

Scandium International CEO on making end-user ready products

March 21, 2018 – “Scandium is different. We can make products that go directly to the end-user. There is a shorter supply chain and we are much more in control of that.” states George Putnam, CEO, President and Director of Scandium International Mining Corp. (TSX: SCY), in an interview with InvestorIntel’s Peter Clausi.

Peter Clausi: I have not talked to you since May. We were chatting before this and I mentioned that scandium was a rare earth. You told me I am wrong. Tell me about that.

George Putnam: Scandium is actually a light transition metal. The difference that we see is that if you are in the rare earth business you are going to make a concentrate and you are going to need a refining capability downstream to actually get your product to the end-user. Scandium is different. We can make products that go directly to the end-user. There is a shorter supply chain and we are much more in control of that.

Peter Clausi: Your CAPEX must be less than.

George Putnam: The rare earth guys tend not to own the refinery that is downstream of them. I would say it is simpler and it is more direct. That is the biggest different for scandium. It is a plus.

Peter Clausi: Right. When we talked in May you were looking at signing a couple of letters of intent and moving the projects along. You have since done that. Tell me about that.

George Putnam: Right. We are now focused on finding customers and signing sales contracts. This is what the first start of

a sales contract looks like, a letter of intent to do some study and do some work on efficacy of scandium and understand what that value is to customers. That is when we know whether they are a true customer or not. It is important to note that the LOIs represent folks we are working with who are happy to have a public disclosure. We have got two kinds of programs underway. There is another set of programs that is very secretive because the customers, the potential customers, want it to be. We can tell you what we can tell you about and we will work with either type.

Peter Clausi: Given what scandium does, one would expect the military and aerospace to be involved in some way. Scandium makes metals lighter with more strength basically.

George Putnam: Right.

Peter Clausi: You were showing me some anodized pieces yesterday.

George Putnam: Yes. We think there is a real finish advantage, an anodization finish advantage to aluminum-scandium alloys. That may be the key element that brings some customers to the table. Not strength, not other properties, anodization. That finish is so important.

Peter Clausi: It would then resist oxidization or what we like to call rust.

George Putnam: Right. It would be more durable and it would be better looking for a very long time.

Peter Clausi: Right. You have a property in Finland. You have done some work on, but the majority of your scandium would be coming out of your property in Australia...to access the complete interview, [click here](#)

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Tasman Metals – Masters of All they Survey in Scandiland

Ever since the Tasman/Flinders merger deal was floated it was apparent that Tasman (TSXV: TSM | NYSE-MKT: TAS) wanted the benefits of diversification would bring. After all, if you a betting on a horse race it's better to have stakes on two favoured horses rather than just one. The Flinders deal went away and Flinders went on focus on its graphite mine and plant. Tasman has the longer haul REE project at Norra Karr to bring to fruition. The rationale of the earlier merger was to have one advanced project and one longer term one going at the same time. Finding a more advanced REE project than Norra Karr is no easy task, with many REE projects being more like a pack of snails dashing for a finishing line.

Thus to get something that will fill the gap between now and the ribbon-cutting on production at Norra Karr requires something NOT in the REE space because it needs to be something plug and play. This is the antithesis of the available REE projects, with their massive lead-times. Tasman has opted for one of our old favorites, Chromite.

DSO, the Way to Go?

If there is not a big hurdle in infrastructure shortage, then a product that can be produced as Direct Shipping Ore (DSO) is one of the simplest products to move from mine to market. The main mineral products that are traded in this form are also the world's most traded minerals iron ore, manganese, bauxite and chromite. Most are sold in a strictly un-upgraded form though some minimal effort can be made to get them into a more value added state. For example magnetite can be separated from

surrounding non-ferrous material by using large magnets to pick up the ore. Manganese and bauxite are rarely beneficiated much at site and chromite is the one most subject to potential value-added via conversion into ferrochrome. As DSO means large scale products movements at high grades it also requires bulk movement on the projects with the largest capex numbers going towards, conveyors, rail connections ports and the required loaders. The more economically developed the location the less these added expenses are required of a project developer.

Tasman's Move –Chromite in Finland

North-eastern Finland has been a very active exploration district, following the discovery of the large Sakati Cu-Ni deposit by Anglo American, which was announced in November 2011.

Tasman has acquired two chromite projects (Akanvaara and Koitelainen) that lie approximately 75 km apart in north-eastern Finland. The projects total 11,400 hectares in size and the company paid CAD\$45,529 to pick up these assets. Both have had extensive previous drilling, metallurgical testing and historical resources. Both are easily accessible by road.

