EERC | UND UNIVERSITY OF NORTH DAKOTA

Critical Challenges. Practical Solutions.

Energy & Environmental Research Center (EERC)

North Dakota CarbonSAFE Phase III: Site Characterization and Permitting

(FE0031889)

U.S. Department of Energy

Fossil Energy & Carbon Management / National Energy Technology Laboratory

Carbon Management Research Project Review Meeting

August 06, 2024

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Project Overview

Objective:

- Perform commercial-scale site characterization and permitting for the geologic storage of nearly 4 million metric tons (Mt) of CO_2 per year.

- Performance dates:
  - BP1: October 2020 - September 2022
  - BP2: October 2022 - September 2024

PROJECT TUNDRA

Minnkota Power Cooperative — A Touchstone Energy® Cooperative

EERC — University of North Dakota

U.S. Department of Energy | National Energy Technology Laboratory

Industrial Commission of North Dakota
Lignite Research, Development and Marketing Program

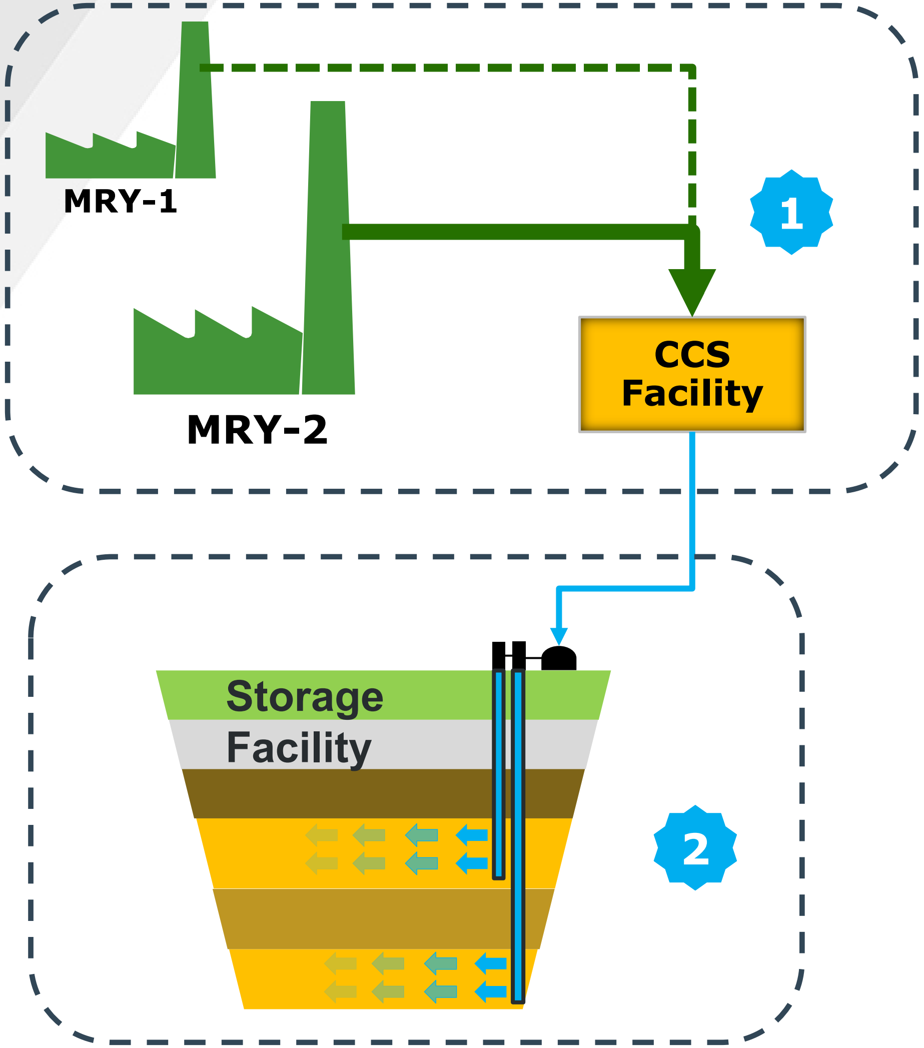
CMG Computer Modelling Group Ltd.

