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## **SEARCH MINERALS INC.**

# TECHNICAL REPORT ON THE FOXTROT PROJECT IN LABRADOR, NEWFOUNDLAND & LABRADOR, CANADA

NI 43-101 Report

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May 9, 2013

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**Report Distribution** 

Document Title	Technical Report on the Foxtrot Project in Labrador, Newfoundland and Labrador, Canada							
Client Name & Address	Search Minerals Inc. 155 University Ave, Suite 1240 Toronto, Ontario M5H 3B7							
Document Reference	Project #1802	Status ( No.	& Issue	Final Version				
Issue Date	May 9, 2013			]				
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### **1 SUMMARY**

### **EXECUTIVE SUMMARY**

#### INTRODUCTION

Roscoe Postle Associates Inc. (RPA) was retained by Search Minerals Inc. (Search Minerals) to prepare an independent Technical Report on the Foxtrot Rare Earth Element (REE) Project (Foxtrot Project) near Port Hope Simpson, Newfoundland and Labrador, Canada. The purpose of this report is to disclose the results of a Preliminary Economic Assessment (PEA) on Search Minerals' Foxtrot Project. This Technical Report conforms to National Instrument 43-101 (NI 43-101) Standards of Disclosure for Mineral Projects. RPA visited the Foxtrot Project site and field office on October 27, 2011.

Search Minerals is a public company that trades on the TSX Venture Exchange under the symbol SMY. Search Minerals is currently exploring 19 prospects on three REE properties in Labrador, Canada, and holds additional properties in Newfoundland.

#### CONCLUSIONS

The PEA is based on the previously disclosed September 30, 2012 Mineral Resource estimate and evaluates a combined open pit and underground mining approach along with processing of 1,500 tpd by gravity, magnetic separation, and flotation concentration, followed by acid baking and water leaching, producing a mixed rare earth oxalate concentrate.

The PEA indicated that positive economic results can be obtained for the Foxtrot Project and that further advancement of the Project is merited.

The Life-of-Mine (LOM) plan for the Project indicated that 5.3 Mt, at an average grade of 0.89% Total Rare Earth Elements (TREE), could be mined over 10 years, including open pit mining for the first 3.5 years and underground mining thereafter. Production was projected to total 38 million kg of payable rare earth material.

Specific conclusions by area are as follows:



#### GEOLOGY AND MINERAL RESOURCE CONCLUSIONS

The Mineral Resource estimate uses a cut-off grade of 130 ppm dysprosium (Dy). This reporting cut-off grade, which corresponds to 150 ppm for the oxide form,  $Dy_2O_3$ , produces a Net Smelter Return (NSR) value considerably higher than the anticipated cost of mining and processing. RPA considers that material with more than 130 ppm Dy meets the requirement of the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards that Mineral Resources have a reasonable prospect of economic extraction.

Indicated Mineral Resources are estimated to total 9.23 Mt at 0.88% TREE (or 1.07% Total Rare Earth Oxides (TREO)), and Inferred Mineral Resources are estimated to total 5.17 Mt at 0.77% TREE (or 0.93% TREO).

A high-grade core (HGC) within the Mineral Resource was identified, corresponding to the largest and most consistent felsic band within the deposit. It was wireframed separately to allow mine designs to focus on selective mining of the highest grade portions of the deposit. HGC Indicated Resources are estimated to total 3.42 Mt at 1.04% TREE, and HGC Inferred Resources are estimated to total 0.66 Mt at 1.03% TREE.

With the Central Area of the deposit still open at depth, future resource estimates will likely report higher tonnages, of both Indicated and Inferred Resources. The grade of the deeper resource currently appears to be similar to the shallower resource, so future resource estimates are likely to have similar grades to the current resource estimate, but higher tonnages.

There is potential for the delineation of additional resources at depth along strike, both east and west of the Central Area, however, HGC is absent near surface to the east and west along strike. The Phase III drilling targeted the HGC in the Central Area at depth; future drilling should include deeper holes on the sections immediately adjacent to the Central Area. The recent drilling indicates that the most promising sections appear to be those immediately to the east (down plunge) of the Central Area.

Within the Central Area, the rare-earth mineralization with economic potential is hosted in bands of felsic volcanic rocks that are inter-layered with mafic volcanic rocks. The first three phases of drilling have confirmed that it is possible to visually distinguish the felsic mineralization from the mafic waste. Statistical analysis of the multi-element ICP data for the



resource estimation studies also suggests that it is possible to identify the felsic material using automated classification based on major-element chemistry. The combination of a characteristic visual appearance and a characteristic multi-element signature creates many possibilities for efficient and effective grade control. There are optical and chemical sorting technologies that should be very effective at segregating the higher-grade material from the mixed volcanic rocks.

Statistical analysis of the assay data from the felsic samples shows that there is a bi-modal distribution in the felsic bands. With the higher-grade population having grades about five times those of the lower-grade population, it may be possible to further upgrade the run of mine material into an even higher-grade product in fewer ore tonnes. To realize this possibility, a better understanding of the geology and mineralogy of the two felsic populations is needed.

The very strong correlations between the rare earth elements will simplify grade control. The entire rare earth suite of elements occurs as a single package at Foxtrot, and a potential future mining operation will not have to contend with the complications of having to mine material that has low grades of some REEs in order to recover higher grades of other REEs.

#### MINING

In the previous PEA (dated July 15, 2012), RPA investigated the potential for larger-scale (4,000 tpd) open pit mining of the Indicated and Inferred Mineral Resources. While open pit mining provided a cost advantage over underground mining, the plant feed grades were lower, the mine footprint was large, and the capital costs for a larger plant were high.

In this revised PEA, based on the updated resource block model, the new approach is the selective mining of the delineated REE HGC, again considering the Indicated and Inferred Mineral Resources, and using the same REE prices.

RPA investigated the potential for a smaller open pit/underground mining scenario with lower throughput, lower initial capital costs, and higher grade mill feed. Operating costs for open pit and underground methods were evaluated using a mill feed rate of 1,500 tpd of REE-bearing material on a stand-alone basis. The break-even stripping ratio, beyond which the underground mining would produce more favourable economic results, was estimated. Within approximately 100 m of surface, stripping ratios remain low enough for open pit



method to be more profitable; below 100 m, underground mining improves the economic results.

RPA notes that this trade-off result is specific to the relative costs between the two methods, estimated for a production rate of 1,500 tpd.

A production schedule was developed, starting with open pit mining for 3.5 years, while underground mine development was in progress. As the open pit comes to an end, underground production ramps up to the full plant feed rate. The total LOM is ten years.

#### PROCESSING AND METALLURGY

Aside from the adjustment in production rate, process and metallurgy remains unchanged from the previous PEA.

Metallurgical testwork involved three beneficiation techniques to concentrate the REE in the Foxtrot sample, including Wilfley tabling, magnetic separation, and flotation. The Wilfley tabling was used to test amenability to gravity concentration. Magnetic separation was used to reject magnetite from the Wilfley concentrates. Flotation was tested both as a primary method of concentration for the Foxtrot sample and as a scavenging method to recover additional REE from the Wilfley tails. The work was preliminary in nature.

Recovery of REEs from the combined beneficiation results ranged from 80% to 86%.

The gravity concentrate and the combined gravity/flotation concentrate were subjected to hydrometallurgical processing by acid leaching or acid baking at 200°C to 250°C followed by water leaching. The acid bake and water leach results produced high extractions.

Overall recoveries range from 78% to 82% for light rare earths (LREE), and 77% to 80% for heavy rare earths (HREE).

The process proposed for the PEA utilizes the following basic unit operations: crushing, grinding, gravity recovery, magnetic separation, flotation, acid bake, water leaching, and solution purification to recover a mixed REE product.



#### ENVIRONMENT

The Project is at an early stage and therefore Search Minerals has not yet begun environmental baseline work. Despite that, RPA does not anticipate any fatal flaws regarding environmental issues with the Project as proposed. The challenges normal to permitting and developing an open pit/underground mine in Labrador are expected to be manageable.

Search Minerals has initiated community and Aboriginal consultation programs and has signed a Mining Exploration Activities Agreement with the NunatuKavut Community Council (NCC).

#### MARKETS

Rare earth prices remain unchanged from the previous PEA, when they were selected from the low end of a range of available forecasts, averaging \$38/kg of REO (net of separation charges). Q1 2013 spot prices, for comparison, average \$44/kg REO (net).

RPA considers these rare earth prices to be appropriate for a PEA-level study, however, RPA notes that the recent market volatility introduces considerably more uncertainty than a comparable base or precious metals project. This uncertainty is mitigated to some extent, by the selection of conservative rare earth pricing.

#### ECONOMIC ANALYSIS

RPA conducted an economic analysis of the Foxtrot Project applying operating and capital cost estimates based on a 10 year production schedule.

The initial capital cost is approximately \$221 million, including approximately \$73 million in contingency capital. The average operating cost over the life of the project is approximately \$134 per tonne milled.

The economic analysis shows that the Project yields a pre-tax and after-tax net present value (NPV) at a 10% discount rate of \$220 million and \$133 million, respectively. Total pre-tax undiscounted cash flow is \$640 million. Over the life of mine, the pre-tax and after-tax Internal Rate of Return is 27% and 21%, respectively. The pre-tax payback period is 3.8 years and the after-tax payback period is 4.6 years.



This PEA is considered by RPA to meet the requirements of a PEA as defined in Canadian NI 43-101 regulations. The economic analysis contained in this section is based, in part, on Inferred Resources, and is preliminary in nature. Inferred Resources are considered too geologically speculative to have mining and economic considerations applied to them and to be categorized as Mineral Reserves. There is no certainty that the reserves development, production, and economic forecasts on which this PEA is based will be realized.

#### RECOMMENDATIONS

RPA recommends that Search Minerals continue collecting data to support the feasibility and licensing process, and proceed with further studies. The end goal should be a feasibility study suitable for use in making an investment decision.

Specific recommendations by area are as follows:

#### GEOLOGY & MINERAL RESOURCES

- Further drilling should be done to follow the HGC at depth in the Central Area and down plunge below 400 m towards the east. Infill drilling should be carried out throughout the HGC, to bring the confidence level of the resource to Indicated. Other targets within the area are worthy of further exploration.
- During drilling, the quality assurance/quality control (QA/QC) data from Search Mineral's external monitoring program, as well as from Actlabs' internal monitoring program, should be reviewed monthly in order to identify batches of samples that may need to be re-analyzed, or to identify single samples for which a duplicate analysis would be useful. Although a good program has been in place for gathering QA/QC data during Phases I through III, the data from this program are usually assessed after the drilling has been completed. Without regular monthly review of the QA/QC data, problems with accuracy and precision cannot be dealt with in a timely manner.
- Search Minerals should work with an assay lab to develop certified reference materials with REE grades similar to those found at the Foxtrot Project.

#### MINING

• Carry out geotechnical investigations and analysis for use in determining pit slopes and underground stope sizing.

#### METALLURGICAL TESTWORK

• The mafic and felsic material are inter-mixed on a fine scale. With the felsic material carrying the mineralization, it would be useful to have some test work done on ore sorting possibilities, such as optical or x-ray sorting.



 If mafic material cannot be effectively segregated from felsic material, then some metallurgical test work is needed on the effect of mafic material in the ROM ore feed. The felsic material has been the focus of test work; it would be useful to establish the effect on metallurgical recovery from the felsic material when it has been diluted by 10% to 20% mafic material.

#### ENVIRONMENTAL CONSIDERATIONS

- Begin a program of environmental baseline study work, and carry out all necessary data collection and studies to support an Environmental Impact Assessment.
- Continue with community and Aboriginal consultation regarding plans for the Project.

#### BUDGET

A budget for data collection, testwork and completion of a feasibility study has been estimated, as summarized in Table 1-1:

# TABLE 1-1 BUDGET FOR PROJECT ADVANCEMENT Search Minerals Inc. – Foxtrot Project

Item	Cost (C\$)
Diamond drilling (35,000 m @ \$180/m)	6,300,000
Mineral Resource Update	100,000
Geotechnical Investigation	300,000
Metallurgical Testwork	600,000
Environmental Studies	1,000,000
Community Consultation	200,000
Feasibility Study	1,500,000
Total	10,000,000

#### ECONOMIC ANALYSIS

The Project evaluation work includes an economic summary, discounted cash flow analysis, as well as capital and operating costs estimates. RPA considers the PEA cost estimates to have an estimation accuracy of +35% to -15%.

The Foxtrot Project will process 540,000 t annually at full production, at an average grade of 0.89% TREE, and produce an average of 3.8 million kilograms of payable rare earth elements per year.

#### ECONOMIC CRITERIA

Key economic inputs to the cash flow are as follows:



#### Revenue

- 1,500 tonnes per day processing rate.
- Average REE recovery of 79%.
- Average TREO basket price of \$38 per kg.
- Light Rare Earth Element (LREE) separation charge of \$5 per kg.
- Heavy Rare Earth Element (HREE) separation charge of \$30 per kg.
- Revenue is recognized at the time of production.

#### Costs

•

- Pre-production period: two years.
- Mine life: ten years.
  - Mine life capital consists of \$221 million initial capital,

\$127 million sustaining and closure capital, \$348 million total capital.

• Average operating cost over the mine life is \$134 per tonne milled.

#### Taxation

- Federal tax rate of 15%.
- Provincial tax rate of 14%.
- All capital assumed to be depreciable on a units-of-production basis.
- No credits that may have been accumulated by Search Minerals have been applied.



#### TABLE 1-2 RPA AFTER-TAX CASH FLOW SUMMARY - OP / UG MINE Search Minerals Inc. - Foxtrot Project

OP Mining	Input	Units	Total/Avg.	-2 -1 1	2	3	4	5	6	7	8	9	10
Mined Mill Feed Stockpile Ore Grade		tonnes tonnes g/t Au	1,860,000 -	490,000	540,000	540,000	290,000	-		-		-	
Mined Waste Mined Waste by Contractor		tonnes	3,270,000	1,090,000	1,030,000	840,000	310,000						
Total Material Moved		tonnes	5,130,000	1,580,000	1,570,000	1,380,000	600,000	-	-		-		-
Waste to Ore ratio			1.76	2.22	1.91	1.56	1.07						
UG Mining													
Mined Mill Feed		tonnes	3,460,000		-	-	250,000	540,000	540,000	540,000	540,000	540,000	510,000
Processing Feed to Mill		'000 tonnes	5,320	490 1,361.11	540 1,500.00	510 1,500.00							
Head Grade Yttrium		tpd ppm	1,053.8	903.6	903.6	903.6	1,010.5	1,134.6	1,134.6	1,134.6	1,134.6	1,134.6	1,134.6
Lanthanum Cerium		ppm	1,673.1 3.391.5	1,447.7 2,916.9	1,447.7	1,447.7	1,608.2	1,794.3	1,794.3	1,794.3	1,794.3	1,794.3	1,794.3 3,646.7
Praesodymium Neodymium		ppm	389.3 1,455.2	331.7 1,231.7	331.7 1,231.7	331.7 1,231.7	372.7 1,390.8	420.2 1,575.3	420.2 1,575.3	420.2 1,575.3	420.2 1,575.3	420.2 1,575.3	420.2 1,575.3
Samarium Europium		ppm	264.0 13.3	221.4 11.2	221.4 11.2	221.4 11.2	251.7 12.7	286.9 14.5	286.9 14.5	286.9 14.5	286.9 14.5	286.9 14.5	286.9 14.5
Gadolinium Terbium		ppm ppm	207.5	174.6 27.5	174.6 27.5	174.6 27.5	198.0 31.4	225.2 35.8	225.2 35.8	225.2 35.8	225.2 35.8	225.2 35.8	225.2 35.8
Dysprosium Holmium		ppm	191.9 37.2	160.5 30.8	160.5 30.8	160.5 30.8	182.9 35.4	208.8 40.6	208.8 40.6	208.8 40.6	208.8 40.6	208.8 40.6	208.8 40.6
Erbium Thulium		ppm	104.8	87.2 12.6	87.2 12.6	87.2 12.6	99.7 14.4	114.2 16.5	114.2 16.5	114.2 16.5	114.2 16.5	114.2 16.5	114.2 16.5
Ytterbium Lutetium		ppm ppm	93.3 13.8	78.0 11.5	78.0	78.0	88.9 13.2	101.6 15.1	101.6 15.1	101.6 15.1	101.6 15.1	101.6 15.1	101.6 15.1
LREE Grade HREE Grade		ppm ppm	7,173.1	6,149.4 1.497.5	6,149.4 1,497.5	6,149.4 1,497.5	6,878.2 1.687.1	7,723.4	7,723.4	7,723.4	7,723.4	7,723.4	7,723.4
Total REE Grade		ppm	8,936.9 19,485.3	7,646.9 16,643.6	7,646.9	7,646.9 16,643.6	8,565.3 18,666.6	9,630.3 21,012.9	9,630.3 21,012.9	9,630.3 21,012.9	9,630.3 21,012.9	9,630.3 21,012.9	9,630.3 21,012.9
Average Recovery													
Yttrium Lanthanum	79.5% 81.9%	% %	79.5% 81.9%	79.5% 81.9%	79.5% 81.9%	79.5% 81.9%	79.5% 81.9%	79.5% 81.9%	79.5% 81.9%	79.5% 81.9%	79.5% 81.9%	79.5% 81.9%	79.5% 81.9%
Cerium Praesodymium	78.9% 82.3%	%	78.9% 82.3%	78.9% 82.3%	78.9% 82.3%	78.9% 82.3%	78.9% 82.3%	78.9% 82.3%	78.9% 82.3%	78.9% 82.3%	78.9% 82.3%	78.9% 82.3%	78.9% 82.3%
Neodymium Samarium	77.7% 80.1%	%	77.7% 80.1%	77.7% 80.1%	77.7% 80.1%	77.7% 80.1%	77.7% 80.1%	77.7% 80.1%	77.7% 80.1%	77.7% 80.1%	77.7% 80.1%	77.7% 80.1%	77.7% 80.1%
Europium Gadolinium	79.5% 78.6%	%	79.5% 78.6%	79.5% 78.6%	79.5% 78.6%	79.5% 78.6%	79.5% 78.6%	79.5% 78.6%	79.5% 78.6%	79.5% 78.6%	79.5% 78.6%	79.5% 78.6%	79.5% 78.6%
Terbium Dysprosium	78.3% 77.3%	%	78.3% 77.3%	78.3% 77.3%	78.3% 77.3%	78.3% 77.3%	78.3% 77.3%	78.3% 77.3%	78.3% 77.3%	78.3% 77.3%	78.3% 77.3%	78.3% 77.3%	78.3% 77.3%
Holmium Erbium	77.5% 77.6%	% %	77.5% 77.6%	77.5% 77.6%	77.5% 77.6%	77.5% 77.6%	77.5% 77.6%	77.5% 77.6%	77.5% 77.6%	77.5% 77.6%	77.5% 77.6%	77.5% 77.6%	77.5% 77.6%
Thulium Ytterbium	77.8% 77.6%	%	77.8% 77.6%	77.8% 77.6%	77.8% 77.6%	77.8% 77.6%	77.8% 77.6%	77.8% 77.6%	77.8% 77.6%	77.8% 77.6%	77.8% 77.6%	77.8% 77.6%	77.8% 77.6%
Lutetium Average	77.7%	%	77.7% 78.8%	77.7%	77.7%	77.7%	77.7%	77.7%	77.7%	77.7%	77.7%	77.7%	77.7%
Concentrate Weight Recovery	38.5%	1000.1		38.5%	38.5%	38.5%	38.5%	38.5%	38.5%	38.5%	38.5%	38.5%	38.5%
Concentrate Tonnage Concentrate Grades		'000 tonnes	2,047	189	208	208	208	208	208	208	208	208	196
Yttrium Lanthanum		ppm ppm	2,177 3,560	1,867 3,081	1,867 3,081	1,867 3,081	2,088 3,422	2,344 3,818	2,344 3,818	2,344 3,818	2,344 3,818	2,344 3,818	2,344 3,818
Cerium Praesodymium		ppm ppm	6,949 832	5,976 709	5,976 709	5,976 709	6,669 797	7,472	7,472 898	7,472	7,472	7,472 898	7,472
Neodymium Samarium		ppm ppm	2,938 549	2,487 461	2,487 461	2,487 461	2,808 524	3,181 597	3,181 597	3,181 597	3,181 597	3,181 597	3,181 597
Europium Gadolinium		ppm ppm	28 424	23 356	23	23 356	26 404	30 460	30 460	30 460	30 460	30 460	30 460
Terbium Dysprosium		ppm ppm	67 386	56 323	56 323	56 323	64 368	73 420	73 420	73 420	73 420	73 420	73 420
Holmium Erbium		ppm ppm	75 211	62 176	62 176	62 176	71 201	82 230	82 230	82 230	82 230	82 230	82 230
Thulium Ytterbium		ppm ppm	31	25 157	25 157	25 157	201 29 179	230 33 205	230 33 205	230 33 205	230 33 205	230 33 205	230 33 205
Lutetium		ppm	28	23	23	23	27	30	30	30	30	30	30
Material Recovered Yttrium		kg	4,457,919	352,064	387,989	387,989	433,890	487,176	487,176	487,176	487,176	487,176	460,110
Lanthanum Cerium		kg kg	7,289,045 14,226,931	580,906 1,126,988	640,182 1,241,987	640,182 1,241,987	711,156 1,385,861	793,450 1,552,728	793,450 1,552,728	793,450 1,552,728	793,450 1,552,728	793,450 1,552,728	749,370 1,466,466
Praesodymium Neodymium		kg kg	1,703,704 6,015,931	133,716 469,005	147,360 516,863	147,360 516,863	165,575 583,627	186,677 661,049	186,677 661,049	186,677 661,049	186,677 661,049	186,677 661,049	176,306 624,324
Samarium Europium		kg kg	1,124,766 56,445	86,881 4,364	95,746 4,809	95,746 4,809	108,850 5,453	124,072 6,226	124,072 6,226	124,072 6,226	124,072 6,226	124,072 6,226	117,180 5,880
Gadolinium Terbium		kg kg	867,306 137,028	67,216 10,548	74,074 11,625	74,074 11,625	84,002 13,273	95,541 15,133	95,541 15,133	95,541 15,133	95,541 15,133	95,541 15,133	90,233 14,292
Dysprosium Holmium		kg kg	789,539	60,816 11,699	67,022 12,893	67,022 12,893	76,376 14,819	87,191 16,995	87,191 16,995	87,191 16,995	87,191 16,995	87,191 16,995	82,347 16.051
Erbium Thulium		kg kg	432,567 62,651	33,163 4,804	36,547 5,294	36,547 5,294	41,786 6,050	47,864 6,932	47,864 6,932	47,864 6,932	47,864 6,932	47,864 6,932	45,205 6,547
Ytterbium Lutetium		kg kg	385,438 57,237	29,664 4,379	32,691 4,826	32,691 4,826	37,260 5,539	42,583 6,336	42,583 6,336	42,583 6,336	42,583 6,336	42,583 6,336	40,217 5,984
Total Material Recovered TREE Con Grade		kg %	37,759,839 1.84%	2,976,213 1.58%	3,279,908 1.58%	3,279,908 1.58%	3,673,516 1.77%	4,129,956 1.99%	4,129,956 1.99%	4,129,956 1.99%	4,129,956 1.99%	4,129,956 1.99%	3,900,514 1.99%
Revenue													
Payable REEs Yttrium		kg	4,457,919	352,064	387,989	387,989	433,890	487,176	487,176	487,176	487,176	487,176	460,110
Lanthanum Cerium		kg kg	7,289,045 14,226,931	580,906 1,126,988	640,182 1,241,987	640,182 1,241,987	711,156 1,385,861	793,450 1,552,728	793,450 1,552,728	793,450 1,552,728	793,450 1,552,728	793,450 1,552,728	749,370 1,466,466
Praesodymium Neodymium		kg kg	1,703,704 6,015,931	133,716 469,005	147,360 516,863	147,360 516,863	165,575 583,627	186,677 661,049	186,677 661,049	186,677 661,049	186,677 661,049	186,677 661,049	176,306 624,324
Samarium Europium		kg kg	1,124,766 56,445	86,881 4,364	95,746 4,809	95,746 4,809	108,850 5,453	124,072 6,226	124,072 6,226	124,072 6,226	124,072 6,226	124,072 6,226	117,180 5,880
Gadolinium Terbium		kg kg	867,306 137,028	67,216 10,548	74,074 11,625	74,074 11,625	84,002 13,273	95,541 15,133	95,541 15,133	95,541 15,133	95,541 15,133	95,541 15,133	90,233 14,292
Dysprosium Holmium		kg kg	789,539	60,816	67,022	67,022	76,376	87,191 -	87,191 -	87,191 -	87,191	87,191	82,347
Erbium Thulium		kg kg	432,567	33,163	36,547	36,547	41,786 -	47,864	47,864	47,864	47,864	47,864	45,205
Ytterbium Lutetium		kg kg	385,438	29,664	32,691	32,691	37,260	42,583	42,583	42,583	42,583	42,583	40,217 -
Total Payable Material		kg	37,486,618	2,955,331	3,256,896	3,256,896	3,647,108	4,099,691	4,099,691	4,099,691	4,099,691	4,099,691	3,871,931



	Input	Units	Total/Avg.	-2	-1	1	2	3	4	5	6	7	8	9	10
Market Prices															
Y <sub>2</sub> O <sub>3</sub>		US\$/kg	\$ 20.00			\$ 20 \$						\$ 20			
La <sub>2</sub> O <sub>3</sub> CeO <sub>2</sub>		US\$/kg US\$/kg	\$ 10.00 \$ 5.00			\$ 10 \$ \$ 5 \$	10 \$ 5 \$	10 \$ 5 \$		; 10 \$ ; 5 \$			\$ 10 \$ 5	\$ 10 \$ 5	\$ 10 \$ 5
Pr <sub>6</sub> O <sub>11</sub>		US\$/kg	\$ 5.00 \$ 75.00			\$ 75 \$	75 \$	75 \$				\$ 75			\$ 75
Nd <sub>2</sub> O <sub>3</sub>		US\$/kg	\$ 75.00			\$ 75 \$	75 \$	75 9						\$ 75	\$ 75
Sm <sub>2</sub> O <sub>3</sub>		US\$/kg	\$ 9.00			\$ 9 \$	9 \$	9 \$		9 \$		\$ 9		\$ 9	\$ 9
Eu <sub>2</sub> O <sub>3</sub>		US\$/kg	\$ 500.00			\$ 500 \$								\$ 500	\$ 500
Gd <sub>2</sub> O <sub>3</sub>		US\$/kg	\$ 30.00			\$ 30 \$								\$ 30	\$ 30
Tb <sub>4</sub> O <sub>7</sub>		US\$/kg	\$ 1,500.00			\$ 1,500 \$	1,500 \$	1,500 \$	,		,	. ,		\$ 1,500	\$ 1,500
Dy <sub>2</sub> O <sub>3</sub>		US\$/kg	\$ 750.00			\$ 750 \$ \$ 65 \$	750 \$ 65 \$	750 \$ 65 \$						\$ 750 \$ 65	\$ 750 \$ 65
Ho <sub>2</sub> O <sub>3</sub> Er <sub>2</sub> O <sub>3</sub>		US\$/kg US\$/kg	\$ - \$ 40.00			\$ 65 \$ \$ 40 \$	65 \$ 40 \$	65 \$ 40 \$						\$ 65 \$ 40	\$ 65 \$ 40
Tm <sub>2</sub> O <sub>3</sub>		US\$/kg	\$ +0.00			\$ 2,000 \$							• ••	\$ 2,000	\$ 2,000
Yb <sub>2</sub> O <sub>3</sub>		US\$/kg	\$ 50.00			\$ 50 \$								\$ 2,000	\$ 50
Lu <sub>2</sub> O <sub>3</sub>		US\$/kg	\$ -			\$ 320 \$	320 \$	320 \$						\$ 320	
Gross Revenue H Yttrium		US\$ 000s	\$ 113.226			\$ 8,942 \$	9,854 \$	9,854 \$	\$ 11,020 \$	12,374 \$	12.374	\$ 12,374	\$ 12.374	\$ 12,374	\$ 11.686
L Lanthanum		US\$ 000s	\$ 85,484			\$ 6,813 \$	7,508 \$	7,508 \$	\$ 8,340 \$	9,305 \$	9,305	\$ 9,305	\$ 9,305	\$ 9,305	\$ 8,788
L Cerium L Praesodymium		US\$ 000s US\$ 000s	\$ 87,380 \$ 154,377			\$ 6,922 \$ \$ 12,116 \$	7,628 \$ 13.353 \$	7,628 \$						\$ 9,537 \$ 16,915	\$ 9,007 \$ 15,976
L Neodymium		US\$ 000s	\$ 526,266			\$ 41,028 \$	45,215 \$	45,215	51,055 \$	57,828 \$	57,828	\$ 57,828	\$ 57,828	\$ 57,828	\$ 54,615
L Samarium		US\$ 000s	\$ 11,739 \$ 32,680			\$ 907 \$ \$ 2.526 \$	999 \$	999 \$ 2.784 \$						\$ 1,295 \$ 3,605	\$ 1,223 \$ 3,404
H Europium H Gadolinium		US\$ 000s US\$ 000s	\$ 32,680 \$ 29,990			\$ 2,526 \$ \$ 2,324 \$	2,784 \$ 2,561 \$	2,784 \$ 2,561 \$						\$ 3,605 \$ 3,304	\$ 3,404 \$ 3,120
H Terbium		US\$ 000s	\$ 241,754			\$ 18,610 \$	20,509 \$	20,509 \$	\$ 23,417 \$	26,699 \$	26,699	\$ 26,699	\$ 26,699	\$ 26,699	\$ 25,216
H Dysprosium H Holmium		US\$ 000s US\$ 000s	\$ 679,607 \$ -			\$ 52,348 \$ \$ - \$	57,690 \$	57,690 \$		75,051 \$			\$ 75,051 \$ -	\$ 75,051 \$ -	\$ 70,882 \$ -
H Erbium		US\$ 000s	\$ 19,785			\$ 1,517 \$	1,672 \$	1,672 \$						\$ 2,189	\$ 2,068
H Thulium H Ytterbium		US\$ 000s US\$ 000s	\$ - \$ 21.945			s - s	- \$ 1,861 \$	- \$ 1,861 \$						\$ - \$ 2.424	\$ - \$ 2.290
H Ytterbium H Lutetium		US\$ 000s US\$ 000s	\$ 21,945 \$ -			\$ 1,689 \$ \$ - \$	1,861 \$	1,861 \$						\$ 2,424 \$ -	\$ 2,290 \$ -
Total Gross Revenue	1	US\$ 000s	\$ 2,004,232			\$ 155,742 \$	171,634 \$							\$ 220,525	\$ 208,274
Exchange Rate	1.0	\$C/\$US				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Gross Revenue		C\$'000s	\$ 2,004,232			\$ 155,742 \$	171,634 \$	171,634 \$	\$ 194,320 \$	220,525 \$	220,525	\$ 220,525	\$ 220,525	\$ 220,525	\$ 208,274
Offsite Costs															
LREE Separation	\$5	C\$'000s	\$ 210,326			\$ 16,610 \$	18,305 \$	18,305						\$ 22,985	\$ 21,708
HREE Separation Product Transportation	\$30	C\$'000s C\$'000s	\$ 93,494 \$ -			\$ 7,210 \$ \$ - \$	7,945 \$ - \$	7,945 \$						\$ 10,320 \$ -	\$ 9,747 \$ -
Total		C\$'000s	\$ 303,820			\$ 23,820 \$								\$ 33,305	\$ 31,455
Offsite Costs per Kg Offsite Costs to Gross Revenue		C\$/Kg %	\$ 8 15%			\$ 8 \$ 15%	8 \$ 15%	8 \$ 15%	\$ 8 \$ 15%	8 \$ 15%	8 15%	\$ 8 15%	\$ 8 15%	\$ 8 15%	\$ 8 15%
		,,,	1078			10,0	1070	1070	1070	1070	1070	1070	1070	1070	1070
NSR Royalty Production Tax	From Proforma	C\$'000s	-			-	-	-	-	-	-		-		-
Production Tax	From Proforma	C\$'000s	-			-	-	-	-	-	-	-	-	-	-
Net Revenue		C\$'000s	\$ 1,700,413			\$ 131,922 \$									\$ 176,819
NSR TREO Net Revenue Basket Price		C\$/t	\$ 319.63 \$ 38			\$ 269.23 \$ \$ 37 \$	269.23 \$ 37 \$	269.23 \$ 37 \$	\$ 305.19 \$ \$ 37 \$				\$ 346.70 \$ 38	\$ 346.70 \$ 38	\$ 346.70 \$ 38
			• ••												
Operating Costs OP Mining by Contractor	\$ 9.70	C\$/t mined				\$ 9.70 \$	9.70 \$	9.70 \$	\$ 9.70 <b>\$</b>	9.70 \$	9.70	\$ 9.70	\$ 9.70	\$ 9.70	\$ 9.70
UG Mining by contactor UG Mining by owner	\$ 58.58	C\$/t mined				\$ 58.58 \$							\$ 58.58		\$ 58.58
Total Mining		C\$/t milled	\$ 47.45			\$ 31.28 \$	28.20 \$	24.79 \$	37.90 \$	58.58 \$	58.58	\$ 58.58	\$ 58.58	\$ 58.58	\$ 58.58
Processing - Concentration G&A (OP followed by UG)	\$ 70.00	C\$/t milled C\$/t milled	\$ 70.00 \$ 16.54			\$ 70.00 \$ \$ 12.24 \$	70.00 \$ 11.11 \$	70.00 \$ 11.11 \$						\$ 70.00 \$ 18.52	\$ 70.00 \$ 19.61
Total Operating Costs		C\$/t milled	\$ 133.99			\$ 113.52 \$							\$ 147.10		
		00.000-				e 45.000 e	45.000 0	40.000							
Mining - Open Pit Mining - Underground		C\$ '000s C\$ '000s	\$ 49,761 \$ 202.687			\$ 15,326 \$ \$ - \$	15,229 \$ - \$	13,386 \$						\$ - \$ 31,633	\$ - \$ 29.876
Processing - Concentration		C\$ '000s	\$ 372,400			\$ 34,300 \$	37,800 \$	37,800	\$ 37,800 \$	37,800 \$	37,800	\$ 37,800	\$ 37,800	\$ 37,800	\$ 35,700
G&A (OP followed by UG) Total Operating Costs	\$ 6,000	C\$ '000s C\$ '000s	\$ 88,000 \$ 712.848			\$ 6,000 \$ \$ 55.626 \$	6,000 \$ 59,029 \$							\$ 10,000 \$ 79,433	\$ 10,000 \$ 75,576
Total Operating Costs		C\$ 0005	\$ 712,848			\$ <b>33,626</b> \$	59,0 <u>2</u> 9 \$	57,186 3	o 08,203 3	o 79,433 \$	79,433	\$ 79,433	\$ 79,433	\$ 79,433	\$ 75,576
Operating Margin		C\$ '000s	\$ 987,565			\$ 76,296 \$	86,355 \$	88,198 \$	\$ 96,538 \$	107,787 \$	107,787	\$ 107,787	\$ 107,787	\$ 107,787	\$ 101,243
Capital Cost															
Surface Infrastructure		C\$ '000s	\$ 47,667	\$ 10,313	\$ 24,063	\$ 3,344 \$	344 \$	6,964 \$	5 440 \$	440 \$	440	\$ 440	\$ 440	\$ 440	
OP Mining UG Mining		C\$ '000s C\$ '000s	\$ 2,165 \$ 59,857	\$ 570		\$ 16 \$ \$ 8,313 \$		37 27,712 \$	\$ 277 \$	1,201 \$	277	\$ 1,201	\$ 277	\$ 1,201	
Processing		C\$ '000s	\$ 73,080	\$ 28,000	\$ 42,000	\$ 6,313 \$ \$	385 \$	385 \$				\$ 385		\$ 1,201 \$ 385	
Tailings	459/	C\$ '000s	\$ 14,000	\$ 4,000		e 1007 -	2010	2,000				\$ 2,000			
EPCM Indirects	15% 25%	C\$ '000s C\$ '000s	\$ 27,224 \$ 35,613	\$ 6,432 \$ 10,721		\$ 1,697 \$ \$ 1,500 \$		5,150 3.000							
Contingency	30%	C\$ '000s	\$ 73,299	\$ 18,011	\$ 30,898	\$ 4,353 \$	7,292 \$	12,744							
Env., Progressive Rehab. & Mine Closure Working Capital		C\$ '000s C\$ '000s	\$ 14,900 \$ -		\$ 9.271	\$ 100 \$	100 \$	100 \$	\$ 100 \$	5 100 \$	100	\$ 100	\$ 100	\$ 100	\$ 14,000 \$ (9,271)
Total Initial Capital		C\$ 000s	\$ 221,210	\$ 78,047											
Total Canital Cost		C\$ 10000		\$ 79.047	\$ 142 404	\$ 19.324 <b>\$</b>	32 460 *	58.002	1 202 *	2.126 \$	1 202	\$ 4400	\$ 1.000	\$ 2.126	\$ 4700
Total Capital Cost		C\$ '000s	\$ 347,804	\$ 78,047	¢ 143,164	¢ 19,324 \$	32,406 \$	56,092 \$	\$ 1,202 \$	2,126 \$	1,202	\$ 4,126	\$ 1,202		\$ 4,729
Pre-Tax Cash Flow		001000					F0 000 -			405.000	400 505	A 405			
Pre-Tax Cash Flow Cumulative		C\$ '000s	\$ 639,761			\$ 56,973 \$ \$ (164,237) \$						\$ 103,661 \$ 331.000			
			1.							.,	,			, .	, .
Taxes Payable		C\$ '000s	\$ 172,096	\$ - 5	5 -	\$ 15,594 \$	16,979 \$	15,850 \$	\$ 17,115 \$	18,954 \$	18,894	\$ 18,619	\$ 18,518	\$ 18,238	\$ 13,335
After-Tax Cash Flow		1													
After-Tax Cash Flow		C\$ '000s	\$ 467,665			\$ 41,378 \$							\$ 88,067		
Cumulative				\$ (78,047) \$	(221,210)	\$ (179,832) \$	(142,922) \$	(128,666) \$	\$ (50,445)	36,263 \$	123,954	a 208,996	» 297,063	ə 384,486	\$ 467,665
Project Economics Pre-Tax NPV	5%	C\$ '000s	\$ 379,104												
Pre-Tax NPV Pre-Tax NPV	5% 8%	C\$ 000s	\$ 379,104 \$ 289,916												
Pre-Tax NPV	10%	C\$ '000s	\$ 219,636												
Pre-Tax IRR		%	27.114%												
Pre-Tax Payback Period		Years	3.8	-	-	-	-	Payback	-	-	-	-	-	-	-
		1		-	-	-	-	3.8	-	-	-	-	-	-	-
After-Tax NPV	5%	C\$ '000s	\$ 258,756												
After-Tax NPV After-Tax NPV	8% 10%	C\$ '000s C\$ '000s	\$ 175,797 \$ 132.603												
A GOLLEA INLY	10 70		\$ 132,603												
After-Tax IRR		%	20.748%												
After-Tax Payback Period		Years	4.6	-	-			-	Payback	-	-		-	-	-
		10010	+.0	-	-	-	-	-	4.6	-	-	-	-	-	-
		I	l	l											



The economic analysis shows that, at an average TREO net revenue basket price of \$38 per kilogram TREO, the project yields a pre-tax NPV at a 10% discount rate of \$220 million, and an after-tax NPV of \$133 million at the same discount rate. Total pre-tax and after-tax undiscounted cash flow is \$640 million and \$468 million, respectively.

Over the life of mine, the pre-tax and after-tax Internal Rate of Return (IRR) is 27.1% and 20.7%, respectively, with an after-tax payback period of approximately 4.6 years.

The economic analysis contained in this report is based, in part, on Inferred Resources, and is preliminary in nature. Inferred Resources are considered too geologically speculative to have mining and economic considerations applied to them and to be categorized as Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. There is no certainty that the reserves development, production, and economic forecasts on which this PEA is based will be realized.

#### SENSITIVITY ANALYSIS

Project risks can be identified in both economic and non-economic terms. Key economic risks were examined by running cash flow sensitivities on:

- Head Grade;
- Recovery;
- Rare Earth Oxide Prices;
- Operating Cost Per Tonne Milled, and
- Initial Capital Cost.

The rare earth element price sensitivity is based on results using a rare earth oxide base case price forecast, which equates to a \$38/kg net revenue basket price.

The pre-tax and after-tax NPV (at 10%) and IRR sensitivity analysis has been calculated for -15% to +35% variations, with the exception of head grade, which has a range of -20% to +20%, and recovery, which has a range of -15% to +20%. The sensitivities are shown in Table 1-3 and Figures 1-1 and 1-2. The NPV is most sensitive to rare earth oxide prices, followed by head grade and metallurgical recovery.



# TABLE 1-3SENSITIVITY ANALYSISSearch Minerals Inc. – Foxtrot Project

Sensitivity to Head Grade											
Factor	TREE	NPV @10%	NPV @10%	0% IRR IRR							
	%	Pre-Tax	After-Tax	Pre-Tax	After-Tax						
Base	0.89%	\$219,636	\$132,603	27%	21%						
0.80	0.71%	\$51,903	\$9,990	15%	11%						
0.90	0.80%	\$135,769	\$71,296	21%	16%						
1.00	0.89%	\$219,636	\$132,603	27%	21%						
1.10	0.98%	\$303,503	\$193,910	33%	25%						
1.20	1.07%	\$387,369	\$255,216	38%	29%						

#### Sensitivity to Recovery

Factor	REC	NPV @10%	NPV @10%	IRR	IRR
	%	Pre-Tax	After-Tax	Pre-Tax	After-Tax
Base	79%	\$219,636	\$132,603	27%	21%
0.85	67%	\$93,836	\$40,643	18%	14%
0.93	73%	\$156,736	\$86,623	23%	17%
1.00	79%	\$219,636	\$132,603	27%	21%
1.10	87%	\$303,503	\$193,910	33%	25%
1.20	95%	\$387,369	\$255,216	38%	29%

### Sensitivity to Market Price

Factor	Basket	NPV @10%	NPV @10%	IRR	IRR
	C\$/t	Pre-Tax	After-Tax	Pre-Tax	After-Tax
Base	\$38	\$219,636	\$132,603	27%	21%
0.85	\$31	\$71,324	\$24,187	16%	12%
0.93	\$34	\$145,480	\$78,395	22%	17%
1.00	\$38	\$219,636	\$132,603	27%	21%
1.18	\$45	\$392,666	\$259,088	38%	30%
1.35	\$53	\$565,696	\$385,573	48%	38%

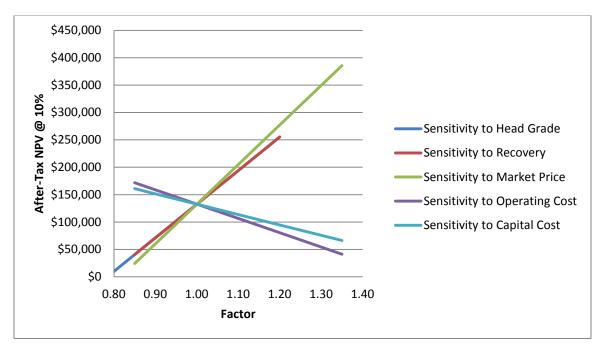
#### Sensitivity to Operating Cost

Factor	Opex	NPV @10%	NPV @10%	IRR	IRR
	C\$/t	Pre-Tax	After-Tax	Pre-Tax	After-Tax
Base	\$134	\$219,636	\$132,603	27%	21%
0.85	\$114	\$272,873	\$171,709	31%	24%
0.93	\$124	\$246,254	\$152,156	29%	22%
1.00	\$134	\$219,636	\$132,603	27%	21%
1.18	\$157	\$157,527	\$86,979	23%	17%
1.35	\$181	\$95,417	\$41,355	18%	14%



Sensitivity to Initial Capital Cost						
Factor	Capex	NPV @10%	NPV @10%	IRR	IRR	
	C\$'000s	Pre-Tax	After-Tax	Pre-Tax	After-Tax	
Base	\$221,210	\$219,636	\$132,603	27%	21%	
0.85	\$188,029	\$248,026	\$160,993	32%	25%	
0.93	\$204,619	\$233,831	\$146,798	29%	23%	
1.00	\$221,210	\$219,636	\$132,603	27%	21%	
1.18	\$259,922	\$186,514	\$99,481	23%	17%	
1.35	\$298,634	\$153,392	\$66,359	20%	14%	

#### FIGURE 1-1 AFTER-TAX NPV SENSITIVITY ANALYSIS





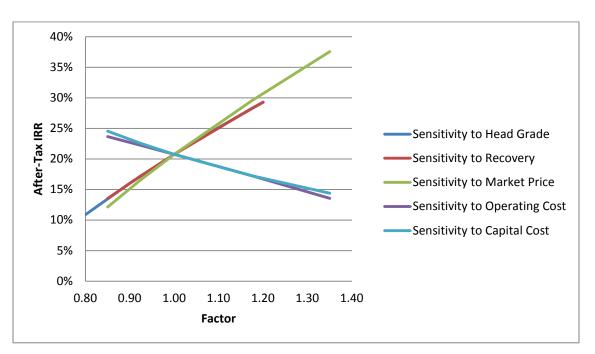


FIGURE 1-2 IRR SENSITIVITY ANALYSIS

#### CURRENT PRICE SENSITIVITY

RPA conducted a rare earth oxide price sensitivity using a current price forecast (Q1 2013), which equates to a \$44/kg net revenue basket price. The current prices used to analyze the model are presented in Table 1-4.



Rare Earth Oxide	FOB China Q1 2013 Spot* (US\$/kg)				
La <sub>2</sub> O <sub>3</sub>	11				
$Ce_2O_3$	11				
$Pr_2O_3$	80				
$Nd_2O_3$	78				
$Sm_2O_3$	26				
$Eu_2O_3$	1,500				
$Gd_2O_3$	50				
Tb <sub>4</sub> O <sub>7</sub>	1,230				
Dy <sub>2</sub> O <sub>3</sub>	700				
Ho <sub>2</sub> O <sub>3</sub>	-				
$Er_2O_3$	75				
$Tm_2O_3$	-				
Yb <sub>2</sub> O <sub>3</sub>	58				
$Lu_2O_3$	-				
$Y_2O_3$	38				

#### TABLE 1-4 CURRENT SPOT PRICES Search Minerals Inc. – Foxtrot Project

\* Source: Metal-Pages.com

At current prices, the undiscounted pre-tax cash flow in this case totals \$926 million. The pretax IRR is 36%, the after-tax IRR is 28%, and the NPVs are as follows:

The NPV at varying discount rates:

- Pre-tax \$361 million, and after-tax \$236 million at a 10% discount rate
- Pre-tax \$457 million, and after-tax \$294 million at an 8% discount rate
- Pre-tax \$577 million, and after-tax \$403 million at a 5% discount rate

### TECHNICAL SUMMARY

#### PROPERTY LOCATION

The Foxtrot Project is located in southeast Newfoundland and Labrador, Canada, centered at 580000E, and 5806000N, UTM Grid Zone 21N, NAD83. The Project is located approximately 36 km east southeast of Port Hope Simpson, Labrador, and approximately 10 km west of St. Lewis, Labrador.



#### LAND TENURE

The Foxtrot Project is centrally located on contiguous licenses under 20 different licences, with a total of 734 claim blocks, each 500 m by 500 m, covering an area of 18,350 ha. Licenses are either registered to Search Minerals or to Alterra Resources Inc. (Alterra), a wholly owned subsidiary of Search Minerals. No surface rights for construction or quarrying are known to exist. At the time of writing, all claims were held in good standing.

