

Search Minerals – Survival of the Fittest in Rare Earths

In any species the survival instinct is key, for without it one ends up as a stuffed exhibit in the museum or totally forgotten, which is even worse. The Rare Earth space has some notably “stuffed” trophies on the wall and the vast bulk of the 2009-11 crowd have been long forgotten. [Search Minerals Inc.](#) (TSXV: SMY) and a small group of others have survived the vicissitudes and are appearing out into the sunlight at the end of a very long tunnel. Hallgarten & Company have launched [coverage](#) of Search Minerals and here is a summary of the conclusions.

The Strategy

The company's strategy is to leverage its scalable breakthrough Direct Extraction Metallurgical Process (patent pending) and its accessible district-scale resources in SE Labrador to attract two important strategic partners:

- an investor to finance the bankable feasibility study for development of its Foxtrot project
- an offtake partner whose long-term commitments will provide the stable income necessary to access capital financing for the project

Search believes that success in securing strategic partners is linked to the completion of the pilot testing of its proprietary Direct Extraction Metallurgical Process. The pilot plant testing has demonstrated the ability to produce a high purity mixed rare earth oxide (REO) concentrate. With the proceeds from its first development, Search will accelerate its exploration cycle in the District and bring other deposits into production achieving operational economies and increasing shareholder value.

The Latest Developments

In recent weeks the company [announced](#) the initial results from the now completed pilot plant operation that it has located at SGS Laboratories in Lakefield, Ontario. This cost CAD\$1.9mn, of which \$1.25mn was funded \$500,000 with from Atlantic Canada Opportunities Agency (ACOA) and \$750,000 of RDC (Research & Development Corporation of Newfoundland & Labrador).

The plant processed over three tonnes of material representative of the Foxtrot Deposit using the patented Search Minerals Direct Extraction Process. The pilot plant testing demonstrated the ability to produce a high purity mixed Rare Earth Oxide concentrate. In addition, the pilot plant testing demonstrated the ability to bring uranium, thorium, zinc, and iron levels below those thresholds expected by refineries that separate mixed REO concentrates into individual Rare Earth elements.



The process starts with finely crushed ore (vial 1 on the far left). The ore is then treated with acid, heated to 1800 C and then water leached. The pH is then raised to precipitate iron to give an orangey stained residue (as seen in vial 2). This is the major solid product from the process and it is 'dry stackable' to give a stable, compact residue impoundment.

The solution is then treated with uranium ion exchange and precipitation to produce an impure mixed rare earth carbonate (vial 3). This material is about 35% REE content by this stage and is re-leached and purified in a second step in the Search

process.

After re-leaching, the process removes thorium, iron, aluminum and silica as a precipitate (which is recycled so it does not show up as a final product) and then the zinc is precipitated as zinc sulphide (Vial 4). This is +60% Zn and saleable as synthetic zinc concentrate.

Then the solution (that is now Thorium-, Uranium- and Zinc-free) is treated with oxalic acid to form a high purity rare earth oxalate (Vial 5). The rare earth oxalate is then heated to a high enough temperature to convert the rare earth oxalate to a rare earth oxide (Vial 6). The rare earth oxide is red due to formation of cerium dioxide when heated. This vial's contents are the Holy Grail of the Rare Earth world, a sellable end product.

Next Steps

The plan going forward in 2017 is twofold. Firstly, a drilling program at Deep Fox to determine better the potential of Deep Fox to possibly become the first target for open pit exploitation. Meanwhile environmental permitting will also be undertaken.

The next sizeable undertaking is the work towards a Feasibility Study. This could potentially cost \$16mn including an infill drilling program aimed at upgrading the existing resource's category at either Foxtrot or Deep Fox.

Conclusion

Yet again, in Search Minerals, we find a case of "hare & tortoise" with a below-the-radar REE hunter moving further down the road to the end goal, verily as some of the more storied names of the REE space have "gone to their maker" having burned through enormous piles of money with nothing to show. Search, instead, has spent the "downtime" of the last four years, proving up its resource and getting its thoughts

in order for a cogent production plan. With the plan and team in place the all-important funding phase begins.

Rare Earths are something of a tinder box. They are one of the few minerals to have not shown a meaningful appreciation in the rerating of the mining space since early 2016. However they are exceedingly vulnerable to any outbreak of sharp elbows in the South China Sea or as a bargaining piece in a Trump-China trade dispute escalation. A little crisis will go a long way in pushing REE prices much higher and then sparking an investor frenzy to find what is left of the REE universe. Search with its advanced status and located in a good jurisdiction will rise to the top in any filter that investors run on the remaining listed players.

Hallgarten & Company regards Search Minerals at this time as a Long opportunity with a twelve-month target price of CAD\$0.27.

To access the report, [click here](#)