



**Mid-Prefeasibility Study (PFS) Update**

**Laurentian Vision Partnership**

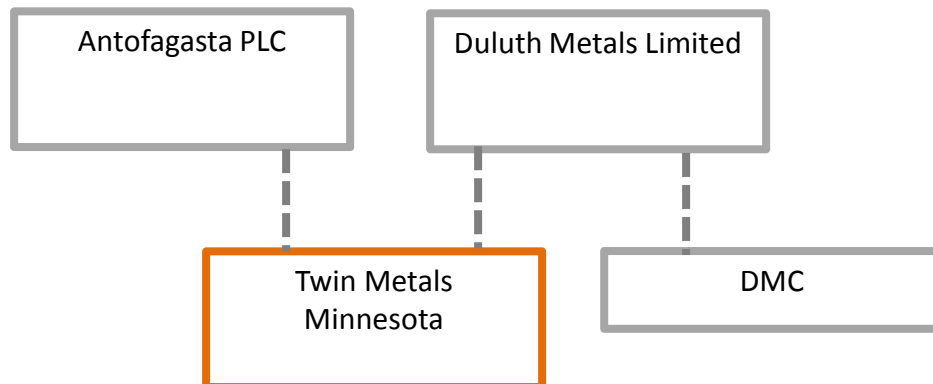
**January 2014**



## Who is Twin Metals Minnesota?

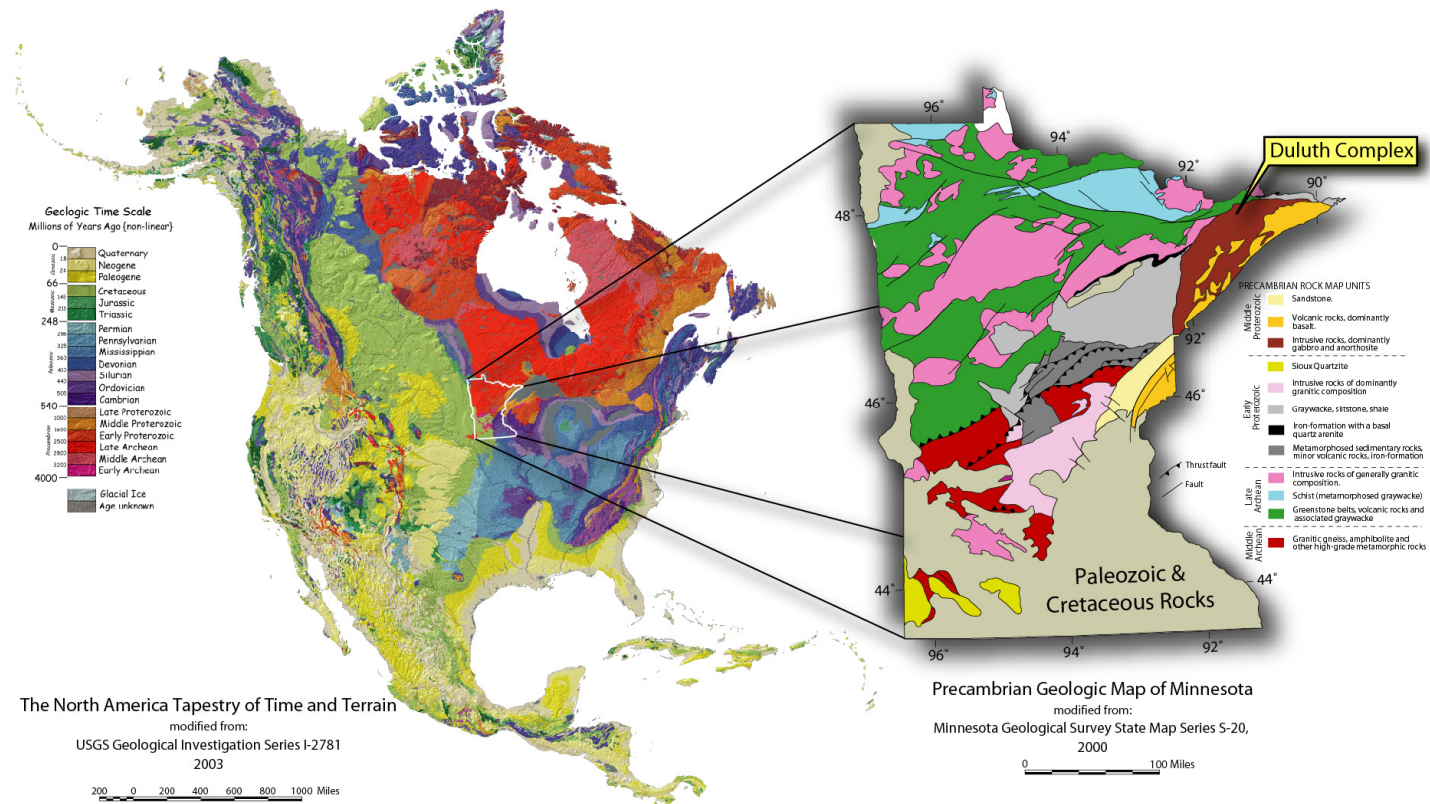
**Twin Metals Minnesota is pursuing the development and operation of an underground copper, nickel, platinum, palladium and gold (strategic metals) mining project in northeastern Minnesota.**

