

CLEAN RESOURCES

CLEAN TECHNOLOGY

CRITICAL MINERALS AND EMERGING TECHNOLOGY - EMERGING TECHNOLOGY

FUNDING DETAILS

Qualification of a Deep Cryogenic Treatment Facility

The project will assemble, test, qualify and validate the world's first deep cryogenic treatment (DCT) equipment built for mining applications - scaled for industrial use and export- integrating an on-site liquid nitrogen generator to provide infinitely renewable and infinitely recyclable™ liquid nitrogen (LN2). This will create a turnkey, engineered and customer-validated platform solution that can be leased or sold to domestic and export markets. The success of this project will enable a low cost, highly effective wear improvement technology to locate at remote mining locations - significantly reducing the high cost of diesel fuel and re-supply logistics.



RECIPIENT:
**Deep Cryogenics
International**



PARTNERS:
**Kinross Gold
Corporation,
University of Alberta**



TOTAL BUDGET:
\$640,000



AI FUNDING:
\$200,000



PROJECT DATES:
**JAN 2023 -
DEC 2023**



PROJECT TRL:
**Start: 7
End: 8**

APPLICATION

DCT is a -196°C cold treatment process that permanently increases wear resistance, yield strength and abrasion resistance in most steel alloys from 20-70%; it can also increase the conductivity of copper, improve surface finishes, lower corrosion rates, and significantly shrink heat affected weld zones. The low-cost, short treatment process doesn't change dimensional size, is non-toxic, uses no chemicals and generates no environmental waste, and has multiple industrial applications.



ALBERTA INNOVATES CLEAN RESOURCES

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PROJECT GOALS

Overall project objectives include:

- Qualify, test, validate, commission and generate documentation for the DCT platform
- Integrate use of an on-site liquid nitrogen generator to provide reliable, infinitely renewable and infinitely recyclable™ LN2
- Validate operational success both at scale and as effective across a variety of customer applications
- De-risk technical challenges involving LN2 transfer, software interconnect and platform communications
- Create a turnkey, engineered platform solution that can be sold or leased to domestic and export markets

BENEFITS TO ALBERTA

The successful implementation of this technology or use of the knowledge generated could result in:

- Reduction in water, land and other environmental impacts by diverting toxic metals and alloy treatment chemicals and coatings displaced by DCT
- Reductions in greenhouse gas emissions through extended wear of critical mining equipment, and reduced distances for equipment through onsite treatment
- Development of new career opportunities in Alberta's clean resources sector to help strengthen and diversify Alberta economy



2 Publications



2 Patents



1 New
Product/Service

CURRENT STATUS

FEB 2023

Project kicked off in January and is progressing on schedule. First phase includes preparation and qualification steps to enable DCT platform interface with autonomous liquid nitrogen transfer from generator to storage.