

## TOWARDS ZERO WASTE MINING: THE EVOLUTION OF CANADA'S MINERAL SECTOR

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### **Canada's Mining Industry**

Mining accounts for over 20% of Canada's overall exports and over \$52 billion (3.4%) of its GDP. The sector provides 330,000 direct Canadian jobs and supports nearly one million indirect service jobs. Mining is the most critical factor with regards to expanding economic growth and skilled employment in Canada's North. *As a sector, the mining industry is the single largest employer of Aboriginal Canadians.*

Base metal mines effectively recover less than 1% of the volume of rock extracted, whereas most gold deposits recover less than a hundredth of a percent. The result is the extraction of huge volumes of rock that end up either in mine waste piles or tailings ponds. Both represent a major part of production cost and of the mine footprint that must be managed for their potential environmental impact long after mine closure. The Canadian mining industry's greatest challenge then is how to more efficiently extract the desired commodity through the minimal displacement of host rock, and more effectively managing mine tailings that continue to be produced. Solving this challenge will result in Canada's mining industry increasing revenues, reducing long term liability, and enhancing an international reputation for responsible mineral extraction, with resultant increased community buy-in and improved social license.

### **Canada Mining Innovation Council: Coordinating and Implementing Innovation**

The mining industry spent \$638 million (2012 figures) in research, development and innovation (RDI), more than motor vehicles and auto parts, machinery, wood products and paper sectors and employed 5,562 personnel in RDI, more than pharmaceuticals and forestry. And yet, like much of Canada's innovation agenda, these many different initiatives are not effectively linked and coordinated between RDI centres, government laboratories and academia.

The Canada Mining Innovation Council is a national non-profit organization that coordinates and develops RDI programs in response to *life of mine* challenges defined by its industry members. These 82 members include mineral exploration and mining companies and their service providers, working together towards common solutions to common challenges. This allows for financial shared risk and wider spread benefits. Challenges are defined and prioritized, and programs developed by CMIC technical groups. CMIC technical groups are led by Canadian company vice presidents and populated by leading industry experts in the fields of mineral exploration, extraction, processing, mine waste management and energy.

### **The CMIC Zero Waste Initiative**

The CMIC technical groups are addressing a number of cross-disciplinary and linked initiatives leading towards reducing the mining footprint. The groups have identified targets and are developing innovation priorities that will lead to significant reductions in mining waste in the next 5 years and move towards net zero waste in mining and mineral processing in 10-20 years. These end points would be staged through more efficient definition of new ore discoveries, more effective *in situ* mining methods to minimize waste rock production, closed system processing to reduce water and energy waste, and refinement of mine tailings towards a benign, saleable product. Rather than having each of these innovation paths developed separately, the CMIC Zero Waste initiative is developing industry-academic-government consortia through both parallel and sequential linkages. These inter-disciplinary and inter-sectoral consortia will minimize overlap and focus joint efforts on the mutually understood end point of zero mine waste.

The program will make Canada a leader in sustainable mining practices, a leader in the development and adoption of new technologies and a leader in exporting new mining technologies. Step-wise achievements in meeting a zero mine waste end point will produce significant economic benefits, high paying jobs and the sustainable development of remote, northern communities.

### **Linkage with Government Policy Priorities**

CMIC is the only industry-led Canadian organization to put in place a strategic *Zero Waste Mining* roadmap at a scale that will impact the entire Canadian mining industry at operations both in Canada and internationally. The CMIC *Towards Zero Waste Mining* initiative addresses several federal government priorities under Canada's Economic Action Plan and Canada's Northern Strategy. This includes:

- *Responsible Resource Development and Jobs*
- *Enhancing Environmental Protection*
- *Aboriginal People's Participation in Canada's Resource Economy*
- *Supporting Entrepreneurs, Innovators and World-Class Research*

### **CMIC Recommendation**

An accelerator funding mechanism for CMIC is required that provides an efficient and effective mechanism to leverage current and future industry investments, reverse the trend of Canadian mining companies investing in innovation overseas and building a sustainable mining industry for the future.

Development of the program streams included in the CMIC *Zero Mining Waste* roadmap will require a 5 year, \$18M investment by the federal government, with matching funding from industry, as an indication of it's commitment to responsible resource development across Canada, and to claiming Canada's leadership role in the minerals industry.