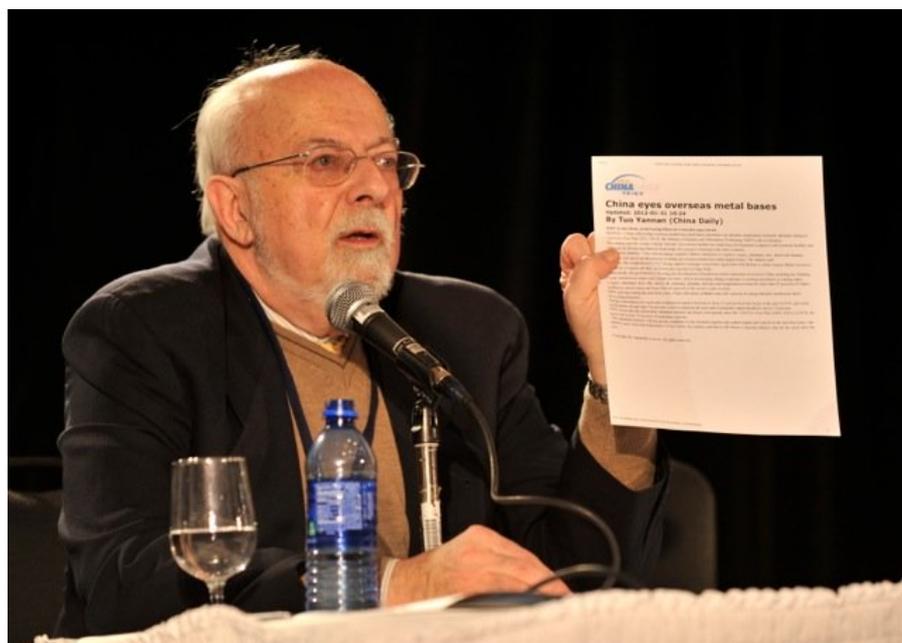


Solvay's toll refining services redirect the downstream rare earth dream

First Come, First Served: How much water can you pour out of an 8 ounce glass? Does that seem to be a trick question to you? It really isn't. The answer is 8 ounces.



So now let's look at an analogous question: How much, in total output, of individual rare earths can Solvay's La Rochelle, France, separation plant with a total installed output capacity of 9,000 metric tons per year process? The

answer is obviously that Solvay's LA Rochelle, France, **global rare earth** (a phrase I use to indicate that the plant can separate from each other and purify any and all of the rare earths plus scandium and yttrium) solvent extraction facility can process a total of 9000 metric tons per year. So why am I pointing out this obvious fact?

I believe that La Rochelle is now operating at about 50% of total capacity, so it has available the open capacity to process 4,500 tons per year. It is a very impressive operation with three stories each having some 600 mixer settler units. The last time I was there (in the Spring of 2013) around 1200 of the 1800 mixer settlers were in operation.

I am pleased that this facility has finally been “discovered” by many managers of the rare earth juniors, and I am pleased that Solvay has very recently decided to offer toll refining services to those whose metallurgy can produce a PLS that will be both legal to import into France (from a radioactive content perspective) and is amenable to the nitrate process used by Solvay, La Rochelle.

Now, back to where I started. If one assumes, for the sake of this article, that Solvay La Rochelle is now running at 50% of capacity. I then also assume that it is operating at least at or close to breakeven at that capacity utilization, and I am reasonably certain that it does not need to run at full capacity in order to be profitable. Note well that Solvay, La Rochelle is not simply a producer of separated rare earths but, in fact, supports two downstream rare earth dependent businesses in which Solvay is the world leader, the production of display and lighting phosphors, which are yttrium oxy compounds “doped” with heavy rare earths, such as, but not limited to terbium, and the production of the cerium doped alumina wash coats (24 different customer specified blends I was told) used to line the channels in the substrates for automotive exhaust emission catalysts and upon which the platinum group metal catalysts used are deposited. Solvay La Rochelle also produces and markets cerium salts used for glass “polishing.” I think that it also produces high purity lanthanum for the production of optical glass.

Solvay, La Rochelle, is therefore not just a solvent extraction operation that produces and markets individual rare earth salts and blends for use by others. It is the anchor of a totally integrated supply chain for phosphors and wash coats and fine chemicals. It is also, by the way, the world’s longest running solvent extraction plant dedicated exclusively to processing (separating and purifying) the rare earths; it has run for 44 years.

It should be clear that any rare earth junior who says he is

going to build a dedicated solvent extraction plant for his own PLS is NOT going to create an operation like La Rochelle in a short time. Nor is the junior going to enter any downstream markets for high tech products even if this type of arrogantly ignorant announcement is frequently made. Alain Levesque, the scientist who was responsible for much of La Rochelle's process chemistry development until his retirement last year (2013) told me in Toronto last year that it could take 10 years of operation before a new SX plant could routinely produce 99.99% pure individual separated rare earths. Like much of engineering trial and error is a common operation when a plant is started up. Success is a matter of luck as well as of well-honed and experienced skill.

I therefore applaud (and approve) of the recent move by many older and now wiser juniors to seek out a toll refiner. I note that the only two former juniors now in operation are vertically integrated downstream at least as far as through the separation of the light rare earths (and in Molycorp's case through the capability to separate heavy rare earths in their subsidiary's Chinese facilities).

