

2016 Mineral Development and Exploration Highlights Minnesota, USA



MINNESOTA
#5 in United States Non-Fuel Mineral Production Value in 2016

STATE PLANS TO HOLD THE 35TH STATE METALLIC MINERALS LEASE SALE

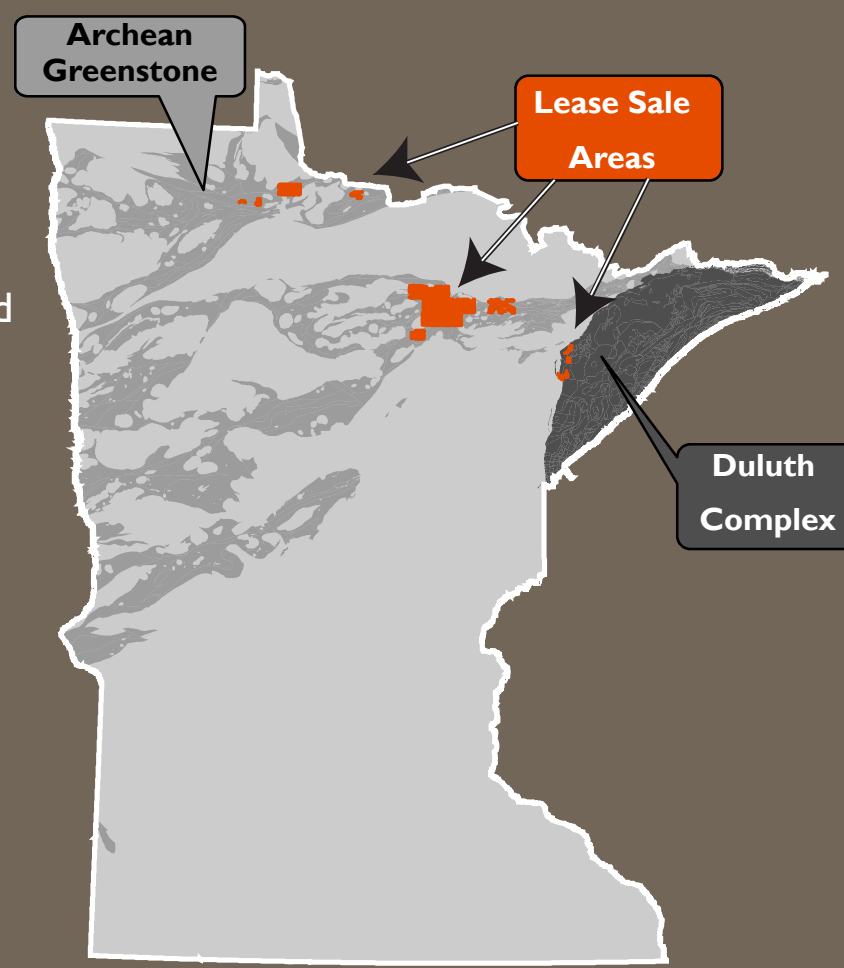
The Department of Natural Resources has announced plans to hold a sale of state-owned metallic mineral leases for sites in northern Minnesota.

The DNR is considering putting up for bid over 300 square miles of state-managed mineral lands, which include sites in Beltrami, Itasca, Koochiching, Lake of the Woods and St. Louis counties.

The areas under consideration are in known high mineral potential zones:

- The Duluth Complex (Midcontinent Rift Zone)
- The Archean Superior Province Greenstone Belts

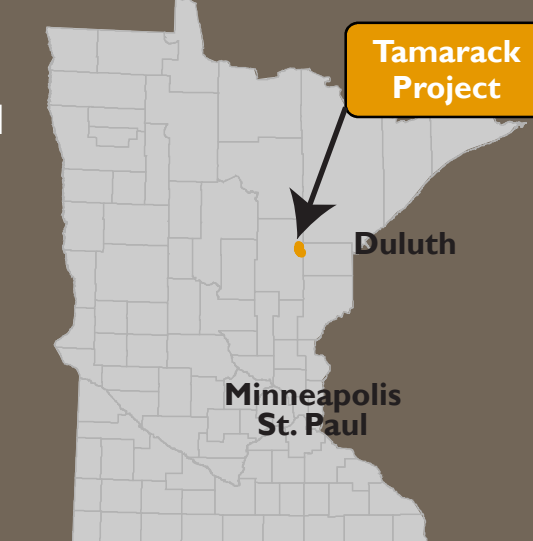
http://dnr.state.mn.us/lands_minerals/leasesale/index.html



