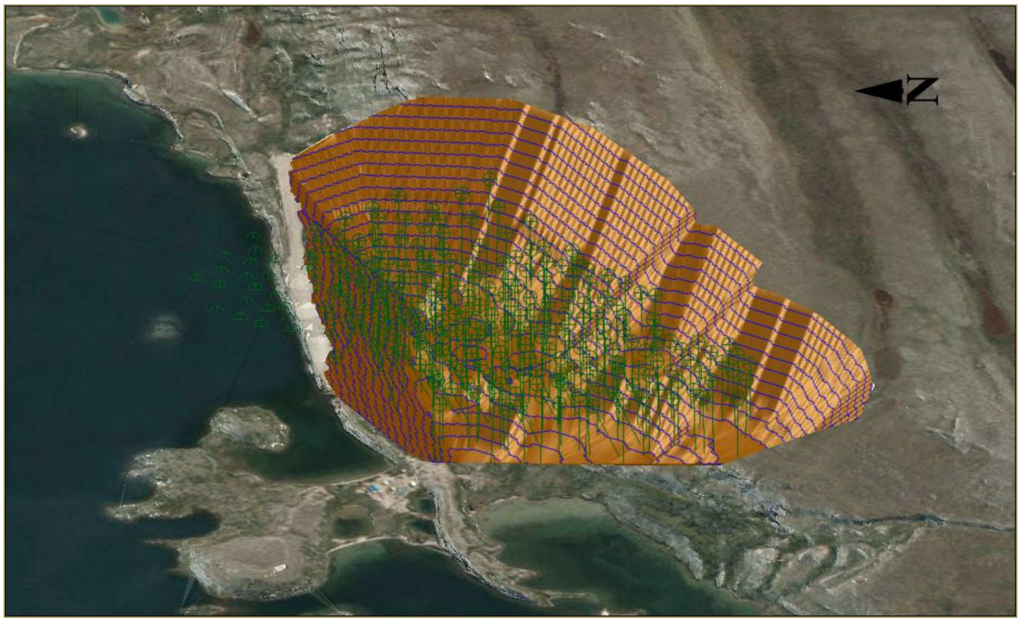


Figure for visualization purposes only, not to scale.

14.6.4 Mineral Resource Classification

Micon has assigned the resources in the B Zone deposit to the Indicated and Inferred classification on the basis of data density. At this time Micon has not assigned any Measured resources. The majority of the B Zone deposit has been drilled at a spacing of 50 m by 50 m with some areas drilled at 25 m by 50 m. At depth, the drill hole spacing becomes 200 m by 100 m since the majority of holes were drilled to less than 150 m depth.

The Indicated class was assigned to all resource blocks which fall in areas with a drill spacing of at least 50 m by 50 m and were estimated using at least 16 samples from a minimum of four drill holes.

All remaining resource blocks in the block model occurring within the optimized pit shell and with an estimated a grade greater than zero were assigned to the Inferred classification.

The Enriched Zone domain contains the highest grade mineralization in the deposit. The high grade mineralization is controlled by the pegmatite lithology which, given the relatively close drill hole spacing, shows a lot of variability in the shape and distribution between sections meaning that it cannot be modelled separately from the granites with confidence. The Enriched Zone model has improved the continuity of the high grade mineralization across the deposit however this domain is comprised of interstitial lenses of pegmatite and granite lithologies each showing a high nugget effect in the mineralization which limits confidence in the actual grade distribution. On the basis of the CIM guidelines for resource classification Micon has assigned the Enriched Zone domain to the Indicated class.

Mineralization in the Subsolvus Granite domain is fairly homogenous with localized isolated patches of higher grade pegmatite mineralisation. Within the 50 m by 50 m drilled area resources in this domain have been classed as Indicated. To define the Indicated proportion of the domain, a contoured surface was made following the bottom of the 50 m by 50 m spaced drill holes. This surface was then lowered a further 50 m and all blocks which fell above the surface were classed as Indicated. All remaining blocks were classed as Inferred.

14.6.5 Mineral Resource Estimation

Mineral resources were estimated in accordance with the definitions contained in the CIM Standards on Mineral Resources and Reserves Definitions and Guidelines that were prepared by the CIM Standing Committee on Reserve Definitions and adopted by the CIM Council on November 27, 2010.

The mineral resources at B Zone occur near to surface and are amenable to conventional open pit mining methods. Although an NSR was used to generate the pit optimization the NSR was converted to an equivalent cut-off grade to be able to compare with the previous estimates. An economic cut-off base case grade of 0.5% TREO was considered appropriate for reporting the mineral resources. A specific gravity of 2.74 g/cm^3 was used for reporting the Enriched Zone domain and 2.72 g/cm^3 for the Granite domain.

Indicated Mineral Resources are estimated at 278.13 Mt at 0.93% TREO. Inferred Mineral Resources are estimated at 214.35 Mt at 0.85% TREO. The resource estimates are summarized in Table 14.8 through Table 14.11.

The effective date of the mineral resource estimate is August 31, 2012 and it was disclosed in a Technical Report dated December 14, 2012.

It is Micon's opinion that there is no known environmental, permitting, legal, title, taxation, socio-economic, marketing or political issues exist that would adversely affect the mineral resources presented above. However, the mineral resources presented herein are not mineral reserves as they have not been subject to adequate economic studies to demonstrate their economic viability.

Table 14.8
B Zone Resources Estimated by Micon as of August 31, 2012

Domain	Tonnes (x1000t)	LREO (%)	HREO + Y (%)	TREO (%)	H:T Ratio	ZrO_2 (%)	HfO_2 (%)	Nb_2O_5 (%)
INDICATED								
Enriched Zone	20,020	0.72	0.72	1.44	0.50	2.59	0.06	0.34
Granite	258,108	0.55	0.33	0.89	0.38	1.87	0.05	0.16
Total	278,128	0.57	0.36	0.93	0.39	1.92	0.05	0.18
INFERRED								
Granite	214,351	0.55	0.30	0.85	0.35	1.71	0.04	0.14

1) Mineral resources which are not mineral reserves do not have demonstrated economic viability. The estimate of mineral resources may be materially affected by environmental, permitting, legal, title, taxation, sociopolitical, marketing, or other relevant issues.
2) The quantity and grade of reported inferred resources in this estimation are conceptual in nature and there has been insufficient exploration to define these inferred resources as an indicated or measured mineral resource and it is uncertain if further exploration will result in upgrading them to an indicated or measured mineral resource category.

The following should be noted:

1. Total Rare Earth Oxides (TREO+Y) include: La_2O_3, CeO_2, Pr_6O_{11}, Nd_2O_3, Sm_2O_3, Eu_2O_3, Gd_2O_3, Tb_4O_7, Dy_2O_3, Ho_2O_3, Er_2O_3, Tm_2O_3, Yb_2O_3, Lu_2O_3 and Y_2O_3.

2. Heavy Rare Earth Oxides (HREO+Y) include: Eu_2O_3, Gd_2O_3, Tb_4O_7, Dy_2O_3, Ho_2O_3, Er_2O_3, Tm_2O_3, Yb_2O_3, Lu_2O_3 and Y_2O_3.

3. Light Rare Earth Oxides (LREO) include: La_2O_3, CeO_2, Pr_6O_{11}, Nd_2O_3 and Sm_2O_3.

4. The effective date of the resource estimate is August 31, 2012.

5. The resource estimate is based on drill-core assays from Quest's 2009 to 2011 assay database.

6. Micon considers a cut-off grade of 0.50% TREO+Y to be reasonable based on a Whittle pit optimization and a minimum marginal economic value of $250 NSR based upon processing and G&A cost estimates for the current block model.

7. Average specific gravity is 2.72 g/cm^3 for the Granite Domain and 2.74 g/cm^3 for the Enriched Zone.

8. The resource estimate has been classified as an Indicated and Inferred Resource on the basis of data density applying the following criteria:

   - Indicated classification was assigned to all resource blocks in the model occurring within the optimized pit shell which fall in areas with a drill spacing of at least 50 m by 50 m and was estimated using at least 16 samples from a minimum of four drill holes.

   - All remaining resource blocks in the block model occurring within the optimized pit shell and with an estimated a grade greater than zero were assigned to the Inferred class.

9. The resource estimate takes into account the following:

- A database of 256 drill holes, totalling approximately 37,434 m of diamond drilling, using 22,565 samples.

- Assay values in the database below the detection limit were assigned a value of half the detection limit.

- Samples were composited to a 2 m length.

- A lithology table was provided with codes for each major rock type observed in the deposit, primarily identified as pegmatite and subsolvus granite.

- A cross-sectional interpretation of the pegmatite lithology was provided by Quest and was used by Micon to model the wider pegmatite spine and dome structure with some mixing of the interlayered lithologies allowed in order to maintain continuity of the domain along strike and to allow for a wireframe construction of the Enriched Zone to be completed.

- The minimum modeled length of the high-grade intervals for the Enriched Zone width was 5 m using a combination of pegmatite lithology indicators and an NSR value with a maximum acceptable internal dilution of 3 m provided the total composite grade remained above a cut-off. An NSR cut-off for the "Enriched Zone" of $725/t was ultimately used as it formed intervals which could be connected between sections and maintained the descriptive statistical properties of the pegmatite.

- Grade capping was applied. In the case of the Enriched Zone, the methodology employed for establishing the outlier limit was to sort the sample populations from smallest to largest and cap to the value where there is a large increment in grade as the population breaks apart. In the granites the outlier limit was set at the 99th percentile value. This set a lower capping value than in the Enriched Zone so that the isolated high-grade pegmatite samples within the domain did not result in local grade overestimation or grade smearing.

- Block model utilized regularly-shaped blocks measuring (X) 10 m by (Y) 10 m by (Z) 5 m which are rotated at 030º. The block model was limited below a topographic surface created using 1 m contours. Overburden lithology was not included in the block model and was excluded using a digital surface model.

- Inverse Distance modeling was used as the method for grade interpolation in the B-Zone block model as it allows simple variation in the power to account for the different statistical properties shown by the different elements. In the REE oxides which show a high nugget effect the grade interpolation was performed using Inverse Distance squared (ID^2). This spreads the estimation weight across the informing composite samples so that the estimation is smoothed, as dictated by a high nugget. In the oxides with lower nugget effect Inverse Distance cubed (ID^3) was used which assigns more of the estimation weight to the closer informing composite samples. Discretization to 2-m cells was applied to the grade interpolations to account for the volume variance effect.

- The resource estimate assumes 100% recovery.

Table 14.9
B Zone Resources in the Enriched Zone Domain by TREO Cut-off Grade

TREO Cut-off (%)	Tonnes (x1000t)	LREO (%)	HREO + Y (%)	TREO (%)	H:T Ratio	ZrO_2 (%)	HfO_2 (%)	Nb_2O_5 (%)	Be (ppm)	Th (ppm)	U (ppm)
INDICATED											
2.00	1,544	1.06	1.23	2.29	54	2.49	0.05	0.46	937	993	146
1.75	3,273	0.97	1.09	2.06	53	2.55	0.06	0.44	836	840	133
1.50	6,690	0.88	0.95	1.83	52	2.60	0.06	0.41	744	719	120
1.25	13,111	0.79	0.82	1.60	51	2.62	0.06	0.37	652	622	107
1.00	19,144	0.73	0.73	1.46	50	2.60	0.06	0.35	586	568	99
0.90	19,880	0.72	0.72	1.44	50	2.59	0.06	0.35	576	560	98
0.80	20,010	0.72	0.72	1.44	50	2.59	0.06	0.34	575	559	97
0.70	20,018	0.72	0.72	1.44	50	2.59	0.06	0.34	575	559	97
0.60	20,020	0.72	0.72	1.44	50	2.59	0.06	0.34	575	559	97
0.50	20,020	0.72	0.72	1.44	50	2.59	0.06	0.34	575	559	97

Table 14.10
B Zone Resources in the Granite Domain by TREO Cut-off Grade

TREO Cut-off (%)	Tonnes (x1000t)	LREO (%)	HREO+ Y (%)	TREO (%)	H:T Ratio	ZrO_2 (%)	HfO_2 (%)	Nb_2O_5 (%)	Be (ppm)	Th (ppm)	U (ppm)
INDICATED											
2.00	29	1.11	1.11	2.22	50	1.81	0.04	0.31	915	753	94
1.75	79	1.03	0.96	1.99	48	1.86	0.04	0.32	722	677	91
1.50	396	0.87	0.80	1.67	48	2.05	0.05	0.31	531	614	89
1.25	2,005	0.77	0.64	1.40	45	2.09	0.05	0.27	472	499	79
1.00	24,680	0.65	0.44	1.09	41	1.99	0.05	0.21	333	356	62
0.90	96,968	0.60	0.38	0.98	38	1.91	0.05	0.18	273	304	55
0.80	225,374	0.57	0.34	0.91	38	1.88	0.05	0.17	240	274	51
0.70	256,151	0.56	0.33	0.89	38	1.87	0.05	0.16	234	269	51
0.60	257,968	0.55	0.33	0.89	38	1.87	0.05	0.16	234	268	51
0.50	258,108	0.55	0.33	0.89	38	1.87	0.05	0.16	234	268	51
INFERRED											
2.00	-	-	-	-	-	-	-	-	-	-	-
1.75	-	-	-	-	-	-	-	-	-	-	-
1.50%	56	0.74	0.82	1.56	52	1.66	0.04	0.21	280	635	79
1.25%	500	0.75	0.61	1.36	45	1.77	0.04	0.20	304	453	67
1.00%	10,025	0.65	0.43	1.07	40	2.02	0.05	0.20	269	348	62
0.90%	41,468	0.60	0.37	0.97	38	1.93	0.05	0.18	230	305	55
0.80%	156,611	0.57	0.31	0.88	35	1.74	0.04	0.15	193	241	46
0.70%	212,266	0.55	0.30	0.85	35	1.71	0.04	0.14	184	227	44
0.60%	214,348	0.55	0.30	0.85	35	1.71	0.04	0.14	184	227	44
0.50%	214,351	0.55	0.30	0.85	35	1.71	0.04	0.14	184	227	44

Table 14.11
Zone REO Resources by TREO Cut-off Grade

TREO Cut-off (%)	Tonnes (x1000t)	La_2O_3 (%)	CeO_2 (%)	Pr_6O_{11} (%)	Nd_2O_3 (%)	Sm_2O_3 (%)	Eu_2O_3 (%)	Gd_2O_3 (%)	Tb_4O_7 (%)	Dy_2O_3 (%)	Ho_2O_3 (%)	Er_2O_3 (%)	Tm_2O_3 (%)	Yb_2O_3 (%)	Lu_2O_3 (%)	Y_2O_3 (%)
Enriched Zone INDICATED																
2.00%	1,544	0.22	0.53	0.058	0.20	0.058	0.004	0.064	0.016	0.114	0.026	0.082	0.013	0.078	0.011	0.82
1.75%	3,273	0.20	0.49	0.053	0.18	0.052	0.003	0.057	0.014	0.101	0.023	0.073	0.012	0.071	0.010	0.72
1.50%	6,690	0.18	0.44	0.048	0.17	0.046	0.003	0.050	0.012	0.088	0.020	0.065	0.010	0.064	0.009	0.63
1.25%	13,111	0.16	0.39	0.043	0.15	0.041	0.002	0.043	0.011	0.075	0.017	0.056	0.009	0.057	0.008	0.54
1.00%	19,144	0.15	0.36	0.040	0.14	0.037	0.002	0.039	0.010	0.067	0.016	0.050	0.008	0.052	0.008	0.48
0.90%	19,880	0.15	0.36	0.039	0.14	0.036	0.002	0.039	0.009	0.066	0.015	0.049	0.008	0.051	0.007	0.47
0.80%	20,010	0.15	0.36	0.039	0.14	0.036	0.002	0.039	0.009	0.066	0.015	0.049	0.008	0.051	0.007	0.47
0.70%	20,018	0.15	0.36	0.039	0.14	0.036	0.002	0.039	0.009	0.066	0.015	0.049	0.008	0.051	0.007	0.47
0.60%	20,020	0.15	0.36	0.039	0.14	0.036	0.002	0.039	0.009	0.066	0.015	0.049	0.008	0.051	0.007	0.47
0.50%	20,020	0.15	0.36	0.039	0.14	0.036	0.002	0.039	0.009	0.066	0.015	0.049	0.008	0.051	0.007	0.47
Granite Domain INDICATED																
2.00%	29	0.22	0.54	0.062	0.22	0.060	0.004	0.064	0.016	0.107	0.024	0.074	0.012	0.065	0.009	0.74
1.75%	79	0.21	0.51	0.057	0.20	0.054	0.003	0.057	0.014	0.092	0.021	0.064	0.010	0.057	0.008	0.63
1.50%	396	0.18	0.43	0.048	0.17	0.045	0.003	0.047	0.012	0.077	0.017	0.054	0.008	0.050	0.007	0.53
1.25%	2,005	0.16	0.38	0.042	0.15	0.037	0.002	0.038	0.009	0.060	0.014	0.043	0.007	0.041	0.006	0.42
1.00%	24,680	0.14	0.32	0.035	0.12	0.029	0.002	0.029	0.006	0.042	0.009	0.029	0.005	0.030	0.004	0.29
0.90%	96,968	0.13	0.29	0.033	0.11	0.026	0.001	0.025	0.005	0.036	0.008	0.025	0.004	0.025	0.004	0.24
0.80%	225,374	0.13	0.28	0.031	0.11	0.025	0.001	0.023	0.005	0.032	0.007	0.022	0.004	0.023	0.003	0.22
0.70%	256,151	0.12	0.27	0.030	0.11	0.024	0.001	0.023	0.005	0.032	0.007	0.022	0.003	0.022	0.003	0.22
0.60%	257,968	0.12	0.27	0.030	0.11	0.024	0.001	0.023	0.005	0.032	0.007	0.022	0.003	0.022	0.003	0.22
0.50%	258,108	0.12	0.27	0.030	0.11	0.024	0.001	0.023	0.005	0.032	0.007	0.022	0.003	0.022	0.003	0.22
Granite Domain INFERRED																
2.00%	56	0.16	0.36	0.040	0.14	0.040	0.002	0.046	0.012	0.077	0.018	0.053	0.009	0.049	0.006	0.55
1.75%	500	0.16	0.36	0.041	0.15	0.036	0.002	0.037	0.009	0.058	0.013	0.040	0.006	0.039	0.005	0.40
1.50%	10,025	0.14	0.32	0.035	0.12	0.029	0.002	0.028	0.006	0.040	0.009	0.028	0.005	0.029	0.004	0.27
1.25%	41,468	0.13	0.29	0.032	0.11	0.026	0.001	0.025	0.005	0.035	0.008	0.024	0.004	0.025	0.004	0.24
1.00%	156,611	0.13	0.28	0.030	0.11	0.024	0.001	0.022	0.005	0.029	0.006	0.020	0.003	0.020	0.003	0.20
0.90%	212,266	0.12	0.27	0.029	0.11	0.023	0.001	0.022	0.004	0.028	0.006	0.019	0.003	0.019	0.003	0.19
0.80%	214,348	0.12	0.27	0.029	0.11	0.023	0.001	0.022	0.004	0.028	0.006	0.019	0.003	0.019	0.003	0.19
0.70%	214,351	0.12	0.27	0.029	0.11	0.023	0.001	0.022	0.004	0.028	0.006	0.019	0.003	0.019	0.003	0.19
0.60%	214,351	0.12	0.27	0.029	0.11	0.023	0.001	0.022	0.004	0.028	0.006	0.019	0.003	0.019	0.003	0.19
0.50%	214,351	0.12	0.27	0.029	0.11	0.023	0.001	0.022	0.004	0.028	0.006	0.019	0.003	0.019	0.003	0.19

15.0 MINERAL RESERVE ESTIMATES

There is no mineral reserve. The PEA can only indicate the potential viability of mineral resources and cannot be used to support mineral reserves.

16.0 MINING METHODS

A conventional open pit mining operation is proposed for the extraction of mineralized material from the B Zone rare earth element mineral deposit for the Strange Lake Project. Mining will be undertaken by Quest using its own equipment and workforce.

Quest will have responsibility for production drilling and blasting, the excavation and haulage of mineralized material to the primary crusher and the waste rock to the appropriate dump or stockpile, oversize breakage, pit dewatering, haul road maintenance, and equipment maintenance. Quest will provide the open pit equipment, operator training, supervision, pit technical support services, mine consumables, and the pit operations and maintenance facilities. Specialized contractors will be used for the initial site clearing and initial haul road construction in preparation for the mining equipment fleet. Explosives, blasting agents, fuel and other consumables will be sourced from established suppliers.

The Strange Lake Project resources are contained in a single deposit. For the PEA, the ultimate pit has been subdivided into five phases for scheduling.

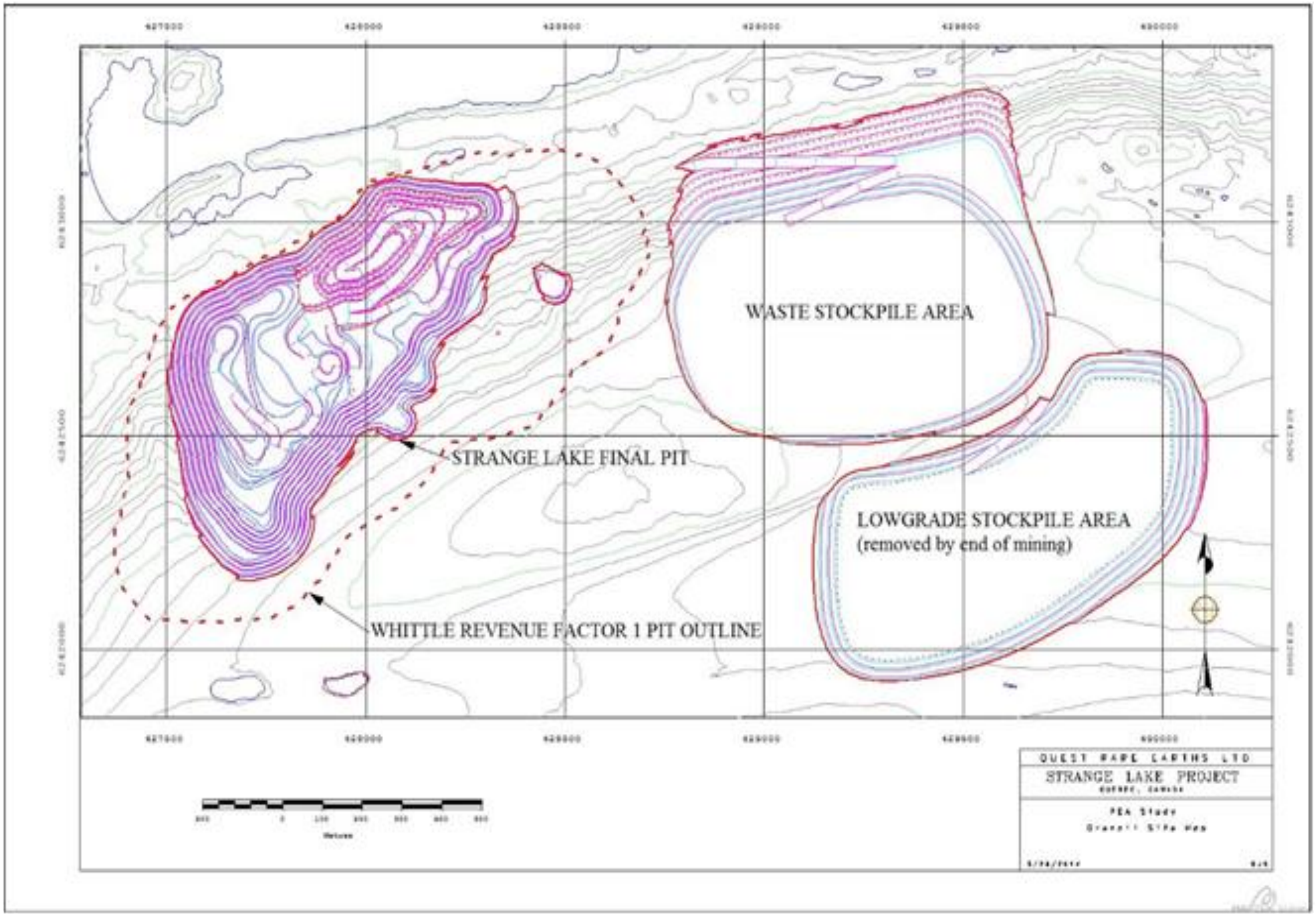
Pit and internal phases were designed using Vulcan software, preliminary geotechnical designs, recommended standards for road widths and minimum mining widths based on efficient operation for the size of mining equipment chosen for the project.

Figure 16.1 shows the locations of the ultimate pit, waste stockpile and low grade stockpile.

16.1 MINE DESIGN

The ultimate pit limit for the Strange Lake deposit was selected based on Lerchs-Grossmann (LG) open pit optimizations using Whittle™ software. The pit will be developed using five distinct phases designed to approximate an optimal extraction sequence. The phase designs are based on slope design parameters and benching configurations provided by AMEC. A mine production schedule was prepared by Micon using Maptek's Chronos scheduling software.

Figure 16.1
Strange Lake Mining Area Layout



16.1.1 Pit Optimization

The LG pit shells were used to evaluate alternatives for determining the economic pit limit and optimum phasing for detailed design work. The LG shells provide a geometrical guide to detailed pit designs.

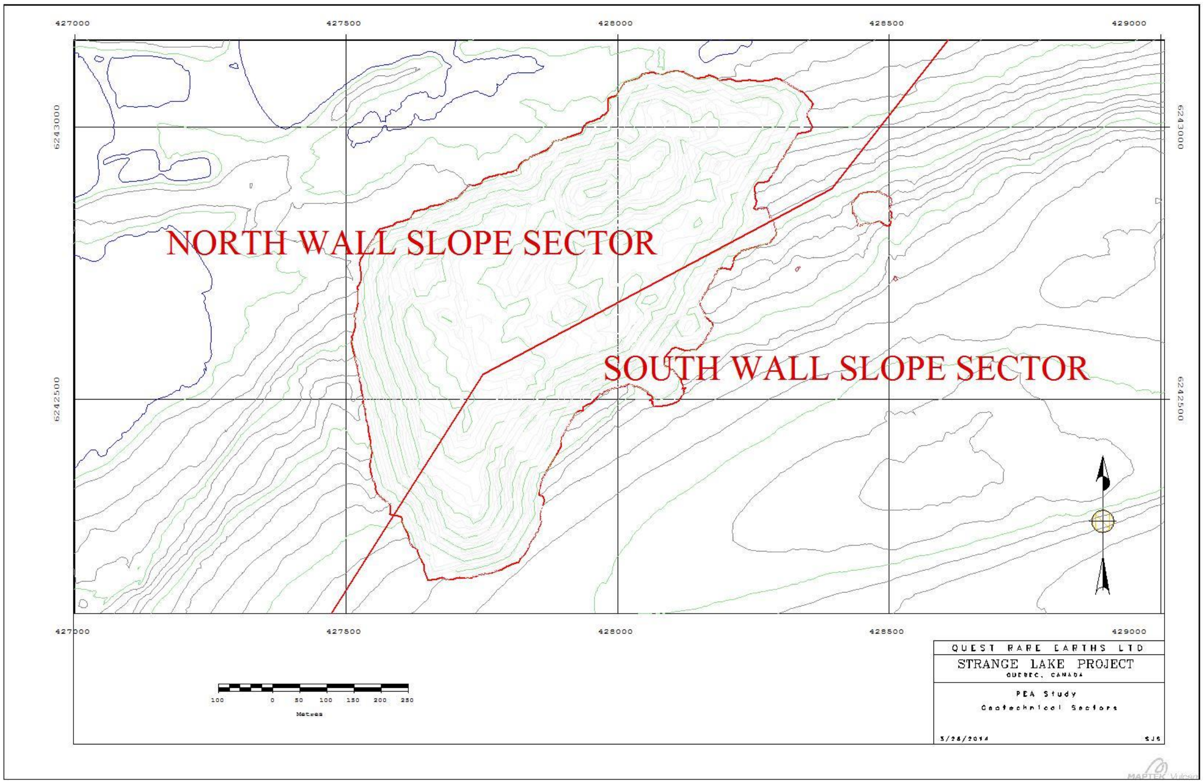
The LG pit shell optimized with base case metal prices (100% value) was selected to guide the design of the ultimate pit. Smaller pit shells exist within the ultimate economic pit limits. When considered at base case economics, these smaller pit shells generated higher revenue per tonne due to lower strip ratios or better grades than the full economic pit limits. Mining these pits as phases allows the mine production schedule to expose mineralized material for the mill start-up with less pre-stripping. This mining sequence will improve project economics as higher value mineralized material is produced in the early years of the production schedule, resulting in higher revenues in those years. The pit phases reduce the cost of mining mineralized material at the start of mining operations and, combined with the higher revenues from higher grades, shorten the project capital payback period and improve overall project cash flow.

Geotechnical mine planning slopes for the pit designs were based on recommendations provided by AMEC. AMEC recommended different configurations for the north and south sides of the pit, as shown in Table 16.1 and Figure 16.2.

Table 16.1
Geotechnical Parameters

Parameter	Units	North Wall	South Wall
Working Bench Height	(m)	5	2
Bench Face Angle (batter)	$^{(o)}$	60	73
Final Bench Stack Height	(m)	15	15
Minimum Bench Width (berm)	(m)	6.5	8
Inter-ramp Angle	$^{(o)}$	45	50
Ramp Width	(m)	22	22

Figure 16.2
Pit Wall Slope Sectors



The optimized shells were generated with an overall slope of 42^o on the north wall and 45^o on the south wall which have been flattened by 3^o and 5^o, respectively, from the inter ramp angle to account for the access ramps required in the pit design.

Pit designs were constrained by a 120-m offset from Lac Brisson which lies to the northwest.

Fixed mining costs for drilling, blasting, loading, pit support and G&A were estimated based on the results of previous economic studies of the Strange Lake Project. A fixed mining cost of $5.67/t for all material was used in the pit optimization study. This was applied to all mineralized material and waste rock types. A mill feed based cost of $29.72/t was applied to each tonne of mill feed as shown in Table 16.2. A concentrate processing cost of $371.32/t concentrate (based on a concentrate production rate of 610,000 t/y) was applied to post-milling processing costs. An additional cost of $35.90/t (based on a concentrate production rate of 610,000 t/y) concentrates was applied to G&A costs as well. Other than the mining cost estimates, which were developed by Micon, Quest provided all of the operating costs, metal recoveries, and metal pricing used in this report.

Table 16.2
Parameters for Whittle™ Economic Pit Optimization

Item	Units	Value
Mining Cost	$/t	5.67
Milling Cost	$/t mill feed	29.72
Downstream Processing Cost	$/t mill feed	371.32
G & A	$/t concentrate	35.90
Exchange Rate	US$/CAD$	0.952
Concentrate Processing Rate	t/y	730,000

The numbers presented above differ slightly from those presented in later sections. They are used at the front-end of the PEA to calculate the NSR which is key in mine modeling to optimize pit design, production and scheduling. These differences are acceptable as their impact on the overall project evaluation is minimal.

The value of the mineralized material was based on the recovery of 15 elements from the mill feed. Due to the number of elements recovered, the grades were combined into a single value based on the metal prices and recoveries (NSR), as well as TREO, HREO and LREO for the Whittle™ optimizations. The LREE are those with atomic numbers 57 through 62 (lanthanum to samarium) and the HREE with atomic numbers from 63 to 71 (europium to lutetium) and, for this study, include yttrium. Metal prices and recoveries used for calculation of the net smelter return are shown in Table 16.3.

Table 16.3
Metal Prices and Recoveries for Net Smelter Return Calculation

Name	Price (US$/kg oxide)	Final Price (US$/kg)	Total Recovery (%)
Lanthanum	9.00	9.00	76.2
Cerium	8.00	8.00	77.2
Praseodymium	85.00	85.00	77.8
Neodymium	80.00	80.00	78.0
Samarium	9.00	9.00	76.6
Europium	1,000.00	1,000.00	73.7
Gadolinium	40.00	40.00	75.5
Terbium	950.00	950.00	72.9
Dysprosium	650.00	650.00	70.6
Holmium	55.00	55.00	68.1
Erbium	70.00	70.00	65.5
Thulium	1,000.00	1,000.00	60.9
Ytterbium	50.00	50.00	57.3
Lutetium	1,100.00	1,100.00	55.4

Name	Price (US$/kg oxide)	Final Price (US$/kg)	Total Recovery (%)
Yttrium	30.00	30.00	69.3
Niobium	0.00	0.00	0.0
Hafnium	0.00	0.00	0.0
Zirconia	0.00	0.00	0.0

Data provided by Quest, 21 February, 2014.

The total value of a tonne of mineralized material was calculated using the metal price and recovery assumptions shown in Table 16.3. Optimized shells were then generated using between 20% and 120% of each block's value with measured and indicated material being treated as potential mineralized material and inferred material being treated as waste. The material contained in each shell is shown in Figure 16.3. The pit shell generated using the metal prices (100% mineralized material value) were used to guide the ultimate pit design and the material contained within this shell is shown in Table 16.4.

Figure 16.3
Strange Lake Whittle™ Optimization Pit by Pit Results

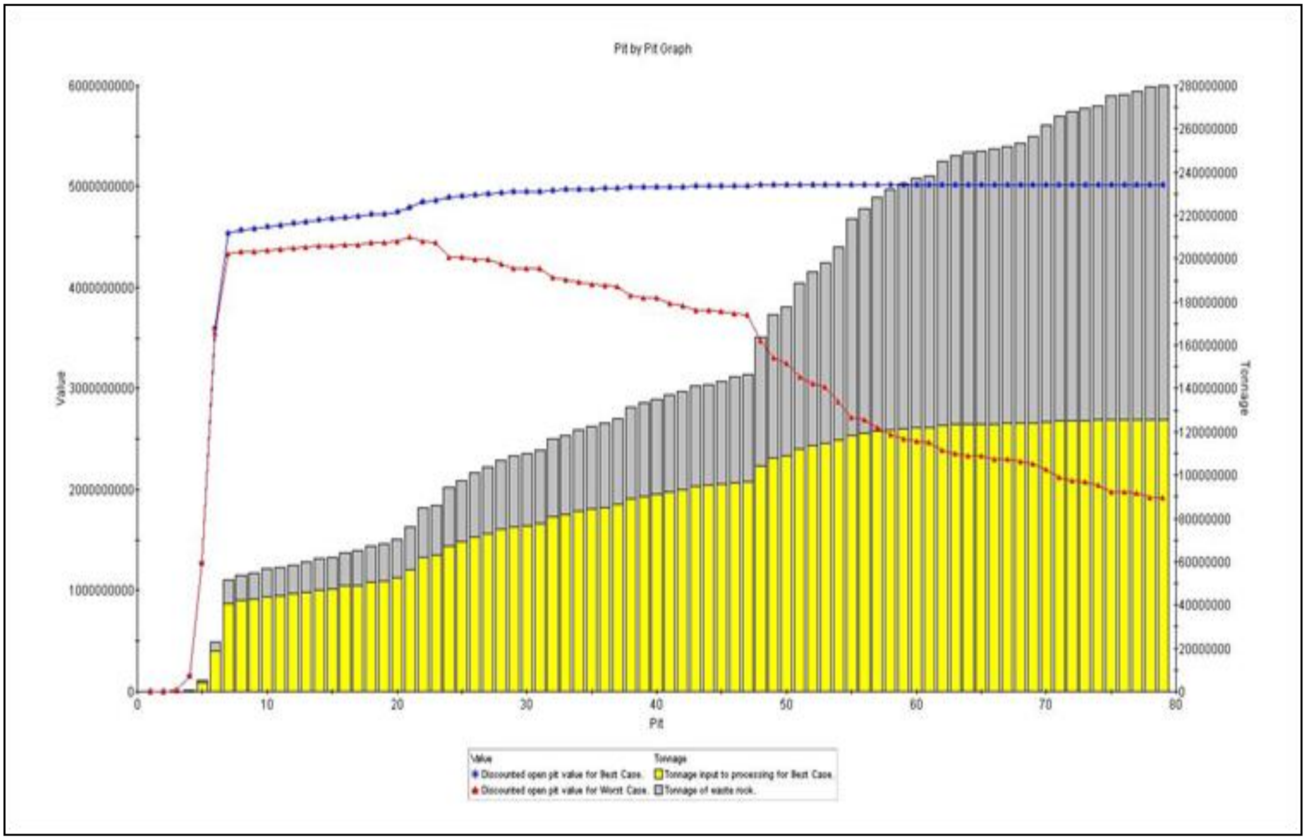


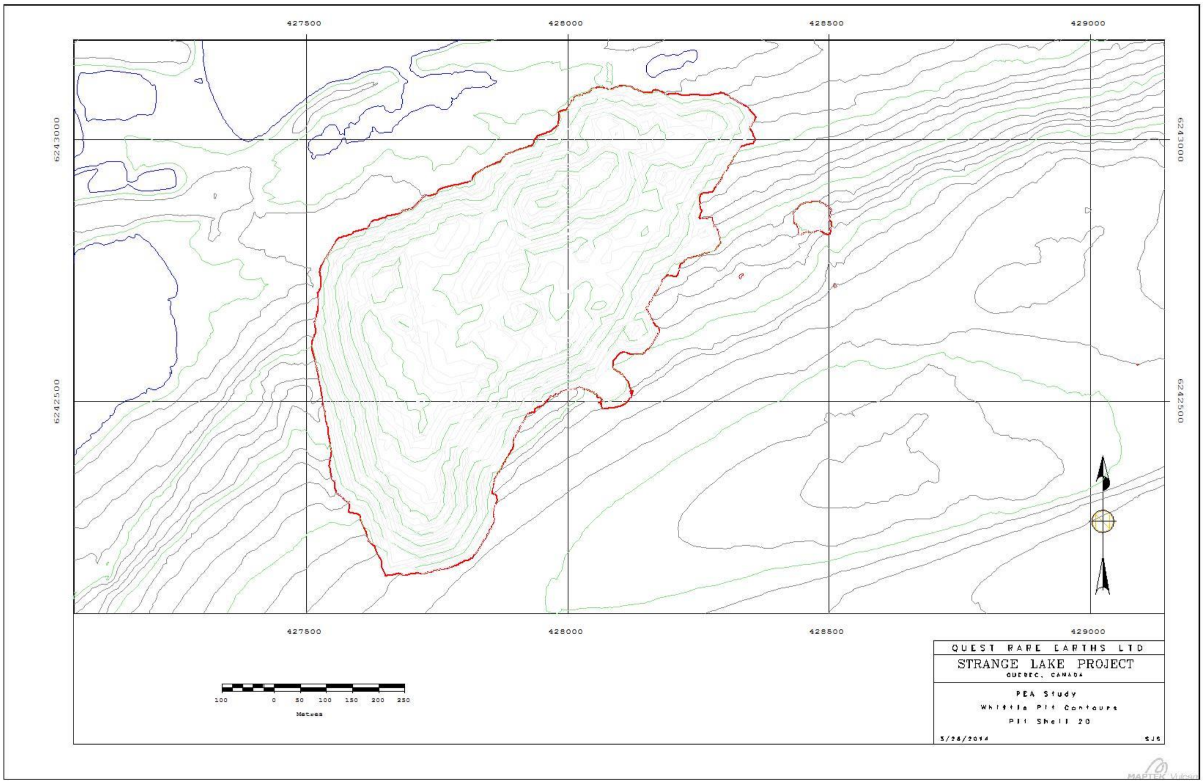
Table 16.4
Selected Lerchs-Grossmann Shell Used to Guide Pit Design

Item	Units	Indicated	Inferred	Overburden	Waste Rock	Total Material
Quantity	t	52,527,000	465,000	4,305,000	13,157,000	70,454,000
NSR	$/t	$425.39	$280.22	-	-	-
TREO	%	1.0895	0.9707	-	-	-
HREO	%	0.4742	0.3651	-	-	-
LREO	%	0.6154	0.5577	-	-	-
CeO_2	%	0.3033	0.2972	-	-	-
Dy_2O_3	%	0.0448	0.0358	-	-	-
Er_2O_3	%	0.0317	0.0238	-	-	-
Eu_2O_3	%	0.0017	0.0015	-	-	-
Gd_2O_3	%	0.0291	0.0256	-	-	-
HfO_2	%	0.0512	0.0459	-	-	-
Ho_2O_3	%	0.0100	0.0077	-	-	-
La_2O_3	%	0.1324	0.1342	-	-	-
Lu_2O_3	%	0.0047	0.0034	-	-	-
Nb_2O_5	%	0.2326	0.2067	-	-	-
Nd_2O_3	%	0.1171	0.1146	-	-	-
Pr_6O_{11}	%	0.0334	0.0325	-	-	-
Sm_2O_3	%	0.0291	0.0271	-	-	-
Tb_4O_7	%	0.0066	0.0054	-	-	-
Tm_2O_3	%	0.0051	0.0038	-	-	-
Y_2O_3	%	0.3084	0.2339	-	-	-
Yb_2O_3	%	0.0322	0.0241	-	-	-
ZrO_2	%	2.1588	1.9213	-	-	-

During Whittle™ pit optimization, revenue factors from 0.2 up to 1.2 times the block NSR value were selected and an optimized pit shell was determined at each revenue factor. Then, using "Best Case" and "Worst Case" production schedules, the discounted cash value (without regard for capital investment) at each revenue factor was calculated at each block NSR value. The Whittle™ "Best Case" schedule mines each shell individually, progressively from the lowest revenue factor (lowest priced pit shell or highest marginal profit pit), using the block NSR value. The Whittle™ "Worst Case" schedule mines the combination of all pit shells from the top down, without regard to the individual shells, again using the block NSR value. A "Best Case" schedule tends to back-load waste stripping while a "Worst Case" schedule tends to front-load waste stripping. The specified case scheduling scenario represents the user selected pit shells used for Whittle™ production scheduling (not used in this case).