The Foxtrot Project Mineral Resource and proposed mine footprint are located on those parts of licenses 016944M, 016949M, and 016955M where they join.

#### LOCAL RESOURCES AND INFRASTRUCTURE

The nearby communities of Port Hope Simpson, St. Lewis, and Mary's Harbour have port access as well as airstrips that can facilitate transportation of goods required for exploration programs. St. Lewis has an ice-free harbour with deep water dock facilities and a small gravel airstrip suitable for small aircraft. Port Hope Simpson, St. Lewis, and Mary's Harbour, which have populations of approximately 500, 300, and 400 respectively, have various services including grocery stores, hardware stores, hotels, and heavy equipment for rent and labourers for hire.

There is no electricity available on the Project site. The closest source is diesel generated electricity in the town of St. Lewis, ten kilometres away.

Water sources are plentiful at the Property.

#### HISTORY

Search Minerals began actively trading on the TSX-V under the symbol SMY after it successfully acquired all outstanding shares of Alterra, and made it a wholly-owned subsidiary. Alterra holds approximately 4,000 mineral claims including claims in the Port Hope Simpson REE district (PHS), where the Foxtrot Project is located. Search Minerals began extensive exploration on the district in late 2009 after it entered into a binding letter of intent to acquire an undivided 100% interest in certain claims in southeast Labrador owned by B and A Minerals Inc. known as the Port Hope Simpson property. Subsequent staking acquired adjacent land, including the Fox Harbour volcanic belt and the Foxtrot Project.



Search Minerals began exploration on the Fox Harbour volcanic belt within the PHS in the winter of 2009, conducting an airborne radiometric and magnetometer survey completed by Aeroquest. The Foxtrot Project is a part of the Fox Harbour volcanic belt that exhibits elevated radiometric and magnetometer values.

Exploration in 2010 consisted of prospecting, mapping, lithogeochemical grab sampling, clearing, hand trenching, channel sampling with a portable circular saw, and diamond drilling. This exploration program was conducted across the entire Fox Harbour volcanic belt, with the main area of focus being the Foxtrot Project.

Search Minerals commenced a Phase I drill program at Foxtrot Project in Q4 2010. The Phase I drill program consisted of 23 drill holes totalling 3,955 m to a depth of 100 m and along two kilometres of strike. A Phase II drill program was completed in Q3 2011 and consisted of 20 drill holes totalling 4,083 m to a depth of 200 m along a 500 m strike.

A Phase III drill program commenced in Q4 2011 and was completed in Q1 2012, and consisted of 29 diamond drill holes totalling 10,896 m.

There are no historical resource or reserves estimates on the Foxtrot Project.

There has been no past production on the Foxtrot Project.

#### **GEOLOGY AND MINERALIZATION**

The Fox Harbour property contains three extensive east-west to north-west trending felsic volcanic belts (Road Belt, Mt Belt, and South Belt), extending upwards of 30 km in length, and 50 m to 500 m in width. These volcanic belts are largely bound by megacrystic granitic augen gneiss, which is variably mylonitized at contacts. The Foxtrot Project is located within the central volcanic belt. These volcanic belts are interpreted to be bi-modal mafic and felsic volcanic rocks, with intercalated volcaniclastic units located largely at contacts and within the mafic volcanic rocks. Mafic volcanic rocks contain large epidote pods, up to one metre by 0.5 m in length and width, along with differential weathering of individual layers, indicating a volcanic protolith. The felsic volcanic rocks have very consistent stratigraphy that can be followed based on the stratigraphic contacts, indicative weathering, mineralogy, geochemistry, magnetic susceptibility, aeromagnetic survey, and ground-based magnetic survey.



All phases of drilling targeted the Mt Belt, a zone of inter-layered bands of mafic and felsic volcanic units that lies between a mafic gneiss to the south and an augen gneiss to the north. This belt is predominantly felsic, with thinner bands of mafic volcanic rocks tending to separate thicker bands of felsic volcanic rocks.

All of the currently discovered mineralization with economic potential lies in the felsic bands of the Mt Belt, with the highest grades lying in a continuous band that has been locally designated as the FT3 Unit by Search Minerals geologists. Other continuous and semicontinuous bands of felsic rocks, such as the FT2, FT2x, FT3b, FT4, and FT5, contain REE mineralization that is either lower in grade or more spatially erratic/thinner.

The Fox Harbour felsic volcanic package is host to REE mineralization. The Foxtrot Project is the thickest currently identified occurrence of these volcanic rocks in the Fox Harbour area. Mineralization in the Foxtrot Project is largely allanite, zircon, chevkinite, and fergusonite. Higher-grade mineralization occurs within specific volcanic units that can be followed for tens of kilometres. These higher-grade zones are characterized by a dark groundmass, consisting of the mineral assemblage that includes all or some of the following minerals: magnetite, pyroxene, amphibole, amazonite, and biotite.

#### **EXPLORATION STATUS**

A Phase III exploration drill program was completed in Q1 2012 and consisted of 29 diamond drill holes totalling 10,896 m to a depth of 450 m along a 600 m strike. The drilling area focused on the thicker portion of FT3, which is approximately 10 m to 25 m true width; this is essentially the HGC unit. The current Mineral Resource estimate is based on data from all three phases of drilling.

#### MINERAL RESOURCES

RPA estimated Mineral Resources on the Foxtrot Project deposit using drill hole, channel, and assay data available as of April 2012. As of this cut-off date, a total of 14,837 assays were available, with a total length of 17,827 m.

The Mineral Resource estimate uses a cut-off grade of 130 ppm on dysprosium. Using preliminary assessments of metal prices and metallurgical recoveries, this reporting cut-off, which corresponds to 150 ppm on  $Dy_2O_3$ , produces an NSR value considerably higher than



the cost of mining and processing ore. Even with changes and uncertainties in the metal prices, recoveries and costs, material with more than 130 ppm Dy meets the requirement of the CIM Definition Standards that Mineral Resources have a reasonable prospect of economic extraction.

The resources have been constrained by an ultimate pit shell to ensure that it properly reflects a geometry that is amenable to open pit mining methods. Mineral Resources have been estimated to a vertical depth of 435 m, and remain open at depth.

Indicated Mineral Resources are estimated to total 9.23 Mt at 0.88% TREE (1.07% TREO), and Inferred Mineral Resources are estimated to total 5.17 Mt at 0.77% TREE (0.93% TREO) (Table 1-5).



Search Minerals Inc. – Foxilot Project							
		Central	Indicated Extensions	Total	Central	Inferred Extensions	Total
Tonnag	e (t)	9,229,000		9,229,000	3,291,000	1,874,000	5,165,000
-							
Element	Units	1 0 4 0		1 0 4 0	982	960	974
Y	ppm	1,040 1,646		1,040 1,646	962 1,564	1,183	974 1,426
La Ce	ppm	3,337		3,337	3,139	2,429	2,881
Pr	ppm	3,337		3,337	359	2,429	330
Nd	ppm	1,442		1,442	1,339	1,046	1,233
Sm	ppm ppm	262		262	245	197	228
Eu		13		13	12	9	11
Gd	ppm ppm	205		205	193	165	183
Tb	ppm	33		33	30	28	30
Dy	ppm	189		189	178	171	176
Ho	ppm	37		37	35	34	34
Er	ppm	103		103	98	98	98
Tm	ppm	15		15	14	15	14
Yb	ppm	92		92	88	95	91
Lu	ppm	14		14	13	15	14
Zr	ppm	9,619		9,619	9,538	10,987	10,064
Nb	ppm	626		626	585	455	538
LREE	%	0.71		0.71	0.66	0.51	0.61
HREE	%	0.17		0.17	0.16	0.16	0.16
TREE	%	0.88		0.88	0.83	0.67	0.77
	70	0.00		0.00	0.00	0.07	0.11
Oxide	Units						
$Y_2O_3$	ppm	1,320		1,320	1,247	1,219	1,237
$La_2O_3$	ppm	1,926		1,926	1,830	1,385	1,669
CeO <sub>2</sub>	ppm	4,105		4,105	3,861	2,988	3,544
$Pr_6O_{11}$	ppm	465		465	434	339	400
$Nd_2O_3$	ppm	1,687		1,687	1,567	1,224	1,442
Sm <sub>2</sub> O <sub>3</sub>	ppm	303		303	285	228	264
$Eu_2O_3$	ppm	15		15	14	10	13
$Gd_2O_3$	ppm	236		236	222	190	210
Tb <sub>4</sub> O <sub>7</sub>	ppm	38		38	36	33	35
$Dy_2O_3$	ppm	217		217	205	197	202
Ho <sub>2</sub> O <sub>3</sub>	ppm	42		42	40	39	39
$Er_2O_3$	ppm	118		118	112	112	112
$Tm_2O_3$	ppm	17		17	16	17	16
Yb <sub>2</sub> O <sub>3</sub>	ppm	105		105	100	109	103
$Lu_2O_3$	ppm	16		16	15	17	16
ZrO <sub>2</sub>	ppm	12,985		12,985	12,877	14,832	13,586
Nb <sub>2</sub> O <sub>5</sub>	ppm	789		789	737	573	677
LREO	%	0.85		0.85	0.8	0.62	0.73
HREO	%	0.21		0.21	0.2	0.19	0.2
TREO	%	1.07		1.07	1.05	0.81	0.93

# TABLE 1-5 MINERAL RESOURCE ESTIMATE – SEPTEMBER 30, 2012 Search Minerals Inc. – Foxtrot Project

Notes:

1. CIM definitions were followed for Mineral Resources.

2. Mineral Resources are estimated at a cut-off grade of 130 ppm Dy.

3. Numbers may not add due to rounding.

4. Heavy Rare Earth Elements (HREE) = Eu+Gd+Tb+Dy+Ho+Er+Tm+Yb+Lu+Y

5. Light Rare Earth Elements (LREE) = La+Ce+Pr+Nd+Sm

6. Total Rare Earth Elements (TREE) = sum of HREE and LREE



- 7. HREO, LREO refer to oxides of heavy and light rare earth elements respectively, and TREO is the sum of HREO and LREO.
- 8. Resources have been estimated inside a preliminary pit shell.

An HGC within the Mineral Resource was identified, corresponding to the largest and most consistent felsic band within the deposit. It was wireframed separately to allow mine designs to focus on selective mining of the highest grade portions of the deposit. HGC Indicated Resources are estimated to total 3.42 Mt at 1.04% TREE, and HGC Inferred Resources are estimated to total 0.66 Mt at 1.03% TREE. HGC resources are a subset of the Mineral Resources estimated for the Project, using the same block model, cut-off grade, and other estimation parameters.

#### **MINING METHODS**

RPA investigated the potential for a combined open pit – underground mining scenario targeting the delineated REE HGC within the whole REE mineralization. The mining of both the Indicated and Inferred Mineral Resources was considered, using REE prices appropriate for a PEA. Open pit (OP) and underground (UG) mining were evaluated with run of mine (ROM) material being processed at a rate of 1,500 tpd or 540,000 tpa in a process plant on site producing a mixed rare earth oxalate concentrate. At estimated operating costs, underground mining was found to be more profitable than open pit mining beneath a depth of approximately 100 m from surface.

Open pit mining of REE bearing material and waste will be carried out by contractors to keep the initial capital as low as possible, and because of the relatively short duration of open pit operations. No pre-stripping of overburden is required above the open pit footprint as the deposit is exposed on surface.

The open pit contract mining will be carried out using conventional open pit mining methods consisting of drilling, blasting, loading, and hauling operations. The production equipment will be supported by bulldozers, graders, and water trucks.

The underground mine will be owner-operated. Pre-production capital (equipment fleet and development) will be spent during open pit operations, allowing funding via operating profit. The mining method to be used is longhole mining with principally transverse access from the deposit hanging wall through to the footwall. Given the HGC is steeply dipping north (or subvertical), accessing stopes this way was to take advantage from the lower surface elevation



to the north for some underground infrastructure (less vertical development). Some longitudinal accesses are planned where deposit width is less than eight metres. Paste fill will be placed in all primary stopes. Secondary stopes will all be backfilled with unconsolidated rockfill, which will be sourced from open pit and underground development waste.

The mining sequence will proceed upward from two mining horizons following an inverted Vshape, progressing vertically from bottom-up and longitudinally from the middle to the edges of the deposit. The 20 m crown pillar under the bottom of the pit is recovered by drilling upward from the highest underground level at the end of the LOM. Underground mining will consist of development and production drilling, ground support, blasting, loading, hauling, and backfilling activities. The stationary equipment required for the mining will be comprised of main and secondary fans combined with a propane heating system for ventilation needs, air compressors, and a mine dewatering infrastructure (pumping stations, sumps, and pumps).

Open pit possibilities were investigated by pit optimization/floating cone analysis using Whittle software on the REE HGC within the resource block model. Pit slope angles were selected based on an industry average of 45°. Pit optimizations were performed based on typical costs for comparable operations and projects of a similar scale, and indicated that a significant proportion of the HGC would be economic to mine using open pit methods.

To determine where underground mining would be more profitable than open pit mining, the trade-off process consisted of the following:

- Estimation of break-even strip ratios, based on operating cost ratios, above which underground turns more profitable than open pit.
- Phasing/discarding pit expansions with actual strip ratios greater than break-even strip ratios, within selected pit shells.
- Selection of the final pit shell under which the underground mine concept would be established.
- Addition of REE bearing blocks outside the HGC to mill feed through elevated NSR cut-off within the final pit shell, as non-HGC material with higher REE grades exhibits positive NSR.



Production quantities total 5.32 Mt, at a grade of 0.89% TREE or a \$320/t NSR value, from both open pit and underground mines.

From the open pit mine, mill feed tonnage is 1.86 Mt grading 0.76% TREE (\$269/t NSR), including dilution of the mineralized felsic material with the intercalated mafic material in each block (assumed to be zero grade). The mafic material portion within mill-feed blocks in the final pit shell supporting the above tonnage is equivalent to an internal dilution of approximately 35%. A 100% mining recovery factor was applied. Material deemed as waste within the pit shells totals 3.27 Mt, resulting in an average stripping ratio of 1.76:1. The proportion of Inferred Resources in the material that may be potentially mineable via open pit is approximately 80%.

Underground, the total diluted and recovered tonnage is 3.46 Mt grading 0.96% TREE (\$347/t NSR). Dilution and mining extraction factors of 15.1% and 90% were applied to HGC REE bearing material within the design stoping volume. The dilution factor represents the combined sloughing thicknesses assumed from both the hanging wall and footwall sides of the HGC (or stopes), and is expressed as an average thickness totalling 1.5 m. The diluting material grade was estimated (using the resource block model) to be 0.38% TREE (\$136/t NSR) within a 15 m halo surrounding the HGC.

Highlights of the production schedule are as follow:

- Project pre-production period of two years.
- Short ramp-up to full production in year one for the 3.5 year open pit mining.
- Ramp-up to full production in year four for the 6.5 year underground mining overlapping with OP phase-out.
- Production of 540,000 tonnes per year, or 1 500 tpd.
- OP waste and lower grade REE material mining average of 950,000 tonnes per year.
- OP lower grade REE material considered as waste exhibiting a positive NSR (potentially could be processed at a later date).

#### MINERAL PROCESSING AND METALLURGICAL TESTING

Three beneficiation techniques were studied in order to concentrate the REE in the Foxtrot sample, including Wilfley tabling, magnetic separation, and flotation. The work was preliminary in nature.



The metallurgical process has been studied from initial recovery of a REE concentrate through to the purification of a leach solution and precipitation of a mixed product. Average recovery used was 79%. These results show that conventional beneficiation methods may be used to recover the REE minerals. Additional testwork using more selective beneficiation or incorporation of cleaning steps in the circuit may improve recoveries.

The recommended process will utilize the crushing, grinding, gravity recovery, magnetic separation, flotation, water leaching, acid bake, and solution purification to recover a mixed REE oxalate product.

Ore will be crushed, ground and screened to produce a suitable sized product for gravity recovery. The product will be subjected to magnetic separation to remove magnetite. The tailings from the gravity recovery step will be subjected to flotation to increase REE recovery.

The non-magnetics and the flotation concentrate will be combined and sent to acid baking, and then to a water leaching step. The product from water leaching will go to solid liquid separation, with the REE containing solution sent to solution purification. After solution purification, oxalic acid will be added to the remaining solution to form a REE containing precipitate. This precipitate will be sent to solid/liquid separation to provide a solid mixed REE oxalate product, and a liquid residue.

#### ENVIRONMENTAL, PERMITTING, AND SOCIAL CONSIDERATIONS

The Project will require environmental baseline study work to support permitting efforts and assist in Project design to avoid or minimize potential adverse effects. No baseline work has been completed to date.

Mining projects in the Province of Newfoundland and Labrador are subject to Environmental Assessment (EA) under the Newfoundland and Labrador Environmental Protection Act. They can also be subject to an environmental assessment under the Canadian Environmental Assessment Act (CEAA) if an approval is required from a federal agency. All provincial and federal EA processes are public.

Search Minerals has initiated a community and Aboriginal consultation process. On August 27, 2012 Search Minerals announced that a Mining Exploration Activities Agreement was signed with the NunatuKavut Community Council (NCC), the political representative body of



the Inuit of South-Central Labrador. Key elements in the agreement address environmental protocols and protection for matters of historic values. The agreement highlights hiring and business opportunities for NunatuKavut members and surrounding communities, and Search Minerals' commitment to make an annual payment to the NCC. Search Minerals also reports that it has held meetings with local community councils in St. Lewis, Port Hope Simpson, and Mary's Harbour, and made presentations to local groups in Goose Bay and Port Hope Simpson.

A formal Rehabilitation and Closure Plan is required to obtain approval for project development under the Newfoundland and Labrador Mining Act. This plan is required to be submitted with or immediately following the submission of the Project Development Plan and provides the basis for the establishment of the Financial Assurance for the Project. The Mining Act requirements will only be reviewed following release of the project from Environmental Assessment, and the review and approval process can typically take four months to one year.

While RPA has not completed a closure plan for the Project, an allowance of \$15 million has been included in the current cash flow. This estimate is based on comparison to similar projects.

#### MARKETS

The market for rare earth products is small and public information on price forecasts and sales terms are difficult to obtain. Current prices are tracked by sources such as Asian Metal and Metal-Pages, based on transactions.

Recent history shows international rare earth market prices growing at an unprecedented rate since China cut export quotas by approximately 40% in 2011, then falling throughout 2012 and into 2013. China's overwhelming control on the rare earth supply chain, from upstream mining to downstream processing and end-user products, is likely to remain intact on all but a few materials through 2016. Rare earth prices are expected to remain volatile in the short term.

Price forecasting in this environment is difficult, and certain to contain wide margins of error.



A small number of REE producers outside of China are likely to be in operation by the time the Foxtrot Project is developed. This is expected to saturate the market for some LREO such as lanthanum and cerium, however, demand for high-value HREO (such as dysprosium) is expected to grow, and supply is expected to remain in deficit. Revenue for the Foxtrot Project is dominated by dysprosium, neodymium, and terbium, elements that are projected to remain in supply deficit.

Rare earth prices remain unchanged from the previous PEA, when they were selected from the low end of a range of available forecasts, averaging \$38/kg of REO (net of separation charges). Q1 2013 spot prices, for comparison, average \$44/kg REO (net).

RPA considers these rare earth prices to be appropriate for a PEA-level study, however, RPA notes that the recent market volatility introduces considerably more uncertainty than a comparable base or precious metals project. This uncertainty is mitigated to some extent, by the selection of conservative rare earth pricing.

#### CAPITAL AND OPERATING COST ESTIMATES

#### CAPITAL COSTS

The mine, mill, and site infrastructure costs are summarized in Table 1-6.

Cost Area	Initial (C\$ million)	Sustaining (C\$ million)
Surface Infrastructure	34.4	13.3
OP Mining	2.1	0.1
UG Mining	0.0	59.9
Processing	70.0	3.1
Tailings	10.0	4.0
EPCM	17.4	9.7
Owner's/Indirect Costs	29.1	6.5
Contingency	48.9	24.4
Rehabilitation & Mine Closure	0.0	14.9
Working Capital	9.3	(9.3)
Total	221.2	126.6

# TABLE 1-6 CAPITAL COST SUMMARY Search Minerals Inc. – Foxtrot Project

The initial capital cost and the sustaining capital are \$221.2 million and \$126.6 million, respectively. The working capital totals \$9.3 million and is fully recovered during the last



year of the LOM. The total capital cost, including initial and sustaining capital, is \$347.8 million.

The required underground mine capital cost totals \$60.0 million and is considered to be a sustaining capital cost as it occurs after production has begun and is to be funded by open pit operations.

Capital costs were estimated using cost models, unit prices, suppliers' budget quotes, preliminary designs, general industry knowledge and experience, and other information from recent similar projects.

Engineering, procurement, and construction management (EPCM), indirects, and contingency for all capital cost components vary depending on cost area. In order to estimate these components specific factors were applied. A 15% and 25% factor was applied to initial capital in order to calculate EPCM and indirects, respectively. To estimate contingency, a 30% factor was applied to directs, indirects, and EPCM. The initial costs for EPCM and indirects are \$17.4 million and \$29.1 million, respectively, and contingency is \$48.9 million.

In order to calculate contingency for UG mine capital, a factor of 10% was applied to the total initial UG mine capital of \$60.0 million and to the initial \$5.0 million in surface infrastructure, as that cost relates specifically to the UG mine only. Therefore the total contingency for UG mine capital totals \$6.5 million.

#### **OPERATING COSTS**

Mine life average operating unit costs for the Project are shown in Table 1-7.

Cost area	OP Unit Cost (C\$/t milled)	UG Unit Cost (C\$/t milled)	LOM Unit Cost (C\$/t milled)
Mining (Contractor/Owner)	26.75 <sup>(1)</sup>	58.58	47.45
Processing	70.00	70.00	70.00
G&A	11.11	19.36	16.54
Total operating cost	107.86	147.94	133.99

#### TABLE 1-7 UNIT OPERATING COSTS SUMMARY Search Minerals Inc. – Foxtrot Project

Notes:

1. Derived from an OP mining cost of \$9.70/t moved on a contract basis.



Mine operating costs were estimated using cost models, unit prices, suppliers' budget quotes, general knowledge and experience, preliminary designs, and other information from recent similar projects.

Process operating costs were estimated using similar rare earth projects in similar geopolitical jurisdictions, and include consideration for diesel power generation, maintenance, reagents and other consumables.

General and administration expenses (G&A) comprise the cost of administration services and staff, as well as management-level human resources for engineering, geology, environment, and construction. Also included are the room and board costs and fly-in/fly-out traveling fees for non-local employees. The remaining costs are for material and supplies, some consultants, insurance and taxes, and communications.



## **2 INTRODUCTION**

Roscoe Postle Associates Inc. (RPA) was retained by Search Minerals Inc. (Search Minerals) to prepare an independent Technical Report on the Foxtrot Rare Earth Element (REE) Project (Foxtrot Project) near Port Hope Simpson, Labrador, Canada. The purpose of this report is to disclose the results of a Preliminary Economic Assessment (PEA) on Search Minerals' Foxtrot Project. This Technical Report conforms to National Instrument 43-101 (NI 43-101) Standards of Disclosure for Mineral Projects. RPA visited the Foxtrot Project site and field house on October 27, 2011.

Search Minerals is a public company that trades on the TSX Venture Exchange under the symbol SMY. Search Minerals is currently exploring 19 prospects on three REE properties in Labrador, Canada and holds additional properties in Newfoundland.

This PEA is based on previously disclosed Mineral Resources and evaluates a combined open pit and underground mining approach along with processing by gravity, magnetic separation, and flotation concentration, followed by acid baking and water leaching, producing a mixed rare earth oxalate concentrate. The pre-production period will be two years and the mine life will be ten years. The processing rate will be 1,500 tpd with an average mill recovery of 79%.

#### SOURCES OF INFORMATION

Jacques Gauthier, P.Eng., RPA Principal Mining Engineer, and Rick Breger, Benchmark Six Inc. (Benchmark Six) Geologist, visited Search Mineral's Foxtrot Project on October 27, 2011. On site Mr. Gauthier and Mr. Breger observed exploration activities and visited the Project's field house to examine core.

Discussions were held with personnel related to the Project:

- Mr. James D. Clucas, President, CEO, Director, Search Minerals Inc.
- Dr. David B. Dreisinger, Ph.D., Vice President Technology, Director, Search Minerals Inc.



- Dr. Randy Miller, Ph.D., P.Geo, Vice President Exploration, Search Minerals Inc.
- James Haley, B.Sc., Project Geologist, Search Minerals Inc.
- Michael Upshall, GIS Analyst, Search Minerals Inc.
- Rob Hoffman, Lithogeochemistry Manager, Activation Laboratories Ltd.
- Nicole Devereaux, Geologist, Search Minerals Inc.

Mr. Jason Cox, P.Eng., RPA Director of Mine Engineering, oversaw preparation of the PEA cash flow and has overall responsibility for this report. Mr. R. Mohan Srivastava, P.Geo, associate consulting geologist with RPA, and President of Benchmark Six, has reviewed all of the data and information gathered during the site visit and has responsibility for the resource estimation. Mr. Gauthier is responsible for mining and infrastructure portions of the report, including cost estimation for those areas. Mr. Holger Krutzelmann, P.Eng., RPA Vice President of Metallurgy and Environment, is responsible for reviewing metallurgical aspects of the Project.

The documentation reviewed, and other sources of information, are listed at the end of this report in Section 27 References.

## RARE EARTH ELEMENTS

In this report, the following abbreviations are used:

- Heavy Rare Earth Elements (HREE) = Eu+Gd+Tb+Dy+Ho+Er+Tm+Yb+Lu+Y
- Light Rare Earth Elements (LREE) = La+Ce+Pr+Nd+Sm
- Total Rare Earth Elements (TREE) = sum of HREE and LREE

LREO and HREO refer to oxides of light and heavy rare earth elements respectively. In this document, TREO (Total Rare Earth Oxides) refers to LREO and HREO collectively.



#### LIST OF ABBREVIATIONS

Units of measurement used in this report conform to the Metric system. All currency in this report is Canadian dollars (C\$) unless otherwise noted.

		1	
а	annum	lb	pound
А	ampere	LREE	light rare earth elements
bbl	barrels	LREO	light rare earth oxides
btu	British thermal units	L/s	litres per second
			•
°C	degree Celsius	m	metre
C\$	Canadian dollars	M	mega (million); molar
cal	calorie	m <sup>2</sup>	square metre
cfm	cubic feet per minute	m <sup>3</sup>	cubic metre
cm	centimetre		micron
		μ	
cm <sup>2</sup>	square centimetre	MASL	metres above sea level
d	day	μg m³/h	microgram
dia	diameter	m³/h	cubic metres per hour
dmt	dry metric tonne	mi	mile
dwt	dead-weight ton	min	minute
°F	degree Fahrenheit		micrometre
	-	μm	
ft	foot	mm	millimetre
ft <sup>2</sup>	square foot	mph	miles per hour
ft <sup>3</sup>	cubic foot	MVA	megavolt-amperes
ft/s	foot per second	MW	megawatt
	gram	MWh	megawatt-hour
g G	giga (billion)	oz	Troy ounce (31.1035g)
		-	
Gal	Imperial gallon	oz/st, opt	ounce per short ton
g/L	gram per litre	ppb	part per billion
Gpm	Imperial gallons per minute	ppm	part per million
g/t	gram per tonne	psia	pound per square inch absolute
gr/ft <sup>3</sup>	grain per cubic foot	psig	pound per square inch gauge
gr/m <sup>3</sup>	grain per cubic metre	REE	rare earth element
ha	hectare	REO	rare earth oxide
hp	horsepower	RL	relative elevation
hr	hour	S	second
HREE	heavy rare earth elements	st	short ton
HREO	heavy rare earth oxides	stpa	short ton per year
Hz	hertz	stpd	short ton per day
in.	inch	l t '	metric tonne
in <sup>2</sup>	square inch	tpa	metric tonne per year
	•		
J	joule	tpd	metric tonne per day
k	kilo (thousand)	TREE	total rare earth elements
kcal	kilocalorie	TREO	total rare earth oxides
kg	kilogram	US\$	United States dollar
km	kilometre	USg	United States gallon
km <sup>2</sup>	square kilometre	USgpm	US gallon per minute
km/h	kilometre per hour	V	volt
kPa	kilopascal	W	watt
kVA	kilovolt-amperes	wmt	wet metric tonne
kW	kilowatt	wt%	weight percent
kWh	kilowatt-hour	yd <sup>3</sup>	cubic yard
L	litre	yr	year
-		i 7.	<b>,</b> 1



## **3 RELIANCE ON OTHER EXPERTS**

This report has been prepared by RPA for Search Minerals. The information, conclusions, opinions, and estimates contained herein are based on:

- Information available to RPA at the time of preparation of this report,
- Assumptions, conditions, and qualifications as set forth in this report, and
- Data, reports, and other information supplied by Search Minerals and other third party sources.

For the purpose of this report, RPA has relied on ownership information provided by Search Minerals. RPA has not researched property title or mineral rights for the Foxtrot Project and expresses no opinion as to the ownership status of the property.

RPA has relied on publicly available information with respect to tax rates and rules applicable to the Project. This may include, but is not limited to, any associated municipal, provincial, state, and federal taxes, royalties and other production-based taxes, and other applicable laws that would allow for the modification of taxes applicable to the project. No information was provided by the Client regarding the tax rates or rules and as such the tax modeling in the cash flow should only be taken as a guide.

Except for the purposes legislated under provincial securities law, any use of this report by any third party is at that party's sole risk.



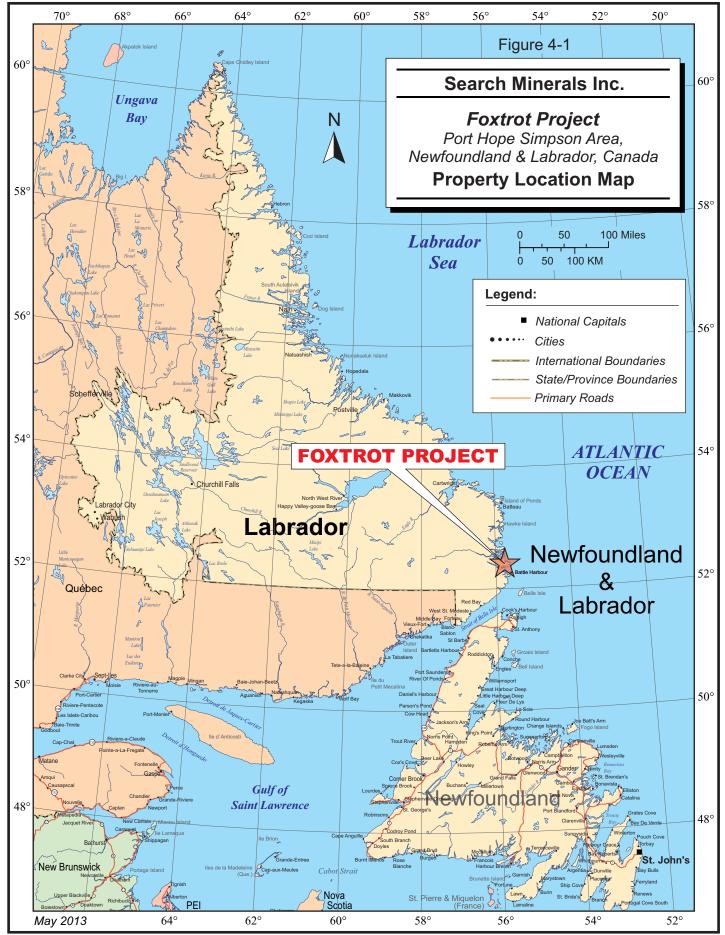
## **4 PROPERTY DESCRIPTION AND LOCATION**

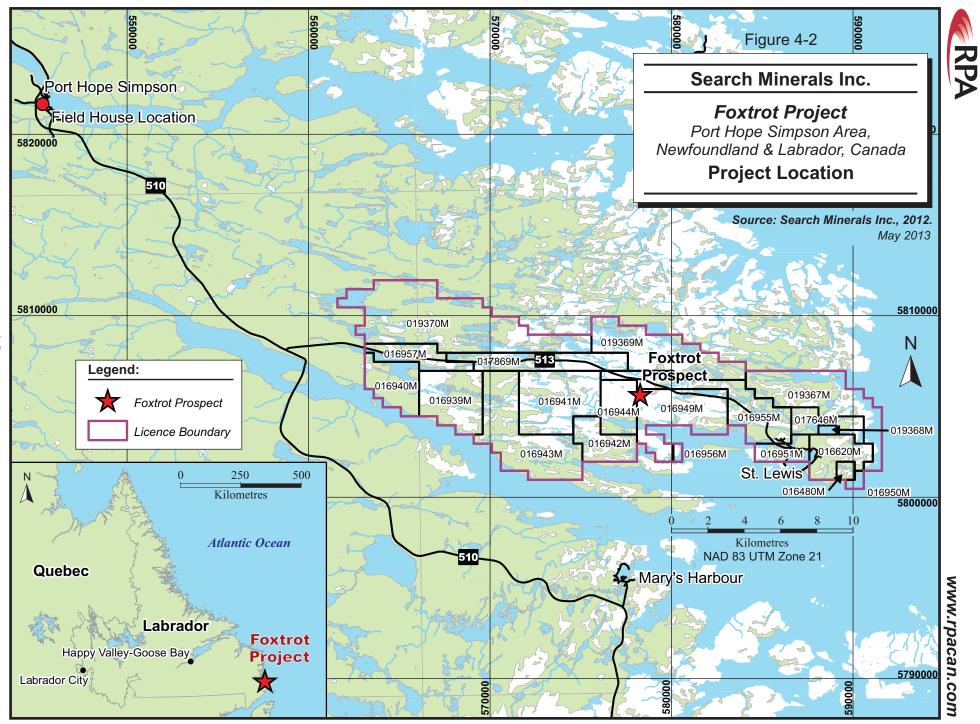
### PROPERTY DESCRIPTION

Search Minerals began to acquire property in the Port Hope Simpson area in 2009 when it announced it had entered into a binding letter of intent with B and A Minerals Inc. to acquire an undivided 100% interest in their Port Hope Simpson property. Additional property was staked shortly after (by Alterra/Search Minerals) to acquire the adjacent Fox Harbour volcanic belt, which contains the Foxtrot Project, based on Search's REE exploration model. Since then the company has conducted exploration programs at the Foxtrot Project drilling approximately 19,000 m to a depth of 450 m.

The Foxtrot Project is located in southeast Labrador, Canada, centered at 580000E, and 5806000N, UTM Grid Zone 21N, NAD83 (Figures 4-1 and 4-2). The Project is located approximately 36 km east-southeast of Port Hope Simpson, Labrador, and approximately ten kilometres west of St. Lewis, Labrador.







4-3



## CLAIMS, STANDING, AND LAND TENURE

The Foxtrot Project is centrally located on 20 contiguous licences, comprised of a total of 734, 500 m by 500 m, claims covering an area of 18,350 ha. Licenses are either registered to Search Minerals or to Alterra Resources Inc. (Alterra), a wholly owned subsidiary of Search Minerals. No surface rights for construction or quarrying are known to exist. At the time of writing, all licenses are held in good standing. Licence details and statistics are summarized in Table 4-1.

Licence Number	Number of Claims	Area (ha)	Issuance Date	Renewal Date	Next Work Due	Expenditures Required (\$)
016939M	43	1.075	12/21/09	12/21/14	12/21/13	7,348.07
016940M	30	750	12/21/09	12/21/14	12/21/13	8,130.37
016941M	57	1.425	12/21/09	12/21/14	12/21/13	6,579.84
016942M	25	625	12/21/09	12/21/14	12/21/13	4,238.36
016943M	73	1.825	12/21/09	12/22/14	12/22/13	18,326.84
016944M	24	600	12/22/09	12/22/14	12/22/21	21,600.00
016949M	53	1.325	12/24/09	12/24/14	12/24/21	47,700.00
016950M	3	75	12/24/09	12/24/14	12/24/17	1,405.76
016951M	14	350	12/24/09	12/24/14	12/24/13	640.71
016955M	52	1.300	12/28/09	12/28/14	12/28/21	46,800.00
016956M	2	50	12/28/09	12/28/14	12/28/15	471.57
016957M	22	550	12/28/09	12/28/14	12/28/13	3,247.67
017869M	37	925	08/04/10	08/04/15	08/04/14	2,879.18
016480M	4	100	09/17/09	09/17/14	09/17/15	2,376.62
016620M	26	650	11/02/09	11/02/14	11/02/13	1,334.03
017646M	18	450	05/15/10	05/14/15	05/14/16	1,239.14
019367M	62	1.550	09/28/11	09/28/16	09/28/13	59.40
019368M	2	50	09/28/11	09/28/16	09/28/14	140.20
019369M	62	1.550	09/28/11	09/28/16	09/28/13	355.83
019370M	125	3.125	09/28/11	09/28/16	09/28/13	5,445.64
TOTAL	734	18.350				180,319.23

# TABLE 4-1 SUMMARY OF LICENCE AND CLAIM BLOCK STATISTICS Search Minerals Inc. – Foxtrot Project

### ENVIRONMENTAL STATUS AND PERMITTING

Permits must be obtained for drilling, trenching, and water use. Activities that only require notification include geology, prospecting, ground geophysics, and all forms of geochemistry and line cutting. Applications for permits and notifications are submitted to the Government of Newfoundland and Labrador, Department of Natural Resources, Mines Branch, Mineral Lands Division.



Search Minerals was fully permitted to conduct all work performed during the 2010, 2011, and 2012 exploration programs and remains fully permitted to conduct all current work being done.



## 5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

### ACCESSIBILITY

The Foxtrot Project is located approximately 36 km east southeast of Port Hope Simpson, and approximately 10 km west northwest of St. Lewis, Labrador. The majority of the property is accessible via Highway 513, which is an all season gravel highway. Properties not adjacent to the roadside are within walking distance. Diamond drill hole locations on licenses 016955M, 016944M and 016949M are located up to approximately 0.5 km from the adjacent Highway 513.

Travel to the mine site from Goose Bay is available via charter plane, helicopter, and road. Goose Bay is a preferred hub as it is regularly serviced from eastern Canadian cities including Quebec City and Montreal, Quebec and Halifax, Nova Scotia. Flight time from the exploration site to Goose Bay by helicopter is approximately two hours, and by plane approximately one hour. Road travel from Goose Bay to mine site is approximately six hours. The mine site is also accessible via road to the Strait of Belle Isle and via a short ferry trip to insular Newfoundland. The flight time to Newfoundland is approximately half an hour.

### CLIMATE

Port Hope Simpson is subject to a maritime climate. During the six month field season, temperatures range from an average low of -1 °C in May, to an average high of 18 °C in July and August. Over the same time period, average monthly precipitation ranges from 64 mm in May, to 92 mm in June. Average monthly snowfall in May and June are 8 cm and 3 cm, respectively; snow is not expected in the remaining months of the field season. Drilling activities can occur all year around due to relatively mild winters.

### LOCAL RESOURCES AND INFRASTRUCTURE

The nearby communities of Port Hope Simpson, St. Lewis and Mary's Harbour have port access as well as airstrips that can facilitate transportation of goods required for exploration programs. St. Lewis has deep water dock facilities and a small gravel airstrip suitable for small aircraft. Port Hope Simpson, St. Lewis, and Mary's Harbour, which have populations of



approximately 500, 300, and 400 respectively, have various services including grocery stores, hardware stores, hotels and, heavy equipment for rent and labourers for hire.

There is no electricity available on the Project site. The closest source is diesel generated electricity in the town of St. Lewis, 8 km away.

Water sources are plentiful at the Property.

### PHYSIOGRAPHY

Elevation ranges from sea level to approximately 100 m. Topography is rugged with generally east-west striking ridges and hills with low lying areas containing rivers, ponds and brooks that generally drain east into St. Lewis Inlet. As an ecoregion, the property can be classified as 'Coastal Barrens' with the majority of the property being scrubland. Vegetation consists of isolated black and white spruce stands in sheltered valleys, mosses, lichens, and Labrador tea in more barren areas and lichen-covered bedrock in higher areas and along ridges.



## 6 HISTORY

In 2008, Search Minerals began actively trading on the TSX Venture Exchange under the symbol SMY after it successfully acquired all outstanding shares of Alterra, now a wholly-owned subsidiary. Alterra holds approximately 4,000 mineral claims including claims in the Port Hope Simpson (PHS) REE district, where the Foxtrot Project is located. Search Minerals began extensive exploration in the district in 2009 after it entered into a binding letter of intent to acquire an undivided 100% interest in certain claims in southeast Labrador owned by B and A Minerals Inc. known as the Port Hope Simpson property. Subsequent staking acquired adjacent land, including the Fox Harbour volcanic belt and the Foxtrot Project.

There are no historical resource or reserve estimates on the Foxtrot Project.

There is no past production on the Foxtrot Project.



## 7 GEOLOGICAL SETTING AND MINERALIZATION

## **REGIONAL GEOLOGY**

The Foxtrot Project occurs adjacent and within the boundaries of three tectonic terranes within the eastern Grenville Province, Labrador. Terranes include the Lake Melville terrane, Mealy Mountain terrane and the Pinware terrane, from north to south, respectively. Differing lithologies, structures, and metamorphic signatures distinguish these terranes from one another; they are largely separated and defined by major fault zones (Gower et al., 1987, 1988; Gower, 2010; Hanmer and Scott, 1990).

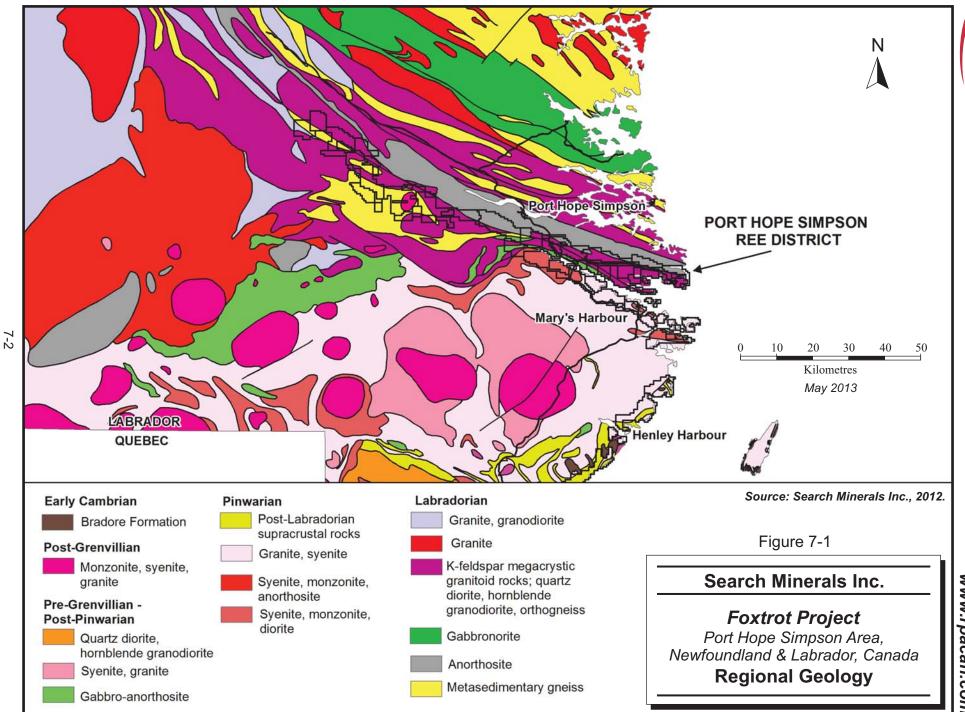
The Foxtrot Project is located adjacent to the south of the Lake Melville terrane, also referred to as the Gilbert River Belt, to the southeast. This terrane is characterized by the Alexis River anorthosite, biotite-bearing granite, granodiorite, and quartz diorite to diorite gneiss (Gower et al., 1987, 1988; Gower 2010; Hanmer and Scott, 1990). The Fox Harbour fault zone is thought to separate the Lake Melville terrane from the Pinware terrane to the south.

The Mealy Mountain terrane occurs to the northwest of the Foxtrot Project. This terrane contains mostly biotite granitic gneiss, potassium feldspar megacrystic granite gneiss, quartz diorite to dioritic gneisses and pelitic to semipelitic sedimentary gneisses (Gower et al., 1987, 1988; Gower, 2010).

The Pinware domain, in the St. Lewis Inlet area, consists of metamorphosed felsic to intermediate intrusions and older intercalated quartzo-feldspathic supracrustal rocks. Intrusions consist mainly of granite, k-feldspar megacrystic granite, quartz monzonite, granodiorite and supracrustal rocks consisting mainly of felsic volcanic rocks and arenitic sediments (Gower, 2007, 2010).

Granitic pegmatites cut most units in the region, but are largely absent from the Fox Harbour area.

Figure 7-1 presents the Foxtrot Project regional geology.

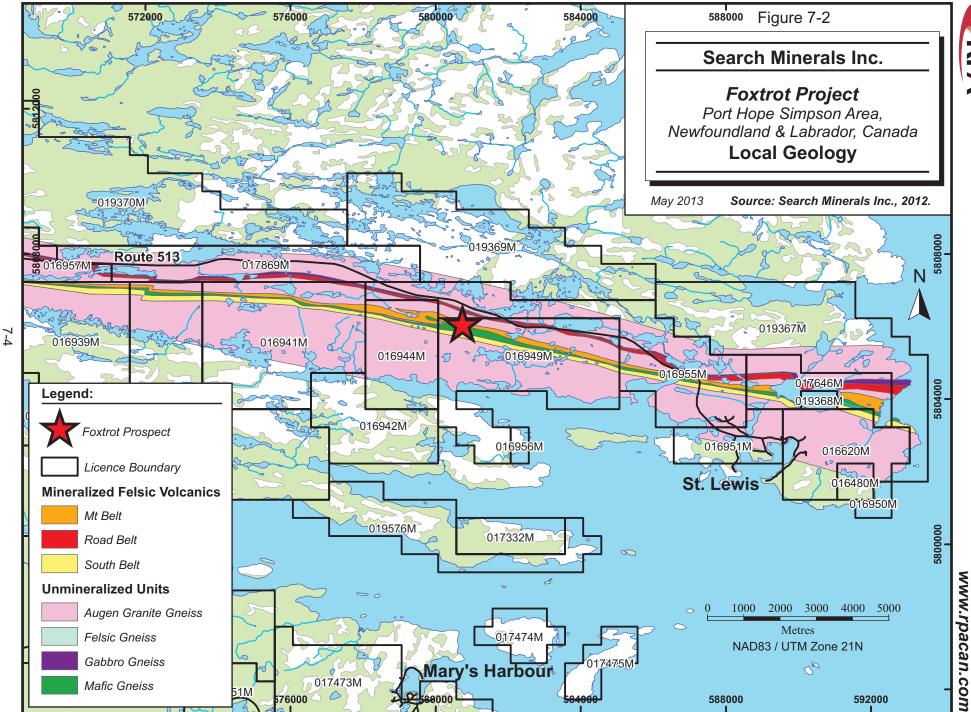


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## LOCAL GEOLOGY

The Foxtrot Project contains three extensive east-west to northwest trending felsic volcanic belts (Road Belt, Mt Belt, and South Belt), extending upwards of 30 km in length, and approximately 50 m to 500 m in width (Figure 7-2). These volcanic belts are largely bound by megacrystic granitic augen gneiss, which is variably mylonitized at contacts. The Foxtrot Project is located within the central volcanic belt (Mt Belt). These volcanic belts are interpreted to be bi-modal mafic and felsic volcanic rocks, with intercalated volcaniclastic units located largely at contacts and within the mafic volcanic units. Mafic volcanic units contain large epidote pods, up to one metre by 0.5 m in length and width, along with differential weathering of individual layers, indicating a volcanic protolith. The felsic volcanic units have very consistent stratigraphy that can be followed based on the stratigraphic contacts, indicative weathering, mineralogy, geochemistry, magnetic susceptibility, aeromagnetic survey, and ground-based magnetic survey.



