



## MEMBERSHIP MEETING SUMMARY

Wednesday, November 13, 2024 (1:00 PM – 2:30 PM)

1003 Discovery Drive | Chisholm, MN 55719

And via Zoom: <https://us02web.zoom.us/j/88401325345>

### MEETING OBJECTIVE

**VISION |** Shaping evolving landscapes for future generations.

**MISSION |** A regional collaboration that invests in our diverse community by:

- Developing opportunities for dynamic minescapes,
- Preserving lands to sustain current and future mining, and
  - Providing resources and education

### STRATEGIC DIRECTIONS

1. Optimizing Organization & Communications
2. Investing in Mineland Communities
3. Enhancing Stakeholder Partnerships
4. Educating Partners & the Public

Check out the updated website: [www.mvpmn.org](http://www.mvpmn.org)

### MEETING SUMMARY

- Welcome & Introductions
- Presentation: Swedish Green Steel
- Presentation: Greenwood Project Update
- Presentation: Pulsar Helium Update
- Presentation: NewRange Copper Nickel Update
- Presentation: Swedish/Finland Biomass Industry & Minnesota Biomass Introduction Preview
- Adjourn

### WELCOME & INTRODUCTIONS

#### Welcome & Introductions

Elissa Hansen & Stefanie Sjelin, Facilitators

MVP Facilitator Elissa Hansen welcomed attendees and called the meeting to order at 1:01 PM. She began by inviting meeting participants to introduce themselves and briefly reviewing the MVP vision, mission, and meeting agenda.

## Swedish Green Steel

Jason Janisch, Iron Range Resources and Rehabilitation

Climate and Energy and Industrial Decarbonization Policy Advisor Jason Janisch with the Minnesota Department of Iron Range Resources and Rehabilitation (IRRR) first shared a presentation on Swedish Green Steel production. See slides for additional information.

Janisch shared insights from his participation on behalf of IRRR in the US-Sweden Clean Hydrogen Delegation, a four-day program held in Sweden from June 10–13, 2024. The program convened representatives from Minnesota, other states like California and Texas, and Swedish industry leaders to explore collaboration opportunities and exchange knowledge in sectors such as transportation, green steel, and energy policy. Janisch noted Sweden is significantly ahead of the United States in green steel and clean hydrogen technology, partially due to strict energy mandates that drive innovation.

The program explored hydrogen's potential applications beyond energy production, including its use in shipping and the development of hydrogen fueling stations in Sweden. Janisch shared a "Green Steel 101" overview to provide a foundational on green steel production, highlighting that "green steel" refers to "green iron." He explained Minnesota has current strengths in the mining aspect of the industry, focusing on the extraction and mechanical separation of iron oxide particles, which are sent to steel mills for processing to remove oxygen particles. A diagram of the steelmaking process illustrated the various stages, from raw material preparation to casting and rolling. Ironmaking is the most carbon-intensive step of the process and reducing CO<sub>2</sub> emissions during this phase is key to achieving greener steel production.

Janisch highlighted three primary methods of steelmaking. The current standard blast furnace (BF) and blast oxygen furnace (BOF) process emits 1.5 to 2.5 tons of CO<sub>2</sub> per ton of steel, although there are efforts to reduce emissions through carbon capture and sequestration, and slag pulls of impurities to produce, pure, high-quality steel. The second method, scrap-based electric arc furnace (EAF) steelmaking, involves remelting scrap steel using electricity. This process emits 0.3 to 0.5 tons of CO<sub>2</sub> per ton of steel and the quality of the final product is dependent on the quality of the input. Lastly, the hydrogen-based steelmaking, or "green steel" method, replaces coke and coal with green hydrogen for emissions of just 0.1 to 0.2 tons of CO<sub>2</sub> per ton of iron. This method is dependent on high-purity iron and the cost of finished steel is currently about 20% to 40% higher than BF/EAF because green steel ironmaking is relatively new technology.

The delegation also learned about two leading Swedish steel producers innovating in green steel. The first, SSAB has a hydrogen steelmaking HYBRIT pilot plant facility producing fossil-free sponge iron, which began with a feasibility study in 2016 and was built in 2019. After completing the pilot phase last year, SSAB is building a demo full-scale industrial plant to serve green steel to the market. SSAB currently has holdings in the US and an interest in bringing the green steel industry here. This depends on factors such as permitting help, grid connection, and new electricity sourcing. Bringing green steel to the US also relies on favorable trade policies and a level play field, with consideration of the European Union (EU) putting carbon border adjustment mechanisms (CBAM) in place. Janisch also noted SSAB has secured up to \$500 million in funding from the Department of Energy (DOE) to build a green steel plant in Mississippi and upgrade EAF in Iowa.