The size of the optimized shell is controlled by the 120-m offset from Lac Brisson and the extent of the inferred material which creates a flat bottom at around the 290 m elevation above sea level, as shown in Figure 16.4.

Figure 16.4
Optimized Whittle™ Pit Shell
(Revenue Factor 0.543)



Based on the updated project economics, metal recoveries, and metal pricing the Whittle™ optimization shows a viable pit on which to base the detailed design for production scheduling in support of this PEA. The pit optimization results were exported and the selected pit shell 20 was used as the basis for design.

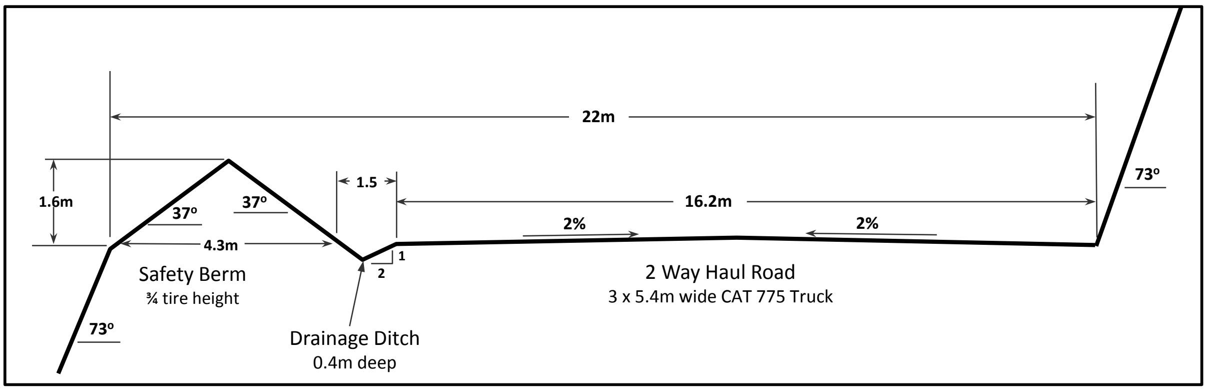
16.1.2 Pit Design Criteria

Geotechnical design criteria are presented in Section 16.1.1. Ramps in the ultimate pit walls have been designed to the minimum width to reduce the amount of pit waste stripping required. Ramps in temporary walls between pit phases, on waste dumps and roads external to the pit, have been designed with an additional 4-m of running width for added safety, to provide working room to deal with snow accumulation, and to provide room to deal with material landing on the road from blasts in an adjacent phase. The parameters used for road and ramp design are shown in Table 16.5 and Figure 16.5.

Table 16.5
Road and Ramp Design

Item	Units	Value
Total Width Allowance on Temporary Roads and Ramps	m	26
Minimum Width Allowance for Two Way Pit Ramps	m	22
Minimum Inside Radius on Corners	m	10
In-pit Ramp Grade	%	10
Maximum Ex-pit Ramp Grade	%	8

Figure 16.5
Minimum Two-way Haul Ramp



16.1.3 Phased Pit Designs

The detailed pit designs were developed from the LG pit shells and design considerations reviewed above. The resultant ultimate pit has been subdivided into five phases, as shown in Figure 16.6. Topographic contours are shown every 5 m. As noted above, the ultimate pit is constrained by a 120-m offset from Lac Brisson. The five phases have been sequenced to access higher grade and lower stripping ratio material first.

- **Phase One** targets a central portion of the ultimate pit where the Enriched Zone outcrops near surface. Access is by a temporary ramp in the western side of the pit which ramps down to the pit bottom at the 410 m elevation above sea level, as shown in Figure 16.7.

- **Phase Two** is an expansion of Phase One to the southwest following the high grade Enriched Zone. Access is by a temporary ramp in the west side of the pit to the pit bottom at the 415 m elevation above sea level, as shown in Figure 16.8.

- **Phase Three** expands the Phase One and Two pits to the final limits on the west and side of the pit as well as final pit limits on all upper benches. Access to the pit bottom at the 365 m elevation above sea level is by a temporary ramp developed on the southeastern wall of the pit, as shown in Figure 16.9.

- **Phase Four** is an extension to the final limit below the phase two and three pits. Access to the pit bottom at the 360 m elevation above sea level is by a final ramp as developed in phase three, as shown in Figure 16.10.

- **Phase Five** is a standalone pit phase east of the main pit area. Access to the pit bottom at the 495 m elevation above sea level is by a final ramp in the form of a shallow slot cut towards the north, as shown in Figure 16.11.

The indicated material contained in the mining phases is shown in Table 16.6. Table 16.7 presents the material mined per phase that is categorized as inferred resources and Table 16.8 shows the total estimated material mined per phase for the life of the mine.

Figure 16.6
Plan View of Phases at 440 m Elevation

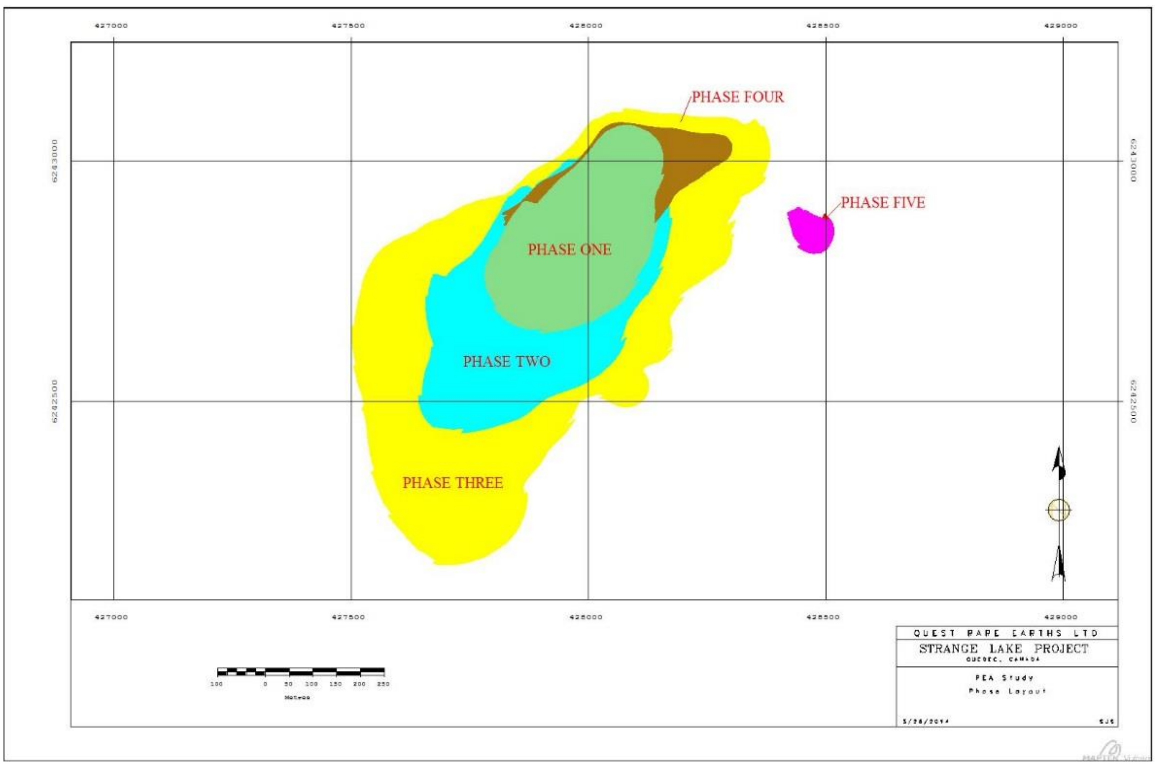


Figure 16.7
Phase One Pit

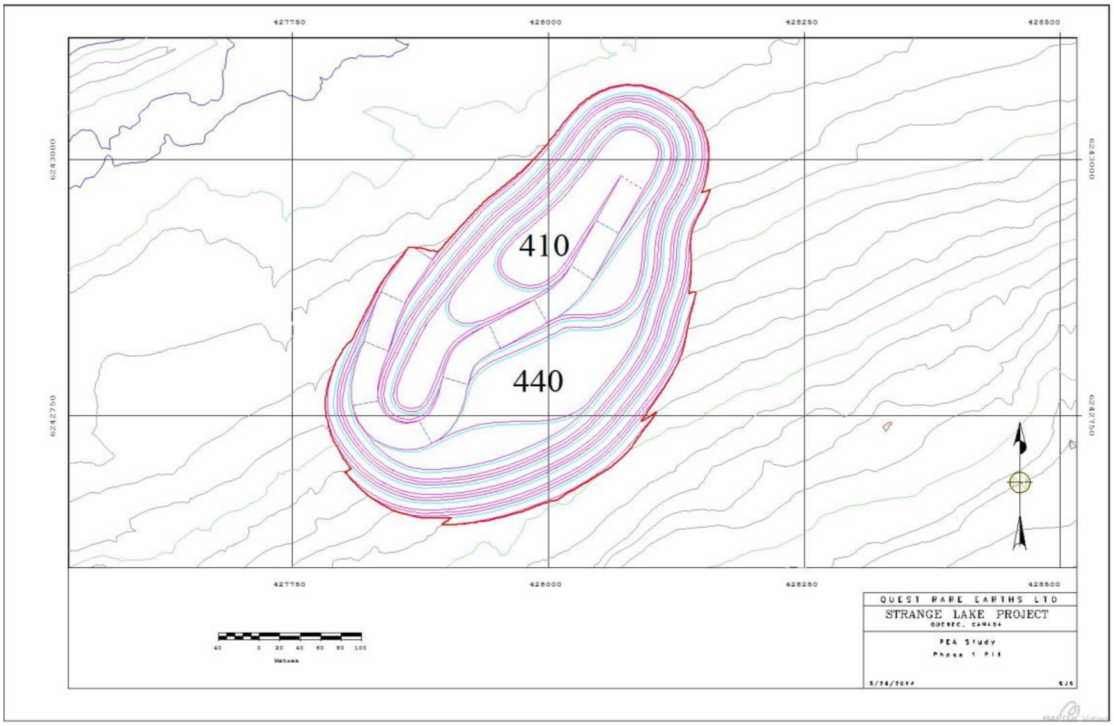


Figure 16.8
Phase Two Pit

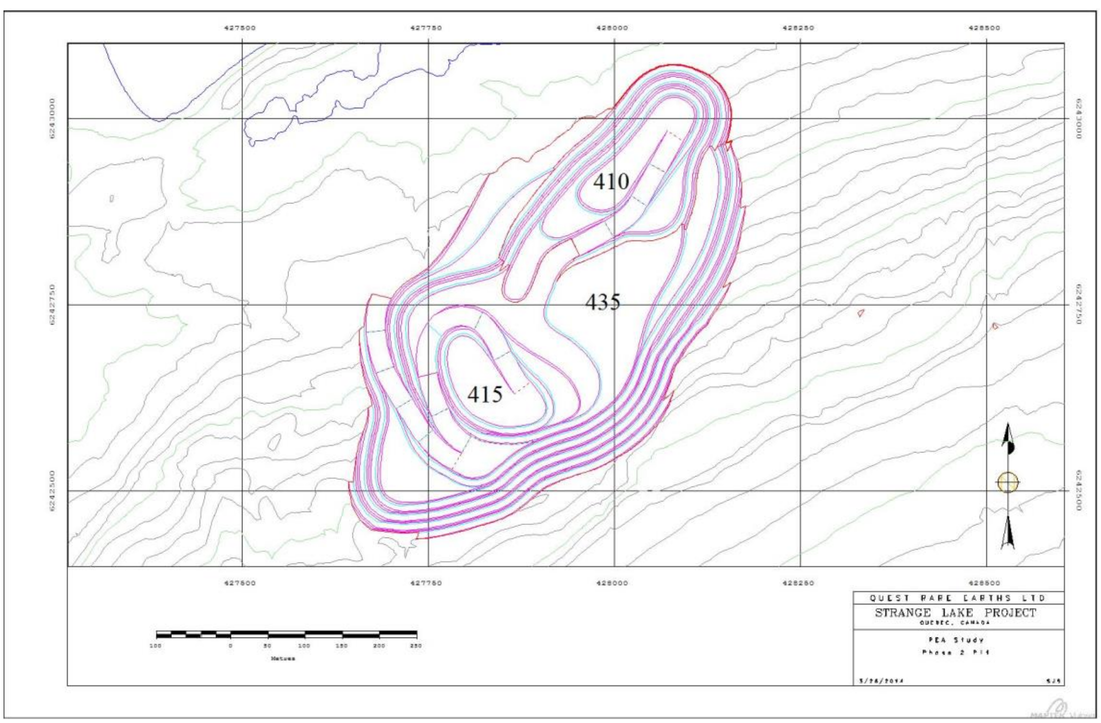


Figure 16.9
Phase Three Pit

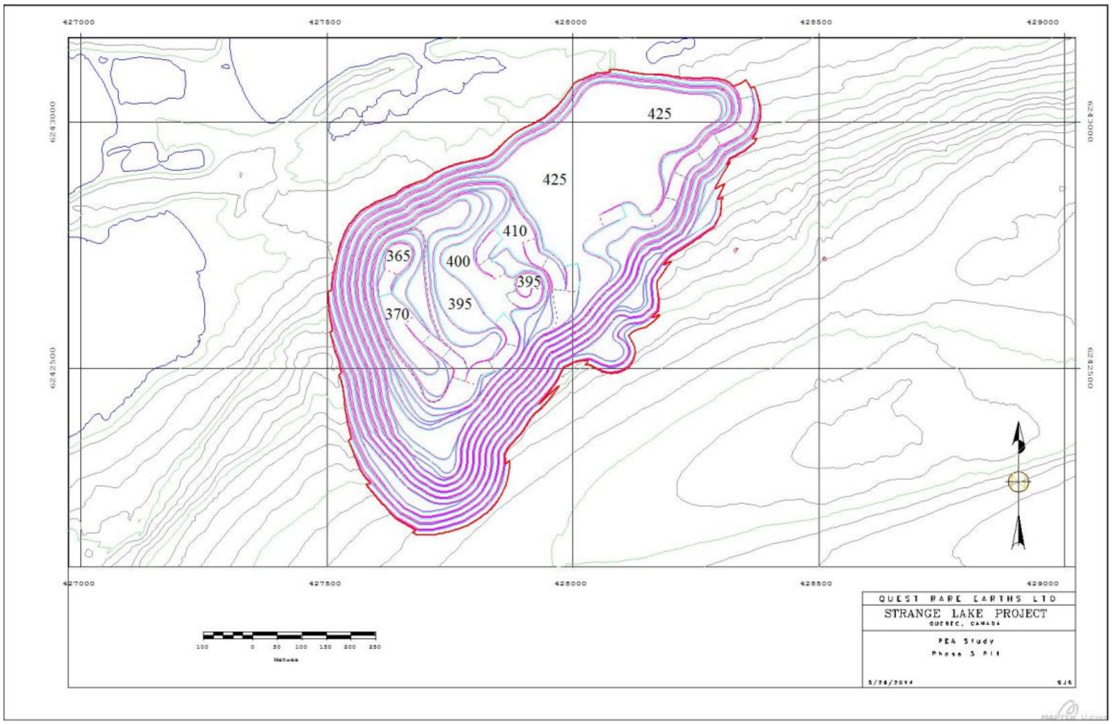


Figure 16.10
Phase Four Pit

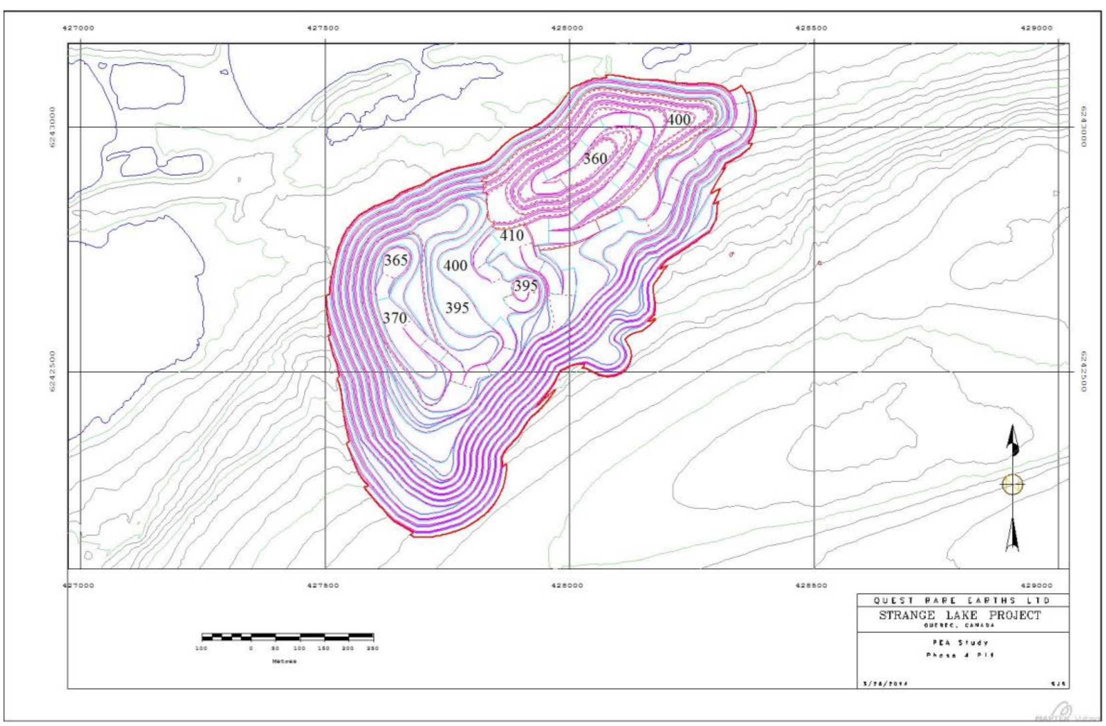


Figure 16.11
Phase Five Pit

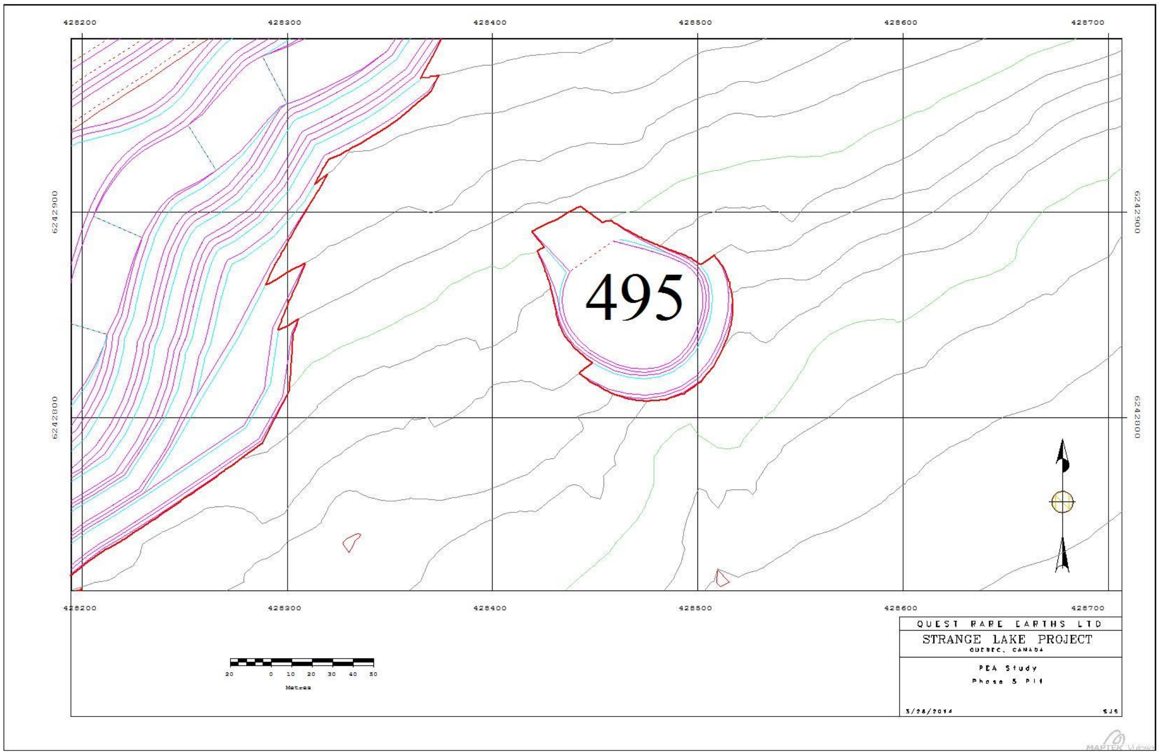


Table 16.6
Indicated Resource Category Material by Phase

Phase	Units	1	2	3	4	5	Totals
Quantity	t	7,378,000	11,125,000	33,578,000	4,362,000	80,000	56,523,000
NSR	$/t	$550.96	$496.46	$358.40	$392.71	$360.46	$413.36
TREO	%	1.2262	1.1432	1.0218	1.0679	1.0052	1.0759
HREO	%	0.5643	0.5239	0.4266	0.4581	0.4481	0.4662
LREO	%	0.6619	0.6193	0.5952	0.6097	0.5571	0.6097
CeO_2	%	0.3288	0.3065	0.2921	0.3007	0.2793	0.3004
Dy_2O_3	%	0.0521	0.0494	0.0407	0.0424	0.0414	0.0440
Er_2O_3	%	0.0375	0.0352	0.0284	0.0307	0.0305	0.0311
Eu_2O_3	%	0.0019	0.0018	0.0016	0.0016	0.0015	0.0017
Gd_2O_3	%	0.0325	0.0309	0.0273	0.0278	0.0247	0.0287
HfO_2	%	0.0557	0.0551	0.0489	0.0489	0.0459	0.0510
Ho_2O_3	%	0.0119	0.0112	0.0090	0.0096	0.0096	0.0099
La_2O_3	%	0.1408	0.1302	0.1296	0.1328	0.1201	0.1314
Lu_2O_3	%	0.0056	0.0053	0.0041	0.0045	0.0039	0.0046
Nb_2O_5	%	0.2891	0.2591	0.2070	0.2197	0.2045	0.2289
Nd_2O_3	%	0.1246	0.1181	0.1135	0.1153	0.1023	0.1160
Pr_6O_{11}	%	0.0360	0.0339	0.0322	0.0330	0.0299	0.0331
Sm_2O_3	%	0.0317	0.0305	0.0277	0.0279	0.0254	0.0288
Tb_4O_7	%	0.0076	0.0072	0.0060	0.0063	0.0057	0.0065
Tm_2O_3	%	0.0060	0.0056	0.0045	0.0049	0.0046	0.0050

Phase	Units	1	2	3	4	5	Totals
Y_2O_3	%	0.3706	0.3411	0.2763	0.2988	0.2981	0.3031
Yb_2O_3	%	0.0385	0.0362	0.0287	0.0314	0.0282	0.0317
ZrO_2	%	2.4097	2.3299	2.0416	2.0771	1.9198	2.1490
Be	ppm	523	401	284	460	392	352
Th	ppm	432	407	342	373	387	369
U	ppm	85	78	61	66	58	68

Table 16.7
Inferred Resource Category Material by Phase

Phase	Units	1	2	3	4	5	Totals
Quantity	t	0	0	773,000	0	0	773,000
NSR	$/t	$0.00	$0.00	$283.96	$0.00	$0.00	$283.96
TREO	%	0.0000	0.0000	0.9702	0.0000	0.0000	0.9702
HREO	%	0.0000	0.0000	0.3699	0.0000	0.0000	0.3699
LREO	%	0.0000	0.0000	0.6004	0.0000	0.0000	0.6004
CeO_2	%	0.0000	0.0000	0.2946	0.0000	0.0000	0.2946
Dy_2O_3	%	0.0000	0.0000	0.0360	0.0000	0.0000	0.0360
Er_2O_3	%	0.0000	0.0000	0.0241	0.0000	0.0000	0.0241
Eu_2O_3	%	0.0000	0.0000	0.0015	0.0000	0.0000	0.0015
Gd_2O_3	%	0.0000	0.0000	0.0257	0.0000	0.0000	0.0257
HfO_2	%	0.0000	0.0000	0.0461	0.0000	0.0000	0.0461
Ho_2O_3	%	0.0000	0.0000	0.0078	0.0000	0.0000	0.0078
La_2O_3	%	0.0000	0.0000	0.1329	0.0000	0.0000	0.1329
Lu_2O_3	%	0.0000	0.0000	0.0035	0.0000	0.0000	0.0035
Nb_2O_5	%	0.0000	0.0000	0.2006	0.0000	0.0000	0.2006
Nd_2O_3	%	0.0000	0.0000	0.1136	0.0000	0.0000	0.1136
Pr_6O_{11}	%	0.0000	0.0000	0.0323	0.0000	0.0000	0.0323
Sm_2O_3	%	0.0000	0.0000	0.0270	0.0000	0.0000	0.0270
Tb_4O_7	%	0.0000	0.0000	0.0055	0.0000	0.0000	0.0055
Tm_2O_3	%	0.0000	0.0000	0.0038	0.0000	0.0000	0.0038
Y_2O_3	%	0.0000	0.0000	0.2375	0.0000	0.0000	0.2375
Yb_2O_3	%	0.0000	0.0000	0.0244	0.0000	0.0000	0.0244
ZrO_2	%	0.0000	0.0000	1.9205	0.0000	0.0000	1.9205
Be	ppm	0	0	237	0	0	237
Th	ppm	0	0	291	0	0	291
U	ppm	0	0	58	0	0	58

Table 16.8
Total Material by Phase

Item	Units	1	2	3	4	5	Totals
Indicated[1]	t	7,378,000	11,125,000	33,578,000	4,362,000	80,000	56,523,000
Inferred[1,2]	t	0	0	773,000	0	0	773,000
Overburden	t	610,000	748,000	3,349,000	0	63,000	4,770,000
Waste Rock	t	610,000	1,131,000	11,848,000	1,773,000	11,000	15,373,000
Total	t	8,598,000	13,004,000	49,548,000	6,135,000	154,000	77,439,000
Strip Ratio[3]	---	0.17	0.17	0.44	0.41	0.93	0.35

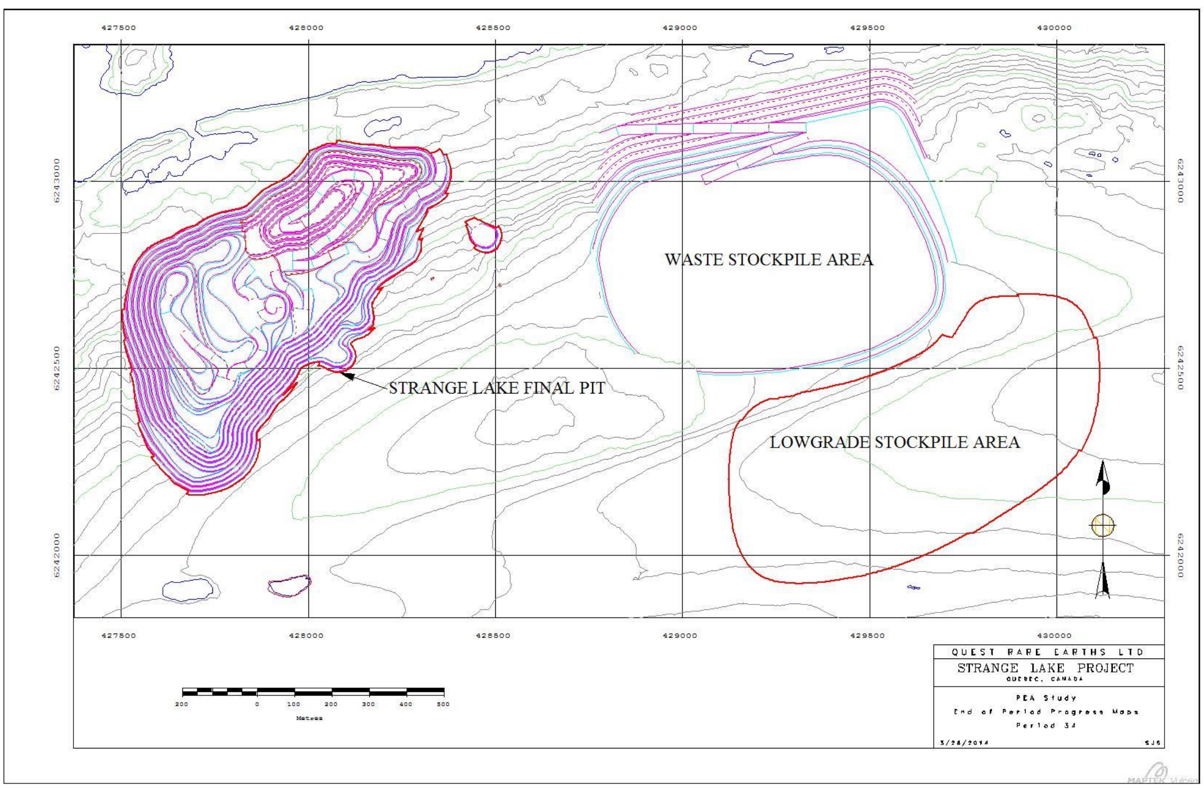
[1]Total Material above a net value of $0.01.
[2]Inferred material has been included as mineralized mill feed material.
[3]Strip ratio is (Tonnes Overburden+Waste Rock)/(Indicated+Inferred Tonnes).

16.1.4 Stockpile Designs

The rock and overburden, as well as the lowgrade stockpiles were designed with a 35° angle of repose, based on the assumption that the quantity of fines or plastic materials incorporated would be minimal. To facilitate reclamation to final out slopes of 2.0(H):1(V), the rock stockpile was designed in 10-m lifts with setbacks of 5.7 m. A swell factor of 20% was applied to the overburden material, and a swell factor of 40% was applied to all other waste rock and mineralized materials.

Over the 34-y mine life, an estimated 4.8 Mt of overburden will be removed from the pit area. Total waste rock placed in the waste stockpile is estimated to be 15.4 Mt. All low grade materials stockpiled will be processed by the end of the mine-life and no low grade stockpile will remain after operations cease in year 34. The waste stockpile remaining is shown below in Figure 16.12.

Figure 16.12
Waste and Low-grade Stockpile Designs



The PEA mine design assumes a mine life of 34 years which completely exhausts the low grade stockpiled material. However, the PEA economic model assumes a 30 year life which results in 11.16 Mt low grade mined mineralization remaining in a stockpile.

16.2 MINE PRODUCTION SCHEDULE

A mine production schedule was prepared using Maptek's Chronos scheduling software. Mineralized material selection was based on a positive net value of $0.01 calculated using the parameters shown in Table 16.2 and Table 16.3. The goal of the Strange Lake production schedule was to move as much metal as economically possible forward in the schedule. This would ensure higher rare earth minerals metal content in the earlier years of the operation ensuring a positive rate of return. The mine life was pre-determined to be 34 years with a maximum annual concentrate production of 610,000 t/y. Actual mill feed tonnes varied annually based on a minimum concentrate grade of Dy_2O_3 of 900 ppm and a maximum concentrate tonnage of 610,000 t/y. To accomplish this, the feed material was classified into two material types:

- **Mill feed Material** – This is material (measured, indicated, and inferred resources) with a NSR of at least $300/t. This material where encountered during production scheduling would be directly shipped to the crusher for processing.

- **Low Grade Material** – This is material (measured, indicated, and inferred resources) with an NSR up to $300/t and a net value of $0.01. Unless there was not enough mill feed material (direct from the mine), low grade material is placed on the low grade stockpile. All of this material is process by the end of the 34 year mine life.

Scheduling runs attempted to force a balanced material movement (including any rehandled low grade material) that achieved a contained Dy_2O_3 metal content of 549 t/y while processing mostly mill feed material and deferring low grade material until late in the mine life.

The schedule was prepared on the following basis:

- **Annual Production Rates** – A maximum annual target of 610,000 t/y of concentrate while balancing overall material movement.

- **Operational Timing** – In order to avoid the worst winter months, the mine will be operated on a nine month (270 day) basis. During this time period, the mine will operate two 12 h shifts 7 d/w. There will be two crews at any given time at the property while two other crews on days off rotation.

- **Blending Requirements** – Other than the 549 t/y of contained Dy_2O_3 in the concentrate, there were no blending requirements.

The detailed production schedule is presented in Table 16.9.

