Twin Metals Minnesota (TMM) Project
Update
Ely City Council
September 28, 2015
Twin Metals Minnesota

- Twin Metals Minnesota (TMM) is pursuing the development and operation of an underground copper, nickel, and PGM metals mining project.

- The TMM Project is located in the Iron Range region of northeast Minnesota.

- Twin Metals is a wholly-owned subsidiary of Antofagasta plc, one of the world’s leading copper mining companies.
Chilean-based copper mining company w/ additional operations in transportation and water distribution.

• Top 10 global copper producer w/four Chilean operations.

• Member - International Council on Mining and Metals: focus on sustainability and environmental stewardship.

• Strong balance sheet. Long-term investment focus. World-class technical & operational expertise.

• Antofagasta has operated in Minnesota since 2010.
Our Commitment to NE Minnesota

- Duluth Metals Ltd. began operations in Ely in 2006.
- Twin Metals opened Ely office in summer 2011.
- Opened Ely Core Storage Building spring 2013.
- Past 4 yrs. 8-19 full time employees located in Ely.
- Total investment to date – contractors, infrastructure, personnel ~ $250 million.
Twin Metals is proud to invest in our communities.

Five Areas of Community Support:
- Health and Wellness
- Economic Development
- Education
- Environmental Stewardship
- Personal and Community Safety

More than $300K Contributed since 2010:
- United Way of Northeastern MN
- Ely Area Food Shelf
- Hunger Solutions
- Friends of the Trees of Ely
- St. Louis and Lake County Rescue
- Northwoods Partners
- Ely Greenstone
- Mesabi Symphony Orchestra
MINNESOTA'S MINING POTENTIAL
National Significance

Top Four Mineral Production States By Value

Source: USGS Mineral Commodity Summaries 2014
Minnesota Poised to be a Global Leader

There are more than 4 billion tons of ore containing copper, nickel and other metal resources within Minnesota’s Duluth Complex, which represents the largest known undeveloped deposit of strategic metals in the world.
Copper

Uses: Wire, pipe & tubing, electrical generation & transmission, electrical components, telecommunications, computer technology, solar energy and wind turbines

Nickel

Uses: Stainless steel, specialty-alloys & super-alloys, combustion turbines, aircraft & aerospace, and military applications

PGMs: Platinum & Palladium

Uses: Petroleum cracking & refining, chemical catalysts, pollution control catalysts, fuel cells and jewelry
No other state in the USA has geologic resources similar to those in Minnesota.

Source: USGS commodity reports integrated with published data from MN mines/projects.
Minnesota Mineral Policy

It is the policy of the state to provide for the diversification of the state’s mineral economy through long-term support of mineral exploration, evaluation, environmental research, development, production, and commercialization.

MN Statute 93.001 – “Policy for Promoting Mineral Development”

The legislature intends that it is the goal of the permanent school fund to secure the maximum long-term economic return from the school trust lands consistent with the fiduciary responsibilities imposed by the trust relationship established in the Minnesota Constitution, with sound natural resource conservation and management principles, and with other specific policy provided in state law.

MN Statute127A.31 – “Goal of the Permanent School Fund”

The DNR Administers 2.5 million acres of School Trust lands
TMM Project Status Update
The TMM Project is located in the northern tier of Minnesota’s Iron Range, within the “Duluth Complex.”
A TMM Project Prefeasibility Study (PFS) was completed June 2014. PFS Technical Report issued October 2014.

• The PFS examined a conceptual mine plan to establish a foundation for further engineering, economic and environmental study.

• Changes to PFS conceptual mine plan are likely based on ongoing analysis.

• Long-term Goal: develop and submit formal mine plan proposal to state and federal agencies for formal environmental review.
TMM Project Timeline

- Resource Characterization: 2006-2012
- Mineral Processing Technology: 2011-2013
- Conceptual & Initial PFS: 2012-2014
- Mine Plan of Operations: Late 2017 to mid-2018

Ongoing Environmental & Geotechnical Studies
October 2014 Technical Report

Metallurgical flow sheet set
Cu & Ni concentrates

Determined:
• Robust resource
• Economically and technically feasible
• Long term sustainability
• Acceptable risk profile
• Project alternatives

Incorporated:
• Best practice – environmental, safety, technology, productivity
Based on everything we now know, Twin Metals is taking a critical look at the project to define the optimum configuration to put forth for further technical and environmental studies:

• **Mine Scope, Mine Size & Mining Rate** – It will be an **Underground Mine**.

• **Tailings Processing & Storage** – Method and location.

• **Transportation Corridors and Facility Locations** – Consolidation, wetlands, visual, etc.

• **Water Appropriation and Management**.
MINING WITHIN THE SUPERIOR NATIONAL FOREST
Mineral Development in SNF is Appropriate

- The TMM Project is located within the Superior National Forest (SNF).

- Exploration and development of minerals are listed as a “desired condition” under the 2004 SNF Land and Resource Management Plan.
1909: Pres. Roosevelt established the Superior National Forest via proclamation No. 848.

At that time public domain minerals w/in the SNF had been previously reserved from the General Mining Law of 1872.

1950: National Forests in Minnesota: authority to prospect, develop, mine, remove mineral resources: Congress explicitly made available public domain minerals within the SNF for mineral exploration and development.
1964: **Wilderness Act of 1964** set aside lands and designated them as Wilderness Areas; the act expressly allowed for prospecting and mineral development to occur within wilderness areas, but withdrew affected minerals after January 1, 1984.