**TMM has offices in St. Paul, Ely and Babbitt, Minn.**

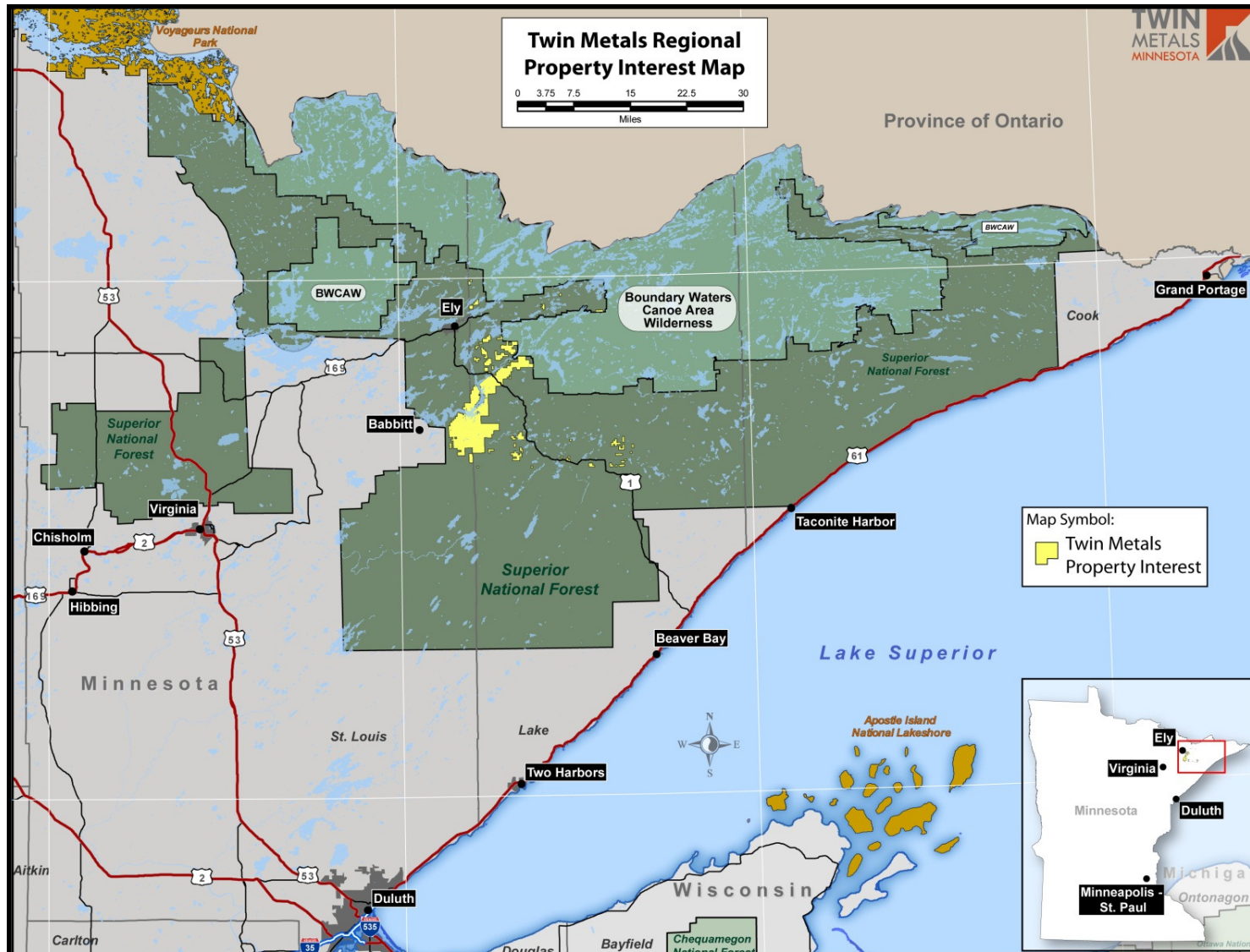


# Minnesota Poised to be a Global Economic Leader

There are more than 4 billion tons of copper, nickel and other metal resources in the state of Minnesota, which represents the largest known undeveloped deposit of strategic metals in the world.



