

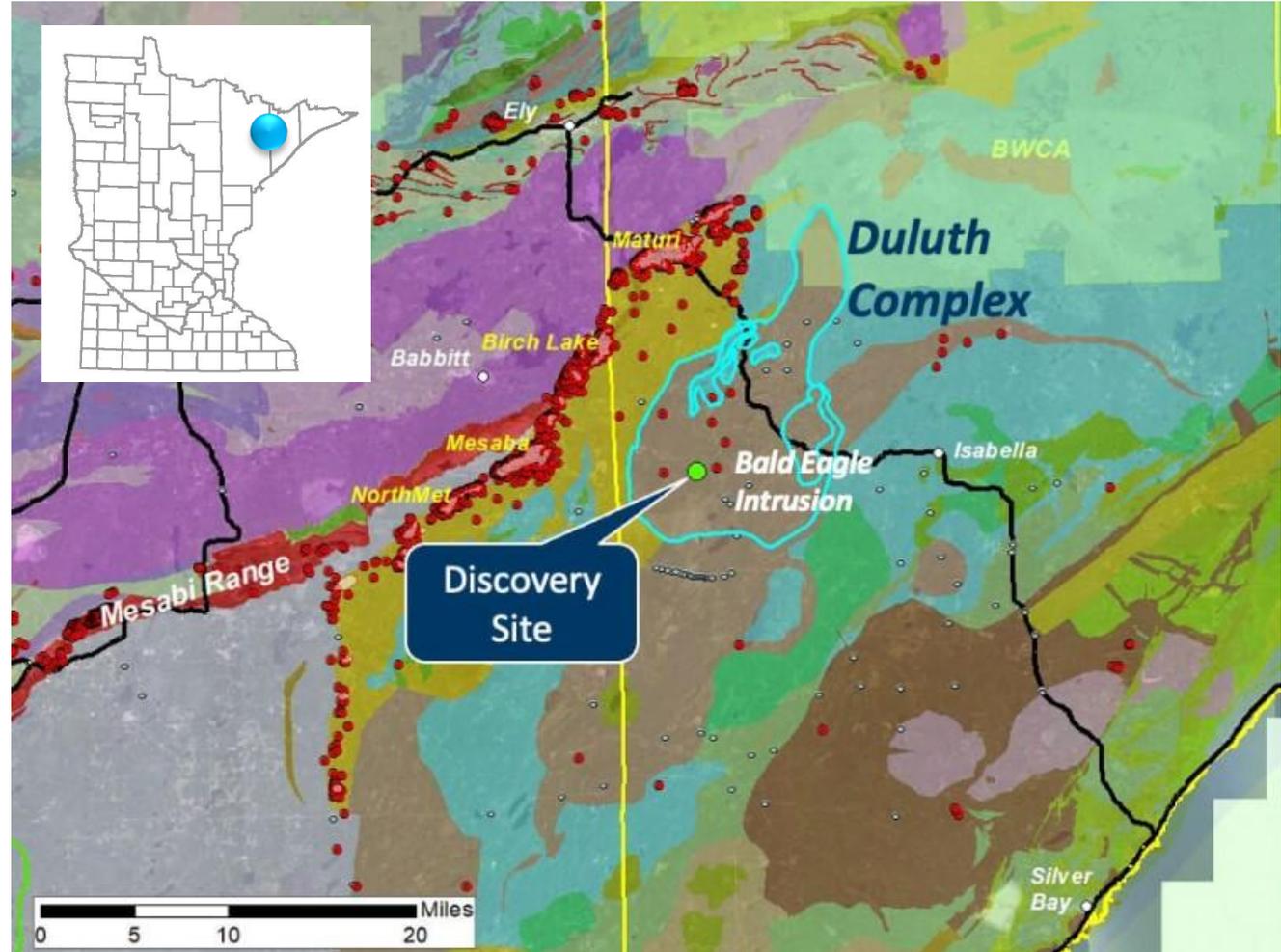


DNR Gas rulemaking for the potential development of helium and natural hydrogen resources in Minnesota

Michael Liljegren | Assistant Division Director

Lands and Minerals Division

Unexpected high-grade helium discovery in 2011



Pressurized Gas Stream

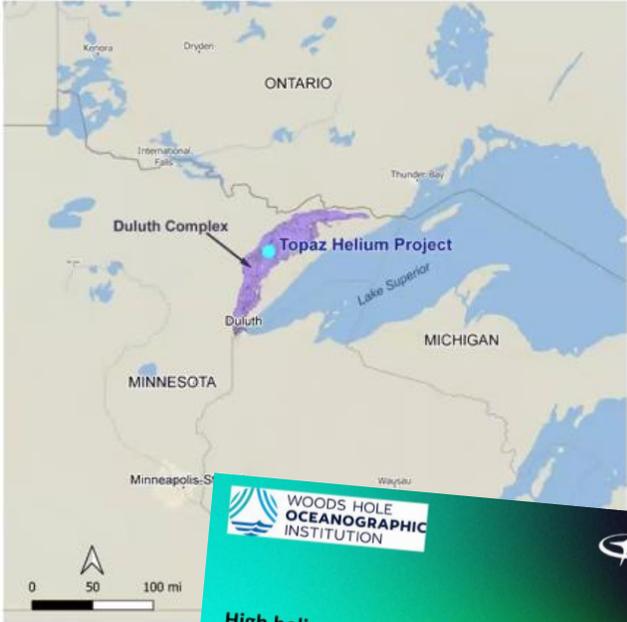
- Duluth Metals collected gas samples analyzed by two independent laboratories.
- CO₂-dominant mixture
- 10.5% helium
- 2.4% methane and other hydrocarbons

PULSAR HELIUM INC.

73.8% CO₂
13.2% N₂
10.5% He
0.1 % O₂ and
2.4% methane and other hydrocarbon gases.