Table 16.9
Mine Production Schedule for the Strange Lake Mineral Resource

Millfeed

Period	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Target Tonnes Dy_2O_3 Contained Metal in Concentrate	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**
Tonnes	1,178,000	1,084,000	1,346,000	1,171,000	1,294,000	1,110,000	1,165,000	1,094,000	914,000	910,000	934,000	899,000	982,000	1,001,000	911,000	887,000	939,000
NSR /Tonne	$577.85	$622.93	$509.71	$578.02	$533.04	$610.10	$574.73	$604.04	$712.30	$719.00	$710.15	$733.55	$678.08	$666.51	$719.51	$741.86	$710.65
TREO %	1.2552	1.3176	1.1927	1.2511	1.2048	1.2700	1.2156	1.2335	1.3534	1.3584	1.3569	1.3880	1.3225	1.3132	1.3669	1.4129	1.3912
HREO %	0.5743	0.6290	0.5523	0.5932	0.5450	0.5918	0.5701	0.5934	0.6836	0.6823	0.6624	0.6879	0.6344	0.6281	0.6693	0.6923	0.6684
LREO %	0.6809	0.6886	0.6405	0.6579	0.6599	0.6782	0.6456	0.6400	0.6698	0.6761	0.6944	0.7000	0.6881	0.6851	0.6975	0.7207	0.7228
CeO_2 %	0.3393	0.3427	0.3166	0.3253	0.3290	0.3367	0.3196	0.3157	0.3308	0.3353	0.3453	0.3472	0.3420	0.3405	0.3452	0.3567	0.3591
Dy_2O_3 %	0.0535	0.0583	0.0518	0.0554	0.0506	0.0553	0.0536	0.0563	0.0644	0.0637	0.0615	0.0639	0.0590	0.0583	0.0630	0.0648	0.0619
Er_2O_3 %	0.0379	0.0419	0.0367	0.0395	0.0370	0.0399	0.0383	0.0400	0.0466	0.0463	0.0448	0.0466	0.0428	0.0426	0.0448	0.0466	0.0454
Eu_2O_3 %	0.0020	0.0020	0.0019	0.0020	0.0019	0.0020	0.0019	0.0020	0.0021	0.0021	0.0021	0.0022	0.0020	0.0020	0.0022	0.0022	0.0021
Gd_2O_3 %	0.0341	0.0355	0.0323	0.0338	0.0318	0.0340	0.0331	0.0345	0.0378	0.0373	0.0366	0.0379	0.0354	0.0350	0.0382	0.0391	0.0372
HfO_2 %	0.0660	0.0576	0.0556	0.0564	0.0589	0.0576	0.0567	0.0553	0.0567	0.0571	0.0555	0.0545	0.0534	0.0540	0.0543	0.0550	0.0542
Ho_2O_3 %	0.0120	0.0133	0.0117	0.0126	0.0115	0.0126	0.0122	0.0128	0.0148	0.0146	0.0141	0.0147	0.0135	0.0134	0.0143	0.0148	0.0142
La_2O_3 %	0.1408	0.1444	0.1369	0.1398	0.1364	0.1417	0.1352	0.1334	0.1389	0.1406	0.1444	0.1455	0.1445	0.1439	0.1448	0.1499	0.1516
Lu_2O_3 %	0.0059	0.0061	0.0053	0.0057	0.0059	0.0059	0.0056	0.0058	0.0068	0.0069	0.0068	0.0070	0.0064	0.0063	0.0064	0.0068	0.0067
Nb_2O_5 %	0.3002	0.3177	0.2725	0.2778	0.2824	0.2963	0.2753	0.2577	0.3001	0.3059	0.3157	0.3314	0.3219	0.3154	0.3089	0.3289	0.3344
Nd_2O_3 %	0.1295	0.1297	0.1207	0.1245	0.1261	0.1290	0.1232	0.1230	0.1282	0.1281	0.1316	0.1332	0.1300	0.1298	0.1335	0.1380	0.1371
Pr_6O_{11} %	0.0374	0.0378	0.0349	0.0358	0.0365	0.0373	0.0355	0.0351	0.0367	0.0370	0.0379	0.0382	0.0374	0.0371	0.0378	0.0391	0.0392
Sm_2O_3 %	0.0338	0.0340	0.0314	0.0326	0.0319	0.0334	0.0321	0.0328	0.0352	0.0351	0.0352	0.0359	0.0342	0.0338	0.0360	0.0370	0.0358
Tb_4O_7 %	0.0079	0.0085	0.0076	0.0080	0.0074	0.0081	0.0078	0.0081	0.0091	0.0090	0.0088	0.0092	0.0085	0.0083	0.0091	0.0093	0.0089
Tm_2O_3 %	0.0061	0.0066	0.0059	0.0063	0.0060	0.0065	0.0061	0.0063	0.0074	0.0074	0.0072	0.0075	0.0069	0.0069	0.0071	0.0074	0.0072
Y_2O_3 %	0.3752	0.4147	0.3622	0.3902	0.3535	0.3865	0.3726	0.3873	0.4472	0.4471	0.4341	0.4512	0.4160	0.4115	0.4392	0.4544	0.4384
Yb_2O_3 %	0.0397	0.0421	0.0370	0.0397	0.0394	0.0410	0.0389	0.0402	0.0472	0.0476	0.0464	0.0479	0.0440	0.0437	0.0449	0.0468	0.0463
ZrO_2 %	2.8245	2.5205	2.3985	2.4485	2.5366	2.4539	2.3918	2.3342	2.4290	2.4187	2.4103	2.3783	2.3161	2.3412	2.3132	2.3847	2.3600
Be ppm	501	558	425	479	413	497	433	397	493	525	568	555	561	546	517	547	541
Th ppm	418	458	401	460	408	457	432	434	508	521	518	554	503	476	525	537	530
U ppm	91	96	81	84	83	87	80	79	91	92	91	92	88	82	86	92	91
Mass Pull	50.2	49.5	41.6	47.4	46.8	52.6	50.9	52.3	57.0	58.8	60.0	60.0	58.9	58.2	59.9	59.9	58.4
Concentrate Tonnes	592,000	537,000	560,000	555,000	605,000	584,000	594,000	573,000	521,000	535,000	560,000	539,000	578,000	582,000	546,000	531,000	549,000
Dy_2O_3 Concentrate Grade ppm	928	1,022	981	989	908	941	925	959	1,053	1,027	980	1,019	949	943	1,005	1,034	1,000
Flotation Recovery ZrO_2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Flotation Recovery Dy_2O_3	87.0%	86.1%	78.2%	84.1%	83.7%	89.1%	87.7%	88.9%	93.0%	94.6%	95.6%	95.6%	94.7%	94.1%	95.6%	95.5%	94.3%
Flotation Recovery Nb_2O_5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Flotation Recovery Nd_2O_3	88.5%	87.7%	80.1%	85.7%	85.2%	90.5%	89.1%	90.3%	94.5%	96.0%	97.1%	97.1%	96.2%	95.5%	97.0%	97.0%	95.7%
Flotation Recovery Tb_2O_3	87.1%	86.2%	78.2%	84.2%	83.7%	89.3%	87.8%	89.1%	93.4%	95.0%	96.0%	96.0%	95.1%	94.5%	96.0%	96.0%	94.7%
Flotation Recovery Y_2O_3	86.4%	85.5%	77.3%	83.4%	82.9%	88.5%	87.0%	88.3%	92.7%	94.3%	95.4%	95.4%	94.5%	93.8%	95.4%	95.3%	94.0%
Flotation Recovery Er_2O_3	86.0%	85.0%	77.0%	83.0%	82.6%	88.0%	86.6%	87.8%	91.9%	93.5%	94.5%	94.5%	93.6%	93.0%	94.5%	94.4%	93.2%
Flotation Recovery Tm_2O_3	85.5%	84.5%	76.5%	82.5%	82.1%	87.5%	86.1%	87.3%	91.4%	92.9%	93.9%	93.9%	93.0%	92.4%	93.9%	93.8%	92.6%
Flotation Recovery Yb_2O_3	84.5%	83.4%	75.6%	81.5%	81.2%	86.4%	85.0%	86.2%	90.0%	91.5%	92.4%	92.4%	91.6%	91.1%	92.4%	92.3%	91.2%
Flotation Recovery Lu_2O_3	83.7%	82.6%	74.5%	80.6%	80.3%	85.6%	84.3%	85.5%	89.4%	90.9%	91.8%	91.8%	91.0%	90.5%	91.8%	91.8%	90.6%
Flotation Recovery Pr_6O_{11}	89.1%	88.3%	80.9%	86.4%	85.9%	91.1%	89.7%	90.9%	95.0%	96.6%	97.6%	97.6%	96.7%	96.1%	97.6%	97.5%	96.3%
Flotation Recovery Gd_2O_3	87.5%	86.6%	78.6%	84.6%	84.1%	89.7%	88.2%	89.5%	93.7%	95.3%	96.4%	96.4%	95.5%	94.8%	96.4%	96.3%	95.0%
Flotation Recovery Ho_2O_3	86.7%	85.8%	77.8%	83.8%	83.3%	88.7%	87.3%	88.6%	92.7%	94.2%	95.3%	95.3%	94.4%	93.8%	95.2%	95.2%	94.0%
Flotation Recovery Eu_2O_3	86.5%	85.6%	77.3%	83.5%	82.9%	88.8%	87.2%	88.6%	93.1%	94.8%	96.0%	96.0%	95.0%	94.3%	95.9%	95.9%	94.5%
Flotation Recovery La_2O_3	89.6%	88.9%	81.8%	87.0%	86.5%	91.6%	90.2%	91.4%	95.4%	96.9%	98.0%	97.9%	97.1%	96.4%	97.9%	97.9%	96.7%
Flotation Recovery CeO_2	89.4%	88.7%	81.4%	86.8%	86.3%	91.4%	90.0%	91.2%	95.2%	96.6%	97.6%	97.6%	96.8%	96.2%	97.6%	97.6%	96.4%
Flotation Recovery HfO_2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Flotation Recovery Sm_2O_3	88.0%	87.2%	79.3%	85.2%	84.7%	90.1%	88.7%	90.0%	94.1%	95.7%	96.8%	96.7%	95.8%	95.2%	96.7%	96.7%	95.4%
Flotation Metal ContentTonnes Dy_2O_3	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0
Flotation Metal ContentTonnes Nd_2O_3	1,350.5	1,237.4	1,304.6	1,253.0	1,391.4	1,298.8	1,280.0	1,217.0	1,108.2	1,120.1	1,192.9	1,162.2	1,227.3	1,241.1	1,180.4	1,187.3	1,233.4
Flotation Metal ContentTonnes Tb_2O_3	80.9	79.8	80.7	79.8	79.8	80.1	80.0	79.6	78.2	78.2	79.1	79.0	79.2	78.9	79.8	79.2	78.8
Flotation Metal ContentTonnes Y_2O_3	3,820.8	3,876.4	3,795.6	3,838.6	3,797.2	3,812.9	3,787.1	3,755.3	3,800.2	3,841.6	3,869.3	3,869.1	3,860.5	3,865.3	3,815.9	3,843.4	3,874.5
Flotation Metal ContentTonnes Er_2O_3	384.7	389.4	383.4	387.0	395.8	391.1	386.8	385.9	393.3	394.5	395.8	396.2	393.5	396.8	385.6	390.3	397.8
Flotation Metal ContentTonnes Tm_2O_3	61.5	61.3	60.9	61.5	64.2	63.1	61.5	60.5	62.2	62.9	63.6	63.3	63.2	63.4	60.8	61.3	63.1
Flotation Metal ContentTonnes Yb_2O_3	395.3	383.9	378.9	382.0	414.6	395.0	386.7	380.5	390.1	396.8	400.3	398.2	395.7	398.8	377.8	383.6	396.8
Flotation Metal ContentTonnes Lu_2O_3	58.3	55.0	53.3	54.0	61.0	56.8	55.2	54.5	56.1	57.1	58.0	57.4	56.8	57.0	53.8	55.4	57.3
Flotation Metal ContentTonnes Pr_6O_{11}	392.9	363.0	380.4	363.7	405.5	378.3	371.1	349.6	318.7	324.8	345.8	335.1	355.3	357.1	336.4	338.5	354.4
Flotation Metal ContentTonnes Gd_2O_3	352.0	336.1	343.5	337.0	346.9	339.3	340.2	338.8	324.5	324.1	329.8	328.0	331.6	332.3	335.3	333.9	332.4
Flotation Metal ContentTonnes Ho_2O_3	123.0	124.5	123.0	124.1	124.3	124.5	123.9	124.0	125.5	125.3	125.5	125.5	125.1	125.5	124.5	125.1	125.7
Flotation Metal ContentTonnes Eu_2O_3	20.3	19.0	19.5	19.4	20.0	19.4	19.3	19.1	18.1	18.3	18.8	18.6	18.8	18.8	18.8	18.8	19.0
Flotation Metal ContentTonnes La_2O_3	1,487.0	1,395.9	1,510.0	1,428.5	1,527.5	1,442.7	1,421.4	1,335.0	1,212.9	1,240.8	1,321.7	1,281.2	1,377.8	1,389.2	1,292.2	1,301.3	1,376.2
Flotation Metal ContentTonnes CeO_2	3,575.5	3,306.4	3,479.6	3,315.6	3,677.3	3,420.9	3,353.8	3,152.3	2,879.5	2,949.7	3,149.1	3,046.8	3,249.9	3,277.8	3,069.7	3,086.8	3,251.0
Flotation Metal ContentTonnes Sm_2O_3	350.5	323.1	336.4	326.1	349.6	334.9	332.3	323.6	303.6	305.8	317.8	312.5	321.8	322.3	317.5	317.4	321.1

Period	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	Totals
Target Tonnes Dy_2O_3 Contained Metal in Concentrate	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	**549**	
Tonnes	1,055,000	1,197,000	1,098,000	1,055,000	942,000	1,200,000	2,750,000	3,170,000	3,170,000	3,170,000	3,170,000	3,170,000	3,170,000	3,170,000	3,170,000	3,170,000	1,651,000	0	57,297,000
NSR /Tonne	$633.42	$566.26	$613.16	$625.96	$701.55	$563.70	$264.83	$234.49	$234.49	$234.49	$234.49	$234.49	$234.49	$234.49	$234.49	$234.49	$234.49	$0.00	$404.57
TREO %	1.2845	1.2379	1.2574	1.2256	1.3434	1.2269	0.9478	0.9143	0.9143	0.9143	0.9143	0.9143	0.9143	0.9143	0.9143	0.9143	0.9143	0.0000	1.0745
HREO %	0.6042	0.5599	0.5888	0.5971	0.6512	0.5732	0.3738	0.3534	0.3534	0.3534	0.3534	0.3534	0.3534	0.3534	0.3534	0.3534	0.3534	0.0000	0.4649
LREO %	0.6803	0.6780	0.6687	0.6286	0.6922	0.6537	0.5740	0.5608	0.5608	0.5608	0.5608	0.5608	0.5608	0.5608	0.5608	0.5608	0.5608	0.0000	0.6096
CeO_2 %	0.3375	0.3350	0.3304	0.3102	0.3415	0.3226	0.2817	0.2748	0.2748	0.2748	0.2748	0.2748	0.2748	0.2748	0.2748	0.2748	0.2748	0.0000	0.3003
Dy_2O_3 %	0.0565	0.0525	0.0547	0.0559	0.0610	0.0533	0.0357	0.0339	0.0339	0.0339	0.0339	0.0339	0.0339	0.0339	0.0339	0.0339	0.0339	0.0000	0.0439
Er_2O_3 %	0.0410	0.0381	0.0402	0.0411	0.0450	0.0392	0.0248	0.0232	0.0232	0.0232	0.0232	0.0232	0.0232	0.0232	0.0232	0.0232	0.0232	0.0000	0.0310
Eu_2O_3 %	0.0020	0.0019	0.0019	0.0018	0.0020	0.0019	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0000	0.0017
Gd_2O_3 %	0.0344	0.0330	0.0338	0.0331	0.0362	0.0330	0.0247	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240	0.0000	0.0287
HfO_2 %	0.0528	0.0534	0.0548	0.0538	0.0535	0.0519	0.0472	0.0475	0.0475	0.0475	0.0475	0.0475	0.0475	0.0475	0.0475	0.0475	0.0475	0.0000	0.0510
Ho_2O_3 %	0.0129	0.0119	0.0125	0.0128	0.0138	0.0122	0.0079	0.0074	0.0074	0.0074	0.0074	0.0074	0.0074	0.0074	0.0074	0.0074	0.0074	0.0000	0.0098
La_2O_3 %	0.1443	0.1451	0.1427	0.1346	0.1470	0.1394	0.1267	0.1236	0.1236	0.1236	0.1236	0.1236	0.1236	0.1236	0.1236	0.1236	0.1236	0.0000	0.1315
Lu_2O_3 %	0.0059	0.0056	0.0060	0.0061	0.0065	0.0058	0.0036	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034	0.0034	0.0000	0.0046
Nb_2O_5 %	0.2986	0.2721	0.2837	0.2889	0.2834	0.2569	0.1848	0.1791	0.1791	0.1791	0.1791	0.1791	0.1791	0.1791	0.1791	0.1791	0.1791	0.0000	0.2286
Nd_2O_3 %	0.1284	0.1287	0.1268	0.1189	0.1319	0.1244	0.1090	0.1069	0.1069	0.1069	0.1069	0.1069	0.1069	0.1069	0.1069	0.1069	0.1069	0.0000	0.1160
Pr_6O_{11} %	0.0367	0.0367	0.0362	0.0338	0.0374	0.0355	0.0310	0.0303	0.0303	0.0303	0.0303	0.0303	0.0303	0.0303	0.0303	0.0303	0.0303	0.0000	0.0331
Sm_2O_3 %	0.0333	0.0326	0.0326	0.0311	0.0343	0.0318	0.0257	0.0251	0.0251	0.0251	0.0251	0.0251	0.0251	0.0251	0.0251	0.0251	0.0251	0.0000	0.0287
Tb_4O_7 %	0.0081	0.0076	0.0079	0.0080	0.0086	0.0077	0.0053	0.0051	0.0051	0.0051	0.0051	0.0051	0.0051	0.0051	0.0051	0.0051	0.0051	0.0000	0.0065
Tm_2O_3 %	0.0066	0.0061	0.0065	0.0066	0.0073	0.0063	0.0039	0.0037	0.0037	0.0037	0.0037	0.0037	0.0037	0.0037	0.0037	0.0037	0.0037	0.0000	0.0050
Y_2O_3 %	0.3957	0.3643	0.3839	0.3896	0.4250	0.3742	0.2414	0.2279	0.2279	0.2279	0.2279	0.2279	0.2279	0.2279	0.2279	0.2279	0.2279	0.0000	0.3023
Yb_2O_3 %	0.0413	0.0388	0.0414	0.0421	0.0457	0.0397	0.0249	0.0235	0.0235	0.0235	0.0235	0.0235	0.0235	0.0235	0.0235	0.0235	0.0235	0.0000	0.0316
ZrO_2 %	2.2713	2.2698	2.3686	2.3017	2.3604	2.2519	1.9509	1.9599	1.9599	1.9599	1.9599	1.9599	1.9599	1.9599	1.9599	1.9599	1.9599	0.0000	2.1459
Be ppm	427	425	476	399	444	529	299	246	246	246	246	246	246	246	246	246	246	0	351
Th ppm	528	459	450	451	534	446	319	287	287	287	287	287	287	287	287	287	287	0	368
U ppm	84	76	78	75	83	74	57	55	55	55	55	55	55	55	55	55	55	0	68
Mass Pull	55.8	50.4	54.9	57.0	59.9	48.8	22.1	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2	0.0	34.0
Concentrate Tonnes	589,000	603,000	603,000	601,000	564,000	585,000	608,000	608,000	607,000	608,000	607,000	608,000	607,000	608,000	607,000	608,000	316,000	0	19478000
Dy_2O_3 Concentrate Grade ppm	933	910	910	913	973	938	903	904	904	904	904	904	904	904	904	904	904	0	945
Flotation Recovery ZrO_2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Flotation Recovery Dy_2O_3	92.1%	87.2%	91.4%	93.1%	95.5%	85.6%	54.7%	51.1%	51.1%	51.1%	51.1%	51.1%	51.1%	51.1%	51.1%	51.1%	51.1%	0.0%	67.8%
Flotation Recovery Nb_2O_5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Flotation Recovery Nd_2O_3	93.5%	88.7%	92.7%	94.5%	97.0%	87.1%	58.8%	55.6%	55.6%	55.6%	55.6%	55.6%	55.6%	55.6%	55.6%	55.6%	55.6%	0.0%	71.0%
Flotation Recovery Tb_2O_3	92.3%	87.3%	91.6%	93.4%	96.0%	85.7%	54.7%	51.1%	51.1%	51.1%	51.1%	51.1%	51.1%	51.1%	51.1%	51.1%	51.1%	0.0%	67.9%
Flotation Recovery Y_2O_3	91.7%	86.6%	90.9%	92.8%	95.3%	84.9%	53.7%	50.1%	50.1%	50.1%	50.1%	50.1%	50.1%	50.1%	50.1%	50.1%	50.1%	0.0%	67.1%
Flotation Recovery Er_2O_3	91.0%	86.2%	90.3%	92.1%	94.4%	84.5%	52.8%	49.1%	49.1%	49.1%	49.1%	49.1%	49.1%	49.1%	49.1%	49.1%	49.1%	0.0%	66.2%
Flotation Recovery Tm_2O_3	90.5%	85.7%	89.8%	91.5%	93.8%	84.0%	51.6%	47.8%	47.8%	47.8%	47.8%	47.8%	47.8%	47.8%	47.8%	47.8%	47.8%	0.0%	65.2%
Flotation Recovery Yb_2O_3	89.2%	84.7%	88.6%	90.2%	92.3%	83.1%	49.9%	46.0%	46.0%	46.0%	46.0%	46.0%	46.0%	46.0%	46.0%	46.0%	46.0%	0.0%	63.7%
Flotation Recovery Lu_2O_3	88.6%	83.9%	87.9%	89.6%	91.8%	82.2%	48.0%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%	0.0%	62.2%
Flotation Recovery Pr_6O_{11}	94.0%	89.3%	93.3%	95.1%	97.5%	87.7%	60.3%	57.2%	57.2%	57.2%	57.2%	57.2%	57.2%	57.2%	57.2%	57.2%	57.2%	0.0%	72.2%
Flotation Recovery Gd_2O_3	92.7%	87.8%	92.0%	93.8%	96.3%	86.1%	55.3%	51.8%	51.8%	51.8%	51.8%	51.8%	51.8%	51.8%	51.8%	51.8%	51.8%	0.0%	68.5%
Flotation Recovery Ho_2O_3	91.7%	86.9%	91.0%	92.8%	95.2%	85.3%	54.1%	50.5%	50.5%	50.5%	50.5%	50.5%	50.5%	50.5%	50.5%	50.5%	50.5%	0.0%	67.3%
Flotation Recovery Eu_2O_3	92.0%	86.7%	91.2%	93.2%	95.9%	85.0%	54.0%	50.4%	50.4%	50.4%	50.4%	50.4%	50.4%	50.4%	50.4%	50.4%	50.4%	0.0%	67.3%
Flotation Recovery La_2O_3	94.4%	89.8%	93.7%	95.5%	97.9%	88.3%	62.8%	59.9%	59.9%	59.9%	59.9%	59.9%	59.9%	59.9%	59.9%	59.9%	59.9%	0.0%	73.9%
Flotation Recovery CeO_2	94.2%	89.6%	93.5%	95.2%	97.6%	88.1%	61.4%	58.4%	58.4%	58.4%	58.4%	58.4%	58.4%	58.4%	58.4%	58.4%	58.4%	0.0%	72.9%
Flotation Recovery HfO_2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Flotation Recovery Sm_2O_3	93.1%	88.3%	92.4%	94.2%	96.7%	86.6%	56.7%	53.2%	53.2%	53.2%	53.2%	53.2%	53.2%	53.2%	53.2%	53.2%	53.2%	0.0%	69.5%
Flotation Metal ContentTonnes Dy_2O_3	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	549.0	285.9	0.0	18,402.9
Flotation Metal ContentTonnes Nd_2O_3	1,266.7	1,365.7	1,291.1	1,186.0	1,205.5	1,301.7	1,770.5	1,883.4	1,883.4	1,883.4	1,883.4	1,883.4	1,883.4	1,883.4	1,883.4	1,883.4	980.9	0.0	48,304.5
Flotation Metal ContentTonnes Tb_2O_3	79.3	79.4	79.2	78.4	77.6	79.8	81.5	82.9	82.9	82.9	82.9	82.9	82.9	82.9	82.9	82.9	43.2	0.0	2,695.6
Flotation Metal ContentTonnes Y_2O_3	3,828.5	3,776.1	3,832.0	3,813.5	3,817.7	3,821.0	3,651.2	3,621.7	3,621.7	3,621.7	3,621.7	3,621.7	3,621.7	3,621.7	3,621.7	3,621.7	1,886.3	0.0	126,145.6
Flotation Metal ContentTonnes Er_2O_3	393.6	393.5	398.2	399.2	400.4	399.1	370.7	360.4	360.4	360.4	360.4	360.4	360.4	360.4	360.4	360.4	187.7	0.0	12,833.7
Flotation Metal ContentTonnes Tm_2O_3	62.6	62.8	63.9	64.0	64.3	63.6	57.4	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	55.9	29.1	0.0	2,028.8
Flotation Metal ContentTonnes Yb_2O_3	389.0	393.6	402.8	401.0	397.8	397.0	352.1	343.2	343.2	343.2	343.2	343.2	343.2	343.2	343.2	343.2	178.7	0.0	12,656.0
Flotation Metal ContentTonnes Lu_2O_3	55.3	56.4	58.1	57.4	56.4	56.9	48.5	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	24.7	0.0	1,797.8
Flotation Metal ContentTonnes Pr_6O_{11}	364.6	392.1	370.5	339.2	343.9	373.9	517.5	550.5	550.5	550.5	550.5	550.5	550.5	550.5	550.5	550.5	286.7	0.0	14,013.4
Flotation Metal ContentTonnes Gd_2O_3	336.9	346.5	341.0	327.7	328.3	341.1	380.4	394.3	394.3	394.3	394.3	394.3	394.3	394.3	394.3	394.3	205.3	0.0	11,861.2
Flotation Metal ContentTonnes Ho_2O_3	124.6	123.7	124.7	125.1	124.1	125.4	120.6	118.6	118.6	118.6	118.6	118.6	118.6	118.6	118.6	118.6	61.7	0.0	4,115.9
Flotation Metal ContentTonnes Eu_2O_3	19.2	19.6	19.4	18.2	18.3	19.2	21.6	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	11.6	0.0	672.1
Flotation Metal ContentTonnes La_2O_3	1,438.0	1,559.1	1,468.2	1,355.6	1,355.9	1,477.6	2,196.2	2,347.6	2,347.6	2,347.6	2,347.6	2,347.6	2,347.6	2,347.6	2,347.6	2,347.6	1,222.7	0.0	56,542.6
Flotation Metal ContentTonnes CeO_2	3,353.8	3,593.3	3,391.8	3,115.1	3,139.0	3,413.9	4,781.1	5,084.7	5,084.7	5,084.7	5,084.7	5,084.7	5,084.7	5,084.7	5,084.7	5,084.7	2,648.2	0.0	128,440.1
Flotation Metal ContentTonnes Sm_2O_3	327.3	344.5	331.3	308.8	312.5	331.0	403.3	424.0	424.0	424.0	424.0	424.0	424.0	424.0	424.0	424.0	220.8	0.0	11,912.1

Material Movement

Period	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Mill Feed																	
Lowgrade Tonnes Direct to Mill	1,170,000	1,033,000	1,266,000	1,116,000	1,279,000	1,087,000	1,147,000	1,075,000	902,000	906,000	933,000	899,000	980,000	1,000,000	911,000	886,000	935,000
Lowgrade Tonnes Direct to Mill	8,000	51,000	80,000	55,000	15,000	23,000	18,000	19,000	12,000	4,000	1,000	0	2,000	1,000	0	1,000	4,000
Lowgrade Stockpile to Mill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Millfeed	***1,178,000***	***1,084,000***	***1,346,000***	***1,171,000***	***1,294,000***	***1,110,000***	***1,165,000***	***1,094,000***	***914,000***	***910,000***	***934,000***	***899,000***	***982,000***	***1,001,000***	***911,000***	***887,000***	***939,000***
Waste																	
Lowgrade to Lowgrade Stockpile	870,000	1,092,000	975,000	1,797,000	1,661,000	1,828,000	1,759,000	1,724,000	1,455,000	1,290,000	1,133,000	1,109,000	1,241,000	1,204,000	1,333,000	1,399,000	1,706,000
Overburden	994,000	1,014,000	997,000	302,000	241,000	171,000	152,000	164,000	116,000	193,000	211,000	173,000	3,000	0	0	0	0
Waste Rock	458,000	310,000	181,000	231,000	304,000	391,000	424,000	518,000	1,014,000	1,107,000	822,000	919,000	874,000	895,000	856,000	814,000	855,000
Total Waste Movement	***2,322,000***	***2,416,000***	***2,153,000***	***2,330,000***	***2,206,000***	***2,390,000***	***2,335,000***	***2,406,000***	***2,585,000***	***2,590,000***	***2,166,000***	***2,201,000***	***2,118,000***	***2,099,000***	***2,189,000***	***2,213,000***	***2,561,000***
Total Material Movement	***3,500,000***	***3,500,000***	***3,499,000***	***3,501,000***	***3,500,000***	***3,500,000***	***3,500,000***	***3,500,000***	***3,499,000***	***3,500,000***	***3,100,000***	***3,100,000***	***3,100,000***	***3,100,000***	***3,100,000***	***3,100,000***	***3,500,000***
Stripping Ratio	1.97	2.23	1.60	1.99	1.70	2.15	2.00	2.20	2.83	2.85	2.32	2.45	2.16	2.10	2.40	2.49	2.73

Period	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	Totals
Mill Feed																			
Lowgrade Tonnes Direct to Mill	1,052,000	1,195,000	1,097,000	1,054,000	941,000	1,182,000	355,000	0	0	0	0	0	0	0	0	0	0	0	24,401,000
Lowgrade Tonnes Direct to Mill	3,000	2,000	1,000	1,000	1,000	18,000	268,000	0	0	0	0	0	0	0	0	0	0	0	588,000
Lowgrade Stockpile to Mill	0	0	0	0	0	0	2,127,000	3,170,000	3,170,000	3,170,000	3,170,000	3,170,000	3,170,000	3,170,000	3,170,000	3,170,000	1,651,000	0	32,308,000
Total Millfeed	***1,055,000***	***1,197,000***	***1,098,000***	***1,055,000***	***942,000***	***1,200,000***	***2,750,000***	***3,170,000***	***3,170,000***	***3,170,000***	***3,170,000***	***3,170,000***	***3,170,000***	***3,170,000***	***3,170,000***	***3,170,000***	***1,651,000***	***0***	***57,297,000***
Waste																			
Lowgrade to Lowgrade Stockpile	2,316,000	1,789,000	1,728,000	1,071,000	783,000	1,045,000	0	0	0	0	0	0	0	0	0	0	0	0	32,308,000
Overburden	0	0	0	0	0	0	39,000	0	0	0	0	0	0	0	0	0	0	0	4,770,000
Waste Rock	1,081,000	881,000	1,250,000	551,000	236,000	773,000	45,000	0	0	0	0	0	0	0	0	0	0	0	15,790,000
Total Waste Movement	***3,397,000***	***2,670,000***	***2,978,000***	***1,622,000***	***1,019,000***	***1,818,000***	***84,000***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***52,868,000***
Total Material Movement	***4,452,000***	***3,867,000***	***4,076,000***	***2,677,000***	***1,961,000***	***3,018,000***	***2,834,000***	***3,170,000***	***3,170,000***	***3,170,000***	***3,170,000***	***3,170,000***	***3,170,000***	***3,170,000***	***3,170,000***	***3,170,000***	***1,651,000***	***0***	***110,165,000***
Stripping Ratio	3.22	2.23	2.71	1.54	1.08	1.52	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.92

16.2.1 Operating and Manpower Assumptions

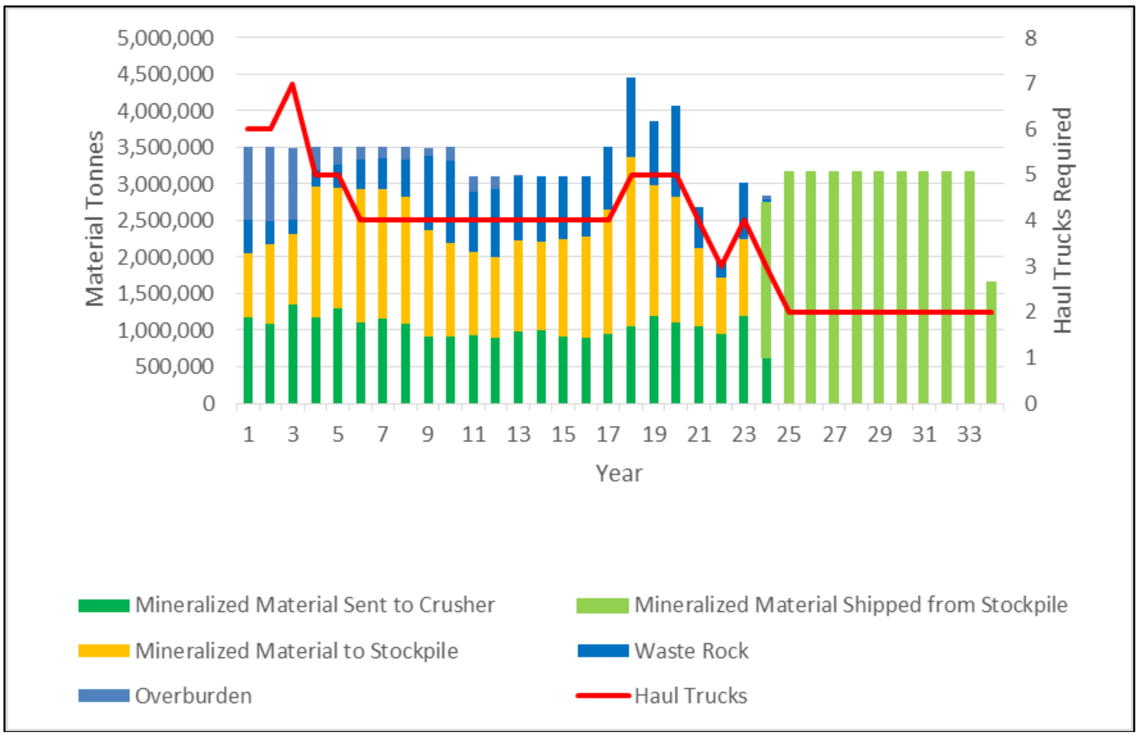
Open pit operations will run 24 h/d and 7 d/w, 270 d/y on a 12-h shift basis. Plant feed material mining and waste stripping operations will be scheduled two shifts per day. Blasting operations will be devoted to day shift only, as well as primary road maintenance. Productivity estimates were based on an assumed mechanical availability of 85% and utilization of available hours varied to reflect seasonal usage of equipment where appropriate.

16.2.2 Annual Production Plans

Annual target concentrate production was set at 610,000 t/y. Full production would be reached starting in the first year of operations.

Over the 34-y operational life of the mine, the average daily production rate is 12,000 t. Maximum annual material movement ranges from a low of 1.7 Mt in Year 34 to a maximum of 4.5 Mt in Year 18. Annual material movement averages about 3.2 Mt. The production schedule by material is shown graphically in Figure 16.13.

Figure 16.13
Material Production Schedule



16.3 MINE EQUIPMENT SELECTION

The project was evaluated assuming that Quest will purchase and operate its own mining fleet including maintenance and repair on all mobile equipment. Specialized contractors will provide explosives storage on-site. Explosives, blasting agents, fuel and other consumables will be provided by established suppliers.

An annual summary of anticipated mine equipment requirements is provided in Table 16.10 with the annual estimated equipment hours summarized in Table 16.11.

Table 16.10
Annual Equipment Requirements

Period	Haul Truck 777G	Wheel Loader 990H	Production Drill D25KS	Wheel Dozer 824H	Track Dozer D9T	Motor Grader 14M	Water Truck L20
1	6	1	1	1	1	1	1
2	6	1	1	1	1	1	1
3	7	1	1	1	1	1	1
4	5	1	1	1	1	1	1
5	5	1	1	1	1	1	1
6	4	1	1	1	1	1	1
7	4	1	1	1	1	1	1
8	4	1	1	1	1	1	1
9	4	1	1	1	1	1	1
10	4	1	1	1	1	1	1
11	4	1	1	1	1	1	1
12	4	1	1	1	1	1	1
13	4	1	1	1	1	1	1
14	4	1	1	1	1	1	1
15	4	1	1	1	1	1	1
16	4	1	1	1	1	1	1
17	4	1	1	1	1	1	1
18	5	1	2	1	1	1	1
19	5	1	2	1	1	1	1
20	5	1	2	1	1	1	1
21	4	1	1	1	1	1	1
22	3	1	1	1	1	1	1
23	4	1	1	1	1	1	1
24	3	1	1	1	1	1	1
25	2	1	1	0	0	1	0
26	2	1	1	0	0	1	0
27	2	1	1	0	0	1	0
28	2	1	1	0	0	1	0
29	2	1	1	0	0	1	0
30	2	1	1	0	0	1	0

Table 16.11
Estimated Annual Equipment Hours

Period	Haul Truck 777G	Wheel Loader 990H	Production Drill D25KS	Wheel Dozer 824H	Track Dozer D9T	Motor Grader 14M	Water Truck L20
1	25,835	3,475	2,693	3,791	3,580	3,791	4,549
2	26,825	3,480	2,672	3,791	3,580	3,791	4,549
3	27,975	3,475	2,689	3,791	3,580	3,791	4,549
4	19,794	3,316	3,438	3,791	3,580	3,791	4,549
5	18,273	3,301	3,503	3,791	3,580	3,791	4,549
6	17,482	3,284	3,578	3,791	3,580	3,791	4,549
7	17,027	3,280	3,598	3,791	3,580	3,791	4,549
8	17,187	3,283	3,585	3,791	3,580	3,791	4,549
9	16,530	3,271	3,636	3,791	3,580	3,791	4,549
10	17,574	3,290	3,554	3,791	3,580	3,791	4,549
11	16,084	2,923	3,105	3,791	3,580	3,791	4,549
12	15,846	2,914	3,146	3,791	3,580	3,791	4,549
13	13,900	2,875	3,328	3,791	3,580	3,791	4,549
14	14,007	2,874	3,332	3,791	3,580	3,791	4,549
15	14,483	2,874	3,332	3,791	3,580	3,791	4,549
16	14,743	2,874	3,332	3,791	3,580	3,791	4,549
17	16,912	3,245	3,762	3,791	3,580	3,791	4,549
18	22,198	4,127	4,785	3,791	3,580	3,791	4,549
19	19,646	3,585	4,156	3,791	3,580	3,791	4,549
20	21,142	3,779	4,381	3,791	3,580	3,791	4,549
21	14,156	2,482	2,877	3,791	3,580	3,791	4,549
22	10,670	1,818	2,108	3,791	3,580	3,791	4,549
23	16,191	2,798	3,244	3,791	3,580	3,791	4,549
24	10,167	2,636	1,963	3,791	3,580	3,791	4,549
25	8,819	2,939	1,855	0	0	3,791	0
26	8,819	2,939	1,855	0	0	3,791	0
27	8,819	2,939	1,855	0	0	3,791	0
28	8,819	2,939	1,855	0	0	3,791	0
29	8,819	2,939	1,855	0	0	3,791	0
30	8,819	2,939	1,855	0	0	3,791	0

16.3.1 Drilling and Blasting

The proposed blast hole patterns and powder factors in mineralized material and waste are summarized in Table 16.12. Production drilling will utilize up to three Sandvik model D25KS diesel down-the-hole (DTH) hammer drills with 140-mm diameter bits. Blasting a 10-m bench and mining in two 5-m lifts is not proposed for the Strange Lake Project since, during sub-zero temperatures, the second bench will freeze and require secondary blasting to enable mining. As a result, mineralized material and waste is planned to be drilled, blasted and mined on 5-m benches.

The long term stockpiles are built from the bottom up in 10-m lifts. This construction method has equipment operating on the surface of each lift so it is expected that the stockpiles will freeze and that frost blasting will be required to loosen the material prior to loading and hauling to the crusher.

Table 16.12
Drill and Blast Pattern Assumptions

Parameter	Plant Feed and Waste Rock	Frost Blasts
Bench height	5 m	5 m
Blasthole diameter	140 mm	140 mm
Burden	3.6 m	5.0 m
Spacing	4.2 m	5.8 m
Subdrill	1 m	1 m
Stemmed length	2.5 m	3 m
In-situ rock density	2.72 t/m^3	2.09 t/m^3
Tonnes broken/hole	204 t	302 t
Explosive type	70/30 blend emulsion	70/30 blend emulsion
Explosive density	1.1 g/cm^3	1.1 g/cm^3
Powder factor	0.29 kg/t (0.79 kg/m^3)	0.17 kg/t (0.35 kg/m^3)

The pit will commence production in Year 1 with one drill and reach its peak fleet of two drills in Year 18. One row of preshear and two rows of buffer holes will be drilled along all permanent walls. The proposed wall control patterns are shown in Table 16.13.

Table 16.13
Wall Control Blasthole Patterns

Parameter	Buffer Rows	Preshear Row
Bench height	5 m	5 m
Blasthole diameter	140 mm	140 mm
Burden	3.3 m	2.2 m
Spacing	3.8 m	2.5 m
Subdrill	0.5 m	0 m
Stemmed length	3.0 m	4.0 m
In-situ rock density	2.72 t/m^3	2.72 t/m^3
Tonnes broken/blasthole	171 t	76 t
Explosive type	70/30 blend emulsion	70/30 blend emulsion
Explosive density	1.1 g/cm^3	1.1 g/cm^3
Powder Factor	0.25 kg/t (0.67 kg/m^3)	0.22 kg/t (0.61 kg/m^3)

Grade control will be overseen by the mine geologist. Cuttings from mineralized material zone blast holes will be sampled for grade control purposes and the assay results will be used to determine which portion of the mineralization is above the internal cut-off value before finalizing the mineralized material blasting limits and blast plans.