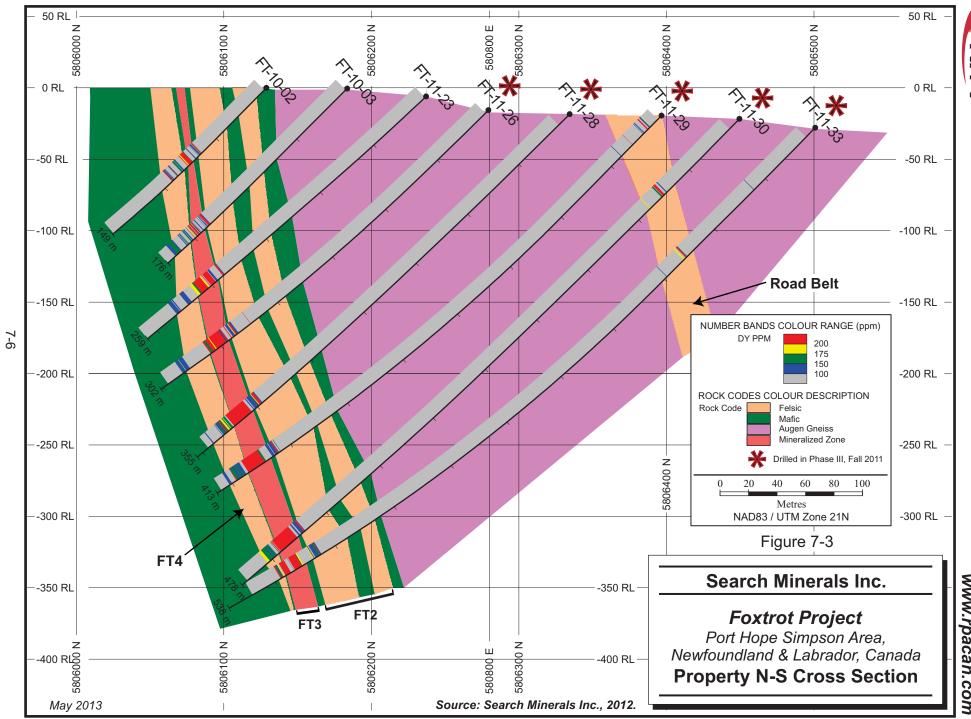
**RPA** 



## PROPERTY GEOLOGY

All phases of drilling targeted the Mt Belt (Figure 7-2), a zone of inter-layered bands of mafic and felsic volcanic rocks that lies between a mafic gneiss to the south and an augen gneiss to the north. As shown in Figure 7-3, this belt is predominantly felsic, with thinner bands of mafic volcanic units tending to separate thicker bands of felsic volcanic units.

All of the currently discovered mineralization with economic potential lies in the felsic bands of the Mt Belt, with the highest grades lying in a continuous band that has been locally designated as the FT3 Unit by Search Minerals geologists. The HGC (high-grade core), a volume identified within the larger resource model, approximates the FT3 Unit, with minor differences due to the application of grade and minimum width criteria. Other continuous and semi-continuous bands of felsic rocks, such as the FT2, FT2x, FT3b, FT4, and FT5, contain REE mineralization that is either lower in grade or more spatially erratic/thinner.



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## RARE EARTH MINERALIZATION

The Fox Harbour bi-modal felsic and mafic volcanic package is host to REE mineralization. The Foxtrot Project is the thickest explored occurrence of these volcanic rocks in the Fox Harbour area. Mineralization in the Foxtrot Project is largely allanite, zircon, chevkinite, and fergusonite. Higher-grade mineralization occurs within specific volcanic packages that can be followed for tens of kilometres. These high-grade zones are characterized by a dark groundmass, consisting of the mineral assemblage that includes all or some of the following minerals: magnetite, pyroxene, amphibole, amazonite, and biotite.



## 8 DEPOSIT TYPES

The Foxtrot Project REE deposit type has not been previously described. It is not peralkaline in nature but is closely related to that deposit type as described below by the Newfoundland and Labrador Geological Survey Mineral Commodity Series (2011):

Rare-earth elements and rare-metal deposits in peralkaline suites define two end-membertypes that are respectively dominated by magmatic and metasomatic-hydrothermal processes, but many deposits exhibit evidence for both processes. In magmatic examples, the ore minerals are dispersed as essential components of igneous rocks, notably in pegmatites and aplites, and hydrothermal alteration is limited. The host rocks may be either of plutonic or volcanic origin, although the former are more common. In metasomatichydrothermal examples, mineralization is superimposed on pre-existing rock units (which may be of peralkaline affinity) reflecting the transfer of metals in magmatic hydrothermal fluids to form replacement zones or vein systems. In such deposits, hydrothermal alteration is more widespread. Both processes operate together and a complex continuum of mineralization styles may occur. However, the REE and related metals are all incompatible trace elements that are concentrated by magmatic fractionation in peralkaline magmas, and this process appears to be fundamental to deposit genesis.

Rare-earth elements and rare-metal deposits may include a wide variety of uncommon minerals in addition to better-known minerals such as zircon, allanite, titanite, monazite and xenotime. The mineralogy of these deposits is a critical factor in their economic evaluation, as some REE-bearing minerals are highly resistant to chemical solvent extraction processes. In many cases, custom-process design is required to successfully extract the desired commodities from ore, and from each other.





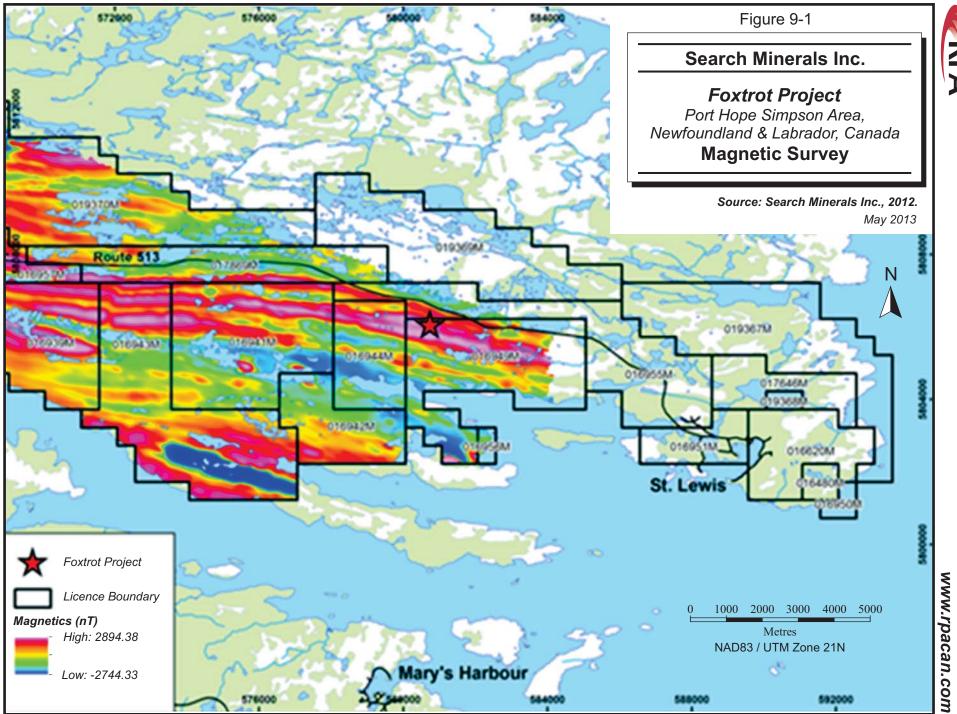
## **9 EXPLORATION**

Search Minerals began exploration on the Fox Harbour property within the PHS in the winter of 2009, conducting an Aeroquest airborne radiometric and magnetometer survey (Figures 9-1, 9-2, and 9-3). Following this survey, anomalous areas of interest were outlined, prioritized and ground-checked during the start of the 2010 field season. The Foxtrot Project is a part of the Fox Harbour volcanic belt that exhibits elevated radiometric and magnetometer values. Exploration in 2010 consisted of prospecting, mapping, lithogeochemical grab sampling, clearing, hand trenching, channel sampling with a portable circular saw and diamond drilling. This exploration program was conducted across the entire Fox Harbour volcanic belt, with the main area of focus being the Foxtrot Project.

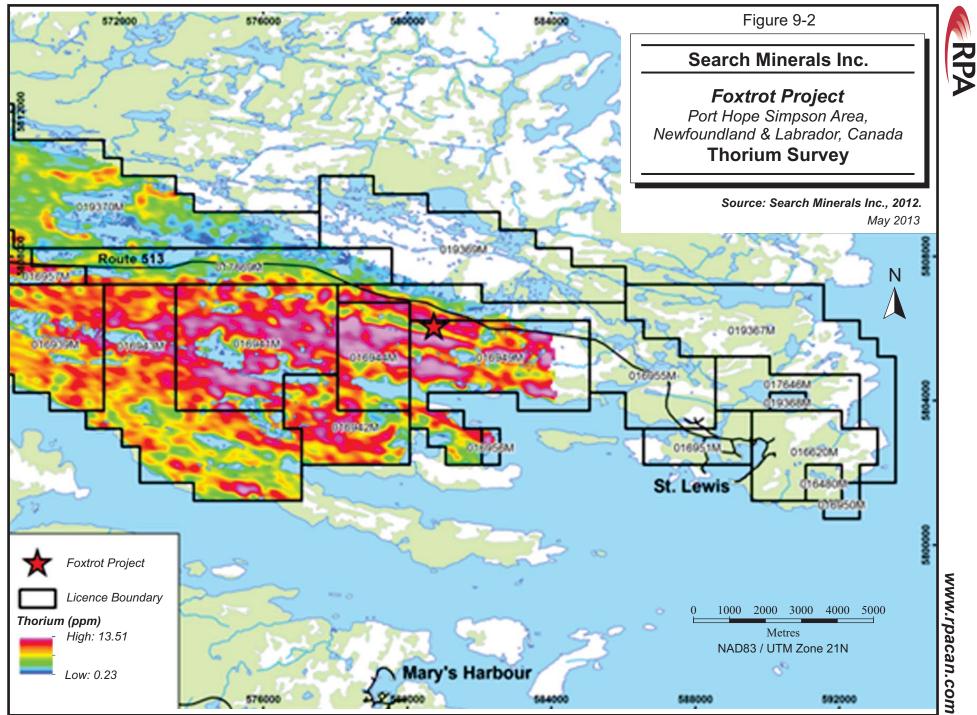
Search Minerals commenced a Phase I exploration drill program at Foxtrot Project in Q4 2010. The Phase I drill program consisted of 23 diamond drill holes (DDH) totalling 3,876 m to a depth of 100 m and along two kilometres of strike. A Phase II exploration drill program was completed in Q3 2011 and consisted of 20 DDHs totalling 4,083 m to a depth of 200 m along a 500 m strike.

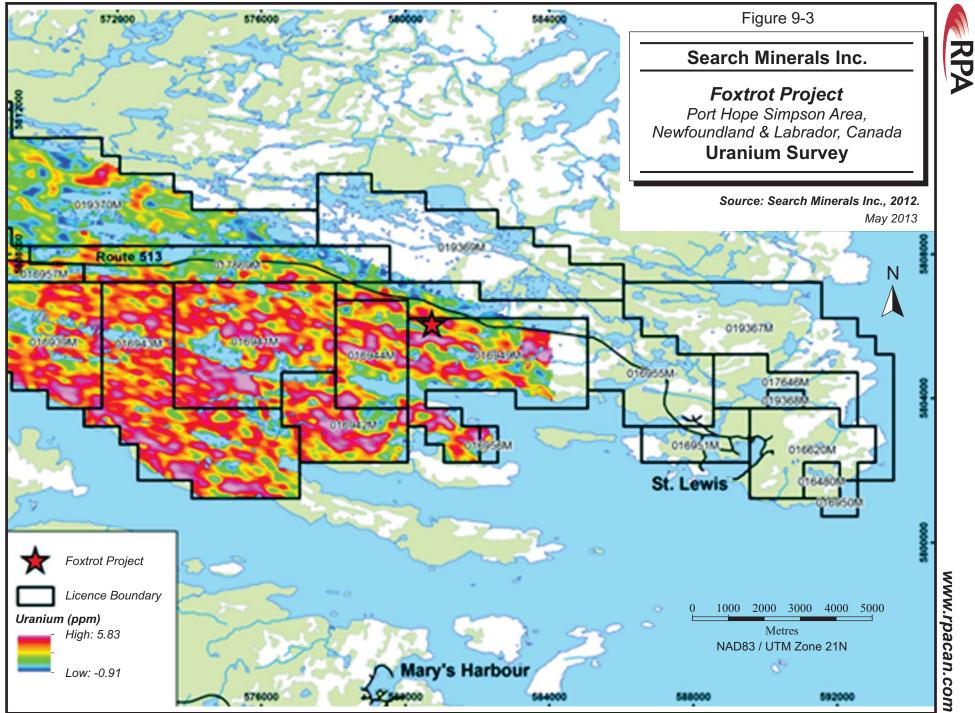
A Phase III exploration drill program was completed in Q1 2012 and consisted of 29 DDHs totalling 10,896 m to a depth of 450 m along a 600 m strike. The drilling area focused on the thicker portion of FT3, which is approximately 10 m to 25 m in true width.

The Mineral Resource estimate in this report is based on data from Phases I, II, and III.



RPA







## **EXPLORATION POTENTIAL**

Exploration in the Fox Harbour volcanic belt and in particular the Foxtrot Project area revealed highly anomalous REE mineralization associated with magnetic/radiometric anomalies in felsic volcanic rocks. The Phase I exploration drill program intersected mineralization in all holes along a two kilometre strike length. The Phase II and Phase III exploration drill programs were focused on a 500 m zone that showed the highest grades and thickest mineralized units (the HGC). All holes drilled to date have intersected the mineralized units.

Potential to expand the HGC resource exists at depth – it does not occur along strike outside the 500 m zone. The next exploration priority at the Foxtrot Project is to drill at depth under the current HGC resource to define the extent of the mineralization and improve quality and size of the Mineral Resource estimate.



## **10 DRILLING**

### DRILLING BY SEARCH MINERALS

Springdale Forest Resources of Springdale, Newfoundland, was awarded the contract to complete the 3,876 m drill program in the late fall of 2010 and early winter of 2011. An excavator assisted with the drill moves for this program, and a Muskeg tractor transported the drillers, fuel, and core.

Logan Drilling Group of Stewiacke, Nova Scotia, was awarded the contract to complete the Phase II drill program totalling 4,083 m in the summer of 2011. A skidder was used in transporting and moving the drill, along with fuel, and core.

Springdale Forest Resources was awarded the contract to complete the Phase III drill program, totalling 10,896 m in the fall of 2011 and early winter of 2012. This drill program utilized two drills, one that was moved by skidder, and the second, which was mounted on a Nodwell. The skidder was also used to transport fuel, propane, and core.

Drill hole collar positions were determined by Search Minerals' senior geological personnel and were located in the field by a Search Minerals geologist. Drill holes were initially plotted using ArcGIS, and collar positions staked using a handheld GPS unit. All drill holes in the Foxtrot Project were surveyed after drilling had been completed to within ±0.60 m GPS positional accuracy, and 0.2° to 1.0° azimuth accuracy. Coordinates were recorded in UTM format according to the NAD83 datum, and elevations were recorded in metres above sea level.

All drill holes were drilled at an angle to the horizontal; the collar azimuth and dip were planned and checked by a Search Minerals geologist. The drill hole was set with an extended foresight from the drill head, and the azimuth of this line direction was measured with a Brunton or Silva type compass. The drill hole collar dip was set and measured with an inclinometer on the drill rods at the drill head.

No serious deviation problems have been encountered in the drilling to date, with most holes deviating less than 5° to 10° per 100 m from both azimuth and dip. Due to the steeply dipping mineralized zone, this did not affect true thickness calculations.



Sample length ranges from 0.05 m to 2.50 m, with the majority being exactly 1.0 m. The true thickness of the mineralization is a 100 m wide package of felsic and mafic bands.

Table 10-1 summarizes the drilling from all three phases.

Tables 10-2 and 10-3 present significant intervals from drilling Phases I and II for key rare earth metals and key rare earth oxides, respectively. Figure 10-1 displays the diamond drill hole locations from Phases I and II and Figure 10-2 displays diamond drill hole locations from Phase III.

Hole_ID	Easting	Northing	RL (m)	Depth (m)	Dip (°)	Azimuth (°)	# of Samples	Assay Range	Work Order Numbers
FT-10-01	580888	5806100	64.5	149	-45.54	190.1	228	455001-455228	A10-8275
FT-10-02	580790	5806121	65.4	149	-45.33	190.1	236	455229-455464	A10-8794/8849
FT-10-03	580799	5806177	64.9	176	-44.90	195.4	289	455464-455752	A10-8849/9404
FT-10-04	580699	5806189	66.4	182	-46.23	197.6	242	455753-456044	A10-9405
FT-10-05	580591	5806219	53.2	224	-45.90	199.7	254	456045-456298	A10-9406/9433
FT-10-06	580570	5806169	57.1	125	-45.00	195.0	148	456299-456438	A10-9613
FT-10-07	580506	5806219	60.0	161	-45.18	197.6	186	456439-456624	A10-9614
FT-10-08	580410	5806247	68.1	137	-44.72	196.3	153	456625-456777	A11-0148/0149
FT-10-09	580340	5806329	68.8	218	-45.62	195.0	253	456778-457030	A11-0149/0208
FT-10-10	580326	5806273	68.3	167	-45.72	197.5	184	457031-457214	A11-0478
FT-10-11	580211	5806291	68.9	164	-42.68	194.7	198	457221-457418	A11-0303
FT-10-12	580119	5806313	69.5	158	-45.49	191.8	215	457419-457633	A11-0471
FT-10-13	580134	5806357	74.8	266	-45.62	190.6	352	457634-457985	A11-0558
FT-10-14	580025	5806349	73.2	161	-43.67	184.9	186	460001-460186	A11-0671
FT-10-15	579941	5806353	73.2	167	-45.09	195.6	180	457986-458165	A11-0670
FT-10-16	579842	5806379	72.0	152	-45.41	189.0	167	460187-460353	A11-0803
FT-10-17	579740	5806375	67.3	176	-44.10	187.2	220	458166-458385	A11-0773
FT-10-18	579644	5806407	71.8	202	-45.59	188.1	264	460354-460617	A11-0910
FT-11-01	579571	5806404.6	71.4	176	-44.752	190.11	215	458386-458600	A11-0778
FT-11-02	579483	5806411	71.6	173	-44.726	190.81	203	460618-460820	A11-0997
FT-11-03	581077	5806016.9	50.4	137	-44.824	191.16	152	458601-458752	A11-0909
FT-11-04	581272	5806004.6	55.9	110	-44.973	195.9	111	460821-460931	A11-0992
FT-11-05	581480	5805961.4	53.2	146	-46.201	196.12	165	458753-458917	A11-0995
FT-11-06	580716	5806251.4	60.8	277	-43.33	193.5	308	505501-505808	A11-4673/4691
FT-11-07	580748	5806176.6	67.2	180	-44.72	195	188	509001-501188	A11-5040/5047
FT-11-08	580628	5806152.9	63.6	127	-42.75	192.08	135	505809-505943	A11-4985/4986
FT-11-09	580647	5806202.9	62.3	181	-45.23	195	187	505944-506130	A11-5047/5048
FT-11-10	580601	5806269.4	57.3	249	-44.48	191.1	263	509189-509451	A11-5284/5370
FT-11-11	580535	5806180.6	54.6	124	-44.53	199.63	123	506131-506253	A11-5371/5446
FT-11-12	580554	5806229.4	58	206.9	-44.14	200.79	227	509452-509678	A11-5446/5448
FT-11-13	580497	5806170.6	59.6	115	-44.08	197.49	119	506254-506372	A11-5467/5468
FT-11-14	580521	5806267.8	61.2	230	-43.7	201.24	231	506373-506603	A11-5472/5473
FT-11-15	580466	5806250.6	63.7	193	-44.66	197.2	207	509679-509885	A11-5625/5627
FT-11-16	580390	5806174.6	64.2	100	-43.78	198.56	109	509886-509994	A11-5811/5829
FT-11-17	580421	5806295.8	68.2	211	-46.4	195.94	235	510125-510359	A11-6033/6037
FT-11-18	580361	5806224	64.2	118	-43.6	190.5	130	509995-510124	A11-5808/5830

# TABLE 10-1 DRILL HOLE SUMMARY Search Minerals Inc. – Foxtrot Project



Hole_ID	Easting	Northing	RL (m)	Depth (m)	Dip (°)	Azimuth (°)	# of Samples	Assay Range	Work Order Numbers
FT-11-19	580375	5806284.4	68.4	226	-44.69	195.92	242	510680-510921	A11-6671/6472
FT-11-20	580453	5806198.4	61.5	130	-44.36	195.66	141	510922-511062	A11-6645/6648
FT-11-21	580722	5806300.8	51.3	304	-44.25	192.5	320	510360-510679	A11-6325/6548
FT-11-22	580662	5806254.4	52.9	253	-42.72	195	260	511332-511591	A11-6958/6959
FT-11-23	580813	5806230.4	59.4	259	-43.609	195.97	269	511053-511331	A11-6859/6850
FT-11-24	580762	5806229.6	64.3	250	-44.19	196.47	257	511592-511848	A11-6959/6963
FT-11-25	580777	5806285.6	52.7	331	-43.03	198.1	334	506604-506937	A11-6960/6963
FT-11-26	580827	5806272	49.8	302	-44.99	192.7	164	512001-512164	A11-11763/11764
FT-11-27	580880	5806261	45.3	299	-44.91	193.3	141	550001-550141	A11-12119/12120
FT-11-28	580838	5806328	47.0	355	-44.74	195.2	145	553001-553145	A11-12121/12122
FT-11-29	580855	5806390	46.0	413	-45.47	195.9	200	550142-550341	A11-12276
FT-11-30	580881	5806440	43.7	478	-45.63	194.1	222	553146-553367	A11-12490
FT-11-31	580518	5806276	63.0	226	-45.45	195.1	155	550342-550496	A11-12492
FT-11-32	580567	5806286	61.1	247	-46.38	195.5	148	550497-550644	A11-12586
FT-11-33	580886	5806494	37.5	538	-45.64	198.2	240	553368-553607	A11-13023/13035
FT-11-34	580617	5806326	58.6	301	-44.36	195.2	211	550645-550855	A11-12801/12804
FT-11-35	580665	5806316	52.0	302	-44.99	193.6	169	550856-551024	A11-13042/13043
FT-11-36	580744	5806356	51.2	350	-45.68	193.3	143	551025-551167	A11-13227/13228
FT-11-37	580986	5806474	30.7	565	-45.56	200.2	234	553608-553841	A11-13499/13500
FT-11-38	580635	5806383	50.1	360	-46.86	195.1	165	551168-551332	A11-13412/13413
FT-11-39	580647	5806437	50.8	415	-45.57	195.3	164	551333-551496	A11-13821/13822
FT-11-40	580970	5806416	32.6	469	-44.29	195.0	202	553842-554043	A11-13913/13914
FT-11-41	580756	5806402	47.0	421	-45.44	193.7	179	551497-551675	A11-14071/14072
FT-11-42	581076	5806380	29.4	469	-44.69	195.0	238	554044-554281	A11-14424
FT-11-43	580773	5806467	50.1	472	-44.65	195.5	251	551676-551926	A11-14425
FT-11-44A	581080	5806440	31.4	550	-45.65	196.1	217	554282-554498	A11-14794
FT-11-45	580940	5806300	41.0	358	-45.38	196.5	135	551940-552074	A11-14994
FT-11-46	580957	5806354	46.0	410	-46.53	195.2	166	552075-552240	A12-00340
FT-11-47	580787	5806517	40.0	514	-44.10	198.5	197	554499-554695	A12-00412
FT-11-48	580589	5806339	56.9	310	-47.62	193.8	137	552241-552377	A12-00340
FT-12-01	580531	5806343	57.7	299	-43.77	194.1	135	554696-554830	A12-00477
FT-12-02	580904	5806609	30.3	649	-45.81	198.4	378	554831-555208	A12-00799
FT-12-03	580666	5806150	66.1	122	-44.68	194.7	130	552378-552507	A12-00902
FT-12-04	580665	5806150	66.3	104	-45.35	196.0	108	555209-555316	A12-01031
FT-12-05	580496	5806368	60.2	299	-45.48	197.2	127	555317-555443	A12-01032





<b>TABLE 10-2</b>	SIGNIFICANT INTERVALS, AVERAGES FOR KEY METALS
	Search Minerals Inc. – Foxtrot Project

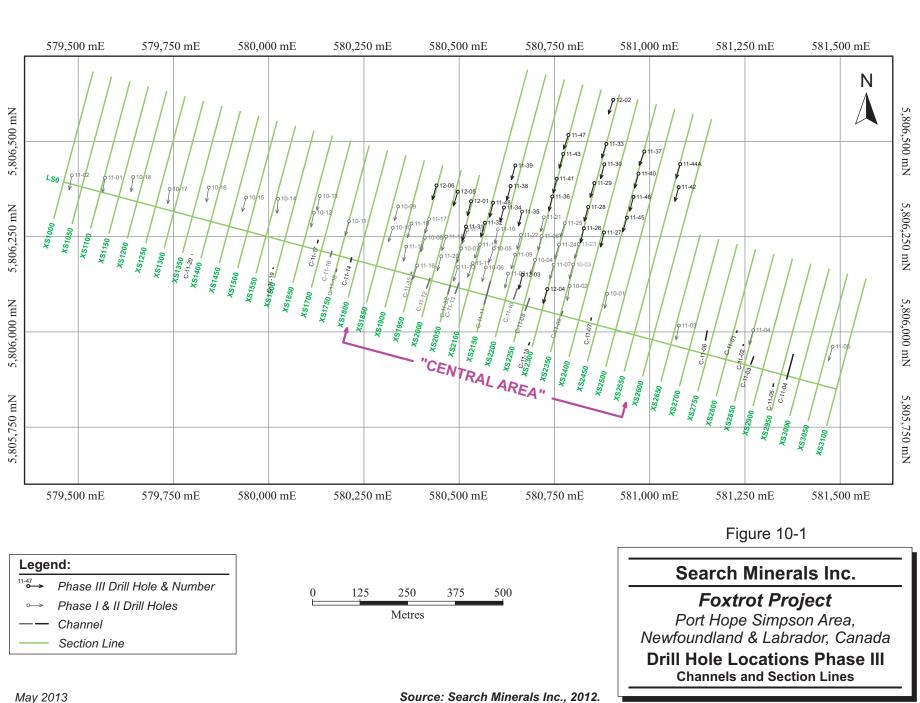
Hole	Length (m)	From (m)	To (m)	Dy (ppm)	Nd (ppm)	Y (ppm)	HREE+Y (%)	TREE+Y (%)
FT-10-04	21.2	123.5	144.7	215	1,639	1,210	0.20	0.99
FT-10-05	11.5	126.4	137.9	217	1,721	1,211	0.20	1.01
FT-10-06	9.9	63	72.9	233	1,795	1,296	0.22	1.09
FT-10-07	12.9	108.3	121.3	203	1,635	1,151	0.19	1.03
FT-10-08	7.6	90.3	97.8	245	1,766	1,312	0.22	1.04
FT-10-11	8.5	96.8	105.3	202	1,756	1,188	0.19	1.09
FT-11-06	21.4	196.9	218.3	221	1,733	1,177	0.20	1.03
FT-11-07	11.5	127.2	138.7	208	1,454	1,141	0.19	0.90
FT-11-08	14.9	60.7	75.6	234	1,647	1,254	0.21	1.02
FT-11-09	25	124.6	149.6	207	1,691	1,149	0.19	1.04
FT-11-10	30.2	181.1	211.3	201	1,507	1,066	0.18	0.92
FT-11-11	18.7	73.6	92.3	230	1,799	1,350	0.22	1.11
FT-11-12	10.3	137	147.3	204	1,729	1,160	0.19	1.06
FT-11-13	24.2	46.3	70.5	212	1,647	1,251	0.20	1.07
FT-11-14	10.8	167.8	178.6	206	1,803	1,222	0.20	1.13
FT-11-16	7.5	21.9	29.4	230	1,921	1,306	0.22	1.17
FT-11-17	10	148	158	228	1,577	1,159	0.20	0.97
FT-11-20	7.1	70.3	77.4	235	1,862	1,330	0.22	1.18
FT-11-21	12	250.7	262.7	240	1,897	1,342	0.22	1.14
FT-11-22	17	179.3	196.3	235	1,786	1,379	0.22	1.11
FT-11-23	15.8	196.6	212.3	212	1,642	1,178	0.20	0.98
FT-11-24	15.1	189.2	204.3	212	1,595	1,141	0.19	0.97
FT-11-25	26.1	243.6	269.6	205	1,526	1,200	0.20	0.95



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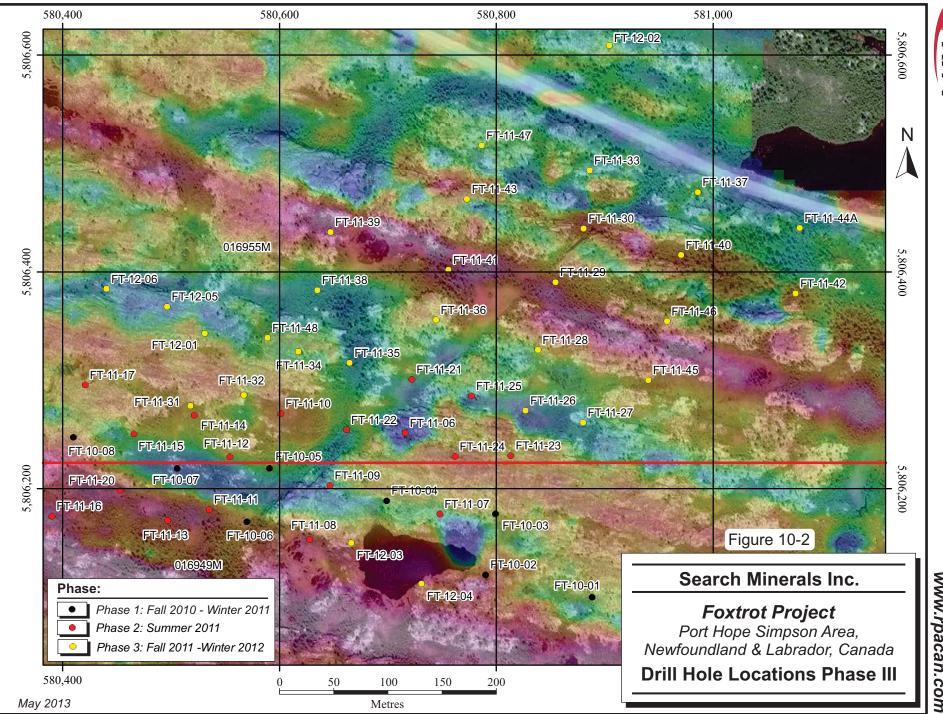
Search Minerals Inc. – Poxilot Project										
Hole	Length (m)	From (m)	To (m)	Dy <sub>2</sub> O <sub>3</sub> (ppm)	Nd₂O₃ (ppm)	Y₂O₃ (ppm)	HREO+Y (%)	TREO+Y (%)		
FT-10-04	21.2	123.5	144.7	248	1,918	1,536	0.24	1.19		
FT-10-05	11.5	126.4	137.9	249	2,014	1,538	0.24	1.22		
FT-10-06	9.9	63	72.9	268	2,100	1,646	0.26	1.32		
FT-10-07	12.9	108.3	121.3	234	1,913	1,461	0.23	1.24		
FT-10-08	7.6	90.3	97.8	281	2,066	1,666	0.27	1.25		
FT-10-11	8.5	96.8	105.3	232	2,055	1,508	0.24	1.31		
FT-11-06	21.4	196.9	218.3	254	2,027	1,495	0.24	1.24		
FT-11-07	11.5	127.2	138.7	239	1,701	1,450	0.23	1.08		
FT-11-08	14.9	60.7	75.6	269	1,927	1,592	0.26	1.22		
FT-11-09	25	124.6	149.6	238	1,978	1,460	0.23	1.25		
FT-11-10	30.2	181.1	211.3	231	1,763	1,354	0.22	1.11		
FT-11-11	18.7	73.6	92.3	264	2,105	1,714	0.27	1.34		
FT-11-12	10.3	137	147.3	235	2,023	1,473	0.23	1.27		
FT-11-13	24.2	46.3	70.5	244	1,927	1,589	0.25	1.28		
FT-11-14	10.8	167.8	178.6	237	2,110	1,552	0.24	1.36		
FT-11-16	7.5	21.9	29.4	265	2,248	1,659	0.26	1.41		
FT-11-17	10	148	158	263	1,846	1,471	0.24	1.16		
FT-11-20	7.1	70.3	77.4	270	2,179	1,689	0.27	1.42		
FT-11-21	12	250.7	262.7	276	2,220	1,704	0.27	1.37		
FT-11-22	17	179.3	196.3	270	2,089	1,751	0.27	1.33		
FT-11-23	15.8	196.6	212.3	244	1,921	1,496	0.24	1.18		
FT-11-24	15.1	189.2	204.3	244	1,866	1,450	0.24	1.17		
FT-11-25	26.1	243.6	269.6	236	1,786	1,524	0.24	1.14		

# TABLE 10-3 SIGNIFICANT INTERVALS, AVERAGES FOR KEY OXIDES Search Minerals Inc. – Foxtrot Project



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## 11 SAMPLE PREPARATION, ANALYSES AND SECURITY

The two sampling methods used at the Foxtrot Project during the 2010 and 2011 sampling programs were diamond drilling and channel sampling. All sample preparation and core logging were done at the field house, which is located in Port Hope Simpson, approximately 45 minutes by truck from the Foxtrot Project field area. Drilling, core logging, and sampling operations were supervised by Randy Miller, P.Geo., VP of Exploration for Search Minerals.

All drilling, logging, and sampling procedures were reviewed by Benchmark Six and RPA during their site visit. The quality assurance/quality control (QA/QC) protocols, procedures for ensuring the security of drill core and channel samples, integrity of chain-of-custody for samples, and accuracy of laboratory analyses all met normal industry practices.

### DIAMOND DRILL CORE

Diamond drill core was placed into standard wooden core boxes and stacked at the drill site. Core boxes were transported by pick-up truck from the field area to the field house at least once a day where they were organized onto racks in the core shed. Geologists log the core and mark assay sample intervals with wax crayon. Intervals averaged one metre but were longer or shorter, at the discretion of the geologist, depending on the structural and lithological features present. Drill core was logged manually and the logs were subsequently entered into a digital database by Search Minerals staff. All original paper drill logs are kept on file.

The core was split by technicians according to the marked assay intervals; all splitting was done using a circular saw with a diamond tip blade. One half of the core was placed in a sample bag and sent to the lab for chemical analyses and the other half remains in the core box for future reference. For each interval, one sample tag was placed in the sample bag and another sample tag was stapled to the bottom of the core box, under the core. After the core had been split and sampled, the remaining core was placed back into core boxes and kept in the core shed. All stored core boxes are affixed with an aluminum plate indicating the hole ID and the interval contained within. A list was made of all sample numbers and their corresponding hole ID, and from-to depths.



The drill rig used during the 2010 sampling program was a Dura-lite 500 and was operated by Springdale Forest Resources. The 2011 sampling program made use of two different drill rigs: a Longyear Super 38 that was fully enclosed and mounted on skids as well as a Longyear Fly 38 that was not enclosed, also mounted on skids and was suitable to be moved by helicopter. These two drill rigs were operated by Logan Drilling Group. All core drilled during the 2010 and 2011 sampling programs was NQ size.

### CHANNEL SAMPLES

Channel samples were taken from surface outcrop, perpendicular to the strike of the mineralization. A circular saw with a diamond tip blade was used to cut the rock into approximately 8 cm thick by 10 cm wide slabs that were then put into channel boxes and transported back to the field house. These samples were logged, cut, and sampled according to the same procedure as the diamond drill core, described above.

#### SAMPLE ANALYSES

Sample bags were transported by Search Minerals staff to Activation Laboratories (Actlabs) in Goose Bay, Labrador, where they were crushed to a minus 10 mesh, riffle split to obtain a representative sample, pulverized to at least 95% passing minus 150 mesh and then sent to Actlabs' Ancaster, Ontario location for analysis. Samples were analyzed using a lithium metaborate/tetraborate fusion with subsequent analysis by inductively coupled plasma (ICP) and ICP/MS (mass spectroscopy).

Actlabs is an independent lab accredited according to both the ISO 17025 standard for testing and calibration laboratories, and the CAN-P-1579 standard, specific to mineral analysis laboratories. In 2007, Actlabs became accredited to NELAP, an American laboratory accreditation program specifically for the environmental sector.

## **QUALITY ASSURANCE AND QUALITY CONTROL**

### ACTLABS INTERNAL QA/QC

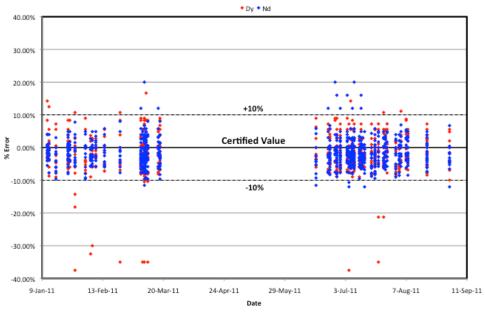
The resource estimate included in this report incorporates analytical results from 69 batches that were submitted to Actlabs between November 2010 and August 2011. With each batch, Actlabs used three types of samples to monitor the accuracy and precision of their results: standards, blanks, and duplicates.



The standards allow the lab to monitor the accuracy of their results. There were a total of 22 different standards that were used to test the accuracy of the REE data and no one standard alone covered the complete set of potentially economic elements.

Among the economically viable elements, dysprosium is one of the more important heavy REEs and neodymium is one of the more important light REEs. Figure 11-1 shows the percent error of the dysprosium and neodymium in the various standards according to date of the analysis, a proxy commonly used for batch.





In all 69 batches, 97.2% of internal standards fall with  $\pm 10\%$  error of the original sample when the dysprosium and neodymium data are isolated. While this is generally accepted as a good result, it is recommended that closer attention be paid to the labs internal standards, and batches that do not meet pre-set protocols should be re-assayed.

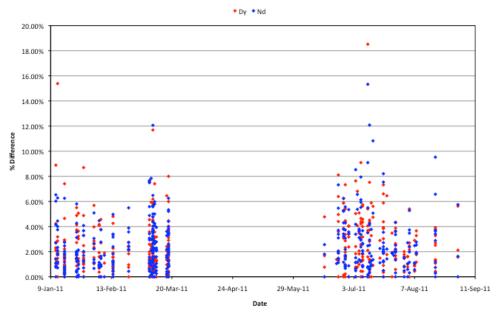
Blank control samples allow the lab to monitor cross contamination between the samples. While contamination can occur during the sample preparation and the analysis stage, these blank control samples were limited to monitoring only the analysis stage.



It is normal industry practice to reject any batch whose results are more than five times the detection limit. Of the 104 blanks tested, no blank control sample had more than twice the detection limit. In RPA's opinion, cross contamination was not an issue at the Foxtrot Project.

Duplicates allow the lab to monitor precision of their analytical results. As with standards, it is normal industry practice to accept batches if 95% of duplicate samples fall within  $\pm 10\%$  of their average. In all 69 batches, 98.8% of internal duplicate assays for dysprosium and neodymium fall within the  $\pm 10\%$  band. The following graph shows the percent difference of duplicate analyses for dysprosium and neodymium.

### FIGURE 11-2 SELECTED RESULTS OF ACTLABS' INTERNAL QUALITY CONTROL FOR DUPLICATES



### SEARCH MINERALS EXTERNAL QA/QC

In addition to Actlabs' internal QA/QC efforts, the reliability of the analytical data was also monitored by Search Mineral's own external QA/QC program, using standards and duplicates.

Search Minerals used two "ore"-grade standards and one standard chosen to effectively act as a blank. The two "ore"-grade standards include one from a eudialyte-rich zone in one of Search Minerals' other REE projects in Labrador, a peralkaline complex known as 'Red Wine' (RW), and one from a mineralized felsic volcanic gneiss unit found in Fox Harbour (FHG). The third standard, the very low grade standard, is from an anorthosite unit also found in Port Hope Simpson area (FHA).

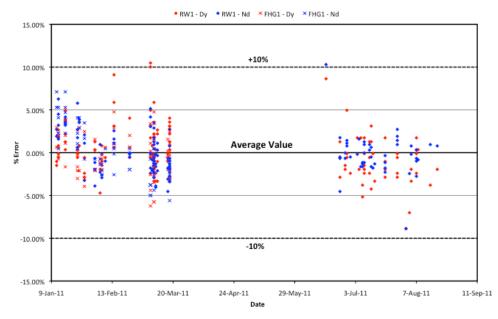


The material for each standard was delivered to Actlabs in bulk and they were instructed to crush, pulverize, homogenize, store, and insert pulp samples into the sample sequence during sample preparation. Throughout the 2010 drilling program, laboratory staff inserted one pulp standard every 50 samples but this procedure was changed in 2011 to include at least one standard with every batch to account for smaller batches of less than 50 samples where standards were previously not being included.

Rather than using certified reference material, Search Minerals used material sourced locally for which no certified value had been established by round-robin analyses from multiple laboratories. In this case, the average of all available results was used as the reference value and percent error was calculated.

The vast majority of results for the RW and FHG standards plot within the  $\pm 10\%$  range. The results for FHA, the very low-grade standard, were not within  $\pm 10\%$  of the average value but rather ranged from -50% to 150%, which is an acceptable range for a blank control sample. Due to the nature of the sample used, the values for each of the elements were very close to detection limit. The following graph shows the percent error of dysprosium and neodymium for the RW and FHG standards only.

FIGURE 11-3 SELECTED RESULTS FOR SEARCH MINERAL'S EXTERNAL QUALITY CONTROL FOR STANDARDS.

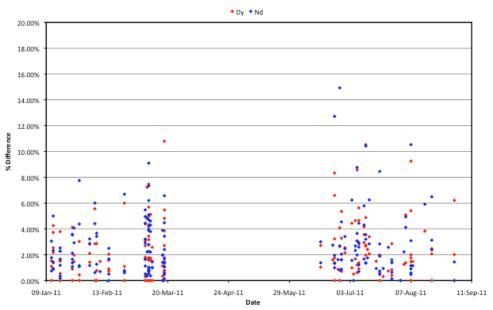




Search Mineral's implementation of duplicate samples as part of their QA/QC program was similar to that of the standards. Actlabs was instructed to duplicate every 25<sup>th</sup> sample and report the results as the original sample number appended with a 'B' in the Certificate of Analysis.

In all, there were 167 samples duplicated in the 69 batches. Of these, only six samples, or less than 4%, did not fall within a  $\pm 10\%$  band. The following graph shows the percent difference of dysprosium and neodymium of the sample duplicates.

# FIGURE 11-4 SELECTED RESULTS FOR SEARCH MINERAL'S EXTERNAL QUALITY CONTROL FOR DUPLICATES



### PHASE III QA/QC

The third drilling campaign at Foxtrot used a QA/QC program similar to the one described above for Phases I and II. In addition to the internal QA/QC checks performed by Actlabs, Search Minerals included reference material in most batches. Three batches of reference material were used, and all three are usually submitted together. One essentially functioned as a blank, with very low REE concentrations (Dy<1 ppm, Nd<10 ppm). The other two served as material that enabled monitoring of the lab's ability to accurately assay samples with strong REE mineralization. One of these has Dy grades of approximately 300 ppm, and Nd grades of approximately 2,400 ppm. Although there was no pre-established



reference value for these external reference materials, they do document that the lab is able to stay within  $\pm 10\%$  of the average grade.

The external reference material had Dy and Nd grades that are higher than typical mineralization at Foxtrot, where most of the strong mineralization is 200 ppm to 250 ppm Dy and 1,000 ppm to 2,000 ppm Nd. RPA recommends that, for future drilling programs, it would be useful to work with Actlabs to develop a certified reference material for which the grade has been established prior to its use. This would help to confirm that there is no systematic bias at the lab. It is also recommended that the external reference materials have Dy grades similar to those encountered at Foxtrot: one reference material with approximately 150 ppm Dy and 1,000 ppm Nd; and another with approximately 250 ppm Dy and 2,000 ppm Nd.

The QA/QC program for the Phase III samples also included duplicate samples submitted externally by Search Minerals' geologists, typically one or two in each batch of samples submitted to the lab. These duplicates confirm the precision of the lab's analytical results. More than 90% of the duplicates produced REE assays within ±10% of the original assay.

Although the QA/QC program could be improved, particularly with the use of certified reference material and with monthly review of the results, the internal and external QA/QC data for the Phase I through Phase III programs demonstrates that the assay data have the accuracy and precision required for producing reliable resource estimates.

### SAMPLE SECURITY

Search Minerals employs strict security protocols with the handling of their samples. Core is transported by truck only, both from the drill site to the field house and from the field house to the lab in Goose Bay. The core is stored in the core shack, a detached structure with doors and locks, and is organized carefully facilitating accessibility to all holes. During logging, cutting, and sampling, drill core is always under the supervision of full-time Search Minerals staff.

In the opinion of RPA, the procedures and protocols for sampling, sample preparation, analysis, and security are all good, always at least as sound as the procedures used elsewhere and, in some aspects, at the level of industry best practice.



### **12 DATA VERIFICATION**

RPA reviewed the resource database that formed the basis for the Resource Estimate presented in this Technical Report. This includes results from the QA/QC program and assay certificates for drill hole samples to a cut-off date of September 30, 2011. In the opinion of RPA no limitations on or failure to conduct data verifications occurred.

#### SITE VISIT

A site visit was conducted by Jacques Gauthier, Principal Mining Engineer for RPA, and Rick Breger, Director of Operations for Benchmark Six, on October 27, 2011. While on site, both the field office and the property were visited.

The site visit consisted of a complete tour of the premises, including the field office, the core logging shack, the core cutting shack, and the core storage facilities. During the visit, logging, cutting and sampling procedures were observed first hand.

The property visit included a tour of the Foxtrot Project. During the time of the visit, the drill on site was being repaired so no drilling was observed. RPA and Benchmark Six inspected surface mineralization, including the location of the trenching and old drill hole collars, specifically FT-10-04, FT-11-10, FT-11-25, and FT-11-31. All old collars are well marked with drill casing and capped with an aluminum tag marked with the hole ID. In addition, the St. Lewis power station and port that could potentially service the property were observed.

Both RPA and Benchmark Six concluded that Search Minerals staff conducted their exploration and drill activities to a standard that met or exceeded normal industry practices.



### FIGURE 12-1 PHOTOGRAPH OF THE TRENCHING DONE DURING THE 2011 EXPLORATION PROGRAM



FIGURE 12-2 PHOTOGRAPH OF THE DRILL ON SITE





### DATABASE VERIFICATION

Benchmark Six verified that the drill hole database matched the original Actlabs assay certificates. This was done by manually checking 10% of the data, across the range of low, medium, and high grade data according to dysprosium values.