Schlumberger

Square Butte Electric Cooperative

GOAL: Accelerate wide-scale deployment of CCUS by assessing and permitting the geologic storage of CO_2 emissions captured from the Milton R. Young Power station.

Project Tundra Overview



Two Projects in One

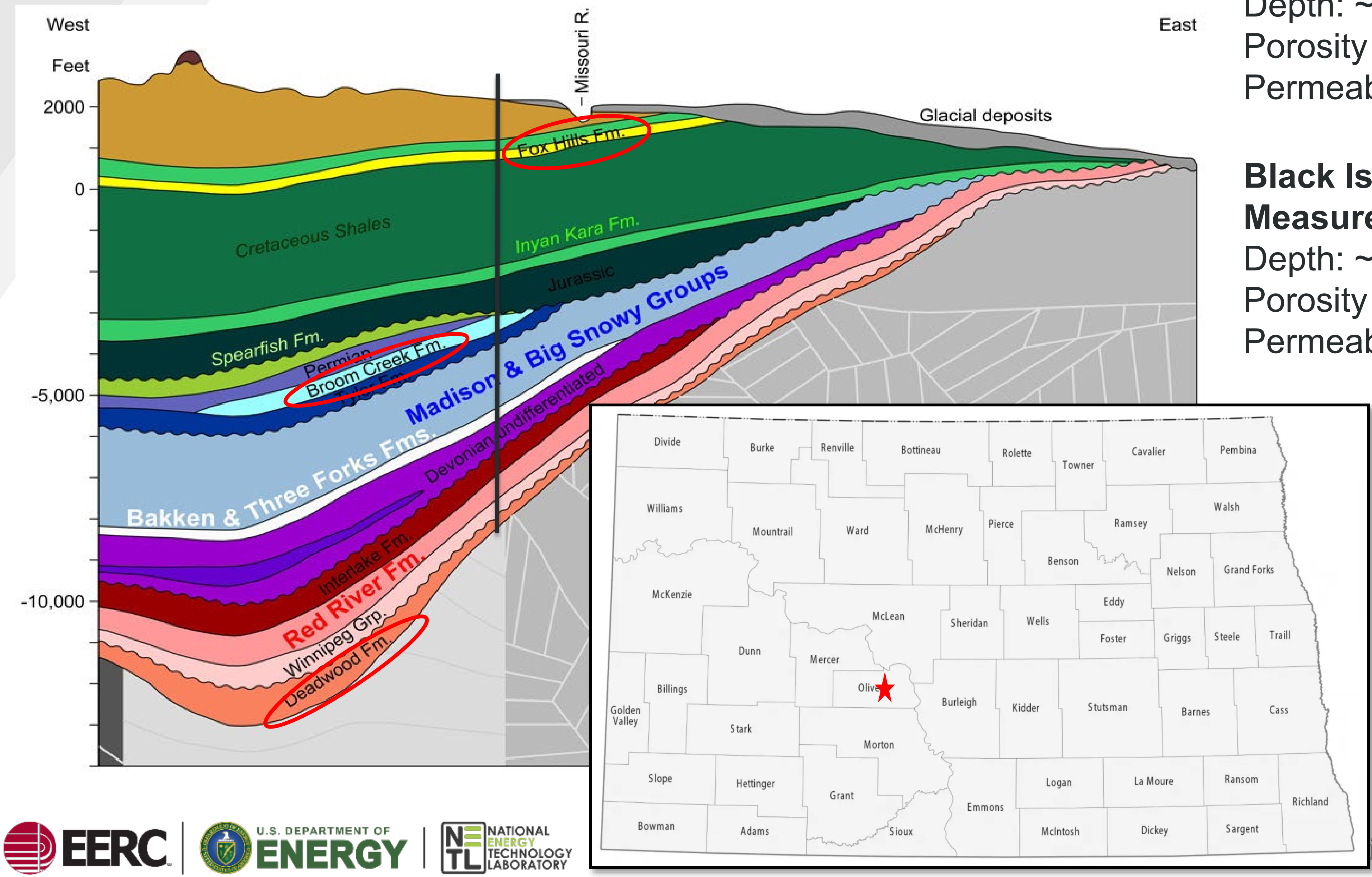
1. **Divert flue gas then separate CO_2** in a carbon capture system that strips out the CO_2 then liquifies under pressure.