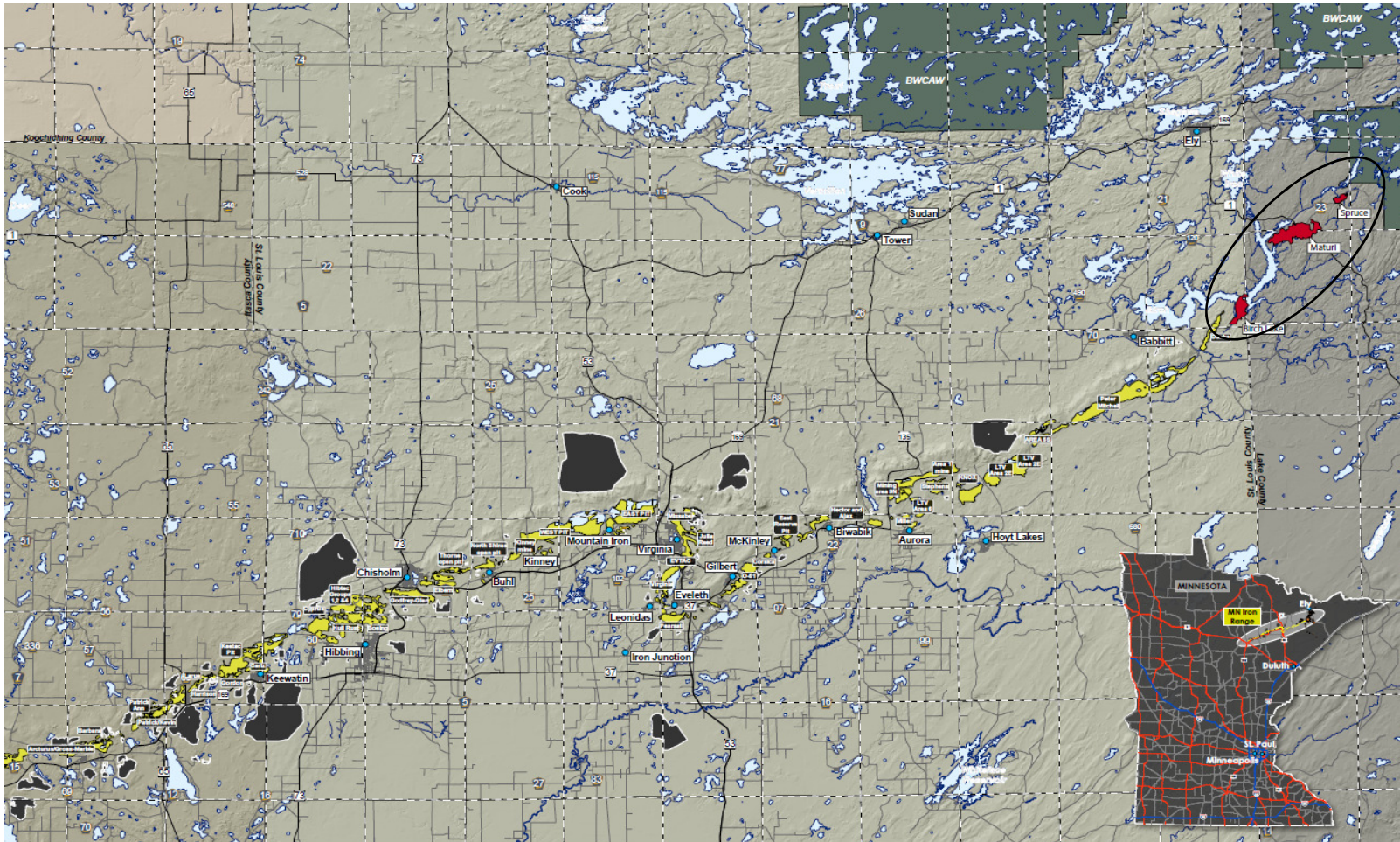
# Twin Metals Minnesota Project Location





