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**The Mercenary Geologist's REE Review:
Every Good Geologist Knows That Grade is King**

A Monday Morning Musing from Mickey the Mercenary Geologist

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Economic geologists are a rare breed and quickly are becoming an endangered species.

Every year it seems there are fewer of us in the field, pounding on rocks, mapping their distributions and contact relationships, developing promising drill targets, and evaluating projects for economic merit. The exploration science of boot leather and drilling may soon be a lost art. I wrote about this subject previously ([The Trouble with Geologists](#); [The Importance of Mentors](#)).

The scarcity of qualified economic geologists is nowhere more apparent than in rare earth element space. According to Intierra Mapping, there were more than 200 public companies worldwide with rare earth element projects and many analysts are on written record that there may be sufficient demand for only four or five new rare earth producers outside of China within the next five years. An optimistic supply/demand scenario would allow 10 success stories in the longer time frame of 10 years. If true, that means 95-98% of current junior REE companies will fail.

For the diligent speculator, it makes sense to eliminate the many pretenders from the few contenders as quickly and efficiently as possible. We can accomplish this task by employing simple economic parameters.

There is a popular saying amongst economic geologists: *Every good geologist knows that grade is king.*

By applying grade comparisons, we can select the few companies that have potentially economic REE deposits from the multitude that are merely promotional and exist to “mine the stock market”.

Firstly, let's separate REE deposits into three basic types so we aren't comparing a bushel of apples to a bag of oranges to *una mano de platanos* (a bunch of bananas):

- Light rare earth-dominated deposits (carbonatite-hosted).
- Heavy rare earth-dominated deposits (alkalic intrusion-hosted).
- Small vein-hosted deposits.

LREE-rich carbonatite deposits have a much lower unit value per tonne than HREE-rich alkalic intrusion deposits. Therefore, a LREE deposit will require a much higher grade to be profitable than a HREE deposit. Because vein deposits are narrow, steeply dipping, and of small tonnage, they must be mined underground and at high cost. Therefore, vein deposits will require a much higher grade to be profitable than a large LREE or HREE deposit that is mineable by cheap open-pit or bulk underground methods.

Secondly, let's compile the published resource grades of six projects that appear likely to achieve commercial production within the next five years. In this analysis please note that I am listing only those projects presently in development or in advanced exploration with at least a pre-feasibility study in progress. There may be other worthy candidates in the REE sector that are not as far advanced and do not qualify for the list below. For example, I am a committed shareholder of **Tasman Metals Ltd**, which has an interesting HREE project with excellent infrastructure in southwest Sweden, but is likely a year away from completing a pre-feasibility study.

| Company | LREE Deposits | Grade TREO | Tonnage (t) | COG | Resource/Reserve |
|------------------------------------|----------------------|------------|-------------|-------------|----------------------------|
| Molycorp Inc MCP.NYSE | Mountain Pass CA | 7.0% | 48,400,000 | 5.0% TREO | Prov/Prob Reserve |
| Lynas Corporation LYN.ASX | Mount Weld W Aus | 10.7% | 10,700,000 | 2.5% TREO | JORC Meas/Ind/Inf Resource |
| Rare Element Resources REE.AMEX | Bear Lodge WY | 3.2% | 22,700,000 | 1.5% TREO | NI-43101 Ind/Inf Resource |
| | | | | | |
| | HREE Deposits | | | | |
| Avalon Rare Metals AVL.AMEX | Nechalacho NWT | 1.5% | 14,500,000 | \$260/tonne | NI-43101 Probable Reserve |
| Quest Rare Minerals QRM.AMEX | Strange Lake QB | 1.6% | 10,700,000 | 0.6% TREO | NI-43101 Ind/Inf Resource |
| | | | | | |
| | Vein Deposit | | | | |
| Great Western Minerals Group GWG.V | Steenkampskrall SA | 11.8% | 250,000 | N/A | Historic Resource |

Note: COG = Cut-Off Grade and is the economic break-even grade in a producing mine.