2. **Inject CO_2 into storage formation** over a mile below lignite mine.

No impact on the power plant and no impact on its costs


Center, ND
(Pop. 588)
1 mile
J-LOC1 Well
(Strat test)
BNI1 Well
(Strat test)
~5 miles
Milton R. Young
Station
J-ROC1 Well
(Strat test)

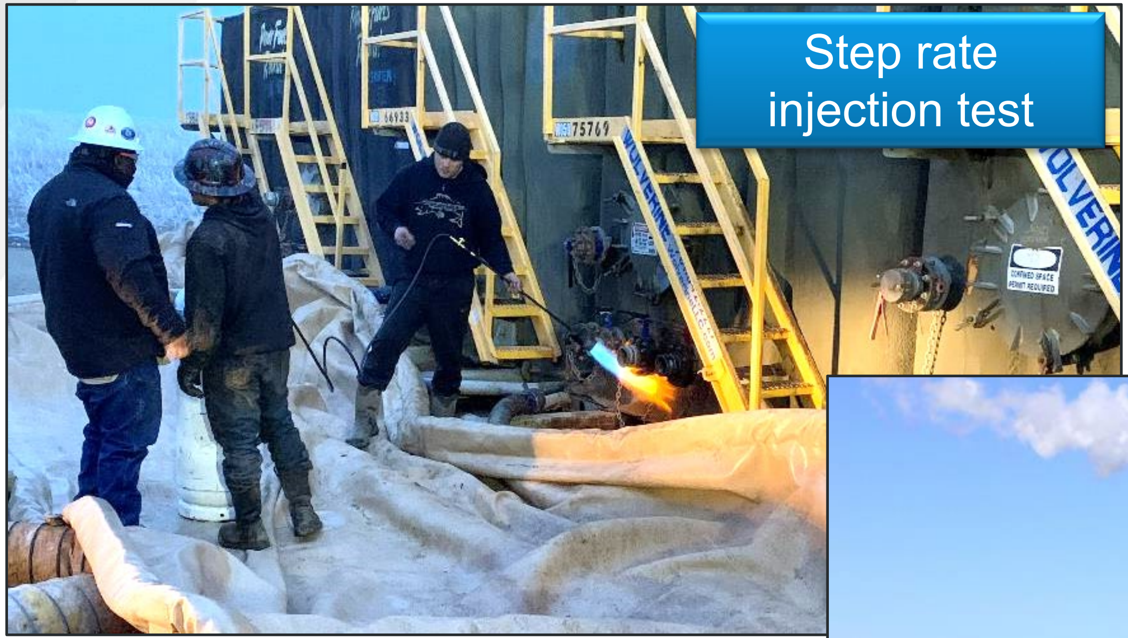
Project Location



Broom Creek Measured Values
Depth: ~4900 ft
Porosity (%): 2 – 27
Permeability (mD): 0.06 – 2690

Black Island/Deadwood Measured Values
Depth: ~9400 ft
Porosity (%): 3.4 – 15
Permeability (mD): 0.03 – 2060