No errors were found and RPA considers the database to be reliable and adequate for the purposes of resource estimation.

### CHECK SAMPLES

During the site visit, RPA took 28 check samples. These samples were taken in order to check both the accuracy of the REE analyses performed by Actlabs and to determine the density of each lithological unit for use in the resource estimate. Of the check samples, 22 were used to check accuracy, and all 28 samples were used to determine density. Table 12-1 shows a detailed summary of the check samples analyzed by SGS, including the 22 drill core samples that were taken to check REE accuracy, for which dysprosium and neodymium grade comparisons are shown, as well as the six channel samples that were taken for the purposes of determining the density of each lithological unit. The channel samples were not analyzed geochemically and the density of these samples is shown in Table 12-2.



# TABLE 12-1 SUMMARY OF ORIGINAL AND CHECK SAMPLES Search Minerals Inc. – Foxtrot Project

Check Sample ID	Hole ID	Original Sample ID	Sample Type	Original Dy (ppm)	Check Dy (ppm)	Original Nd (ppm)	Check Nd (ppm)
MP-11-056	FT-11-12	509652	Drill Core	2.3	2.33	7.9	7.6
MP-11-057	FT-10-15	458142	Drill Core	3.4	3.04	8.9	7.2
MP-11-058	FT-10-17	458361	Drill Core	5.8	6.08	60.6	60.8
MP-11-059	FT-10-13	457844	Drill Core	4.7	4.38	15.9	13.5
MP-11-060	FT-10-02	455416	Drill Core	6.4	7.15	34.6	34.6
MP-11-061	FT-10-18	460354	Drill Core	7.2	6.44	68.4	61.4
MP-11-062	FT-10-09	456856	Drill Core	6.8	6.73	63.7	65
MP-11-063	FT-10-16	460326	Drill Core	8.7	8.71	39.8	37
MP-11-064	FT-10-02	455444	Drill Core	10	9.78	66.3	60.2
MP-11-065	FT-11-22	511521	Drill Core	264	236	1900	1700
MP-11-066	FT-10-06	456309	Drill Core	35.1	34.5	255	243
MP-11-067	FT-10-03	455669	Drill Core	25.6	30.6	127	177
MP-11-068	FT-11-04	460887	Drill Core	7.8	7.7	63.9	57.4
MP-11-069	FT-10-03	455679	Drill Core	40.5	72	241	457
MP-11-070	FT-10-07	456542	Drill Core	12.6	11.4	50.3	49.2
MP-11-071	FT-11-02	460679	Drill Core	360	360	464	419
MP-11-072	FT-11-19	510833	Drill Core	78.3	58.4	538	434
MP-11-073	FT-11-19	510834	Drill Core	198	190	1510	1460
MP-11-074	FT-10-10	457065	Drill Core	30.3	31.9	130	132
MP-11-075	FT-10-09	456941	Drill Core	50	52.8	294	296
MP-11-076	FT-10-09	456889	Drill Core	24.8	24.7	93.4	82.7
MP-11-077	FT-10-17	458242	Drill Core	130	106	440	353
MP-11-078	FTC-11-03	507719	Channel				
MP-11-079	FTC-11-03	507709	Channel				
MP-11-080	FTC-11-04	507818	Channel				
MP-11-081	FTC-11-27	507965	Channel				
MP-11-082	FTC-11-27	507967	Channel				
MP-11-083	FTC-11-04	507844	Channel				



The following table summarizes the results of the bulk density measurements done by SGS for the three lithological units found on the Foxtrot Project.

Check Sample ID	Hole ID	Original Sample ID	Lithological Unit	Bulk Density (g/ml)
MP-11-056	FT-11-12	509652	Mafic	3.1
MP-11-057	FT-10-15	458142	Mafic	3.06
MP-11-058	FT-10-17	458361	Mafic	2.56
MP-11-059	FT-10-13	457844	Mafic	2.95
MP-11-060	FT-10-02	455416	Mafic	2.86
MP-11-061	FT-10-18	460354	Augen	2.67
MP-11-062	FT-10-09	456856	Augen	2.64
MP-11-063	FT-10-16	460326	Mafic	3.09
MP-11-064	FT-10-02	455444	Mafic	2.72
MP-11-065	FT-11-22	511521	Felsic	2.77
MP-11-066	FT-10-06	456309	Felsic	2.66
MP-11-067	FT-10-03	455669	Felsic	2.73
MP-11-068	FT-11-04	460887	Mafic	2.67
MP-11-069	FT-10-03	455679	Felsic	2.81
MP-11-070	FT-10-07	456542	Felsic	3.01
MP-11-071	FT-11-02	460679	Felsic	2.75
MP-11-072	FT-11-19	510833	Felsic	2.51
MP-11-073	FT-11-19	510834	Felsic	2.79
MP-11-074	FT-10-10	457065	Felsic	2.52
MP-11-075	FT-10-09	456941	Felsic	2.61
MP-11-076	FT-10-09	456889	Felsic	2.7
MP-11-077	FT-10-17	458242	Felsic	2.68
MP-11-078	FTC-11-03	507719	Augen	2.28
MP-11-079	FTC-11-03	507709	Mafic	2.84
MP-11-080	FTC-11-04	507818	Mafic	2.85
MP-11-081	FTC-11-27	507965	Augen	2.64
MP-11-082	FTC-11-27	507967	Mafic	3.01
MP-11-083	FTC-11-04	507844	Augen	2.41

#### TABLE 12-2 SUMMARY OF BULK DENSITY CHECK SAMPLES Search Minerals Inc. – Foxtrot Project

### **INDEPENDENT THIRD PARTY QA/QC**

As a further supplement to the quality control measures taken by both Actlabs and Search Minerals, Benchmark Six collected and submitted 30 samples to SGS in Toronto. This included 22 REE check samples, six density check samples, and two quality control samples. SGS uses a quality management system that meets, at a minimum, the requirements for both ISO 9001 and ISO 17025.

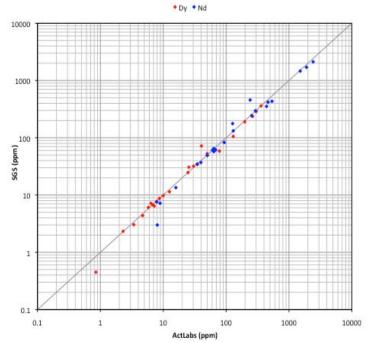
All samples were dried, measured for bulk density prior to being crushed, and then pulverized. The REE and quality control check samples were analyzed according to method IMS95A – dissolved using lithium metaborate fusion and analyzed via ICP/MS. This method



was chosen because it replicated the process used by Actlabs. The two quality control samples were Search Minerals' pulp standards FHA2 and FHG2. The results of the check samples are shown below in Figure 12-3. The density check samples were used to check the density of the three units at Foxtrot Project – the mineralized felsic material, the mafic material, and the augen gneiss.

The REE check samples were chosen according to the distribution of dysprosium seen on the property, ranging from 2.3 ppm Dy to 360 ppm Dy. This allowed for a complete and thorough check of the low, medium, and high grade material.

### FIGURE 12-3 SELECTED RESULTS FROM THE 24 CHECK SAMPLES SUBMITTED TO SGS TORONTO





### 13 MINERAL PROCESSING AND METALLURGICAL TESTING

### MINERALOGY STUDIES

A metallurgical sample obtained from a Foxtrot Project channel sample was submitted to SGS Minerals Services. The sample was stage crushed to K80 of 150  $\mu$ m and then screened into two size fractions: +38  $\mu$ m and -38  $\mu$ m for the mineralogical study, and submitted for QEMSCANTM analysis.

The minerals identified in the sample are listed in Table 13-1.

Mineral	Mineral Formula	Mineral	Mineral Formula
Columbite(Fe)	( <u>Fe,Mn)(Nb,Ta)<sub>2</sub>O</u> 6	Plagioclase	(NaSi,CaAl)AlSi <sub>2</sub> O <sub>8</sub>
Bastnasite	(Ce, La)CO₃F	K-Feldspar	KAISi₃O <sub>8</sub>
Synchysite	Ca(Ce,La)(CO <sub>3</sub> ) <sub>2</sub> F	Biotite	K(Mg,Fe) <sub>3</sub> (AlSi <sub>3</sub> O <sub>10</sub> )(OH) <sub>2</sub>
Monazite	(Ce,La,Pr,Nd,Th,Y)PO₄	Quartz	SiO <sub>2</sub>
Chevkinite	(Ce,La,Ca,Th) <sub>4</sub> (Fe <sup>2+</sup> ,Mg)(Fe <sup>2+</sup> ,Ti,Fe <sup>3+</sup> )- (Ti,Fe <sup>3+</sup> ) <sub>2</sub> (Si <sub>2</sub> O <sub>7</sub> ) <sub>2</sub> O <sub>8</sub>	Muscovites/Clays	KAl <sub>2</sub> (AlSi <sub>3</sub> O <sub>10</sub> )(OH) <sub>2</sub>
Fergusonite	(Y,Er,Ce,Fe)NbO <sub>4</sub>	Amphibole/ Pyroxene	(Ca,Na)(Mg,Fe,Al,Ti)(Si,Al) <sub>2</sub> O <sub>6</sub>
Allanite	$(Ca,Ce)_2(Fe^2,Fe^{3+})Al_2O-(SiO_4)(Si_2O_7)(OH)$	Carbonates	CaCO <sub>3</sub>
Zircon	ZrSiO <sub>4</sub>	Fluorite	CaF <sub>2</sub>
Apatite	(Ca,Ce,Y) <sub>5</sub> (PO <sub>4</sub> ,SiO <sub>4</sub> ) <sub>3</sub> (F,Cl,OH)	Hematite Ilmenite Magnetite	Fe₂O₃ FeTiO₃ Fe₃O₄

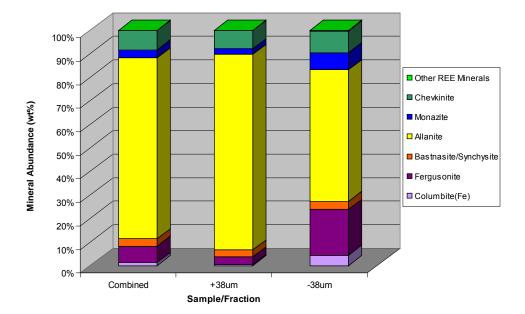
# TABLE 13-1 MINERAL LIST AND FORMULAS Search Minerals Inc. – Foxtrot Project

### MINERAL ABUNDANCE

Figure 13-1 illustrates the normalized mass % of the REE minerals (excluding zircon). It is apparent that allanite is the primary REE phase. The sample is dominated by quartz (35.8%) and K-feldspar (21.0%), moderate amounts of amphibole/pyroxene (13.7%), plagioclase (12.3%), minor Fe-oxides (4.4%), biotite (3.9%) and muscovite/clays (1.6%), and trace amounts of other silicates, carbonates, fluorite, other oxides and sulphides. REE-Zr minerals include mainly allanite (2.6%), zircon (2.5%), chevkinite (0.3%), fergusonite (0.2%), bastnasite/synchysite (0.1%), monazite (0.1%), and rare columbite. Most of the allanite (2.2%) occurs in the +38  $\mu$ m, but most of zircon (1.5%) in the -38  $\mu$ m fraction.



### FIGURE 13-1 NORMALIZED MINERAL ABUNDANCE OF REE MINERALS



### **GRAIN SIZE DISTRIBUTION**

Figure 13-2 summarizes the  $D_{50}$  or 50% passing value from the cumulative grain size distribution of the fergusonite, bastnasite/synchysite, allanite, monazite, chevkinite, zircon, quartz/feldspars, muscovite, other silicates, oxides and overall particle size distribution (PSD) for the Fox HBR Aug-11 sample. The approximate  $D_{50}$  values are as follows:

- fergusonite 22 µm
- bastnasite/synchysite 51 μm
- allanite 65 µm
- monazite 24 µm
- chevkinite 53 µm
- zircon 24 µm

- quartz/feldspars 98 µm
- muscovite 24 µm
- other silicates 83 µm
- oxides 141 µm
- overall particle 98 µm

The grain size data indicates that it should be possible to liberate the REE minerals from the barren gangue minerals using a moderate grind size.



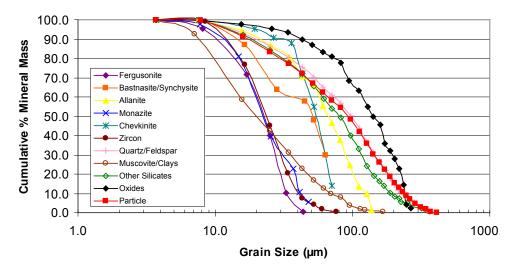


FIGURE 13-2 CUMULATIVE GRAIN SIZE DISTRIBUTION

### MINERAL CHEMISTRY

Electron microprobe analyses (EMPA) were conducted on chevkinite, allanite, fergusonite, bastnasite and synchysite, zircon and an undefined Si/Y/Ca REE phase.

- Allanite averages Ce 11.07 wt%, La 5.18 wt% and Nd 3.66 wt%, and minor Dy 0.40 wt%, Pr 0.92 wt%, Sm 0.24 wt%, Th 0.18% and Y 0.30 wt%.
- Fergusonite carries both, but mainly HREE (heavy rare earth elements) and less LREE (light rare earth elements). It averages Y 17.76%, Nb 29.20%, and minor Dy 3.63%, Gd 3.42%, Er 2.17%, Nd 1.76%, Ce 1.47%, Yb 1.27%, Sm 1.16%, La 0.44%, Ho 0.85%, Pr 0.25%, Tb 0.68%, Tm 0.38%, U 0.37 % and Th 0.61%.
- A Si-Y-Ca phase consists of Y 14.45%, Nd 8.07%, Ce 7.70%, Gd 3.99%, Dy 3.22%, Sm 2.94%, La 2.01%, Pr 1.42%, Yb 1.01% and Tb 0.58%, Tm 0.54% and Th 0.27%. This phase is tentatively identified as a Y-britholite.
- Bastnasite/Synchysite consists of, in average, Ce 27.42%, La 15.27%, Nd 10.92%, Pr 3.06%, Sm 1.44%, Gd 0.90%, Tm 0.33%, Dy 0.28%, Tb 0.24%, Yb 0.18%, Th 0.17%, and Y 0.68%.
- Chevkinite consists of Ce 16.74%, La 6.84%, Nd 6.69%, Pr 1.87%, Nb 1.28%, Gd 0.73%, Dy 0.68%, Sm 0.98%, Yb 0.15%, Th 0.56% and Y 1.72%.
- Although based on a limited number of analyses, there are two populations of zircon grains, with Y-bearing and Y-barren. Y ranges from nil to 0.66% and averages 0.15%.



### LIBERATION AND ASSOCIATION

The liberation and association characteristics of allanite, fergusonite, bastnasite/ synchysite, monazite, chevkinite and zircon were examined.

- Free and liberated allanite account for 66.8%. The main association of allanite is as complex particles (25.8%), and minor middlings with zircon (3.8%) and quartz/feldspars (1.6%), and trace associations (<1%) with other minerals. Free and liberated allanite increases from 59.1% to 86.0% with decreasing size, while complex particles decrease from 33.4% in the +38 µm to 6.7% in the -38 µm fraction.</li>
- Free and liberated fergusonite accounts for 31.4%. The main association of fergusonite is as complex particles (30.8%), followed by middlings with zircon (21.4%), quartz/feldspars (11.4%), and less with allanite (1.6%) and other silicates (1.5%), while other associations are insignificant (<1%). Liberation increases from 12.5% in the +38 μm fraction to 42.6% in the -38 μm fraction. Complex particles decrease from 48.5% to 20.3%, with quartz/feldspars from 26.2% to 2.6%, but those with zircon increase from 8.9% to 28.8%.</li>

### **BENEFICIATION OF FOXTROT SAMPLE**

Three beneficiation techniques were studied in order to concentrate the REE in the Foxtrot sample, including Wilfley tabling, magnetic separation, and flotation. The Wilfley tabling was used to test amenability to gravity concentration. Low Intensity Magnetic Separation (LIMS) was used to reject magnetite from the Wilfley concentrates. Flotation was tested both as a primary method of concentration for the Foxtrot sample and as a scavenging method to recover additional REE from the Wilfley tails. The work was preliminary in nature.

#### GRAVITY CONCENTRATION WITH THE WILFLEY TABLE AND MAGNETIC SEPARATION

A 100 kg charge was stage ground with the closing screen size of 105  $\mu$ m. The -105  $\mu$ m fraction was screened on 75  $\mu$ m, and 38  $\mu$ m screens to make three fractions. The +75  $\mu$ m fraction was tabled and the tails re-passed. The test generated three fractions: Concentrate, Scavenger Middlings, Scavenger Tail. The +38  $\mu$ m fraction was tabled and the tails repassed. The test generated three fractions: Concentrate, Scavenger Middlings, Scavenger Tail. The +38  $\mu$ m fraction was tabled and the tails repassed. The test generated three fractions: Conc, Scav Mids, Scav Tail. The -38  $\mu$ m fraction was passed through the cyclone to eliminate unnecessary slimes on the table. The cyclone overflow was filtered. The cyclone underflow was passed over the Wilfley Table and the tail was re-passed. The Concentrate, Scavenger Middlings, and Scavenger Tailings were submitted for assay. All the table concentrates were passed through LIMS to separate mainly magnetite. The flowsheet is shown in Figure 13-3.



Table 13-2 summarizes the results of the gravity and magnetic separation. It is possible to recover 71.4% of the Ce, 70.7% of the Nd and 70.7% of the Y into a concentrate containing 22.3% of the original mass. Flotation was also examined to enhance the overall recoveries.

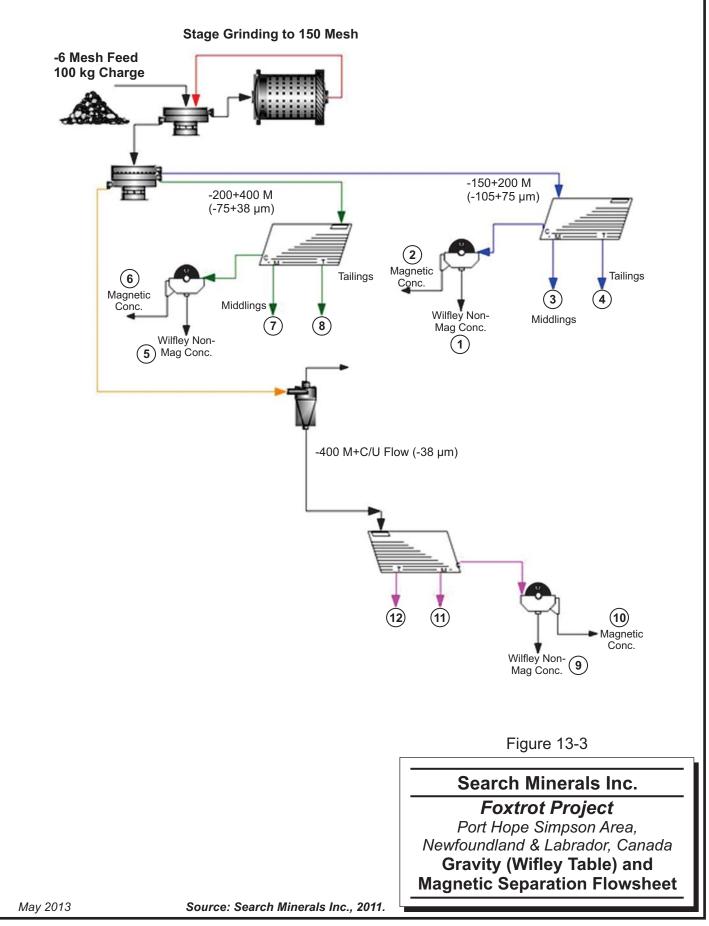
#### FLOTATION SEPARATION

Flotation testing was conducted on a head sample. The flotation was performed as a rougher test with five stages of rougher flotation. Appropriate flotation reagents and test conditions were supplied by SGS for recovery of allanite and fergusonite. The feed particle size was 80% passing 150  $\mu$ m. The flotation test results are shown in Table 13-3. Flotation by itself produced a concentrate containing 70.5% of the Ce, 73.6% of the Nd and 81.7% of the Y in a mass pull of 27.4%. These results are slightly better than the results of the gravity and magnetic separation.

As a last step in the beneficiation testing, the Wilfley table tails (three size fractions) were subjected to flotation to increase the overall recovery of REEs, excluding the cyclone overflow.

The analysis of this concentrate is shown in Table 13-4, along with the associated total recoveries. These results show that conventional beneficiation methods may be used to recover the REE minerals. Additional testwork using more selective beneficiation or incorporation of cleaning steps in the circuit may improve recoveries.







# TABLE 13-2SUMMARY OF THE BENEFICIATION OF 100 KG SAMPLE OF FOXTROT MATERIAL USING<br/>GRAVITY AND MAGNETIC SEPARATION<br/>Search Minerals Inc. - Foxtrot Project

Prod.	Weig	iht				Assav	s, %, g/t							% Dist	ribution			
No.	g	%	CeO <sub>2</sub>	$Nd_2O_3$	$Y_2O_3$	ZrO <sub>2</sub>	Nb <sub>2</sub> O <sub>5</sub>	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	CeO <sub>2</sub>	$Nd_2O_3$	$Y_2O_3$	ZrO <sub>2</sub>	Nb <sub>2</sub> O <sub>5</sub>	SiO <sub>2</sub>	$AI_2O_3$	Fe <sub>2</sub> O <sub>3</sub>
1	8,713	9.53	1.50	0.58	0.39	2.15	0.24	57.8	3.70	17.3	33.8	32.2	28.5	12.0	23.5	8.12	4.88	14.6
2	1,484	1.62	0.09	0.12	0.10	0.76	0.10	4.43	0.30	97.4	0.35	1.10	1.25	0.72	1.65	0.11	0.07	14.0
3	167	0.18	0.25	0.12	0.10	0.76	0.10	69.9	7.67	11.4	0.11	0.12	0.14	0.08	0.19	0.19	0.19	0.18
4	28,797	31.5	0.05	0.01	0.01	0.57	0.01	76.8	8.50	4.10	3.66	2.13	2.39	10.5	4.58	35.6	37.1	11.5
5	5,082	5.56	1.56	0.57	0.39	3.09	0.31	58.0	4.20	15.4	20.5	18.4	16.6	10.1	17.8	4.75	3.23	7.61
6	917	1.00	0.07	0.03	0.08	0.55	0.03	4.23	0.35	95.7	0.17	0.20	0.58	0.33	0.29	0.06	0.05	8.52
7	329	0.36	0.10	0.03	0.08	0.55	0.03	77.4	8.06	3.78	0.08	0.07	0.21	0.12	0.10	0.41	0.40	0.12
8	17,382	19.0	0.11	0.05	0.05	0.62	0.04	75.3	8.53	5.68	4.97	5.14	7.34	6.93	8.29	21.1	22.5	9.60
9	6,576	7.20	1.00	0.48	0.40	8.37	0.33	61.5	5.44	9.52	17.0	20.0	21.9	35.3	24.1	6.52	5.42	6.08
10	976	1.07	0.12	0.05	0.10	1.10	0.05	5.64	0.48	92.7	0.30	0.31	0.81	0.69	0.54	0.09	0.07	8.79
11	34.3	0.04	0.31	0.13	0.11	3.54	0.09	70.8	8.02	6.14	0.03	0.03	0.03	0.08	0.03	0.04	0.04	0.02
12	12,914	14.1	0.31	0.12	0.09	2.20	0.06	70.8	8.04	7.43	10.3	9.55	9.55	18.2	8.21	14.7	15.7	9.33
13	8,019	8.77	0.42	0.21	0.16	0.97	0.12	63.9	8.54	12.3	8.71	10.7	10.7	4.99	10.7	8.26	10.4	9.59
Calc Head	91,388	100	0.42	0.17	0.13	1.71	0.10	67.9	7.22	11.3	100	100	100	100	100	100	100	100
Dir Head			0.45	0.19	0.16	1.86	0.13	65.2	6.92	11.1								
Concentrate 1+5+9	20,370	22.3	1.35	0.55	0.40	4.39	0.29	59.0	4.39	14.31	71.4	70.7	67.0	57.4	65.4	19.4	13.5	28.3

# TABLE 13-3 FLOTATION TEST RESULT FOR SCOPING ROUGHER TEST Search Minerals Inc. - Foxtrot Project

Prod.	Wei	ght		Assays, %, g/t								% Distribution						
No.	g	%	CeO <sub>2</sub>	$Nd_2O_3$	$Y_2O_3$	ZrO <sub>2</sub>	Nb <sub>2</sub> O <sub>5</sub>	SiO <sub>2</sub>	$AI_2O_3$	Fe <sub>2</sub> O <sub>3</sub>	CeO <sub>2</sub>	$Nd_2O_3$	$Y_2O_3$	ZrO <sub>2</sub>	Nb <sub>2</sub> O <sub>5</sub>	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>
Rougher Conc.	536	27.4	1.14	0.52	0.35	4.71	0.27	46.1	4.66	27.4	70.5	73.6	81.7	73.3	62.7	19.0	18.0	65.8
Float Tails	1,419	72.6	0.18	0.07	0.03	0.65	0.06	74.2	8.04	5.39	29.5	26.4	18.3	26.7	37.3	81.0	82.0	34.2



#### TABLE 13-4 COMBINED GRAVITY, MAGNETIC SEPARATION AND FLOTATION CONCENTRATE PRODUCT Search Minerals Inc. - Foxtrot Project

	Units	Concentrate Assay	Recovery (%)
Weight	kg	35.17	-
Mass Pull	%	38.5	-
$La_2O_3$	g/t	3,968	86.2
$Ce_2O_3$	%	0.94	83.0
$Pr_6O_{11}$	g/t	1,160	86.6
$Nd_2O_3$	%	0.38	83.0
$Sm_2O_3$	g/t	741	84.3
$Eu_2O_3$	g/t	34	83.7
$Gd_2O_3$	g/t	559	82.7
$Tb_2O_3$	g/t	93	82.4
$Dy_2O_3$	g/t	543	81.4
$Ho_2O_3$	g/t	105	81.6
$Er_2O_3$	g/t	297	81.7
$Nb_2O_5$	%	0.22	81.8
$Tm_2O_3$	g/t	42	81.9
$Yb_2O_3$	g/t	249	81.7
$Lu_2O_3$	g/t	37	81.8
$Y_2O_3$	%	0.31	83.7
$U_3O_8$	g/t	54	83.8
ThO <sub>2</sub>	g/t	274	86.6
$ZrO_2$	%	3.71	65.9

# HYDROMETALLURGICAL EXTRACTION OF REES FROM FOXTROT CONCENTRATE

The gravity concentrate (Table 13-2) and the combined gravity/flotation concentrate (Table 13-4) were subjected to acid leaching or acid baking at 200°C to 250°C followed by water leaching. The results of the testing are summarized in Table 13-5.



Test ID	AL1	AL2	WL-AB1	WL-AB2	WL-AB3	WL-AB4	WL-AB5	WL-AB6	WL-AB7	WL-AB8	WL-AB9
Feed	grav	grav	AB1	AB2	AB3	AB4	AB5	AB6	AB7	AB8	AB9
	con	con	calcine	calcine	calcine	calcine	calcine	calcine	calcine	calcine	calcine
H2SO4 Addn(kg/t)	1000	1000				1000			1000	750	500
					Extracti	on (%)					
Si	2	4	1	1	1	1	1	1	1	1	1
AI	16	29	15	16	15	17	14	16	16	15	14
Fe	19	35	19	20	35	37	33	32	34	34	33
Mg	15	28	18	19	45	42	44	41	41	38	49
Ca	32	54	36	32	42	45	40	38	36	39	33
Na	1	2	1	2	3	2	3	2	3	3	2
K	15	36	19	5	11	12	11	10	22	11	22
Ti	48	69	75	62	75	74	67	53	59	68	53
Р	87	88	63	60	72	88	57	50	54	74	52
Mn	27	46	30	30	40	43	39	37	40	35	39
Zr	0	1	0	1	0	0	1	0	1	1	1
Nb	5	18	12	4	15	23	9	8	16	16	15
La	95	97	91	89	94	95	92	88	92	93	91
Ce	95	97	91	89	95	96	92	89	93	94	92
Pr	91	96	93	91	95	96	93	89	93	94	92
Nd	93	94	93	91	94	96	93	90	93	94	92
Sm	83	86	93	92	95	95	93	91	93	93	92
Eu	72	79	93	91	94	94	93	91	92	93	92
Gd	70	74	94	92	95	95	95	93	94	94	93
Tb	60	66	94	92	95	95	94	93	93	93	92
Dy	56	61	94	92	94	94	94	92	93	93	92
Ho	51	58	93	90	93	93	93	92	92	92	91
Er	48	54	90	88	91	91	91	89	89	89	89
Tm	46	54	85	84	86	87	86	85	85	85	84
Yb	46	51	78	77	79	80	79	77	77	77	77
Lu	38	45	64	65	65	68	68	66	65	65	64
Y	62	64	92	91	92	92	92	91	90	91	90
Sc	6	7	2	4	3	3	2	2	2	2	2
U	15	22	56	57	59	62	62	62	62	60	61
Th	85	80	96	95	97	97	96	94	96	97	94

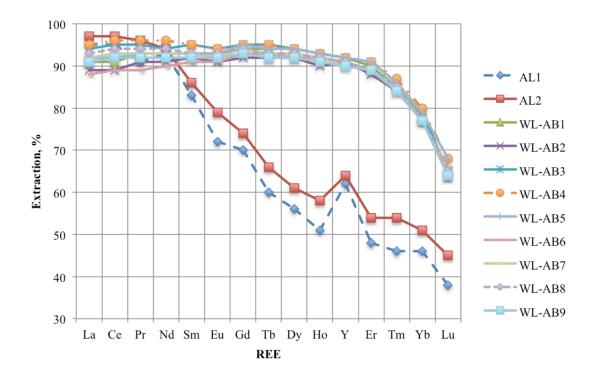
# TABLE 13-5 HYDROMETALLURGICAL LEACHING STUDIES ON FOXTROT CONCENTRATES Search Minerals Inc. – Foxtrot Project

AL = Atmospheric Leach, AB = Acid Bake, WL = Water Leach,



The results are summarized in Figure 13-4. The direct acid leach extractions were somewhat lower and produced slower solid/liquid separations. However, the acid bake and water leach results produced high extractions. If Zr and Nb elements are to be recovered from Foxtrot mineralization, it may be necessary to re-leach the acid leach residue (possibly with alkali). As well, the lighter REE are more highly extracted than the very heavy REE using the acid bake and water leach procedure. The acid leaching procedure (no acid bake) shows a much reduced extraction for the heavy REE.

# FIGURE 13-4 EXTRACTION OF REE FOR THE ACID LEACH AND ACID BAKE – WATER LEACH TESTS



#### LEACH SOLUTION PURIFICATION AND RECOVERY OF MIXED REE PRODUCT

The leach solution purification involved simple pH adjustment to pH 3.0. At this pH, iron, aluminum, silica, titanium, phosphate, zirconium, niobium, and thorium are removed as a mixed hydroxide waste precipitate.

After impurity precipitation, the solids were filtered and analyzed. The remaining solution was then treated with oxalic acid at pH 2.0 to precipitate the REE from solution. The form of the precipitate is as a mixed REE oxalate. The mixed REE oxalate was filtered and washed and analyzed. The results are summarized in Table 13-6.



# TABLE 13-6MIXED OXALATE PRECIPITATE OF REE RECOVERED FROM<br/>SOLUTION

Element	Units	Oxalate Precipitate Analysis (% or ppm)	Oxide	Oxalate Precipitate Analysis (% or ppm)	Recovery from Solution (%)
La	%	7.8	$La_2O_3$	9.15	99.96
Ce	%	18.3	$Ce_2O_3$	21.43	100.0
Pr	%	2.1	$Pr_6O_{11}$	2.54	99.97
Nd	%	8.7	$Nd_2O_3$	10.15	99.98
Sm	%	1.24	$Sm_2O_3$	1.44	99.94
Eu	ppm	759	$Eu_2O_3$	879	99.12
Gd	ppm	11,600	$Gd_2O_3$	13,370	99.95
Tb	ppm	1,840	$Tb_2O_3$	2,164	99.66
Dy	ppm	10,600	$Dy_2O_3$	12,165	99.90
Ho	ppm	2,020	$Ho_2O_3$	23,14	99.80
Er	ppm	5,430	$Er_2O_3$	6,209	99.85
Tm	ppm	735	$Tm_2O_3$	839	98.92
Yb	ppm	4,240	$Yb_2O_3$	4,828	99.90
Lu	ppm	499	$Lu_2O_3$	567	98.81
Y	ppm	50,763	$Y_2O_3$	64,466	99.99
U	ppm	5.5	$U_3O_8$	6	23.17
Th	ppm	282	ThO <sub>2</sub>	321	97.73
		LREO	%	44.70	

#### **Search Minerals Inc. – Foxtrot Project**

Note: Y analysis not available. Y solid analysis entered as estimate using Nd analysis of precipitate as reference

### SUMMARY

The metallurgical process has been studied from initial recovery of a REE concentrate through to the purification of a leach solution and precipitation of a mixed product. Table 13-7 summarizes an overall recovery to a final mixed REE product.



Oxide	Conc. Recovery (%)	Leach Extraction	Impurity Loss	Precip. Efficiency (Oxalate)	Overall Recovery
La <sub>2</sub> O <sub>3</sub>	86.21	95.29	0.77	99.96	81.49
$Ce_2O_3$	82.98	95.89	0.96	100.00	78.80
$Pr_6O_{11}$	86.56	95.79	1.06	99.97	82.01
$Nd_2O_3$	83.04	95.64	1.18	99.98	78.47
Sm <sub>2</sub> O <sub>3</sub>	84.32	94.70	1.17	99.94	78.88
$Eu_2O_3$	83.73	94.28	1.19	99.12	77.31
$Gd_2O_3$	82.65	95.30	1.01	99.95	77.93
$Tb_2O_3$	82.38	94.69	1.07	99.66	76.91
$Dy_2O_3$	81.36	94.21	1.07	99.90	75.76
Ho <sub>2</sub> O <sub>3</sub>	81.59	93.31	1.08	99.8	75.15
$Er_2O_3$	81.67	90.83	1.17	99.85	73.21
$Tm_2O_3$	81.87	86.80	1.26	98.92	69.41
Yb <sub>2</sub> O <sub>3</sub>	81.73	79.89	1.50	99.90	64.25
$Lu_2O_3$	81.75	67.70	1.45	98.81	53.90
$Y_2O_3$	83.71	92.48	1.12	99.99	76.54

#### TABLE 13-7 OVERALL RECOVERY OF REE Search Minerals Inc. – Foxtrot Project

At this early stage of process flowsheet development, RPA is not aware of any processing factors or deleterious elements that could have a significant effect on economic extraction.

### RECOMMENDATIONS

SGS Minerals Services have recommended that further optimization work be started to confirm and improve the results obtained to date as well as to start pilot plant design testwork. Following optimization work, SGS Minerals Services have further recommended continuous metallurgical pilot plant studies. The continuous pilot plant results would be used to support Pre-feasibility and Feasibility studies of the Foxtrot Project.

RPA concurs with the SGS recommendations.



## **14 MINERAL RESOURCE ESTIMATE**

### **SUMMARY**

Table 14-1 summarizes the Mineral Resource estimate for the Foxtrot Project as of September 30, 2012.

					,,		
Classificatior	a Zone	Tonnage (000 t)	Dy (ppm)	Nd (ppm)	Y (ppm)	HREE (%)	TREE (%)
Indicated	Central	9,229	189	1,442	1,040	0.17	0.88
Indicated	Extensions						
Indicated Tot	al	9,229	189	1,442	1,040	0.17	0.88
Inferred	Central	3,291	178	1,339	982	0.16	0.83
Inferred	Extensions	1,874	171	1,046	960	0.16	0.67
Inferred Total	l	5,165	176	1,233	974	0.16	0.77

#### TABLE 14-1 SUMMARY MINERAL RESOURCE ESTIMATE - SEPTEMBER 30, 2012 Search Minerals Inc. – Foxtrot Project

Classification	Zone	Tonnage (000 t)	Dy₂O₃ (ppm)	Nd₂O₃ (ppm)	Y₂O₃ (ppm)	HREO (%)	TREO (%)
Indicated	Central	9,229	218	1,687	1,345	0.21	1.07
Indicated	Extensions						
Indicated Tota	al	9,229	217	1,687	1,320	0.21	1.06
Inferred	Central	3,291	205	1,567	1,247	0.20	1.00
Inferred	Extensions	1,874	197	1,224	1,219	0.19	0.81
Inferred Total		5,165	202	1,442	1,237	0.20	0.93

Notes:

1. CIM definitions were followed for Mineral Resources.

2. Mineral Resources are estimated at a cut-off grade of 130 ppm Dy.

3. Numbers may not add due to rounding.

4. Heavy Rare Earth Elements (HREE) = Eu+Gd+Tb+Dy+Ho+Er+Tm+Yb+Lu+Y

- 5. Light Rare Earth Elements (LREE) = La+Ce+Pr+Nd+Sm
- 6. Total Rare Earth Elements (TREE) = sum of HREE and LREE

7. HREO, LREO refer to oxides of heavy and light rare earth elements respectively, and TREO is the sum of HREO and LREO.

8. Resources have been estimated inside a preliminary pit shell.



### DATA

### DRILL HOLES AND CHANNEL SAMPLES

Figure 14-1 shows the collar locations of the 72 diamond drill holes and 23 surface channel samples that were used for resource estimation. The drill holes include 18 holes (3,138 m) drilled in 2010, 48 holes (13,925 m) drilled in 2011, and six holes (1,771 m) drilled in 2012. All of the channel samples (459 m) were collected during 2011.

In Figure 14-1, the drill holes and channel samples used in the previous resource estimation are shown in gray; the newer drill holes and channel samples that post-date the previous resource estimation are shown in black. The new samples include 29 drill holes that intersect the mineralized bands at greater depths in the Central Area. These deeper intersections, which confirm the down-dip continuity of the resources previously reported, are the main reason for an increase in resource tonnage.

### ASSAYS

All of the assay data available at the end of April 2012 were used for resource estimation. At this cut-off date, a total of 14,837 assays were available, with a total length of 17,827 m.

For sample intervals where internal lab duplicates existed, the assay used for resource estimation purposes was the first assay. All of the duplicates were checked and in no case was there a significant difference between the first assay and the internal duplicate.

### DENSITY

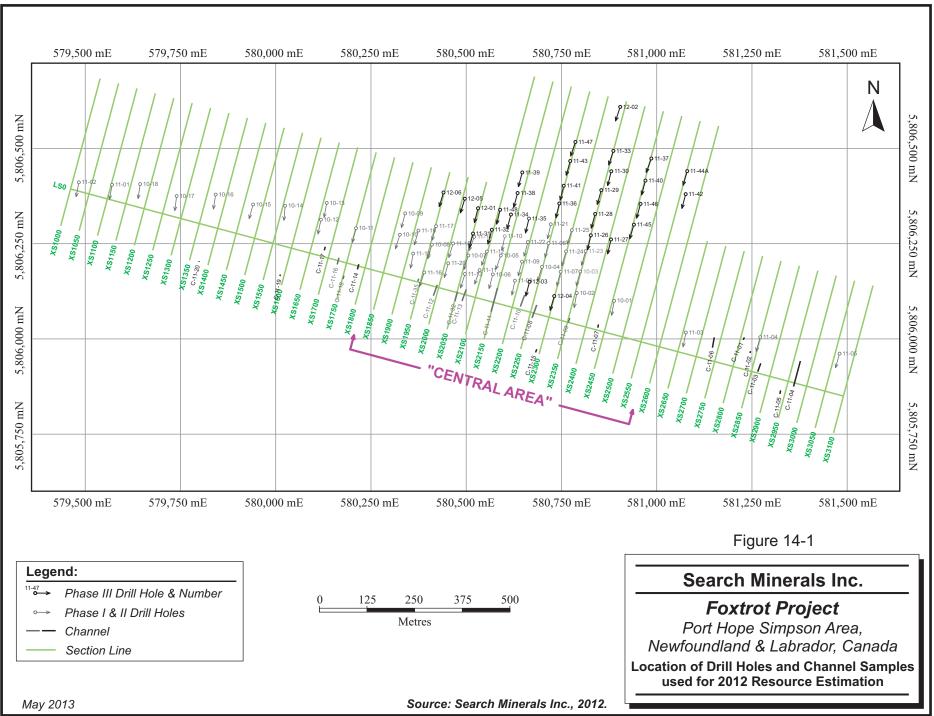
During the site visit in 2011, 28 samples were collected for determination of dry bulk density. The five augen gneiss samples had an average dry bulk density of 2.53 t/m<sup>3</sup>. The 12 felsic samples had an average dry bulk density of 2.71 t/m<sup>3</sup>. The 11 mafic samples had an average dry bulk density of 2.88 t/m<sup>3</sup>. These averages were used to calculate tonnages from volumes for each of the three rock types.

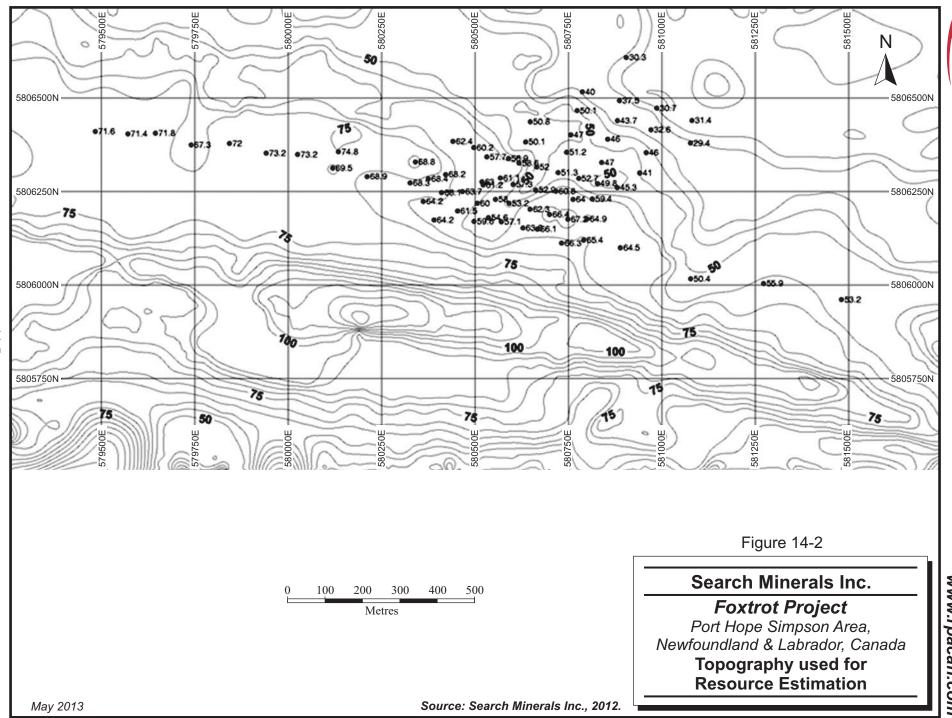
### TOPOGRAPHY

The topographic surface used for the current resource estimation was created by merging surveyed drill hole collars and the regional topographic contours from the public Geoscience Atlas provided by the government of Newfoundland and Labrador.



With drill hole collars differing from the government's regional topography by up to plus or minus six metres, the regional topography was locally modified by calculating residuals at the collar locations, creating a smoothed map of the residuals, and adding the map of residuals to the original regional topography. The result, shown in Figure 14-2, is a topography model that reflects the broad shape of the regional topography while exactly honouring the surveyed elevations at all of the hole collar locations.





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### DATA ANALYSIS

There are 17 elements included in the Foxtrot Project resource block model:

- La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu (all of the lanthanoids with the exception of promethium (Pm), which does not occur in nature)
- Yttrium (Y), which is usually classified as a rare earth
- Zirconium (Zr) and Niobium (Nb), which are not classified as rare earth elements

Also included are combinations of the oxides of these 17 metals: the total rare earth oxides (TREO), the light rare earth oxides (LREO) and the heavy rare earth oxides (HREO).

Some of the following discussion of statistical analysis focuses on two elements, dysprosium (Dy) and neodymium (Nd). Dy has been chosen since it is the heavy rare-earth element (HREE) at Foxtrot with the greatest in situ value (grade X metal price). Similarly, Nd has been chosen since it is the light rare-earth element (LREE) with the greatest in situ value.

Table 14-2 shows the correlation coefficients between the 17 elements. Within the LREE group (La, Ce, Pr, Nd, and Sm), highlighted in blue, the correlations are extremely high (>0.98). With Nd having an excellent correlation (0.99) with each of the light rare earth elements, its statistical characteristics are a good surrogate for the entire LREE group. Within the HREE group (Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, and Y), highlighted in green, the correlations are all strong (>0.80). Dy has a very good correlation (> 0.90) with each of the heavy rare earth elements and is a good surrogate for any element in the HREE group. The observations presented in the following sections about Dy and Nd are also pertinent to the other elements with which they share a strong correlation.



	La	Се	Pr	Nd	Sm	Eu	Gd	Тb	Dy	Но	Er	Tm	Yb	Lu	Ŷ	Zr	Nb
La	1.00	0.99	0.99	0.99	0.98	0.94	0.97	0.93	0.91	0.89	0.87	0.85	0.84	0.82	0.91	0.75	0.89
Се		1.00	0.99	0.99	0.99	0.96	0.98	0.95	0.93	0.91	0.89	0.87	0.86	0.84	0.93	0.77	0.89
Pr			1.00	0.99	0.99	0.96	0.98	0.95	0.93	0.91	0.90	0.88	0.86	0.85	0.93	0.77	0.89
Nd				1.00	0.99	0.97	0.98	0.96	0.93	0.91	0.90	0.88	0.86	0.85	0.93	0.77	0.89
Sm					1.00	0.96	0.99	0.98	0.96	0.94	0.93	0.91	0.90	0.88	0.95	0.80	0.90
Eu						1.00	0.95	0.92	0.90	0.88	0.86	0.84	0.82	0.80	0.89	0.71	0.85
Gd							1.00	0.99	0.98	0.97	0.96	0.94	0.93	0.91	0.97	0.81	0.90
Тb								1.00	0.99	0.99	0.98	0.97	0.96	0.95	0.99	0.83	0.89
Dy									1.00	0.99	0.99	0.98	0.98	0.96	0.99	0.83	0.88
Но										1.00	0.99	0.99	0.99	0.98	0.99	0.84	0.87
Er											1.00	0.99	0.99	0.98	0.99	0.84	0.87
Tm												1.00	0.99	0.99	0.98	0.85	0.86
Yb													1.00	0.99	0.98	0.86	0.85
Lu														1.00	0.97	0.86	0.84
Y															1.00	0.83	0.88
Zr																1.00	0.77
Nb																	1.00

# TABLE 14-2 CORRELATION COEFFICIENTS Search Minerals Inc. – Foxtrot Project

ote: Blue = Light Rare Earth Elements Green = Heavy Rare Earth Elements

### HISTOGRAMS AND SUMMARY STATISTICS

Figure 14-3 shows histograms of Dy and Nd for all samples. The distributions show three prominent modes that correspond to the three main rock units. The lowest mode belongs to samples from the Mafic Volcanic (MV) unit and from the Augen Gneiss (AG), the rock units that bound two steeply-dipping zones of mixed volcanic rocks known as the Foxtrot (FT) and Road Belt. The middle and upper modes belong to samples from the FT and Road Belt zones of mixed volcanic rocks.



