Imperial Mining Reports Encouraging Results for Scandium Recoveries from the Crater Lake Project, Northern Quebec

written by Raj Shah | March 3, 2020

March 2, 2020 (Source) – **Imperial Mining Group Ltd. ("Imperial")** (**TSX VENTURE: IPG**) is pleased to announce that encouraging results have been received from its Crater Lake Phase 2 Scandium (Sc) metallurgical test program completed by MPlan-Dorfner ANZAPLAN at its lab in Hirschau, Germany.

The test work was completed on two diamond drill core bulk samples, collected from Crater Lake TG Zone during winter 2019 diamond drilling program. The samples represent typical mineralization types encountered in the zone yielding assays of up to 474 ppm scandium oxide (Sc2O3) over 12.5 m in an interval grading 341 ppm Sc2O3 over 74.9 m.

"The Phase 2 metallurgical test work showed greatly improved scandium recovery results compared to the already favourable test results obtained from our Phase 1 work completed in 2018," said Peter Cashin, Imperial's President & CEO. "The amenability of the Crater Lake mineralization to concentration of the scandium and REE through these relatively simple processing technologies is very encouraging. These will have a positive impact on the project's operating costs and capital expenditures by reducing the need for on-site milling equipment and the associated additional energy cost requirements and provide a low cost, local source of scandium for Quebec's aluminum industry."

A Sc mineral concentrate was produced from Crater Lake mineralization by using simple low-cost magnetic separation techniques. A combination of low intensity magnetic separation (LIMS) and wet high-intensity magnetic separation (WHIMS) produced a mineral concentrate yielding an impressive 88% Sc recovery as well 69% recovery of total rare earth elements (TREE) for one sample. A combination of LIMS and WHIMS on the second sample with differing mineralogy also yielded encouraging recoveries of 78% Sc and 56% TREE.

Additional testwork utilizing Sensor-based ore sorting and heavy liquid separation (HLS) methods confirm that X-Ray Transmission (XRT) sensor-based sorting and dense media separation (DMS) offer additional low-cost alternatives for inexpensively producing a mineral concentrate without the need of grinding, chemical reagents or extensive water consumption. DMS separation yielded recoveries of 90.6% Sc and 89.2% TREE in the mineral concentrate.

Imperial Mining is in the process of planning the activities for the Phase 3 hydrometallurgical flowsheet development for the extraction of scandium oxide suitable to produce aluminum scandium alloys and is currently reviewing proposals for this work from commercial and Government test labs.

Phase 2 Detailed Metallurgical Test Results

The main objective of Phase 2 program was to concentrate the scandium (Sc) bearing minerals (pyroxene and amphibole) present in the host rocks by using magnetic separation, flotation, sensor-based ore sorting and heavy liquid separation. In addition, mineralogical characterization of the two drill core samples MET-01 and MET-02 was completed. The intent of the program was to reject as much of the non-Sc bearing rock while maximizing Sc recovery from the bulk samples.

The mineralogical characterization of the samples showed that MET-01 represents a cumulate ferrosyenite or pyroxenite, while sample MET-02 is described as a more evolved, non-cumulate variety of MET-01. The mineralogy confirmed the results of the previous metallurgical program completed in 2018, which showed that 100% of the scandium is contained in pyroxene and amphibole. In addition, albite, microcline, anorthoclase, fayalitic olivine and biotite constituted the dominant mineral phases. Accessory ilmenite, magnetite, rare earth elements-bearing apatite, TREE mineral britholite and zircon were also identified in the samples.

Flotation tests in combination with WHIMS of the slimes (-0.02 mm) yielded comparable Sc recovery but superior recovery of TREE when compared to Magnetic separation (LIMS-WHIMS) for both MET-01 and MET-02 samples: 83% Sc and 88% TREE were recovered into the mineral concentrate for MET-01, while for MET-02 sample, the concentrate contained 74% and 83% of the Sc and TREE, respectively. More importantly, a combination of low intensity magnetic separation (LIMS) and wet high-intensity magnetic separation (WHIMS) for sample MET-01 produced a mineral concentrate of 39% mass pull with 88% Sc recovery and 69% TREE recovery.