I submit that this treatment, although admittedly simple, can be utilized as a top cut to separate various deposits that stand a chance of sending rock to the *ore bin* from those hopelessly destined for the *waste dump*. Only the best projects will deliver product to the marketplace in 2012-2017 while the remainder will be shut out.

Now that we've determined some of the advanced projects contending for success, let's examine a few of the glaring pretenders that have been presented to me over the past year.

Low-grade **LREE** deposits cannot compete with **Molycorp** at 7%, **Lynas** at over 10% and **Rare Element Resources** at over 3%. MCP and LYN will be in production in 2012; REE has a growing deposit with excellent infrastructure, significant HREE values, new discoveries, and good location in the very mining friendly jurisdiction of Wyoming.

Here are two examples in **LREE** space that I think are over-promoted and likely to fail:

- **Commerce Resources Corp** has a low-grade LREE-bearing carbonatite in a very remote place in the lowlands of far northeastern Quebec. The Eldor project location and access make the admittedly infrastructure-challenged Strange Lake 300 km to the east look like a Sunday afternoon drive.

Despite various ads depicting bull elephants and rare meat, to me an inferred resource grading 1.74% TREO is little more than another Toronto Venture Exchange “mine”.

The company is part of the Zimtu Capital group, with its outrageously expensive corporate back office and high-salaried, oft-rewarded management. In addition, it has “*a wee bit of Aus disease*” with 147 million shares outstanding.

- **Geomega Resources Inc** has a low-grade carbonatite project called Montviel located in the northern Abitibi of NW Quebec. There currently is no resource estimate but using a weighted average of 18 holes in an initial drill program, the project grades about 1.3%.

Its claim to fame is hosting by the “largest carbonatite in the world.” I suggest comparing the grade, infrastructure, and climate at Mountain Pass, California or Bear Lodge, Wyoming with this low-grade mineralization in the swamp and boreal forest of northern Canada. The company apparently considers 100 km from the nearest supply town and 65-75 km from highway, rail, and power as “nearby” infrastructure. I disagree.

Next let’s examine a couple of **HREE** properties with grades a fraction of the TREOs of **Avalon Rare Metals** at 1.5% and **Quest Rare Minerals** at 1.6%:

- **Stans Energy Corp** has a low-grade HREE deposit in Kyrgyzstan that was nearly mined out by the Soviets. The historic mine grade at Kutessay II was 0.41% TREO with a recovery of 65%, giving a produced grade of 0.26%. This would never have been mined in a free market economy because it simply would not have made a profit.

But get this: According to a recent JORC measured and indicated resource, the project contains a grand total of 42,980 tonnes (yes, you read that correctly, *thousands* not millions of tonnes) and runs 0.26% *in-situ* with a 0.10% COG. Note that’s before any dilution, mining losses, and recovery factors are applied.

The overall grade is a paltry portion of a percent and is less than half of the projected economic cut-off grades at Nechalacho and Strange Lake. For additional opinions regarding this company, read my musing: [REE Review: The Anatomy and Dissection of a Junior](#).

No matter how bad the above examples may seem, there’s no doubt that the next one takes first prize:

- **Texas Rare Earth Resources Corp**, an OTCBB-listed company, contacted me recently about its flagship project, Round Top Mountain, located in southwest Texas. It recently morphed from a beryllium-uranium project into a HREE prospect. The letter pointed out the great size at 1.6 billion tonnes, that HREOs comprise 70% of the TREOs, and there would be zero strip ratio. Plus this: “The Company expects to be in production in the 2015-2016 timeframe.” That’s quite a forward-looking statement for a company without an REE resource.

What they conveniently failed to mention was the grade of the “deposit”. I had to search the company website to find that number: 0.07%.

That folks, is not a typo. This big rhyolite body runs *700 parts per million* TREOs, or about a tenth of the cut-off grade of AVL’s Nechalacho and QRM’s Strange Lake and a quarter of the average grade of the Kutessay II deposit previously discussed.