#### FIGURE 14-3 HISTOGRAMS AND SUMMARY STATISTICS FOR DYSPROSIUM AND NEODYMIUM FOR ALL SAMPLES

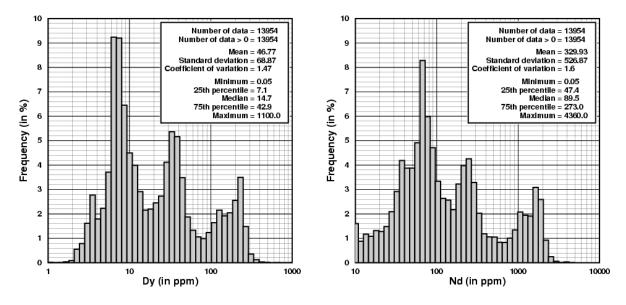
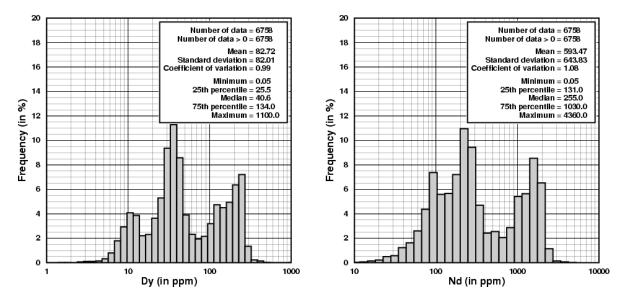


FIGURE 14-4 HISTOGRAMS AND SUMMARY STATISTICS FOR DYSPROSIUM AND NEODYMIUM IN FELSIC BANDS.



The FT and Road Belt zones consist of inter-layered bands of felsic and mafic volcanic rocks. Within these zones, the felsic rocks predominate, accounting for approximately two-thirds of the zone. All of the mineralization with economic potential lies in the felsic bands; the vast majority of this lies in the felsic bands in the southern parts of the FT zone. Figure 14-4 shows the histograms of Dy and Nd in the felsic bands of the FT and Road Belt zones. The main mode (around 40 ppm Dy and 200 ppm Nd) corresponds to the northern parts of



the FT zone and to the Road Belt zone, where the mineralization in the felsics is generally weaker than in the southern parts of the FT. The high mode (around 200 ppm Dy and 1,500 ppm Nd) corresponds to the felsic bands that lie in the southern parts of the FT zone (the HGC).

Table 14-3 provides, for all 17 elements, a statistical summary of the distributions of the samples from the felsic bands.

	N	Average (ppm)	Standard Deviation (ppm)	Coefficient of Variation	Minimum (ppm)	25th percentile (ppm)	Median (ppm)	75th percentile (ppm)	Maximum (ppm)
La	6,757	695.9	757.5	1.09	3.3	158	313	1,180	5,460
Ce	6,757	1,394.6	1,505.7	1.08	6.1	319	621	2,380	10,800
Pr	6,757	159.4	172	1.08	0.6	35.8	69.9	274	1,210
Nd	6,757	593.6	643.8	1.08	2.4	131	255	1,030	4,360
Sm	6,757	109.4	113.8	1.04	0.8	27.9	49.5	181	703
Eu	6,757	5.3	5.8	1.09	0.1	1.3	2	9.2	35.7
Gd	6,757	87.7	88.6	1.01	1.2	24.6	41.3	143	548
Tb	6,757	14.2	14	0.99	0.2	4.3	6.9	22.8	155
Dy	6,757	82.7	82	0.99	1.6	25.5	40.6	134	1,100
Но	6,757	16	15.9	0.99	0.4	5	7.9	25.7	232
Er	6,757	45.6	45	0.99	1.2	14.2	22.9	73.4	661
Tm	6,757	6.6	6.5	0.98	0.2	2.1	3.4	10.6	94
Yb	6,756	41.7	40.3	0.97	1.1	13.4	22.4	66.1	537
Lu	6,757	6.3	6	0.95	0.2	2.1	3.6	10	72.6
Y	6,757	455.3	458.2	1.01	11	135	217	750	6,447
Zr	6,757	4,500.4	4,813.7	1.07	21	1,302	2,141	7,251	72,680
Nb	6,559	289.6	2,94.2	1.02	4	78	137	525	1,360

#### TABLE 14-3 SUMMARY STATISTICS FOR FELSIC SAMPLES Search Minerals Inc. – Foxtrot Project

### **GRADE CAPPING**

No capping of high-grade assays was required since all of the grade distributions for felsic samples had very low coefficients of variation, close to one, which indicates that averages are not dominated by a few extremely high values. Local grade interpolation, which uses local weighted averages, was not affected by spatially erratic extreme values creating large halos of abnormally high grade estimates.



### VARIOGRAMS

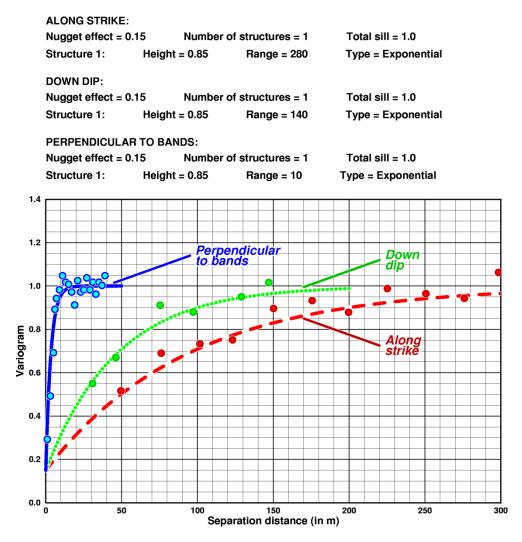
With very strong correlations between all of the elements, a single variogram model was used. Figure 14-5 shows the average experimental variogram for all elements, with the averaging being done after the sill of the variogram for each element has been standardized to one. The experimental variograms in this figure use only the assay data from felsic sample intervals, and group them into three directions:

- along the strike of the FT and Road Belt zones, horizontally in the N75°W direction;
- down the dip, 70° to 90° downward from horizontal in the N15°E direction; and,
- perpendicular to the banding, 0° to 20° upward from horizontal in the N15°E direction.

The direction of maximum continuity is the strike direction, with a range of 280 m. In the down-dip direction, the range is 140 m, and across the felsic bands the range is only 10 m.

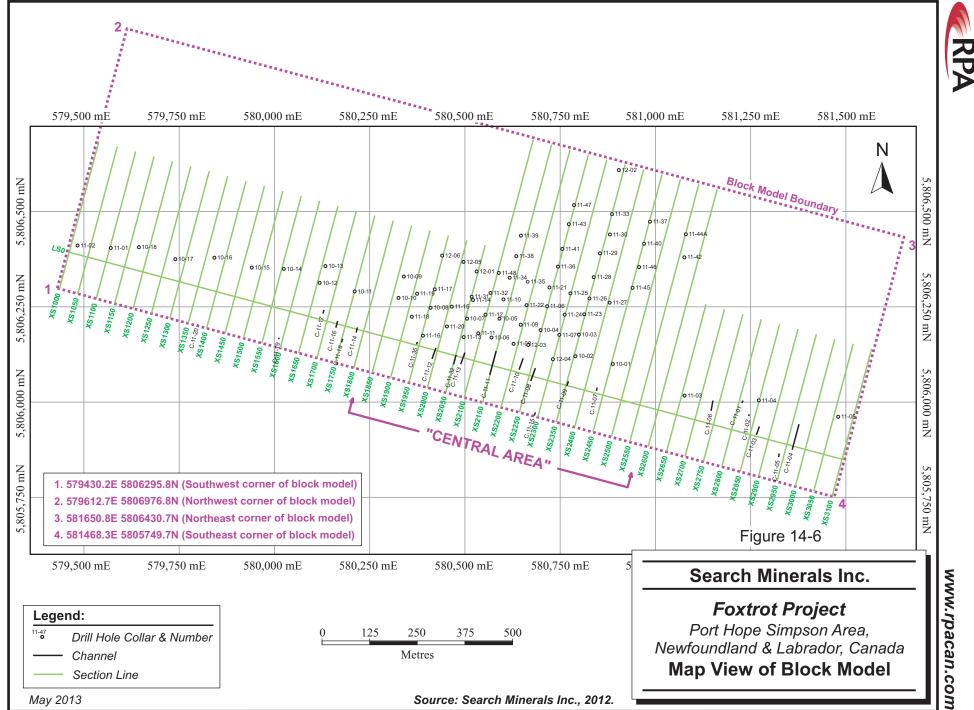


# FIGURE 14-5 AVERAGE VARIOGRAM FOR ALL ELEMENTS IN THE FELSIC ZONE



### **RESOURCE BLOCK MODEL CONFIGURATION**

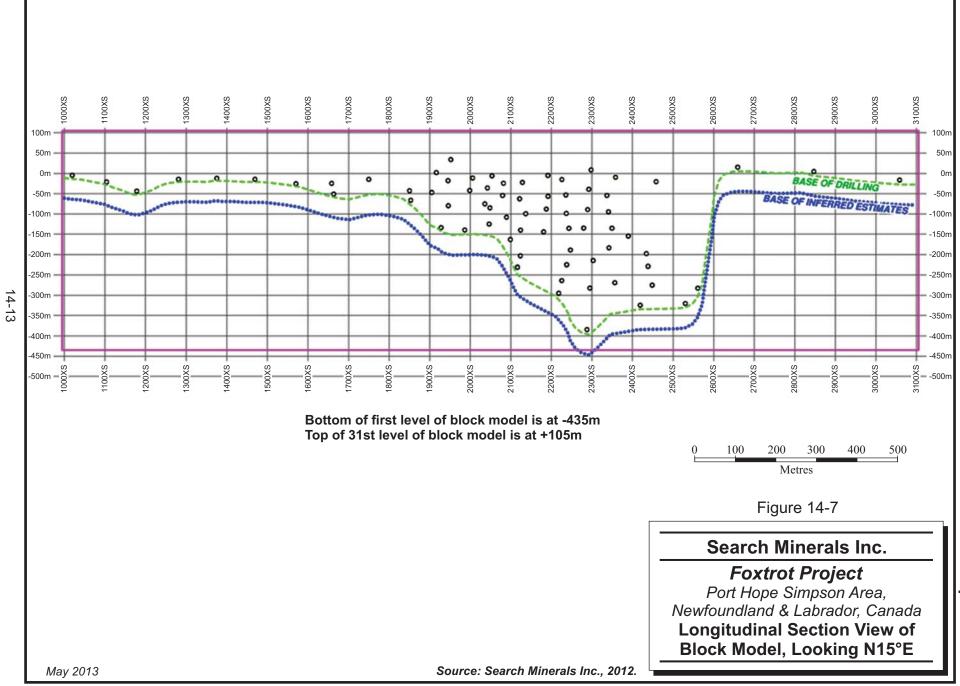
As shown in Figures 14-6 and 14-7, the block model uses 10 m by 5 m by 10 m blocks that are aligned with the strike of the deposit, which is in the N75°W direction. The block model has 211 columns in the strike direction, 141 rows in the horizontal direction across the strike of the deposit, and 54 levels in the vertical direction.



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14-12

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As shown in Figure 14-7, the base of the block model is at -435 m, which is about 50 m below the base of the Phase III drilling in the Central Area. With the range of correlation in the down-dip direction being 140 m, and with the deepest drill holes still showing strong mineralization, extending the block model 50 m beneath the base of drilling is reasonable. Resources beneath the base of drilling were classified as Inferred. No resources were estimated at depths greater than 50 m below the base of drilling.

### **RESOURCE ESTIMATION PROCEDURE**

### MINERALIZED DOMAINS

The contacts of the FT and Road Belt bands were modelled in 3D and wireframed to produce the surfaces shown in red in Figure 14-8. Tonnage and grade estimates were produced for all 10 m by 5 m by 10 m blocks with centres within the FT band or RB band, below the topography, and within 50 m of a drill hole in the vertical direction (the dotted line in Figure 14-7).

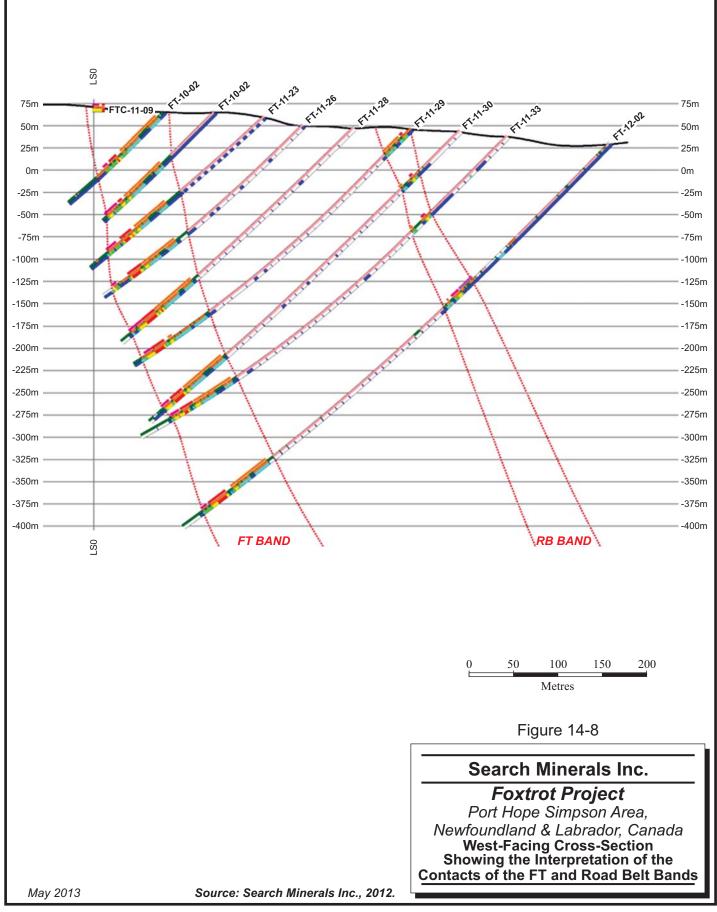
### LOCAL DIP DIRECTIONS

Although the FT and Road Belt bands are approximately tabular, there are variations in the local dip; as seen on Figure 14-8, the dip is nearly vertical in some places and can flatten to about 65° in others.

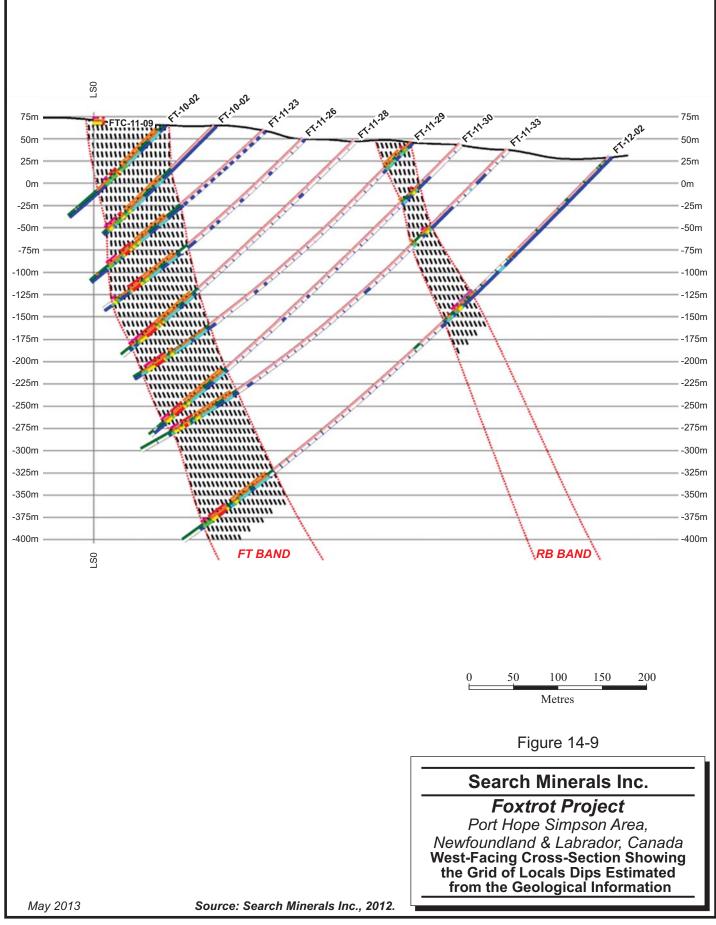
To improve local precision of the tonnage and grade estimates, the local dip was estimated for each block, using the geological cross-sections to provide control points that were then interpolated to a regular grid us inverse-distance-squared interpolation. Figure 14-9 shows an example of the grid of local dips.

In all of the kriging calculations done for the tonnage and grade estimates, the dip direction of the variogram model and the search radius is locally adjusted so that it is aligned with the dip value estimated for that block. The use of a locally-varying dip direction allows undulations in the FT and Road Belt bands to be captured without breaking up the ore bands into sub-parallel en echelon pods that are disconnected.











## TONNAGE ESTIMATION

For each block being estimated, the first step was to estimate its tonnage, which depended on the proportion of felsic material in the block. The proportion of felsic material was estimated using an indicator kriging of the nearby samples, with the felsic intervals coded as one and the non-felsic (usually mafic) intervals coded as zero. The variogram model used for this indicator kriging was the one shown in Figure 14-5. The radiuses of the search ellipse were set to half of the variogram ranges (140 m by 70 m by 5 m), and aligned with the strike and local dip. An octant search was used to limit the number of samples from any one quadrant, with no more than three samples being used per octant. This indicator kriging produces an estimate of the proportion of felsic material in the block; the remaining material is assumed to be mafic.

Once the volume proportion of felsic and mafic material had been estimated, the tonnage of the block was calculated by multiplying the volume-weighted average of the 2.71 t/m<sup>3</sup> density for felsic material and the 2.88 t/m<sup>3</sup> density for mafic material. The separate tonnages of the felsic and the mafic material in the block were also written to the block model file so that the resource inventory could tabulate felsic tonnages and grades separately from the mafic material.

### **GRADE ESTIMATION**

The grades of the 17 elements were estimated by ordinary kriging of the assays; no compositing was done. Half of the sample intervals are exactly one metre in length, but there are some as short as 0.05 m, and some as long as 2.5 m. To account for the fact that some of the assays used for local grade interpolation have different lengths than others, the ordinary kriging weights were multiplied by the sample length and then renormalized to sum to one.

For each block being estimated, the direction of maximum continuity was aligned with the strike of the FT and Road Belt bands (N75°W). The direction of intermediate continuity was aligned with the dip, as given by the grid of interpolated dip values. The direction of minimum continuity was perpendicular to the other two. The search ellipse had radiuses equal to half the range of the variogram model: 140 m in the strike direction, 70 m in the dip direction, and five metres in the direction perpendicular to the felsic banding.



A maximum of three samples per octant were used for estimation. When more than three samples were available in any octant, the three retained for estimation were those with the lowest variogram value, i.e. the closest in terms of statistical distance, not Euclidean distance.

The grade of the felsic portion of each block was estimated using the nearby felsic assays, and the grade of the mafic portion was estimated using the nearby mafic assays. The block model records the average grade of the entire block (i.e. the tonnage-weighted average of the felsic and mafic portions) and also records the separate grades of the felsic and mafic portions of each block. Resources have been inventoried by comparing the grade of the felsic proportion to the cut-off grade; this approach implies that a future mining operation will have the ability to separate felsic material from mafic. Although no specific testing of this has yet been done, the strong visual difference between felsic and mafic material suggests that some ore sorting technology, such as optical sorting, would be successful at separating felsic material from mafic material.

# **RESOURCE CLASSIFICATION**

Mineral resources have been classified in accordance with the CIM (2010):

A **Measured Mineral Resource** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, physical characteristics are so well established that they can be estimated with confidence sufficient to allow the appropriate application of technical and economic parameters, to support production planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough to confirm both geological and grade continuity.

An **Indicated Mineral Resource** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and



drill holes that are spaced closely enough for geological and grade continuity to be reasonably assumed.

An **Inferred Mineral Resource** is that part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity. The estimate is based on limited information and sampling gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes.

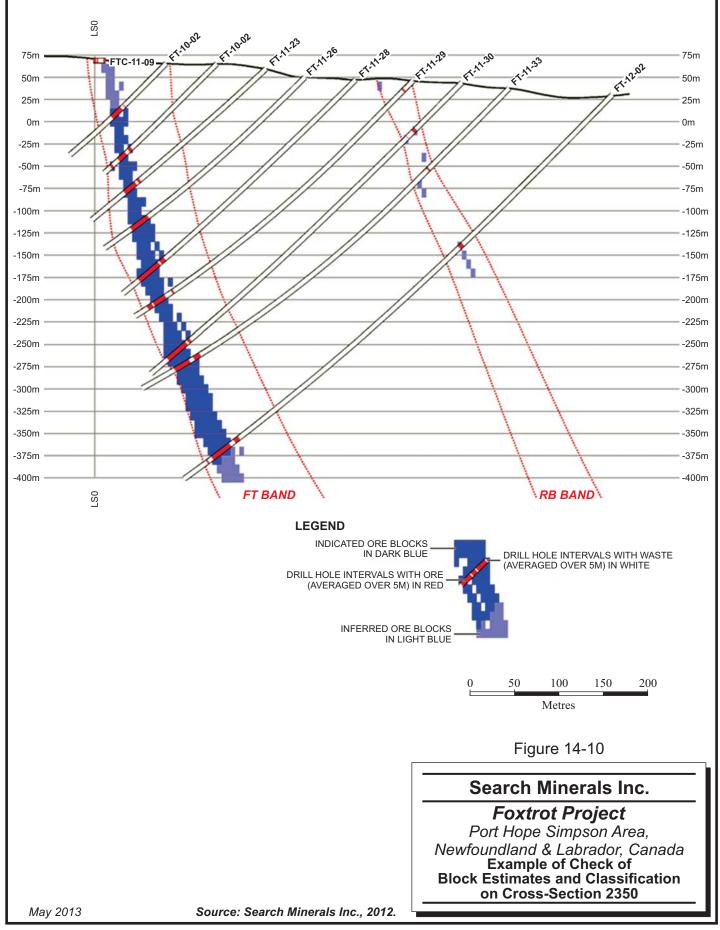
Resource classification was based on two criteria: the number of octants with data, and the horizontal and vertical position of the block:

- Blocks were classified as Indicated if they were estimated using data in all octants, if they were in the Central Area (Figure 14-1), and if they were above the base of drilling (Figure 14-7). These requirements limit the Indicated Resources to the welldrilled heart of the deposit.
- All blocks not classified as Indicated were classified as Inferred if they were above the base of drilling, or no more than 50 m below the base of drilling (Figure 14-7). With the search ellipse having used radii that were half of the variogram range, this requirement limits the Inferred Resources to regions where there is at least one well correlated sample nearby. In the vertical direction, the requirement is a bit more restrictive: Inferred Resources cannot extend more than 50 m down-dip from the Phase II drill holes.

# CHECKS OF RESOURCE BLOCK MODEL

The resource block model was checked visually against the original drill hole data on crosssections, maps, and in a 3D viewer to confirm that the estimated felsic content and the estimated grades were consistent with nearby drill hole data, that the topography and the geologic contacts were respected and that the classification properly showed only Inferred material below the base of drilling and in the extensions east and west of the Central Area. Figure 14-10 shows an example of one of these checks, a section showing the grade estimates on the cross-section with the deepest drilling. In addition to honouring the drill hole data, the classification is also correct, as shown by the dark (Indicated) and light (Inferred) blue shading of the estimated blocks.







# MINERAL RESOURCE ESTIMATE

The classified Mineral Resource estimate is presented in Table 14-4, using a reporting cut-off of 130 ppm on dysprosium. Using preliminary assessments of metal prices and metallurgical recoveries, this reporting cut-off, which corresponds to 150 ppm on  $Dy_2O_3$ , produces an NSR considerably higher than the cost of mining and processing ore. Even with changes and uncertainties in the metal prices, recoveries and costs, material with more than 130 ppm Dy meets the requirement of the CIM Definition Standards: that Mineral Resources have a reasonable prospect of economic extraction.

The resource estimate has also been constrained by an ultimate pit shell to ensure that it properly reflects a geometry that is amenable to open pit mining methods.

# SENSITIVITY OF REPORTING CUT-OFF

Some of the uncertainties in metal prices, metallurgical recoveries and the cost of mining and processing were investigated, but even when a more detailed analysis of technical and economic parameters is available, there will very likely still be uncertainty in the reporting cutoff that best reflects a break-even economic cut-off in the future. Fortunately, the strong correlations between the various elements that contribute economic value make it possible to assess the sensitivity of resources to changes in the cut-off grade. Changes in the reporting cut-off grade of dysprosium will correspond very directly to changes in the cut-off grade of any other element, groups of elements, or NSR. Table 14-5 shows how resource tonnage and grade are affected by  $\pm 25$  ppm changes in the dysprosium cut-off; this magnitude of change is approximately a  $\pm 20\%$  change in the reporting cut-off.



			Indicated			Inferred	
		Central	Extensions	Total	Central	Extensions	Total
Tonnag	je (t)	9,229,000		9,229,000	3,291,000	1,874,000	5,165,000
Element	Units						
Y	ppm	1,040		1,040	982	960	974
La	ppm	1,646		1,646	1,564	1,183	1,426
Ce	ppm	3,337		3,337	3,139	2,429	2,881
Pr	ppm	384		384	359	280	330
Nd	ppm	1,442		1,442	1,339	1,046	1,233
Sm	ppm	262		262	245	197	228
Eu	ppm	13		13	12	9	11
Gd	ppm	205		205	193	165	183
Tb	ppm	33		33	30	28	30
Dy	ppm	189		189	178	171	176
Ho	ppm	37		37	35	34	34
Er	ppm	103		103	98	98	98
Tm	ppm	15		15	14	15	14
Yb	ppm	92		92	88	95	91
Lu	ppm	14		14	13	15	14
Zr	ppm	9,619		9,619	9,538	10,987	10,064
Nb	ppm	626		626	585	455	538
LREE	%	0.71		0.71	0.66	0.51	0.61
HREE	%	0.17		0.17	0.16	0.16	0.16
TREE	%	0.88		0.88	0.83	0.67	0.77
Oxide	Units						
$Y_2O_3$	ppm	1,320		1,320	1,247	1,219	1,237
$La_2O_3$	ppm	1,926		1,926	1,830	1,385	1,669
CeO <sub>2</sub>	ppm	4,105		4,105	3,861	2,988	3,544
Pr <sub>6</sub> O <sub>11</sub>	ppm	465		465	434	339	400
$Nd_2O_3$	ppm	1,687		1,687	1,567	1,224	1,442
Sm <sub>2</sub> O <sub>3</sub>	ppm	303		303	285	228	264
Eu <sub>2</sub> O <sub>3</sub>	ppm	15		15	14	10	13
Gd <sub>2</sub> O <sub>3</sub>	ppm	236		236	222	190	210
Tb <sub>4</sub> O <sub>7</sub>	ppm	38		38	36	33	35
Dy <sub>2</sub> O <sub>3</sub>	ppm	217		217	205	197	202
Ho <sub>2</sub> O <sub>3</sub>	ppm	42		42	40	39	39
Er <sub>2</sub> O <sub>3</sub>	ppm	118		118	112	112	112
Tm <sub>2</sub> O <sub>3</sub>	ppm	17		17	16	17	16
Yb <sub>2</sub> O <sub>3</sub>	ppm	105		105	100	109	103
$Lu_2O_3$	ppm	16		16	15	17	16
ZrO <sub>2</sub>	ppm	12,985		12,985	12,877	14,832	13,586
Nb <sub>2</sub> O <sub>5</sub>	ppm	789		789	737	573	677
LREO	%	0.85		0.85	0.8	0.62	0.73
HREO	%	0.21		0.21	0.2	0.19	0.2
TREO	%	1.06		1.07	1.05	0.81	0.93

# TABLE 14-4 MINERAL RESOURCES – SEPTEMBER 30, 2012 Search Minerals Inc. – Foxtrot Project

#### Notes:

1. CIM definitions were followed for Mineral Resources.

2. Mineral Resources are estimated at a cut-off grade of 130 ppm Dy.

3. Numbers may not add due to rounding.

4. Heavy Rare Éarth Elements (HREE) = Eu+Gd+Tb+Dy+Ho+Er+Tm+Yb+Lu+Y.

5. Light Rare Earth Elements (LREE) = La+Ce+Pr+Nd+Sm.

6. Total Rare Earth Elements (TREE) = sum of HREE and LREE.



- 7. HREO, LREO refer to oxides of heavy and light rare earth elements respectively, and TREO is the sum of HREO and LREO.
- 8. Resources have been estimated inside a preliminary pit shell.

#### TABLE 14-5 SENSITIVITY OF TOTAL MINERAL RESOURCES TO CHANGES IN THE DY CUT-OFF GRADE Search Minerals Inc. – Foxtrot Project

Classification	Dy Cut-off Grade (ppm)	Tonnage (t)	Dy (ppm)	Nd (ppm)	Y (ppm)	HREE+Y (%)	TREE+Y (%)
Indicated	130	9,229,000	189	1,442	1,040	0.17	0.88
	150	7,653,000	199	1,515	1,094	0.18	0.93
	170	6,056,000	210	1,594	1,149	0.19	0.97
	190	4,605,000	219	1,660	1,198	0.20	1.01
Inferred	130	5,165,000	176	1,233	974	0.16	0.77
	150	3,661,000	191	1,371	1,058	0.18	0.86
	170	2,537,000	204	1,523	1,137	0.19	0.95
	190	1,654,000	218	1,673	1,217	0.20	1.04
Classification	Dy₂O₃ Cut-off Grade (ppm)	Tonnage (tonnes)	Dy <sub>2</sub> O <sub>3</sub> (ppm)	Nd₂O₃ (ppm)	Y₂O₃ (ppm)	HREO+Y (%)	TREO+Y (%)
Classification Indicated	Cut-off Grade		•			-	-
	Cut-off Grade (ppm)	(tonnes)	(ppm)	(ppm)	(ppm)	(%)	(%)
	Cut-off Grade (ppm) 150	(tonnes) 9,229,000	(ppm) 217	(ppm) 1,687	(ppm) 1,320	(%) 0.21	(%) 1.06
	Cut-off Grade (ppm) 150 173	(tonnes) 9,229,000 7,653,000	(ppm) 217 229	(ppm) 1,687 1,772	(ppm) 1,320 1,389	(%) 0.21 0.22	(%) 1.06 1.11
	Cut-off Grade (ppm) 150 173 196 219 150	(tonnes) 9,229,000 7,653,000 6,056,000 4,605,000 5,165,000	(ppm) 217 229 241 252 202	(ppm) 1,687 1,772 1,865 1,943 1,442	(ppm) 1,320 1,389 1,459 1,521 1,237	(%) 0.21 0.22 0.24 0.25 0.20	(%) 1.06 1.11 1.17 1.22 0.93
Indicated	Cut-off Grade (ppm) 150 173 196 219	(tonnes) 9,229,000 7,653,000 6,056,000 4,605,000	(ppm) 217 229 241 252	(ppm) 1,687 1,772 1,865 1,943	(ppm) 1,320 1,389 1,459 1,521	(%) 0.21 0.22 0.24 0.25	(%) 1.06 1.11 1.17 1.22

### **HIGH GRADE CORE**

After the resource estimate was disclosed, a high-grade core (HGC) within the Mineral Resource, corresponding to the largest and most consistent felsic band within the deposit (FT3), was wireframed separately to allow mine designs to focus on selective mining of the highest grade portions of the deposit. HGC Indicated Resources are estimated to total 3.42 Mt at 1.04% TREE, and HGC Inferred Resources are estimated to total 0.66 Mt at 1.02% TREE (Table 14-6). HGC resources are a subset of the Mineral Resources estimated for the Project, using the same block model, cut-off grade, and other estimation parameters.



## TABLE 14-6 MINERAL RESOURCES WITHIN A CONTINUOUS HIGH-GRADE CORE

		la dia ata d	lu fa una d
		Indicated	Inferred
Tonnag	ge (t)	3,423,000	660,000
Element	Units		
Y	ppm	1,238	1,199
La		1,931	1,894
-	ppm	,	*
Ce	ppm	3,945	3,861
Pr	ppm	455	443
Nd	ppm	1,711	1,658
Sm	ppm	312	302
Eu	ppm	16	15
Gd	ppm	245	238
Tb	ppm	39	38
Dy	ppm	228	219
Ho	ppm	44	43
Er	ppm	125	121
Tm	ppm	18	17
Yb	ppm	111	108
Lu	ppm	16	16
Zr	ppm	11,779	11.716
Nb	ppm	691	676
LREE	%	0.84	0.82
HREE	%	0.21	0.20
TREE	%	1.04	1.02

## Search Minerals Inc. – Foxtrot Project

Notes:

- This table summarizes a sub-set of the Mineral Resources, contained within a contiguous volume.
- CIM definitions were followed for Mineral Resources.
   This table summarizes a sub-set of the Mineral Resources, contained within a Numbers may not add due to rounding.
   Heavy Rare Earth Elements (HREE) = Eu+Gd+Tb+Dy+Ho+Er+Tm+Yb+Lu+Y.
- 5. Light Rare Earth Elements (LREE) = La+Ce+Pr+Nd+Sm.
- 6. Total Rare Earth Elements (TREE) = sum of HREE and LREE.
- 7. HREO, LREO refer to oxides of heavy and light rare earth elements respectively, and TREO is the sum of HREO and LREO.
- 8. Resources have been estimated inside a preliminary pit shell.



# **15 MINERAL RESERVE ESTIMATE**

A technical and economic assessment to permit a Mineral Reserve estimate on the Project has not yet been completed.



# **16 MINING METHODS**

# INTRODUCTION

In the previous PEA, RPA investigated the potential for open pit mining of the Indicated and Inferred Mineral Resources, using REE prices appropriate for a PEA. With the REE mineralization being considered as a whole, the choice was to go with a bulk open pit concept, as the underground mining showed no enhanced economic viability based on operating costs (opex).

In this revised PEA, based on the updated resource block model, the approach is rather the selective mining of REE high-grade core (HGC) material, again considering the Indicated and Inferred Mineral Resources, and using the same REE prices. RPA thus investigated the potential for an open pit/underground scenario with lower initial capital costs, lower mining rate, and higher grade mill feed. Open pit (OP) and underground (UG) mining options were evaluated with run of mine (ROM) material being processed at a rate of 1,500 tpd in a process plant on site, producing a mixed rare earth product. Infrastructure, road access, power, and room and board facilities requirements, were also considered. Environmental considerations include the impact of the pit, waste rock dump, and tailings storage.

Preliminary OP and UG mine opex were estimated for use in determining where each method was more advantageous (a trade-off study). These estimates were based on preliminary mine concepts and on typical costs for Canadian mining operations of a similar scale. At the assumed process rate of 1,500 tpd, the open pit operating cost was estimated to \$8/t (assuming contractor mining), while the underground operating cost was estimated to be \$76/t. The underground operating cost includes direct opex, additional general and administration (G&A) (mainly due to greater manpower, additional accommodations, and higher fly-in fly-out expenses), and lateral/vertical development. This underground opex was itemized as follows:

- UG mining \$59/t milled
- UG capital development \$7/t milled
- UG additional G&A vs. OP \$10/t milled



The UG/OP opex ratio suggests that an open pit strip ratio of 8.5:1 is the tipping point, above which the underground mining method should be more favourable.

# **MINING OPERATIONS**

## **OPEN PIT MINING**

The production rate is assumed to be 540,000 tpa, or 1,500 tpd, of HGC and non-HGC REE bearing material. Mining of mineralized material and waste (no pre-stripping of overburden is required, as the deposit is exposed on surface) would be carried out by contractors to keep initial capital as low as possible, and because of the relatively short duration of the OP operations.

The contract mining will be carried out using a conventional open pit method consisting of the following activities:

- Drilling performed by conventional production drills.
- Blasting using ANFO (ammonium-nitrate fuel oil) and a down-hole delay initiation system.
- Loading and hauling operations performed with hydraulic shovel, front-end loader, and rigid frame haulage trucks.

The production equipment will be supported by bulldozers, graders, and water trucks.

### UNDERGROUND MINING

The production rate for the underground mine is assumed to be the same as for the open pit, namely 540,000 tpa, or 1,500 tpd, of REE bearing material within HGC. The underground mine will be owner-operated.

The HGC is globally dipping 75° to the north (therefore sub-vertical), and the topography is sloping down from south to north. All considered, the underground mining method recommended by RPA is longhole mining with principally transverse access from the deposit hanging wall through to the footwall in order to benefit from the lower surface elevation to the north for some UG infrastructure (lesser vertical development). Some longitudinal accesses are planned where deposit width is less than eight meters.



Paste fill will be placed in all primary stopes. The secondary stopes will all be backfilled with unconsolidated rockfill as surrounding stopes would have been filled with paste fill. Paste fill will be generated from tailings, reducing the total amount of tailings to be stored on surface. The rockfill will come from both underground development waste and open pit waste.

The mining sequence will proceed upward from two mining horizons following an inverted V-shape, progressing vertically bottom-up and longitudinally from the middle to the edges of the deposit.

The pillar under the bottom of the pit is recovered by drilling upward from UG Level 1 at the end of mining of the Life of Mine (LOM).

Mining will incorporate the following activities:

- Lateral development performed with hydraulic jumbos (drilling) and mechanical bolters (ground support).
- Vertical development performed with Alimak (vent raise/second egress, fill raise) and V-30 type drill (slot raises).
- Production drilling carried out with longhole top-hammer drills.
- Blasting using ANFO (ammonium-nitrate fuel oil) in development activities, and bulk emulsion (with electronic caps) in production operations.
- Loading and hauling operations performed with LHD units (scooptrams) and underground trucks for waste and REE bearing material up to surface.
- Backfilling of stopes with paste fill or unconsolidated rockfill (waste rock sent underground from surface via the fill raise or taken directly underground from underground development activities, and then hauled to stopes with LHDs).

Stationary equipment for underground mining would consist of the following:

- Main fan and propane heating system, and secondary fans for ventilation requirements.
- Air compressor.
- Mine dewatering pumps located underground at the main pumping stations, and at development headings.



## **GEOTECHNICAL ASSESSMENTS**

Pit slope angles were selected based on industry averages. Pit optimizations were carried out using pit slopes of 45°. Industry average geotechnical conditions for the underground mine were assumed relative to stope dimensions, minimum distance of drifts to the stopes hanging wall, and ground support.

Design parameters for the waste dumps and the overburden pile were also selected based on industry averages.

Drill core and outcrop inspected on the site visit appear to be competent, however, no geotechnical testing, logging, or analysis has been completed. Geotechnical assumptions require verification and assessment as the Project is advanced.

## HYDROLOGICAL/HYDROGEOLOGICAL ASSESSMENTS

Hydrogeological and hydrological conditions may have an impact on pit design parameters. At this stage of the Project, industry average pit slope angles were used. Capital expenditures and operating costs related to water management were part of the cost estimation process for both mining methods.

The hydrogeological/hydrological conditions will have to be further assessed as the Project is advanced.

### SEISMICITY

Seismicity issues were not considered in conceptual designs at this point in the Project. The seismicity will have to be assessed and be considered once detailed engineering work begins.

### **OPEN PIT DESIGN**

Open pit possibilities were investigated by pit optimization/floating cone analysis (Lerchs-Grossmann algorithm), using Whittle software, run on the resource block model. Pit optimizations indicated that a significant proportion of the HGC within the resource block model would be economic to mine using open pit methods.



The final pit optimization was performed based on typical costs for comparable operations and projects of a similar scale, with HGC and non-HGC REE mineralization as mill feed target. This will be explained in the following section. Cost details for optimization purposes were as follows:

- OP Mining \$7 to \$10/t moved (ore and waste)
- Milling \$70/t milled
- G&A \$15/t milled

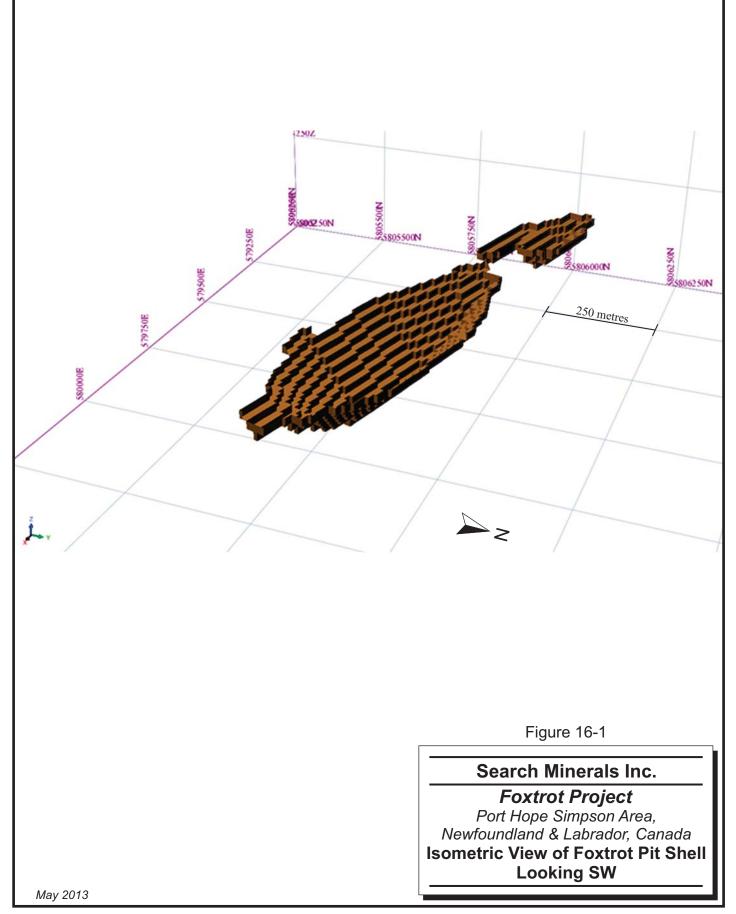
NSR revenue factors were calculated using metallurgical recoveries, offsite costs for REE separation, and REE prices, which are discussed in detail under their respective sections in this report. The revenue factors were used to generate an NSR value in the model which was used to float cones in the Whittle software.

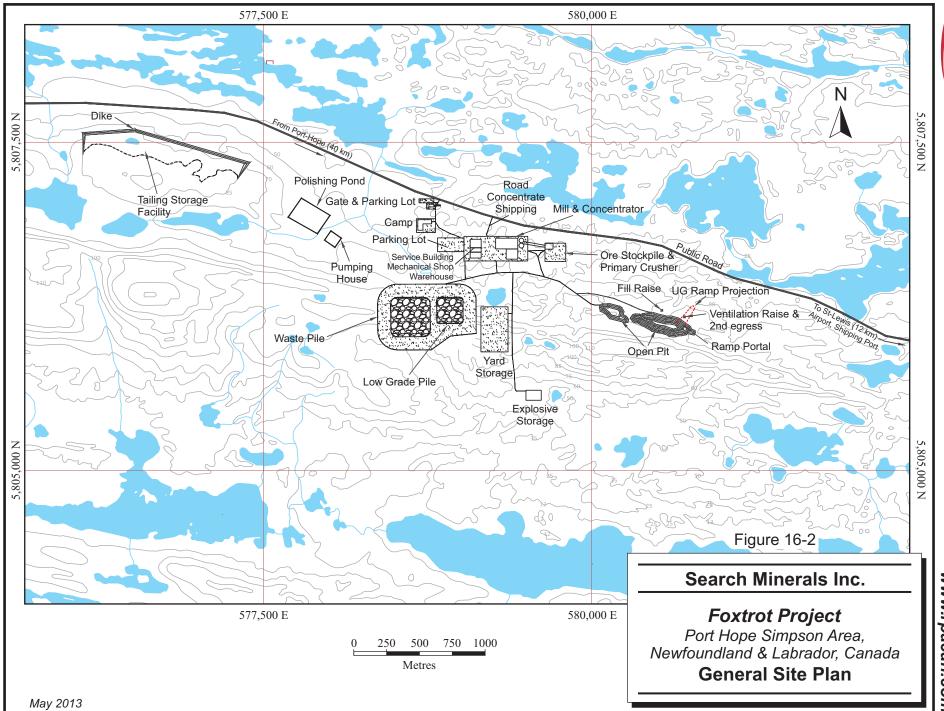
Pit slope angles were selected based on industry averages. Pit optimizations were carried out using pit slopes of 45°.

Pit optimizations do not include individual benches or ramp design. For the pit size, production requirements, and recommended equipment fleet, RPA considers mining of 5 m benches and development of 17 m wide ramps, including ditches and safety berm, to be appropriate for the open pit operations. The ramps should be designed at 10% grade with exits appropriately located in order to minimize distances to the mill and the waste rock dumps. Figure 16-1 shows an isometric view showing the location of the final pit shells in the context of a combined OP/UG production scenario, and subsequent to the trade-off process.

A general site plan of the Project is included in Figure 16-2. This figure shows the location of main surface facilities such as open pit, tailings pond and dams, waste dumps, process plant, camp facilities, and haul roads.







**RPA** 

16-7



## **OP/UG TRADE-OFF METHODOLOGY AND RESULTS**

The Lerchs-Grossmann algorithm (Whittle software) targeting the REE HGC was used to define the theoretical ultimate pit shell for the REE prices that reflect the block's NSR value, as well as nested shells produced using lower REE prices (or NSR values). Shells were generated into 16 potential phases summarized in Table 16-1.

Nested Shell	Revenue Factor	Mill Feed (Mt)	Waste rock (Mt)	Stripping Ratio	Pit Shell Depth (m)	Potential pit LOM duration
1	0.375	0.29	0.37	1.28	40	0.5
2	0.450	0.55	1.29	2.35	60	1.0
3	0.525	0.80	2.87	3.59	90	1.5
4	0.600	1.08	5.13	4.75	110	2.0
5	0.650	1.36	8.37	6.15	150	2.5
6	0.750	1.69	13.00	7.69	180	3.1
7	0.775	1.78	13.97	7.85	190	3.3
8	0.800	1.94	16.97	8.75	190	3.6
9	0.825	2.07	19.06	9.21	200	3.8
10	0.850	2.14	20.40	9.53	200	4.0
11	0.875	2.19	21.29	9.72	200	4.1
12	0.900	2.32	23.95	10.32	210	4.3
13	0.925	2.54	28.53	11.23	220	4.7
14	0.950	2.85	35.34	12.40	230	5.3
15	0.975	2.99	39.10	13.08	240	5.5
16	1.000	3.03	39.96	13.19	240	5.6

# TABLE 16-1 LERCHS-GROSSMANN NESTED PIT SHELLS Search Minerals Inc. – Foxtrot Project

The ultimate pit at revenue factor 1 returned a stripping ratio of 13.2, which is much greater than the OP/UG break-even strip ratio of 8.5, derived from the UG mine equivalent opex of \$76/t milled divided by the OP mine opex of \$8/t moved. In Table 16-1, the OP/UG break-even strip ratio is reached at nested shell No. 8 with a corresponding potential pit life of 3.6 years and a depth of 190 m out of the 480 m which is the vertical extent of the REE HGC resource. The resources within the HGC without any applied dilution and mining extraction factors total 4.1 Mt and represent the tonnage that is potentially mineable via UG methods (maximum potential UG LOM of 7.6 years). In these circumstances, the remaining tonnage below 190 m depth, or under nested pit shell No. 8, would be approximately 2.3 Mt giving a UG mine life of four years subsequent to an OP mine life of 3.6 years.