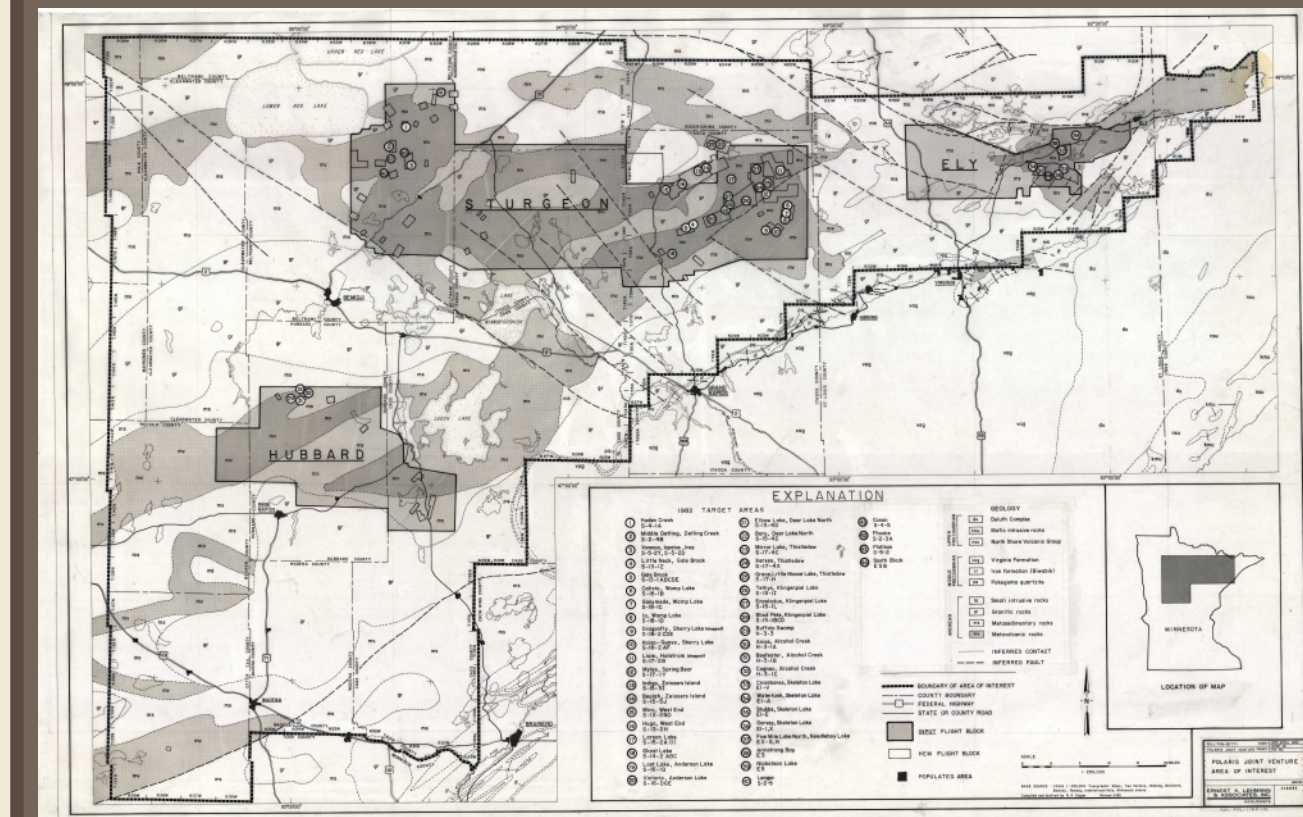
EXECUTIVE COUNCIL APPROVES NEW METALLIC MINERAL LEASES AT TAMARACK

On February 23, 2017, the State of Minnesota's Executive Council approved a request by Kennecott Exploration Company to expand its land position at the Tamarack Nickel-Copper-PGE project with an additional 6,800 acres of state-managed mineral rights. Kennecott now holds 99 state metallic mineral leases, covering more than 43,000 acres (177 square kilometers).

The leases were obtained through a negotiated lease process that allows mineral exploration companies to expand their operational footprint outside of the annual metallic mineral lease sale process.