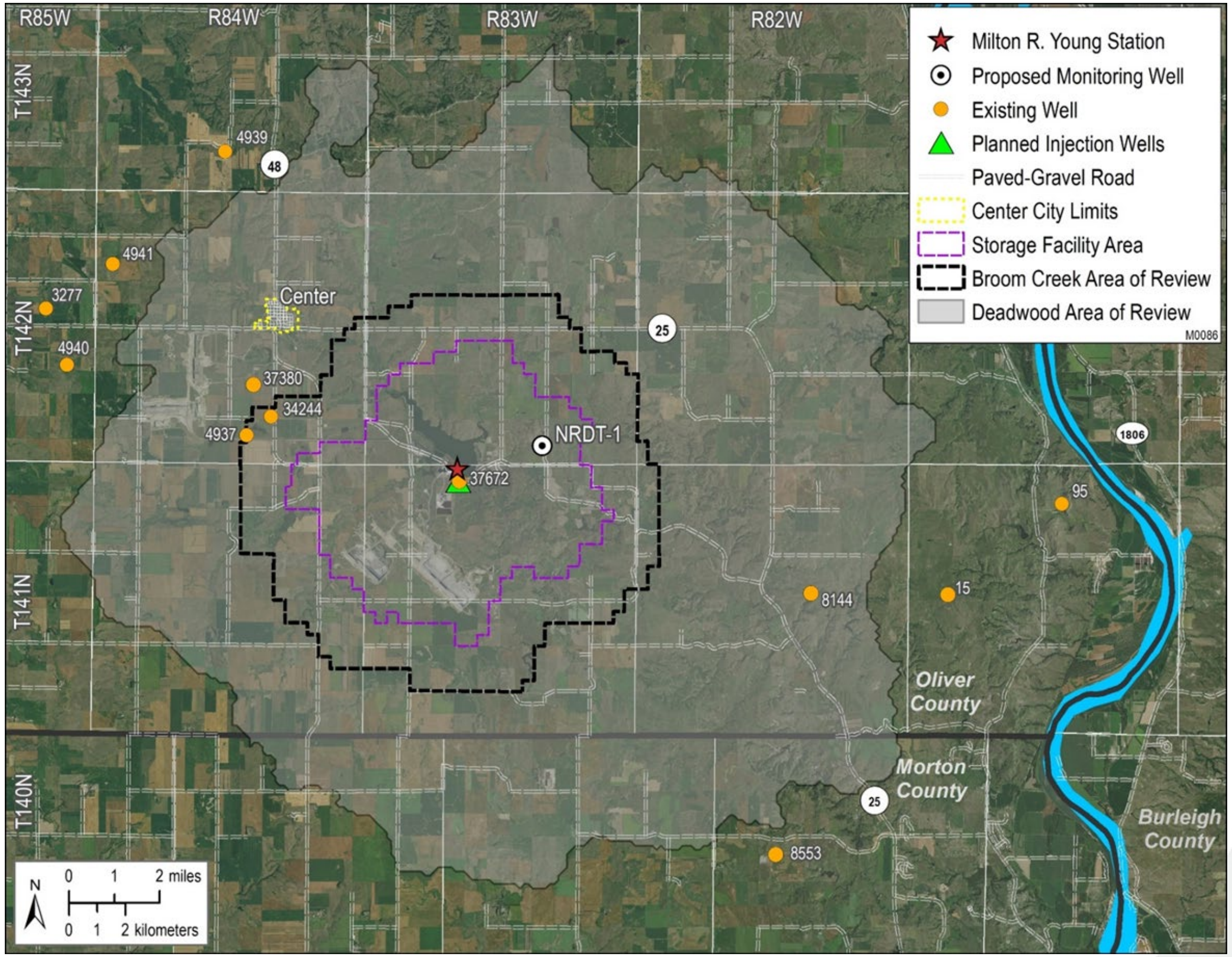
Data Collection



Pore Space and Area of Review

- Pore Space Access:
  - ~50 parcels of land
  - ~60 different landowners
  - >95% voluntary enrollment

- Area of Review (AOR) – risk-based approach for over-pressured formations (Broom Creek Formation)



Public Hearing

Combined applications were **1200+ pages**

Over 7 hours of testimony and responding to public comments

EIV Submitted and Approved

Environmental Assessment (EA)

- Draft EA approved August 9, 2023
- Published for public comment
- Anticipating mid August 2024 final approval (FONSI)

Where Are We Today

- NDIC administrative orders signed for two CO2 storage facility permits
- Received approval for Class VI injection wells
- MRV plan approved
- Pending approval of the Environmental Assessment

Lessons Learned

- Injection tests are worth it.
- Scenario iteration takes time–every answer generates more questions.
- Pore space acquisition takes more time than you'd think.
- Working in a state with Class VI primacy–priceless.
- Great partners make a difference!