- **Federal mineral leases MNES 1352 & 1353 were granted in 1966.**

1978: **BWCAW Act** codified a federal-state compromise setting aside certain areas for wilderness protection, while maintaining mining within the SNF outside of the BWCAW.

- **Within the BWCAW Act, Congress established the “Mining Protection Area,” a defined buffer zone outside the BWCAW.**

2003: **Minnesota Outdoor Recreation Area Act.** State of MN creates state wilderness as a buffer.
Federal, State, and Private Party Agreement: Protect BWCAW While Allowing Resource Development in SNF
• Congress has purposely authorized acquisition and development of minerals within the Superior National Forest.

• Mining within the SNF is in the direct interest of the United States.

• 1978 compromise: no mining w/in the BWCA, but mining could and should occur in other areas of SNF.

• Failure to allow federal mineral development w/in SNF would significantly impact state minerals and state school trust lands.
ENVIRONMENTAL STEWARDSHIP
TMM is committed to protecting Minnesota’s wilderness, natural environment & recreational resources.

- TMM Project must meet state and federal environmental standards to be approved:
  - Rigorous environmental review by state & federal agencies and tribal governments.
  - State and federal permits protecting water, air, land and wildlife will include stringent environmental standards.
The TMM Project is under the regulatory oversight of state and federal agencies.

- MN Dept. of Natural Resources
- MN Pollution Control Agency
- Tribal Governments
- US Forest Service
- US Bureau of Land Management
- US Army Corps of Engineers
- US Environmental Protection Agency
State Permits

- Minnesota Department of Natural Resources
  - Permit to Mine
  - Water appropriation
  - Minnesota Wetland Conservation Act
  - Dam safety

- Minnesota Pollution Control Agency
  - Construction and operating air emissions permit
  - Wastewater and stormwater discharge NPDES/SDS
  - MN State Executive Council
  - State lands lease/sale authorization

Federal Permits & Authorizations

- BLM
  - Plans of Operation for data collection activities
  - Mine Plan of Operations approval
  - ROW for decline

- Other Federal Agencies
  - Clean Water Act Sections 404 & 10 wetlands / waterways permits (COE)
  - Underground Injection Control for backfill (EPA)
  - Endangered species incidental take Permits (USFWS and permitting agencies)
Baseline studies and impact predictions required for environmental review and permitting

- **Surface water (7)**
- **Groundwater**
- **Wetlands**
- **Wild rice (4)**
- **Air quality (1+)**
  - **Sensitive species**
  - **Invasive species**
  - **Soundscapes**
  - **Visual resources**
  - **Cultural resources**

- **Materials characteristics**
- **Reclamation**
- **Land use**
- **Biodiversity**
- **Greenhouse gases**
- **Recreation**
- **Traffic**
- **Socioeconomics**
- **Human health impacts**
- **Environmental justice**
ECONOMIC IMPACTS
State & Regional Economic Impact

2009 UMD Study (long-term impacts):
• All potential copper-nickel mining projects: > 12,000 MN construction jobs and > 5,000 long-term mining jobs created.

2012 UMD Study (focus through 2016):
• Copper-nickel project construction = $1.7 billion impact to state; up to 2,000 jobs.
• Copper-nickel project operations = $200 million impact to state; > 1,300 jobs.

MN School Trust Fund Revenues:
• 2011 DNR analysis: copper-nickel mining has the potential to generate > $2.5 billion in royalty revenues for the MN School Trust Fund, nearly tripling the size of the trust.
Annual Mining Wages 2013
Source: U.S. Bureau of Labor Statistics

MINING JOBS COMPARED TO OTHERS

- **MINING JOBS IN MN**: $83,359 (65% higher than ALL INDUSTRIES AVG. IN MN: $50,475)
- **ALL INDUSTRIES AVG. IN U.S.**: $49,700
- **MINING JOBS IN U.S.**: $72,512 (46% higher than ALL INDUSTRIES AVG. IN U.S.)
• TMM project could create hundreds of long-term mining jobs, and thousands of construction jobs.

• Every direct mining job creates another 2.1 to 2.5 indirect jobs (UMD 2012)

• Geologists, engineers, carpenters, safety inspectors, mine designers, mapping experts, mechanics, electricians, miners, truck drivers, business administration, and more.

Jobs for Generations
TMM has partnered with numerous Minnesota businesses throughout the multi-year project development process, including:

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Partnerships to Develop Future Workforce

NHED
Northeast Higher Education District
Member of Minnesota State Colleges and Universities

Iron Range Engineering
Minnesota State University Mankato

Positively Minnesota
Department of Employment and Economic Development

Starting Resources Research Institute
Natural Resources Research Institute

Minneapolis State Colleges and Universities

Montana Tech
The University of Montana

Colorado School of Mines
Earth & Energy & Environment

Precambrian Research Center
University of Minnesota Duluth

South Dakota School of Mines & Technology

“Each rock is the final court of appeal.” Francis Pettijohn.

Working to increase representation of American Indians and Alaskan Natives in engineering, science and other related technology disciplines in the Upper Midwest

Welcome to NSAAP

North Star AISES Alliance and Professional Chapter

Michigan Tech

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