SASKATCHEWAN RESEARCH COUNCIL

SRC Rare Earth Processing Facility

Saskatchewan:

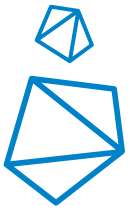
A Key Player in the Global Mining Industry

As the world looks to secure access to the critical minerals vital for telecommunications, computing and clean energy, Saskatchewan (and Canada) are well-positioned to meet that demand.

Saskatchewan is among the best places in the world to invest in critical minerals, as the province has a reputation as a world leader in mining investment attractiveness, resource potential, a strong stable government, and ethical and sustainable practices. Saskatchewan has high-quality and easily accessible geoscience and mineral resource information to inform and attract exploration for new discoveries. The province offers attractive exploration incentives and tax credits, and has a highly competitive royalty system for base, precious and emerging critical minerals.

- The Fraser Institute ranks Saskatchewan as the most attractive jurisdiction in Canada for mining investment and the third highest globally.

- The Fraser Institute ranks Canada as the number one country in the world for mineral investment (based on the combined rankings of all the provinces and territories).

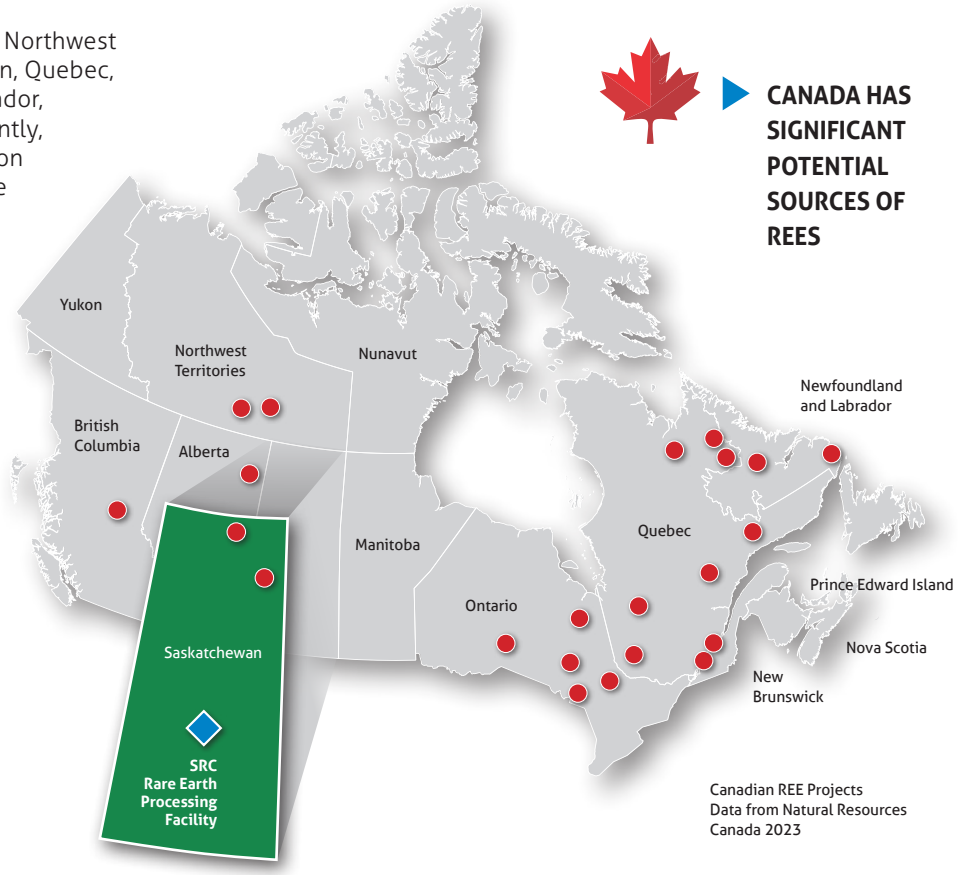


Saskatchewan is home to **23 of the 31** minerals identified by the Government of Canada as essential for an economically secure, low-carbon economy. Saskatchewan's **Critical Minerals Strategy** (released in 2023) includes goals around doubling the number of critical minerals being produced in Saskatchewan by 2030 and establishing Saskatchewan as a rare earth element hub.