The blast holes will be loaded with a 70/30 blend of emulsion explosive and ANFO delivered to the holes by the explosives supplier. The explosive supplier will construct an emulsion plant on the mine property and deliver the emulsion, non-electric detonators, boosters and other blasting accessories to the pit blasting crew.

The current blast design is based on the use of a 70/30 blend emulsion which offers a high velocity of detonation and good water resistance, and one surface delay, "handidet" type cap and booster per blast hole. The design powder factor is 0.29 kg/t in mineralized material and waste. It is envisaged that once mining operations commence, the mine will evaluate its blasted rock fragmentation and progressively refine and optimize its production drilling and blasting parameters.

16.3.2 Loading and Hauling

Mining will utilize conventional open pit equipment and practices. The pit will commence mining operations with the following key loading and haulage equipment:

- One wheel loader.
- Six haul trucks.
- Ancillary equipment.

Material is loaded by wheel loaders into 55-t capacity haul trucks. Cat 990H wheel loaders and Cat 773G diesel-powered mechanical drive haulage trucks were selected as representative equipment for the purposes of this PEA and are well suited to the project. Productivity estimates were based on four-pass loading for the loaders as shown in Table 16.14.

Table 16.14
Fleet Productivity Assumptions

Parameter	Units	Cat 990H Wheel Loader		
		Mineralized Material & Waste	Overburden	Snow
Bucket Size	m^3	8.6	8.6	8.6
Fill Factor	%	90	90	90
Effective Capacity	m^3	7.7	7.7	7.7
In situ Density	t/m^3	2.72	2.01	0.80
Swell Factor	%	140	120	100
Bulk Density	t/lcm[1]	1.94	1.68	0.80
Moisture	%	3	3	n.a.
Wet Bulk Density	t/lcm[1]	2.00	1.73	0.80
Bucket Load	t	15.5	13.4	6.2
Bucket load Limit	t	15.0	15.0	15.0
Actual Bucket Load	t	15.0	13.4	6.2
		Cat 773G Haul Truck		
Truck Capacity	t	55.6	55.6	55.6
Box Size	m^3	35.1	35.1	35.1
Average Fill Factor	%	95	95	95
Maximum Truck Capacity	t	55.6	55.6	26.7
Cycles to Fill	number	3.7	4.2	4.3
Actual Cycles	number	4	4	4
Truck Payload	wet t	55.6	53.4	26.7
Truck Payload	dry t	53.9	51.8	26.7
Truck Maneuver and First Bucket Time	s	45	45	45

Parameter	Units	Cat 990H Wheel Loader		
		Mineralized Material & Waste	Overburden	Snow
Remaining Passes	s	135	135	180
Total Loading Time	s	180	180	225
	min	3.00	3.00	3.75

[1] lcm stands for loose cubic metres.

Trucking requirements were estimated using Maptek Pty Ltd's Vulcan Haulage Profile software program. Using performance data provided by the manufacturer, the Haulage Profile program automatically generates highly detailed cycle time estimates for a given haulage profile, taking into full account anticipated acceleration and deceleration, as well as any user-applied speed limits based on safety considerations. This program outputs the results for each block contained within the block model. Data calculated and stored include the total block productivity time (time required to excavate and move the block to its final destination) in minutes, total cycle time in minutes, and total one-way haul in metres. The block data are used later during schedule optimization as a constraint to level out haulage equipment requirements.

The approach used to develop the haulage profiles using the Haulage Profile software includes:

1) The user digitizes a set of haulage routes, each beginning on the final bench of each respective pit phase and terminating at each of the possible final destinations a block will reach (e.g., the crusher, the final lift of each rock stockpile, and any temporary staging areas).

2) The truck gradeability and retarding information is then entered for 1% increases/decreases in the grade. Additionally, various fixed cycle times (loading, dumping, delays, and spot times) and rolling resistance are also entered for each truck classification.

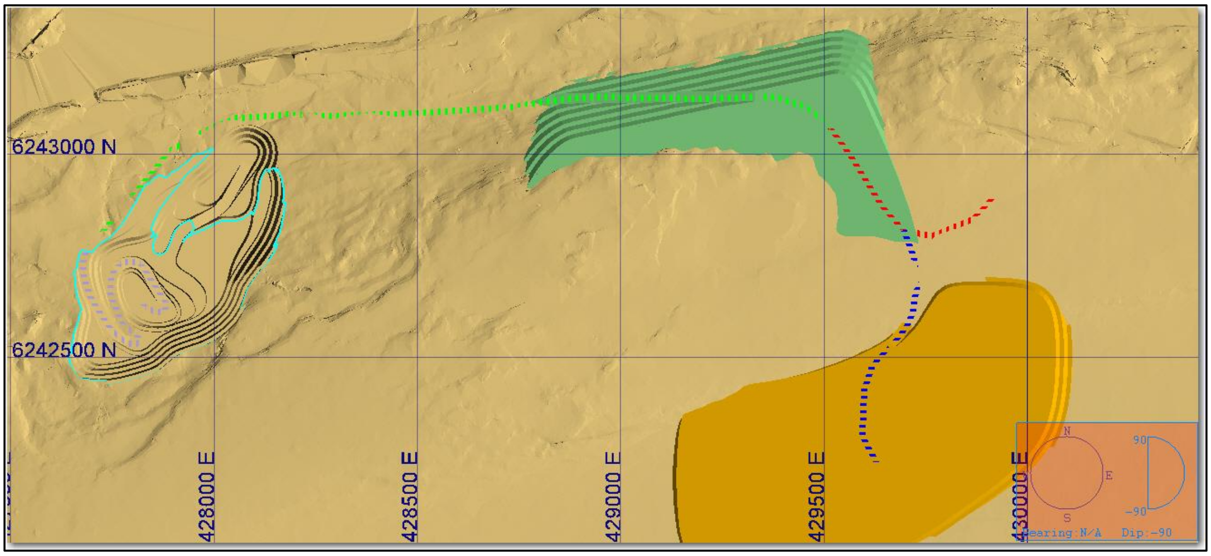
3) Speed limits and delays associated with sharp corners are added as well.

4) The program is then run for each pit phase and the results (truck productivity, cycle time, and haulage distance) are output into the block model. An Excel spreadsheet is also generated allowing the user to check the breakdown of the hauls with the actual haulage distance and grades.

5) These stored data (in the block model) are then available during scheduling as a constraint and/or an output from the production schedule allowing the user to examine and determine while scheduling if any trucking issues exist in the production schedule.

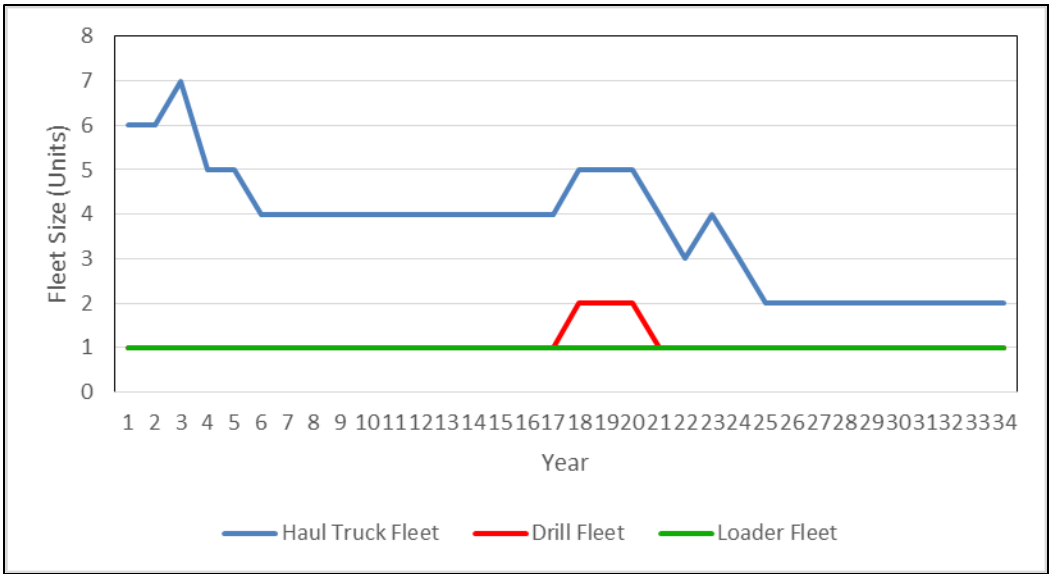
An example of the user digitized haulage routes is shown in Figure 16.14.

Figure 16.14
Example of Haulage Profiles, Strange Lake Phase 2



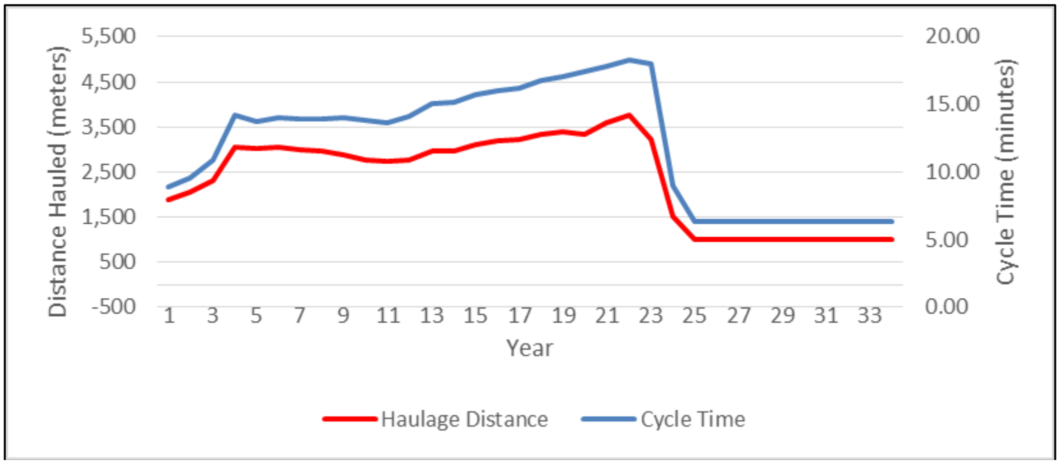
The drill, loader, and truck fleet sizes by year are shown in Figure 16.15.

Figure 16.15
Equipment Fleet Size



The average cycle time over the 34-y mine life is 12.9 min while the average haulage distance is 2,566 m. Figure 16.16 shows the annual truck average cycle times and haulage distance.

Figure 16.16
Annual Truck Cycle Times and Haulage Distances



16.3.3 Support Equipment

An auxiliary fleet of dozers, graders, water trucks and other support equipment will be required. One Cat D9T track dozer will be staged at the waste rock stockpile. The Cat 824H wheel dozer will remain available as a mobile unit capable of handling miscellaneous tasks as required.

16.3.4 Equipment Availability and Utilization

The mechanical availability of the drills, loaders, haul trucks, and support equipment is shown below in Table 16.15. Equipment utilization varies by equipment class and operating minutes per hour are assumed to be 52. Mine operations are assumed to run 270 d/y, 24 h/d.

Table 16.15
Equipment Availability and Utilization

Unit	Brand	Description	Mechanical Availability (%)	Equipment Utilization (%)	Annual Equipment Hours
773G	CAT	Haul Truck	90.0	90.0	4,549
990H	CAT	Wheel Loader	85.0	85.0	4,058
D25KS	Sandvik	Production Drill	85.0	80.0	3,819
824H	CAT	Wheel Dozer	90.0	75.0	3,791
D9T	CAT	Tracked Dozer	85.0	75.0	3,580
14M	CAT	Motor Grader	90.0	75.0	3,791
L20	Kenworth	Water Truck	90.0	90.0	4,549
$329	CAT	Support Excavator	90.0	50.0	2,527
252B	CAT	Skidsteer Loader	85.0	75.0	3,580
Hydraulic Rock Breaker	-	Hydraulic Rock Breaker	85.0	75.0	3,580
Class 12,000L	Volvo	Fuel/Lube Truck	85.0	50.0	2,387
Mechanics Truck	-	Mechanics Truck	85.0	25.0	1,193
Welding Truck	-	Welding Truck	85.0	25.0	1,193
Crane (25 t)	-	Crane (25 Ton)	85.0	25.0	1,193
Pick Up Trucks	-	Pick Up Trucks	85.0	40.0	1,909
Crew Vans	-	Crew Vans	85.0	40.0	1,909
Tractor/Trailer with 50 t Lowboy	-	Tractor/Trailer with 50 t Lowboy	85.0	25.0	1,193
Portable Light Towers	-	Portable Light Towers	85.0	45.0	2,148

16.3.5 Mine Maintenance

The mine maintenance shop will include a main shop building and adjoining heated warehouse, offices, first aid station, lunch room, supervisors offices, mine superintendent office, and technical services office.

The shop will be utilized to service and repair the pit mobile equipment. The service bays are sized to accommodate a Cat 773 haul truck and the Cat 990 loader with sufficient bay height and clearance to enable maintenance personnel to raise/remove truck boxes. The shop will be equipped with an overhead crane to facilitate maintenance and materials handling. The shop will have one wash bay, two heavy equipment servicing bays, and three small vehicle repair bays. Truck tires will be stored next to the shop and in an enclosed cold storage area.

The shop will be well-equipped with a central lubricant and coolant distribution system, welding equipment, office furniture and computers, a computerized preventative maintenance system, tools and diagnostic equipment, safety equipment, used oil and used coolant collection system, and waste bins. The pit haul trucks will re-fuel at the diesel fuel storage and dispensing facility, and a fuel truck will be utilized for fueling the loading units and other equipment in the field.

16.3.6 Mine Manpower

The operation will be staffed seven days per week with two 12-h shifts per day. Truck and loading operations will be carried on around the clock. A standard day-shift blasting crew will be required while four operating labour crews will be needed to man two 12-h shifts per day.

Total annual required mine manpower by mining section is shown in Figure 16.17 and Figure 16.18.

Figure 16.17
Total Mine Employees by Period and Area

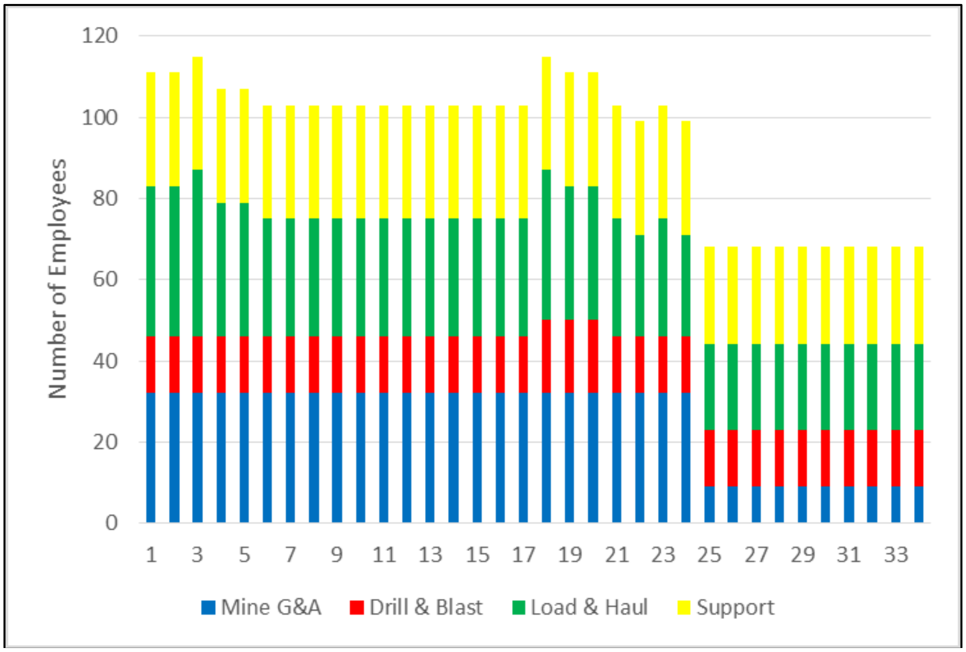
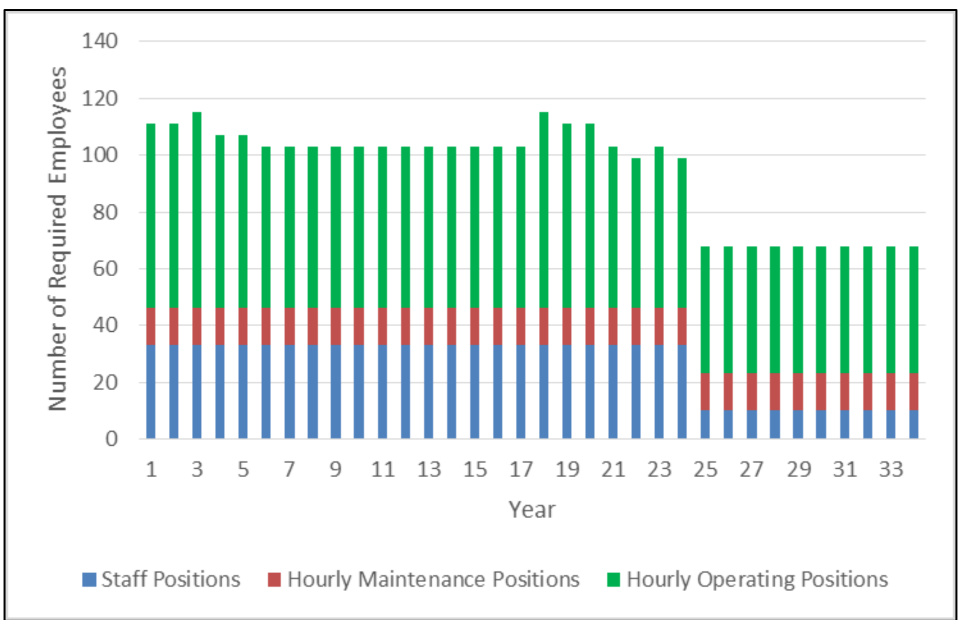


Figure 16.18
Mine Employees by Period and Position



17.0 RECOVERY METHODS

The mineral resources for the Strange Lake project will be mined and beneficiated to recover a flotation concentrate at the Strange Lake site. The flotation concentrate will be transported by truck to the port at Edward's Cove where it will be loaded onto ships and transported to the processing facility at the Bécancour Industrial Park for recovery of rare earths and yttrium.

Processing at Strange Lake will comprise crushing, grinding and beneficiation by flotation. Processing at Bécancour will include acid thermal processing (acid bake) and water leaching to extract the payable elements into solution followed by hydrometallurgical precipitation to recover the rare earth elements and yttrium into a mixed REE+Y concentrate. The REE+Y concentrate will be treated to recover individual rare earth and yttrium oxides.

17.1 DESIGN BASIS AND PROCESS DESIGN CRITERIA

The crushing, grinding and flotation processing facility at Strange Lake is designed to operate for 365 days per year at a design throughput of 1,346,000 t/y for the first 23 years of the mine life.

As discussed in the mining Section 16.0, the optimized mine plan has been developed to maintain a steady dysprosium content in material fed to the concentration plant at Strange Lake. This results in a variable feed tonnage to the beneficiation plant based on the grade of dysprosium. For the first 23 years of the mine operating life, the annual plant feed tonnage in the PEA mine plan varies from 886,000 t/y to 1,279,000 t/y. A plant expansion will enable the processing of up to 3,170,000 t/y of lower grade stockpiled mineralized material from year 24 onwards to the end of planned production (year 30).

The processing plant at Bécancour is designed to treat a maximum of 610,000 dry t/y of flotation concentrate. This plant will operate for 365 days per year, 24 hours per day. The design average throughput rate for the processing plant at Bécancour is 1,671 dry t/d. The ranges of estimated annual production for the separated rare earth and yttrium oxides, based on the PEA mine plan and estimated metallurgical recoveries, are given in Table 17.1.

Table 17.1
Average Annual Design Production
(t/y)

Product	Low	High	Comments
Mill Feed	887,000	3,170,000	Dry basis
Flotation Concentrate	521,000	608,000	Dry basis, varies to maintain Dy_2O_3 output
Total Separated Rare Earth Oxides	9,021	13,114	
La_2O_3	985	1,908	LREE output increases late in LOM
CeO_2	2,363	4,176	

Product	Low	High	Comments
Pr_6O_{11}	266	460	
Nd_2O_3	928	1,579	
Sm_2O_3	249	349	
Eu_2O_3	15	18	
Gd_2O_3	267	325	
Tb_4O_7	62	66	
Dy_2O_3	418	427	Mine plan is based on constant Dy production
Ho_2O_3	89	95	
Er_2O_3	264	293	
Tm_2O_3	39	45	
Yb_2O_3	229	276	
Lu_2O_3	31	40	
Y_2O_3	2,816	3,057	

Data provided by Quest, March, 2014.

The average metal recoveries are estimated from the metallurgical testwork described in Section 13, as shown in Table 17.2.

Table 17.2
Average Project Metal Recoveries

Element	Flotation Yr 1-23 (%)	Flotation Yr 24-30 (%)	Leach Extraction (%)	Direct Precipitation Plant Recovery (%)	Separation Plant Recovery (%)	Recovery from Mine to Separated Oxide Yr 1-23 (%)
La	93%	60%	87%	95%	98%	75%
Ce	92%	59%	89%	94%	98%	76%
Pr	92%	58%	91%	94%	98%	77%
Nd	91%	56%	91%	94%	98%	77%
Sm	91%	54%	90%	93%	98%	75%
Eu	90%	51%	89%	93%	98%	73%
Gd	91%	52%	90%	94%	98%	75%
Tb	90%	52%	88%	93%	98%	72%
Dy	90%	52%	86%	92%	98%	70%
Ho	90%	51%	84%	92%	98%	68%
Er	89%	50%	83%	91%	98%	65%
Tm	88%	48%	81%	89%	98%	62%
Yb	87%	47%	80%	85%	98%	58%
Lu	86%	45%	79%	85%	98%	57%
Y	90%	51%	86%	94%	98%	71%

17.2 PROCESS DESCRIPTION

The selected process plant flowsheet and design parameters are based on the testwork described in Section 13.0. Simplified block flowsheets for the proposed processing facility are shown in Figure 13.4 and Figure 13.5. A summary description of the selected process unit operations included in the PEA is included below.

17.2.1 Crushing and Grinding

The crushing, milling and flotation circuits located at Strange Lake have been designed to support treatment of a maximum of 1,346,000 t/y feed in the first 23 years of the operation with further capacity expansion to process a maximum of 3,170,000 t/y in the last seven years. The crushing circuit is designed to operate for 365 days per year, 12 hours per day. The grinding, flotation and dewatering circuits are designed to operate for 365 days per year, 24 hours per day.

The crushing circuit will consist of a jaw crusher to reduce run-of-mine mineralized material to -150 mm. Crushed mineralized material will be ground to a particle size of 80% passing (P_{80}) 40 µm in a typical semi-autogenous grinding (SAG)/ball mill/pebble crusher grinding circuit in closed circuit with hydrocyclone classifiers. The grinding circuit product particle size was selected based on the required grind size for effective liberation of the rare earth- and yttrium-bearing minerals.

The grinding circuit product will feed a bank of desliming hydrocyclones. The overflow from the desliming hydrocyclones, with particle size of 80% passing 10 µm, will be collected as slime and combined with the flotation concentrate to be thickened in a high-rate thickener. The desliming hydrocyclone underflow will feed the flotation circuit.

17.2.2 Flotation and Concentrate Dewatering

The flotation circuit will consist of a conditioning stage and four rougher stages to generate a concentrate and a tailing. The flotation concentrate combined with slime from the desliming hydrocyclone will be thickened in a high rate thickener and then dewatered in steam pressure filters to reduce the moisture to less than 10%. The flotation tailings comprising non-REE mineralized gangue will be sent to a residue management facility located at the mine site.

Flotation concentrate will be loaded into containerized trucks for delivery to the port facility at Edward's Cove from where it will be shipped to the processing plant at Bécancour.

17.2.3 Acid Bake Water Leach (ABWL)

The processing plant at Bécancour will comprise the direct precipitation plant (DPP) and the REE separation plant.

The flotation concentrate from Strange Lake will be dried, heated, mixed with preheated sulphuric acid and fed to an acid thermal processing vessel for the transformation of contained REE and yttrium into water soluble sulphates. The acid bake product will feed an acid recovery vessel where sweep gas (air) recovers unspent acid via acid coolers and an electrostatic precipitator. The discharging air flow will be passed through a slaked lime scrubber to capture any residual acid prior to release to the environment. The recovered acid will be recycled to the concentrate-acid mixing stage for reuse.

The calcine product will be cooled and fed to the water leach circuit. The leach discharge slurry will be pressure filtered and washed to produce pregnant leach solution (PLS). The calcine product will generate a clean leach solution with low concentrations of impurities such iron and aluminium, and low free acid, to feed the direct precipitation plant. The rare earth elements and yttrium will be recovered from the clean solution by a simple precipitation method.

Water leach residue will be treated and neutralized in a residue neutralization circuit along with direct precipitation plant waste streams. The resulting treated residue will be filtered and mixed with cement for discharge to the Bécancour residue management facility (RMF).

17.2.4 Impurity Removal

PLS from the acid bake-water leach circuit will be fed to the impurity removal circuit. Impurities including iron, aluminium, thorium, titanium, and residual zirconium and niobium, will be selectively precipitated by pH adjustment. The precipitated impurities will be thickened, filtered, washed and finally combined with leached residue solids for disposal in the RMF.

Thickener overflow and impurity precipitate filtrates will be combined to form the feed solution to REE crude concentrate precipitation.

17.2.5 Crude Concentrate Precipitation

In the crude concentrate precipitation circuit, solution from the impurity removal circuit will be pH-adjusted to selectively precipitate a crude rare earth concentrate. The concentrate will be thickened, filtered and washed before being fed to the concentrate re-leach circuit.

17.2.6 Concentrate Re-leach and Oxalate Precipitation

The washed crude rare earth concentrate will be dissolved in sulphuric acid to produce concentrated rare earth sulphate liquor. Rare earths and yttrium will be precipitated by addition of oxalic acid to produce a rare earth oxalate concentrate. The oxalate concentrate will be filtered and washed prior to calcining.

17.2.7 Oxalate Calcining

The mixed REE+Y oxalate will be fed to a direct fired calciner. Mixed REE+Y calcine (oxide) will be cooled and discharged to a bin before being fed to the separation plant.

17.2.8 Separation Plant

The mixed REE+Y oxide will be digested in acid to form a concentrated solution. The REE+Y solution will be fed to a conventional rare earth separation circuit based on solvent extraction.

Individual, purified rare earth and yttrium strip solutions (from stripping of loaded organic from the solvent extraction circuit) will be precipitated and pure rare earth and yttrium solids will be filtered, washed and calcined to produce the final high purity oxides.

Stripped and regenerated organic will be recycled in the circuit.

17.2.9 Effluent Treatment

The combined plant effluent and leached residue will undergo treatment including lime neutralization and addition of barium chloride for effective control of contaminants. The solids in the combined effluent stream will be thickened, filtered, and transported to the Bécancour RMF.

17.2.10 Reagents

17.2.10.1 Strange Lake

Grinding media, flotation reagents and flocculant will be delivered to Strange Lake and stored on site.

17.2.10.2 Bécancour

Sulphuric acid will be purchased from a third party.

Purchased magnesia (MgO) and lime will be slaked in a slaking plant. The slaked MgO and lime will be stored and used for neutralization within the process.

Other reagents that will be delivered, stored, mixed and distributed within the processing facilities include the following:

- Barium chloride.
- Flocculants.
- Sodium hydroxide.
- Oxalic acid.
- Organic extractant.
- Organic diluent.
- Cement.

17.2.11 Plant Utilities

17.2.11.1 Steam

Low pressure steam will be supplied to the Bécancour facilities from a distribution header and transferred to various usage points within the plant by a piping network.

17.2.11.2 Water Systems

Cooling water will be supplied to the Bécancour facilities via a dedicated distribution network.

17.2.11.3 Compressed Air

Compressed air and instrument air systems will be provided to service the processing facilities. Compressed air receivers will be installed at various locations within the plant to provide the necessary surge capacity

18.0 PROJECT INFRASTRUCTURE

The infrastructure of the project is divided between two regional areas:

1. Northern Project Area, comprising:
   - The mine and beneficiation site at Strange Lake, Québec.
   - The port site at Edward's Cove, Newfoundland and Labrador.
   - The access road of about 170 km between the above sites.

2. Southern Project Area, situated at Bécancour Industrial Park, Québec comprising:
   - The Bécancour process plant site.
   - The process plant residue management facility.

18.1 NORTHERN PROJECT AREA

18.1.1 Strange Lake Mine Site

Facilities considered essential to support operations comprise an accommodation camp, a multi-functional building and a maintenance workshop building. Site access roads will link the mine and beneficiation plant with these facilities, mineralized material stockpiles, waste rock dump, flotation tailings management facility, ponds, landfill and an airstrip.

18.1.1.1 Haul Roads and Stockpiles

Haul roads will be built with an inter-berm width of 19 m, suitable for trucks carrying a 55 t payload. Roads will be constructed or extended as required during the pre-production and operational periods.

It is intended that all stockpiled material Medium and Low Grade material should eventually be processed. Therefore, mineralized material stockpiles will be located so as to facilitate future reclamation.

Overburden and waste rock will be stockpiled on the west side of the open pit. During construction, the project will aim to select suitable material to build on-site infrastructure, subject to geotechnical investigations determining its suitability. This will minimize both the size of the waste-rock dump and the quantity of material imports.

18.1.1.2 Water Supply and Pit Dewatering

Lac Brisson is expected to be the major source of fresh water, and esker SG-1 is also considered a potential source. More detailed analyses, particularly for radionucleides, will be required to confirm suitability of each source and, in line with best practice, all potable water will be treated before use.

A pumping station will be established on the bank of Lac Brisson, with an intake deep enough to avoid the impact of ice built-up during the winter time. A pipeline of about 1.5 km will deliver water to the treatment facility. A 5 m wide service road will also be required.

Abstraction from the aquifer beneath esker SG-1 would be through two wells, accessible by a service road. It has the advantage of proximity to the mine and potentially requires less treatment than water from Lac Brisson or from the open pit.

Sources of water inflow to the open pit include rain water, groundwater, and water from the lake fault structure. Most volume is expected though the latter, located in one part of the pit, and will be pumped from strategically located in-pit sumps using diesel power. Nevertheless, at the feasibility study stage the use of interception well(s) should also be assessed as a means of reducing inflows to the open pit, to minimize ice build-up during winter.

Any water collected from the mine pit will be delivered to a retention pond and treated in a water treatment plant prior to its use or discharge. Québec Directive 19 requires that all possible efforts should be made for the reuse of this water. (Directive 19 Sur l'industrie minière, March 2012).

During construction, the camp will require approximately 55 m^3/d of potable water. The requirement will be less during operations when the camp will accommodate fewer people.

A fire protection water tank will be filled using water from the esker SG-1, and a minimum volume of water maintained in this tank, which will also supply water for equipment maintenance and dust suppression.

The sewage treatment plant (STP) at mine site will comprise a containerised, skid-mounted plant with septic and equalization tanks. The plant will include a membrane bio-reactor system, aeration, activated sludge treatment and ultra-filtration to meet regulatory standards for effluent quality, including total suspended solids (TSS) and biochemical oxygen demand (BOD). Sludge produced in the septic tank must be cleaned out once a year, dewatered on sand beds and transferred to the landfill.

18.1.1.3 Mine Explosives Plant

The selected explosives supplier will be responsible for the construction of an emulsion plant on the mine property and the delivery of emulsion, non-electric detonators, boosters and other blasting accessories to the pit blasting crew. The explosive plant will be located along the access road, near the waste rock stockpile, about 4.5 km from the open pit.

18.1.1.4 Crushing, Grinding and Flotation

Primary crushing, grinding and beneficiation of mineralized material mined at Strange Lake will be performed on site. A crushing, milling and flotation plant will be located at the mine site. The crusher and grinding mill will comprise hopper, silo, jaw crusher, SAG mill, ball mill, hydrocyclones and conveying equipment. The beneficiation plant consists of a rougher flotation circuit only. Flotation concentrate will be transferred to shipping containers for onward transportation to the Bécancour site.

18.1.1.5 Fuel Storage and Distribution

Approximately three weeks' supply of fuel will be stored at the mine site. The fuel tank will be located in a bermed containment area; secondary containment will protect against leaks and spills. A further 13 weeks supply will be stored at the Edward's Cove port and delivered to the mine by road tanker as required.

A refuelling station will serve light and heavy vehicles (including tankers and tractor trailers). Tractors for concentrate transportation will be refuelled at either Strange Lake or Edward's Cove, as needed.

The airstrip will be equipped with a 30 m^3 tank for the storage of aviation fuel to be used in case of emergency.

18.1.1.6 Power Supply and Distribution

A power plant at the mine site will be equipped with a battery of Arctic diesel-powered generators, with two of them on standby or undergoing maintenance.

Distribution to substations and large motors will be at generator output voltage (4.16 kV), avoiding the need for step-down transformers.

The airstrip will have its own power supply, provided by a diesel generator, supplied with a small day tank, as well as a large storage tank for Arctic diesel fuel supply.

18.1.1.7 Camp Accommodation

A temporary construction camp will be located within the vicinity of the proposed mine site facilities. The temporary camp facilities will accommodate 375 persons for the duration of the construction. Permanent camp facilities will also be located within the vicinity of the mine site. The camp will be a modular design to accommodate a maximum of 375 persons and constructed to industry acceptable standards for long term, permanent site accommodation for mine operations personnel, with additional space for truck drivers and other visitors. Arctic corridors will be provided to link the buildings.

The permanent camp modules will be prefabricated for assembly at site on foundations constructed using concrete piling and grade beams and will accommodate 220 personnel. The central core will include recreational, kitchen, and dining facilities, meeting rooms and offices, as well as medical, first aid and emergency response facilities. The dining room will seat 110 per sitting. Recreational facilities will include a gymnasium, sauna, weight room, games and TV rooms. Bedrooms will be located in three-storey wings connected to the central core building; each will have a private toilet and shower.

18.1.1.8 Multi-functional Building

A multi-functional building will incorporate heated and non-heated warehouses, change-house, lockers, laundry facilities, medical and fire safety, laboratory, offices and meeting rooms for mine management and administration staff; garages for emergency vehicles (fire truck, ambulance), and associated emergency response equipment storage.

The building will be located on an esker 2 km from the open pit. Building on this ground will not require foundation piles since it has sufficient bearing capacity. This location will also be a source of borrow material for construction.

18.1.1.9 Workshop

The main mine site maintenance shop will be part of the mine site maintenance and warehouse facility. The mine site workshop building will be a heavy duty, custom designed metal-clad structure containing maintenance bays, wash bay, lubricant storage, machine shop and related offices. The workshop building will contain the following:

- Two bays for repair and servicing of mining trucks and other mining equipment.
- Six bays for service of transport tractor trailers.
- A mobile equipment wash bay.
- A lube truck warm up bay.
- Lubricant storage and dispensing rooms.
- A machine and welding shop.
- An electrical/instrumentation shop.
- Mechanical/electrical room.
- Equipment washing and sump room.
- Tyre changing pad and equipment.
- Administration offices and coffee room.

Bridge cranes will be provided with the capacity to lift the heaviest component, typically the box of a mine truck. The machine/welding shop will be equipped with welding, lathe, and milling machines, parts washer, bandsaw, hydraulic press and other tools and equipment. Lubrication, glycol coolant, engine and welding fume exhaust systems and compressed air will be provided in the service bays and welding shop.

18.1.1.10 Mine Warehouse

Heated and unheated storage at the mine site will be provided in the multifunctional building. This will include approximately 500 m^2 of heated space and 500 m^2 of unheated space. This space will be sufficient to store goods and equipment parts for use during the winter months.

A concrete floor will be provided in the warehouse to facilitate the material handling. The truck loading and unloading will be performed with appropriate lifting equipment.

18.1.1.11 Airstrip

The airport facility will be capable of operating 24 h/d, 365 d/y. The runway and taxiway will be constructed of gravel. A trailer will be used for the terminal building, with capacity for around 60 passengers, including washroom facilities, storage area, and office space.

18.1.1.12 Medical Emergency Response

Medical and emergency response facilities will be provided at the multifunctional building at the mine site. An ambulance will be available and maintained in the ambulance bay of this building complex.

In addition, a nurse's station will be provided at the mine permanent camp. A qualified nurse and/or doctor will be available at the mine site to deal with medical emergencies. Qualified personnel trained in first aid and emergency response will also be available. When necessary, an air ambulance will take patients to a hospital facility located in a major centre such as the Labrador Health Centre located in Happy Valley-Goose Bay.

18.1.1.13 Waste Management and Landfill

Recoverable materials will be compacted on site, and sent to a sorting facility. Special waste will be sent to an authorized treatment/disposal facility. Kitchen/organic waste and other non-recyclable and non-hazardous domestic wastes will be despatched by road twice a week to the port site for incineration.

A landfill to accommodate non-hazardous solid waste will be built along the access road between the airport and the open pit, in a topographically suitable area. A pad of 2,500 m^2 will be constructed near the landfill, for use in remediation of any contaminated soil.

18.1.1.14 Tailings Management Facility

Residue from the flotation plant will be stored in the tailings management facility located at the mine site. In order to minimize any potential impact to the local environmental, the tailings will be thickened filtered and dry-stacked within a lined area. A more detailed study on flotation tailings storage will be undertaken during the next phase of project development.

18.1.2 Mine Access Road

The link between the port and the mine site will be an 8-m wide all-weather access road, constructed over a distance of 168 km. Preliminary designs envisage a crushed rock or gravel surface to sustain high traffic volumes. The preferred alignment represents the shortest route, provides the fastest travel time for a roundtrip between the port and the mine site and traverses less difficult topography than other routes considered in the study. Nevertheless, a potential avalanche and landslide risk with this option merits further consideration at feasibility study stage.

As far as possible, the road alignment will balance cut and fill, avoid tight curves and have a maximum gradient of 12%. The proposed route crosses three water courses. Two culverts and a bridge will be required, and will meet seasonal caribou crossing requirements.

Figure 18.1 shows the route of the proposed access road.