The second Swedish producer highlighted, H2 Green Steel (recently rebranded as Stegra), is skipping the pilot phase and currently constructing a full-scale production facility. The facility is designed to produce 2.5 million tons of finished steel annually using a 700 MW electrolyzer. Janisch shared this is about three times the power currently used by Minntac and acknowledged the significant power needs. Stegra's vision includes 95 percent decarbonization potential by applying green hydrogen in steelmaking. They are also seeking to expand beyond Sweden and looking at locations such as Canada, Brazil, Iberia, and the United States. Needs for expansion include stable costs and an abundant, stable supply of green energy. Current concerns for the U.S. include iron ore logistics, no baseload of green energy, and regulatory uncertainty.

Janisch concluded by highlighting several key takeaways. He emphasized that Sweden is highly advanced and experienced in green steel production, and that building relationships can help us to learn from what they know. Janisch also noted that a large, competitive supply of green electricity is critical for the success of green steel. Additionally, SSAB's HYBRIT technology is licensable and may be a path forward. Although Minnesota is not currently seen as a leading contender to

attract international green steel, Janisch highlighted efforts underway to change that. Working with local iron-ore mining partners to invest in green-iron production is crucial to regional success, and DRI pellets at Cliffs/USS are a significant first step. The work toward industrial decarbonization led by the Natural Resources Research Institute (NRRI) and National Renewable Energy Laboratory (NREL) is also an important step toward green steel production in the region.

Janisch invited questions from the group.

## P R E S E N T A T I O N

### **Greenwood Project Update**

Jordan Erickson, Hibbing Taconite Company

Environmental Engineer Jordan Erickson with the Hibbing Taconite Company (HTC) presented an update on the Forestry Reclamation Approach (FRA) for Project Greenwood. See slides for further information.

Erickson first gave a brief overview of the HTC facility, which has a pit that spans approximately eight miles and includes large stockpiles. HTC is practicing progressive reclamation to restore stockpiles over time. Originally developed in Appalachia's coal mining regions, FRA uses science-based reclamation techniques and has been gaining in popularity. Project Greenwood has received support from the IRRR and was named after a reference in J.R.R. Tolkien's *Lord of the Rings*, where Greenwood the Great is described as being "restored to the greatest forest of the earth."

FRA provides several benefits in Minnesota, including increased species richness, reduced non-native plants, promotion of natural forest succession, improved wildlife and pollinator habitats, soil stabilization, and CO<sub>2</sub> sequestration. The approach focuses on creating an intentional forest with old-growth conditions. Erickson noted HTC's location was historically a forested area, with species such as tamarack, black spruce, and aspen. FRA aims to return the site to its pre-development landscape. The presentation reviewed past reclamation efforts, including a historical stockpile released from reclamation in the 1980s. Native grass seeding was used in compliance with 6130 rules, which met reclamation standards. However, Northern Minnesota's traditional environment is forested instead of prairielands. Additional past efforts highlighted included tree planting done by local sixth graders in 2013. A photo from 2023 showed a mix of trees, shrubs, and grasses successfully grown on stockpiles.

The FRA framework consists of five steps. Step one involves creating a suitable rooting medium at least four feet deep, using materials such as topsoil or weathered sandstone. HTC addressed this by amending approximately ten acres of a silty till stockpile with biochar, which builds soil health, sequesters carbon, and reduces the need for commercial fertilizer. Step two focuses on loosely grading the soil to create a noncompacted growth medium. HTC loosened compacted soil on flat stockpiles by using a haul truck to create a rip pattern about two to three feet deep, which helps retain water and prevent erosion. Step three involves using ground covers compatible with tree growth. HTC recently hand-spread native grass seed in specific areas, testing combinations with biochar to determine optimal growth conditions. Step four requires planting two types of trees: early successional species for wildlife and soil stability, and commercially valuable crop trees. HTC planted five tree species, including red pine, eastern white pine, bur oak, and white spruce, with consideration of elevation and succession rates. Step five emphasizes proper tree planting techniques; Erickson noted the importance of following established methods, referencing sixth-grade planting efforts that required replanting.