The OP opex, however, decreases with the increase of total tonnage output, because the OP tonnage output is directly and only dependent on the strip ratio as the mill feed remains constant. As a result, the OP/UG break-even stripping ratio varies depending on the size of the OP operations in terms of total tonnage moved. The Lerchs-Grossmann findings were thus used as the starting point in the search for the suitable depth at which OP operations should be replaced by UG mining.

An OP/UG break-even strip ratio was determined for each of the Lerchs-Grossmann nested shells through high-level opex estimation based on total daily pit output. All nested shells returned an estimated OP/UG break-even strip ratio greater than or almost equal to their respective actual strip ratio, as summarized in Table 16-2.

Nested shell	Potential LOM pit duration	OP total daily output (t)	OP opex (\$/t moved)	OP/UG break-even strip ratio	Pit shell strip ratio	Pit shell depth (m)
1	0.5	3,670	10.00	6.60	1.28	40
2	1.0	5,110	9.40	7.09	2.35	60
3	1.5	6,800	8.80	7.64	3.59	90
4	2.0	8,630	8.30	8.16	4.75	110
5	2.5	10,810	8.00	8.38	6.15	150
6	3.1	13,160	7.90	8.62	7.69	180
7	3.3	13,260	7.90	8.62	7.85	190
8	3.6	14,590	7.80	8.74	8.75	190
9	3.8	15,450	7.70	8.87	9.21	200
10	4.0	15,650	7.70	8.87	9.53	200
11	4.1	15,910	7.70	8.87	9.72	200
12	4.3	16,970	7.10	9.70	10.32	210
13	4.7	18,360	6.40	10.88	11.23	220
14	5.3	20,020	5.00	12.82	12.40	230
15	5.5	21,260	5.00	14.20	13.08	240
16	5.6	21,320	5.00	14.20	13.19	240

#### TABLE 16-2 COMPARISON OF STRIPPING RATIOS Search Minerals Inc. – Foxtrot Project

Table 16-2 shows that OP mining is more favourable than UG mining in all cases, considering the range of precision of this high-level estimation. On this basis, the OP would proceed as deep as 240 m (nested shell 16, RF 1) out of the 480 m HGC vertical extent, which means that an OP daily total output would be close to the output disclosed in the July 15, 2012 PEA (Cox et al., 2012). Furthermore, it would leave approximately 25% of the REE



HGC tonnage as potentially mineable material for UG mining, which is equivalent to two years of production.

Other elements were also considered in the OP/UG analysis targeting the HGC to identify the primary assumptions as follows:

- OP production will last from three to five years to fund the UG initial capital and to give time for the UG mine to reach full production after required development and ramp-up.
- Phasing/discarding pit expansions with the actual strip ratio greater than the OP/UG break-even strip ratio.
- The REE mineralization outside the HGC should be included in potentially mineable material using an elevated NSR cut-off value within selected pit shells, as the previous PEA proved that low-grade material (out of HGC REE mineralization) was profitable.

The results of the OP/UG analysis targeting the HGC are summarized as follows:

- 5-year pit retained (nested shell No. 14).
- Yearly phasing within the retained pit shell lead to the discard of Year 3 to Year 5 phases, as related expansion stripping ratios were greater than their respective OP/UG break-even strip ratios.
- Previous 2-year optimized nested pit shell No. 4 is the pit shell below which UG mining is more profitable from an opex point of view.
- An elevated NSR cut-off value within this 2-year pit varies from \$85/t (the cumulative process and G&A operating costs) to \$151/t when considering both HGC and non-HGC REE mineralization, with an OP mine life from three to four years.
- REE bearing material considered as mill feed totals 1.9 Mt. This tonnage supports three consecutive years of ramp-up to full OP production, followed by an OP phase-out/UG phase-in period occurring in Year 4.

To complete with the OP/UG trade-off process, one last pit optimization, this time targeting HGC and non-HGC REE mineralization, was performed to compare with previous results. The exercise returned more profitable economics within the 5-year optimized pit shell at an elevated NSR cut-off of \$164/t (from \$85/t), giving the same total mill feed tonnage and OP mine life.

The resultant pit shell optimized with HGC and non-HGC REE material as target mill feed was retained as the final open pit for the purpose of this PEA (see Figure 16-1).



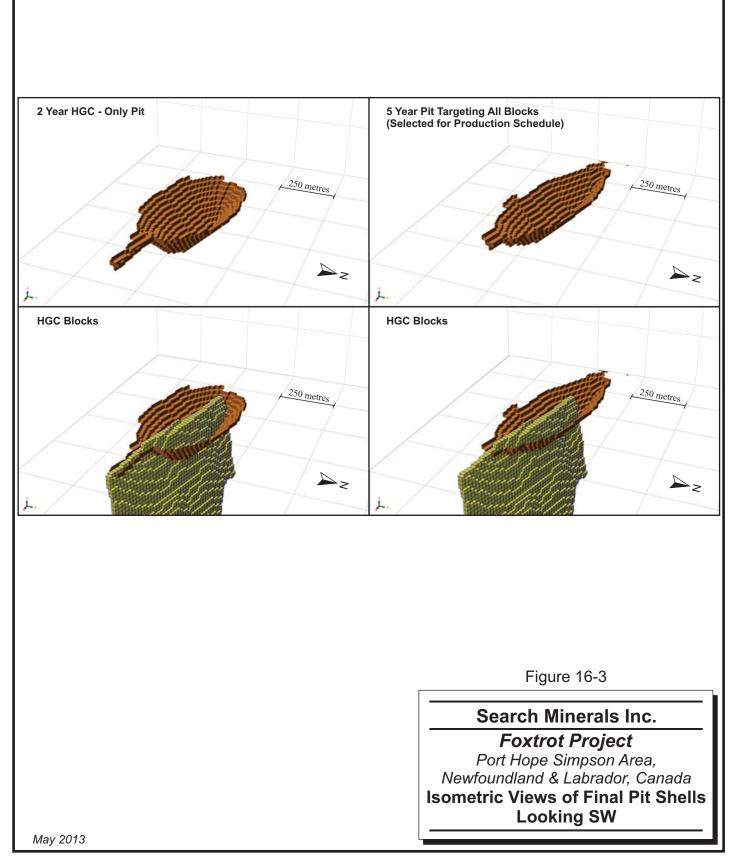
Physicals and economics of the two last pit shells are compared in Table 16-3, and pits are shown in Figure 16-3 with and without the REE HGC (2-year HGC target pit shell on the left and 5-year HGC/non-HGC target pit shell on the right).

The schematic of the final open pit in relation with the UG mine concept is presented in Table 16-4.

		HGC Target	Pit Optimization		-HGC Target Pit mization
Item	Units	2-year Pit Shell	3.4-year OP LOM in 2-year Pit Shell	5-year Pit Shell	3.4-year OP LOM in 5-year Pit Shell
Revenue Factor		0.60	0.60	0.55	0.55
NSR Cut-off	\$/t	85.00	151.00	85.00	164.00
Mill Feed	Mt	1.08	1.86	2.64	1.86
Waste Mined	Mt	5.12	4.34	2.49	3.27
Strip ratio (W/O)		4.74	2.33	0.94	1.76
Total Mined	Mt	6.20	6.20	5.13	5.13
Daily Total Mined	tpd	8,600	5,100	2,900	4,200
LOM	year	2.0	3.4	4.9	3.4
Maximum Pit Depth	m	110	110	90	90
Approximate Pit Volume	Мm³	2.25	2.25	1.87	1.87
Avg NSR to Mill	\$/t milled	294.56	261.74	226.90	269.54
Avg Dy to Mill	ppm	176.2	155.5	135.3	160.5
LOM Value to Mill	M\$	318	487	599	501
Unit Mine Opex (contract)	\$/t moved	8.30	9.40	10.40	9.70
LOM Opex	M\$	143	216	278	208
LOM Opex Profit	M\$	175	271	321	293
Unit LOM Opex Profit	\$/t milled	162.04	145.70	121.59	157.53
LOM Opex Profit at 10% discount	M\$	141	218	247	226

# TABLE 16-3 PHYSICALS AND ECONOMICS OF THE OP/UG TRADE-OFF Search Minerals Inc. – Foxtrot Project







OP bench Elevation (m) (at floor)	UG level / Elevation (m) (at floor)	Description
75		
65		
55		
45		UG ramp portal located on this OP bench
35		
25		
15		
5		
-5		Selected pit bottom at -5m Z elevation - 90m deep open pit
	Level 1 / -25	First UG level - 20m high up to pit bottom (will also act as a 20m thick OP/UG
	Level 2 / -55	pillar along the 180m pit-bottom extent to be recovered at the end of the LOM)
	Level 3 / -85	
	Level 4 / -115	
	Level 5 / -145	
	Level 6 / -175	Mining horizon No 1 comprised of 5-30m & 1-20m levels
	Level 7 / -205	
	Level 8 / -235	
	Level 9 / -265	
	Level 10 / -295	
	Level 11 / -325	
	Level 12 / -355	
	Level 13 / -385	Mining horizon No 2 comprised of 7-30m levels, for a 380m UG mine Z extent

# TABLE 16-4 SCHEMATIC OF THE OP/UG MINE CONCEPT Search Minerals Inc. – Foxtrot Project

### UNDERGROUND MINE DESIGN

For the underground portion of the OP/UG production scenario, a level-by-level economic optimization was performed in order to determine the underground levels for which NSR value was greater than total operating costs that were estimated to be \$154/t milled, all inclusive. Breakdown is as follows:

- UG Mining \$59/t milled
- Milling \$70/t milled
- G&A \$25/t milled (note that G&A is higher during UG operations)

Also, portions of the REE HGC where width is less than four metres were discarded in the longitudinal extents of the potentially UG mineable material, as this is the minimum mining width. The exercise was performed with the resource block model and focused on the HGC REE mineralization.



NSR revenue factors were calculated using metallurgical recoveries, offsite costs for REE separation, and REE prices, which are discussed in detail under their respective sections in this report, and were the same as for the open pit approach.

Industry average geotechnical conditions were integrated in terms of stope dimensions and minimum distance of drifts to the HGC hanging wall. The stope dimension is 25 m along strike by 30 m floor-to-floor, while minimum distances of the main ramp and the haulage drifts to the stopes hanging wall are respectively 65 m and 25 m.

The result is the deepest underground level at -385 m El. (Level 13), while UG Level 1 is 20 m below the open pit bottom at -25 m El. Therefore, the vertical extent of the underground stoping is from the open pit bottom at -5 m El. down to Level 13 over 380 m.

The underground mining method retained was longhole mining with transverse and some longitudinal accesses as explained previously. A general underground drift network was designed to fit with this underground mining method in order to estimate capital and operating development for the underground mine.

From the portal in the open pit (at 45 m El.), a 3.1 km ramp at an average 14% slope will reach the bottom of the Foxtrot stoping extent, providing access to all levels spaced every 30 m vertical from -25 m El. (Level 1). Approximately 14,100 m of lateral development (main ramp, crosscuts, haulage drifts, drawpoints, longitudinal drifting in HGC, exploration and service drifts) will be required in both waste and REE bearing material. Vertical development, mostly in REE bearing material, consisting of a ventilation raise (serving as second egress also), a fill raise and slot raises (in REE HGC), would total approximately 5,000 m.

Summaries of underground lateral and vertical development for the Project are presented in Tables 16-5 and 16-6 respectively.



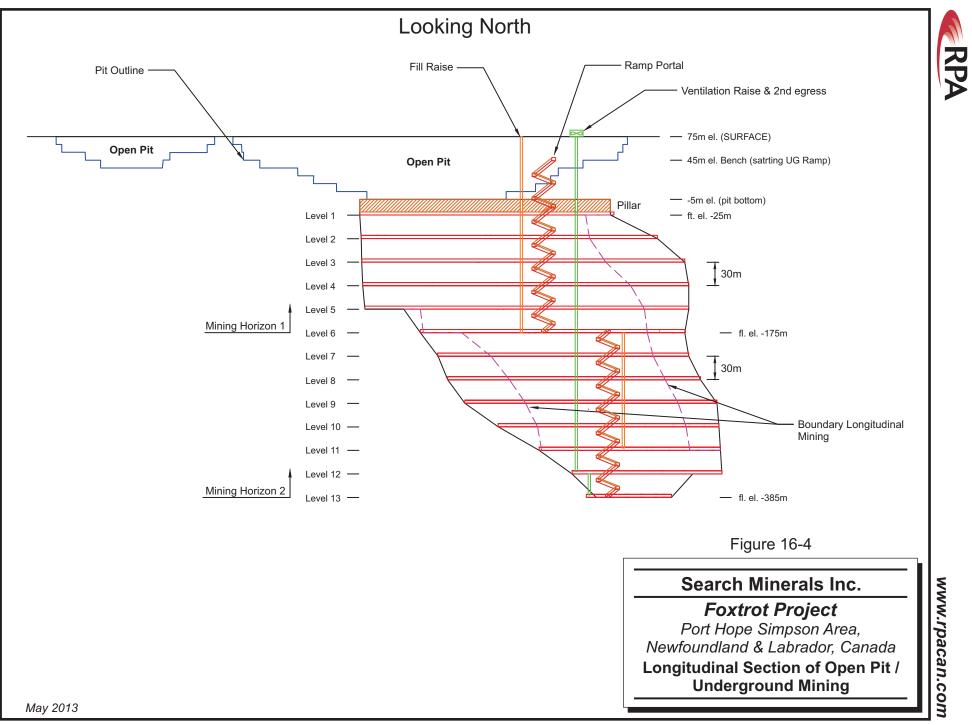
# TABLE 16-5 LATERAL DEVELOPMENT Search Minerals Inc. – Foxtrot Project

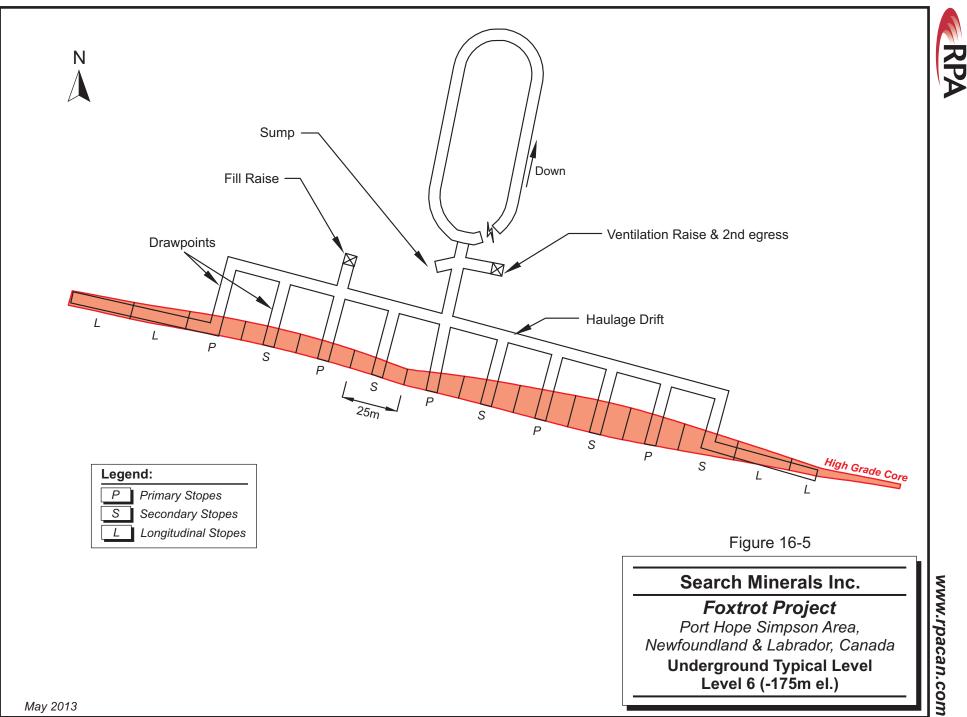
Location	Capital dev't in waste (m)	Operating dev't in waste (m)	Operating dev't in REE bearing material (m)	Total (m)
Main Ramp	3,055	0	0	3,055
Haulage & Access drifts	4,285	0	0	4,285
Exploration & Serv. drifts	870	0	0	870
Drawpoint	0	3,500	1,321	4,821
Longitudinal Drift in HGC	0	0	1,030	1,030
Total	8,210	3,500	2,351	14,061

# TABLE 16-6VERTICAL DEVELOPMENTSearch Minerals Inc. – Foxtrot Project

Location	Capital dev't in waste (m)	Operating dev't in waste (m)	Operating dev't in REE bearing material (m)	Total (m)
Vent Raise	450	0	0	450
Fill Raise	320	0	0	320
Fingers to Fill Raise	216	0	0	216
Slot Raise (Qty 161)	0	0	4,025	4,025
Total	986	0	4,025	5,011

A longitudinal section showing the general concept of the underground mine under the open pit is included in Figure 16-4, while a typical underground level layout is illustrated in Figure 16-5.







## **PRODUCTION QUANTITIES**

Production quantities total 5.32 Mt of potentially mineable material, at a grade of 0.89% TREE or a \$320/t NSR value, from both OP and UG mines.

From the OP mine, mill feed tonnage is 1.86 Mt grading 0.76% TREE (\$269/t NSR), which numbers include dilution of the mineralized felsic material with the intercalated mafic material in each block (assumed to have zero grade). On a block model global basis, the mafic content within HGC and non-HGC REE blocks is 5% and 40% respectively. Therefore, the mafic material portion within mill-feed blocks in the final pit shell supporting the above tonnage totals 0.48 Mt, which is equivalent to an internal dilution of approximately 35% tonnage. On a block by block basis (10 m x 5 m x 10 m high) and within a PEA level of detail and precision, it was assumed that blocks located at the contact of REE mineralization and waste, if any, will not contribute any additional dilution other than their intrinsic mafic material. Furthermore, because the mill feed within the final open pit is mainly comprised of HGC and non-HGC REE high-grade material, almost no blocks should be mined at the REE / waste contact. Therefore, no operational dilution was added over and above and a 100% mining extraction factor was applied for the same reason.

As a result, the diluted and recovered tonnage and grades remained the same. Waste within the pit shell totals 3.27 Mt, resulting in an average strip ratio of 1.76:1. The difference with the basic strip ratios (ref.: Table 16-3) reached in the pit optimization process is due to a post- cut-off NSR increase within the final pit shell in order to improve the head grade at the process plant and to optimize the economics of the Project.

The proportion of Inferred Resources in the material that may be potentially mineable via open pit is approximately 80%; the rest being in the Indicated category.

The delineated underground stoping volume contains 3.34 Mt of potentially mineable resources grading 1.05% TREE (\$379/t NSR) considering the intrinsic mafic material content within each block, which is 5% globally in the HGC as stated previously.

The mineral resources considered were in the Indicated and Inferred categories. The proportion of Inferred Resources in the material that may be potentially mineable via underground mining is approximately 8%.



Dilution and mining extraction factors of 15.1% tonnage (equivalent to 14.8% volume considering both waste and REE mineralization densities) and 90% of REE bearing material within the design stoping volume respectively were applied to the above numbers. The dilution was estimated according to sloughing thickness assumptions around stopes. The 15.1% tonnage dilution represents the combined thicknesses for both the hanging wall and footwall sides of the mineralized zones. It is expressed as sloughing thicknesses of 0.75 m on each side of the HGC. The diluting material grade was estimated to be 0.38% TREE (\$136/t NSR) within a 15 m halo surrounding the HGC.

The total diluted and recovered tonnage was 3.46 Mt of potential mill feed from the UG mine grading 0.96% TREE (\$347/t NSR). The detail calculations of potentially mineable resources by mining method are summarized in Table 16-7.

	Quantity (Mt)	TREE (%)	NSR (\$/t)
Open Pit			
Mill feed prior dilution and mining extraction	1.86	0.76	269
Mafic content (equiv. to 35% intrinsic dilution)	0.48		
Assumed dilution (0%)	0.00		
Mill feed prior 100% mining extraction	1.86	0.76	269
Subtotal - OP mill feed	1.86	0.76	269
Underground Mine			
Mill feed prior dilution and mining extraction	3.34	1.05	379
Mafic content (equiv. to 5% intrinsic dilution)	0.17		
Estimated dilution (15.1%)	0.50	0.38	136
Mill feed prior 90% mining extraction	3.84	0.96	347
Subtotal - UG mill feed	3.46	0.96	347
Total Combined OP and UG mill feed	5.32	0.89	320

#### TABLE 16-7 DETAILS OF PRODUCTION QUANTITIES Search Minerals Inc. – Foxtrot Project

### WASTE DUMP AND LOW-GRADE STOCKPILE

A waste dump and a low-grade stockpile were designed to receive all non-mill feed materials within the final open pit. As per Figure 16-2, the waste dump and low-grade stockpile are located west of the open pit. Respective height and total footprint of the waste dump and the low-grade stockpile are approximately 30 m and 76,000 m<sup>2</sup>, and 15 m and 38,000 m<sup>2</sup>, considering a swell factor of 1.5. Materials with an NSR value lower than the \$85/t cut-off value (i.e., waste) total 2.49 Mt of rock. The remaining 0.78 Mt out of 3.27 Mt is the REE low-grade material planned to be disposed of in a separate stockpile, as this material exhibits



a positive NSR and could be processed at a later date. For the purpose of this PEA, however, it has been considered as waste.

#### **PRODUCTION SCHEDULE**

The OP contract mining will be carried out on two 10-hour shifts per day, seven days per week, with the exception of the last 12 months of the OP operations occurring on Year 3 and Year 4 of the Project, when only one 10-hour shift / seven days per week will be required as the strip ratio will be lower. The UG owner-operated mining will be carried out on two 12-hour shifts per day, seven days per week. OP and UG staffing will be on a rotating shift system being carried out by four shift crews with the exception of the last 12 months of OP operations when only two shift crews will be required.

Highlights of the production schedule are as follows:

- A short ramp-up to full production in Year 1 for the OP mining
- A short ramp-up to full production in Year 4 for the UG mining overlapping with OP phase-out
- Production of 540,000 tonnes per year, or 1,500 tpd
- OP waste and low-grade mining average of 950,000 tonnes per year

The production schedule is summarized in Table 16-8.



Year	Mining Method	OP and/or UG Mined REE Bearing Material (Mt)	OP Mined Waste and Low- Grade (Mt)
-2			
-1			
1	OP	490,000	1,090,000
2	OP	540,000	1,030,000
3	OP	540,000	840,000
4	OP & UG <sup>(1)</sup>	540,000	310,000
5	UG	540,000	
6	UG	540,000	
7	UG	540,000	
8	UG	540,000	
9	UG	540,000	
10	UG	510,000	
Total		5,320,000	3,270,000

#### TABLE 16-8 PRODUCTION SCHEDULE Search Minerals Inc. – Foxtrot Project

Notes:

1. 290,000 t OP overlapped/followed by 250,000 t UG.

### MINE EQUIPMENT

The contractor mine equipment fleet for the open pit operation, listed in Table 16-9, was selected based on comparison to operations of similar size and using InfoMine USA Inc.

Туре	Quantity
Backhoe Hydraulic Shovel 4 m <sup>3</sup>	1
Backhoe Hydraulic Shovel 2 m <sup>3</sup>	1
Front End Loader 4 m <sup>3</sup>	1
Haul Trucks 35 t	3
Rotary Drill 15-20 cm	2
Dozer 305 kW	2
Grader 140 kW	1
Anfo Truck	1
Explosive Truck (cap)	1
Water Truck	1
Service Truck (for maintenance)	1
Lube/Fuel Truck	1
Loader (Yard Handling) <sup>(1)</sup>	1
Pickup Truck <sup>(1)</sup>	6

# TABLE 16-9 OPEN PIT CONTRACTOR MINING FLEET Search Minerals Inc. – Foxtrot Project



Туре	Quantity
Bus (for people transportation) <sup>(1)</sup>	1
Light Plants 8 kW	4

Notes:

1. Yard handling loader, bus and three (out of six) pickups to be purchased by the owner.

The owner-operated mine equipment fleet for the underground operation, listed in Table 16-10, was selected based on comparison to operations of similar size and in-house database.

Туре	Quantity
Jumbo drill	2
LHD 11 yards	2
LHD 8 yards	1
Truck 45 t	3
Longhole production drill	1
V-30 type drill (slot raise) <sup>(1)</sup>	1
Alimak climber (vertical development) <sup>(1)</sup>	2
Bolter	1
Scissor lift	1
Anfo truck (development)	1
Explosive truck (production)	1
Cable bolt drill	1
Cable inserter	1
Boom truck (material handling)	1
Lube truck (fuel & oil)	1
Service truck (construction & maintenance)	2
Service truck (people transportation)	2
Concrete truck	1
Shotcrete machine	1
Small shovel	1
Grader	1

# TABLE 16-10 UNDERGROUND OWNER MINING FLEET Search Minerals Inc. – Foxtrot Project

Notes:

1. Not purchased by the owner as these activities executed under contract.

# MINE INFRASTRUCTURE AND SERVICES

This section is dedicated to infrastructure directly associated with mine operations. For all other general infrastructure located at surface, see Section 18 (Project Infrastructure).



### **OPEN PIT**

#### MATERIAL HANDLING

The mineralized material and waste will be hauled out of the pit with the off-highway equipment fleet listed previously. The material deemed as waste rock will be transported to the waste dump or to the low-grade stockpile, located west of the open pit. The REE bearing material (mill feed) will be delivered directly into the primary crusher or stockpiled nearby. Crushing will be performed prior to feeding the process plant.

#### DEWATERING

The dewatering system will comprise dewatering wells surrounding the open pit footprint. A pumping network will also be installed to pump water run-off from the open pit (three 50-kW pumps).

Pumped water from all sources will be directed through the water treatment system comprised of settling/polishing ponds prior to its release into the environment.

#### EXPLOSIVES AND DETONATORS

Detonators and explosives will be stored in approved explosives magazines. They will be located at a safe distance from the mining operations.

The explosives and detonators magazines will be located southwest of the open pit, along the haul road to the waste dump, and far enough from buildings and working areas. The selected site is shown on Figure 16-2.

Suppliers will deliver explosives and detonators directly into dedicated magazines for storage until use.

#### UNDERGROUND MINE

#### MATERIAL HANDLING

The mucking, loading and hauling operations out of the underground mine, for both REE bearing material and waste, will be done with the underground mobile equipment listed previously. From stopes or development faces, the REE bearing material and waste will be loaded with LHDs into underground trucks at dedicated loading set-ups, as at the intersections of haulage and access drifts on each level for REE bearing material, and will



then travel via lateral drifts and the main ramp up to surface into the mill feed stockpile or on the waste dump at surface.

Once in production, waste rock from underground development will proceed directly into stopes with underground trucks and/or LHDs; otherwise, waste rock will be temporarily stored underground until its use as backfill or hauled at the surface waste dump as required.

REE bearing material from UG will then follow the same path as for the Open Pit that is to the primary crusher or the mill feed stockpile nearby. UG development waste disposed of in the waste dump at surface will then proceed into underground stopes as rockfill. The UG-issued waste will account for approximately half of the needs; the remaining will come from OP-issued waste already stored at surface.

#### BACKFILL

The paste fill plant located at surface will be used to prepare the tailings and cement binder mixture for the underground mine requirements. Paste fill will be used to backfill primary stopes. Approximately 20% of the total tailings produced will be used as backfill, reducing the required capacity of the tailings storage facility.

A borehole originated from surface, and then secondary piping within the UG mine, will permit the distribution of the paste via pumping to each primary stopes

Waste rock produced during UG pre-production or OP production, when needed underground as rockfill, will be transported from the waste dump to a fill raise starting from surface and equipped with finger dump/fill waste passes along its path. It will be needed for the backfill when waste rock generated by development work will not suffice to meet the backfill requirements. The secondary stopes will be backfilled with unconsolidated rockfill.

#### VENTILATION

The main ventilation system is located at surface beside the vent raise. The ventilation network will be in positive pressure. The fresh air requirement was established based on the average of two methods of calculation: the cumulative volume associated to each underground piece of equipment and the daily tonnage throughput. Therefore, two 350 hp fans are required and will have a combined capacity of 450,000 cfm at 9.5 in. of water. A variable drive motor will be used to adjust the rate of the air flow to suit the ventilation needs



during the various phases of the Project. A 45 MBtu heating system (propane) will be installed as part of the ventilation system. The mercaptan system will be installed in the main ventilation system (intake fresh air) for emergency warning.

A 2.8 m x 2.8 m Alimak raise will connect at each production level down to the bottom of the UG mine. This ventilation raise, equipped with a manway, will be needed to start production work, because it will also serve as a second emergency egress.

The fresh air will circulate via the raise (intake). The levels will be supplied with fresh air from the vent raise through secondary ventilation. The main ramp will be used as exhaust network.

Prior to the main ventilation system being ready, an appropriate temporary ventilation system will be installed at the entrance of the ramp to meet the development work requirements (two 125 hp fans with a 7 MBtu heating system for 72,000 cfm pushed through a 60 in. diameter metallic rigid vent duct).

#### POWER DISTRIBUTION

The underground main power will be at 4.16 kV, 3 phases, 60 Hz. Primary electric power will be distributed underground via the main ramp and from boreholes. This approach is advisable because of the long distances to cover. It will also make the electric power distribution network more stable and less sensitive to power failures.

As required, portable substations on skid will be used to transform the 4,160 V to 600 V for local use before permanent substations will be strategically located within the UG mine. From there, the reticulation network to end-uses will be resistor-grounded for more safety.

Switching devices will be installed on the main network to share the load between feeders to match power needs. Feeders for mobile mining equipment will be equipped with ground fault protection.

#### INDUSTRIAL WATER SUPPLY

For underground industrial water requirements, water will be sourced from the water treatment system at surface. A groundwater supply exploration program will be conducted at



relevant locations, in order to determine whether or not water wells could meet the water requirements.

A submersible pump will be installed in the collecting pond and the line up to the portal will be heat traced. Should an underground water source be encountered while mining, then a recovery program would be considered to decrease pumping requirement. Industrial water will be distributed to the entire underground network by gravity via piping.

Water tanks with automatic level control will be located and installed where needed in the underground mine to control the water pressure.

#### DEWATERING

Two main water pumping stations will be installed underground at Levels 6 and 12 to keep the mine dry. The pumping stations will be fitted with identical pumps resulting in a flexible network, and be made of portable modules on skid equipped with enough 100 hp pumps to meet pressure and flow rate requirements. The design capacity of 350 US gpm will be sufficient to pump-out the combined underground industrial water consumption and underground water infiltration, with pumping on a 12 hour daily basis.

The pumps were selected to handle turbid water containing up to 5% solids, eliminating the need for settling systems at the pumping stations. Sumps will be located in the level accesses and linked by drainage holes with one another.

The pumped water will be directed through the water treatment system at surface prior its release into the environment.

#### COMPRESSED AIR

A compressor for the underground operation will be located in a dedicated building annexed to the processing plant. Screw type compressors and an air receiver to regulate the pressure and absorb consumption surge will be the components of the air compressing system.

Compressed air will be brought underground through pipes via the main ramp. Underground levels will be serviced by smaller compressed air pipes.



A second mercaptan system (in addition to the one at the fresh air intake raise) will be installed in the mine compressed air system for emergency warning.

#### EXPLOSIVES AND DETONATORS

During the underground pre-production period, the open pit mine explosives magazines located at surface will be used as UG explosives storage facilities, one for explosives and one for detonators. Later on, permanent storage magazines will be built underground.

Suppliers will deliver explosives and detonators to the mine portal where they will be immediately transferred into the underground mine service truck. Explosives and detonators will then be immediately hauled underground for storage until use.

#### FUEL AND MAINTENANCE SERVICES

The garage, for which details are provided in Section 18, will be located at surface and a team will provide emergency service and day-to-day maintenance work directly on the job sites. Most of the underground equipment will fuel at surface.

#### COMMUNICATION AND AUTOMATION

The main communication system will combine the use of data networking (Ethernet for computer and automation network), voice (portable radio) and video (IP camera).

For emergency phone service, a separate cable will be installed from the foreman's office at surface to the refuge stations underground.

#### **REFUGE STATIONS**

The refuge stations will be located to ensure the safety of the personnel and to accommodate lunch breaks. Two main refuge stations will be constructed and one additional portable refuge station will be located throughout the mine.

#### UNDERGROUND STORAGE

To optimize costs, remuck bays will be converted into storage areas for miscellaneous items at convenient time.



## **17 RECOVERY METHODS**

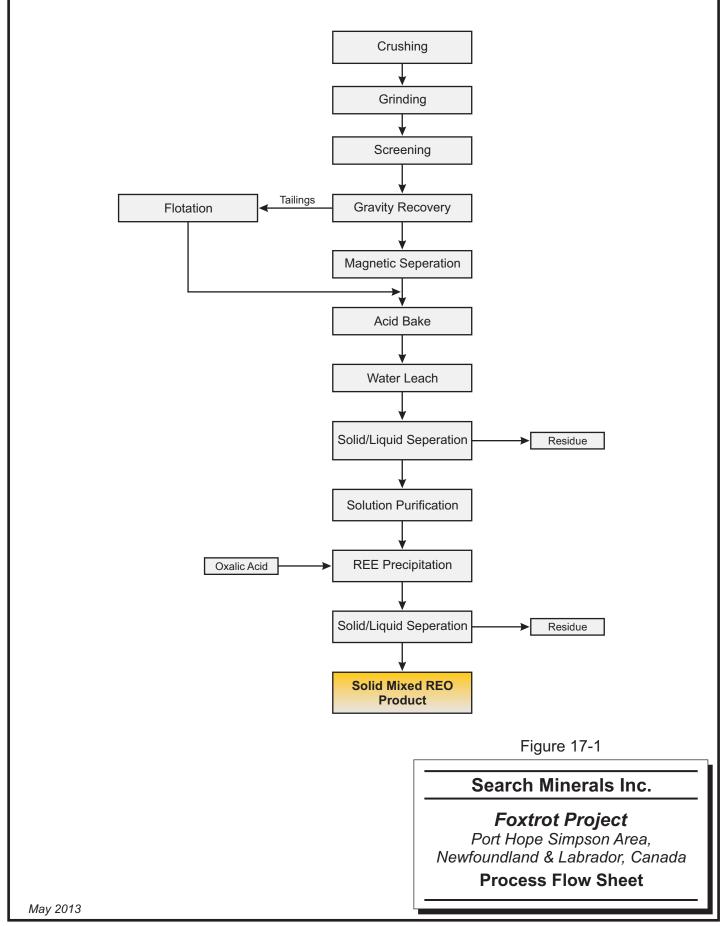
## PRELIMINARY PROPOSED PROCESS

The process will utilize the following basic unit operations: crushing, grinding, gravity recovery, magnetic separation, flotation, water leaching, acid bake, and solution purification to recover a mixed REE product, as shown below in Figure 17-1.

Ore will be crushed, ground and screened to produce a suitable sized product for gravity recovery. Gravity recovery unit operations may include tabling to produce separate sized material. The product from the tabling operation will be subjected to magnetic separation to remove magnetite. The tailings from the gravity recovery step will be subjected to flotation to increase REE recovery.

The non-magnetics from magnetic separation, and the flotation concentrate will be combined and sent to acid baking, and then to a water leaching step. The product from water leaching will go to solid liquid separation, with the REE containing solution sent to solution purification, and the solids sent to residue disposal. After solution purification, oxalic acid will be added to the remaining solution to form REE containing precipitate. This precipitate will be sent to solid/liquid separation to provide a solid mixed REE oxalate product, and a liquid residue.







## **18 PROJECT INFRASTRUCTURE**

The surface infrastructure area totals 300 ha and covers two watersheds. It has been assumed that except for the waste stockpile drainage the project infrastructure, including mine water discharge for the mine, will be located at the northern watershed.

#### POWER SUPPLY

Hydroelectric power is not available near the mine site. Power at Goose Bay is fed by a main power line coming from Churchill Falls but the straight distance between Goose Bay and the mine site is more than 300 km. Diesel driven generators will be installed at the mine site near the process plant. Maximum power demand will be on the order of 6 MW. The electric line network will be approximately eight kilometres in length and will supply the process plant, accommodation camp, pumping stations, mechanical shop, warehouse, service buildings, and site lighting.

A preventive maintenance program for diesel driven generators must be set up and carefully followed by mine site maintenance personnel and an emergency backup system will always have to be operational.

#### FUEL STORAGE

A central fuel storage system comprising two 700 m<sup>3</sup> diesel storage tanks contained within a bunded area will be installed adjacent to the process plant and close to the mine services area. This fuel storage will mainly supply diesel driven generators and refuelling requirements for the mine fleet and light vehicles.

#### WATER SUPPLY

It is anticipated that raw water for process plant use will be sourced mainly from the tailings storage facility (TSF) polishing pond and a natural pond located south side of TSF. The main objective will be to maximize the amount of reused water for processing and use fresh water only when necessary.

It has been assumed that the accommodation camp will be supplied with fresh water, treated for potable use, from a bore hole located in close proximity to the site.



Water for fire hydrants will be supplied from a natural pond located at the south side of the TSF. The water will be pumped to a tank dedicated for fire emergencies. Six fire hydrants will be connected by a 200 mm diameter HDPE pipe and will be used to provide fire protection around the mine site.

#### ROADS

The site is located 500 m to the south of a public road which provides access to the small community of St-Lewis. It is anticipated that the 12 km road going to St-Lewis will require upgrades.

Approximately 8 km of road on site is required for the mining operation and to access site buildings. The travelling road has a planned 10 m width and radius of curvature of 200 m minimum and the production road from open pit to ROM pad and waste pad has a planned 20 m width and radius curvature of 250 m minimum. Waste coming from the open pit will be used as material to build the road base and after grinding-screening could be used as a rolling surface.

#### BUILDINGS

The following buildings are the major buildings located at the mine site. All buildings will be in steel frame metal clad construction-type with a concrete slab base. It is assumed that the foundations will be built on the bed rock with a minimum amount of filling material needed.

- Administration and Services Office
- Mill and concentrate loading/shipping installation
- Primary Crushing Plant
- Mechanical and Electrical Shop
- Warehouse
- Accommodation camp
- Main security gate house
- Community relations

#### ADMINISTRATION AND SERVICES OFFICE

The administration and services office building will accommodate mine management, administration, engineering/geology department, first aid room, training and meeting rooms, and a mine dry room. The building will be two storeys and completed in modules. Costs include the complete supply and installation of building foundations, mechanical equipment, and electrical equipment.



#### GARAGE, MAINTENANCE SHOPS AND WAREHOUSE

The garage will include a wash bay, three mechanical bays, and a welding shop. Four other shops adjacent to the garage and the main warehouse will be added for welders, carpenters, pump and accessories maintenance, and for electrical and instrumentation workers. There will be two levels in the warehouse with maintenance on the lower floor and parts storage and a dining room on the upper floor. In the electrical equipment maintenance area, a second floor will be occupied by maintenance foreman offices.

#### **ACCOMMODATION CAMP - OPERATIONS**

An accommodation camp will be constructed west of the plant site to house the permanent mining and process plant workforce. It is expected that this camp will have a total capacity of approximately 175 people. There will be sleeping rooms, a kitchen/dining facility, clinic, laundry, and recreation facilities.

The Project will seek local employment to the extent possible. Search Minerals intends to investigate accommodation alternatives to an on-site mining camp, to the benefit of the local communities.

#### **ACCOMMODATION CAMP - CONSTRUCTION**

Temporary accommodation for the construction phase will be located adjacent to the permanent camp site. The temporary camp will be removed upon completion of construction.

#### OTHER SITE INFRASTRUCTURE

Communications services for the Project will include voice, data/internet communications via satellite, and satellite cable services for television entertainment.

#### WASTE ROCK DUMP AND LOW GRADE STOCKPILE

The waste pile and low grade stockpile will be located one km west of the open pit and will have respectively a maximum capacity of approximately 1.7 million m<sup>3</sup> and a maximum height of 30 m and 0.4 million m<sup>3</sup> and a maximum height of 15m.



#### TAILINGS DYKE

The tailings will be stored in a conventional tailings storage facility (TSF). The TSF concept is based on the assumption that the bedrock is impermeable and that the tailings are non-acid producing. Tailings will be transported through a 3.5 km HDPE pipe (250 mm ID).

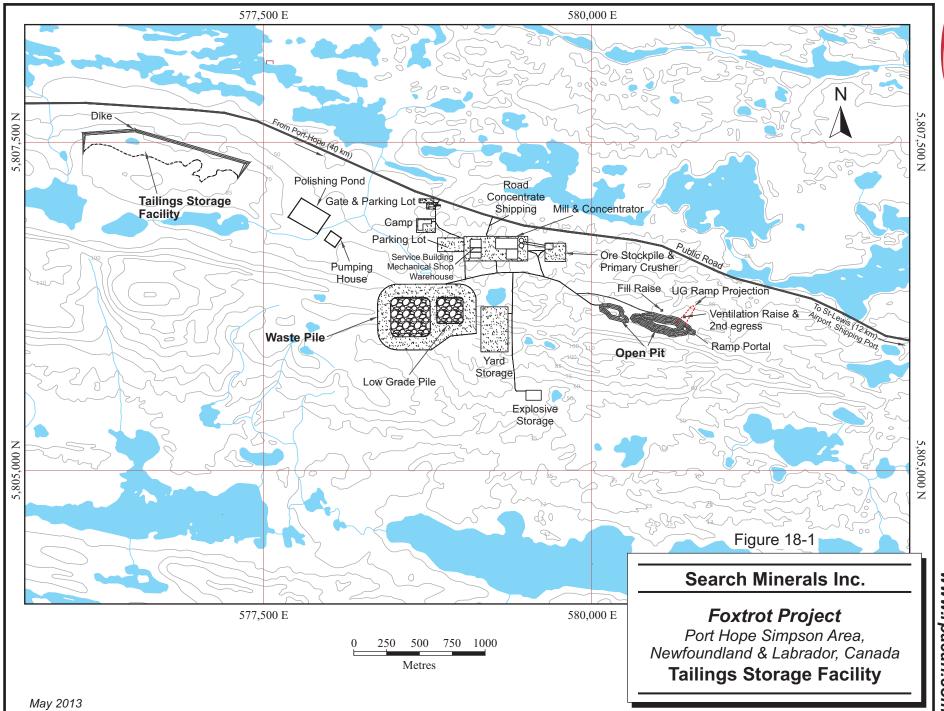
The TSF will ultimately cover a maximum area of 30 ha. Location of the TSF is shown in Figure 18-1. The dyke, anticipated to be constructed using ROM waste and waste from a quarry located inside tailings pond area, will have the capacity to enclose 1.6 million m<sup>3</sup> of tailings and will require 0.6 million m<sup>3</sup> of rock fill for construction.

#### PORT

The infrastructure facilities at the port at St-Lewis will require upgrades, including the construction of a cold shed and concentrate storage facility. Sea containers, concentrate, and consumables delivered to port are assumed to be handled by the mine personnel.

#### AIRPORT

Aircraft will be based on Dash 8 Series 300, Q400 or other type of aircraft having a capacity of at least 55 passengers, and needing a minimum airstrip length of 1.3 km to 1.6 km; the current landing runway is 700 m in length. Therefore the current airstrip of St-Lewis must be upgraded or relocated, or air travel must be via Port Hope Simpson.



**RPA** 



## **19 MARKET STUDIES AND CONTRACTS**

### RARE EARTH ELEMENTS

RPA collected historical price information, supply/demand analysis, and long term forecasts for REO. The sources of price information include the websites of Metal-Pages<sup>™</sup> and Asian Metal, and analyst reports by Asian Metal, TD (Toronto Dominion) Newcrest Inc., and CIBC (Canadian Imperial Bank of Commerce).

#### RARE EARTH SUPPLY

Rare earth elements are found in more than 200 minerals, of which about a third contain significant concentrations. Only a few, however, have potential commercial interest. Historically, the most important source minerals, for most LREE, were carbonates (bastnaesite) and phosphates (apatite, monazite and xenotime). The most important source for heavy rare earth elements were ionic clays and xenotime. More recently, oxides and silicate minerals (zircon, allanite, eudialyte, kainosite, fergusonite) have become more important exploration and development targets, especially for HREE.

The main geological environments for rare earth element minerals are:

- Carbonatites bastnaesite (Bayan Obo, Inner Mongolia; Mountain Pass, California; Kola Peninsula, Russia; Sichuan, China; Mt. Weld, Australia; Bear Lodge, Wyoming)
- Monazite and xenotime-bearing placers and paleo-placers (west coast of Australia; east coast of India)
- Ion absorption clays (Longnan, Jiangxi, China)
- Peralkaline eudialyte-bearing intrusions eudialyte, bastnaesnite, allanite, zircon, parasite, fergusonite (Kola Peninsula, Russia; Dubbo, Australia; Illimausuaq, Greenland; Norra Karr, Sweden; Kipawa, Canada; Thor Lake, Canada; Red Wine, Canada)
- Peralkaline granites monazite, kainosite, allanite, synchysite, bastnaesite (Bokan Mountain, Alaska; Strange Lake; Canada)
- Felsic volcanic/subvolcanic rocks bastnaesite, allanite, zircon, monazite (Foxtrot, Canada; Brockman Range, Australia; Round Top Mountain, Texas; Dubbo, Australia)



Currently, the most important current sources of rare earth elements are the Bayan Obo iron - rare earth deposits (LREE) near Baotou, Inner Mongolia, the bastnaesite deposits (LREE) in Sichuan, China and the ionic clay deposits (HREE) in southern China. China is the dominant source of all rare earth oxides, accounting for approximately 97% of world production in 2009. Light rare earth elements are primarily produced in northern China (Inner Mongolia) and south-western China (Sichuan). The heavy rare earth elements are primarily produced in southern China (Guangdong), from ionic clays.

There are distinct differences in the elemental composition of various rare earth sources, as illustrated in Table 19-1.

Source	Baotou, Inner Mongolia	Sichuan	Guangdong	Longnan, Jiangxi	Mountain Pass, Ca	Mt. Weld, W. Australia <sup>1</sup>
Ore Type	Bastnaesite Concentrate	Bastnaesite Concentrate	High-Eu clay	High-Y clay	Bastnaesite	Monazite
TREO in Concentrate <sup>2</sup>	50%	50%	92%	95%		
Element						
La	23	29.2	30.4	2.1	33.2	25.5
Ce	50.1	50.3	1.9	0.2	49.1	46.74
Pr	5	4.6	6.6	0.8	4.34	5.32
Nd	18	13	24.4	4.5	12	18.5
Sm	1.6	1.5	5.2	5	0.789	2.27
Eu	0.2	0.2	0.7	0.1	0.118	0.44
Gd	0.8	0.5	4.8	7.2	0.166	1
Tb	0.3	0	0.6	1	0.0159	0.07
Dy	0	0.2	3.6	7.2	0.0312	0.12
Er	0	0	1.8	4	0.0035	0.1
Y	0.2	0.5	20	62	0.0913	trace
Ho-Tm-Yb-Lu	0.8	0	0	5.9	0.0067	trace
Total TREO	100	100	100	100	99.9	100

# TABLE 19-1 DISTRIBUTION OF RARE EARTH ELEMENTS BY SOURCE – CHINA Search Minerals Inc. – Foxtrot Project

Source: Neo-Materials International, Harben, Lynas Corp.

#### Notes:

- 1. Central Zone pit assays for La, Ce, Pr, Nd, Sm, Dy, Eu, and Tb
- 2. TREO contents of China clays represent the relative amounts in concentrate produced from the clay deposits

Total supply of rare earth oxides for 2010 was estimated at between 123,600 tonnes and 124,000 tonnes, as illustrated in Table 19-2.