HISTORIC MINERAL EXPLORATION DOCUMENTS ONLINE



http://www.dnr.state.mn.us/lands_minerals/polaris/index.html

A generous gift from the Lehmann Family Fund had made historical hard-copy mineral exploration data from the 1980s available and digitally accessible to the public and to the industry. The donation honors the lifelong work of Ernie Lehmann who was a pioneer in evaluating the mineral resource potential of Minnesota's greenstone belts and Duluth Complex.

The data represents a study area of 13,000 square miles and includes volumes of historical mineral exploration records.

In August of 2016 the DNR posted the collection online as new digital data. There are approximately 20,000 individual pages available from this collection comprised of 2,056 documents. The documents include reports, maps, and raw data; nearly all have been scanned and are available online. The collection can be searched in a spreadsheet, in GIS, and also in an interactive web map application.

2016 PRIVATE COMPANY MILESTONES

PolyMet Submitted its Permit to Mine Application	Poly Met Mining, Inc. (PolyMet) is proposing to develop a mine and associated processing facilities for the extraction of copper, nickel, and platinum group elements (PGE) in northeastern Minnesota. In November 2016 PolyMet submitted its permit to mine application to DNR. The application includes the proposed mine plan, financial assurance, and the wetlands replacement plan. The Permit to mine application as well as water appropriation and dam safety applications are currently under review by DNR technical experts and consultants hired to assist the DNR. The State of Minnesota established an internet portal (polymet.mn.gov) to share updates on PolyMet permit applications and additional project information.
Kennecott Exploration and Talon Metals continue the Tamarack Project	In 2016, Kennecott Exploration Company and Talon Metals Corp completed 21 new exploratory borings, 8 wedges and a boring extensions at the Tamarack Nickel-Copper-PGE project. High grade Ni-Cu intercepts were recorded both within and distal to the ore body described in a 2014 NI 43-101 Technical Report, including 10.5 meters grading at 5.88% Ni, 2.32% Cu, 0.93 g/t PGE and 0.09 g/t Au. The companies have co-funded a US\$3.5 million exploration campaign for Winter 2016-17 that is mainly focused on testing new targets identified from expanded gravity and magnetotelluric ("MT") surveys completed in 2016.
Vermillion Gold undertakes rotasonic drilling campaign in the Linden Grove exploration area	Vermillion Gold LLC initiated a Winter 2016-17 rotasonic drilling campaign to test potential gold mineralization within the Linden Grove exploration area, located within a portion of the Archean Superior Province. The exploration program collected samples of glacial sediment and the uppermost portion of underlying bedrock, using the same technique that initially identified New Gold's Rainy River deposit, located in Ontario 20km north the Minnesota border.
U.S. Steel reopens Keetac Iron Mine	U.S. Steel announced in December 2016 that it would reopen its Keetac taconite iron ore mine and processing center, after securing agreements to supply iron ore pellets to third-party customers. The early January 2017 restart brought hundreds of workers back to work after a protracted idling, with production anticipated to begin in March 2017.
Magnetation assets acquired by ERP Iron Ore	ERP Iron Ore entered into a purchase agreement to acquire Magnetation LLC's assets and certain liabilities, including its mining operations in Minnesota. The sale, approved by a federal bankruptcy court on Jan 30, 2017, paves the way for a potential restart of Minnesota operations including Plant 4 (Coleraine), followed by Plant 2 (Bovey). ERP Iron Ore would like to start extracting and concentrating iron concentrate from tailings some time in 2017.
Cliffs Natural Resources Breaks Ground on US\$65M Pellet Project	In August 2016, Cliffs Natural Resources kicked-off the US\$65 million Mustang Pellet Project, which will upgrade its UTAC Forbes Plant for the production of a specialized superflux taconite "mustang" pellet for ArcelorMittal, its largest customer. The 200,000 man hour construction project includes new rail access, storage systems, upgraded furnaces and refurbished grinding lines. Cliffs plans to deliver the new Mustang pellets to ArcelorMittal by the end of 2017.



PolyMet's Proposed Plant Site for the extraction of copper, nickel, and platinum group elements (PGE) in northeastern Minnesota



Kennecott Exploration Company drilling near Tamarack, Minnesota.