REE Industry in Canada and Saskatchewan

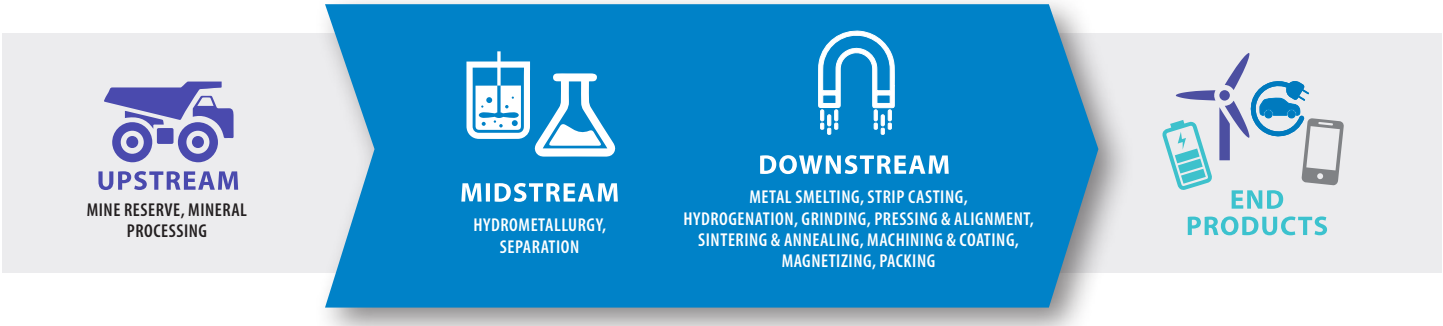
Canada has some of the largest known reserves (measured) and resources (indicated) of rare earths in the world, estimated at over 15.2 million tonnes of Rare Earth Oxides (REOs) in 2022.

- These deposits are located in the Northwest Territories, northern Saskatchewan, Quebec, Ontario, Newfoundland and Labrador, and Alberta shale deposits. Currently, most of them are under exploration and have the potential to produce concentrated REE ore within the next five to ten years.
- With its plentiful REE deposits and considerable mining expertise and talent, Saskatchewan is well positioned to establish the REE processing industry, from mine to magnets.
- Saskatchewan has a secure and stable supply chain that provides the food, fuel, fertilizer and critical minerals needed to support a growing world.



Canadian REE Projects
Data from Natural Resources Canada 2023

REE Global Supply Chain



Most of the world has been dependent on foreign sources of critical materials for many decades. This import dependence can be a concern because it puts supply chains and material users at risk.

With the evolution in both the auto and energy industries, hydrocarbon demand is diminishing and REE demand is increasing. The secure supply of rare earth elements and the resiliency of their supply chains are essential to meeting this demand.

The REE supply chain is complex and poses many challenges to develop because there are many individual stages of the full REE production chain including mining, beneficiation, hydrometallurgy, separation, metal alloys, magnets, original equipment manufacturers (OEM) and finally end use.

SRC Rare Earth Processing Facility – First of Its Kind in Canada

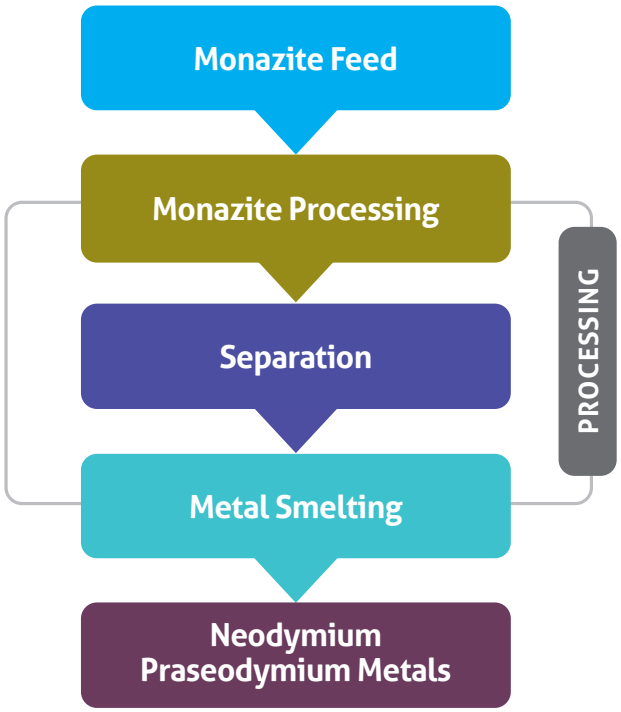
With support from the Government of Saskatchewan, the Saskatchewan Research Council (SRC) is constructing North America's first fully integrated, commercial, demonstration Rare Earth Processing Facility, with hydrometallurgy, separation and metal smelting units.