Figure 18.1
Proposed Mine Access Road

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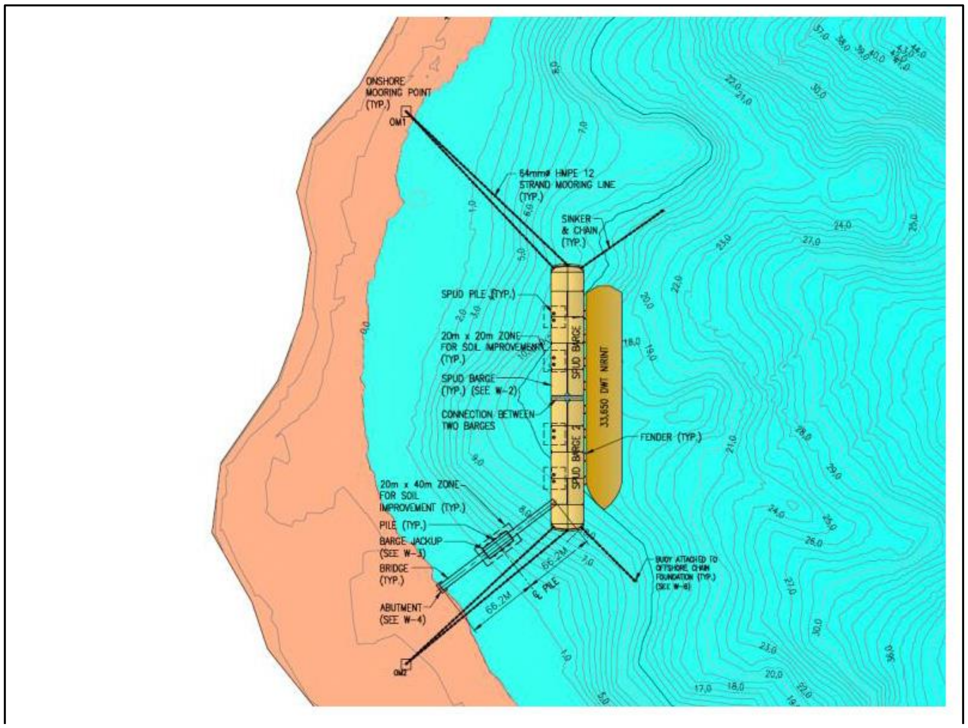
18.1.3 Edward's Cove Port

A systematic analysis of various options for the location and design of a wharf resulted in the identification of Alternative 6 (Floating Wharf) as the preferred option (see Figure 18.2), principally since this structure could be dismantled during the ice season, and potentially requires less capital.

At the subsequent feasibility study stage, the above conclusions need to be validated and confirmed by conducting more extensive (including summer) wind, tidal, current, and wave measurements. Further field geotechnical investigation should be conducted to examine the rock elevations at project site (wharf area and along the trestle length) and terminal operation criteria should be developed early in the next phase of the project. This is necessary in order to: assess the need of tug assistance, determine the requirements of wharf material handling equipment, confirm the dimension of wharf; and to determine the acceptable terminal downtime.

Figure 18.2
Proposed Floating Wharf



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As well as the marine works (wharf), on-shore infrastructure at the port includes ancillary facilities located 2 km from the shoreline. These include port site roads, fuel tank farm, container storage and handling area, concentrate stockpile, incinerator, landfill, accommodation camp, multi-functional building and services. A small control building will be located in the port area, providing office space, a lunchroom and toilets. A temporary landing barge and airstrip will be required during the construction phase.

Concentrate will be delivered to the port in 30-t shipping containers, with three containers per tractor load. Container handling at Edward's Cove varies depending on the season:

- When ships are at berth (summer operation) full containers will be delivered to the ship, and concentrate will be reclaimed by front end loader from the concentrate stockpile to fill empty containers unloaded from the ship.

- When there are no ships at berth (winter operation) lids will be removed from full containers which are then handled using a reach stacker equipped with a Rotabox, to empty the concentrate from the container into a mobile feed hopper. From here, a transfer conveyor and a stacker conveyor will feed the concentrate stockpile.

Empty containers will be loaded onto tractor trailers for back haul to the mine.

18.1.3.1 Fuel Handling and Storage

The fuel tank farm will be located near the wharf where tankers will be offloaded. Arctic diesel fuel will be pumped from the fuel tanker using the ships' pumps, boosted as required through a pumping station located on the dock and delivered to the tank farm through a double-walled pipeline system. The diesel tank farm at the port will comprise one 750 m^3 storage tank, to supply 13 weeks of storage for the mining operations at Strange Lake, and three 1,650 m^3 storage tanks to supply 16 weeks of fuel for port operations at Edward's Cove. The tanks will be placed within a bermed containment area. Secondary containment will protect against accidental leaks and spills. A foam-based fire protection system will be employed.

Road tankers will collect fuel from a filling station located between the tank farm and the access road to the mine site. These road tankers will deliver fuel to the mine site and to generators, heating systems and incinerator serving the port buildings and camp site. Concentrate transport trucks will also refuel here in preference to refueling at the mine site, thus saving on fuel haulage costs.

18.1.3.2 Port Area Facilities

In the port area, an accommodation camp, multi-functional building and warehouse will be established in the location used as a laydown area during construction. Where possible, temporary infrastructure required during construction phase will be retained for use during operations.

The multi-functional building will include workshops for road vehicle and equipment servicing, offices, a change-room for 70 permanent staff, medical and emergency response facilities including a fire and ambulance station.

The warehouse building will store parts and supplies that cannot be left outside or in shipping containers where most materiel will be stored.

At the commencement of project construction, an 80-person hotel barge or similar vessel will be used to house construction workers who will be tasked to build the permanent and temporary camps at the Edward's Cove Port terminal. This 'flotel' will be docked in a suitable strategic location nearest to the proposed dock and port facilities.

Once the permanent and temporary camps at the port are complete, a total of up to 100 workers will use the facility during the construction phase. The permanent camp will remain occupied throughout the operating period of the port, housing 70 staff. The camp will be located approximately 2 km south of the wharf along the access road connecting the port with the mine.

The permanent camp will be of a pre-fabricated modular design, constructed to industry acceptable standards. The core will contain recreational, cafeteria and kitchen facilities, meeting rooms, offices, shower and change rooms, as well as medical, first aid and emergency response facilities. The cafeteria will seat 35. Recreational facilities will include weight and exercise rooms, sauna, games and TV rooms. The bedrooms would be located in two-storey wings connected to the central core, each with a private toilet and shower.

18.1.3.3 Water Supply, Treatment and Run-Off Management

Groundwater is believed to be the most cost-effective and convenient source for the modest volume of water supply required in the port area. Specific sources should to be identified and tested at the feasibility stage. Well pumps will deliver water to a treatment plant from where it will be distributed around the camp area. Water for the office building in the wharf area will be delivered by tanker, as required.

At the camp, a firewater tank of 750 m^3 will feed a pump house and hydrant network. Sprinklers, standpipe and hose stations will be provided in accordance with relevant codes.

Wastewater treatment will be through skid-mounted, containerized sewage treatment plants. For the port camp site, a capacity of 25 m^3/d will be provided, while the port control building will have a system sized to handle 2 m^3/d. Sludge will be dewatered prior to being disposed of as landfill.

The concentrate stockpile area will be fully bermed and lined with geomembrane to prevent absorption of water, and so will generate runoff proportionate to rainfall received. All runoff that has come into contact with the concentrate stockpile will be collected by ditches then discharged into a retention pond, sized to contain a 1 in 100 y event, i.e., 85 mm within 24 h. This water will be treated using lime addition and solid/liquid separation to remove dissolved contaminants before being released to the environment.

To the maximum extent possible, clean runoff from rain falling outside project activity areas will be collected in ditches and diverted around and away from active areas, and discharged back into the environment.

18.1.3.4 Power Supply and Distribution

After consideration of alternatives, the study concluded that both the port and its camp should be powered using medium speed diesel generators, a well-proven technology widely used in the Canadian North. The PEA assumes that the power plant will be owner-operated.

The number of generators is based on an N+2 configuration, where N is the number of units required to supply the base load using 80% of full capacity, leaving one unit on standby and another on maintenance. At the port, with a peak demand of 440 kW, a single generator rated at 650 kW is required to be running at any given time. The N+2 configuration dictates that three such units be installed.

The generators will burn Arctic Diesel Fuel No.2, in common with boilers used for direct heating, as well as the haulage truck and mine fleets. In the cold winter months, approximately 85% of surplus heat energy will be recovered from the generators using a recovery system supplying heat to adjacent buildings.

Distribution around the port area will utilize armoured cables which may simply and safely be laid on the ground, without mechanical protection. This will result in greater reliability than conventional overhead lines.

18.1.3.5 Other Infrastructure

Communications (voice and data) from the Northern project area will be via a bi-directional satellite link, with local networks for on-site communications, supplemented by two-way radios and a satellite-based real time location system (RTLS) for vehicles travelling between the mine and the port.

The mine access road enters the port area and forms a loop to accommodate trucks with full containers awaiting loading and empty containers heading back to the mine or the stockpile.

A dual-chamber incinerator at the port site will have a batch capacity of 1 t/d. This incinerator will receive kitchen waste and other non-recyclable, non-hazardous domestic wastes from both port and mine sites. The incinerator will be enclosed in a separate building located near the landfill and contaminated soil pad along the access road. Ash will be tested for leachable metals and, if suitable, transferred to the landfill or, if hazardous, temporarily stored before being shipped to an authorized disposal facility.

The landfill for disposal of non-hazardous solid waste will be located along the access road between the facilities area and the port, in an area with suitable topography. Over 30 years, the estimated surface areas required for the landfill and inert waste dump, respectively, are 1.0 ha and 0.2 ha.

A contaminated soil pad, constructed near the landfill, will also be used also soil remediation.

18.2 SOUTHERN PROJECT AREA

The PEA proposes that a process plant and residues management facility (RMF) should be developed within the Bécancour industrial park, located on the south bank of the St. Lawrence River opposite the city of Trois-Rivières. Flotation concentrate containers shipped from Edward's Cove and other bulk supplies will be offloaded from vessels berthing at the nearby port of Bécancour and brought to the process plant site by road.

Located on Lot 4 of the industrial park, the process plant site will include a concentrate area, hydrometallurgical processing plant, REE separation plant, utilities and supporting systems while the RMF, located on a remote lot in the park, will include the residue stockpiles, the dewatering building and related ponds.

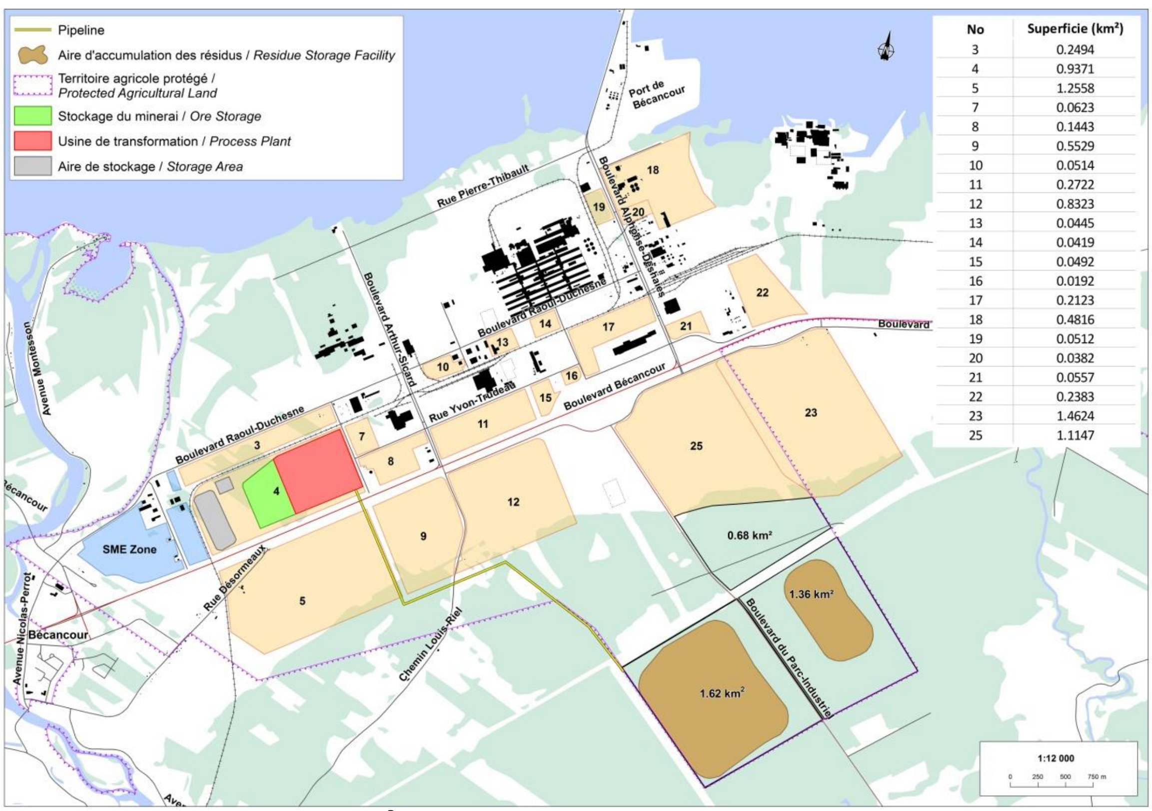
18.2.1 Bécancour Port

The existing port and berth structures at Bécancour are adequate to receive vessels of the size required to deliver 610,000 t/y concentrate in containers. No marine works or modifications of the port are envisaged in the PEA.

The concentrate containers will be offloaded from the vessels by crane and loaded onto flatbed trucks for the 7 km haul to the process plant site.

Figure 18.3 provides the layout for the proposed site facilities at Bécancour.

Figure 18.3
Layout of Bécancour Site Facilities



Lot numbers given with area in km^2.
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18.2.2 Bécancour Processing Plant

As well as the port facility, existing infrastructure supporting the processing of concentrate at the Bécancour plant includes the availability of utilities at the industrial park (industrial water supply, sewage disposal, electrical power and gas supplies). In addition, the industrial park is responsible for the provision of emergency (fire, medical) and waste management services.

Where appropriate, the PEA provides for the establishment of connections to these existing supplies, bulk materials handling, and other infrastructure as described below.

18.2.2.1 Bulk Materials Handling

On arrival at the plant site, the containers will be placed in a thaw shed to thaw the concentrate that may have frozen during transportation from the mine site. After thawing, the containers will be emptied into a mobile feed hopper and the empty containers returned to the port. The feed hopper will discharge onto a mobile transfer conveyor which, in turn, will feed a stacker conveyor to create a concentrate stockpile. The concentrate will be reclaimed by front end loader and dumped into a feed hopper for delivery to the concentrate dryer.

Truckloads of bulk lime and magnesia (MgO) will be transferred to their respective storage silos using the truck's on-board blower, and will feed a lime and MgO slaking plant. A suitable dust control system will be needed in this area.

The process plant residues will be pumped to the RMF, where the residue slurry will be dewatered and conditioned with cement in the dewatering building before being stockpiled.

18.2.2.2 Electrical Power

Power Supply

All of the power required to operate the process plant, including base and peak loads, will come from existing Hydro-Québec transmission lines. For some of the critical loads a local emergency generation system will be required. The capacity of these units will only be determined at the feasibility stage of the project but, for the purpose of the PEA, it is assumed that 10% of the loads will require emergency power supply.

Power Distribution

Based on the anticipated peak load, and considering equipment costs, the optimal voltage level for incoming power supply would be 13.8 kV. This voltage will be used for power distribution and also for power supply for motors above 3,000 HP. The voltage will be stepped down to 4.16 kV to feed the large motors (250-3,000 HP) and for power distribution to remote loads and areas. Emergency power at 600 V will feed critical loads during a power outage.

Within the process plant there will be four levels of power distribution:

- 13.8 kV, 3 PH, 3 W, 60 Hz, resistance grounded neutral: for main power distribution and motors above 3,000 HP.

- 4.16 kV, 3 PH, 3 W, 60 Hz, high resistance grounded neutral: for power distribution and large motors (250-3,000 HP).

- 600 V, 3 PH, 3 W, 60 Hz high resistance grounded neutral: for small power distribution (Between non-process buildings) and small process loads (below 250 HP).

- 208/120 V, 3 PH, 4 W, 60 Hz, solidly grounded neutral: for small loads, lighting and non-process loads.

18.2.2.3 Natural Gas

At Bécancour, natural gas available at the site boundary will be used to supply heat in the mill to dry and roast concentrate, evaporate sulphuric acid from baked concentrate, heat sweep gas and sulphuric acid, and produce steam. Heating will be required also in the direct precipitation plant. Gas distribution pipelines within the site will be designed to ensure the pressure and volume of supply are adequate.

18.2.2.4 Buildings

In addition the process and hydrometallurgical buildings, the following will be needed:

- General administrative and management services, housed in a 2-storey building with offices, training area, meeting room, lunch room and ancillary services.

- Warehouse, laboratory, shop and medical (first aid) facility.

- Cafeteria, change room and lockers.

- Guard house/security services.

18.2.2.5 Information and Communications Technology

Communications from the plant site to the Northern project area will utilize a commercial internet service. Cellular phones will be supported by a local base station at the plant site. Two-way radios will also be used for vehicles travelling between the plant and port areas.

The process plant will be equipped with a Supervisory, Control and Data Acquisition (SCADA) system operating over industry-standard communications networking hardware and software.

IP-based video surveillance cameras will be supported by the IT network and telecommunication links. Additionally, intercom systems are deployed on remote gates and limited access doors.

18.2.2.6 Site Water Balance

At Bécancour, water requirements are as follow:

- Process water required for the hydrometallurgical plant, the RMF and industrial facilities such as the powerhouse et cetera.

- Cooling water from the existing raw water distribution network in the industrial park, used in the hydrometallurgical plant and other process areas.

- Demineralized water required for steam generation in the boilers, solvent extraction and acid making.

- Potable water.

Process Water Treatment

The neutralization circuit and process water treatment sections of the production cycle include a series of mixing, coagulation, neutralization and settling steps, after which the treated effluent will be passed through a series of sand filters to capture suspended solids. Solids from the neutralization circuit will be sent to the RMF for dry stacking.

Cooling Water System

Water needed for cooling purposes in the plant is never mixed with process water. After use, it is collected in a dedicated Cooling Water Pond (CWP). The CWP will be provided with sufficient surface area to allow for aeration and natural cooling of collected water and, in addition, it will be equipped with an air-draft cooling tower for use during warm weather.

Demineralized Water System

The Bécancour site needs demineralized water for use in high pressure steam boilers. Condensate return for steam end users is mixed with water and fed into the demineralization plant and to deaerators, as needed, for further treatment and conditioning before it is distributed across the site.

Potable Water

The SPIPB provides potable water to the site boundary. On the site, an underground pipe network will connect all buildings and will also provide fire protection where possible, eliminating the need for a dedicated fire water tank and potable water treatment system. The final design of the network will depend on the water pressure and flow, to be finalized with SPIPB representatives at feasibility study stage.

18.2.2.7 Sewage Water Treatment

In the process plant area, sewage water will be collected and piped to a point on the boundary of the site where it will be discharged into the industrial park sewage network.

18.2.2.8 Site Drainage

The flotation concentrate stockpile area will be lined with a geomembrane to allow collection of all rainwater. A network of drains will deliver this runoff to a retention pond where solids will settle before the water is sent to the process plant. The retention pond is designed to accommodate a 1 in 100 y, 24 h rain event, i.e., 103 mm.

Precipitation on other areas susceptible to contamination, such as the diesel fuel station, will flow through an oil separator prior being sent to a water treatment system.

Precipitation falling on the remainder of the plant area will be collected and discharged into the environment as natural runoff.

18.3 RESIDUES MANAGEMENT

As part of the PFS dated December, 2013, SLR International Corporation (SLR) prepared a study that describes the nature of the process residues and the selection of the method and location of residue disposal at the Bécancour site in southern Québec. Although not part of the PFS, SLR also provided conceptual designs for the residue storage facility (RMF) at the Strange Lake site with a 30-year capacity at a processing rate of 4,000 t/d (i.e., 66 Mt of residues and cement).

With production of the flotation concentrate at the Strange Lake site and a simplified hydrometallurgical process for the recovery of rare earths and yttrium, production of residues in the Bécancour processing facility will be smaller than envisaged in the PFS. Also, approximately 40% of the milled material will remain at the mine site as flotation tailings.

The characterization of the residues and detailed design of the tailings management facility at Strange Lake and the RMF at Bécancour will be completed at a later stage of project development. However, for the purposes of the PEA, the SLR studies have been used as a basis for the conceptual design and cost estimates for the process waste management facilities.

19.0 MARKET STUDIES AND CONTRACTS

19.1 INTRODUCTION

As discussed in Section 17, Recovery Methods, the prefeasibility study is based on the production of separated rare earth and yttrium oxides. Zirconium and niobium will be contained in the processing residues. In future studies, Quest will examine the commercial and technical potential of recovering, marketable zirconium and niobium products but, given the company's strategic focus on rare earth elements, these are not included in the PEA.

Quest retained Roskill Consulting Group Limited (Roskill) to prepare an analysis of the markets for rare earths, zirconia and niobium in January, 2011. Roskill provided interview notes for the study in March, 2012 and a report in May, 2012 (Roskill, 2012). Roskill's 2012 study focused on yttrium, dysprosium, terbium, neodymium, zirconia and zirconium chemicals, and niobium. Roskill interviewed a total of 31 companies representing the sectors of interest, located in North America, Europe and Asia. The report was updated for rare earths and niobium in January, 2013 (Roskill, 2013a) and an update on rare earth pricing was prepared in August, 2013 (Roskill, 2013b).

At an overall average production rate of 610,000 t/y feed of flotation concentrate to the processing plant at Bécancour, output from the Strange Lake project will comprise between 9,300 t/y and 12,800 t/y separated rare earth and yttrium oxides.

19.2 RARE EARTHS

The rare earth elements, a group of metals also known as the lanthanides, comprise the 15 elements in the periodic table with atomic numbers 57 to 71. Yttrium, atomic number 39, is often included with the lanthanides since it has similar chemical and physical characteristics often occurs with them in nature.

The 15 lanthanide elements are divided into two groups. The 'light' elements (LREE) are those with atomic numbers 57 through 62 (lanthanum to samarium) and the 'heavy' elements (HREE) from 63 to 71 (europium to lutetium). The term 'middle rare earths' comprises those with atomic numbers 62 through 64 (samarium, europium and gadolinium, also referred to as SEG). Generally, the light rare earth elements are more common and more easily extracted than the so-called 'heavies'. In spite of its low atomic weight, yttrium has properties more similar to the heavy lanthanides and is included within this group. Promethium, atomic number 61, does not occur in nature. The rare earth element content of ores and products is generally expressed in terms of the oxide equivalent, or REO.

The principal commercial sources of the rare earth elements are bastnaesite, a fluocarbonate which occurs in carbonatites and related igneous rocks; xenotime, a yttrium phosphate commonly found in mineral sand deposits; and loparite, a titanate related to perovskite and which occurs in alkaline igneous rocks. In China, rare earth elements and yttrium are found in ion-adsorption clays that formed as a result of lateritic weathering of igneous rocks.

Rare earths and yttrium usually enter the market as chemical concentrates, oxides, metals or metal alloys. Most oxides are typically sold at purities of >99.9% REO and metals within the same range for total metal content. Trade in chemical concentrates is mainly within China, but has declined with the increasing consolidation of control of rare earth resources and integration into downstream products within the country.

19.2.1 Production and Supply

China has dominated the global supply of rare earths since the mid-1990s after a rapid growth in rare earth output and, in 2012 and 2013, is estimated to have accounted for 90% of global rare earth supply. The U.S. Geological Survey (USGS) reported total world mine production at approximately 110,000 t REO in 2013, of which China accounted for 100,000 t REO (USGS, 2014). Both production and exports of Chinese rare earths are controlled by the central government. Outside China, rare earths are produced in the United States, Russia and India, with relatively minor amounts also produced in Malaysia and Brazil.

Most LREEs are derived from bastnaesite and monazite, the majority from Inner Mongolia and Sichuan in China, but with increasing volumes from the Mountain Pass operation of Molycorp, Inc. (Molycorp) in the United States and the Mount Weld operation of Lynas Corporation Ltd. in Australia. Almost all HREEs are derived from ion adsorption clays that are found in a number of provinces in southern China. To date, similar deposits with the potential for exploitation have not been delineated, although they could exist in under-explored regions of Southeast Asia. Similar deposits have been discovered in Brazil and Africa but have not yet been brought into production. Over the medium term, production of HREEs in the rest of the world will come principally from the minerals which occur in igneous alkaline or carbonatite intrusives.

19.2.1.1 China

There are three main producing areas in China, the Inner Mongolia Autonomous Region, Sichuan province and southern China (Jiangxi, Fujian, Guangdong, and Hunan provinces). In 2012, Roskill reported that 24 companies were officially recognized as producing rare earth concentrates, and approximately 100 companies were engaged in rare earth processing. The number of both rare earth producers and processors has declined through 2013 as consolidation of the rare earth industry, environmental controls and restrictions on exports of rare earth materials have taken effect (see Roskill, 2012).

The Baotou area of Inner Mongolia is responsible for over half of China's rare earth production. Output is based predominantly on bastnaesite and monazite which are enriched in the LREEs (principally, lanthanum, cerium and neodymium). Bastnaesite is also the major rare earth mineral extracted in Sichuan province. Rare earth production in southern China is based on deposits of ion adsorption clays which formed from weathering of minerals such as apatite and xenotime. The term refers to the adsorption of rare earth elements into the structure of kaolinitic clay minerals. The ion adsorption clays are relatively low grade but are easily mined and processed and are characterized by the relatively high proportion of HREEs (including europium and dysprosium, as well as yttrium). Production increased rapidly during the early 2000s through numerous small-scale artisanal operations but this resulted significant environmental damage. Mining quotas imposed since the mid 2000s by the Chinese government have been partially successful in curtailing the production of rare earths but illegal mining still takes place.

19.2.1.2 United States

In the mid-1990s, the United States produced some 20,000 t/y REO, all of which came from the Mountain Pass operation of Molycorp, Inc. (Molycorp) in California. The operation is centred on the Sulphide Queen carbonatite body in which bastnaesite is the principal rare earth-bearing mineral. LREE predominate.

Processing of rare earths at Mountain Pass was suspended in 1998 as a result of unresolved regulatory and permitting issues, as well as low prices. Mining continued until 2002. The company supplied between 1,500 and 3,000 t/y of mixed rare earth products from stockpiled material. In 2007 the separation plant restarted using stockpiled feed. Mining restarted in December, 2010, followed by milling and mineral cracking operations in February, 2012. Production at the refurbished plant will re-establish Molycorp as a major global supplier of rare earths.

Molycorp has concluded a number of transactions which enhance its position as the major western world participant in the rare earth industry. It acquired ownership of the Estonian rare earth processor, AS Silmet, and purchased Santoku America Inc., the American subsidiary of Santoku Corporation (Santoku). Molycorp also acquired Neo Material Technologies Inc., including the Magnequench subsidiary which has a patented magnetic powder product range.

19.2.1.3 Russia

In June, 2011, OJSC Uralkali (Uralkali) acquired the Karnasurt mine as a result of the merger with OJSC Silvinit (Silvinit). The primary business of both companies is potash production in Russia.

The Karnasurt mine, located in the Kola Peninsula, produces a loparite (a complex rare earth-alkali-titanate-niobate-tantalate) concentrate which is processed at the Solikamsk Magnesium Works (SMW) of Silvinit in the Ural region. Mineralization is hosted within nepheline-feldspar-aegirine pegmatite veins which form part of the underlying Lovozero alkaline igneous massif.

19.2.1.4 India

India Rare Earths Limited (IREL) is the largest producer of rare earths in India mining beach sands in Kerala, Tamil Nadu and Orissa states. Monazite and zircon occur as by-products with ilmenite and rutile which are the principal minerals and source of titanium dioxide.

19.2.1.5 Australia

Lynas Corporation (Lynas) operates the Mount Weld project in Western Australia where the mine on the Central Lanthanide Deposit opened officially in August, 2011. The Central Lanthanide Deposit is composed principally of weathered monazite with a relatively high neodymium content. A LREE concentrate is produced on site and is stockpiled for shipment to the Lynas Advanced Materials Plant (LAMP) which has been constructed in Malaysia for separation of rare earths. Initial commercial output from the LAMP took place in June, 2013.

19.2.1.6 Supply Outlook

As a result of reduced export quotas imposed on Chinese suppliers and increasing prices, the potential for rare earth production outside China has been assessed by both mining companies and major rare earth consumers.

Each of the major established producers outside China, i.e., Molycorp, Uralkali and IREL, plans to increase production, and this is expected to total approximately 45,000 to 50,000 t/y REO by 2020.

Over 20 rare earth projects were identified by Roskill, of which the most advanced are the Dubbo project of Alkane Resources Ltd.; the Nechalacho (Thor Lake) project of Avalon Rare Metals Inc.; the Kutessay II project of Stans Energy Corporation and the uranium tailings processing project of Summit Atom Rare Earth Company (SARECO) (Roskill, 2012).

19.2.2 Consumption and Demand

Lanthanum, cerium, neodymium and yttrium are more abundant in nature than most of the HREE, and elements with an even atomic number are more abundant than their odd-numbered neighbours in the periodic table. In the processing of rare earth ores, the relatively abundant LREE are easier and less costly to separate. Traditionally, the market for rare earths has been divided between relatively high volume applications for the LREE (petroleum cracking catalysts and glass polishing, for example) and relatively low volume applications for high purity HREE (phosphors, dopants and specialty alloys).

As a group, the rare earth elements have magnetic, chemical and spectroscopic properties that have led to their application in a wide range of end-uses. There are important differences in the physical and chemical properties of the LREE and HREE that allow them to be utilized differently, and the more subtle differences between the properties of individual elements allow them to be used in particular applications for which the technical specifications are very precise.

The rare earths market is not a single entity, however, and the individual elements have their own demand drivers. For example, neodymium and dysprosium are used mostly in magnets while the principal market for terbium and yttrium is in phosphors. High growth rates for the applications in which neodymium and HREEs are used emphasise the lack of connection between the natural occurrence of the rare earth elements and the ratios in which they are consumed. Inevitably, there will be periods in which some rare earth elements are in surplus while others are in deficit.

The principal end-use sectors are shown in Table 19.1 with summary comments on the principal rare earth elements used in each. Components which use rare earths, such as magnets, display screens and phosphors, are then incorporated in the manufacture of finished consumer or industrial products.

Roskill (2012) estimated that metallurgical applications, magnets and catalysts each accounted for approximately 20% of total demand for rare earths in 2012. Polishing compounds accounted for a further 15%. Ceramics, phosphors and glass each accounted for between 5% and 10% of the total with the balance in a wide range of relatively minor applications.

Table 19.1
Principal Applications for Rare Earth Elements

Application	Comments
Magnets	Nd with Dy and Tb in neodymium-iron-boron permanent magnets
Metallurgy	Y in light weight and super alloys Nd in magnesium alloys Tb in magnetostrictive alloys LREE in pyrophoric alloys LREE in nickel-metal hydride rechargeable batteries
Catalysts	Ce, La and Nd used in automotive and petroleum cracking catalysts
Polishing	Ce in glass polishing compounds
Glass	LREE as colourants, decolourizers and stabilizers in optical, safety and crystal glasses HREE/Dy as dopant in laser glass
Phosphors	Y/HREE in display screens, fluorescent and LED lighting, X-ray film
Ceramics	LREE/Nd as dopants in capacitors

Roskill, 2012.

Global trends which have strongly influenced the demand for rare earths are miniaturization, particularly of consumer electronic devices, automotive emissions control and energy efficiency, coupled with the general shift of manufacturing away from the United States, Europe and Japan to China, South Korea and elsewhere. Demand for rare earths within China has grown significantly over the past 10 years. This reflects the extent of its increased manufacturing capability, specifically in a wide range of products which utilize rare earths.

The principal geographical centres of consumption of rare earths are China, Japan and other Asian countries, and the United States, where magnets, batteries, automotive catalyst systems, fluorescent lighting tubes or display panels are manufactured.

Global consumption of rare earths has increased over the past decade at a rate of approximately 3%/y. The market shrank in 2009 because of the effects of the global economic downturn, which had a significant negative effect on markets outside China. Global demand began to recover in 2010, but slowed once again in 2011 as global GDP growth also contracted. In 2012 and 2013, demand resumed an upward trend,

19.2.2.1 Demand Outlook

Roskill (2012) projected that global demand will grow at around 6-7%/y over the next five years as global economic conditions improve and increasing quantities of rare earths are required in new and existing applications. As in the past decade, demand is expected to continue to grow faster in China than in the rest of the world, driven by increased domestic consumption and an increased number of foreign companies relocating manufacturing to China.

By 2020, Roskill estimated that magnets, metallurgy and catalysts will continue to account for the majority of demand at just under 60% of the total.

Roskill projected that the elements that are most likely to be in deficit in the years to 2020 are dysprosium, yttrium and europium. Periodically, neodymium may also be in deficit.

China is a major user of neodymium, terbium, dysprosium and yttrium in its domestic manufacturing and the government will continue to seek to secure supplies of these materials for its own industries. The introduction of separate export quotas for HREEs and LREES in 2012 is one aspect of this policy.

19.2.3 Prices for Rare Earths

There is no terminal market for rare earth products and sales are arranged between buyer and seller.

Spot prices for the principal rare earth oxides, FOB China, are reported by Industrial Minerals, www.indmin.com, and prices for a full range of Chinese rare earth products are reported by Asian Metal, www.asianmetal.com and Metal-Pages Ltd., www.metal-pages.com.

19.2.3.1 Price Projection

Based on its assessment of the updated pricing outlook prepared by Roskill in August, 2013 (Roskill, 2013b) and its own data collection and analysis, Quest prepared projections of prices for separated rare earth oxides.

Rare earth and yttrium oxide prices starting in 2020 used in the financial model are shown in Table 19.2.

Table 19.2
Projected Prices for Rare Earth Elements and Yttrium

Rare Earth/Yttrium Oxide	Price (US$/kg)
La_2O_3	9.00
CeO_2	8.00
Pr_6O_{11}	85.00
Nd_2O_3	80.00
Sm_2O_3	9.00
Eu_2O_3	1,000.00
Gd_2O_3	40.00
Tb_4O_7	950.00
Dy_2O_3	650.00
Ho_2O_3	55.00
Er_2O_3	70.00
Tm_2O_3	1,000.00
Yb_2O_3	50.00
Lu_2O_3	1,100.00
Y_2O_3	30.00

19.3 CONTRACTS

On 9 July, 2013, Quest announced the signing of a non-binding letter of intent with TAM Ceramics Group of New York, LLC (TAM), under which TAM intends to purchase 100% of zirconium basic sulphate (ZBS) which, at the time, was envisaged would be produced from the Strange Lake project. Due to the change in Quest’s flowsheet, ZBS will not be produced although the extraction of zirconium from the processing residues will be developed in the future. The letter of intent is subject to the execution and delivery of a definitive sales agreement between Quest and TAM no later than 31 December, 2014. The letter of intent will therefore be allowed to expire at the end of 2014.

Quest is pursuing opportunities for strategic alliances, tolling and off-take agreements.

At the time of writing, there are no other contracts or agreements in place.

20.0 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

Environmental work is being carried out with support from local Aboriginal partners and regional service providers to the greatest extent possible.

Quest reports that work on the Environmental Impact Assessment (EIA) for all project components will start early in 2014, following submission of a project description to the relevant government authorities. EIAs may be triggered in five jurisdictions: two in Québec (north and south), Newfoundland and Labrador (provincial and Nunatsiavut), and one with the federal government. Assuming some degree of harmonization between jurisdictions, the EIA studies and associated public consultations are expected to take approximately two years to complete. The EIA would be followed by a period of up to six months in which to obtain necessary environmental approvals prior to initiating construction.

Appropriate mitigation and monitoring plans are being considered by the project team to address unavoidable environmental impact of mining, including possible compensation scenarios for any net wildlife habitat loss and project closure reclamation.

The description of environmental baseline studies has been summarized from Section 8 of the December, 2013 PFS document and Section 20.2 has been extracted from Section 5 of the PFS document to which the reader is referred for more detail.

20.1 SUMMARY OF ENVIRONMENTAL BASELINE STUDIES

The Strange Lake Project has been divided into northern and southern areas for the purposes of environmental baseline studies. Baseline studies have been undertaken for all or part of the relevant project components located in northern Québec. For the southern Québec area, a desktop review of existing information was completed by spring 2013 followed by field investigations to collect baseline data. These baseline studies are currently being completed and other studies will be undertaken in spring and summer, 2014.

Baseline studies in both northern and southern areas are broadly similar in scope and include physical, biological and social components.

20.1.1 Environmental Baseline Study Areas

For each project component under review (i.e., mine, road, port, plant), environmental baseline (EB) study areas were defined encompassing potential direct effects, as well reasonable indirect effects where possible, for both the construction and operation phases.

Figure 20.1 illustrates the EB study areas each of the project components in the northern project area. A total study area of approximately 7,900 km^2 was defined to accommodate all environmental components.

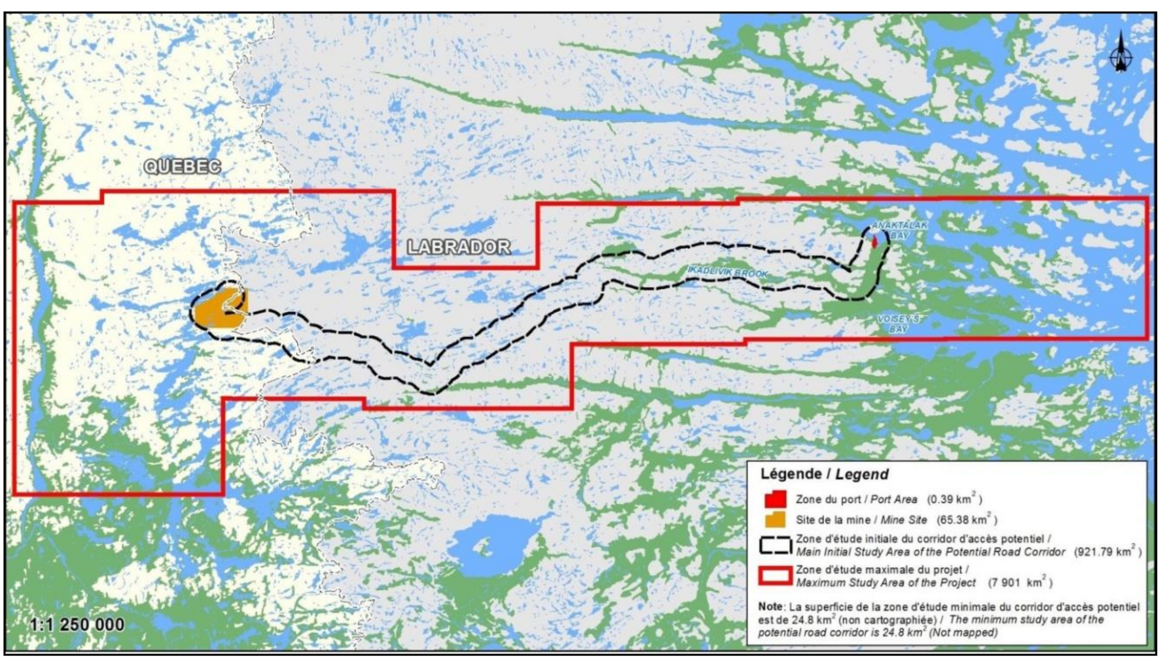
The mine site study area, approximately 63 km^2, was established to include all possible infrastructure around the B-Zone deposit. Larger areas were established for caribou/raptors and for traditional knowledge while more limited study areas were established for physical components such as hydrogeology, waste rock storage and airstrip locations, in addition to the B-Zone deposit.