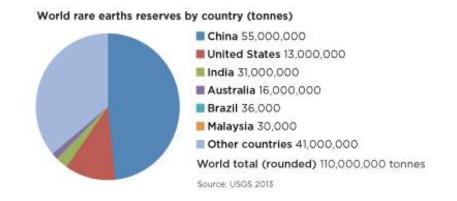
Source		Supply 2008 (tonnes REO)	Supply 2010 (tonnes REO)
China		117,000	120,000
Others			
	Recycling	~5,000	N/A
	Russia	2,500 - 3,000	1,800 - 2,000
	India	100	25 - 50
	Mountain Pass	2,000	1,800 – 2,000
Total		121,600 - 127,100	123,600 - 124,000

# TABLE 19-2RARE EARTH SUPPLY – 2008 & 2010Search Minerals Inc. – Foxtrot Project

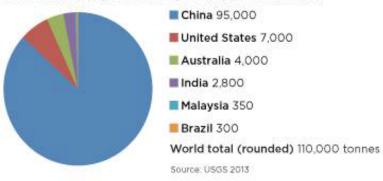
Source: Roskill Information Services, 2010 & 2011

As described by Asian Metal, the international rare earths market has grown at an unprecedented rate since China cut export quotas by approximately 40% in 2011. China's overwhelming control (Figure 19-1) on the REE supply chain, from upstream mining to downstream processing and end-user products, is likely to remain intact on all but a few materials through 2016. Further price increases are expected with continued decreases in export availability from major Chinese suppliers and a surge in domestic China demand.

#### FIGURE 19-1 REE RESERVES AND PRODUCTION BY COUNTRY







#### Rare earth oxide production by country in 2012 (tonnes)

A crackdown on illegal mining operations, which accounted for an estimated 20% to 25% of production over the past five years, has substantially cut down on the availability of material on the spot market. A major consolidation of the market, which began in 2009, has also limited the number of active rare earth miners, separation plants, and exporters in China.

New production from US-based Molycorp was initiated in 2012, and Australia-based Lynas is expected to be in production in 2013, adding between 30,000 tons (27,000 tonnes) and 40,000 tons (36,000 tonnes) of high purity material to the market, which is widely expected to saturate the light rare earths market when it becomes available. The ore bodies from Molycorp's Mountain Pass and Lynas' Mount Weld mine sites are predominantly composed of LREE - lanthanum, cerium, praseodymium, and neodymium. The heavy rare earths and yttrium are found at the mines only in trace amounts and will be neither recovered nor produced in quantities that would have a material impact on global supply.

It should be noted that the HREE – Dy, Er, Eu, Gd, Ho, Lu, Sc, Sm, Tb, Tm, Y, Yb – are not only much more rare than the LREE, but the separation and processing of heavy rare earth-rich concentrate into high purity oxides and metals outside of China will require substantial new capital investment. At present, substantially all heavy rare earth processing facilities are in China, and previous scoping studies done by prospective rare earth mining ventures indicate that a new separation plant would cost roughly US\$250 million to US\$350 million and take three to four years to complete. As a result, availability of HREE will be contingent on Chinese production levels until 2016 at the earliest - the soonest a non-Chinese processing facility could be completed.



On a macro level, over the next five years, the Chinese government is expected to further regulate the rare earth mining industry. China has already begun enacting a series of new policies designed to improve environmental guidelines, limit illegal production, establish provincial and national stockpile reserves, and continue a consolidation of the overall industry.

#### RARE EARTH PRICING

The market for rare earth products is relatively small, and information on pricing and sales terms, especially for 2016, is difficult to obtain. Sustained growth in demand and price is expected for nearly all rare earth elements through 2016 with the exception of lanthanum, cerium, and praseodymium.

REO price forecasts for 2016 were obtained from a number of sources, which covered a wide range of values. The prices used in the cash flow are described in Table 19-3. The prices were applied as a constant throughout the LOM schedule.

Rare Earth Oxide	Base Case (US\$/kg)	Q1 2013 Spot* (US\$/kg)
La <sub>2</sub> O <sub>3</sub>	10	11
$Ce_2O_3$	5	11
$Pr_2O_3$	75	80
$Nd_2O_3$	75	78
$Sm_2O_3$	9	26
$Eu_2O_3$	500	1,500
$Gd_2O_3$	30	50
Tb <sub>4</sub> O <sub>7</sub>	1,500	1,230
Dy <sub>2</sub> O <sub>3</sub>	750	700
Ho <sub>2</sub> O <sub>3</sub>	-	-
$Er_2O_3$	40	75
$Tm_2O_3$	-	-
Yb <sub>2</sub> O <sub>3</sub>	50	58
$Lu_2O_3$	-	-
$Y_2O_3$	20	38

# TABLE 19-3 REO FORECAST PRICES VS. CURRENT SPOT PRICES Search Minerals Inc. – Foxtrot Project

\* Source: Metal-Pages.com



The average rare earth oxide price used is \$38/kg, while current (Q1 2013) prices average C\$44/kg.

#### MARKETING CONCLUSIONS

RPA considers these REO prices to be appropriate for a PEA-level study, however, we note that the recent market volatility introduces considerably more uncertainty than a comparable base or precious metals project.

## CONTRACTS

No contracts relevant to the PEA have been established by Search Minerals. Search Minerals has not hedged, nor committed any of its production pursuant to an off-take agreement.



## 20 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

### ENVIRONMENTAL STUDIES

#### ENVIRONMENTAL BASELINE STUDY

It is expected that a Newfoundland and Labrador Environmental Impact Statement (EIS) and a Federal Comprehensive Study will be required for the Foxtrot Project. An Environmental Baseline Study (EBS) will be completed to support these environmental assessments.

To date, no EBSs have been conducted at the Foxtrot Property. An EBS is necessary to understand the specific interactions between the project and the natural environment and to design the project to avoid or minimize potential adverse effects. The EBS would also support the preparation of a registration document for the project and an EIS in the event that it is required by the province (detailed below). An EBS is typically conducted over a minimum of 12 continuous months to provide coverage of all four seasons. Studies may continue beyond this12-month period as may be justified by the occurrence of abnormal seasonal conditions. In cases where the EBS may focus on specific information gaps the study period may be shorter than 12 months. The EBS scope is typically developed in consultation with the local and regional resource management and regulatory agencies in order to ensure agency concerns can be addressed with the study results. The initial EBS report is typically completed within 14 to 16 months of the start of the field program and the Environmental Impact Assessment (EIA) is typically based upon this initial EBS report.

The following environmental baseline studies are likely required:

- Sound monitoring;
- Air quality;
- Historic and heritage sites;
- Fish and fish habitat baseline;
- Traditional land use (trap-lines etc.)
- Rare plant analysis;
- Migratory Birds



- Ecological land classifications (ELC) including wildlife assemblages and wetlands; and
- Song birds.

Determination of Harmful Alteration, Disruption, or Destruction of Fish Habitat (HADD) and socio-economic baseline studies will also be undertaken.

### PROJECT PROCESS AND PERMITTING

Mining projects in the Province of Newfoundland and Labrador are subject to Environmental Assessment (EA) under the Newfoundland and Labrador Environmental Protection Act. They can also be subject to an environmental assessment under the Canadian Environmental Assessment Act (CEAA) if an approval is required from a federal agency. All provincial and federal EA processes are public. These processes are discussed below:

#### **PROVINCIAL PROCESS**

The EA process is initiated with a formal registration of the Project, submitted in a prescribed format, to the Newfoundland and Labrador Department of Environment and Conservation. The registration is made available to the public and to government agencies for review. Within 45 days of receiving a registration, the Minister will issue a decision on the proposed project. All decisions are announced in the Environmental Assessment Bulletin. There are three possible decisions:

- An Environmental Preview Report is required;
- An Environmental Impact Statement is required; or
- No further EA is required.

#### ENVIRONMENTAL PREVIEW REPORT

An Environmental Preview Report (EPR) is ordered by the Minister when additional information is required to determine the potential for a project to result in significant adverse environmental effects. The project proponent is responsible to prepare a project-specific EPR, in response to government-issued guidelines. The EPR is available for public and government review. At the completion of the review period, the Minister decides if the EPR is sufficient. If not, the proponent is required to revise and/or amend it. Upon a



determination of sufficiency, the Minister will release the project, conditionally release the project, or call for an Environmental Impact Statement (EIS).

#### ENVIRONMENTAL IMPACT STATEMENT

An EIS is required in cases where potential exists for a project to cause significant adverse environmental effects. The project proponent is responsible to prepare a project-specific EIS and associated component studies in response to government issued guidelines. Field work is typically required for the completion of an EIS. The component studies and EIS are available for public and government review. At the completion of the review period, the Minister decides if the component studies and/or EIS are sufficient. If not, the proponent is required to revise and/or amend the document. Upon a determination of sufficiency, Cabinet will release the project, conditionally release the project, or not release the project. Once the project is released from the EA process and prior to project construction, the proponent can proceed to obtain the necessary permits and authorizations. A release from the provincial process is valid for three years.

#### PERMITTING

Proponents should follow the *Environmental Guidelines for Construction and Mineral Exploration Companies* (DNR, 2011) provided by the Newfoundland and Labrador Department of Natural Resources. The *Guidebook to Exploration, Development and Mining in Newfoundland and Labrador* (GNL, 2010) also provides useful guidance on the regulatory process.

#### WATER QUALITY MANAGEMENT

Although no water balance has been completed for the Project, the discharge of effluents is probable. Discharges may originate from several sources, including open pit dewatering, groundwater seepage, precipitation, and general site run-off, including run-off from ore, waste rock, and overburden stockpiles; and periodic releases of water from the tailings management area. As such a water treatment plant will likely be required to manage the quality of water being discharged into the environment.

The control and management of water resources in Newfoundland and Labrador is legislated by the Water Resources Act, although related development activities cannot be permitted or undertaken without first obtaining authorization from the Province under the Environmental Protection Act.



#### SURFACE WATER

Licences under the Water Resources Act will be required prior to release of any effluent. Effluents discharged to surface water from mining activities must, at minimum, comply with Sections 3, 19.1, and 20 of the MMER (Table 20-1). Site specific effluent quality criteria may be imposed as a condition of any approval in the event that compliance with the MMER does not provide adequate protection of receiving water quality. Effluent treatment is expected to be required to meet effluent quality limits for total suspended solids (TSS), ammonia, and potentially for management of metal concentrations. Specific treatment requirements will be developed in subsequent Project planning phases.

Monitoring of any liquid discharge from the Project to receiving waters will be required as part of any provincial environmental permit or approval. The basic monitoring requirements are those detailed in the MMER, which require routine monitoring of deleterious substances (Table 20-1) and effluent volume. Periodic effluent characterization also is required, which includes the deleterious substances and analyses of alkalinity, hardness, aluminum, cadmium, iron, mercury, molybdenum, ammonia, nitrate, major anion and cation species, and Project-specific contaminants of concern (COC). The MMER also require periodic receiving water quality monitoring, and environmental effects monitoring.

Neither the process water requirement for the mill or the water source has been determined at this time, however, water usage from any natural surface water body will need to be licensed under the *Water Resources Act*.

#### GROUNDWATER

Hydrogeological conditions in the vicinity of the open pit need to be studied in order to estimate the potential for groundwater seepage into the pit, to design the necessary water diversion and water management works, and to assess how the Project interactions with groundwater may affect nearby surface water bodies. Any dewatering will be required to be licensed under the *Water Resources Act*.



#### TABLE 20-1 METAL MINING EFFLUENT REGULATIONS, SOR/2002-222 – AUTHORIZED LIMITS OF DELETERIOUS SUBSTANCES Search Minerals Inc. – Foxtrot Project

Deleterious Substance	Maximum Authorized Monthly Mean Concentration	Maximum Authorized Concentration in a Composite Sample	Maximum Authorized Concentration in a Grab Sample
Arsenic	0.50 mg/L	0.75 mg/L	1.00 mg/L
Copper	0.30 mg/L	0.45 mg/L	0.60 mg/L
Cyanide	1.00 mg/L	1.50 mg/L	2.00 mg/L
Lead	0.20 mg/L	0.30 mg/L	0.40 mg/L
Nickel	0.50 mg/L	0.75 mg/L	1.00 mg/L
Zinc	0.50 mg/L	0.75 mg/L	1.00 mg/L
Total Suspended Solids	15.00 mg/L	22.50 mg/L	30.00 mg/L
Radium 226	0.37 Bq/L	0.74 Bq/L	1.11 Bq/L

Source: Department of Justice 2011

Notes:

1. All concentrations are total values.

2. Cyanide only required for mines using cyanide in the metallurgical process.

3. Current version as posted between April 3, 2009 and April 15, 2009. SOR/2006-239, s. 25.

#### OTHER PERMITS

#### Mining Lease

A mining lease must be obtained under the provincial *Mineral Act* for exclusive rights to develop, extract, remove, deal with, sell, mortgage, or otherwise dispose of all the unalienated materials, or those specified in the lease, in, on or under the land described in the lease (GNL, 2010). Surface rights that include the entire footprint of the mine and related infrastructure must also be obtained under the *Mineral Act*.

#### Mill License

A mill license is required for operation of a mill in conjunction with a mining operation, as per Section 5 of the *Mining Act*. Mill licenses are issued by the Department of Natural Resources to the holder of a mining lease (GNL, 2010), and a mill may not be operated without first obtaining a mill license.

#### Fuel Storage and Handling

Fuel storage and handling in Newfoundland and Labrador is regulated by *The Storage and Handling of Gasoline & Associated Products Regulations*, and a Certificate of Approval for a fuel storage system must be obtained from the Department of Government Services and



Lands. Registration is required for all underground and above ground storage facilities for the storage and handling of fuel and associated products.

#### Explosives

Explosives must be stored at least 22.86 m from any road and 30.48 m from an occupied building. Explosives in excess of 68.04 kg can be kept only on premises which have been licensed under *The Explosives Act* (Canada). All transportation of explosives must conform to *The Fire Commissioners Act* and *The Explosives Act* (Canada). Permits related to explosives are often held by the explosives supplier in circumstances where the onsite storage facilities are owned and operated by the supplier.

#### FEDERAL PROCESS

#### ENVIRONMENTAL ASSESSMENT

Any requirement for a federal environmental assessment would be conducted in accordance with the Draft Canada-Newfoundland and Labrador Agreement on Environmental Assessment Cooperation (2005). The Provincial government and Canadian Environmental Assessment (CEA) Agency will advise proponents at the earliest opportunity about the potential for a cooperative environmental assessment of a proposed project.

#### CANADIAN ENVIRONMENTAL ASSESSMENT ACT

The Project registration document will be circulated to the CEA Agency and to federal authorities such as Environment Canada, Health Canada, Fisheries and Oceans Canada, Natural Resources Canada and Transport Canada. The federal agencies will determine if a federal environmental assessment is necessary. A federal environmental assessment is typically triggered when a federal authority determines it must provide a licence, permit, or an approval that enables a project to be carried out (e.g., authorization under the federal *Fisheries Act*).

If a federal agency determines that it must issue a permit or approval for the Project, the federal agency would then determine the level of environmental assessment to be applied to the Project. The level of environmental assessment that is necessary for a mining operation in the presence of a CEAA trigger is determined by a number of factors which are outlined in the *Comprehensive Study List Regulations* under CEAA. The basic level of assessment is the screening level. The next level is the comprehensive study, which is typically applied to



larger and more complex Projects. In general, a metal mine with a planned production rate of 3,000 tpd or greater is subject to a comprehensive study.

The proposed Project is considered a natural resource development which triggers involvement of the Major Project Management Office (MPMO) to provide overarching project management for a federal environmental assessment if required. The MPMO is administered by Natural Resources Canada, whose role is to provide guidance to project proponents and other stakeholders, coordinate project agreements and timelines between federal departments and agencies, and to track and monitor the progression of major resource projects through the federal regulatory review process.

#### FISHERIES ACT

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat in Canada. Under section 35(1) of the federal *Fisheries Act*, works that result in the harmful alteration, disruption or destruction (HADD) of fish habitat must be authorized in advance by DFO, (DFO 2002). If a DFO Authorization is required, it can take anywhere from one month to several years to obtain an Authorization, depending on the type of approval required, the complexity of the project, and any associated field studies. Other Project activities (e.g., construction of crossing structures [culverts] through fish habitat, any work in or about a fish-bearing watercourse that may disturb, alter, or destroy fish habitat) will require an Authorization under the Fisheries Act if they result in a HADD. Habitat compensation is an option for achieving no net loss when residual impacts on habitat productive capacity are deemed harmful after relocation, redesign, or mitigation options have been implemented. Habitat compensation involves replacing the lost habitat. Depending on the nature and scope of the compensatory works, habitat compensation may require (but is not limited to) five years of post-construction monitoring (DFO 2002).

#### **PROVINCIAL AUTHORIZATIONS**

Following release from the multi-jurisdictional environmental assessment process, the Project will require a number of approvals, permits, and authorizations prior to Project initiation. In addition, throughout Project construction and operation, Search Minerals will also be required to comply with any other terms and conditions associated with the release issued by the regulatory jurisdictions. Preliminary lists of permits, approvals, and



authorizations that may be required for the Project are presented in Table 20-2. Permits and authorizations will also be required from affected municipalities.

# TABLE 20-2 PROVINCIAL AUTHORIZATIONS Search Minerals Inc. – Foxtrot Project

Permit, Approval or Authorization Activity	Issuing Agency
<ul> <li>Release from Environment Assessment Process</li> </ul>	DOEC - Environmental Assessment Division
<ul> <li>Permit to Occupy Crown Land</li> </ul>	DOEC – Crown Lands Division
<ul> <li>Permit to Construct a Non-Domestic Well</li> </ul>	DOEC - Water Resources Management
<ul> <li>Water Resources Real-Time Monitoring</li> </ul>	Division
<ul> <li>Certificate of Environmental Approval to Alter a Body of</li> </ul>	
Water	
<ul> <li>Culvert Installation</li> </ul>	
Fording	
<ul> <li>Stream Modification or Diversion</li> </ul>	
<ul> <li>Other works within 15 metres of a body of water (site</li> </ul>	
drainage, dewater pits, settling ponds)	
<ul> <li>Certificate of Approval for Construction and Operation</li> </ul>	DOEC – Pollution Prevention Division
<ul> <li>Certificate of Approval for Generators</li> </ul>	
<ul> <li>Industrial Processing Works</li> </ul>	
<ul> <li>Approval of MMER Emergency Response Plan</li> </ul>	
<ul> <li>Approval of Waste Management Plan</li> </ul>	
<ul> <li>Approval of Environmental Contingency Plan (Emergency</li> </ul>	
Spill Response)	
<ul> <li>Approval of Environmental Protection Plan</li> </ul>	
<ul> <li>Permit to Control Nuisance Animals</li> </ul>	DOEC – Wildlife Division
<ul> <li>Pesticide Operators License</li> </ul>	DOEC – Pesticides Control Section
<ul> <li>Blasters Safety Certificate</li> </ul>	Government Service Centre (GSC)
Magazine License	
<ul> <li>Approval for Storage and Handling Gasoline and</li> </ul>	
Associated Products	
<ul> <li>Temporary Fuel Cache</li> </ul>	
<ul> <li>Fuel Tank Registration</li> </ul>	
Approval for Used Oil Storage Tank System (Oil/Water	
<ul> <li>Approval for Used Oil Storage Tank System (Oil/Water Separator)</li> </ul>	
<ul> <li>Approval for Used Oil Storage Tank System (Oil/Water Separator)</li> <li>Fire, Life and Safety Program</li> </ul>	
<ul> <li>Approval for Used Oil Storage Tank System (Oil/Water Separator)</li> <li>Fire, Life and Safety Program</li> <li>Certificate of Approval for a Waste Management System</li> </ul>	
<ul> <li>Approval for Used Oil Storage Tank System (Oil/Water Separator)</li> <li>Fire, Life and Safety Program</li> <li>Certificate of Approval for a Waste Management System</li> <li>Approval of Development Plan, Closure Plan, and</li> </ul>	Department of Natural Resources (DNR) –
<ul> <li>Approval for Used Oil Storage Tank System (Oil/Water Separator)</li> <li>Fire, Life and Safety Program</li> <li>Certificate of Approval for a Waste Management System</li> <li>Approval of Development Plan, Closure Plan, and Financial Security</li> </ul>	Department of Natural Resources (DNR) – Mineral Lands Division
<ul> <li>Approval for Used Oil Storage Tank System (Oil/Water Separator)</li> <li>Fire, Life and Safety Program</li> <li>Certificate of Approval for a Waste Management System</li> <li>Approval of Development Plan, Closure Plan, and Financial Security</li> <li>Mining Lease</li> </ul>	
<ul> <li>Approval for Used Oil Storage Tank System (Oil/Water Separator)</li> <li>Fire, Life and Safety Program</li> <li>Certificate of Approval for a Waste Management System</li> <li>Approval of Development Plan, Closure Plan, and Financial Security</li> <li>Mining Lease</li> <li>Surface Rights Lease</li> </ul>	
<ul> <li>Approval for Used Oil Storage Tank System (Oil/Water Separator)</li> <li>Fire, Life and Safety Program</li> <li>Certificate of Approval for a Waste Management System</li> <li>Approval of Development Plan, Closure Plan, and Financial Security</li> <li>Mining Lease</li> <li>Surface Rights Lease</li> <li>Quarry Development Permit</li> </ul>	Mineral Lands Division
<ul> <li>Approval for Used Oil Storage Tank System (Oil/Water Separator)</li> <li>Fire, Life and Safety Program</li> <li>Certificate of Approval for a Waste Management System</li> <li>Approval of Development Plan, Closure Plan, and Financial Security</li> <li>Mining Lease</li> <li>Surface Rights Lease</li> <li>Quarry Development Permit</li> <li>Operating Permit to Carry out an Industrial Operation</li> </ul>	
<ul> <li>Approval for Used Oil Storage Tank System (Oil/Water Separator)</li> <li>Fire, Life and Safety Program</li> <li>Certificate of Approval for a Waste Management System</li> <li>Approval of Development Plan, Closure Plan, and Financial Security</li> <li>Mining Lease</li> <li>Surface Rights Lease</li> <li>Quarry Development Permit</li> <li>Operating Permit to Carry out an Industrial Operation During Forest Fire Season on Crown Land</li> </ul>	Mineral Lands Division
<ul> <li>Approval for Used Oil Storage Tank System (Oil/Water Separator)</li> <li>Fire, Life and Safety Program</li> <li>Certificate of Approval for a Waste Management System</li> <li>Approval of Development Plan, Closure Plan, and Financial Security</li> <li>Mining Lease</li> <li>Surface Rights Lease</li> <li>Quarry Development Permit</li> <li>Operating Permit to Carry out an Industrial Operation During Forest Fire Season on Crown Land</li> <li>Permit to Cut Crown Timber</li> </ul>	Mineral Lands Division
<ul> <li>Approval for Used Oil Storage Tank System (Oil/Water Separator)</li> <li>Fire, Life and Safety Program</li> <li>Certificate of Approval for a Waste Management System</li> <li>Approval of Development Plan, Closure Plan, and Financial Security</li> <li>Mining Lease</li> <li>Surface Rights Lease</li> <li>Quarry Development Permit</li> <li>Operating Permit to Carry out an Industrial Operation During Forest Fire Season on Crown Land</li> </ul>	Mineral Lands Division



### SOCIAL OR COMMUNITY REQUIREMENTS

#### COMMUNITY AND ABORIGINAL ENGAGEMENT

The implementation of an effective community and Aboriginal engagement program is fundamental to the successful environmental permitting of mining projects. The purpose of this program is to ensure that all potentially affected persons, businesses, and communities have a full understanding of the Project and an opportunity to share information with respect to concerns regarding potential effects, and so the proponent has an opportunity to explain how these concerns are addressed in the Project design and operations. This program typically begins in the early stages of project planning and continues through the life of the Project.

Search Minerals has initiated a community and Aboriginal consultation process. On August 27, 2012 Search Minerals announced that a Mining Exploration Activities Agreement was signed with the NunatuKavut Community Council (NCC), the political representative body of the Inuit of South-Central Labrador. Key elements in the agreement address environmental protocols and protection for matters of historic values. The agreement highlights hiring and business opportunities for NunatuKavut members and surrounding communities, and Search Minerals' commitment to make an annual payment to the NCC. Search Minerals also reports that it has held meetings with local community councils in St. Lewis, Port Hope Simpson, and Mary's Harbour, and made presentations to local groups in Goose Bay and Port Hope Simpson.

### MINE CLOSURE REQUIREMENTS

#### REGULATORY REQUIREMENTS

The Rehabilitation and Closure Plan is a provincial requirement of the Newfoundland and Labrador Mining Act, Chapter M-15.1, Sections (8), (9), and (10). Under the Mining Act, the "Rehabilitation and Closure Plan" is defined as a plan which describes the process of rehabilitation of a project at any stage of the project up to and including closure. Rehabilitation is defined as measures taken to restore the property as close as is reasonably possible to its former use or condition or to an alternate use or condition that is considered appropriate and acceptable by the Department of Natural Resources.



#### REHABILITATION AND CLOSURE PLAN SUBMISSION AND REVIEW

A formal Rehabilitation and Closure Plan is required to obtain approval for project development under the Mining Act. This plan is required to be submitted with or immediately following the submission of the Project Development Plan and provides the basis for the establishment of the Financial Assurance for the Project. The Mining Act requirements will only be reviewed by NLDNR following release of the project from Environmental Assessment and the review and approval process can typically take four months to one year.

The Rehabilitation and Closure Plan is directly linked to mine development and operation over the life of a mine and therefore must be considered a "live" document. It is common practice in the industry to review and revise the Rehabilitation and Closure Plan throughout the development and operational stages of the Project. The process of reviewing and updating the Plan commonly occurs on a five year cycle after the start of operations, however, the review cycle is typically established on a site by site basis. The final review of the Rehabilitation and Closure Plan generally occurs once the mine closure schedule is known (typically 12 months or more before end of mining). This final review forms a Closure Plan which defines in detail the actions necessary to achieve the Rehabilitation and Closure objectives and requirements. This Plan utilizes the actual site conditions and knowledge of the operation of the site and can therefore provide specific reference to activities and goals.

#### DESIGN AND IMPLEMENTATION

#### **OBJECTIVES OF THE REHABILITATION AND CLOSURE PLAN**

There are three stages of rehabilitation activity that occur over the life of a mine:

- 1. Progressive rehabilitation
- 2. Closure rehabilitation
- 3. Post closure monitoring and treatment

Progressive rehabilitation is considered to include rehabilitation completed, where possible or practical, throughout the mine operation stage, prior to closure. This would include activities that would contribute to the rehabilitation effort that would otherwise be completed upon cessation of mining operations (closure rehabilitation). Closure rehabilitation would include the measures, remaining after progressive rehabilitation activities, required to fully restore or reclaim the property as close as reasonably possible to its former condition or to an approved alternate condition. This would include demolition and removal of site infrastructure,



vegetation, and all other activities required to achieve the requirements and goals detailed in the Program.

Upon completion of the closure rehabilitation activities, a period of 'post-closure monitoring' is then required to ensure that the rehabilitation activities have been successful in achieving the prescribed goals. At this stage of rehabilitation, some treatment requirements may continue until the natural baseline conditions are restored and these conditions would then persist without need for additional treatment. Once it can be demonstrated that practical rehabilitation of the site has been successful, the site should be closed-out or released by the Regulatory authority and the land relinquished to the Owner or the Crown.

The overall objectives proposed for the Project site should include:

- Restoration of the health and fertility of the land to a self-sustaining, natural state
- Provision of an agreeable habitat for wildlife (including fish) in a balanced and maintenance free ecosystem
- Creation of a landscape which is visually acceptable and compatible with surrounding terrain
- Mitigation and control to within acceptable levels, the potential sources of pollution, fire risk, and public liability
- Outline and undertake the studies and/or planning to be completed during the operations period to allow for detailed Closure planning to proceed without delay at the cessation of mining
- Provide a safe environment for long term public access

The natural and existing characteristics of the site which provide the basis for the Plan design include physical stability and chemical stability.

#### PHYSICAL STABILITY

The closure plan must address the physical stability aspect of the mine site components which remain after operations have ceased. In the case of the Foxtrot Project, these components will likely include the open pit, waste dumps, tailings containment dams, overflow channels, and construction features associated with buildings and site infrastructure. The closure plan must consider the deterioration of site components over the



long term, by perpetual forces such as precipitation, wind, chemical weathering, and seismic events.

#### CHEMICAL STABILITY:

It is necessary to ensure long-term chemical stability of the rehabilitated mine site. Design of the closure plan must contain appropriate methods to ensure that on-site water, drainage, and surface run-off from the site meet acceptable water quality standards.

#### NATURAL AESTHETIC REQUIREMENTS

Visual impact of the mine site is an important consideration in terms of its existing noncompatibility with the surrounding landscape. The Plan will ultimately result in the removal and/or capping, and vegetation of the majority of the physical features and structures associated with operations.

#### VEGETATION AND WILDLIFE

Closure plan design must ensure that vegetation will be self-sustaining over the long term by being compatible with on-site soil and local climatic conditions. Establishment of vegetation should facilitate the natural recovery of the area for use by local wildlife.

Closure plan should ensure that disturbed areas of the site requiring rehabilitation, such as roadways, building foundation areas, storage pads and storage area bases, are suitably prepared either by scarification to loosen the soil, and/or loosened and covered with a cap of local till prior to vegetation. Concrete structures and foundations will be removed or buried under a suitable cover of till to permit vegetation growth.

Vegetation will be established through proper site preparation and encouragement of natural vegetation or planting. The selected method will depend upon location of the disturbed area, anticipated time for natural succession and the requirement for immediate erosion and sedimentation control through provision of a vegetation cover. In all cases, the primary objective of vegetation is to stabilize the soil against erosional forces of both wind and water, and provide a naturally sustainable surface cover.

#### WATER MANAGEMENT

The closure plan will consider water management issues related to:



- Control and mitigation of drainage issues from surface waste materials
- The long term fate of discharges of process water from the mill, drainage from the mine, sanitary sewage, and other wastewater from the site infrastructure following closure of the mine
- Control and mitigation of discharge water from the mine tailings disposal area following closure of the mine
- Site drainage and surface run-off for the mine site to control erosion, sedimentation, and the degradation of adjacent water courses.

The overall objective of the water management within the closure plan is to minimize any impact to the water resources on site and surrounding area. Integrated water management, including monitoring of surface and groundwater resources, will be used to ensure that water quality is maintained within guideline levels without creating the requirement for long term water treatment.

#### LONG TERM LAND USE

The closure plan must consider long term land use for the mine site that is sustainable and compatible with local and regional topography, soil, and climatic conditions.

Other land use options, such as agricultural and commercial/industrial are not considered viable at this time. However, natural vegetation of the site is expected to permit managed forestry activity and recreational activity to resume.

Final closure planning would be based on the current CCME soil quality guidelines to industrial classification.

While RPA has not completed a closure plan for the Project, an allowance of \$15 million has been input into the PEA cash flow. This estimate is based on comparison to similar projects.



## **21 CAPITAL AND OPERATING COSTS**

## **CAPITAL COST ESTIMATES**

#### SUMMARY

The mine, mill, and site infrastructure costs are summarized in Table 21-1. All costs in this section are in 2012 Canadian dollars unless otherwise specified.

Cost Area	Initial (C\$ million)	Sustaining (C\$ million)
Surface Infrastructure	34.4	13.3
OP Mining	2.1	0.1
UG Mining	0.0	59.9
Processing	70.0	3.1
Tailings	10.0	4.0
EPCM	17.5	9.7
Owner's/Indirect Costs	29.1	6.5
Contingency	48.9	24.4
Rehabilitation & Mine Closure	0.0	14.9
Working Capital	9.3	(9.3)
Total	221.2	126.6

# TABLE 21-1 CAPITAL COST SUMMARY Search Minerals Inc. – Foxtrot Project

Note: Numbers are rounded.

The initial capital cost and the sustaining capital are \$221.2 million and \$126.6 million, respectively. The working capital totals \$9.3 million and is fully recovered during the last year of the LOM. The total capital cost, including initial and sustaining, considered for the purpose of the economic analysis is \$347.8 million.

The underground mine capital cost required totals \$60 million and is considered to be a sustaining capital cost as it occurs after production has begun and to be funded by the open pit operations,

Capital costs were estimated using cost models, unit prices, suppliers' budget quotes, preliminary designs, general industry knowledge and experience, and other information from recent similar projects.



Engineering, procurement, and construction management (EPCM), indirects, and contingency for all capital cost components vary depending on cost area. In order to estimate these components specific factors were applied. A 15% and 25% factor was applied to initial capital in order to calculate EPCM and indirects, respectively. To estimate contingency, a 30% factor was applied to directs, indirects, and EPCM. The initial costs for EPCM and contingency are \$17.4 million and \$48.9 million, respectively, and indirects is \$29.1 million.

In order to calculate contingency for UG mine capital, a factor of 10% was applied to the total initial UG mine capital of \$60.0 million and an initial \$5.0 million in surface infrastructure, as that cost relates specifically to UG mine only. Therefore the total contingency for UG mine capital totals \$6.5 million.

#### SURFACE INFRASTRUCTURE

Surface infrastructure costs include general site preparation, construction of on-site roads, buildings construction, equipment and furniture, power distribution, fluid pumping networks, fuel storage and distribution, and fire protection. Surface infrastructure capital costs are shown in Table 21-2.

Cost Area	Initial (C\$ million)	Sustaining (C\$ million)
Public Road Access to St-Lewis	0.8	
St-Lewis Harbor upgrading	1.0	
St-Lewis Airport upgrading	2.5	
Site Preparation (Civil Work)	2.5	
Pumping Stations	2.5	
Administration and Services Office	5.0	
Garage, Shops, Warehouse and Cold Shed	6.0	
Accommodation Camp	7.0	3.0
Concrete Plant	1.5	
Paste Fill Plant		6.0
Mobile Equipment	0.7	
Site preparation Explosive Magazine	0.3	
Diesel tank and distribution	1.5	
Genset and Electrical Distribution	3.1	0.6

#### TABLE 21-2 SURFACE INFRASTRUCTURE CAPITAL Search Minerals Inc. – Foxtrot Project



Cost Area	Initial (C\$ million)	Sustaining (C\$ million)
OP/UG Surface Sustaining		3.7
Total	34.4	13.3

Note: Numbers are rounded.

For the LOM, sustaining surface infrastructure capital for both the OP and UG totals \$13.3 million.

#### MINING

Mining capital costs include the purchases of some mobile ancillary equipment for the OP operations (contract mining), plus the cost of the UG mining fleet / stationary equipment (owner-operated), OP site preparation, UG pre-production development, waste piles and ore stockpile preparation, ditches and hauling roads from open pit to ROM pad and waste dumps, and other related installations.

UG mine capital makes up a large portion of total mining capital cost. Estimates for equipment costs as well as development unit costs were based on internal databases for recent underground operations of a similar scale. Mining capital costs are summarized in Table 21-3.



Cost Area	Initial (C\$ million)	Sustaining (C\$ million)
Mining equipment	0.5	19.1
Open pit site preparation and ditches	0.4	
Waste pile site preparation and ditches	0.6	
Ore stockpile preparation and ditches	0.1	
Hauling roads and ditches	0.4	
Lateral development		24.6
Vertical development		3.1
Underground stationary equipment		4.3
Underground construction		4.3
Mobile Equipment and Mine Site		0.9
OP Mobile Equipment and Mine Site		0.1
UG Mobile Equipment and Infrastructure		4.5
Total	2.1	60.0

#### TABLE 21-3 MINING CAPITAL COST Search Minerals Inc. – Foxtrot Project

Note: Numbers are rounded.

The sustaining capital for OP and UG mining is estimated to be \$60.0 million over the LOM.

#### PROCESSING FACILITY

Total capital for the process facility, as shown in the process flowsheet (Section 17, Figure 17-1), is estimated to be \$70.0 million, as shown in Table 21-4. This estimate includes equipment, materials, electrical, and construction.

<b>TABLE 21-4</b>	PROCESSING FACILITY CAPITAL COST
Sea	arch Minerals Inc. – Foxtrot Project

Cost Area	Initial (C\$ million)	Sustaining (C\$ million)
Total	70.0	3.1

Note: Numbers are rounded.

Sustaining capital for the process facility totals \$3.1 million over the LOM.

#### TAILINGS STORAGE FACILITY

The TSF capital cost is estimated to be \$10 million as seen in Table 21-5 and is based on facilities with similar storage requirement.



#### TABLE 21-5 TAILINGS STORAGE FACILITY CAPITAL COST Search Minerals Inc. – Foxtrot Project

Cost Area	Initial (C\$ million)	Sustaining (C\$ million)
Total	10.0	4.0

Note: Numbers are rounded.

Sustaining capital for the TSF totals \$4 million over the LOM and includes \$2 million in each of year three and year seven.

#### **INDIRECT COSTS**

Indirect costs consist of warehouse inventory (spare parts) and mill start-up/commissioning. Owner's costs, which are included in indirects, are operating costs that occur during the preproduction period. They comprise general and administrative and labour expenses.

In order to estimate Indirect costs inclusive of the EPCM, a factor of 40% was applied to initial direct capital (EPCM accounting for 15%). From RPA's experience this factor represents a consistent proportion of indirect capital costs to direct capital costs for operating projects. Applying this factor, indirect cost plus EPCM are estimated to be \$62.8 million for total LOM. The same EPCM factor of 15% was applied to UG mine capital costs and totals \$9.7 million. The indirects factor of 25% was reduced to 10% for UG mine capital costs, which totals \$6.5 million. Total indirects capital cost plus EPCM is estimated to be \$62.7 million over the LOM.

#### **CLOSURE AND RECLAMATION**

A cost allowance of \$14.9 million was made for closure and reclamation of the tailings storage facility and mine site. It was assumed that equipment sales would pay for buildings demolition.

#### WORKING CAPITAL

Working capital was estimated to be approximately two months of first year operating costs.

#### EXCLUSIONS

The following is excluded from the capital costs estimate:



- Project financing and interest charges
- Escalation during the Project
- Permits, fees and process royalties
- Pre-feasibility and Feasibility studies
- · Environmental and social impact studies
- Any additional civil, concrete work due to the adverse soil condition and location
- Sales taxes
- Import duties and custom fees
- Cost of geotechnical and geomechanical investigations
- Cost of hydrogeology investigations
- Rock mechanics study
- Metallurgical testwork
- Exploration drilling
- Costs of fluctuations in currency exchanges
- Project application and approval expenses.

### **OPERATING COST ESTIMATES**

#### SUMMARY

Mine life average operating unit costs for the Project are shown in Table 21-6. Details on individual operating costs are provided further below.

Cost area	OP Unit Cost (C\$/t milled)	UG Unit Cost (C\$/t milled)	LOM Unit Cost (C\$/t milled)
Mining (Contractor/Owner)	26.75 <sup>(1)</sup>	58.58	47.45
Processing	70.00	70.00	70.00
G&A	11.11	19.36	16.54
Total operating cost	107.86	147.94	133.99

# TABLE 21-6 UNIT OPERATING COSTS SUMMARY Search Minerals Inc. – Foxtrot Project

Notes:

1. Derived from an OP mining cost of \$9.70/t moved on a contract basis.

2. Numbers are rounded.

#### MINING

Mine operating costs were estimated using cost models, unit prices, suppliers' budget quotes, general knowledge and experience, preliminary designs, and other information from recent similar projects.



The contractor unit mining cost for the OP mine was estimated to be \$9.70/t moved including a \$2.90/t (approximately 30% of the total) attributed to fixed cost for overhead, supervision, security, and profit.

#### PROCESSING FACILITY

Process operating costs are estimated at \$70.00 per tonne milled and is presented in Table 21-7. The cost is estimated from similar rare earth projects in similar geopolitical jurisdictions and includes consideration for diesel power generation, maintenance, reagents and other consumables.

#### TABLE 21-7 BREAKDOWN OF MILL OPERATING COST Search Minerals Inc. – Foxtrot Project

Cost area	Unit Cost (C\$/t milled)	
Total processing cost	70.00	

Note: Numbers are rounded.

#### GENERAL AND ADMINISTRATION

G&A comprise the cost of administration services and staff, as well as management, human resources for engineering, geology, environment, and construction. Also included are the room and board costs and the fly-in/fly-out traveling fees. The remaining costs are for material and supplies, some consultants, insurance and taxes, and communications. G&A has been estimated at \$6 million annually during OP operations and \$10 million annually during OP and UG combined operations (based on 540,000 tpa).

#### MANPOWER

Manpower estimates are based on typical manpower requirements for open pit and underground operations of similar scale, similar fly-in/fly-out schedule, and in similar geopolitical jurisdictions. Manpower estimates at peak requirements for the various units are shown in Table 21-8. Total manpower requirement is approximately 300 people when both OP and UG mining are taking place concurrently. During the last 12 months of OP operations only one 10 hour shift/seven days per week is required because of the lower stripping ratios.



#### TABLE 21-8 MANPOWER SUMMARY Search Minerals Inc. – Foxtrot Project

Unit	Operation	Maintenance	Supervision and Technical Services	Total
Administration	-	-	30	30
OP Mine	42	12	24	78
UG Mine	61	18	44	123
Surface	-	39 <sup>(1)</sup>	5	44
Process Plant	40	16	14	70

Notes:

1. Including manpower for the accommodation camp services.



## **22 ECONOMIC ANALYSIS**

The economic analysis contained in this report is based, in part, on Inferred Resources, and is preliminary in nature. Inferred Resources are considered too geologically speculative to have mining and economic considerations applied to them and to be categorized as Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. There is no certainty that the reserves development, production, and economic forecasts on which this PEA is based will be realized.

The Project economic evaluation is based on operating and capital costs as discussed previously. The Project evaluation work includes an economic summary, discounted cash flow analysis, as well as capital and operating costs estimates. RPA considers the PEA cost estimates to have an estimation accuracy of +35% to -15%.

The economic analysis shows that, at an average TREO net revenue basket price of \$38 per kilogram TREO, the project yields a pre-tax NPV at a 10% discount rate of \$220 million, and an after-tax NPV of \$133 million at the same discount rate. Total pre-tax and after-tax undiscounted cash flow is \$640 million and \$468 million, respectively.

The initial capital cost is \$221 million, and total LOM capital is approximately \$348 million, including approximately \$73 million in contingency capital. The average operating cost over the life of the project is approximately \$134 per tonne milled.

The Foxtrot Project will process 540,000 t annually at full production, at an average grade of 0.89% TREE, and produce an average of 3.8 million kilograms of payable rare earth elements per year.

Over the life of mine, the pre-tax and after-tax Internal Rate of Return (IRR) is 27.1% and 20.7%, respectively, with an after-tax payback period of approximately 4.6 years.



#### ECONOMIC CRITERIA

REVENUE

- 1,500 tonnes per day processing rate.
- Average REE recovery of 79%.
- Average TREO basket price of \$38 per kg.
- LREE Separation charge of \$5 per kg.
- HREE separation charge of \$30 per kg.
- Revenue is recognized at the time of production.

#### COSTS

- Pre-production period: two years.
- Mine life: ten years.
- Life of Mine production plan as summarized in Table 16-1.
- Mine life capital consists of \$221 million initial capital, \$127 million sustaining and closure capital, \$348 million total capital.
- Average operating cost over the mine life is \$134 per tonne milled.

#### TAXATION

- Federal tax rate of 15%.
- Provincial tax rate of 14%.
- All capital assumed to be depreciable on a units-of-production basis.
- No credits that may have been accumulated by Search Minerals have been applied.