- The SRC Rare Earth Processing Facility is positioned as a catalyst to stimulate the resource sector in Saskatchewan and across Canada, providing the early-stage supply chain needed to generate industry investment and growth.
- The Facility will begin to establish an REE technology hub in Saskatchewan, forming an industry model for future commercial REE initiatives and supply chain development.
- Targeting Net Zero on REEs by 2030

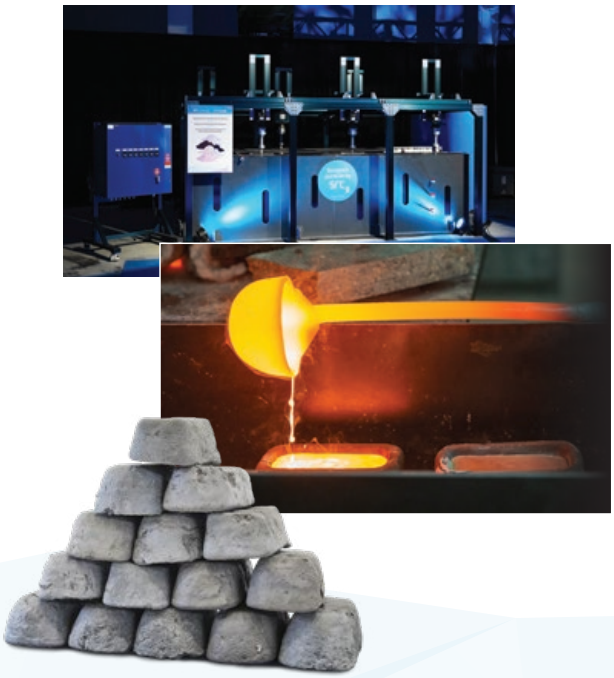
Separation and Metal Smelting

- Proprietary Solvent Extraction Cell and Metal Smelting Technologies
- Designed, Manufactured and Installed by SRC
- Proprietary Processes and Operation Methods
- AI and Automation Applications Improve Product Quality and Operating Costs

SRC Facility



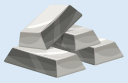
SRC, one of Canada's leading research and technology organizations, has investigated lithium and REE technologies for over 15 years. SRC is home to world-class REE experts and is recognized nationally and internationally as a centre of expertise in REE extraction and processing technology.



Production Capabilities

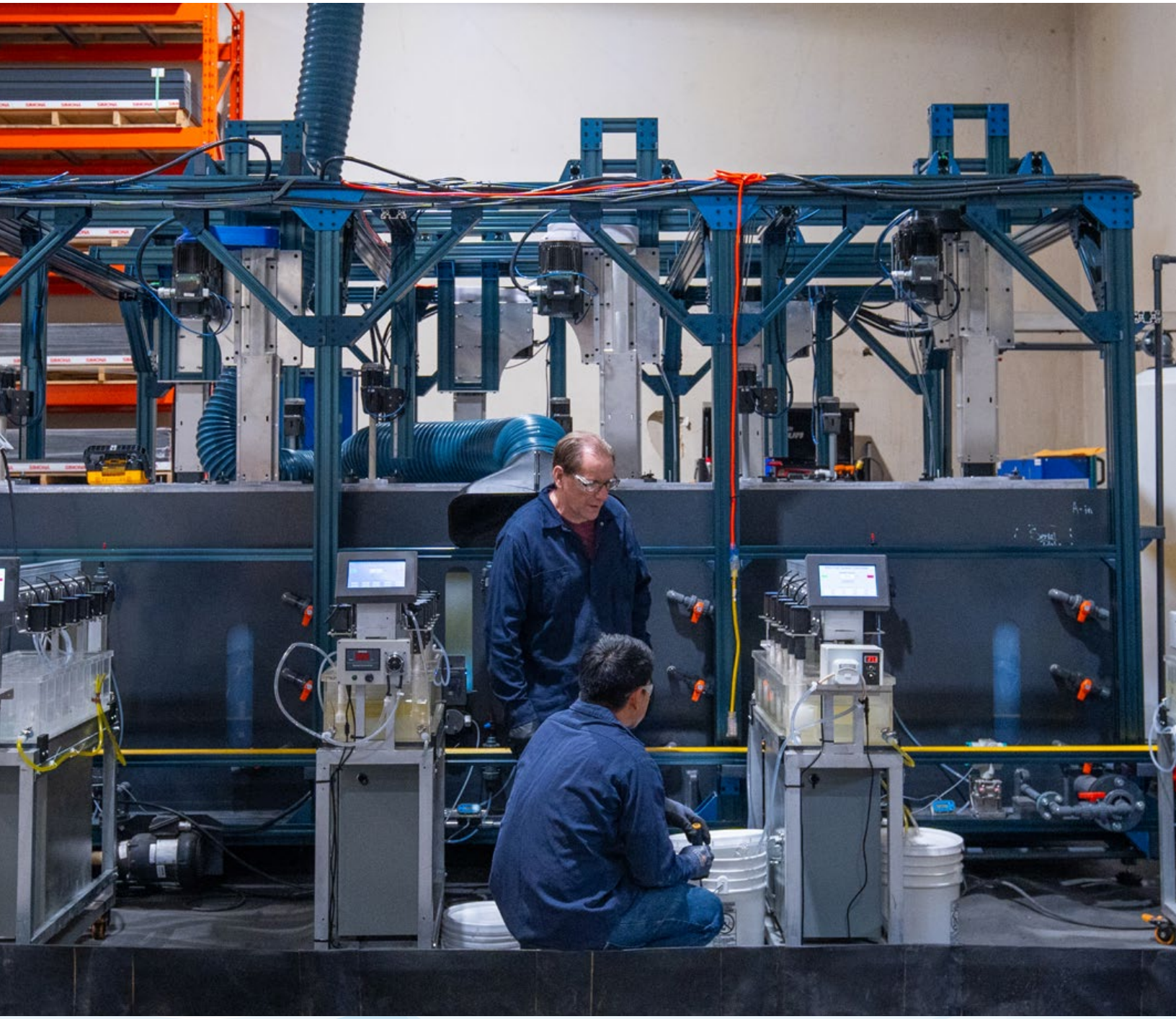
- The SRC Rare Earth Processing Facility will be operational in 2024.
- SRC is open to discussing the offtakes for monazite feed and the Separation and Metal Smelting Units product line.
- SRC will also consider the toll processing of various materials in its facilities from 2026 on.