The corridor for the 165 km access road between the mine and port varied in width for each EB study. Wildlife and habitat mapping surveyed a corridor up to 5 km wide, while aquatic field surveys were as narrow as 100 m.

The port study area of approximately 0.4 km^2 was delineated, with various locations/angles for the potential wharf within Edwards Cove, just off Anaktalak Bay and the foreshore zone of the Labrador Sea. Marine surveys focused mainly on the zone within 1 km of the port area.

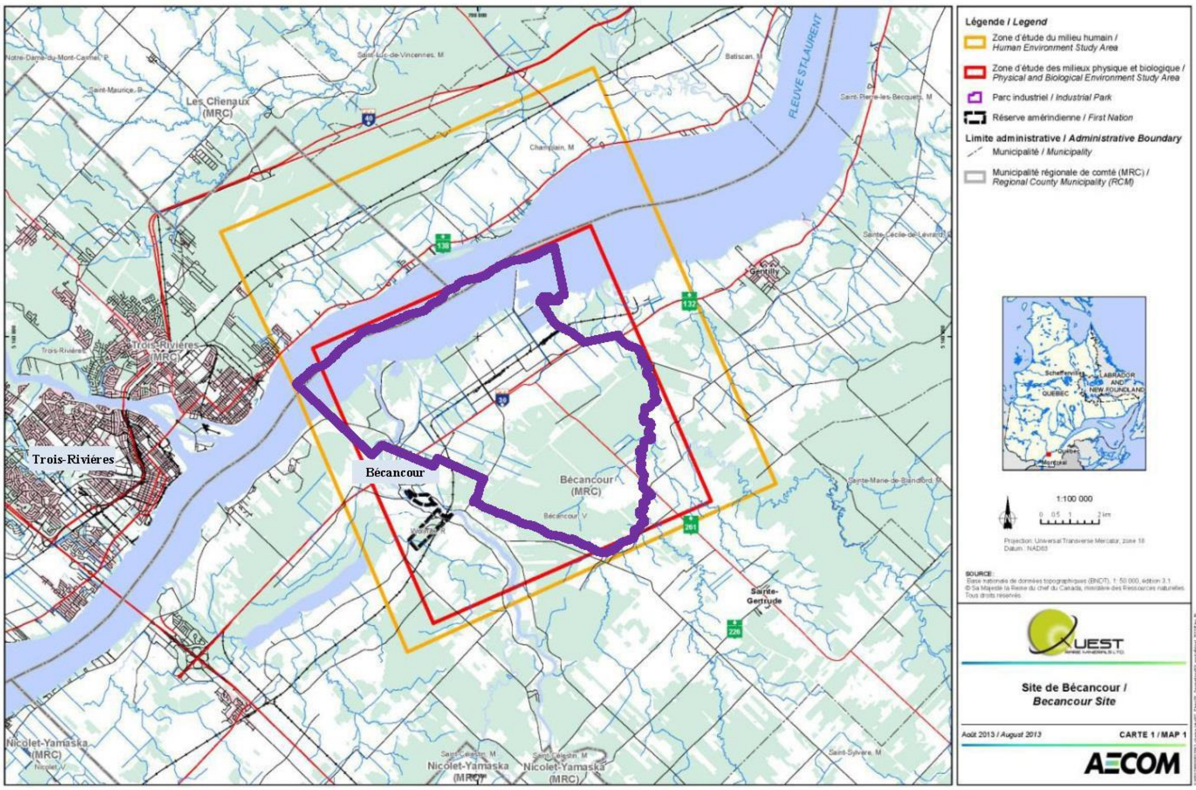
The processing plant study area in Bécancour covers approximately 210 km^2 (16 km by 13.1 km), including the Société du parc industriel et portuaire de Bécancour (SPIPB) property limits, adjacent land between the Bécancour and Gentilly Rivers, and part of the St. Lawrence River. A smaller study area was established for physical and biological components such as freshwater habitats, wetlands and terrestrial ecosystems. Filed work was limited principally to an area of 306.6 ha comprising Lot 4 (91.2 ha) and two lots reserved for the RMF (215.4 ha) within the SPIPB which may be subject to direct environmental impacts. See Figure 20.2 and Figure 18.3, above.

Figure 20.1
Study Area for Project Environmental Baseline Studies, Northern Québec



Micon December, 2013 Technical Report.

Figure 20.2
Bécancour Regional Study Area, Southern Québec



Micon December, 2013 Technical Report.

Where relevant, data were also collected on a regional basis for the northern and the southern areas.

The following provides a brief summary of the results of baseline investigations in relation to the physical environment, vegetation and fauna. Section 8 of the PFS provides details on the following physical environmental data:

- Climate,
- Ambient air quality.
- Ambient noise.
- Geomorphology.
- Hydrogeology.
- Soil quality.
- Hydrology.
- Freshwater sediment quality.
- Physical marine environment.
- Geochemistry.

20.1.1.1 Physical Environment

Northern Project Area

The Strange Lake project is located in a discontinuous permafrost zone. Near-surface and at-depth permafrost is expected within upland portions of the area (especially those areas with less snow cover).

A total of 19 watersheds and 90 lakes or depressions were found in the vicinity of the mine site. The watersheds hosting the B-Zone and related future infrastructure drain primarily towards Lac Brisson. The road corridor crosses the catchments of Kogaluk River, Konrad Brook, Trout Pond/Voisey's Bay and Ikadlivik River.

The proposed port location on the west side of Edwards Cove is located approximately 70 km from the open ocean. The bay and islands between the port and the open ocean provide a degree of shelter from wind, waves and pack ice. Ice cover is generally expected between December and June.

Southern Project Area

The Bécancour Industrial Park is located on the south shore of the St. Lawrence River and is within the immediate St. Lawrence River watershed. The study area hosts two small streams at the plant site on Lot 4 (Mayrand and the Zéphirin-Deshaies), and the upstream reaches of two unnamed tributaries in the downstream reaches of the area around the RMF. Both areas also host drainage ditches.

Bécancour lies within the physiographic area known as the St. Lawrence Lowlands. The terrain is generally flat and smooth, and rises gently from the river, from approximately 20 m to 40 m above sea level at the southern edge of the park. Wetlands are concentrated near the St. Lawrence River as well as near the local height of land in the southern portions of the industrial park.

20.1.1.2 Vegetation

Northern Project Area

The northern project area lies within the Taiga Shield Ecozone as defined by the Canadian Ecological Framework. On a regional scale, it is located in the Kingarutuk-Fraser River Ecoregion. The 2011 and 2012 surveys did not identify any vascular plants listed under either provincial endangered species legislations, on Canada's species at-risk list, or by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). A number of very rare (S1) or rare (S2) species were identified near or within the potential access road right-of-way, but not within the road trace.

Southern Project Area

The proposed processing plant is located on the Clay Plain biophysical unit. Vegetation around the site consists of abandoned croplands dominated by young trees or shrubs, swamps and marshes, some cultivated fields and some tree plantations. Wetlands around the proposed RMF cover about 57% of the site and are dominated by forested bogs. Forested bogs dominated by tamarack are restricted to central elongated depressions. Two plant species likely to be designated threatened or vulnerable in Québec were found in 2013 at the proposed RMF site.

20.1.1.3 Semi-Aquatic and Terrestrial Wildlife

Northern Project Area

The harlequin duck is a protected species found close to the mine site and in the streams and rivers located in or near the road corridor. Other species include Canada goose, green-winged teal, long-tailed duck, red-breasted merganser, northern pintail, common merganser and greater scaup. Habitat losses for breeding waterfowl are expected to be limited as the road alignment will be routed away from wetlands to the extent possible.

Higher bird and mammal diversity was found in the forested habitats along the valley of the Ikadlivik Brook than in the open habitats that dominate at the mine site and in the western part of the road corridor. Ptarmigan, snowshoe hare and red squirrel were the dominant winter species. During the summer, major mammal species observed included caribou from the George River Caribou Herd, black bear, arctic and red fox, arctic hare, red-backed vole and masked shrew.

Caribou present a key issue given the value of this animal for native and non-native peoples of Québec and Labrador and the recent severe decline in population (from 74,000 in 2010 to 27,600 in 2012). Caribou cross the mine site area and portions of the road corridor twice annually, when moving to northerly calving grounds in the spring, then back south in the fall for their wintering range.

Southern Project Area

Surveys conducted during spring 2013 found no amphibians or bird species of special status. Bird abundance and diversity during the breeding season were typical of fragmented farm and forested habitats of the St. Lawrence Plains. Additional wildlife surveys are planned for early spring 2014 to determine distribution and use of the winter yard by whitetail deer at the RMF location.

20.1.1.4 Freshwater Aquatic Ecology

Northern Project Area

At the mine site, large oligotrophic lakes (e.g. Lac Brisson, Lake Napeu) characterized by low primary productivity, and relatively low pH values and low buffer capacity. Their fish communities are dominated by salmonids.

Along the road corridor, 52% of the sampled water crossing options contained fish populations dominated by brook trout and, to a lesser extent, by arctic char.

Southern Project Area

The plant site is located on the south shore of the St. Lawrence River. A total of 64 different fish species are reported for the St. Lawrence River located between Trois-Rivières and Gentilly. The plant site on Lot 4 contains the Mayrand and Zéphris-Deshaies streams, as well as four drainage ditches. Fish surveys caught 13 fish species, none of which had special conservation status. Additional surveys will be completed in 2014 to investigate potential spring spawning activities. Records indicate that the brassy minnow, classified as having special status, may have been caught in the Mayrand stream.

20.1.1.5 Marine Biology

Northern Project Area – Port Site

Surveys were conducted to characterize the marine habitats and biota at the proposed port locations in Anaktalak Bay, Labrador. Anaktalak Bay is used by seabirds to a limited extent for breeding purposes (typically islands 30 km to 60 km offshore are used). Although there were no specific surveys conducted for marine birds in Anaktalak Bay in 2012, many gull species were observed while surveying and boating in the vicinity of the proposed port. Sightings of harlequin and other sea ducks were also reported occasionally, as were Canada geese and American black ducks. Desktop studies revealed that in the late 1970s, the most abundant breeding species were the Atlantic puffin, razorbill, glaucous gull and black guillemot. The area from Sandy Island (60 km east of the port area) to Skull Island was also heavily used by moulting sea ducks.

The use of Anaktalak Bay by marine mammals is well-documented in surveys. Ringed seals, harp seals, bearded seals and minke whales were observed near the proposed port in September, 2012. Beluga whales have been observed occasionally in Anaktalak Bay.

20.1.1.6 Land Use and Traditional Ecological Knowledge

Northern Project Area

Changes may potentially occur in land and resource use activity among the Nunavik Inuit, Kawawachikamach Naskapi, Québec Innu, Labrador Inuit and Labrador Innu as result of development of the Strange Lake Project.

A land use and traditional knowledge study was initiated in 2012 and data gathering from all communities is to be completed by 2013. The study reveals that many Aboriginal groups traditionally used territories located within or near the Strange Lake Project study area. While some groups continue to visit these lands, contemporary use is sporadic and low intensity, especially in the vicinity of the proposed mine site.

Available documentation, meetings with Aboriginal leaders, as well as information gathered during community meetings in Nain and in other communities regarding the road corridor, revealed that the project will likely affect current activities including caribou and small game hunting, char fishing and snowmobile transportation.

Land use by Aboriginal groups is greater at the proposed port area. Anaktalak Bay is used by the Labrador Inuit for harvesting activities and is occasionally used by the Innu. Edward's Cove is visited for hunting and trapping of waterfowl. Ice fishing for salmon and arctic char is practised at river mouths and further upstream. Waterfowl are hunted near river mouths, in coves and around islands. Berry-picking, black bear hunting/trapping, fox trapping and small game hunting are conducted along the coast surrounding the bay. Sea mammals are also hunted.

Southern Project Area

The southern project area is located within the administrative regions of the Centre-du-Québec on the south shore of the St. Lawrence River and the Mauricie on the north shore. The Indian Reserve of the Abénaquis community of Wôlinak, established on the western shore of the Bécancour River, lies within the City of Bécancour. A large portion of the study area on the south shore is occupied by the Bécancour Industrial Park which covers an area of 6,900 ha, of which about one-third is used by industrial or service companies in the area north of Highway 30.

The City of Bécancour is currently conducting a comprehensive review of its zoning by-laws. Currently, the lands of the industrial park are designated for use by heavy and light industry, and public utilities. Zoning by-laws do not mention a RNF either as a permitted or prohibited land use.

Residences and farms are sparsely distributed throughout the west, south and east sides of the industrial park. The area for the proposed RMF is also occasionally used by local residents for recreational activities and hunting (deer and moose). Some sectors of the study area fall within the protected agricultural zone. The Commission de protection du territoire agricole (CPTAQ) is responsible for zoning within the protected agricultural area. Only a municipality or an RCM may apply to the CPTAQ for the exclusion of lands from the agricultural protection zone. The proposed location of the RMF is at the edge of the protected agricultural zone.

20.1.1.7 Archaeological Surveys

Northern Project Area

Archaeological surveys carried out in the northern project area 2011 and 2012 revealed several archaeological sites. Archaeological site HbDb-b, a suspected maritime cache, is located possibly close to the edge of the ancient glacial Lake Naskaupi. The site is located within the edge of the B Zone approximately 500 m from Lac Brisson. Archaeological site HbDb-3 consists of three concentrations of quartz flakes and a concentration of burned bone fragments situated less than 100 m from the lake. In 2012, a new site was discovered next to the lake at the end of the present airstrip within Québec. Temporarily named Tarmac 1, the site presents numerous stone flakes.

For the large area located between the B Zone, only the shoreline of Lac Brisson was considered to have archeological potential and was prospected during the 2012 field season. The survey of sand and gravel pit 16 near the potential access road closer to the port area confirmed the presence of a known burial site (HcCm-20) as well as a flake concentration within the eastern half of the proposed pit. The western half of the same pit also presents numerous concentrations of flakes, as well as archaeological site HcCm-22 not directly observed in 2012.

The known archaeological sites were re-evaluated in the port area to include any previously established protection areas (site HcCm-08 in particular).

Southern Project Area

An assessment of archaeological potential was carried out in 2013 in the Bécancour Industrial Park. The archaeological survey identified only stone foundations of secondary farm structures considered to be contemporary and without archeological value on Lot 4. Many archaeological sites have been discovered along Route 132 a few hundred metres west of the Bécancour River. The archaeological survey found only a contemporary milestone in the southern part of the proposed RMF. The archeological potential is considered to be low where there are wetlands.

20.1.1.8 Socio-economic Issues

Northern Project Area

The Strange Lake Project is expected to have a greater impact on Aboriginal communities than non-Aboriginal communities in northern Québec and Labrador. Aboriginal communities are characterized by their smaller size, isolation, greater poverty and vulnerability, and lower levels of educational levels and skills training. Traditional Aboriginal activities such as hunting, fishing and harvesting of foods have high social and cultural value, although the economic value is now limited.

In contrast, communities with significant portions of non-Aboriginal residents are more concerned by rapid rate of development in the mining and/or resource sectors, increasing demand and costs for accommodation, inadequate existing infrastructure, the need for education and training programs and harmonious relationships with Aboriginal peoples residing within the towns.

Both Aboriginal and non-Aboriginal communities have common socio-economic interests and concerns with respect to mining projects. Preliminary consultation suggests that they will expect equitable employment, training and business opportunities as a result of project development.

Southern Project Area

The Strange Lake Project may be expected to have the greatest impact on the City of Bécancour, especially for residents of the Bécancour and Ste.-Gertrude sectors. The area has hosted industrial facilities since the 1970s, including the Gentilly-1 and Gentilly-2 nuclear power plants. The closure of Gentilly-2 has adversely affected employment in the Bécancour and Trois-Rivières area.

Many residents use groundwater as a water source and recent mobilization against local drilling activities of the shale gas industry has strengthened local environmental awareness.

The City of Bécancour and the Bécancour RCM are characterized by low unemployment rates (5%) compared with Trois-Rivières (8%) and the Province of Québec (7%). In 2006, the economic sectors employing the most workers in the Bécancour RCM were manufacturing (mainly metal processing and chemical manufacturing), agriculture and forestry, and services (public and health services). Tourism is increasing in the Bécancour RCM.

20.1.1.9 Environmental Supervision and Monitoring

Ongoing environmental monitoring and reporting are expected conditions of both federal and provincial environmental assessment approvals, as well as certain operating permits. The EIA process will provide the basis for a monitoring program.

Environmental parameters to be monitored will be selected according to the importance of their potential impacts. Monitoring locations will be considered based on the spatial distribution of the environmental impacts relative to sensitive ecological and human receptors. The schedule of monitoring activities will be designed to follow the development of the construction activities and to match critical operations activities. Sampling and analytical procedures will comply with applicable legislation and recognized standards/practices, in each province.

20.1.1.10 Closure and Site Rehabilitation

A conceptual closure plan has been developed for the PFS to cover all of the project components in the northern and southern areas.

Quest will comply with the Québec Mining Act and its associated regulations, as well as with similar standards in Newfoundland and Labrador. Companies are required to file a site rehabilitation plan and to provide financial guarantees in both provinces.

Closure Criteria

The present conceptual closure plan follows the 1997 Québec guidelines to restore the mine site to a satisfactory condition. It assumes that the future land use in the northern project area is wildlife habitat and that disturbed areas will be returned to the pre-mining state so that traditional activities can resume. Alternative land uses can be explored as more information is available regarding stakeholder expectations.

It is assumed that progressive rehabilitation will not be carried out during operations, mainly because the entire open pit will continue to be developed and the road/port used during the life of the mine. However, as the details of the mine plan are developed, opportunities for progressive rehabilitation in the accumulation areas should be evaluated and incorporated into the closure plan assumptions.

The overall mine site, port, and access road conceptual closure plan was based on the following:

- Hazardous materials will be classified and disposed of appropriately.

- Equipment and buildings at the mine site and port area will be shipped for reuse, recycling or disposal, and rock used during project construction is assumed to be clean and suitable for use as cover material.

- A 10-year period of post-closure monitoring and maintenance is assumed to begin in October of closure year 2.

- Closure activities will be completed over a two-year period but only in the summer months between May and October.

It is assumed that future use for the Bécancour site will continue to be industrial. The conceptual closure plan for the Bécancour site aims for rehabilitation to achieve sustainable conditions within six years of closure (in line with guidelines in Québec without further liability to Quest. An allowance of 10 years for post-closure monitoring has been made for data collection and analysis to demonstrate achievement of the closure criteria and objectives.

No post-closure monitoring for the processing plant area is anticipated. Post-closure monitoring and maintenance for the RMF has been developed.

A closure risk register summarizing proposed conceptual closure plan treatments and associated residual risks has been developed.

20.1.1.11 Financial Guarantee

The Québec Mining Act requires that a financial guarantee be submitted to the MRN. The total amount is calculated at 70% of the estimated cost for restoration of the accumulation areas, i.e., the RMF including the settling ponds, as well as waste rock piles, mining waste disposal areas, mineralized material and concentrate stockpiles and mine dewatering basins.

The guarantee may be paid in annual installments over a period of up to 15 years. When the expected duration of the mining activities is more than 15 years, as is the case for the Strange Lake Project, the first payment must be made no later than the fourth year of operation.

Once all site remediation and rehabilitation work is complete and in accordance with the approved closure plan, the site is considered safe and does not present any residual environmental risks, the MRN may certify that the proponent is free of its financial obligations.

20.2 ENGAGEMENT AND COMMUNICATIONS

General issues affecting all stakeholder categories will be addressed through the EIA and consultation processes. An Engagement and Communications Plan (ECP) has been developed to establish social acceptance for the project based on defined engagement levels.

The ECP will support future project development activities. It is structured around consultation with governments, Aboriginal groups and non-aboriginal stakeholders. The ECP has been designed to ensure key stakeholders are well informed and have ongoing opportunities to engage in discussion about the project, and for their concerns and interests to be addressed. The ECP is designed to fulfill the requirements of the different jurisdictions for local review and consultation.

Quest initiated early meetings with certain northern Aboriginal leaders in 2008. A series of strategic meetings was undertaken in 2012 to provide all key groups with similar levels of information and a comparable opportunity to ask questions and comment on the initial project concept. In January 2013, draft Memoranda of Understanding were presented to potentially-affected Aboriginal groups, to serve as a basis for negotiations to commence in 2014 on Impact and Benefit Agreements (IBA) or other similar arrangements. The current schedule anticipates resolution by early 2016, which will facilitate the federal government's own requirement to consult with Aboriginal groups before issuing environmental approvals. Both Aboriginal and government stakeholders have been provided with regular updates on the progress of both environmental studies and community engagement.

In southern Québec, a preliminary evaluation of potential social and cultural issues was carried out through a desktop review. No direct consultations have yet been held since the project components in the southern project area were publically announced only early-November, 2013. Socio-economic baseline studies and stakeholder mapping exercises have been carried out. A review was also completed of the issues and concerns raised by economic and environmental citizen groups and NGOs during the development of other industrial developments around the area in the last decade.

20.3 Overview of Environmental Assessment and Approvals Process

The Strange Lake mine site is located north of latitude 55^{o} north, in Nunavik and, therefore, will be subject to the Environmental and Social Impact Assessment and Review Procedure Guide of the Kativik Environmental Advisory Committee (KEAC). The KEAC is composed of Inuit, provincial and federal representatives and supervises the application and administration of the environmental protection regimes under the James Bay and Northern Québec Agreement (JBNQA). The Kativik Environmental Quality Commission (KEQC), composed of Québec and Inuit representatives, is responsible for assessing and reviewing projects located north of latitude 55^{o} north. The decisions of the KEQC are ratified by MDDEFP.

For projects south of latitude 55^{o} north, the review the process is entirely within the authority of the MDDEFP. The construction and operation of a treatment plant and RMF in Bécancour will be subject to an EIA and public hearings may take place before project approval.

The use of public land for the road located on Labrador Inuit lands is regulated by the Environmental Protection Act of the Nunatsiavut government and by the Newfoundland and Labrador EIA process. The Environmental Protection Act gives the responsibility for management of environmental assessments on Labrador Inuit lands jointly to the Nunatsiavut Department of Lands and Natural Resources, the Newfoundland and Labrador Department of Environment and Conservation, and relevant federal authorities.

In addition to provincial regulation, the Strange Lake Project may be subject to the Canadian Environmental Assessment Act (CEAA) of 2012. Public consultation is also potentially part of the environmental assessment process under the CEAA.
If it is determined that a decision is required by both federal and other levels of government, a Joint Review Panel may be appointed that would make recommendations to the federal Minister of the Environment.

20.3.1 Environmental Impact Assessment Triggers

Each of the jurisdictions noted identify in their regulations the minimum thresholds that would trigger the EIA and/or exemption from the EIA process. It is anticipated that EIAs will be triggered in four jurisdictions, as summarized in Table 20.1.

Table 20.1
Environmental Impact Assessment Process in the Project Areas

Jurisdiction	EIA Procedure	Legal Reference
Québec (north of latitude 55°)	Environmental and Social Impacts Assessment and Review	Québec Environmental Quality Act and the JBNQA
Québec (south)	Environmental Impact Assessment and Review Procedure	Québec Environmental Quality Act (c.Q-2)
Newfoundland and Labrador	Environmental Assessment	NL Environmental Protection Act NL Environmental Assessment Regulation
Nunatsiavut Labrador Inuit Land	Environmental Review	Nunatsiavut Assembly Bill No. 2010-07 Labrador Inuit Land Claims Agreement
Federal	Environmental Assessment	CEAA, 2012, Physical Activities Designation Regulation; Prescribed Information for the Description of a Designated Project Regulations.

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Table 20.2 summarizes the different requirements by jurisdiction and by stage of assessment.

Table 20.2
Environmental Assessment Procedures Applicable to the Project Area

Stage	KEQC	Southern Québec	CEAA	Newfoundland and Labrador	Nunatsiavut Government
Project Component	**Mine and Support Infrastructure**	**Plant and Residues**	**All**	**Road, Port**	**Road, Port**
Guidelines	Preliminary information	Project notice	Project description	Registration	Registration
	Evaluation	Evaluation	Evaluation	Review	Review
	Guidelines issued	Guidelines issued	Consultation on the project summary description	Comments from the public	Comments from the public
			Screening by CEAA	Decision by the Minister	Decision by the Minister
			Preliminary guidelines issued	Preliminary guidelines	Preliminary guidelines
			Comments from public	Comments from public	Comments from public
			Final guidelines issued[1]	Final guidelines issued	Final guidelines issued
Impact Assessment	Impact Assessment Report by Proponent	Impact Assessment Report by Proponent	Impact Assessment Report by Proponent	Impact Assessment Report by Proponent	Impact Assessment Report by Proponent
Review	Questions	Questions and comments	Questions	Questions	Questions
	Answers and clarification	Answers and clarification	Answers and clarification	Answers and clarification	Answers and clarification

Stage	KEQC	Southern Québec	CEAA	Newfoundland and Labrador	Nunatsiavut Government
Project Component	**Mine and Support Infrastructure**	**Plant and Residues**	**All**	**Road, Port**	**Road, Port**
		Public consultation on the Summary and the EIA report	Public consultation on the Summary and the EIA report	Ministerial announcement and public review and comment	Ministerial announcement and public review and comment
		Public hearings (if requested) and BAPE[2] report	Final EIA report	EA committee recommendations	EA committee recommendations
Decision	KEQC decision	Ministerial analysis	Minister's decision	Ministerial recommendation	Ministerial recommendation
	Certificate of authorization	Government decree		Decision	Decision

[1] Steps are shown for a standard EIA process. The CEAA process can also be substituted by an equivalent provincial process or sent for review by a panel.
[2] Bureau d'audiences publiques sur l'environnement.
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The EIA is currently estimated to take approximately 26 months to complete, including about seven weeks to prepare the project description for submission to each lead agency. Once the project is released from the EIA process, permits and approvals will be required from the federal government, the provincial government of Québec, the provincial government of Newfoundland and Labrador, and the regional government of Kativik. There may also be other permitting requirements with other governments, such as the regional government of Nunatsiavut, which currently has the power to pass regulations but has yet to do so.

20.4 PERMITTING

Table 20.3 provides a summary of permits and approvals likely to be required for the project.

Table 20.3
Summary List of Permits and Approvals

Permit/Authorization	Law	Activity
Government of Canada		
Decision Statement	Canadian Environmental Assessment Act, 2012	Project approval.
Radio Station Licence	Radio Communications Act	Install and operate radio station.
Licence	Nuclear Safety and Control Act	Processing radioactive material/certain gauges and equipment.
Permit for construction of structures in or near water bodies	Navigable Water Protection Act	Effluent outfall, wastewater discharge, wastewater outfall, wharf construction, stream crossings.
Permit for approval of harmful alteration, disruption or destruction of fish or fish habitat	Fisheries Act	Effluent outfall, wastewater discharge, wastewater outfall, wharf construction, stream crossings.
Metal Mining Effluent Regulations	Fisheries Act	The deposit of mine effluent, waste rock and residues produced during mining operations in natural fish bearing waters.
Permit to transport explosives	Explosives Act	Transportation of explosives.
Approval of Emergency Response	Transportation of Dangerous Goods Act	Emergency response assistance plan and permit

Permit/Authorization	Law	Activity
Assistance Plans		demonstrating equivalent level of safety.
Licence for explosive magazines	Explosives Act	Utilize explosives.
Government of Newfoundland and Labrador		
Release from Environmental Assessment	Environmental Protection Act and Environmental Assessment Regulations	Proceed to permitting stage.
Ministerial Approval	Mining Act	Mine and closure plans; financial assurance.
Mining Lease	Mineral Act	Operation of mine.
Licence to occupy Crown Land	Lands Act	All infrastructure not included in Mining Lease.
Quarry Permit	Quarry minerals Act, Quarry Materials Regulations	Quarry for construction materials.
Surface Rights	Mineral Act	Operation of mine.
Water Use Licence	Water Resources Act	Extract potable or process water.
Permit to Construct Waterworks	Water Resources Act	Potable water system.
Certificate of Approval	Environmental Protection Act	All discharges to the environment.
Approval for waste disposal (landfill)	Environmental Protection Act	Waste management/disposal.
Permit to construct sewage works	Sanitation Regulations	Sewage treatment plant/septic system.
Permit to construct sewage works	Water Resources Act	Sewage treatment plant/septic system.
Certificate of Registration	Storage and Handling of Gasoline and Associated Products	Petroleum products storage.
Certificate of Registration	Heating Oil Storage Tank System, Regulations 2003	Heating oil storage.
Permit for flammable and combustible liquid storage	Fire Prevention Services Regulations	Bulk fuel storage.
Permit to operate a used oil furnace	Used Oil Control Regulation; Air Pollution Control Regulation	To burn used oil.
Certificate of Approval	Used Oil Control Regulation	To store used oil.
Explosives Permit	OHS safety Act, OHS regulations, mines (safety of workmen) Amendment #1Water Resources Act	Use of explosives.
Certificate of Approval - Generators	Environmental Protection Act	Large, permanent generators >100 kW.
Occupancy Permit/Accessibility	Registration Buildings Accessibility Act and Regulations	Occupy buildings.
Food Establishment Licence	Health and Community Act, Food and Drug Act, Food Premises Regulations	Kitchens at workers camps.
Permit to Alter a Watercourse	Water Resources Act	Alterations to a body of water: Infilling wetlands, culverts, bridges, etc.
Permit to install a non-domestic well	Water Resources Act	Potable water or other wells.
Permission to shoot or trap nuisance wildlife	Wildlife regulations	Shoot or trap nuisance wildlife.
Government of Québec		
Government Decree and Certificate of Authorization	Environmental Quality Act	Environmental Impact Assessment
Approval	Mining Act	Rehabilitation and restoration plan.
Mining lease	Mining Act	Mining lease
Surface rights	Mining Act	Surface rights.
Certificate of compliance with Municipal by-laws	Regulation respecting the Application of the EQA	Mine site development.
Authorization for the occupation of water courses	Watercourses Act	Stream crossings, mining residues and waste rock storage construction.
Authorization for potable water	Surface and groundwater catchment regulations	Potable water supply.
Authorization to establish waterworks	Environmental Quality Act	Potable water supply.
Certificate of Approval or Written Notice for a landfill site	Regulation respecting the Landfilling and Incineration of Residual Materials	Waste disposal.
Authorization and Permit for sewer	Environmental Quality Act	Sewage treatment facilities.

Permit/Authorization	Law	Activity
or wastewater treatment		
Certificate of Authorization for discharge activities	Environmental Quality Act	Sewage treatment plant discharge and waste management.
Authorization for installation of air pollution control device	Environmental Quality Act	Air emissions/pollution control.
Authorization to operate a pit or quarry	Regulations respecting pits and quarries	Borrow pit and quarry.
Depollution Attestation	Environmental Quality Act	Pollution control.
Permit for explosives	Act respecting explosives	For possession, purchase and storage of explosives.
Certificate of Conformity	Construction Code	Alteration or demolition of high risk petroleum equipment.
Kativik Regional Government		
Resolution	Kativik Regional Government	Land use.
Certificate of Conformity	Kativik Regional Government	Building of camps and roads.
City of Bécancour		
Construction permit for construction, reconstruction and transformation projects	Construction By-Law N.332.	Construction, reconstruction, alteration, expansion or addition of building projects located on the territory of the City. Installation of an individual or collective treatment of sanitary wastewater and drinking water systems.
Installation of waterworks	By-Law N.554 respecting construction standards for the usage and maintenance of drinking water and sewer systems and standards related to effluents released to the sewer system.	Installing, renewing or modifying a connection to the waterworks or sewage. In areas I01-103, I02-208, I02-209 and I01-210, as specified in the Zoning Bylaw 334, written approval of the Bécancour Waterfront Industrial Park is required to grant the permit.
Installation of propane bottles and tanks	By-Law N.1199 respecting Fire prevention.	Installation of propane bottles and tanks with a capacity of 100 lb and more, for gas supply equipment such as cooking appliances, heating, air conditioning and other.

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It is understood that Quest has in hand all permits necessary to conduct exploration and prefeasibility study work. Permits and approvals referenced in Table 20.3 will be sought once the project is released from the EIA process.

20.5 POTENTIAL ENVIRONMENTAL ISSUES THAT MAY AFFECT EXTRACTION OF MINERAL RESERVES

No potential environmental issues have been identified that may affect extraction of mineral reserves at Strange Lake and which cannot be mitigated through implementation of appropriate measures.

Nearby communities in the northern project area will need information on potential effects of project development on human and ecological health. A Human Health and Ecological Risk Assessment will be integrated as a discrete section within the EIA.

Québec Inuit have expressed interest in the possible impacts on water quality, given that Lac Brisson is part of the George River watershed where they fish, albeit over 100 km further north (downstream). Similar concerns can be expected from Québec NGOs, outfitters and other Aboriginal groups based south of the mine site.

In anticipation of the EIA, possible mitigation and compensation measures have also been identified to minimize the potential effects on rare plants, protected species, declining populations, such as the George River caribou herd, and valuable natural resources such as salmon/char in the Ikadlivik Brook valley.

Compensation for any unmitigated human impacts is assumed to be covered through the IBA process, or other suitable arrangement. However, the IBA only covers the key Aboriginal groups and does involve other stakeholders who may demand mitigation and compensation measures through the EIA process.

Certain mitigation measures may be implemented well before the EIA is complete. For example, archeological sites that cannot be avoided must be excavated prior to any ground disturbance during site preparation or construction.

An Environmental Management Plan (EMP) will be developed through the feasibility study phase of the project.

21.0 CAPITAL AND OPERATING COSTS

21.1 CAPITAL COSTS

One of the primary objectives of the PEA was to achieve a capital cost estimate with a target accuracy of between ±20% to ±35%, for the mine site, flotation plant, processing plant, separation plant, port site and access road, including indirect and owner's costs.

To achieve this objective, the majority of the direct capital cost items were estimated using engineering designs and costs available based on work Quest completed for the PFS. Available capital cost information was appropriately factored and adjusted to estimate the direct capital cost for the revised project plan and the PEA. For the mine, port, and access road, preliminary design information was used to develop material take offs which were priced at current day rates. There are no changes to the port and access road from what is presented in the PFS. . The indirect costs were calculated on the basis of conceptual methodology of executing the projects to estimate time and resources required, and vendor quotations. For some components, percentages were considered more appropriate and were based on experience.

The total estimated capital cost for the project in 2nd/3rd quarter 2013 is CAD$1,631 million including an itemized contingency applied to direct and indirect costs. Certain areas unchanged from the PFS retained the PFS contingency while new estimates for the PEA have a contingency of 25% applied. The separation plant has a contingency built into its estimate. A summary of the capital cost is included in Table 21.1.

Table 21.1
Summary of Capital Cost Estimate

Area	Capital Cost ($M)
Strange Lake Mine Site	201.0
Mine Access Road	228.3
Edward's Cove Port	52.8
Bécancour Process Plant	127.4
Bécancour Direct Precipitation	72.6
Bécancour Balance of Plant	88.6
Bécancour Residue Disposal Site	41.1
Becancour Separation / Refinery	190.4
Indirect Costs	407.0
Contingency	221.4
Total	**1,631.0**

21.1.1 Basis of Estimate

The capital cost estimate was prepared by Quest and Micon, primarily based on factorization of existing cost estimates (completed by AECOM, Hatch and SLR for Quest's 2013 PFS) to reflect the updated project scope. For the Direct Precipitation Plant, Quest developed flow sheets and an equipment list in house, and factored available cost information from work completed by Hatch in 2013 to develop an estimate. Micon prepared the mining capital cost estimate. The capital cost estimate included verification of quantities, unit prices, and selection of suppliers. The methodology used in the PFS estimate, from which the PEA estimate has been developed, is described as follows:

Three principal categories of cost are recognised: Direct Costs, Indirect/Owner's Costs and Contingencies.

21.1.1.1 Direct Costs

Direct costs are subdivided into installation, equipment, bulk materials, shop fabrication (where necessary) and sub-contractors.

Installation productivity was evaluated on the basis of man-hours. Labour rates were developed separately for job sites in the Provinces of Québec and Newfoundland and Labrador (NL), based on the respective collective agreements between unions and governmental organizations. Texas–Gulf productivity data was adjusted for local site conditions, with productivity factors evaluated for each crew.

For major permanent equipment and certain bulk materials, specifications and conceptual designs were developed and, where appropriate, the material take off (MTO) was prepared. In other cases, such as buildings, concrete, structural steel, architectural finishing, piping and fitting, wiring, cabling and instrumentation, where engineering development was not similarly advanced, parametric estimates or percentages and benchmarking was adopted.

Where possible, modularization of some concentrate unit processes, and building may be employed. Modules will be assembled in Québec or Maritimes, prior to their transport to site for installation. Modularization of camp accommodation buildings is reflected in Vendor quotations. Trade off studies of modular construction versus on site construction can be undertaken at the Feasibility stage.

Some project works will be realized as specialized subcontracts, such as dredging works, wharf and marine construction, soil stabilization (piling), etc. Subcontract costs were established on the basis of quoted unit rates, lump sum amounts, or historical data.

21.1.1.2 Indirect Costs

Indirect costs are those not directly associated with supply of the installation of permanent equipment or bulk material. Indirect/Owner's costs and contingency were estimated separately as elements of the work breakdown structure (WBS).

Table 21.2
Factors for Indirect Capital Cost

	% of Direct Costs
Engineering and engineering support	3.5
Project Management and Project Controls	1.5
Equipment procurement, installation and construction	1.0
Construction management	6.0

Construction camp facilities including bed and board (mess) services, community and recreational buildings on both the mine and port sites will be provided by Quest. Air tickets will be charged to contractors.

Construction equipment rental and operating costs were evaluated using statistics published by the respective governments of Québec and NL. For the mine, concentrator, road and port job sites the working week will be 60 hours, with rotation every four weeks on site and one week off site.

21.1.1.3 Owner's Costs

Owner's costs include fees, permitting, and insurances etc., estimated by Quest, together with Environmental Impact Assessment costs, IBA negotiation fees and environmental permitting, estimated by AECOM's Environmental.

Provision of first fills is based on estimated quantities and market price per unit. Spare parts assume the following percentages of permanent equipment supply costs: 1.5% for commissioning spares; 0.5% for first year of operation; and 2.5% for capital spares. Provision for spare parts on equipment employed in construction of the RSF is included in direct costs.