$^4\text{He}/\text{N}_2 = 0.8 !!!$

The Topaz Discovery



20

Pulsar Helium Technical Presentation, March 2023

WOODS HOLE OCEANOGRAPHIC INSTITUTION

PULSAR HELIUM INC.

High helium concentrations in well gases from the Duluth Complex, Minnesota, USA

RMAG Helium Meeting, Denver, CO – March 23, 2022

Peter H. BARRY¹, Barbara SHERWOOD LOLLAR², Chris J. BALLENTINE³, Phillip C. LARSON⁴, Josh J. BLUETT⁵, and Thomas H. ABRAHAM-JAMES⁶

(1)WHOI, (2)University of Toronto, (3)University of Oxford, (4)Keweenaw Resources Inc., (5)Pulsar Helium Inc.

Lighter-than-air potential



High helium concentrations in well gases from the Duluth Complex, Minnesota, USA

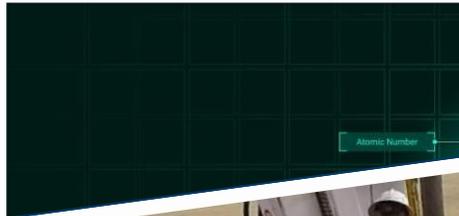
RMAG Helium Meeting, Denver, CO – March 23, 2022

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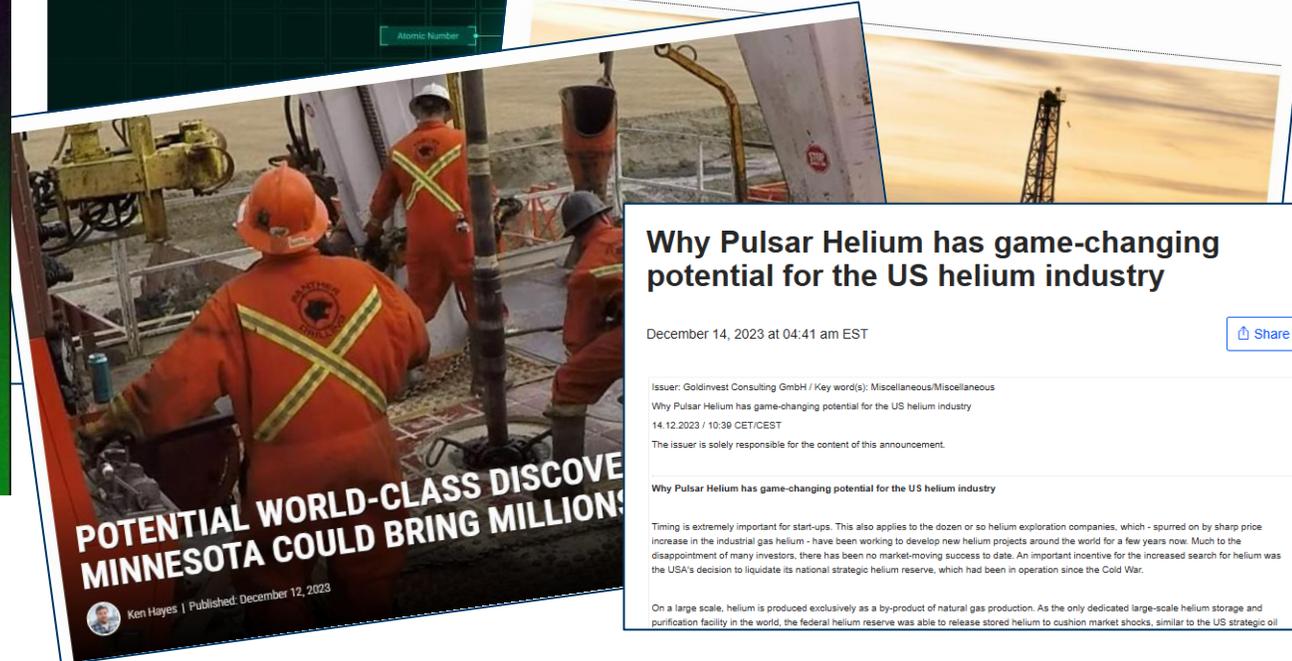
The potential of helium production in Minnesota

Critical Raw Materials | 26th October 2023



Pulsar Helium Inc: Appraisal drilling programme nears

Critical Raw Materials | 25th October 2023



Why Pulsar Helium has game-changing potential for the US helium industry

December 14, 2023 at 04:41 am EST



Issuer: Goldinvest Consulting GmbH / Key word(s): Miscellaneous/Miscellaneous

Why Pulsar Helium has game-changing potential for the US helium industry

14.12.2023 / 10:39 CET/CEST

The issuer is solely responsible for the content of this announcement.

Why Pulsar Helium has game-changing potential for the US helium industry

Timing is extremely important for start-ups. This also applies to the dozen or so helium exploration companies, which - spurred on by sharp price increase in the industrial gas helium - have been working to develop new helium projects around the world for a few years now. Much to the disappointment of many investors, there has been no market-moving success to date. An important incentive for the increased search for helium was the USA's decision to liquidate its national strategic helium reserve, which had been in operation since the Cold War.

On a large scale, helium is produced exclusively as a by-product of natural gas production. As the only dedicated large-scale helium storage and purification facility in the world, the federal helium reserve was able to release stored helium to cushion market shocks, similar to the US strategic oil

Natural/Geologic Hydrogen Hype

ENERGY

Natural Hydrogen Could Change the World, If We Understood It

Share 0

MAY 13, 2025

The GIST

Hidden hydrogen: Earth's crust holds clues to untapped clean energy source

by University of Oxford

Editors' notes

"The US admits 'we're jealous of France'": Unthinkable wealth beneath their feet as France uncovers \$92 billion hydrogen goldmine, the world's largest reserve

In a groundbreaking discovery that could redefine the future of clean energy, scientists in France have unearthed a colossal 46 million-ton reserve of natural hydrogen beneath the soil of Folschviller, promising a \$92 billion shift towards sustainable fuel sources.