REE Facility Products

Product	Tonnes per year (Up to)	REO Distribution (tonnes per year, tpy)
 **Byproduct Tri-Sodium Phosphate (TSP)**	3,000	Tri-sodium Phosphate = ~3,000
 **Medium/Heavy Mixed REE Carbonate**	450	**Medium REOs** Samarium, Europium, Gadolinium = ~75 **Heavy REOs** Terbium, Dysprosium, Holmium, Erbium, Thulium, Ytterbium, Lutetium, Yttrium = ~100
 **Lanthanum/Cerium Mixed REE Carbonate**	1,900	Cerium Oxide = ~600 Lanthanum Oxide = ~300
 **Neodymium/ Praseodymium Metal Alloy**	400	Neodymium Oxide = ~320 Praseodymium Oxide = ~80
 **Dysprosium Oxide**	20	Dysprosium Oxide = ~20
 **Terbium Oxide**	5	Terbium Oxide = ~5

Solvent Extraction Cells

- SRC designed and manufactured proprietary commercial-scale solvent extraction cells for its Rare Earth Processing Facility.
- Saskatchewan and Canada are now only one of a handful of jurisdictions in the world with this capability.
- SRC has developed proprietary artificial intelligence technology for the automation of its solvent extraction cells.



Metal Smelting

- SRC's industrial-scale REE Metal Smelting Unit is capable of producing neodymium, praseodymium, and didymium metals.
- SRC has achieved a sustained recovery factor of over 96 per cent.
- SRC has achieved a sustained purity of over 99.5 per cent.
- SRC has recycled 100 per cent of the production waste from its Metal Smelting Unit.
- SRC has managed 24/7 operations with limited staffing with its proprietary artificial intelligence assistance.

SRC Metal Ingot Production

Summary of Analyses

Element	wt.%
Lanthanum	0.14
Cerium	0.64
Praseodymium	26.77
Neodymium	73.61
Samarium	0.05
Others	0.00
Total REE	**99.31**

Impurities	wt.%
Magnesium	0.02
Iron	0.92
Silicon	0.05
Aluminum	0.25
Molybdenum + Tungsten	0.01
Calcium	1.25
Carbon	0.45
TOTAL	**100.00**

Completing the Strategic Supply Chain

- After a successful test run of its Metal Smelting Unit, the under construction SRC Rare Earth Processing Facility became the first large-scale producer of magnet metals in Canada.
- Metal ingots, a rare earth metal, are the key ingredient used to manufacture permanent magnets which are used in electric vehicles, wind turbines, electronics, etc.

The SRC Rare Earth Processing Facility will produce enough metals to create 500,000 electric vehicles annually.