RECENT MINERAL DEVELOPMENT PROJECTS CAPITAL INVESTMENT AND PERMITTING STATUS

Project Description	Project Related CapEx(US \$)	Year Permit Issued
1. New taconite iron ore mine pit (ArcelorMittal)	Unknown	2007
2. New taconite iron ore mine, taconite process plant, & steel mill (Mesabi Metallics, LLC)	US\$1200 Million	2007
3. New pig iron nugget plant near Hoyt Lakes (Mesabi Nugget LLC)	US\$235 Million	2007
4. Iron ore tailings reprocessing plant, Mesabi Chief Basin (Plant 1, ERP Iron Ore, LLC)	US\$10 Million (Estimated)	2008
5. 1400 ton bulk sample open pit for Cu + Ni + PGM (Teck American, Inc.)	US\$1 Million (Estimated)	2008
6. Manganese ore bulk sample near Emily (Cooperative Mineral Resources LLC)	Unknown	2010
7. New iron ore tailings reprocessing facility, East Trout Lake & Holman Basins (Plant 2, ERP Iron Ore, LLC)	US\$10 Million	2010
8. Processing plant expansion to increase taconite pellet production (Cliffs Natural Resources United Taconite)	Unknown	2010 (MPCA)
9. Significant expansion of Keewatin Taconite facility (U.S. Steel Keewatin Taconite)	>US\$650 Million	2011
10. New iron ore tailings reprocessing facility in Chisholm (Plant 3, Mining Resources LLC)	US\$50 Million	2011
11. Expansion of iron ore tailings reprocessing operation to Plummer Basin (Plant 2, ERP Iron Ore, LLC)	Unknown	2012
12. New iron ore tailings reprocessing operation, Buckeye/-Canisteo Basin (Plant 4, ERP Iron Ore, LLC)	US\$80 Million	2013
13. Taconite iron ore pellet plant expansion (Mesabi Metallics, LLC)	Unknown	SEIS deemed Adequate, 2011. NPDES/SDS Permit reissued 2012. Permit to Mine Amendment issued 2012
14. Taconite iron ore pit extension (U.S. Steel Minntac)	US\$40 Million	EAW completed in 2012. State permits and approvals issued Jan, 2014. (DNR and MPCA)
15. New Cu+Ni+PGM open pit mine and re-use of former taconite mill and tailings facility (PolyMet Mining Corp.)	US\$312 Million	Final Environmental Impact Statement (FEIS) deemed adequate March 2016. Permit applications under review.
16. Taconite iron ore pit extension & stockpile plan (Cliffs Natural Resources Northshore Mining)	Unknown	EAW completed April 2015. Permit to Mine Amendment issued March 2016.
17. Taconite iron ore pit extension for 2017 (Cliffs Natural Resources United Taconite)	Unknown	FEIS for Hwy 53 reroute released in June. FEIS/ROD approved by FHA in Sept 2015. Permit applications being reviewed.
18. Additional basins and stockpile material (Plant 4, ERP Iron Ore, LLC)	Unknown	2015
19. Dewatering of Canisteo Pit to access potential resource (ERP Iron Ore, LLC), project on hold	Unknown	EAW Completed 2015
20. Mesabi Metallics LLC minor expansion of footprint of facility based on construction progress	Unknown	(Permit to Mine amendment) March 2016
21. Addition of haul road (Plant 4, ERP Iron Ore, LLC)	Unknown	(Permit to Mine amendment) July 2016
22. Addition of permeable reactive barrier test location for Minntac	Unknown	(Permit to Mine amendment) April 2016
23. Tailings basin dike raise and storage capacity increase for United Taconite	Unknown	(Permit to Mine amendment) January 2017
24. Change of pit area from stockpile to mine pit of "Auburn" area for United Taconite	Unknown	(Permit to Mine amendment) February 2017

EXPLORATION DRILLING IN MINNESOTA

22 exploratory borings were completed in 2016 compared to 41 in 2015. 21 of the 22 were completed by Kennecott Exploration Company. Total drilling footage in 2016 was about 61,000 feet compared to 40,000 feet in 2015. Even though there were fewer borings in 2016, the drilling footage increased significantly. This is due to deeper drilling and additional footage (~12,000 feet) from 8 wedges drilled inside existing boreholes plus one existing boring that was extended that are not counted as "new" borings.

A "ball park" estimate of the private investment for exploration in Minnesota during 2016 is \$10 million. This is up 150% from the estimate of \$4 million in 2015. The DNR presumes this because there is a new explorer (Anglo) and the use of a new drill technology that is more expensive.

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Exploration and Investigative Drilling for Metallic Minerals Total Number of Drill Holes and Drill Hole Footage Statewide by Calendar Year Definition of Exploratory Boring per Minnesota Statutes, Chapter 1031