Another red flag was raised with the company's OTC bulletin board listing and lack of presence on the technically regulated Toronto Venture Exchange.

Finally let's look at a small **vein-hosted** deposit and compare it to **Great Western Minerals Group Ltd's** small historic resource at Steenkampskrall in South Africa. It grades 11.7% TREOs, mainly as LREOs but with 0.89% HREOs:

- **Ucore Rare Minerals Inc** controls Bokan Mountain in extreme southern Alaska, 60 km southwest of Ketchikan. The project is located in a cold rain forest and is accessible via boat, float plane, or helicopter, which the company views as "excellent logistics". The project area was previously mined for uranium and the company, like many of its REE brethren, was a uranium explorer until mid 2009.

Dotson Ridge is a narrow, steeply dipping, vein-dike deposit with a 43-101 inferred resource of 3.7 million tonnes grading 0.75% TREO at a cut off of 0.5%. About 38% are heavies giving a grade of 0.29% HREOs and 0.46% LREOs.

Compare that with Steenkampskrall at 0.89% HREOs and 10.9% LREOs.

During a tour of Bokan Mountain a year ago, I determined that individual veins average less than 0.5 meters wide, and have little strike continuity. There was sparse information on continuity with depth.

Because of the low grade, potential fatal flaws are the high cost of narrow vein mining and wall rock dilution that will necessitate separation of waste from ore prior to grinding and concentration. My recommendation to Ucore was to immediately apply for an Alaska small mine permit for underground access to drill, test mine, and bulk sample during the 2011 field season. I never received a response to my letters.

Therefore, I concluded that Ucore is unlikely to advance the project in a timely fashion. It appears to me the corporate exit strategy is to wait for a takeover offer and/or government financial assistance. But with 149 million shares outstanding, 174 million fully diluted, and a 2011 burn rate of over \$9 million, I opine that one of these scenarios must happen soon.

In this missive I reviewed a basket of six REE companies that have the highest grade and most advanced deposits outside of China. I consider these to be some of the contenders to develop rare earth mines from 2012-2017.

Then I compared five high profile REE explorers whose projects are much lower in grade and much less advanced. Because of low grade projects, I suggested that these five companies are among the vast legion of pretenders that has a very slim chance of ever making a profitable mine.

My analysis was based primarily on the grade of the flagship project. However, other factors are equally important when evaluating a company for speculation including share structure, people, and market valuation compared to peers. For example, I eliminated Great Western Minerals from my radar screen almost four years ago because of a highly dilutive share structure. Since then, shares outstanding have more than tripled to 381 million with 475 million fully diluted. I recently suggested to the company that a rollback is necessary for the company to advance to top tier status among REE developers.

Comparing the grade of an exploration company's flagship project to "Cream of the Crop" REE development and advance exploration projects will allow the diligent investor to quickly eliminate many companies from further consideration.

Don't forget the adage: Every good geologist (and lay investor) knows that grade is king.

Ciao for now,

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The [Mercenary Geologist Michael S. "Mickey" Fulp](#) is a Certified Professional Geologist with a B.Sc. Earth Sciences with honor from the University of Tulsa, and M.Sc. Geology from the University of New Mexico. Mickey has over 30 years experience as an exploration geologist searching for economic deposits of base and precious metals, industrial minerals, uranium, coal, oil and gas, and water in North and South America, Europe, and Asia.

Mickey has worked for junior explorers, major mining companies, private companies, and investors as a consulting economic geologist for the past 24 years, specializing in geological mapping, property evaluation, and business development. In addition to Mickey's professional credentials and experience, he is high-altitude proficient, and is bilingual in English and Spanish. From 2003 to 2006, he made four outcrop ore discoveries in Peru, Nevada, Chile, and British Columbia.

Mickey is well-known and highly respected throughout the mining and exploration community for his ongoing work as an analyst, writer, and speaker.

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