The mass pull to mineral concentrate (how much of the total rock sample reported to the concentrate) and corresponding recovery results for Sc and TREE from MET-01 and MET-02 samples for all mineral processing options evaluated are presented below in Table 1:

Table 1 – Crater Lake Sc Mineral Beneficiation Processing Test Results

Mineral Beneficiation Techniques	MET-01 Sample Recovery			MET-02 Sample Recovery		
	Mass, %	Sc, %	TREE, %	Mass, %	Sc, %	TREE, %
LIMS+WHIMS	38.8	87.5	67.9	51.5	77.8	57.5
LIMS+Flotation	39.6	81.9	70.4			
Flotation	45.6	82.8	87.9	50.9	74.1	83.3

The test results showed that Crater Lake MET-01 and MET-02 samples are very amenable to XRT sorting, Dense media separation, Magnetic separation and Flotation. Scandium mineral concentrates can be produced by using simple magnetic separation (LIMS-WHIMS) techniques. XRT sorting and DMS offers potential to produce scandium mineral concentrate on a stand-alone basis or as preconcentration method for coarser size fraction. This could have a significant positive impact on the project's operating costs and capital expenditures.

About the Scandium Market

Scandium (Sc) acts as a grain-refiner and hardener of aluminum (Al) alloys. Al-Sc alloys combine high strength, ductility, weldability, improved corrosion resistance and a lower density. The combination of these properties makes aluminum-scandium alloys well-suited for industries that require next-generation lightweight structural materials for their platforms. Sc-modified Al alloys are highly valued as a critical lightweighting material as it is 35% the weight of steel and is 60 % of the weight of titanium alloys yet has equivalent mechanical strength characteristics.

The broader adoption of Sc in the aluminum alloys sector has been constrained by the limited availability of the metal in western commercial markets from the primary supply sources in China and Russia. The lack of reliable long-term supply sources to provide material for additional applications has also

constrained market growth. This has resulted in much higher prices for Sc compared to competing alloy materials, such as titanium and carbon composites, limiting its broader use. The current price of the metal oxide published by USGS indicates that it trades in a range of **approximately US$2,000-4,000/kg for 99.99% purity**.

Strong interest has been expressed by Canadian Federal and Provincial Governments to support development of Critical Mineral assets across Canada. This renewed enthusiasm was the result of the recent signing of the *Canada-United States Joint Action Plan on Critical Minerals Collaboration*. It highlights that Canada and the United States share a mutual interest in improving critical mineral security and ensuring the future competitiveness of Canadian and U.S. minerals industries. This agreement is anticipated to result in greater support for the development of critical mineral projects, such as Crater Lake, and the establishment of a strong North American mine-to-market supply chain to serve the automotive, aerospace, defense and fuel cell industries.

Imperial's Crater Lake project *is the only known primary bedrock source of scandium in North America with the potential for supporting a new domestic supply chain at prices that undercut the tipping point for broader consumption in manufacturing.*

Qualified Person

The technical content in this press release was reviewed and certified by Dr. Yemi Oyediran, P. Eng., Imperial's Manager of Metallurgical Development.

ABOUT IMPERIAL MINING GROUP LTD.

Imperial is a Canadian mineral exploration and development company focused on the advancement of its copper-zinc, gold and

technology metals properties in Québec. Imperial is publicly listed on the TSX Venture Exchange as "IPG" and is led by an experienced team of mineral exploration and development professionals with a strong track record of mineral deposit discovery in numerous metal commodities.

ABOUT M.PLAN INTERNATIONAL LIMITED

M.Plan International Limited is a joint venture between two internationally recognized consulting companies, Dorfner Anzaplan GmbH and Micon International Limited, combining their expertise in global geological and mining consulting with analytics, processing and engineering with significant experience in the specialty minerals and metals sector.

M.Plan has deep project experience from initial mineral resource estimation through to process development, engineering design and project development. M.Plan and its joint venture owners have been involved in several rare earth element projects globally and hundreds of development studies in the mining sector, including independent lenders' engineer assignments and as due diligence lead for multiple European and North American capital providers.

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