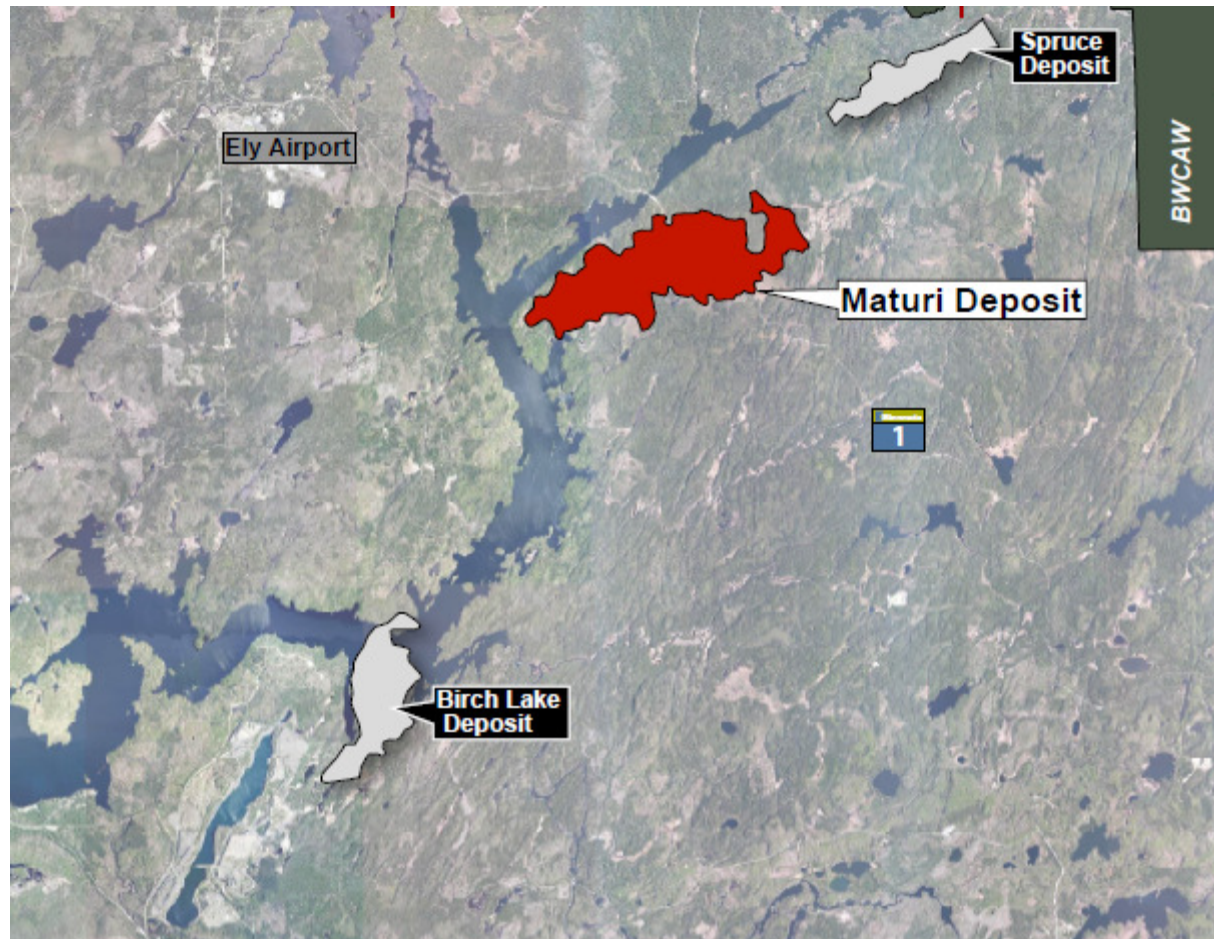
# Twin Metals Minnesota

## Part of Northern Minnesota's Mining Range





## Twin Metals Minnesota Identified Mineral Deposits



- Three identified mineral deposits: Maturi, Spruce Road and Birch Lake.
- Babbitt 10 miles to the SW and Ely 15 miles to the NW of Maturi Deposit.

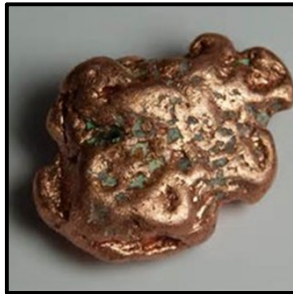
# Twin Metals' Current Resource Estimates

- One of the world's largest Cu-Ni-PGM polymetallic deposits
- December 2012 AMEC Report
  - “Indicated” resources\* (high certainty)
    - 13.7 billion lbs copper
    - 4.4 billion lbs nickel
    - 21.2 million ozs palladium + platinum + gold (TPM)
  - “Inferred” resources\*
    - 11.8 billion lbs copper
    - 4.0 billion lbs nickel
    - 12.8 million ozs TPM

\* Using a 0.3% cut-off



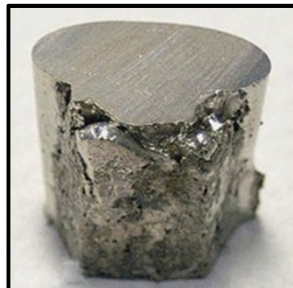
# Twin Metals – Strategic Metals Serve Today's Economy & Quality of Life



**Copper**

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

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**Nickel**

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

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**PGMs:  
Platinum &  
Palladium**

**Uses:** Petroleum cracking & refining, chemical catalysts, pollution control catalysts, fuel cells and jewelry



# **TMM Project Prefeasibility Study (PFS)**

## Twin Metals Minnesota Prefeasibility Study (PFS)

- **TMM is in PFS phase of project development, studying the critical details that will form the proposed mine plan (MPO) that will be submitted to state and federal agencies for environmental review.**
  - Mine design and processing rates
  - Environmental impacts and controls
  - Type of ore processing
  - **Facility locations**
  - **Transportation methods and routes**
  - Power sources and transmission routes
  - Economics: jobs, revenues, taxes, royalties