The Akanvaara and Koitelainen chromite projects are of a stratiform intrusion-hosted style (compared to podiform deposits in locations like Albania). According to Tasman these, together with similar deposits on the Kola Peninsula of Russia, constitute one of the largest known undeveloped resources of chromite in the world. The Akanvaara and Koitelainen intrusions are part of a group of Archean/early Proterozoic mafic layered intrusions within the Fennoscandian Shield, which show cumulate igneous layering similar to other large layered intrusions (Fiskenaesset, Burakovka, Bushveld), and host deposits of **chromite, vanadium, titanium, PGE's and gold**. The new projects lie along the geological trend of the producing Kemi chromite mine, owned by Outokumpu, that has

been producing since 1966.



In addition to stratiform chromite, Tasman feels that the projects have potential for both platinum group metals (PGM's) and Vanadium (V). This is no surprise as PGMs often occur with Chromite.

Chromite – Relatively Immune to the Steel Blues

Having once been a director of a Chromite company the attractions of this metal come easily to mind. For us it was the easy mining and shipping that proved to be the main attraction. We have most particularly looked at the metal in Albania (where the metal was once so synonymous with the country that China managed to peel it off the Soviet Bloc just so they could exclusively have its supplies) and Turkey where there is quite a lot of production but mainly from quasi-artisanal mining operations.

Chromium (Cr) is an essential industrial element due in particular to its strengthening effect on steel alloys and its resistance to corrosion. The main application is as Ferrochrome (FeCr), which is a corrosion-resistant alloy with 80% of FeCr output goes towards Stainless Steel production. The average chrome content in stainless steel is 18% and stainless steel requires a minimum of 10.5% Cr by mass to impart favorable strength and anti-corrosion properties.

The remaining chromite is used in the aeronautics (for the protection of aluminium aircraft bodies), foundry, chemical and refractory sectors. Overall, demand growth for stainless steel and therefore chromium is forecast in the range 4-5% per year to 2020. The price trend for Ferrochrome has not been as depressing as for most other bulk commodities either...



China is the leading chromium-consuming country and the leading stainless steel producer. China produced 17 to 18 million metric tons of stainless steel and produced 3 million metric tons of high-carbon ferrochromium, the leading chromium ferroalloy used to make stainless steel. According to the USGS, China, anticipating a 500,000 ton-per-year-increase in stainless steel production, boosted its ferrochromium production capacity by 1.5 million metric tons in recent years. China's chromite ore imports were expected to increase to support increased ferrochromium production as were its ferrochromium imports to supplement that domestically produced for stainless steel production.

South Africa has been the leading chromite ore and ferrochromium producer. A couple of years back, South Africa's electrical power generating group declared an emergency because of the country's constrained electrical power supply. The power group negotiated short-term buyback deals with ferrochromium producers. However it should be noted that at the same time the government there took exception to the practice of exporting chromite ore in a DSO form to China for elaboration in Asia into FeCr and thus slapped restrictions on exports much in the same way Indonesia has done with Nickel and Tin and that the DRC has spoken of in Copper and Cobalt.

Tasman sees a niche for any potential output from its new assets in serving European stainless steel producers. They rank second only to China in scale and account for some 20% of global output. Europe's share of world chromium metal demand is equally significant, estimated by the European Commission at 1.8 million tonnes (approximately 18.5% of global consumption). The Kemi mine of Outokumpu in northern Finland is the EU's only chromium supplier. The US consumes about 6% of global chrome production and has no production though Stillwater in Montana are said to have some resources in this metal.

There is however no shortage of the metal and according to the

USGS, world resources are greater than 12 billion tons of shipping-grade chromite, sufficient to meet conceivable demand for centuries. About 95% of the world's chromium resources is geographically concentrated in Kazakhstan and southern Africa. However, it should be noted that the metal emanates from other places as well. Production from Albania is patchy these days and Turkey is a player. Canada used to be a producer with mines in the Thetford Mines area of Quebec.

Conclusion

As emerging "new" mining districts go, Scandinavia is one of the least new. The long history of mining in the region was essentially forgotten by those outside the region post-WW2 as the area was regarded as an industrial wonder and home to stultifying social security and tax systems. However companies like Boliden forged on with their traditional mining activities. With a number of years of experience in the region behind it Tasman now feels comfortable in spreading its wings across the region and across the different resources available in this richly geologically endowed area. Instead of being a playing field only for local companies it has become the favoured area for mine development in Europe in the space of just one decade. A very skilled and educated workforce combined with government's that know the worth of mining's value added makes it a totally different equation for the other "emerging" mining regions with rapacious and fickle administrations.

Tasman's management has now been immersed for years in the Scandinavian way of doing things and are clearly comfortable with the idea of getting even further into the mining scene in the region. That they have chosen a non-challenging metal, in terms of extraction, processing or pricing, is indeed a welcome sign.. To top it all off there are no listed Chromite stories we know of outside of the South African player, Merafe. This will give Tasman a further USP...