#### TABLE 22-1 RPA AFTER-TAX CASH FLOW SUMMARY - OP / UG MINE Search Minerals Inc. - Foxtrot Project

OP Mining	Input	Units	Total/Avg.	-2 -1 1	2	3	4	5	6	7	8	9	10
Mined Mill Feed Stockpile		tonnes tonnes	1,860,000 -	490,000	540,000	540,000	290,000	-				-	
Ore Grade Mined Waste Mined Waste by Contractor		g/t Au tonnes tonnes	3,270,000	1,090,000	1,030,000	840,000	310,000	-	-	-	-	-	-
Total Material Moved		tonnes	5,130,000	1.580.000	1,570,000	1,380,000	600,000	-	-	-	-	-	-
Waste to Ore ratio			1.76	2.22	1.91	1.56	1.07						
UG Mining													
Mined Mill Feed		tonnes	3,460,000	-	-	-	250,000	540,000	540,000	540,000	540,000	540,000	510,000
Processing Feed to Mill		'000 tonnes	5,320	490		540	540	540	540	540	540	540	510
Head Grade		tpd		1,361.11	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00
Yttrium Lanthanum		ppm ppm	1,053.8 1,673.1	903.6 1,447.7	903.6 1,447.7	903.6 1,447.7	1,010.5 1,608.2	1,134.6 1,794.3	1,134.6 1,794.3	1,134.6 1,794.3	1,134.6 1,794.3	1,134.6 1,794.3	1,134.6 1,794.3
Cerium Praesodymium		ppm ppm	3,391.5 389.3	2,916.9 331.7	331.7	2,916.9 331.7	3,254.8 372.7	3,646.7 420.2	3,646.7 420.2	3,646.7 420.2	3,646.7 420.2	3,646.7 420.2	3,646.7 420.2
Neodymium Samarium		ppm ppm	1,455.2 264.0	1,231.7 221.4	1,231.7 221.4	1,231.7 221.4	1,390.8 251.7	1,575.3 286.9	1,575.3 286.9	1,575.3 286.9	1,575.3 286.9	1,575.3 286.9	1,575.3 286.9
Europium Gadolinium		ppm ppm	13.3 207.5	11.2 174.6		11.2 174.6	12.7 198.0	14.5 225.2	14.5 225.2	14.5 225.2	14.5 225.2	14.5 225.2	14.5 225.2
Terbium Dysprosium		ppm ppm	32.9 191.9	27.5 160.5		27.5 160.5	31.4 182.9	35.8 208.8	35.8 208.8	35.8 208.8	35.8 208.8	35.8 208.8	35.8 208.8
Holmium Erbium		ppm ppm	37.2 104.8	30.8 87.2	87.2	30.8 87.2	35.4 99.7	40.6 114.2	40.6 114.2	40.6 114.2	40.6 114.2	40.6 114.2	40.6 114.2
Thulium Ytterbium		ppm ppm	15.1 93.3	12.6 78.0	78.0	12.6 78.0	14.4 88.9	16.5 101.6	16.5 101.6	16.5 101.6	16.5 101.6	16.5 101.6	16.5 101.6
Lutetium LREE Grade		ppm ppm	13.8 7,173.1	11.5 6,149.4	11.5 6,149.4	11.5 6,149.4	13.2 6,878.2	15.1 7,723.4	15.1 7,723.4	15.1 7,723.4	15.1 7,723.4	15.1 7,723.4	15.1 7,723.4
HREE Grade Total REE Grade		ppm ppm	1,763.8 8,936.9	1,497.5 7,646.9	7,646.9	1,497.5 7,646.9	1,687.1 8,565.3	1,906.9 9,630.3	1,906.9 9,630.3	1,906.9 9,630.3	1,906.9 9,630.3	1,906.9 9,630.3	1,906.9 9,630.3
			19,485.3	16,643.6	16,643.6	16,643.6	18,666.6	21,012.9	21,012.9	21,012.9	21,012.9	21,012.9	21,012.9
Average Recovery Yttrium	79.5%	%	79.5%	79.5%		79.5%	79.5%	79.5%	79.5%	79.5%	79.5%	79.5%	79.5%
Lanthanum Cerium	81.9% 78.9%	% %	81.9% 78.9%	81.9% 78.9%	78.9%	81.9% 78.9%							
Praesodymium Neodymium	82.3% 77.7%	% %	82.3% 77.7%	82.39 77.79	77.7%	82.3% 77.7%							
Samarium Europium	80.1% 79.5%	%	80.1% 79.5%	80.19 79.59		80.1% 79.5%							
Gadolinium Terbium	78.6% 78.3%	% %	78.6% 78.3%	78.69 78.39		78.6% 78.3%							
Dysprosium Holmium	77.3% 77.5%	% %	77.3% 77.5%	77.3% 77.5%	77.3%	77.3% 77.5%							
Erbium Thulium	77.6% 77.8%	%	77.6%	77.69 77.89	77.6%	77.6% 77.8%							
Ytterbium	77.6% 77.7%	%	77.6%	77.69 77.79	77.6%	77.6% 77.7%							
Average	11.176	%	78.8%		11.170	11.170	11.170	11.170	11.170	11.170	11.170	11.170	11.170
Concentrate Weight Recovery Concentrate Tonnage	38.5%	'000 tonnes	2,047	38.5% 189	38.5% 208	38.5% 196							
Concentrate Grades Yttrium		ppm	2,177	1.867	1.867	1,867	2.088	2.344	2.344	2.344	2.344	2,344	2.344
Lanthanum Cerium		ppm	3,560	3,081 5,976	3,081	3,081	3,422 6.669	3,818	3,818	3,818	3,818	3,818	3,818 7,472
Praesodymium		ppm ppm	6,949 832	709	709	709	797	898	898	898	898	898	898
Neodymium Samarium		ppm ppm	2,938 549	2,487 461	2,487 461	2,487 461	2,808 524	3,181 597	3,181 597	3,181 597	3,181 597	3,181 597	3,181 597
Europium Gadolinium		ppm ppm	28 424	23 356	23 356	23 356	26 404	30 460	30 460	30 460	30 460	30 460	30 460
Terbium Dysprosium		ppm ppm	67 386	56 323		56 323	64 368	73 420	73 420	73 420	73 420	73 420	73 420
Holmium Erbium		ppm ppm	75 211	62 176	176	62 176	71 201	82 230	82 230	82 230	82 230	82 230	82 230
Thulium Ytterbium		ppm ppm	31 188	25 157	25 157	25 157	29 179	33 205	33 205	33 205	33 205	33 205	33 205
Lutetium		ppm	28	23	23	23	27	30	30	30	30	30	30
Material Recovered Yttrium		kg	4,457,919	352,064	387,989	387,989	433,890	487,176	487,176	487,176	487,176	487,176	460,110
Lanthanum Cerium		kg kg	7,289,045 14,226,931	580,906 1,126,988	640,182 1,241,987	640,182 1,241,987	711,156 1,385,861	793,450 1,552,728	793,450 1,552,728	793,450 1,552,728	793,450 1,552,728	793,450 1,552,728	749,370 1,466,466
Praesodymium Neodymium		kg kg	1,703,704 6,015,931	133,716 469,005	147,360 516,863	147,360 516,863	165,575 583,627	186,677 661,049	186,677 661,049	186,677 661,049	186,677 661,049	186,677 661,049	176,306 624,324
Samarium Europium		kg kg	1,124,766 56,445	86,881 4,364	95,746 4,809	95,746 4,809	108,850 5,453	124,072 6,226	124,072 6,226	124,072 6,226	124,072 6,226	124,072 6,226	117,180 5,880
Gadolinium Terbium		kg kg	867,306 137,028	67,216 10.548	74,074 11,625	74,074 11,625	84,002 13,273	95,541 15,133	95,541 15,133	95,541 15,133	95,541 15,133	95,541 15,133	90,233 14,292
Dysprosium Holmium		kg kg	789,539	60,816 11.699	67,022 12,893	67,022 12,893	76,376 14,819	87,191 16,995	87,191 16,995	87,191 16,995	87,191 16,995	87,191 16,995	82,347 16.051
Erbium Thulium		kg kg	432,567 62,651	33,163 4,804		36,547 5,294	41,786 6,050	47,864 6,932	47,864 6,932	47,864 6,932	47,864 6,932	47,864 6,932	45,205 6,547
Ytterbium		kg	385,438	29,664	32,691	32,691	37,260	42,583	42,583	42,583	42,583	42,583	40,217
Lutetium Total Material Recovered		kg kg ∞∕	57,237 37,759,839	2,976,213	3,279,908	4,826 3,279,908	5,539 3,673,516	6,336 4,129,956	6,336 4,129,956	6,336 4,129,956	6,336 4,129,956	6,336 4,129,956	5,984 3,900,514
TREE Con Grade		%	1.84%	1.589	1.58%	1.58%	1.77%	1.99%	1.99%	1.99%	1.99%	1.99%	1.99%
Payable REEs Yttrium		kg	4,457,919	352,064	387,989	387,989	433,890	487,176	487,176	487,176	487,176	487.176	460,110
Lanthanum Cerium		kg kg	7,289,045 14,226,931	580,906 1,126,988	640,182	640,182 1,241,987	711,156 1,385,861	793,450 1,552,728	793,450 1,552,728	793,450 1,552,728	793,450 1,552,728	793,450 1,552,728	749,370 1,466,466
Praesodymium		kg	1,703,704	133,716	147,360	147,360	165,575	186,677	186,677	186,677	186,677	186,677	176,306
Neodymium Samarium		kg kg	6,015,931 1,124,766	469,005 86,881	516,863 95,746	516,863 95,746	583,627 108,850	661,049 124,072	661,049 124,072	661,049 124,072	661,049 124,072	661,049 124,072	624,324 117,180
Europium Gadolinium		kg kg	56,445 867,306	4,364 67,216	4,809 74,074	4,809 74,074	5,453 84,002	6,226 95,541	6,226 95,541	6,226 95,541	6,226 95,541	6,226 95,541	5,880 90,233
Terbium Dysprosium		kg kg	137,028 789,539	10,548 60,816	11,625 67,022	11,625 67,022	13,273 76,376	15,133 87,191	15,133 87,191	15,133 87,191	15,133 87,191	15,133 87,191	14,292 82,347
Holmium Erbium		kg kg	432,567	33,163	-	36,547	41,786	47,864	47,864	47,864	47,864	47,864	45,205
Thulium Ytterbium		kg kg	385,438	- 29,664	32,691	32,691	37,260	42,583	42,583	42,583	42,583	42,583	40,217
Lutetium Total Payable Material		kg kg	37,486,618	2,955,331	-	3,256,896	3,647,108	4,099,691	4,099,691	4,099,691	4,099,691	4,099,691	3,871,931
		,	,	,,									



Market Prices		Units	Total/Avg.	-2	-	1	2	3	4	5	0		U	, v	10
Y <sub>2</sub> O <sub>3</sub>		US\$/kg	\$ 20.00		s	20	\$ 20	\$ 20 5	\$ 20 \$	20 \$	20	\$ 20	\$ 20 \$	\$ 20	\$ 20
La <sub>2</sub> O <sub>3</sub>		US\$/kg	\$ 10.00		s					10 \$			\$ 10 \$		\$ 10
CeO2		US\$/kg	\$ 5.00		s					5 \$			\$5\$		\$ 5
Pr <sub>6</sub> O <sub>11</sub>		US\$/kg	\$ 75.00		S			\$ 75		75 \$			\$ 75 \$		\$ 75
Nd <sub>2</sub> O <sub>3</sub> Sm <sub>2</sub> O <sub>3</sub>		US\$/kg US\$/kg	\$ 75.00 \$ 9.00		s			\$75 \$9		75 \$ 9 \$			\$75 \$ \$9 \$		\$ 75 \$ 9
Eu <sub>2</sub> O <sub>3</sub>		US\$/kg	\$ 500.00		s					500 \$			\$ 500 \$		\$ 500
Gd <sub>2</sub> O <sub>3</sub>		US\$/kg	\$ 30.00		s	30	5 30	\$ 30 \$	\$ 30 \$	30 \$	30	\$ 30	\$ 30 \$	\$ 30	\$ 30
Tb <sub>4</sub> O <sub>7</sub>		US\$/kg	\$ 1,500.00		s			• •,••••	,	1,500 \$	,	. ,	\$ 1,500 \$		\$ 1,500
Dy <sub>2</sub> O <sub>3</sub>		US\$/kg US\$/kg	\$ 750.00		s			\$ 750 \$ \$ 65 \$		750 \$ 65 \$			\$750 \$ \$65 \$		\$ 750 \$ 65
Ho <sub>2</sub> O <sub>3</sub> Er <sub>2</sub> O <sub>3</sub>		US\$/kg US\$/kg	\$ - \$ 40.00		3			s oo: \$ 40 5		40 \$			s 603 \$405		\$ 65
Tm <sub>2</sub> O <sub>3</sub>		US\$/kg	\$ -		s					2,000 \$			\$ 2,000 \$		\$ 2,000
Yb <sub>2</sub> O <sub>3</sub>		US\$/kg	\$ 50.00		s					50 \$			\$ 50 \$		\$ 50
Lu <sub>2</sub> O <sub>3</sub>		US\$/kg	\$-		s	320	320	\$ 320	\$ 320 \$	320 \$	320	\$ 320	\$ 320 \$	\$ 320	\$ 320
Gross Revenue															
H Yttrium L Lanthanum		US\$ 000s US\$ 000s	\$ 113,226 \$ 85,484		S			\$ 9,854 \$ 7,508		12,374 \$ 9,305 \$			\$ 12,374 \$ \$ 9,305 \$		\$ 11,686 \$ 8,788
L Cerium		US\$ 000s	\$ 87,380		s	6,922	7,628	\$ 7,628	\$ 8,512 \$	9,537 \$	9,537	\$ 9,537	\$ 9,537 \$	\$ 9,537	\$ 9,007
L Praesodymium L Neodymium		US\$ 000s US\$ 000s	\$ 154,377 \$ 526,266		S			\$ 13,353 \$ 45,215		16,915 \$ 57,828 \$			\$ 16,915 \$ \$ 57,828 \$		\$ 15,976 \$ 54,615
L Samarium		US\$ 000s	\$ 11,739		s	907	999	\$ 999 5	\$ 1,136 \$	1,295 \$	1,295	\$ 1,295	\$ 1,295 \$	\$ 1,295	\$ 1,223
H Europium H Gadolinium		US\$ 000s US\$ 000s	\$ 32,680 \$ 29,990		S			\$ 2,784 \$ 2,561		3,605 \$ 3,304 \$			\$ 3,605 \$ \$ 3,304 \$	,	\$ 3,404 \$ 3,120
H Terbium		US\$ 000s	\$ 241,754		s	18,610	20,509	\$ 20,509	\$ 23,417 \$	26,699 \$	26,699	\$ 26,699	\$ 26,699 \$	\$ 26,699	\$ 25,216
H Dysprosium H Holmium		US\$ 000s US\$ 000s	\$ 679,607 \$ -		S			\$ 57,690	\$ 65,742 \$	75,051 \$ - \$	75,051		\$75,051 \$-\$		\$ 70,882 \$ -
H Erbium		US\$ 000s	\$ 19,785		s	1,517		\$ 1,672	\$ 1,911 \$	2,189 \$	2,189		\$ 2,189 \$		\$ 2,068
H Thulium H Ytterbium		US\$ 000s US\$ 000s	\$ - \$ 21,945		S			\$-\$ \$1,861 \$		- \$ 2,424 \$			\$-\$ \$2,424 \$		\$ - \$ 2,290
H Lutetium		US\$ 000s	\$-		s		5 - 3	\$- \$	5-\$	- \$	-	\$ -	\$-\$	s -	\$-
Total Gross Revenue		US\$ 000s	\$ 2,004,232		s	155,742	5 171,634	\$ 171,634 \$	\$ 194,320 \$	220,525 \$	220,525	\$ 220,525	\$ 220,525 \$	\$ 220,525	\$ 208,274
Exchange Rate	1.0	\$C/\$US				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Gross Revenue		C\$'000s	\$ 2,004,232			155,742	171 634	\$ 171.634	\$ 194,320 \$	220.525	220 525	\$ 220 525	\$ 220.525	\$ 220 525	\$ 208 274
		00000	÷ 2,004,232		•	100,742		,004 .	ο.,οzο φ	LL0,020 Ø	220,020		- 220,020 4	, 220,020	\$ 100,214
Offsite Costs LREE Separation	\$5	C\$'000s	\$ 210,326		s	16,610	18,305	\$ 18,305 \$	\$ 20,472 \$	22,985 \$	22,985	\$ 22,985	\$ 22,985 \$	\$ 22,985	\$ 21,708
HREE Separation	\$30	C\$'000s	\$ 93,494		s	7,210	7,945	\$ 7,945	\$ 9,045 \$	10,320 \$	10,320	\$ 10,320	\$ 10,320 \$	\$ 10,320	\$ 9,747
Product Transportation Total		C\$'000s C\$'000s	\$ - \$ 303,820		s					- \$ 33,305 \$			\$-\$ \$33,305 \$		\$ - \$ 31,455
									,						,
Offsite Costs per Kg Offsite Costs to Gross Revenue		C\$/Kg	\$ 8 15%		s	8 15%	\$ 8 15%	\$8: 15%	\$8\$ 15%	8 \$ 15%	8 15%	\$ 8 15%	\$8\$ 15%	\$ 8 15%	\$ 8 15%
	From Proforma From Proforma	C\$'000s C\$'000s				-	-		-		-		-		
						131,922	445 004	*		187,220 \$	407.000	6 407 000	* 407.000	407.000	\$ 176,819
Net Revenue NSR		C\$'000s C\$/t	\$ 1,700,413 \$ 319.63		<b>\$</b> S			\$ 145,384 \$ 269.23	\$ 164,803 \$ \$ 305.19 \$				\$ 187,220 \$ \$ 346.70 \$		\$ 346.70
TREO Net Revenue Basket Price			\$ 38		ş	37	37	\$ 37 \$	\$ 37 \$	38 \$	38	\$ 38	\$ 38 \$	\$ 38	\$ 38
Operating Costs															
OP Mining by Contractor UG Mining by owner		C\$/t mined C\$/t mined			S			\$					\$ 9.70 \$ \$ 58.58 \$		\$ 9.70 \$ 58.58
Total Mining		C\$/t milled	\$ 47.45		\$	31.28	28.20	\$ 24.79 \$	\$ 37.90 \$	58.58 \$	58.58	\$ 58.58	\$ 58.58 \$	58.58	\$ 58.58
Processing - Concentration G&A (OP followed by UG)	\$ 70.00	C\$/t milled C\$/t milled	\$ 70.00 \$ 16.54		s			\$ 70.00 \$ \$ 11.11 \$		70.00 \$ 18.52 \$			\$ 70.00 \$ \$ 18.52 \$		\$ 70.00 \$ 19.61
Total Operating Costs		C\$/t milled	\$ 133.99		ŝ			\$ 105.90					\$ 147.10 \$		\$ 148.19
Mining - Open Pit		C\$ '000s	\$ 49.761		s	15.326	15.229	\$ 13.386	\$ 5.820 \$	- s		s -	s - s		s -
Mining - Underground		C\$ '000s	\$ 202,687		s	- 5	-	\$	\$ 14,645 \$	31,633 \$	31,633	\$ 31,633	\$ 31,633 \$	\$ 31,633	\$ 29,876
Processing - Concentration G&A (OP followed by UG)	\$ 6,000	C\$ '000s C\$ '000s	\$ 372,400 \$ 88,000		ş				\$ 37,800 \$ \$ 10,000 \$	37,800 \$ 10,000 \$			\$ 37,800 \$ \$ 10,000 \$		\$ 35,700 \$ 10,000
Total Operating Costs	\$ 0,000	C\$ '000s	\$ 712,848		ŝ			\$ 57,186			79,433		\$ 79,433 \$		\$ 75,576
Operating Margin		C\$ '000s	\$ 987.565			76 296	86 355	\$ 88 198	\$ 96,538 \$	107 787 \$	107 787	\$ 107 787	\$ 107 787	\$ 107 787	\$ 101 243
		00 0000	• 001,000			10,200		• •••,•••	¢ 00,000 ¢	101,101		•,	• 101,101		• 101,240
Capital Cost Surface Infrastructure		C\$ '000s	\$ 47,667	\$ 10,313 \$	24,063 \$	3,344	344	\$ 6,964 \$	\$ 440 <b>\$</b>	440 \$	440	\$ 440	\$ 440 \$	\$ 440	
OP Mining		C\$ '000s	\$ 2,165	\$ 570 \$	1,505 \$	16	5 37	\$ 37							
UG Mining Processing		C\$ '000s C\$ '000s	\$ 59,857 \$ 73,080	\$ 28,000 \$	\$ 42,000	8,313		\$ 27,712 \$ 385		1,201 \$ 385 \$		\$ 1,201 \$ 385	\$277 \$ \$385 \$		
Tailings		C\$ '000s	\$ 14,000	\$ 4,000 \$	6,000			\$ 2,000		V		\$ 2,000			
EPCM Indirects	15% 25%	C\$ '000s C\$ '000s	\$ 27,224 \$ 35,613	\$ 6,432 \$ \$ 10,721 \$				\$ 5,150 \$ 3,000							
Contingency	30%	C\$ '000s	\$ 73,299	\$ 18,011 \$	30,898 \$	4,353	5 7,292	\$ 12,744							
Env., Progressive Rehab. & Mine Closure Working Capital		C\$ '000s C\$ '000s	\$ 14,900 \$ -	s	\$ 9,271	100	\$ 100	\$ 100 \$	\$ 100 \$	100 \$	100	\$ 100	\$ 100 \$	\$ 100	\$ 14,000 \$ (9,271)
Total Initial Capital		C\$ '000s	\$ 221,210	\$ 78,047 \$	143,164										, (0,2,1)
Total Capital Cost		C\$ '000s	\$ 347,804	\$ 78,047 \$	143,164 \$	19,324	32,466	\$ 58,092	\$ 1,202 \$	2,126 \$	1,202	\$ 4,126	\$ 1,202 \$	\$ 2,126	\$ 4,729
Pre-Tax Cash Flow Pre-Tax Cash Flow		C\$ '000s	\$ 639,761						\$ 95,336 \$						
Cumulative				\$ (78,047) \$	(221,210) \$	(164,237)	\$ (110,349)	\$ (80,243)	\$ 15,093 \$	120,754 \$	227,339	\$ 331,000	\$ 437,585 \$	\$ 543,246	\$ 639,761
Taxes Payable		C\$ '000s	\$ 172,096	\$-\$	- \$	15,594	16,979	\$ 15,850	\$ 17,115 \$	18,954 \$	18,894	\$ 18,619	\$ 18,518 \$	\$ 18,238	\$ 13,335
After-Tax Cash Flow															
After-Tax Cash Flow Cumulative		C\$ '000s	\$ 467,665	\$ (78,047) \$ \$ (78,047) \$	(143,164) \$	41,378	36,910	\$ 14,256 \$	\$ 78,221 \$ \$ (50,445) \$	86,707 \$	87,691	\$ 85,042 \$ 208.000	\$ 88,067 \$ \$ 297,063 \$		
Gunulduve				\$ (/8,04/) \$	(221,21U) \$	(1/9,832)	(142,922)	φ (120,000) 3	≠ (JU,445)\$	JU,203 \$	120,904	φ ∠U8,990	φ 201,003 \$	≠ J04,486	φ <del>4</del> 07,005
Project Economics															
Pre-Tax NPV	5%	C\$ '000s	\$ 379,104												
Pre-Tax NPV Pre-Tax NPV	8% 10%	C\$ '000s C\$ '000s	\$ 289,916 \$ 219,636												
	.070														
Pre-Tax IRR		%	27.114%												
Pre-Tax Payback Period		Years	3.8	-	-	-	-	Payback	-		-		-		-
				-	-	-	-	3.8	-	-	-	-	-	-	-
After-Tax NPV	5%	C\$ '000s	\$ 258,756												
After-Tax NPV After-Tax NPV	8% 10%	C\$ '000s C\$ '000s	\$ 175,797 \$ 132,603												
After-Tax IRR		%	20.748%												
After-Tax Payback Period		Years	4.6	-	-	-	-	-	Payback	-	-	-	-		-
				-	-	-	-	-	4.6	-	-	-	-	-	-



#### SENSITIVITY ANALYSIS

Project risks can be identified in both economic and non-economic terms. Key economic risks were examined by running cash flow sensitivities on:

- Head Grade;
- Recovery;
- Rare Earth Oxide Prices;
- Operating Cost Per Tonne Milled, and
- Initial Capital Cost.

The rare earth elements price sensitivity is based on results using a rare earth oxide base case price forecast, which equates to a \$38/kg net revenue basket price.

The pre-tax and after-tax NPV (at 10%) and IRR sensitivity analysis has been calculated for -15% to +35% variations, with the exception of head grade, which has a range of -20% to +20%, and recovery, which has a range of -15% to +20%. The sensitivities are shown in Table 22-2 and Figures 22-1 and 22-2. The NPV is most sensitive to rare earth oxide prices, followed by head grade and metallurgical recovery.

		Sensitivit	ty to Head Grade				
Factor	TREE	NPV @10%	NPV @10%	IRR	IRR		
	%	Pre-Tax	After-Tax	Pre-Tax	After-Tax		
Base	0.89%	\$219,636	\$132,603	27%	21%		
0.80	0.71%	\$51,903	\$9,990	15%	11%		
0.90	0.80%	\$135,769	\$71,296	21%	16%		
1.00	0.89%	\$219,636	\$132,603	27%	21%		
1.10	0.98%	\$303,503	\$193,910	33%	25%		
1.20	1.07%	\$387,369	\$255,216	38%	29%		
	Sensitivity to Recovery						
Factor	REC	NPV @10%	NPV @10%	IRR	IRR		
	%	Pre-Tax	After-Tax	Pre-Tax	After-Tax		
Base	79%	\$219,636	\$132,603	27%	21%		
0.85	67%	\$93,836	\$40,643	18%	14%		

\$86,623

\$132,603

\$193,910

\$255,216

23%

27%

33%

38%

17%

21%

25%

29%

# TABLE 22-2SENSITIVITY ANALYSISSearch Minerals Inc. – Foxtrot Project

\$156,736

\$219,636

\$303,503

\$387,369

73%

79%

87%

95%

0.93

1.00

1.10

1.20



		Sensitivity to	Market Price		
Factor	Basket	NPV @10%	NPV @10%	IRR	IRR
	C\$/t	Pre-Tax	After-Tax	Pre-Tax	After-Tax
Base	\$38	\$219,636	\$132,603	27%	21%
0.85	\$31	\$71,324	\$24,187	16%	12%
0.93	\$34	\$145,480	\$78,395	22%	17%
1.00	\$38	\$219,636	\$132,603	27%	21%
1.18	\$45	\$392,666	\$259,088	38%	30%
1.35	\$53	\$565,696	\$385,573	48%	38%

#### Sensitivity to Operating Cost

Factor	Opex	NPV @10%	NPV @10%	IRR	IRR
	C\$/t	Pre-Tax	After-Tax	Pre-Tax	After-Tax
Base	\$134	\$219,636	\$132,603	27%	21%
0.85	\$114	\$272,873	\$171,709	31%	24%
0.93	\$124	\$246,254	\$152,156	29%	22%
1.00	\$134	\$219,636	\$132,603	27%	21%
1.18	\$157	\$157,527	\$86,979	23%	17%
1.35	\$181	\$95,417	\$41,355	18%	14%

#### Sensitivity to Initial Capital Cost

Factor	Capex C\$'000s	NPV @10% Pre-Tax	NPV @10% After-Tax	IRR Pre-Tax	IRR After-Tax
Base	\$221,210	\$219,636	\$132,603	27%	21%
0.85	\$188,029	\$248,026	\$160,993	32%	25%
0.93	\$204,619	\$233,831	\$146,798	29%	23%
1.00	\$221,210	\$219,636	\$132,603	27%	21%
1.18	\$259,922	\$186,514	\$99,481	23%	17%
1.35	\$298,634	\$153,392	\$66,359	20%	14%



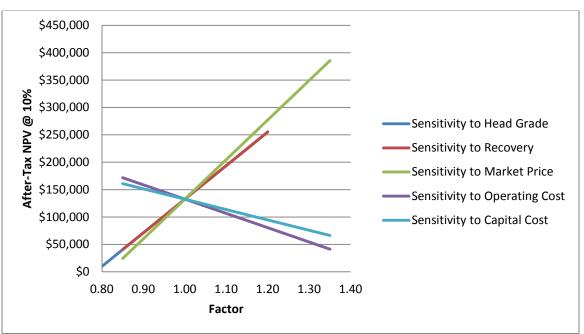
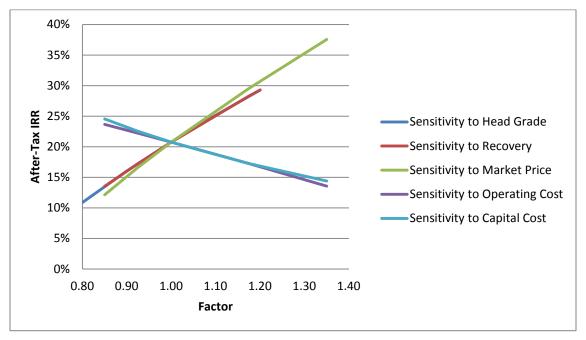


FIGURE 22-1 AFTER-TAX NPV SENSITIVITY ANALYSIS





#### CURRENT PRICE SENSITIVITY

RPA conducted a rare earth oxide price sensitivity using a current price forecast (Q1 2013), which equates to a \$44/kg net revenue basket price. The current prices used to analyze the model are presented in Table 22-3.



Search Minerals Inc. – Foxtrot Project						
Rare Earth Oxide	FOB China Q1 2013 Spot* (US\$/kg)					
La <sub>2</sub> O <sub>3</sub>	11					
$Ce_2O_3$	11					
$Pr_2O_3$	80					
$Nd_2O_3$	78					
$Sm_2O_3$	26					
$Eu_2O_3$	1,500					
$Gd_2O_3$	50					
Tb <sub>4</sub> O <sub>7</sub>	1,230					
Dy <sub>2</sub> O <sub>3</sub>	700					
Ho <sub>2</sub> O <sub>3</sub>	-					
$Er_2O_3$	75					
$Tm_2O_3$	-					
Yb <sub>2</sub> O <sub>3</sub>	58					
$Lu_2O_3$	-					
$Y_2O_3$	38					

#### TABLE 22-3 CURRENT SPOT PRICES Search Minerals Inc. – Foxtrot Project

\* Source: Metal-Pages.com

At current prices, the undiscounted pre-tax cash flow in this case totals \$926 million. The pretax IRR is 36%, the after-tax IRR is 28%, and the NPVs are as follows:

The pre-tax NPV at varying discount rates is as follows:

- \$361 million at a 10% discount rate
- \$457 million at an 8% discount rate
- \$577 million at a 5% discount rate

The after-tax NPV at varying discount rates is as follows:

- \$236 million at a 10% discount rate
- \$294 million at an 8% discount rate
- \$403 million at a 5% discount rate



# **23 ADJACENT PROPERTIES**

There are currently no adjacent properties looking for rare earth elements.



# 24 OTHER RELEVANT DATA AND INFORMATION

No additional information or explanation is necessary to make this Technical Report understandable and not misleading.



### **25 INTERPRETATION AND CONCLUSIONS**

The PEA is based on the previously disclosed September 30, 2012 Mineral Resource estimate and evaluates a combined open pit and underground mining approach along with processing of 1,500 tpd by gravity, magnetic separation, and flotation concentration, followed by acid baking and water leaching, producing a mixed rare earth oxalate concentrate.

The PEA indicated that positive economic results can be obtained for the Foxtrot Project, and that further advancement of the Project is merited.

The LOM plan for the Project indicated that 5.3 Mt, at an average grade of 0.89% TREE, could be mined over 10 years, including open pit mining for the first 3.5 years, and underground mining thereafter. REE production was projected to total 38 million kg.

Specific conclusions by area are as follows:

#### GEOLOGY AND MINERAL RESOURCE CONCLUSIONS

The Mineral Resource estimate uses a cut-off grade of 130 ppm dysprosium. This reporting cut-off grade, which corresponds to 150 ppm for the oxide form,  $Dy_2O_3$ , produces an NSR value considerably higher than the anticipated cost of mining and processing. RPA considers that material with more than 130 ppm Dy meets the requirement of the CIM Definition Standards that Mineral Resources have a reasonable prospect of economic extraction.

Indicated Mineral Resources are estimated to total 9.23 Mt at 0.88% TREE (or 1.07% TREO), and Inferred Mineral Resources are estimated to total 5.17 Mt at 0.77% TREE (or 0.93% TREO).

A high-grade core (HGC) within the Mineral Resource was identified, corresponding to the largest and most consistent felsic band within the deposit. It was wireframed separately to allow mine designs to focus on selective mining of the highest grade portions of the deposit. HGC Indicated Resources are estimated to total 3.42 Mt at 1.04% TREE, and HGC Inferred Resources are estimated to total 0.66 Mt at 1.03% TREE.



With the Central Area of the deposit still open at depth, future resource estimates will likely report higher tonnages, both of Indicated and Inferred Resources. The grade of the deeper resource currently appears to be similar to the shallower resource, so future resource estimates are likely to have similar grades to the current resource estimate, but with higher tonnages.

There is potential for the delineation of additional resources at depth along strike, both east and west of the Central Area, however, HGC is absent near surface to the east and west along strike. The Phase III drilling targeted the HGC in the Central Area at depth; future drilling should include deeper holes on the sections immediately adjacent to the Central Area. The recent drilling indicates that the most promising sections appear to be those immediately to the east (down plunge) of the Central Area.

Within the Central Area, the rare-earth mineralization with economic potential is hosted in bands of felsic volcanic rocks that are inter-layered with mafic volcanic rocks. The first three phases of drilling have confirmed that it is possible to visually distinguish the felsic mineralization from the mafic waste. Statistical analysis of the multi-element ICP data for the resource estimation studies also suggests that it is possible to identify the felsic material using automated classification based on major-element chemistry. The combination of a characteristic visual appearance and a characteristic multi-element signature creates many possibilities for efficient and effective grade control. There are optical and chemical sorting technologies that should be very effective at segregating the higher-grade material from the mixed volcanic rocks.

Statistical analysis of the assay data from the felsic samples shows that there is a bi-modal distribution in the felsic bands. With the higher-grade population having grades about five times those of the lower-grade population, it may be possible to further upgrade the run-of-mine material into an even higher-grade product in fewer ore tonnes. To realize this possibility, a better understanding of the geology and mineralogy of the two felsic populations is needed.

The very strong correlations between the rare earth elements will simplify grade control. The entire rare earth suite of elements occurs as a single package at Foxtrot, and a potential future mining operation will not have to contend with the complications of having to mine material that has low grades of some REEs in order to recover higher grades of other REEs.



#### MINING

In the previous PEA (dated July 15, 2012), RPA investigated the potential for larger-scale (4,000 tpd) open pit mining of the Indicated and Inferred Mineral Resources. While open pit mining provided a cost advantage over underground mining, the plant feed grades were lower, the mine footprint was large, and the capital costs for a larger plant were high.

In this revised PEA, based on the updated resource block model, the new approach is the selective mining of the delineated REE HGC, again considering the Indicated and Inferred Mineral Resources, and using the same REE prices.

RPA investigated the potential for a smaller open pit/underground mining scenario with lower throughput, lower initial capital costs, and higher grade mill feed. Operating costs for open pit and underground methods were evaluated using a mill feed rate of 1,500 tpd of REE-bearing material on a stand-alone basis. The break-even stripping ratio, beyond which the underground mining would produce more favourable economic results, was estimated. Within approximately 100 m of surface, stripping ratios remain low enough for open pit method to be more profitable; deeper, underground mining improved the economic results.

RPA notes that this trade-off result is specific to the relative costs between the two methods, estimated for a production rate of 1,500 tpd.

A production schedule was developed, starting with open pit mining for 3.5 years, while underground mine development was in progress. As the open pit comes to an end, underground production ramps up to the full plant feed rate. The total life of mine is ten years.

#### PROCESSING AND METALLURGY

Aside from the adjustment in production rate, process and metallurgy remains unchanged from the previous PEA.

Metallurgical testwork involved three beneficiation techniques to concentrate the REE in the Foxtrot sample, including Wilfley tabling, magnetic separation and flotation. The Wilfley tabling was used to test amenability to gravity concentration. Magnetic separation was used to reject magnetite from the Wilfley concentrates. Flotation was tested both as a primary



method of concentration for the Foxtrot sample and as a scavenging method to recover additional REE from the Wilfley tails. The work was preliminary in nature.

Recovery of REEs from the combined beneficiation results ranged from 80% to 86%.

The gravity concentrate and the combined gravity/flotation concentrate were subjected to hydrometallurgical processing by acid leaching or acid baking at 200°C to 250°C followed by water leaching. The acid bake and water leach results produced high extractions.

Overall recoveries range from 78% to 82% for LREE and 77% to 80% for HREE.

The process proposed for the PEA utilizes the following basic unit operations: crushing, grinding, gravity recovery, magnetic separation, flotation, acid bake, water leaching, and solution purification to recover a mixed REE product.

#### ENVIRONMENT

The Project is at an early stage and therefore Search Minerals has not yet begun environmental baseline work or community consultation. Despite that, RPA does not anticipate any fatal flaws regarding environmental issues with the Project as proposed. The challenges normal to permitting and developing an open pit mine in Labrador are expected to be manageable.

#### MARKETS

Rare earth prices remain unchanged from the previous PEA, when they were selected from the low end of a range of available forecasts, averaging \$38/kg of REO (net of separation charges). Q1 2013 spot prices, for comparison, average \$44/kg REO (net).

RPA considers these rare earth prices to be appropriate for a PEA-level study, however, RPA notes that the recent market volatility introduces considerably more uncertainty than a comparable base or precious metals project. This uncertainty is mitigated to some extent, by the selection of conservative rare earth pricing.

#### ECONOMIC ANALYSIS

RPA conducted an economic analysis of the Foxtrot Project applying operating and capital cost estimates based on a 10 year production schedule.



The initial capital cost is approximately \$221 million, including approximately \$73 million in contingency capital. The average operating cost over the life of the project is approximately \$134 per tonne milled.

The economic analysis shows that the Project yields a pre-tax and after-tax net present value (NPV) at a 10% discount rate of \$220 million and \$133 million, respectively. Total pre-tax undiscounted cash flow is \$640 million. Over the life of mine, the pre-tax and after-tax Internal Rate of Return is 27% and 21%, respectively. The pre-tax payback period is 3.8 years and the after-tax payback period is 4.6 years.

This PEA is considered by RPA to meet the requirements of a PEA as defined in Canadian NI 43-101 regulations. The economic analysis contained in this section is based, in part, on Inferred Resources, and is preliminary in nature. Inferred Resources are considered too geologically speculative to have mining and economic considerations applied to them and to be categorized as Mineral Reserves. There is no certainty that the reserves development, production, and economic forecasts on which this PEA is based will be realized.



### **26 RECOMMENDATIONS**

RPA recommends that Search Minerals continue collecting data to support the feasibility and licensing process, and proceed with further studies. The end goal should be a feasibility study suitable for use in making an investment decision.

Specific recommendations by area are as follows:

#### GEOLOGY & MINERAL RESOURCES

- Further drilling should be done to follow the HGC at depth in the Central Area and down plunge below 400 m towards the east. Infill drilling should be carried out throughout the HGC, to bring the confidence level of the resource to Indicated. Other targets within the area are worthy of further exploration.
- During drilling, the quality assurance/quality control (QA/QC) data from Search Mineral's external monitoring program, as well as from Actlabs' internal monitoring program, should be reviewed monthly in order to identify batches of samples that may need to be re-analyzed, or to identify single samples for which a duplicate analysis would be useful. Although a good program has been in place for gathering QA/QC data during Phases I through III, the data from this program are usually assessed after the drilling has been completed. Without regular monthly review of the QA/QC data, problems with accuracy and precision cannot be dealt with in a timely manner.
- Search Minerals should work with an assay lab to develop certified reference materials with REE grades similar to those found at the Foxtrot Project.

#### MINING

• Carry out geotechnical investigations and analysis for use in determining pit slopes and underground stope sizing.

#### METALLURGICAL TESTWORK

- The mafic and felsic material are inter-mixed on a fine scale. With the felsic material carrying the mineralization, it would be useful to have some test work done on ore sorting possibilities, such as optical or x-ray sorting.
- If mafic material cannot be effectively segregated from felsic material, then some metallurgical test work is needed on the effect of mafic material in the ROM ore feed. The felsic material has been the focus of test work; it would be useful to establish the effect on metallurgical recovery from the felsic material when it has been diluted by 10% to 20% mafic material.

#### ENVIRONMENTAL CONSIDERATIONS

• Begin a program of environmental baseline study work, and carry out all necessary data collection and studies to support an Environmental Impact Assessment.



• Continue with community and Aboriginal consultation regarding plans for the Project.

#### BUDGET

A budget for data collection, testwork and completion of a feasibility study has been estimated, as summarized in Table 26-1:

# TABLE 26-1 BUDGET FOR PROJECT ADVANCEMENT Search Minerals Inc. – Foxtrot Project

Item	Cost (C\$)
Diamond drilling (35,000 m @ \$180/m)	6,300,000
Mineral Resource Update	100,000
Geotechnical Investigation	300,000
Metallurgical Testwork	600,000
Environmental Studies	1,000,000
Community Consultation	200,000
Feasibility Study	1,500,000
Total	10,000,000



# **27 REFERENCES**

- Canadian Institute of Mining, Metallurgy and Petroleum (CIM), 2010: CIM Definition Standards for Mineral Resources and Mineral Reserves, Prepared by CIM Standing Committee on Reserve Definitions, Adopted by CIM Council, November 27, 2010
- Cox, J., Srivastava, R. M., Gauthier, J., Krutzelmann, H., 2012: Technical Report on the Foxtrot Project in Labrador, Newfound & Labrador, Canada, prepared by Roscoe Postle Associates Inc., prepared for Search Minerals Inc. (June 15, 2012).
- Dresinger, D. B., Clucas, J.D, Verbaan N., Grammatikopoulos T., Aghamirian, M., Forstner, C. 2012 The Processing of REE's from Search Minerals Foxtrot Resource, COM 2012.
- Gower, C.F., Neuland, S., Newman, M., and Smyth, J. 1987: Geology of the Port Hope-Simpson map region, Grenville Province, eastern Labrador. *In* Current Research. Newfoundland Department of Mines, Mineral Development Division, Report 87-1, pages 183-199.
- Gower, C.F., van Nostrand, T., and Smyth, J. 1988: Geology of the St. Lewis River map region, Grenville Province, eastern Labrador. *In* Current Research. Newfoundland Department of Mines, Mineral Development Division, Report 88-1, pages 59-73.
- Gower, C.F. 2007: Protolith recognition of metamorphosed volcanic/volcaniclastic rocks, with special reference to the Grenville Province in southeast Labrador. *In* Current Research. Newfoundland and Labrador Department of Natural Resources, Geological Survey, Report 07-1, pages 11-23.
- Gower, C.F., 2010: Geology of the St. Lewis River area (NTS sheets 03D/04 and 05; 13A/01, 02, 07 and 08), southeastern Labrador. Geological Survey, Mines Branch, Department of Natural Resources, Government of Newfoundland and Labrador, Map 2010-24, Open File LAB/1566.
- Hanmer, S., Scott, D.J. 1990: Structural observations in the Gilbert River Belt, Grenville Province, southeastern Labrador. *In* Current Research, Part C. Geologic Survey of Canada, Paper 90-1C, pages 1-11.
- Mineral Commodities of Newfoundland & Labrador Rare-Earth Elements (Including Y, Zr, Nb, Be), Geological Survey Mineral Commodities Series No. 6, Geological Survey of Newfoundland & Labrador, Complied by A. Kerr and H. Rafuse, 2011.
- Search Minerals Press Release May 9, 2012 "Search Minerals Announces Successful Metallurgical Testing of Foxtrot Project Sample to Recover a 55.48% TREO +Y2O3 Product (46.99% TREE+Y) with Overall Average Recovery of 78.8%.



# **28 DATE AND SIGNATURE PAGE**

This report titled "Technical Report on the Foxtrot Project in Labrador, Newfoundland and Labrador, Canada" and dated May 9, 2013, was prepared and signed by the following author:

#### (Signed & Sealed) "Jason J. Cox"

Dated at Toronto, ON May 9, 2013

Jason J. Cox, P.Eng. Principal Mining Engineer

#### (Signed & Sealed) "R. Mohan Srivastava"

Dated at Toronto, ON May 9, 2013

R. Mohan Srivastava, P.Geo. Associate Principal Geologist

(Signed & Sealed) "Jacques Gauthier"

Dated at Quebec, QC May 9, 2013

Jacques Gauthier, ing., MGP Principal Mining Engineer

(Signed & Sealed) "Holger Krutzelmann"

Dated at Toronto, ON May 9, 2013

Holger Krutzelmann, P.Eng. Principal Metallurgical Engineer



# 29 CERTIFICATE OF QUALIFIED PERSON

#### JASON J. COX

I, Jason J. Cox, P.Eng., as an author of this report entitled "Technical Report on the Foxtrot Project in Labrador, Newfoundland and Labrador, Canada" prepared for Search Minerals Inc. and dated May 9, 2013, do hereby certify that:

- 1. I am a Principal Mining Engineer with Roscoe Postle Associates Inc. of Suite 501, 55 University Ave Toronto, ON, M5J 2H7.
- 2. I am a graduate of the Queen's University, Kingston, Ontario, Canada, in 1996 with a Bachelor of Science degree in Mining Engineering.
- 3. I am registered as a Professional Engineer in the Province of Ontario (Reg.# 90487158). I have worked as a Mining Engineer for a total of 16 years since my graduation. My relevant experience for the purpose of the Technical Report is:
  - Review and report as a consultant on more than a dozen mining operations and projects around the world for due diligence and regulatory requirements
  - Feasibility Study project work on three North American mines
  - Planning Engineer to Senior Mine Engineer at three North American mines
  - Contract Co-ordinator for underground construction at an American mine
- 4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
- 5. I did not visit the Foxtrot Project.
- 6. I am responsible for the overall preparation of the Technical Report and for Sections 1 through 6, 15, 19, 20, and 22 through 29 of the Technical Report.
- 7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
- 8. I have prepared previous Technical Reports on the Foxtrot Project.
- 9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.



10. At the effective date of the Technical Report, 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 the Technical Report not misleading.

Dated this 9<sup>th</sup> day of May, 2013

#### (Signed & Sealed) "Jason J. Cox"

Jason J. Cox, P.Eng.



#### R. MOHAN SRIVASTAVA

I, R. Mohan Srivastava, P.Geo., as an author of this report entitled "Technical Report on the Foxtrot Project in Labrador, Newfoundland and Labrador, Canada" prepared for Search Minerals Inc. and dated May 9, 2013, do hereby certify that:

- 1. I am a Consulting Associate Geologist with Roscoe Postle Associates Inc. of Suite 501, 55 University Ave Toronto, ON, M5J 2H7, and President of Benchmark Six Inc.
- 2. I am a graduate of the Massachusetts Institute of Technology (Cambridge, MA, USA) in 1979 with a B.Sc. in Earth Sciences and of Stanford University (Stanford, CA, USA) in 1987 with a M.Sc. in Applied Earth Sciences (Geostatistics).
- 3. I am registered as a Professional Geologist in the Province of Ontario (Reg.#0547). I have worked as a resource estimation geologist and geostatistician for a total of 30 years since my graduation. My relevant experience for the purpose of the Technical Report is:
  - Resource estimation for base and precious metals projects
  - Resource estimation for poly-metallic deposits
  - Exploration and development drilling programs for volcanic-hosted mineral deposits
- 4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
- 5. I have not visited the Foxtrot Project site.
- 6. I am responsible for Sections 7 through 12, and 14 and parts of Sections 1, 25, and 26 of the Technical Report.
- 7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
- 8. I have prepared previous Technical Reports on the Foxtrot Project.
- 9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
- 10. At the effective date of the Technical Report, 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 the technical report not misleading.

Dated this 9<sup>th</sup> day of May, 2013

#### (Signed & Sealed) "R. Mohan Srivastava"

R. Mohan Srivastava, P.Geo.



#### JACQUES GAUTHIER

I, Jacques Gauthier, ing., MGP, as an author of this report entitled "Technical Report on the Foxtrot Project in Labrador, Newfoundland and Labrador, Canada" prepared for Search Minerals Inc. and dated May 9, 2013 do hereby certify that:

- 1. I am Principal Mining Engineer with Roscoe Postle Associates Inc. of Suite 302, 1305 Boulevard Lebourgneuf, Québec, QC G2K 2E4.
- I am a graduate of Université Laval, Québec, Quebec, in 1980 with a B.Sc. degree in Mining Engineering and Université du Québec en Abitibi-Témiscamingue, Québec, in 2002 with a Masters of Project Management – Professional Profile degree.
- 3. I am registered as a professional engineer in the Province of Ontario (Reg.#100110996) and an engineer in the Province of Quebec (Reg.#34899). I have worked as a mining engineer for a total of 31 years since my graduation. My relevant experience for the purpose of the Technical Report is:
  - Review and report as a consultant on mining operations and projects for due diligence and regulatory requirements
  - Project management of technical and economic feasibility studies
  - Mine planning and technical assistance
  - Practical experience in mining industry as Chief Engineer and Project Manager
- 4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
- 5. I visited the Foxtrot Project on October 27, 2011.
- 6. I am responsible for Sections 16, 18, and 21 and parts of Sections 1, 25, and 26 of the Technical Report.
- 7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
- 8. I have prepared previous Technical Reports on the Foxtrot Project.
- 9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
- 10. At the effective date of the Technical Report, 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 the Technical Report not misleading.

Dated this 9<sup>th</sup> day of May, 2013

#### (Signed & Sealed) "Jacques Gauthier"

Jacques Gauthier, ing., MGP



#### HOLGER KRUTZELMANN

I, Holger Krutzelmann, P. Eng., as an author of this report entitled "Technical Report on the Foxtrot Project in Labrador, Newfoundland and Labrador, Canada" prepared for Search Minerals Inc. and dated May 9, 2013 do hereby certify that:

- 1. I am Vice President, Metallurgy & Environment with Roscoe Postle Associates Inc. of Suite 501, 55 University Ave Toronto, ON, M5J 2H7.
- 2. I am a graduate of Queen's University, Kingston, Ontario, Canada in 1978 with a B.Sc. degree in Mining Engineering (Mineral Processing).
- 3. I am registered as a Professional Engineer with Professional Engineers Ontario (Reg.# 90455304). I have worked in the mineral processing field, in operating, metallurgical, managerial; and engineering functions, for a total of 33 years since my graduation. My relevant experience for the purpose of the Technical Report is:
  - Reviews and reports as a metallurgical consultant on a number of mining operations and projects for due diligence and financial monitoring requirements
  - Senior Metallurgist/Project Manager on numerous gold and base metal studies for a leading Canadian engineering company.
  - Management and operational experience at several Canadian and U.S. milling operations treating various metals, including copper, zinc, gold and silver.
- 4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
- 5. I did not visit the Foxtrot Project.
- 6. I am responsible for Sections 13 and 17, and parts of Sections 1, 25, and 26 of the Technical Report.
- 7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
- 8. I have prepared previous Technical Reports on the Foxtrot Project.
- 9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
- 10. At the effective date of the Technical Report, 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 the Technical Report not misleading.

Dated this 9<sup>th</sup> day of May, 2013

#### (Signed & Sealed) "Holger Krutzelmann"

Holger Krutzelmann, P.Eng.