21.1.1.4 Capital Cost Contingency

A contingency allowance of 16% of the project costs, including the Separation Plant direct and indirect costs was calculated based on experience of similar studies, and allowances made during the estimation process.

21.1.2 Details of Estimate

21.1.2.1 Strange Lake Mine Site

Table 21.4 provides a breakdown of the capital costs estimate for the Strange Lake mine site.

Table 21.3
Summary of Mine Site Capital Cost Estimate

Area	Capital Cost ($M)
Site Preparation (Mining & Crushing)	0.2
Ore Stockpiles	5.6
Mine Infrastructure	1.2
Mining Equipment	12.7
Haul Roads	5.5
Crushing Plant	3.7
Grinding Plant	30.9
Ore Slurry Filtration	12.0
Flotation Plant	13.1
Office and Maintenance Buildings	37.7
Accommodation Camp	8.7
Strange Lake Services and Infrastructure	44.0
Airstrip	10.3
Residue Management	14.4
Environment	1.5
Total	**201.0**

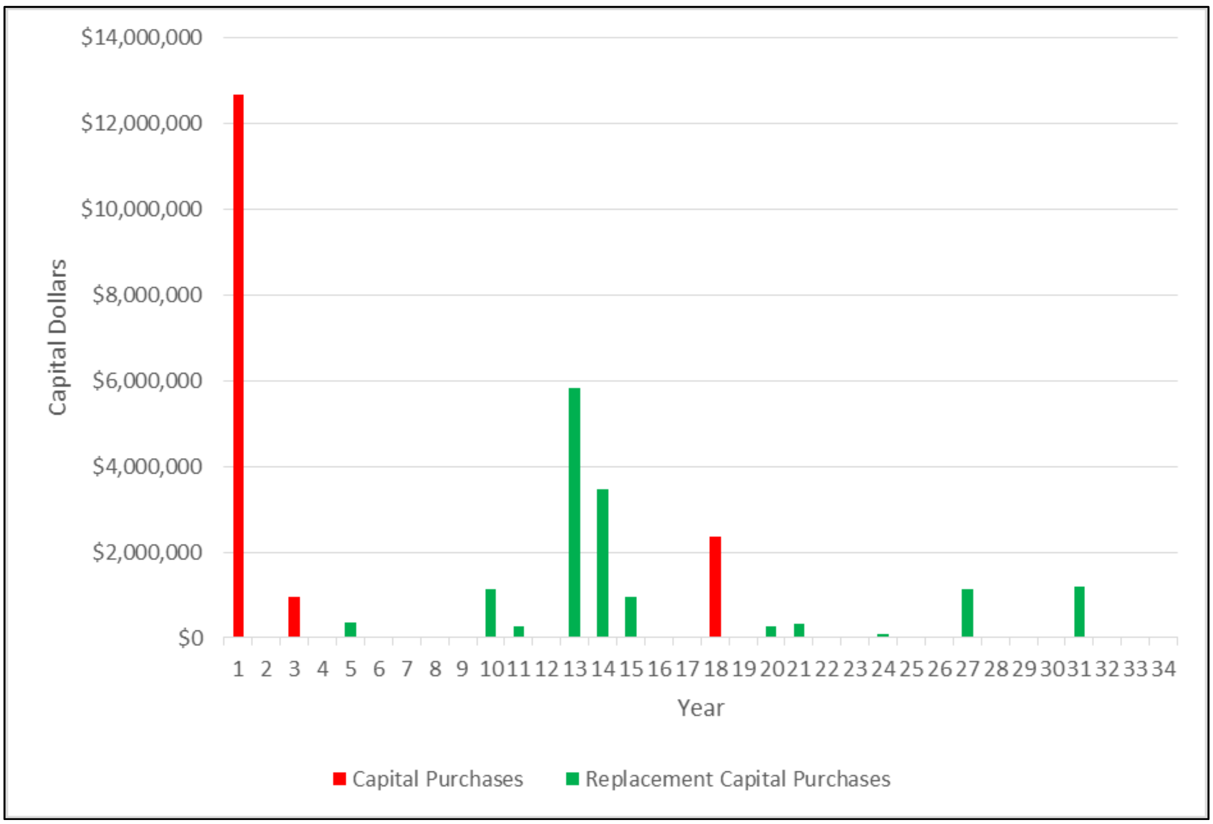
Initial mine capital costs are estimated at $12.7 million with additional new and replacement capital purchases throughout the life of the mine. The initial fleet summary and number of units required in each equipment class is summarized in Table 21.4. Figure 21.1 shows total capital and replacement capital purchases over the mine life. Total mine capital costs (initial) over the project are estimated at $16.0 million and mine replacement capital costs at $15.0 million. Total mine capital (initial and replacement) is estimated to be $31.0 million.

Table 21.4
Summary of Mine Capital Cost Estimate

Unit	Description	Year 1 Units	Cost ($)
773G	Haul Truck	6	5,824,000
990H	Wheel Loader	1	1,140,000
D25KS	Production Drill	1	1,210,000
824H	Wheel Dozer	1	699,000
D9T	Tracked Dozer	1	944,000
14M	Motor Grader	1	452,000
L20	Water Truck	1	283,000
329	Support Excavator	1	261,000
252B	Skidsteer Loader	1	65,000
Hydraulic Rock Breaker	Hydraulic Rock Breaker	1	92,000
Class 12,000L	Fuel/Lube Truck	1	318,000
Mechanics Truck	Mechanics Truck	1	289,000
Welding Truck	Welding Truck	1	79,000
Crane (25 Ton)	Crane (25 Ton)	1	136,000

Unit	Description	Year 1 Units	Cost ($)
Pick Up Trucks	Pick Up Trucks	5	235,000
Crew Vans	Crew Vans	2	114,000
Tractor/Trailer with 50t Lowboy	Tractor/Trailer with 50t Lowboy	1	210,000
Portable Light Towers	Portable Light Towers	5	76,000
Mine Planning/Survey Equipment	Mine Planning/Surveying Equipment	1	250,000
Total	**-**	**33**	**$12,677,000**

Figure 21.1
Capital and Replacement Capital Requirements



21.1.2.1 Mine Access Road

The estimated capital costs for the Strange Lake mine access road is given in Table 21.5.

Table 21.5
Summary of Mine Site Capital Cost Estimate

Area	Capital Cost ($M)
Plant Mobile Equipment	13.0
Access Road (NL)	184.5
Bridge No.1, KM (TBD)	2.3
Bridge No.2, KM (TBD)	1.2
Bridge No.3, KM (TBD)	1.2
Safety Shelters	0.5
Environmental Monitoring	3.6
Access Road (QC)	18.7
Environmental mitigation	3.2
Total	**228.3**

21.1.2.2 Edward's Cove

The estimated capital cost for the port facilities at Edward's Cove is detailed in Table 21.6.

Table 21.6
Summary of Port Capital Cost Estimate

Area	Capital Cost ($M)
Marine Works	25.3
Concentrate Handling	1.5
Fuel Handling	5.6
Buildings	2.9
Accommodation Camp	3.6
Services	6.3
Other Infrastructure	7.6
Environment	0.1
Total	**52.8**

21.1.2.3 Bécancour Processing Facility

Table 21.7 gives the estimated capital cost for the ore processing plant at Bécancour, including the solvent extraction plant.

Table 21.7
Summary of Process Plant Capital Cost Estimate

Area	Capital Cost ($M)
Ore, Lime and Sulphur Handling	12.9
Acid Baking	69.1
Leaching & Waste Treatment	30.5
Outside Pipe racks	14.7
Direct Precipitation Plant	72.6
Separation Plant	190.4
Site Works	27.8
Energy Supply	14.5
Services & Distribution	24.3
Buildings	19.0
Other Infrastructure	2.9
Total	**478.8**

21.1.2.4 Residue Management Facility

The capital cost estimate for the residue storage facility is given in Table 21.8.

Table 21.8
Summary of Residue Management Facility Capital Cost Estimate

Area	Capital Cost ($M)
Site Preparation	1.7
Residue Containment	11.6
Cement Handling	1.0
Residue Filtration	21.7
Run of Water Management	0.2
Environment	5.0
Total	**41.1**

21.1.2.5 Indirect and Owner’s Costs

Indirect and owner’s capital cost estimate is given in Table 21.9.

Table 21.9
Summary of Indirect and Owner’s Capital Cost Estimate

Area	Capital Cost ($M)
Owner's Team	67.4
Financing , Land & Royalties	9.0

Area	Capital Cost ($M)
Project Office Salaries & Fees - ECPM	89.7
Direct Precipitation Indirects	26.9
Separation Plant Indirects	70.5
Temporary Facilities	2.7
Site Operation & Maintenance	45.7
Supply, Equipment & communication	1.9
Construction Camps	46.2
Construction & Commissioning Support	6.0
Freight	41.0
Total	**407.0**

21.1.2.6 Capital Cost Contingency

A breakdown of the capital cost contingency is given in Table 21.10.

Table 21.10
Summary of Capital Cost Contingency

Area	Capital Cost ($M)
Mine Site and Edward’s Cove	101.3
Bécancour Site	120.1
Total	**221.4**

21.2 SUSTAINING CAPITAL COSTS

Sustaining capital is the investment required to maintain production at the planned level throughout the 30 year project life, as shown in Table 21.11.

Table 21.11
Life-of-mine Sustaining Capital

Area	Capital Cost ($M)
Strange Lake	134.2
Mine Access Road	73.8
Edward’s Cove	20.1
Bécancour Process Plant	55.8
Bécancour Direct Precipitation	41.8
Bécancour Balance of Plant	38.9
Bécancour RSF	84.1
Becancour Separation Plant	79.8
Total	**528.5**

The sum total of the sustaining capital is estimated at $529 M/y over the 30 year LOM. For assets other than mobile equipment, the sustaining capital is equivalent to approximately 32% of the cost of depreciation in a given year.

21.3 OPERATING COSTS

Table 21.12 shows a summary of the estimated LOM operating costs.

Table 21.12
Summary of Operating Cost Estimate

Area	LOM Operating Cost ($M)	Avg. Annual Cost ($M)	Unit Operating Cost ($/t milled)	Unit Operating Cost ($/t flotation concentrate)	Unit Operating Cost ($/t production)
Mining	654	21.8	14.18	38.38	2,092
Beneficiation	1,002	33.4	21.71	58.77	3,203
Concentrate transport	1,625	54.2	35.23	95.37	5,198
Processing	6,595	219.8	142.95	386.96	21,092
G&A (site costs)	315	10.5	6.84	18.50	1,009
Off-site costs	519	17.3	11.24	30.44	1,659
Total	**10,710**	**357**	**232.15**	**628.42**	**34,254**

The costs presented above include all on-site and off-site cash costs, but exclude post closure rehabilitation costs and non-cash depreciation charges.

21.3.1 Mining Operating Costs

Total mine operating costs for open pit operations are estimated at $6.45/t of material mined. Costs were estimated from first principles for the unit operations of drilling, blasting, loading, hauling, support and mine G&A as summarized in Table 21.13. Unit drilling and blasting costs are reported per tonne blasted; all other unit costs are expressed per tonne mined.

Table 21.13
Summary of Mining Operating Cost Estimate

Year	Drilling & Blasting	Load & Haul Support	Support	Mine G&A	Total Mine
1	$2.26	$2.30	$1.71	$1.65	$7.28
2	$2.27	$2.34	$1.71	$1.64	$7.31
3	$2.26	$2.57	$1.71	$1.63	$7.53
4	$2.01	$1.88	$1.71	$1.58	$7.02
5	$2.00	$1.82	$1.71	$1.59	$6.98
6	$1.98	$1.61	$1.71	$1.59	$6.79
7	$1.97	$1.59	$1.71	$1.59	$6.78
8	$1.98	$1.60	$1.71	$1.60	$6.79
9	$1.97	$1.57	$1.71	$1.63	$6.82
10	$1.99	$1.61	$1.71	$1.64	$6.84
11	$2.11	$1.76	$1.93	$1.83	$7.49
12	$2.10	$1.75	$1.93	$1.84	$7.49
13	$2.04	$1.66	$1.93	$1.82	$7.45
14	$2.04	$1.66	$1.93	$1.82	$7.46
15	$2.04	$1.69	$1.93	$1.82	$7.48
16	$2.04	$1.70	$1.93	$1.81	$7.49
17	$1.94	$1.59	$1.71	$1.61	$6.85
18	$1.90	$1.55	$1.35	$1.28	$6.08
19	$2.02	$1.70	$1.55	$1.46	$6.72
20	$1.97	$1.66	$1.47	$1.41	$6.51
21	$2.19	$1.93	$2.24	$2.07	$8.44
22	$2.58	$2.07	$3.06	$2.79	$10.50
23	$2.07	$1.81	$1.99	$1.86	$7.72
24	$1.74	$1.41	$2.12	$1.92	$7.16
25		$1.00	$1.36	$0.46	$4.32
26		$1.00	$1.36	$0.46	$4.32
27		$1.00	$1.36	$0.46	$4.32
28		$1.00	$1.36	$0.46	$4.32
29		$1.00	$1.36	$0.46	$4.32
30		$1.00	$1.36	$0.46	$4.32
Average	**$1.90**	**$1.57**	**$1.70**	**$1.36**	**$6.45**

21.3.2 Beneficiation Operating Costs

Beneficiation includes the costs for crushing, grinding, flotation and concentrate dewatering at the Strange Lake project site. Table 21.14 summarizes the estimated cost of beneficiation.

Table 21.14
Summary of Estimated Beneficiation Operating Costs

Cost Area	LOM Operating Cost ($M)	Avg. Annual Cost ($M)	Avg. Cost ($/t milled)	Avg. Cost ($/t flotation concentrate)	Avg. Cost ($/t production)
Crushing	66	2.2	1.43	3.87	211
Grinding	473	15.8	10.26	27.77	1,514
Thickening & filtration	144	4.8	3.11	8.42	459
Flotation	237	7.9	5.13	13.88	757
Maintenance	82	2.7	1.78	4.83	263
Total	**1,002**	**33.4**	**21.71**	**58.77**	**3,203**

21.3.3 Flotation Concentrate Transport Costs

Flotation concentrate transport costs include nine months per year operating cost of trucking concentrate 170 km from the Strange Lake mine site to the port at Edward's Cove using vehicles with a 90 Mt payload, including maintenance of the haul road, the cost of ship loading at Edward's Cove, marine transport to Bécancour, unloading at Bécancour and haulage to the process plant site. Table 21.15 summarizes the material transport operating cost estimate.

Table 21.15
Summary of Material Transport Operating Cost Estimate

Cost Area	LOM Operating Cost ($M)	Avg. Annual Cost ($M)	Unit Operating Cost ($/t milled)	Unit Operating Cost ($/t flotation concentrate)	Unit Operating Cost ($/t production)
Trucking to Edward's Cove	441	14.7	9.56	25.88	1,411
Port operations and shipping	1,034	34.5	22.42	60.69	3,308
Trucking from Bécancour to site	150	5	3.25	8.79	479
Total Transport	**1,625**	**54.2**	**35.23**	**95.37**	**5,198**

21.3.4 Process Operating Costs

Table 21.16 summarizes the estimated operating costs for the tailings management facility at Strange Lake, assay laboratory costs and the costs process the concentrate at Bécancour, including the costs for the rare earth separation facility.

Table 21.16
Summary of Process Operating Cost Estimate

Cost Area	LOM Operating Cost ($M)	Avg. Annual Cost ($M)	Unit Operating Cost ($/t milled)	Unit Operating Cost ($/t flotation concentrate)	Unit Operating Cost ($/t production)
Acid bake water leach (ABWL)	1,329	44.3	28.80	77.97	4,250
Tailings disposal	186	6.2	4.04	10.92	595
Assay laboratory	93	3.1	2.01	5.45	297
Subtotal Ore Preparation	**1,608**	**53.6**	**34.85**	**94.34**	**5,142**
Solution purification	672	22.4	14.57	39.43	2,149
Crude con. precipitation & releach	238	7.9	5.15	13.94	760
Oxalate precipitation and calcining	872	29.1	18.90	51.16	2,789
Effluent treatment	286	9.5	6.21	16.81	916
Utilities & reagents	51	1.7	1.11	3.01	164
Maintenance labour	212	7.1	4.60	12.46	679
Subtotal Direct Precipitation	**2,332**	**77.7**	**50.54**	**136.82**	**7,458**
Separation / Refining costs	2,655	88.5	57.55	155.80	8,492
Total Processing Costs	**6,595**	**219.8**	**142.95**	**386.96**	**21,092**

21.3.5 General and Administrative Operating Costs

Table 21.17 summarizes the estimated LOM general and administration (G&A) costs.

Table 21.17
Summary of G&A Operating Cost Estimate

Cost Area	LOM Operating Cost ($M)	Avg. Annual Cost ($M)	Unit Operating Cost ($/t milled)	Unit Operating Cost ($/t flotation concentrate)	Unit Operating Cost ($/t production)
Camps at mine and port sites	79	2.6	1.72	4.66	254
Air transport to camps	37	1.2	0.81	2.20	120
Environmental monitoring	11	0.4	0.23	0.63	34
Environmental management	63	2.1	1.36	3.67	200
Rehabilitation[1]	46	1.5	1.01	2.73	149
Building maintenance	25	0.8	0.54	1.46	80
Site G&A	54	1.8	1.17	3.16	172
Total G&A	**315**	**10.5**	**6.84**	**18.50**	**1,009**

[1]The rehabilitation costs exclude the estimated post production closure costs of $M138.4. However, these additional costs have been included in the PEA project economic model.

21.3.6 Off-Site Operating Costs

The estimated LOM product selling costs, including costs for shipping for final products, are summarized in Table 21.18.

Table 21.18
Summary of Off-Site Operating Cost Estimate

Cost Area	LOM Operating Cost ($M)	Avg. Annual Cost ($M)	Unit Operating Cost ($/t milled)	Unit Operating Cost ($/t flotation concentrate)	Unit Operating Cost ($/t production)
Shipping export costs	32	1.1	0.69	1.88	102
Salaries and services, etc.	333	11.1	7.22	19.53	1,065
Other overheads	154	5.1	3.34	9.03	492
Total	**519**	**17.3**	**11.24**	**30.44**	**1,659**

22.0 ECONOMIC ANALYSIS

This preliminary economic assessment is preliminary in nature; it includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the preliminary economic assessment will be realized.

22.1 ASSUMPTIONS

Assessment of the economic viability of the project, including testing of the sensitivity of returns to changes in key parameters, has been carried out using a discounted cash flow model. For the purposes of the evaluation, it has been assumed that the operations are established within a single corporate entity. The project has been evaluated on an unlevered, all-equity basis.

The model uses inputs from all elements of the project to provide a comprehensive financial projection for the entire project, on an annual basis over a 30-year operating life. All costs and revenues are expressed in constant, 2013 Canadian dollars. Where appropriate, an exchange rate of $1.05 per US dollar has been applied.

22.2 REE CONTENT, PRODUCTION, PRICE AND REVENUE

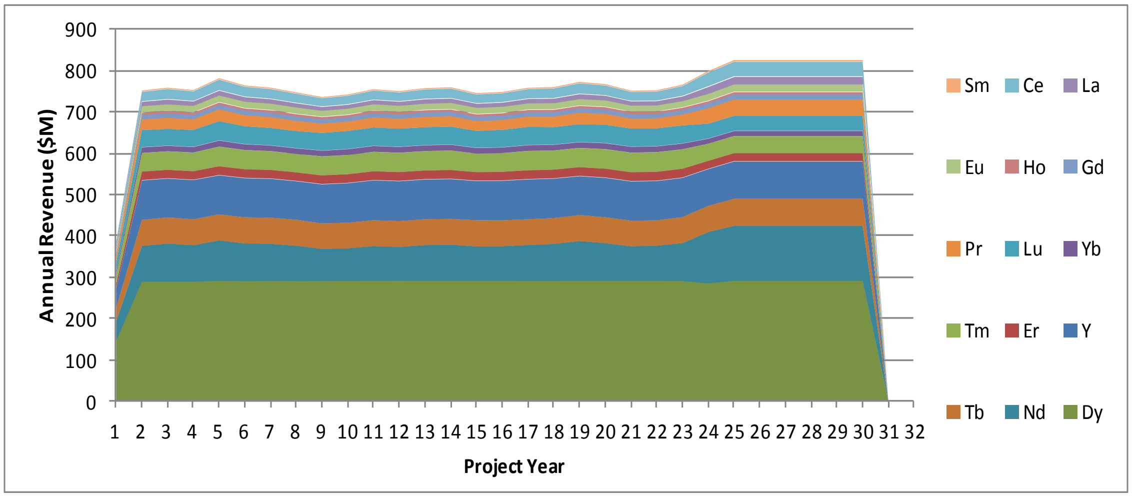
Table 22.1 lists the elements of value in the Strange Lake deposit, the annual average content of material processed (expressed as the mass of oxide), the average annual yield for the 30 year life of the mine, market price for the oxide and annual revenues.

Table 22.1
Annual Average Revenue by Element

Element (oxide)	Content (t/y)	Yield (t/y)	Yield (%)	Price (US$/kg)	Revenue ($M/y)	Percent of total
Dysprosium (Dy_2O_3)	713	419	58.8%	650	286	38
Neodymium (Nd_2O_3)	1,818	1,145	63.0%	80	96	13
Terbium (Tb_4O_7)	104	63	60.0%	950	62	8
Yttrium (Y_2O_3)	4,925	2,928	59.4%	30	92	12
Erbium (Er_2O_3)	506	277	54.7%	70	20	3
Thulium (Tm_2O_3)	81	42	52.1%	1,000	44	6
Ytterbium (Yb_2O_3)	516	250	48.4%	50	13	2
Lutetium (Lu_2O_3)	75	35	47.1%	1,100	41	5
Praseodymium (Pr_6O_{11})	519	331	63.7%	85	30	4
Gadolinium (Gd_2O_3)	458	283	61.7%	40	12	2
Holmium (Ho_2O_3)	160	92	57.3%	55	5	1
Europium (Eu_2O_3)	26	16	59.6%	1,000	17	2
Lanthanum (La_2O_3)	2,051	1,287	62.8%	9	12	2
Cerium (CeO_2)	4,713	2,975	63.1%	8	25	3
Samarium (Sm_2O_3)	465	281	61.6%	9	3	0
Total	**17,121**	**10,423**	**60.9%**		**758**	**100**

Figure 21.1 shows projected revenues over the LOM period.

Figure 22.1
Annual Revenues by Element

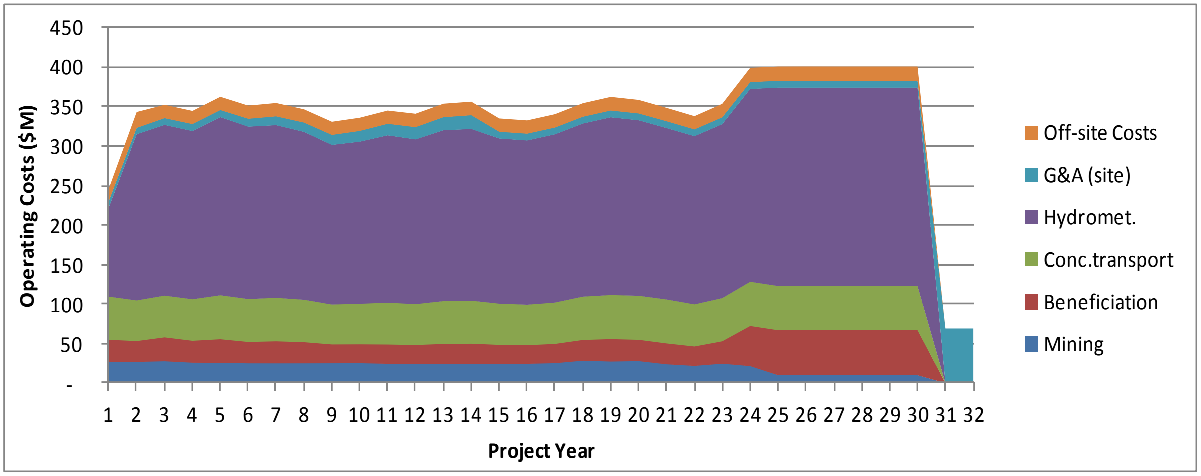


Over the life of the operation, 58% of REO production but just 22% of revenues derive from light rare earth metals. In contrast 42% of REO production but 78% of revenues derive from heavy rare earth metals.

22.3 OPERATING COSTS

Over the LOM period, cash operating costs average $232 per tonne milled ($617 per tonne of flotation concentrate), as described in Section 21.3, above. Figure 22.2 shows how these costs are distributed during each year of operation.

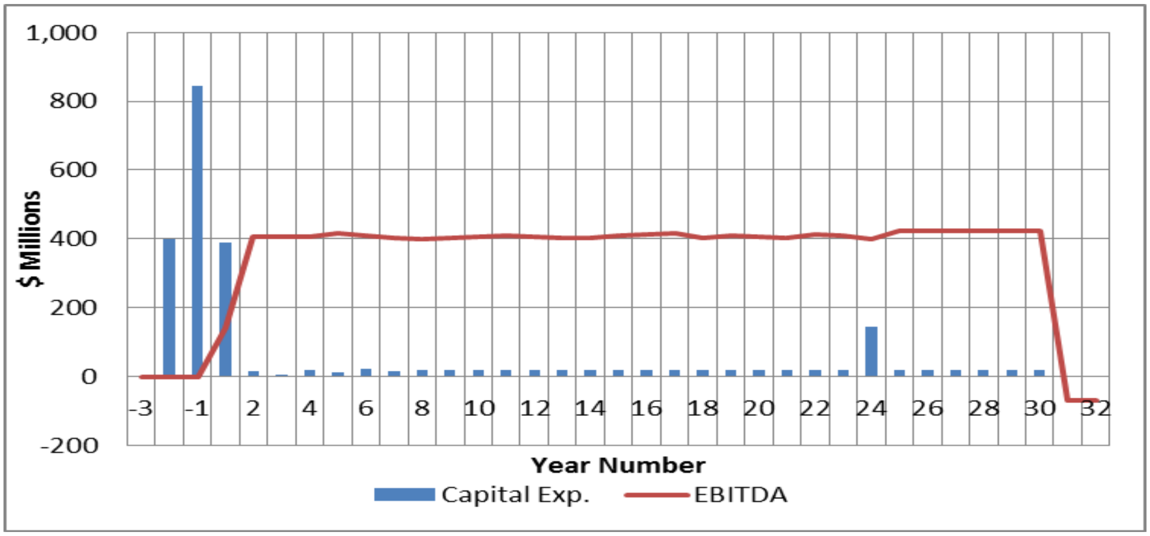
Figure 22.2
Operating Cost Breakdown



22.4 CAPITAL COSTS

Initial capital expenditures for the project take place over a three year period, totalling $1.631 billion as described in Section 21.1. Thereafter, sustaining capital expenditures are small in comparison to the cash generated by the operation, reflected in Figure 22.3 which shows earnings before interest, tax, depreciation and amortization (EBITDA) compared to capital expenditures over the LOM period.

Figure 22.3
Capital Cost Breakdown



It should be noted that most sustaining capital expenditure occurs after year 23 of the project and, as a result, the project returns are largely insensitive to changes in the level of sustaining capital.

22.5 WORKING CAPITAL

The working capital requirement is an estimate of the cash required to fund accounts receivable and inventories net of accounts payable.

Accounts receivable reflect the average time between shipping goods and receiving payment from them. This is assumed to be 40 days of sales. Accounts payable reflect the average time between receiving supplier's invoices and paying those invoices. The provision for accounts payable is equivalent to 40 days of cash operating costs.

Inventories consist of finished goods, flotation concentrate in transit, and supplies of input materials (e.g. reagents/chemicals, diesel fuel, cement) and work in progress (WIP). Finished goods inventory is the average amount of product waiting to be shipped to customers and/or in transit, if ownership has not yet transferred to a customer. Working capital also includes the cost of first fills.

Finished goods inventory is assumed to be 15 days of cost of goods sold. Flotation concentrate in transit is the average amount that is in transit and/or temporarily stockpiled between the Strange Lake mine area and the processing facilities at Bécancour. The processing plants will operate all year but trucking from the mine to the Labrador port occupies only 9 months of the year and marine transport from the Labrador port to Southern Québec only occurs for 6 months of the year. This means that, for example, at the end of the marine shipping season there needs to be at least a 7 months stockpile of concentrate in Southern Québec to supply the processing plants for operation over the winter. Consequently, on average there will be 180 days of concentrate in inventory. With respect to supplies of input materials and WIP, it is assumed that there is on average 30 days of such inventory.

The total working capital requirement averages $110M over the 30 year life of the project and peaks at just over $114M.

22.6 TAXATION

The LOM cash flow projection includes calculation of the following:

i) Federal Income Taxes at the rate of 15%
ii) Québec Income Taxes, at the rate of 11.9%
iii) Québec Mining Taxes the rate of which varies based on gross margin:
    - Gross margin (0-35%) - 16%
    - Gross margin (35-50%) - 22%
    - Gross margin (50-100%) - 28%)

The taxable income calculation for mining taxes includes a 20% Processing Allowance as well as a $5M Northern Allowance.

The computation of Federal and Provincial income taxes takes account of applicable Capital Cost Allowances (CCA) related to the initial and sustaining capital investment. The specific CCA classes differ depending on the type of asset.

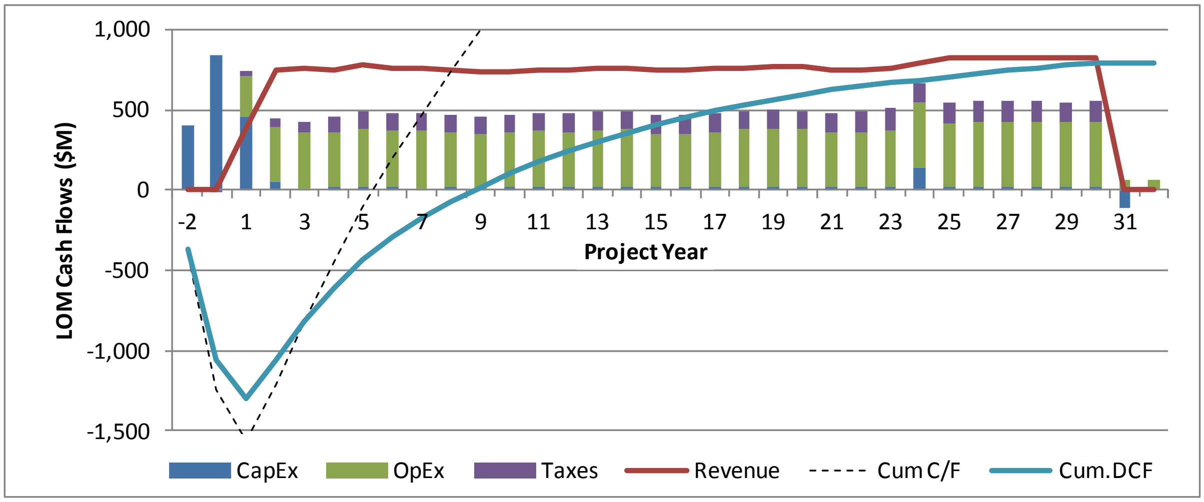
Provincial income tax also includes utilization of a tax holiday that is applicable for large (>$300M) investment projects in Québec. The tax holiday has a maximum benefit of 15% of eligible investment available where such investments exceed $300M. The tax holiday period is limited to 10 years. The eligible assets in this project are estimated to total $458M.

The average amount of all income and mining taxes payable annually over the 30 year LOM is estimated to be $112M, or an average of 34% of income before tax.

22.7 CASH FLOW PROJECTION

The project cash flow is summarized in Figure 22.4, and annual cash flows are detailed in Table 22.3 (over).

Figure 22.4
LOM Project Cash Flow



The net present value (NPV) over a range of discount rates, internal rate of return (IRR) and undiscounted payback of the base case cash flow are shown in Table 22.2.

Table 22.2
LOM Income Statement and Cash Flow

Discount Rate (%)	Pre-Tax NPV ($M)	After-tax NPV ($M)
8%	2,072	1,236
10%	**1,416**	**788**
12%	947	465
IRR (%)	20.1	16.7
Payback period (y)	5.0	5.3

Micon considers a discount rate of 10%/y to be appropriate for use as its base case for the purposes of conducting further analysis of project value.

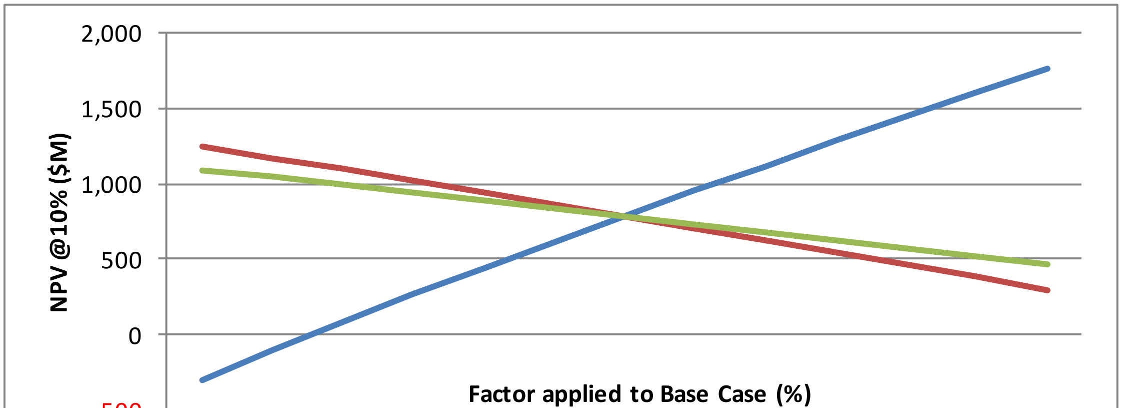
22.8 SENSITIVITY STUDY

Micon has tested the sensitivity of the project's after-tax NPV at an annual discount rate of 10% (NPV_{10}) to changes in the principal drivers of project value, over a range 30% above and below base case parameters. The results, shown in Figure 22.5 (over), demonstrate that after-tax NPV_{10} remains positive even with a 20% adverse change in project revenues, representing any combination of grade, yield, market prices and discount factors.