Project Greenwood's efforts in 2024 build off reclamation work from 2023, during which HTC planted over 95,000 red pine trees with support from the Rajala Foundation and Barr Engineering. Now that planting is complete, monitoring of planting areas is underway, with plans for assessments at three, five, and ten years, in line with Department of Natural Resources (DNR) schedules. Each planted area was planted with a different radius to evaluate growth patterns. Erickson highlighted that while 6130 rules specify 90% ground cover, they do not provide detailed guidance for forest reclamation. HTC is aiming to meet standards through innovative methods, refining techniques based on what works and adapting approaches for future use. Erickson concluded by emphasizing the long-term goal of establishing forests that align with the region's natural landscape and can be enjoyed for generations to come.

Erickson welcomed questions from meeting participants following the presentation.

## P R E S E N T A T I O N

### **Pulsar Helium Update**

Thomas Abraham-Jones Pulsar Helium

President, CEO, and Co-Founder of Pulsar Helium, Thomas Abraham-Jones, then presented an update on the Topaz Project. See slides for additional details.

Abraham-Jones began by sharing that Pulsar was given the speaking slot at the most recent annual Helium Summit in Houston, placing it on the national and international stage. He emphasized Pulsar's first-mover advantage in two brand-new helium districts, including the flagship Topaz Project in Minnesota. This discovery east of Babbitt, includes helium concentrations up to 14.5%. Such purity is rarely seen for helium, and anything above 0.3% is considered economically significant. The CO<sub>2</sub> associated with helium also presents a potential value add for the Topaz Project due to shortages. Abraham-Jones then gave a brief overview of the Pulsar team, including General Manager of Operations Michael Sturdy, Technical Manager Josh Bluett, Executive Chairman Neil Herbert, and CFO Dan O'Brien. He also noted that as the President and CEO, he has a background in geology and a decade of experience in the helium industry.

The Pulsar portfolio includes the Topaz Project in Minnesota and Tunu in Greenland, one of the few helium occurrences in Europe, both 100% owned. A roadmap outlining eight project steps—Identify, Lease, Data Collection, Resource Evaluation, Drilling, Reserve Establishment, Offtake Agreements, and Production—was shared. Abraham-Jones noted that leasing can be a challenge due to the lack of existing legislation for helium, but Minnesota has been supportive and passed new legislation this year.

The deposit was discovered near the Bald Eagle intrusion within the Duluth Complex, a geological feature featured in textbooks worldwide, and benefits from proximity to the Voyageur Highway. Instead of being piped out, helium is shipped by truck due to its natural tendency to leak (similar to a balloon). With the U.S. as the largest global helium consumer and growing concerns over dependence on foreign sources like Russia, domestic production is critical. Pulsar holds private mineral rights over nearly 6,000 gross acres at the Topaz site.

The initial discovery at Topaz was made in 2011 while drilling for nickel and copper. Drill operators encountered high-pressure gas, initially raising concerns about combustibility. Samples were sent to two independent labs, which confirmed the high helium concentration. Pulsar took over the project in 2021, starting with the unusual position of having drilled before collecting data, when usually it is the other way around. Subsequent data collection focused on seismic data, gravity, and magnetic readings to validate and expand the discovery.

Pulsar successfully “twinned” the discovery by drilling a new well 50 feet from the original site, reaching a depth of 2,200 feet, and achieved natural gas flow without fracking. Abraham-Jones noted fracking is not necessary and will not be done at the Topaz site, and that the project is not associated with groundwater or water in reservoirs. For gas like helium, the key things are size of the reservoir, concentration, and natural flowrate; the Topaz site has received incredibly encouraging results for all criteria. Independent analysis by Sproule determined the reservoir likely contains nearly half a billion cubic feet of helium, which is significant for a single well and notable given that only 13% of the land has been explored due to private mineral rights limitations.

Next steps include deepening the current well by an additional 16–40 feet with a drill rig arriving at the Topaz site by December 24. The goal is to drill through the entire section, assess pressure and flow rates, and gather additional data. This phase is expected to conclude by Christmas. In 2025, Pulsar plans additional drilling and economic evaluations as part of the exploration phase, with production contingent on successful results. A diagram of ambient noise tomography showed seismic data that indicates the presence of gas and further supports the potential of a significant helium deposit.

The presentation concluded with a summary of Pulsar Helium's position as an emerging helium developer with two high-impact, strategically located assets with world-class concentration levels, a defined development strategy, and a highly

experienced team. Abraham-Jones invited meeting attendees to reach out to connect if they would like to learn more.

Following the update, Abraham-Jone opened the floor for questions.