The Solvay people told me that when they announced at the Roskill Conference in Hong Kong in November of 2012 that Solvay had just then decided to look at toll refining their representatives were inundated with requests for meetings. They were surprised, I was told. I was not surprised, because I have observed the juniors walking around with blinders since the current rare earth bombast began in 2007. Most of the managers at first completely ignored the downstream aspects of rare earth production, and those that did learn of it sought out Chinese technology vendors for advice. No one ever mentioned Rhodia (bought by Solvay recently with its rare earth processing and manufacturing business renamed as Solvay Rare Earth Systems just last year, 2013), but this could have been because Rhodia's La Rochelle and two Chinese facilities were company dedicated and not offering toll refining

services.

I don't know if Rhodia, La Rochelle, has commenced toll refining services, because none of the public or even private juniors I am aware of has commenced production of a clean PLS. By clean I mean a PLS without radioactive or nuisance elements, such as uranium, thorium, iron, aluminum, fluorine (fluoride), and the like all and each of which impair solvent extraction efficiency or even efficacy.

I suspect that La Rochelle is now being offered feed stocks from off-the-books production in southeast Asia, but even these would have to meet the no radioactives and/or nuisance standards.

In any case Solvay La Rochelle is looking for revenues from toll refining and not necessarily for feed stocks for its own downstream businesses. And even where Solvay, as any other company in its situation, would like alternative sources for yttrium and the heavy rare earths its new demands will be relatively small, since it has been sourcing these materials for decades and in all likelihood has a good supplier base.

The point I want to make here is that Solvay, La Rochelle, has a finite open capacity; it will be tolling, not buying rare earths; it will work with whoever (and this could be more than one) can supply "acceptable" PLS and pay the tolling fees up to whatever portion of its open capacity it is allocating for tolling. It will be FIRST COME FIRST SERVED!

Look carefully then at the start-up of production dates for the juniors, before you decide that any association with Solvay is a game changer or it means that the game is over.

Next week I'll comment on the latest comments by juniors on "marketing" their "products." (Note from the Publisher: Next week's commentary will be exclusive to [InvestorIntelReport](#) members only.)

Avalon Rare Metals takes one giant step towards rare earths production



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pare and just one brief moment to sign, but on March 3, in occasion of the largest mining event in the global calendar (the Prospectors and Developers Association conference – PDAC), Avalon Rare Metals ('Avalon', TSX: AVL | NYSE MKT: AVL) signed a formal agreement for the Nechalacho project with the Northwest Territory Métis Nation (NWTMN). The agreement is the result of Avalon's goals to pursue its project in an ethical and responsible manner, ensuring that its pursuit of natural resources will benefit the local population and respect the local environment. Avalon's concern for sustainability suggests that it is one of the most far-sighted companies in

the rare earths sector; it also shows that the company is being well managed. The agreement means that rather than antagonists, the local people will support the project in the short and long term. The agreement with the NWTMN effectively concludes Avalon's 'bureaucratic' phase. The Project was already granted ministerial approval of the Environmental Assessment for the project.

Avalon took the 'heat' from the community and the media during hearings and also worked to ensure that community relations would not be an afterthought; rather, that they be included in the planning since the very first stages of the project. This means the company has a well rooted plan for continuity as it proceeds toward mine construction and then production. In the context of the participation agreement, Avalon has issued 10,000 shares and 20,000 non-transferable subscription rights to the NWTMN. Therefore, thanks Avalon's culture of sustainability, it has obtained the trust of the First Nations communities, who now have a stake the project's success.

Avalon is now set to join those few companies challenging China's dominance in the rare earths industry. Currently, China produces around 90 % of the global rare earth supply, but the industry is suffering from illegal mining, smuggling due to export quotas, severe environmental degradation and lack of global competitiveness due to weak research and development activities. Avalon has the ambitious goal of going into production by 2017 and to become one of the leaders in research and development in the sector. On February 25, the market showed its confidence in Avalon's project with a 12.5% share price increase and high trading volumes. Avalon has continued to rise in the weeks following that 'jump' as it races to become what could be Canada's first rare earth mine. The cost for the construction of the mine and the processing and refining facilities will be about USD\$ 1.6 billion as noted in the Feasibility Study. This is in line with other rare earths projects around the world, whereby a cost of 1

billion might even be considered 'discounted'. Avalon has reached memorandum of understanding agreements with potential end-users who have shown interest in the project and plans to generate the funds to build the mine through these.

Apart from the formal ceremony announcing the partnership with NWTMN, Avalon's CEO, Don Bubar, announced that it has signed a 10-year processing agreement with Solvay, a French chemical company, which will process rare earth concentrate into oxide products at Solvay's facility in La Rochelle, France. This will avoid a number of regulatory issues, as La Rochelle has been one of the world's main rare earth processing facilities for decades. Solvay would also purchase the REE concentrate from Avalon, as it is one of the largest suppliers of rare earths to the European automotive industry. Avalon's CEO, Don Bubar, said that Solvay would also support the design and construction of Avalon's hydrometallurgical processing plant, which should be built in Geismar, Louisiana. The proposed USD\$ 300 million facility would employ 175 people.

Avalon's Nechalacho REE, among the various REE projects that have been launched around the world, is one of the few that actually have reserves and that are at an advanced stage of development. Avalon investors, moreover, may rest assured that the Company has a valuable resource and that it has completed all phases of the project in the run up to production, expected in 2016-2017. Avalon was one of the first companies to embark in the rare earth adventure and years before the 2010-2011 spike that attracted so many other juniors to this space. Avalon is confident in its technical and economic potential to reach production, which includes highly desirable heavy rare earths such as dysprosium and neodymium as well as an enriched zirconium concentrate (EZC), a highly desirable compound for its heat resistance and in demand by the nuclear and aerospace industry.