Table 22.3
LOM Income Statement and Cash Flow

Year relative to start of production	LOM Total	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Canadian $ (millions)																																			
Revenues	22,748.4	0.0	0.0	387.4	750.9	757.7	751.9	780.7	763.1	757.8	746.3	735.4	741.3	754.1	749.3	756.6	758.7	744.6	747.5	757.4	759.2	771.7	766.3	750.5	751.4	764.9	797.8	824.3	824.3	824.3	824.3	824.3	824.3	0.0	0.0
Mining	654.1	0.0	0.0	26.3	26.4	27.2	25.4	25.3	24.6	24.6	24.6	24.7	24.8	24.1	24.1	24.0	24.0	24.0	24.1	24.8	27.9	26.9	27.4	23.4	21.4	24.1	21.1	9.8	9.8	9.8	9.8	9.8	9.8	0.0	0.0
Beneficiation	1,001.6	0.0	0.0	28.3	26.6	30.5	28.0	30.1	27.3	28.2	27.0	24.1	24.1	24.6	24.0	25.4	25.7	24.2	23.8	24.6	26.5	28.7	27.3	26.6	24.8	28.6	50.9	56.9	56.9	56.9	56.9	56.9	56.9	0.0	0.0
Processing	1,607.9	0.0	0.0	28.2	50.4	52.2	51.7	55.1	53.5	54.6	53.1	49.5	50.4	52.1	51.5	54.2	54.5	51.9	50.9	52.2	55.0	56.1	56.0	55.8	53.2	54.9	58.3	58.8	58.8	58.8	58.8	58.8	58.8	0.0	0.0
Direct Precipitation	2,331.9	0.0	0.0	40.1	74.8	76.8	75.8	80.3	77.8	78.0	75.8	71.7	72.9	75.3	73.7	76.8	77.2	74.1	73.5	75.3	77.8	79.9	78.9	77.3	75.5	78.1	86.0	88.1	88.1	88.1	88.1	88.1	88.1	0.0	0.0
Hydromet. Separation	2,655.3	0.0	0.0	44.7	85.6	87.4	85.8	90.3	87.2	86.4	83.9	81.1	82.2	84.7	83.6	85.7	86.1	83.4	83.8	85.8	86.6	89.3	87.5	84.2	84.5	87.6	100.1	104.6	104.6	104.6	104.6	104.6	104.6	0.0	0.0
Transportation & Logistics	1,742.2	0.0	0.0	58.6	55.4	56.8	56.5	59.6	58.3	59.0	57.7	54.4	55.3	56.9	55.7	58.2	58.4	56.1	55.2	56.3	58.8	59.7	59.7	59.6	57.3	58.6	60.0	60.0	60.0	60.0	60.0	60.0	60.0	0.0	0.0
General & Administration	336.8	0.0	0.0	4.5	4.5	5.1	5.3	5.5	6.5	7.6	8.3	9.2	10.1	11.1	12.0	13.0	13.9	5.1	5.1	5.1	5.1	5.1	5.1	5.2	5.1	5.1	5.1	5.1	5.2	5.1	5.1	5.2	5.2	69.2	69.2
Depreciation	2,138.2	0.0	1.8	1.8	89.7	91.2	91.7	93.5	94.7	96.7	93.9	95.7	97.4	99.3	93.1	93.5	95.0	95.1	95.9	77.5	78.0	78.1	78.3	78.4	30.9	30.9	30.9	39.2	39.2	39.2	39.2	39.2	39.2	0.0	0.0
Cost of Goods Sold	12,468.1	0.0	1.8	232.5	413.4	427.2	420.2	439.7	429.9	435.0	424.3	410.4	417.2	428.1	417.7	430.7	434.7	413.9	412.2	401.6	415.8	423.8	420.3	410.6	352.7	367.9	412.5	422.6	422.7	422.6	422.6	422.6	422.6	69.2	69.2
Gross Margin	10,280.3	0.0	(1.8)	154.9	337.6	330.5	331.7	340.9	333.2	322.7	322.0	325.0	324.1	325.9	331.7	325.9	324.0	330.7	335.2	355.9	343.4	347.8	346.1	340.0	398.8	397.0	385.3	401.7	401.7	401.7	401.7	401.7	401.7	(69.2)	(69.2)
Gross Margin (%)				*40%*	*45%*	*44%*	*44%*	*44%*	*44%*	*43%*	*43%*	*44%*	*44%*	*43%*	*44%*	*43%*	*43%*	*44%*	*45%*	*47%*	*45%*	*45%*	*45%*	*45%*	*53%*	*52%*	*48%*	*49%*	*49%*	*49%*	*49%*	*49%*	*49%*		
Overhead Costs	518.8	0.0	0.0	15.9	20.2	16.9	16.7	16.9	16.7	16.9	16.9	16.7	16.8	16.8	17.0	17.2	17.2	16.9	16.9	17.0	17.2	17.3	17.2	17.0	16.8	17.2	18.2	18.1	18.1	18.1	18.1	18.1	18.1	0.0	0.0
EBIT	9,761.5	0.0	(1.8)	139.0	317.4	313.6	315.0	324.1	316.5	305.8	305.2	308.3	307.3	309.1	314.6	308.8	306.8	313.8	318.3	338.9	326.2	330.5	328.8	323.0	381.9	379.8	367.0	383.7	383.6	383.6	383.6	383.6	383.6	(69.2)	(69.2)
Tax	3,353.0	0.0	(0.5)	29.3	55.9	65.1	98.3	108.0	108.7	107.6	109.2	111.8	112.4	113.6	115.3	113.1	112.5	115.1	117.0	122.5	117.4	118.9	118.0	115.5	132.4	131.4	122.0	130.4	131.1	131.5	131.7	125.7	132.2	0.0	0.0
Net Income after Tax	6,408.4	0.0	(1.3)	109.7	261.5	248.4	216.7	216.1	207.7	198.2	196.0	196.5	195.0	195.5	199.4	195.7	194.3	198.7	201.4	216.4	208.8	211.7	210.8	207.5	249.5	248.4	245.1	253.3	252.5	252.2	252.0	258.0	251.4	(69.2)	(69.2)
Net Income % of revenues				*28%*	*35%*	*33%*	*29%*	*28%*	*27%*	*26%*	*26%*	*27%*	*26%*	*26%*	*27%*	*26%*	*26%*	*27%*	*27%*	*29%*	*28%*	*27%*	*28%*	*28%*	*33%*	*32%*	*31%*	*31%*	*31%*	*31%*	*31%*	*31%*	*30%*		
EBITDA	11,899.6	0.0	0.0	140.8	407.1	404.8	406.7	417.5	411.2	402.5	399.0	403.9	404.7	408.4	407.7	402.3	401.8	408.9	414.2	416.3	404.2	408.7	407.2	401.4	412.8	410.7	397.9	422.9	422.8	422.9	422.9	422.9	422.9	(69.2)	(69.2)
EBITDA (%)				*36%*	*54%*	*53%*	*54%*	*53%*	*54%*	*53%*	*53%*	*55%*	*55%*	*54%*	*54%*	*53%*	*53%*	*55%*	*55%*	*55%*	*53%*	*53%*	*53%*	*53%*	*55%*	*54%*	*50%*	*51%*	*51%*	*51%*	*51%*	*51%*	*51%*		
Proforma Statement of Cash Flow																																			
Year relative to start of production		**-2**	**-1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**
Net Income	6,408.4	0.0	(1.3)	109.7	261.5	248.4	216.7	216.1	207.7	198.2	196.0	196.5	195.0	195.5	199.4	195.7	194.3	198.7	201.4	216.4	208.8	211.7	210.8	207.5	249.5	248.4	245.1	253.3	252.5	252.2	252.0	258.0	251.4	(69.2)	(69.2)
Depreciation	2,138.2	0.0	1.8	1.8	89.7	91.2	91.7	93.5	94.7	96.7	93.9	95.7	97.4	99.3	93.1	93.5	95.0	95.1	95.9	77.5	78.0	78.1	78.3	78.4	30.9	30.9	30.9	39.2	39.2	39.2	39.2	39.2	39.2	0.0	0.0
Accrued income tax payable (recoverable)	54.8	0.0	(0.5)	28.9	53.9	59.8	79.5	46.1	25.8	(9.6)	(12.4)	(15.3)	(17.4)	(19.0)	(18.1)	(18.7)	(19.5)	(19.7)	(20.1)	(15.3)	(15.5)	(15.6)	(15.7)	(15.8)	(3.0)	(3.0)	1.2	2.1	0.2	(1.2)	(2.2)	20.5	(5.3)	0.0	0.0
Change in working capital	0.0	0.0	0.0	73.1	36.3	1.5	(1.3)	4.1	(2.5)	(0.4)	(1.6)	(2.3)	0.9	1.5	(1.0)	1.6	0.2	(1.6)	(0.1)	1.7	2.4	1.0	(0.2)	(3.2)	(1.7)	2.8	0.6	(2.6)	(0.0)	0.0	0.0	(0.0)	0.0	(109.3)	0.0
Capital Investments	2,284.4	398.8	842.6	389.7	14.9	5.1	17.9	11.6	20.8	14.2	17.9	17.6	18.6	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	144.4	19.5	19.5	19.5	19.5	19.5	19.5	0.0	0.0
Other Investing cashflows	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cash flow from operations	6,317.0	(398.8)	(842.6)	(322.3)	353.9	392.7	371.2	340.0	309.9	271.5	261.1	261.6	255.4	254.7	255.9	249.4	250.1	256.2	257.7	257.4	249.3	253.7	254.1	253.8	259.6	254.0	132.1	277.6	272.5	270.7	269.5	298.2	265.8	40.2	(69.2)
Net Operating Cash Flow before tax	9,615.3	(398.8)	(842.6)	(321.9)	355.9	398.1	390.0	401.9	392.8	388.7	382.8	388.7	385.2	387.3	389.2	381.2	382.0	391.1	394.8	395.1	382.2	388.1	387.8	385.1	395.0	388.5	252.9	406.0	403.3	403.4	403.4	403.4	403.4	40.2	(69.2)
Net Operating Cash Flow after tax	6,317.0	(398.8)	(842.6)	(322.3)	353.9	392.7	371.2	340.0	309.9	271.5	261.1	261.6	255.4	254.7	255.9	249.4	250.1	256.2	257.7	257.4	249.3	253.7	254.1	253.8	259.6	254.0	132.1	277.6	272.5	270.7	269.5	298.2	265.8	40.2	(69.2)

Figure 22.5
Sensitivity Study Results



	70%	75%	80%	85%	90%	95%	100%	105%	110%	115%	120%	125%	130%
Prices	-297	-98	88	268	443	617	788	955	1,120	1,283	1,445	1,606	1,766
Opex	1,248	1,173	1,097	1,021	944	867	788	708	626	545	463	380	297
Capex	1,093	1,043	993	942	892	840	788	735	682	627	573	518	463

The project is significantly less sensitive to changes in operating and capital costs, with a 30% adverse change reducing NPV_{10} by approximately 62% and 41%, respectively.

22.9 CONCLUSION

Micon concludes that the project base case cash flow and sensitivity studies demonstrate that the project has potential to provide positive economic returns and is sufficiently robust to withstand adverse changes in the tested parameters over the expected range of accuracy of the PEA.

23.0 ADJACENT PROPERTIES

Micon has not verified the information regarding adjacent properties and has not visited them or audited them. The information contained in this section of the report is not necessarily indicative of the mineralization at the Strange Lake Project. The information was taken from the December, 2012 Micon Technical Report (Wardrop, 2011) and updated for any areas where new information was available for the adjacent properties. The information for this section was generally provided by Quest.

There are no significant mineral occurrences adjacent to the Strange Lake property. However, a significant proportion of the Main Zone deposit is situated across the Québec border in the 'exempt mineral lands (EML)' in Newfoundland and Labrador and as such cannot be staked. While this portion of the Main Zone that is contained in the EML in Newfoundland and Labrador could be considered to be a significant mineral occurrence adjacent to the Quest ground, until permission is obtained to stake this area, the remaining portion of the Main Zone mineralization is considered secondary importance to the mineralization occurrence identified at B Zone.

Midland Exploration Inc., a Montreal-based mineral exploration company, holds the mineral rights to a block of mineral claims (Ytterby 1) adjacent to the south of the property and is located approximately 5 km south of the B Zone deposit. The northernmost extent of the Ytterby 1 block of claims is south of the southern margin of the SLAC, located on the eastern margin of the Nepeau Kainiut pluton. To date, there has been no significant REE mineralized discovered on the Ytterby 1 claims, however, Québec Ministry of Natural Resources and Wildlife (MRNF) regional lake sediment sampling have found elevated La and Y values.

Hinterland Resources Ltd. (Hinterland) holds the mineral rights to one of four mineral claims adjacent to the northwest of Quest's mineral claims. Hinterland has completed a data compilation of the area and proposed an airborne geophysical survey in 2011.

24.0 OTHER RELEVANT DATA AND INFORMATION

24.1 PROJECT EXECUTION PLAN

The project execution plan (PEP) designed during the PFS described in the December 2013 report has been updated by Quest to address the implementation strategies and approach for executing the Strange Lake Project and will be used to guide the project development team through the subsequent feasibility study and project implementation phases.

The feasibility study will build on the PEA in order to define any technical issues and to increase the reliability of all elements of the cost estimates to a range of ±15%.

24.1.1 Project Development Schedule

Quest has set out the following milestones and dates for the development schedule for the Strange Lake Project. It can be seen that, within the overall project development schedule, the schedule for submission of documentation relating to the EIA and the receipt of approval of the EIA are critical to the start of construction in January, 2017.

Submission of EIA project description	:	September, 2014
Start feasibility study	:	October, 2014
Start detailed design and engineering	:	January, 2015
Submission of EIA report	:	Nov, 2015
Approval of EIA	:	December, 2016
Delivery of construction permits	:	January, 2017
Start of construction	:	January, 2017
First concentrate shipment	:	April, 2019
Bécancour plant start-up	:	May, 2019

24.2 RISK REGISTER

A project risk register was developed during the PFS (December, 2013) to assess risks and develop management or mitigation measures for the project. The critical risk items identified, which had assigned preventive and mitigation measures, include the following:

- Public concern over carbon footprint, radioactivity.
- Delays to IBA negotiations beyond dates required by EIA/permitting.
- Delay to approval of EIA.
- Inability to secure land rights for mining, road to port, port access.
- Impact on capital and operating costs of major changes to design due to scaling from mini-pilot/laboratory to commercial scale.

- Occupational exposure of workers to dust (Be, asbestiform minerals, uranium, radon).
- Dust from the TSF and RSF due to radioactive content.
- Impact on recovery and operating costs of material changes to the process design criteria due to unexpected test results from flotation testing of variable ore types, acid recycle efficiency at design temperatures tests and REO separation tests.
- Impact of discharging treated water to the environment at Bécancour.

It was noted that the minority one of these identified critical risk factors relate to strictly technical issues, the remainder generally relate to environmental and/or social issues. Risks to project development associated with exposure to radioactive elements are likely to have greater impact on project activities in southern Québec.

The risk register will be updated during the feasibility study stage which will allow preventive and mitigation measures to be identified in greater detail.

25.0 INTERPRETATION AND CONCLUSIONS

The PEA has been completed to evaluate the potential economic and technical benefits of significant changes to the mining and processing aspects of the Project originally outlined in a prefeasibility study (PFS), the results of which were published in a NI 43-101 Technical Report dated 6 December, 2013 (Micon, 2013). By definition, the PEA can only indicate the potential viability of mineral resources and cannot be used to support mineral reserves.

A PEA for the Strange Lake Project, which is based on the mining and beneficiation of a REE-rich deposit at Strange Lake in northern Québec and processing at a facility at Bécancour in southern Québec, will recover individual pure rare earth oxides.

Table 25.1 presents the key project economic parameters, based on 100% equity financing.

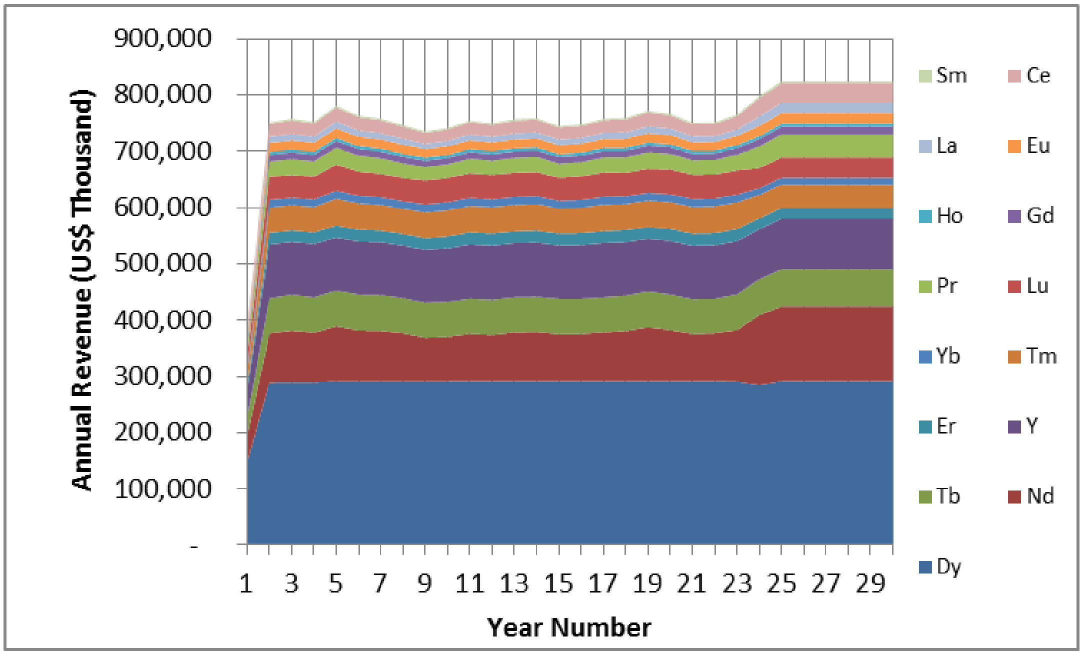
Table 25.1
Key Project Parameters

Parameter	Units	Quantity
Pre-tax economics		
IRR	%	20.1
NPV_{10}	$ million	1,416
Payback period	y	5.0
After-tax economics		
IRR	%	16.7
NPV_{10}	$ million	1,236
Payback period	y	5.3
Mining		
Average mining rate (years 1 to 23)	Mt	3.354
Production rate (years 1 to 23)	Mt/y plant feed	1.045
Mine production life	y	30
Total revenue	**$ million/y**	**758**
Operating costs	**$ million/y**	**357**
Unit operating cost	**$/t milled**	**232**

Annual revenues by element through the life of the project are shown in Figure 25.1 which demonstrates how the project focuses on producing a relatively constant supply of individual rare earth products throughout the mine life.

It is noted that the inclusion of the rare earth separation plant provides a significant boost to the revenue stream compared to previous technical studies completed on the Strange Lake Project. The assumptions used in the PEA regarding recoveries and costs of the separation plant are based on information gleaned from comparable operating facilities and will need to be verified during the next phase of project development.

Figure 25.1
Annual Revenues by Element



Micon has tested the sensitivity of the project after-tax NPV at an annual discount rate of 10% to changes in the principal drivers of project value over a range of 30% above and below base case parameters. The results demonstrate that after-tax NPV_{10} remains positive even with a 20% adverse change in project revenues, representing any combination of grade, yield, market prices and discount factors.

25.1 METALLURGICAL TESTWORK

Development testwork that was used to define the PEA flowsheet was mainly undertaken at SGS, Lakefield, Ontario. These testwork programs used representative mineralized samples from the Strange Lake B Zone deposit.

The PEA flowsheet comprises crushing, grinding, flotation and acid thermal processing (acid bake) and water leach to extract the payable metals into solution. The PLS will be partially neutralized to precipitate low levels of residual impurities, before further neutralization to produce a crude rare earth concentrate. The crude concentrate will be re-leached and the rare earths re-precipitated and finally calcined to produce a mixed rare earth oxide feed to rare earth separation. In the separation plant, the mixed rare earth oxide will be digested, and individual rare earths selectively recovered and precipitated. The purified rare earth solids produced in the separation plant will be calcined to produce the final separated rare earth oxide products.

25.2 MINERAL RESERVE ESTIMATE

There is no mineral reserve. The PEA can only indicate the potential viability of mineral resources and cannot be used to support mineral reserves.

25.3 MINING

A conventional open pit mining operation is proposed for the extraction of mineralized material from the B Zone rare earth element mineral deposit for the Strange Lake Project.

Mining will be undertaken by Quest using its own equipment and workforce. Specialized contractors will be used for the initial site clearing and initial haul road construction in preparation for the mining equipment fleet. Explosives, blasting agents, fuel and other consumables will be sourced from established suppliers.

Over the 30-y mine life, an estimated 4.77 Mt of overburden will be removed from the pit area. Total mineralized material mined is estimated at 46.1 Mt. Total waste rock placed in the waste stockpile is estimated to be 15.79 Mt.

In order to avoid the worst winter weather, the mine will be operated on a nine-month (270-day) basis. During this time period, the mine will operate two 12 h shifts, 7 d/w.

25.4 PROCESSING

Average annual feed to the beneficiation plant situated at the mine site for the first 23 years will be 1.059 Mt. This plant will be expanded to handle 3.17 Mt in year 24 to the end of the mine life.

Flotation concentrate will be transported to the Strange Lake processing facility located at Bécancour, southern Québec. This facility is designed to produce separated rare earth oxide products.

The design Bécancour process plant throughput is 610 t/d of concentrate and the LOM average annual production rate is 10,423 tonnes of rare earth oxide products.

25.5 INFRASTRUCTURE

The Strange Lake project will be supported by infrastructure required for the mining and beneficiation operation at mine site, the trucking of concentrate to a shipping facility at Edward's Cove on the Labrador coast, shipment of concentrate by sea to the processing facilities at Bécancour in southern Québec, unloading facilities at Bécancour and all supporting infrastructure at the Bécancour site.

Disposal of processing waste will take place in an engineered tailings management facility at the mine site and the residue management facility at the Bécancour site.

25.6 MARKETING AND CONTRACTS

Quest and its specialist retained consultants have undertaken analysis of markets for rare earth elements and yttrium to provide input to the economic analysis of the Strange Lake project.

In July, 2013, Quest announced the signing of a non-binding letter of intent with TAM Ceramics Group of New York, LLC (TAM), under which TAM intends to purchase 100% of zirconium basic sulphate (ZBS) which, at the time, was envisaged would be produced from the Strange Lake project. Due to the change in the processing flowsheet, ZBS will not be produced and the letter of intent will be allowed to expire at the end of 2014.

Quest is pursuing opportunities for strategic alliances, tolling and off-take agreements.

At the time of writing, there are no other contracts or agreements in place.

25.7 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

Environmental work is being carried out with support from local Aboriginal partners and regional service providers to the greatest extent possible.

Quest reports that work on the Environmental Impact Assessment (EIA) for all project components will start early in 2014, following submission of a project description to the relevant government authorities. EIAs may be triggered in four jurisdictions: two in Québec (north and south), Newfoundland and Labrador (provincial and Nunatsiavut), and one with the federal government. Assuming some degree of harmonization between jurisdictions, the EIA studies and associated public consultations are expected to take approximately two years to complete. The EIA would be followed by a period of up to six months in which to obtain necessary environmental approvals prior to initiating construction.

Appropriate mitigation and monitoring plans are being considered by the project team to address unavoidable environmental impact of mining, including possible compensation scenarios for any net wildlife habitat loss and project closure reclamation.

It is understood that Quest has in hand all permits necessary to conduct exploration and prefeasibility study work. Permits and approvals will be sought once the project is released from the EIA process.

No potential environmental issues have been identified that may affect extraction of mineral reserves at Strange Lake and which cannot be mitigated through implementation of appropriate measure.

25.8 CAPITAL AND OPERATING COSTS

25.8.1 Capital Costs

One of the primary objectives of the PEA was to achieve a capital cost estimate with a target accuracy of between ±20% and ±35%, for the mine site, Bécancour processing plant, port site and access road, including indirect and Owner’s costs.

Where possible, the direct capital cost was estimated by factorizing the estimates produced during the PFS. For new items, such as the flotation plant and rare earth separation refinery, the capital costs were estimated to a PEA level of accuracy. The indirect cost was calculated using the same methodology as the PFS and applying percentages where considered more appropriate. These were based on experience. The total estimated pre-production capital cost for the project in 4th quarter 2013 Canadian dollars is $1.631 million.

25.8.2 Operating Costs

Operating costs were estimated from first principals. The costs include all on-site and off-site cash costs, but exclude non-cash depreciation charges and any net cost associated with compliance to the terms of an IBA.

The average annual operating costs have been estimated at $357 million, equivalent to $232/t of material milled, $628/t of flotation concentrate or $34,254/t of rare earth oxide produced.

25.9 ECONOMIC ANALYSIS

Micon has prepared its economic assessment of the Strange Lake project based on discounted cash flow analysis from which NPV, IRR, payback and other economic parameters can be determined.

Micon concludes that the project base case cash flow and sensitivity studies demonstrate that the project has the potential to provide positive economic returns and is sufficiently robust to withstand adverse changes in the tested parameters over the expected range of accuracy of the prefeasibility study.

25.10 OTHER RELEVANT DATA AND INFORMATION

25.10.1 Project Development Schedule

Quest has set out the following milestones and dates for the development schedule for the Strange Lake Project. It can be seen that, within the overall project development schedule, the schedule for submission of documentation relating to the EIA and the receipt of approval of the EIA are critical to the start of construction in January, 2017.

Submission of EIA project description	:	September, 2014
Start feasibility study	:	October, 2014
Start detailed design and engineering	:	January, 2015
Submission of EIA report	:	Nov, 2015
Approval of EIA	:	December, 2016
Delivery of construction permits	:	January, 2017
Start of construction	:	January, 2017
First concentrate shipment	:	April, 2019
Bécancour plant start-up	:	May, 2019

25.10.2 Risk Register

A project risk register was developed during the PFS (December, 2013) to assess risks and develop management or mitigation measures for the project. The critical risk items identified, which had assigned preventive and mitigation measures, include the following:

- Public concern over carbon footprint, radioactivity.
- Delays to IBA negotiations beyond dates required by EIA/permitting.
- Delay to approval of EIA.
- Inability to secure land rights for mining, road to port, port access.
- Impact on capital and operating costs of major changes to design due to scaling from mini-pilot/laboratory to commercial scale.
- Occupational exposure of workers to dust (Be, asbestiform minerals, uranium, radon).
- Dust from the TSF and RSF due to radioactive content.
- Impact on recovery and operating costs of material changes to the process design criteria due to unexpected test results from flotation testing of variable ore types, acid recycle efficiency at design temperatures tests and REO separation tests.
- Impact of discharging treated water to the environment at Bécancour.

It was noted that the minority one of these identified critical risk factors relate to strictly technical issues, the remainder generally relate to environmental and/or social issues. Risks to project development associated with exposure to radioactive elements are likely to have greater impact on project activities in southern Québec.

26.0 RECOMMENDATIONS

The PEA study shows that for the selected base case the Project has the potential to provide positive economic returns and is sufficiently robust to withstand adverse changes in the tested parameters over the expected range of accuracy of the study. It is Micon's recommendation that the project development continues towards the feasibility level, which includes work necessary to optimize and define each area and the work required to prepare capital and operating cost estimates with an accuracy of +/-15%.

It is also recommended that the work required to advance the project approval process continue. This includes fieldwork and studies associated with the environmental impact assessments (EIA) for various jurisdictions, environmental authorizations, permits and licences, non-environmental permitting; and community relations.

26.1 GEOLOGY AND RESOURCES

No additional drilling resource definition drilling is recommended. The current indicated mineral resource is of sufficient quality to support the PEA and feasibility studies.

The high nugget effect in the lenses and the shape and distribution between sections of both the pegmatite and granite lithologies do not allow for separate interpretation on the current 50 m centered drilling. It is Micon's opinion that closer spaced drilling will not necessarily improve the confidence of the current mineral classification from an indicated to a measured category without drilling on such closed spaced centres as to be cost prohibitive.

Micon recommends that the current mineral resource estimate be reviewed for the feasibility study to confirm that the updated economic and other NSR cut-off parameters will not materially affect the estimate.

26.2 MINING

It is recommended that the mine design and associated cost estimates be reviewed, optimized and updated to a feasibility level of study.

26.3 METALLURGY AND PROCESS ENGINEERING

It is recommended to continue with the metallurgical mini pilot plant testwork and to initiate the integrated pilot/demonstration scale testwork program which will simulate continuous operations of the process to confirm process design criteria, effectiveness and efficiencies of unit operations and to identify deportment of impurities and their effects on the various product qualities.

It is recommended to continue with the ongoing program of field work to further define engineering design parameters, geotechnical and complementary environmental studies data subject to EIA terms of reference and normal permitting processes (including any related environmental monitoring).

In addition to the process pilot plant studies, it is recommended to undertake the following metallurgical/process related optimization studies:

- A detailed surge capacity analysis to optimize the number and location of surge volumes linking process areas together in order to minimise knock-on effects of upset conditions in one area on another.

- An energy recovery trade-off study to explore further opportunities for heat recovery within the Bécancour process plant including a steam generation strategy study.

- Protection against beryllium dust exposure in the workplace.

- Benefits of using super heat steam drying the filter cake prior to the acid baking kiln.

26.4 INFRASTRUCTURE

The following infrastructure related items are recommended:

- Review and design optimization of access roads.
- Port groundwater risk potential assessment study.
- Process plant water supply assessment with SPIPB and laboratory optimization.

26.5 TAILINGS AND RESIDUE MANAGEMENT FACILITIES

The design of the TMF and RMF should be further developed during and subsequent to the feasibility study. Additional studies will be necessary to confirm the proposed tailings/residues management plan and to refine the design and operational procedures, as necessary.

26.6 MARKETING

It is recommended that Quest continues to:

- Undertake analysis of the markets for rare earths and yttrium.
- Negotiate with potential off-takers, strategic partners and providers of tolling services.

26.7 BUDGET FOR ONGOING WORK

As shown in Table 26.1, Quest has budgeted a total of $14.30 million for work on the Strange Lake Project to the end of 2014 by which time results of pilot plant studies will have been generated, substantial work on the EIA will have been completed. This will allow the company to determine details for the project feasibility study.

Table 26.1
Budget for Ongoing Work

Description	**$M**
Project optimization	5.0
Integrated pilot plant and demonstration plants	7.7
EIA	0.9
Project management team	0.7
Total	**14.3**

Micon has reviewed the proposed budget and considers that it is reasonable and appropriate.

27.0 DATE AND SIGNATURE PAGE

"William J. Lewis" *{signed and sealed}*

William J. Lewis, B.Sc., P.Geo.
Senior Geologist, Micon International Limited Report Date: April 9, 2014

"R.V. Zalnieriunas" *{signed and sealed}*

R.V. Zalnieriunas, P.Geo.
Principal Geologist, R.V. Zalnieriunas Consulting Report Date: April 9, 2014

"Richard Gowans" {signed and sealed}

Richard Gowans, P.Eng.
President, Principal Metallurgist, Micon International Limited Report Date: April 9, 2014

"Sam Shoemaker" *{Signed and sealed}*

Sam J. Shoemaker, Jr., Reg.Mem.SME
Senior Mining Engineer, Barr Engineering Company Report Date: April 9, 2014

"Jane Spooner" *{Signed and sealed}*

Jane Spooner, P.Geo.
Vice President, Micon International Limited Report Date: April 9, 2014

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29.0 CERTIFICATES

CERTIFICATE OF AUTHOR

Richard Gowans

As the co-author of this report entitled "NI 43-101 Technical Report, Pre-feasibility Study for the Strange Lake Project, Québec, Canada", with an effective date of April 9, 2014 (the "Technical Report"), I, Richard Gowans do hereby certify that:

1) I am employed by, and carried out this assignment for Micon International Limited, Suite 900, 390 Bay Street Toronto, Ontario, M5H 2Y2 tel. (416) 362-5135 fax (416) 362-5763 e-mail: rgowans@micon-international.com

2) I hold the following academic qualifications:

   B.Sc. (Hons) Minerals Engineering, The University of Birmingham, U.K., 1980

3) I am a registered Professional Engineer of Ontario (membership number 90529389); as well, I am a member in good standing of the Canadian Institute of Mining, Metallurgy and Petroleum.

4) I have worked as an extractive metallurgist in the minerals industry for over 30 years.

5) I do, by reason of education, experience and professional registration, fulfill the requirements of a Qualified Person as defined in NI 43-101. My work experience includes the management of technical studies and design of numerous metallurgical testwork programs and metallurgical processing plants.

6) I have not visited the project site.

7) I am responsible for the preparation of Sections 1, 2, 3, 13, 17, 18.1, 18.2, 20, 21, 22, 24, 25 and 26 of this report.

8) I am independent of Quest Rare Minerals Limited, as defined in Section 1.5 of NI 43-101.

9) I was a co-author of the Technical Report for Quest entitled "Technical Report for the Strange Lake B Zone Rare Earth Element (REE) Deposit, Updated Mineral Resource Estimate, Province of Quebec (Quebec), Canada" dated December 14, 2012, and the Technical Report entitled "NI 43-101 Technical Report On The Pre-Feasibility Study For The Strange Lake Property Quebec, Canada", dated December 6, 2013

10) I have read NI 43-101 and the portions of this report for which I am responsible have been prepared in compliance with the instrument.

11) As of the date of this certificate, to the best of my knowledge, information and belief, the sections of this Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make this report not misleading.

Report dated this 9th day of April, 2014.

"Richard Gowans" {signed and sealed}

Richard Gowans, P.Eng.
President, Micon International Limited

CERTIFICATE OF AUTHOR

William J. Lewis

As the co-author of this report entitled "NI 43-101 Technical Report, Pre-feasibility Study for the Strange Lake Project, Québec, Canada", with an effective date of April 9, 2014 (the "Technical Report"), I, William J. Lewis do hereby certify that:

1) I am employed as a Senior Geologist by, and carried out this assignment for, Micon International Limited, Suite 900, 390 Bay Street, Toronto, Ontario M5H 2Y2, tel. (416) 362-5135, fax (416) 362-5763, e-mail wlewis@micon-international.com;

2) I hold the following academic qualifications: B.Sc. (Geology) University of British Columbia, 1985

3) I am a registered Professional Geoscientist with the Association of Professional Engineers and Geoscientists of Manitoba (membership # 20480); as well, I am a member in good standing of several other technical associations and societies, including:

   - Association of Professional Engineers and Geoscientists of British Columbia (Membership # 20333).
   - Association of Professional Engineers, Geologists and Geophysicists of the Northwest Territories (Membership # 1450).
   - Association of Professional Geoscientists of Ontario (Membership # 1522).
   - The Geological Association of Canada (Associate Member # A5975).
   - The Canadian Institute of Mining, Metallurgy and Petroleum (Member # 94758).
   - Quebec Temporary Certificate Number 224

4) I have worked as a geologist in the minerals industry for 28 years;

5) I am familiar with NI 43-101 and, by reason of education, experience and professional registration, I fulfill the requirements of a Qualified Person as defined in NI 43-101. My work experience includes 4 years as an exploration geologist looking for gold and base metal deposits, more than 11 years as a mine geologist in underground mines and 3 years as a surficial geologist and 10 years as a consulting geologist on precious and base metals and industrial minerals;

6) I visited the Strange Lake Project between March 26 and 29, 2012;

7) I was a co-author of the Technical Report for Quest entitled "Technical Report for the Strange Lake B Zone Rare Earth Element (REE) Deposit, Updated Mineral Resource Estimate, Province of Quebec (Quebec), Canada" dated December 14, 2012, and the Technical Report entitled "NI 43-101 Technical Report On The Pre-Feasibility Study For The Strange Lake Property Quebec, Canada", dated December 6, 2013

8) As of the date of this certificate to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make this report not misleading;

9) I have read the NI 43-101 Instrument and this Technical Report has been prepared in compliance with this Instrument;

10) I am independent of Quest Rare Minerals Ltd., as defined by Canadian NI 43-101 regulations and have provided consulting services to the companies.;

11) I supervised the work conducted by Jonathan Steedman on the updated mineral resource estimate for the B Zone contained in this report with an effective date of August 31, 2012 and therefore take responsibility for this work.

12) I am responsible for Sections 4 through 10, 12.1, 14 and 23 of this Technical Report.

Report dated this 9th day of April, 2014.

"William J. Lewis" {signed and sealed}

William J. Lewis, B.Sc., P.Geo.
Senior Geologist, Micon International Limited

CERTIFICATE OF AUTHOR

Sam Shoemaker, Jr., Reg.Mem.SME

As the co-author of this report entitled "NI 43-101 Technical Report, Pre-feasibility Study for the Strange Lake Project, Québec, Canada", with an effective date of April 9, 2014 (the "Technical Report"), I, Sam Shoemaker, do hereby certify that:

1. I am employed by Barr Engineering Company, 4700 West 77th Street, Minneapolis MN 55435 USA, and carried out this for Micon International Limited, Suite 900, 390 Bay Street, Toronto, Ontario M5H 2Y2, tel. (416) 362-5135, fax (416) 362-5763, e-mail SShoemaker@barr.com.

2. I hold the following academic qualifications:

   B.Sc., Mine Engineering, Montana College of Mineral Science and Technology, 1982

3. I am a registered member of the Society for Mining, Metallurgy, and Exploration, Inc. (Member Number 2941320); as well, I am a member in good standing of other technical associations and societies, including the Australasian Institute of Mining and Metallurgy (Member Number 229733

4. I have worked as a mining engineer in the minerals industry for over 30 years.

5. I have read NI 43-101 and Form 43-101F1 and, by reason of education, experience and professional registration, I fulfill the requirements of a Qualified Person as defined in NI 43-101. My work experience includes 10 years as a mining engineer with Cleveland Cliffs Inc. and 18 years with other mining companies where I was responsible for completing geologic models, reserve estimates, economic analysis, slope designs, pit optimization, pit design, long term scheduling, short term scheduling and reserve validation.

6. I have not visited the property.

7. I am responsible for the preparation of Sections 15.0 and 16.0 of the Technical Report.

8. I am independent of the parties involved in the transaction for which this report is required, as defined in Section 1.5 of NI 43-101.

9. I was a co-author of the Technical Report for Quest entitled "NI 43-101 Technical Report on the Pre-Feasibility Study for the Strange Lake Property Quebec, Canada", dated December 6, 2013.

10. I have read NI 43-101 and the portions of this report for which I am responsible have been prepared in compliance with the instrument.

11. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make this report not misleading.

Report dated this 9th day of April, 2014.

"Sam Shoemaker, Jr." {Signed}

Sam Shoemaker, Jr., B.Sc., Reg.Mem.SME.
Barr Engineering Company

micon INTERNATIONAL LIMITED | mineral industry consultants

CERTIFICATE OF AUTHOR

Jane Spooner

As the co-author of this report entitled “NI 43-101 Technical Report, Pre-feasibility Study for the Strange Lake Project, Québec, Canada”, with an effective date of April 9, 2014 (the “Technical Report”), I, Jane Spooner, P.Geo., do hereby certify that:

1. I am employed by, and carried out this assignment for
   Micon International Limited
   Suite 900, 390 Bay Street
   Toronto, Ontario, M5H 2Y2
   tel. (416) 362-5135   fax (416) 362-5763
   e-mail: jspooner@micon-international.com

2. I hold the following academic qualifications:
   B.Sc. (Hons) Geology, University of Manchester, U.K. 1972
   M.Sc. Environmental Resources, University of Salford, U.K. 1973

3. I am a member of the Association of Professional Geoscientists of Ontario (membership number 0990); as well, I am a member in good standing of the Canadian Institute of Mining, Metallurgy and Petroleum.

4. I have worked as a specialist in mineral market analysis for over 30 years. I have managed consulting assignments on behalf of Micon, including those requiring independent Technical Reports under NI 43-101.

5. I do, by reason of education, experience and professional registration, fulfill the requirements of a Qualified Person as defined in NI 43-101. My work experience includes the analysis of markets for base and precious metals, industrial and specialty minerals (including rare earth elements), coal and uranium.

6. I have not visited the project site.

7. I am responsible for the preparation of Section 19.0 of this report.

8. I am independent of Quest Rare Minerals Ltd., as described in Section 1.5 of NI 43-101.

9. I was a co-author of the Technical Report for Quest entitled “NI 43-101 Technical Report on the Pre-Feasibility Study for the Strange Lake Property Quebec, Canada”, dated December 6, 2013.

10. I have read NI 43-101 and the portions of this report for which I am responsible have been prepared in compliance with the instrument.

11. As of the date of this certificate, to the best of my knowledge, information and belief, the sections of this Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make this report not misleading.

Report dated this 9th day of April, 2014.

"Jane Spooner" {signed and sealed}

Jane Spooner, M.Sc., P.Geo.
Vice President, Micon International Limited

CERTIFICATE OF AUTHOR

R.V. Zalnieriunas

As the co-author of this report entitled “NI 43-101 Technical Report, Pre-feasibility Study for the Strange Lake Project, Québec, Canada”, with an effective date of April 9, 2014 (the “Technical Report”), I, Rimant (Ray) V. Zalnieriunas do hereby certify that:

1) I am self-employed as a geologist working as the Principal Geologist of R.V. Zalnieriunas Consulting, and carried out this assignment for, Micon International Limited, Suite 900, 390 Bay Street, Toronto, Ontario M5H 2Y2, tel. (416) 362-5135, fax (416) 362-5763, e-mail ray.rvzc@gmail.com;

2) I hold the following academic qualifications:
B.Sc. (Hon.) in Geology   Queen’s University   1978;

3) I am a registered Professional Geoscientist with the Association of Professional Geoscientists of Ontario (registration Number 0391) and *l’Ordre des géologues du Québec (numero de member 541*); as well, I am a member in good standing of several other technical associations and societies, including: Society of Economic Geologists; The Prospectors and Developers Association of Canada; Ontario Prospectors Association; Northern Prospectors Association;

4) I have worked as a geologist in the minerals industry for 35 years;

5) I am familiar with NI 43-101 and, by reason of education, experience and professional registration; I fulfill the requirements of a Qualified Person as defined in NI 43-101;

6) I last visited the Strange Lake Project site between March 26 and 29, 2012;

7) Prior to co-authoring this Technical Report, I was engaged by Quest Rare Minerals Ltd. as an independent consulting geologist to provide support services as a Director of Technical Services and was the designated qualified person (QP) for the 2011 diamond drilling program carried out on the area of B Zone. I was also a co-author of the Technical Report for Quest entitled “Technical Report for the Strange Lake B Zone Rare Earth Element (REE) Deposit, Updated Mineral Resource Estimate, Province of Quebec (Quebec), Canada” dated December 14, 2012, and the Technical Report entitled “NI 43-101 Technical Report On The Pre-Feasibility Study For The Strange Lake Property Quebec, Canada”, dated December 6, 2013;

8) As of the date of this certificate to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make this report not misleading;

9) I have read the NI 43-101 Instrument and this Technical Report has been prepared in compliance with this Instrument;

10) I am independent of Quest Rare Minerals Ltd., as defined by Canadian NI 43-101 regulations and have provided consulting services to the company;

11) I am responsible for Sections (Items) 11 and 12.2 of this Technical Report.

Report dated this 9th day of April, 2014.

"R.V. Zalnieriunas" {signed and sealed}

R.V. Zalnieriunas, P.Geo.
Principal, R.V. Zalnieriunas Consulting