March 25, 2025 at 11:09 AM — Steve Lapierre 30

Share     

NEWS

Scientists Discover Massive Hydrogen Reserve in Earth's Crust, Enough to Meet Energy Needs for Centuries

New discoveries suggest that Earth's crust contains vast reserves of natural hydrogen, potentially offering a sustainable and clean energy source for centuries to come.

Emily Carter Published on December 10, 2025 Read : 3 min 0

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Buried 950 meters underground — Mankind's last fuel reserve could power the planet for millennia

by Phumlani S. — November 13, 2025 in Energy

Scientists may have found a near-limitless energy source that could power Earth forever

By Eric Ralls
Earth.com staff writer

 Follow Earth on Google

USGS Hydrogen Prospectivity Map

[USGS Geologic Hydrogen Prospectivity Map](#)

Statement of Dr. Geoffrey S. Ellis
Energy Resources Program Lead for Geologic Hydrogen
U.S. Geological Survey
before the
Senate Committee Energy and Natural Resources
on
February 28, 2024

Good morning, Chairman Manchin, Ranking Member Barrasso, and Members of the Committee. Thank you for the opportunity to testify before you today on the potential for geologic hydrogen resources. My name is Geoffrey Ellis and I lead the U.S. Geological Survey's (USGS) research on geologic hydrogen resources.

Introduction

The USGS is the science arm of the Department of the Interior and brings impartial, actionable science to an array of stakeholders and partners, including decision-makers such as Congress.



