Progress Report #13 September 9th, 2015

I am pleased to bring you up to date several important developments since our last Progress Report #12 that was shared on May 28th.

Network Membership

CREEN has received annual dues payments from 12 industry members plus Natural Resources Canada & Quebec's Ressources Naturelles. CREEN continues to work with organizations that have pledged their participation and others who have expressed an interest in joining.

Network Management & Governance

As previously reported, the Canadian Institute of Mining, Metallurgy & Petroleum (CIM) and of Metallurgy & Materials Society of Canada (Metsoc) offered to host and provide back-office support to CREEN. I am pleased to report that the Terms of Reference (ToR) of the relationship have been agreed. The ToR recognize CREEN's unique mission & goals and paid membership structure. CIM/MetSoc will act in a fiduciary capacity with regards to CREEN's activities. Organizationally, CREEN will be established as a Special Committee within MetSoc, with the one member from each of CREEN's members-in-good-standing making up the Committee, and essentially serving as the CREEN Board. CREEN will continue to organize the successful REE symposia, first introduced in 2012. CREEN member institutions will each receive one complimentary CIM individual membership.

The ToR will facilitate the further strengthening of collaborative relationship with MetSoc sections, including considerations around the broadening CREEN's mission to address 'critical or technology materials'. The Committee/MetSoc arrangement will also examine possible models for revenue generation beyond the symposium organization.

CREEN Executive Committee

CREEN members-in-good-standing held its General Meeting on August 25th at which time it approved the ToR arrangements with MetSoc. Based on the expression of volunteered support, the members approved the appointment of a five-person CREEN Executive Committee, to hold office for a period of one year (to be revisited at COM16 in mid-September 2016):

- Chair –- Ian London (Avalon Rare Metals)
- Vice-Chair –- Boyd Davis (Kingston Process Metallurgy)
- Secretary/ Treasurer -- Steve Wilson (SGS Canada)
- Technical Lead – David Dreisinger (Search Minerals/UBC)
- Economics/Supply Chain Lead – Gareth Hatch (Innovation Metals)

Canadian REE R&D Initiative

As reported in Progress Reports #11 and #12, the Federal Government of Canada, through Natural Resources Canada (NRCan), is investing roughly $15.5 million over five years to stimulate the technological innovation needed to produce and separate rare earth elements (REE). Building on the successful technical Workshop hosted by CREEN in June 2014, NRCan convened a follow-on workshop on June 22nd with stakeholders from across the Canadian REE industry and academia to refine previously-established and identify any new R&D gaps and needs for the Canadian REE industry, and research projects that would be best addressed through this program.

The Workshop heard presentations from international experts in the area of rare earth elements processing, and an industry panel provided the backdrop for two key breakout sessions designed to identify research and development needs in the areas of advanced characterization, physical processing, leaching/cracking, separation, reagents, breakthrough/ emerging technologies and environmental challenges.

In addition to validating the areas of focus identified at the June 2014 CREEN workshop, several other projects were identified as priorities including (but not limited to) a separation roadmap, impurity removal, fundamental characterization of Canadian ores, review of separation technologies including techno-economic analysis, evaluation of secondary sources of REE in Canada, baseline assessment of the Chinese industry (e.g. production cost), improved understanding of mineral surface chemistry, and options to increase the separation factor in solvent extraction.

The R&D program, which is to be industry-driven and NRCan's CanmetMINING delivered, will aim to reduce the operating and capital expenditures of Canadian projects and lead to the ultimate production of separated rare earth element oxides at a competitive cost in Canada. The work will provide options to reduce and manage toxicity effects of radioactive elements such as uranium and thorium and other chemicals used in the processing of REE to accelerate and inform the environmental assessments of Canadian projects. Ultimately, the program is expected to deliver the technological innovation needed to ensure the emerging Canadian REE industry is equipped to contribute to the global production of the rare earth elements in an economical and responsible manner.

