Wyoming CarbonSAFE: Accelerating CCUS Commercialization and Deployment at Dry Fork Station and the Wyoming Integrated Test Center

PROJECT AWARD #: DE-FE0031891
J. Fred McLaughlin, Scott Quillinan, Zunsheng Jiao and Dan Eakin
University of Wyoming School of Energy Resources

U.S. Department of Energy
National Energy Technology Laboratory
Carbon Management Project Review Meeting
August 6, 2024
CARBON TRANSPORT AND STORAGE BREAKOUT SESSION 1, 10:55am

UNIVERSITY OF WYOMING | School of Energy Resources

THE WORLD NEEDS MORE COWBOYS.

Acknowledgment

Disclaimer

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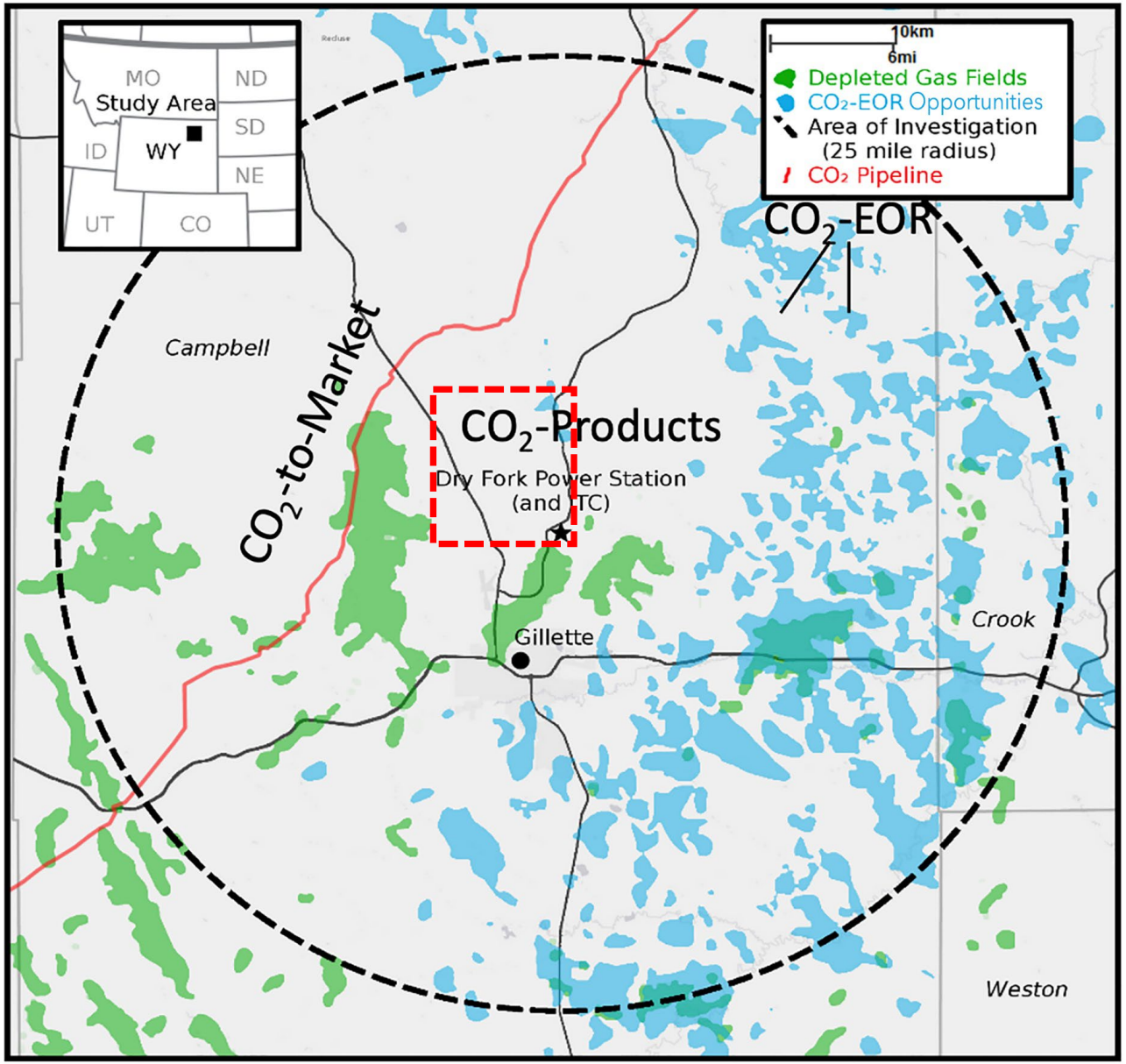
Project Overview

Regional Carbon Management Opportunities

- The Wyoming CarbonSAFE Storage Hub is located adjacent to:
  - Existing intrastate CO_2 transportation network
  - Multiple utilization industries
    - Carbon to products industry
    - CO_2-EOR for carbon utilization
  - Experienced carbon workforce
  - Multiple CO_2 point sources
  - Transportation infrastructure
- Wyoming has:
  - CO_2 management legislative and gov't framework
  - Class VI primacy
  - Long-term CCUS liability fund
  - Educated and supportive public
  - Known geologic storage targets



Project Overview: Wyoming CarbonSAFE Phase III

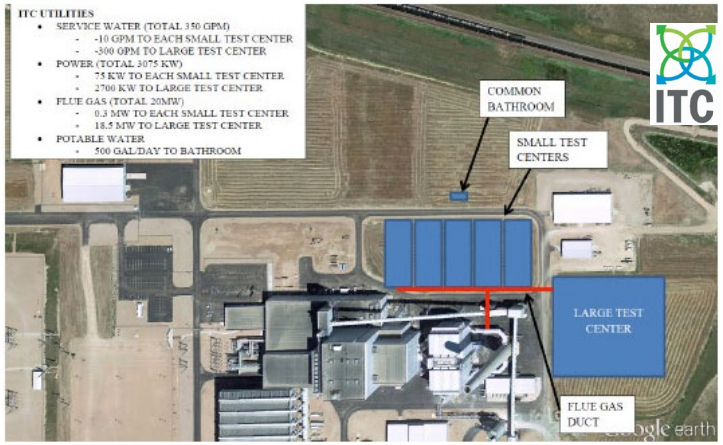
Dry Fork Station

- Built in 2007
- Operating life to 2072
- 385 MW
- 3.3 million tons of CO_2/year

Wyoming Integrated Test Center (ITC)

- Completed fall 2017
- Test CO_2 capture and untilization technologies
- Membrane Technology Research (MTR) Large-scale pilot, also Kawasaki, TDA and others

BASIN ELECTRIC POWER COOPERATIVE
A Touchstone Energy® Cooperative



WYOMING INTEGRATED TEST CENTER

UW School of Energy Resources

Carbon Capture at Wyoming CarbonSAFE

Membrane Technology Research (MTR) at the ITC

Large Pilot Testing of the MTR Membrane Post-Combustion Capture Process (FE0031587)

NATIONAL ENERGY TECHNOLOGY LABORATORY

DE-FE0031587

ITC WYOMING INTEGRATED TEST CENTER

MTR

Sargent & Lundy

TRIMERIC CORPORATION

MTR

Project Participants

ACADEMIC PARTNERS

University of Wyoming

Advanced Resources International

Energy and Environmental Research Center

Los Alamos National Laboratory

CARBON CAPTURE

Membrane technology and Research, Inc. (MTR)

Wyoming Integrated Test Center

INDUSTRIAL PARTNERS

Basin Electric Power Cooperative

Schlumberger Carbon Services

Denbury Resources

Oxy Low Carbon Ventures

Carbon GeoCapture

Western Fuels Association

Wyoming Municipal Power Agency

PERMITTING, ENVIRONMENTAL AND REGULATORY EXPERTS

Long Reimer Winegar Beppler, LLP

TriHydryo Corporation

Wyoming Energy Authority

Wyoming Department of Environmental Quality (DEQ)