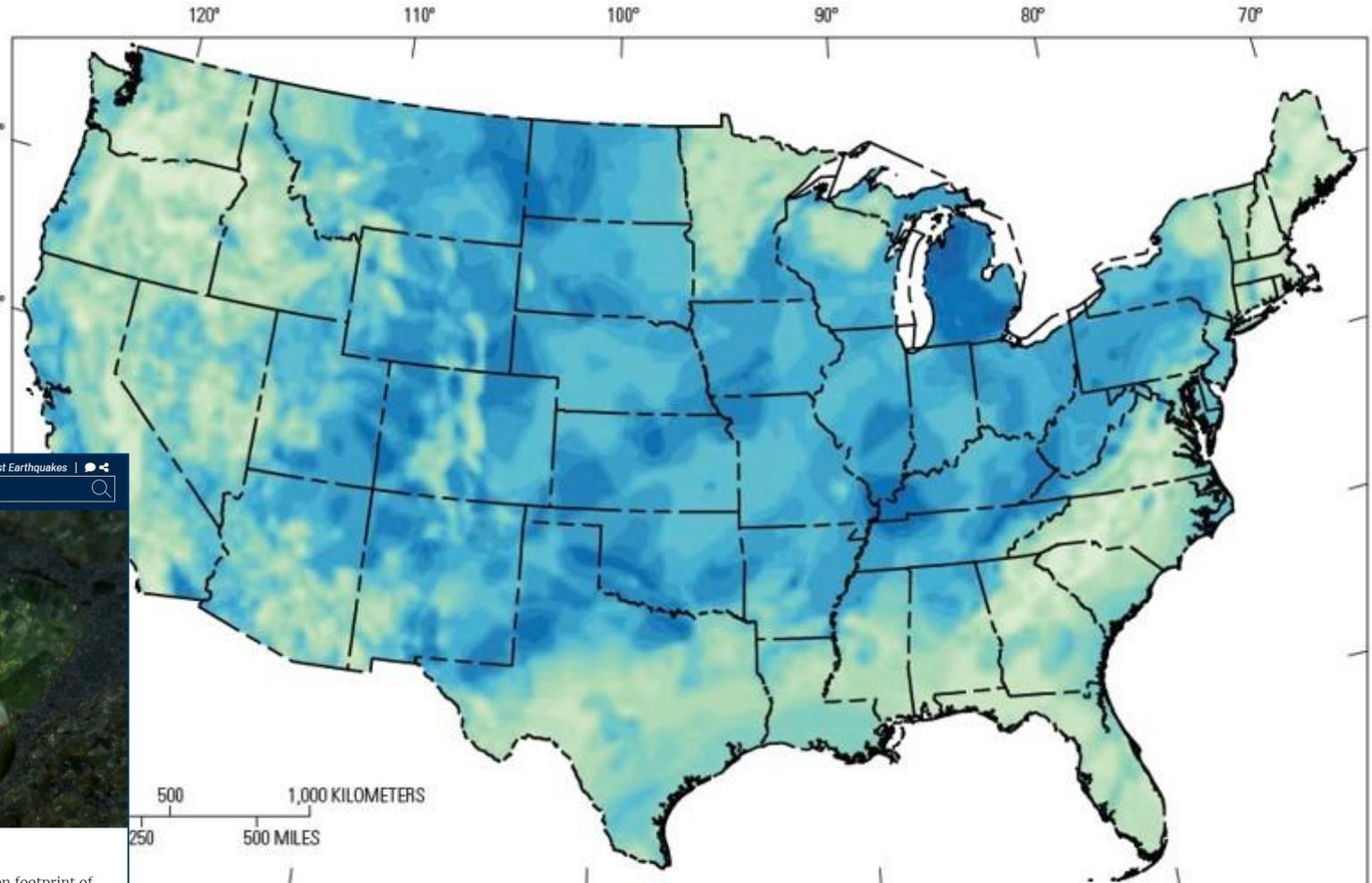
FEATURED STORY

The Potential for Geologic Hydrogen for Next-Generation Energy

The smallest element may hold big promise for clean energy

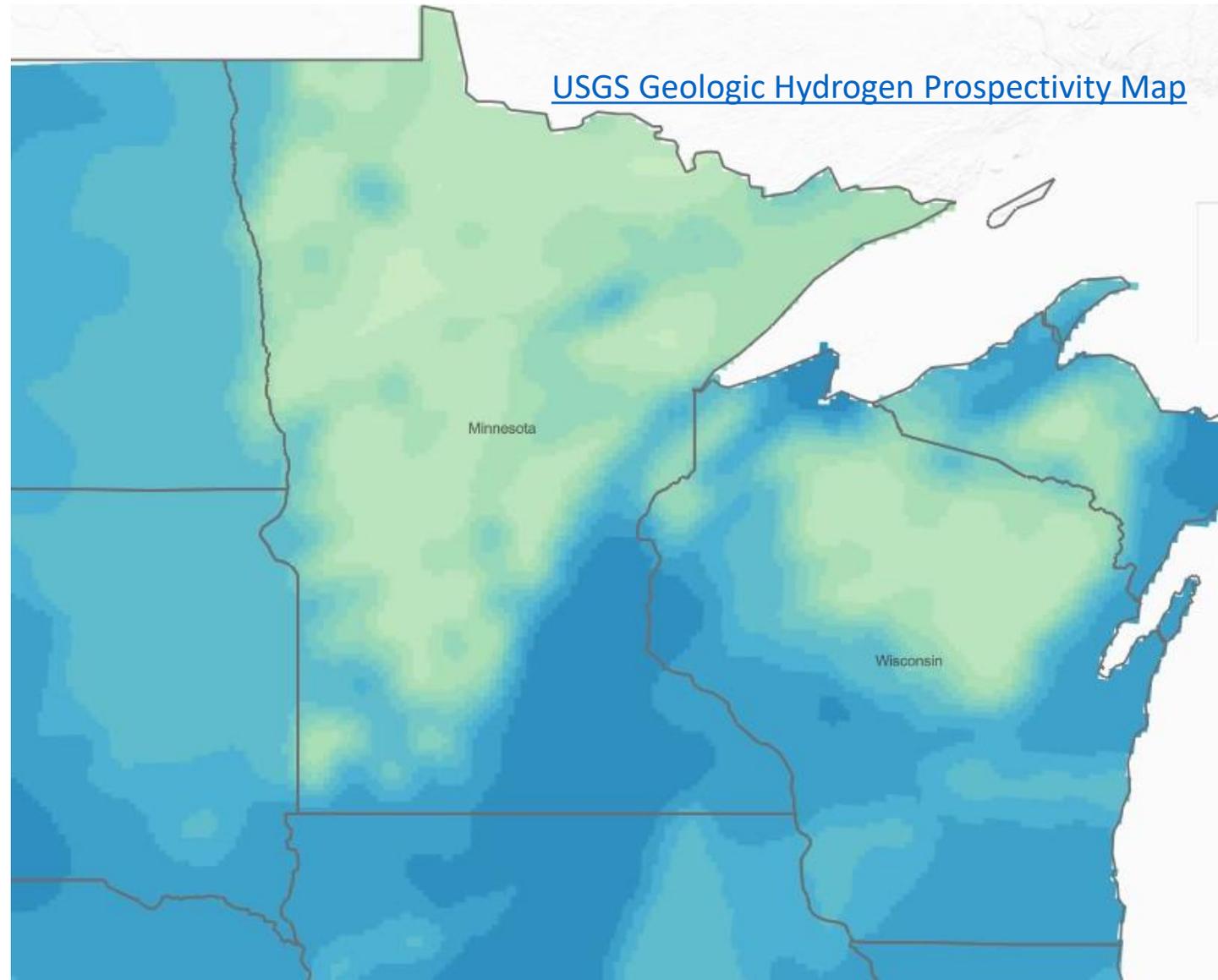
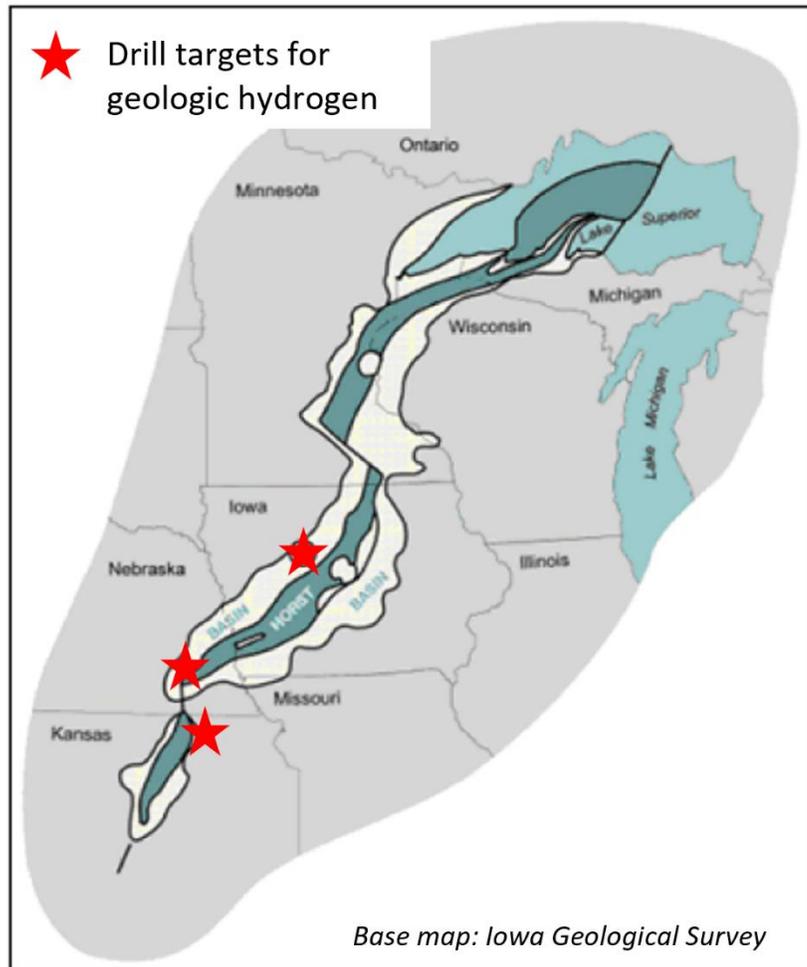
By [Communications and Publishing](#) April 13, 2023

A previously overlooked, potential geologic source of energy could increase the renewability and lower the carbon footprint of our nation's energy portfolio: natural hydrogen.