## P R E S E N T A T I O N

### **NewRange Copper Nickel Update**

Simon Charter, NewRange Copper Nickel

Next, Simon Charter, Community and Social Performance Manager with NewRange Copper Nickel, shared a project update. See slides for further information.

Charter began with an overview of NewRange Copper Nickel, highlighting the NorthMet and Mesaba deposits are globally significant and represent one of the largest undeveloped copper-nickel resources in the world. The project, now two decades in development, has faced permitting challenges and other setbacks, but remains committed to finding a path forward. NewRange is also working to support clean energy transition and aims to adhere to the highest environmental performance standards while also limiting new environmental impacts. Charter noted the NorthMet (formerly PolyMet) and Mesaba projects were previously separate but have since merged. NewRange is now a 50/50 joint venture between Glencore and Teck Resources. These parent companies provide technical support, expertise, resources, and strong financial backing to support project development.

A map of the project area showed that Mesaba is the larger of the two deposits; however, the primary focus is currently on NorthMet. The NorthMet project is permitted for 32,000 tons per day under an open pit mine plan, utilizing 70% already impacted lands and existing infrastructure, facilities, and tailings storage to reduce environmental impacts. The project received \$1 billion in state assurance and aims to deliver substantial economic benefits to the Iron Range region. NewRange is also working to address legacy water quality issues associated with past mining operations at the site.

The Mesaba deposit offers significant potential as one of the world's largest undeveloped copper-nickel resources but remains in the early stages of development. The project is many years from fruition, with current efforts focused on baseline and other pre-development studies. Mesaba presents opportunities for future development synergies, including hydrometallurgical processing using proprietary technology from the parent companies. Charter noted that these opportunities require different types of processes and capital and are being explored closely.

Charter highlighted the deposits' geopolitical importance, citing long life assets that include 9.5 million tons of copper (enough to build 1.4 terawatts of wind capacity), 2.3 million tons of nickel (enough for 20 million electric vehicles), and 195,000 tons of cobalt (enough for 12 million electric vehicles). These quantities underscore the deposits' global significance. The numbers for copper are strong but are especially remarkable for nickel in comparison to competitors.

Other updates included recent activities following the merger early last year. Much of the work has focused on integrating operations and progressing the NorthMet project, with both parent companies requiring stringent criteria for project funding. The recycle and salvage project recently had around 500 community members tour the site. The project involved stripping the quarter mile-long concentrator down to bedrock. It included removing 64 grinding mills (190 tons each), 81,000 tons of taconite from fine ore bins, 26,000 tons of structural steel (twice the amount used in the US Bank Stadium), and 70,000 cubic yards of concrete, much of which was recycled. 16,000 cubic yards of coarse tailings were also removed for use in roadway construction within the site. The project used union labor and an estimated 70,500 labor hours. The project was expected to be completed imminently and progressed ahead of schedule despite logistical challenges.

Looking ahead, Charter noted that the next year is expected to be quieter as NewRange focuses on four key studies to enhance environmental safeguards and improve overall project performance. These studies will address tailings storage, water science, efficient production, and carbon reduction. Plans include exploring a \$100 million water treatment facility and investigating the use of conveyor systems for moving ore on-site instead of rail infrastructure.

Charter then welcomed questions from the group.

## P R E S E N T A T I O N

### Swedish/Finland Biomass Industry & Minnesota Biomass Introduction Preview

Jason Janisch, IRRR

In the last presentation of the meeting, IRRR Climate and Energy Policy Advisory Jason Janisch returned to briefly introduce a preview of the Swedish/Finland biomass industry and Minnesota biomass.

Janisch noted that IRRR is exploring the possibility of hosting a future MVP meeting focused on biomass and bioforestry-related topics. While acknowledging that he is not a subject matter expert, he also mentioned the potential relevance of discussing data centers, including what they are, what they might look like on the Iron Range, and their environmental impacts, as potential topics for upcoming MVP meetings. He strongly encouraged the group to share ideas for topics they believe would be relevant to the needs of the group and the region. Janisch shared that moving forward, he will be taking over IRRR facilitation duties for MVP meetings from Jim Plummer, who will be retiring. He emphasized his commitment to ensuring that meetings align with the group's mission and provide value to participants. Janisch concluded by inviting questions from the group, both following the preview presentation and at any time in the future.

## A D J O U R N

The meeting was adjourned at 2:24 PM. Save the date for February/March for the next MVP Partnership meeting.

### Mineland Vision Partnership thanks its financial contributors:

