Q&A with Peter Cashin, President & CEO of Imperial Mining Group Ltd.

Building a Global Scandium Supply Chain: Crater Lake Project, Quebec

1. While Imperial Mining has a multi-commodity portfolio of properties, you seem to have been putting a lot of emphasis on your scandium project, Crater Lake. How did you acquire it in the first place?

When I left Quest Rare Minerals in April 2015, I brought the Crater Lake scandium property with me because I believed strongly in the property’s value and potential. Imperial Mining was founded in 2018, and Crater Lake became the flagship of its portfolio.

2. Why is scandium important and what are some of its key applications?

Scandium is the most efficient alloy agent for aluminum alloys*, acting as a hardener and increasing its mechanical strength by as much as 150%. Aluminum alloys have long been used in the aerospace, automobile and military industries so an aluminum-based alloy product showing equal strength to steel and titanium would be very attractive to these manufacturing sectors.

We did a lot of downstream marketing to get a grip of where the market exists and where underserved areas are that could cause significant growth potential for scandium. It became obvious that with a drive to reduce the carbon footprint of the transportation industry (auto, aerospace, rail), there would be a requirement to develop next-generation lightweighting materials for the manufacturing process to reduce CO2 and Greenhouse Gas (GHG) emissions. This is particularly true for the European region where strict emission standards are due to kick in in 2021 and again in 2030.

Another area we view as an important potential consumer of scandium is armour plating for defense platforms (tanks, personnel carriers, jeeps, warships, personal ballistic protection equipment).

*An alloy is a combination of metals or metals combined with one or more other elements.
3. Everyone knows a lot about lithium and other battery metals, why not scandium?

The two issues impeding growth of the scandium market are lack of a long-term, sustainable source of the metal. This has resulted in scandium having too high a price to be attractive to potential consumers for inputs in automotive, aerospace and fuel cell manufacturing. Our Crater Lake project will be able to address these issues by offering a large, long-term scandium source at a price point that would be appealing to manufacturers.

4. How does scandium compare to titanium?

Scandium-aluminum has the same mechanical properties as titanium alloy but is 40% lighter and costs 10 times less to produce. It is also one-third of the weight of steel.

5. Which countries presently produce scandium?

China 66%, Russia 26%, Ukraine 8%.

6. How does Crater Lake compare to other deposits around the world?

We are viewed by our peers and industry experts as the largest known scandium deposit in the western world.
Can you elaborate on the property’s location? Are there any advantages of it being located in Quebec and its specific location in Quebec?

The resource is located to the north of the St. Lawrence River region of Quebec, Canada’s most **important centre for aluminum production**. This provides producers with a potential local source of scandium for production of scandium alloys.

The province has developed an aluminium ecosystem around three primary global producers (Alcoa, Rio Tinto, and Aluminerie Alouette) operating nine smelters in the province that produce 2.9 million metric tons. This is approximately 90% of Canadian and 60% of North American production.

Other important advantages are fiscal. Quebec is a favorable mining tax jurisdiction. The province is known for the lowest commercial electricity rates in the western world, as well as a 15-year Tax Holiday on downstream metal processing and a 24% tax rebate for building Quebec-based processing plants valued at greater than $75 million. It really doesn’t get much better than this.

What are the main drivers or primary revenue generators for scandium?

The principal driver for scandium input is reduction of carbon footprint by lightening the weight of their manufactured platforms. This is particularly true for the automotive manufacturers who are attempting to reduce their fleet emissions to meet incoming government standards in North America and Europe.

Would the majority of these be civilian or military driven?

Initially, civilian demand will be the early consumption adopters of this specialty alloy, followed by military demand as they drive to lighten the weight of current military platforms (tanks, personnel carriers, marine applications, fighter jets).
**Imperial Mining positions Crater Lake as a ‘long-term, high-purity source of scandium’. How big is the deposit and can you give us a rough estimate of its life span?**

Our exploration drilling has identified two important scandium mineralized deposits along the trend that has been traced for at least 7 km in strike length. To date, detailed exploration has only been completed over 20% of the structure, so a lot of potential remains to be evaluated. Taking into account the information currently available to us, we estimate that at least 40 years of mineral inventory is potentially available.

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Can you give us some specific examples of parts, components, or other instruments produced with scandium in them?

It can be used in a wide variety of civilian applications, including electronics, lasers, EV drive motors, fuel cells, and high-strength/high-temperature applications.

Scandium-aluminum alloys will also be a critical lightweighting contributor to military armour, such as fighter jets and battleships, as well as space exploration vehicles.

Currently, the military has had to add supplementary, heavy steel armour to existing defense platforms to counter new, efficient weaponry being brought to bear against them. These applications are becoming so exceedingly heavy that the capacity of existing battlefield delivery methods is being exceeded. A material, such as high-strength, scandium-aluminum alloy with similar ballistic strength to steel armour, will be an important lightweighting input for this effort.