Geological Survey, The National Map, 2021
a Conic, U.S. Geological Survey contiguous United States projection
Datum of 1983

Natural/geologic hydrogen potential



Need for a regulatory framework

- Helium appraisal well drilled February 2024
- Company stated production could potentially start sometime in 2025
- Lacking a regulatory framework, there would be no tax revenue from production and the rule of capture would apply.



2024 Legislation

- Prohibition/Moratorium on Gas Production without a permit
- Expedited Rulemaking (24 months)
- Technical Advisory Committee
- Recommendations on permitting under temporary framework
- Authorization to Lease

Sec. 23. [93.513] PROHIBITION ON PRODUCTION OF GAS OR OIL WITHOUT PERMIT.

Subdivision 1. **Permit required.** Except as provided in section 103I.681, a person must not engage in or carry out production of gas or oil from consolidated or unconsolidated formations in the state unless the person has first obtained a permit for the production of gas or oil from the commissioner of natural resources. Any permit under this section must be protective of natural resources and require a demonstration of control of the extraction area through ownership, lease, or agreement. For purposes of this section, "gas" includes both hydrocarbon and nonhydrocarbon gases. For purposes of this section, "production" includes extraction and beneficiation of gas or oil.

Subd. 2. **Moratorium.** Until rules are adopted under section 93.514, the commissioner may not grant a permit for the production of gas or oil unless the legislature approves a temporary permit framework that allows issuance of temporary permits.

EFFECTIVE DATE. This section is effective the day following final enactment.

Sec. 24. [93.514] GAS AND OIL PRODUCTION RULEMAKING.

(a) The following agencies may adopt rules governing gas and oil exploration or production, as applicable:

(1) the commissioner of the Pollution Control Agency may adopt or amend rules regulating air emissions; water discharges, including stormwater management; and storage tanks as they pertain to gas and oil production;

(2) the commissioner of health may adopt or amend rules on groundwater and surface water protection, exploratory boring construction, drilling registration and licensure, and inspections as they pertain to the exploration and appraisal of gas and oil resources;

(3) the Environmental Quality Board may adopt or amend rules to establish mandatory categories for environmental review as they pertain to gas and oil production;

(4) the commissioner of natural resources must adopt or amend rules pertaining to the conversion of an exploratory boring to a production well, pooling, spacing, unitization, well abandonment, siting, financial assurance, and reclamation for the production of gas and oil; and

(5) the commissioner of labor and industry may adopt or amend rules to protect workers from exposure and other potential hazards from gas and oil production.

(b) An agency adopting rules under this section must use the expedited procedure in section 14.389. Rules adopted or amended under this authority are exempt from the 18-month time limit under section 14.125. The agency must publish notice of intent to adopt expedited rules within 24 months of the effective date of this section.

(c) For purposes of this section, "gas" includes both hydrocarbon and nonhydrocarbon gases. "Production" includes extraction and beneficiation of gas or oil from consolidated or unconsolidated formations in the state.

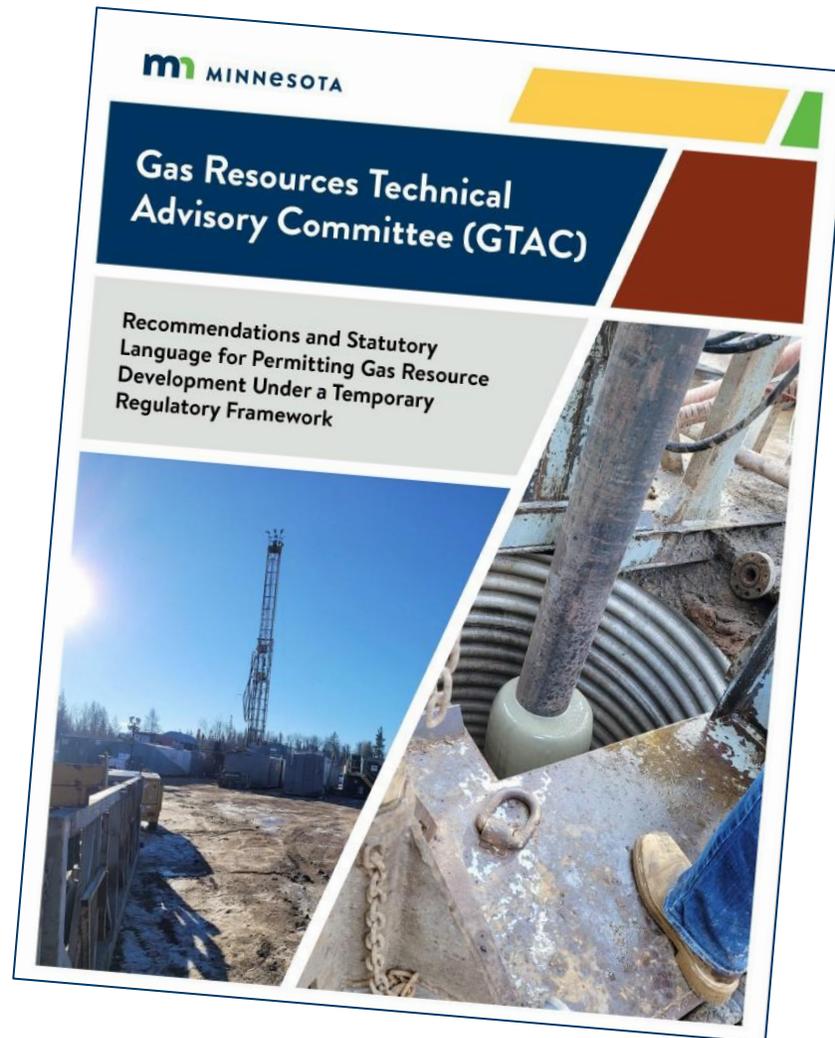
(d) Any grant of rulemaking authority in this section is in addition to existing rulemaking authority and does not replace, impair, or interfere with any existing rulemaking authority.