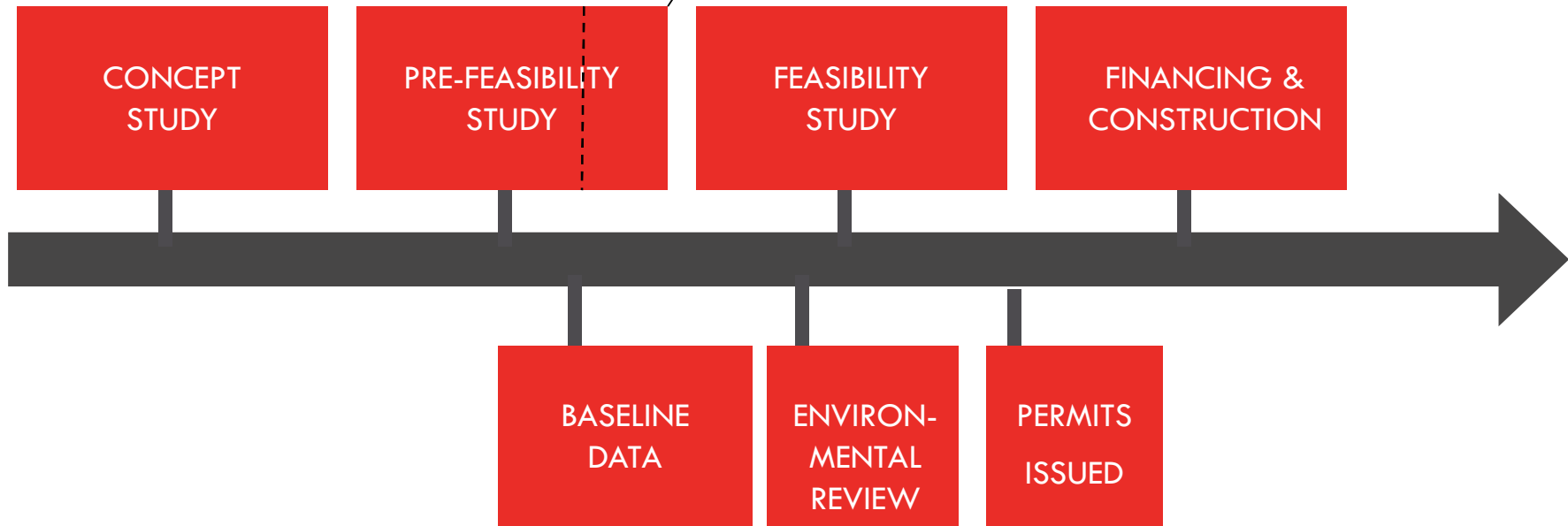




## TWIN METALS MINNESOTA CURRENT PROJECT TIMELINE

**TMM IS HERE**

mid-2014



**TMM submits proposed Mine Plan of Operation (MPO) to regulatory agencies for rigorous environmental review through the EIS and permitting processes.**