Sustainability is at the Forefront of SRC's Rare Earth Processing Facility

SRC will solely operate the commercial demonstration facility at the highest environmental standards and we own all the necessary permits. Our target is to be net zero on REE within the first few years of operation. There will be zero liquid discharge from the Facility.

- SRC works closely with its clients and stakeholders to explore opportunities and develop sustainable solutions for now and in the future. We are committed to providing positive environmental impacts in our province and around the world through diverse projects and initiatives.

Tailings Management

SRC has years of scientific, technical and management knowledge dealing with tailings, as well as experience working with regulators, communities, Indigenous groups and industry. Our capabilities in this area also include holding licences from the Canadian Nuclear Safety Commission (CNSC), as well as expertise at our Pipe Flow Technology Centre™ and through our remediation project in northern Saskatchewan that involves managing tailings remediation work at a large abandoned uranium mine site.

SRC Collaboration Opportunities

In the future, SRC will be seeking investment into further developing and expanding the REE sector.

SRC offers a fee-for-service model that provides services and expertise to clients.

- As a Treasury Board Crown Corporation, SRC works closely with the Government of Saskatchewan, including the Ministry of Trade and Export Development, the Ministry of Energy and Resources and the Ministry of Environment. SRC can help facilitate communication between the private sector and the Government of Saskatchewan for licensing and permitting, funding opportunities and investment credits.
- Over the past 75 years, SRC has built strong relationships within the mining sector in Canada and Saskatchewan. We are working closely with the burgeoning rare earth mining industry in Saskatchewan to help develop this emerging sector.
- SRC protects any intellectual property it develops on its own or as required for its clients. This may include copyrights, patents and trade-secret information. SRC and its employees will not knowingly infringe upon the intellectual property of an organization or individual. Intellectual property is covered under a standard clause as part of client agreements and negotiated on a case-by-case basis.

For more than 60 years, SRC has actively engaged with the uranium and nuclear industry on numerous fronts. Our work has encompassed research to improve analyses and processes, project management and on-the-ground operational support.

Future-Focused Support for REE Sector

Growth

The Government of Saskatchewan and SRC have the capacity and capabilities to develop the REE industrial sector, from minerals to metals.

Facility Expansion Plans

- Expansion plans for SRC's Rare Earth Processing Facility include producing permanent magnets, with the capability to use both rare earth ingots and magnet scrap feed as feedstock.

Technology Licensing

- SRC is exploring the licensing of its metal smelting technology and its solvent extraction processing technology, which includes the design, fabrication and installation of custom-built, proprietary solvent extraction cells.
- Both technologies use artificial intelligence and automation to maximize efficiency and safety and reduce operating costs, while maintaining product quality.

Research and Technology Support

- SRC's world-renowned experts offer research and technology development support to the REE industrial sector—from proof of concept to commercialization—using a stage-gated, fast-to-fail approach for the development of this sector in Saskatchewan, Canada and beyond.

REE Services Across SRC

Mineral Processing

The Saskatchewan Research Council's (SRC) Mineral Processing team provides leading-edge research, development and demonstration services for a variety of commodities and minerals processing technologies. SRC's team of engineers and scientists have extensive experience and know-how in all aspects of REE process testing and development.

Mineral Analysis: Geochemistry and Mineralogy

SRC is Saskatchewan's most advanced and complete mineral analysis centre supporting resource industries through its Geoanalytical Laboratories and Advanced Microanalysis Centre™. We have the necessary analytical tools, expertise and experience to provide you with a wide range of services and analytical packages, all available from one location.

Our labs and experts are focused on providing leading-edge research, development and demonstration, as well as analytical services to support companies, consultants, researchers and governments with mineral exploration, mineral processing, tailings management and reclamation and mine closure. We have specialized expertise in mineralogical characterization for sensor-based sorting technologies, which are becoming more important in REE projects.

Service Capabilities

- Technology and Process **TESTING** (Primary and Secondary Resources)
  - **Bench**
  - **Pilot**
  - **Field**
- Technoeconomic **EVALUATION** of REE technologies
  - **Mineralogy**
  - **Process**
  - **Equipment**
- Process **DESIGN**
- **OPTIMIZATION** and **TROUBLESHOOTING** of REE hydrometallurgical and separation plants
- **PRODUCT MANUFACTURE** and tolling services to produce either marketing samples or production
- **GEOCHEMICAL** Assays - Lithium metaborate fusion or hydrofluoric acid total digestion with an ICP-OES or ICP-MS finish
- **MINERALOGICAL** Analysis – QEMSCAN® and XRD
- Radioactive Samples – Separate **CNSC-LICENSED** facility for thin sectioning and density measurement

For more information please visit:

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