More Lessons Learned-Engagement and Acceptance

- Starts with defining “Community”
  - Know your history, or…
  - Prioritize stakeholder groups
- Establishing guideposts for “engagement” and “project acceptance”
  - Again, history
  - Clear project motivation
- Communicating Successfully
  - What does transparency look like to the community?
  - What is it they really want?

Defining Community

- Know your history
  - most often interdependent on a history of other technology development
  - Social media is a game changer
  - Roles and Responsibilities
- Prioritizing Stakeholders Interests
  - Don't forget the project will set a standard or… a hurdle

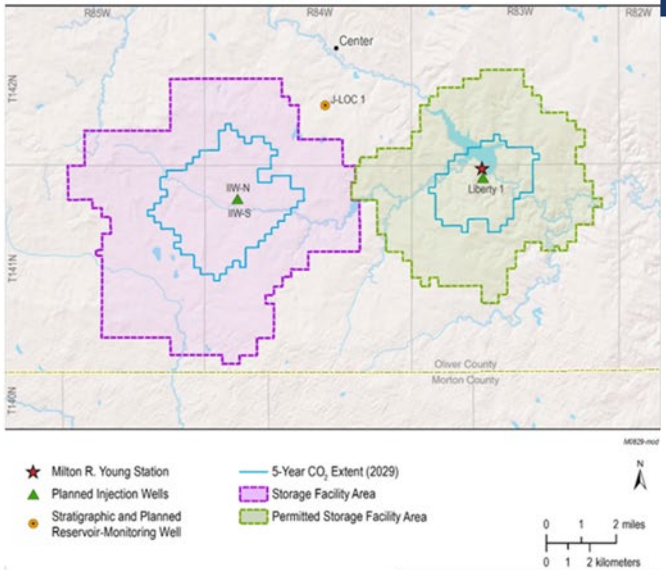
Engagement and Project Acceptance

- History of development is important
  - Standards are set from expectations
  - Existing frameworks
- Defining your Project Motivation
  - History will again play a role
  - Meaningful and relatable

Storage Facilities by the Numbers

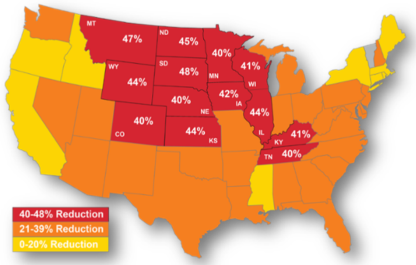
PROJECT TUNDRA

- **17,000** acres of seismic survey
- **20,000+** feet drilled
  - 2 stratigraphic test wells
- **2,500+** feet of core rock recovered!
- **East Site – 95.73% Landowner consent**
  - Total about 19,000 acres
  - Broom Creek and Deadwood
- **West Site – 80.33% Landowner consent**
  - Total about 29,000 acres
  - Broom Creek only
- A combined capacity to store **222 million metric tons** of CO_2 over 20 years.



Project Tundra Drivers

- Clean Power Plan, 2015 (withdrawn)
  - ND was required to have a 45% reduction in CO_2 emissions by 2022
  - Replaced by the ACE Rule (also withdrawn)
- New carbon regulations are anticipated
  - Regulations from EPA expected in 2023 for new, modified, reconstructed plants – 111(b)
  - December 23, 2022 – EPA issued a proposed rule to govern the process and timelines for submittal of State Plans, for when EPA publishes final emissions guidelines under 111(d)
- Avoid stranded investment in MRYS
  - $400 million in air pollution controls to comply with BART (1st round of regional haze)
- Preserve an important dispatchable resource for the coop members



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Critical Challenges. Practical Solutions.

Communicating “Successfully”

- What does it look like:
  - Anticipate(remember know your history)
  - Honest
  - Sincerity takes time
- What do they want:
  - Listeners
  - Empowerment
  - Invitation

https://www.projecttundrand.com/

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