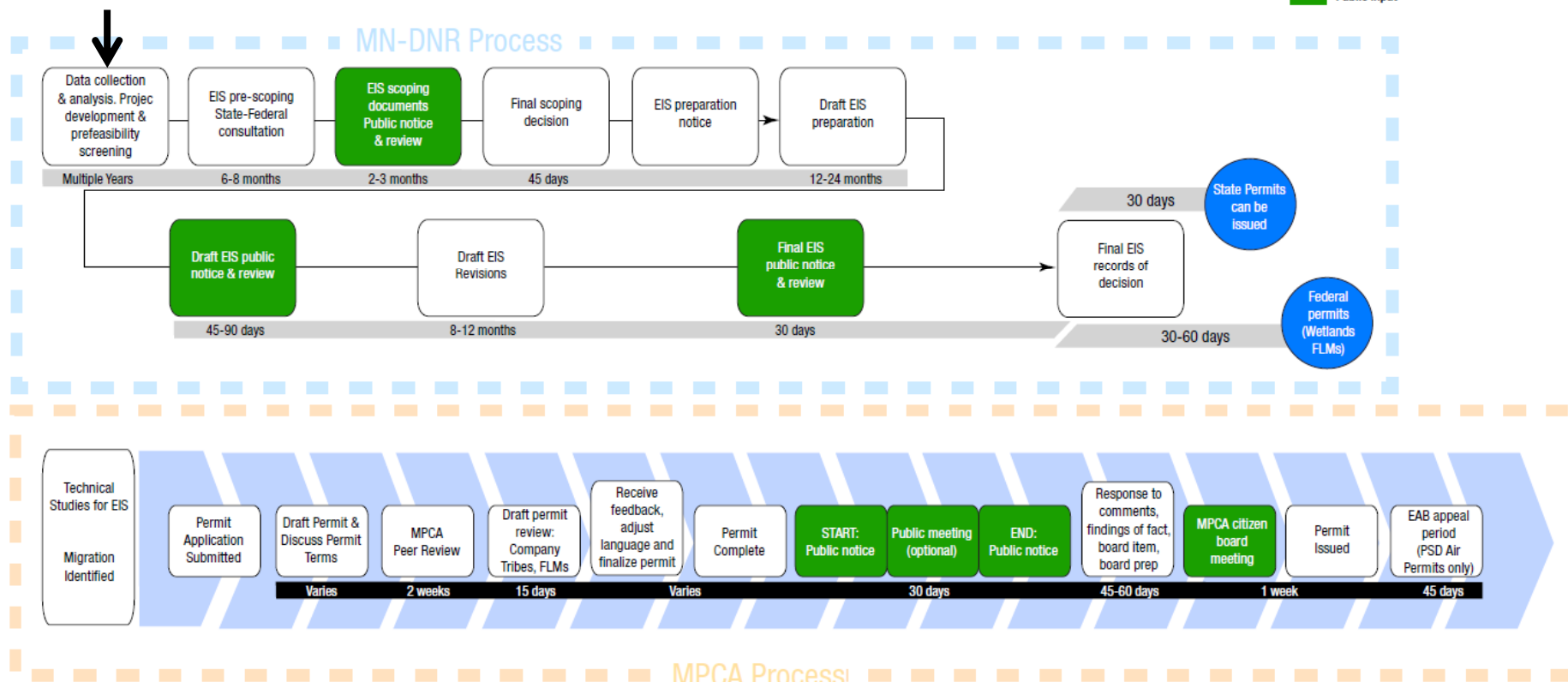


# Typical EIS & Environmental Permitting Process

DNR / MPCA

TMM is approx. here

Public Input



## **TMM Environmental Commitment**

# **Twin Metals Minnesota – Environmental Commitment**

- ***Protect Minnesota's Pristine Wilderness, Natural Environment and Recreational Resources***
- ***Meet State and Federal Environmental Protection Standards:***
  - **Project will face rigorous, thorough and lengthy environmental review by multiple state and federal agencies and tribal governments.**
  - **State and federal environmental permits protecting water, air, land and wildlife will include stringent standards.**
  - **Project MUST meet those standards, or it will not be approved.**