The Workshop results were summarized in an 80-page report shared among the delegates in mid-July. The Workshop also established four Technical Committee to provide ongoing expert advice and input in R&D areas covered under the Program. The Technical Committees convened their first meetings on Aug 25th, during COM15, to review detailed work plans for Year 1 and overall program design for the 5 year program. The Technical Committees also named the following industry co-Chairs of the Technical Committees:

- Characterization – Dominic Fragomeni, XPS
- Physical Processing – Claude Gagnon, COREM
- Leaching Separation – Neils Verbaan, SGS Canada
- Environment – Andre Gauthier, Matamec Exploratio

A Steering Committee, also collaboratively co-Chaired with industry, was established at the June Workshop to guide the overall Canadian REE R&D Initiative. Program Management responsibilities have been assigned to NRCan's Janice Zinck (janice.zinck@nrcan.gc.ca).

CREEN Outreach

Critical Materials Institute (CMI) – CREEN was invited to and delivered one of the opening day addresses at CMI's (two-and-a-half day) 3rd annual meeting in early August. The CMI has recently completed its second full year of operations, with some 300 scientists and engineers working on a wide-range of critical material processing, recycling and environmental projects. Year three of the CMI program foresees definitive and bold results, including technical discoveries, licencing/commercialization of new technologies and international collaborative research partnerships. There are clearly opportunities for the Canadian REE R&D Program to collaborate in the areas of leaching/separation, environment and elsewhere.

NATO – NATO continues to be interested in the risks and solutions around critical materials and is constituting a new AVT (Advanced Vehicle Technologies) panel with a specific critical materials focus. CREEN has been invited to participate on the panel, with other panel members coming from the US, Australia, and across-European member countries. The focus of the new panel is primarily 'education-oriented' so as to get NATO members up-to-speed on the latest and anticipated technical & economic issues and possible solutions related to its needs. The new panel is set to hold its first meeting in mid-October. (Note: This new panel is a follow-on to an earlier rare earth panel AVT 231 on which CREEN was involved.)

COM16 REE Symposium - The COM16 REE Symposium is to be convened in Quebec City in September 2016 in conjunction with IMPC2016 (International Mineral Processing Congress). The REE Symposium Organizing Committee, chaired by SGS' Niels Verbaan, is working toward presenting some 70 papers from 15 countries, which builds on and reinforces the international reputation established with COM's 12, 13 and 14. The Call for Abstracts is still open to accept high quality submissions.

MetSoc recently announced that COM18 will be convened in conjunction with MST&T 2018, to be held in Columbus Ohio; the first time this Canadian premiere program will be held outside Canada.

Fifth Trilateral EU-US-Japan Meetings (Oct 26th-29th, Sendai, Japan) – This year's international forum will focus on Substitution of Critical Raw Materials. Canada and Australia have generally been invited to participate in this forum.

Other Initiatives

The CREEN network was established with a specific REE focus in light of the global market demands and industry's needs at the time. Over the intervening years, the nature of which rare metals are deemed critical has shifted in response to advances in technology and changes in demand/supply scenarios. CREEN will consider the merits and best approaches to Canada of broadening CREEN's mission to better address the broader scope of critical/technology metals to meet evolving clean energy and economic objectives.

Industry-wide Education & Info Sharing -- CREEN has been approached by several member companies and a number of external organizations (national and foreign) inquiring if there is any platform for global players to consistently address and communicate, in an scientific and independent matter, on economic and trade opportunities, environment and radioactive risks and management, and relevant matters. The CREEN Executive Team will meet to consider interests and options, and welcomes any insights and ideas from the CREEN Progress Reports audience.

CREEN Website -- www.ree-etr.ca was quickly pulled together on CREEN's launch in October 2013. It clearly needs to be up upgraded, particularly with our growing audience. CREEN will be pulling together a small task group to present options.

As always, I hope you find these progress reports helpful. Please feel free to contact CREEN with any suggestions you may have.

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