Major Objectives

1. Finalize surface and subsurface characterization activities at DFS

2. Conduct NEPA and environmental analysis

3. Integrate MTR's CO_2 FEED capture assessment

4. Complete Class VI permits to construct for the Wyoming CarbonSAFE storage hub

5. Advance commerciality within the Wyoming CarbonSAFE Storage Hub

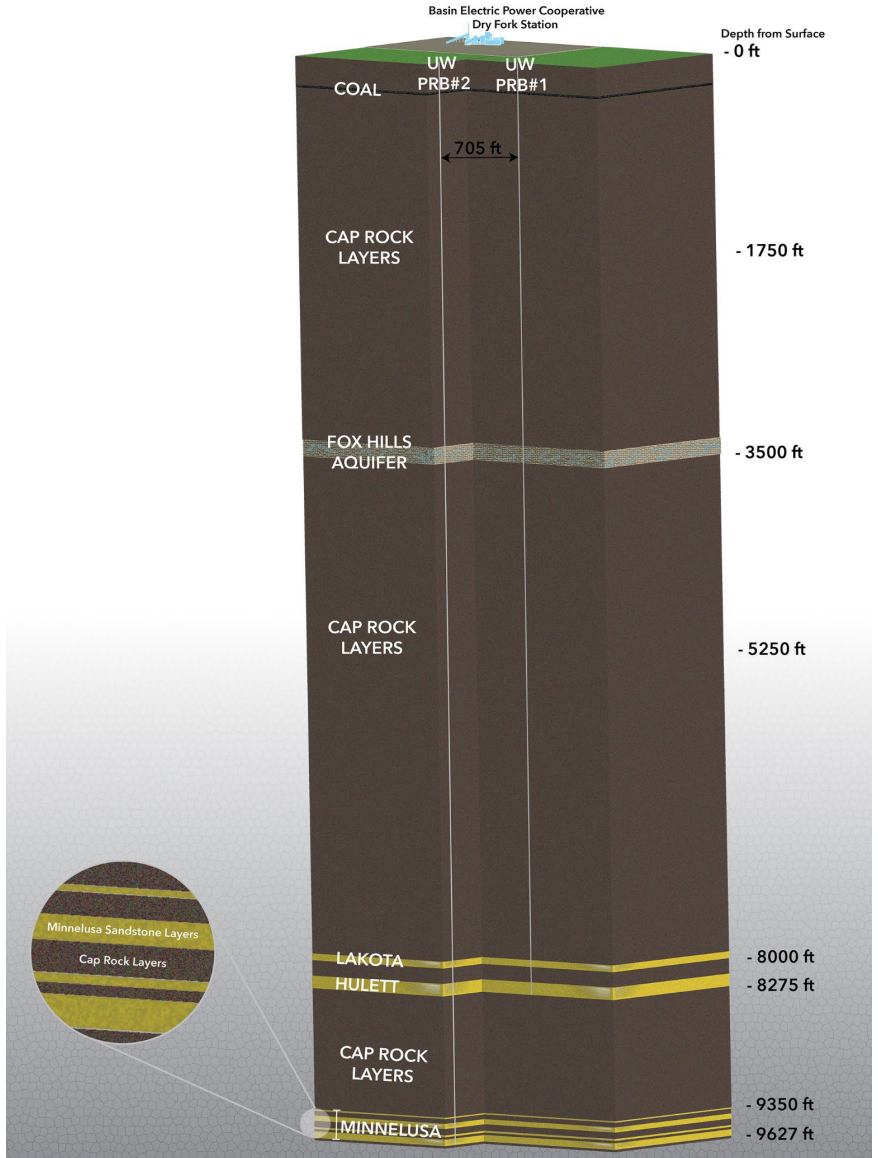
Project funding:

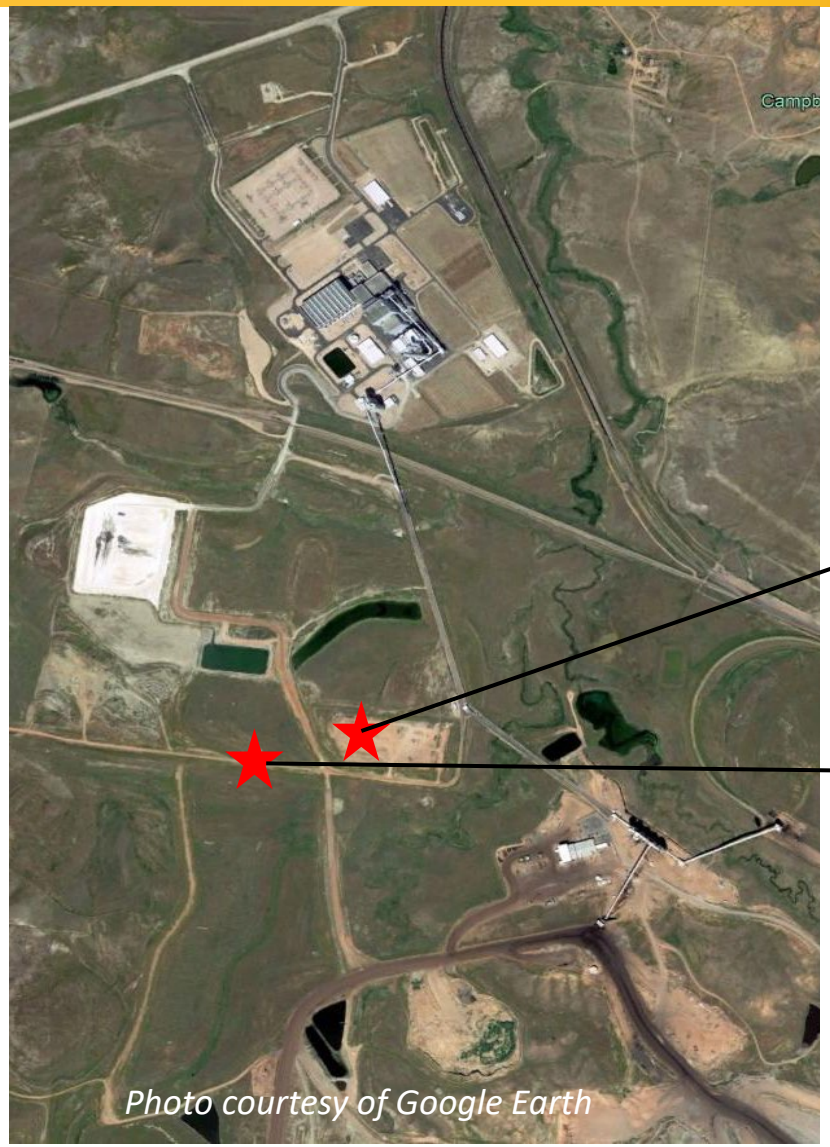
- $17,190,829 (Federal)
- $2,185,941 (Cost share)
- $19,367,770 (Total)

Period of performance: Oct. 2020 to Sept. 2024

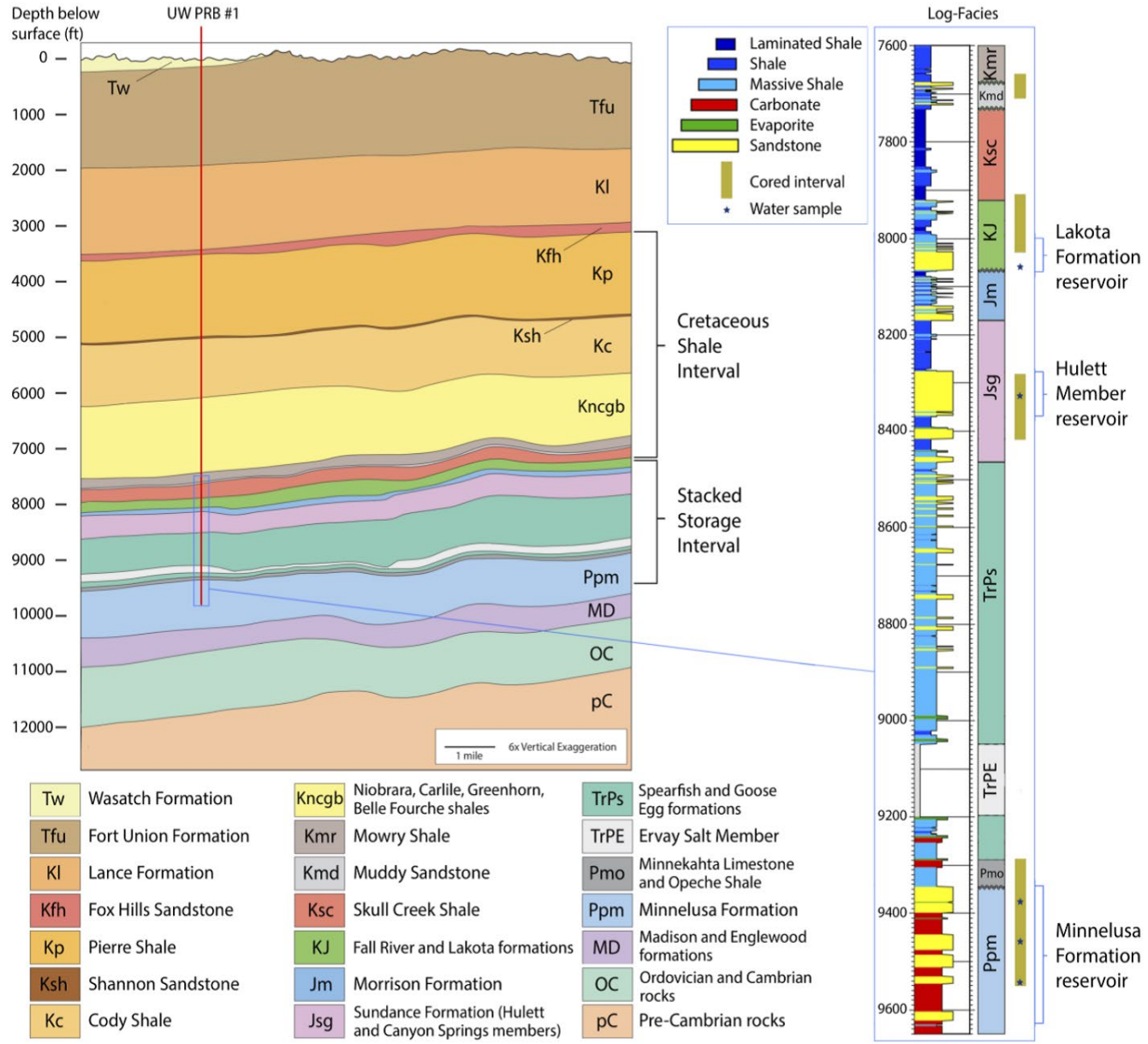
Technical Approach

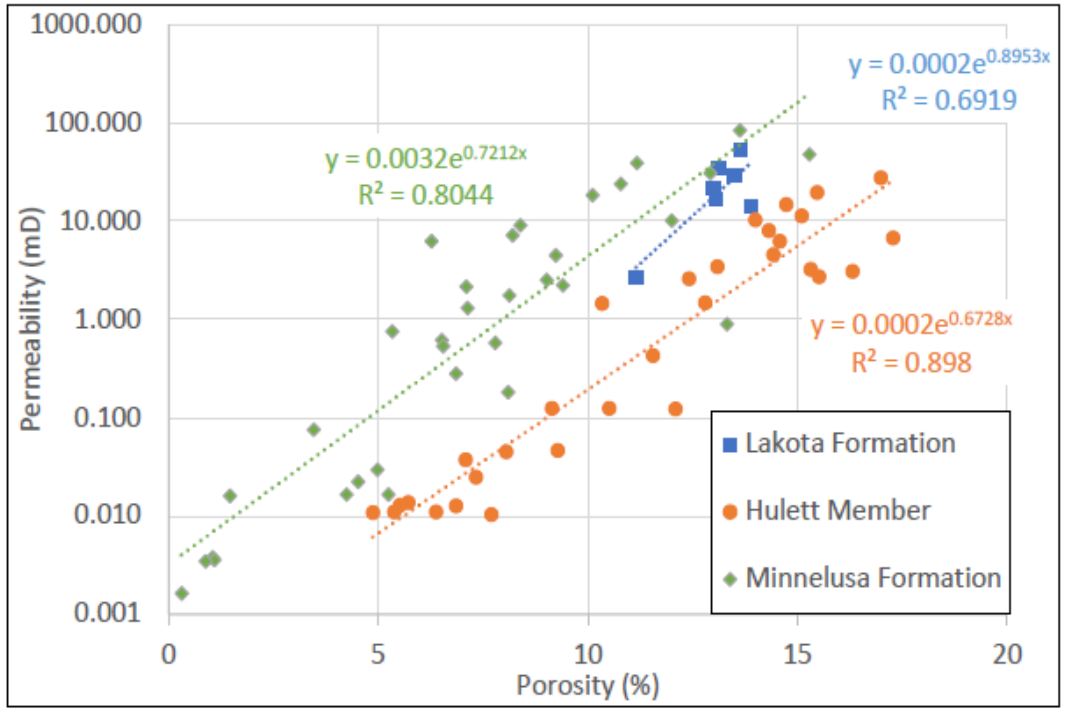
Technical Approach





Technical Approach





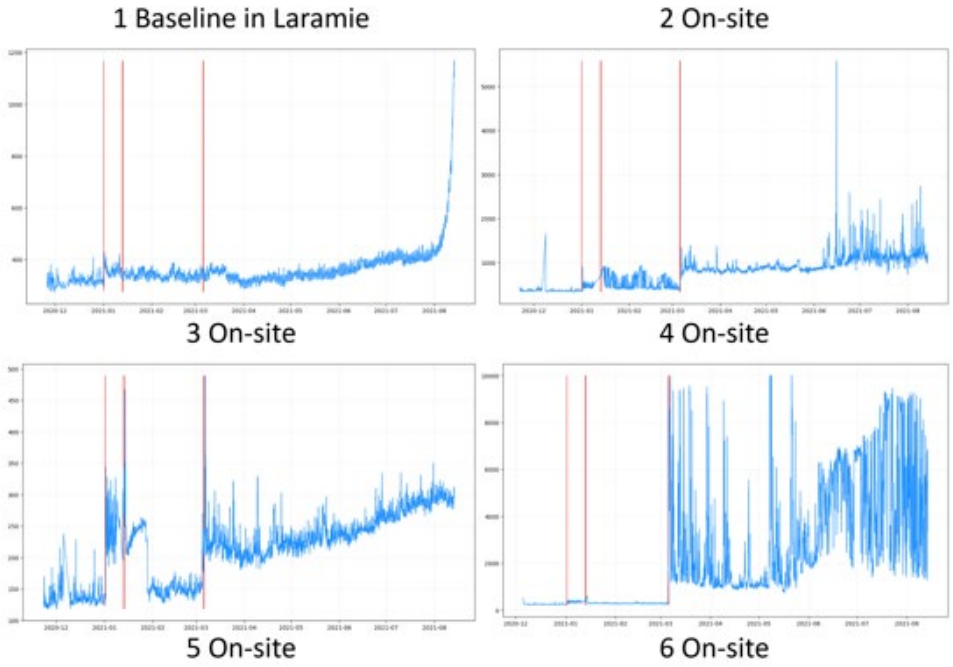
Core measurements from UW PRB#1

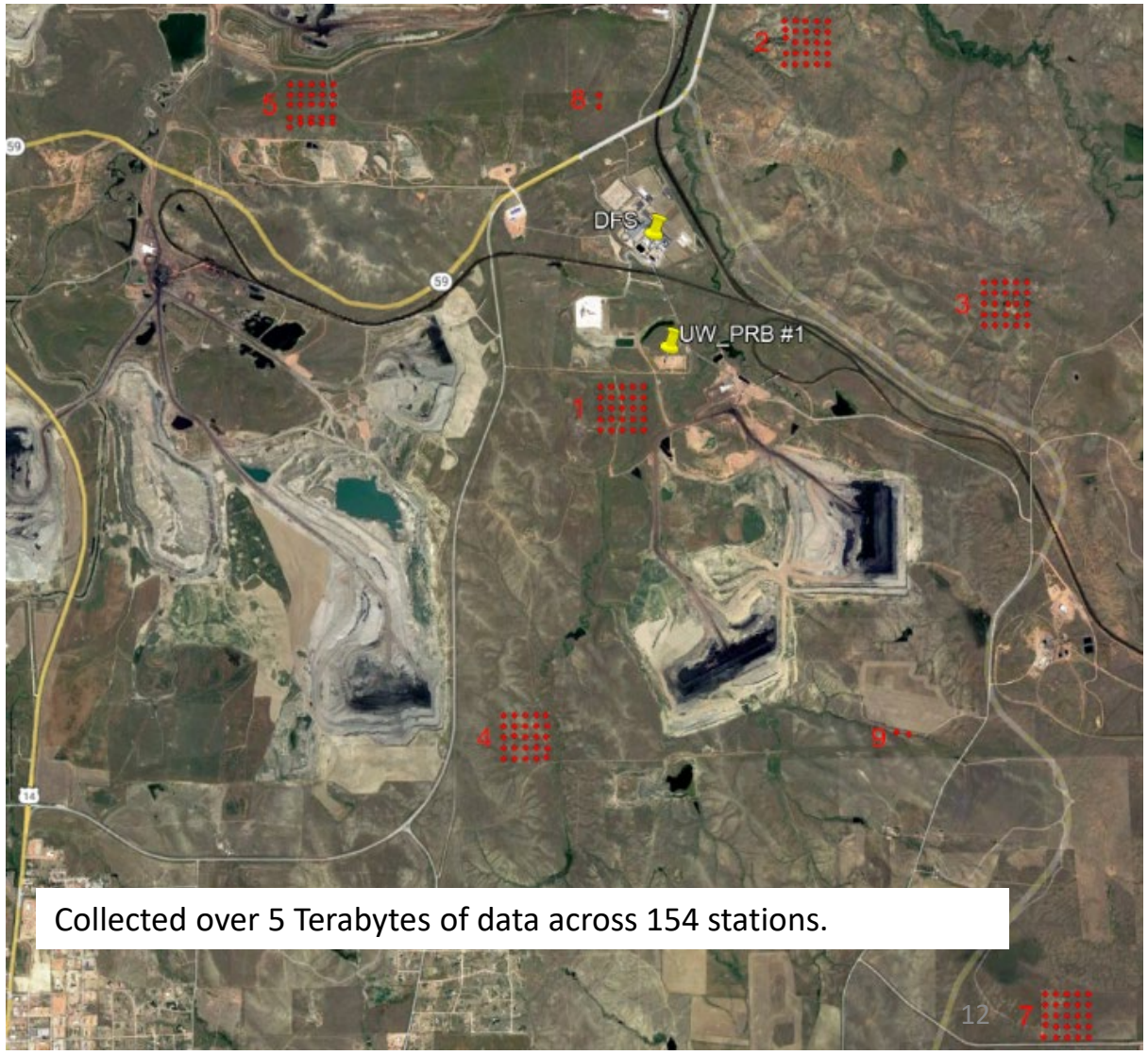
Technical Approach

Environmental and Risk Monitoring

- Tested three passive seismic technologies
  - Seismicity from natural and industrial sources, drilling and mining operations

- Two+ years of soil and groundwater monitoring





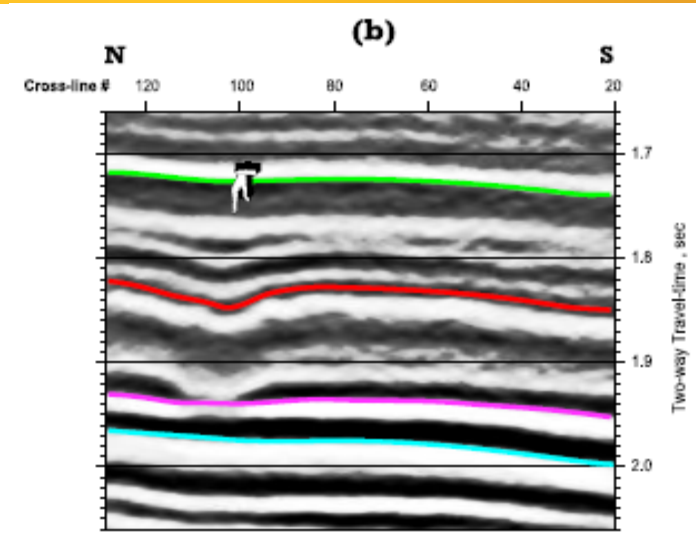
Collected over 5 Terabytes of data across 154 stations.

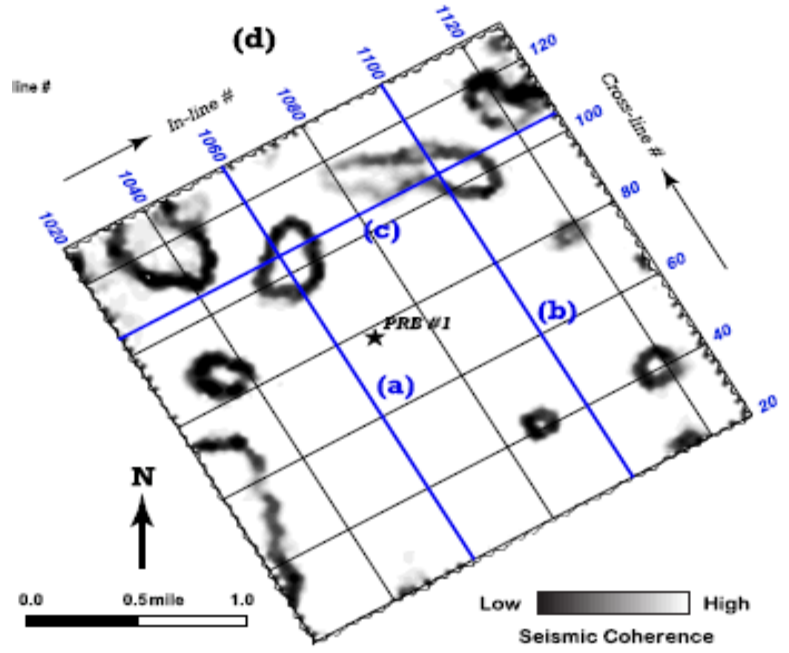
Status Update

THE WORLD NEEDS MORE ADVENTUROUS SPIRIT.

Progress and Current Status

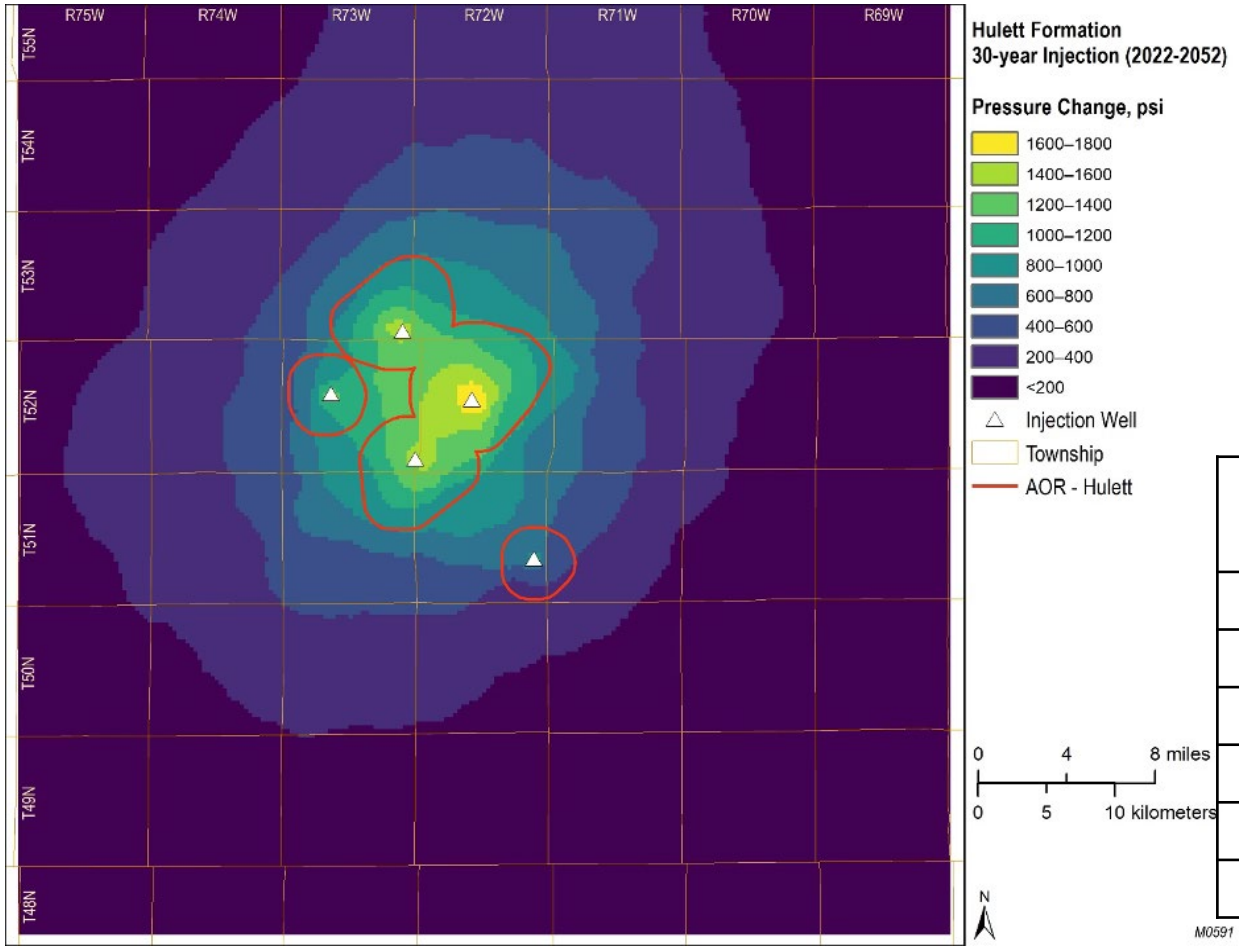
1. Storage Hub Capacity And Permitting
2. NEPA Assessment
3. Risk Assessment
4. CO_2 Pipeline FEED Study
5. Community Benefit and Public Outreach
6. Collaborations at Wyoming CarbonSAFE

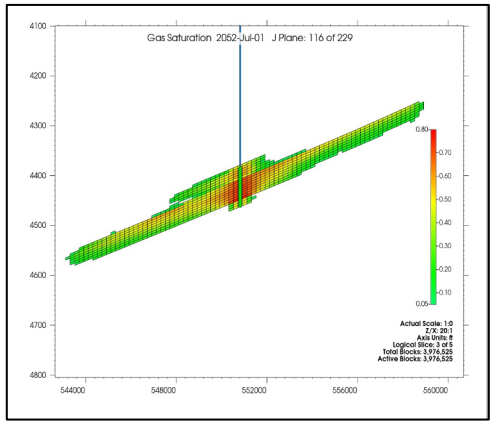




Progress and Current Status

Storage Hub Capacity And Permitting

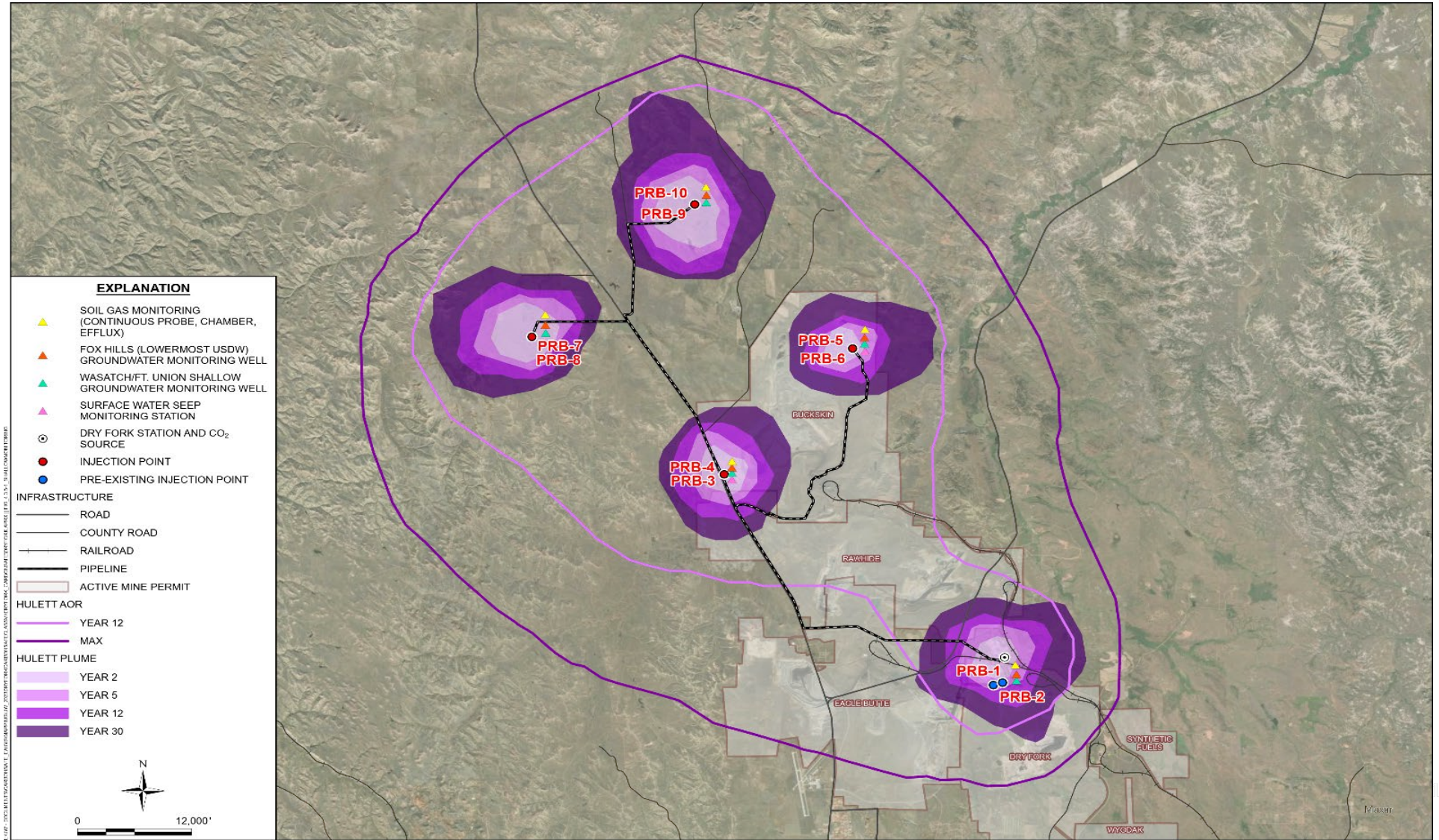




	Lakota	Hulett	Minnelusa	Total (Metric Ton)
Pad 1	2,756,404	5,534,440	6,945,025	15,235,869
Pad 2	4,124,417	7,436,942	10,348,528	21,909,886
Pad 3	1,549,456	4,083,569	7,681,164	13,314,189
Pad 4	1,317,538	2,704,578	9,558,274	13,580,389
Pad 5	2,228,563	5,092,045	12,674,302	19,994,910
Total	11,976,377	24,851,574	47,207,292	84,035,243

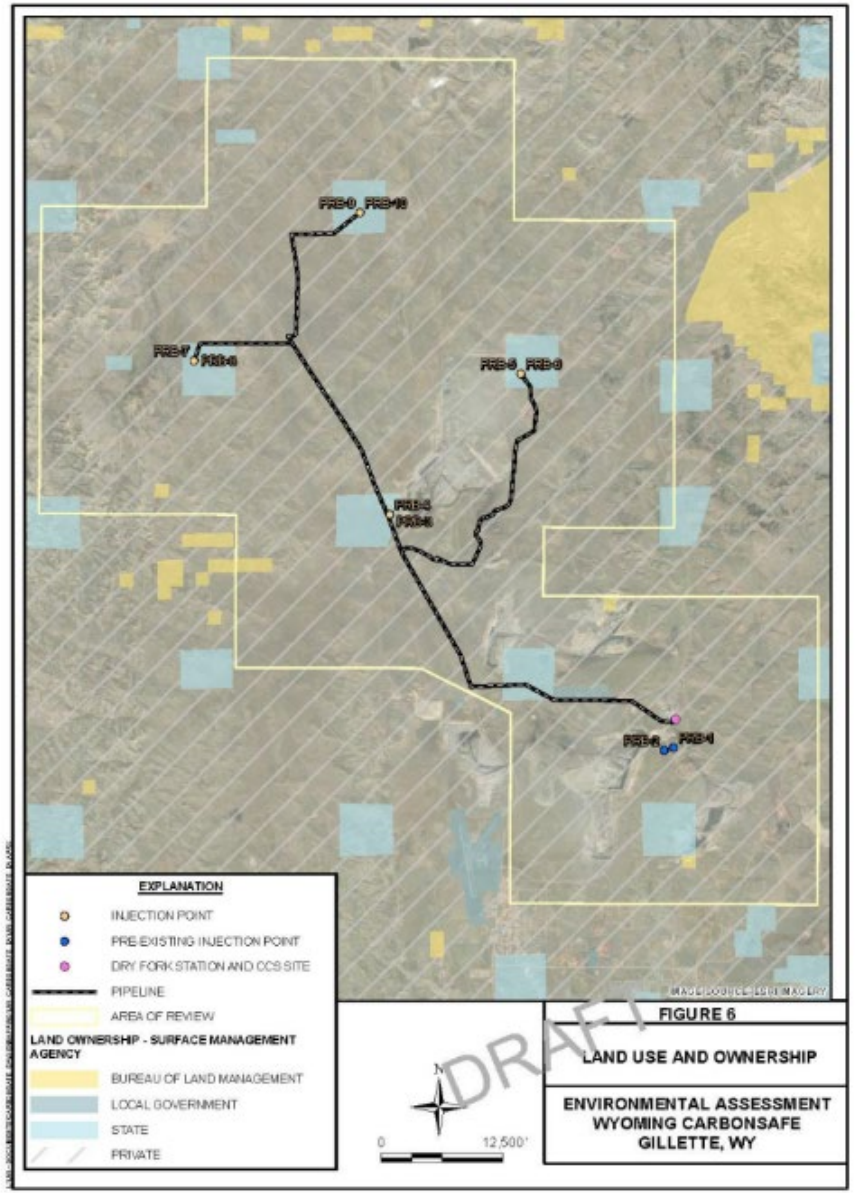
Progress and Current Status

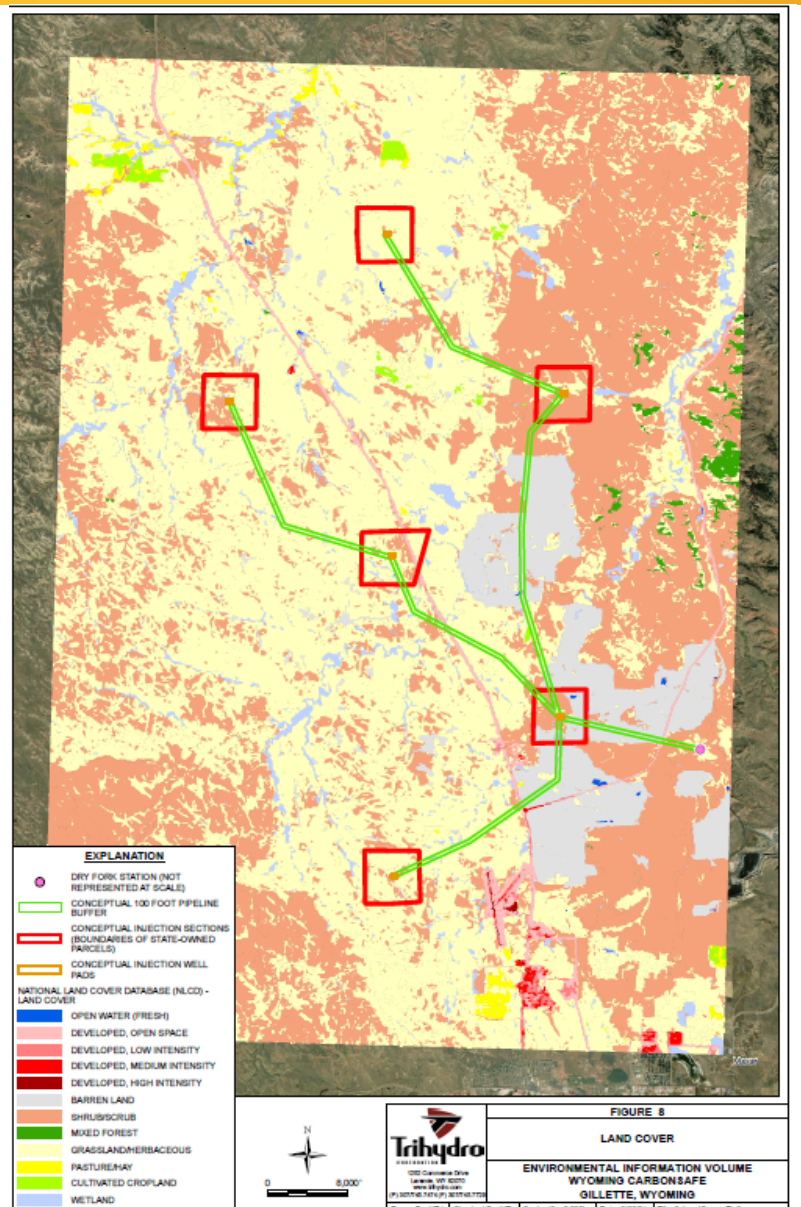
Storage Hub Capacity And Permitting



Progress and Current Status

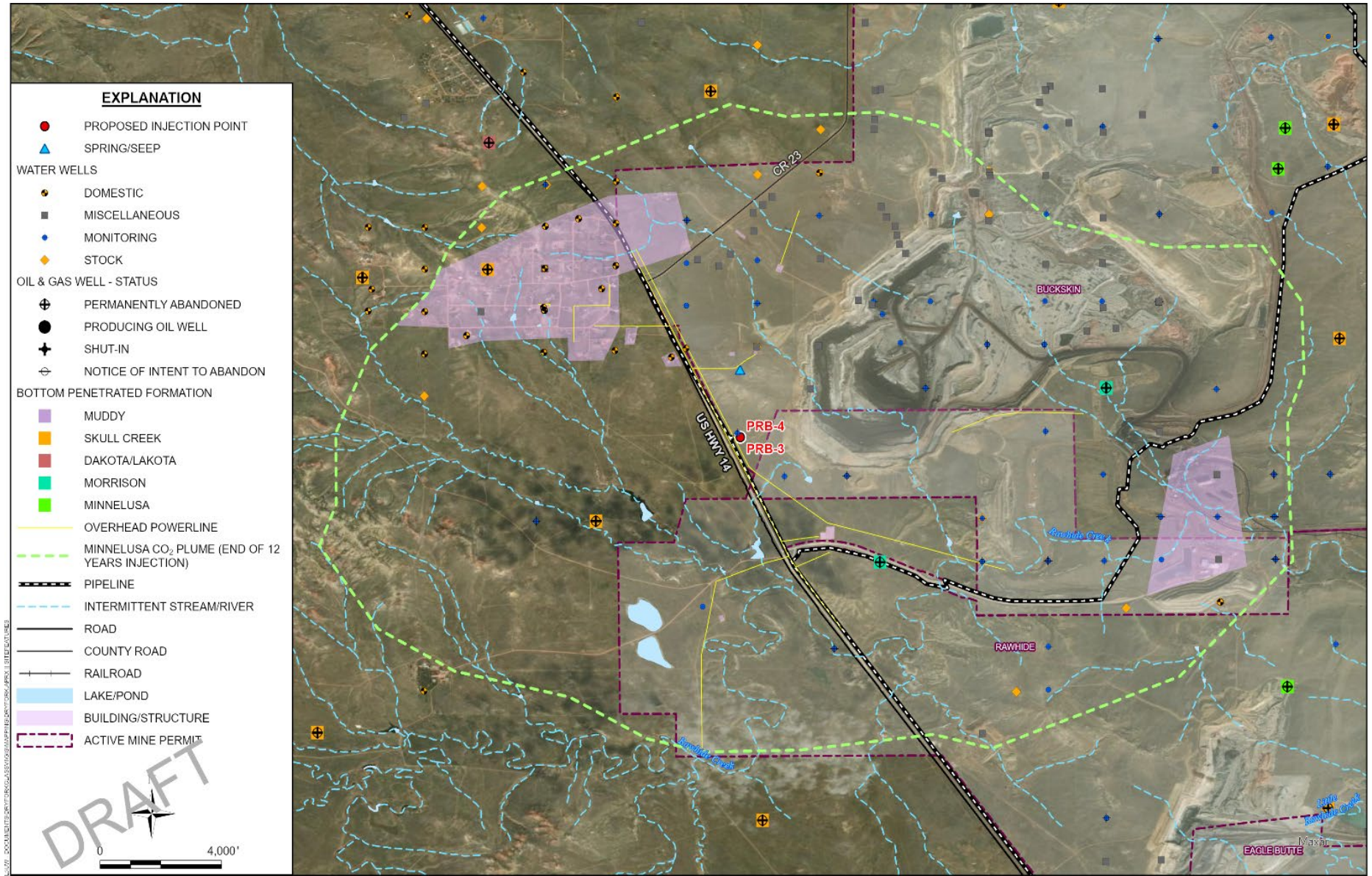
NEPA Assessment





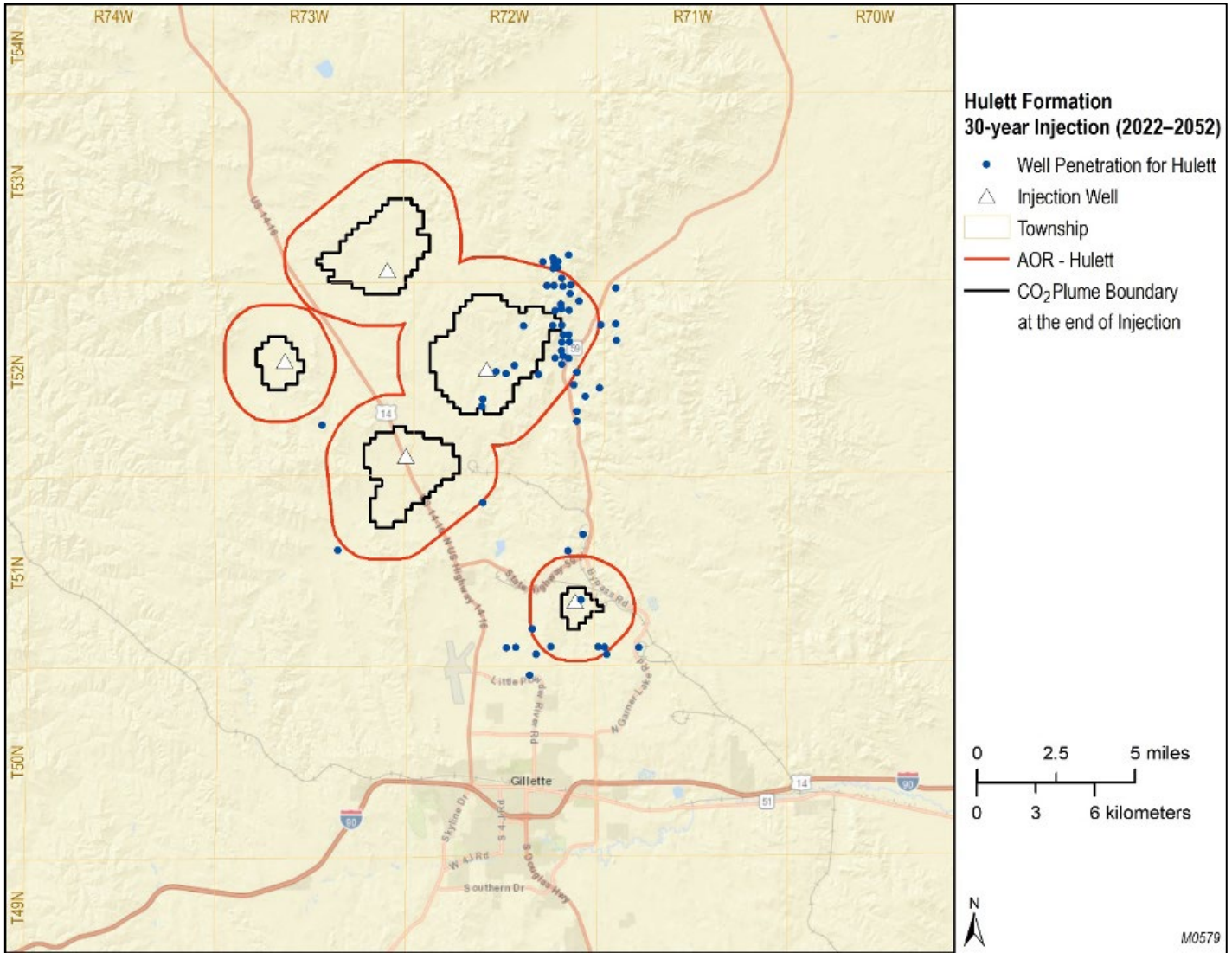
Progress and Current Status

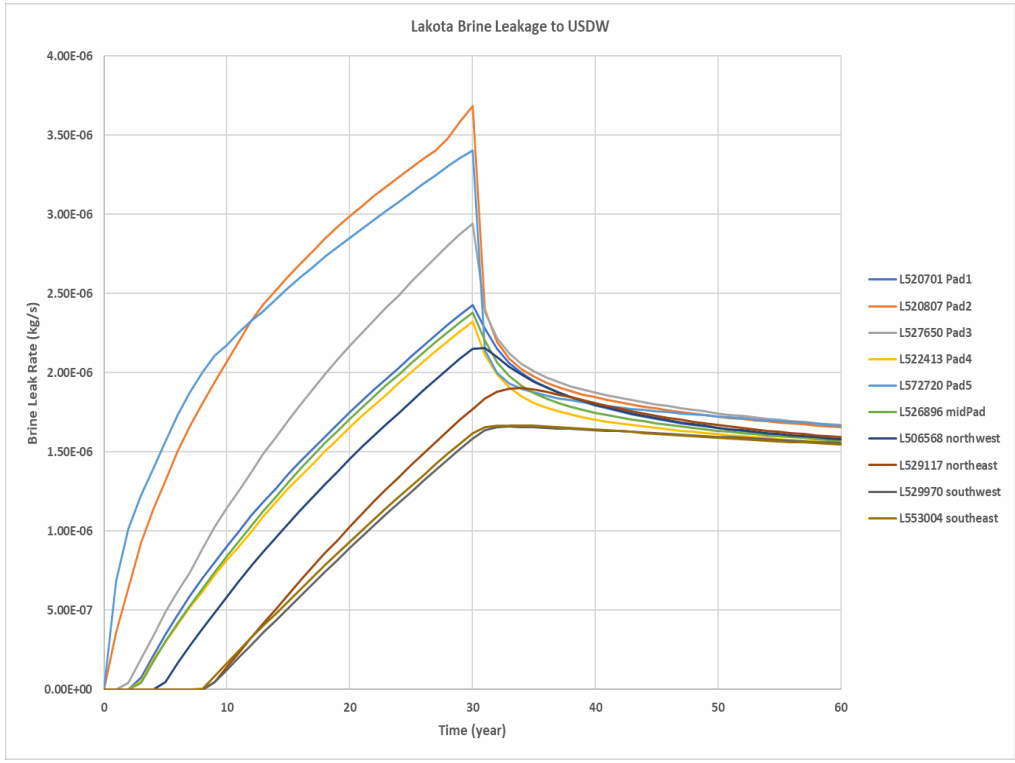
Risk Assessment



Progress and Current Status

Risk Assessment



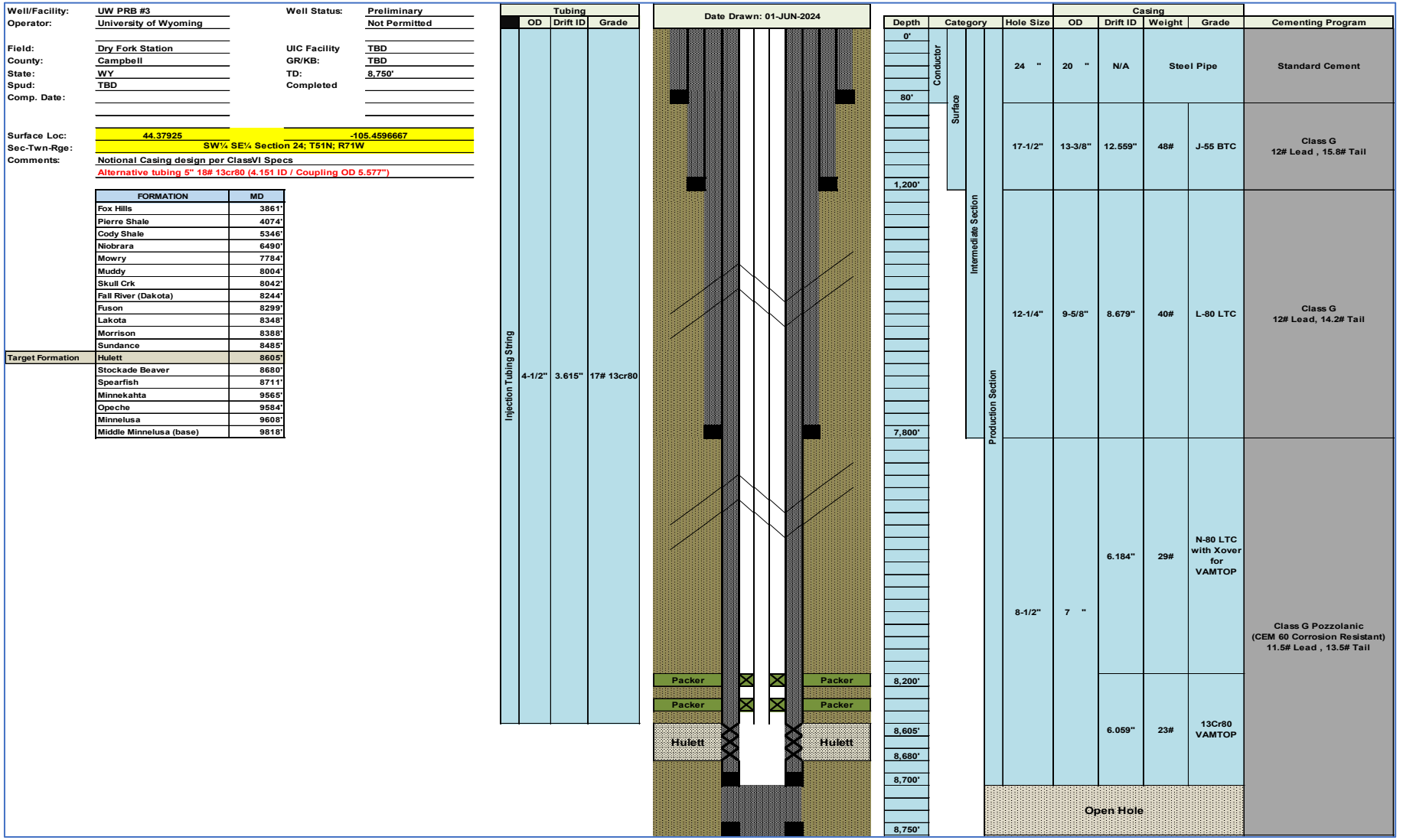


Progress and Current Status

Risk Assessment

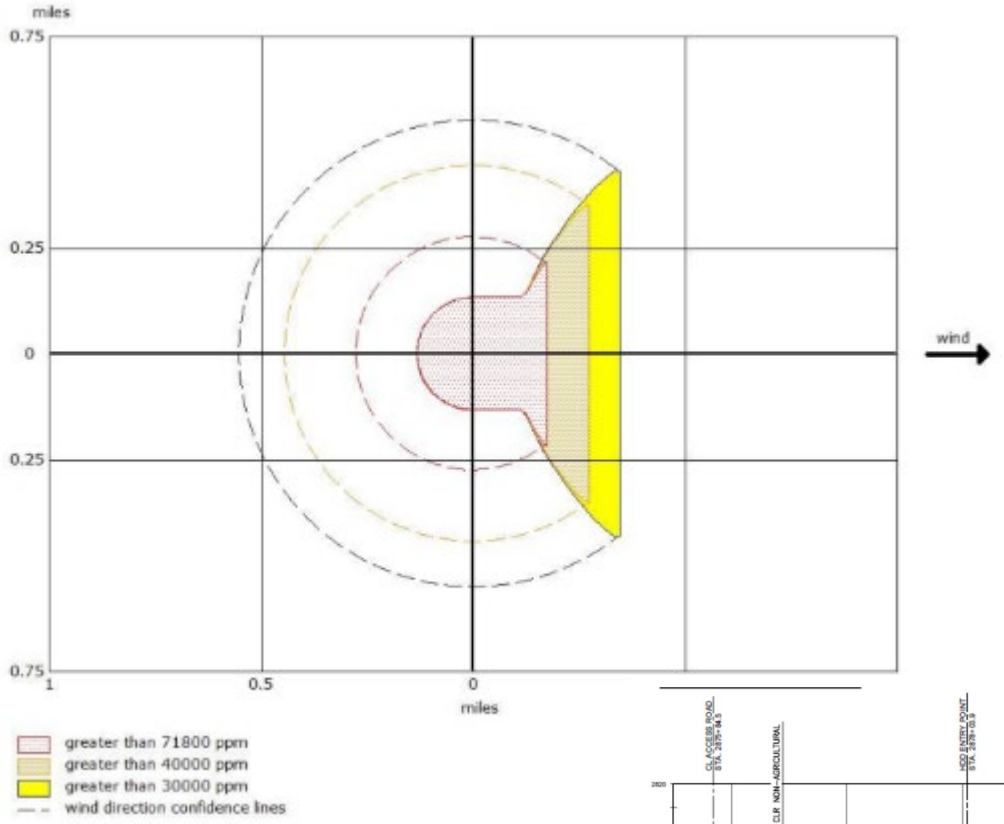
Well/Facility:	UW PRB #3	Well Status:	Preliminary
Operator:	University of Wyoming		Not Permitted
Field:	Dry Fork Station	UIC Facility	TBD
County:	Campbell	GR/KB:	TBD
State:	WY	TD:	8,750'
Spud:	TBD	Completed	
Comp. Date:			
Surface Loc:	44.37925	-105.4596667	
Sec-Twn-Rge:	SW¼ SE¼ Section 24; T51N; R71W		
Comments:	Notional Casing design per ClassVI Specs		
	Alternative tubing 5" 18# 13cr80 (4.151 ID / Coupling OD 5.577")		

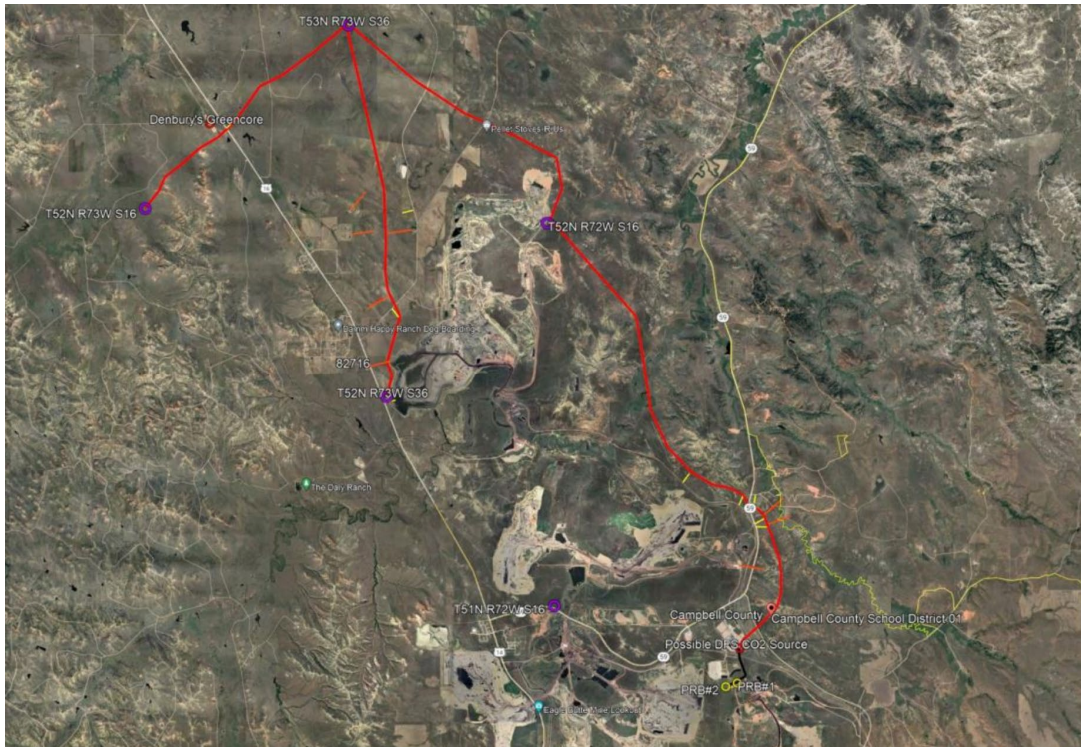
	FORMATION	MD
	Fox Hills	3861'
	Pierre Shale	4074'
	Cody Shale	5346'
	Niobrara	6490'
	Mowry	7784'
	Muddy	8004'
	Skull Crk	8042'
	Fall River (Dakota)	8244'
	Fuson	8299'
	Lakota	8348'
	Morrison	8388'
	Sundance	8485'
Target Formation	Hulett	8605'
	Stockade Beaver	8680'
	Spearfish	8711'
	Minnekahta	9565'
	Opeche	9584'
	Minnelusa	9608'
	Middle Minnelusa (base)	9818'

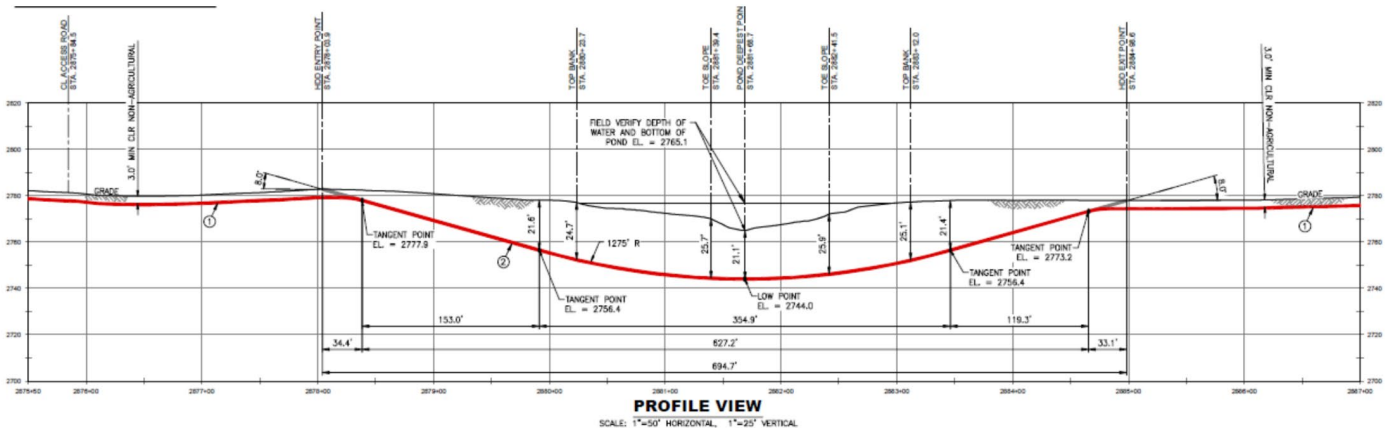


Progress and Current Status

CO_2 Pipeline FEED Study





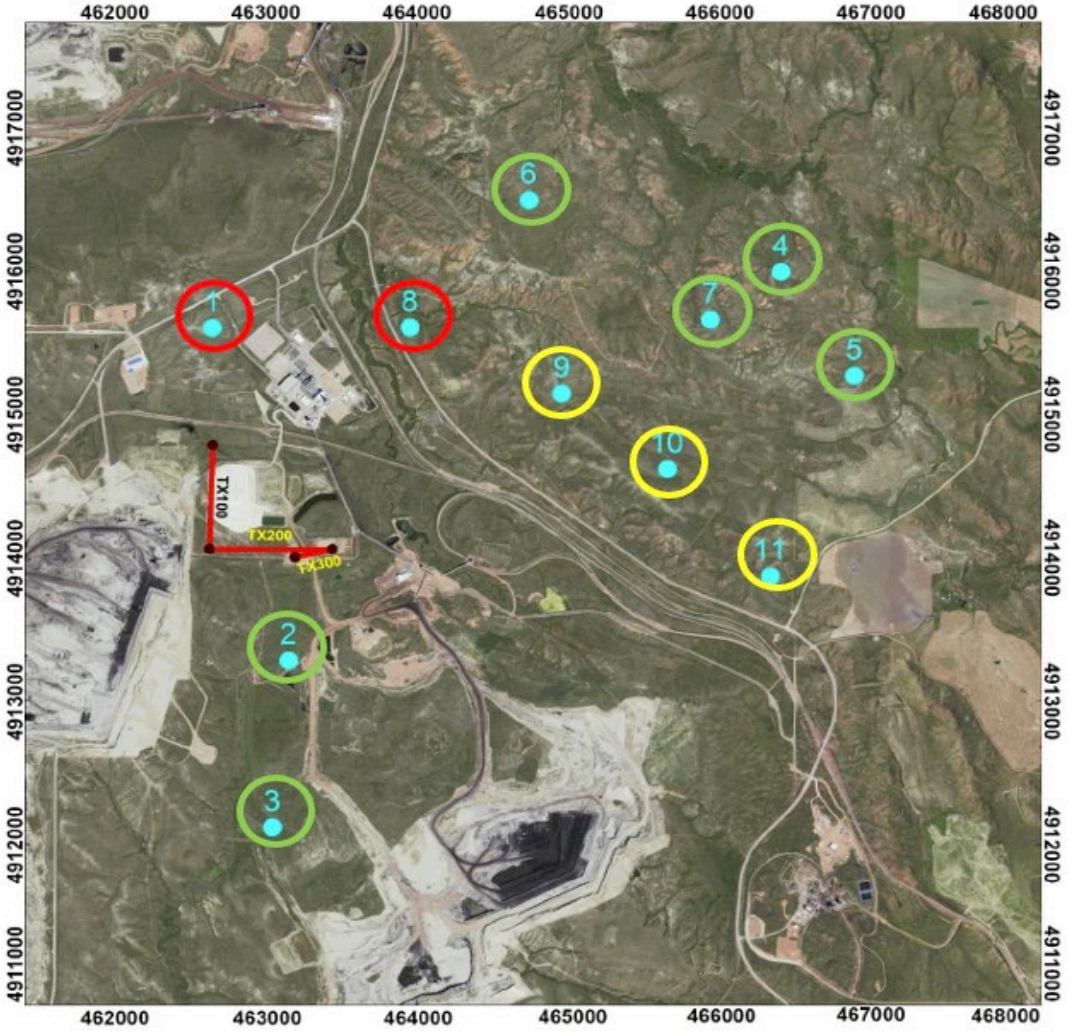


Progress and Current Status

Community Benefit and Public Outreach

Collaborations

Collaborations at Wyoming CarbonSAFE



Questions?

Mine (not shown)

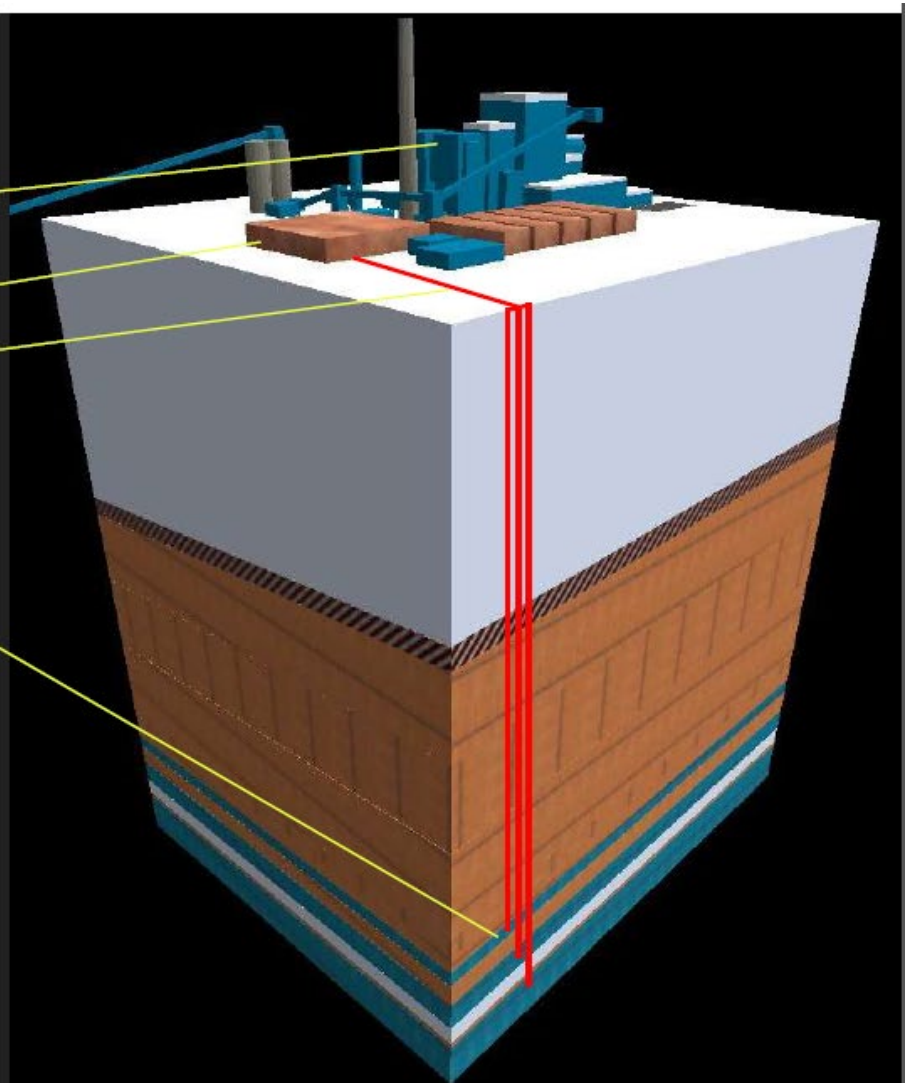
DFS Power Station (source)

CO2 Capture Plant (purification)

Pipeline (transport)

Undrinkable-Saline wells (storage)

Alternative storage: Transport further to EOR



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