EFFECTIVE DATE. This section is effective the day following final enactment.

Sec. 25. [93.516] GAS AND OIL LEASING.

Subdivision 1. **Authority to lease.** (c) With the approval of the Executive Council, the commissioner of natural

- Five agencies with regulatory oversight.
- Draft recommendations completed in four months.
- Input from the Tribes, stakeholders, and public.
- Finalized recommendations and draft legislative language submitted to the State Legislature on Jan. 15, 2025.



Gas Rulemaking

- Minnesota is 18 months into the construction of a new regulatory framework for the production of helium, hydrogen and other gases.
- DNR is writing rules for a regulatory framework within a dynamic environment.

2024 Minnesota Statutes

93.514 GAS AND OIL PRODUCTION RULEMAKING.

(a) The following agencies may adopt rules governing gas and oil production:

(1) the commissioner of the Pollution Control Agency may adopt rules governing air discharges, including stormwater management; and storage tanks;

(2) the commissioner of health may adopt or amend rules governing occupational safety, boring construction, drilling registration and licensure, and gas and oil resources;

(3) the Environmental Quality Board may adopt or amend rules governing the review as they pertain to gas and oil production;

(4) the commissioner of natural resources must adopt rules governing boring to a production well, pooling, spacing, unitization, and rules for the production of gas and oil; and

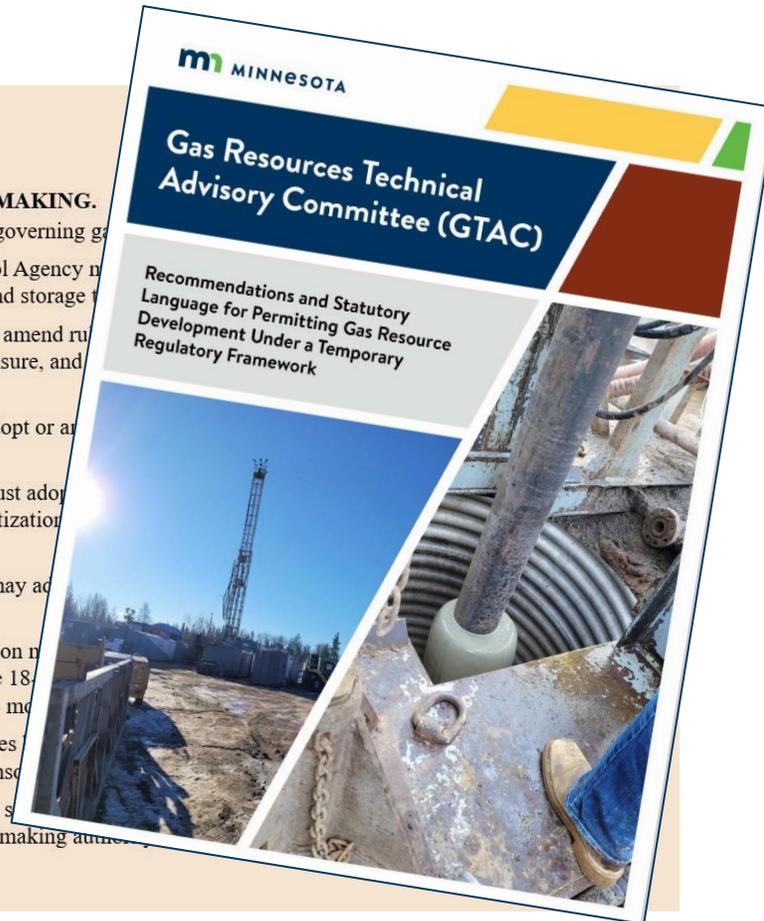
(5) the commissioner of labor and industry may adopt rules governing potential hazards from gas and oil production.

(b) An agency adopting rules under this section may adopt rules that are amended under this authority are exempt from the 180-day notice of intent to adopt expedited rules within 24 months.

(c) For purposes of this section, "gas" includes helium, hydrogen, and other gases extracted and beneficiation of gas or oil from conventional or unconventional sources.

(d) Any grant of rulemaking authority in this section shall not replace, impair, or interfere with any existing rulemaking authority.

History: 2024 c 116 art 3 s 24



DNR rulemaking topics

- Permitting and reclamation
- Financial assurance
- Siting and setbacks
- Pooling and spacing

2024 Minnesota Statutes

93.514 GAS AND OIL PRODUCTION RULEMAKING.

(a) The following agencies may adopt rules governing gas and oil exploration or production, as applicable:

(1) the commissioner of the Pollution Control Agency may adopt or amend rules regulating air emissions; water discharges, including stormwater management; and storage tanks as they pertain to gas and oil production;

(2) the commissioner of health may adopt or amend rules on groundwater and surface water protection, exploratory boring construction, drilling registration and licensure, and inspections as they pertain to the exploration and appraisal of gas and oil resources;

(3) the Environmental Quality Board may adopt or amend rules to establish mandatory categories for environmental review as they pertain to gas and oil production;

(4) the commissioner of natural resources must adopt or amend rules pertaining to the conversion of an exploratory boring to a production well, pooling, spacing, unitization, well abandonment, siting, financial assurance, and reclamation for the production of gas and oil; and

(5) the commissioner of labor and industry may adopt or amend rules to protect workers from exposure and other potential hazards from gas and oil production.

(b) An agency adopting rules under this section must use the expedited procedure in section [14.389](#). Rules adopted or amended under this authority are exempt from the 18-month time limit under section [14.125](#). The agency must publish notice of intent to adopt expedited rules within 24 months of May 22, 2024.

(c) For purposes of this section, "gas" includes both hydrocarbon and nonhydrocarbon gases. "Production" includes extraction and beneficiation of gas or oil from consolidated or unconsolidated formations in the state.