# Extensive Environmental Regulation/Oversight

**MN Dept. of Natural Resources**

**MN Pollution Control Agency**

**MN Tribal Governments**

**US Forest Service**

**US Bureau of Land Management**

**US Army Corps of Engineers**

**US Environmental Protection Agency**



## **TMM Project - Potential Facility Configuration**



# **Twin Metals Minnesota**

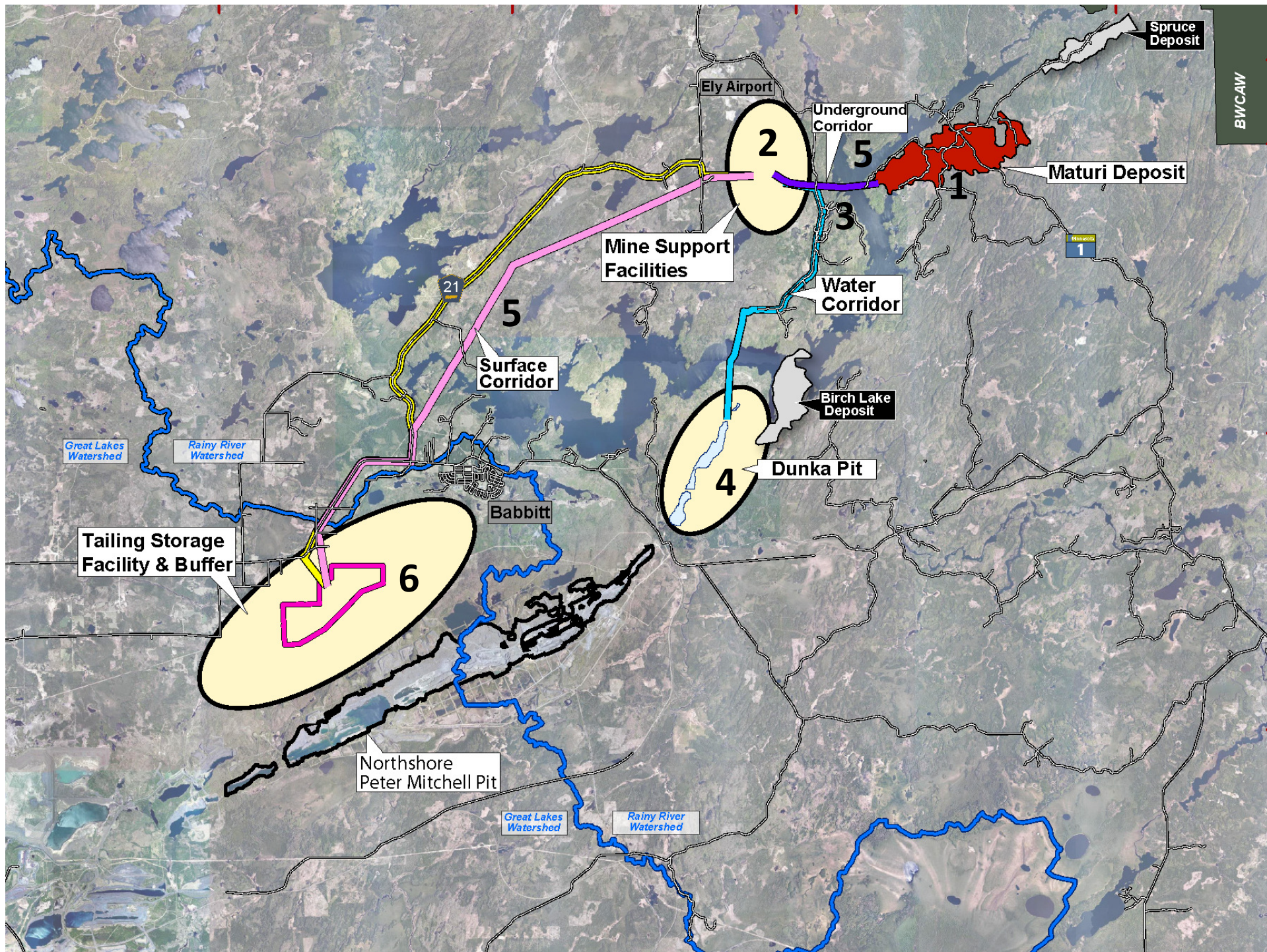
## **Potential Project Components**

### **Environmental Principles**

**TMM has identified potential facility locations and corridors for further detailed study within the PFS, based on the following environmental principles:**

- ✓ **Minimize surface impacts.**
- ✓ **Protect air and water quality.**
- ✓ **Site facilities near existing mining or industrial operations.**
- ✓ **Avoid environmentally sensitive areas.**
- ✓ **Seek “brownfield” redevelopment opportunities.**







## **Twin Metals Minnesota**

### **Potential Project Components – Key Points**

**These locations and operations are preliminary and subject to change as PFS moves forward.**

- 1. 25-year Mine Plan of Operation (initial permitting period) focused on underground mine at Maturi Deposit.**
- 2. Concentrator, mine access and other mine-related facilities being examined west of Maturi Deposit, near Ely Airport.**
- 3. Underground corridors will connect mine support facilities to the underground mine, minimizing surface impacts.**
- 4. The Dunka Pit (an old mining site) being examined as water source for TMM operations. Brownfield redevelopment with updated environmental management. Regulated by the MN DNR & PCA.**
- 5. 50% of tailings returned to the underground mine (“backfill”); 50% stored in regulated surface facility. Surface tailings storage is a safe and common practice in Minnesota.**
- 6. Potential surface location south of Babbitt, MN, within Great Lakes Watershed adjacent to a developed and active taconite mining area.**

# **TMM Project Job Estimates and Workforce Development**





# Twin Metals Minnesota – “Jobs for Generations”

## 2009 UMD Study (long-term impacts):

- Strategic metals projects: > 12,000 MN construction jobs and > 5,000 long-term mining jobs created when all strategic metal mining projects move forward.

## 2012 UMD Study (focus through 2016):

- Strategic metals project construction = \$1.7 billion contributed to state economy; up to 2,000 jobs.
- Strategic metals project operations = \$200 million to state economy; > 1,300 jobs.



### Study Sponsors

**MN DEED**

**IRRRB**

**NRRI**

**MN Power**

**Mining MN**

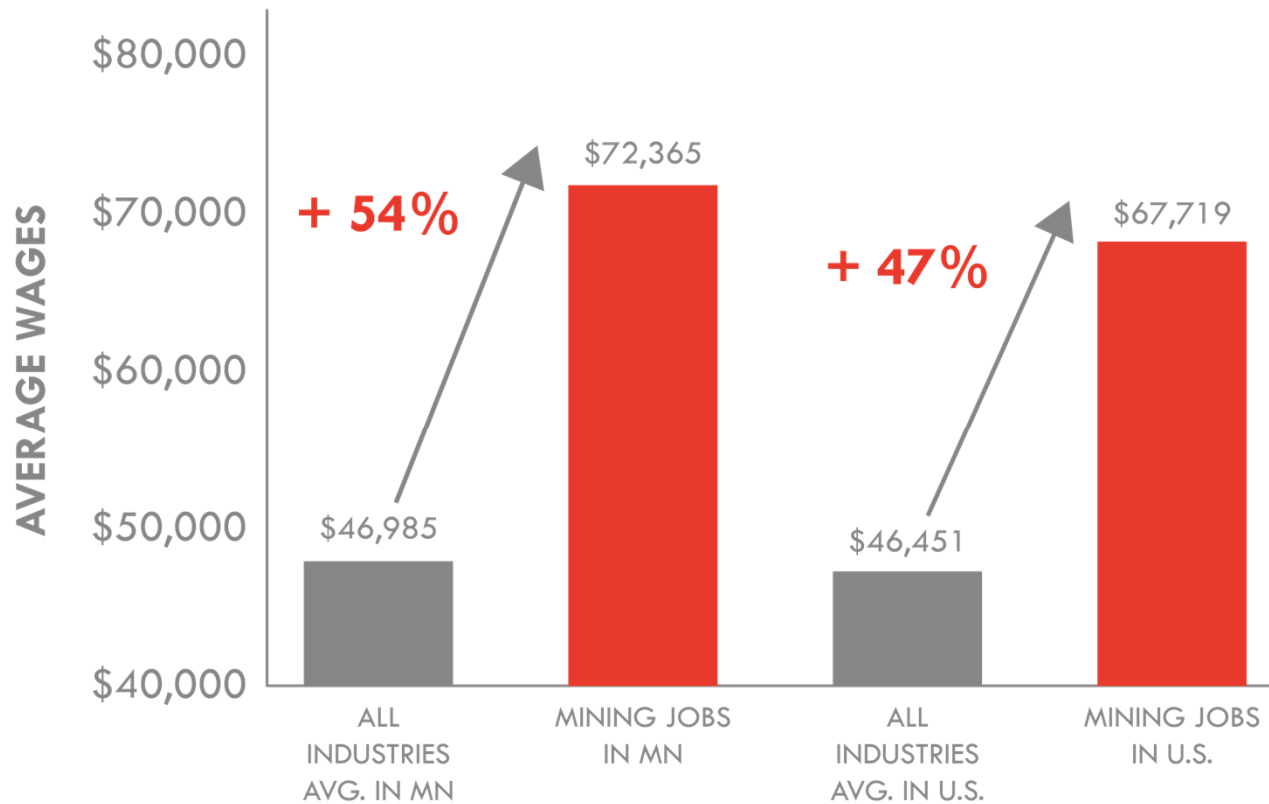
**Iron Mining Assoc. of MN**



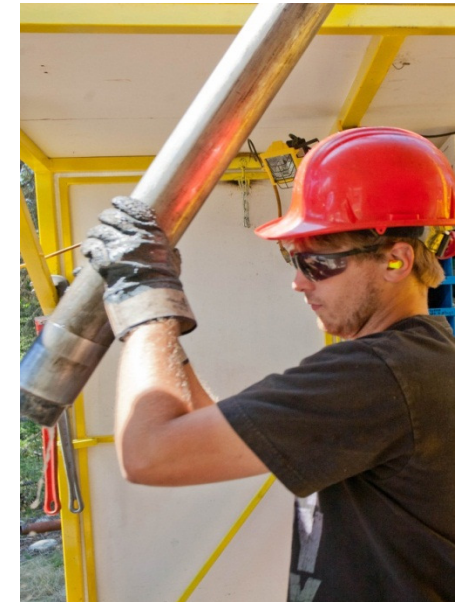
# Twin Metals Minnesota – “Jobs for Generations”

## Annual Mining Wages 2010

Source: U.S. Bureau of Labor Statistics



MINING JOBS COMPARED TO OTHERS



## Twin Metals Minnesota PFS Updated Job Estimates



- **Current estimates: TMM project could create 1,000 - 1,300 long-term mining jobs, and more than 3,500 construction jobs.**
- **Every direct mining job creates another 2.1 indirect jobs (*UMD 2012*)**
- **Geologists, engineers, carpenters, safety inspectors, mine designers, mapping experts, mechanics, electricians, miners, truck drivers, business administration, and more.**

# Twin Metals Minnesota Partnerships to Educate & Train Future Workforce



SOUTH DAKOTA



SCHOOL OF MINES  
& TECHNOLOGY



North Star AISES Alliance  
and Professional Chapter

*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

*"The rocks are the final court of appeal" Francis Pettijohn*





## Addressing Public Questions

**Citizens with questions or comments about the potential components of the Twin Metals Minnesota project can contact TMM:**

- Online - [www.Twin-Metals.com](http://www.Twin-Metals.com)
- Email - [info@twin-metals.com](mailto:info@twin-metals.com)
- Facebook - [www.facebook.com/TwinMetalsMN](https://www.facebook.com/TwinMetalsMN)

**Thank you**

