

PRESS RELEASE

For immediate release

Mining Innovation Launch: Hydraulic Air Compressor (HAC) Demonstrator

Sudbury, ON (June 21, 2017) – After a seven month long build, the Hydraulic Air Compressor (HAC) Demonstrator at Dynamic Earth has officially opened. The 100 feet high (above and below ground) industrial scale system for testing and demonstration of compressed air production is installed in a former elevator shaft at Science North's Dynamic Earth in Sudbury, ON. This innovative technology provides an energy efficient alternative to conventional mechanical air compression that promises up to 50% savings in lifecycle cost for mine operators and other industrial scale users of pneumatic power.

The HAC Demonstrator project is a joint undertaking of the Ultra Deep Mining Network (UDMN) - a business led-NCE, with MIRARCO Mining Innovation, Laurentian University, Electrale Innovation Ltd. and Reasbeck Construction. Canada's Ultra-Deep Mining Network, hosted at CEMI, continues to make strides in resolving the challenges that impact resource extraction in ultra-deep (below 2.5km) environments.

This UDMN project was combined into two phases: research and construction, with a total value of \$3.375 million. Significant financial contributions included: \$463,000 through the province's Northern Ontario Heritage Fund Corporation (NOHFC); \$499,000 from the Independent Electricity System Operator's (IESO) Conservation Fund; and \$620,000 from Electrale Innovation Ltd and MIRARCO – Mining Innovation, with contributions from Victaulic Canada and KROHNE Canada. Additional support was provided by Science North / Dynamic Earth, Vale Canada, the Ontario Trillium Foundation and the Canada Foundation for Innovation (CFI).

The construction project was a team effort coordinated by general contractor Reasbeck Construction Inc. with project management by the Centre for Excellence in Mining Innovation (CEMI), that drew upon the skills and services of numerous Sudbury-based businesses: Specialty Alloys and Stainless, Talevi Welding and Mechanical, Hanking Mechanical, Fuller Industrial, Sling Choker, Flynn, Admira DHES Inc., Riventa Canada, Blackrock Engineering, Nortec Industries, IONIC Engineering, KROHNE Canada/Bridson Process Controls, Synergy Controls, Cementation Canada, and Victaulic Canada. The Cambrian Innovates team at Cambrian College was commissioned to fabricate the air-water mixing head, a specialty item that followed a design created by Charles Havelock Taylor in 1905 for the HAC embedded in the concrete abutments of the Peterborough Lift Lock, on the Trent-Severn Canal, now operated by Parks Canada.

At the opening event, guests met the HAC team, partners and sponsors and those who contributed to the build, they were guided on a tour of the facility by the project team members, enjoyed BBQ food and listened to a special briefing from the project leader, Dr. Dean Millar, entitled: *What the heck is the HAC?*

Hydraulic Air Compressors promise low cost, low carbon, energy efficient compressed air for all industries requiring pneumatic power, but there is a special synergy with the mining industry because the systems have great vertical extent. The objective of the wider project is to lower the cost of energy for mine operators to help maintain the global competitiveness of the Ontario Mining Industry. One intended new use for the compressed air produced by a HAC is for refrigeration of ventilation air for ultra deep mine cooling. Once the facility is opened, innovators from MIRARCO,

scientists and engineers from Laurentian University and engineers from the industry partners will work collaboratively to prove the energy efficiency of the systems and to investigate their feasibility for mine cooling, gas liquefaction and carbon capture. Electrale Innovation Ltd is already exploring commercial opportunities for this energy efficient technology.

For more HAC info visit: www.electrale.com For a guided tour email: info@mirarco.org

Project Principal Investigator, Dr. Dean Millar, Professor in the Bharti School of Engineering at Laurentian University, Director of Energy Renewables & Carbon Management at MIRARCO and President of Electrale Innovation Ltd. states, “We are sincerely thankful to our funders and collaborators for investing in the development of the HAC project. The historical and spiritual home of this technology is the mining industry of Ontario’s North. In its 21st century guise, we are confident that this Northern Ontario Mining Cleantech will achieve its energy efficient air compression and mine cooling objectives so that costs are lowered for mine operators. We are also excited by its potential for carbon capture for industry, right across the Province.”

“The addition of the HAC to Dynamic Earth allows us to demonstrate exactly what can be achieved when we bring the best of Northern Ontario together. By combining the experience of our mining industry with our leaders in the world of education and innovation, we have been able showcase our strengths to the world. With contributions from the Northern Ontario Heritage Fund Corporation as well as The Ontario Trillium Foundation we have been able to build a demonstration of innovative, energy efficiency, clean technology.” - Hon Glenn Thibeault, Ministry of Energy & MPP for Sudbury

“This UDMN project will show that hydraulic air compressors will be able to supply compressed air to provide a novel technique for mine air cooling in ultra-deep mines, and that it can do so safely, cheaply and reliably. This will increase the ability of mines to improve productivity in both development and production processes,” stated UDMN Network Director and CEMI President & CEO, Douglas Morrison.

Terry Young, Vice-President, Conservation and Corporate Relations, IESO remarked, “The IESO, through its Conservation Fund, is proud to support projects like these across all sectors that embrace new technologies and engage large consumers in new ways to help foster a culture of innovation in Ontario. Electrale Innovation’s leading edge project will play an important role in supporting a competitive and sustainable electricity system in Ontario. We look forward to seeing the results of the project.”

Dominic Giroux, President of Laurentian University stated, “This initiative has resulted from the vibrant, mining industry-facing focus of innovation created at Laurentian University. We are committed to the Project’s success in achieving the science and innovation objectives and maximizing the positive impact it will have on the economic development of the region and the province.”

Guy Labine, CEO of Science North stated, “Science North was thrilled to work with Dr. Millar and offer our site for this research project at Dynamic Earth. We knew our earth sciences centre would be a great facility for this, with the old Big Nickel Mine shaft in which the HAC is now housed, but also we saw a future opportunity to have our Bluecoats communicate this ground breaking research to our visitors for years to come.”

Mike R. Reasbeck, President, Reasbeck Construction Inc. remarked, “As the lead builder of the HAC demonstrator, we are proud to be part of the team who transformed this innovative technology into an industrial scale system for testing

and demonstration. This full scale demonstrator opens the door to commercial opportunities for the mining sector to adopt and implement into the deepest mines in Canada and beyond. Reasbeck is a Canadian multi-trade general constructor established to satisfy the growing demand for consistent and dependable source of construction services.”

About UDMN

The Ultra-Deep Mining Network (UDMN) is a national \$35M business-led NCE network, managed through CEMI – Centre for Excellence in Mining Innovation, and supported by members of the mining, oil & gas industries, and with the active participation of small-to-medium sized enterprises, industry agencies, research facilities and academia. UDMN aims to become the leading organization in Ultra-Deep (below 2.5km) research and innovation and to solve the challenges that impact resource extraction in these environments. www.miningdeep.ca

About Laurentian University

Laurentian University offers an outstanding university experience in English and French, with a comprehensive approach to Indigenous education. Laurentian University, situated on the traditional territory of the Anishinabe peoples of Atikameksheng First Nation, prepares students as agents of change and empowers them to create innovative responses to local and global challenges. Laurentian’s students benefit from small class sizes and exceptional post-graduation employment rates. With nine Canada Research Chairs and nineteen research centres, Laurentian is a recognized leader in its specialized areas of research strength, which include mining innovation and exploration, stressed watershed systems, particle astrophysics and rural and northern children’s health. Laurentian University has secured over \$100 million in research income in the past five years. www.laurentian.ca

About Electrale Innovation Ltd

Electrale Innovation Ltd develops products that we believe will have a global impact on reduction of GHG emissions because we regard Sustainable Development as our core mission. Our strategy is to embed technological solutions for GHG mitigation within industry. Green energy solutions are no longer just reflections of passionate environmentalism; they are now ‘alternative’ energy technologies only in that they offer lower costs. In developing our technologies by working with, and for, globalised industries like mining, we aim to infuse these benefits into those industries as we know they will enhance their financial sustainability. We think that this is the fastest way to bring about meaningful Climate Adaptation at the scale we aspire to. Through the innate leveraging of partnership working, Electrale Innovation Ltd has brought together a delivery / supply chain team for Hydraulic Air Compressors that is totally committed to excellence and poised to deliver substantial value to mining clients. www.electrale.com

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