(d) Any grant of rulemaking authority in this section is in addition to existing rulemaking authority and does not replace, impair, or interfere with any existing rulemaking authority.

History: [2024 c 116 art 3 s 24](#)

2025 Gas bill (not enacted)

- Statutes for constructing a temporary regulatory framework
- Statutes foundational to both temporary and permanent frameworks.
- MDH rulemaking authority for gas wells
- Appropriations
 - MDH rulemaking
 - MDH and DNR regulatory programs

The screenshot displays the website for the Office of the Revisor of Statutes. At the top, there is a navigation bar with a search function: "Retrieve by number Bills GO". Below this, a breadcrumb trail reads "Bills > 94th Legislature (2025 - 2026) > SF2530". The main header for the bill is "SF 2530 Status in the Senate - 94th Legislature (2025 - 2026)".

Key information and links provided include:

- Current bill text: 2nd Engrossment
- Add SF2530 to MyBills
- Version List
- Long Description
- Companion: HF2447
- Companion Text
- House Search
- Committee Hearings and Actions
- Revisor number: 25-04622
- Senate Counsel & Research Summary
- Fiscal Notes

The "Description" section states: "Orderly and environmentally responsible development of the states gas resources facilitation provision and appropriation".

Under "Authors (1)", the author is listed as [Hauschild](#).

The "Actions" section shows two tabs: "Separated" and "Chronological". The "Separated" tab is active, showing the bill's status in the "Senate".

Local impact of gas production (had 2025 bill passed)

- Tax revenue
 - Gross proceeds tax
 - Occupation tax
 - Helium Relief Area
- State-managed mineral interests
 - Royalty payments (no less than 18.75%)
 - Rental income
 - Bonus considerations (not less than \$15/acre)

NATIONAL ASSOCIATION OF COUNTIES NACo

Advocacy Tools For Counties Topics Events About NACo About Counties

NEWS

County News

Helium find could be a boon to a 82% public lands county in Minnesota

APR 22, 2024 Share

AUTHOR

 Meredith Moran
County News Staff Writer

UPCOMING EVENTS

WEBINAR
Bridging the Generational Divide in the County Workforce, a NACo EDGE Webinar
MARCH 26, 2026

WEBINAR
NACo Membership Series: First 100 Days, Week 9

RAMS Range Association of Municipalities and Schools
5525 Emerald Drive
Mt. Iron, MN 55708
rams@ramsra.org • 218.748.7651

December 23, 2024

GTAC
500 Lafayette Road N, Box 45
St. Paul, MN 55155-4045

RE: GTAC Comments – Range Association of Municipalities and Schools

Commissioner Strommen:

On Behalf of the RAMS, the Range Association of Municipalities and Schools, representing 69 local units of government including 27 cities, 27 townships, and 15 school districts in the Taconite Assistance Area of northeastern Minnesota, commonly known as the Iron Range, I am happy to offer comments to the GTAC regarding new rules for an exciting industry, Helium that has the potential to promise new economic benefit to our communities, local municipalities, and schools.

We would encourage the rulemaking authorities to support the current two-step process for this new industry. However, the draft indicates that an Environmental Assessment Worksheet (EAW) be required for exploration. This means an EAW for every exploration hole. This is inconsistent with current mining exploration practices and rules. This would unnecessarily delay the exploration phase. Instead, we would encourage the requirement for an EAW at the production phase of beneficiation. Please allow for exploration, then phases of development, which have the built-in process for appropriate environmental review. We support basic permitting consistent with our other mineral assets.

Additionally, whatever is created, our local communities must continue to benefit from the resources in our region. RAMS supports rolling the royalty process into existing mining laws, especially incorporating gas and oil into the Gross Proceeds Tax (in lieu of property taxes), promoting consistent application and beneficiation strategies across local communities and the state. The assumptions under draft warrant fair and equitable, in spirit of severance tax systems, for both the region and any company wishing to explore the resource.

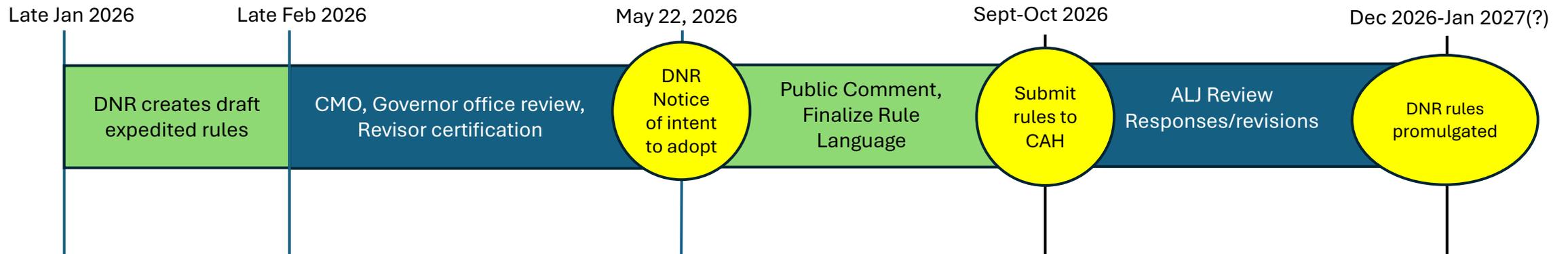
Sincerely,


Paul Petier
Executive Director

Range Association of Municipalities and Schools (RAMS) The organization represents more than 151,000 residents and 69 public sector units of government, including 27 cities, 15 public school districts, and 27 townships in the 11,000-square mile Taconite Assistance Area (TAA) of northeast Minnesota. As an organization, RAMS has represented the interests of the Iron Range region for 53 years.

ONE RANGE
RAMS
ONE VOICE

DNR (and EQB) Rulemaking Timeline



- Recommendations
- Draft legislative language
- Best regulatory practices report
- Compilation of input
- Links to 2025 legislative proposals

m REGULATORY FRAMEWORK FOR DEVELOPING GAS RESOURCES IN MINNESOTA

Home Project Background Enacted Legislation Recommendations Project Timeline

GTAC's final recommendations have been submitted!
[Review the documents](#)

Gas resources in Minnesota?

Minnesota has untapped and unexplored potential for both geologic hydrogen and helium resources. With no history of gas production in the state, Minnesota needs a framework that would regulate these emergent industries to properly protect natural resources and human health, develop a fair royalty structure on state-managed lands and ensure the conservation of the state's natural resources.

What is GTAC?

In May 2024 the Minnesota Legislature directed the formation of a Gas Resources Technical Advisory Committee (GTAC). Representatives from the following state agencies are part of the Advisory Committee

- Minnesota Department of Natural Resources (DNR)
- Minnesota Department of Health (MDH)
- Environmental Quality Board (EQB)
- Minnesota Pollution Control Agency (MPCA)
- Minnesota Department of Revenue (DOR)

GTAC focuses on developing a framework for consideration of permit applications for development of gas resources.

What are we doing now?

GTAC conducted a public input period on draft recommendations and draft statutory language during 10 person meetings. GTAC considered all public input as well as input from Tribal Governments and finalized language in a report submitted to the legislature on January 15, 2025.

JUST ENERGY LAW
Williams Weiss
Pappalardo & Ferguson
Auto Technical, LLC
Final Report of Best Practices

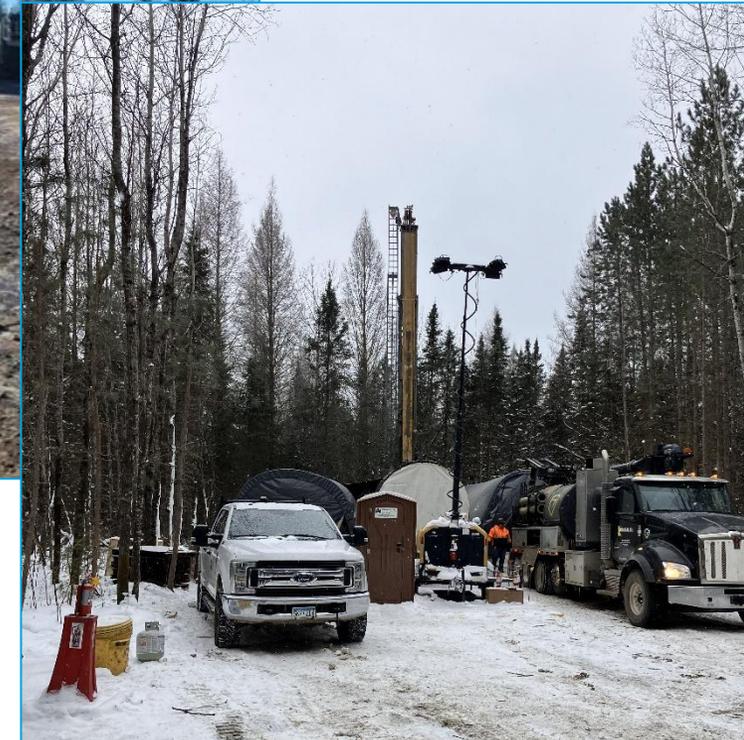
WHITE EARTH RESERVATION
Minnesota Department of Natural Resources
Division of Energy Resources
Project: Energy Resources, Statewide
Project: Energy Resources, Statewide
Project: Energy Resources, Statewide

WATERLEGACY
Paula Chubbuck, Executive Director
2025 Lake Ave., St. Paul, MN 55108
www.waterlegacy.org
December 23, 2024
Sent electronically to GTAC@dnr.mn.gov
Gas Resources Technical Advisory Committee
Minnesota Department of Natural Resources
Minnesota Department of Health

VEMA HYDROGEN
December 16, 2024
Minnesota Department of Natural Resources
Gas Resources Technical Advisory Committee (GTAC)
gtac@dnr.mn.gov
Subject: Vema Hydrogen Feedback to GTAC's Working Recommendations and Statutory Language
published November 19, 2024
To Whom It May Concern:
Vema Hydrogen is a US company that is developing technology to produce low-carbon, stimulated geologic hydrogen. Vema is launching the first stimulated geologic hydrogen projects in the United States and is a world leader in this technology. Vema uses catalysis and subsurface stimulation to produce clean hydrogen gas for less than \$1.00 per kg H2 (net-of-cost).
Vema is interested in the GTAC's proposed gas resources development framework because Minnesota's clean energy and mining infrastructure combined with Vema's Stimulated Geologic Hydrogen process could make the state a global leader in clean hydrogen production.

Pulsar Helium

- Winter 2024 (Jetstream #1)
- Winter 2025 (deepen Jetstream #1, Jetstream #2)
- Fall 2025-present (JS3 – JS6+)
- Fall 2026 (Go/No Go decision)



Mesabi Hydrogen Range?

Oscillate Plc

- Active exploration on 60,000 acres of private mineral interests and RGRAs on state minerals
- Land package overlies Biwabik Iron Formation
- Acquired by Pulsar Helium in late 2025

Iron Range Exploration (Koloma)

- Leased private minerals
- Interest in leasing and exploring on state-managed mineral interests
- Geophysical survey in Lake County, 2025

Orvian (QIMC)

- Exploration on private and state mineral interests (RGRA)

H₂

Quebec Innovative Materials' Partner Orvian Acquires Key Minnesota Land for Clean Hydrogen Exploration

By FCW Team
July 30, 2025 at 10:19 AM EDT

Listen 3:19

HYDROGEN MARKET

Oscillate PLC Expands Hydrogen Exploration Efforts in Minnesota

By Fuel Cells Works
February 4, 2025 at 10:36 AM EDT

Listen 3:53

HYDROGEN MARKET

Race to Find Hydrogen in Minnesota Begins in Lake County

By Fuel Cells Works
December 22, 2025 at 10:47 AM EDT

Thank You!

Michael Liljegren

Michael.Liljegren@state.mn.us

651-259-5689